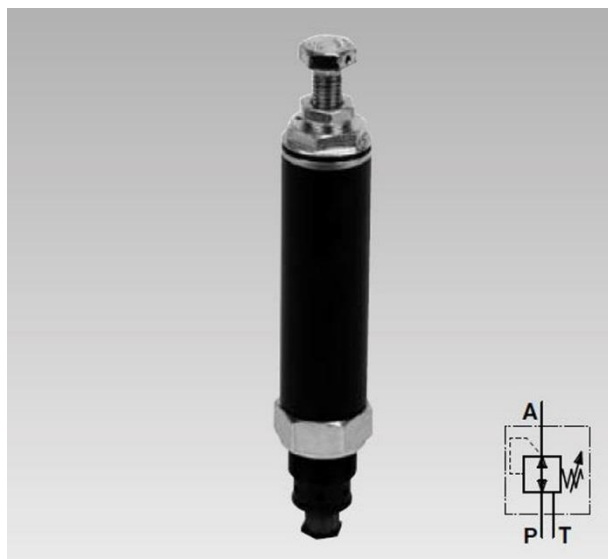




## Pressure reducing valve

Poppet valve with overpressure function  
max. operating pressure 500 bar



### 1 Description of the product

#### General information

Pressure reducing valves keep the outlet pressure (A) constant, also in case of a changeable, but always higher inlet pressure (P).

#### Function

Below the set outlet pressure, the hydraulic oil flows unhindered from P to A. In case of a pressure increase, the set spring force is overcome and a check valve cuts off the flow hermetically sealed. Thus, a further pressure increase is avoided, also in case of increasing inlet pressure p. In case of a pressure drop, e.g. because of a leakage at a cylinder, the check valve will be opened by a strong spring against the existing inlet pressure p.

Hydraulic oil can continue flowing until the set outlet pressure is obtained.

If the outlet pressure increases, e.g. because of oil warming, the pressure relief valve. Thus, oil in the outlet pressure area can drain off by the reservoir line until the preset outlet pressure is more or less obtained and the pressure relief valve is closed.

A return flow from A to P is only possible if the inlet pressure p drops below the set outlet pressure.

#### Application

This pressure reducing valve can only be used in static clamping systems. The connected clamping elements must be leakage-free.

### 2 Validity of the documentation

This document applies to the following products:

Pressure reducing valve of data sheet C 2.9534.

The following types or part numbers are concerned:

#### Pressure reducing valve:

- 2953 200, 2953 201
- 2953 211, 2953 213
- 2953 215, 2953 216

### Table of contents

|    |                               |   |
|----|-------------------------------|---|
| 1  | Description of the product    | 1 |
| 2  | Validity of the documentation | 1 |
| 3  | Target group of this document | 2 |
| 4  | Symbols and signal words      | 2 |
| 5  | For your safety               | 2 |
| 6  | Application                   | 3 |
| 7  | Assembly                      | 3 |
| 8  | Start up                      | 5 |
| 9  | Maintenance                   | 6 |
| 10 | Trouble shooting              | 6 |
| 11 | Accessory                     | 6 |
| 12 | Technical characteristics     | 6 |
| 13 | Storage                       | 6 |
| 14 | Disposal                      | 6 |
| 15 | Declaration of manufacture    | 7 |

### 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

#### **WARNING**

##### Person damage

Stands for a possibly dangerous situation.

If it is not avoided, death or very severe injuries will result.

#### **CAUTION**

##### Easy injuries / property damage

Stands for a possibly dangerous situation.

If it is not avoided, minor injuries or material damages will result.



##### Hazardous to the environment

The symbol stands for important information for the proper handling with materials that are hazardous to the environment.

Ignoring these notes can lead to heavy damages to the environment.

