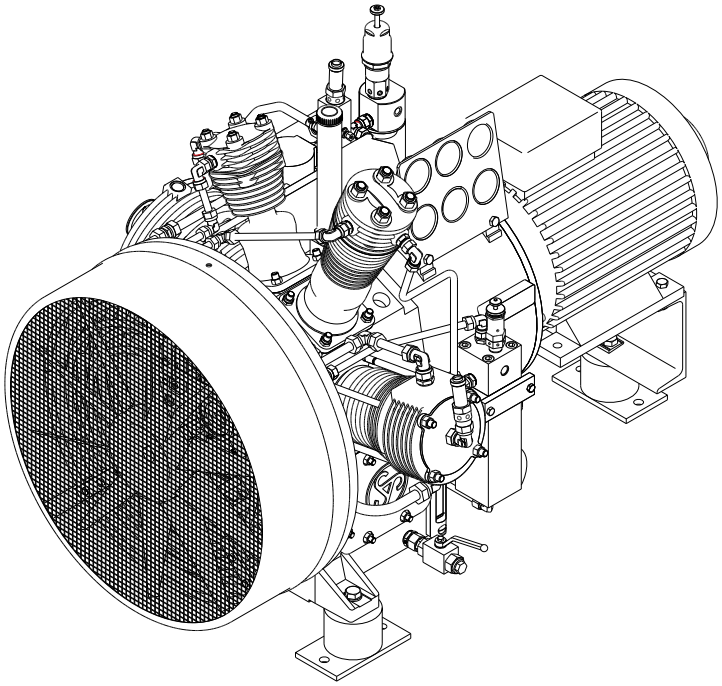
Sauer Compressors



- *High pressure compressor*
- *4-stage*
- *Air-cooled*

MAINTENANCE INSTRUCTIONS

Sauer-Compressors
Type: WP4331/WP4341 Basic
Series: Series: Hurricane

EN 01 | 2016

www.sauerusa.com

Original maintenance instructions
Edition: 01 / 2016
Edited by: Sauer USA – Technical Documentation

Table of contents

1 General

1.1 Foreword

These maintenance instructions describe how to maintain the Sauer-Compressor WP4331/WP4341 Basic and provide maintenance personnel with the following essential information:

- Performing maintenance
- Testing components
- Replacing components

These maintenance instructions and the associated operating instructions cover proper use and maintenance. Any other work must be carried out by specialist personnel authorized by Sauer USA.

More detailed information about the technical documentation and safety-related information can be found in the operating instructions for the WP4331/WP4341 Basic.

1.2 Target group

These maintenance instructions are aimed at all personnel who perform work with or on the Sauer-Compressor, e. g.:

- Servicing
- Inspection
- Maintenance
- Care

Personnel who carry out this work must have read and understood the maintenance instructions first.

Actions or activities that are not described in this documentation may only be carried out by Sauer-Service or by specialist personnel authorized by Sauer USA.

2 Sauer-Service

In case of technical questions and any queries regarding spare parts orders, maintenance and repairs, contact Sauer-Service.

For any enquiries to Sauer-Service, have the following specifications for the Sauer-Compressor to hand:

- Compressor type
- Serial number
- Year of construction

This specifications can be found on the nameplate on the crankcase of the Sauer-Compressor.

Contact

Postal address:	Sauer Compressors USA 245 Log Canoe Circle Stevensville, MD 21666
Telephone (international):	443-249-7823
Technical information:	
Spare parts orders:	443-249-8022
Telefax (international):	
Emergency service 24/7 (international):	
E-mail:	*service@sauerusa.com*
Web:	*www.sauerusa.com*

3 Preparing for maintenance

This chapter summarises the general preparations that are necessary before any maintenance activities.

3.1 Installation conditions

The following conditions must be met:

- The installation location must be dry and free from dust.
- Ensure that the installation location is ventilated in such a way that the heat generated during operation can be extracted.
- The room temperature must be within the range defined in the technical specifications. ↳ Operating Instructions, "Technical specifications" chapter
- The Sauer-Compressor must be easily accessible at all times.

3.2 Requirements for maintenance work

Personnel qualification

Service personnel
Personnel authorized to service the compressor must be trained technical specialists employed by the operator and the manufacturer.

Required personal protective equipment

Hearing protection
Wear protective equipment to protect the hearing against damage, predominantly caused by excessively loud noises.

Protective gloves
Wear protective gloves.

Safety boots
Wear safety boots.

Safety goggles
Wear protective equipment to protect the eyes against harmful influences.

Work clothing
Wear clothing to prevent against harmful influences.

Required tools

Crane and lifting gear
Crane and appropriate lifting gear (e. g. chains, cross beam) with sufficient load bearing capacity.

Measuring beaker
Measuring beaker for measuring out operating materials, e.g. oil.

Oil injector
Oil injector for feeding in small quantities of operating materials, e.g. preservation oil.

Required materials

Preservation oil
In line with the specifications in the oil recommendations for Sauer-Compressors.

Table of tightening torques

Data	Value	Unit
Connecting rod bolts	70	Nm
Flywheel fixing screws	175	Nm
Cylinder head nuts, compression stage 1	42	Nm
Cylinder head nuts, compression stages 2 and 3	75	Nm
Cylinder head nuts, compression stage 4	175	Nm

3.3 Ordering spare parts

Order the Sauer Spare Parts or Sauer maintenance kits required for the maintenance work from Sauer-Service. Specify the following information in the order:

- Part number
  The part numbers for Sauer Spare Parts can be found in the spare parts catalogue.
  The part numbers for maintenance kits can be found in the maintenance schedule in the maintenance instructions.
- Main specifications of the Sauer-Compressor. The key characteristic data for the Sauer-Compressor can be found on the nameplate.
- Number of operating hours

The spare parts catalogue and operating instructions are also available on CD. To save time, you can fill out the order form contained therein, print it and send it off.

Compressor type:	
Serial number:	
Year of construction:	

Only genuine Sauer Spare Parts

- *are subject to continuous quality assurance and ongoing development. They conform to the latest technical develop-ments.*
- *guarantee the long service life of your Sauer-Compressor.*
- *meet the conditions of warranty of Sauer USA.*

3.4 Basic activities

Before starting any maintenance work:

- Turn off the Sauer-Compressor power supply and secure against being turned on again.
- Put up “Attention! Maintenance work!” sign on the power supply.

After completion of all maintenance work:

- Remove "Attention! Maintenance work!" sign.
- Turn on the power supply to the Sauer-Compressor.
- Perform an inspection **50 operating hours after all maintenance work**. Check all screws affected by maintenance to see if they are tight.

4 Maintenance

These maintenance instructions describe the necessary maintenance work involved in preventive servicing of the Sauer-Compressor.

The maintenance schedule provides you with an overview of the successive maintenance intervals, the maintenance work to be carried out and the required SauerEasyCare maintenance kits.

The maintenance work is explained step by step in the following sections of the maintenance instructions.

4.1 Maintenance schedule

The maintenance schedule is used as a guideline and to document the maintenance work. **Please refer to maintenance schedule provided with package from Sauer USA.**

1. Use the maintenance schedule as a template to be copied, or save it as a digital document in an appropriate format.
2. Compare the regular operating hours of the Sauer-Compressor with the maintenance intervals. The maintenance intervals can be found in the header of the maintenance schedule.
3. Determine the maintenance routine (scheduled maintenance work at the maintenance interval). The maintenance work appears in the header column.
4. Carry out the maintenance routine and document this in the maintenance schedule by entering the number of operating hours, date and signature.

