



Coupling Units

for manual operation, for single and double acting cylinders, max. operating pressure 500 bar



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1 Description of the product

This coupling unit is used if the clamping fixture is manually separated from the pressure generator, e.g. in flexible manufacturing systems or when using one pressure generator only for several clamping fixtures.

It can be supplied with two different accumulators:

Size 1 for clamping fixtures with a big oil volume. Size 2 for clamping fixtures with a small oil volume.

2 Validity of the documentation

Coupling units of data sheet F 9.425.

The following types or part numbers are concerned:

Coupling units for single-acting cylinders:

- 9425 011, 012

Coupling units for double-acting cylinders:

- 9425 021, 022

Multi-coupler aluminium version:

- 9425 102

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

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

DANGER

Danger of explosion due to welding, soldering and mechanical works!

Due to works on the hydraulic accumulator, the stability of the component can be reduced.

- No processing!

Danger of explosion due to the use of incorrect filling media!

Hydraulic accumulators must **only** be filled with nitrogen!

WARNING

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.

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.

CAUTION

Operating pressure should not exceed

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

5.3 Equipment and safety devices

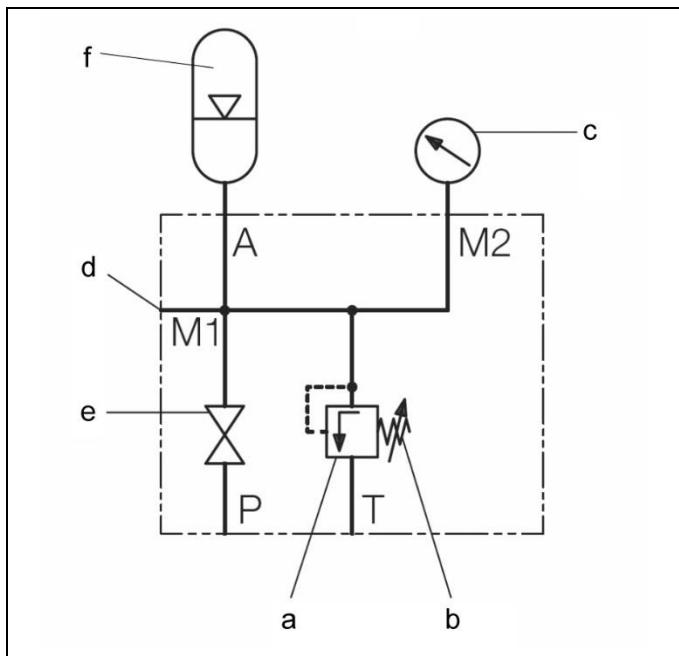


Figure 1: Example for equipment and safety devices for single-acting elements

a Pressure relief valve (DBV)	d Test measuring port (by the customer)
b Relief device	e Shut-off valve
c Pressure gauge	f Hydraulic accumulator

Equipment, installation and operation of hydraulic accumulators differ from country to country.

In the Federal Republic of Germany, this is regulated for example by the "regulations on health and safety at work, BetrSichV" and/or EN14359.

For the safe installation of accumulators, it is recommended to follow the specifications of the technical regulations for pressure vessels (TRB).

These demand the following minimum equipment:

- Safety device for protection against excessive pressure (this must be type tested, either by prototypes or by individual approvals),
- Relief devices between hydraulic accumulator and shut-off device,
- Pressure measuring device with marking of the admissible operating overpressure,
- Connecting possibilities of a testing pressure gauge,
- Shut-off device.

Further accessories can be mounted:

- Safety devices for protection against excessive temperature,
- Electro-magnetically actuated relief valve.

5.3.1 Device for protection against excessive pressure / pressure relief valve (DBV)

The pressure relief valve shall protect the hydraulic accumulator against a pressure increase by more than 10 % of the maximum operating pressure.

Adjustment has to be effected with the maximum flow rate of the power unit. The reaction pressure of the pressure relief valve should be a little bit higher than the nominal pressure of the hydraulic accumulator.

The valve spindle of the pressure relief valve has to be secured against adjustment in the direction of higher pressure by means of distance plates and/or lead-sealing.

CAUTION

Damage of the hydraulic accumulator due to too high system pressure

The pressure relief valve of the power unit must not be adjusted above the maximum operating pressure of the hydraulic accumulator.

5.3.2 Relief device

WARNING

Danger of injury due to high-pressure injection!

Hydraulic oil in the accumulator is under pressure.

Before working on the hydraulic system or the fixture, the hydraulic accumulator should be completely discharged.

