



CHAPTER OVERVIEW

Operating Instructions

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D

Attachment

E

Manufacturer in terms of 97/23/EC

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SERVICE INFORMATION / WARRANTY

Compressor information

Type designation

Serial number

Date of construction

Purchase information

Purchase date

First commissioned on

Warranty period

Dealer's stamp

Warranty

L&W will uphold warranty claims made during a period of 12 months from the invoice date.

If the compressor was purchased from an official L&W dealer, the date on the dealer's invoice is valid. Warranty claims can only be made on presentation of the original invoice.

Should verifiably defective parts have been delivered, we will decide to either replace the parts or repair them. The resulting transport and assembly costs will be invoiced.

No reduction of the purchase price or changes to the contract can be made. The parts for which a claim is being made should be kept safe by the purchaser and, when requested, sent to us at their cost. Replaced parts become the property of L&W. If maintenance work is carried out without our knowledge or permission by the purchaser or a third party, we are absolved from any liability for warranty claims. As a matter of principle, warranty claims can only be made by the initial purchaser.

Operating Instructions

Breathing Air Compressor

LW 230 E Compact / LW 280 E Compact / LW 320 E Compact

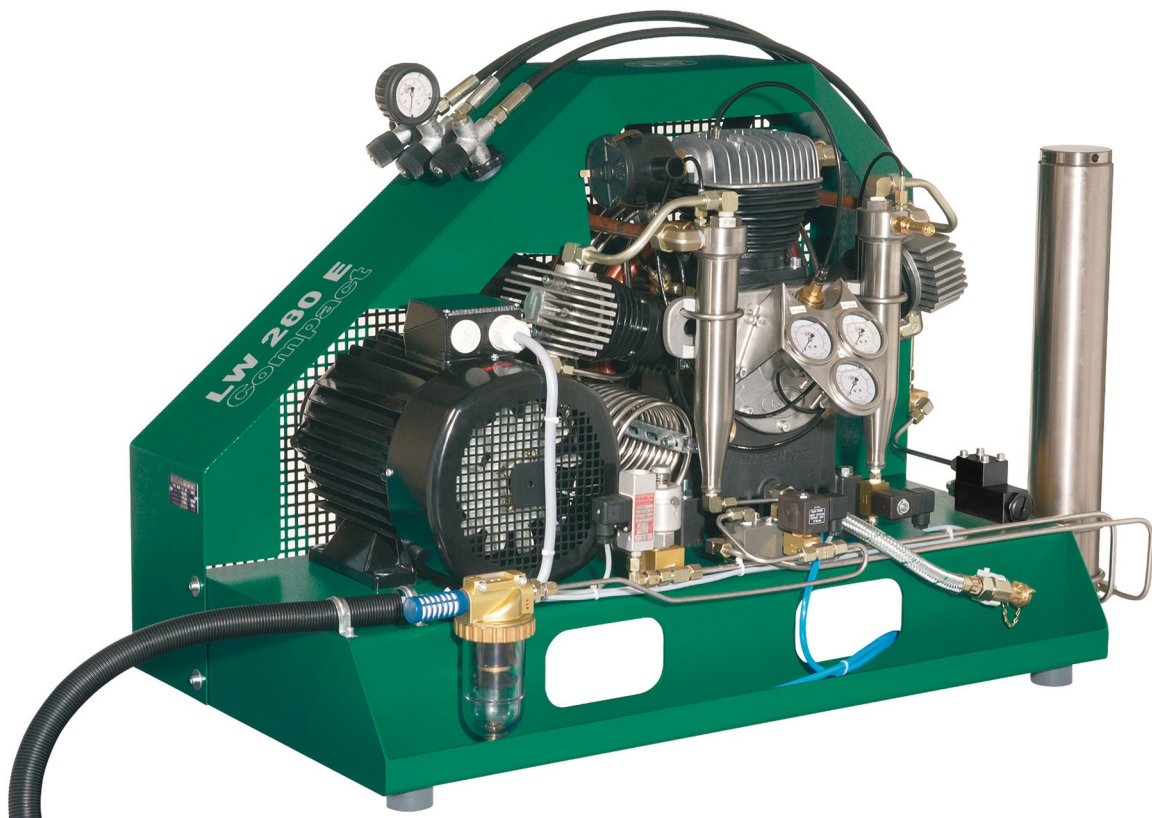




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GENERAL INFORMATION

General Information

We strongly recommend reading this manual thoroughly prior to operation and follow all the safety precautions precisely. Damage resulting from any deviation from these instructions is excluded from warranty and liability for this product. Carry out other commissioning steps only if you have fully understood the following contents.

Before commissioning and using the unit, carry out all the essential preliminary work and measures concerning legal regulations and safety. These are described on the following pages of this operation manual.

A

Description of marks and warning signs

The following warning signs are used in this document to identify the corresponding warning notes which require particular attention by the user. The warning signs are defined as follows:



Caution

Indicates an imminently hazardous situation which, if not avoided, could result in serious injury, physical injury or death.



Warning

Indicates a potentially hazardous situation which, if not avoided, could result in physical injury or damage to the product or environment.



Note

Indicates additional information on how to use the unit.



DESCRIPTION

Scope of Delivery

Compressors are provided in different equipped versions.

A

Versions

Filling pressure versions:

- PN 225 bar
- PN 330 bar
- PN 225 / 330 bar

Specifications

- Painted steel frame and fan belt guard (RAL 6026)
- Hour counter
- Start/ Stop and emergency stop switch
- Manual condensate drain
- 1 x Filling hose c/w filling valve
- Motor protection switch (LW 230 Optional)
- Pressure maintaining and non return valve
- All pistons c/w steel piston rings
- Low pressure oil pump and filter
- Oil- / Water separators in stainless steel
- Safety valves after each stage
- 3 x concentric suction/pressure valves
- Filling pressure to your choice (200 or 300 bar)

Options

- Automatic condensate drain
- Automatic stop at final pressure
- Auto start system
- 200 and 300 bar parallel filling pressures
- Oil pressure gauge and intermediate pressure gauges
- Oil pressure monitoring c/w auto shut down
- Cylinder head temperature monitoring with auto shut down
- Puracon filter monitoring (Auto shut down also available)
- Phase monitoring c/w shut down at wrong direction of rotation
- Additional high pressure outlet
- Power cable and plug

DESCRIPTION

Technical Data



| Technical Data | LW 230 E | LW 280 E | LW 320 E |
|---|--------------------------------|--------------|--------------|
| Capacity [l/min]: | 230 | 280 | 320 |
| Max. Operating Pressure [bar]: | 350 | 350 | 350 |
| RPM [min ⁻¹]: | 1080 | 1300 | 1450 |
| Number of Pressure Stages: | 3 | 3 | 3 |
| Cylinder Bore 1st Stage [mm]: | Ø 95 | Ø 95 | Ø 95 |
| Cylinder Bore 2nd Stage [mm]: | Ø 40 | Ø 40 | Ø 40 |
| Cylinder Bore 3rd Stage [mm]: | Ø 18 | Ø 18 | Ø 18 |
| Medium: | Compressed Air / Breathing Air | | |
| Intake Pressure: | atmospheric | | |
| Oil Pressure [bar]: | +0.6 to +4.0 | +0.6 to +4.0 | +0.6 to +4.0 |
| Oil Capacity [l]: | 1.8 | 1.8 | 1.8 |
| Intake Temperature [°C]: | 0 < +45 | 0 < +45 | 0 < +45 |
| Ambient Temperature [°C]: | +5 < +45 | +5 < +45 | +5 < +45 |
| Cooling Air Volume [m ³ /h]: | > 1650 | > 2250 | > 2250 |
| Voltage: | 400 V / 3 phase / 50 Hz | | |
| Protection Class Drive Motor: | IP 54 | IP 54 | IP 54 |
| Drive Power [kW]: | 5.5 | 7.5 | 7.5 |
| RPM Motor [min ⁻¹]: | 2890 | 2890 | 2890 |
| Start: | Star/Delta | | |
| Noise level from a distance of 1 m [dB(A)]: | 82 | 83 | 83 |
| Dimensions W x D x H [mm]: | 1200 x 600 x 900 | | |
| Weight [kg]: | approx. 195 | approx. 195 | approx. 195 |
| Content Volume Filter housing [l]: | 1.7 | 1.7 | 1.7 |

DESCRIPTION

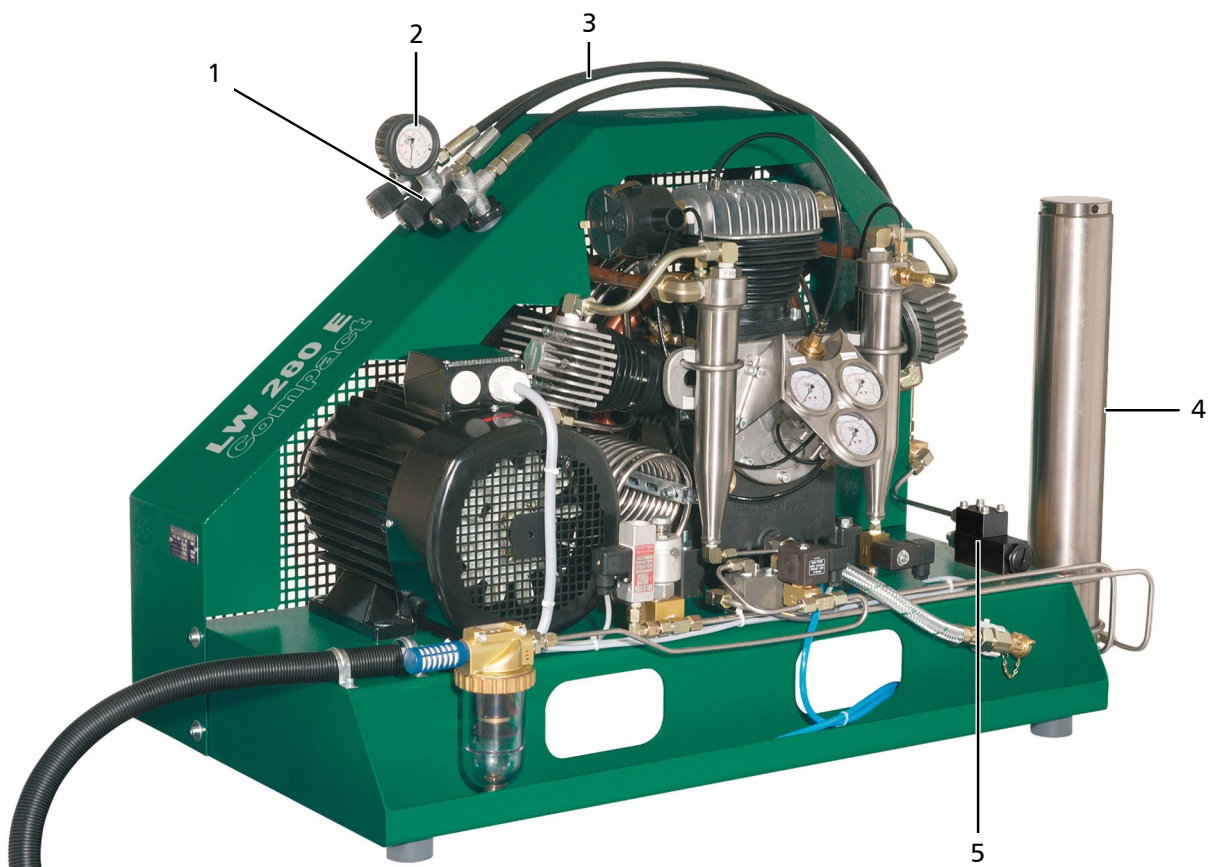
Unit Assembly



Note

Following options for the shown compressor:

Auto shut down, automatic condensation drain, two additional filling hoses, intermediate pressure gauge, oil pressure display, remote control box.

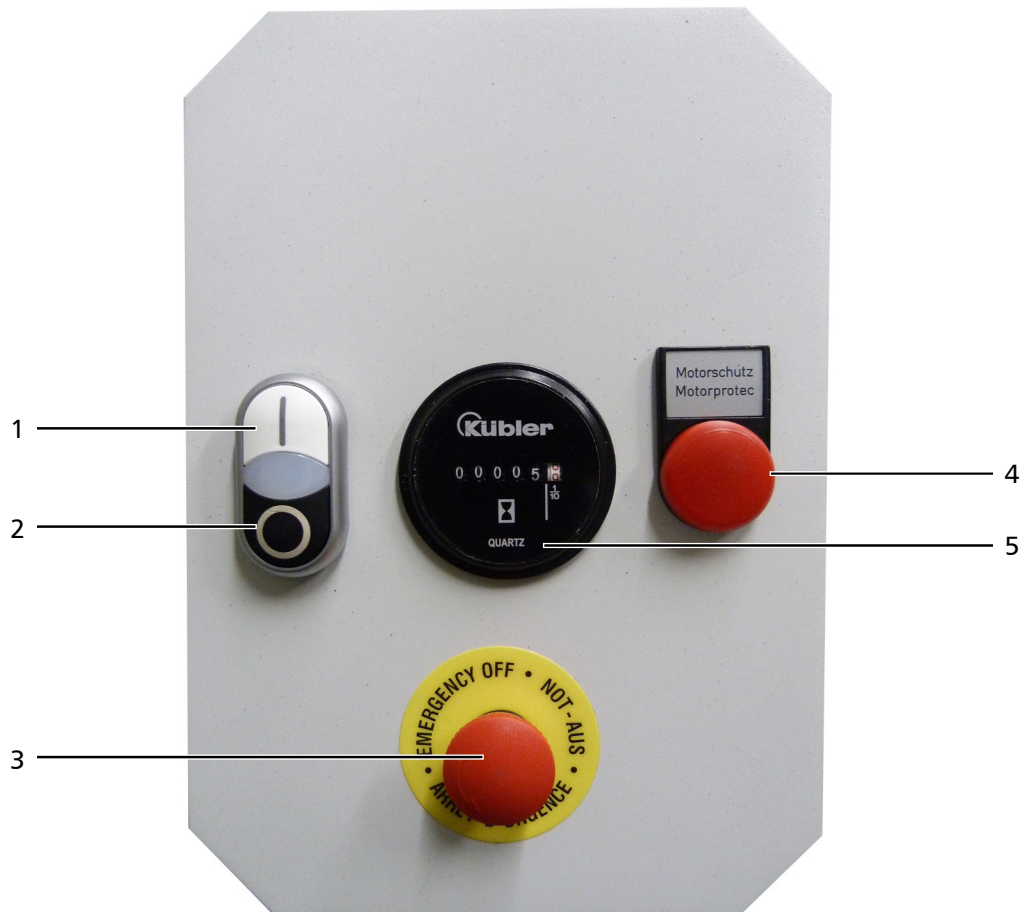


| No. | Designation |
|-----|---|
| 1 | Filling valve |
| 2 | Filling pressure gauge |
| 3 | Filling hose |
| 4 | Filter housing |
| 5 | Pressure maintaining / non return valve |

DESCRIPTION

Switchboard

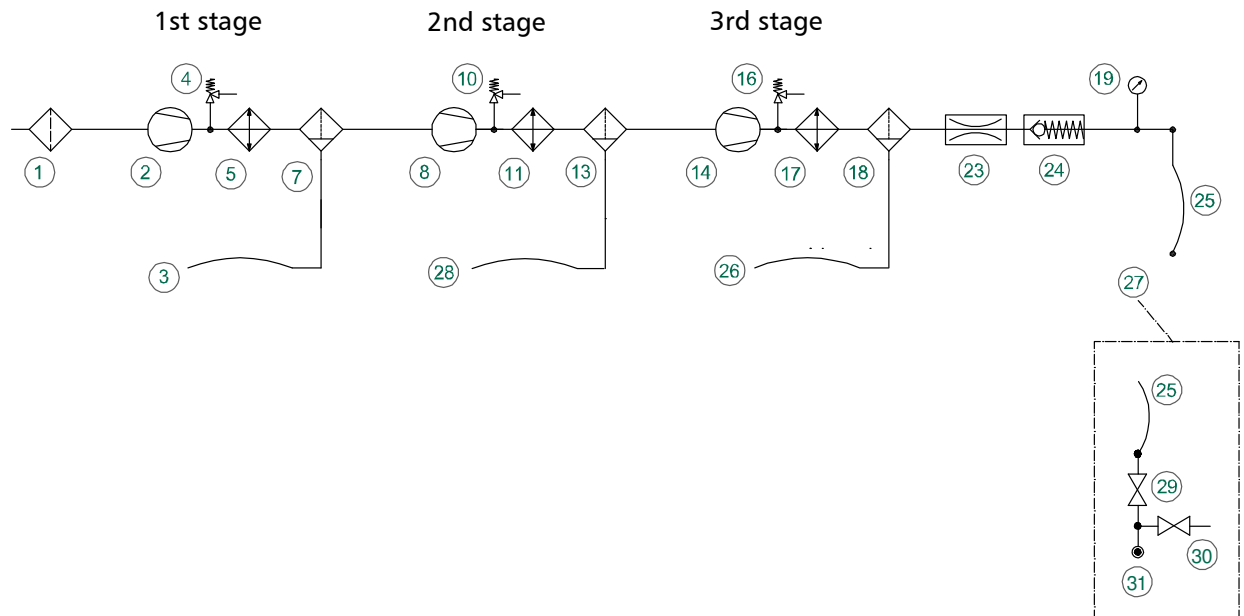
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| No. | Designation |
|-----|--------------------------------|
| 1 | ON button |
| 2 | OFF button |
| 3 | Emergency shut-off switch |
| 4 | Motor protection warning light |
| 5 | Hour counter |

DESCRIPTION

Flow chart



- | | |
|---|--|
| 1. Ansaugfilter / Air Intake Filter | 18. Öl-/Wasserabscheider / Oil-/Water Separator |
| 2. 1. Verdichterstufe / 1st Pressure Stage | 19. Druckmanometer (Fülldruck) / Pressure Gauge (Filling Pressure) |
| 3. Kondensatablaßschlauch / Condensate Release Hose | 23. Druckhalteventil / Pressure Maintaining Valve |
| 4. Sicherheitsventil 1. Stufe / Safety Valve 1st Stage | 24. Rückschlagventil / Non-Return Valve |
| 5. Wärmetauscher / Heat Exchanger | 25. Hochdruckschlauch / HP-Hose |
| 7. Öl-/Wasserabscheider / Oil-/Water Separator | 26. Kondensatablaßschlauch / Condensate drain hose |
| 8. 2. Verdichterstufe / 2nd Pressure Stage | 27. Füllventil / Filling valve |
| 10. Sicherheitsventil 2. Stufe / Safety Valve 2nd Stage | 28. Kondensatablaßschlauch / Condensate drain hose |
| 11. Wärmetauscher / Heat Exchanger | 29. Füllspindel / Filling spindle |
| 13. Öl-/Wasserabscheider / Oil-/Water Separator | 30. Entlüftungsspindel / Vent spindle |
| 14. 3. Verdichterstufe / 3rd Pressure Stage | 31. Flaschenanschluss / Tank Connector |
| 16. Sicherheitsventil 3. Stufe / Safety Valve 3rd Stage | |
| 17. Wärmetauscher / Heat Exchanger | |



A

SAFETY PRECAUTIONS



SAFETY PRECAUTIONS

Intended Use

Only use the unit in perfect condition for its intended purpose, safety and intended use and observe the operating instructions! In particular disorders that may affect safety have to be eliminated immediately!

Use the unit exclusively for the determined medium (see "Technical Data"). Any other use that is not specified is not authorized. The manufacturer/supplier shall not be liable for any damages resulting from such use. Such risk lies entirely with the user. Authorization for use is also under the condition that the instruction manual is complied with and inspection and maintenance requirements are enforced.

No change and modification to the unit can be made without the written agreement of the manufacturer. The manufacturer is not liable for damage to persons or property resulting from unauthorized modifications.

Operators

Target groups in these instructions;

Operators

Operators are persons who are authorized and briefed for the use of the compressor.

Qualified personnel

Qualified personnel are persons who are entitled to repair, service, modify and maintain the system.



Warning

Only trained personnel are permitted to work on the unit!



Warning

Work on the electrical equipment on / with the machine / unit may only be carried out by qualified electricians.

SAFETY PRECAUTIONS

Safety instructions on the unit

Importance of notes and warning signs that are affixed to the compressor according to the application or its equipment.

A



Warning
High voltage!



Note
Ensure correct direction of rotation!



SAFETY PRECAUTIONS

General Safety Precautions

- Read the Operating Instructions of this product carefully prior to use.
- Strictly follow the instructions. The user must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the intended use section of this document.
- Do not dispose the operating instructions. Ensure that they are retained and appropriately used by the product user.
- Only trained and competent personnel are permitted to use this product.
- Comply with all local and national rules and regulations associated with this product.
- Only trained and competent personnel are permitted to inspect, repair and service the product.
- Only authentic L&W parts and accessories may be used for maintenance work. Otherwise, the proper functioning of the product may be impaired.
- Do not use faulty or incomplete products. Do not modify the product.
- Inform L&W in the event of any product or component fault or failure.
- The quality of the air supply must meet EN 12021 specifications for breathing air.
- Do not use the product in areas prone to explosion or in the presence of flammable gases. The product is not designed for these applications. An explosion might be the result if certain conditions apply.

A



SAFETY PRECAUTIONS

Unit customised safety notices

Organisational measures

- In addition to the instruction manual, observe and comply with universally valid legal and other obligatory regulations regarding accident prevention and environment protection.
- In addition to the instruction manual, provide supplementary instructions for supervision and monitoring duties taking into consideration exceptional factors e.g. with regard to organisation of work, production, personnel employed.
- Supervise personnel's work in accordance with the instruction manual, taking into account safety and danger factors.
- Observe all safety and danger notices on the compressor and check readability and completeness.

Safety instructions operation

- Take measures to ensure that the machine is only taken into operation under safe and functional conditions. Only operate the compressor if all protective and safety equipment, e.g. detachable protective equipment, are provided and in good working order.
- Check the compressor at least once per day for obvious damage and defects. Inform the responsible department / person immediately if anything is not as it should be (including operation performance). Shut down the machine immediately if necessary and lock it.
- In case of malfunction, stop the compressor immediately and lock it. Repair malfunctions immediately.
- If there is a failure in the electric energy supply, shut the machine / unit down immediately.
- Ensure safe and environmentally friendly disposal of consumables and old parts.
- The stipulated hearing protectors must be worn.
- Soundproofing equipment on the compressor has to be activated in safety function during operation.
- When handling with fats, oils and other chemical agents, observe the note for the product-related safety.

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SAFETY PRECAUTIONS

Maintenance instructions

- Hoses have to be checked by the operator (pressure and visual inspection) at reasonable intervals, even if no safety-related defects have been detected.
- Immediately repair any damage. Escaping compressed air can cause injury.
- Depressurise system and pressure lines before beginning repair work.
- Pressurised air lines must be laid and mounted by qualified personnel. Connections must not be mixed up. Fittings, length and quality of the piping must correspond to requirements.
- Adjustment, maintenance and inspection activities and keep appointments, including information on replacement parts / equipment, prescribed in the operating instructions have to be respected.
- If the machine / equipment is completely off during maintenance and repair work, it must be protected against unexpected restart. Turn off main control device and remove the key and/or display a warning sign on the main switch.
- The machine and especially the connections and fittings should be cleaned from oil, fuel and maintenance products at the beginning of the maintenance / repair. Do not use aggressive cleaning agents. Use fibre-free cleaning cloths.
- Switch off compressor and clean with a slightly damp cloth. Remove dirt from cooling pipes by using a brush.
- After cleaning, examine all pipes for leaks, loose connections, chafing and damage. Immediately eliminate any faults.
- Always retighten any screw connections loosened for maintenance or repair work.
- If it is necessary to remove safety devices for maintenance and repair work, these must be replaced and checked immediately after completion of the maintenance or repair work.
- The electrical equipment of the compressor must be regularly checked. Defects, such as loose screw connections or burnt wires, must be immediately rectified by electrically skilled personnel.
- Only personnel with particular knowledge and experience with pneumatics may carry out work on pneumatic equipment.
- Only personnel with particular knowledge and experience in gas equipment may carry out work on gas equipment.

A



SAFETY PRECAUTIONS

Transportation instructions

- Parts which need to be dismantled for transport purposes must be carefully replaced and secured before taking into operation.
- The transport may only be carried out by trained personnel.
- For transportation, only use lifting devices and equipment with sufficient lifting power.
- Do not stand or work under suspended loads.
- Also separate from minor relocation machinery / system of any external energy supply. Before recommissioning, reconnect the machine to the mains according to regulations.
- When recommissioning, proceed according to the operating instructions..

Safety regulations

- Inspections according to legal and local obligatory regulations regarding accident prevention are carried out by the manufacturer or by authorised expert personnel. No guarantees whatsoever are valid for damage caused or favoured by the non-consideration of these directions for use.

A



A

INSTALLATION

INSTALLATION

Installation in closed rooms



Danger

No operation in explosion-hazard areas.
The unit is not approved for operation in areas prone to explosion.

For installation in closed rooms, observe the following:

- Install the unit horizontally and level. The floor must be vibration-free and capable of taking the load of the system weight.
- The compressor room must be clean, dry, dust free and as cool as possible. Avoid direct exposure to sunlight. If possible, install unit in such a manner that the compressor fan can intake fresh air from outside. Ensure adequate ventilation and exhaust air opening.
- When locating the compressor in rooms of less than 30 m³ space where natural ventilation is not ensured or other systems having high radiation are operating in the same room, measures must be taken to provide artificial ventilation.
- Intake air must be free from noxious gas e.g. smoke, solvent vapours, exhaust fumes etc.
- Observe the specified operating temperature (see "Technical Data")!



Hinweis

- Intake air must be free from noxious gas e.g. smoke, solvent vapours and exhaust fumes. We recommend not to use the intake air inside the compressor housing. An intake hose would be recommendable!

Approximate value - Diameter of intake hose depending on the length of the intake hose

| Pos. | Length of Intake Hose [m] | Diameter of Intake Hose [mm] |
|------|---------------------------|------------------------------|
| 1 | ≤ 03 | Ø 30 |
| 2 | ≤ 10 | Ø 80 |
| 3 | ≤ 15 | Ø 100 |
| 4 | ≤ 20 | Ø 120 |

INSTALLATION

Dimensions

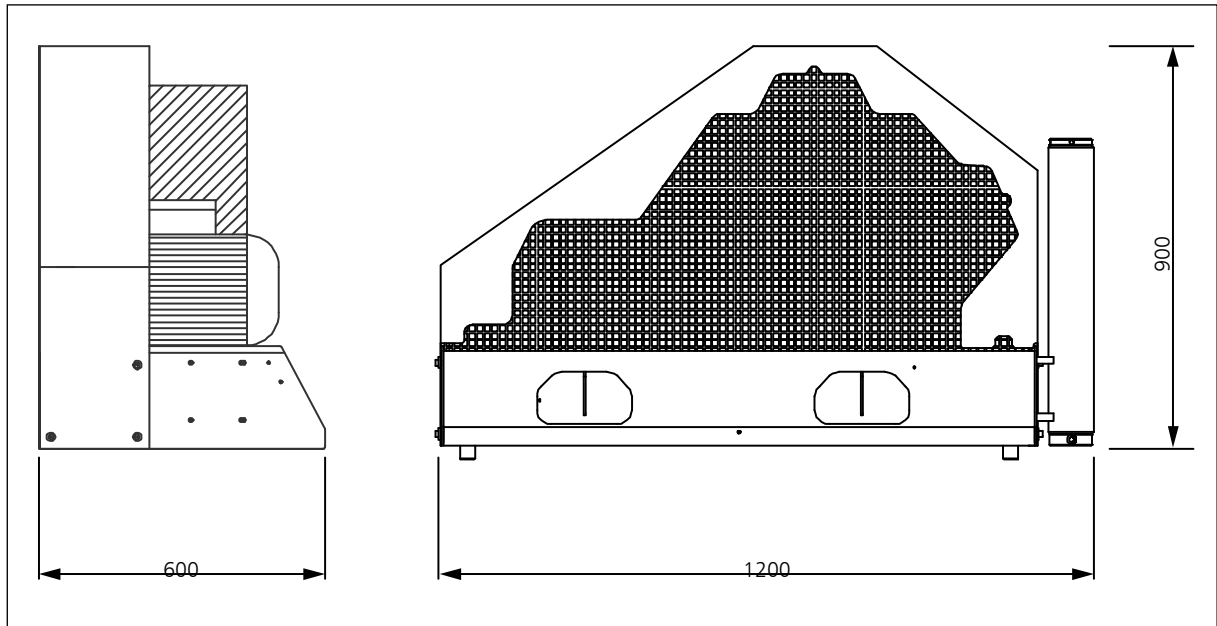


Fig. Dimensions

A

INSTALLATION

Minimum distances



Note

Minimum distances must be adhered!

- Make sure that the compressor always has a sufficient amount of fresh air available.
- To prevent serious damage, ensure that the cooling air flow can flow freely.
- The following minimum distances must be adhered:
Front side min. 1500 mm, sides min. 500 mm, rear side min. 500 mm.
Avoid anything in this area which can restrict the cooling air flow.

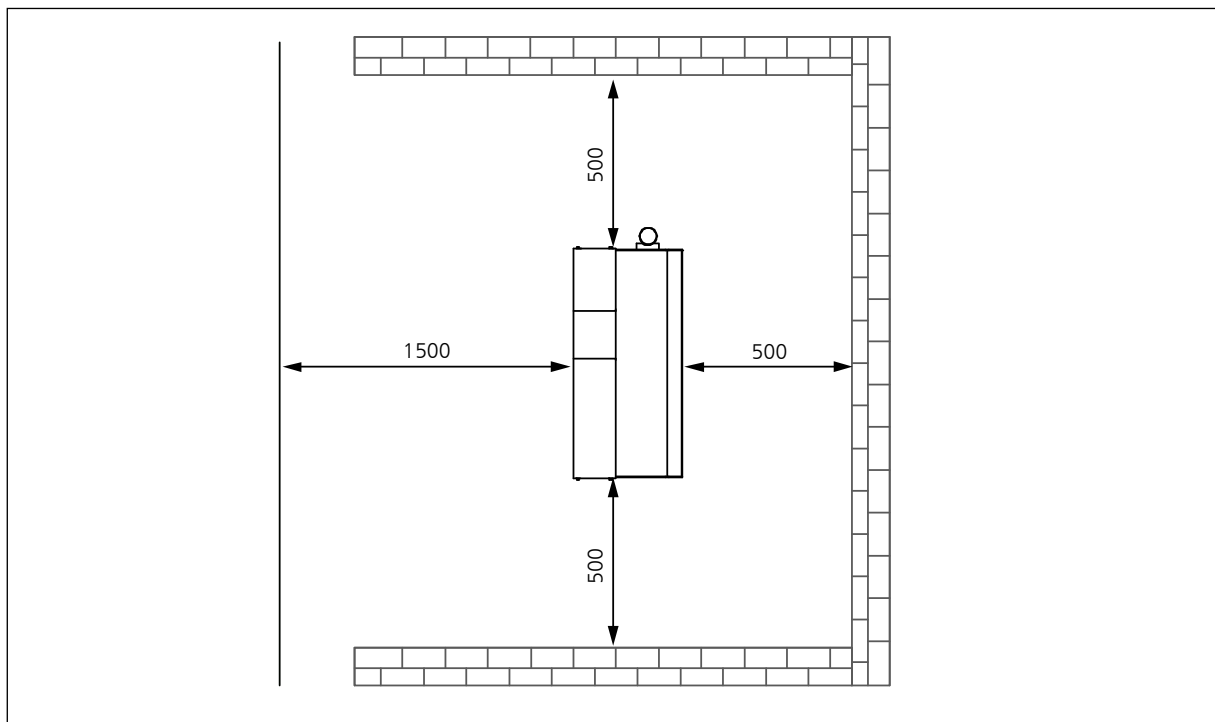


Fig. Minimum distances

INSTALLATION

Ventilation

- Make sure that the compressor always has a sufficient amount of fresh air available for cooling.
- To prevent serious damage, ensure that the cooling air flow can flow freely.
- The necessary cooling air flow can be calculated by using the following formula:
 $300 \times \text{drive power [kW]} = \text{required cooling air flow [m}^3/\text{h]}$
 Example 11kW motor: $300 \times 11\text{kW} = 3300 \text{ m}^3/\text{h} = \text{required cooling air flow.}$
- The fan capacity for fresh air and warm air must meet at least the required cooling air flow.
 The fans must have the same capacity.

A

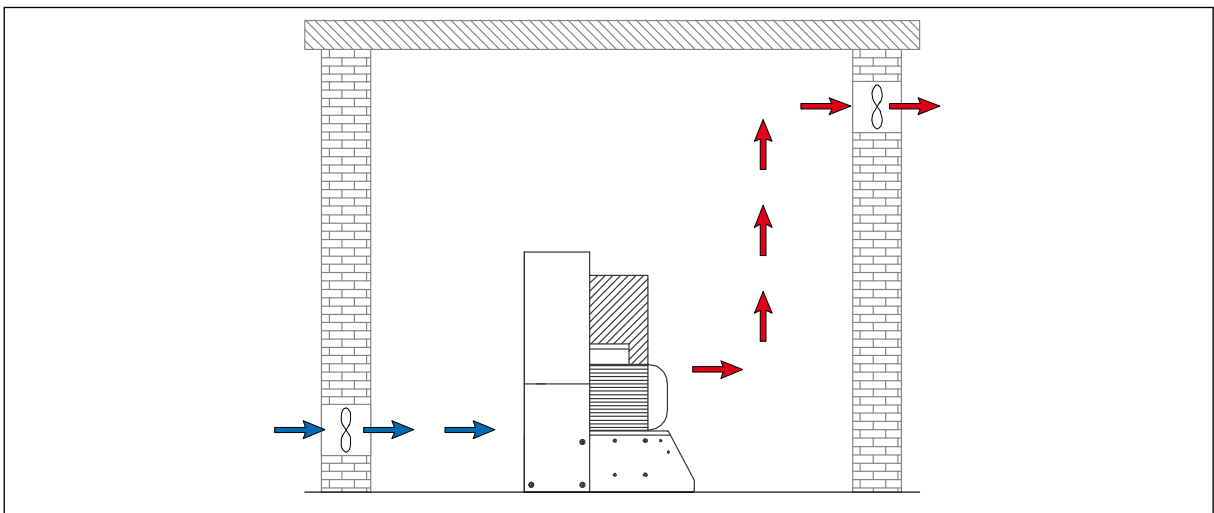


Fig. Ventilation through facade

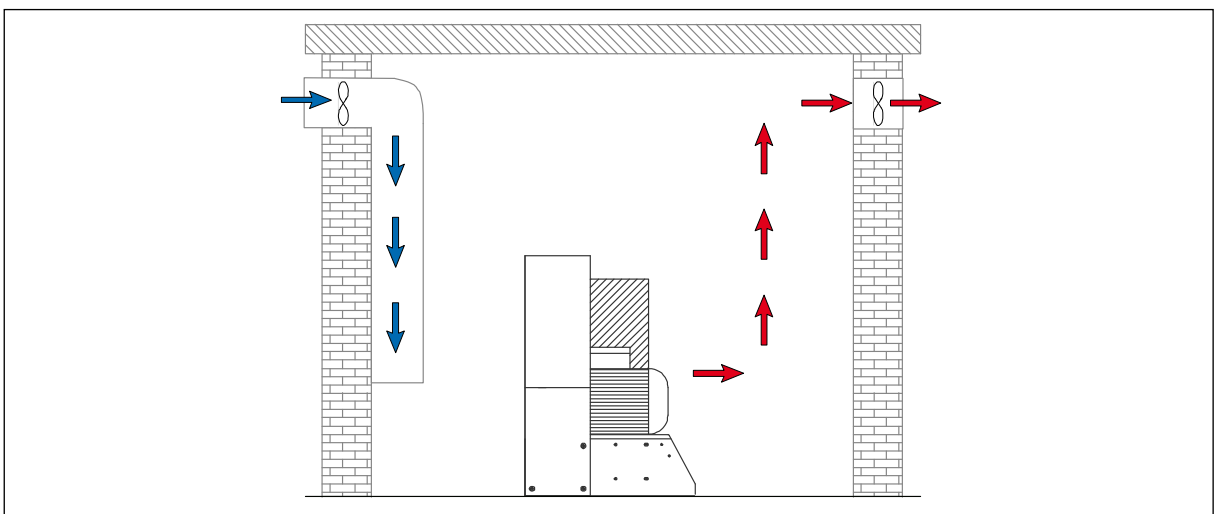


Fig. Ventilation via ventilation stack

INSTALLATION

Electrical Installation



Warning

Work on the electrical equipment on / with the machine / unit may only be carried out by qualified electricians.

For installation of electrical equipment, observe the following:

- If control devices are delivered by the factory, refer to the appropriate wiring diagram.
- Ensure correct installation of protective conductors.
- Check conformity of motor and control device tension and frequency with those of the electric network (see name plate on the compressor).
- The fusing should be done in accordance with the valid regulations of the responsible electricity supply company.
- When connecting the unit to the electrical supply, check the compressor direction of rotation (see chapter "Maintenance" -> Check turning direction).
- Fuse the motor correctly (see table; use slow-blow fuses).