#### **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 in 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

### **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 Screw-in valve

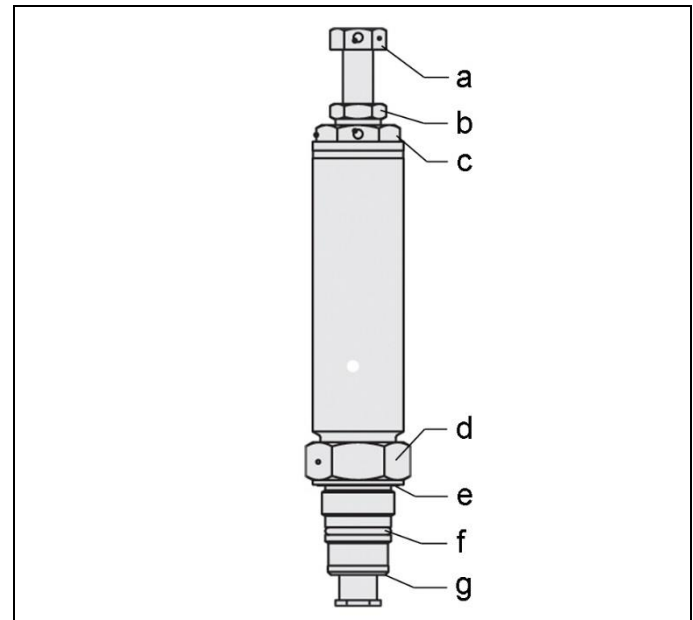


Figure 1: Screw-in valve

|   |                           |   |                       |
|---|---------------------------|---|-----------------------|
| a | Adjusting screw SW16      | e | Kantseal sealing ring |
| b | Lock nut SW16             | f | O-ring                |
| c | Valve body SW24           | g | Sealing edge          |
| d | Lock and sealing nut SW30 |   |                       |

### 7.1.1.1 Mounting instructions for screw-in valve

- Before screwing in, turn back lock and sealing nut up to the stop.
- Screw in valve body and tighten by 70 Nm. Sealing is made metalically on the sealing edge.
- Tighten the lock and sealing nut by 60 Nm. Sealing is made with the Kantseal sealing ring.
- Disassembly is made in reverse sequence.
- 

### 7.1.2 Pipe thread

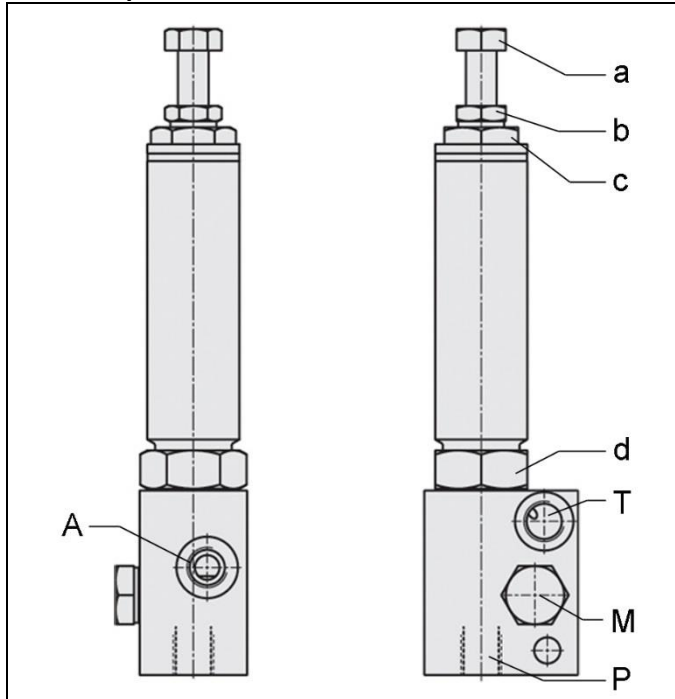


Figure 2: Pipe thread G1/4

|                             |                                            |
|-----------------------------|--------------------------------------------|
| a Adjusting screw SW16      | T Reservoir port G1/4                      |
| b Lock nut SW16             | P Pressure inlet G1/4                      |
| c Valve body SW24           | A Pressure outlet G1/4                     |
| d Lock and sealing nut SW30 | M Pressure gauge connection in outlet G1/4 |

