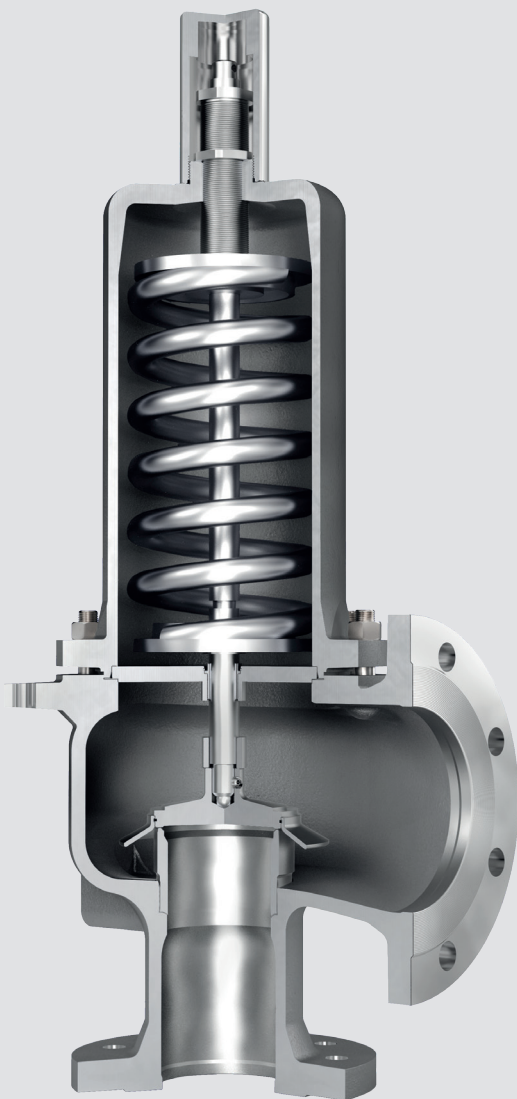


# Operating, installation and general maintenance instruction

## Operating instructions



**LESER**

The-Safety-Valve.com

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## 1 Introduction

### 1.1 Manufacturer

LESER manufactures safety valves for all industrial applications. A large selection of types, materials and options are available.

Safety valves from LESER fulfil all quality and environmental requirements that are necessary for the operation of the valves according to the applicable product certification.

LESER is certified according to:

- DIN EN ISO 9001/20xx (quality management system),
- DIN EN ISO 14001/20xx (environmental management system),
- Pressure Equipment Directive Module B+D1 (quality assurance in production),
- ASME Sec. XIII (ASME VIII) UV.

### 1.2 About this Document

This document covers the following types of safety valves and peripheral devices in summary form:

- spring-loaded safety valves (**A**),
- pilot-operated safety valves (**B**),
- supplementary loaded safety valves (**C**).

Safety valves can also be equipped with bursting discs, pneumatic supplementary loading, bellows and upstream change-over valves.

Certain regulations and standards apply depending on the system and medium.

These regulations and standards must be observed. In addition to the information in these operating instructions, the generally applicable safety and work safety regulations must also be observed as well as the applicable user guides for additionally purchased parts. In like manner, the environmental protection regulations must be adhered to.

### 1.3 Illustration Conventions

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

#### **DANGER**

This identifies the highest risk situation. If the guidelines are not observed, the result will be serious injury or death.

#### **WARNING**

This identifies a high risk situation. If the guidelines are not observed, the result may be serious injury or death.

#### **CAUTION**

This identifies a risky situation. If the guidelines are not observed, the result may be minor or medium injuries.

#### **CAUTION**

This identifies warnings regarding material damage. If the guidelines are not observed, the result may be material damage. The safety guidelines and warnings are or-

ganised as follows:

## Source of the danger

Consequences if the danger is disregarded

- Measures to counter the danger and to prevent injuries.

The basic safety guidelines are summarised in chapter 2.4. Warnings are found in the handling instructions.

Individual paragraphs that only apply to specific types of safety valves are identified with a letter.

The following letters are used for marking paragraphs:

- **A** for spring-loaded safety valves,
- **B** for pilot-operated safety valves,
- **C** for supplementary loaded safety valves,

## 2 Safety

### 2.1 Proper Use

Safety valves come in different designs. When choosing a safety valve, the designated purpose must be taken into consideration.

A safety valve is designed for operation within a specific pressure range and a maximum mass flow.

The maximum permissible operating pressure depends on several factors, including:

- the material of the safety valve,
- the temperature of the medium,
- the design pressure,
- the flange rating class.

The actual operating pressure and temperature must not exceed the maximum permissible pressure and temperature values for the inlet and outlet connections.

Safety valves must only be used for media for which they have been approved as specified on the type plate.

Improper operation of the safety valves can result in faults and failures, posing a risk to persons and property.

Incorrectly dimensioned safety valves are likely to cause faults and failures, posing a risk to persons and property.

Dependent on the system, specific threshold values for the medium temperature and the back pressure apply. The safety valve spring must be configured accordingly. The set pressure must be adjusted accordingly. In safety valves with bellows, the maximum back pressure might be reduced relative to the rated outlet pressure. Elastomer bellows are not suitable for superimposed back pressures due to their design. For more information on maximum back pressure, please contact LESER.