When beginning a new maintenance schedule

- **enter:**
  - Main specifications
  - Date of commissioning
  - Maintenance schedule number
  - Date
  - Number of operating hours completed
- **tick:** Start after initial commissioning/major overhaul

NOTICE!

Always check the compressor after **50 hours** following any maintenance work. Check all screws and nuts affected by maintenance to see if they are tight.

NOTICE!

Sauer offers maintenance kits that include all of the necessary equipment needed for each overhaul. For more information, please contact ***parts@sauerusa.com***.

4.1.1 Cleaning the air filter

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

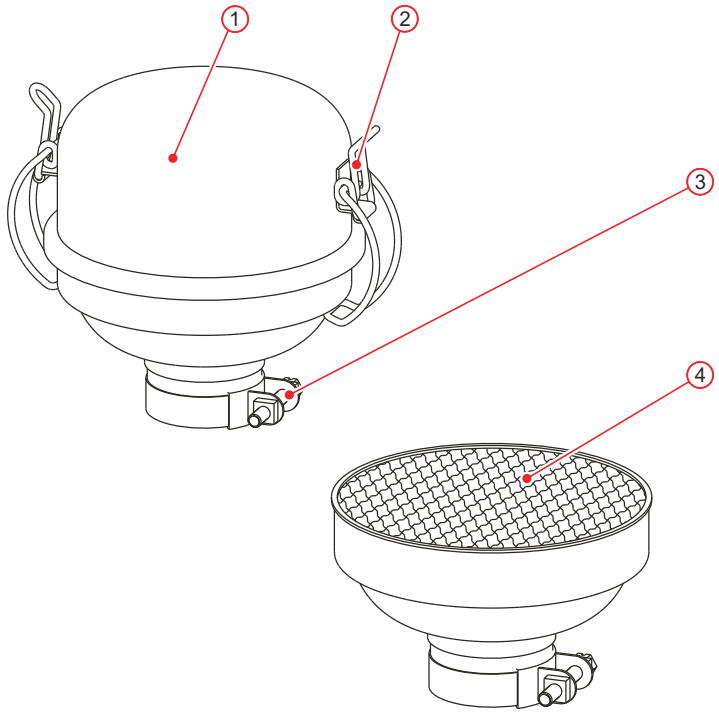


Fig. 1: Cleaning the air filter

1 Air filter cap
2 Clamp
3 Clamp
4 Air filter

1. Open the clips and take the air filter cap off.

2. Loosen the clamp and remove the air filter from the suction line.

3. Check the air filter for signs of wear and contamination. The air filter must be replaced if it cannot be cleaned or the air filter is damaged.

4. Wash out the air filter with oil-dissolving liquid (kerosene).

5. Clean the air filter by blowing through with compressed air from the inside out.

6. Fit the cleaned air filter on the suction line and tighten the clamp.

7. Wipe out the air filter cap with a lint-free cloth.
8. Fit the air filter cap and close the clamps.

4.1.2 Replace air filter insert

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

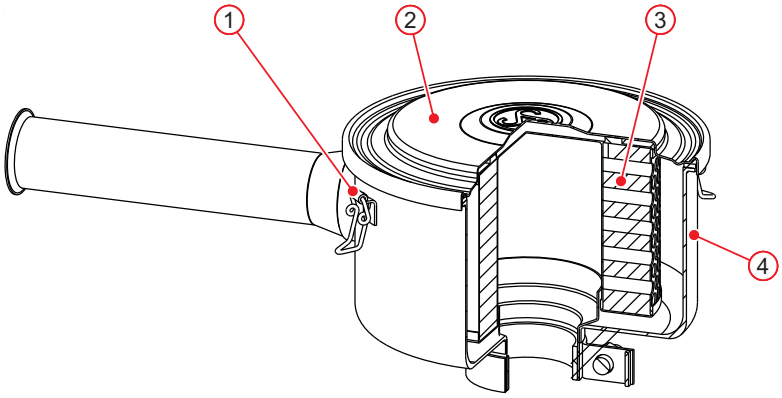


Fig. 2: Air filter

1 Clamp
2 Air filter cap
3 Air filter insert
4 Air filter housing

1. Loosen clamps and remove the air filter cover.
2. Remove the air filter insert from the air filter housing.
3. Clean the air filter housing with a lint-free cloth.
4. Fit a new air filter insert in the air filter housing.
5. Attach the air filter cap and close the clamps.

4.1.3 Changing the oil

Personnel:
- Service personnel

Protective equipment:
- Safety goggles
- Protective gloves
- Work clothing
- Safety boots

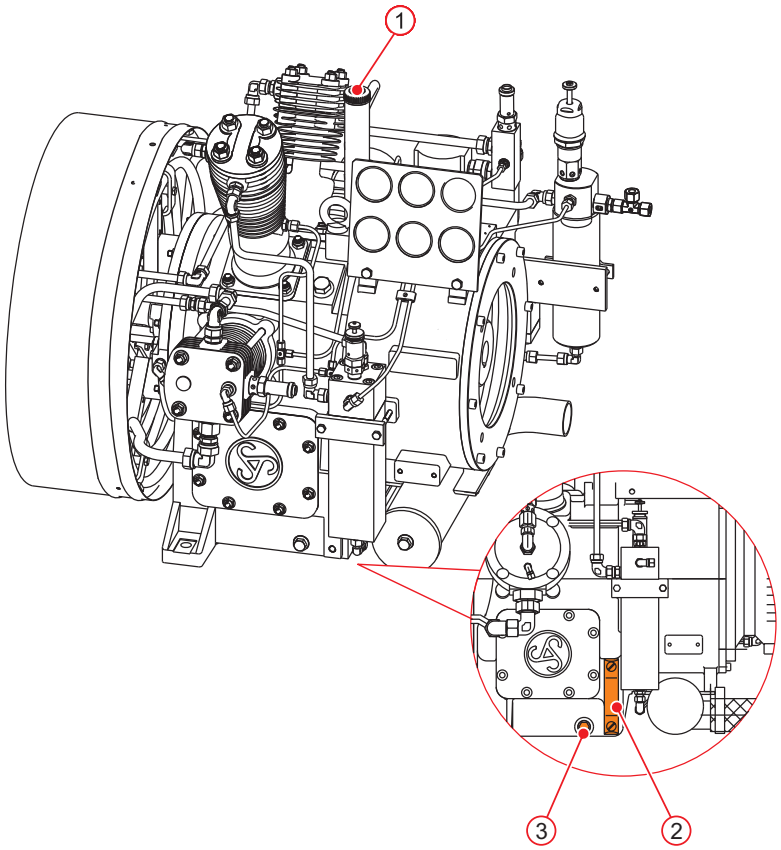


Fig. 3: Changing the oil (Example: WP4341)

1 Oil filler cap
2 Oil level indicator
3 Oil drain screw

1. Unscrew the oil filler cap and remove it.

2. Place an oil collection pan with sufficient capacity under the oil drain screw.

Oil quantity

↳ *Operating Instructions, "Technical specifications" chapter*

3. Unscrew the oil drain screw.

4. Drain the oil completely.

5. Screw the oil drain screw in and tighten it.

6. Fill the oil and check the level on the oil level indicator. The oil level must rise to the middle of the oil level indicator.