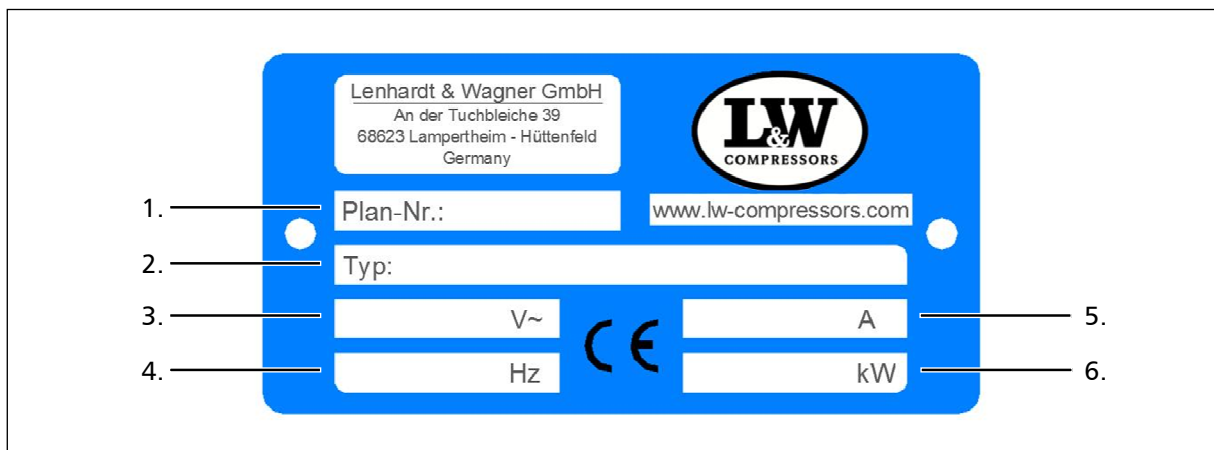


Fig. Compressor name plate

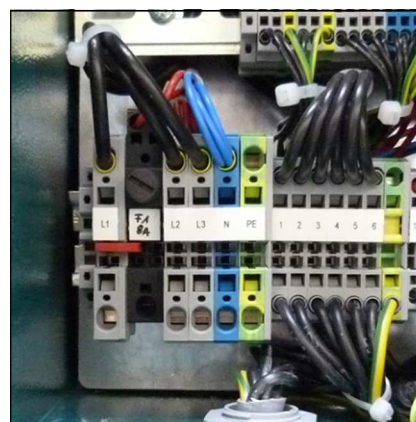
| No. | Designation |
|-----|---------------------------|
| 1. | Circuit diagram number |
| 2. | Compressor type |
| 3. | Power supply |
| 4. | Frequency |
| 5. | Motor current consumption |
| 6. | Nominal motor power |

INSTALLATION

Electrical Installation

The standard compressor version is prepared for the connection to three phases (brown, black, grey), neutral conductor (blue) and protective earth conductor (green/yellow).

Fig. - Connection to the switch box



A

Recommended fuses for 360 - 500 V operating voltage

| Nominal motor power | | Fusing start A | | Connection in mm ² | |
|---------------------|------|----------------|------------|-------------------------------|-----------|
| [kw] | [A] | Direct | Star/Delta | Contactor supply | Motor S/D |
| 2.2 | 5 | 10 | - | 1.5 | 1.5 |
| 4 | 8.5 | 20 | - | 2.5 | 1.5 |
| 5.5 | 11.3 | 25 | 20 | 2.5 | 1.5 |
| 7.5 | 15.2 | 30 | 25 | 2.5 | 1.5 |
| 11 | 21.7 | - | 35 | 4 | 2.5 |
| 15 | 29.9 | - | 35 | 6 | 4 |
| 18.5 | 36 | - | 50 | 6 | 4 |
| 22 | 41 | - | 50 | 10 | 4 |
| 30 | 55 | - | 63 | 10 | 6 |

Recommended fuses for 220 - 240 V operating voltage

| Nominal motor power | | Fusing start A | | Connection in mm ² | |
|---------------------|------|----------------|------------|-------------------------------|-----------|
| [kw] | [A] | Direct | Star/Delta | Contactor supply | Motor S/D |
| 2.2 | 8.7 | 20 | - | 1.5 | 1.5 |
| 4 | 14.8 | 25 | - | 2.5 | 1.5 |
| 5.5 | 19.6 | 35 | 25 | 4 | 2.5 |
| 7.5 | 26.4 | 50 | 35 | 6 | 4 |
| 11 | 38 | - | 50 | 6 | 4 |
| 15 | 51 | - | 63 | 10 | 4 |
| 18.5 | 63 | - | 80 | 16 | 6 |
| 22 | 71 | - | 80 | 16 | 6 |
| 30 | 96 | - | 125 | 25 | 10 |



A

OPERATION



OPERATION

Important operation instructions



Note

Ensure that all persons handling the compressor are familiar with function and operation of the unit.



Wear hearing protection

When working on a running machine, always wear hearing protection.

A

FIRST COMMISSIONING

A

Prior to first commissioning, observe the following:

Necessary steps are described on the next page.

- Ensure that cooling air can flow freely.
- Check compressor oil level by the oil sight glass (see next page).
- Check all connections and retighten if necessary.
- Check if the filter cartridge is in place (see "Service and Maintenance").
- Check the V-belt tension (see next page).
- Check if all filling valves are closed. Open one filling valve and hold tight manually!

Start the compressor

1. Start the compressor by pushing the ON button.
2. Check turning direction - see the rotary direction arrow on the housing of the electric motor (see next pages). If the turning direction is wrong, immediately stop the compressor by pushing the OFF button and contact an authorised electrician.



Warning

Wrong impeller rotation direction!

Immediately after switching the compressor on, check the rotation direction. Depending on the place of installation, the phase sequence can influence the rotation direction.

3. Check oil pressure (if oil pressure gauge is installed).
4. Run the compressor for about 2 minutes.
5. Close the open filling valve carefully.
6. Run the compressor up to maximum pressure and check if the safety valve opens at the adjusted set pressure. (The set pressure value is engraved on the knurled screw of the safety valve.) If this function can not be ensured, the unit must be immediately taken out of service. -> Change safety valve!
7. Check the compressor unit for leaks (little smoke emission and release noises from the inlet filter housing can be ignored).
8. Now check the condensate drain valves:
 - Fix the black condensate hoses
 - Open manual condensate drain valves
 - If correct, air escapes
9. Stop the compressor by pushing the OFF button.
10. Open all filling valves carefully to vent.

FIRST COMMISSIONING

Check oil level



Warning

Check oil level daily. Never start the compressor with a too low oil level. Risk of accidental loss, destruction or deterioration.

Check the oil level before each operation of the unit by using the oil dipstick.

Oil level check as follows:

- Unscrew oil dipstick
- Wipe off oil residues
- Insert the oil dipstick back into its tube and screw it until stop
- Unscrew oil dipstick again

The oil level should be between the notch and the end of the oil dipstick. If there is no oil between the notch and the end of the oil dipstick, refill immediately new full synthetic compressor oil.



Oil dipstick

Check V-belt tension

The V-belts could lose tension during transportation. Please check the V-belt tension before starting the compressor.

Tension V-belts

To tighten V-belt tension, loosen 4 mounting nuts of the drive motor. Use the tensioning screw to move the electric motor until the V-belt tension is sufficient. Then, tighten mounting nuts and check V-belt tension.

We recommend using a V-belt tension gauge.

Correct V-belt tension

Do not tension V-belts too tight. This damages bearings of compressor and motor. The V-belts should only be tensioned until there is no noise caused by slipping during start.

Settings

| Motor Type | Initial Installation | Operation after running in |
|----------------------|----------------------|----------------------------|
| Electric motors 50Hz | 500 N | 400 N |
| Electric motors 60Hz | 400 N | 300 N |

FIRST COMMISSIONING

Check turning direction



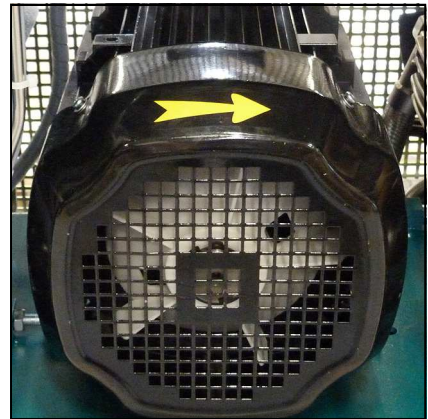
Warning

Wrong impeller rotation direction!

Immediately after switching the compressor on, check rotation direction. Depending on the place of installation, the phase sequence can influence the rotation direction.

Before starting the compressor for the first time, check rotation direction (see the rotary direction arrow on the housing of the electric motor).

If the direction of rotation is wrong, the guide pistons of the 2nd and 3rd stages can not be sufficiently lubricated, with the consequence that the pistons will be damaged. Furthermore, cooling air flow will not be sufficient.



Rotation direction arrow

A



DAILY COMMISSIONING

Prior to daily operation observe the following:

- Ensure cooling air can flow freely.
- Check compressor oil level by the oil sight glass.
- Check if filter cartridge is in place / observe filter cartridge life!
- Ensure toxic-free, pure intake air.

A

OPERATION

Filling procedure

**Caution! Fill only cylinders which:**

- are marked with the test mark and the test stamp of the expert.
- have been hydrostatic tested (check last test date).
- are rated for the final pressure.
- are free from humidity.

**Note**

The unit must be stopped manually when final pressure is reached. No serial auto shut down. The unit must also be started manually.

**Caution**

Vent condensate drain valves every 15-30 minutes manually.

1. Close all filling valves.
2. Connect the closed compressed air cylinders.
3. Open cylinder valves.
4. Start the compressor by pushing the ON button.
5. When filling pressure gauge increases, open filling valves slowly.
6. Fill the compressed air cylinders to the desired pressure; subsequently close the filling valves slowly.
7. Switch off the compressor.
8. Close and vent all filling valves.
9. Disconnect all compressed air cylinders from filling valves.
10. Open condensate drain valves manually.



OPERATION

Switch off the compressor

The compressor unit is not equipped as standard with an auto shut down. The unit must always be stopped manually when final pressure is reached.

During filling process, the system can be shut down at any time by pushing the red button (OFF) or the emergency stop (only in case of emergency!).



Note

After switching off, open condensate drain valves manually to vent the unit.

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REMEDYING FAULTS

REMEDYING FAULTS

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Final pressure can not be reached

| Cause of fault | Remedy |
|---|---|
| Connections leaky | Retighten or clean/replace if necessary |
| Final pressure safety valve leaky | Replace |
| Pipes / heat exchanger broken | Replace |
| Condensate drain valves leaky | Unscrew valves, check sealing surfaces, clean, replace if necessary |
| Final pressure switch stop unit | Verify settings, replace if necessary |
| Piston of pneumatic condensate valve sticks | Clean pneumatic condensate valve and restore function, check/replace o-rings, replace valve completely if necessary |

Strong compressor vibration

| Cause of fault | Remedy |
|---------------------------------------|---------------------------------|
| V-belt tension too loose | Tension V-belt |
| Drive motor / Compressor unit loosely | Retighten mounting screws |
| Anti vibration mounts used up | Replace |
| Ground not levelled | Ensure a solid and level ground |

Air supply too low

| Cause of fault | Remedy |
|--|---|
| Inlet and outlet valves contaminated / defective | Clean, replace if necessary |
| Cylinder(s), piston(s) or piston ring(s) used up | Replace |
| V-belt slips | Tension V-belt |
| See chapter "Final pressure can not be reached" | See chapter "Final pressure can not be reached" |

REMEDYING FAULTS

Compressor overheated

| Cause of fault | Remedy |
|--|---|
| Inlet filter cartridge contaminated | Replace |
| Ambient temperature too high | Improve room ventilation / |
| Cooling air inlet and outlet insufficient | Observe minimum distances (see Installation Instructions) |
| Air intake hose too long | Reduce length of the air intake hose |
| Air intake hose diameter too small | Use a larger diameter |
| Wrong compressor rotation direction | Ensure correct phase rotation, |
| Inlet and outlet valves contaminated / defective | Clean, replace if necessary |

Safety valve leaks

| Cause of fault | Remedy |
|---|-----------------------------|
| Inlet and outlet valves of the following pressure stage defective | Clean, replace if necessary |
| Sinter filter of the following water separator blocked | Replace |
| Safety valve leaky | Replace |

Oil taste in the air

| Cause of fault | Remedy |
|--|----------------------------|
| Mole carbon filter cartridge saturated | Replace |
| Compressor oil unsuitable | Use prescribed oil quality |
| Filter cartridge unsuitable | Use prescribed filter type |
| Cylinder(s), piston(s) or piston ring(s) defective | Replace |

REMEDYING FAULTS

Automatic condensate drain defective

| Cause of fault | Remedy |
|---|---|
| Solenoid coils defective | Replace |
| Cable / supply cable defective | Repair, replace if necessary |
| Timer / relais defective | Replace |
| Sinter filter of pneumatic condensate valve blocked | Replace |
| Piston of pneumatic condensate valve sticks | Clean pneumatic condensate valve and restore function, check/replace o-rings, replace valve complete if necessary |

Condensate drain starts before reaching final pressure

| Cause of fault | Remedy |
|---|---|
| Pressure stages are not as prescribed, control pressure of pneumatic condensate valve too low | Check corresponding inlet and outlet valve, replace if necessary. |
| Piston sealing of pneumatic condensate valve contaminated / used up | Clean, replace if necessary |
| Timer / relais settings not correct | Adjust as prescribed |
| Timer / relais defective | Replace |

Compressor stops before final pressure

| Cause of fault | Remedy |
|---|---|
| Final pressure switch settings not correct | Correct settings |
| Opening pressure of the pressure maintaining valve too high | Correct settings |
| Fuse / circuit breaker has tripped Valid only for E models | Check fusing of the power supply / observe regulations |
| Emergency stop switch has tripped | Unlock emergency stop switch, close compressor housing door correctly |



REMEDYING FAULTS

Filter life not sufficient

| Cause of fault | Remedy |
|--|--|
| Pressure maintaining valve settings not correct | Adjust as prescribed |
| Filter cartridge unsuitable | Replace by a prescribed filter cartridge type |
| Filter cartridge too old | Observe expiration date |
| Filter cartridge packaging incorrect / damaged / already opened. Filter cartridge already partly saturated before change | Store filter cartridges properly, dispose defective cartridges |
| Operating temperature too high | Ensure sufficient ventilation |
| Cylinder(s), piston(s) or piston ring(s) defective | Replace |

Oil consumption too high

| Cause of fault | Remedy |
|--|---|
| Cylinder(s), piston(s) or piston ring(s) defective | Replace |
| Compressor oil unsuitable | Use prescribed oil quality |
| Operating temperature too high | Observe prescribed operating temperatures |
| Oil leak at the compressor block | Tighten corresponding mounting screws, if necessary replace corresponding paper sealing / o-ring / shaft seal |

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MAINTENANCE AND SERVICE

Service, Repair and Maintenance

Carry out service and maintenance work exclusively when the compressor is stopped and depressurised. The unit should be leak-checked regularly. Leaks can be preferably localised by using a leak detector spray (if necessary, brush pipes with soapy water).

We recommend that only authorised L&W service technicians carry out service work on the bearing of the compressor (crankshaft and connecting rods).

We urgently recommend that all maintenance, repair and installation work must only be carried out by trained personnel. This is necessary because all maintenance work can not be explained exactly and detailed in this manual.

Only use authentic spare parts for service work.

**Danger**

Components under pressure, such as hose ends, can quickly come loose when manipulated and can cause potentially fatal injuries due to the pressure surge. Any work on system parts may only be performed in a pressure-compensated state.

**Warning**

The use of accessories that have not been tested can lead to death or serious injury or damage to the unit. Only use authentic spare parts for service work.

**Warning**

Carry out maintenance or service work when the unit is switched off and protected against unexpected restart.

**Warning**

Risk of burns!

Carry out maintenance or service work when the unit has cooled down.



MAINTENANCE AND SERVICE

Daily before taking unit into operation

| Maintenance work | Type | Quantity | Order No. |
|--|------|----------|-----------|
| Check oil level | - | - | 000001 |
| Check condition of all filling hoses | - | - | - |
| Check filter cartridge lifetime | - | - | - |
| Operate unit to final pressure and check function of final pressure switch | - | - | - |

At 25 operation hours

| Maintenance work | Type | Quantity | Order No. |
|------------------|------|----------|-----------|
| Oil change | - | 1.8 | 000001 |

Every 3 months or as required

| Maintenance work | Type | Quantity | Order No. |
|---|------|----------|-----------|
| Check automatic condensate drain, open manual condensate taps | - | - | - |
| Check/Retorque all connections and bolts | - | - | - |

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MAINTENANCE AND SERVICE

Annually

| Maintenance work | Type | Quantity | Order No. |
|---|------------------|----------|-----------|
| Oil change, if less than 1000 operating hours | - | 1.8 | 000001 |
| Check V-belt tension and condition | LW 230 EC (50Hz) | 2 | 003694 |
| | LW 230 EC (60Hz) | 2 | 000148 |
| | LW 280 EC (50Hz) | 2 | 001685 |
| | LW 280 EC (60Hz) | 2 | 003694 |
| | LW 320 EC (50Hz) | 2 | 001685 |
| | LW 320 EC (60Hz) | 2 | 001685 |
| Check opening pressure of final safety valve | - | - | - |
| Clean coolers | - | - | - |
| Clean all oil/water separators, if less than 500 operating hours | - | - | - |
| Service intake filter (depends on condition - if less than 500 operating hours) | - | - | - |
| Clean oil filter element, if less than 1000 operating hours | - | - | - |
| Check all connections for leakage | - | - | - |

Every 500 operating hours

| Maintenance work | Type | Quantity | Order No. |
|---|-----------|-----------|-----------|
| Change intake filter * | - | 1 | 000170 |
| Check pressure maintaining/non-return valve | - | - | - |
| Check V-belt tension and condition | see above | see above | see above |



* Note

Article is part of our 1000h and 2000h service kits.

MAINTENANCE AND SERVICE

Every 1000 operating hours (latest in 5 years)

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| Maintenance work | Type | Quantity | Order No. |
|---|-------------------|----------|-----------|
| Replace sintered metal filter element of water separators | 1st and 2nd stage | 2 | 002123 |
| Replace o-rings of water separators | 1st and 2nd stage | 2 | 001255 |
| Replace o-ring of oil separator | - | 1 | 001294 |
| Replace silencer | - | 1 | 000178 |
| Replace sintered metal filter of oil separators | - | 1 | 000184 |
| Replace sintered metal filter of pneumatic condensate valve | - | 1 | 000188 |
| Replace o-rings of the final filter housing | - | 2 | 001287 |
| Replace back-up rings of the final filter housing | - | 2 | 001285 |
| Replace sintered metal filter of oil filter | - | 1 | 000184 |
| Replace o-ring of oil filter | - | 1 | 000435 |
| Oil change | - | 1.8 | 000001 |



Note

All stated quantities are parts of our 1000h and 2000h service kits. You can find an overview on page Service Kits.



MAINTENANCE AND SERVICE

Every 2000 operating hours (latest in 10 years)

| Maintenance work | Type | Quantity | Order No. |
|---|------------------|----------|-----------|
| Replace all inlet and outlet valves incl. Gaskets | 1st stage | 1 | 002093 |
| | 2nd stage | 1 | 000542 |
| | 3rd stage | 1 | 000543 |
| | Upper gasket 1st | 1 | 000257 |
| | Lower gasket 1st | 1 | 000258 |



Note

All stated quantities are parts of our 2000h service kits. You can find an overview on page Service Kits.

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MAINTENANCE AND SERVICE

Service Kits

The service kits contain parts for maintenance according to the factory requirements.

The use of the service kits ensures that all required parts are ordered and replaced and gives assurance that all parts are included in the order. Depending on the model and interval, the service kits include parts such as O-Rings, Sinter Filter, Inlet Filter, Silencers, In-&Outlet Valve, Valve Seals and Compressor oil.



Service Kits

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Service Kits LW 230 E / 280 E / 320 E Compact (manual condensate drain)

| Compressor | Operating Hours | Order No. |
|------------------|-----------------|-----------|
| LW 230 E Compact | 1000 h | 011061 |
| LW 230 E Compact | 2000 h | 011062 |
| LW 280 E Compact | 1000 h | 011061 |
| LW 280 E Compact | 2000 h | 011062 |
| LW 320 E Compact | 1000 h | 011061 |
| LW 320 E Compact | 2000 h | 011062 |

Service Kits LW 230 E / 280 E / 320 E Compact (automatic condensate drain)

| Compressor | Operating Hours | Order No. |
|------------------|-----------------|-----------|
| LW 230 E Compact | 1000 h | 004970 |
| LW 230 E Compact | 2000 h | 003920 |
| LW 280 E Compact | 1000 h | 004970 |
| LW 280 E Compact | 2000 h | 003920 |
| LW 320 E Compact | 1000 h | 004970 |
| LW 320 E Compact | 2000 h | 003920 |



Note

V-belts are not included in our 1000h and 2000h service kits.



MAINTENANCE AND SERVICE

Check V-belt tension

The V-belts could lose tension during transportation. Please check the V-belt tension before starting the compressor.

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Tension V-belts

To tighten V-belt tension, loosen 4 mounting nuts of the drive motor. Use the tensioning screw to move the electric motor until the V-belt tension is sufficient. Then, tighten mounting nuts and check V-belt tension.

We recommend using a V-belt tension gauge.

Correct V-belt tension

Do not tension V-belts too tight. This damages bearings of compressor and motor. The V-belts should only be tensioned until there is no noise caused by slipping during start.

Settings

| Motor Type | Initial Installation | Operation after running in |
|----------------------|----------------------|----------------------------|
| Electric motors 50Hz | 500 N | 400 N |
| Electric motors 60Hz | 400 N | 300 N |

Check oil level



Warning

Check oil level daily. Never start the compressor with a too low oil level. Risk of accidental loss, destruction or deterioration.

Check the oil level before each operation of the unit by using the oil dipstick.

Oil level check as follows:

- Unscrew oil dipstick
- Wipe off oil residues
- Insert the oil dipstick back into its tube and screw it until stop
- Unscrew oil dipstick again

The oil level should be between the notch and the end of the oil dipstick. If there is no oil between the notch and the end of the oil dipstick, refill immediately new full synthetic compressor oil.



Oil dipstick

Oil change



Note

We recommend oil change at least once a year - depending on total operating hours.

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Oil change as follows:

- Run compressor warm for approx. 2 min.
- Switch off and vent compressor.
- Place a suitable oil drain tray under the drain hose.
- Open carefully oil drain valve and drain oil completely.
- Close oil drain valve.
- Loosen oil fill port with an appropriate adjustable wrench (AF 0-40 mm) and unscrew manually.
- Fill oil by using a funnel.
- Check oil level. The oil level should be between the middle and upper end of the oil sight glass.
- Screw oil fill port manually in and tighten with the adjustable wrench.

The oil change is now completed.

Maintenance intervals

- First oil change after 25 operating hours (total hours).
- All further changes after each 1,000 operating hours.

Oil and oil capacity

Approx. 1800 ml synthetic compressor oil is necessary for one oil change. Only use synthetic compressor oil which is recommended as suitable from L&W.

MAINTENANCE AND SERVICE

Oil filter maintenance



Caution

Oil filter housing is filled with oil. Take all necessary protection measures.



Note

Clean all parts thoroughly before assembly.

Oil filter maintenance as follows:

- Loosen pipe connections
- Loosen mounting screws (Fig. 1) and remove oil filter
- Loosen mounting screws of the filter cover (Fig. 2).
- Change o-ring, previously grease new o-ring (Fig. 3)
- Loosen mounting nuts and remove filter washer (Fig. 4)
- Change sinter filter (Fig. 4).
- Place filter washer and washer (Fig. 5) and tighten nut.
- Place filter cover, fix and tighten mounting screws of the filter cover (Fig. 2).
- Screw and tighten mounting screws of the oil filter (Fig. 1).
- Connect pipe connections and tighten.

The oil filter maintenance is now completed.

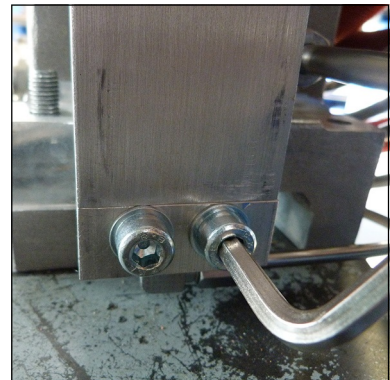


Fig. 1 - Loosen mounting screws

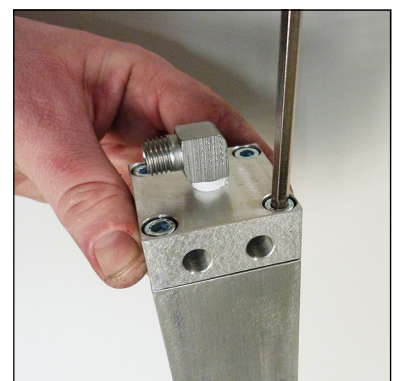


Fig. 2 - Loosen mounting screws of the filter cover

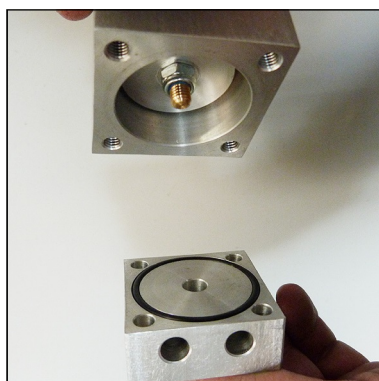


Fig. 3 - Change o-ring

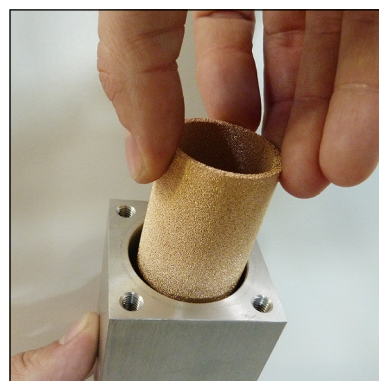


Fig. 4 - Change sinter filter



Fig. 5 - Place filter washer and washer

MAINTENANCE AND SERVICE

Manual condensation dump system



Note

The collected condensate can contain oil and has to be disposed according to regulations.

Oil- / water separators

The compressor comes as standard with an automatic condensation dump system. Drain condensate separators every 15 minutes.

To release the complete condensate through the black plastic hoses we recommend using a 20 l container at least.

The drain noise can be kept to a minimum by using a silencer.

Manual drain



Warning

Open valve spindle max. 1.5 turns.
The pressure in the housing can shoot out the valve spindles at high speed.

To drain manually, open the condensate drain valves of the 1st and the 2nd stage of the oil / water separators and the condensate drain valve of the filter housing (Fig. 2).

Open valve spindle max. 1.5 turns anti-clockwise. The condensate will be drained.

Then close valve spindle clockwise.

Maintenance intervals

We recommend to clean oil and water separators every 500 operating hours or at least once a year, to check for corrosion damage and to replace o-rings if necessary.

All oil / water separators have an integrated sinter filter which has to be replaced every 1,000 operating hours.

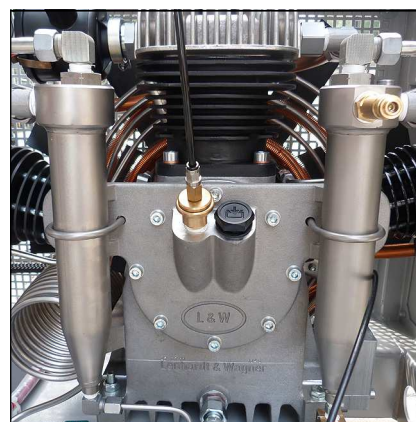


Fig. 1 Oil / water separators 1st and 2nd stage with automatic condensate drain system

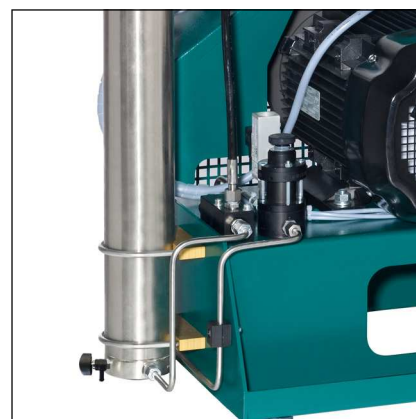


Fig. 2 - Condensate drain valve of the filter housing



Fig. 3 - Condensate drain valve

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MAINTENANCE AND SERVICE

Oil / Water separators 1st and 2nd stage - Maintenance



Note

Clean all parts thoroughly before assembly.

Maintain oil / water separators 1st and 2nd stage as follows:

- Loosen pipe connections (Fig. 1)
- Loosen screw connection at the water separator (sinter filter holder)
- Remove sinter filter holder (Fig. 2).
- Change sinter filter (Fig. 3), screw-in new sinter filter by using a suitable screwdriver.
- Change o-ring, previously grease new o-ring (Fig. 4)
- Place sinter filter holder into the water separator and tighten
- Connect pipe connections and tighten.

The oil / water separator maintenance is now completed.

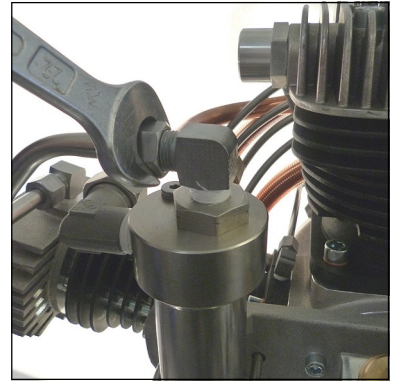


Fig. 1 - Loosen pipe connections

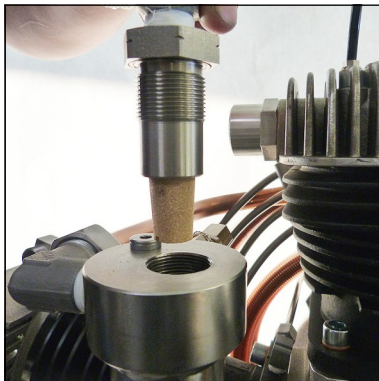


Fig. 2 - Remove sinter filter holder



Fig. 3 - Change sinter filter



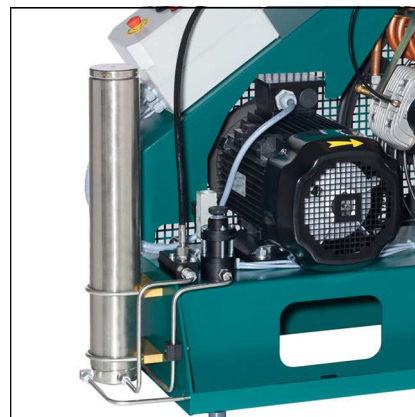
Fig. 4 - Change o-ring

MAINTENANCE AND SERVICE

Filter housing

The mole carbon filter housing is installed on the right hand side of the compressor housing.

Inside the filter housing a jet blows air on to the housing wall. Condensation water and oil are led by centrifugal force to the bottom of the housing. Air flows through the mole carbon filter cartridge, which purifies the air from residual moisture and odours.



Filter housing

Filter cartridge

The high-pressure compressor is equipped with an integrated breathing air purification system. Air is compressed up to 330 bar, dried and odour- and tasteless purified. Oil residues are bounded. The breathing air filter cartridge consists of a molecular sieve and activated-carbon filter.

Cartridge capacity: approx. 1.7 l

All breathing air filter cartridges are factory vacuum sealed.

We recommend unpacking the filter cartridges just before installation. Filter cartridges which are exposed too long could be saturated with moisture and become unusable.

| P/N | Filtering | Models |
|------------------|---|--|
| 000002 000003 | DIN EN 12021 (Breathing Air) | For models with 1.7 ltr Filter housings For models with 2.3 ltr Filter housings |
| 001459 | DIN EN 12021 (Breathing Air) incl. CO/CO ₂ | For models with 1.7 ltr Filter housings For models with 2.3 ltr Filter housings |
| 001466 001467 | Only oil / odour removal (<0,1mg/m ³) | For models with 1.7 ltr Filter housings For models with 2.3 ltr Filter housings |
| 001460 001462 | Only drying (<15mg/m ³) | For models with 1.7 ltr Filter housings For models with 2.3 ltr Filter housings |
| 001468 | CNG filter (drying and oil removal) | For models with 2.3 ltr Filter housings |

Maintenance intervals

Filter cartridges should be changed at the following intervals, at +20°C or more often, depending on humidity and ambient temperature:

- 72 hours for LW 230 E Compact
- 54 hours for LW 280 E Compact
- 46 hours for LW 320 E Compact

MAINTENANCE AND SERVICE

Filter cartridge change

Filter cartridge change as follows:

- Run the compressor up to a pressure of 100 bar.
- Stop compressor.
- Open filling valve.
- Unscrew filter housing cover by using the special filter tool (Fig. 1).
- Place the T-piece end of the filter tool in the recess of the filter cartridge (Fig. 2).
- Unscrew the filter cartridge anti-clockwise and pull the cartridge out of the housing (Fig. 3).
- Open the packing of the new filter cartridge and place it with the filter tool in the filter housing.
- Screw the new filter cartridge hand tight in by using the filter tool.
- Screw the cover of the filter housing first manually in.
- After it has been completely screwed in, turn cover anticlockwise for 90°. This avoids tightening of the cover due to vibration..

The filter cartridge change is now completed.



Note

Ensure that the old filter cartridge is disposed correctly at an approved waste point.



Fig. 1 - Unscrew the filter housing cover.



Fig. 2 - Place the T-piece end of the filter key in the top of the filter cartridge.



Fig. 3 - Pull the cartridge out of the housing.

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Filter housing - maintenance



Note

Clean all parts thoroughly before assembly.

Filter housing maintenance as follows:

- Open Filter Cover (Fig. 1).
- Change o-ring and back-up ring, previously grease both (Fig. 2).
- Grease filter cover thread and close.

Dismount filter housing

- Loosen pipe connections and nuts (Fig. 3).
- Remove filter housing.
- Dismount filter housing base.
- Change o-ring and back-up ring, previously grease both (Fig. 4).
- Screw filter base tight in.

Mount filter housing

- Connect pipe connections and tighten.
- Adjust holding clamp and tighten nuts.

The filter housing maintenance is now completed.



Fig. 1 - Open Filter cover

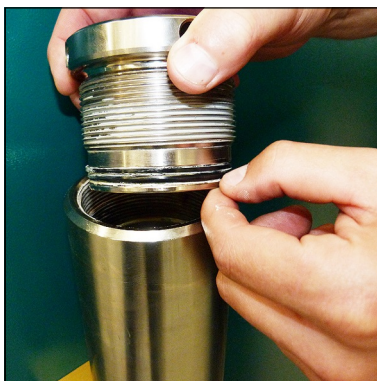


Fig. 2 - Change o-ring and back-up rings

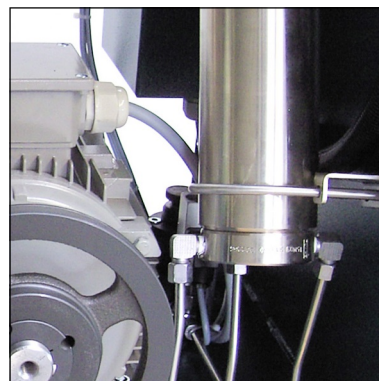


Fig. 3 - Loosen pipe connections and nuts



Fig. 4 - Change o-ring and back-up rings

MAINTENANCE AND SERVICE

Inlet filters



Note

Dirty filters make intaking air difficult and reduce delivery capacity. Risk of compressor overheating.

A micro filter cartridge is used as an air inlet filter. Check air inlet filter regularly or replace it. Defective air inlet filters should be immediately replaced with a corresponding filter.

Maintenance intervals

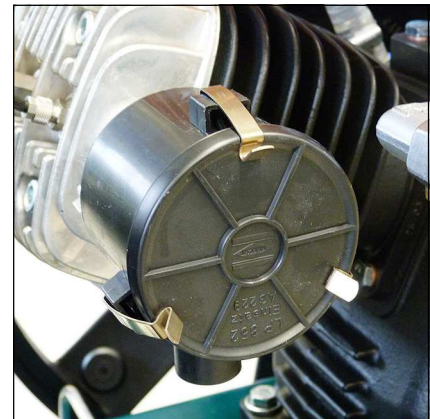
We recommend that the filter cartridge should be replaced every 500 working hours (depending on pollution grade).

Inlet filter cartridge change

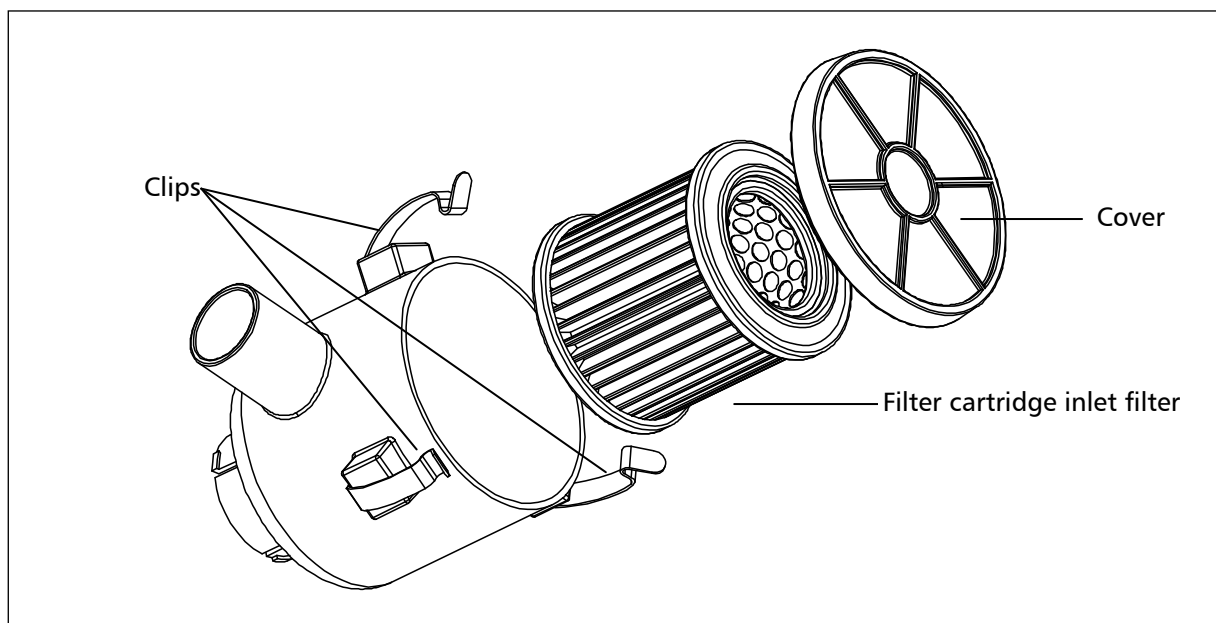
Inlet filter cartridge change as follows:

- Loosen cover by pushing the three clips apart.
- Remove inlet filter cartridge and replace it by a new one.
- Refit cover and snap the three clips until a loud 'click' can be heard.

The inlet filter cartridge change is now completed.



Air filters



Filter cartridge inlet filter

MAINTENANCE AND SERVICE

Cylinder heads and valves

Inlet and outlet valves of the specific compressor stages are located between valve head and cylinder. Outlet valves open while piston upstroke or compression stroke, inlet valves open while downstroke.