When working with dangerous or harmful media, the respective regulations and standards must be observed.

Dangerous media includes:

- toxic media,
- caustic media,

- irritating media,
- environmentally hazardous media,
- hot media,
- explosive media,
- flammable media.

Safety regulations and warnings must be observed.

For additional information about this product, contact the manufacturer.

## 2.2 Improper Use

Safety valves must not be used improperly. In the event of improper use, the manufacturer is no longer liable.

Seals must not be damaged or removed. Changes may affect the operation and the performance of the safety valve. The guarantee is voided. Moving and functionally important parts must not be given a protective coating.

Safety valves – especially the actuator and coupling – must not be blocked.

Improper use of the test gag can result in impaired safety, as certain valve functions might no longer be available. If the test gag is screwed in too tight, there might be leakage. Safety valves shipped with a tightened test gag for protection during transport are labelled with a red flag. Prior to commissioning, the lifting mechanism must be modified from “blocked” (long blocking screw inserted) to “not blocked” (short screw plug inserted).

Levers on safety valves must not be used

as hangers for any objects. The position of the lever must not be changed. No additional weight may be applied to the levers.

## 2.3 Standards and Technical Guidelines

The safety valves are state of the art at the time of delivery.

The following standards and regulations must be observed when working with safety valves:

- TRD 421, 721,
- TRB 403,
- AD 2000 Merkblatt A2, A4 and W10,
- DIN EN ISO 4126,
- Pressure Equipment Directive 2014/68/EU,
- ASME Code, Sections II, VIII and XIII,
- API 520, 526, 527.

Other standards and regulations must be observed depending on the use of the safety valve. The information in this document is based on the assumption of quasi-static operation (load reversals = 1000 according to AD 2000 data sheet S 1, section 1.4).

This section of the operating instructions is only valid in conjunction with a Declaration of Conformity in accordance with EU Directive 2014/34/EU on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres. An ignition hazard assessment according to EN 80079-36 was performed for the safety valves, and the following findings were made:

- The maximum surface temperature of the safety valve is generated by the medium alone. The permissible operating temperature of the safety valve listed on the type plate must not be exceeded.
  - If suitably configured, the safety valves are free of intrinsic ignition sources. Open bonnets and open vents are not permitted. The suitability of the configuration must be assessed prior to the installation of the valve, and must be certified by a declaration by the manufacturer. Such certificates are available on request from LESER.
  - The safety valves are not certified for use in potentially explosive atmospheres (ATEX) and are thus not labelled as such.
  - The safety valves may be operated in ATEX zones. For the installation and operation of the valves in ATEX zones, the following requirements in connection with proper use must be strictly adhered to:
  - The outlet of the safety valve and, if present, the drainage opening, the flushing connection or the bellows monitor must be connected in a pressure-tight manner and relieved to a non-hazardous area outside of the ATEX zone. The drains and flushing connections can also be sealed with screw plugs in a pressure-tight manner.
  - In case of hot gases or flammable operating fluids, pilot-controlled safety valve type 811 must not be used in explosive atmospheres because the pop action pilot blows off into the environment and is therefore not gas-tight. The connection of pipework to the pop action pilot is not permitted due to its functional principle.
  - Additional components (products conforming to 2014/34/EU or electrical and non-electrical components that are not subject to conformity assessment according to 2014/34/EU) must be individually assessed as regards their safe use in the ATEX zones defined by the operator (zone plan) before they are installed. The assembled unit is considered a product under EU Directive 2014/34/EU, and the operator must therefore carry out a conformity assessment of the assembly. LESER only provides Declarations of Conformity for individual components (and not for assemblies in the sense of the ATEX regulations). The installation and operating instructions required for the components are supplied with the products.
  - The safety valve must be properly grounded and incorporated into the grounding concept of the plant. All applicable statutory regulations and technical rules must be adhered to.
  - Additional coats applied to the safety valve must be separately assessed for conformity by the operator.
  - It is the responsibility of the operator to ensure that all maintenance and repair work is performed in such a way that there is no risk of ignition sources.
- The standards and technical guidelines that are fulfilled by a specific type of safety valve can be found in the declaration of conformity.

## 2.4 Basic Safety Guidelines

### **⚠ DANGER**

#### Changes to safety valves

Prohibited increases in pressure in the system to be secured and functioning in contravention of the regulatory requirements

- Do not make any changes to the condition on delivery

#### Dangerous media

Poisoning, caustic burns and other burns, injuries

- Use suitable protective devices
- Use suitable collecting tanks.
- Wear suitable protective equipment.

#### Foreign bodies in the safety valve

Danger from failure of safety valve or leaks

- Flush the system before installation of a safety valve.

- Check the safety valve for foreign objects.
- Remove foreign objects

#### Bug screen is damaged or missing (*B or option*)

Dirt, objects or insects get into the safety valve. Danger from malfunction of the safety valve.

- Install the bug screen correctly.
- Check the bug screen regularly.

#### Ambient temperature is too high

Material expansion. Danger from malfunction of the safety valve.

- If temperatures are above 60 °C, then configure pressure tapping lines to be as long as possible and with a water seal (**only C**).
- Position the control cabinet and actuators so that they are not subjected to temperatures higher than 60 °C (**only C**).

#### Ambient temperature is too low

Icing, freezing vapours, reduced flow rate due to congealing media. Danger from functional disruption of the safety valve.