7. Screw on the oil filler cap.

4.1.4 Cleaning the oil strainer

Personnel:
- Service personnel

Protective equipment:
- Safety goggles
- Protective gloves
- Work clothing
- Safety boots

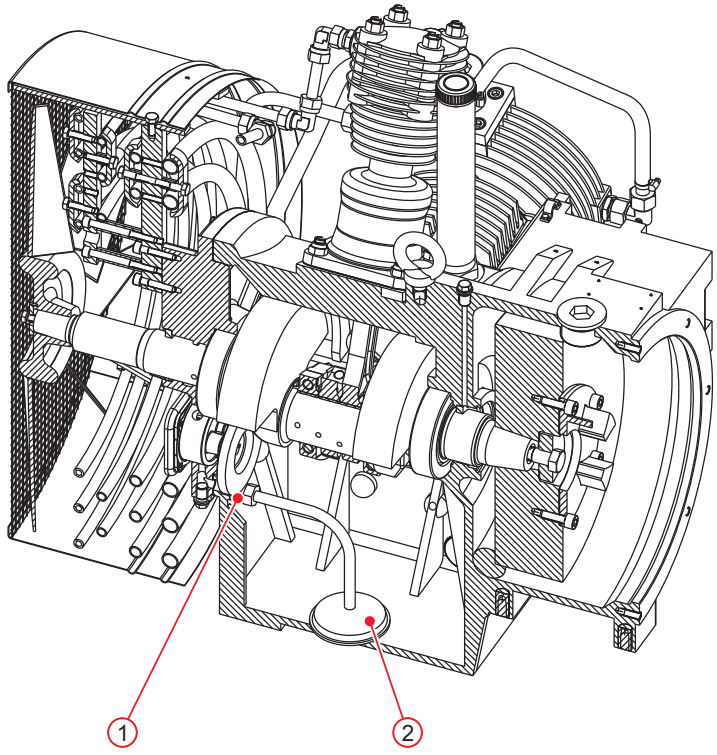


Fig. 4: Cleaning the oil strainer (Example: WP4341)

1 Union
2 Oil strainer

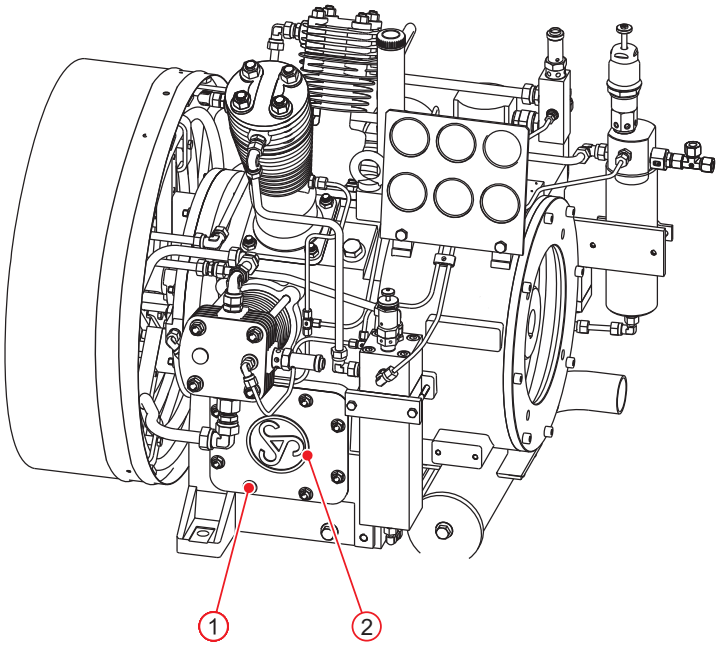


Fig. 5: Cleaning the oil strainer (Example: WP4341)

1 Nut
2 Crankcase inspection cover

1. Remove the nuts.
2. Remove crankcase inspection cover.
3. Loosen the union on the oil strainer.
4. Remove the oil strainer.
5. Clean the oil strainer with an oil-dissolving liquid (kerosene).
6. Carefully clean the sealing surface for the inspection cover gasket.
7. Mount the oil strainer.
8. Use a new inspection cover gasket.
9. Install the crankcase inspection cover.
10. Screw the nuts in and tighten them.

4.1.5 Checking and replacing valves

4.1.5.1 Preparatory work

Personnel:
- Service personnel

Protective equipment:
- Safety goggles
- Protective gloves
- Work clothing
- Safety boots

NOTICE!

Damage due to faulty gaskets

Do not continue using used gaskets. Doing this will lead to leakages within a short period of time.

– Only re-install valves, cylinder heads and cylinders with new gaskets.

NOTICE!

Damage due to low quality spare parts

Installation of low quality spare parts may lead to leakages and may cause substantial damage to the compressor.

– Use only genuine Sauer Spare Parts. They are precision parts specially designed for these installation situations with defined and tested dimensions and material characteristics.

NOTICE!

Damage due to faulty valves

Do not repair used valves. Valves that have reached the end of their service life must be replaced and disposed of.

– Use only genuine Sauer spare parts.

Valves are exposed to the greatest loads of all the parts of a piston compressor. In order to achieve the guaranteed maintenance intervals, these valves are high-quality precision parts, specially adapted to the individual compression units and their function carefully checked before delivery.

If necessary, contact Sauer-Service.

1. **For compressors with an air filter:** Loosen the screw on the air filter flange and remove the air filter.
2. Unscrew and remove the pipe unions and hose lines at the cylinder heads.

4.1.5.2 WP4331

Removing the compression stage 1 valve

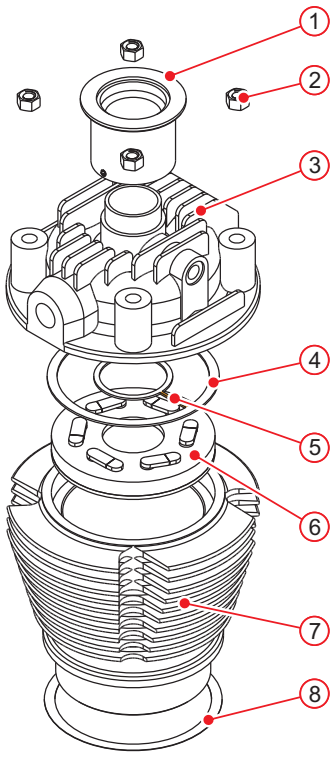


Fig. 6: Compression stage 1 valve

1 Cylinder head gasket

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 1.
2. Remove the compression stage 1 valve from the cylinder.

Check the compression stage 1 valve

→ Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 1 valve

1. Insert the compression stage 1 valve in the cylinder.
2. Slide a new cylinder head gasket over the studs and onto the cylinder.