Valves are subject to normal wear and tear and have to be replaced at certain intervals (depending on specific operating conditions). Dismount valve heads to change valves. The three valves are combined inlet and outlet valves. The first stage is a plate valve. The stages two and three are made of a spring operated piston which acts inside a bronze cylinder.



Inlet and outlet valve incl. gaskets of the 3rd stage

Maintenance intervals

All valves should be replaced after 2000 working hours due to normal wear and tear. To replace valves the cylinder heads have to be removed. There are no special tools required to replace these valves.

Available special tools

Special tools are not necessary for dismounting inlet and outlet valves but make work easier.

Order number: 006847



Special tool

Replace inlet and outlet valve 1st stage



Note

The figures of the parts can differ due to the different stages.

Replace the inlet and outlet valve 1st stage as follows:

Remove Inlet / Outlet Valve

- Loosen pipe connections
- Loosen screw connections of the crankcase ventilation hose (Fig. 1)
- Remove hose
- Loosen valve head screws
- Remove valve head
- Pull out inlet and outlet valve (Fig. 2)
- CAUTION: Observe that the lower copper valve ring is also pulled out. It can still stick inside the cylinder (Fig. 3).
- Check valve head if defective

Install Inlet / Outlet Valve - see following page

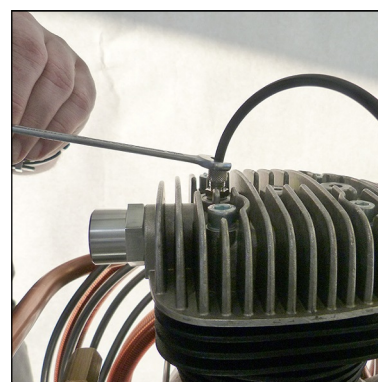


Fig. 1 - Loosen valve head screws

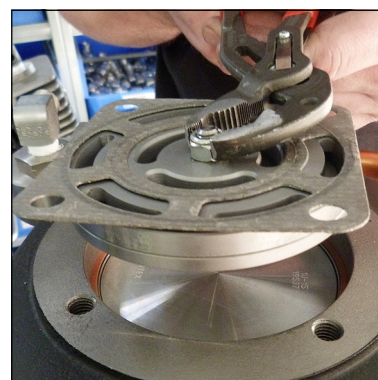


Fig. 2 - Pull out inlet and outlet valve

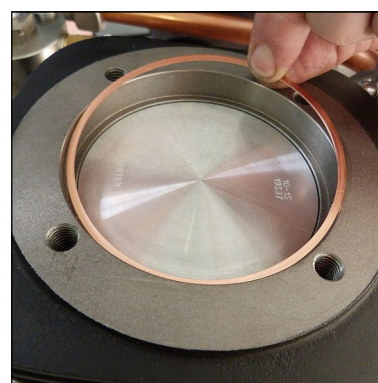


Fig. 3 - Copper valve ring

Replace inlet and outlet valve 1st stage - continued from previous page



Warning

The exact alignment of upper and lower valve gasket is very important. Inlet and outlet channels have to be exactly centred.

Install Inlet / Outlet Valve

- Grease new lower valve gasket and place into the cylinder.
CAUTION: Ensure the correct mounting position of the copper valve ring (position the burr-free side in direction of the cylinder).
- Place the new inlet and outlet valve on the cylinder and align upper valve gasket (paper gasket) (Fig. 4).
CAUTION: Do not turn the inlet and outlet valve inside the cylinder! The paper gasket could cover inlet channels!
- Refit the valve head and tighten the valve head screws crosswise. (Fig. 5)
- Torques: 1st stage 40 Nm
- Fit crankcase ventilation hose and tighten screw connection
- Connect pipe connections and tighten (Fig. 6).

Inlet and outlet valves change 1st stage is now completed.

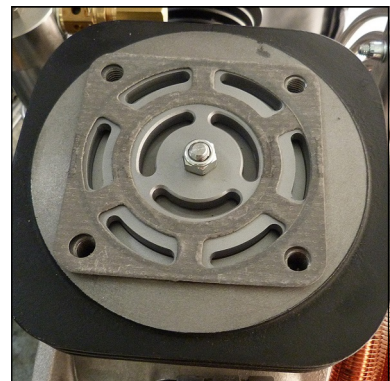


Fig. 4 - Place and align upper valve gasket

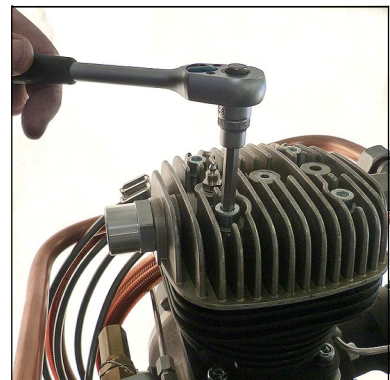


Fig. 5 - Screw valve head screws in



Fig. 6 - Connect pipe connections and tighten

MAINTENANCE AND SERVICE

Replace inlet and outlet valves 2nd and 3rd stage



Note

The figures of the parts can differ due to the different stages.

Inlet and outlet valves change as follows:

- Loosen pipe connections (Fig. 1).
- Loosen valve head screws (Fig. 2).
- Remove lower valve gasket (Fig. 3).
- Dismount inlet and outlet valve (Fig. 4).
Observe that the upper valve gasket is also pulled out. It can still stick inside the cylinder head.
- Check valve head if defective (check centre pin)
- Mount valve gasket on inlet and outlet valve
CAUTION: Ensure correct mounting position of the upper valve gasket (Fig. 5).
- Insert new inlet and outlet valve into valve head
CAUTION: Observe correct position between valve centre hole and valve head centre pin.
- Place lower valve gasket
- Place valve head with the new inlet and outlet valve. Tighten valve head screws crosswise (tightening torque 35 Nm).
- Connect pipe connections and tighten.

The inlet and outlet valves change is now completed.

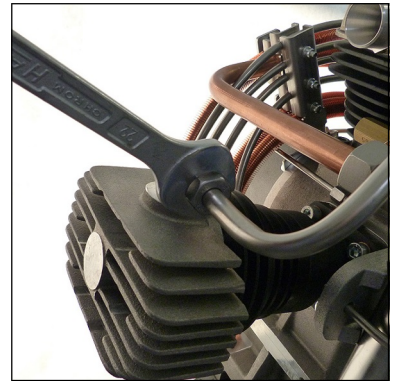


Fig. 1 - Loosen pipe connections



Fig. 2 - Loosen valve head screws

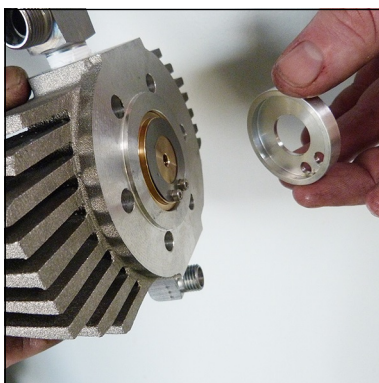


Fig. 3 - Remove lower valve gasket

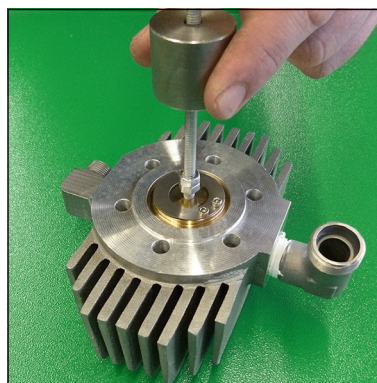


Fig. 4 - Remove inlet and outlet valve

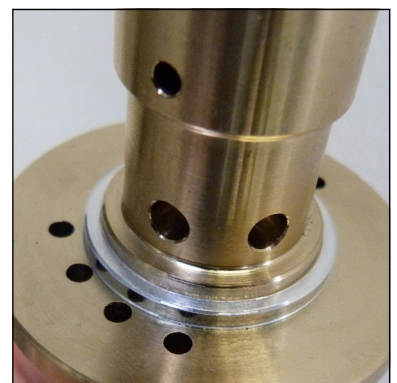


Fig. 5 - Ensure correct mounting position of the upper valve gasket

MAINTENANCE AND SERVICE

Safety valves

Every pressure stage is equipped with a separate over pressure safety valve. Safety Valves avoid a non permissible high pressure at the specific pressure stages and limit maximum operation pressure of the compressor.

Safety valves are adjusted to:

- 1st Stage: 8 bar
- 2nd Stage: 60 bar
- 3rd Stage: max. final pressure

The adjusted blow-off pressure [bar] of the safety valves is indicated on their housings.

All safety valves are factory sealed with special L&W safety seals to avoid manipulation of the limit value settings.

Safety valves with removed seals have to be immediately checked for the prescribed settings and replaced if necessary.

The safety valve of the final stage is furthermore equipped with a knurled screw to be activated once.

Turning the knurled screw clockwise could vent the valve completely and therefore the final filter housing.

During normal operation conditions, the knurled screw has to be turned anti-clockwise up to the upper stop. An integrated circlip avoids complete unscrewing.

If a safety valve blows off, it indicates problems with either inlet or outlet valve of the following stage.

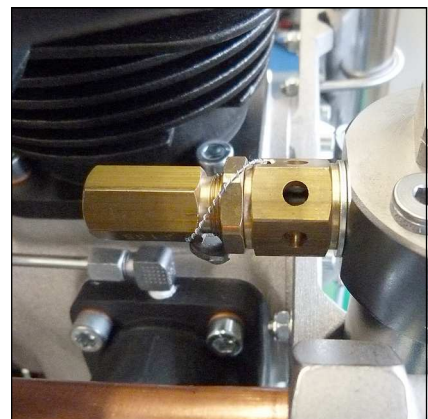


Note

Replace defective safety valves immediately!



Safety valve 1st stage



Safety valve 2nd stage



Safety valve 3rd stage

A

Pressure maintaining / non return valve

**Note**

If the adjusted opening pressure of the pressure maintaining valve is higher than the final pressure of the compressor, the final pressure safety valve blows off before pressure maintaining valve opens (final pressure = 0 bar). When valve settings are not clear (e.g. after disassembly / repair), start the adjustment with a low basic setting (turn adjusting screw approx. 3 times in).

A pressure maintaining / non return valve is installed after the filter housing. It maintains a pressure of at least 150 bar inside the filter housing - this optimises filter efficiency.

Pressure maintaining valve

The pressure maintaining valve drains a large part of the water content of the compressed air mechanically by ensuring the minimum outlet pressure. This guarantees optimal drying and purification of the breathing air.

After starting the compressor, the pressure inside the final filter housing constantly increases. The pressure maintaining valve prevents the compressed air from blowing off (final pressure gauge = 0 bar).

When the adjusted opening pressure is reached (150 and 180 bar), the purified compressed air flows via pressure maintaining and non return valve to the filling valve.

The value of the opening pressure of the pressure maintaining valve can be read at the final pressure gauge. When opening pressure is reached, the pressure gauge value increases within a few seconds.



Pressure maintaining/non-return valve



MAINTENANCE AND SERVICE

Test of pressure equipment

According to the German Industrial Safety Ordinance 2015, pressure equipment is subject to regular inspection.

Subject: pressure equipment with a product permissible operating pressure [bar] x content volume [litres] from 200 up to 1000.

Example: Filter housing 1.7 l

Maximum operating pressure: 350 bar

Content volume: 1.7 litres

$350 \text{ bar} \times 1.7 \text{ litres} = 595$

595 is smaller than 1000 -> result: Test is applicable!!

Example: Filter housing 2.3 l

Maximum operating pressure: 350 bar

Content volume: 2.3 litres

$350 \text{ bar} \times 2.3 \text{ litres} = 805$

805 is smaller than 1000 -> result: Test is applicable!!

Pressure equipment from 200 up to 1000 have to be tested as follows:

1. Examination after 5 years by a qualified person or authorized organisations:

Visual inspection, inside and outside.

2 Examination after 10 years by a qualified person or authorized organisations:

Visual inspection, inside and outside.

In addition, a water pressure test is carried out at 1.5 times of the permissible vessel operating pressure.



A

MAINTENANCE RECORDS



MAINTENANCE RECORDS

Introduction form for the Operator

A

| No. | Surname, Name | Date | Place | Signature | Instructor |
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By adding themselves to this list, the person that signs it confirms having been given a yearly introduction/instruction about the function and operation of the compressor unit. Furthermore, they have be informed about the relevant safety rules and regulations (TRG, DGRL, BetrSichV, GSG, GSGV).



MAINTENANCE RECORDS

Top up oil, oil change

| Date | Operating hours | Oil quantity [l] | Name |
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MAINTENANCE RECORDS

Cartridge change

| Date | Operating hours | Difference | Name |
|------|-----------------|------------|------|
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MAINTENANCE RECORDS

Maintenance work

| Description | Date, signature |
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MAINTENANCE RECORDS

Replaced Parts

| Designation | Part number | Date, signature |
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STORAGE

Conservation / storage of the compressor

If the compressor unit is not to be used for an extended period of time, we recommend to carry out the following work before storage time:

- Run the compressor at 200 bar filling pressure for approximately ten minutes (control the flow with the filling valve to maintain constant pressure).
- Replace compressor oil, open filling valve(s) and run compressor for a few minutes.
- Stop compressor and open drain valves (depending on the compressor type, this may happens automatically). Remove top cap of final filter housing: clean throat, grease o-ring. and throat with a food grade grease or silicone grease. Close filter housing.
- Remove intake filter cartridge and undo intake pipes on all valve heads.
- Start compressor unit. Spray a few drops of compressor oil into intake connectors.
- Stop compressor unit and insert intake filter cartridge. Bring intake pipes back in position and fix connections and nuts. Close filling- and drain valves.
- Store the compressor in a cool dry place free from dust and contamination. A dust cover is recommended as long as condensation can be avoided.
- If compressor unit should be stored for a period of more than one year, an oil change is strongly recommended before it's been re-used.
- Fuel driven units only: fill up fuel tank to top level to avoid corrosion.

De-conservation, commissioning

After the compressor has been stored, the following steps are to be taken:

- If compressor hasn't been used for longer than 12 months, we strongly recommend an oil change before any use.
- Replace intake filter cartridge and check oil level.
- Clean compressor unit, check for foreign objects. Check condition and tension of V-belts, replace if necessary. Check condition of filling hoses, replace if necessary.
- Secure hoses against whipping and open filling valves and run compressor for approximately 10 minutes.
- Check condition of final filter cartridge, replace if necessary.
- Close filling valves and run compressor up to final pressure.
- Check safety valve relief pressure of final stage and/or pressure switch setting.
- Check all connections and pipe work for leaks.

Once all above steps are completed, compressor unit is now ready for use.

STORAGE

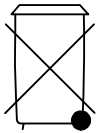
Transportation instructions

- Parts which need to be dismantled for transport purposes must be carefully replaced and secured before taking into operation.
- The transport may only be carried out by trained personnel.
- For transportation, only use lifting devices and equipment with sufficient lifting power.
- Do not stand or work under suspended loads.
- Also separate from minor relocation machinery / system of any external energy supply. Before recommissioning, reconnect the machine to the mains according to regulations.
- When recommissioning, proceed according to the operating instructions..

Disposal

The product must be disposed in accordance with national waste disposal regulations and by an appropriate waste disposal company.

Electric and electronic components



EU-wide regulations for the disposal of electric and electronic appliances which have been defined in the EU Directive 2002/96/EC and in national laws are effective from August 2005 and apply to this device.

Common household appliances can be disposed by using special collecting and recycling facilities. However, as this device has not been registered for household usage, it must not be disposed of through these means.

The device can be returned to L&W. Please do not hesitate to contact us if you have any further questions on this issue.



**ERSATZTEILLISTEN / SPARE PARTS LISTS
DETAILANSICHTEN / DETAILED VIEWS**

C



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ERSATZTEILLISTE / SPARE PART LIST

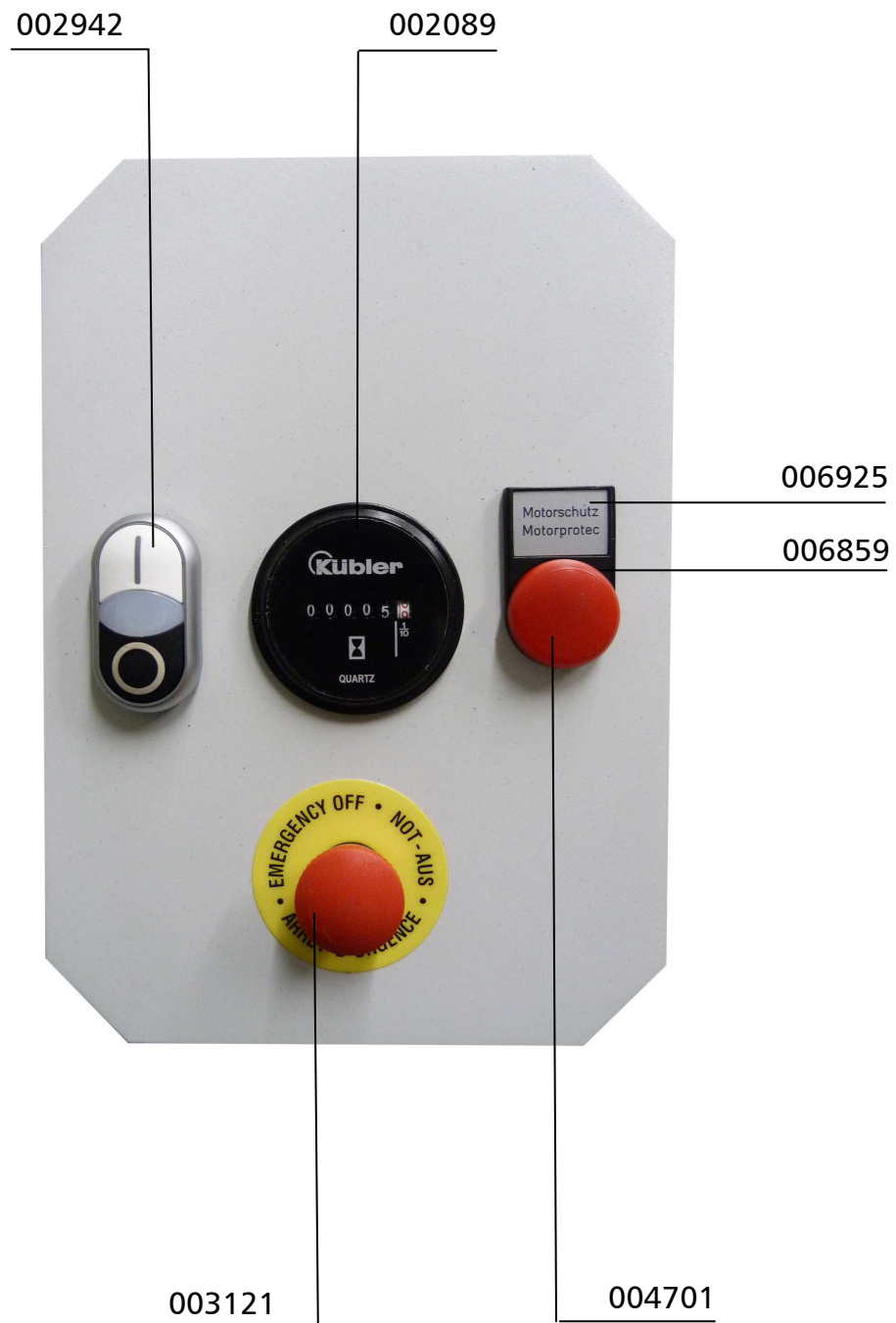
Baugruppe: Schalttafel / Control Board

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|----------------------------|---------------------|
| 002089 | Betriebsstunderzähler 230V | Hour Counter 230V |
| 002942 | Start/Stop Schaltelement | Start / Stop Button |
| 003121 | Not-Halt Schalter | Emergency switch |
| 004701 | Warnlampe | Warning lamp |
| 006859 | Schildträger | Label holder |
| 006925 | Einlegeschild | Label |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Schalttafel / Control Board



C



ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Kompressorblock / Assembly: Compressor Block

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|--------------------------------|
| 000205 | Kurbelgehäuseentlüftungsventil | Crankcase Breather Valve |
| 000257 | Obere Ventildichtung, 1. Stufe | Upper Valve Gasket, Paper, 1st |
| 000258 | Untere Ventildichtung | Lower Valve Gasket, Copper |
| 000432 | Ölmesstab | Oil Dip Stick LW 280 |
| 000542 | Saug- & Druckventil, 2. Stufe komplett | In- & Outlet Valve, 2nd Stage |
| 000543 | Saug-Druckventil kompl.mit Aludichtungen | In- & Outlet Valve, 3rd Stage |
| 000761 | Verschraubung | Elbow Connection |
| 000765 | Schneidring | Olive Seal |
| 000766 | Mutter | Nut |
| 000783 | Verschraubung | Straight Connection |
| 000811 | Verschraubung | Elbow Connection WE3/8"/12L |
| 000863 | Winkelverschraubung 90° | Elbow Connection |
| 000967 | Zylinderschraube | Allen Bolt |
| 001041 | Zylinderschraube | Allen Screw |
| 001069 | Zylinderschraube | Allen Bolt |
| 001088 | Zylinderschraube | Hexagon Bolt |
| 001164 | Stopfmutter | Lock Nut M10 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 001186 | U-Scheibe A10 | Washer A10 |
| 001189 | Schnorr-Scheibe S10 | Clamp Washer S10 |
| 001275 | O-Ring | O-Ring guide cylinder 280 |
| 001284 | O-Ring | O-Ring 60x4 |
| 001310 | O-Ring, | O-Ring 105x4 |
| 001314 | O-Ring | O-Ring |
| 001315 | O-Ring | O-Ring |
| 001323 | CU-Ring | Copper Seal Ring |
| 001384 | Kompressorblock LW280 mit Testlauf | Compressor Block LW280 |
| 001623 | Zylinder 3. Stufe | Cylinder 3rd Stage |
| 001650 | Gehäusedeckel | Crankcase Cover |



ERSATZTEILLISTE / SPARE PART LIST

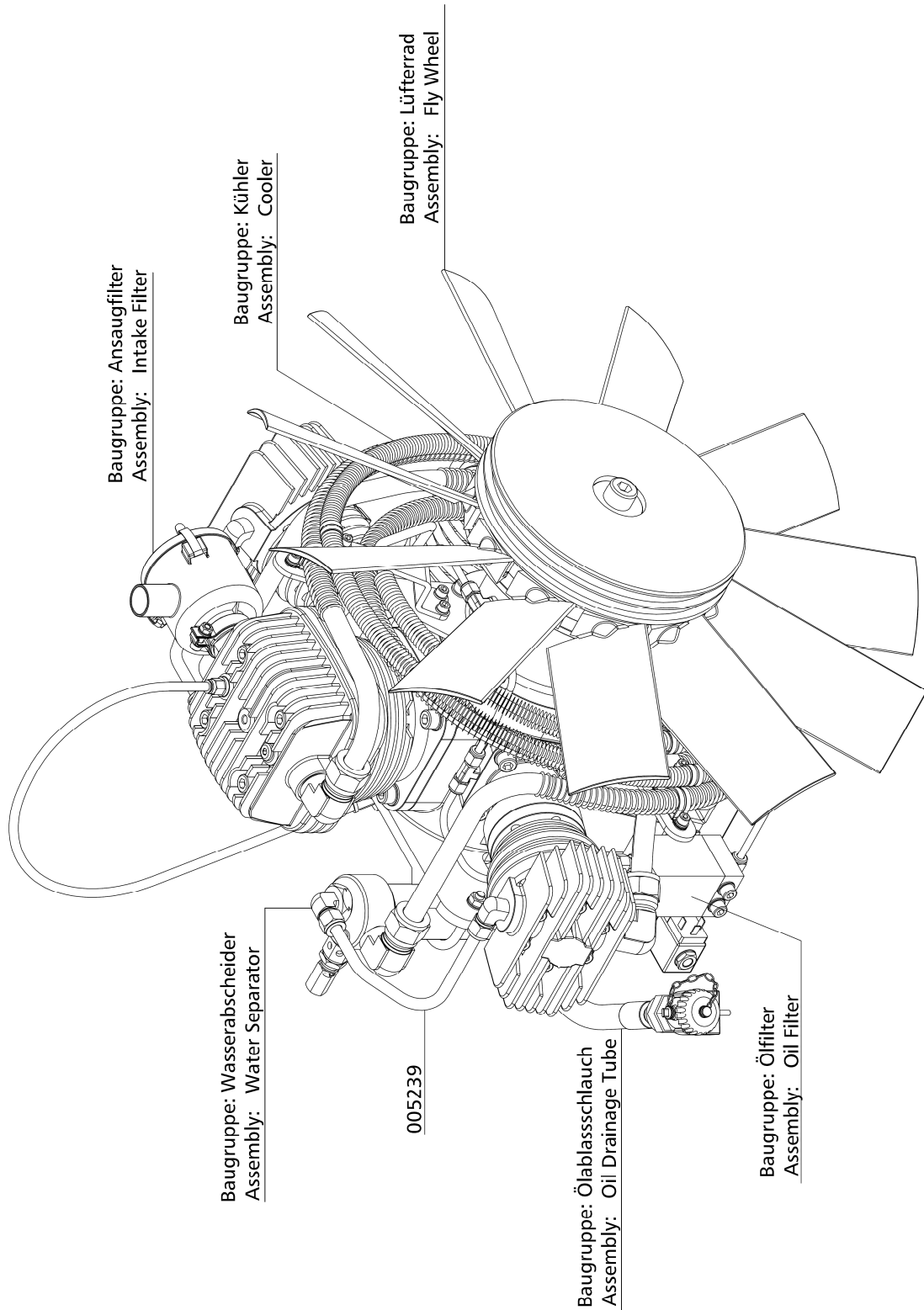
Baugruppe: Kompressorblock / Assembly: Compressor Block

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|-------------------------------------|--------------------------------|
| 001660 | Winkelverschraubung mit Düse | Elbow Connection c/w Jet |
| 002093 | Saug-und Druckventil, 1. Stufe | In & Outlet Valve 1st Stage |
| 002096 | Zylinder 1. Stufe | Cylinder, 1st Stage |
| 002107 | Zylinder 2. Stufe | Cylinder, 2nd Stage |
| 002108 | Führungszylinder 2. + 3. Stufe | Guide cylinder 2nd+3rd Stage |
| 002121 | Ventilkopf, 2. Stufe | Valve head 2nd Stage |
| 002124 | Ventilkopf 3. Stufe | Valve head 3rd Stage |
| 002154 | T-Stück mit Düse (lang) | T-piece with injector (long) |
| 002155 | T-Stück mit Düse (kurz) | T-piece with injector (short) |
| 002158 | Ölrohr (Lagerflansch - 3. Stufe) | Oil Pipe (Flange - 3rd Stage) |
| 002159 | Ölrohr (Ölpumpe - Ölfilter) | Oil pipe (oil pump-oil filter) |
| 002160 | Ölrohr (Öelfilter - 2.Stufe) | Oil pipe (oil filt.-2nd Stage) |
| 003583 | Öldruckleitung 2. Stufe | Oil pipe 2nd stage |
| 004982 | Dichtring für Peilstab | Gasket seal for oil dipstick |
| 005239 | Verbindungsrohr | Connection pipe |
| 005837 | Sechskantschraube m. Schaft | Hexagon Bolt |
| 005859 | Gerade Einschraubverschraubung 6 mm | Straight Hose Connection 6 mm |
| 006518 | Ventilkopf für Ventil, 1. Stufe | Valve Head for Valve 1st Stage |
| 007434 | Entlüftungsschlauch Kurbelgehäuse | Crankcase Breather Hose |

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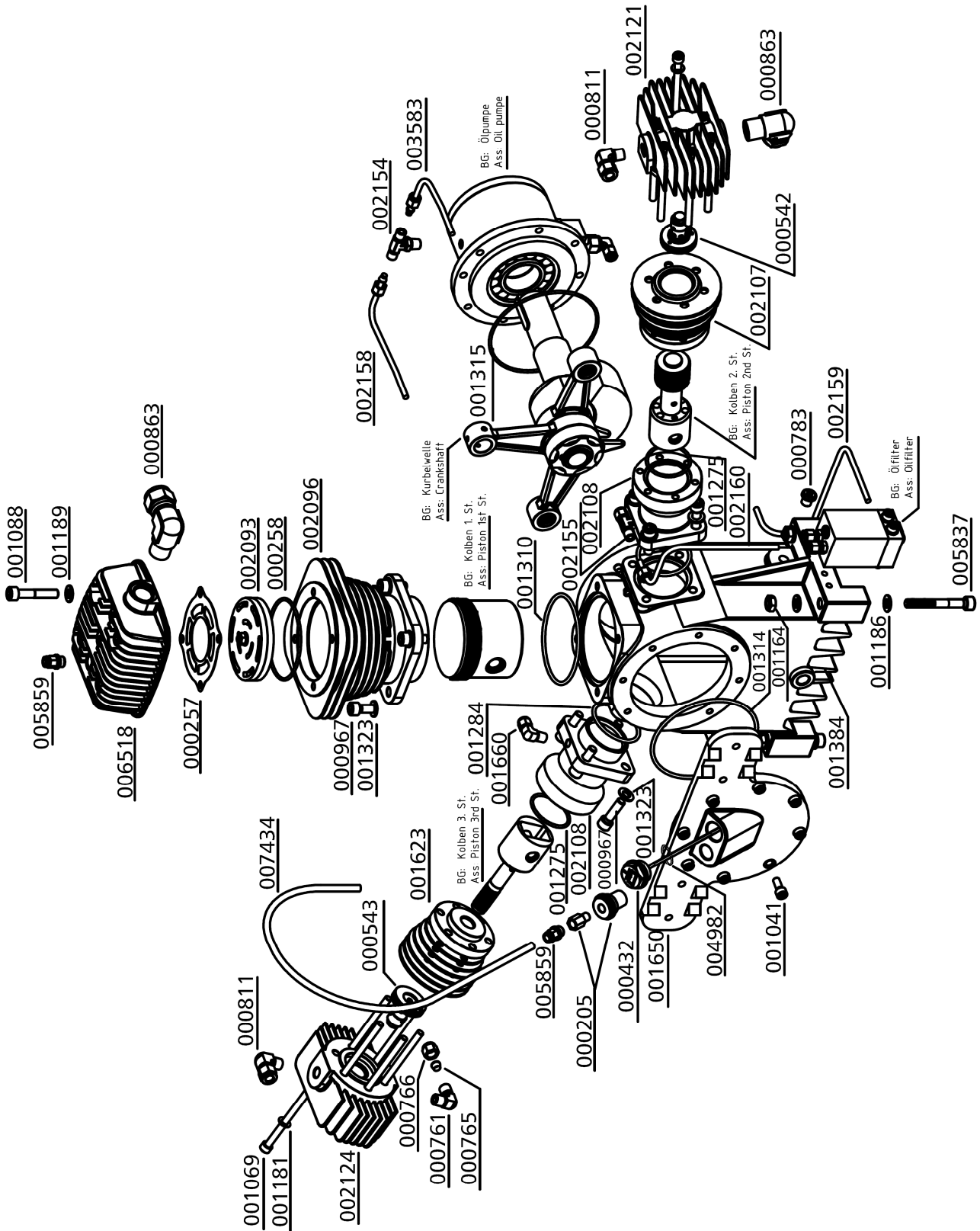
DETAILANSICHT / DETAILED VIEW

Baugruppe: Kompressorblock / Assembly: Compressor Block



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Baugruppe: Kompressorblock / Assembly: Compressor Block





ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Wasserabscheider 1. und 2. Stufe

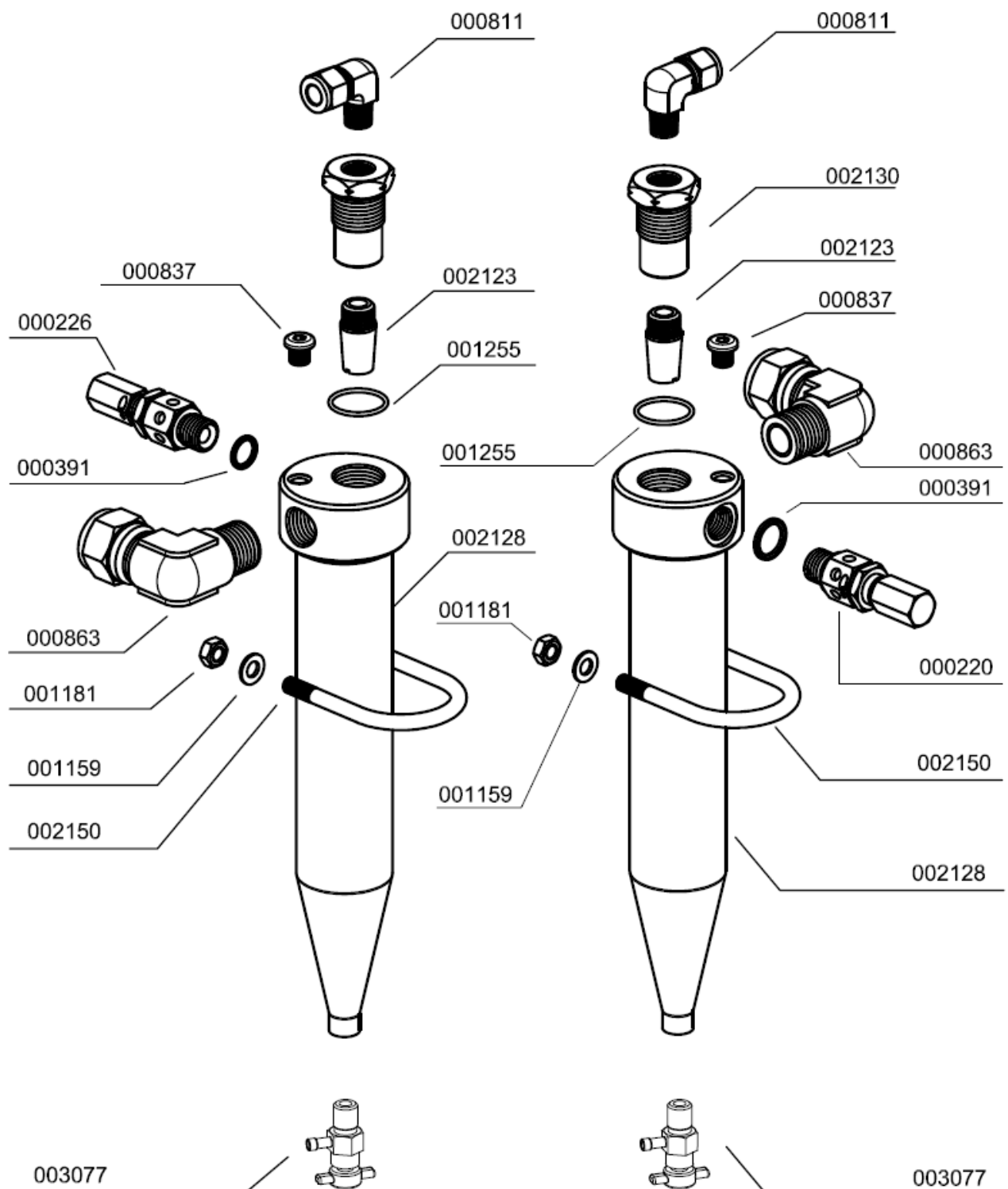
Assembly: Water Separator 1st and 2nd Stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------------------------|--------------------------------|
| 000220 | Sicherheitsventil G3/8" | Safety Valve G3/8" 8 bar |
| 000226 | Sicherheitsventil G3/8" | Safety Valve G3/8" 60 bar |
| 000391 | U-Sit Ring, | Seal Ring U-Sit |
| 000811 | Verschraubung | Elbow Connection WE3/8"/12L |
| 000837 | Verschlussstopfen | Plug |
| 000863 | Winkelverschraubung 90° | Elbow Connection |
| 001159 | Stopfmutter | Lock Nut M8 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 001255 | O-Ring | O-Ring |
| 002123 | Sinterfilter G3/8" AG, 1. + 2. Stufe | Sinterfilter G3/8" 1st+2nd St. |
| 002128 | Wasserabscheider, 1. und 2. Stufe | Water separa. 1st + 2nd Stage |
| 002130 | Halter für Sinterfilter G3/8" | Holder for Sinterfilter G3/8" |
| 002150 | Haltebügel für Wasserabweiser LW280 | U-Clamp Water Separator |
| 003077 | Entwässerungsventil G1/4" | Drain Valve G1/4" |

DETAILANSICHT / DETAILED VIEW

Baugruppe: Wasserabscheider 1. und 2. Stufe

Assembly: Water Separator 1st and 2nd Stage





ERSATZTEILLISTE / SPARE PART LIST

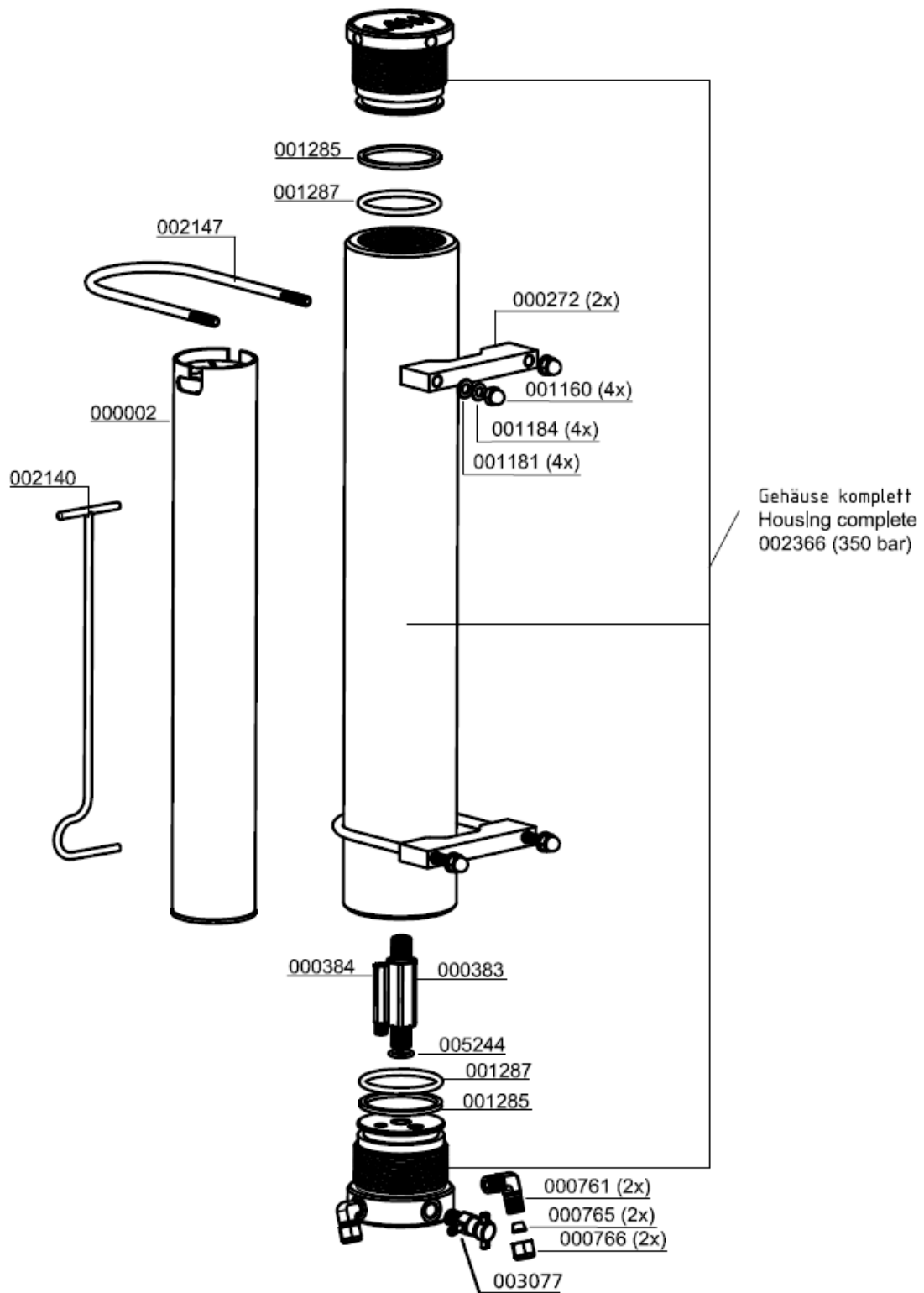
Baugruppe: Filtergehäuse 1,7 l / Assembly: Filter housing 1.7 ltr