- Protect safety valve and pipelines from cold (**only C**).
- Take the appropriate measures for temperatures below 2 °C (**only C**).
- Heat the control cabinet and pressure tapping lines for temperatures below 2 °C (**only C**).

Protect the safety valve and the pressure tapping lines against low temperatures, for instance by insulation or pipe heating.

#### Air quality

For the supply of the actuators in H8, and additional loads, the control air must meet the DIN ISO 8573-1 quality standards.

#### Abrasive or corrosive media

Moving parts jam or become stuck. Danger from functional disruption of the safety valve.

- Service the safety valve after each time it opens.

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- Use bellows.
- Ensure proper clearance of movable parts.

## Media with high proportion of particles (only B)

Deposits and clogging. Danger from malfunction of the safety valve.

- Use a filter with the correct mesh size.
- Use additional filters to increase the filter capacity.

## Residual media in the safety valve

Poisoning, caustic burns and other burns, injuries

- Wear suitable protective equipment.
- Remove residual media.

### **WARNING**

## Leaky safety valve

Danger from leaking media due to damaged gaskets and sealing surfaces.

- Protect the safety valve against vibrations and blows especially during transport and installation.
- Check safety valve regularly for leaks.

## Open bonnets, lifters or spindle guides

Danger from leaking media

- Make sure that no danger can arise from leaking media.
- Keep a safe distance.
- Wear suitable protective equipment.

## Risk of damage from manipulation

- Ensure that the valve cannot be blocked by objects.

## Pressure range of the air supply exceeded or not reached (only C)

Proper use of the control system cannot be guaranteed.

- Comply with the pressure range of the air supply:
  - Maximum pressure: 10 bar,
  - Minimum pressure: 4.0 bar.

### **CAUTION**

## Hot medium

Burns or scalding.

- Wear suitable protective equipment.

## Hot surfaces

Burns.

- Wear suitable protective equipment.

## Cold surfaces

Cold burn. Burns.

- Wear suitable protective equipment.

## Aggressive medium

Caustic burns. When processing media such as chlorine gas, there is a risk of acid formation.

- Wear suitable protective equipment.



## Open bonnets, lifters or spindle guides

Pinching danger from moving parts.

- Install suitable safety guards.

## Sharp edges and burrs

Danger of injury.

- Wear safety gloves.
- Handle the safety valve carefully.

## High noise emission

Hearing damage.

- Wear ear protection.

## 3 Marking

After setting and testing, each safety valve is sealed. Only if the seal is undamaged is it assured that the safety valve will operate in accordance with the marking.

The component marking attached to the safety valve (type plate) provides information about the following, among other things:

- order data (serial number),
- technical data,
- set pressure,
- VdTÜV component test number,
- CE marking with number of the specified centre,
- UV marking if applicable.

Other markings can be applied in accordance with the requirements of the applied

standards, for example:

- marking with a marking stamp,
- cast marking,
- hammered-in marking (e.g. for threaded safety valves),
- separate marking (e.g. for the heating jacket),
- warning tags (e.g. for a test gag).

If there are technical changes to a safety valve, then the markings must be changed as well.

## 4 General Information on Safety Valves

### 4.1 Gaskets and Leaks

Safety valves are manufactured with high precision. Above all, the sealing surfaces of the safety valves are processed very carefully.

Soft sealing and metallic sealing safety valves are differentiated.

Metallic sealing safety valves fulfil the seal tightness requirements of the national and international standards.

A variety of soft seal materials are offered for soft sealing safety valves. The soft seal material must be selected in accordance with the area of application. The choice is dependent on the medium, pressure and temperature.

The operator is responsible for the compatibility between the fluid and material used.

A check gauge can be used to detect leaks. For spring-loaded safety valves, bellows can be used to prevent media from leaking out.

A collecting tank can be used to collect any leaking media.

For models with bellows that are operated with an open bonnet, the instructions regarding the open bonnet apply.

## 4.2 Drainage

As a rule, safety valves are delivered without a drainage opening because the drainage must take place via a blow-off line. Only in exceptional cases are drainage openings permitted or even required directly in the safety valve (for example, for installation on ships). Safety valves can be ordered with a drainage opening. Even afterwards, a drainage opening can be drilled at the spot designated for it. Subsequent installation of a drainage opening must be carried out properly and correctly. This task is the responsibility of the party carrying out this task. The respective drawings must be requested from the manufacturer.

Drainage openings that have no function must be sealed.

## 4.3 Operating Pressure and Set Pressure

In order to guarantee reliable closing after a safety valve opens, system operating pressure must continuously remain below the set pressure.

The operating pressure must be at least the value of the closing pressure difference plus 5% below the set pressure.

The clamping force of a spring-loaded safety valve drops as the operating pressure increases. The closer the operating pressure is to the set pressure, the more likely it is for the medium to escape (**only A**).

This may result in leaks especially if the sealing surfaces are damaged or dirty.

If the compressed air for the supplementary loading fails, then the safety valve functions just like a conventional safety valve without supplementary loading (**only C**).

## 4.4 Ambient Conditions

The controllers and actuators are designed for use between 2 °C and 60 °C.

Safety valves made of stainless steel are recommended for use under extreme conditions.

