



## CHAPTER OVERVIEW

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### Manufacturer in terms of 2014/68/EU

The full name and address of the manufacturer is:

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Internet: [www.lw-compressors.com](http://www.lw-compressors.com)



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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.

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# Operating Instructions

Breathing Air Compressor

LW 150 ES / LW 200 ES





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## GENERAL INFORMATION

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### 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.

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### 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

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### Scope of Delivery

Compressors are provided in different equipped versions.

### Versions

#### Filling pressure versions:

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

### Specifications

- Electro Motor
- Powder coated housing in RAL 6026 / 7016
- Sound insulated housing
- Automatic condensate drain
- Automatic stop at final pressure
- Hour counter
- Operating panel with start/stop and condensate test button, as well emergency stop switch
- Phase monitoring c/w start prevention
- 2 x Filling hose and filling valve
- Safety switch
- Pressure maintaining and non return valve
- All pistons c/w steel piston rings
- 3 x concentric suction/pressure valves
- Oil- / Water separators after 2nd and 3rd stage
- Safety valves after each stage
- Condensate-Stop-Valve
- 10 l Condensate tank with venting silencer
- Maintenance door on both sides
- Filling pressure of your choice (200 or 300 bar)
- Breathing air purification in accordance to EN 12021

### Options

- Auto start system
- Up to 2 additional hoses available
- Motor protection switch
- Ambient temperature monitoring c/w auto shut down
- 200 and 300 bar parallel filling pressures
- Oil pressure gauge
- Intermediate pressure gauges
- Oil pressure monitoring c/w auto shut down
- Oil pump c/w oil sieve
- Indicator light - service interval
- Cylinder head temperature monitoring with auto shut down
- Oil temperature display with auto shut down
- Filter housing for 2,3 l filter cartridges
- Puracon filter monitoring (Auto shut down also available)
- RTC - Remote Tab Control
- Additional high pressure outlet
- Power cable and plug
- Special voltages / frequencies on request

## DESCRIPTION

### Technical Data



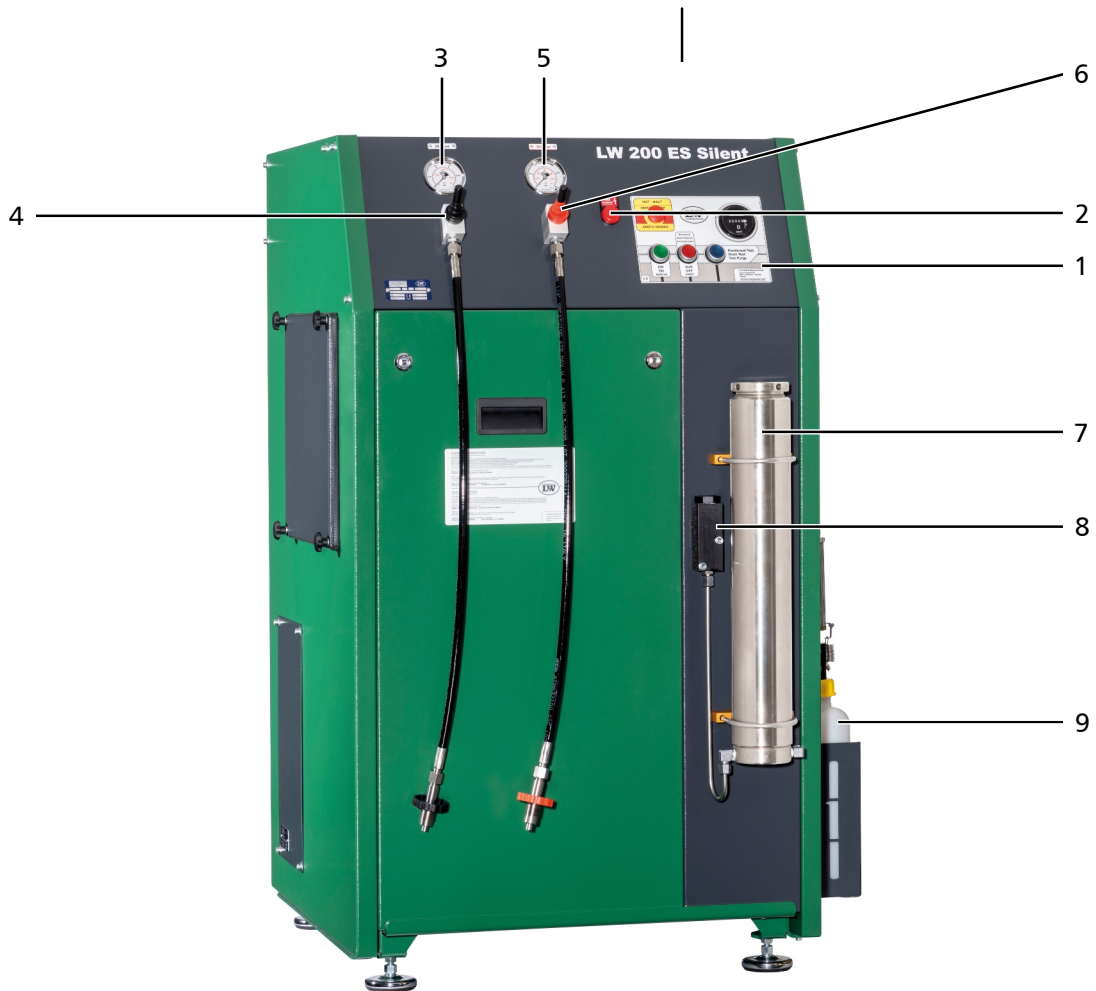
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Technical Data	LW 150 ES	LW 200 ES
Capacity [l/min] / [Nm <sup>3</sup> /h] / [cfm]:	150 / 9 / 5.3	200 / 12 / 7.1
Max. Operating Pressure [bar]:	350	350
RPM [min <sup>-1</sup> ]:	1425	1300
Number of Pressure Stages:	3	3
Cylinder Bore 1st Stage [mm]:	Ø 72	Ø 75,5
Cylinder Bore 2nd Stage [mm]:	Ø 32	Ø 32
Cylinder Bore 3rd Stage [mm]:	Ø 14	Ø 14
Medium:	Compressed Air / Breathing Air	
Intake Pressure:	atmospheric	
Oil Pressure [bar]:	+0.6 to +4.0	+0.6 to +4.0
Oil Capacity [l]:	0.8	0.8
Intake Temperature [°C]:	-20 < +45	-20 < +45
Ambient Temperature [°C]:	+5 < +45	+5 < +45
Cooling Air Volume [m <sup>3</sup> /h]:	> 1050 / > 1260	> 1200 / > 1440
Voltage:	E-Motor 230 - 440V / 3-Phases / 50-60 Hz	E-Motor 230 - 440V / 3-Phases / 50-60 Hz
Protection Class Drive Motor:	IP 54	IP 54
Drive Power [kW] with 50 Hz / 60 Hz:	3.5 / 4.2	4.0 / 4.8
RPM Motor [min <sup>-1</sup> ]:	2890	2890
Start:	Star/Delta	
Noise level from a distance of 1 m [dB(A)]:	61	61
Dimensions W x D x H [mm]:	900 x 1085 x 1330	
Weight [kg]:	approx. 265	approx. 270
Content Volume Filter housing [l]:	1.7	1.7



## DESCRIPTION

### Unit Assembly



No.	Designation
1	Switchboard
2	Phase monitoring
3	Filling pressure gauge 200 bar
4	Lever filling valve (200) bar c/w filling hose & filling connector
5	Filling pressure gauge 300 bar
6	Lever filling valve (300) bar c/w filling hose & filling connector
7	Filter housing
8	Pressure maintaining / non return valve
9	Condensate catch tank

## DESCRIPTION

### Switchboard

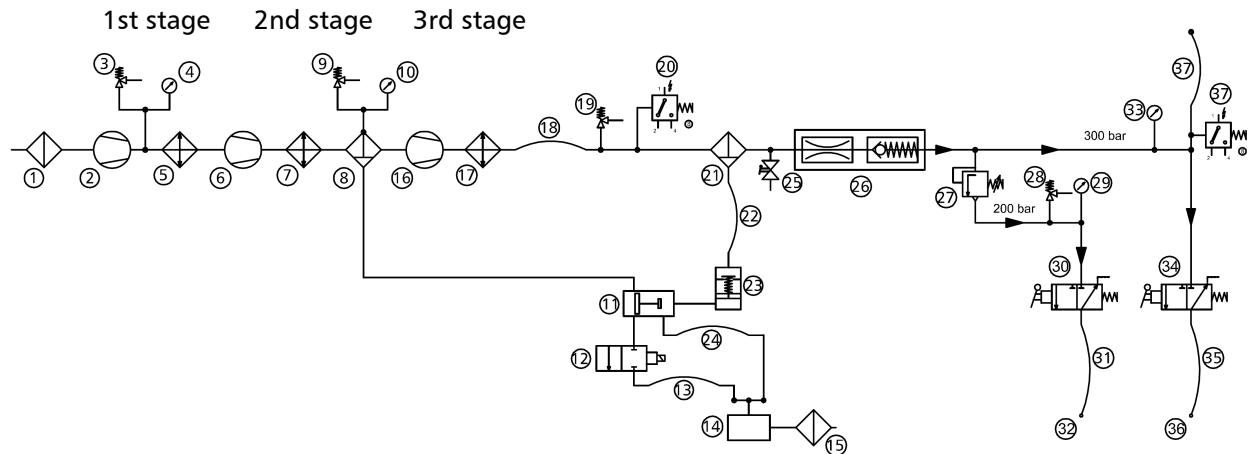
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No.	Designation
1	Emergency shut-off switch
2	Hour counter
3	ON button
4	OFF button
5	Drain test button

## DESCRIPTION

### Flow chart



- |  |   |
|--|---|
| 1. Ansaugfilter / Air Intake Filter                                      | 21. Öl-/Wasserabscheider 1,7 l / Oil-/Water Separator 1.7 ltr.          |
| 2. 1. Verdichterstufe / 1st Pressure Stage                               | 22. Hochdruckschlauch / HP-Hose   |
| 3. Sicherheitsventil 1. Stufe / Safety Valve 1st Stage                   | 23. Kondensat-Stopp-Ventil / Condensate-Stop-Valve                      |
| 4. Zwischendruckmanometer (Option) / Interstage Pressure Gauge (Option)  | 24. Kondensatablassschlauch / Condensate Drain Hose                     |
| 5. Wärmetauscher / Heat Exchanger  | 25. Entlüftungsventil / Vent Valve                                      |
| 6. 2. Verdichterstufe / 2nd Pressure Stage                               | 26. Druckhalte-Rückschlagventil / Pressure Maintaining Non-Return Valve |
| 7. Wärmetauscher / Heat Exchanger  | 27. Druckminderer (Option) / Pressure Reducer (Option)                  |
| 8. Öl-/Wasserabscheider / Oil-/Water Separator                           | 28. Sicherheitsventil 200bar (Option) / Safety Valve 200bar (Option)    |
| 9. Sicherheitsventil 2. Stufe / Safety Valve 2nd Stage                   | 29. Manometer (Option) / Gauge (Option)                                 |
| 10. Zwischendruckmanometer (Option) / Interstage Pressure Gauge (Option) | 30. Kipphebelventil 200bar (Option) / Lever Valve 200bar (Option)       |
| 11. Pneum. Kondensatventil / Pneumatic Condensate Valve                  | 31. Füllschlauch 200 bar (Option) / Filling Hose 200bar (Option)        |
| 12. Magnetventil / Solenoid Valve  | 32. Füllanschluss 200 bar (Option) / Filling Connection 200bar (Option) |
| 13. Kondensatablassschlauch / Condensate Drain Hose                      | 33. Manometer (Option) / Gauge (Option)                                 |
| 14. Kondensatsammelbehälter / Condensate Catch Tank                      | 34. Kipphebelventil 300bar / Lever Valve 300bar                         |
| 15. Schalldämpfer / Silencer   | 35. Füllschlauch 300 bar (Option) / Filling Hose 300bar                 |
| 16. 3. Verdichterstufe / 3rd Pressure Stage                              | 36. Füllanschluss 200 bar (Option) / Filling Connection 200bar (Option) |
| 17. Wärmetauscher / Heat Exchanger                                       | 37. Druckschalter (Auto Start) / Pressure Switch (Auto Start)           |
| 18. Hochdruckschlauch / HP-Hose  | 38. Hochdruckschlauch (Option) / HP-Hose (Option)                       |
| 19. Sicherheitsventil 3. Stufe / Safety Valve 3rd Stage                  |   |
| 20. Druckschalter (Auto Stopp) / Pressure Switch (Auto Stop)             |   |



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## SAFETY PRECAUTIONS



## SAFETY PRECAUTIONS

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### 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 unauthorised 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**

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### **Safety instructions on the unit**

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

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**Warning**  
High voltage!



**Note**  
Ensure correct direction of rotation!



## **SAFETY PRECAUTIONS**

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### **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.

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## **SAFETY PRECAUTIONS**

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### **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

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### 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.

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## **SAFETY PRECAUTIONS**

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### **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.

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# 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 m<sup>3</sup> 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

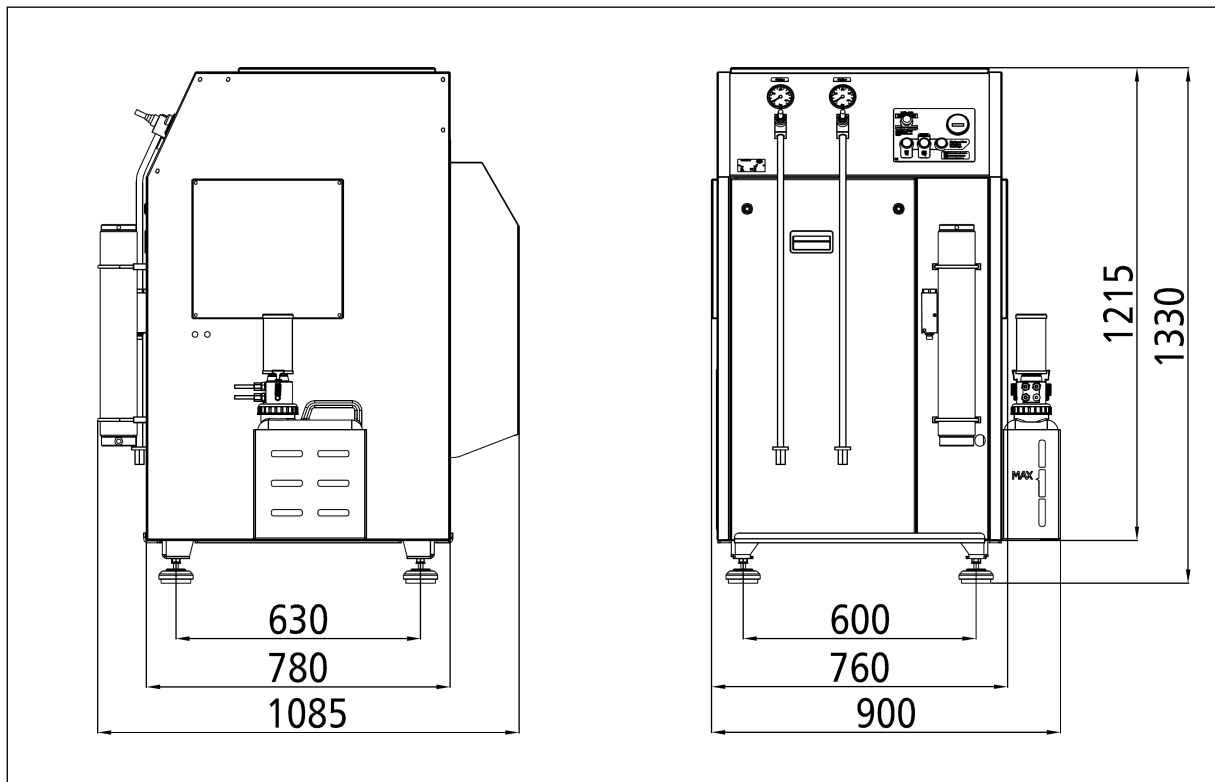
- Intake air must be free from noxious gas e.g. smoke, solvent vapours and exhaust fumes. We recommend not to use the intake air inside the compressor housing. An intake hose would be recommendable!

#### 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



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Fig. Dimensions

## 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 and rear side min. 500 mm, distance to the ceiling min. 500 mm.  
Avoid anything in this area which can restrict the cooling air flow.

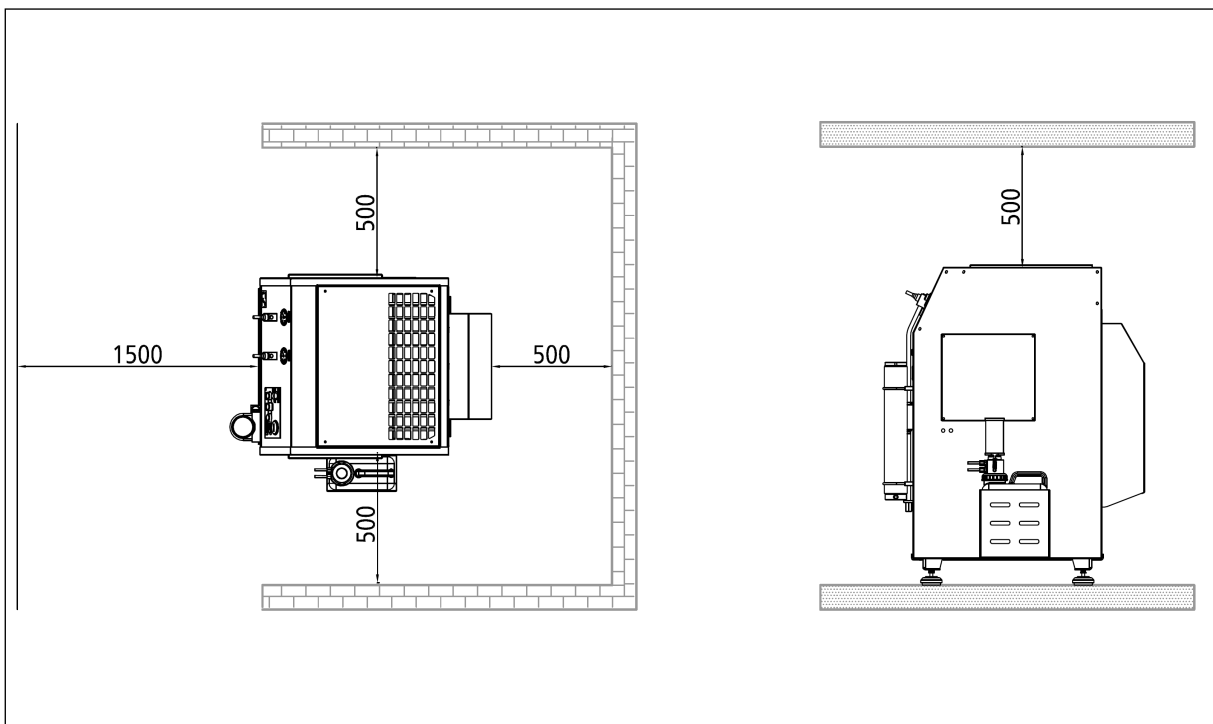


Fig. Minimum distances

## 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

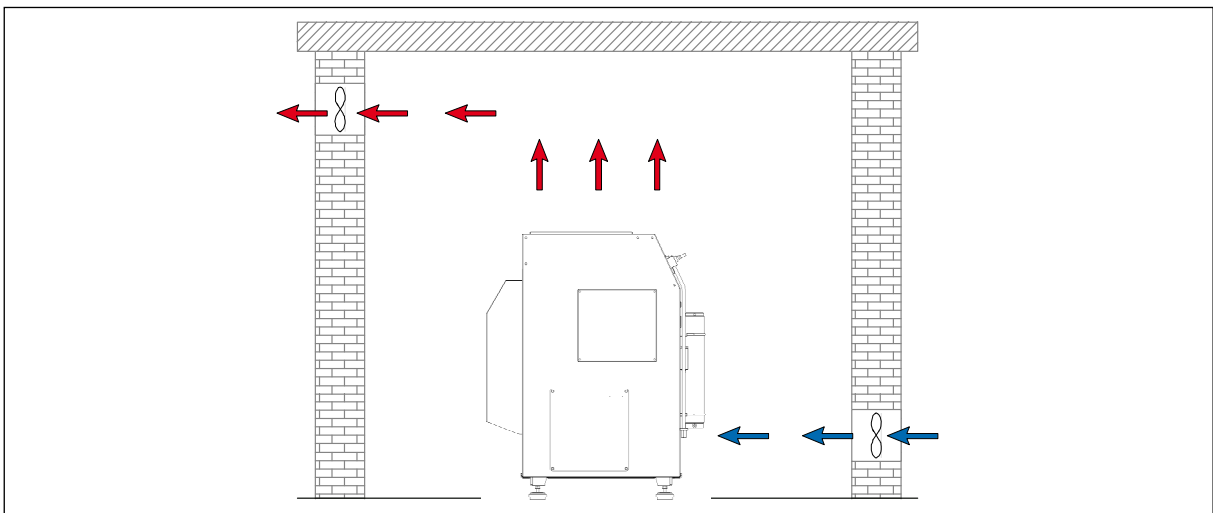


Fig. Ventilation through facade

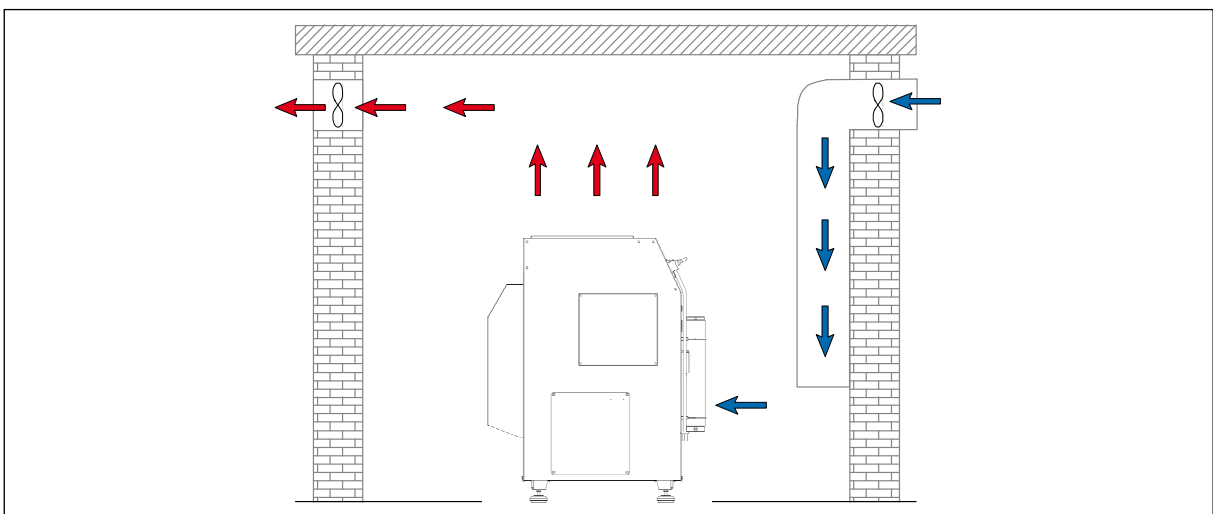


Fig. Ventilation via ventilation stack

## 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).

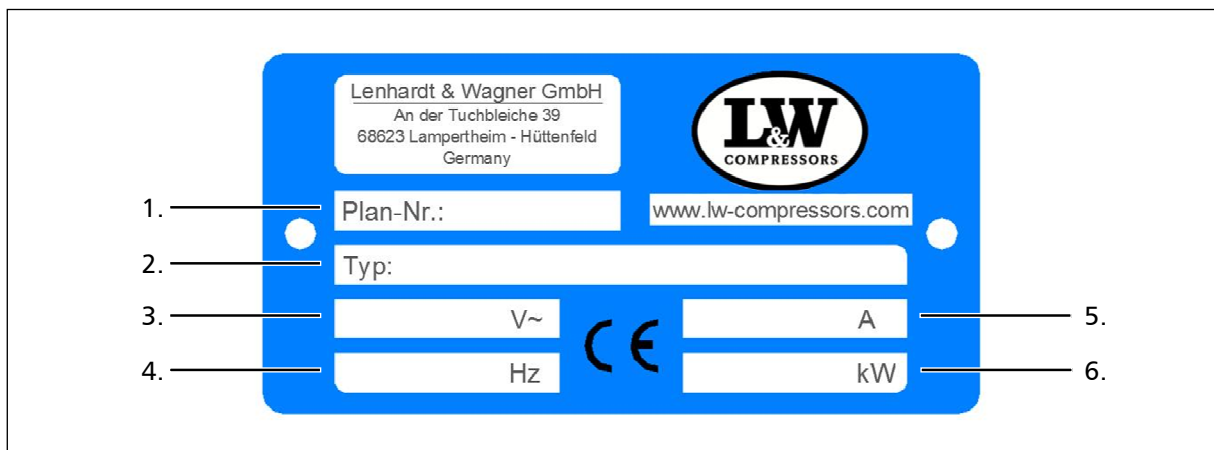


Fig. Compressor name plate

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

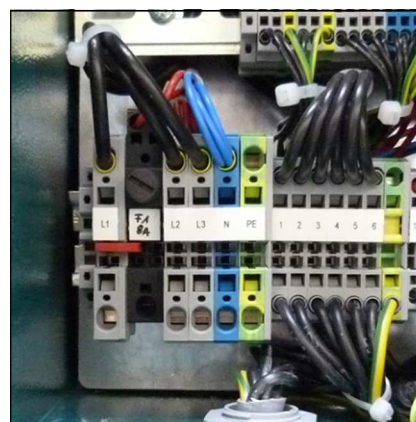


## INSTALLATION

### 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



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### Recommended fuses for 360 - 500 V operating voltage

Nominal motor power		Fusing start A		Connection in mm <sup>2</sup>	
[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 <sup>2</sup>	
[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



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# OPERATION

## OPERATION

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### 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.

