Pilot-controlled check valve

without/with pre-release, pipe-thread type
max. operating pressure 500 bar

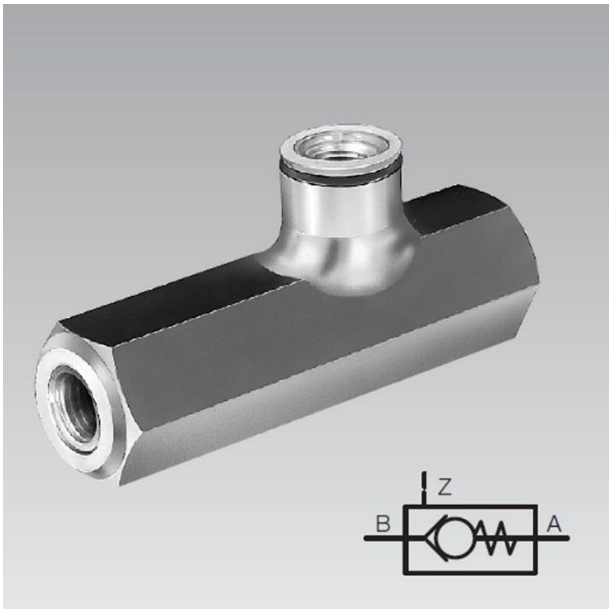

Table of contents

1 Description of the product

General information

Pilot-operated check valves are spring-loaded poppet valves with free flow from B to A and blocked flow in the opposite direction that can be "unblocked" by pressurizing the control port Z.
The minimum pressure required for unblocking depends on the height of the counter pressure at port A (see diagram). In the version with pre-release first a smaller poppet valve located in the main valve piston is opened. This offers the following advantages:

1. The control pressure required for opening is considerably lower, and thereby the use of swing clamps with unfavourable surface ratios is possible.
2. Pressure reduction is effected relatively softly. That saves all hydraulics components and the noise level sinks.

Application

Blocking of leakage-free cylinders combined with non leakage-free directional control valves and pressure maintenance on uncoupled parts of the installation (clamping pallets).

2 Validity of the documentation

Pressure reducing valve of data sheet C 2.9511.
The following types or part numbers are concerned:

Pressure reducing valve:

- 2951 417
- 2951 421
- 2951 501

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydraulic expert knowledge.

Qualification of the personnel

Expert knowledge means that the personnel must

- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he

- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

4 Symbols and signal words

⚠ DANGER

Danger of life / heavy health damages

Stands for an imminent danger.
If it is not avoided, death or very severe injuries will result.

⚠ WARNING

Personal damage

Stands for a possibly dangerous situation.
If it is not avoided, death or very severe injuries will result.

⚠ CAUTION

Slight injuries / property damage

Stands for a possibly dangerous situation.
If it is not avoided, minor injuries or property damages can be the consequences.

Mandatory sign!

The symbol stands for important information, necessary protection equipment, etc.

NOTE

This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

5 For your safety

5.1 Basic information

The operating instructions serve for information and avoidance of dangers when installing the products into the machine as well as information and references for transport, storage and maintenance.
Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the products can be guaranteed.
Furthermore, the consideration of the operating instructions will:

- avoid injuries
- reduce down times and repair costs,
- increase the service life of the products.

5.2 Safety instructions

The product was manufactured in accordance with the generally accepted rules of the technology.
Observe the safety instructions and the operating instructions given in this manual, in order to avoid personal damage or material damage.

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep these operating instructions so that they are accessible to all users at any time.
- Pay attention to the current safety regulations, regulations for accident prevention and environmental protection of the country in which the product will be used.
- Use the ROEMHELD product only in perfect technical condition.
- Observe all notes on the product.
- Use only accessories and spare parts approved by the manufacturer in order to exclude danger to persons because of not suited spare parts.
- Respect the intended use.

- You only may start up the product, when it has been found that the incomplete machine or machine, in which the product shall be mounted, corresponds to the country-specific provisions, safety regulations and standards.
- Perform a risk analysis for the incomplete machine, or the machine.
  Due to the interactions between the product and the machine/fixture or the environment, risks may arise that only can be determined and minimized by the user, e.g. :
  - generated forces,
  - generated movements,
  - Influence of hydraulic and electrical control,
  - etc.