The safety valves and pipelines must be protected from atmospheric influences.

## 4.5 Protective Coating

Safety valves are given a protective coating at the factory. The protective coating protects the safety valve during storage and transport. If the external conditions are corrosive, then additional corrosion protection is necessary.

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

## 4.6 Spring

It is the responsibility of the user to ensure that the chosen spring does not corrode under the actual application conditions and that there will be no deposits of dirt between the spring windings. If necessary, the user must perform regular inspections in order to eliminate the risks described above.

## 5 Packaging, Transport and Storage

### 5.1 Packaging

The safety valve must only be operated and maintained by suitably trained personnel.

Safety valves are checked for damage and leaks before delivery. For safe transport, all sealing surfaces, sealing lips and threads must be protected against damage using protectors.

### 5.2 Transport

Safety valves may only be lifted by the transport tabs/cast support brackets (**only A**) and ring nuts provided for transport (**only B**). Safety valves which do not have any transport tabs/cast support brackets must be transported with suitable transport aids, such as lifting belts.

Safety valves must not be lifted by the venting lever or by any outside pipework.

Safety valves must be transported careful-

ly. Safety valves must not fall over. Vibrations and impacts may damage the sealing surfaces.

Safety valves must be protected against soiling during transport. Protectors and suitable packaging must be used.

### 5.3 Storage

Safety valves must be stored in a dry area and protected against soiling.

The safe storage temperature is between 5 °C and 40 °C.

The upper limit for the storage temperature is 50 °C, and the lower limit is -10 °C.

Safety valves are equipped with flange protection caps at the factory. These flange protection caps must be in place during storage.

If safety valves are stored at temperatures below zero degrees, then the temperature resistance of the materials (e.g. of seals) must be taken into consideration.

## 6 Installation

### 6.1 General Information about Installation

Only trained personnel may install safety valves.

Training can be obtained in seminars from LESER, from experienced personnel in workshops, or by studying the documentation provided by LESER such as video films, catalogues and installation guides.

Besides these general operating instruc-

tions, we have also devised type-specific maintenance instructions that must be strictly adhered to.

Safety valves must be secured in accordance with the specifications in the drawings. All designated fastening elements must be used so that no excessively high forces or mechanical stress may arise. Nuts must be fully screwed onto the bolts so that 1.5 turns of the thread are exposed.

Torques must be adhered to. Safety valves – above all the sealing surfaces – must be protected against impacts during the installation.

As a rule, safety valves must be installed in an upright position. Exceptions are only permissible if other installation positions are mentioned in the product-related technical documents.

Safety valves for upside down installation must be labelled with a stainless steel tag bearing the text “SV für hängenden Einbau / Upside Down Installation”. For maintenance or for the adjustment/change of pressure settings in these valves, please note that the cold differential test pressure (CDTP) specified on the type plate does not only take into account the correction factor for temperature and backpressure, but also the position of installation. This fact must be considered when readjusting the valve settings. For correction factors, see LDeS 1001.69 in the Maintenance Handbook. Adjusting the CDTP is only permitted after consultation with LESER. For upside down valves, also take into account that

the components contain drain holes (e.g. in bonnet, guide disc) and that these must not be blocked, as the SV will otherwise not work properly. Safety valves configured for upside down installation must only be installed and operated in upside down position. In vented models, the venting lever is secured with a wire in its neutral position.

LESER is not responsible for welding activities on connection ends.

The properties after welding must satisfy the product's scope of application. This means that the welding activities must be performed so that:

- orifice areas and wall thicknesses are not reduced,
- the interpass temperature does not exceed 50 °C.

Annealing processes may be required to treat the material after welding. The following requirements apply: The annealing temperature must be below 630 °C and the annealing time must not exceed 40 minutes. Restrict the heat input during the annealing process to the weld seam's heat-affected zones to prevent the entire valve from heating. The temperature on the bonnet's flange must not exceed 150 °C for the entire annealing process. This can be ensured by cooling the entire bonnet.

The prescribed flow direction according to the arrow on the body must be observed.

Safety valves must be installed in such a way that dynamic vibrations in the system cannot be transmitted to the safety valves.

If the system is not vibration free, then bellows, O-rings or U-shaped expansion pipes are suitable for decoupling the safety valves from the system.

It is the responsibility of the plant operator to assess the reactive forces that might occur during blowing off. Support brackets on safety valves have proven suitable fixtures for the transfer of reactive forces.

Safety valves with support brackets allow for proper fixture inside the plant. It is the responsibility of the plant operator to determine the type and positions of the support brackets for proper reactive force transfer (if required).

The support brackets absorb the reaction forces.

Adequately dimensioned gaskets must be used on the connections of the safety valves. Sealants or parts thereof must not restrict the flow areas and must not be able to detach and enter the flow space. The connections must be configured in accordance with the specifications in the rule groups.

Due to the many common pipe standards, the connection inside diameter of the safety valve might deviate from the inside diameter of the pipe connection. The diameters of the inlet and outlet pipelines must not be smaller than the respective diameters at the safety valve.

The supply lines and blow-off lines of the safety valve must be dimensioned adequately and adapted to the local operating conditions. The diameters of the inlet and outlet pipelines must not be smaller

than the respective diameters at the safety valve. Flushing devices must not obstruct the flow cross-section.