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## FIRST COMMISSIONING

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### 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 with the oil dipstick (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 final pressure switch shuts off the compressor. If the final pressure switch does not shut off, switch off the compressor with the OFF button (see chapter "REMEDYING FAULTS").
7. Check the compressor unit for leaks (see "SERVICE AND MAINTENANCE")
8. Now check the condensate drain valves:
  - Fix the black condensate hoses
  - Drain test - press the test button
  - If correct, air escapes
9. Stop the compressor by pushing the OFF button.
10. Open all filling valves carefully to vent.

## FIRST COMMISSIONING

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### Check oil level

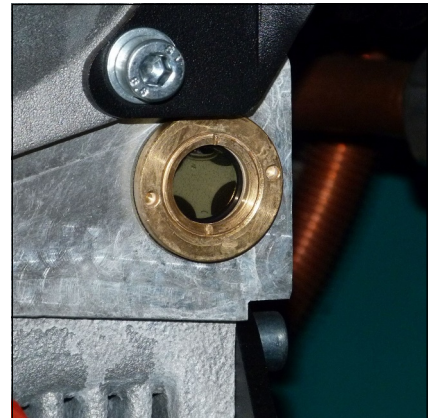


#### Warning

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

The oil level should be between the middle and upper end of the oil sight glass. Never start the compressor with a too low oil level.

Refill new compressor oil at least when the oil level reached the middle of the indicated area.



Oil sight glass



#### Warning

- First oil change after 25 operating hours.

### 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 / Correct V-belt tension

See chapter "Service and Maintenance" -> "Tension V-belts"

## 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

### Phase Monitoring

With this option the direction of rotation is controlled by a phase monitoring system during the operation.

If the compressor is incorrectly connected the power supply does not allow to start the machine. In this case the red warning lamp will indicate the problem. A changing of the direction of rotation is inevitable then.

Another advantage is the control during the operation. In case of dissolving a phase, the compressor will shut-down automatically. The red warning lamp will indicate to this after shut-down directly.



Phase Monitoring



## DAILY COMMISSIONING

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### **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.

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## OPERATION

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

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

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## OPERATION

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### Switch off the compressor

The compressor unit is equipped as standard with a pressure switch which automatically shuts down the system when the corresponding final pressure is reached.

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



#### Note

After automatic or manual switching off, all pressure vessels and filter housings of the compressor will be automatically vented.

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# REMEDYING FAULTS

## REMEDYING FAULTS

### 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 / Reduce operation times
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, observe rotation direction arrow!
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	-	0,8	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	-	-	-
Check V-belt tension and condition	LW 150 ES MC	1	011839
	LW 200 ES MC	1	011839
	LW 250 ES MC	1	-

## MAINTENANCE AND SERVICE

### Annually

Maintenance work	Type	Quantity	Order No.
Oil change, if less than 1000 operating hours	-	0.8	000001
Check V-belt tension and condition	LW 150 ES MC	1	001685
	LW 200 ES MC	1	001685
	LW 250 ES MC	1	011154
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.
Check V-belt tension and condition	see above	see above	see above
Change intake filter *	-	1	001708
Check pressure maintaining/non-return valve	-	-	-
Check all connections for leaks	-	-	-
Clean oil/water separators	-	-	-



#### \* Note

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

## MAINTENANCE AND SERVICE

### Every 1000 operating hours (latest in 5 years)

Maintenance work	Type	Quantity	Order No.
Replace o-ring of the DIN filling connector	-	2	001237
Replace o-ring of the revolvable filling hose	-	2	001224
Replace sintered metal filter of oil separator	2. Stufe	1	002123
Replace o-ring of the water separator	2. Stufe	1	001255
Replace o-ring of condensate stop valve	-	1	001264
Replace sintered metal filter of condensate stop	-	1	002914
Replace o-ring of condensate stop valve housing	-	1	006382
Replace sintered metal filter of pneumatic condensate valve	-	1	000188
Replace o-rings of the filter housing 1.7ltr	-	2	001287
Replace back-up rings of the filter housing 1.7ltr	-	2	001285
Oil change	-	0,8 l	000001
Replace filter of condensate-catch-tank	-	1	006462
Replace o-ring of condensate-catch-tank	-	1	002152



#### 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)

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Maintenance work	Type	Quantity	Order No.
Replace o-rings and gaskets of 1st, 2nd and 3rd stage	O-Ring (1st stage)	1	011104
	O-Ring (2nd + 3rd stage)	2	011105
Replace all inlet and outlet valves incl. Gaskets	1st stage	1	003652
	2nd stage	1	000551
	3rd stage	1	011123
	Upper gasket 1st	1	003651
	Lower gasket 1st	1	011103



**Note**

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

## 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 150 ES / LW 200 ES / LW 250 ES

Compressor	Operating Hours	Order No.
LW 150 ES / LW 200 ES / LW 250 ES	1000 h	011840
LW 150 ES / LW 200 ES / LW 250 ES	2000 h	011841



#### Note

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

### Tension V-belt

Tension V-belt as follows:

- Loosen mounting screws (Fig. 1)
- Tighten V-belt by the lock nuts (Fig. 2 & 3)
- Tighten mounting screws (Fig. 1)

ATTENTION:

Motor plate (A) and motor (B) must be mounted in parallel (Fig. 4)

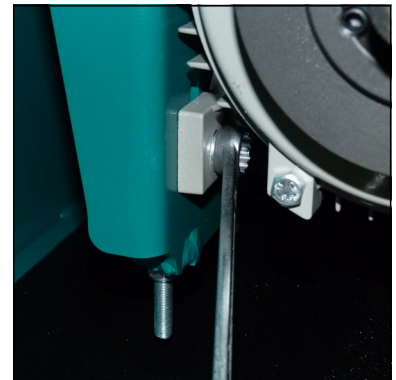


Fig. 1 - Loosen mounting screws

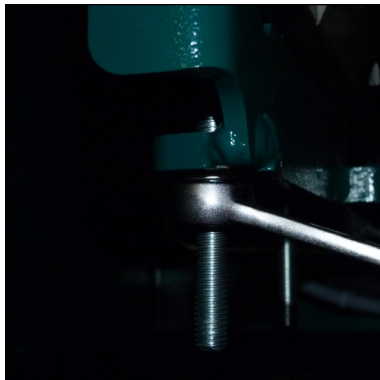


Fig. 2 - Tighten V-belt by the lock nut



Fig. 3 - Tighten V-belt by the lock nut

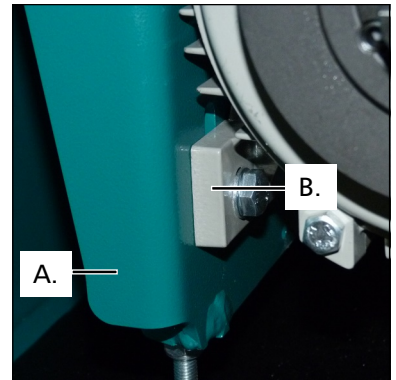


Fig. 4 - Motor plate and motor must be mounted in parallel

### 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

## MAINTENANCE AND SERVICE

### Compressor Lubrication

Pistons, cylinders, crankshaft and connecting rods are provided with oil by splash lubrication.

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### Check oil level



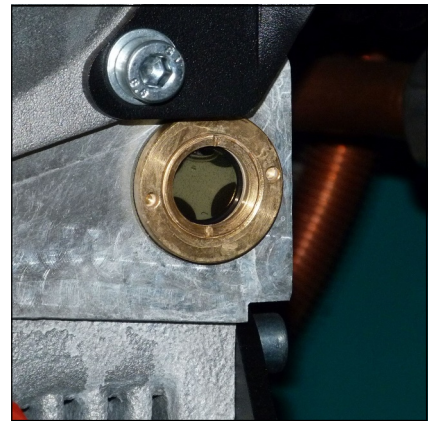
#### Warning

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

Check oil before each operation of the system!

The oil level should be between the middle and upper end of the oil sight glass. Never start the compressor with a too low oil level.

Refill new compressor oil at least when the oil level reached the middle of the indicated area.



Oil sight glass



#### Warning

- First oil change after 25 operating hours.

### 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.
- 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 by hand.

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. 800 ml synthetic compressor oil is necessary for one oil change. Only use synthetic compressor oil which is recommended as suitable from L&W (L&W Article no.: 000001).



### Final pressure switch



**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.

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:

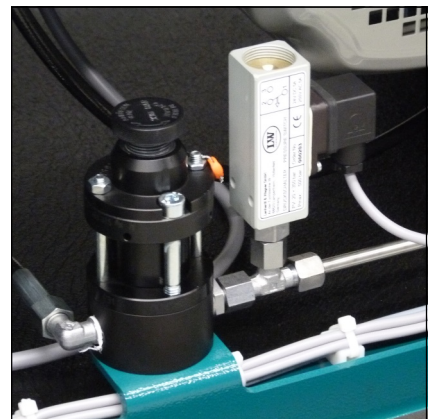
**Increasing cut-out pressure:**

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

**Example settings:**

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

### Automatic condensation dump system

 **Note**

The compressor 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 the 2nd and 3rd stage of compression. All two 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.

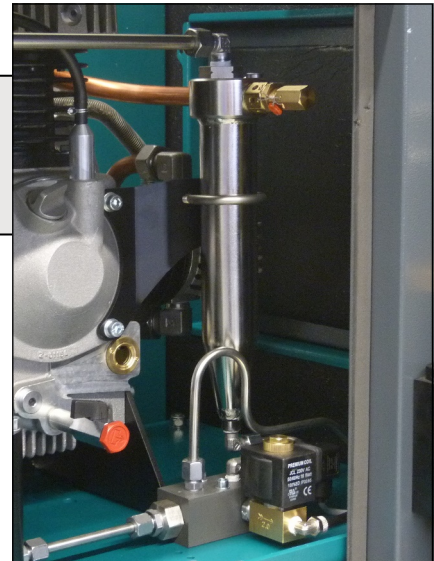
To release the complete condensate through the black plastic hoses, we recommend using an 10 l container at least.

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 to be replaced every 1,000 operating hours.



Oil / water separator 2nd stage



Oil / water separators final stage has



Kondensatbehälter 10 l

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### Oil / Water separator 2nd stage - Maintenance



#### Note

Clean all parts thoroughly before assembly.

#### Maintain oil / water separator 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.

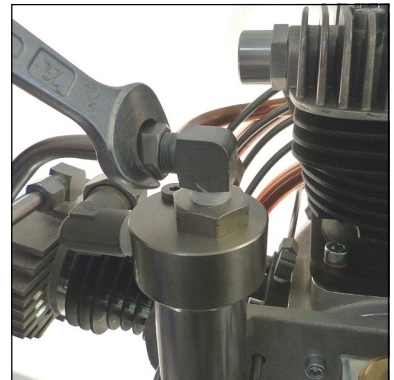


Fig. 1 - Loosen pipe connections

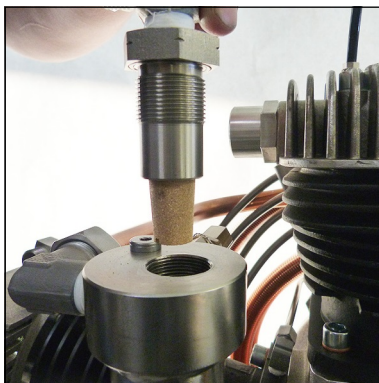


Fig. 2 - Remove sinter filter holder



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 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.



Filter housing

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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 001461	DIN EN 12021 (Breathing Air) incl. CO/CO2	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 <sup>3</sup> )	For models with 1.7 ltr Filter housings For models with 2.3 ltr Filter housings
001460 001462	Only drying (<15mg/m <sup>3</sup> )	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

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

- 100 hours for LW 150 ES
- 75 hours for LW 200 ES

## 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.

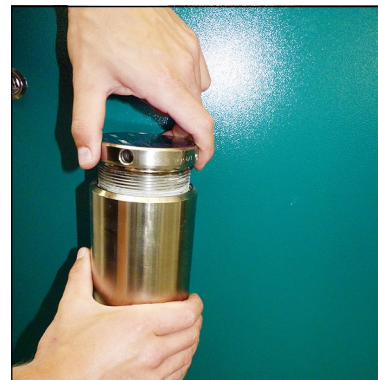


Fig. 1 - Open Filter cover



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

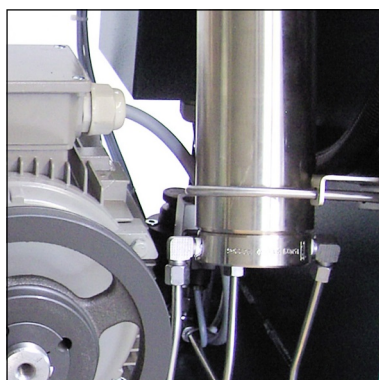


Fig. 3 - Loosen pipe connections and nuts



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

### Condensate stop valve - maintenance



#### Note

Clean all parts thoroughly before assembly.

#### Change/clean condensate stop valve as follows:

- Loosen pipes and mounting screws.
- Remove condensate stop valve housing.
- Remove allen bolts and pull off the cover by screwing two allen bolts into the threaded holes (Fig. 2).
- Pull the condensate stop valve out of the filter housing by using a threaded rod
- Change o-ring, previously grease new o-ring (Fig. 3).
- Push the condensate stop valve into the filter housing by using a threaded rod.
- Change o-ring of the cover, previously grease new o-ring (Fig. 4).
- Mount the cover, tighten the allen bolts crosswise.
- Remove the connection on the cover ring and change the sinter filter (Fig. 5).
- Reassemble the connection
- Mount condensate valve housing.
- Tighten mounting screws and pipes

The oil / water separator maintenance is now completed.

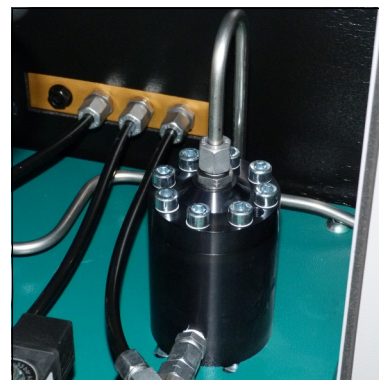


Fig. 1 - Condensate stop valve housing



Fig. 2 - Remove the cover

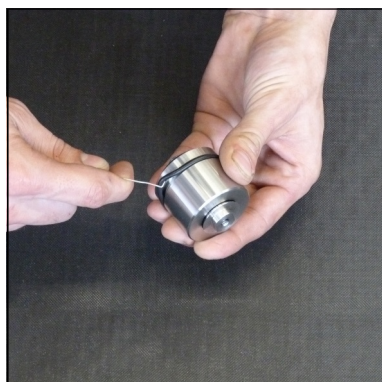


Abb. 3 - O-Ring wechseln  
(Kondensat-Stopp-Ventil)



Abb. 4 - O-Ring wechseln (Deckel  
Kondensat-Stopp-Ventil)



Abb. 5 - Sinterfilter wechseln

### Pneumatic condensate valve - maintenance



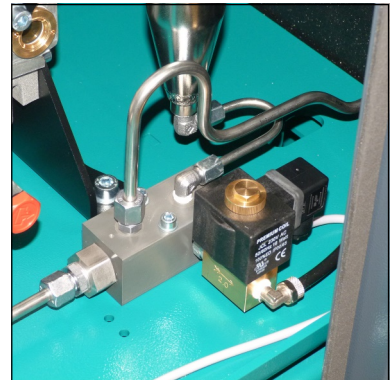
#### Note

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

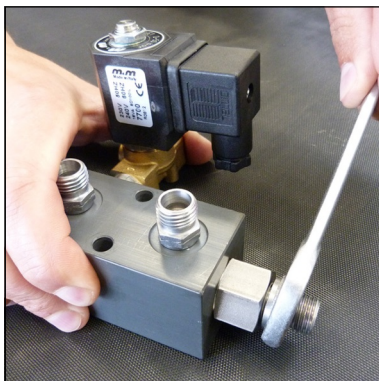


Fig. 2 - Loosen connection

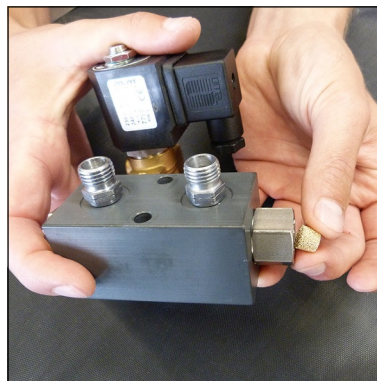


Fig. 3 - Change sinter filter



## MAINTENANCE AND SERVICE

### Check or change filter inlet



#### Note

Clean all parts thoroughly before assembly.

To properly change the filter inlet, proceed as follows:

- Disconnect the crankcase housing at the ventilation hose (Fig. 1).
- Remove mounting screw and pull out filter housing carefully (Fig. 2).
- Clean filter housing and o-rings and check if defective (fissures).
- Place o-ring into the housing (Fig. 3).
- Insert the new cartridge and assemble the housing. Place o-ring into the groove (Fig. 4).
- Place and align the filter housing carefully, inlet port up, hose connector 90° turned to the left (Fig. 5).
- Tighten mounting screw and connect the crankcase housing ventilation hose to the oil fill port (Fig. 6).

The filter inlet change is now completed.



Fig. 1 - Pull off ventilation hose at the oil fill port



Fig. 2 - Pull out filter housing carefully



Fig. 3 - Place o-ring into the filter housing



Fig. 4 - Place o-ring into the groove

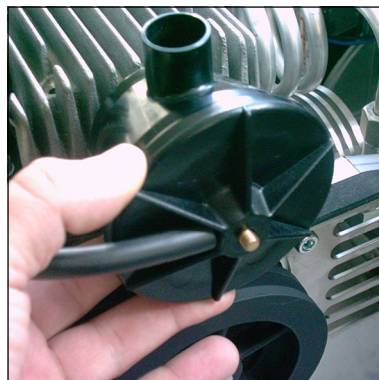


Fig. 5 - Place and align filter housing carefully

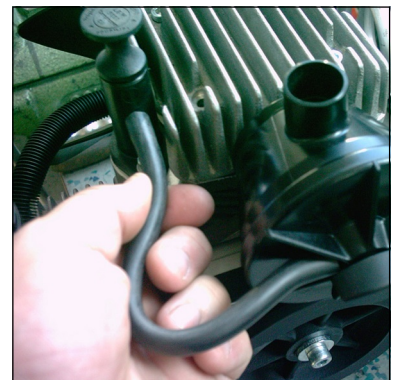


Fig. 6 - Connect ventilation hose at the oil fill port

## 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 in- 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

- Remove spring wire clamps of the crankcase ventilation hose (Fig. 1).
- Remove hose.
- Loosen pipe connections.
- Loosen valve head screws.
- Remove valve head and check if defective.
- Remove upper valve head gasket and inlet / outlet valve.

Install inlet / outlet valve - see following page



Fig. 1 - Remove spring wire clamps



Fig. 2 - Remove in- and outlet valve

## MAINTENANCE AND SERVICE

### Replace in- and outlet valve 1st stage



#### Note

The figures can differ from the delivered parts.

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

- Insert lower valve gasket (Fig.1).
- Insert upper valve gasket (Fig.2).
- Insert in- and outlet valve. CAUTION: Observe correct position between valve centre hole and valve head locating pin (Fig. 2+3).
- Place valve head carefully on top of the cylinder (take care to keep valve in place) (Fig.4)
- Tighten valve head screws crosswise.
- Set tight connecting nut and fix vent hose to air intake housing. Don't forget to fix spring wire clamp.