> *Remove the strips of the cylinder head gasket before installation.*

3. Carefully slide the cylinder head over the studs and onto the cylinder.
4. Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 2 valve

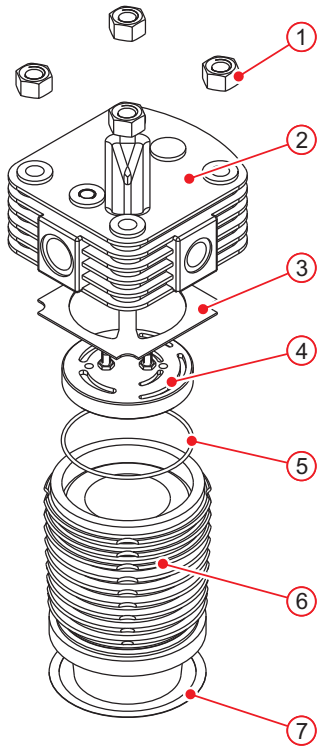


Fig. 7: Compression stage 2 valve

1 Cylinder head gasket
2 O-ring

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 2.
2. Remove the compression stage 2 valve from the cylinder.

Check the compression stage 2 valve

Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 2 valve

1. Replace the o-ring.
2. Insert the compression stage 2 valve in the cylinder.
3. Slide a new cylinder head gasket over the studs and onto the cylinder.

Remove the strips of the cylinder head gasket before installation.

4. Carefully slide the cylinder head over the studs and onto the cylinder.
5. Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 3 valve

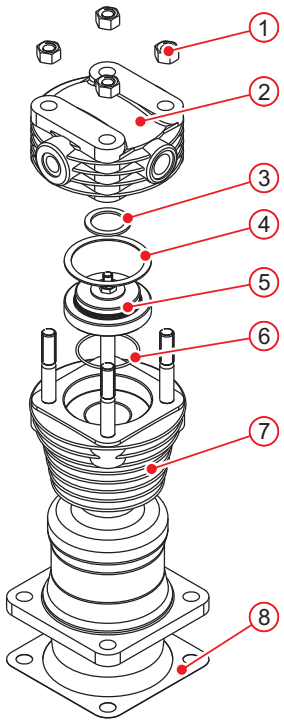


Fig. 8: Compression stage 3 valve

1 Low tolerance o-ring
2 Cylinder head gasket

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 3.
2. Remove the compression stage 3 valve from the cylinder.

Check the compression stage 3 valve

→ Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 3 valve

1. Slide a new cylinder head gasket over the studs and onto the cylinder.

Remove the strips of the cylinder head gasket before installation.

2. Replace the low tolerance o-ring.
3. Insert the compression stage 3 valve in the cylinder.
4. Carefully slide the cylinder head over the studs and onto the cylinder.
5. Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 4 valve

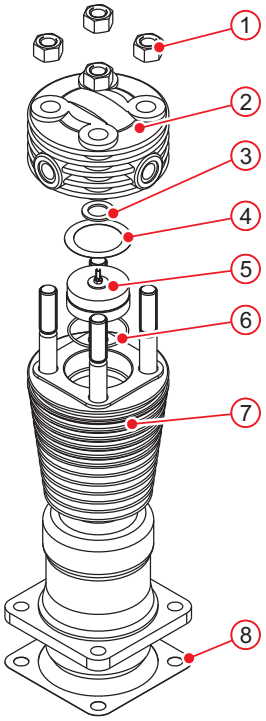


Fig. 9: Compression stage 4 valve

1 Low tolerance o-ring
2 Cylinder head gasket
3 O-ring

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 4.
2. Remove the compression stage 4 valve from the cylinder.

Check the compression stage 4 valve

- Check the exterior of the valve for:
  - damage,
  - coking,
  - oiling,
  - Corrosion
  - moisture.

  If necessary, establish the cause of the fault.

Installing the compression stage 4 valve

1. Slide a new cylinder head gasket over the studs and onto the cylinder.

> *Remove the strips of the cylinder head gasket before installation.*

2. Replace the o-ring.
3. Replace the low tolerance o-ring.
4. Insert the compression stage 4 valve in the cylinder.
5. Carefully slide the cylinder head over the studs and onto the cylinder.
6. Screw on the cylinder head nuts and finger-tighten.

4.1.5.3 WP4341

Removing the compression stage 1 valve

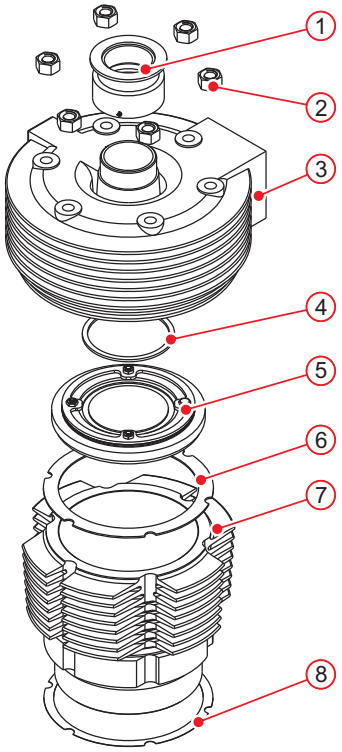


Fig. 10: Compression stage 1 valve

1 Low tolerance o-ring
2 Cylinder head gasket

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 1.
2. Remove the compression stage 1 valve from the cylinder.

Check the compression stage 1 valve

→ Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 1 valve

1. → Slide a new cylinder head gasket over the studs and onto the cylinder.

Remove the strips of the cylinder head gasket before installation.

2. → Replace the low tolerance o-ring.
3. → Insert the compression stage 1 valve in the cylinder.
4. → Carefully slide the cylinder head over the studs and onto the cylinder.
5. → Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 2 valve

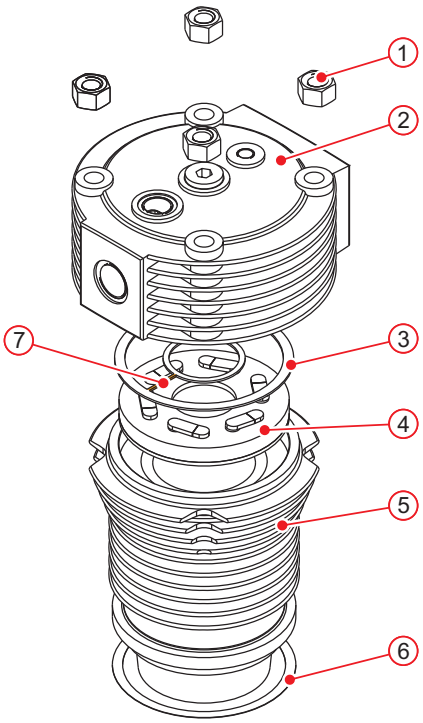


Fig. 11: Compression stage 2 valve

1 Cylinder head gasket

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 2.
2. Remove the compression stage 2 valve from the cylinder.

Check the compression stage 2 valve

→ Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 2 valve

1. Insert the compression stage 2 valve in the cylinder.
2. Slide a new cylinder head gasket over the studs and onto the cylinder.

Remove the strips of the cylinder head gasket before installation.