For media that might become solid when cooled down, you must install a heating system that ensures that the medium retains the viscosity that was applied for the dimensioning of the valve.

For certain applications, safety valves need to be packed in insulation. The bonnet and the cooling zone (if in place) are normally not insulated in order to prevent inadmissible heat build-up around the spring. This must be taken into account when preparing the installation of the valve.

The maximum occurring back pressure, the maximum inlet pressure loss and the temperature must be taken into account. The unhindered and risk-free flow-off of the medium through the outlet must always be guaranteed. Horizontal installation is only permitted with the explicit consent of the manufacturer. The outlet adapter must always face down. Safety valves may not be rendered ineffective by blocking devices. Flow-off from the pop action pilot into the atmosphere must always be possible. Where hazardous media are to be used, a separate risk assessment must be carried out.

For the installation of the safety valves, make sure that the connections to the pipelines are not exposed to undue forces or torques. The lines must be dimensioned and installed so that they can withstand the expected static, dynamic (reactive forces) and thermal stress, taking into account the

operating conditions on site.

Safety valves must be installed such that no inadmissibly high static and thermal stress can be transferred to the safety valve from the supply and discharge lines. Pipes may only be connected in operation without force and torque.

Reaction forces during the blow-off and temperature expansion during operation must also be taken into consideration during installation. During the installation, any occurring reaction forces during blow-off and any temperature expansion during operation must also be taken into consideration.

The blow-off lines must be installed in a way that is flow-optimised. Depending on the designated use, the blow-off lines must have different discharge directions. There is a differentiation between discharge lines for vapours or gases and discharge lines for fluids.

The discharge line for discharging vapours or gases must be attached such that they rise in order to guarantee discharging without any danger.

In order to drain the discharge line, the discharge line must be attached such that it has a downward slope to the drainage opening at the lowest point. Correct drainage is only possible if the discharge line directly behind the safety valve has a downward slope so that the medium can completely drain off. The discharge line must not have a direct upwards slope be-

hind the safety valve.

The drainage opening must be placed at the lowest point of the discharge line. The drainage opening must be dimensioned adequately and be freely accessible with a possibility to be monitored. Escaping media must be collected (e.g. through condensate collectors, collecting tanks or filters).

If a drainage opening or control thread is placed directly on the safety valve or bonnet, then it must be protected by safety guards so that neither moisture nor dirt can get in.

Pressure and temperature limits of safety valves with bellows must be observed. Defective bellows can be recognised by fluid escape from the open bonnet or the control thread in the case of closed bonnets. Danger from the escaping fluid must be ruled out.

The open inspection hole ensures a constant pressure equalisation between the bonnet space and the environment. The open inspection hole poses a risk to the functioning of the valve under certain conditions. Reasons for this may include: the penetration of moisture and icing, the escaping of critical media or insect nests. Preventive measures must be taken in this regard. The operator may determine – with the responsible monitoring organisation, if required – that the inspection hole on the bonnet is to be closed with screw plugs or screws.

The inspection hole may only be closed if:

- this is permitted by the applicable regu-

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- lations and standards,
- A prohibited pressure build-up in the bonnet can be ruled out based on operating experience, regular maintenance and inspection of the bonnet area, which also must be especially observed with a “Balanced Piston Construction”, and
  - there is a greater risk of icing of the bellows.

Closing a connection that is equipped with a factory-mounted bug screen is prohibited in pilot-controlled safety valves, as this would impair the function of the valve. For critical media, ensure that escaping process media can be drained off safely and when not pressurised.

On ships, classification organisations require that pipework for flammable fluids be connected at safe locations **(only B)**.

Closed bonnets with bellows-type designs must be designed to be depressurised by suitable means or with permanent pressure monitoring.

If the system is operated at temperatures greater than 60 °C, then the pressure tapping lines of the supplementary loaded safety valves must be as long as possible and have a water seal. The control cabinet and actuators must be placed such that they are not subjected to temperatures higher than 60 °C **(only C)**.

There is a danger of icing at temperatures below 2 °C. For lower temperatures, the control cabinet and pressure tapping lines must be heated **(only C)**.

Pressure tapping lines must not be blocked. Locking rails or seals prevent blocks from being closed **(only C)**.

The control cabinet for the supplementary loading must be protected against soiling. The control cabinet must be closed. If soiling cannot be excluded, then an encapsulated control cabinet must be used **(only C)**.

When the control cabinet is used for several safety valves, venting valve group type 731 is used.

The venting valve group acts as a distributor station for the loading and lifting air pressure. The shut-off ball valves are 3/2-way valves. Through the disconnection of the loading air, the connected safety valves can each be individually vented with the available lifting air. Accidental venting of the safety valve must be avoided.

The shut-off ball valves are lead-sealed against unauthorised adjustment depending on the application (open or closed) **(only C)**.

If a safety valve with a bursting disc is used, then make sure that the safety valve is not rendered ineffective by the upstream bursting disc. Structural measures must be taken to make sure that it is not possible for the bursting disc to be aligned incorrectly. The relief valve must be installed horizontally.

Bursting discs may only be used if they satisfy the safety requirements. Evidence that the bursting discs open fragment-free must be provided. LESER offers approved

safety valve and bursting disc assemblies. Contact LESER to determine whether such assemblies are permissible. The enclosed area between the bursting disc and the safety valve plate must be depressurised or the pressure must be monitored.