Fig. 1 - Lower valve gasket



Fig. 2 - Correct position of in-and outlet valve

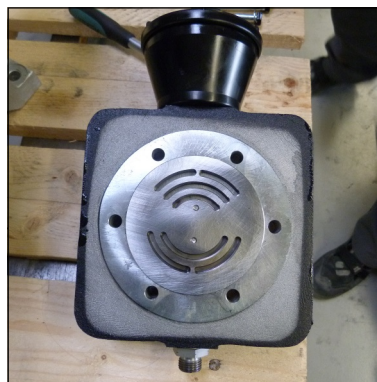


Fig. 3 - Correct position of in-and outlet valve

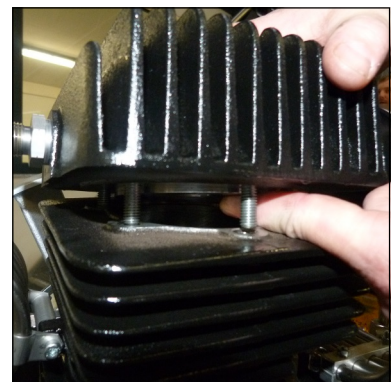


Fig. 4 - Take care to kkeep valve in place

### Replace inlet and outlet valve 2nd stage / 3rd stage



#### Note

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

#### Replace the inlet and outlet valve 2nd stage as follows:

- Loosen pipe connections.
- Loosen valve head screws.
- Remove valve head Observe that the lower valve gasket is also pulled out. It can still stick inside the cylinder head.
- Remove inlet / outlet valve.
- Check valve head if defective (check locating pin).
- Change upper valve gasket.
- Change lower valve gasket (aluminium gasket).
- Insert new inlet and outlet valve into the valve head (Fig. 1). CAUTION: Observe correct position between valve centre hole and valve head locating pin.
- Place the valve head with the new inlet and outlet valve.
- Place pipe connections.
- Tighten valve head screws crosswise.
- Tighten pipe connections.

Inlet and outlet valves change 2nd stage / 3rd stage is now completed.



Fig. 1 - Ensure correct valve position (centre pin)

### 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: 70 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.

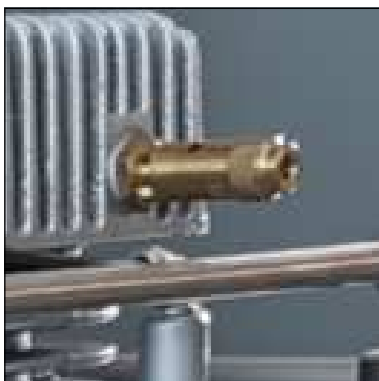
During normal operation conditions, the knurled screw has to be turned anti-clockwise up to the upper stop. An integrated circlip avoids complete unscrewing.

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

### 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 160 bar inside the filter housing - this optimises filter efficiency.

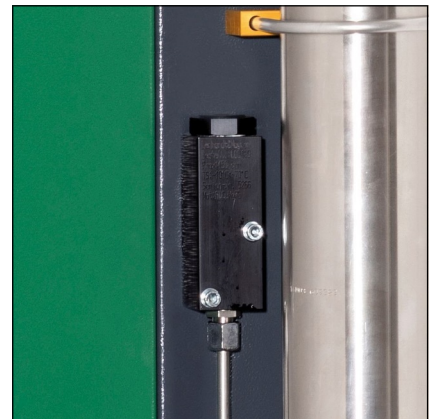
### Pressure maintaining valve

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 (160 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

### Safety valve test



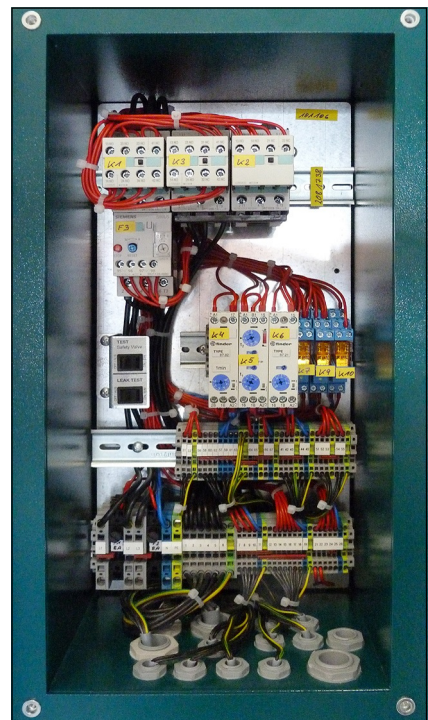
#### Note

Do not fill any tank during test phase!

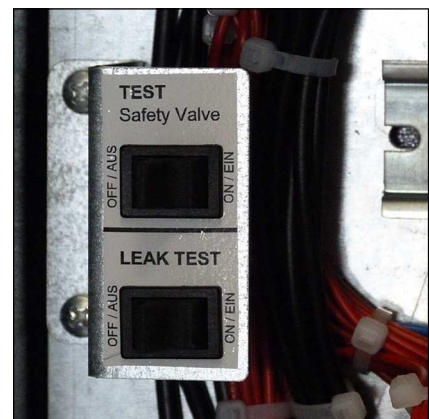
#### Safety valve test as follows:

- 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)



## MAINTENANCE AND SERVICE

### 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)

### Test of pressure equipment

According to the Pressure Equipment Directive 2014/68/EU and TÜV Darmstadt (German supervising authorities).

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

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### Introduction form for the Operator

A

No.	Surname, Name	Date	Place	Signature	Instructor

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 been informed about the relevant safety rules and regulations (TRG, DGRL, BetrSichV, GSG, GSGV).



**MAINTENANCE RECORDS**

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**Top up oil, oil change**

A

Date	Operating hours	Oil quantity [l]	Name





## MAINTENANCE RECORDS

---

### Maintenance work

Description	Date, signature

A



## MAINTENANCE RECORDS

### Replaced Parts

A

Designation	Part number	Date, signature



## STORAGE

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### 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 happen 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

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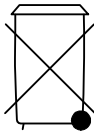
### Transportation instructions

- 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: Gehäuse / Assembly: Housing

Best.-Nr. / Order No.	Benennung	Description
000498	U-Scheibe A6	Washer A6
001030	Zylinderschraube M6x16mm DIN912 8.8 ZN	Allen Bolt M6x16mm DIN912 8.8 ZN
001156	Stopfmutter M6 DIN985 ZN	Lock Nut M6 DIN985 ZN
001163	Mutter M10 DIN934 ZN	Nut M10 DIN934 ZN
001164	Stopfmutter M10 DIN985 ZN	Lock Nut M10 DIN985 ZN
001178	U-Scheibe A6 DIN9021 ZN	Washer A6 DIN9021 ZN
001182	U-Scheibe A8 DIN9021 ZN	Washer A8 DIN9021 ZN
001186	U-Scheibe A10 DIN125 ZN	Washer A10 DIN125 ZN
001675	Gummilager 2x M10x20 mm	Rubber Mounts 2x M10x20 mm
001677	Griffschale PVC-schwarz	Plastic Snatch, PVC, black
002551	Vorreiber komplett	Housing Lock
005437	Standfuß, Höhenverstell. mit Gummieinl. Ø80 mm, M10x45mm	Foot, Height adjustable Ø80 mm, M10x45mm
005839	Linsenflanschschraube mit Innensechskant M6x25 mm, DIN 7380F, 10.9	Flange Button Head Screw M6x25 mm, DIN 7380F, 10.9
005841	Linsenflanschschraube mit Innensechskant M6x20 mm, DIN 7380F, 10.9	Flange Button Head Screw M6x20 mm, DIN 7380F, 10.9
005842	Linsenflanschschraube mit Innensechskant M6x16 mm, DIN 7380F, 10.9	Lens Head Screw M6x16 mm, DIN 7380F, 10.9
005848	Sterngriffschraube ES Gehäuse	Star Grip Bolt
006164	Befestigungsklammer Griffschale	Clip for Moulded Recess
011748	Deckel Elektroschaltkasten	Cover Electro Box
011749	Tür vorne	Front Door
011750	Tür hinten	Back Door
011751	Quertraverse hinten	Rear Cross Panel
011752	Deckel oben	Top Cover
011753	Oberer Zwischenboden	Upper Separating Panel
011754	Seitenteil links	Side Panel - left hand side
011755	Seitenteil rechts	Side Panel - right hand side
011758	Wartungsdeckel	Service Cover
011760	Stehblech Filterbehälter	Filter Panel
011761	Kompressor- / Motorplatte Baueinheit	Compressor / Motor Plate Unit

C



## ERSATZTEILLISTE / SPARE PART LIST

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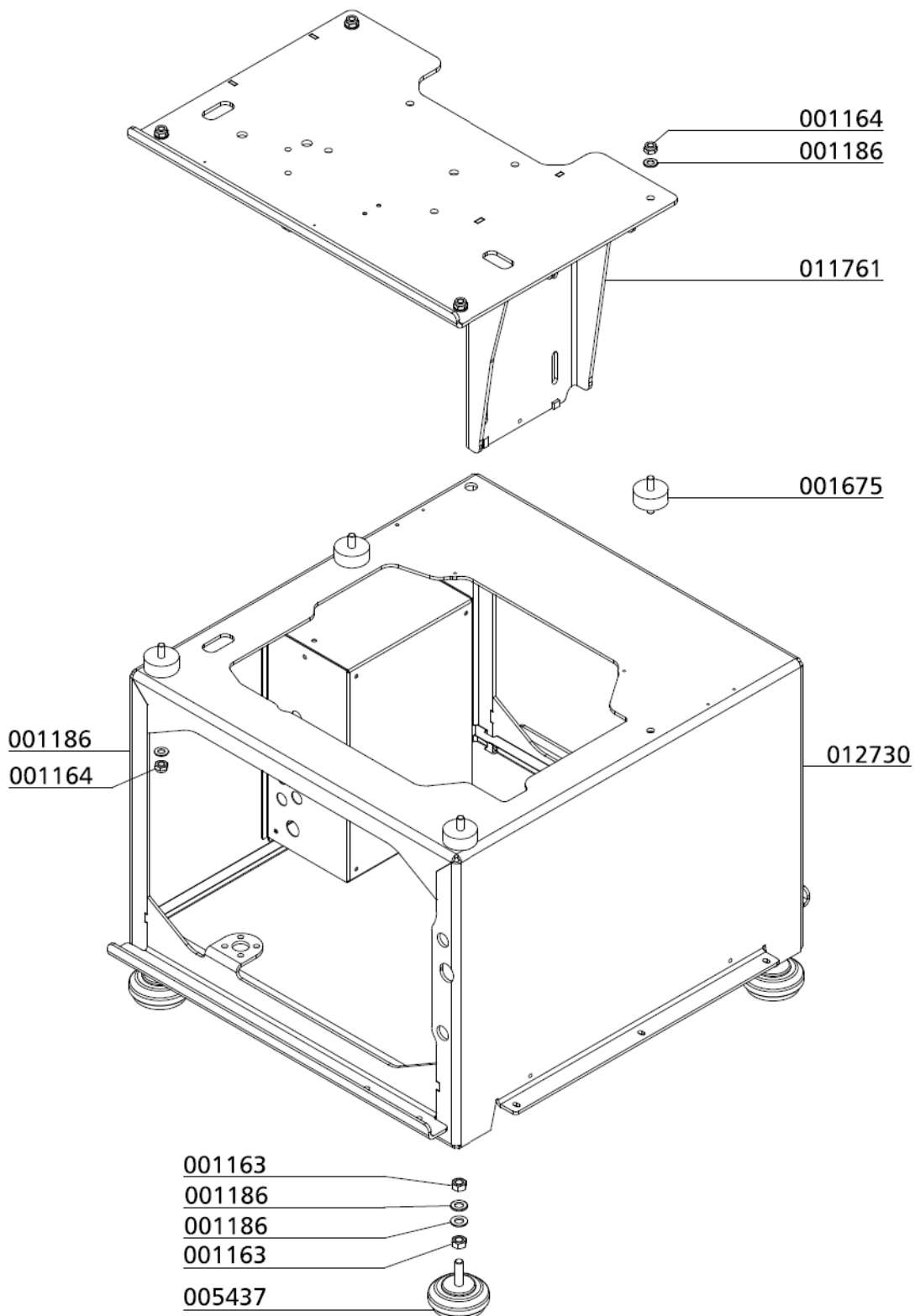
### Baugruppe: Gehäuse / Assembly: Housing

Best.-Nr. / Order No.	Benennung	Description
011762	Luftleitblech Lüfterrad	Fan / Flywheel Panel
011888	Schalldämmmatten LW 150/200 ES	Sound Isolating Mats LW 150/200 ES
011972	Sterngriff M8x55 mm, schwarz	Hand Knob M8x55mm, black
012730	Grundkonsole LW 150 - 200 ES	Main Console LW 150 - 200 ES

C

**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Gehäuse / Assembly: Housing**

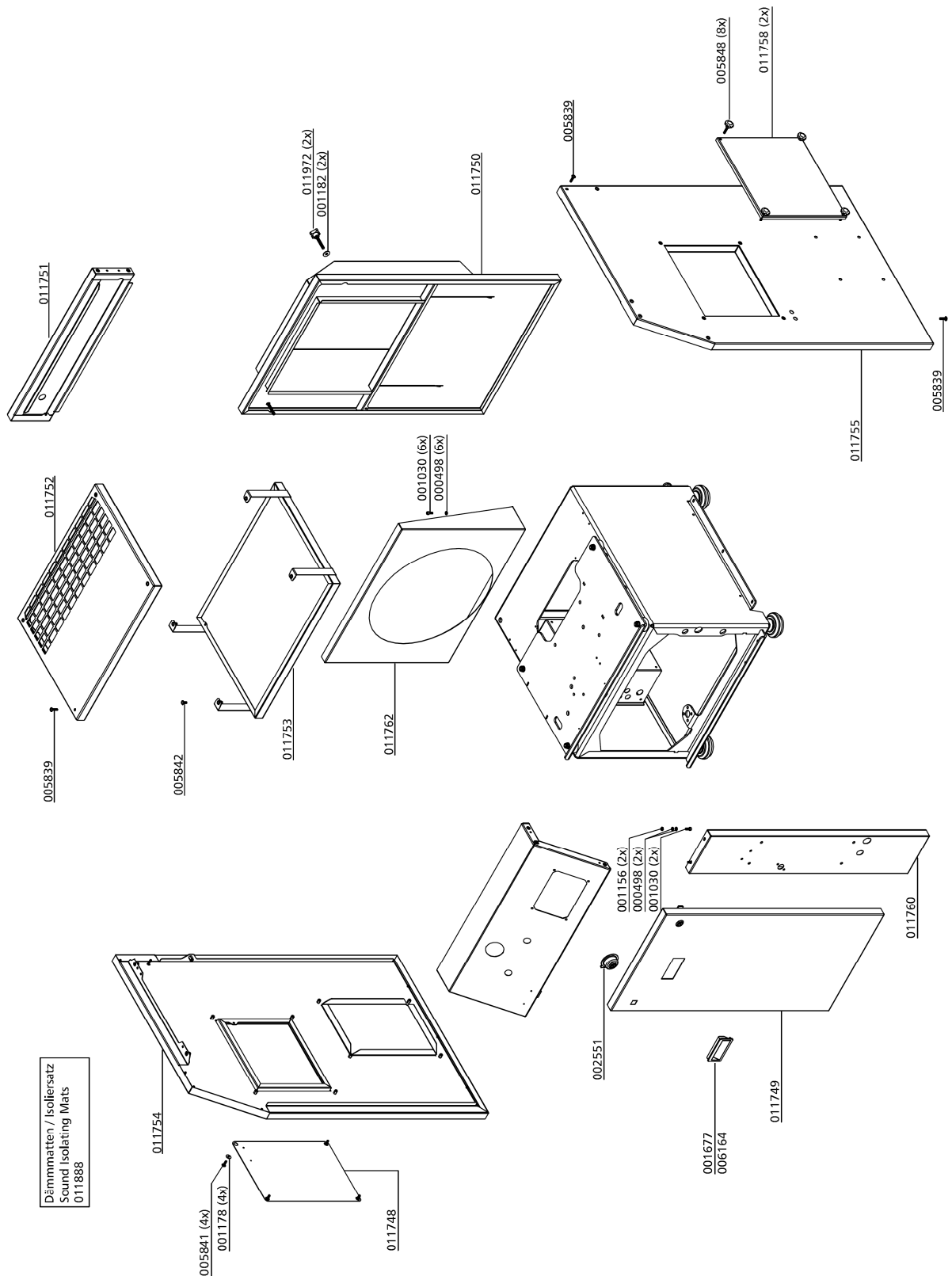


C



# DETAILANSICHT / DETAILED VIEW

## Baugruppe: Gehäuse / Assembly: Housing



C



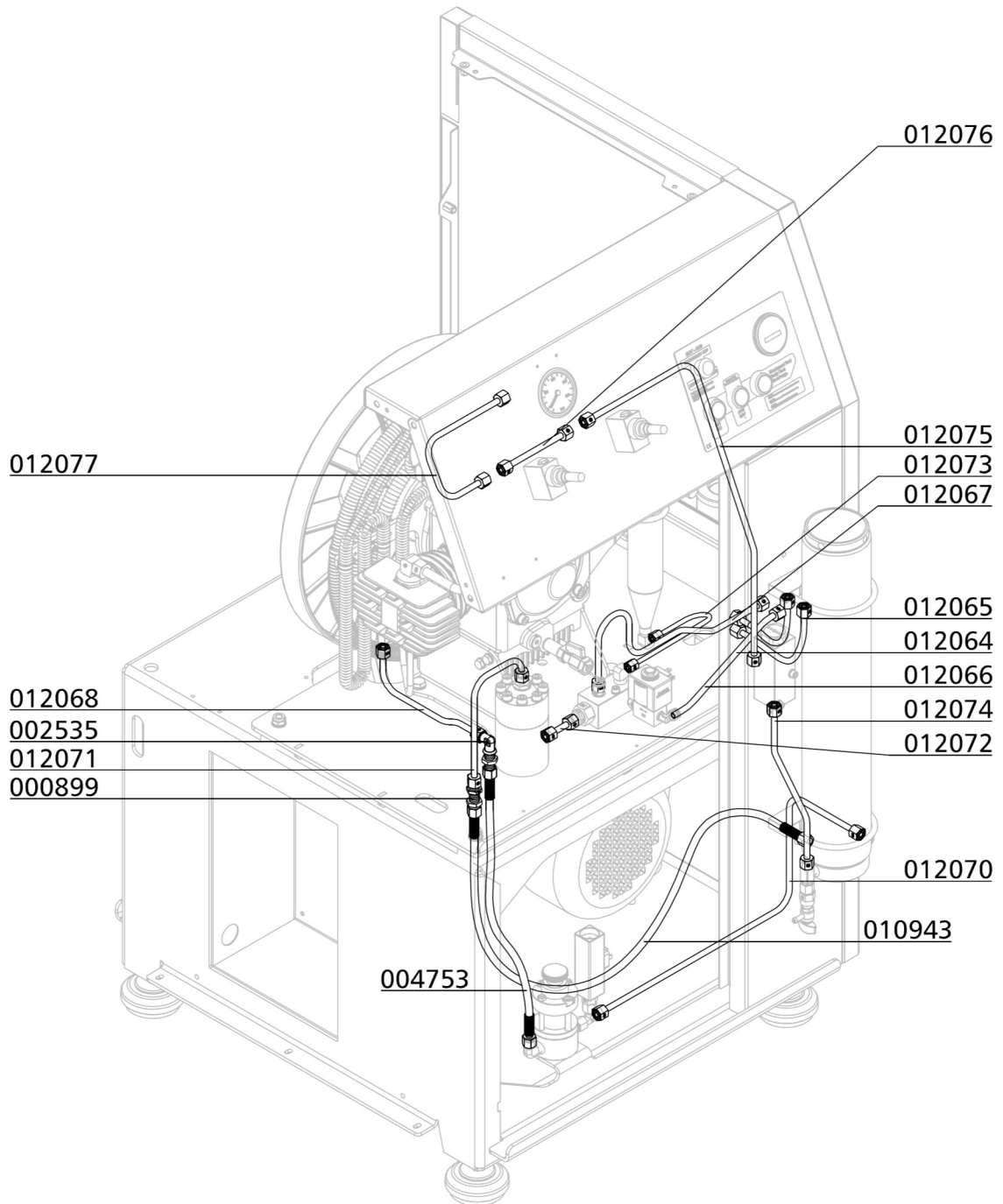
## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Rohrleitungssystem Füllventile / Assembly: Pipework Filling Valves

Best.-Nr. / Order No.	Benennung	Description
000899	Schottverschraubung SV08LOMDA3C	Bulkhead Fitting SV08LOMDA3C
002535	Winkelschottverschraubung WSV08L A3C	Bulkhead connection WSV08L A3C
004753	Hochdruckschlauch 450mm, beidseitig 8L	HP-Hose 450mm, both sides 8L
010943	Hochdruckschlauch 1000mm, beidseitig 8L	HP-Hose 1000mm, both sides 8L
012064	Kondensatschlauch Ø8x1.5x270mm, beidseitig 8L	Condensate Hose Ø8x1.5x270mm, both sides 8L
012065	Kondensatschlauch Ø8x1.5x225mm, beidseitig 8L	Condensate Hose Ø8x1.5x225mm, both sides 8L
012066	Kondensatschlauch Ø8x1.5x268mm, einseitig 8L	Condensate Hose Ø8x1.5x268mm, one side 8L
012067	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012068	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012070	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012071	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012072	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012073	Rohrleitung Ø6mm, komplett mit M.&S.	Pipe Ø6mm c/w nuts&olive seals
012074	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012075	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals
012076	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals
012077	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals

**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Rohrleitungssystem Füllventile / Assembly: Pipework Filling Valves**



C



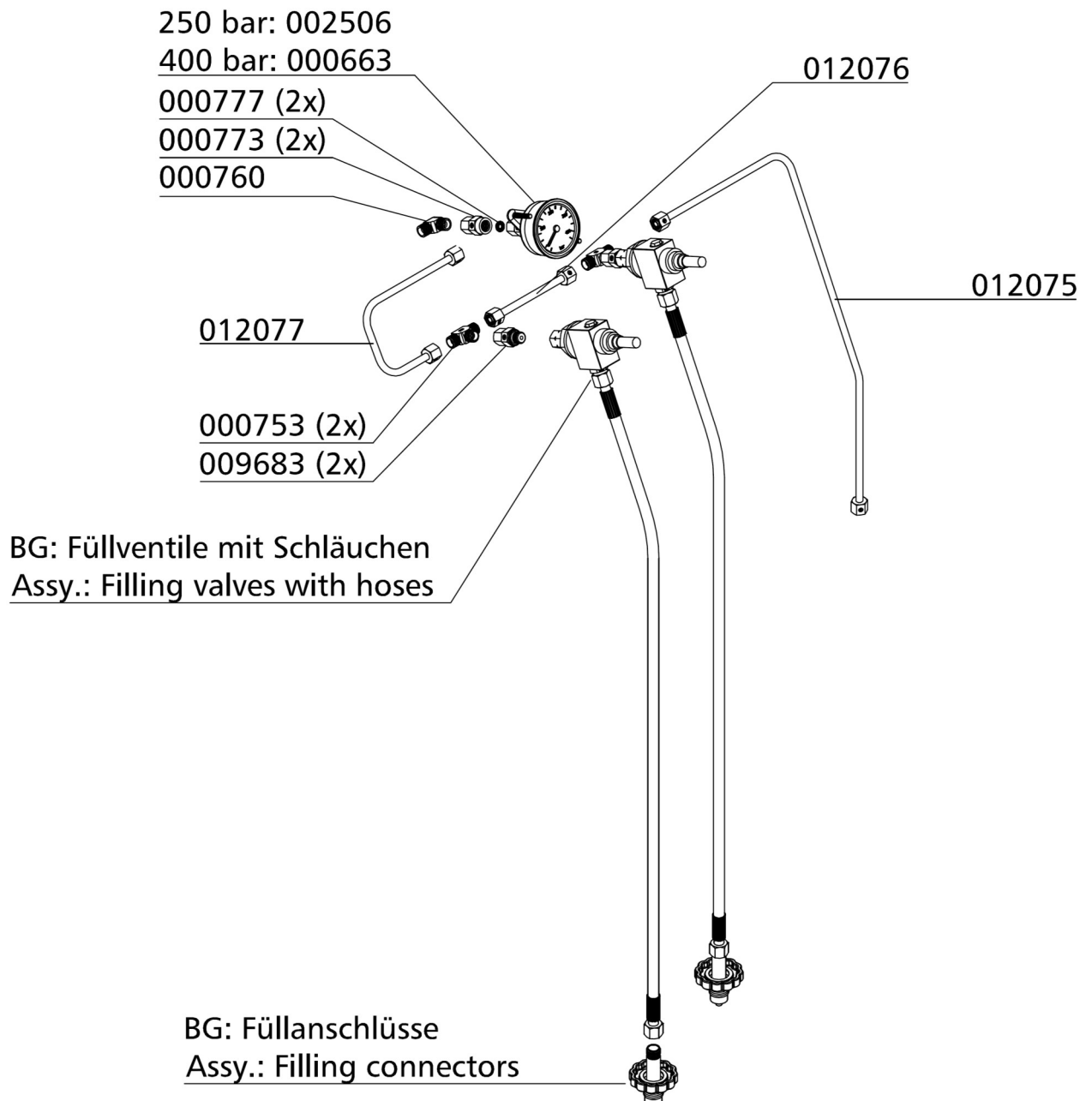
## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Rohrleitungssystem Füllventile / Assembly: Pipework Filling Valves