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|--------------------------------|
| 000002 | Filterpatrone 1,7 Liter | Filter Cartridge 1.7 ltr BA |
| 000272 | Abstandshalter für Filtergehäuse | Spacer Bracket for Filtertower |
| 000383 | Messing Adapter für Filterpatrone | Brass Filter Adapter |
| 000384 | Düse für Filtergehäuse | Jet Filter Housing |
| 000761 | Verschraubung | Elbow Connection |
| 000765 | Schneidring | Olive Seal |
| 000766 | Mutter | Nut |
| 001160 | Hutmutter | Domed Nut M8 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 001184 | Schnorr-Scheibe | Clamp Washer S8 |
| 001285 | Stützring, Filtergehäuse | Back-up Ring Filter Housing |
| 001287 | O-Ring, Filtergehäuse | O-Ring filter housing |
| 002140 | Filterschlüssel 1,7 & 2,3 Liter Behälter | Filter tool 1,7 & 2,3 Litre |
| 002147 | Haltebügel für Filtergehäuse (ES) | U-Clamp for filter housing ES |
| 002366 | Filtergehäuse | Filter housing |
| 003077 | Entwässerungsventil G1/4" | Drain Valve G1/4" |
| 005244 | O-Ring | O-Ring |

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DETAILANSICHT / DETAILED VIEW

Baugruppe: Filtergehäuse 1,7 l / Assembly: Filter housing 1.7 ltr



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ERSATZTEILLISTE / SPARE PART LIST

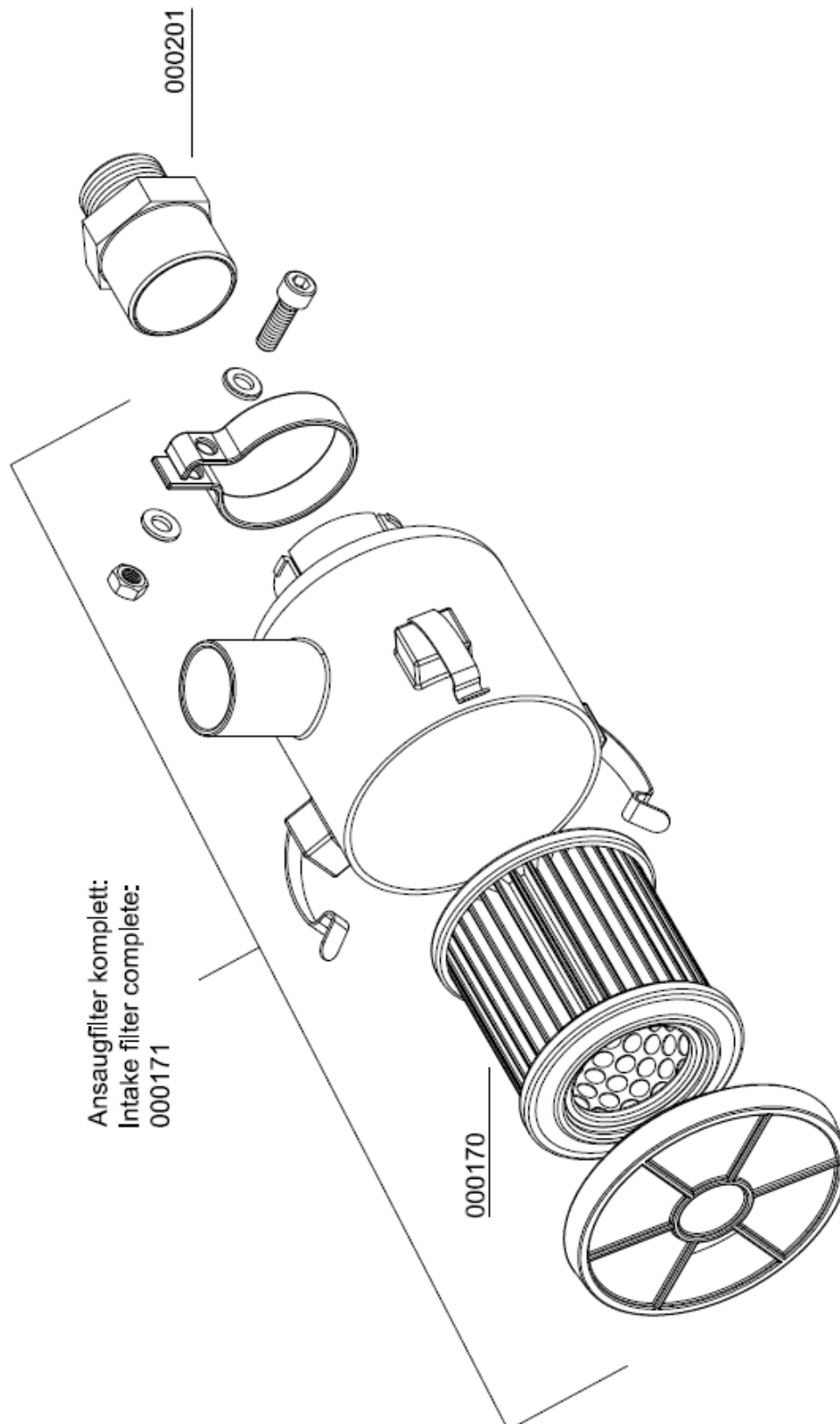
Baugruppe: Ansaugfilter / Intake Filter

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|--------------------------------|
| 000170 | Ansaugfilterpatrone | Air Intake Filter Cartridge |
| 000171 | Ansaugfiltergehäuse inkl. Patrone, kompl | Int. Filter Housing c/w filter |
| 000201 | Einschraubadapter Ansaugfilter | Adapter Inlet Filter Housing |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Ansaugfilter / Intake Filter



C



ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Sicherheitsventil / Assembly: Safety Valve

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|-------------------------------|
| 000165 | Gehäuse Rückschlagventil | Body Non-Return Valve |
| 000233 | Sockel für Sicherheitsventil mit TÜV/CE | Base f. Safety Valve TÜV type |
| 000553 | Sicherheitsventil - Bauteilgeprüft | Safety Valve TÜV 225 bar |
| 000554 | Sicherheitsventil - Bauteilgeprüft | Safety Valve TÜV 250 bar |
| 000555 | Sicherheitsventil - Bauteilgeprüft | Safety Valve TÜV 300 bar |
| 000556 | Sicherheitsventil - Bauteilgeprüft | Safety Valve TÜV 330 bar |
| 000557 | Sicherheitsventil - Bauteilgeprüft | Safety Valve TÜV 350 bar |
| 000738 | Verschraubung | Connection |
| 000762 | Verschraubung | Elbow Connection |
| 000765 | Schneidring | Olive Seal |
| 000766 | Mutter | Nut |
| 001044 | Zylinderschraube | Allen Screw |
| 001058 | Zylinderschraube | Allen Bolt |
| 001158 | Mutter | Nut M8 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 001244 | O-Ring | O-Ring, flange safety valve |
| 001814 | Sicherheitsventil - Bauteilgeprüft | Safety Valve |
| 001815 | Sicherheitsventil - Bauteilgeprüft | Safety Valve |
| 001816 | Sicherheitsventil - Bauteilgeprüft | Safety Valve |
| 001817 | Sicherheitsventil - Bauteilgeprüft | Safety Valve |

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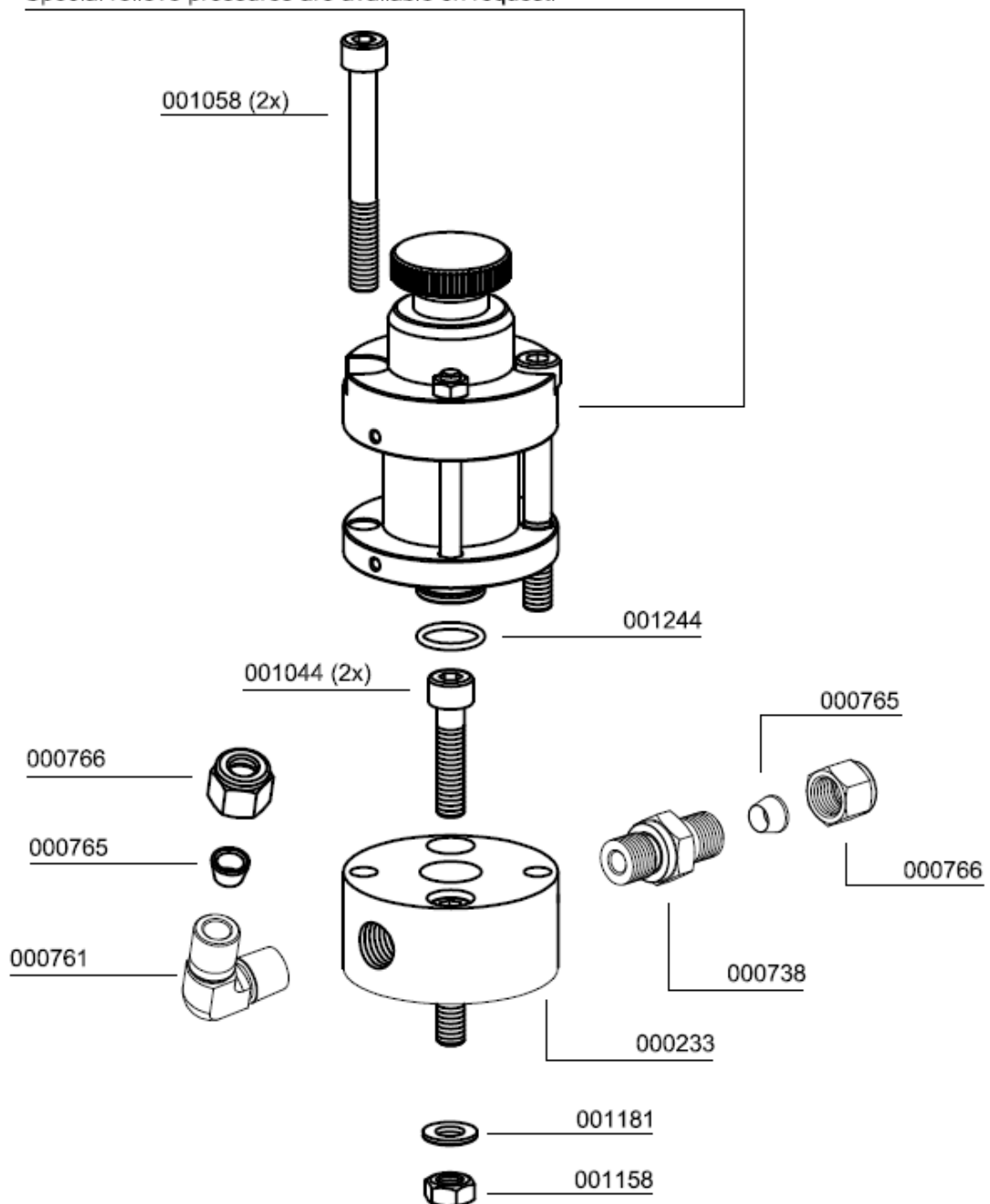
ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Sicherheitsventil / Assembly: Safety Valve

| Druck/ Pressure | SV-Ventil mit CE-Prüfung/ Safety Valve with CE | SV-Ventil mit TÜV-Prüfung/ Safety Valve with TÜV |
|--------------------|---|---|
| 225 bar | 001814 | 000553 |
| 250 bar | 001815 | 000554 |
| 285/300 bar | _____ | 000555 |
| 330 bar | 001816 | 000556 |
| 350 bar | 001817 | 000557 |

Sonder-Einstelldrücke auf Anfrage! /

Special relieve pressures are available on request!





ERSATZTEILLISTE / SPARE PART LIST

Druckhalteventil / Pressure Maintaining Valve

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|---------------------------------------|
| 000169 | Druckhalterückschlagventil, schwarz | Pressure Maint. Valve black |
| 000498 | U-Scheibe DIN 125 A6 | Washer DIN 125 A6 |
| 000506 | Feder | Spring |
| 000508 | USIT Ring 13,7 x Ø20 x 1,5 | Gasket Ring U-Sit 13,7 x Ø20 x 1,5 |
| 000511 | Mutter, Druckhalterückschlagventil | Lock Nut PMV |
| 000512 | Schraube, Druckhalte-Rückschlagventil | Set Bolt PMV |
| 000513 | Druckstück für Druckhalteventil, Federadapter | Spring Adapter PMV, spring adapter |
| 000514 | Stift Druckhalte-/Rückschlagventil | Stud PMV |
| 000515 | Gehäuse, Druckhalte-Rückschlagventil | Main Body PMV |
| 000516 | Nutring, Druckhalterückschlagventil 5 x 10 x 5/2,5 90° Blau | Seal Ring PMV 5 x 10 x 5/2,5 90° blue |
| 000517 | Feder, Druckhalterückschlagventil | Coil Spring PMV |
| 000518 | Unterlegscheibe, Messing | Washer, Brass |
| 000519 | Dichtkappe, Druckhalte Rückschlagventil, schwarz | Plastic Seal Piston PMV, black |
| 000520 | Hohlschraube, DHRV | Inlet Jet PMV |
| 000765 | Schneidring PSR 08 LX | Olive Seal PSR 08 LX |
| 000767 | Mutter 08 S | Union Nut 08 S |
| 001023 | Zylinderschraube | Allen Bolt |

DETAILANSICHT / DETAILED VIEW

Druckhalteventil / Pressure Maintaining Valve

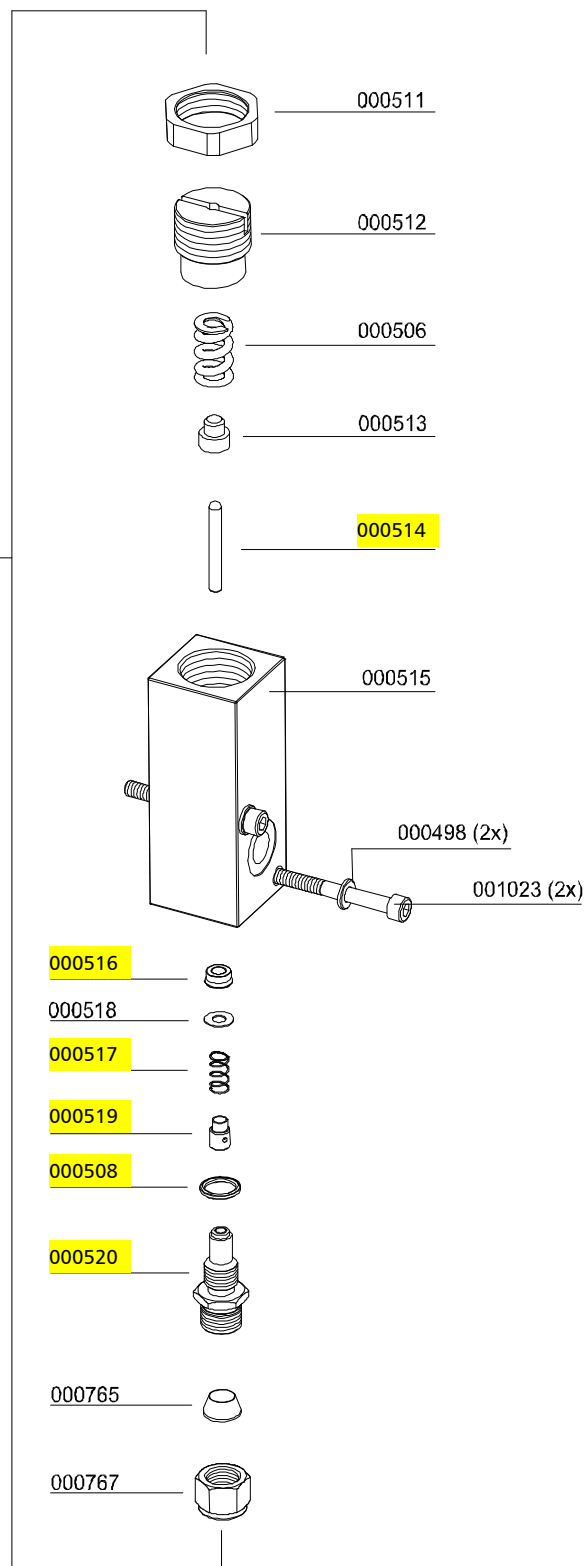
**Reparatursatz
003548:**

Bestehend aus:
Gelbmarkierte
Bestellnummern

**Repair kit
003548:**

Consists of:
Yellow marked
P/N's

000169 (complete)



C



ERSATZTEILLISTE / SPARE PART LIST

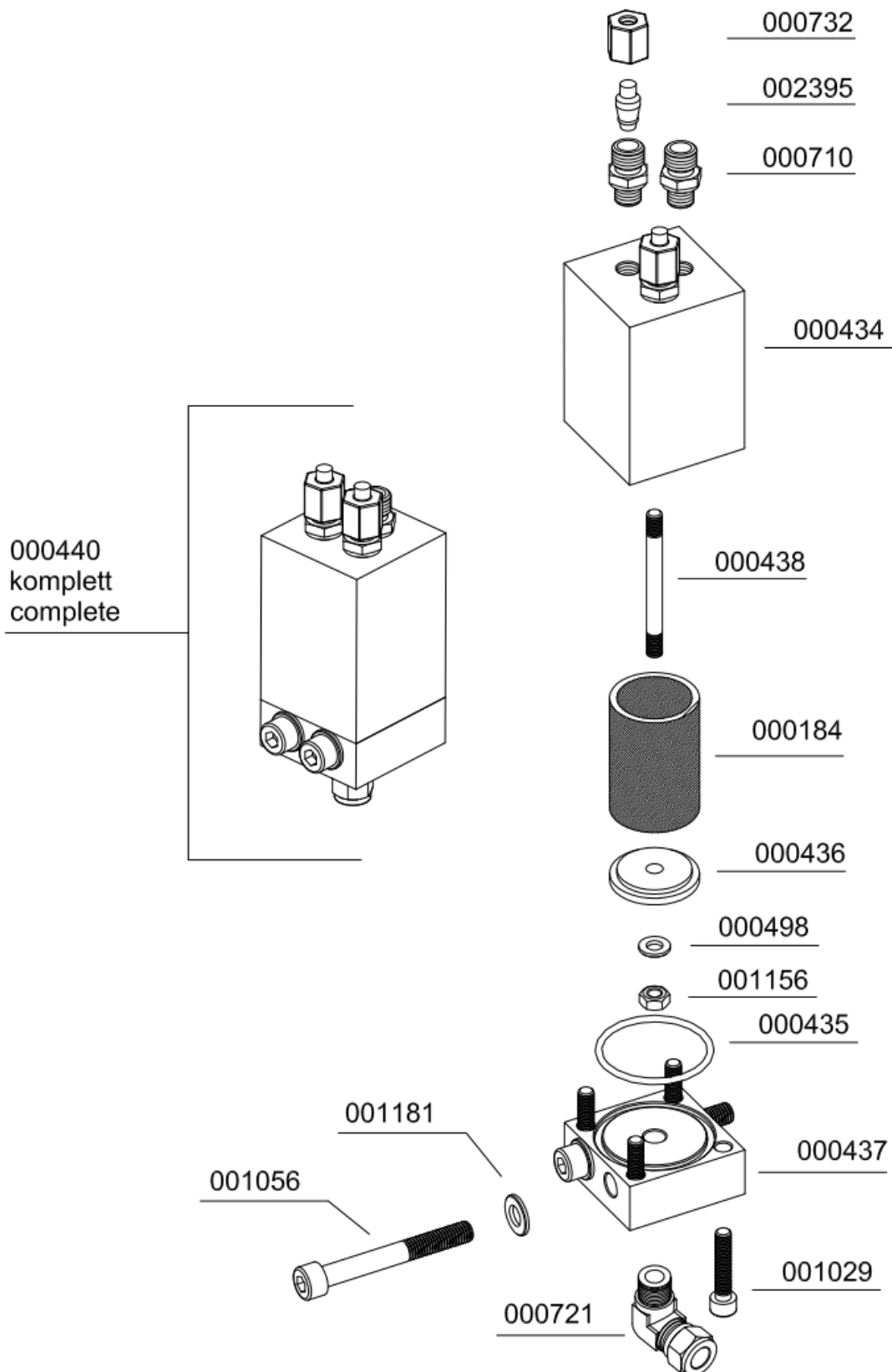
Baugruppe: Ölfilter / Assembly: Oil Filter

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|-------------------------------|--------------------------------|
| 000184 | Sinterfilter Wasserabscheider | Siltered Filter, Oil Filter |
| 000434 | Gehäuse (Ölfiltergehäuse) | Body Oil Filter Housing |
| 000435 | O-Ring, Ölfiltergehäuse | O-Ring |
| 000436 | Filterscheibe Ölfiltergehäuse | Filter Disk (oil filter assy) |
| 000437 | Filterdeckel Ölfiltergehäuse | Filter Cover (oil filter assy) |
| 000438 | Stiftschraube Ölfiltergehäuse | Threaded Bolt, oil filter assy |
| 000440 | Ölfilter kompl. | Oil Filter Unit LW 280 |
| 000498 | U-Scheibe A6 | Washer A6 |
| 000710 | Verschraubung | Connection w/o nut& olive seal |
| 000721 | Verschraubung | Connection |
| 000732 | Überwurfmutter 6L | Nut 6L |
| 001029 | Zylinderschraube | Allen Bolt |
| 001056 | Zylinderschraube | Allen Bolt |
| 001156 | Stoppmutter | Lock Nut M6 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 002395 | Verschlusskegel 06mm | Locking cone 06mm |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Ölfilter / Assembly: Oil Filter



C



ERSATZTEILLISTE / SPARE PART LIST

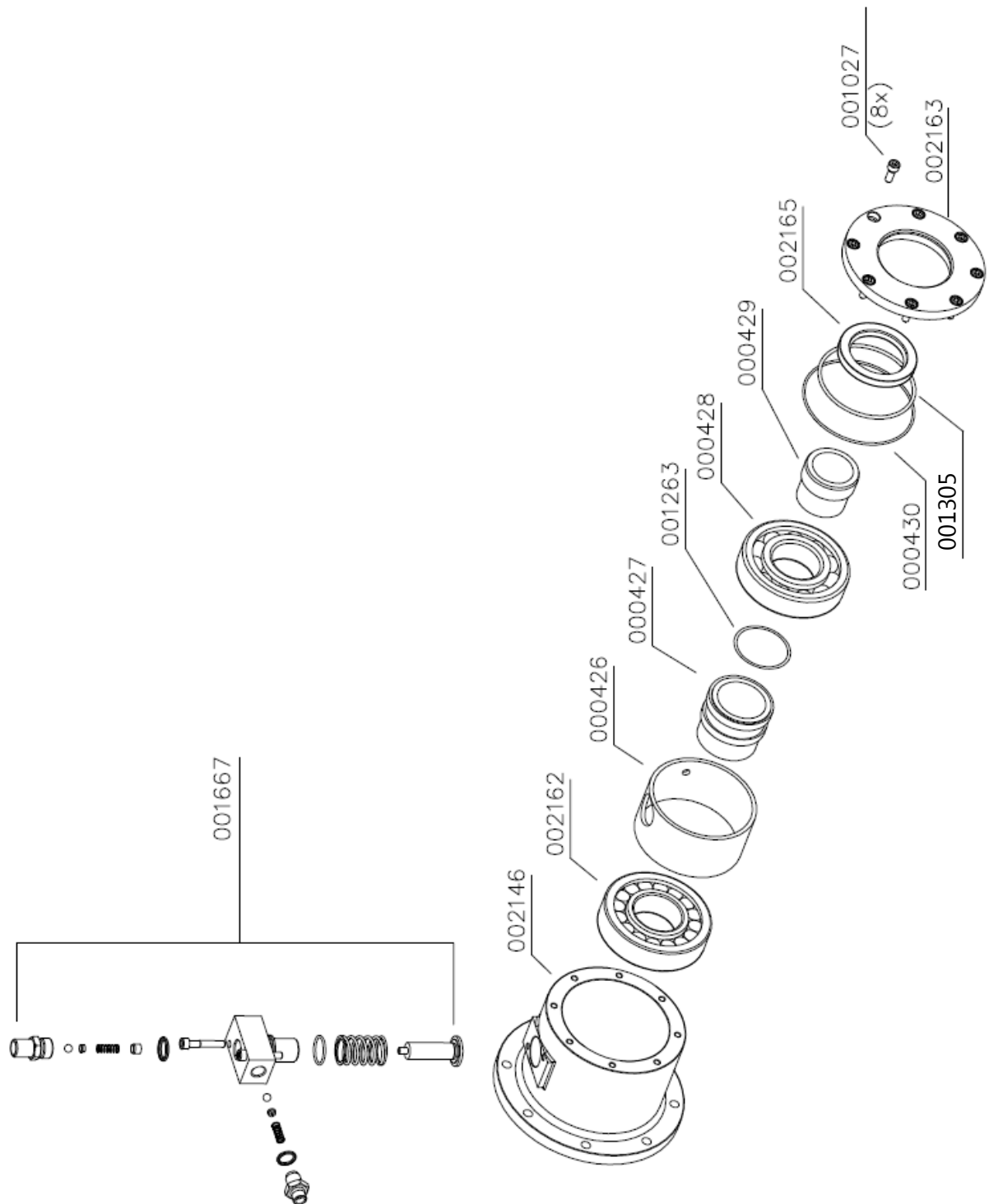
Baugruppe: Ölpumpe / Assembly: Oil Pump

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|-------------------------------|---------------------------|
| 000426 | Distanzbuchse, (Hauptlager) | Spacer Tube |
| 000427 | Nocke, (Hauptlager) | Cam Bush |
| 000428 | Hauptlager, (Kugellager) | Main Ball Bearing |
| 000429 | Buchse für Wellendichtring | Sleeve for Seal Ring |
| 000430 | O-Ring | O-Ring |
| 001027 | Zylinderschraube | Allen Bolt |
| 001263 | O-Ring | O-Ring |
| 001305 | O-Ring | O-Ring Viton |
| 001667 | Ölpumpe kompl. | Oil Pump, compl. Assembly |
| 002146 | Lagerflansch | Bearing flange |
| 002162 | Hauptlager | Main bearing |
| 002163 | Simmerringdeckel | Cover Shaft Seal |
| 002165 | Radial-Wellendichtring | Radial shaft seal |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Ölpumpe / Assembly: Oil Pump





ERSATZTEILLISTE / SPARE PART LIST

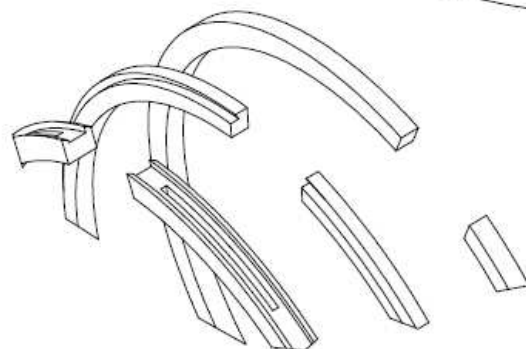
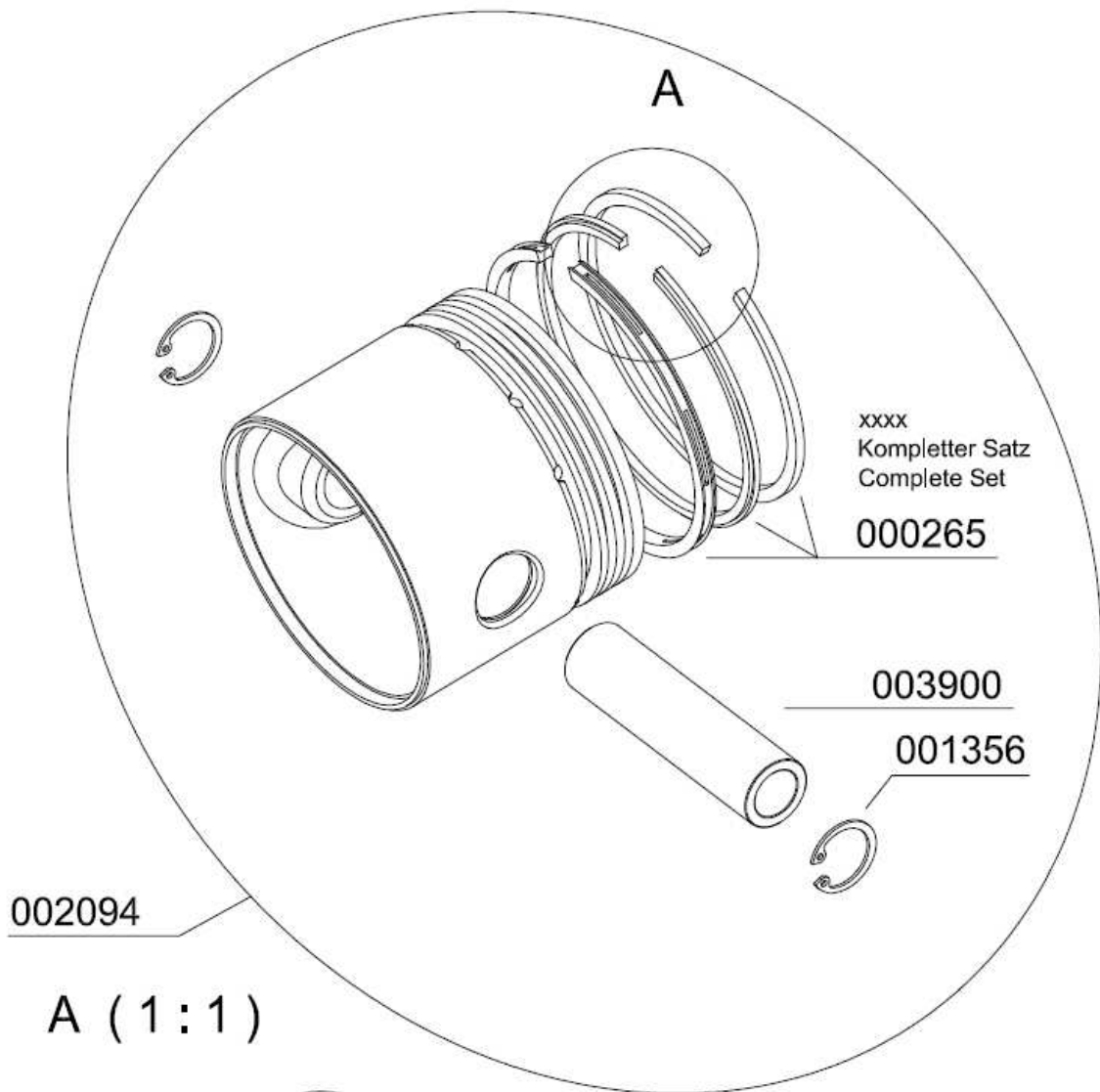
Baugruppe: Kolben 1. Stufe / Assembly: Piston 1st Stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|--------------------------|
| 000265 | Kolbenringe 1. Stufe, Satz/3 Stk. | Piston Ring Set 3 pcs |
| 001356 | Sicherungsring | Circlip I22 |
| 002094 | Kolben kompl. mit Ringen,Bolzen 1. Stufe | Piston, compl. 1st Stage |
| 003900 | Kolbenbolzen, 1. Stufe | Piston pin, 1st stage |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kolben 1. Stufe / Assembly: Piston 1st Stage





ERSATZTEILLISTE / SPARE PART LIST

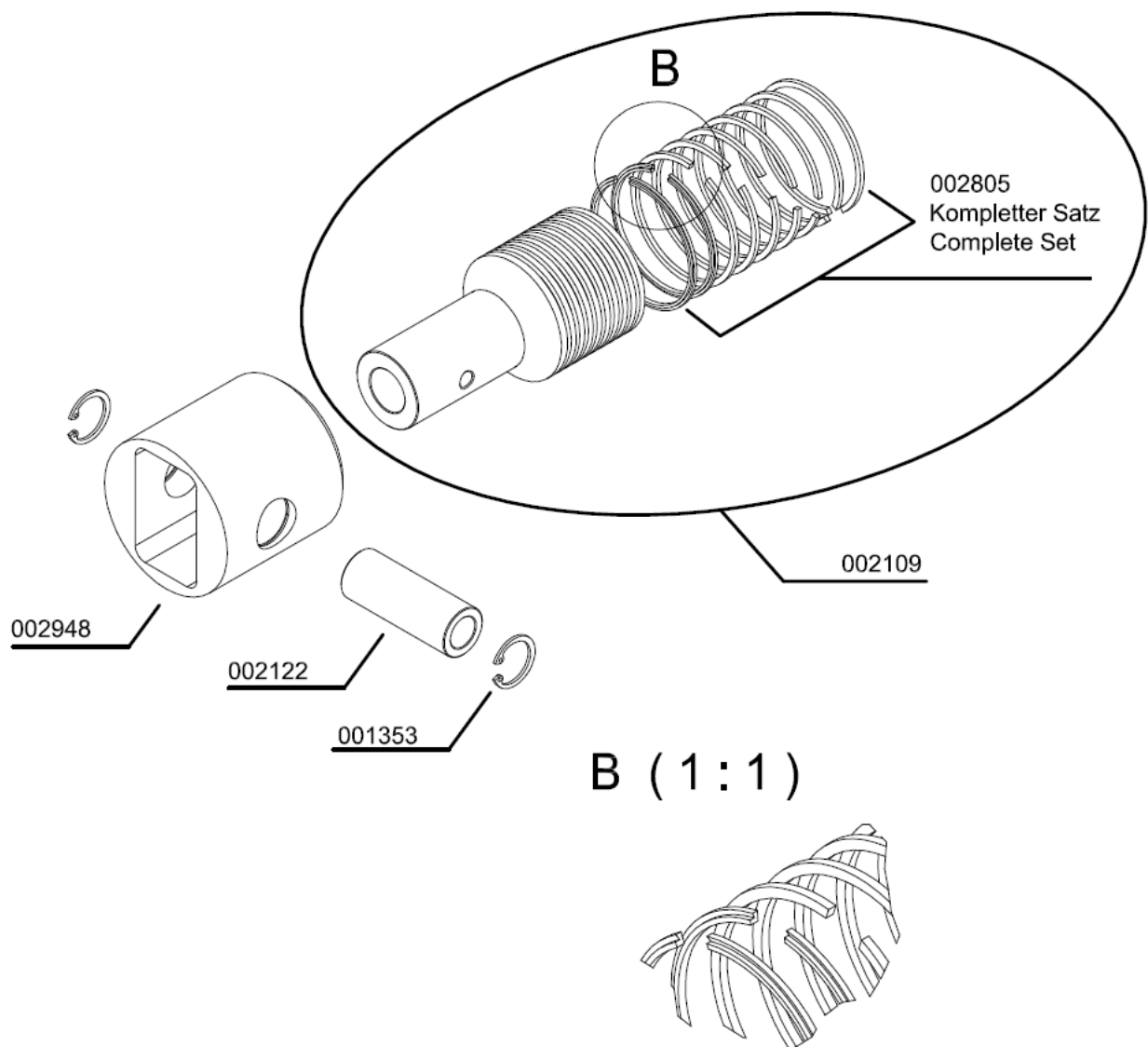
Baugruppe: Kolben 2. Stufe / Assembly: Piston 2nd Stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|-------------------------------|
| 001353 | Sicherungsring | Circlip I16 |
| 002109 | Kolben 2. Stufe, kompl. mit Kolbenringe | Piston (c/w) rings 2nd Stage |
| 002122 | Kolbenbolzen, 2. + 3. Stufe | Piston pin, 2nd + 3rd Stage |
| 002805 | Kolbenringe 2. Stufe Satz | Set of piston rings 2nd stage |
| 002948 | Führungskolben 2. / 3. Stufe | Guide piston 2nd + 3rd stage |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kolben 2. Stufe / Assembly: Piston 2nd Stage