To drain the accumulator, there are two possibilities:

- Completely unscrew the valve spindle of the pressure relief valve towards the lower pressure.
- Open an installed shut-off valve or a swivel banjo coupling, emergency pressure reducing valve for accumulator (see example).

5.3.3 Pressure gauge / pressure gauge connection

The pressure gauge shall indicate the actual pressure in the hydraulic accumulator. For this purpose a direct supply line has to be mounted. The pressure gauge at the power unit is not suitable for that purpose.

The maximum operating pressure of the hydraulic accumulator shall be indicated by a marking on the pressure gauge scale. Alternatively also a labelled plate or tag can be fixed.

5.3.4 Shut-off device / shut-off valve

By means of the shut-off valve the hydraulic accumulator can be separated from the power unit and the fixture in order to realise adjusting and maintenance works without danger.

6 Safety devices

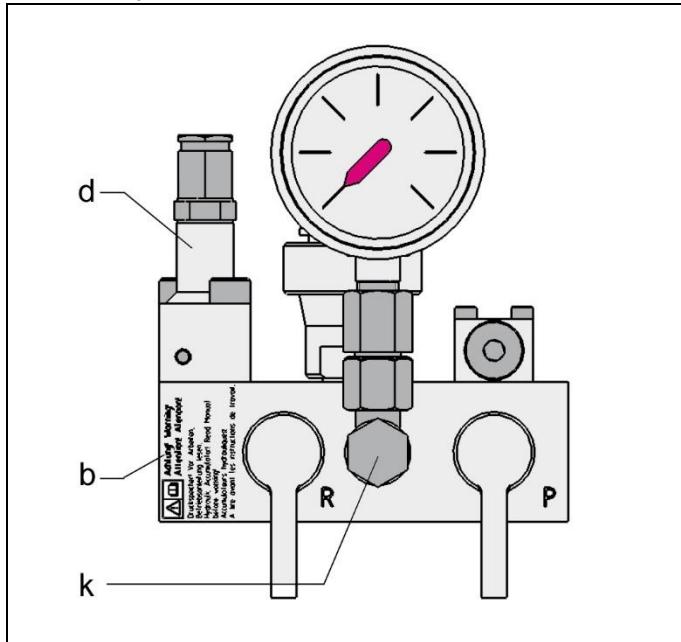


Figure 2: Safety device, warning

b Note: "Attention! Hydraulic accumulator! Read the operating in- structions, before work- ing!", in three languages	d Pressure relief valve, At- tention! In case of over- pressure, hydraulic fluid is released to the envi- ronment through a filter. k Swivel banjo coupling, emergency pressure reduction for hydraulic accumulator
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Note

The pressure relief valve is no "safety-related part" in accordance with EN ISO 13849-1.

6.1 Device for relief of the accumulator

For maintenance and/or repair, it is important that the pressure in the accumulator can be reduced before starting the work.

The customer should provide a device to relieve the pressure in the hydraulic accumulator.

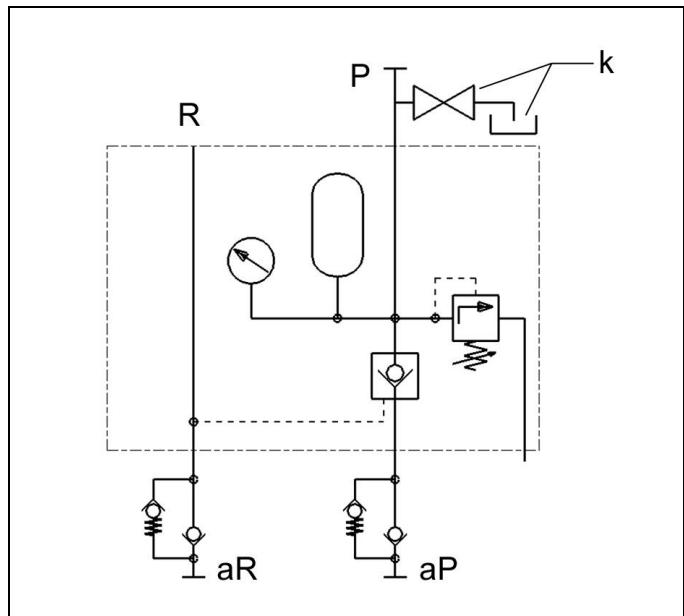


Figure 3: Example: Device to relieve the pressure for double-acting elements

k Shut-off valve with sump tray or connection to the reservoir (provided by the customer).	P Connection to the pressure generator
aP Nipple with dust cap, port P	R Connection to the pressure generator