3. Carefully slide the cylinder head over the studs and onto the cylinder.
4. Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 3 valve

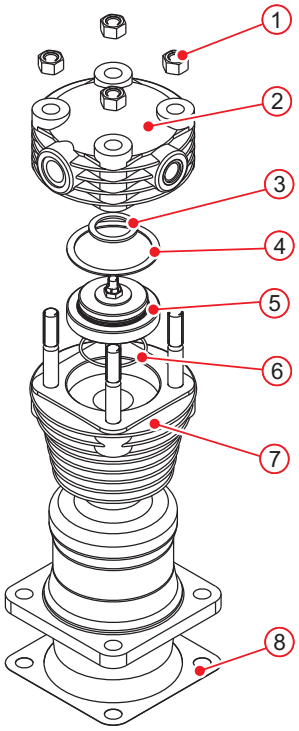


Fig. 12: Compression stage 3 valve

1 Low tolerance o-ring
2 Cylinder head gasket
3 O-ring

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 3.
2. Remove the compression stage 3 valve from the cylinder.

Check the compression stage 3 valve

- Check the exterior of the valve for:
  - damage,
  - coking,
  - oiling,
  - Corrosion
  - moisture.

  If necessary, establish the cause of the fault.

Installing the compression stage 3 valve

1. Slide a new cylinder head gasket over the studs and onto the cylinder.

> *Remove the strips of the cylinder head gasket before installation.*

2. Replace the o-ring.
3. Replace the low tolerance o-ring.
4. Insert the compression stage 3 valve in the cylinder.
5. Carefully slide the cylinder head over the studs and onto the cylinder.
6. Screw on the cylinder head nuts and finger-tighten.

Removing the compression stage 4 valve

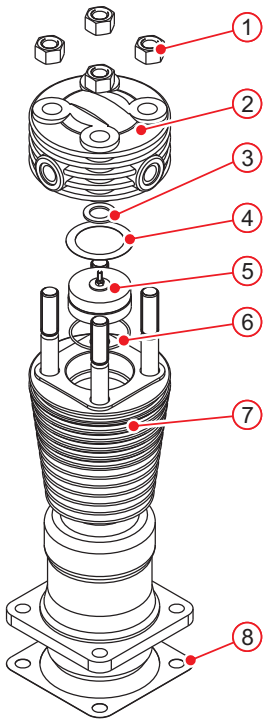


Fig. 13: Compression stage 4 valve

1 Low tolerance o-ring
2 Cylinder head gasket
3 O-ring

1. Unscrew the cylinder head nuts and remove the cylinder head for compression stage 4.
2. Remove the compression stage 4 valve from the cylinder.

Check the compression stage 4 valve

Check the exterior of the valve for:

- damage,
- coking,
- oiling,
- Corrosion
- moisture.

If necessary, establish the cause of the fault.

Installing the compression stage 4 valve

1. Slide a new cylinder head gasket over the studs and onto the cylinder.

   Remove the strips of the cylinder head gasket before installation.

2. Replace the o-ring.
3. Replace the low tolerance o-ring.
4. Insert the compression stage 4 valve in the cylinder.
5. Carefully slide the cylinder head over the studs and onto the cylinder.
6. Screw on the cylinder head nuts and finger-tighten.

4.1.5.4 Final tasks

Final tasks

1. Screw the pipe unions and hose line back on the cylinder heads, but do not tighten.
2. Securely tighten the cylinder head nuts. Observe the tightening torque.

   'Table of tightening torques' on page 10

3. Securely tighten the pipe unions and hose lines.

4.1.6 Replacing the piston rings, gudgeon pins and gudgeon pin bearings

Removing the piston

Personnel:
- Service personnel

Protective equipment:
- Safety goggles
- Protective gloves
- Work clothing
- Safety boots

Special tool:
- Crane and lifting gear

Requirement: Cylinder head and valves have already been removed.

1. Unscrew the cylinder foot nuts on the compressor stages.
2. Carefully remove the cylinders and guide pistons.

NOTICE!
Damage to the piston
The piston may be damaged if it strikes against the crankcase while work is carried out on the cylinder or connecting rod.
– Always support or hold the piston while work is carried out.

3. Replace the gudgeon pins and gudgeon pin bearings as described in *Chapter 4.1.6.1 'Replacing the gudgeon pins and gudgeon pin bearings' on page 34*.

Replacing the piston rings

1. Remove all piston rings from the piston using piston ring pliers.

Remove the screw cap and spacer rings from the compression stage 4 piston.

NOTICE!
Damage due to faulty piston rings
Do not continue using used piston rings. Doing so will lead to damage to the piston and cylinder liner within a short period of time.
– Only re-install pistons with new piston rings.

2. Clean the piston using an oil-dissolving fluid. Clean the connecting rod with a lint-free cloth.
3. Measure the pistons, cylinder liners and cylinder wear as described in *Chapter 4.1.6.2 'Checking the pistons and cylinders' on page 37*.
4. Insert new piston rings into the grooves on the piston using piston ring pliers.

Observe the position of the piston rings. Piston rings with an asymmetrical cross section have a marking on one of the surfaces. This marked face must point to the cylinder head when the piston ring is installed.

5. Position the piston rings so that the joint gaps are offset. The piston rings can be secured in position using grease.

Assembly

1. Assemble the guide pistons.
2. Lubricate the pistons and cylinders
3. Fit a new cylinder foot gasket for each cylinder.
4. Slide the cylinders over the pistons. The pistons must not tilt as you do this. If there is too much resistance, check the position of the piston rings.
5. Tighten the cylinder foot nuts.

4.1.6.1 Replacing the gudgeon pins and gudgeon pin bearings

The instructions for replacing the gudgeon pins and gudgeon pin bearings are described as an example and apply equally to all compression stages.

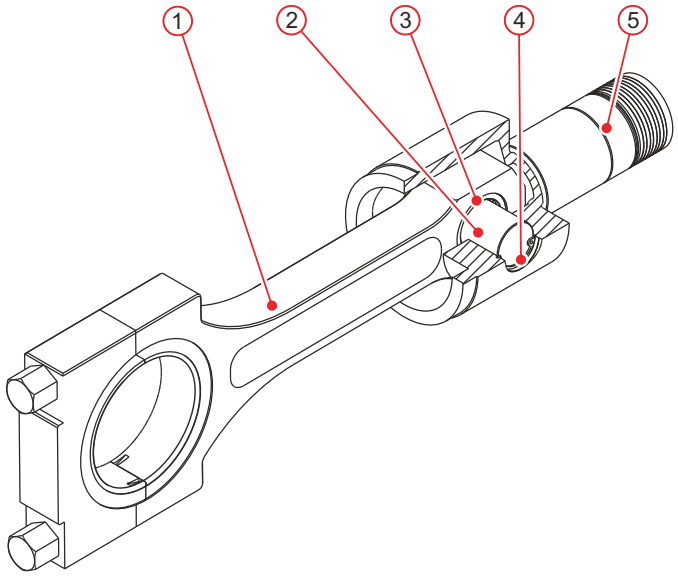


Fig. 14: Connecting rod (Example)

1 Connecting rod
2 Gudgeon pin
3 Gudgeon pin bearing
4 Circlips
5 Piston

Requirement: Cylinder heads, valves, cylinders and pistons have already been removed.