C



ERSATZTEILLISTE / SPARE PART LIST

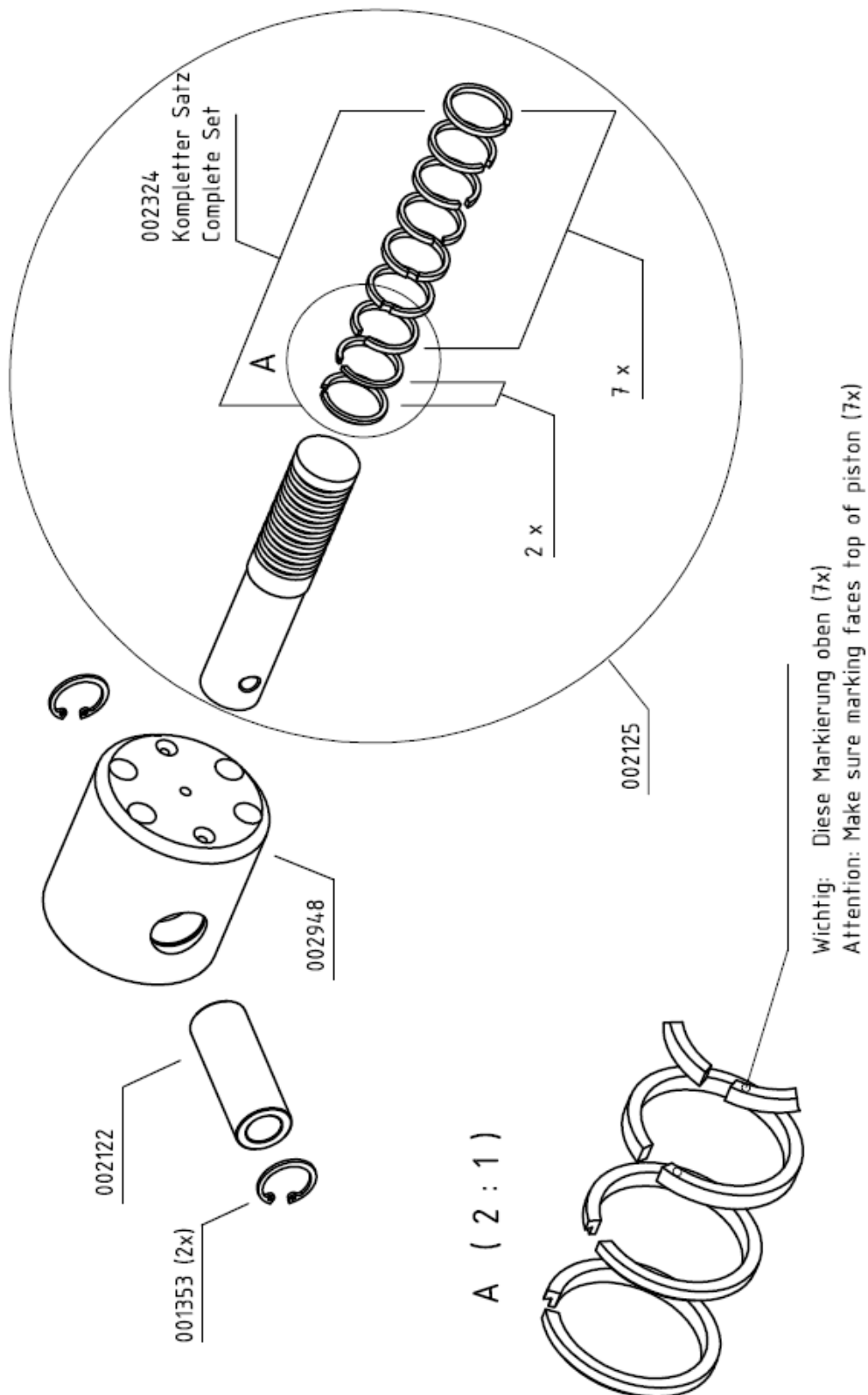
Baugruppe: Kolben 3. Stufe / Assembly: Piston 3rd Stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|------------------------------------|------------------------------|
| 001353 | Sicherungsring | Circlip I16 |
| 002122 | Kolbenbolzen, 2. + 3. Stufe | Piston pin, 2nd + 3rd Stage |
| 002125 | Kolben inkl. Kolbenringe, 3. Stufe | Piston c/w rings 3rd Stage |
| 002324 | Kolbenringe 3. Stufe Satz/9Stk. | Piston rings, 3rd Stage |
| 002948 | Führungskolben 2. / 3. Stufe | Guide piston 2nd + 3rd stage |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kolben 3. Stufe / Assembly: Piston 3rd Stage



C



ERSATZTEILLISTE / SPARE PART LIST

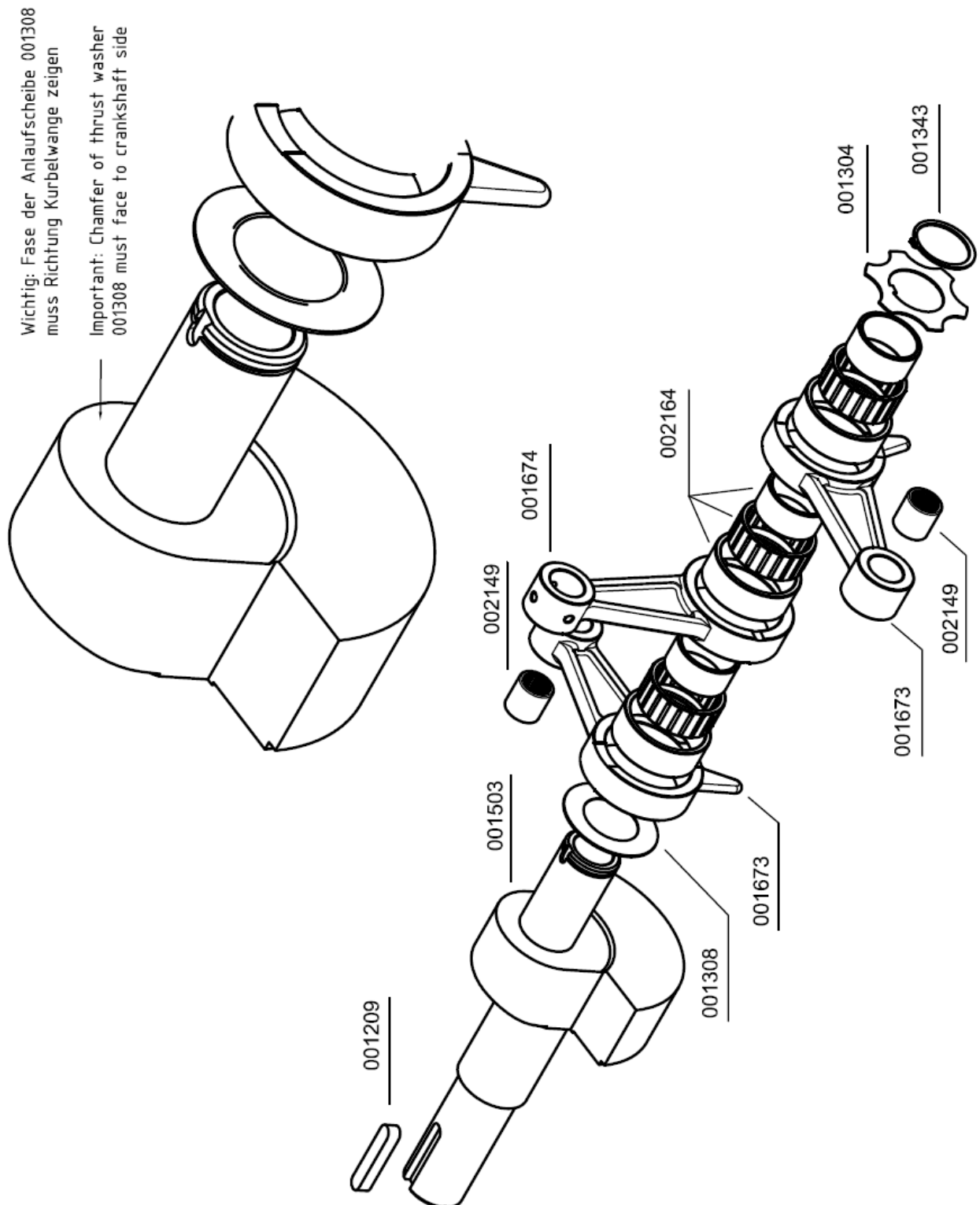
Baugruppe: Kurbelwelle / Assembly: Crankshaft

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|-------------------------------------|------------------------------|
| 001209 | Passfeder | Woodruff Key |
| 001304 | Anlaufscheibe vordere (sternförmig) | Thrust Washer, Star shaped |
| 001308 | Anlaufscheibe hintere | Thrust Washer - rear side |
| 001343 | Sicherungsring | Circlip A35 |
| 001503 | Kurbelwelle | Crank Shaft |
| 001673 | Pleuel 2.+3. Stufe | Connecting Rod 2nd/3rd Stage |
| 001674 | Pleuel 1. Stufe | Connecting Rod 1st Stage |
| 002149 | Pleuellager oberes | Small end bearing |
| 002164 | Pleuellager unteres | Big end bearing |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kurbelwelle / Assembly: Crankshaft





ERSATZTEILLISTE / SPARE PART LIST

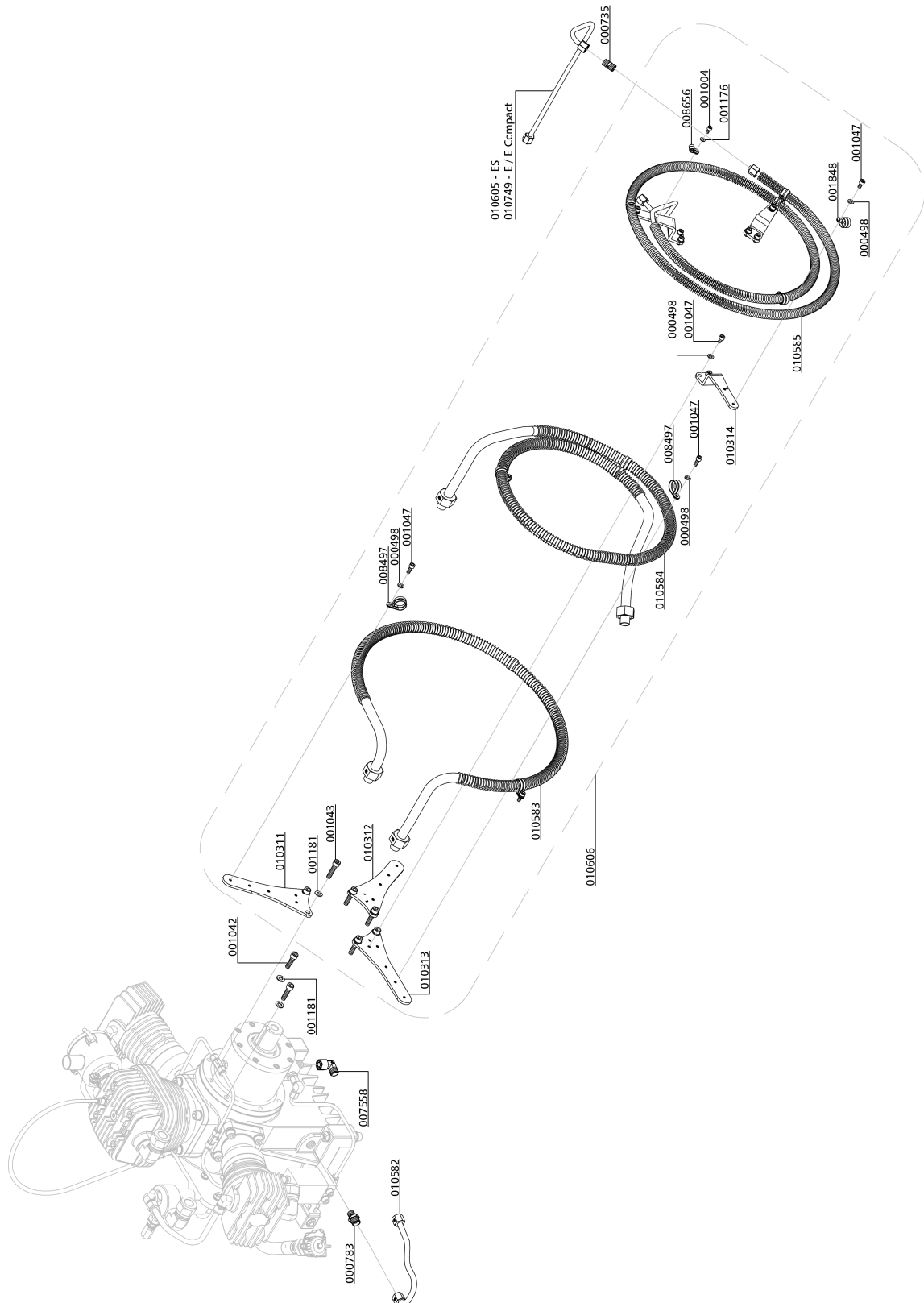
Baugruppe: Kühlrohre / Assembly: Cooling Pipes

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|-------------------------------|
| 000498 | U-Scheibe A6 | Washer A6 |
| 000735 | Verschraubung | Connection |
| 000783 | Verschraubung | Straight Connection |
| 001004 | Zylinderschraube | Allen Screw |
| 001042 | Zylinderschraube | Allen Screw |
| 001043 | Zylinderschraube | Allen Screw |
| 001047 | Zylinderschraube | Allen Bolt |
| 001176 | U-Scheibe A5 | Washer A5 |
| 001181 | U-Scheibe A8 | Washer A8 |
| 001848 | Rohrschelle (Ø15-18mm) | Pipe Clamp, 8mm Finned Pipe |
| 007558 | Verschraubung | Connection |
| 008497 | Rohrschelle Ø21 - 12 breit | Pipe Clamp |
| 008656 | Rohrschelle Ø8mm | P-Clip |
| 010311 | Kühlerhalterung 1.&2.Stufe - gerade(1) | Holder Cooler 1st & 2nd Stage |
| 010312 | Kühlerhalterung 1.&2.Stufe - quer(2) | Holder Cooler 1st & 2nd Stage |
| 010313 | Kühlerhalterung 1.&2.Stufe - quer1(3) | Holder Cooler 1st & 2nd Stage |
| 010314 | Kühlerhalterung 3.Stufe | Holder Cooler 3rd Stage |
| 010582 | Ölansaugrohr, Ø10mm | Oil Intake Pipe, Ø10mm |
| 010583 | Kühler 1.Stufe, Ø18mm CU-Rippenrohr | Cooler 1st Stage |
| 010584 | Kühler 2.Stufe, Ø18mm CU-Rippenrohr | Cooler 2nd Stage |
| 010585 | Kühler 3.Stufe, Ø8mm VA-Rippenrohr | Cooler 3rd Stage |
| 010605 | Rohrleitung Ø8mm, mit M. & S. | Pipe Ø8mm |
| 010606 | Kühler LW 280, komplett | Cooler LW 280, complete |
| 010749 | Rohrleitung Ø8mm, mit M. & S. | Pipe Ø8mm |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kühlrohre / Assembly: Cooling Pipes





ERSATZTEILLISTE / SPARE PART LIST

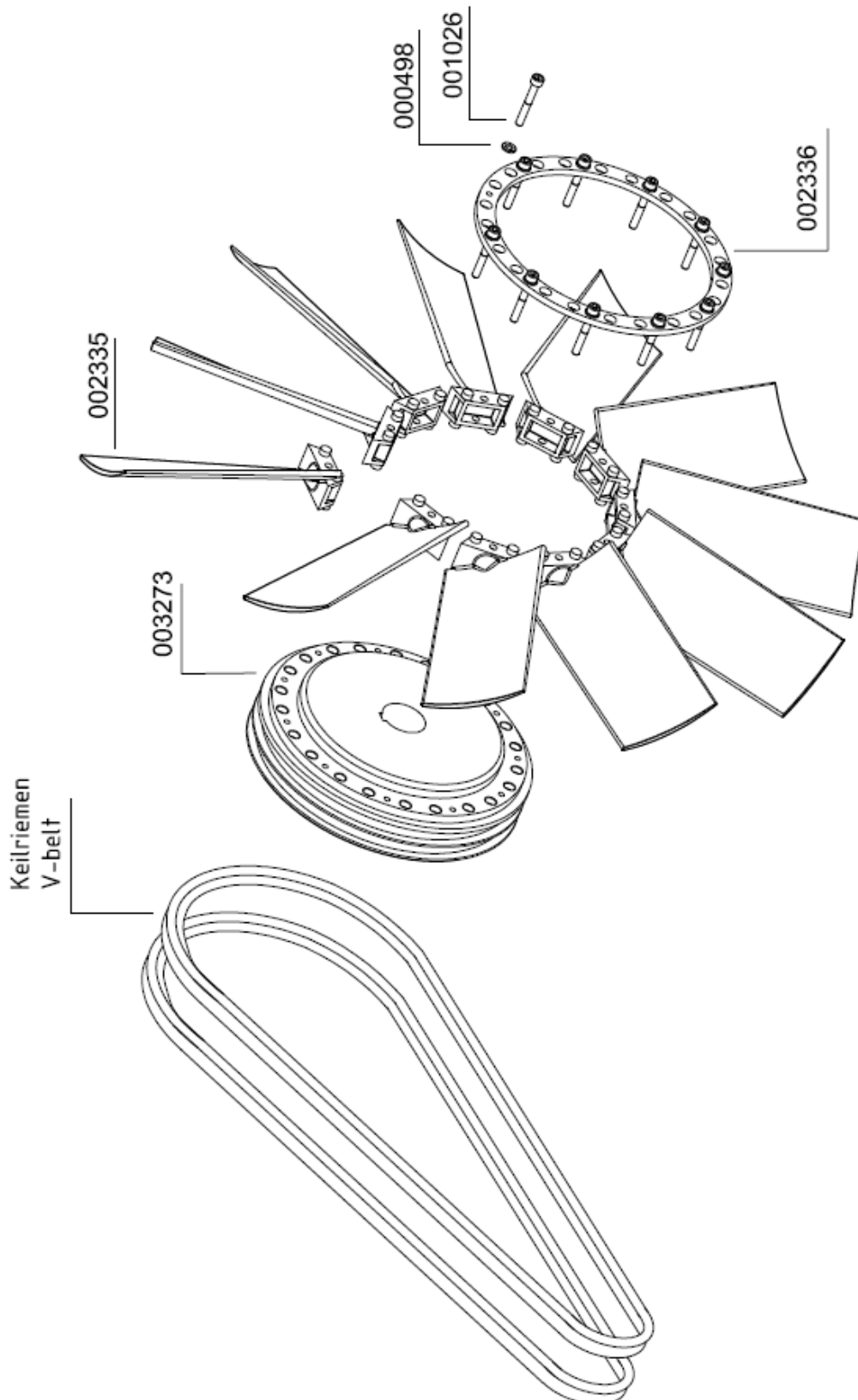
Baugruppe: Lüfterrad / Assembly: Fan Wheel

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|-------------------------------|
| 000498 | U-Scheibe A6 | Washer A6 |
| 001026 | Zylinderschraube | Allen Bolt |
| 002335 | Ventilatorflügelblatt, schwarz | Fan blade, black, new version |
| 002336 | Haltering Ventilatorflügel | Fan blade holder |
| 003273 | Schwungrad, inkl. Schrauben & Haltering | Flywheel c/w bolts & clamping |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Lüfterrad / Assembly: Fan Wheel



C



ERSATZTEILLISTE / SPARE PART LIST

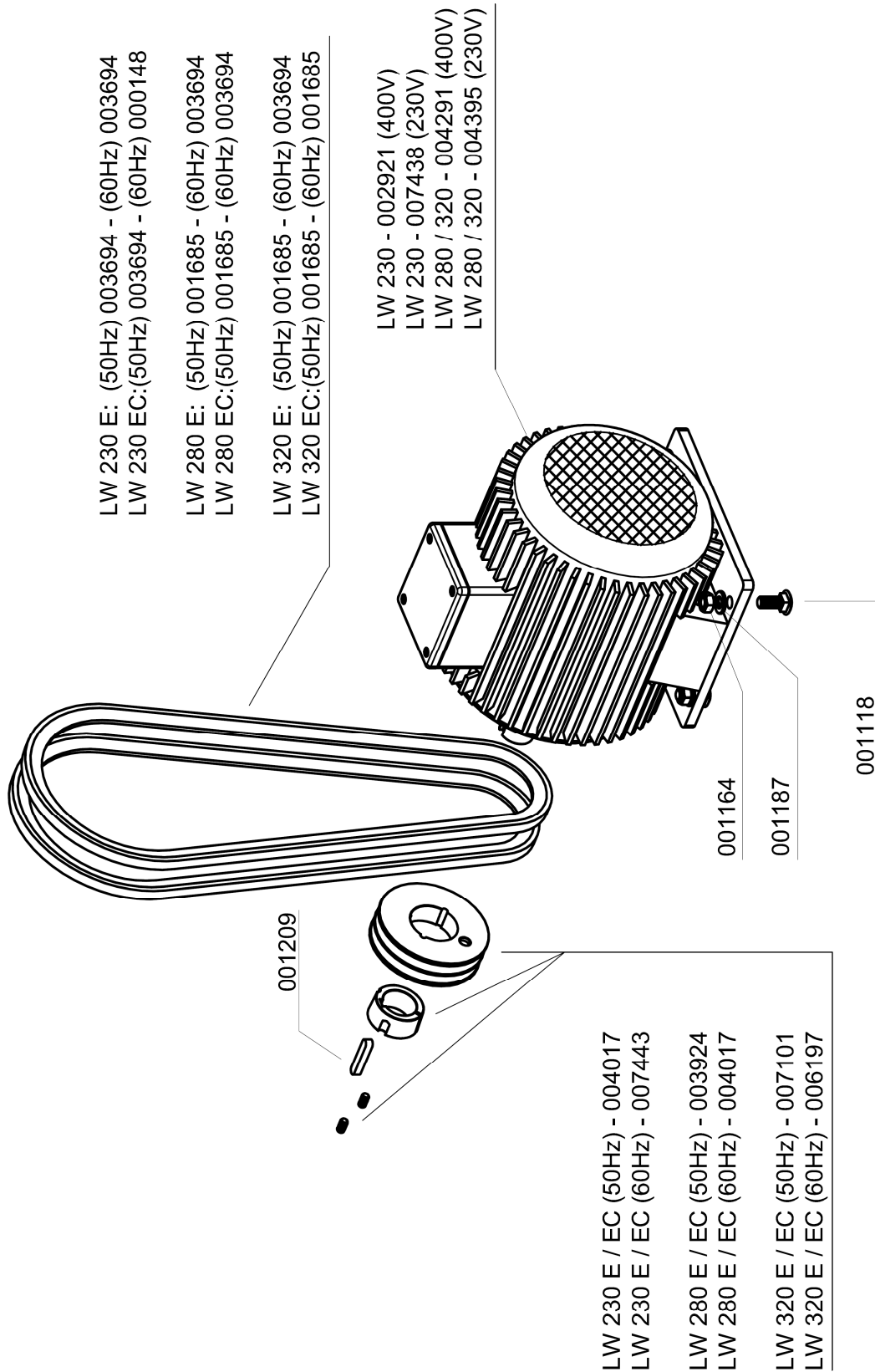
Baugruppe: E-Motor / Assembly: E-Motor

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|--------------------------------|
| 000148 | Keilriemen | V-Belt |
| 001118 | Schlossschraube | Carriage Screw |
| 001164 | Stopfmutter | Lock Nut M10 |
| 001187 | U-Scheibe A10 | Washer A10 |
| 001209 | Passfeder | Woodruff Key |
| 001685 | Keilriemen | V-Belt |
| 002921 | Antriebsmotor 5,5kW 400 V | Drive motor 5,5 kW 400V |
| 003694 | Keilriemen | V-Belt |
| 003924 | Keilriemenscheibe | V-belt pulley |
| 004017 | Keilriemenscheibe Alu | V-belt pulley alloy |
| 004291 | Antriebsmotor 7,5 kW / 400 V - 50/60 Hz | Motor 7,5kW, 400V, 50-60Hz |
| 004395 | Antriebsmotor 7,5kW / 230V / 50/60 Hz | Motor, 7,5kW, 230V, 50-60 Hz |
| 006197 | Riemenscheibe | Pulley c/w bushing |
| 007101 | Keilriemenscheibe inkl. Spannbuchse | V-belt pulley for motor 7.5 kW |
| 007438 | Antriebsmotor 5,5kW 230V | Drive motor 5,5 kW 230V |
| 007443 | Keilriemenscheibe 2-rilling SPA, Alu | V-belt pulley alloy |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: E-Motor / Assembly: E-Motor



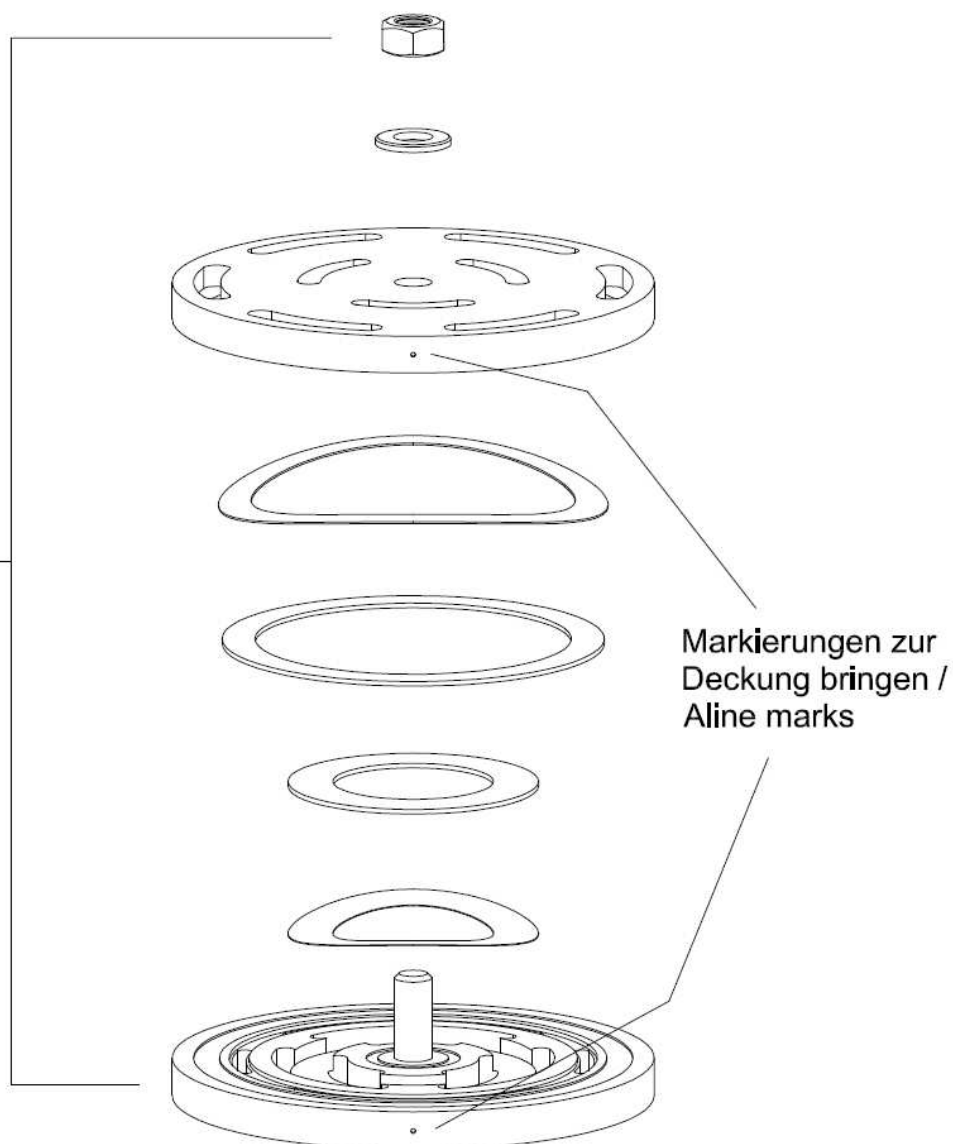
ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Saug und Druckventil 1. Stufe /

Assembly: In and outlet valve 1st stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------------------|-----------------------------|
| 002093 | Saug-und Druckventil, 1. Stufe | In & Outlet Valve 1st Stage |

002093
komplett /
complete

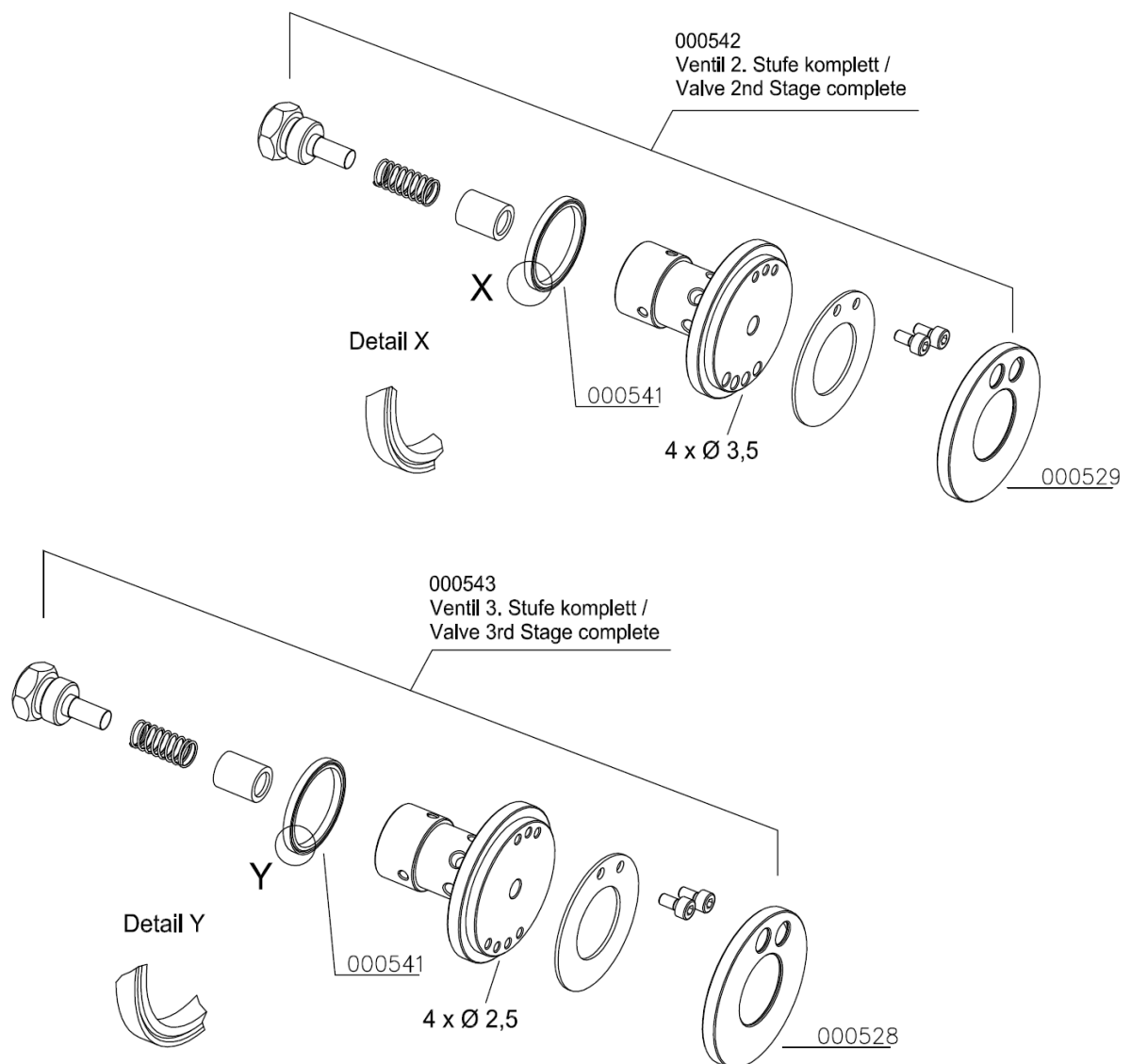


ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Saug und Druckventile 2. und 3. Stufe /

Assembly: In and outlet valves 2nd and 3rd stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|-------------------------------|
| 000528 | Ventildichtung, Saug- & Druckventil unten | Lower Valve Gasket, 3rd St. |
| 000529 | Ventildichtung, Saug- & Druckventil unten | Lower Valve Gasket, 2nd St. |
| 000541 | Dichtring / Dichtung Ventil | Upper Alloy Seal Ring |
| 000542 | Saug- & Druckventil, 2. Stufe komplett | In- & Outlet Valve, 2nd Stage |
| 000543 | Saug-Druckventil, 3. Stufe | In- & Outlet Valve, 3rd Stage |





ERSATZTEILLISTE / SPARE PART LIST

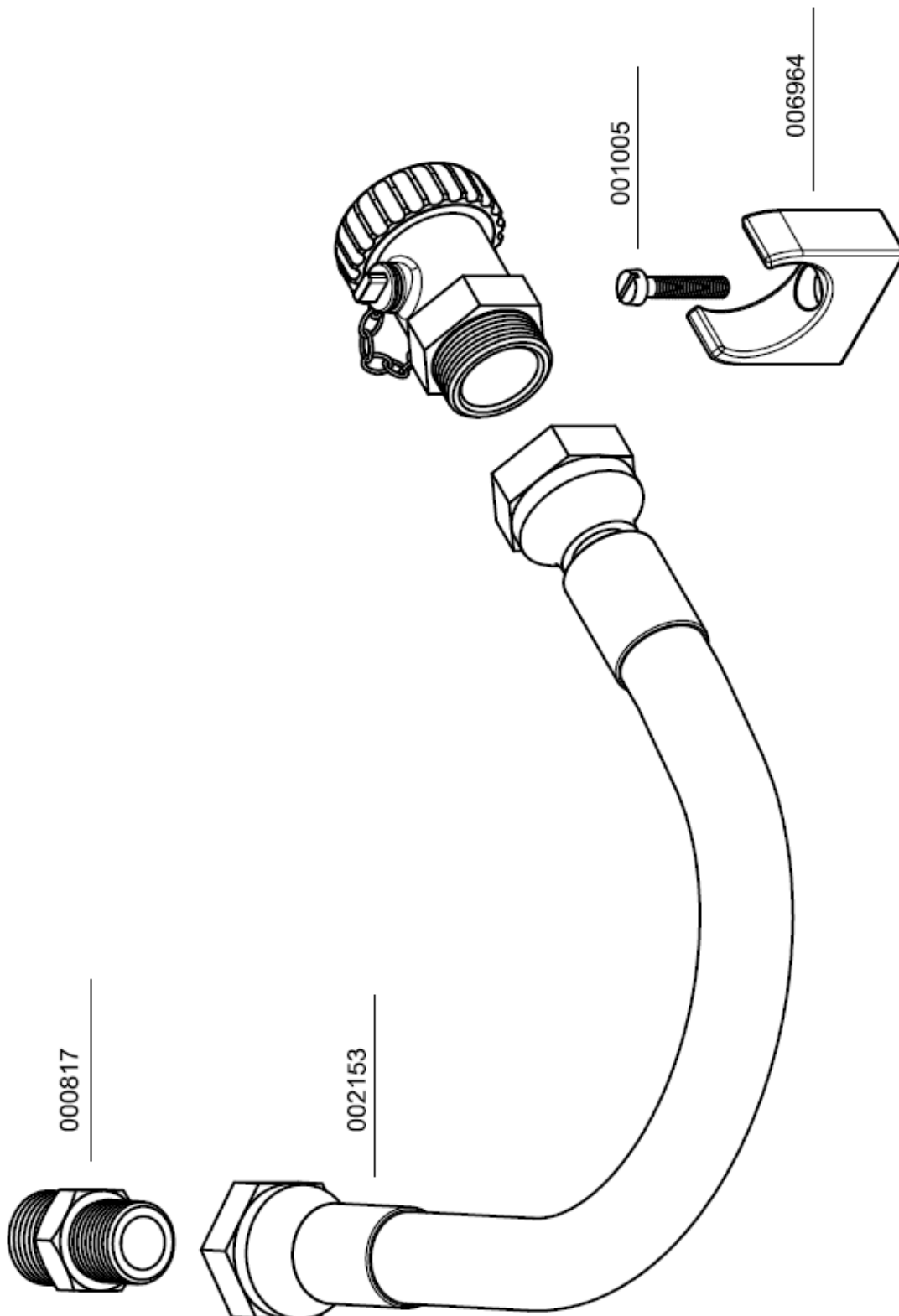
Baugruppe: Ölablassschlauch / Assembly: Oil Drainage Tube

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|------------------------------|----------------------|
| 000817 | Verschraubung | Connection |
| 001005 | Zylinderschraube | Allen Screw |
| 002153 | Ölablassschlauch | Oil drain hose |
| 006964 | Klemmhalter Ölablassschlauch | Clamp Oil Drain Hose |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Ölablassschlauch / Assembly: Oil Drainage Tube



C



ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Verteilerleiste mit Füllschlauch