### 7.1.3 Manifold-mounting connection

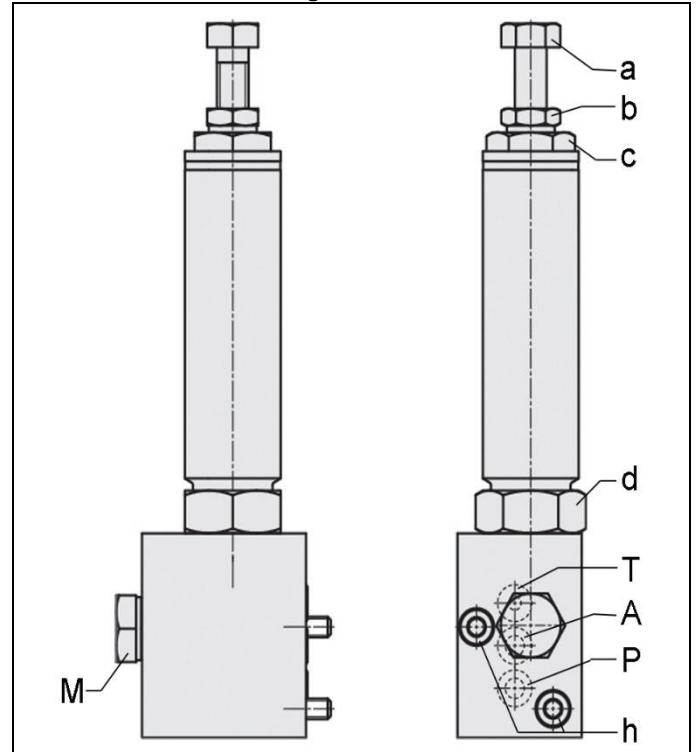


Figure 3: Manifold-mounting connection

|                             |                                            |
|-----------------------------|--------------------------------------------|
| a Adjusting screw SW16      | T Reservoir port                           |
| b Lock nut SW16             | A Pressure output                          |
| c Valve body SW24           | P Pressure input                           |
| d Lock and sealing nut SW30 | M Pressure gauge connection in outlet G1/4 |
|                             | h Fixing screws                            |

### NOTE

#### Mounting instructions for pressure reducing valve

- General mounting instructions see data sheet C2.9533 or C2.9534

### WARNING

#### Bursting of components due to overpressure

- Pressure increase due to heating of the hydraulic fluid!
- Due to extreme heating, the hydraulic fluid expands and causes a pressure increase in the system!
- To avoid reservoir port T, connect port L to the power unit.

## 7.2 Connection of the hydraulic equipment

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

### NOTE

#### Reservoir connection

The reservoir port P must not be closed to guarantee a perfect functioning.

#### 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.

### NOTE

The return flow from A to P is only possible if the inlet pressure P drops below the set outlet pressure A.

### 7.2.1 Pressure reducing valve

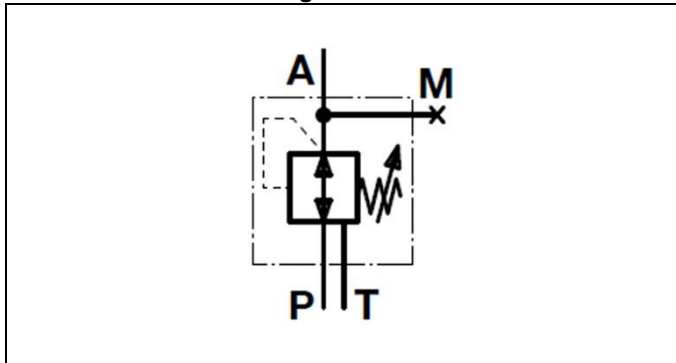


Figure 4: Representation in the hydraulic circuit diagram (connection "M" only available with manifold-mounting and pipe thread variant).