6.2 Safety elements

- 1 The coupling units are equipped with a firmly adjusted pressure relief valve. This pressure relief valve, in the function of a safety valve against overload of the accumulator, is set to an opening pressure of 500 bar.
- 2 All coupling nipples are provided with a preloaded valve, which limits a pressure increase in the nipple in decoupled mode in case of a possible leakage to approx. 5 bar.
- 3 The coupling units for double-acting cylinders are provided with a pilot-controlled check valve. Thereby a higher operating safety is achieved. These coupling units can also be used for single-acting cylinders, however a power unit for double-acting cylinders has to be used as pressure generator.
- 4 With coupling units for double-acting cylinders a multi-coupler can be used
 - a) to simplify the coupling motion
 - b) to prevent the exchange of the clamping and unclamping line.
- 5 The safety support is used as holder for coupler or multi-coupler after uncoupling has been made.
The release signal of the integrated switch makes sure that the clamping fixture can only be moved if the coupler or multi-coupler has been correctly removed from the clamping fixture P A1 A2.

7 Application

7.1 Intended use

Quick-disconnect couplings are used for coupling and uncoupling of hoses.

The couplings are designed for manual operation and are to be operated in depressurised mode only.

7.2 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.

Special solutions are available on request!

8 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.

⚠️ WARNING

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.

8.1 Design

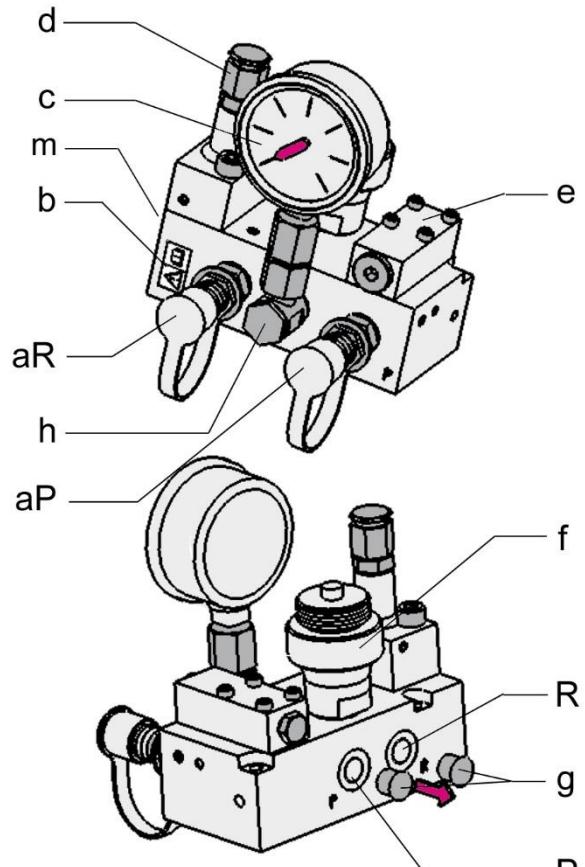


Figure 4: Components, example of the double-acting version

aP	Nipple with dust cap, port P	e	Pilot-controlled check valve
aR	Nipple with dust cap, port R	f	Hydraulic accumulator
b	Note: "Attention! Accumulator! Read the operating instructions, before working!", in three languages	g	Plug as transport lock (remove before mounting)
c	Pressure gauge with cushioning	m	Discharge outlet for overpressure
d	Pressure relief valve, Attention! In case of overpressure, hydraulic fluid is released to the environment through a filter.	P	Port to the consumer (on the fixture)
		R	Port to the consumer (on the fixture)

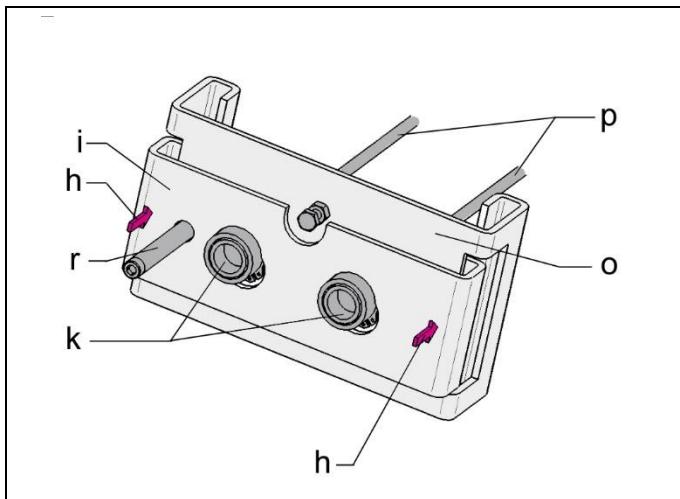


Figure 5: Components, multi-coupler (accessories)

h	Handling for unlocking	o	Coupling nipple unit
i	Locking bar	p	Hydraulic hose (by the customer)
k	Coupler	r	Guide