Assembly: Distributor Block c/w Filling Hose

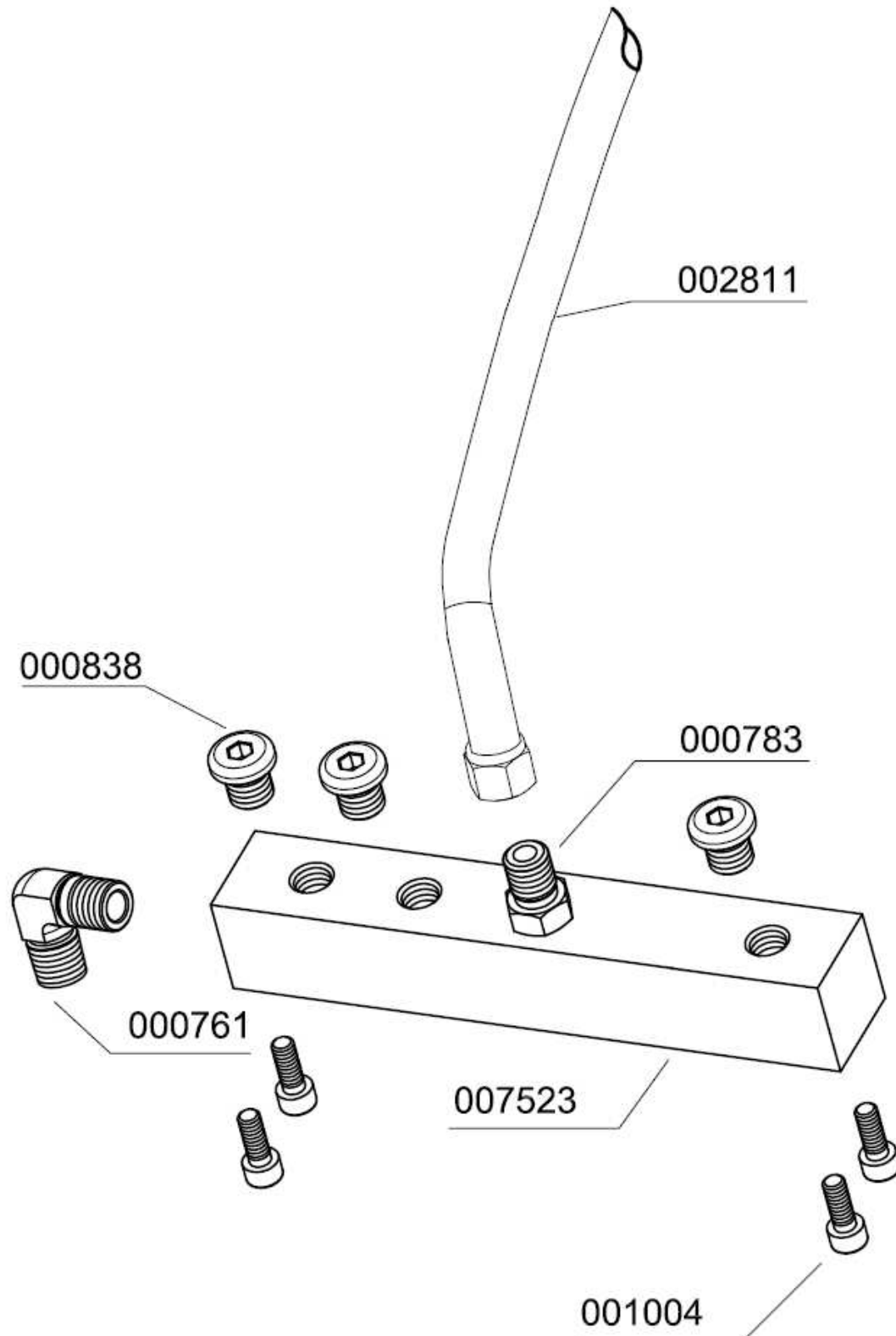
| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|----------------------------|--------------------------------|
| 000761 | Verschraubung | Elbow Connection |
| 000783 | Verschraubung | Straight Connection |
| 000838 | Verschlussstopfen | Plug |
| 001004 | Zylinderschraube | Allen Screw |
| 002811 | Hochdruckschlauch | HP-Hose |
| 007523 | Verteilerleiste, Alu, gold | Distributor Block, alloy, gold |

C

DETAILANSICHT / DETAILED VIEW

Baugruppe: Verteilerleiste mit Füllschlauch

Assembly: Distributor Block c/w Filling Hose



C

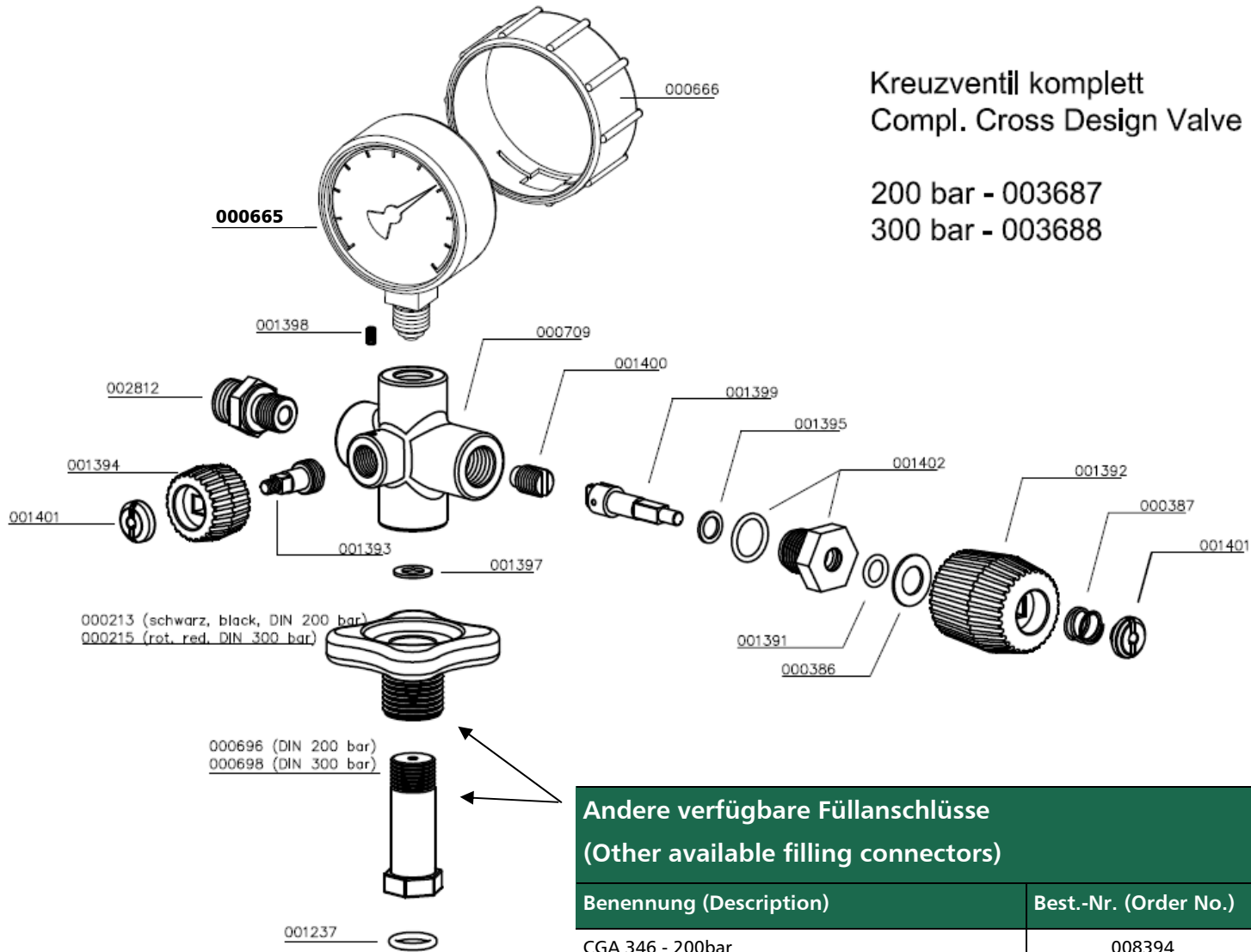


ERSATZTEILLISTE / SPARE PART LIST

Baugruppe: Kreuzventil / Assembly: Cross Design Valve

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|--|
| 000213 | Handrad, schwarz DIN 200bar | Hand Wheel DIN 200 bar, black |
| 000215 | Handrad rot DIN 300bar | Hand Wheel DIN 300 bar, red |
| 000386 | Gleitscheibe, Kreuzventil | Slide Washer |
| 000387 | Feder (Kreuzventil) | Coil Spring, cross d. valve |
| 000665 | Manometer Messing | Pressure Gauge, brass |
| 000666 | Manometerschutzkappe Ø63mm | Protector Pressure Gauge Ø63mm |
| 000696 | Füllanschluss o. Handrad 200bar | Filling Connector w/o handwheel 200bar |
| 000698 | Füllanschluss o. Handrad 300bar | Filling Connector w/o handwheel 300bar |
| 000709 | Füllventil Kreuzbauweise, kompl. | Filling Valve cross design |
| 001237 | O-Ring DIN Flaschenanschluss | O-Ring DIN filling connector |
| 001391 | O-Ring | O-Ring |
| 001392 | Füllhandrad Kreuzventil | Hand Wheel Filling Valve cross |
| 001393 | Entlüftungsspindel | Vent Spindle |
| 001394 | Entlüftungshandrad | Vent Hand Wheel |
| 001395 | Gleitscheibe, schwarz, Kreuzventil | Slide Washer, plastic black |
| 001397 | Kupferdichtung | Copper Seal Ring |
| 001398 | Madenschraube | Worm Screw |
| 001399 | Oberspindel | Adapter Shaft |
| 001400 | Dichtspindel, Kreuzventil | Seal Spindle Filling Valve |
| 001401 | Schlitzmutter | Slotted Nut |
| 001402 | Gehäuseverschraubung komplett mit O-Ringen | Filling Spindle Body c/w O-Rings |
| 002812 | Verschraubung, Edelstahl | Connection, S/S |
| 003687 | Füllventil Kreuzbauweise komplett 200bar | Filling Valve cross complete unit 200bar |
| 003688 | Füllventil Kreuzbauweise komplett 300bar | Filling Valve cross complete unit 300bar |

C



Kreuzventil komplett
Compl. Cross Design Valve

200 bar - 003687
300 bar - 003688

**Andere verfügbare Füllanschlüsse
(Other available filling connectors)**

| Benennung (Description) | Best.-Nr. (Order No.) |
|--------------------------|-----------------------|
| CGA 346 - 200bar | 008394 |
| CGA 347 - 300bar | 006842 |
| INT / Yoke - 200/232 bar | 002307 |

DETAILANSICHT / DETAILED VIEW

Baugruppe: Kreuzventil / Assembly: Cross Design Valve





OPTIONS



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AUTO SHUT DOWN

D

AUTO SHUT DOWN

Final pressure switch

The pressure switch shuts off the compressor automatically when the selected final pressure is reached. The final pressure switch is already adjusted to the corresponding cut-out pressure.

The pressure can be adjusted with the upper adjusting screw as follows:

Increasing cut-out pressure:

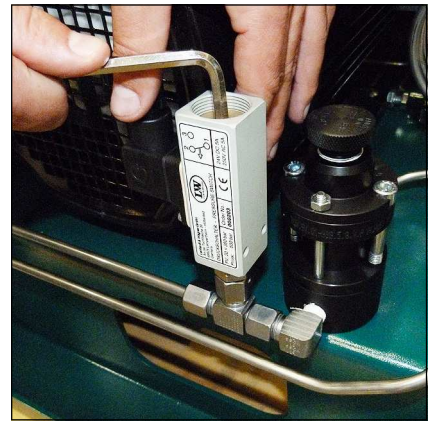
Turn the adjusting screw clockwise

Reducing cut-out pressure:

Turn the adjusting screw anti-clockwise

Adjust the pressure switch in steps of a quarter turn.

Restart the compressor after every adjustment step to verify the actual cut-out pressure.



Final pressure switch

D



Note

Do not adjust the final pressure switch to the safety valve pressure. The final pressure switch has to be adjusted to min. 10 bar below the safety valve pressure. Otherwise, the safety valve can open during operation. This considerably reduces the life of the safety valve.

Example settings:

| Safety valve | Max. Operating Pressure |
|--------------|-------------------------|
| 225 bar | 215 bar |
| 250 bar | 240 bar |
| 330 bar | 320 bar |

AUTO SHUT DOWN

Safety valve test



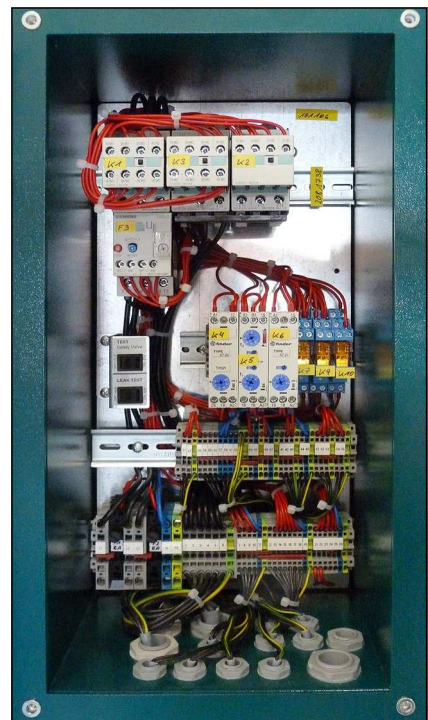
Note

Do not fill any tank during test phase!

Safety valve test as follows:

- Disconnect compressor from the electrical power supply and protect against unexpected restart.
- Remove the cover of the switch box.
- Switch on the "Test Safety Valve" switch (pressure switch will be deactivated!).
- Mount the cover of the switch box.
- Connect the compressor to the electrical power supply.
- Close filling valves.
- Start the compressor.
- Watch the final pressure gauge. The safety valve should open when reaching working pressure of the compressor. If not, switch off the unit and take out of service until the safety valve has been replaced.
- Switch off the compressor (compressor vented).
- Disconnect the compressor from the electrical power supply and protect against unexpected restart.
- Remove the cover of the switch box.
- Switch off the "Test Safety Valve" switch (pressure switch will be activated!).
- Mount the cover of the switch box.
- Connect the compressor to the electrical power supply.

The safety valve test is now completed.



Switch box



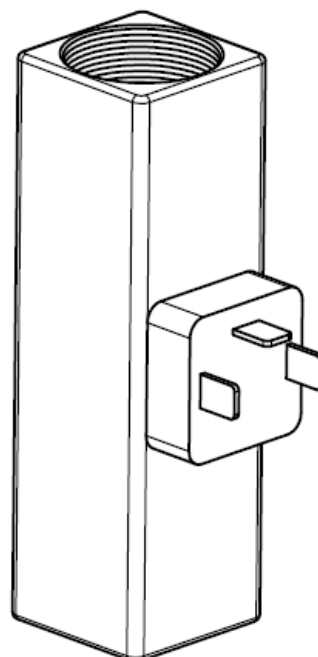
Safety valve test switch (up)

AUTO SHUT DOWN

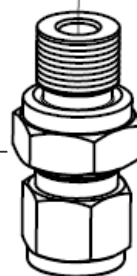
Druckschalter / Pressure Switch

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|----------------------------------|----------------------------|
| 000203 | Druckschalter 50-350 bar | Pressure Switch 50-350 bar |
| 000749 | Verschraubung, mit fester Mutter | Connection with fixed nut |
| 000764 | Winkelverschraubung | Elbow connection |

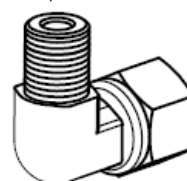
000203



000749



000764



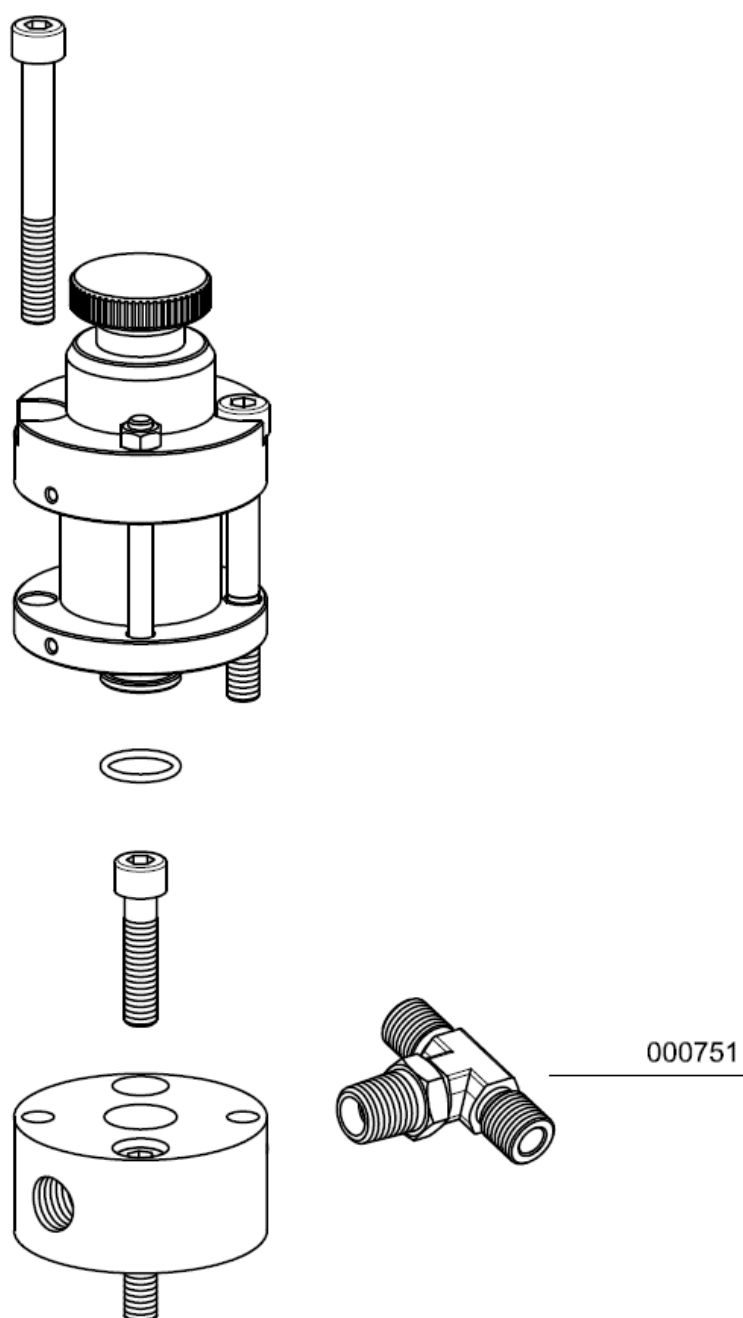
D

AUTO SHUT DOWN

Sicherheitsventil / Safety Valve

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------|-----------------|
| 000751 | T-Verschraubung 8L | T-connection 8L |

The safety valve in option Auto-Stop is different to the standard one. A T-connection is installed at the outlet of the safety valve!



D



AUTOMATIC CONDENSATION DRAIN

D

AUTOMATIC CONDENSATION DRAIN

Automatic condensation dump system



Note

The collected condensate can contain oil and has to be disposed according to regulations.

The LW 230-280-320 E Compact comes as standard with an automatic condensation dump system. Solenoids drain all condensate separators every 15 minutes.

To test the system, press the blue condensate test drain button on the operating panel.

Oil / water separators

Condensate is separated after every stage of compression. All three oil / water separators are equipped with electronic timer controlled solenoids. The timer is located in the switch box and activates the dump valves about every 15 minutes.

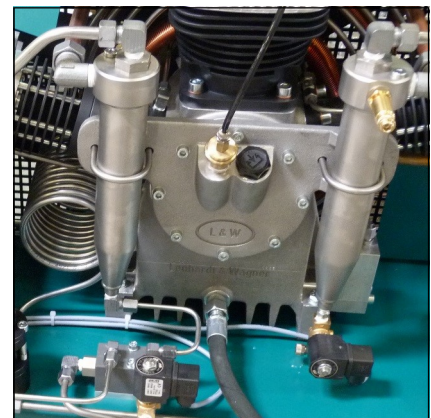
To release the complete condensate through the black plastic hoses, we recommend using an 20 l container at least.

The drain noise can be kept to a minimum by using a silencer.

Maintenance intervals

We recommend to clean oil and water separators every 500 operating hours or at least once a year, to check for corrosion damage and to replace o-rings if necessary.

All oil / water separators have an integrated sinter filter which has to be replaced every 1,000 operating hours.



Öl- / Wasserabscheider 1. und 2. Stufe



Oil / water separators final stage

AUTOMATIC CONDENSATION DRAIN

Leak test



Note

Do not fill any tank during test phase!

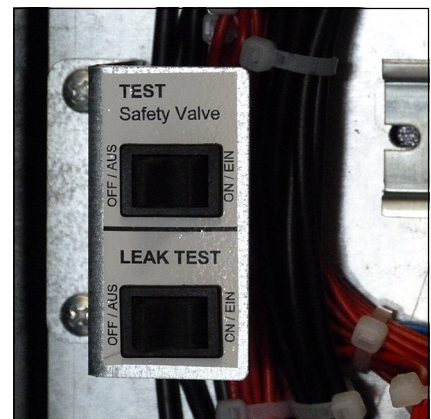
Leak test as follows:

- Disconnect the compressor from the electrical power supply and protect against unexpected restart.
- Remove the cover of the switch box.
- Switch on the leak test switch (solenoid valves will be deactivated!).
- Mount the cover of the switch box.
- Connect the compressor to the electrical power supply.
- Close filling valves.
- Start the compressor.
- Switch off the compressor at a pressure of approx. 150 bar.
- Verify the compressor for release noises. (A slight hiss of the air inlet filter nozzle can be ignored). If release noises occur, localise blow off position(s).
- Switch off the compressor.
- Disconnect the compressor from the electrical power supply and protect against unexpected restart.
- Remove the cover of the switch box.
- Switch off the leak test switch (solenoids will be activated!).
- Mount the cover of the switch box.
- Connect the compressor to the electrical power supply (compressor vented).

The leak test is now completed.



Switch box



Leak test switch (lower)

AUTOMATIC CONDENSATION DRAIN

Oil / water separators final stage - maintenance



Note

Clean all parts thoroughly before assembly.

Change/clean oil / water separators final stage as follows:

- Loosen pipe connections and mounting screws.
- Remove oil / water separators.
- Open ring nut and remove separator top (Fig. 1).
- Loosen nut at the separator top.
- Change sinter filter (Fig. 2).
- Reassemble all parts and tighten nut.
- Change o-ring, previously grease new o-ring (Fig. 3).
- Place separator top and tighten ring nut manually.
- Replace silencer.
- Mount oil / water separators.
- Tighten pipe connections and mounting screws.

The oil / water separator maintenance is now completed.



Oil / water separators final stage



Fig. 1 - Loosen ring nut

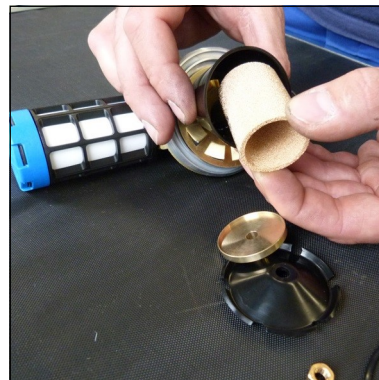


Fig. 2 - Change sinter filter



Fig. 3 - Change o-ring

AUTOMATIC CONDENSATION DRAIN

Pneumatic condensate valve - maintenance



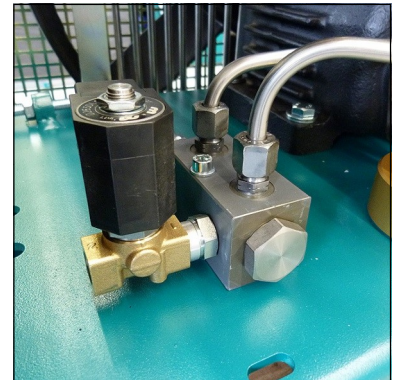
Note

Clean all parts thoroughly before assembly.

Pneumatic condensate valve change as follows:

- Loosen pipe connections and mounting screws.
- Remove pneumatic condensate valve.
- Loosen connection (Fig. 2).
- Change sinter filter (Fig. 3).
- Tighten horizontal screw.
- Mount pneumatic condensate valve.
- Tighten pipe connections and mounting screws.

Pneumatic condensate valve maintenance is now completed.



Pneumatic Condensate Valve

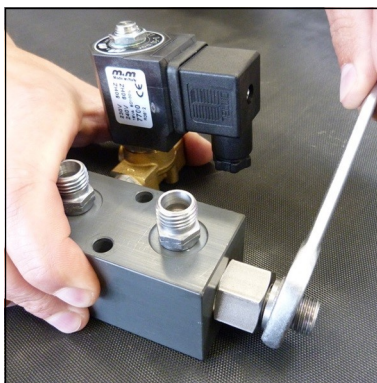


Fig. 2 - Loosen connection

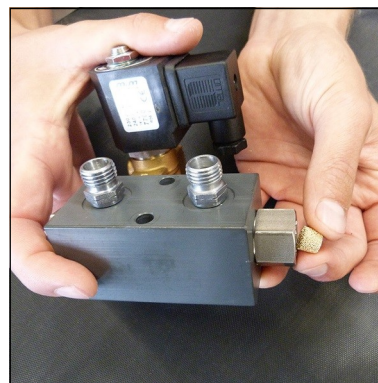


Fig. 3 - Change sinter filter

AUTOMATIC CONDENSATION DRAIN

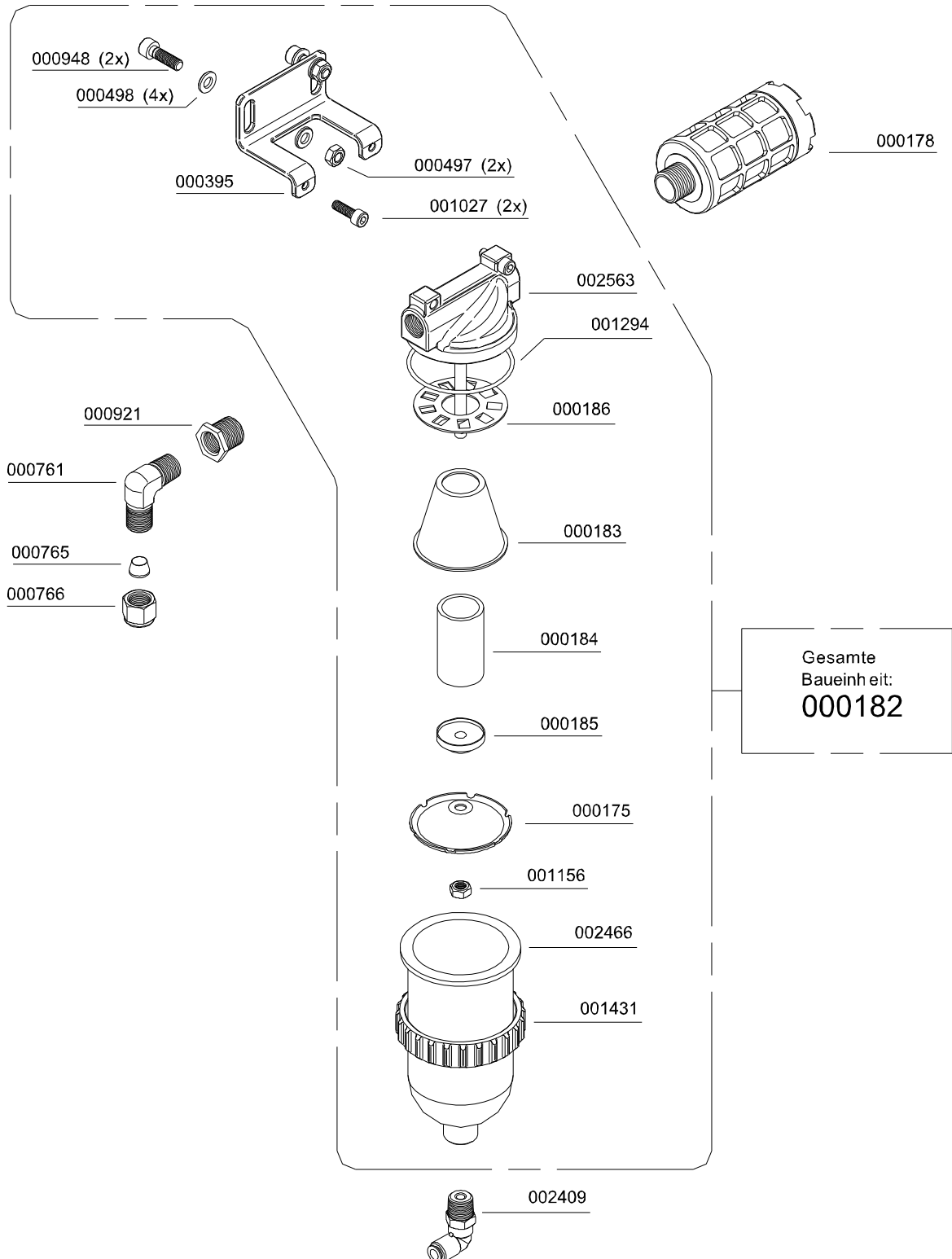
Öl- / Wasserabscheider Endstufe / Oil- / Water Separator Final Stage

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--|---------------------------------------|
| 000175 | Deckel, Wasserabscheider | Cap |
| 000178 | Schalldämpfer G1/2" | Silencer G1/2" |
| 000182 | Endstufe Wasserabscheider (PN 15 bar) | Water Separator c/W bracket |
| 000183 | Wasserabweiser | Filter Protecor |
| 000184 | Sinterfilter Wasserabscheider | Siltered Filter, Oil Filter |
| 000185 | Halteteller | Plate |
| 000186 | Drallscheibe | Twist Disk |
| 000395 | Blechhalter Kondensatabscheider | Bracket water separator |
| 000497 | Mutter M6 | Nut M6 |
| 000498 | Unterlegscheibe | Washer A6 |
| 000761 | Verschraubung WE 08 PLR CFX | Connection |
| 000765 | Schneidring PSR 08 LX | <i>Olive Seal 8mm</i> |
| 000766 | Mutter 8L | Nut 8L |
| 000921 | Reduzierung 1/2"-1/4" | Reducer 1/2"-1/4" |
| 000948 | Flachkopfschraube M6x16mm DIN6912 8.8 ZN | Pan Head Bolt M6x16mm DIN6912 8.8 ZN |
| 001027 | Zylinderschraube M6x30 | Allen Bolt M6x30 |
| 001156 | Stopfmutter M6 DIN985 ZN | Lock Nut M6 |
| 001294 | O-Ring 68x3 NBR90 | O-Ring 68x3 |
| 001431 | Befestigungsring Wasserabscheider LW 450 | Lock Ring Water Separator |
| 002409 | Winkelschnellkupplung G1/8"-8mm | Quick release coupling elbow |
| 002466 | Kondensatbehälter für Abscheider | Condensate bowl |
| 002563 | Wasserabscheider Oberteil PN 15 bar | Water Separator, upper comp. PN15 bar |

D

AUTOMATIC CONDENSATION DRAIN

Öl- / Wasserabscheider Endstufe / Oil- / Water Separator Final Stage



D



AUTOMATIC CONDENSATION DRAIN

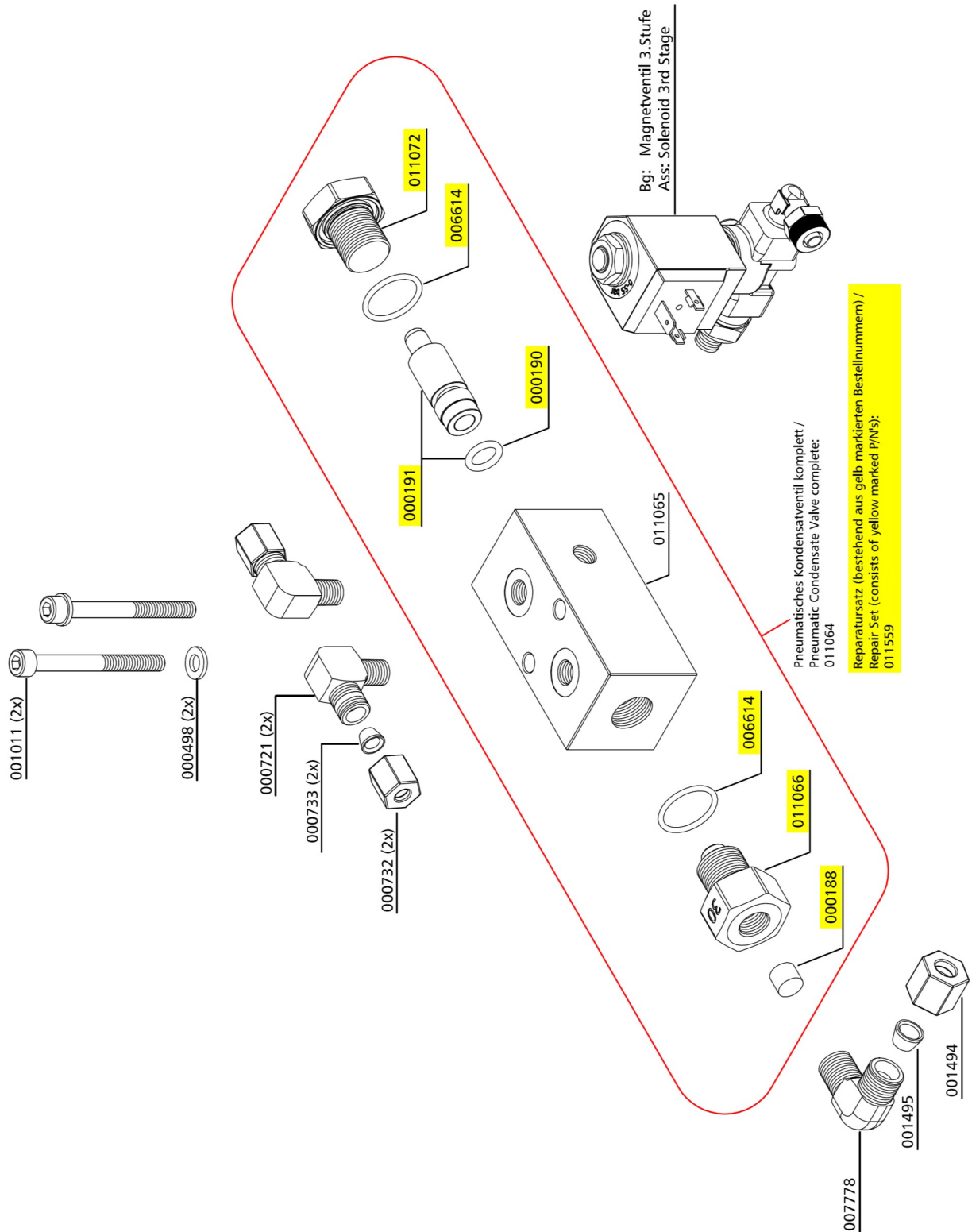
Pneum. Kondensat-Ablassventil / Pneumatic Condensate Valve

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------------------------|-----------------------------|
| 000188 | Sinterfilter | Sintered Filter |
| 000190 | O-Ring, 10 x 2,5 NBR90 | O-Ring, 10 x 2,5 NBR90 |
| 000191 | Steuerkolben | Piston |
| 000498 | U-Scheibe A6 | Washer A6 |
| 000721 | Verschraubung | Connection |
| 000732 | Mutter | Union Nut 06L |
| 000733 | Schneidring | Olive Seal SR 06 (Ø 6mm) |
| 001011 | Zylinderschraube | Allen Bolt |
| 001494 | Mutter 08L, Edelstahl | Union Nut 08L, S/S |
| 001495 | Schneidring 8mm, Edelstahl | Oilve Seal 8mm, S/S |
| 006614 | O-Ring, 20 x 2 NBR90 | O-Ring, 20 x 2 NBR90 |
| 007778 | Verschraubung, Edelstahl | Elbow Connection, S/S |
| 011064 | Pneum. Kondensatablaßventil | Pneumatic Condensate Valve |
| 011065 | Gehäuse, pneum. Kondensatventil | Housing PCV |
| 011066 | Düsenschraube | Inlet Jet Screw |
| 011072 | Verschlussstopfen für 011064 | Plug for 011064 |
| 011559 | Reparatursatz pneum. Kondensatventil | Repair Kit Condensate Valve |

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AUTOMATIC CONDENSATION DRAIN

Pneum. Kondensat-Ablassventil / Pneumatic Condensate Valve

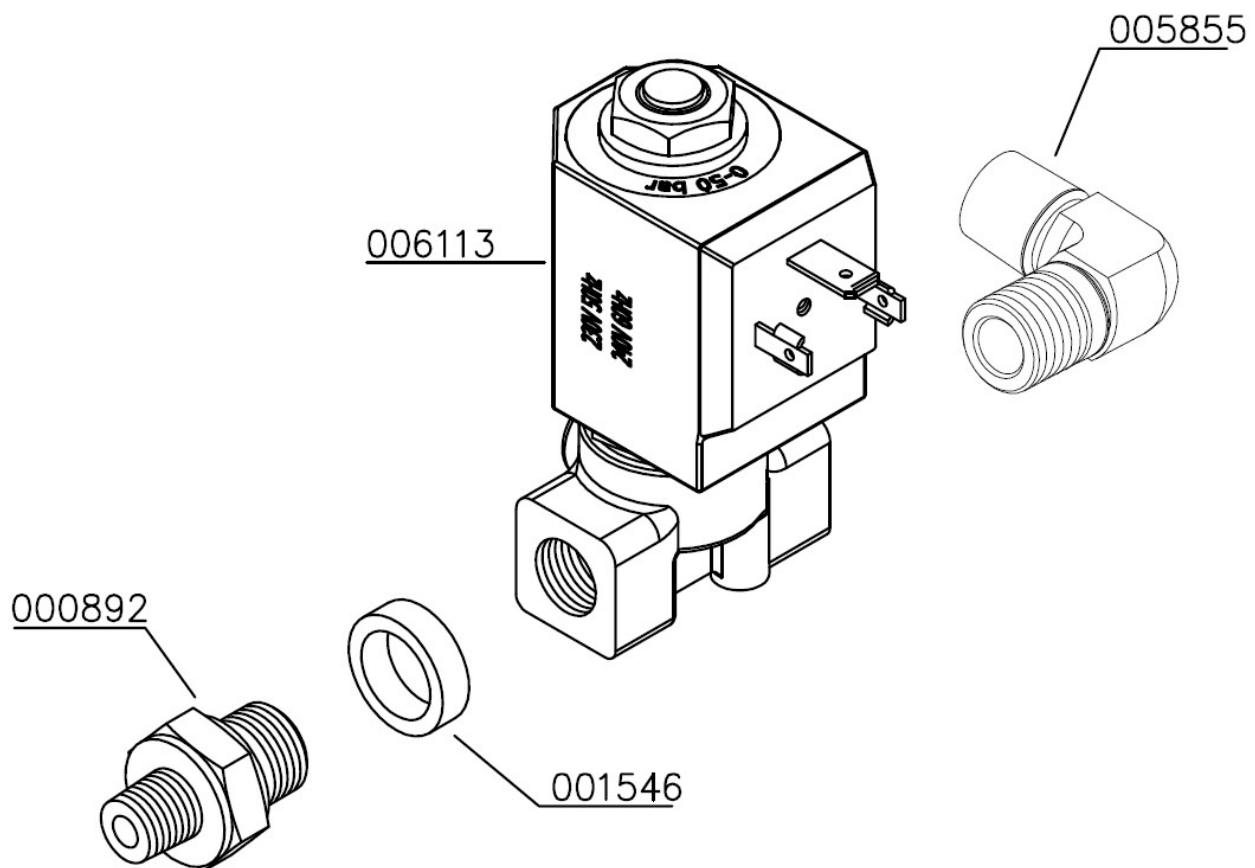


D

AUTOMATIC CONDENSATION DRAIN

Baugruppe: Magnetventil / Assembly: Solenoid

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------------------------|----------------------------|
| 000892 | Doppelnippel | Double Nipple |
| 001546 | Aludichtring für Magnetventile G1/4" | Alloy Seal Ring for G1/4" |
| 005855 | Winkelschraubverschraubung 8 mm | Elbow Hose Connection 8 mm |
| 006113 | Magnetventil 0-55 bar | Solenoid 0-55 bar |



AUTOMATIC CONDENSATION DRAIN

Switch box with condensate drain test switch

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|------------------------------|---------------------------|
| 002089 | Betriebsstundenzähler | Hour counter |
| 002502 | Kondensat Test Schalter | Drain test switch |
| 002942 | START/STOP Schalter mit LED | Start/Stop switch c/w LED |
| 003121 | NOT-AUS Schalter | Emergency switch |
| 004704 | Warnlampe | Warning Lamp |
| 005670 | Einlegeschild Kondensat Test | Label Drain Test |
| 006859 | Schildträger | Label holder |
| 006925 | Einlegeschild Motorschutz | Label Motor protect |

D





AUTO START FUNCTION

D

AUTO START FUNCTION

Auto Start Function

The auto start function allows operating the compressor optionally in automatic or semi-automatic mode by turning the selector switch.