6 Application

6.1 Intended use

Pressure reducing valves are used to pressurise individual clamping elements or groups of clamping elements in hydraulic clamping systems with reduced pressure.
The connected elements must be leakage-free in static mode.

In addition, use in compliance with the intended purpose includes:

- Use within the capacity limits specified in the technical data (see data sheet).
- Use as described in this operating manual.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.
- Use only within closed, low-dust rooms

6.2 Misapplication

⚠ WARNING

Injuries, material damages or malfunctions!

- Do not modify the product!

The use of these products is not admitted:

- For domestic use.
- On pallets or machine tool tables in primary shaping and metal forming machine tools.
- If due to physical / chemical effects (vibrations, welding currents or others) damages of the products or seals can be caused.
- In machines, on pallets or machine tool tables that are used to change the characteristics of the material (magnetise, radiation, photochemical procedures, etc.).
- In areas for which special guidelines apply, especially installations and machines:
  - For the use on fun fairs and in leisure parks.
  - In food processing or in areas with special hygiene regulations.
  - For military purposes.
  - In mines.
  - In explosive and aggressive environments (e.g. ATEX).
  - In medical engineering.
  - In the aerospace industry.
  - For passenger transport.
- For other operating and environmental conditions e.g.:
  - Higher operating pressures than indicated on the data sheet or installation drawing.
  - With hydraulic fluids that do not correspond to the specifications.
  - Higher flow rates than indicated on the data sheet or installation drawing.
- For use as safety component with safety function.

Special solutions are available on request!

7 Assembly

⚠ DANGER

Sudden movement of the hydraulic drives in case of incorrect disassembly

Serious injury or death

- depressurise the hydraulic system,
- carry out safety measures to prepare for maintenance.

⚠ WARNING

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

- Improper connection can lead to escapes of oil under high pressure at the connections.
- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil under high pressure.

- Before using them make a visual control.

Injury by falling parts!

- Keep hands and other parts of the body out of the working area.
- Wear personal protection equipment!

Poisoning due to contact with hydraulic oil!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil.
Incorrect connection can lead to escapes of oil at the ports.

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

7.1 Design

7.1.1 Check valve

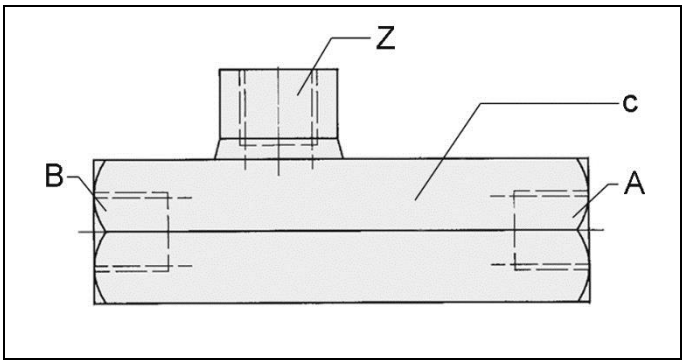

Figure 1: Pipe thread

A	Cylinder port A	c	Wrench flat
B	Pressure port B	Z	Control port

7.2 Connection of the hydraulic equipment

1. Connect hydraulic lines to qualifying standards and pay attention to scrupulous cleanness!

NOTE

More details
- See ROEMHELD data sheets A 0.100, F 9.300, F 9.310 and F 9.360.

Screwed Plug
- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

hydraulic connection
- Do not use sealing tape, copper rings or coned fittings.

Pressure fluids
- Use hydraulic oil as per ROEMHELD data sheet A 0.100.
- Swarf or contamination in the hydraulic oil lead to increased wear or damage at the guides, running surfaces and seals.

The maximum operating pressure and the admissible flow rate of the valve must not be exceeded.
- Use only hydraulic oil HLP32 as per DIN51524.