Best.-Nr. / Order No.	Benennung	Description
000663	Einbaumanometer 0-400 bar Ø63mm, mit Befestigungsbügel	Press. Gauge 0-400 bar Ø63mm, c/w fixing strap
000753	Verschraubung, T08L	Connection, T08L
000760	Verschraubung, W08LCFX	Connection, W08LCFX
000773	Manometerverschraubung IG G1/4" MAVE 08 LR	Connection Pressure Gauge female G1/4" MAVE 08 LR
000777	Dichtring für Manometerverschraubung	Seal Ring for Pressure Gauge
002506	Einbaumanometer 0-250 bar Ø63mm, mit Befestigungsbügel	Pressure Gauge 0-250 bar Ø63mm, c/w fixing strap
009683	Verschraubung mit fester Mutter, EGE 08L RED / G1/4	Connection with fixed nut, EGE 08L RED / G1/4
012075	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals
012076	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals
012077	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts & olive seals

**DETAILANSICHT / DETAILED VIEW**

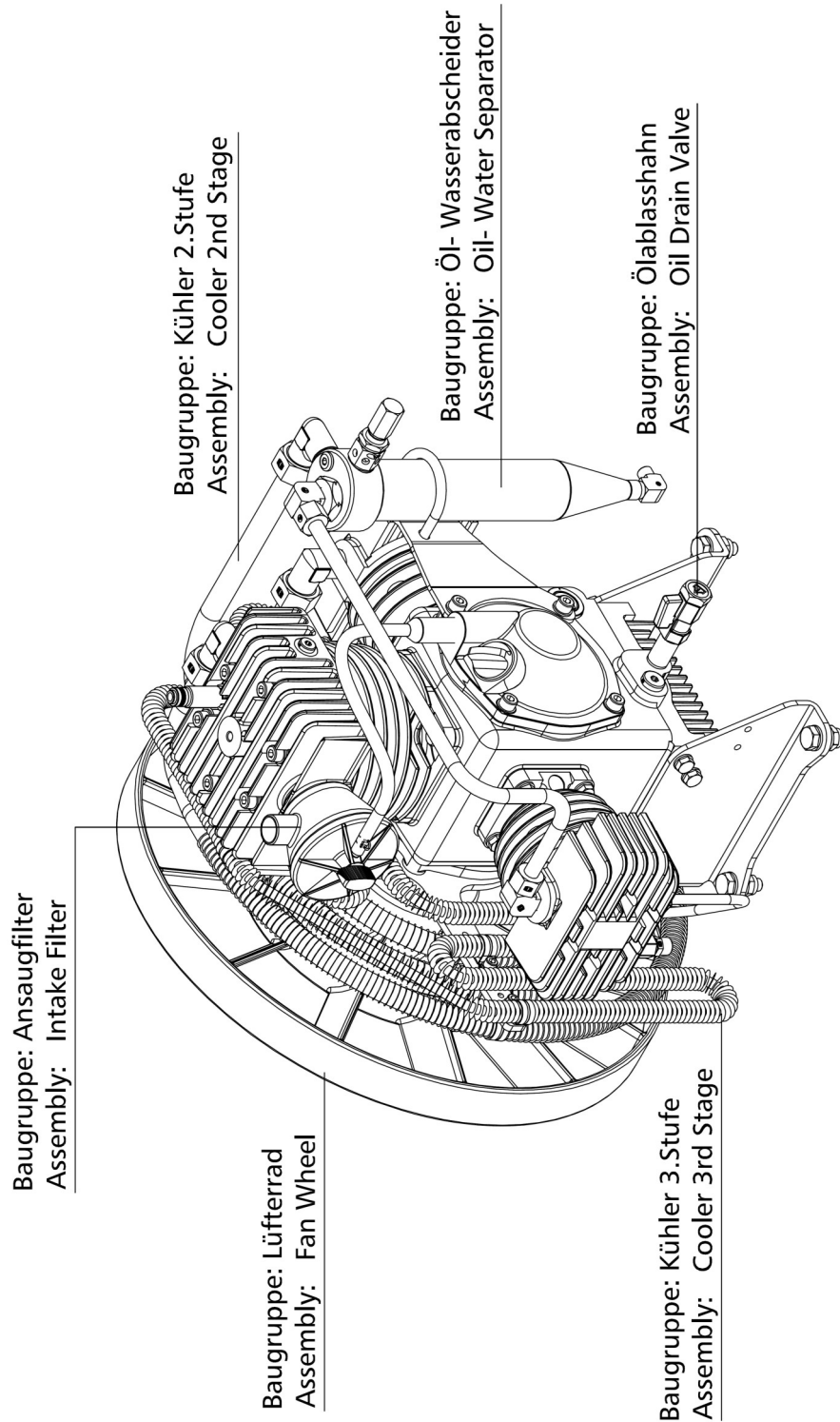
**Baugruppe: Rohrleitungssystem Füllventile / Assembly: Pipework Filling Valves**



C

**DETAILANSICHT / DETAILED VIEW**

**Gesamtansicht Verdichtereinheit / Overall View Compressor Assembly**





## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Kompressorblock / Assembly: Compressor Block

Best.-Nr. / Order No.	Benennung	Description
000220	Sicherheitsventil G3/8, 8 bar	Safety Valve
000738	Gerade Verschraubung GE 08 L	Straight Connection
000811	Winkelverschraubung WE 12L G3/8	Elbow Connection
000837	Verschlussstopfen G1/8	Plug
000838	Verschlussstopfen G1/4	Plug
000863	Winkelverschraubung WE 18L R1/2	Elbow Connection
001041	Zylinderschraube M8x25mm	Allen Screw
001042	Zylinderschraube M8x30mm	Allen Screw
001045	Zylinderschraube M8x45mm	Allen Screw
001056	Zylinderschraube M8x60mm	Allen Screw
001060	Zylinderschraube M8x80mm	Allen Screw
001081	6-kant Schraube M8x20mm	Hexagon Screw
001082	6-kant Schraube M8x25mm	Hexagon Screw
001159	Stopfmutter M8	Lock Nut
001164	Stopfmutter M10	Lock Nut
001181	U-Scheibe A8	Washer
001186	U-Scheibe A10	Washer
002124	Ventilkopf 3. Stufe	Valve Head 3rd Stage
003651	Obere Dichtung Ventil 1.Stufe	Gasket, Valve 1st Stage (up)
003652	Saug- & Druckventil 1. Stufe	Valve 1st stage
003766	Aludichtring für G3/8 Gewinde	Alloy Seal Ring for G3/8
005856	Winkelverschraubung Ø8mm R1/8	Elbow Hose Connection
006846	Schlauchselle	Hose Clamp
007043	Kondensatschlauch Ø5,4xØ9,4mm	Condensate Hose
008482	Haltebügel für Wasserabweiser	U-Clamp Water Separator
008696	6kt-Schraube M10x30mm	Hexagon Screw
010451	Ventilkopf 1. Stufe	Valve Head 1st Stage
010785	O-Ring Ø128 x 2mm	O-Ring
010810	Zylinder 1.Stufe	Cylinder 1st Stage
010811	Zylinder 1.Stufe	Cylinder 1st Stage

C



## ERSATZTEILLISTE / SPARE PART LIST

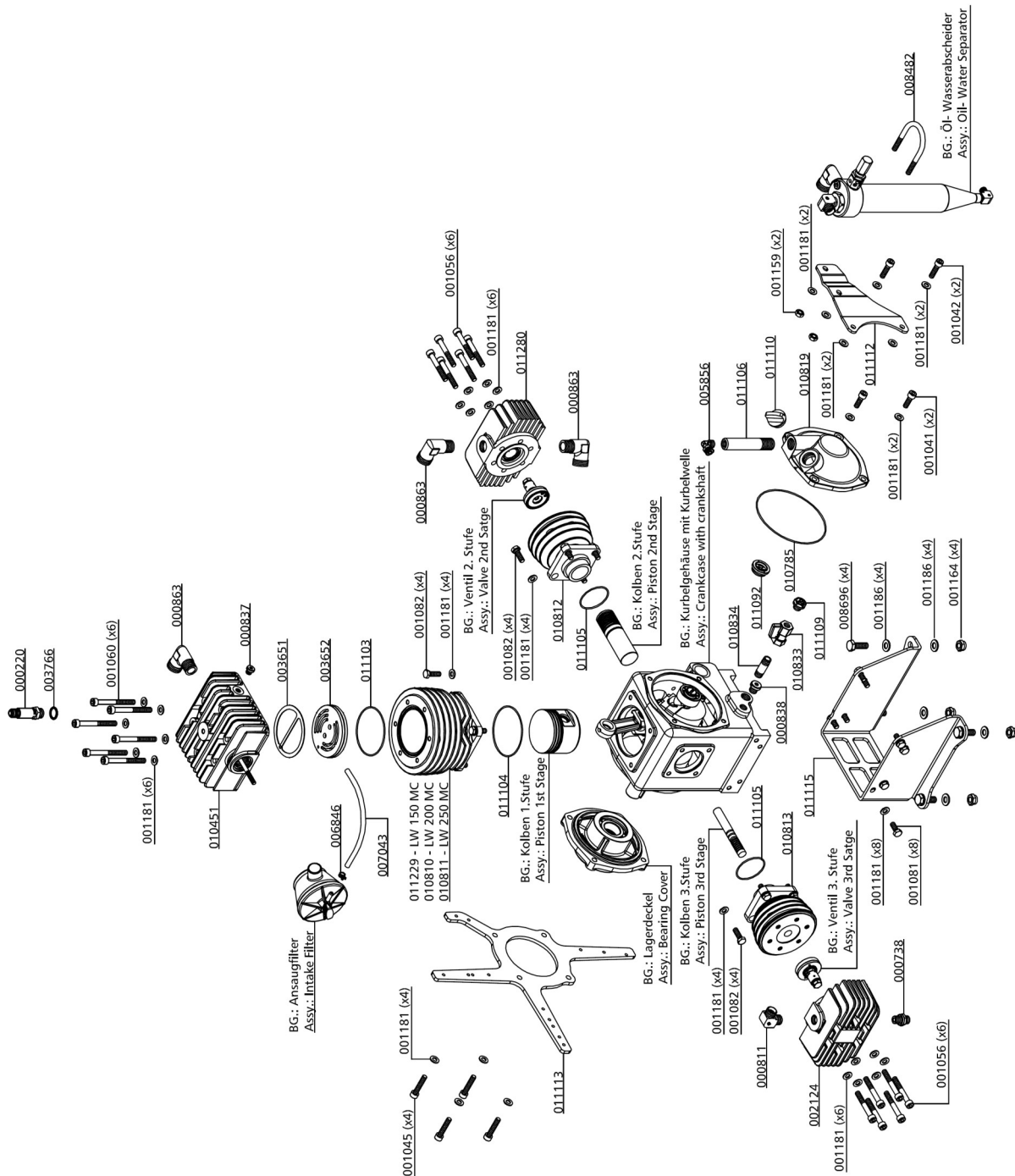
### Baugruppe: Kompressorblock / Assembly: Compressor Block

Best.-Nr. / Order No.	Benennung	Description
010812	Zylinder 2.Stufe	Cylinder 2nd Stage
010813	Zylinder 3.Stufe	Cylinder 3rd Stage
010819	Lagerdeckel	Bearing Cover
010833	Kugelhahn 2 x G3/8 IG	Ball Valve
010834	Doppelnippel R3/8, Länge 40mm	Double Nipple
011092	Ölschauglas mit Dichtung G3/4	Oil Level Indicator c/w gasket
011103	O-Ring Ø81x2mm	O-ring
011104	O-Ring Ø84x2mm	O-ring
011105	O-Ring Ø50x2mm	O-ring
011106	Anschlussadapter Kurbelgehäuseentlüftung	Adapter Crankcase Vent
011109	Verschlussschraube GN 740 G3/8	Plug
011110	Verschlussschraube GN 441 G3/4	Plug
011112	Halteblech Wasserabscheider	Holder Oil- Water Separator
011113	Halteblech Kühler	Holder Cooler
011115	Konsole Kompressorblock	Console Compressor Block
011280	Ventilkopf 2. Stufe	Valve Head 2nd Stage



**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kompressorblock / Assembly: Compressor Block**





## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Kurbeltrieb / Assembly: Crank Drive

Best.-Nr. / Order No.	Benennung	Description
000839	Verschlussstopfen	Plug
000969	Zylinderschraube	Allen Bolt
001010	Zylinderschraube	Allen Screw
001323	CU-Ring	Copper Seal Ring
001336	Sicherungsring	Circlip A16
001342	Sicherungsring	Circlip A30
001365	Sicherungsring	Circlip I35
010112	Passfeder	Woodruff Key
010809	Kurbelgehäuse	Crankcase
010818	Pleuel 1.Stufe	Con Rod
010823	Kurbelwelle	Crankshaft
010824	Gegengewicht-Unterteil	Counterweight lower Part
010829	Kreuzkopf	Crosshead
010830	Kreuzkopfbolzen	Crosshead Pin
011099	Flachkopfschraube	Pan Head Bolt
011100	Passfeder	Woodruff Key
011121	Zylinderrollenlager 17x40x16 mm	Bearing
011122	Nadellager 22x34x20 mm	Bearing
011352	Sockel	Base
011353	Kulisse komplett	Motion Link complete

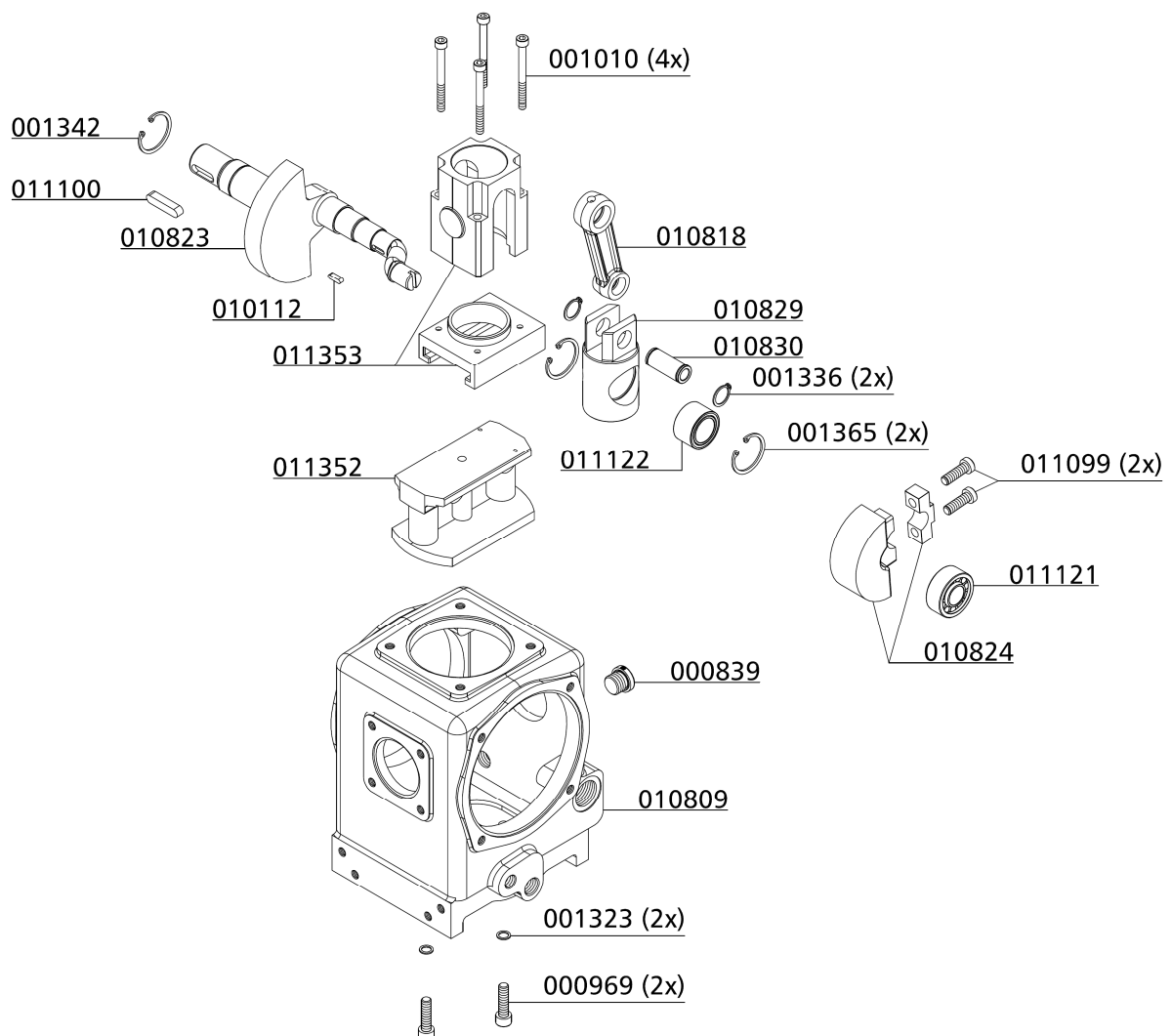
C

**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kurbeltrieb / Assembly: Crank Drive**

Ab Blocknummer 14  
From Block Number 14

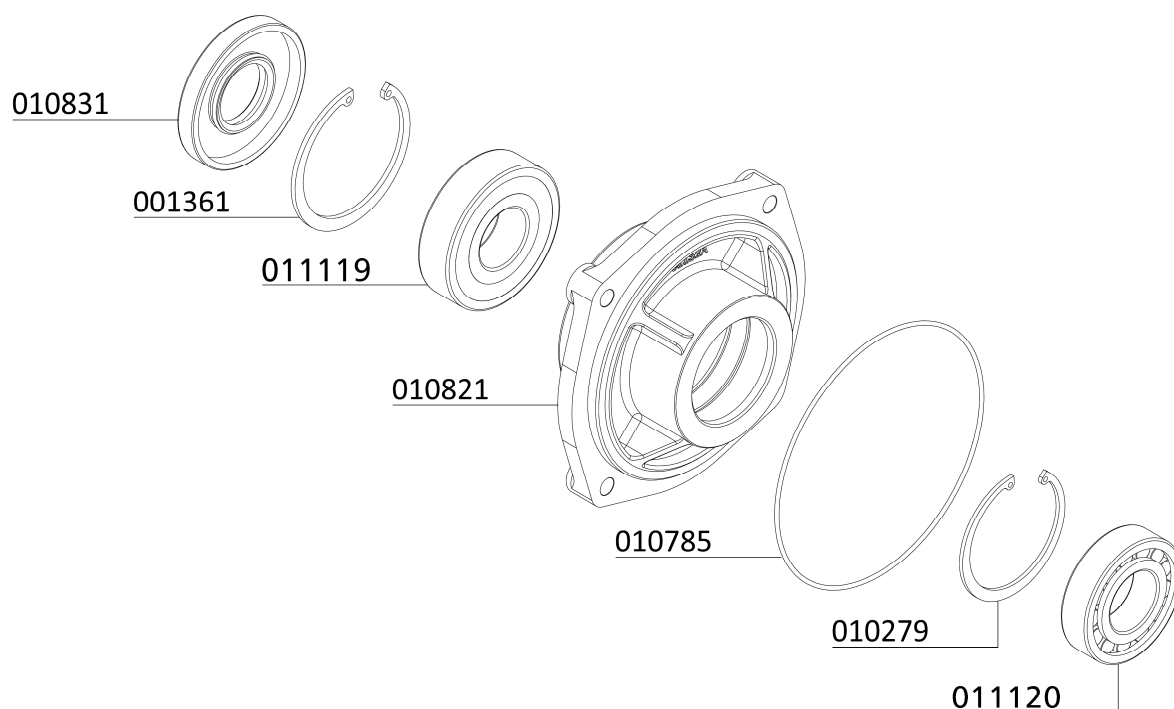
C



**Baugruppe: Lagerdeckel schwungradseitig**

**Assembly: Bearing Cover Flywheel Side**

Best.-Nr. / Order No.	Benennung	Description
001361	Sicherungsring I70	Circlip
010279	Sicherungsring I62	Circlip
010785	O-Ring Ø128x2mm	O-Ring
010821	Lagerdeckel	Bearing Cover Flywheel Side
010831	Wellendichtring 30x72x10RST	Shaft Seal
011119	Rillenkugellager 30x72x19mm	Bearing
011120	Zylinderrollenlager 30x62x16mm	Bearing