1. Remove crankcase inspection cover.
2. Loosen the connecting rod bolts and remove the connecting rod bearing cover with the bearing shell. Take connecting rod out.
3. Remove the gudgeon pin circlips and press the gudgeon pin out of the gudgeon pin bearing.
4. Remove the piston.
5. Press the gudgeon pin bearing out of the connecting rod eye using a bearing press.
6. Clean and lubricate the connecting rod eye.
7. Clean the hole for the gudgeon pin in the piston.
8. Lubricate the hole for the gudgeon pin in the piston and the gudgeon pin itself.
9. Press the new gudgeon pin bearing into the connecting rod eye and lubricate the gudgeon pin bearing.
10. Fit a circlip in the piston.
11. Slide the gudgeon pin into the gudgeon pin bearing.
12. Fit the second circlip.

13. Lubricate the upper and lower parts of the connecting rod.

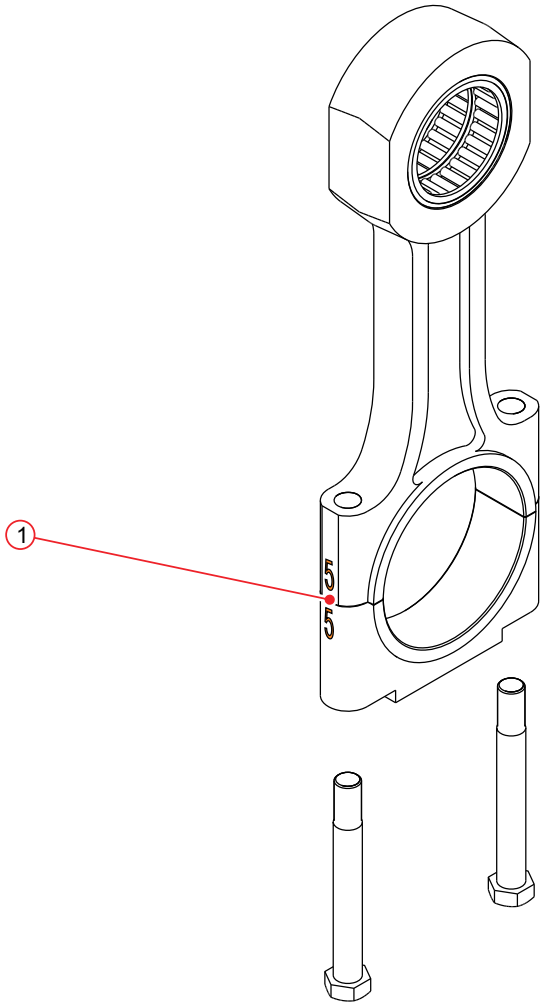


Fig. 15: Connecting rod (Example)

1 Numerical marking on connecting rod

14. Fit the connecting rod. To do this, use new connecting rod bolts and tighten them by hand. Make sure that the connecting rods are seated correctly on the crankshaft, and that the upper and lower parts of the connecting rod are installed the right way round.

⇨ The numerical markings must match.

15. After tightening, the connecting rod should rotate easily on the crankshaft. Observe the tightening torque ↬ *Chapter 3.2 'Requirements for maintenance work' on page 9*.

16. Replace the inspection cover.

17. Fit the pistons, cylinders, valves and cylinder heads.

4.1.6.2 Checking the pistons and cylinders

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

The term cylinder as used here also includes cylinder liners.

Compression unit has already been removed. Piston has already been disassembled. ↳ *"Replacing the piston rings, gudgeon pins and gudgeon pin bearings" chapter*

1. Check the piston and cylinder for scoring marks and excessive wear.
2. If there is excessive wear, replace the parts.

Fig. 16: Cylinder surface in unused condition

Contact the Sauer-Service department of Sauer USA if cylinders or pistons need to be replaced.

Measuring cylinder wear

This measurement can be made with used or new piston rings.

1. 1st measurement:

   Push the piston ring into the cylinder about 5 mm below the upper edge of the cylinder and above the visible running surface of the piston rings. Measure the gap clearance with a feeler gauge.

2. 2nd measurement:

   Push the piston ring into the cylinder about 50 mm below the upper edge of the cylinder and within the visible running surface of the piston rings. Measure the gap clearance with a feeler gauge.

3. Calculate the difference between the gap clearances from the 1st and 2nd measurements, and compare this with the values in the permitted gap clearance differences table.

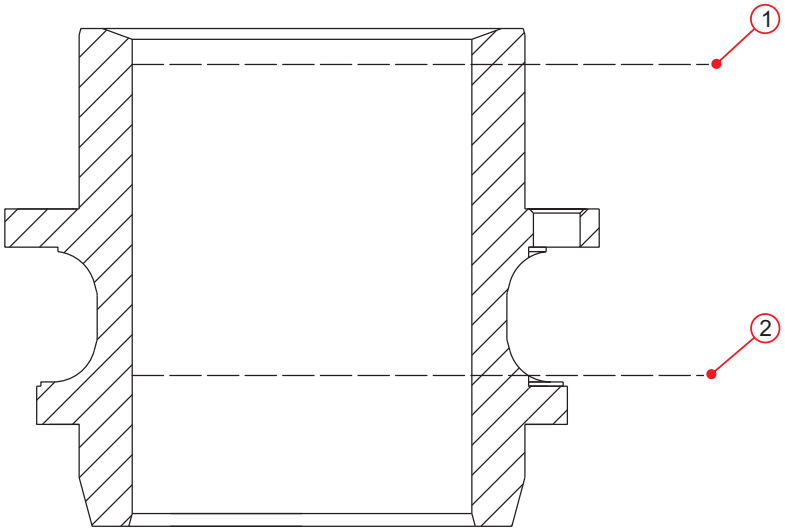


Fig. 17: Cylinder wear measurement

1 approx. 5 mm below the upper edge of the cylinder
2 approx. 50 mm below the upper edge of the cylinder

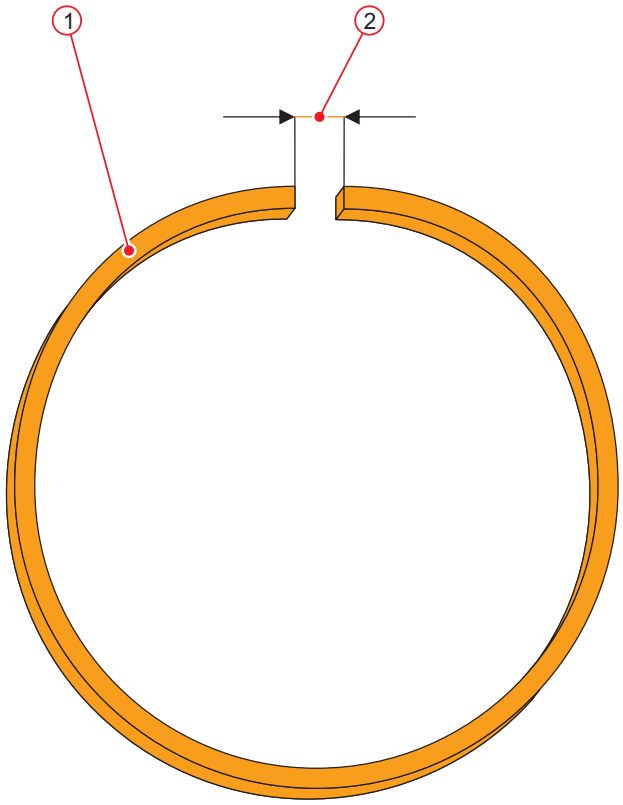


Fig. 18: Gap clearance

1 Piston ring
2 Gap clearance

Piston diameter	Permissible gap clearance difference
≥ 100 mm	0.45 mm
< 100 mm	0.30 mm

If the permissible gap clearance difference is exceeded, contact Sauer-Service.