7.2.1 Hydraulic symbol

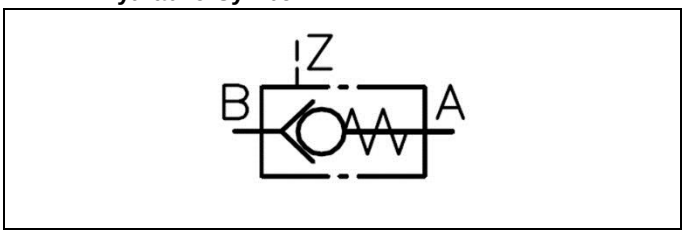

Figure 2: Presentation in the hydraulic circuit diagram

8 Start up

⚠ WARNING

Injuries due to misuse, incorrect operation or abuse!

Injuries can occur if the product is not used within the intended use and the technical performance data.
- Before start up, read the operating instructions!

Troubles of functioning

Protect the valve against penetration of swarf, otherwise the clamping force of a connected clamping cylinder is possibly no longer guaranteed.

Swarf in the hydraulic oil

Swarf in the hydraulic oil can damage the valve seat so that an immediate pressure drop can occur in the clamping system.

⚠ CAUTION

Operating pressure should not exceed

The max. operating pressure must not be exceeded (see technical characteristics).

9 Maintenance

⚠ WARNING

Burning due to hot surface!
- In operating conditions, surface temperatures of more than 70 °C can appear at the product.
- All maintenance and repair works must only be effected in cooled mode or with safety gloves.

9.1 Cleaning

Check regularly, but at least once a year, whether the hydraulic connections are damaged (visual control). If external leakages occur, take the system out of service and repair it.
Clean the device surface (dust deposits and dirt) at regular intervals, but at least once a year.

10 Trouble shooting

Fault	Cause	Remedy
Pressure drop at cylinder port A	Valve seat damaged by swarf	Replace valve

11 Accessory

NOTE

Accessories
- See data sheet.

12 Technical characteristics

Part no.	2951 XXX
Max. operating pressure, port A, B, Z	500 bar
Control flow [cm³]	See data sheet
Control pressure pz [bar]	See data sheet
Flow rates max. [l/min]	See data sheet
Hydraulic oil	HLP as per DIN 51524
Ambient temperature	approx. -40…+80°C

Wrench size

Part no.	Wrench size [mm]
2951 417	24
2951 421	32
2951 501	32

NOTE

Further information

- For further technical data see ROEMHELD data sheet. C29511

13 Storage

⚠ CAUTION

Storage of components!

- The product may not be exposed to direct solar radiation, because the UV light can destroy the seals.
- A storage differing from the storage conditions is inadmissible.
- In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion at the element can occur.

The elements are tested by default with mineral oil. The exterior of the elements is treated with a corrosion inhibitor.
The oil film remaining after the test provides for a six-month interior corrosion protection, if stored in dry and uniformly tempered rooms.
For longer storage times, the element has to be filled with a non-resinifying corrosion inhibitor and the outside surfaces must be treated.

14 Disposal

Hazardous to the environment
Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions.
Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.
For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

15 Declaration of manufacture

Manufacturer
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35321 Laubach, Germany
Tel.: +49 (0) 64 05 / 89-0
Fax: +49 (0) 64 05 / 89-211
E-mail: info@roemheld.de
www.roemheld.com

Declaration of manufacture of the products
They are designed and manufactured in line with the relevant versions of the directives **2006/42/EC** (EC MSRL) and in compliance with the valid technical rules and standards.
In accordance with EC-MSRL and EN 982, these products are components that are not yet ready for use and are exclusively designed for the installation in a machine, a fixture or a plant.

According to the pressure equipment directives the products are not to be classified as pressure reservoirs but as hydraulic placing devices, since pressure is not the essential factor for the design, but the strength, the inherent stability and solidity with regard to static or dynamic operating stress.

The products may only be put into operation after it was assessed that the incomplete machine/machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The manufacturer commits to transmit the special documents of the products to state authorities on request.
The technical documentation as per appendix VII part B was prepared for the products.

Responsible person for the documentation:
Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

Römheld GmbH
Friedrichshütte

Laubach, 02.05.2019