## 6.2 Safety Valve Installation

### **WARNING**

Different installation steps are required, depending on the system and type of safety valve. Only the essential installation steps are summarised and given in the following handling instructions.

The handling instructions are only intended to provide a rough orientation. For details, refer to the type-specific maintenance instructions.

Always observe the instructions and specifications of the seal and flange connection manufacturers.

Safety valves that are subject to special cleaning requirements must only be removed from the packaging immediately prior to installation. When unpacking such valves, check the packaging for damage and make sure that the safety valve has not become contaminated. During installation, ensure that the cleanliness requirements are met and that the safety valve does not become contaminated.

### Prerequisites

- Remove protectors on the flanges and control connections of the bonnet and

closure plates of single pilots and packaging.

- The safety valve has been identified based on the type plate.
- A visual check of the system has been performed.
- Connections have been checked for seal tightness.
- The system has been flushed in order to make sure that no impurities or foreign objects have got into the safety valve.
- For safety valves without a test gag, the pressure test of the system is performed with a blind flange or sealing plate.

### Procedure

- Mount the safety valve.  
If support brackets are available, then they must be used. Observe the reaction forces.
- Attach the supply and discharge lines.  
Use adequately dimensioned gaskets. Observe the maximum supply line pressure losses and maximum back pressures. Observe the minimum required pipe cross-sections of incoming and outgoing pipelines.
- If necessary, provide drainage for the discharge line.  
Observe the condensate drain.
- Prevent condensate in the outlet of the safety valve. If necessary, place a drainage opening at the lowest point of the discharge line.
- Check the bonnet inspection hole. Ensure safe discharge if critical fluids are present. In applications with hazardous fluids and back pressure, the fluid must be drained via the inspection hole of the



bonnet.

- Remove securing devices from the safety valve. For example, test gag, flange protectors.

## 7 Start-Up

### 7.1 Starting up the System

#### **⚠ WARNING**

Safety valves must only be operated and maintained by suitably trained personnel.

Different steps are required for the start-up, depending on the system and type of safety valve. Only the essential steps for start-up are summarised and given in the following handling instructions. The handling instructions are only intended to provide a rough orientation.

#### **Prerequisites**

- » The safety valve is installed.

#### **Procedure**

1. For safety valves with a blocking screw, perform a pressure test. The maximum hydrostatic test pressure must not exceed a value of 1.5 x nominal pressure or the local requirements of the respective pressure chamber to be tested. Higher test pressures must be clarified with LESER. If the additional load test is performed with the help of a test gag, the test pressure must be determined on the basis of the cold differential test

pressure and not the rated pressure PN.

2. Check the position of the release lever – the safety valve is in a “closed position”.
3. Remove the test gag.
4. Secure the blow-off chamber.
5. Start the system slowly, and increase the pressure slowly, but not up to the set pressure. Type-specific approach ramps can be requested from the manufacturer.
6. Check the safety valves and connections for leaks.

» The system is now in operation.

#### **Clean Service supplement**

The Clean Service safety valves of the 48x series are suitable for integration into systems that make EC 1935-compliant processes possible. To minimise the risk of the accidental unintentional introduction of substances into the system, cleaning is recommended for applications in the Food & Pharmaceuticals segment. The system owner should perform a suitable CIP (cleaning in place) and/or SIP (sterilisation in place) process before the first commissioning of the plant.

A list of materials that could come into direct or indirect contact with food can be found in the Declaration of Conformity.

## 8 Operation

### 8.1 General Information about Operation

#### **WARNING**

During operation, the operability of the safety valve must be checked regularly.

For pilot-operated safety valves, the pilot lifting device, the main valve lifting device or the pilot test connector (FTC) can be used for testing the set pressure. The test connector must always be accessible **(only B)**.

To test the operation of the safety valves, they must be lifted. Safety valves can be vented as of an operating pressure of 75 % of the set pressure. The maintenance intervals must be taken from the regulations and rule groups. LESER recommends having pilot safety valves serviced once a year.

This is done by means of a lever or a screw. For lifting by lever, pull the lever up. For lifting by screw, turn the cap until the “open” mark is visible. After testing the valve for smooth operation, return the lifting device to its initial position.

With regard to the closing pressure difference, the 810 series POSV can be set manually between 3% and 15%. The usual factory setting without a special request from the customer is between 3% and 7%. The blow-down setting is secured by a seal.

The test can take place during operation for pilot-operated safety valves with a pilot test connection. The correct test medium must be used. After the pilot has executed the switching operation, the main valve lifts. In the process, the medium must be drained off securely. After testing, check whether the safety valve is leak-free. The pilot test connection must be secured again against impurities with the sealing cap **(only B)**.

For pilot-operated safety valves without a pilot test connection, the test must be performed on a test bench **(only B)**.

Depending on the fluid and operating conditions, the moving guide surfaces and soft seals could become gummed up during blow-off **(only B)**.

Pilot-operated safety valves are not suitable for fluids with a tendency to gum up **(only B)**.

**(only B)** Cryogenic design: The operating frequency affects the soft gasket, which must therefore be chosen with care and inspected on a regular basis.