### 7.2.2 Application example

To guarantee perfect functioning of the pressure reducing valves, flow control valves and sequence valves must always be installed in front of the pressure reducing valve.

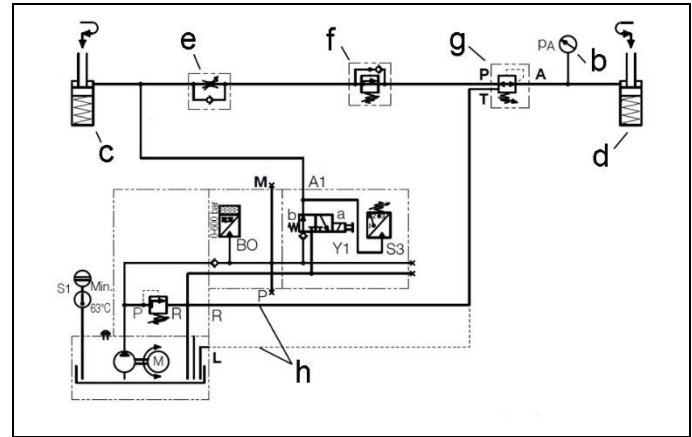


Figure 5: Symbolic representation of the sequence with other hydraulic valves

|                                      |                                                                   |
|--------------------------------------|-------------------------------------------------------------------|
| b Pressure gauge                     | e Flow control valve                                              |
| c Cylinder with full system pressure | f Sequence valve                                                  |
| d Cylinder with reduced pressure     | g Pressure reducing valve                                         |
|                                      | h Max. return pressure 20 bar alternative (prefer leakage port L) |

### 7.2.3 Adjust the pressure reducing valve

A pressure indicator such as a pressure gauge or a pressure transducer on the outlet side is absolutely required for adjustment.

- Unscrew lock nut SW16 (b).
- Unscrew adjustment screw SW16 (a) with suitable tool.
- Apply inlet pressure (P).
- Screw in adjustment screw (a). The outlet pressure increases continuously. Watch the pressure indicator.
- As soon as the outlet pressure is reached, tighten the lock nut (b).

### NOTE

- Check correct operation by actuating several times.

### CAUTION

**Damage of components due to incorrectly adjusted components**

Carry out some clamping and unclamping operations to ensure proper operation.

## 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

The product must be cleaned from dirt, swarf and liquids at regular intervals.

### 9.2 Regular checks

### ⚠ WARNING

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

Defect or leaking fittings and connecting parts have to be exchanged.

### ℹ NOTE

The checks or a new calibration has to be effected by trained personnel with appropriate equipment.

#### General Information

1. Check components if there are damages.
2. Check tightness and leakage of hydraulic connections and connecting parts (visual control).
3. Check adjusted pressures. For this purpose a measuring connection should be used.
4. Check the observance of the maintenance intervals.

## 10 Trouble shooting

| Fault                                             | Cause                                        | Remedy                                               |
|---------------------------------------------------|----------------------------------------------|------------------------------------------------------|
| Pressure at port A rises above the adjusted value | Reservoir port T closed or not depressurised | Connect port T to leakage oil port at the power unit |
| Power unit switches on continuously.              | Damage of the valve seat by swarf            | Exchange pressure reducing valve.                    |

## 11 Accessory

### ℹ NOTE

#### Accessories

- See data sheet.

## 12 Technical characteristics

| Part no.                        | 2953 XXX             |
|---------------------------------|----------------------|
| Max. operating pressure, port P | 500 bar              |
| Adjustment range [bar]          | See data sheet       |
| Max. flow rate                  | See data sheet       |
| Hydraulic oil                   | HLP as per DIN 51524 |
| Ambient temperature             | -40...+80 °C         |

### ℹ NOTE

#### Further information

- For further technical data see ROEMHELD data sheet. C29534

## 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**

Römheld GmbH Friedrichshütte  
Römheldstraße 1-5  
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