Semi-automatic operation:

Start the compressor by pushing the Start button. The compressor automatically shuts off when final pressure is reached. To restart the compressor, push the Start button again. The unit can be shut down at any time during operation by pushing the Stop button.



Selector switch auto start function

Automatic operation:

Start the compressor only once by pushing the Start button. The Start button lights up and the unit automatically shuts off when final pressure is reached. If outlet pressure decreases below the selected minimum pressure, the unit automatically restarts.



Note

The compressor can not be manually started during automatic operation.

To enable a manual start, shut off automatic operation by pushing the Stop button (Start button lamp goes out). Now turn selector switch to semi-automatic mode and start the compressor with the Start button.

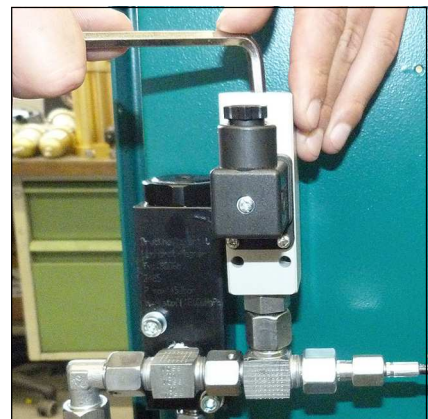
Adjust re-start pressure (minimum filling pressure)

The pressure switch for start pressure is located after the pressure maintaining valve. The pressure can be adjusted with the upper adjusting screw.

Increasing re-start pressure: turn adjusting screw clockwise

Reducing re-start pressure: turn adjusting screw anti-clockwise

Adjust pressure switch in steps of a quarter turn. Check settings after every adjustment step.



Adjust re-start pressure

AUTO START FUNCTION

Filling procedure semi-automatic operation



Caution! Only fill cylinders which:

- are marked with the test mark and the test stamp of the expert.
- have been hydro static tested (check last test date).
- are rated for the final pressure.
- are free from humidity.



Note

The unit shuts down when final pressure is reached. Thus, the unit always has to be restarted manually.

1. Turn selector switch to semi-automatic mode.
2. Close all filling valves.
3. Connect closed compressed air cylinders.
4. Open filling valves.
5. Start compressor by pushing the ON button.
6. When filling pressure gauge increases, open filling valves slowly.
7. Fill compressed air cylinders to the desired pressure, subsequently close filling valves slowly.
8. Close and vent all filling valves.
9. Disconnect all compressed air cylinders from filling valves.

AUTO START FUNCTION

Filling procedure automatic operation

**Caution! Only fill cylinders which:**

- are marked with the test mark and the test stamp of the expert.
- have been hydro static tested (check last test date).
- are rated for the final pressure.
- are free from humidity.

**Note**

The unit shuts down when final pressure is reached. Thus, the unit always has to be restarted manually.

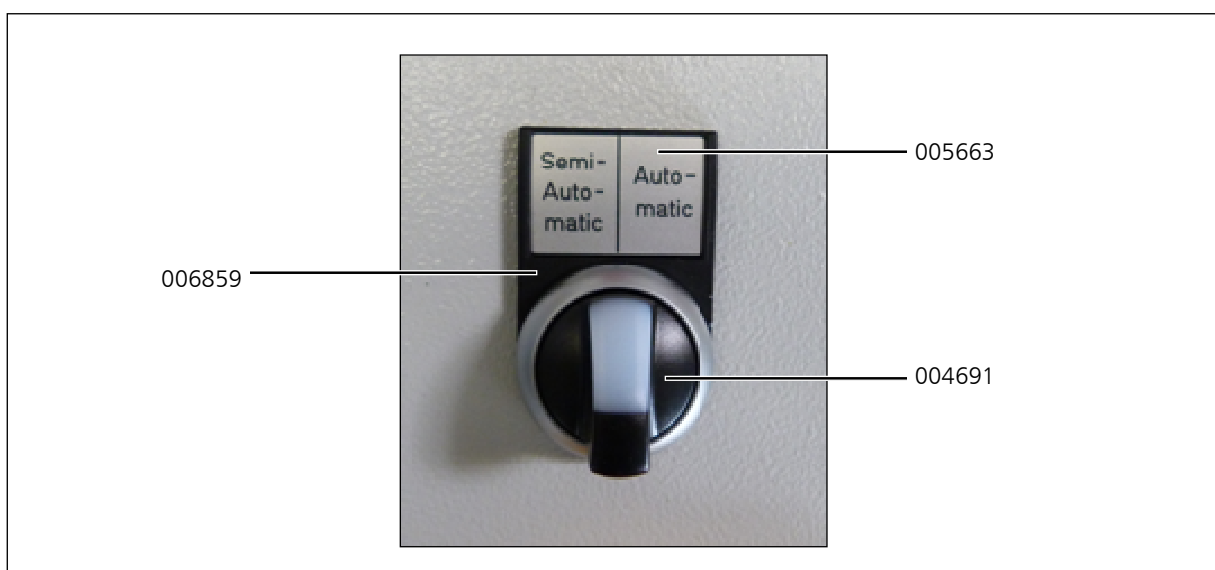
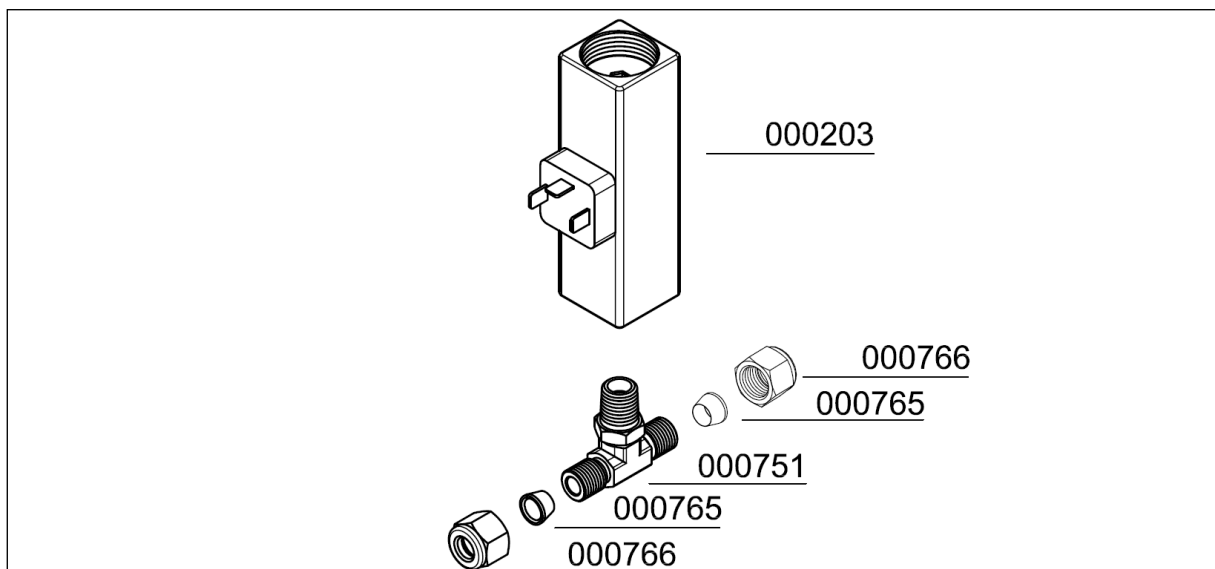
1. Turn selector switch to automatic mode.
2. Close all filling valves.
3. Connect closed compressed air cylinders.
4. Open filling valves.
5. Start compressor by pushing the ON button.
6. When filling pressure gauge increases, open filling valves slowly.
7. Fill compressed air cylinders to the desired pressure, subsequently close filling valves slowly.
8. Close and vent all filling valves.
9. Disconnect all compressed air cylinders from filling valves.
10. If automatic operation is interrupted by:
 - pushing the OFF button
 - turning the selector switch
 - tripping the emergency shut-off switch
 - opening of the doors or the coverthe unit has to be restarted.

AUTO START FUNCTION

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------|-----------------|
| 000203 | Druckschalter | Pressure Switch |
| 000751 | T-Verschraubung 8L | T-Piece 8L |
| 000765 | Schneidring 8L | Olive Seal 8L |
| 000766 | Schneidring 8L | Olive Seal 8L |
| 004691 | Wahlschalter | Selector switch |
| 005663 | Einlegeschild | Label |
| 006859 | Schildträger | Label holder |

D





OIL PRESSURE GAUGE

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OIL PRESSURE GAUGE

Oil pressure gauge

The oil pressure gauge shows the compressor oil pressure during operation. Oil pressure values should remain between:

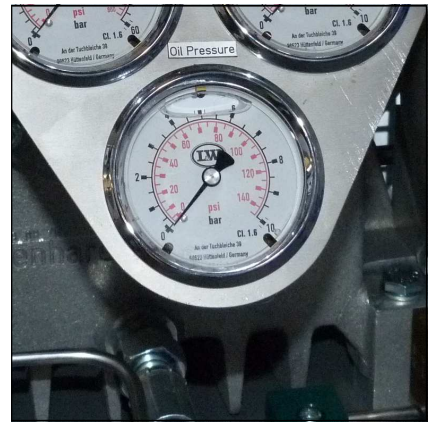
- min. + 0.5 bar
- max. + 4.0 bar

If oil pressure value stays below the minimum value:

- Wrong compressor rotation direction (see rotation direction arrow)
- Oil level too low, not enough oil in the compressor
- Oil pump filter contaminated
- Oil intake pipe damaged / defective
- Oil temperature below +5 °C - lubrication not possible
- Oil temperature higher than +120 °C - oil viscosity too low
- Oil pump defective

If oil pressure value stays above the maximum value:

- Low oil temperature, between +5 °C and +10 °C
- Should stay within the range of tolerance when operation temperature is reached..

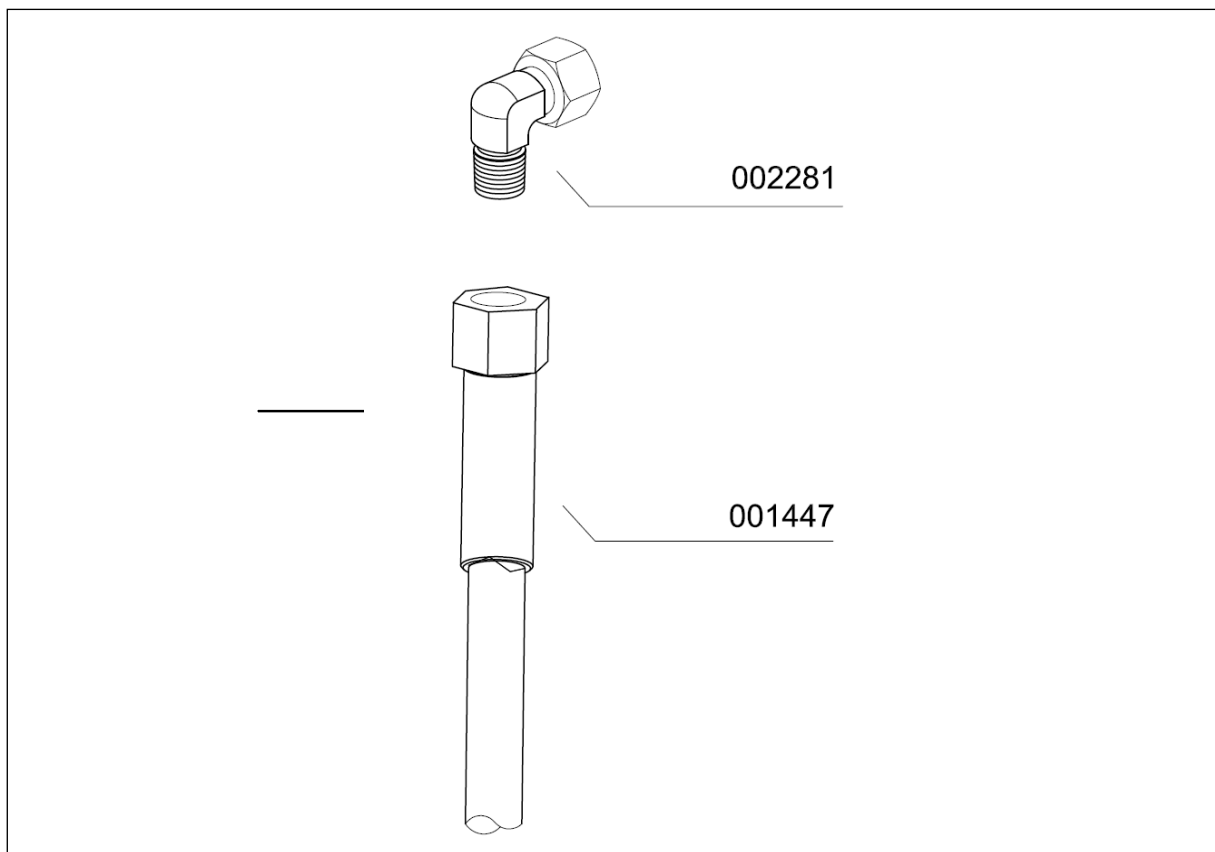
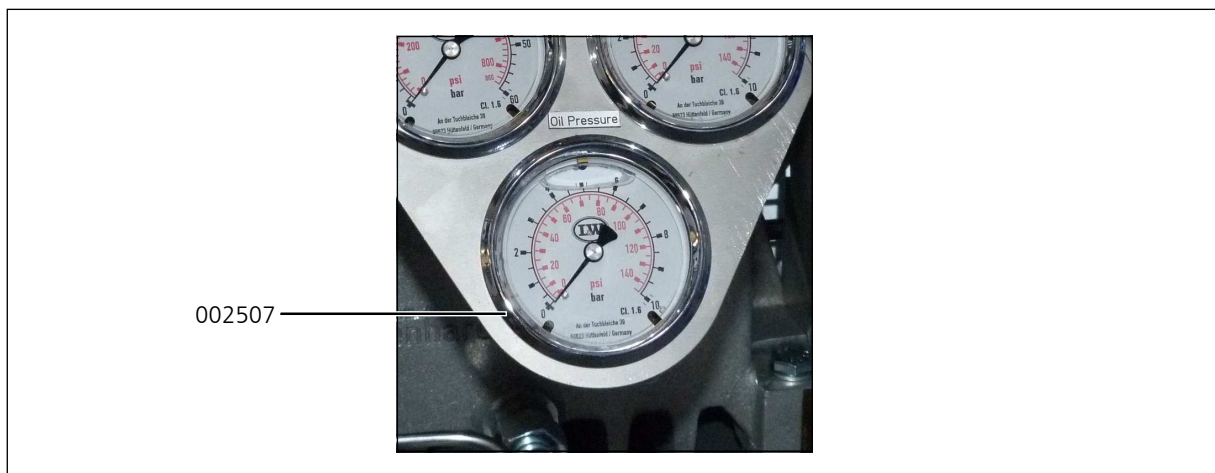


Oil pressure gauge

OIL PRESSURE GAUGE

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---------------------------------|---------------------------------|
| 001447 | Manometerschlauch 800mm | Hose for Pressure Gauge 800mm |
| 002281 | Winkelversch. mit fester Mutter | Elbow connection with fixed nut |
| 002507 | Öldruckmanometer 0-10 bar | Oil Pressure Gauge 0-10 bar |





OIL PRESSURE MONITORING

D

OIL PRESSURE MONITORING

Oil pressure monitoring

The oil pressure is maintained by a pressure switch during operation. The compressor automatically shuts off when oil pressure decreases below the minimum pressure of +0.5 bar. The red warning lamp "Oil Pressure Monitoring" lights up.

Possible causes of fault:

- Wrong compressor rotation direction
(see rotation direction arrow)
- Oil level too low, not enough oil in the compressor
- Oil pump sieve contaminated
- Oil intake hose damaged / defective
- Oil temperature below +5 °C - lubrication not possible
- Oil temperature higher than +120 °C - oil viscosity too low
- Oil pump defective



Oil Pressure Monitoring



OIL PRESSURE MONITORING

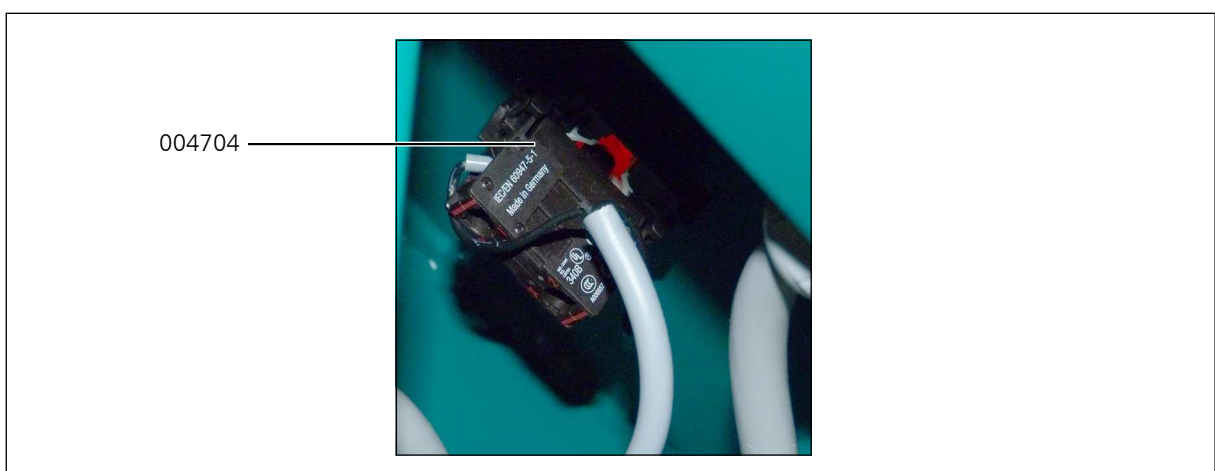
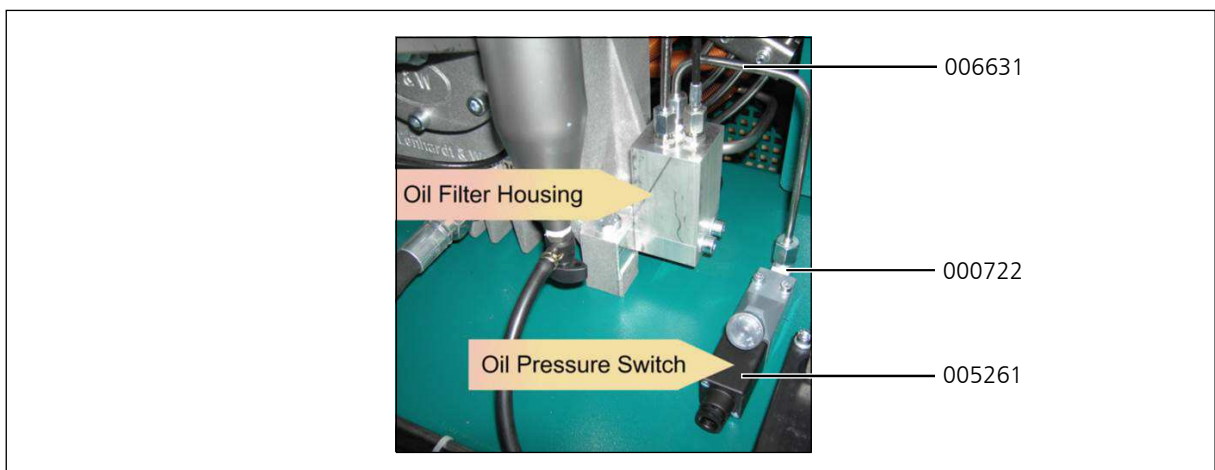
Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|----------------------|-------------------------|
| 000722 | Winkelverschraubung | Elbow Connection |
| 004701 | Warnlampe | Warning Lamp |
| 004703 | Schild | Label |
| 004704 | Relais für Warnlampe | Relais for warning lamp |
| 005261 | Öldruckschalter | Oil Pressure Switch |
| 006631 | Rohrleitung | Pipe |
| 006859 | Schildträger | Label holder |

D

OIL PRESSURE MONITORING

Spare part lists



D



OIL TEMPERATURE MONITORING

D

OIL TEMPERATURE MONITORING

Oil temperature monitoring

Oil temperature monitoring

The oil temperature is maintained by a temperature sensor inside the compressor block during operation.

The compressor automatically shuts off when oil temperature exceeds the maximum pressure of +120 °C. The red warning lamp "Oil Temperature Monitoring" lights up.

Possible causes of fault:

- Ambient temperature too high
- Cooling air flow not sufficient
- Oil level too low
- Cooling pipes contaminated



Oil Temperature Monitoring



Warning

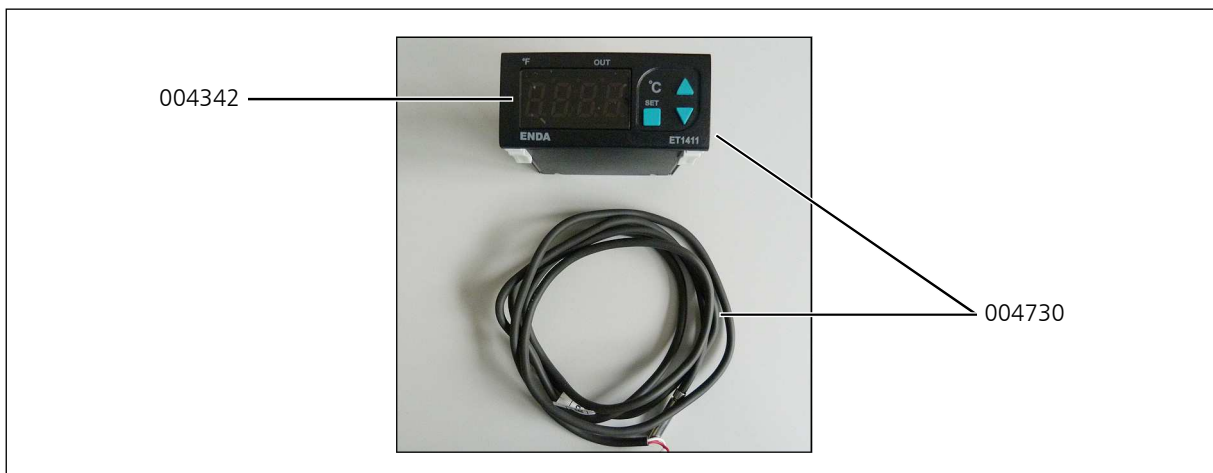
Risk of burns!

Allow the unit to cool before beginning troubleshooting.

OIL TEMPERATURE MONITORING

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------|--------------------|
| 004342 | Display | Display |
| 004730 | Display und Sensor | Display and Sensor |



D



CYLINDER HEAD TEMPERATURE MONITORING

D

CYLINDER HEAD TEMPERATURE MONITORING

Cylinder head temperature monitoring

The cylinder head temperature is maintained by a temperature sensor at the cylinder head of the high pressure stage during operation. The compressor shuts off automatically when cylinder head temperature exceeds the maximum pressure of +160° C. The red warning lamp "Cylinder Head Temperature Monitoring" lights up.

Possible causes of fault:

- Ventilation of the compressor room is not sufficient
- Cooling air flow not sufficient
- Cooling pipes contaminated



Warning

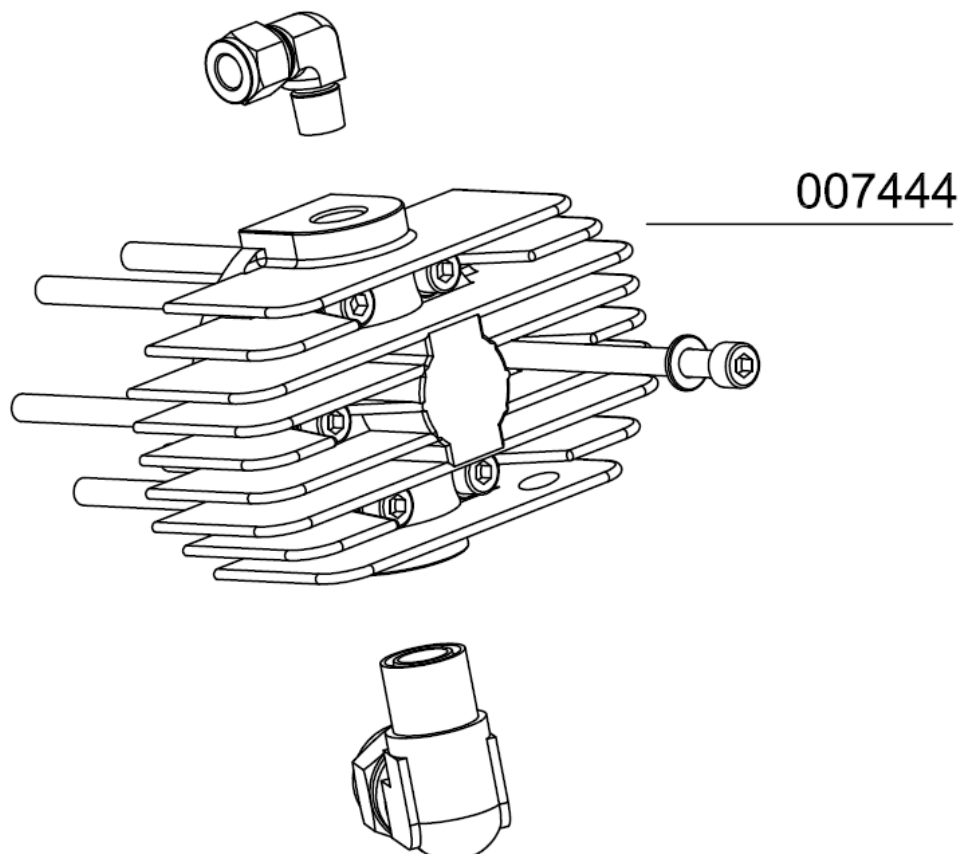
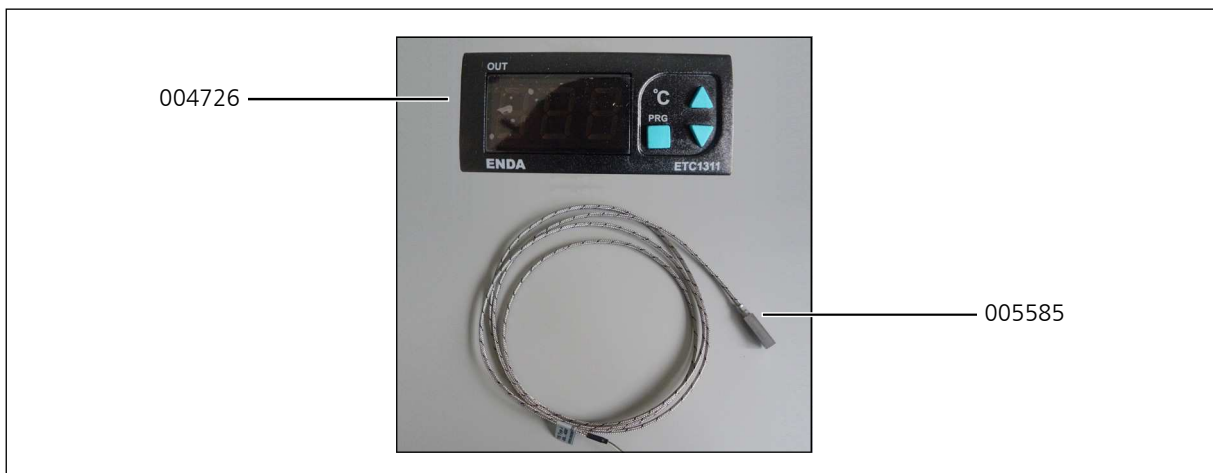
Risk of burns!

Allow the unit to cool before beginning troubleshooting.

CYLINDER HEAD TEMPERATURE MONITORING

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|--------------------------------|------------------------------|
| 004726 | Display | Display |
| 005585 | Sensor | Sensor |
| 007444 | Ventilkopf (Spezielle Version) | Valve Head (special version) |





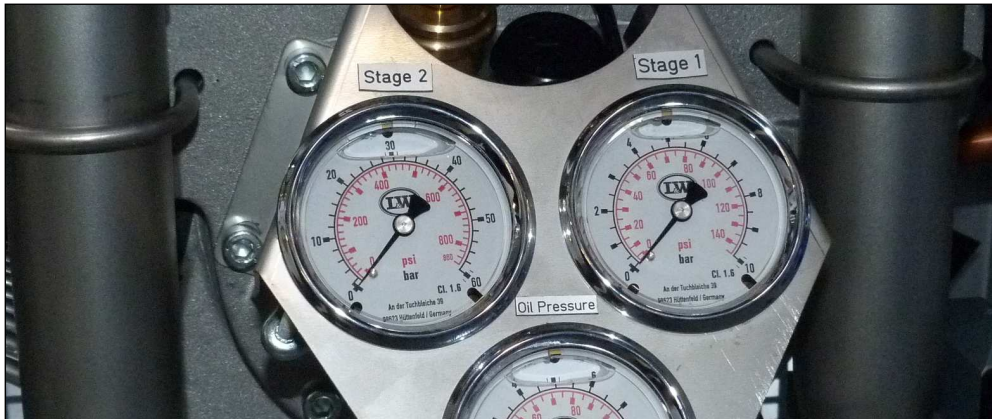
INTERSTAGE PRESSURE GAUGE

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INTERSTAGE PRESSURE GAUGE

Interstage pressure gauge

Each of the 3 pressure stages is monitored by a single pressure gauge. This is serviceable for troubleshooting and allows detecting faults at an early stage.



Indicated interstage pressures depend on final pressure settings.

The pressure gauges should show the following values at a final pressure of 300 bar:

1st stage: approx. 5 bar

2nd stage: approx. 42 bar

3rd stage: approx. 300 bar



INTERSTAGE PRESSURE GAUGE

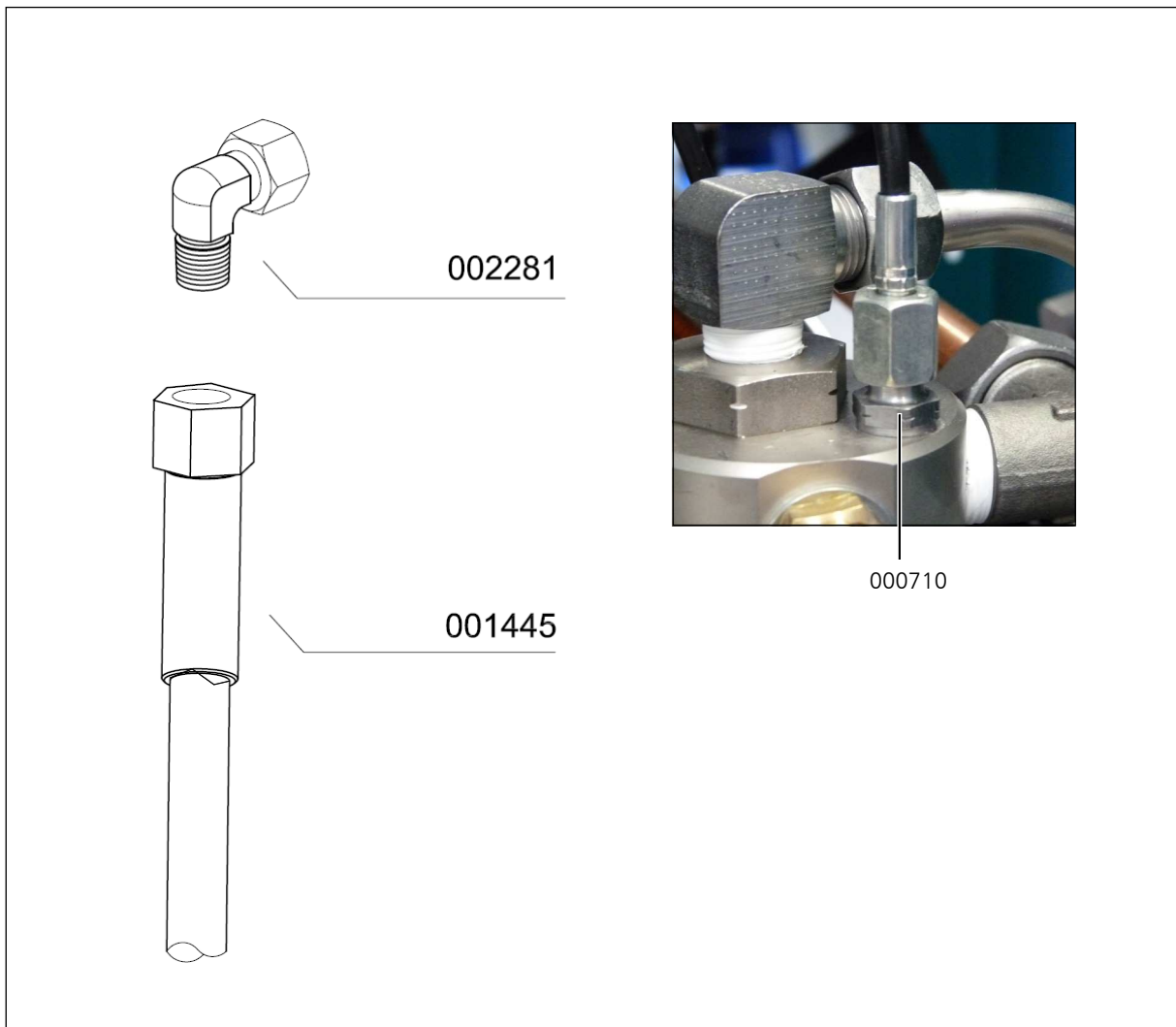
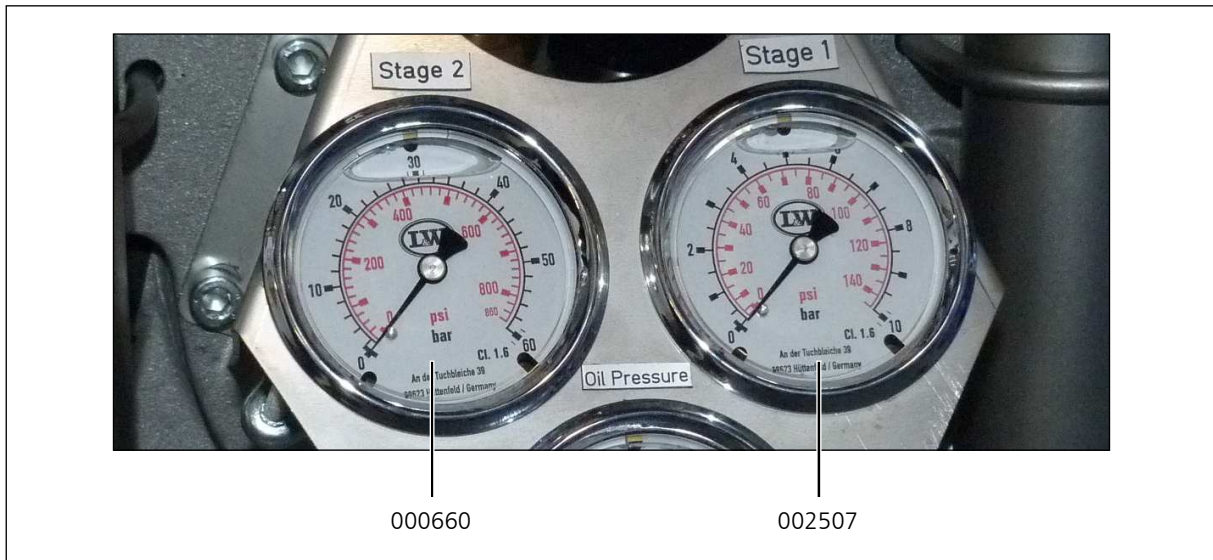
Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|----------------------------------|-----------------------------------|
| 000660 | Manometer 0-60 bar | Pressure Gauge 0-60 bar |
| 000710 | Verschraubung (1/8" -> 6L) | Connection (1/8" -> 6L) |
| 001445 | 6L Manometerschlauch 600 mm | 6L Hose for Pressure Gauge 600 mm |
| 002281 | Winkelverschr. mit fester Mutter | Elbow connection with fixed nut |
| 002507 | Manometer 0-10 bar | Pressure Gauge 0-10 bar |

D

INTERSTAGE PRESSURE GAUGE

Spare part lists





**200 / 300 BAR
PARALLEL FILLING
PRESSURE OPERATION**

D

200 / 300 BAR PARALLEL FILLING PRESSURE OPERATION

200 bar / 300 bar parallel filling pressure operation

This option allows the filling of 200 bar and 300 bar at the same time.

In this case, the compressor is equipped with a pressure reducer, a second final pressure safety valve and a second filling pressure gauge.

The handwheels or gaiters are colour-coded to allow an optical differentiation:

- 200 bar: black
- 300 bar: red

Furthermore, the corresponding filling pressures at the compressor are marked with labels.