The reservoir for preheated medium in the heat exchanger system is sufficient for 3 operations performed in quick sequence. Additional operations must only be performed after a waiting time of minimum 30 minutes after the last operation, in order to prevent thermal damage to the soft gasket. As a rule, LESER recommends examining the soft gasket after each blow-off procedure.

The POSV works only correctly, if it is at the same temperature as its ambient. Therefore, the valve must be operated in an environment that is continuously aired. The ambient conditions specified by the cus-

tomer for the POSV must be maintained at all times. The bonnet must not be sealed. LESER recommends testing the valve after each operation, in order to establish whether it worked properly and as intended. If this is not the case, suitable action must be taken.

If the safety valve is leaky because of a damaged sealing surface, it must be serviced. Vent the safety valve and blow off the medium.

Safety valves that are cleaned while installed must be suitable for the respective cleaning process. During cleaning, the pressure and temperature limits specified in the order must not be exceeded.

If the safety valve is leaky because of a damaged sealing surface, it must be serviced.

Vibration in the system and PTFE flow under pressure can cause components to become loose. Screw connections must be checked regularly.

The maintenance intervals are dependent on the conditions of use. Therefore, there are separate maintenance intervals for all safety valves that must be defined in consultation with the operator, the manufacturer and the notified body.

The maintenance intervals become shorter if:

- corrosive, aggressive or abrasive media are used,
- a safety valve opens frequently.

A supplementary loading system must be checked at least once a year.

## 8.2 Checking the Operation of the Safety Valve

Different steps are required for testing during operation, depending on the system and type of safety valve. Only the essential steps are summarised and given in the following handling instructions.

The handling instructions are only intended to provide a rough orientation. The details must be taken from the type-specific guides.

### **WARNING**

**For media discharging at high speed, high temperature and high loudness level**

Danger of injury and hearing damage

- Wear protective equipment.
- Wear ear protection.

### **Procedure**

1. Vent the safety valve.
2. If applicable, check the supplementary loading (**only C**).
3. Blow off medium.
4. Remove deposits.
5. Check whether the movable guide surfaces or soft seals are stuck.
6. Check whether the venting lever is freely accessible.
7. Check the drainage operation.

» The safety valve has now been inspected.

## 8.3 Safety Valve Inspection

Different steps are required for testing during operation, depending on the system and type of safety valve. Only the essential steps are summarised and given in the following handling instructions.

The handling instructions are only intended to provide a rough orientation and only apply to pilot-operated safety valves (**B**). For details, refer to the type-specific maintenance instructions.

### Procedure

1. Check exterior pipelines for damage.
2. Check screw connections.
3. Clean pressure tapping and control lines.
4. Check attachments for damage.
5. Check the clearance of the attachments.
6. Clean the filter in front of the pilot regularly.
7. Clean additional filters regularly.

» The safety valve has now been inspected.

## 8.4 Service life

The service life of safety valves is determined by a number of factors, including ambient conditions and the properties of the medium.

Under favourable conditions, LESER safety valves have a service life of up to 25 years. The service life of the valves can be prolonged by compliance with the operating and maintenance instructions, and strict ad-

herence to the prescribed maintenance intervals. We strongly recommend using only LESER original parts and having all maintenance work carried out by suitably qualified personnel. Make sure that all components and materials of the valve are protected against substances and ambient conditions that might reduce their service life.

## 9 Decommissioning

All decommissioning tasks must be performed by suitably qualified personnel.

Prior to removing the valve, ensure that the pressure vessel or the pipeline system to which the safety valve is connected is depressurised and is at ambient temperature. To prevent damage from escaping hazardous media, drain and flush the system. Before opening the connections to the pipelines, ensure that the assembly is not under stress. To remove the safety valve from the plant, use suitable lifting gear such as a crane. Lifting gear must be attached to the safety valve as described in chapter 5.2.

## 10 Maintenance

### 10.1 General Information about Maintenance

Only trained personnel may maintain safety valves. Use only original LESER spare parts.

Maintenance intervals that are not adjusted to the actual operating conditions, and incorrectly performed maintenance tasks pose a risk to persons and property.

Training can be obtained via LESER seminars, from experienced personnel in workshops, or by studying the documentation provided by LESER.

Anyone who disassembles safety valves must be informed of the dangers.

LESER's worldwide network provides maintenance services.

If the valve is used for processes that are subject to special cleaning procedures, clean the valve accordingly after the service is completed.

The safety valve must be disassembled for maintenance work. Disassembly may be more difficult if the lubricants have been washed out.

Pressure must be released from the system before dismounting.

Before disassembly, check whether there is any medium in the bonnet. If any medium is leaking from the open bonnet or the drainage opening, then the bellows is faulty. Faulty bellows must be replaced immediately.

Bellows should be checked when disassembling the safety valve and always replaced if there is any damage.

Bellows have a maximum number of load cycles. The bellows must be replaced when that number of load reversals has been reached.

Gaskets and gasket points must be checked regularly. If the seal tightness requirements are no longer fulfilled, then the gaskets

must be replaced. For operation with repeat opening cycles, LESER recommends shortening the inspection interval for seals/soft gaskets and bellows. Spare assemblies can be ordered from LESER.

If the set pressure is to be changed, then the spring table must be used to check whether the spring may be used. The correct spring for the designated set pressure must be used. After the set pressure has been changed, the configuration of the entire safety valve must be checked.