4.1.7 Replacing the elastomeric element

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

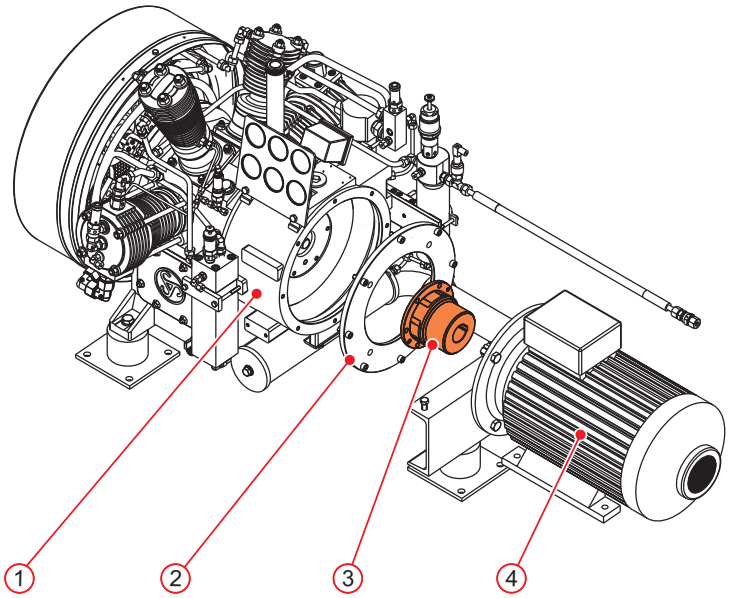


Fig. 19: Elastomeric element (example: WP4341)

1 Compressor crankcase
2 Adapter plate
3 Elastomeric element between the flange hub on the compressor side and the hub on the motor side
3 Motor

1. Shut down the compressor and secure it against restarting.
2. Support the compressor under the bell housing.
3. Unscrew fixing screws of the motor.
4. Carefully lift the motor using the lifting eyes.
5. Pull the motor carefully away from the crankcase.
6. Replace the elastomeric element.
7. Carefully slide the motor onto the crankcase and screw in and tighten the fixing screws on the motor.
8. Remove the support under the bell-housing.

4.1.8 Servicing the solenoid drain valve

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

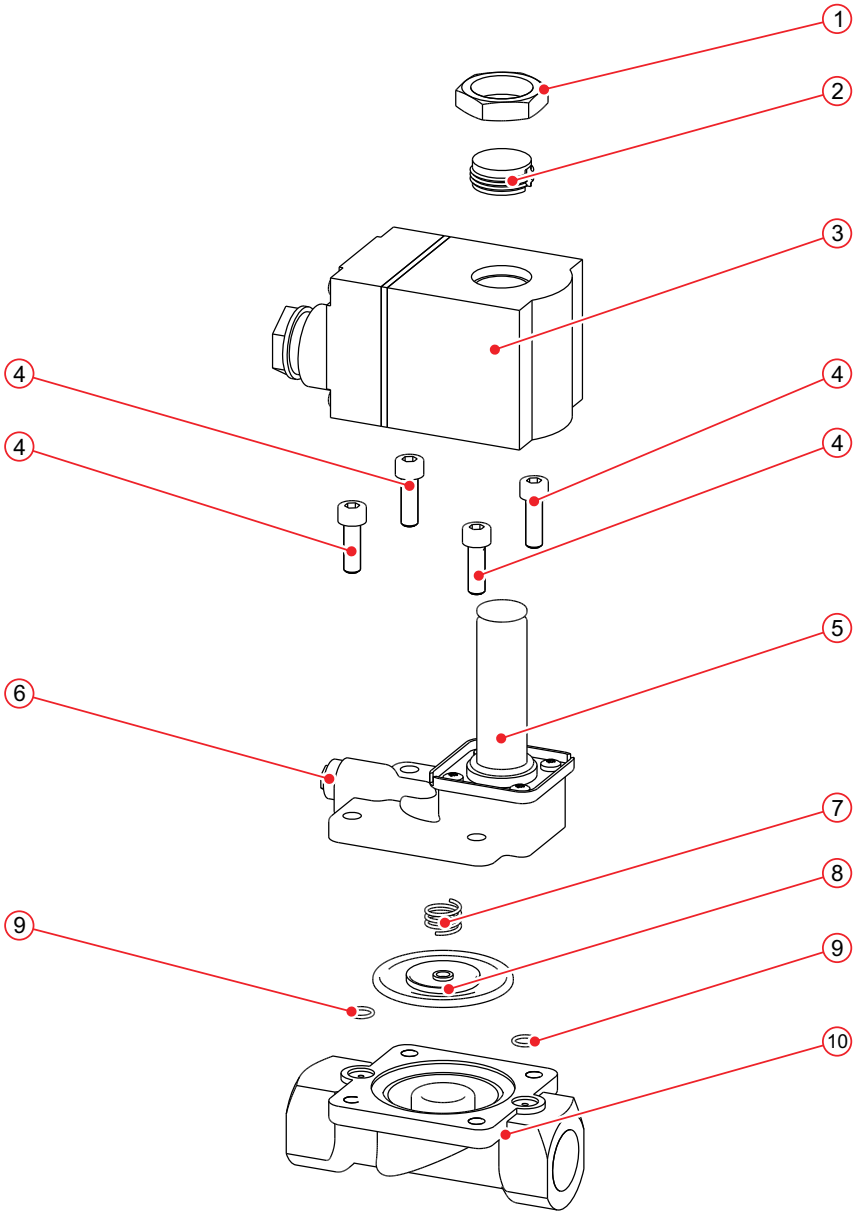


Fig. 20: Solenoid drain valve (exploded drawing)

1 Hexagon nut
2 Threaded element
3 Coil
4 Inner hexagon socket head screws
5 Solenoid armature
6 Nozzle
7 Spring
8 Diaphragm
9 O-rings
10 Lower valve section

1. Unscrew the hexagon nut.

2. Carefully lift the threaded element with the wrench.
3. Remove the coil from the solenoid armature.
4. Loosen the four hexagon socket head screws.
5. Remove the upper section of the valve.
6. Replace the following parts:
   - Spring
   - Diaphragm
   - O-rings
7. Clean the nozzle.
8. Attach the upper section of the valve. Screw in and tighten the four hexagon socket head screws. Attach the coil to the solenoid armature.
9. Position the threaded element correctly and press it onto the solenoid armature.
10. Carefully screw on the hexagon nuts by hand.
11. Slightly tighten the hexagon nuts.