8.2 Assembly

1. Design hydraulic lines as per operating pressure!
2. Connect hydraulic lines to qualifying standards, pay attention to scrupulous cleanliness!
3. Do not use sealing tape, copper rings or coned fittings.
4. Clean tubes and hoses, e.g. with cleaning agents.
5. Check sealing of the lines!
6. Use hydraulic oil as per ROEMHELD data sheet A 0.100.

9 Start up

- Check tight seating (check tightening torque of the fixing screws, see chapter "Technical characteristics").
- Check tight seating of hydraulic connections (check tightening torque of the hydraulic connections, see chapter "Technical characteristics").
- Bleed the hydraulic system.

9.1 Operation

Note

Safe operation

- The operating pressure should not exceed 400 bar so that, in case of a rise in temperature, the maximum operating pressure of 500 bar will not be exceeded and no oil can be lost through the pressure relief valve.
- After uncoupling from the pressure generator the operating pressure has to be checked at the pressure gauge. If the pressure drops continuously, there is a leakage which has to be eliminated immediately.
- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

For pressures below 100 bar the gas preload of the accumulator must be adapted. In addition the pressure relief valve (DBV) must be adapted to the operating pressure.

- This may only be made by a specialist!
See also BA_F9601.

The coupling units for double-acting cylinders are equipped with a preloaded valve. These are set to approx. 5 bar. They have the task to reduce the pressure in the coupler.

If the connection is pressurised in uncoupled mode, there will be leakages of hydraulic oil.

- Do not pressurise in uncoupled mode!

9.1.1 Operation

WARNING

Injuries due to non-compliance of the operating instructions!

- The product may only be operated, if the operating instructions - especially the chapter "Safety instructions" have been read and understood.

CAUTION

Risk of injury!

Due to spring-loaded components hand or fingers can be squeezed.

- Wear personal protection equipment!

Material damage

Product and customer's installation can be damaged due to penetrating dirt.

- Last clean the nipple with compressed air before coupling is made.

9.1.1.1 Operation of the coupling units

The quick-disconnect coupling is a coupling which locks automatically after uncoupling. The coupling must only be operated in depressurised mode!

Displacement of the sliding sleeve in the corresponding coupling or uncoupling direction loosens the balls which are used for locking.

Leakages during coupling are normal due to the design.

Nota

To avoid penetration of contamination into the system, connect also the dust caps in coupled mode.

In uncoupled mode protect coupler and nipple with dust caps. (See figure coupling complete)

- Coupling and uncoupling must only be effected in depressurised mode.

Coupling

- Remove dust cap
- Clean coupling parts
- Depressurise the connecting lines of the coupling parts.
- Couple coupler of quick-disconnect coupling.
- Connect dust caps, if required.

Uncoupling

- Disconnect dust caps, if required.
- Depressurise the connecting lines of the coupling parts. and close shut-off valve (single-acting version).
- Disconnect coupler of quick-disconnect coupling and put it into a safety support, if necessary.
- Attach dust cap to coupling nipple and coupler.

9.1.1.2 Operation of the single-acting version
Clamping

- Couple, if required.
- Open shut-off valve.
- Actuate power generator until pressure gauge shows required clamping pressure.
- Close shut-off valve.
- Uncouple, if required.

Unclamping

- Couple, if required.
- Depressurise the connecting lines of the coupling parts.
- Open shut-off valve.
- Uncouple, if required.

9.1.1.3 Operation of the double-acting version
Clamping

- Couple, if required, depressurise the corresponding connection.
- Actuate power generator until pressure gauge shows required clamping pressure.
- Uncouple, if required.

Unclamping

- Couple, if required, depressurise the corresponding connection.
- Actuate power generator until pressure gauge shows required unclamping pressure.
- Uncouple, if required.

9.1.1.4 Operation of the double-acting version
Coupling

- Remove dust cap
- Clean coupling parts
- Depressurise the connecting lines of the coupling parts.
- Put multi-coupler, pull locking bar to the coupling nipple unit, and couple.
- Connect dust caps, if required.