The seal must be removed to adjust the set pressure and to replace the spring. This voids the guarantee. Changes should be made in the factory, by an authorised workshop, or by a notified body.

The residual test medium remains inside after adjusting the pilot-operated safety valve. The user must determine whether the product is compatible with the fluid, and initiate additional flushing measures, if required.

For products whose bonnet / housing connection is designed as a ring clamp, observe the following: To mount the semi-rings on the bonnet / housing interface, use securing devices and tightening torques according to LGS 3323.

Prior to delivery, ring clamps are sealed. The seal indicates that the connection must only be dismantled after the system has been completely depressurised. For this reason, the seal does not bear the manufacturer mark, and is of a distinct colour. The seal must only be broken, if this is necessary for the proper operation of the pressure equipment, or for maintenance and repair. A bro-

ken ring clamp seal does not mean that the pressure settings of the safety valve need to be tested or approved again.

After maintenance, repair or cleaning (COP), we recommend installing a new seal.

## 10.2 Setting the Set Pressure

Different steps are required for the disassembly, depending on the system and type of safety valve. Only the essential steps are summarised and given in the following handling instructions. The handling instructions are only intended to provide a rough orientation and only apply to basic safety valves without special options. The details must be taken from the type-specific guides.

### **WARNING**

#### Leaking medium

Danger to persons and the environment.

- Take safety measures in accordance with the medium.
- Capture the medium from the pipelines.
- Do not allow unauthorised persons in the danger zone.
- Wear suitable protective equipment.

### **CAUTION**

#### Spindle is not protected against twisting

Damage to the sealing surfaces.

- Secure the spindle against twisting.

## Prerequisites

- Ensure the system is not under pressure.
- There must not be any media in the bonnet of the safety valves.

## Procedure

1. Break the seal.
2. Remove the lever cover.
3. Secure the spindle against twisting.
4. Tighten the spring and adjust the pressure screw to the desired set pressure. Observe the permissible adjustment range of the spring when doing so.
  - The set pressure becomes higher when the pressure screw is turned to the right. The spring is put under more tension.
  - The set pressure becomes lower when the pressure screw is turned to the left. The tension on the spring is relieved.
5. Check the set pressure.
6. Install the lever cover.
7. Have the safety valve resealed by an authorised centre.

» The set pressure has now been set.

## 10.3 Replacing the Spring

Different steps are required for the disassembly, depending on the system and type of safety valve. Only the essential steps are summarised and given in the following handling instructions.

The handling instructions are only intended to provide a rough orientation and only ap-

ply to spring-loaded safety valves without options (A). The details must be taken from the type-specific guides.

## **⚠ WARNING**

### **Leaking medium**

Danger to persons and the environment.

- Take safety measures in accordance with the medium.
- Capture the medium from the pipelines.
- Do not allow unauthorised persons in the danger zone.
- Wear suitable protective equipment.

## **⚠ WARNING**

### **Spring is under tension**

Risk of injury from parts flying around.

- Observe the installation instructions for the safety valve.
- Wear protective equipment.

## **⚠ WARNING**

### **Inverted springs**

Blocked springs. Loss of operation.

- Do not invert springs when taking the safety valve apart.

## **CAUTION**

### **Spindle is not protected against twisting**

- Damage to the sealing.
- Secure the spindle against twisting.

### **Procedures (only A)**

1. Break the seal.
2. Remove the lever cover.
3. Secure the spindle against twisting.
4. Raise the pressure screw.
5. Remove the bonnet.
6. Remove the spring.
7. Remove the spindle with the guide and disc.
8. Clean the seat, disc, and body.
9. Reinstall the spindle with the guide and disc.
10. Insert a new spring.
11. Put the bonnet back on.
12. Secure the spindle against twisting.
13. Tighten the spring and adjust the pressure screw to the desired set pressure. Observe the permissible adjustment range of the spring when doing so.
  - The set pressure becomes higher when the pressure screw is turned to the right. The spring is put under more tension.
  - The set pressure becomes lower when the pressure screw is turned to the left. The tension on the spring is relieved.
14. Check the set pressure.
15. Install the lever cover.
16. Pull the venting lever to the middle so that the lifting fork engages under the coupling.
17. Have the safety valve resealed by an authorised centre.

» The spring has now been replaced.

## 11 Disposal

Decommission the valve as described in chapter 9. Safety valves that have come into contact with potentially hazardous substances must be decontaminated before they can be disposed of. Dispose of the valve in accordance with the applicable statutory regulations.

Products with components or constituents made of PTFE are subject to special disposal requirements. The basic requirements of the EU Waste Framework Directive (Directive 2008/98/EC) and the regulations of the German Recycling Management Act (KrWG) according to §23 Product Responsibility shall be observed. If these components or constituents made of PTFE are also subject to local official regulations for special treatment and disposal, these regulations must be observed in accordance with the applicable local official regulations.



# Solutions

## LESER Products at a glance



High Performance



API



High Efficiency –  
Pilot Operated  
Safety Valve



High Efficiency –  
Supplementary  
loading system



Compact  
Performance



Critical Service



Clean Service



Modulate Action



Best Availability –  
KUB Bursting disc



Best Availability –  
Change-over Valve

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