4.1.9 Servicing pneumatic drain valves

Personnel:
- Service personnel

Protective equipment:
- Protective gloves
- Work clothing
- Safety boots

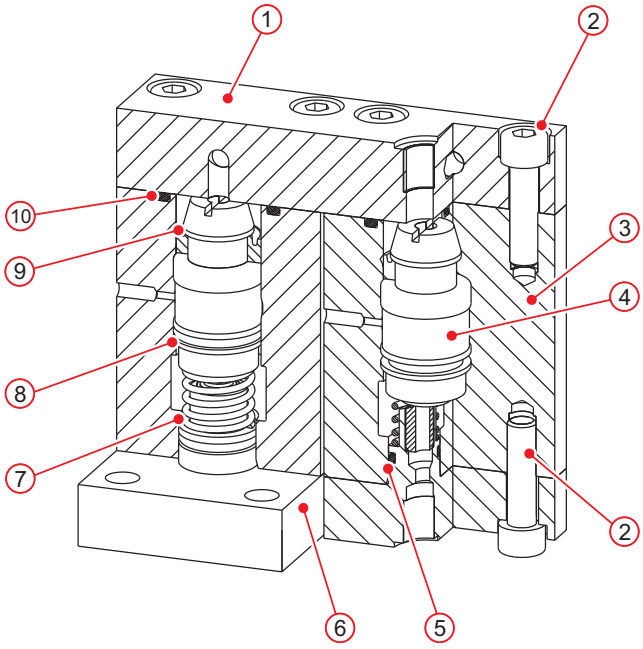


Fig. 21: Pneumatic drain valve

1 Housing cover
2 Socket head cap screw
3 Valve body
4 Valve piston
5 O-ring
6 Housing flange
7 Spring
8 O-ring
9 Gasket
10 O-ring

1. Disconnect all pipelines from the pneumatic drain valve.
2. Remove the pneumatic drain valve.
3. Unscrew the socket head cap screws on the housing flange and remove the housing flange. Replace the O-rings. Check the surface of the valve seat on the housing flange.
4. Unscrew the socket head cap screws on the housing cover and remove the housing cover from the valve body. Replace the O-rings.
5. Screw the M 6 screw into the thread on the valve piston and remove the valve piston from the valve body. Replace the o-rings and ring gaskets.
6. Check the surface of the valve seat at the base of the valve piston for damage, clean and lubricate. Replace damaged valve pistons.
7. Lubricate the valve piston and insert in the valve body.

8. Fit the housing cover on the valve body with new ring gaskets.
9. Fit the housing flange with new o-rings.
10. Re-install the pneumatic drain valve.
11. Connect the drainage lines of compression stages 3 and 4. Make sure that the correct channels are connected to the lines of compression stages 3 and 4. The diameter of the channel for compression stage 4 is smaller.
12. Connect the pipelines to the pneumatic drain valve and tighten the union nuts at both ends.

4.1.10 Checking the safety valves

DANGER!

Risk of pressure being exceeded

Faulty or manipulated safety valves may lead to excess pressure build-up. Excess pressure build-up may destroy the system. In this case, there is a serious risk of death in the vicinity of the system due to flying parts and escaping hot gas, hot air or hot coolant.

– Check the safety valves regularly and replace if faulty.
– Do not adjust, disable or remove safety valves.

The safety valves are sealed by the manufacturer to prevent tampering. The construction of the safety valves means that they cannot be tested for function.

The operator must check the safety valves in accordance with country-specific guidelines and laws, and replace them as necessary.

Sauer USA offers a professional and qualified safety valve replacement service and corre-sponding training for maintenance personnel.. Please contact Sauer-Service.

Carry out the following checks to detect any damage to safety valves:

- Check the safety valve and seal for signs of external damage.
- Test threaded connections for proper seating.
- Inspect attached parts and lines for damage.

Have damage to safety valves, attached parts and lines repaired immediately by the Sauer-Service department.

5 Preservation

This chapter describes the preservation work that is required before and after storing the Sauer-Compressor for a long period.

5.1 Preservation for decommissioning of longer than 12 weeks

If the Sauer-Compressor is scheduled to be decommissioned for longer than 12 weeks, Sauer USA recommends preserva-tion with a preservation oil. If this preservation is carried out, periodic test runs are not needed.

Use one of the preservation oils specified in the "Oil recommen-dation for Sauer-Compressors".

Personnel:	■ Service personnel
Protective equipment:	■ Hearing protection ■ Safety goggles ■ Protective gloves ■ Work clothing ■ Safety boots
Special tool:	■ Measuring beaker ■ Oil injector
Materials:	■ Preservation oil

1. Disconnect the power supply for the solenoid drain valves from the compressor control.
   ⇨ The solenoid drain valves remain open.
2. Run the compressor for around 5 minutes with the solenoid drain valves and pressure line open.
   ⇨ Any existing condensate is blown out.
3. Stop the compressor.
4. Drain the oil and dispose of it in an environmentally safe manner.
5. Fill the compressor with lubricating oil up to 3/4 of the regular oil sump capacity.
6. Run the compressor for around 5 minutes with the solenoid drain valves and pressure line open.
   ⇨ The preservation oil disperses in the oil circuit.
7. Stop the compressor.

8. Make sure that the Sauer-Compressor is depressurized. To do this, check the pressure displays for the compression stages on the gauge panel.

   If there is any residual pressure, check whether all solenoid drain valves are open.

9. WP4331: Unscrew the air filter.

10. WP4341: Loosen the clips, take off the air filter cap and remove the air filter insert.

11. Spray approx. 100 ml preservation oil into the suction compartment of compression stage 1.

12. Unscrew the compression stage 1 safety valve on the compression stage 2 cylinder head.

13. Spray approx. 50 ml preservation oil into the suction compartment of compression stage 2.

14. Disconnect the pressure lines on the suction side of compression stage 3 cylinder.

15. Spray approx. 50 ml preservation oil into the suction compartment of compression stage 3.

16. Disconnect the pressure lines on the suction side of compression stage 4 cylinder.

17. Spray approx. 20 ml preservation oil into the suction compartment of compression stage 4.

18. Refit the pressure line.

19. Re-install the safety valve using a new gasket.

20. WP4331: Mount the air filter.

21. WP4341: Fit an air filter insert in the air filter housing. Attach the air filter cap and close the clamps.

22. Run the compressor for around 15 seconds with the solenoid drain valves and pressure line open.

    ⇨ The preservation oil disperses in the oil circuit.

23. Turn off the Sauer-Compressor and secure against being turned on again.

    If fitted, turn off the main switch to disconnect the power to the Sauer-Compressor and the compressor control.

24. Reconnect the power supply for the solenoid drain valves to the compressor control.

25. Drain the preservation oil.

    Ensure that the oil is disposed of or treated in an environmentally friendly manner.

26. Attach a warning sign to prevent the preserved compressor from being started accidentally.

5.2 Commissioning after storage

If the maximum storage time is exceeded, the Sauer-Compressor must be inspected for possible damage before commissioning.

NOTICE!

Damage to the Sauer-Compressor

The following work should be carried out independently with the authorisation ofJ.P. Sauer & Sohn Maschinenbau GmbH.

Otherwise, contact the Sauer-Service department.

Personnel:
- Service personnel

Protective equipment:
- Hearing protection
- Work clothing
- Protective gloves
- Safety boots

Requirement: The Sauer-Compressor has been properly preserved and stored.

1. Connect the power supply.
2. Fill the compressor with a specified oil.
3. Perform commissioning according to the operating instructions.
4. Watch out for abnormal operating noise.
5. Compare the pressure displays for each compression stages indicated on the gauge panel with the specified setpoints in the technical data: Operating Instructions

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