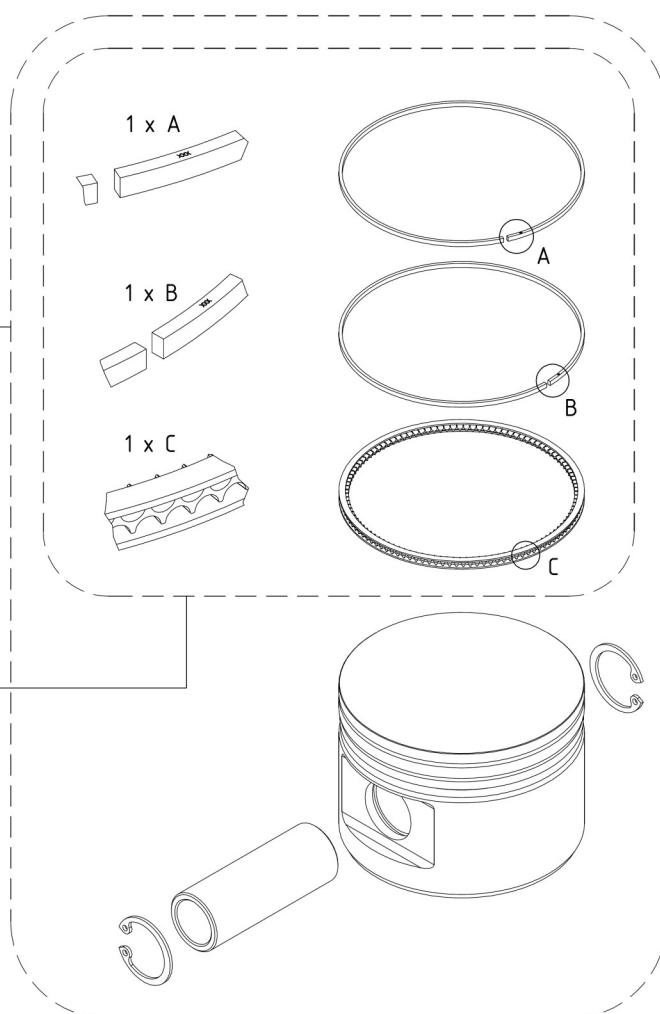
**Baugruppe: Kolben 1. Stufe / Assembly: Piston 1st Stage**

Best.-Nr. / Order No.	Benennung	Description
000047	Satz Kolbenringe Ø75,5mm 1. Stufe	Set Piston Rings 1st Stage
000051	Satz Kolbenringe Ø72mm 1. Stufe	Set Piston Rings 1st Stage
010814	Kolben 1.Stufe Ø75,5mm, komplett	Piston 1st Stage, complete
010815	Kolben 1.Stufe Ø80mm, komplett	Piston 1st Stage, complete
011116	Satz Kolbenringe Ø80mm 1. Stufe	Set Piston Rings 1st Stage
011602	Kolben 1.Stufe Ø72mm, komplett	Piston 1st Stage, complete

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011602 - LW 150 MC  
 010814 - LW 200 MC  
 010815 - LW 250 MC

000051 - LW 150 MC  
 000047 - LW 200 MC  
 011116 - LW 250 MC



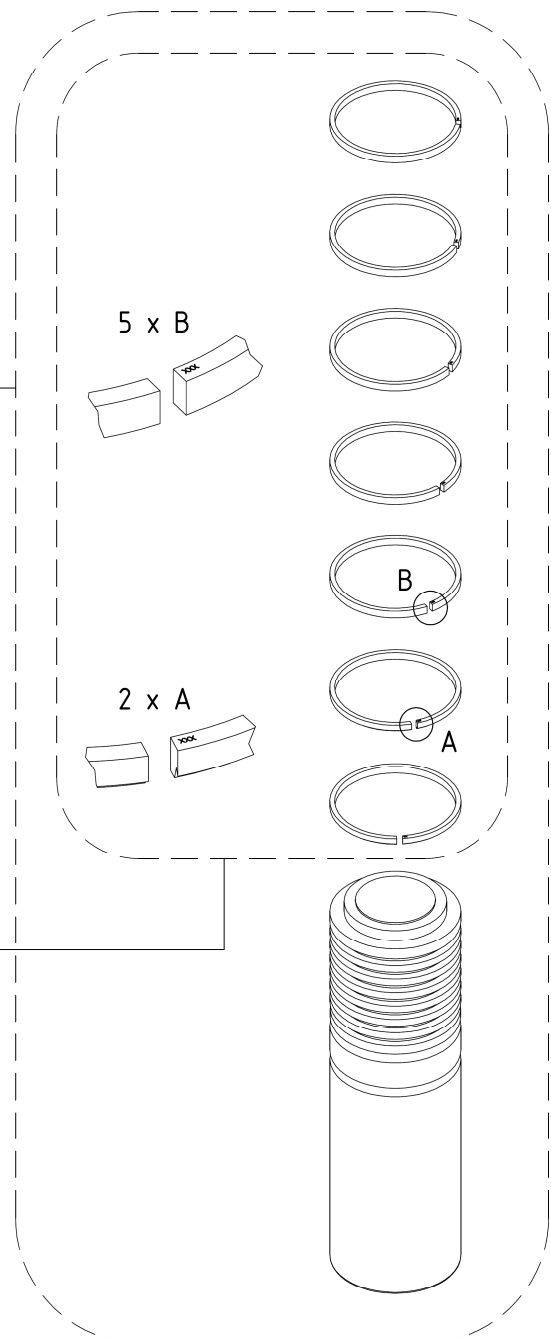
## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Kompressionskolben 2. Stufe Assembly: Compression Piston 2nd Stage

Best.-Nr. / Order No.	Benennung	Description
010816	Kolben 2.Stufe Ø32mm komplett	Piston 2nd Stage, complete
011117	Satz Kolbenringe 2. Stufe / 7Stk.	Set of Piston Rings, 2nd Stage

010816 - Ø32mm

011117 - Ø32mm



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**ERSATZTEILLISTE / SPARE PART LIST**

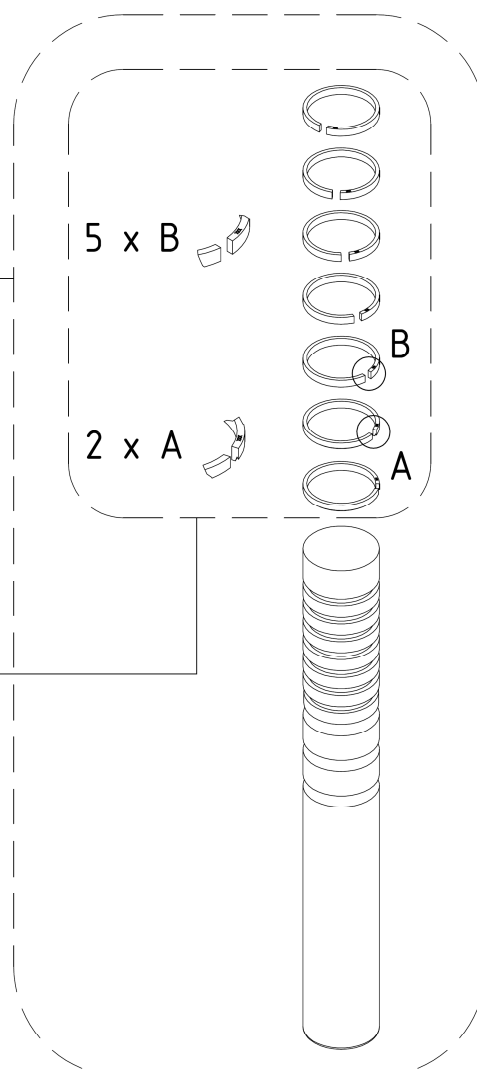
**Baugruppe: Kompressionskolben 3. Stufe**  
**Assembly: Compression Piston 3rd Stage**

Best.-Nr. / Order No.	Benennung	Description
010817	Kolben 3.Stufe Ø14mm komplett	Piston 3rd Stage
011118	Satz Kolbenringe 3. Stufe / 7Stk.	Set of Piston Rings, 3rd Stage

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**010817 - Ø14mm**

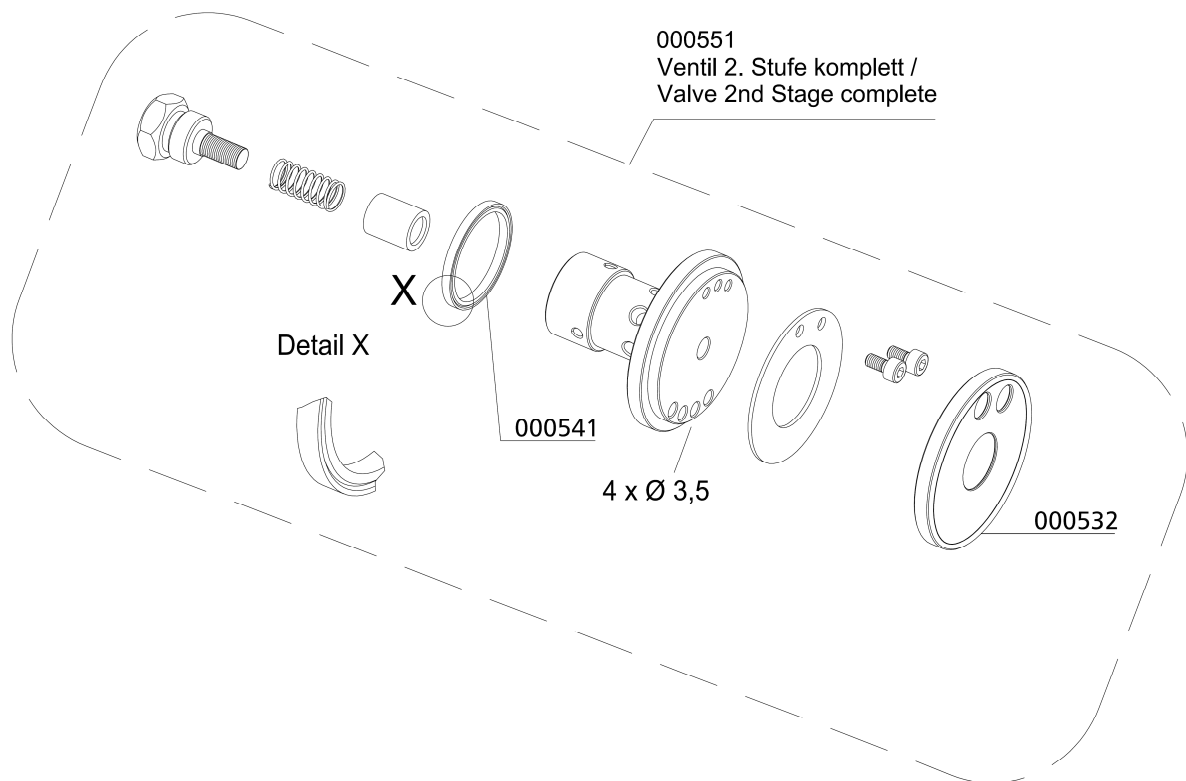
**011118 - Ø14mm**



## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Saug & Druckventil 2. Stufe / Assembly: In & Outlet Valve 2nd Stage

Best.-Nr. / Order No.	Benennung	Description
000532	Ventildichtung, Saug-& Druckventil unten	Lower Valve Gasket
000541	Dichtring / Dichtung Ventil	Upper Alloy Seal Ring
000551	Saug- & Druckventil	In- & Outlet Valve

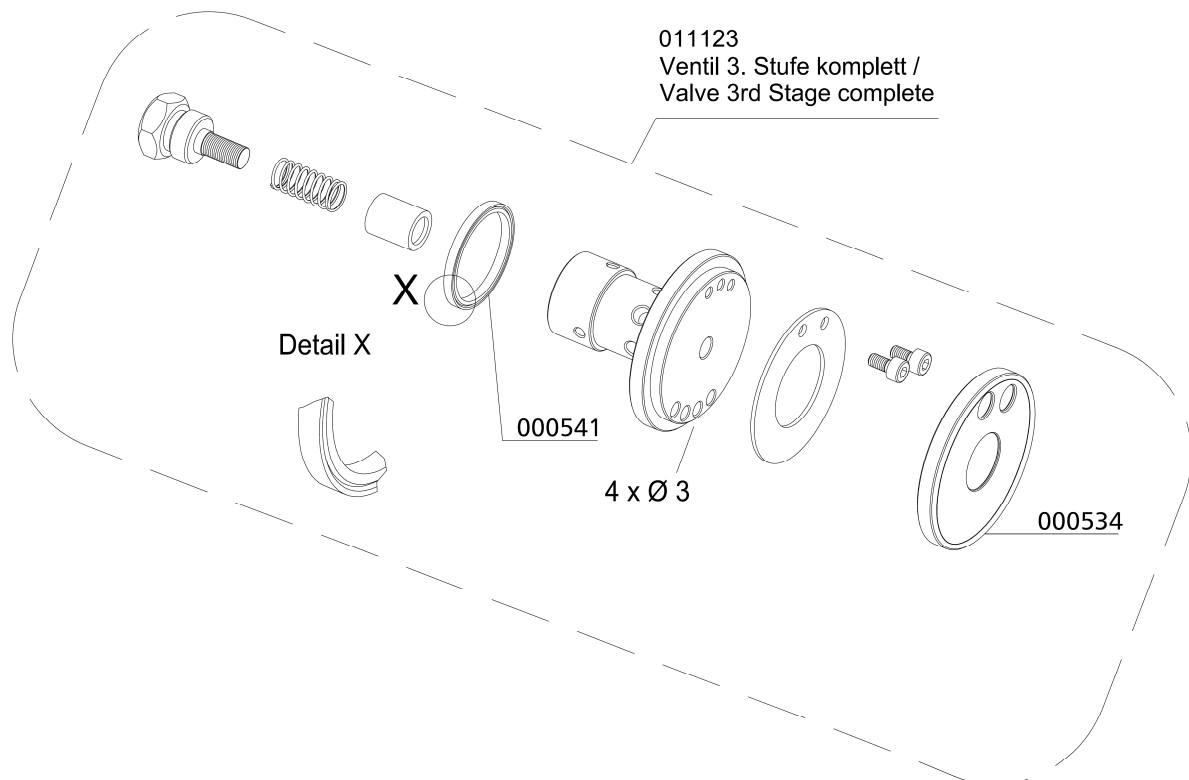




## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Saug & Druckventil 3. Stufe / Assembly: In & Outlet Valve 3rd Stage

Best.-Nr. / Order No.	Benennung	Description
000534	Ventildichtung, Saug- & Druckventil	Lower Valve Gasket
000541	Dichtring / Dichtung Ventil	Upper Alloy Seal Ring
011123	Saug-Druckventil, komplett	In- & Outlet Valve





## ERSATZTEILLISTE / SPARE PART LIST

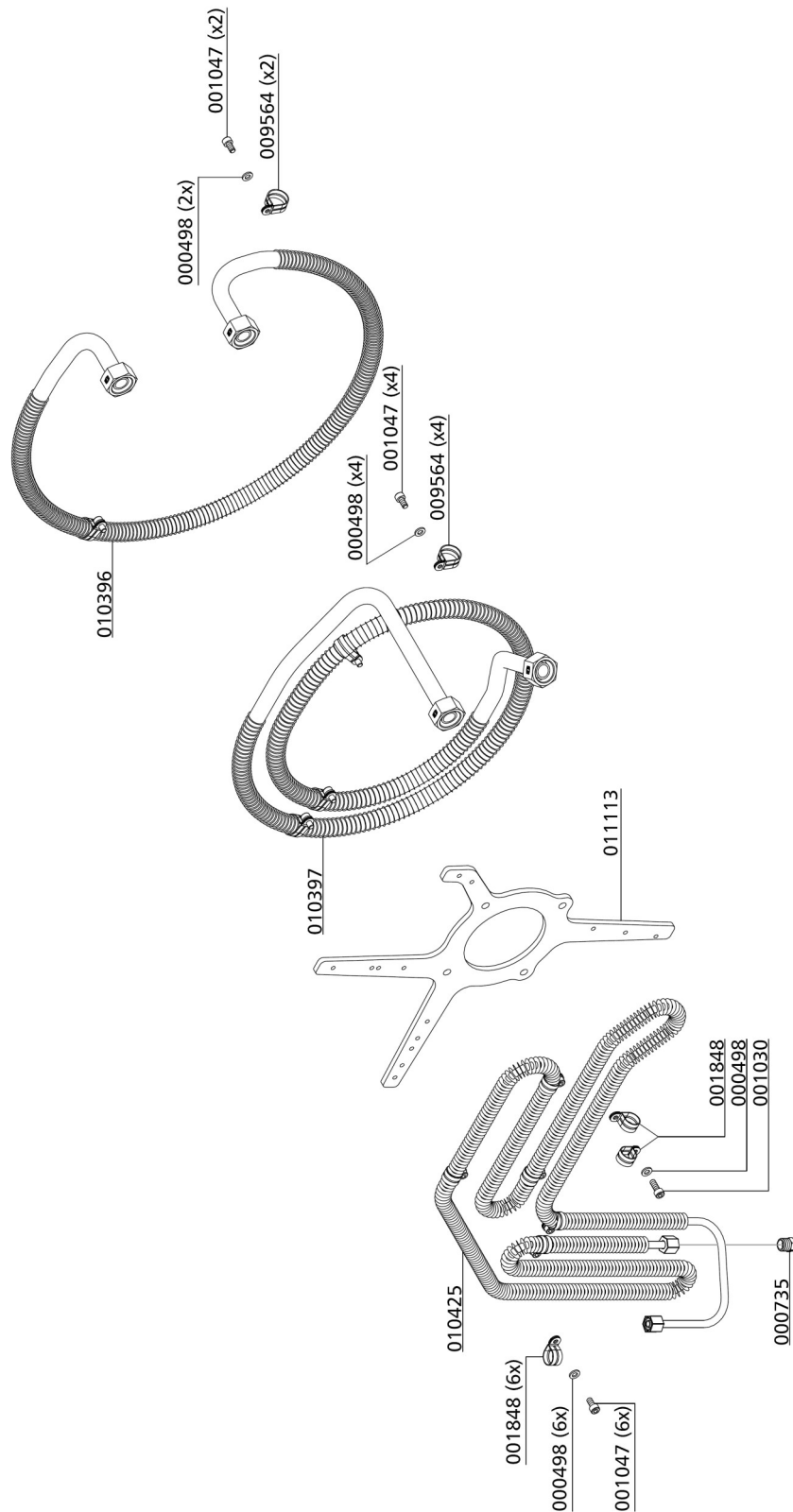
### Baugruppe: Kühler / Assembly: Cooler

Best.-Nr. / Order No.	Benennung	Description
000498	U-Scheibe A6	Washer
000735	Gerade Verschraubung G08L	Connection
001030	Zylinderschraube M6x16mm	Allen Bolt
001047	Zylinderschraube M6x12mm	Allen Bolt
001848	Rohrschelle (Ø15-18mm)	Pipe Clamp, 8mm Finned Pipe
009564	Rohrschelle Ø21, 12 breit	Pipe Clamp
010396	Kühler 1. Stufe, mit Muttern & Schneidr.	Cooler 1st Stage LW 200
010397	Kühler 2. Stufe, mit Muttern & Schneidr.	Cooler 2nd Stage LW 200
010425	Kühler 3. Stufe	Cooler 3rd Stage LW 200
011113	Halteblech Kühler	Holder Cooler

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**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kühler / Assembly: Cooler**



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## ERSATZTEILLISTE / SPARE PART LIST

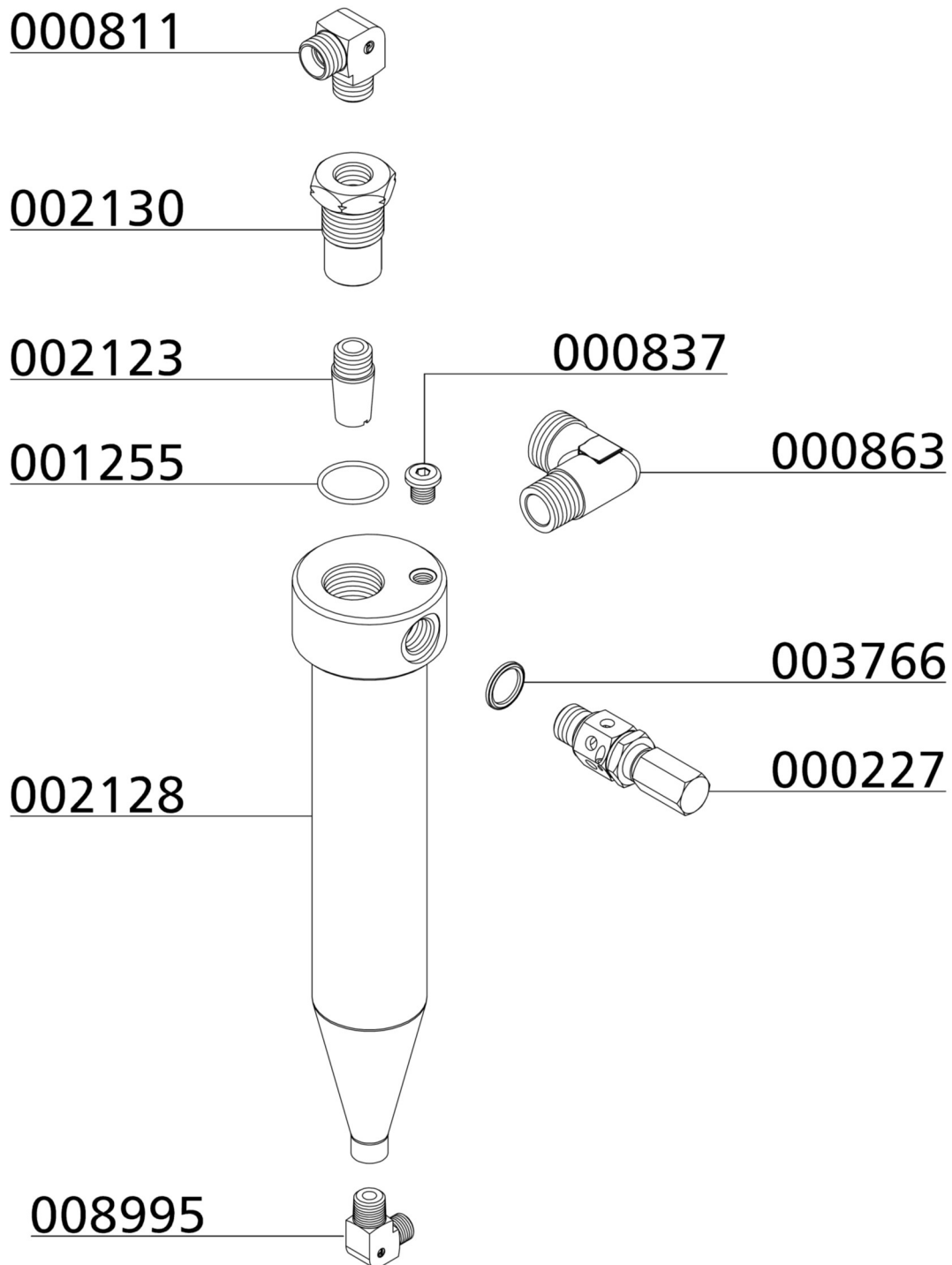
### Baugruppe: Öl- Wasserabscheider / Assembly: Oil- Water Separator

Best.-Nr. / Order No.	Benennung	Description
000227	Sicherheitsventil G3/8" 70bar	Safety Valve G3/8" 70bar
000811	Winkelverschraubung WE 12L R3/8	Elbow Connection
000837	Verschlussstopfen G1/8	Plug
000863	Winkelverschraubung WE 18L R1/2	Elbow Connection
001255	O-Ring Ø26x2mm	O-Ring
002123	Sinterfilter G3/8 AG	Sinter Filter
002128	Wasserabscheider, 1. und 2. Stufe	Water separa. 1st + 2nd Stage
002130	Halter für Sinterfilter G3/8	Holder for Sinterfilter G3/8
003766	Aludichtring für G3/8 Gewinde	Alloy Seal Ring
008995	Winkelverschraubung WE06LR1/4"	Elbow Connection WE06LR1/4"