Uncoupling

- Disconnect dust caps, if required.
- Depressurise the connecting lines of the coupling parts.
- Pull locking bar to the coupling nipple unit, and couple.
- Put the multi-coupler into the location hole, if necessary.
- Attach dust cap to coupling nipple and coupler.

10 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.

10.1 Plan for maintenance

Maintenance works	Interval	Realisation
Check hydraulic accumulator	In accordance with the applicable regulations or operating instructions for hydraulic accumulators F9.601	Qualified personnel
Check preload pressure	one week after installation	
	8 weeks after installation	
	If no noticeable gas loss appeared, the future test intervals can be made once a year.	

Maintenance works	Interval	Realisation
Cleaning	As required	Operator
Regular checks	daily	Operator
Repair/ change seal kit	1,000,000 cycles or 2 years	Qualified personnel

Maintenance works	Interval	Realisation
Check hydraulic accumulator	In accordance with the applicable regulations or operating instructions for hydraulic accumulators F9.601	Qualified personnel
Check preload pressure	one week after installation	
	8 weeks after installation	
	If no noticeable gas loss appeared, the future test intervals can be made once a year	

>Note

- Continuous use at high operating temperatures requires shorter test intervals.
- The applicable regulations and guide lines for hydraulic accumulators have to be met.

10.2 Cleaning

⚠ CAUTION

Aggressive cleaning agents

The product must not be cleaned with:

- Corrosive or corroding components or
- Organic solvents as halogen or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.), because this can destroy the seals.

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

In the case of heavy contamination, the cleaning has to be made in shorter intervals.

10.3 Regular checks

1. Check tightness of hydraulic connections (visual control).
2. Check running surfaces (of the piston rod or bolt) if there are marks and scratches. Traces of marks can be an indication for a contaminated hydraulic system or an inadmissible side load of the block cylinder.
3. Leakage check at the housing - piston rod, bolt or flange.
4. Clamping force control by pressure control.
5. Check if the maintenance intervals are kept.

10.4 Hydraulic Accumulator

10.4.1 Basic maintenance instructions

Diaphragm accumulators are in general maintenance-free.

However to allow trouble-free function and a long life the following checks have to be realised:

- Gas preload
- Safety devices
- Pipe connections
- Fixing of the accumulator

10.4.2 Test intervals prefilling pressure

It is recommended to keep the following test intervals:

- after every installation,
- one week after installation,
- eight weeks after installation

If no noticeable gas loss appeared, the future test intervals can be made

- once a year.

ⓘ Note

Continuous use at high operating temperatures requires shorter test intervals.

10.4.3 Service life

The service life of diaphragm accumulators depends on the width of pressure variations and the number of load changes. Similar to high-pressure hoses, you can assume a life of 6 years with conventional use.

If the number of load cycles is high, the maintenance intervals should be shortened.

11 Accessory

ⓘ NOTE

Accessories

- See data sheet.

12 Technical characteristics

Characteristics of the single-acting version

Type		9425		
		011	012	016
Max. operating pressure	[bar]	400		500
Nominal volume of the hydraulic accumulator	ccm	75	13	13
Accumulated volume at max. operating pressure	ccm	59	9,75	8,8
Gas preload of the hydraulic accumulator	[bar]	100		160

Characteristics of the double-acting version

Type		9425		
		021	022	026
Max. operating pressure	[bar]	400		500
Nominal volume of the hydraulic accumulator	ccm	75	13	13
Accumulated volume at max. operating pressure	ccm	59	9,75	8,8
Gas preload of the hydraulic accumulator	[bar]	100		160

ⓘ NOTE

Further information

- For further technical data see ROEMHELD data sheet. F9425

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.

ROEMHELD elements are tested with mineral oil. The exterior of the elements is protected against corrosion.

Is the period of storage up to the start-up not longer than 3 months, it is sufficient to store the preloaded hydraulic accumulator in a dry and cool place protected against direct sunlight.

The hydraulic accumulator can be installed in any position.

In order to avoid a penetration of dirt into the hydraulic accumulator, it should be ensured that the hydraulic port is closed.

If the storage is longer than 3 months, the prefilling pressure has to be reduced to 2 bar in order to prevent a deformation of the diaphragm.

For the storage of diaphragms, the standard DIN 7716 "Rubber products, requirements for storage, cleaning and maintenance" has to be considered.

14 Disposal

For disposal of the hydraulic accumulator the gas pressure must be discharged.

If required, appropriate safety measures have to be taken!

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.

Hazardous to the environment



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

15 Declaration of manufacture

Manufacturer

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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, 27.05.2019