DIN handwheels 200 bar and 300 bar



Fig. Pressure reducer: 330 / 225 bar



200 / 300 BAR PARALLEL FILLING PRESSURE OPERATION

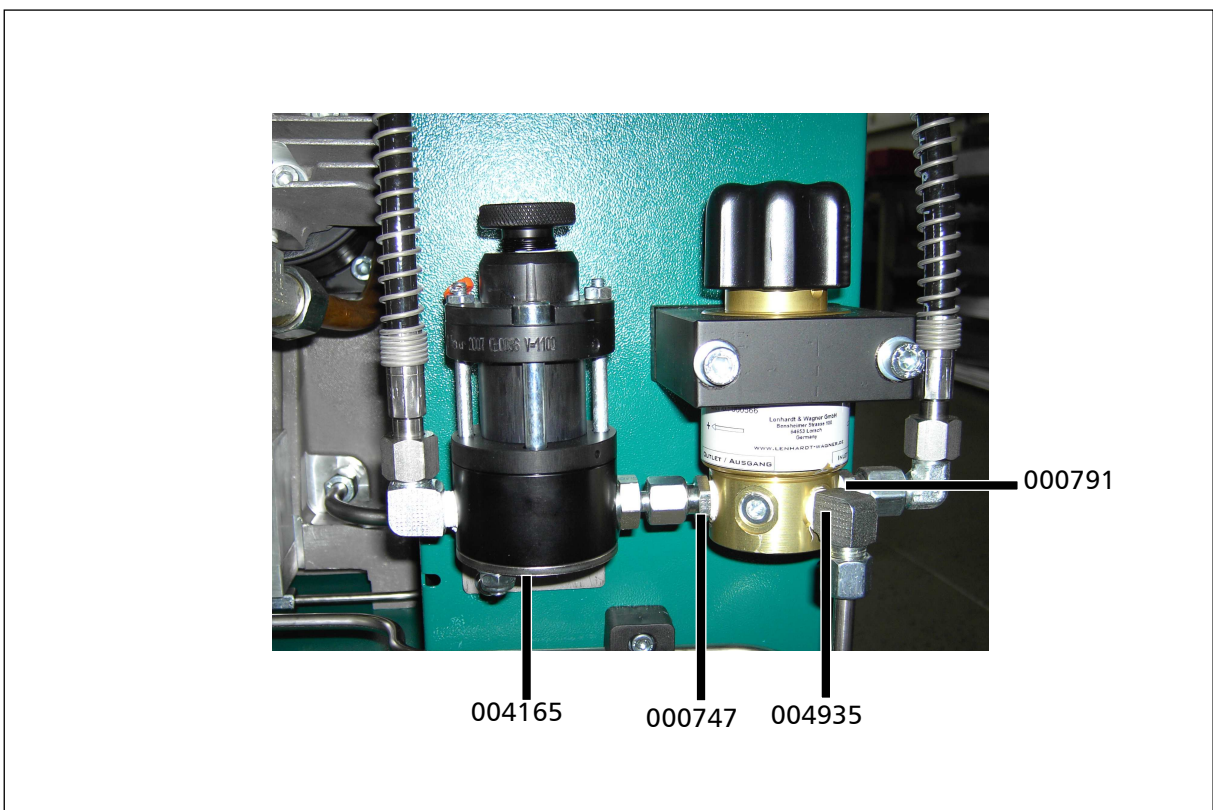
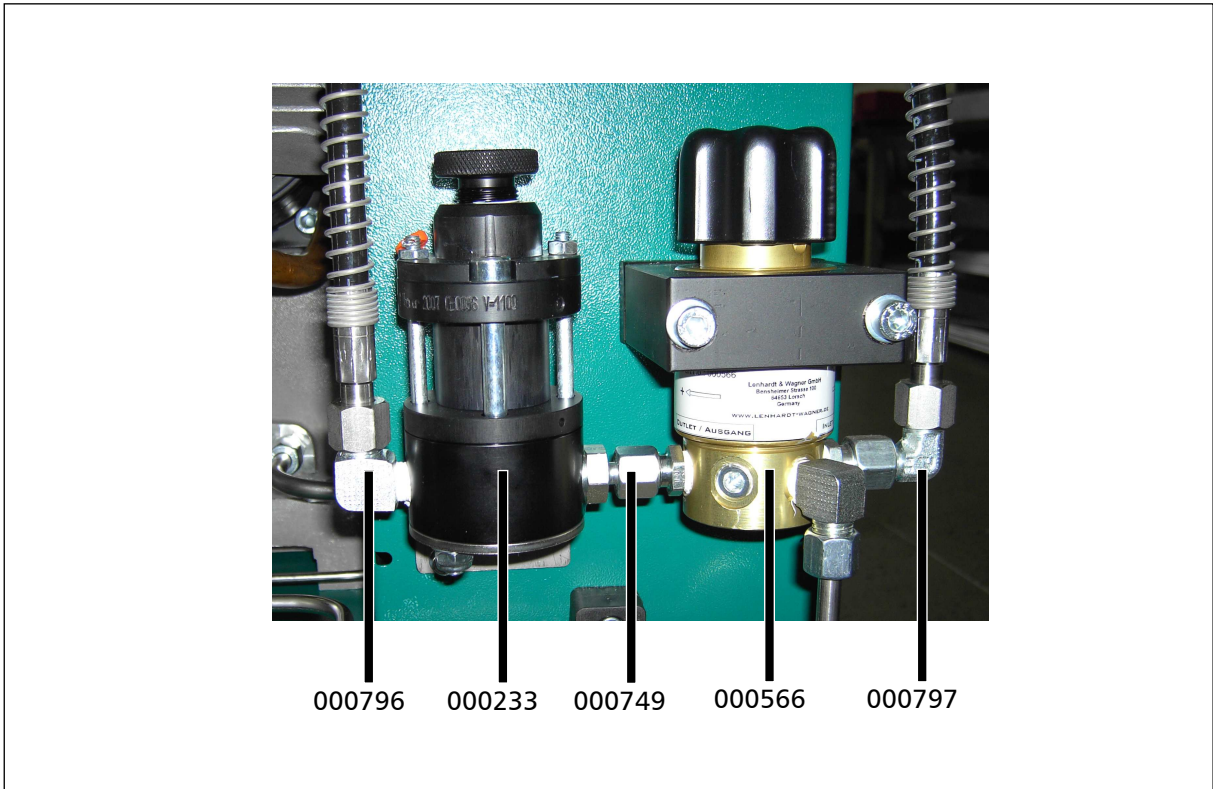
Verrohrung 2 Druckbereiche / Spare Part List: Piping 2 Pressure Ranges

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|---|
| 000233 | Sockel für Sicherheitsventil | Base for Safety Valve |
| 000566 | Druckminderer | Pressure Reducer |
| 000747 | Verschraubung NPT 1/4" - 8L | Connection NPT 1/4" - 8L |
| 000749 | Verschraubung NPT 1/4" - 8L mit fester Mutter | Connection NPT 1/4" - 8L with fixed nut |
| 000791 | Verschraubung NPT 1/4" - 10L | Connection NPT 1/4" - 10L |
| 000796 | Winkelverschraubung 1/4" - 10L | Elbow Connection 1/4" - 10L |
| 000797 | Winkelverschraubung 10L mit fester Mutter | Elbow Connection 10L with fixed nut |
| 004165 | Halteblech Sockel für Sicherheitsventil | Bracket for Safety Valve Base |
| 004935 | Winkelverschraubung NPT 1/4" - 10L | Elbow Connection NPT 1/4" - 10L |

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200 / 300 BAR PARALLEL FILLING PRESSURE OPERATION

Verrohrung 2 Druckbereiche / Spare Part List: Piping 2 Pressure Ranges





AIR COOLER CONNECTION KIT

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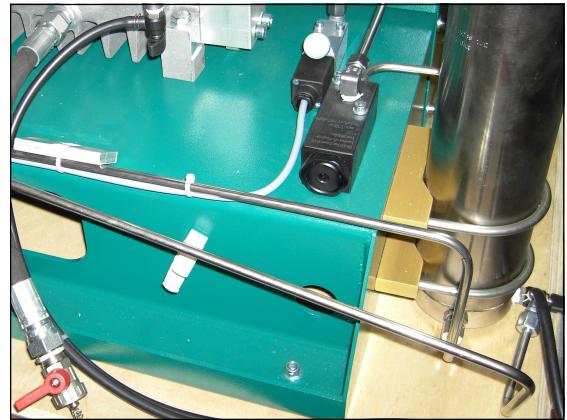
AIR COOLER CONNECTION KIT

Air cooler connection kit

The Air Cooler Connection Kit provides an easy connection and a simple and time-saving installation or backfitting.

The piping inside the compressor is completely installed. Just disconnect the pipe of the safety valve to the inlet of the final filter housing and connect the air cooler according to the connection designation (inlet/outlet).

To operate the unit without air cooler, reinstall the pipe and the compressor is ready for use.



Zu entfernende Rohrleitung

D

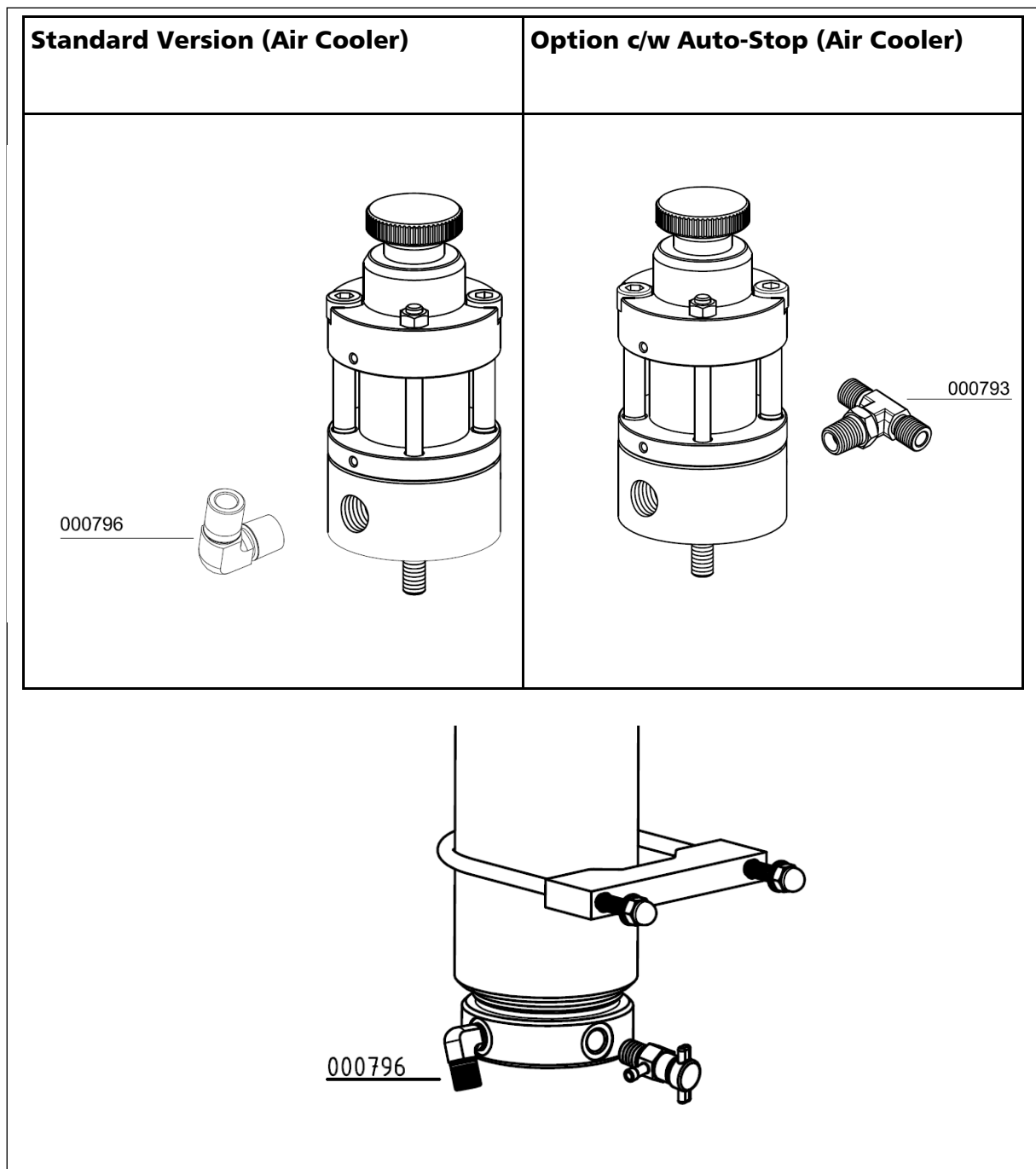
All length of high pressure hoses available

The Air Cooler Connection Kit does not include the high pressure hoses. So you can't find any part numbers of our hoses in this chapter. We have a wide range of high pressure hoses in our product range. Please ask if you need special lengths.

AIR COOLER CONNECTION KIT

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|-------------------------|----------------------|
| 000793 | T-Verschraubung 10L | T-Connection 10L |
| 000796 | Winkelverschraubung 10L | Elbow Connection 10L |



D



CONDENSATE TANK 60 LTR.

D

CONDENSATE TANK 60 LTR.

The 60 ltr. tank is equipped with an active carbon filter to collect condensate odourlessly and quietly. The condensate can be easily transported in the collecting tank and disposed environmentally sound.

The flexible connection hoses are fitted with quick-couplings, to allow easy separation from the compressor. The tank is equipped with a level gauge to indicate max. filling level. Two sturdy carrying handles ensure a safe transportation.

Technical Data:

- Dimensions: Ø 400 mm x 800 mm
- Weight: 20 kg



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CONDENSATE TANK 60 LTR.

Maintenance and service

How to change the activated carbon and the metal filter insert

- Shut down the unit
- Plug out the condensate hoses
- Remove the protector cap, the nut and the allen bolts (Fig. 1)
- Take down the cover plate and the upper felt. Tip out the activated carbon and replace the lower felt
- Fill up the activated carbon and cover it with a new felt
- Put on the cover plate, screw the allen bolts and the nut and plug on the protector cap
- Unscrew the filter housing
- Remove the floater and the lower cover plate (Fig. 2)
- Take a pliers and pull the metal filter out of the metal case
- Insert the metal filter
- Install the cover plate and the floater
- Screw the filter housing onto the tank
- Plug in the condensate hoses

Maintanance intervals

We recommend to change the activated carbon if it has reached the saturation level (smell of oil).

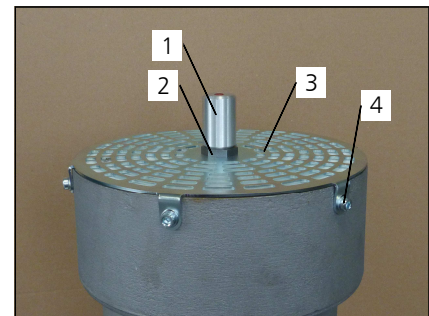


Fig. 1

- 1 Protector cap
- 2 Nut
- 3 Cover plate
- 4 Allen bolts (6x)

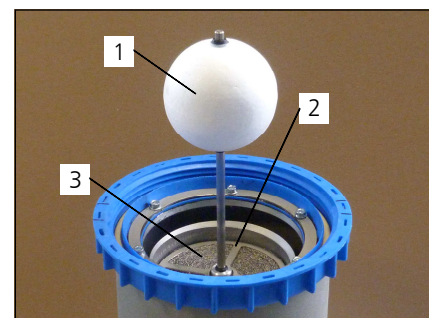


Fig. 2

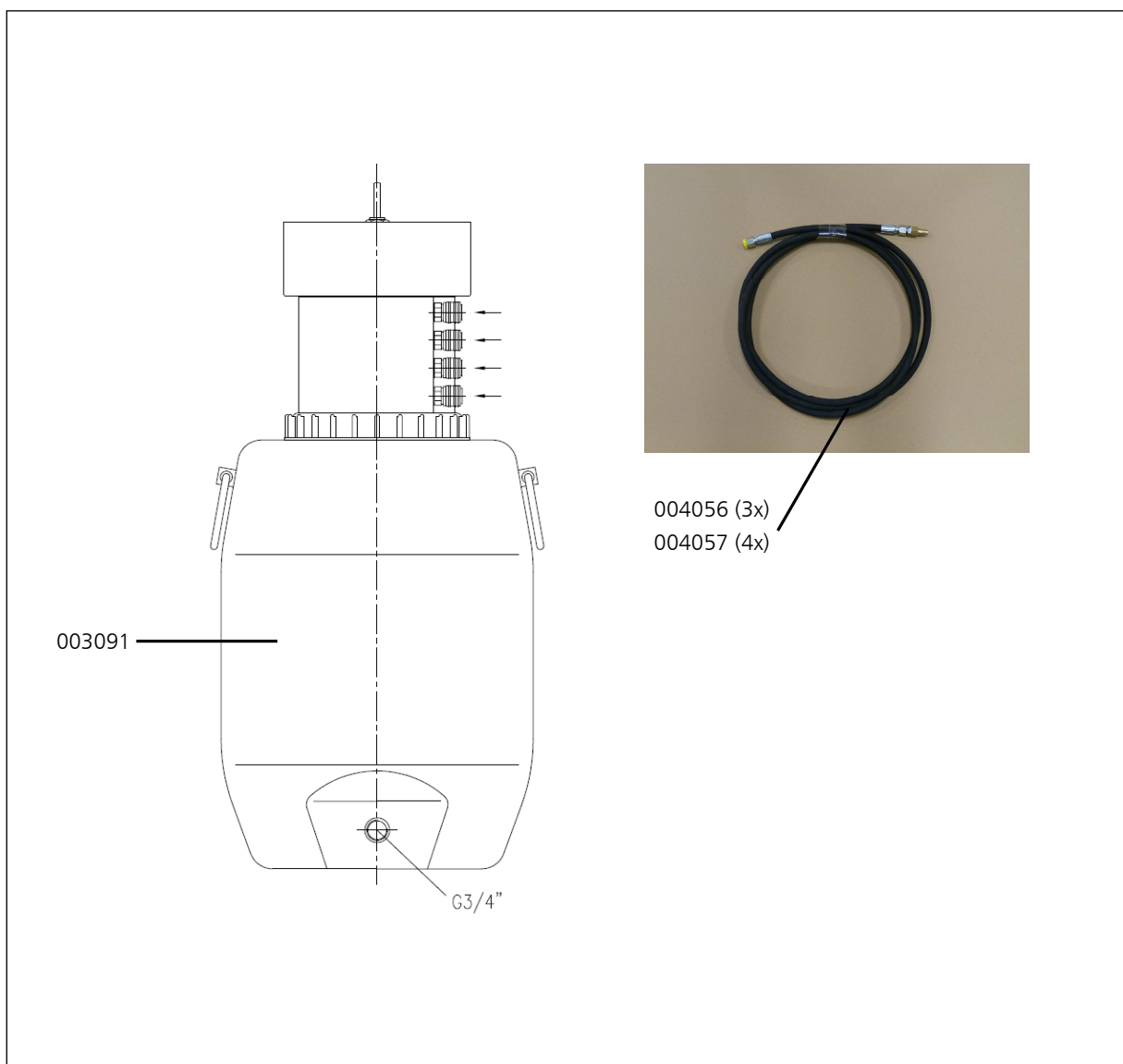
- 1 Floater
- 2 Lower cover plate
- 3 Metal filter

CONDENSATE TANK 60 LTR.

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|-----------------------------------|
| 003091 | Kondensatbehälter 60 Liter | Condensate Tank 60L |
| 004056 | Kondensatschläuche Kondensatbehälter 60L, für 3- | Set of condensate hoses, 3 stages |
| 004057 | Kondensatschläuche Kondensatbehälter 60L, für 4- | Set of condensate hoses, 4 stages |

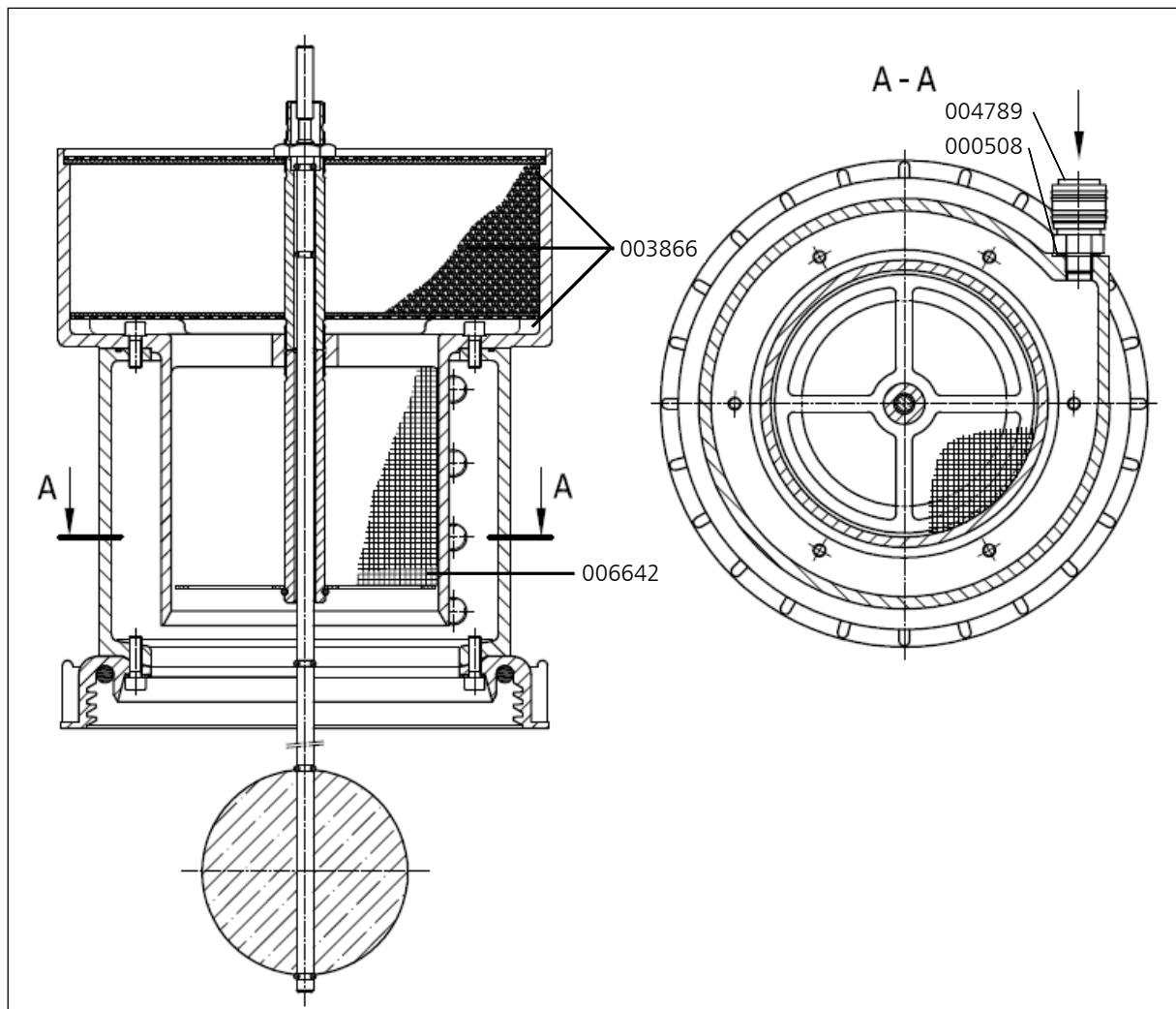
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CONDENSATE TANK 60 LTR.

Spare part lists

| Best.-Nr. / Order No. | Benennung | Description |
|-----------------------|---|------------------------------------|
| 000508 | USIT-Ring 13,7 x Ø20 x 1,5 | Gasket Ring U-Sit 13,7 x Ø20 x 1,5 |
| 003866 | Filter Nachfüllset für 60 Liter | Filter refill set 60 ltr |
| 004789 | Schnellkupplung G1/4", DN 7,2 | Quick connector G1/4", DN 7,2 |
| 006642 | Metallgestrick für Kondensatbehälter 60 ltr | Metal filter insert 60 ltr tank |



D



ATTACHMENT

E

Lenhardt & Wagner GmbH

**An der Tuchbleiche 39
D-68623 Lampertheim – Hüttenfeld**

www.lw-compressors.com



Operating Instruction

Safety valve

Typ:

SiV2 BKZ 989 TÜV.SV.12-989.5.G.V.P CE 0091 AlMgSi1 F31 1100* Lenhardt & Wagner

SiV BKZ TÜV.SV.14-1140.5.G.V.p CE 0091 AlMgSi1 F31 1100* Lenhardt & Wagner

| | |
|-------------------------|--|
| Set pressure: | see mark (hand wheel on top of valve) |
| Maximum outflow: | Set pressure 100-159 bar: 750 l / min Set pressure 160-350 bar: 1.100 l / min |
| Suitable media: | Media-resistant, non-corrosive gases |

The safety valve is used for protection of pressurized components, eg pipelines, pressure vessels, or the compressor itself.

The hand wheel on the top of the safety valve is marked with the adjusted set pressure.



- 1) **Identification of set pressure**
- 2) **Seal**
- 3) **Fixing screws¹**
- 4) **Venting screw (hand wheel)**
- 5) **Identification serial number**
- 6) **Socket for safety valve**

Safety valve with socket

¹ und die Anforderungen des AD 2000 Merkblatts W7 erfüllen. The fixing screws M8 must be strength class 8.8 and meet the requirements of Merkblatt AD 2000 leaflet W7. Shaft length 70mm.

In order to prevent manipulation of the set pressure, all safety valves are factory fitted with a seal.

A safety valve on which the seal has been removed, must be returned to the manufacturer for repair / adjustment before further use.

In addition, the safety valve has a venting device (hand wheel).

When rotated clockwise, the safety valve and the filter housing of the final stage are completely vented.

During normal operation, the screw is unscrewed to the upper stop anticlockwise; an integrated safety ring prevents the screw from being removed.

If a safety valve blows off, the system must be switched off immediately and the cause of the error, investigated.

There are two possible reasons:

1. The safety valve is defective and blows off before the set pressure.

In this case the safety valve should be submitted immediately to the manufacturer for repair or replaced with a new one.

2. The safety valve opens properly, the problem is on the system.

A constant blowing of the safety valve is not permitted, the sealing seat of the valve can be damaged. The error on the system must be detected and repaired before further filling operations.

The safety valve may only be used if it is ensured that the maximum flowrate of the system does not exceed the blow-off rate of the safety valve.

The safety valve may only be used with the approved media.

Repair work on compressors must only be performed by trained personnel.

Dismantling of the safety valve

Ensure that on the safety valve is no pressure.

Loosen and remove the two M8 fixing bolts with a 6 mm Allen key.

The safety valve can now be removed by turning and simultaneously pulling out of the socket.

Mounting

1. Clean the safety valve socket.

2. Oil the insert pin of the safety valve including the O-ring with 1 to 2 drops of oil.

3. Press the safety valve pin complete into the socket.

4. Fasten the safety valve with the two 8 mm allen screws into the socket

(Tightening torque: 10 Nm)

5. Screw the venting screw (hand wheel) anticlockwise to its upper limit.

6. Start the System (Compressor), check installation for leaks and proper function.

Manufacturer: Lenhardt & Wagner GmbH
An der Tuchbleiche 39
D-68623 Lampertheim – Hüttenfeld

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Web: www.lw-compressors.com
Tel.: +49 (0) 6256 – 85880 0
Fax: +49 (0) 6256 – 85880 14

Note:

Only use safety valves which are in a technically perfect condition, for its intended purpose, safety and danger awareness, in compliance with the operating instructions!

Faults which could affect safety must be rectified immediately!

Notes:

- The safety valve must be installed directly on the protected pressure vessel and / or the plant.
 - The safety valve must be installed in an upright position.
 - The flow area of the port must be greater than the valve opening.
 - Protect valve against splashes
-

Maintenance:

- In accordance with current Pressure Equipment Directives, the safety valve must be periodically checked for operation and reliability.
- Refill annually lubricating oil:
Oil filling position:
Hole on the spacer (see arrow, Figure 1)
- Oil level: Fill oil into the hole until oil comes out of the hole.

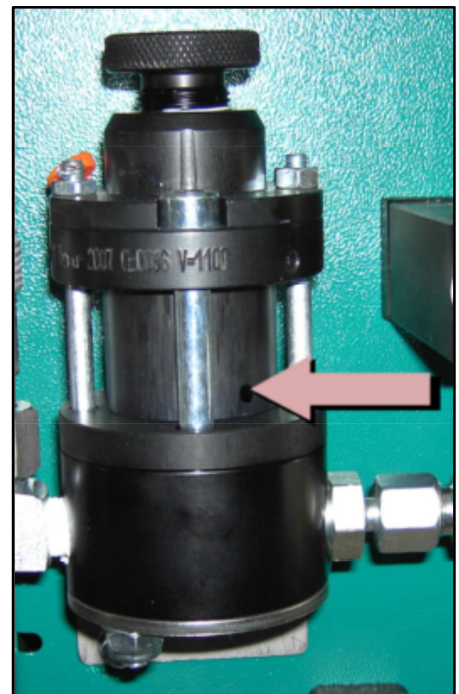


Figure 1: Position for oil refill

To be used lubricating oil for the safety valve: L&W Article N°.: 008500 (content: 30 ml)



INFORMATION ON THE
SERVICE LIFE OF
L&W HIGH PRESSURE HOSES





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TESTING HOSE LINES

Testing hose lines

An essential factor in ensuring operational safety when handling L&W compressors is the proper testing of the hose lines used.

Tests are necessary:

- After assembly and before commissioning the hose line.
- After accidents, changes (modifications) to the compressor system, longer periods of non-use and damage due to, for example, collisions or natural phenomena (extraordinary test).
- After carrying out repair work on the compressor system that could compromise safety.
- Recurrently at fixed, regular intervals.

The proprietor must determine the type, scope and deadlines for the tests according to his or her individual operating conditions and on the basis of a risk assessment. **The specifications and recommendations of the manufacturer must be observed.** The specifications made regarding type, scope and deadlines (as well as the replacement intervals) must be documented in writing as occupational health and safety measures.

The results of the tests must also be recorded, e.g. together with the test report of the machine, and kept at least until the next test.

The above-mentioned tests may only be carried out by persons who are qualified to do so and who are authorized by the company (employer).

Testing after assembly and before commissioning

In the test after assembly and before commissioning, factors relating to assembly or factors that can only be evaluated on the fully assembled machine must be assessed.

The assembled hose lines must also be assessed.

Some test points can already be assessed during a visual inspection when the machine is switched off.

An overview of the recommended scope of testing for a visual inspection of hose lines is given in the appendix.

Further test points included in the test of hose lines before commissioning, require a functional test with the machine running.

A recommendation for the scope of testing is given in the appendix.



TESTING HOSE LINES

Recurring test

Since hose lines are subject to influences that cause damage during operation and can lead to dangerous situations, they must be tested recurrently at fixed intervals. The aim of recurring tests is to detect and repair damage in good time.

The objective is to ensure that the system remains in a safe condition.

Procedure for hose lines found to be "defective"

If defects are found during the testing of the hose line that impair the safe condition of the work equipment, these must be rectified immediately. If this is not possible, suitable measures must be taken to ensure that the machine cannot be used further before it is repaired. Defective hose lines must be replaced before the machine can be used further.

It is not permitted to repair or reassemble damaged hose lines with old, previously used parts!

If several hose lines are replaced at the same time, precautions must be taken to prevent mix-ups of the connections or the installation points.

Test intervals

Deadlines for the recurring tests of the hose lines should already be set before commissioning.

Otherwise, there is a risk that work equipment will continue to be used or operated for too long without being tested.

The intervals between the recurring tests must be selected in such a way that deviations from the safe operating condition of work equipment can be detected and eliminated in good time.

The intervals for recurring tests specified here are guidelines and based on experience. Shorter test intervals may have to be specified on the basis of the risk assessment; special operating conditions; or according to the manufacturer's specific instructions in the machine operating manual. Longer test intervals may also be specified, provided that this is justifiable and tenable from a safety point of view. The determination of the test intervals should be documented.

| Type of test | Recommended test intervals |
|---------------------|--|
| Visual inspection | Before commissioning the system |
| Functional test | Annually with previous visual inspection |

Persons qualified to test hose lines

A qualified person is a person who, through his or her professional training, professional experience and recent professional activity, has the necessary specialist knowledge required for testing work equipment - in this case for testing hose lines.

These requirements are defined in the Technical Rules for Industrial Safety TRBS 1203

"Qualified persons - general requirements" fulfilled if:

- the qualified person has completed a professional training that enables his or her professional knowledge to be determined in a comprehensible manner, i.e. based on professional qualifications or comparable evidence. For the testing of hose lines, the person concerned must have completed a technical professional training or another technical qualification sufficient for the intended testing tasks. The object is to guarantee that the tests will be carried out properly.
- proof of practical use at work of the equipment to be tested as well as the associated professional experience is provided. The qualified person must be sufficiently familiar with the conditions that demand the performance of tests, such as the result of the risk assessment or observations during the working day.
- there is proof of recent professional activity in the area of the upcoming tests and appropriate further training. The qualified person must also have gained experience with regard to the tests to be performed or comparable tests. He or she must also have knowledge of the state of the art with regard to the work equipment or components to be tested as well as the hazards to be considered. This also includes knowledge of the relevant technical regulations and the updating of this knowledge, e.g. through participation in training courses/instruction.

The qualified person is not subject to any technical instruction during the course of his or her testing activity and must not be disadvantaged because of this.

Experts who have carried out tests on the hose lines up to now and who meet the three criteria mentioned above and who have familiarized themselves with the contents of the German Ordinance on Industrial Safety and Health and the changes associated with it are also considered qualified persons to whom the tests can continue to be assigned.

See also:

- ⇒ § 2 para. 7 of the German Ordinance on Industrial Safety and Health,
- ⇒ Technical Rules for Operational Safety TRBS 1203.



Replacing hose lines

As a general rule, even when stored properly and subjected to permissible stress during use, all hose lines are subject to natural aging, which changes the material and composite properties and reduces the performance of the hose lines.

This limits the service life of a hose line and the operator must ensure that hose lines are replaced at appropriate intervals.

Immediate replacement of hose lines

Hose lines must be replaced immediately in the event of the following defects:

- External visible damage to the hose line or fittings.
- Internal damage to the tube or the reinforcement.
- Leakage from the hose line or the fittings.
- Deformation of the hose line or the fittings.



SERVICE LIFE

Service life of L&W high pressure hoses

When determining the service life or the replacement interval of the individual hose lines, the concrete specifications and recommendations of the hose line or machine manufacturer must be observed. Furthermore, empirical values resulting from previous tests done under the prevailing operating conditions on site are also relevant.

Guideline values for recommended replacement intervals of hose lines which have proven themselves in practice are summarized below.

| Hose line requirements | Recommended replacement intervals |
|--|---|
| Standard requirements | 6 years (Service life including a maximum of 2 years storage time) |
| Increased requirements, e.g. due to - increased operating time, e.g. multi-shift operation, or short machine or pressure pulse cycle times - strong external and internal influences (due to the medium), which greatly reduce the service life of the hose line | 2 years (service life) |

The guideline given above for a replacement interval of six years for hose lines meeting normal requirements includes a maximum storage period of two years. The guideline value of two years for hose lines meeting increased requirements represents the maximum permissible service life.

A prolongation of the guideline values given above for replacement intervals is possible if

- appropriate test values and empirical values are available from the operator of the machine which permit safe continued use beyond the recommended maximum service period,
- a hazard or risk assessment, documented in writing, has been carried out by the operator, which also takes into account protective measures in the event of failure of hose lines, and
- tests for safe working conditions are carried out by qualified persons at appropriately set, if necessary reduced, intervals.

It must be ensured that the prolongation of the replacement intervals does not result in a dangerous situation that could injure employees or other persons.

If hose lines fail during operation or if damage or defects are frequently detected during the recurring tests, then, in addition to investigating the causes, the test and replacement intervals must be shortened.



STORAGE

Storing hose lines

When storing hose lines, storage conditions must be aimed at minimizing the natural aging that occurs over time and the associated change in material and composite properties.

For this purpose, the following information must be provided:

- Store in a cool, dry and low-dust place.
Low-dust storage can be achieved, for example, by wrapping the hoses in plastic film.
- Avoid direct sun or UV radiation.
- Shield from nearby heat sources.
- Avoid storage temperatures below -10 °C for elastomers.
- Do not use ozone-generating light fittings or electrical devices that may produce sparks in the immediate vicinity.
(Ozone-generating light fittings are, for example, fluorescent light sources, mercury vapor lamps).

The most favorable storage conditions are temperatures between +15 °C and +25 °C, as well as a relative humidity below 65 %.

During storage, hose lines must not come into contact with substances that could cause damage, e.g. acids, alkalis, solvents. Penetration of ozone or other harmful air constituents can be prevented by sealing the ends or by wrapping the hoses in plastic film. They must be stored flat and free of tension.

The storage period for hose lines should not exceed two years.



ANNEX

Recommended scope of testing "visual inspection" (before initial commissioning or recommissioning)

- Is all user information required for safe operation of the system available (e.g. flow chart, operating instructions)?
- Do the hose lines comply with the flow chart or parts list?
- Are there protective measures in place, such as pressure relief valves, for cases of unusually high pressure pulses or pressure amplifications?
- Are the hose lines marked with the name or abbreviation of the manufacturer, maximum permissible operating pressure, nominal diameter, quarter/year of manufacture?
- Are the hose lines installed in such a way that, in accordance with DIN 20 066
 - the natural position does not hinder movement?
 - turning or twisting of the hose is prevented, likewise tensile load caused by a line that is too short and a bending radii that is too small?
 - the hose is routed via a kink protector (if necessary on the connecting element)?
 - sufficient clearance prevents external mechanical influences or abrasion on the edges?
 - hose bridges prevent damage being caused by driving over the hose line?
 - hose guides (such as hose saddles and sufficiently wide hose brackets) protect loosely laid hose lines and
 - a heat shield protects against high temperature exposure?
- Are suitable protective measures, such as fixtures, safety gear or shielding provided for hose lines that, in the event of failure, pose a risk of whipping?
A risk is to be assumed if persons are generally present in the immediate vicinity of the hose lines, for example.
- Do the hose lines of newly commissioned or re-commissioned machines already show signs of damage?
- Are the installed hose lines still within the storage/use period recommended by the relevant manufacturer?
- Are the hose lines free of paint?
- Are the hose lines free of chafe marks?
- Does the operating manual contain information on test intervals? If so, what?

Note:

The installed hose lines should not be made from used hoses or used press fittings that have already been in use as part of a hose assembly!



ANNEX SCOPE OF TESTING; TEST CRITERIA

Recommended scope of testing "Functional test" (before initial or recommissioning)

Note:

Visual inspection must be carried out before the functional test

- All parts of the system must be tested at least at the maximum working pressure that could be achieved taking into account all intended applications:
 - Are the hose lines and connecting elements free of leakage?
 - Have all hose lines withstood the pressure?

Note:

The installed hose lines should not be made from used hoses or used press fittings which have already been in use as part of a hose assembly!