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**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Öl- Wasserabscheider / Assembly: Oil- Water Separator**



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## ERSATZTEILLISTE / SPARE PART LIST

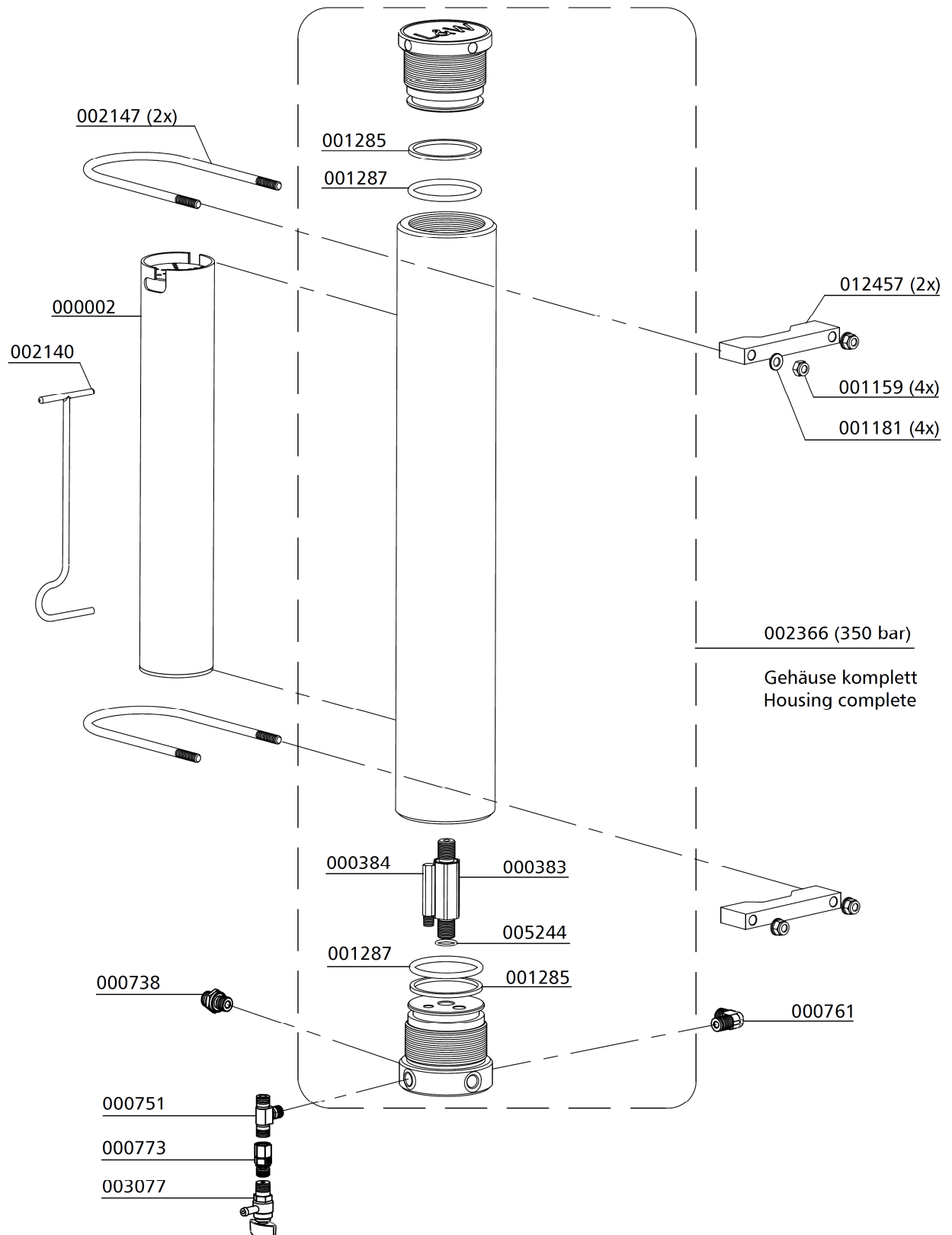
### Filtergehäuse 1,7 l / Filter Housing 1.7 ltr

Best.-Nr. / Order No.	Benennung	Description
000002	Filterpatrone 1,7 l	Filter Cartridge 1.7 ltr
000383	Messing Adapter	Brass Filter Adapter
000384	Düse Filtergehäuse	Jet Filter Housing
000738	Gerade Verschraubung GE08LRFCX	Straight Connection GE08LRFCX
000751	Verschraubung TE08LRFCX	Connection TE08LRFCX
000761	Winkelverschraubung, WE08L/1/4"	Elbow Connection, WE08L/1/4"
000773	Manometerverschraubung G1/4"/08L	Connection Pressure Gauge G1/4"/08L
001159	Stopfmutter, M8 DIN985 ZN	Lock Nut, M8 DIN985 ZN
001181	U-Scheibe A8 DIN125 ZN	Washer A8 DIN125 ZN
001285	Stützring, 63,96x4,65 NBR90, 350 bar, Filtergehäuse	Back-up Ring, 63,96x4,65 NBR90, 350 bar, Filter Housing
001287	O-Ring, 62,87 x 5,33 NBR90, Filtergehäuse	O-Ring, 62,87 x 5,33 NBR90, filter housing
002140	Filterschlüssel 1,7 & 2,3 Liter Behälter	Filter tool 1,7 & 2,3 Litre
002147	Haltebügel für Filtergehäuse, beidseitig M8X35mm	Holder for filter housing, M8X35mm (both sides)
002366	Filtergehäuse, 1,7l	Filter housing 1.7ltr
003077	Entwässerungsventil G1/4" AG	Drain valve G1/4" male
005244	O-Ring, 16 x 2,5 NBR90	O-Ring, 16 x 2,5 NBR90
012457	Halteschale Endfiltergehäuse	Spacer Bracket Filter Housing

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**DETAILANSICHT / DETAILED VIEW**

**Filtergehäuse 1,7 l / Filter Housing 1.7 ltr**



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## ERSATZTEILLISTE / SPARE PART LIST

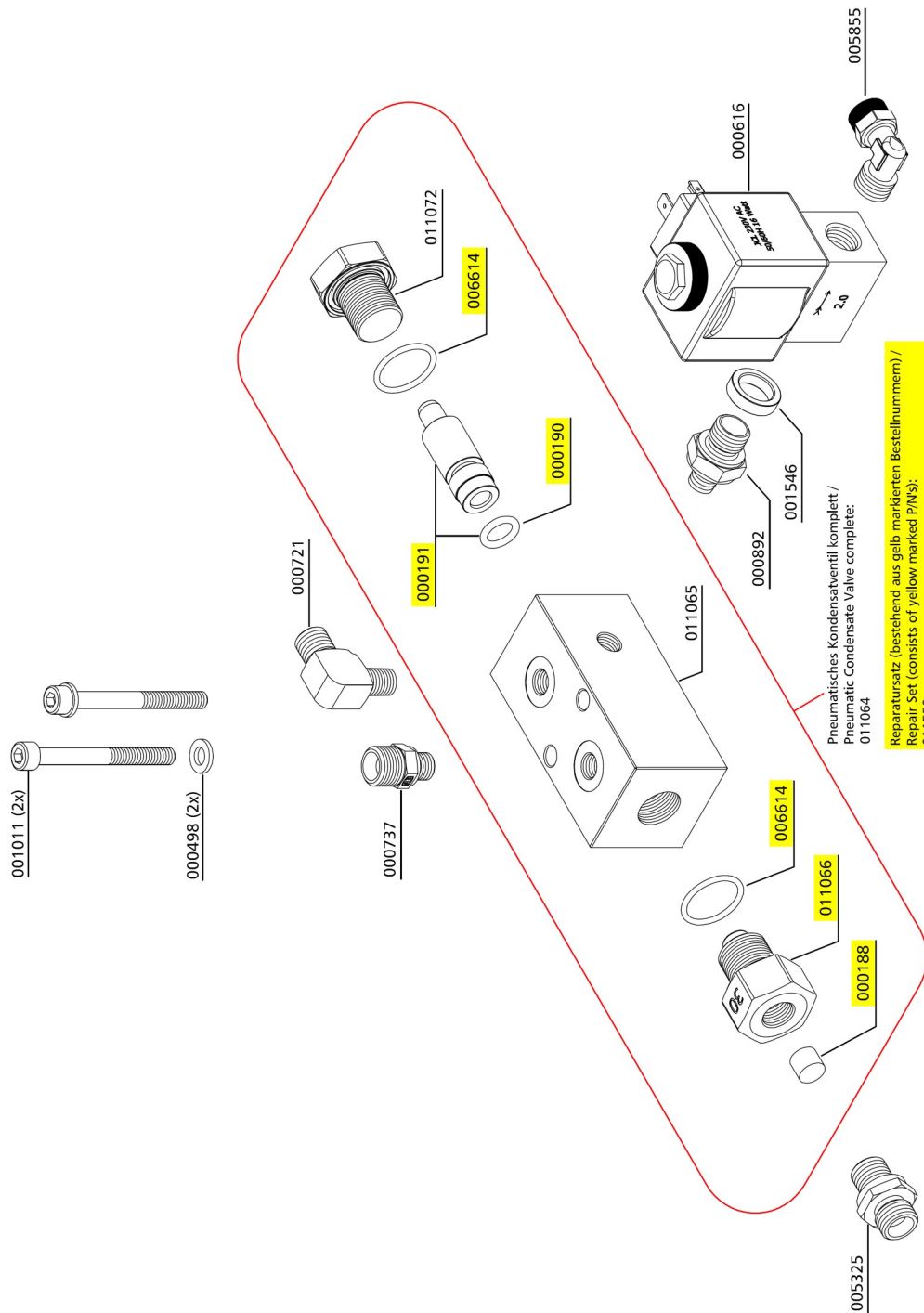
### Pneum. Kondensat-Ablassventil / Pneumatic Condensate Valve

Best.-Nr. / Order No.	Benennung	Description
000188	Sinterfilter, pneum. Kondensatventil	Sintered Filter
000190	O-Ring 10 x 2,5 NBR90	O-Ring 10 x 2,5 NBR90
000191	Steuerkolben, pneum. Kondensatventil	Piston
000498	U-Scheibe A6	Washer A6
000616	Magnetventil NC 80bar, 2xG1/4", 230V, 16Watt	Solenoid NC 80bar , 2xG1/4", 230V, 16Watt
000721	Verschraubung WE06LRFCX	Connection WE06LRFCX
000737	Verschraubung GE08LR1/8CFX	Connection GE08LR1/8CFX
000892	Doppelnippel G1/8"-1/4"	Double Nipple G1/8"-1/4"
001011	Zylinderschraube	Allen Bolt
001546	Aludichtring für Magnetventile G1/4", Ø19 x 12,3 x 5mm	Alloy Seal Ring for G1/4" male, Ø19 x 12,3 x 5mm
005325	Verschraubung GE 08L R1/4" .71	Connection GE 08L R1/4" .71
005855	Winkeleinschraubverschraubung, G1/4" - 8 mm	Elbow Hose Connection, G1/4" - 8 mm
006614	O-Ring 20x2 NBR90	O-Ring 20x2 NBR90
011064	Pneum. Kondensatablassventil, PN 420 bar, Einlass Ø3,0 mm	Pneumatic Condensate Valve, PN 420 bar, intake Ø3,0 mm
011065	Gehäuse, pneum. Kondensatventil	Housing PCV
011066	Düsenschraube, pneum. Kondensatventil, Standard Bohrung Ø3,0mm	Inlet Jet Screw, type "30"
011072	Verschlussstopfen, pneum. Kondensatventil	Plug PCV
011559	Reparatursatz pneum. Kondensatventil	Repair Kit PCV



# DETAILANSICHT / DETAILED VIEW

## Pneum. Kondensat-Ablassventil / Pneumatic Condensate Valve





## ERSATZTEILLISTE / SPARE PART LIST

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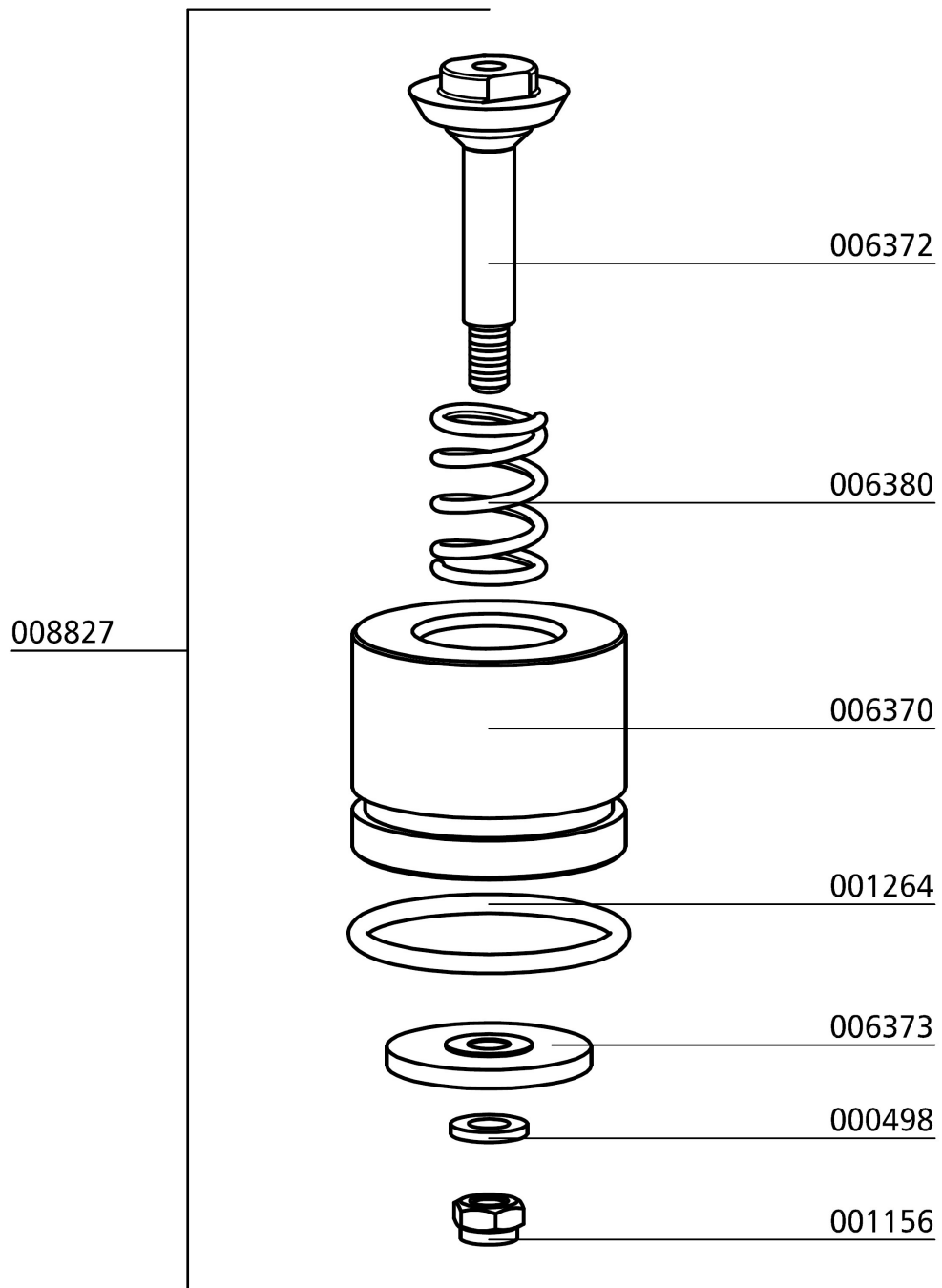
### Baugruppe: Kondensat-Stopp-Ventil / Assembly: Condensate-Stop-Valve

Best.-Nr. / Order No.	Benennung	Description
000498	U-Scheibe DIN 125 A6	Washer DIN 125 A6
001156	Stopfmutter M6 DIN985 ZN	Lock Nut M6 DIN985 ZN
001264	O-Ring, 38 x 3 NBR70	O-Ring, 38 x 3 NBR70
006370	Gehäuse Kondensat-Stopp-Ventil	Housing-Condensate-Stop-Valve
006372	Ventilkegel Kondensat-Stopp-Ventil	Valve Condensate Stop Valve
006373	Stauscheibe Kondensat-Stopp-Ventil	Baffle Plate Condensate Stop Valve
006380	Druckfeder	Compression Spring
008827	Kondensat-Stopp-Ventil Einsatz	Condensate-Stop-Valve Assembly

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**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kondensat-Stopp-Ventil / Assembly: Condensate-Stop-Valve**



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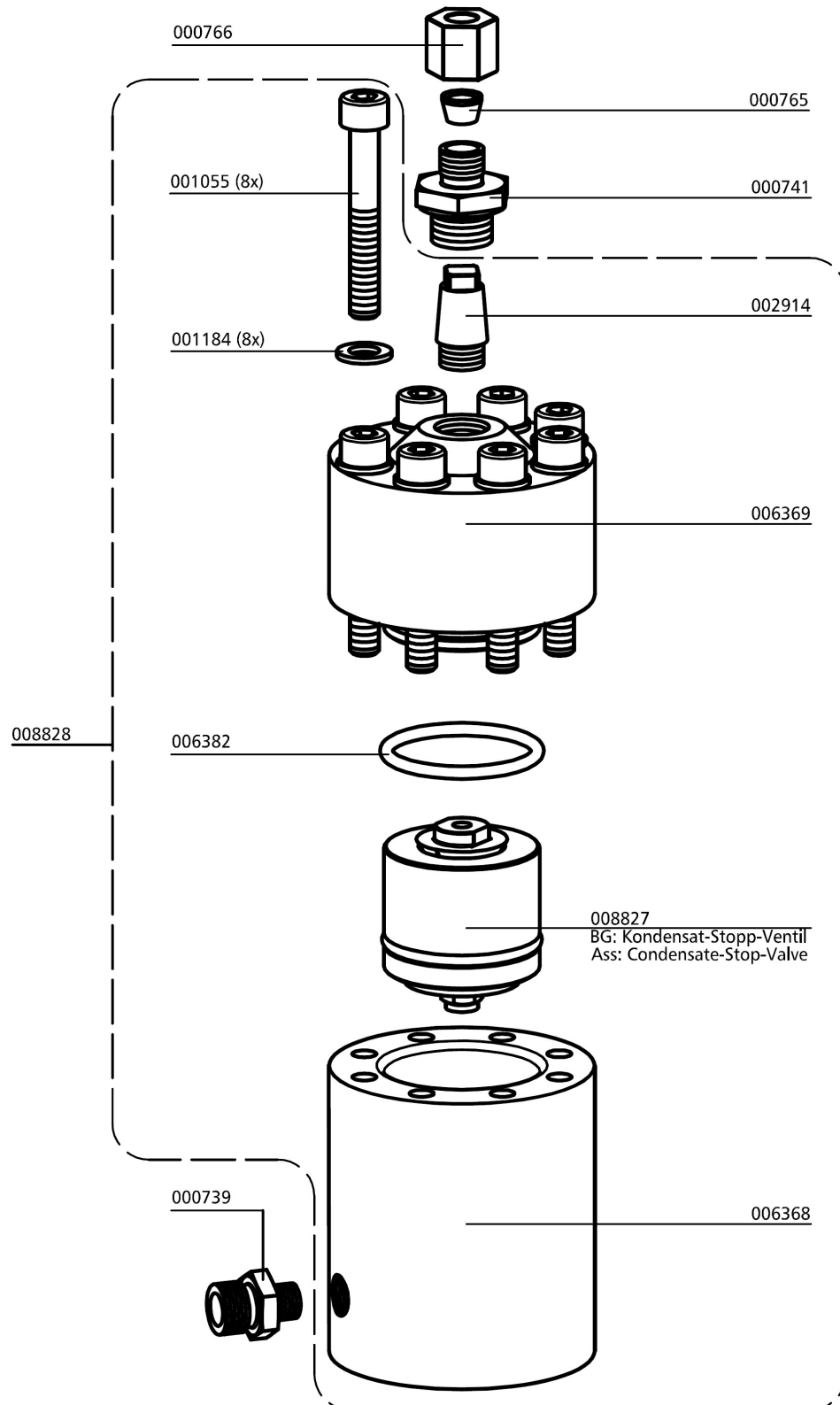
**Baugruppe: Kondensat-Stopp-Ventil-Gehäuse / Assembly: Housing Condensate-Stop-Valve**

Best.-Nr. / Order No.	Benennung	Description
000739	Verschraubung GE08L/1/4KEGCFX	Connection GE08L/1/4KEGCFX
000741	Verschraubung, GE08LR3/8CFX	Connection, GE08LR3/8CFX
000765	Schneidring PSR 08 LX	Olive Seal PSR 08 LX
000766	Mutter M08LCFX	Nut M08LCFX
001055	Zylinderschraube, M8x55mm DIN912 8.8 ZN	Allen Screw, M8x55mm DIN912 8.8 ZN
001184	Schnorr-Scheibe S8 N0110 ZN	Clamp Washer S8 S8 N0110 ZN
002914	Sinterfilter für Wasserabscheidersockel, M12x1,5mm AG	Sintered filt. water sep. Base, M12x1,5mm AG
006368	Behälter Kondensat-Stopp-Ventil	Container Condensate-Stop-Valve
006369	Behälterdeckel Kondensat-Stopp-Ventil	Cover Condensate-Stop-Valve
006382	O-Ring 38x3,5 NBR90	O-Ring 38x3,5 NBR90
008827	Kondensat-Stopp-Ventil Einsatz	Condensate-Stop-Valve Assembly
008828	Kondensat-Stopp-Ventil kompl., inkl. Ventileinsatz 008827	Condensate-Stop-Valve, compl., incl. valve assembly 008827

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**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kondensat-Stopp-Ventil-Gehäuse / Assembly: Housing Condensate-Stop-Valve**



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## 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
000761	Winkelverschraubung WE08LRA3CX	Elbow Connection WE08LRA3CX
001023	Zylinderschraube M5x50mm DIN912 8.8 ZN	Allen Bolt M5x50mm DIN912 8.8 ZN
003548	Reparatursatz Druckhalterückschlagventil	Repair kit, PMV

## DETAILANSICHT / DETAILED VIEW

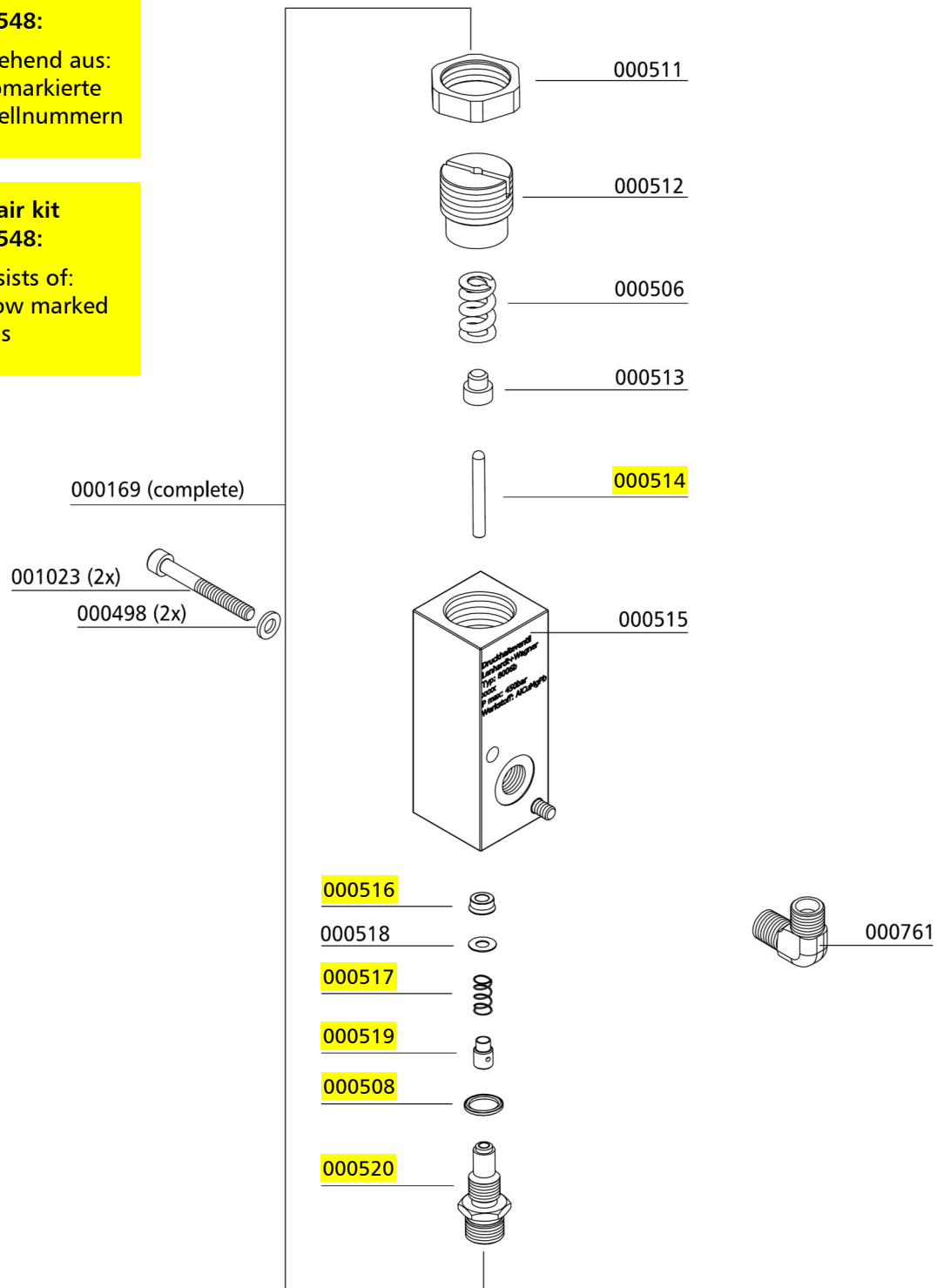
### Druckhalteventil / Pressure Maintaining Valve

**Reparatursatz  
003548:**

Bestehend aus:  
Gelbmarkierte  
Bestellnummern

**Repair kit  
003548:**

Consists of:  
Yellow marked  
P/N's



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## ERSATZTEILLISTE / SPARE PART LIST

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### Druckschalter / Pressure Switch

Best.-Nr. / Order No.	Benennung	Description
000203	Druckschalter 50-350 bar	Pressure Switch 50-350 bar
000757	T-Verschraubung mit fester Mutter seitl. EL 08 L	T-Connection with fixed nut EL 08 L
009683	Verschraubung, mit fester Mutter	Connection with fixed nut

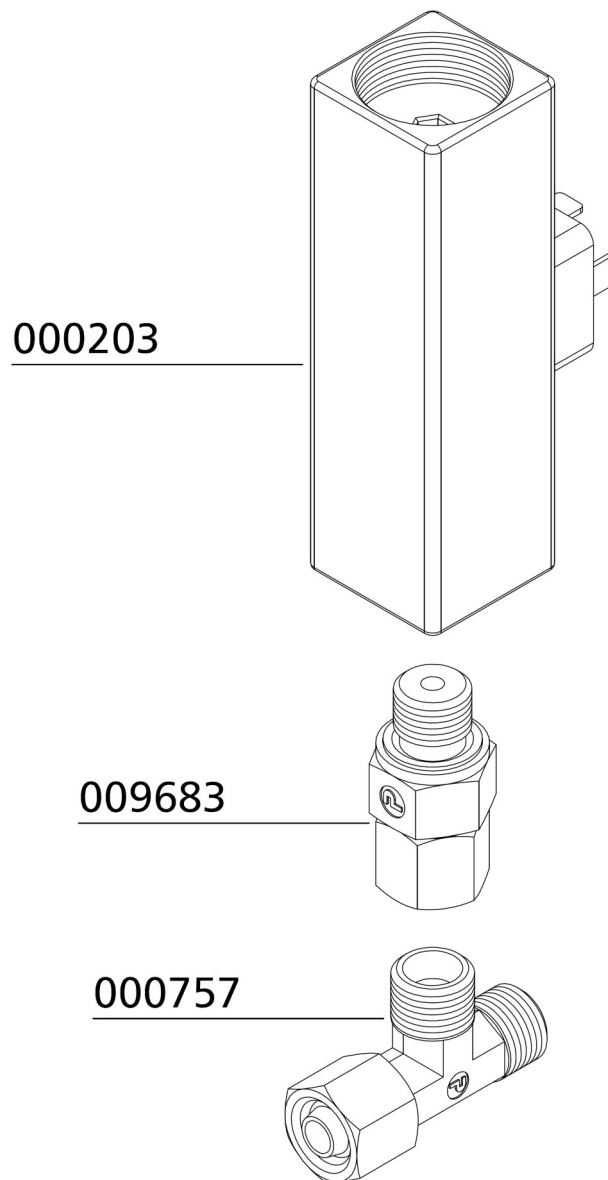
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**DETAILANSICHT / DETAILED VIEW**

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**Druckschalter / Pressure Switch**



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## ERSATZTEILLISTE / SPARE PART LIST

### Sicherheitsventil / Safety Valve

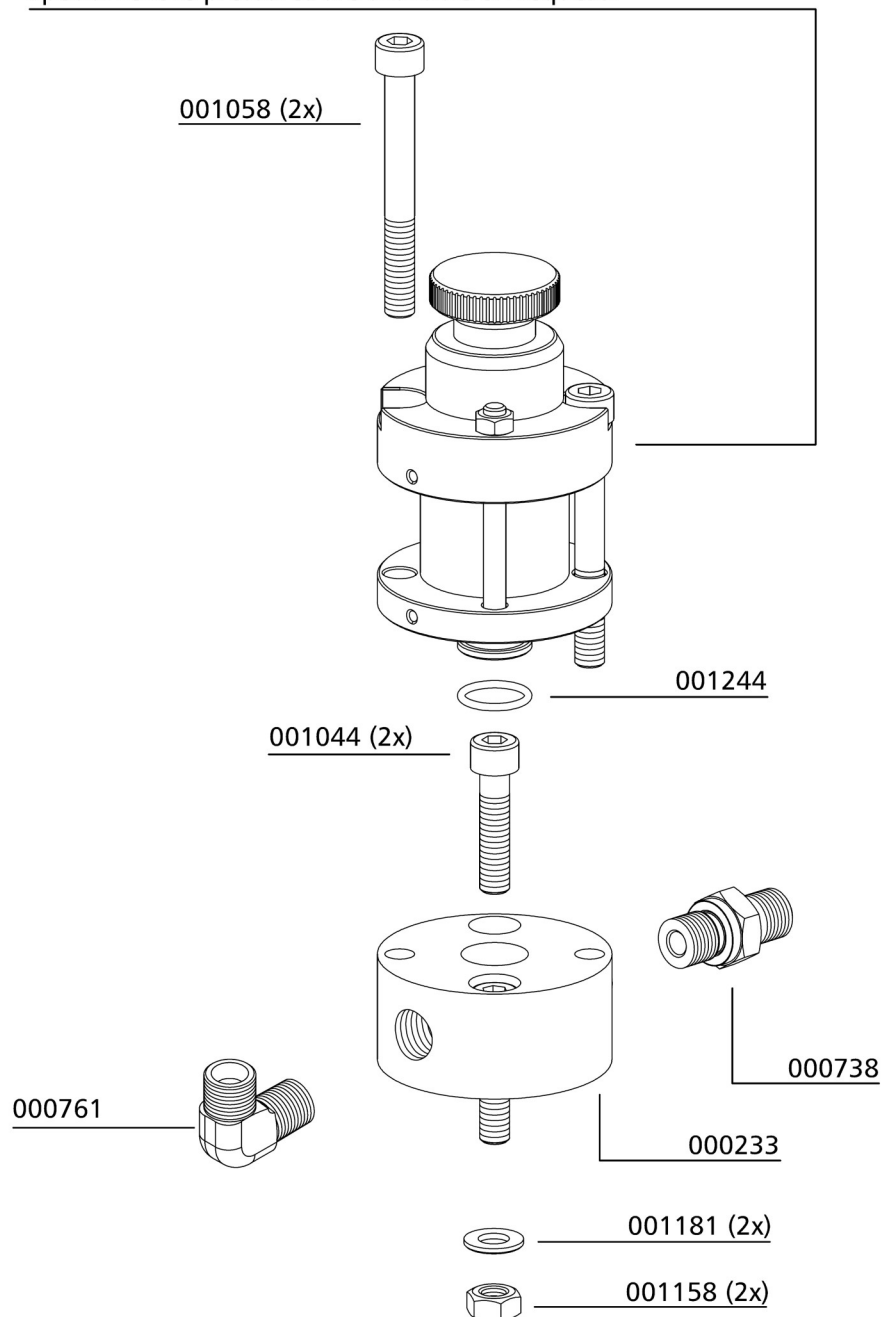
Best.-Nr. / Order No.	Benennung	Description
000233	Sockel für Sicherheitsventil mit TÜV, x G1/4" seitlich 180°	Base for Safety Valve TÜV type
000553	Sicherheitsventil 225bar mit TÜV	Safety Valve 225bar c/w TÜV
000554	Sicherheitsventil 250bar mit TÜV	Safety Valve 250bar c/w TÜV
000555	Sicherheitsventil 300bar mit TÜV	Safety Valve 300bar c/w TÜV
000556	Sicherheitsventil 330bar mit TÜV	Safety Valve 330bar c/w TÜV
000557	Sicherheitsventil 350bar mit TÜV	Safety Valve 350bar c/w TÜV
000738	Verschraubung GE08LRFCX	Connection GE08LRFCX
000761	Winkelverschraubung WE08LRA3CX	Elbow Connection WE08LRA3CX
001044	Zylinderschraube	Allen Bolt
001058	Zylinderschraube	Allen Bolt
001158	Mutter	Nut
001181	U-Scheibe	Washer
001244	O-Ring, Flansch Sicherheitsventil	O-Ring, Flange Safety Valve
001814	Sicherheitsventil 225bar mit CE	Safety Valve 225bar with CE
001815	Sicherheitsventil 250bar mit CE	Safety Valve 250bar with CE
001816	Sicherheitsventil 330bar mit CE	Safety Valve 330bar with CE
001817	Sicherheitsventil 350bar mit CE	Safety Valve 350bar with CE

## DETAILANSICHT / DETAILED VIEW

### Sicherheitsventil / 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

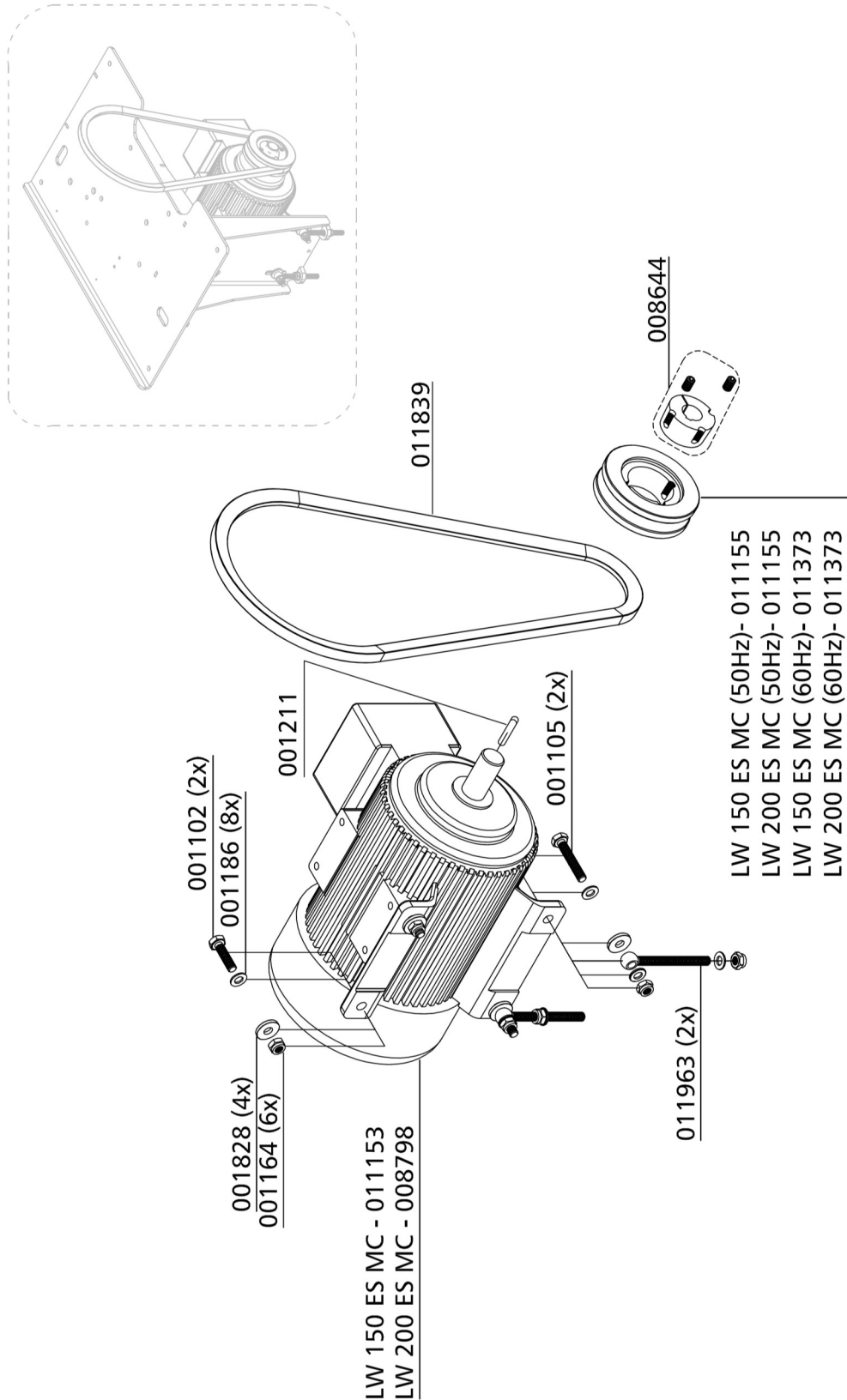
### Baugruppe: Motor / Assembly: Engine

Best.-Nr. / Order No.	Benennung	Description
001102	Sechskantschraube M10x40mm DIN933 8.8 ZN	Hexagon Bolt M10x40mm DIN933 8.8 ZN
001105	Sechskantschraube M10X60mm DIN933 8.8 ZN	Hexagon Bolt M10X60mm DIN933 8.8 ZN
001164	Stopfmutter M10	Lock Nut
001186	U-Scheibe A10	Washer
001211	Passfeder DIN6885 A10X8X56mm	Woodruff Key DIN6885 A10X8X56mm
001828	U-Scheibe A10,5	Washer
008644	Spannbuchse Ø28mm	Clamp sleeve for pulley
008798	Antriebsmotor 4,0 kW	Drive Motor
011153	Antriebsmotor 3,0 kW	Drive Motor
011155	Keilriemenscheibe SPA 125-1	V-Belt Pulley
011373	Keilriemenscheibe SPA 106-1	V-Belt Pulley
011839	Keilriemen SPA 1507	V-Belt SPA 1507
011963	Augenschraube DIN 444 4.6 ZN LBM10x 100	Eyebolt DIN 444 4.6 ZN LBM10x100

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**DETAILANSICHT / DETAILED VIEW**

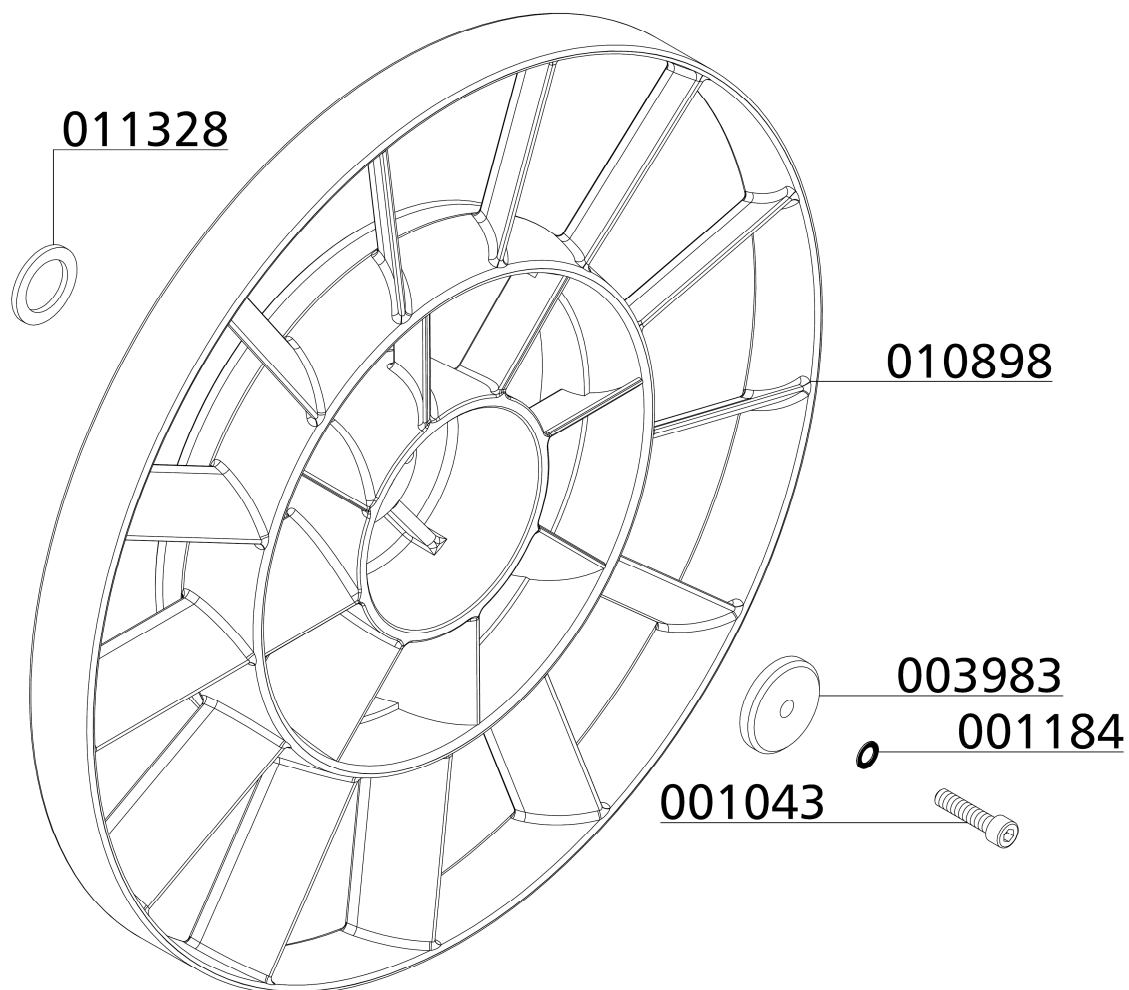
**Baugruppe: Motor / Assembly: Engine**



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**Baugruppe: Lüfterrad / Assembly: Flywheel Assembly**

Best.-Nr. / Order No.	Benennung	Description
001043	Zylinderschraube M8x35	Allen Bolt
001184	Schnorr-Scheibe S8	Clamp Washer
003983	Scheibe Schwungrad	Washer, Flywheel
010898	Lüfterrad Ø460mm	Fan Wheel Ø460mm
011328	Anlegescheibe 3mm	Washer 3mm





## ERSATZTEILLISTE / SPARE PART LIST

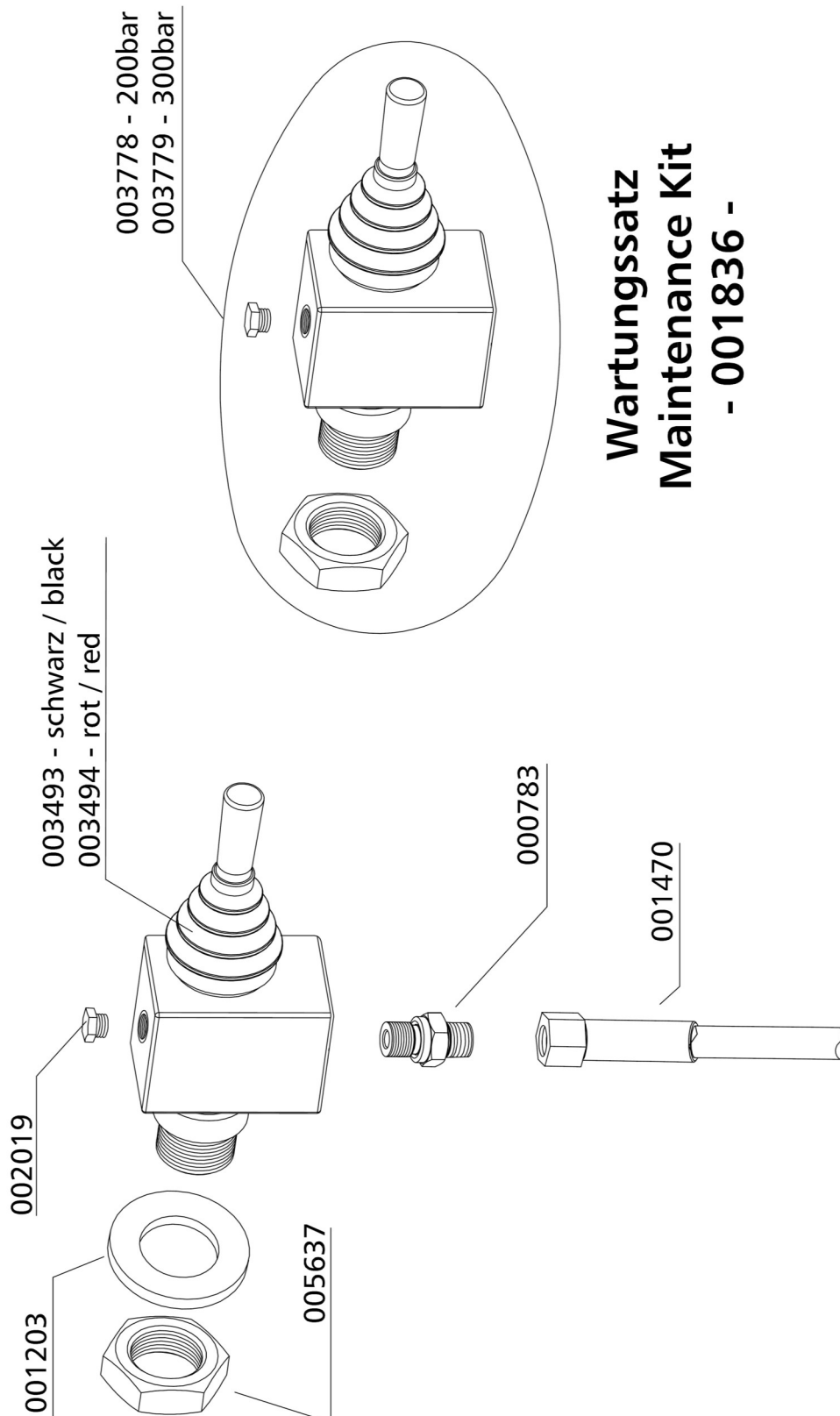
### Füllventile mit Schläuchen / Filling valves with hoses

Best.-Nr. / Order No.	Benennung	Description
000783	Gerade Verschraubung GE10L - R1/4"	Straight Connection GE10L - R1/4"
001203	U-Scheibe DIN 125 ZN A25	Washer DIN 125 ZN A25
001470	Hochdruckschlauch 800mm, beidseitig	HP Hose 800mm, both sides 10L
001836	RepSatz für Kipphebelventil	Repair Kit Lever valve
002019	Schalldämpfer, Kipphebelventil G1/8"	Silencer Lever Filling Valve G1/8"
003493	Faltenbalg Kipphebelventil schwarz	Gaiter, lever valve, black
003494	Faltenbalg, Kipphebelventil rot	Gaiter, lever valve, red
003778	Kipphebelventil 200bar Kompressor	Lever filling valve compressor 200bar
003779	Kipphebelventil 300 bar Kompressor	Lever fill. valves compressor 300bar
005637	Mutter M24x1,5mm, DIN 936 ZN	Nut M24x1,5mm, DIN 936 ZN

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**DETAILANSICHT / DETAILED VIEW**

**Füllventile mit Schläuchen / Filling valves with hoses**



**Wartungssatz  
Maintenance Kit  
- 001836 -**







## ERSATZTEILLISTE / SPARE PART LIST

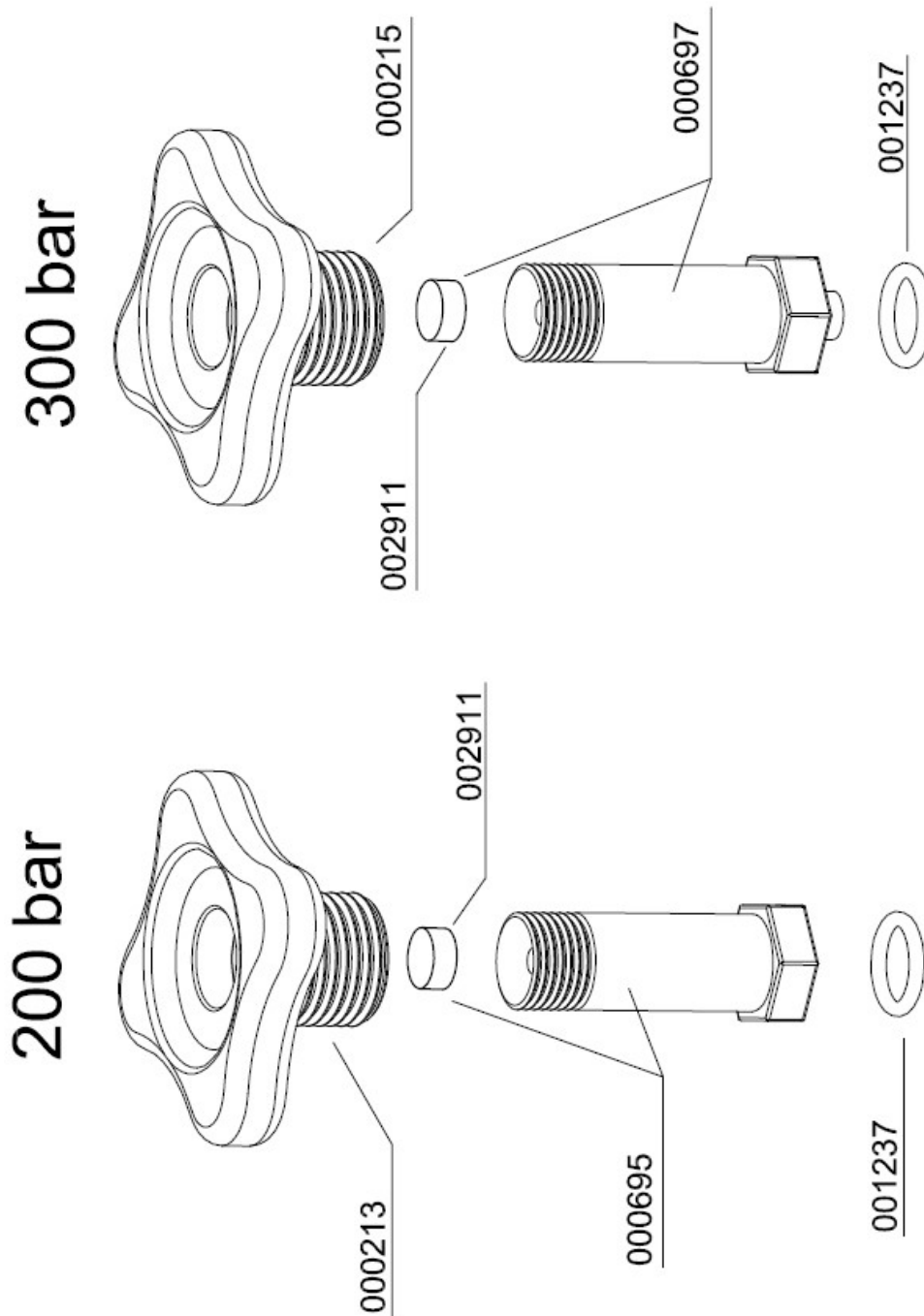
### Füllanschlüsse / Filling connectors

Best.-Nr. / Order No.	Benennung	Description
000213	Handrad, schwarz DIN	Hand Wheel, black
000215	Handrad rot DIN	Hand Wheel, red
000695	Füllanschluss o. Handrad, 200bar	Filling Connector w/o handwheel 200bar
000697	Füllanschluss o. Handrad, 300bar	Filling Connector w/o handwheel 300bar
000701	Sicherheitsfüllanschluss, ohne Handrad,	Anti Whip Connector w/o handwheel, 200bar
000702	Sicherheitsfüllanschluss, ohne Handrad,	Anti Whip Connector w/o handwheel, 300bar
001237	O-Ring DIN Flaschenanschluss	O-Ring DIN filling connector
002911	Sinterfilter DIN Flaschenanschluß	Sintered filter, DIN filling connector

C

**DETAILANSICHT / DETAILED VIEW**

**Füllanschlüsse / Filling connectors**



Sicherheitsfüllanschluss verfügbar  
 Safety Filling Connector available  
 200bar - 000701 / 300bar - 000702





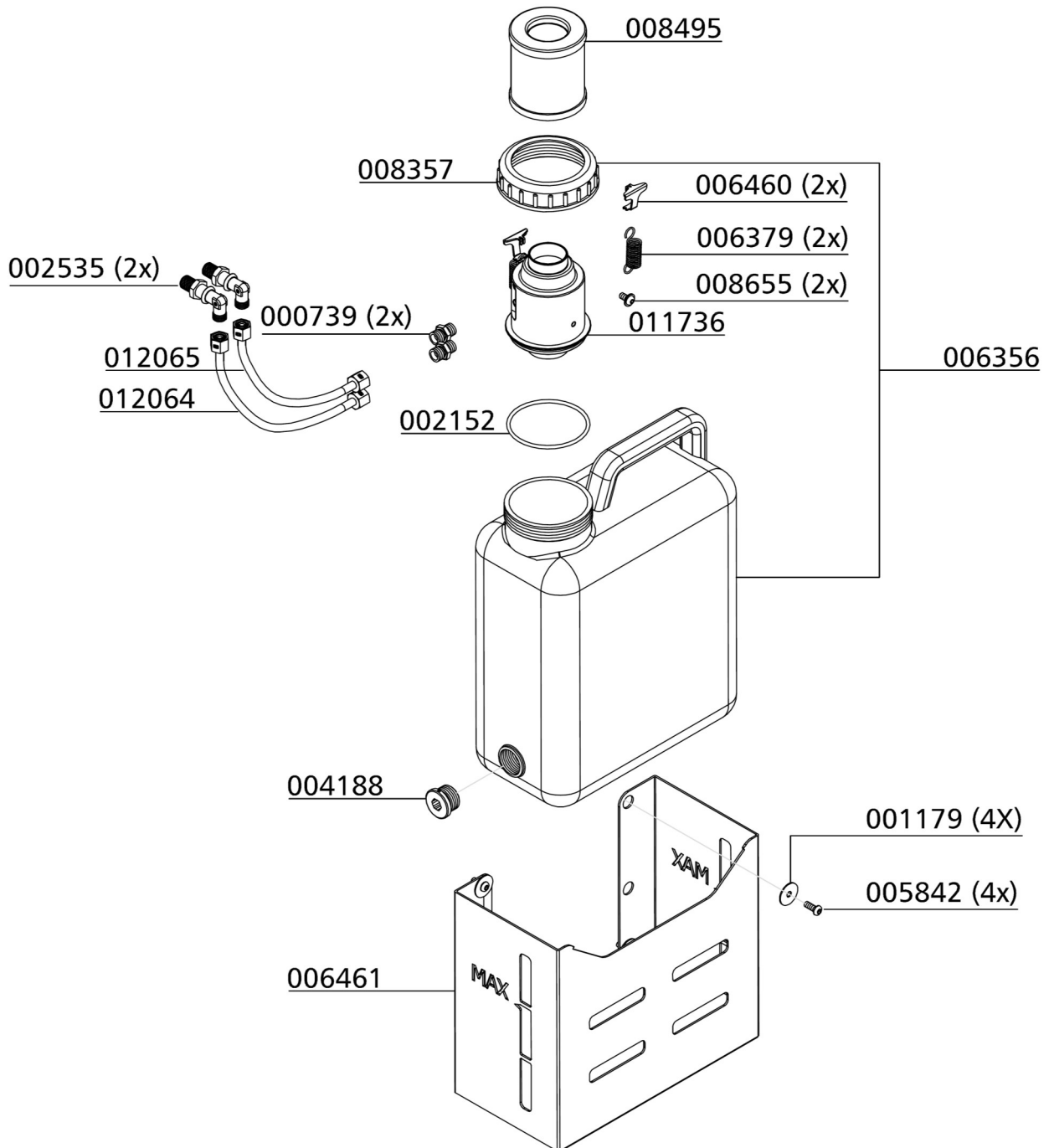
## ERSATZTEILLISTE / SPARE PART LIST

### Baugruppe: Kondensat-Sammelbehälter / Assembly: Housing Condensate-Catch-Tank

Best.-Nr. / Order No.	Benennung	Description
000739	Verschraubung E08L/1/4KEGCFX	Connection E08L/1/4KEGCFX
001179	U-Scheibe A6, Ø6,5mmx25mm	Washer A6, Ø6,5mmx25mm
002152	O-Ring	O-Ring
002535	Winkelschottverschraubung WSV08L A3C	Bulkhead connection WSV08L A3C
004188	Verschlusschraube G3/4	Plug G3/4
005842	Linsenflanschschraube mit Innensechskant M6x16 mm, DIN 7380F, 10.9	Lens Head Screw M6x16 mm, DIN 7380F, 10.9
006356	Kondensatbehälter 10 Liter	Condensate Catch Tank 10 Litre
006379	Zugfeder Kondensatfilterpatrone	Spring Condensate Filter Cartr
006460	Federspannblech Kondensatbehälter	Spring Clamping Plate CCT
006461	Halteblech Kondensatbehälter	Bracket Condensate Catch Tank
008357	Verschlusskappe für 006356	Cap for Condensate Catch Tank
008495	Filter Kondensatbehälter	Filter Condensate Catch Tank
008655	Linsenflanschschraube mit Innensechskant	Lens Head Screw
011736	Anschlussadapter Kondensatbehälter 10ltr	Adapter Condensate Catch Tank
012064	Kondensatschlauch, Ø8x1,5mm	Condensate Hose Ø8x1.5mm
012065	Kondensatschlauch, Ø8x1,5mm	Condensate Hose Ø8x1.5mm

**DETAILANSICHT / DETAILED VIEW**

**Baugruppe: Kondensat-Sammelbehälter / Assembly: Housing Condensate-Catch-Tank**



C



## OPTIONS



## **Inhaltsverzeichnis**

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## 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.

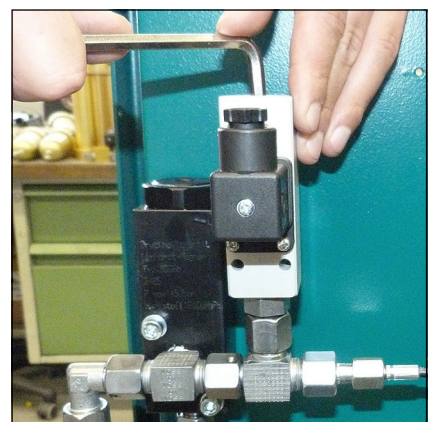
### Adjust re-start pressure (minimum filling pressure)

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**

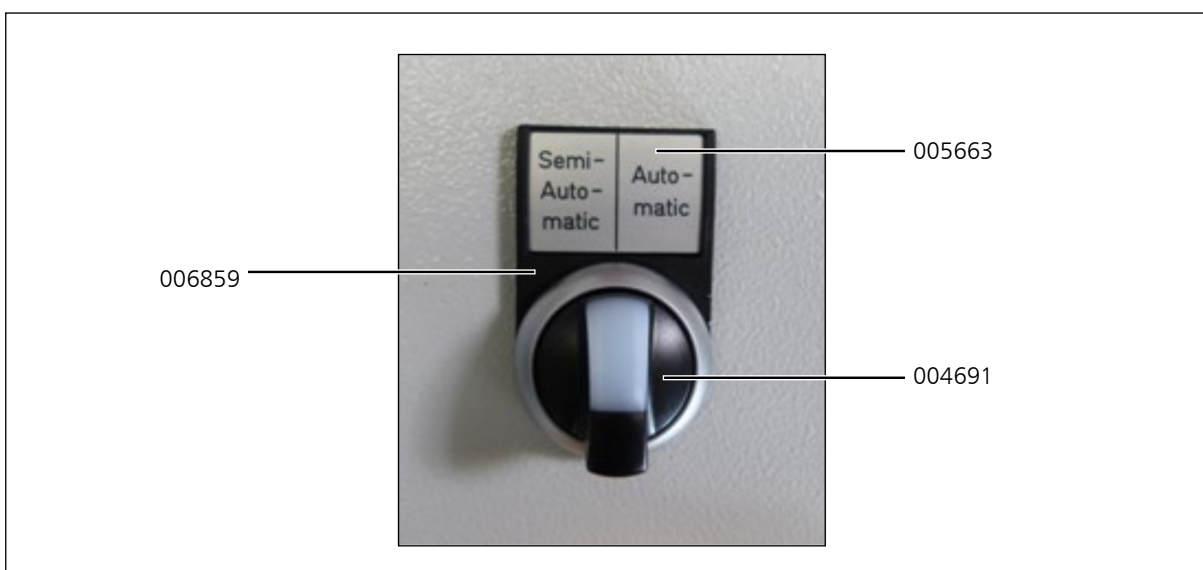
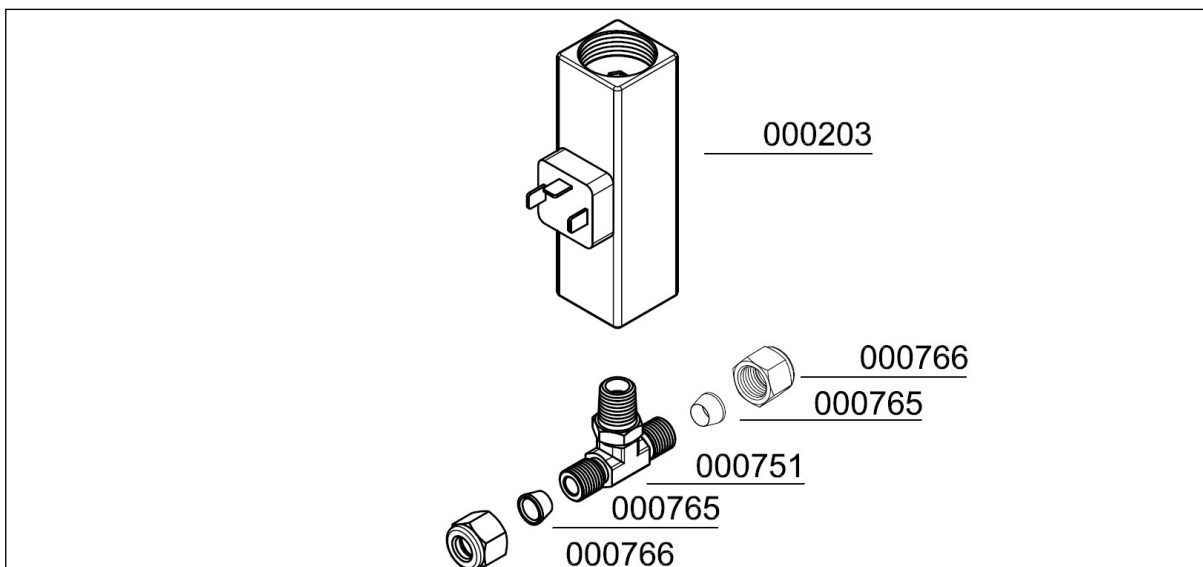
The unit shuts down when final pressure is reached. Thus, the unit always has to be restarted manually.

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





## ADDITIONAL FILLING HOSE

C



## ADDITIONAL FILLING HOSE

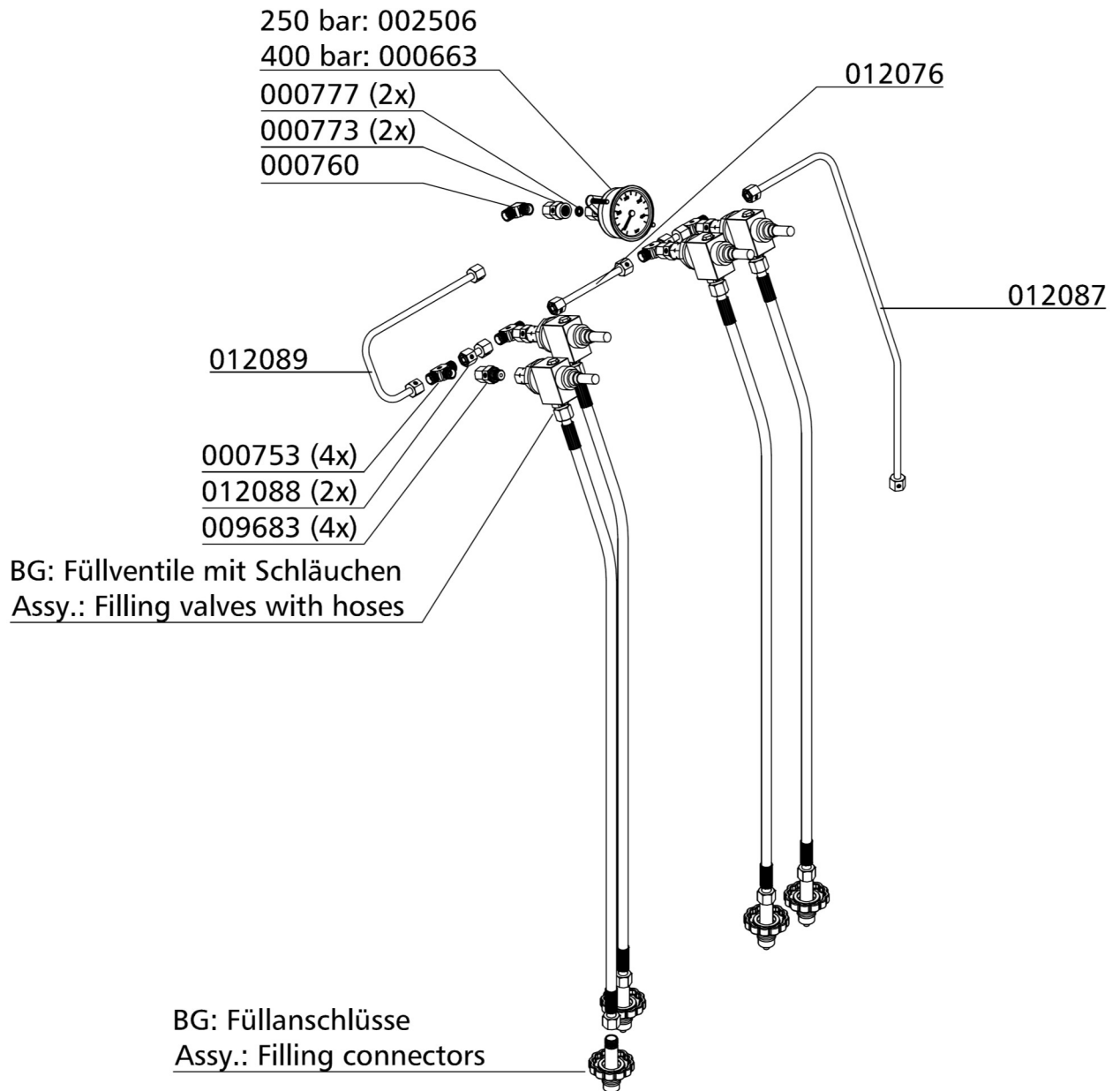
The additional hose with filling valve allows to fill two bottles simultaneously. The hose with filling valve is available in 200 and 300 bar version.

Please refer to Chapter A for all information about the filling process.

Best.-Nr. / Order No.	Benennung	Description
000663	Einbaumanometer mit Befestigungsbügel, 0-400 bar Ø63mm	Press. Gauge c/w fixing strap, 0-400 bar Ø63mm
000753	Verschraubung T08L	Connection T08L
000760	Verschraubung W08LCFX	Connection W08LCFX
000773	Manometerverschraubung IG 1/4" MAVE 08 LR, mit fester NMutter	Connection Pressure Gauge G 1/4" MAVE 08 LR (c/w fixed nut)
000777	Dichtring für Manometerverschraubung DK11/4CFX	Seal Ring for Pressure Gauge DK11/4CFX
002506	Einbaumanometer mit Befestigungsbügel, 0-250 bar Ø63mm	Press. Gauge c/w fixing strap, 0-250 bar Ø63mm
009683	Verschraubung mit fester Mutter EGE 08L RED / G1/4	Connection with fixed nut EGE 08L RED / G1/4
012076	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012087	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012088	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012089	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals

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## ADDITIONAL FILLING HOSE



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**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

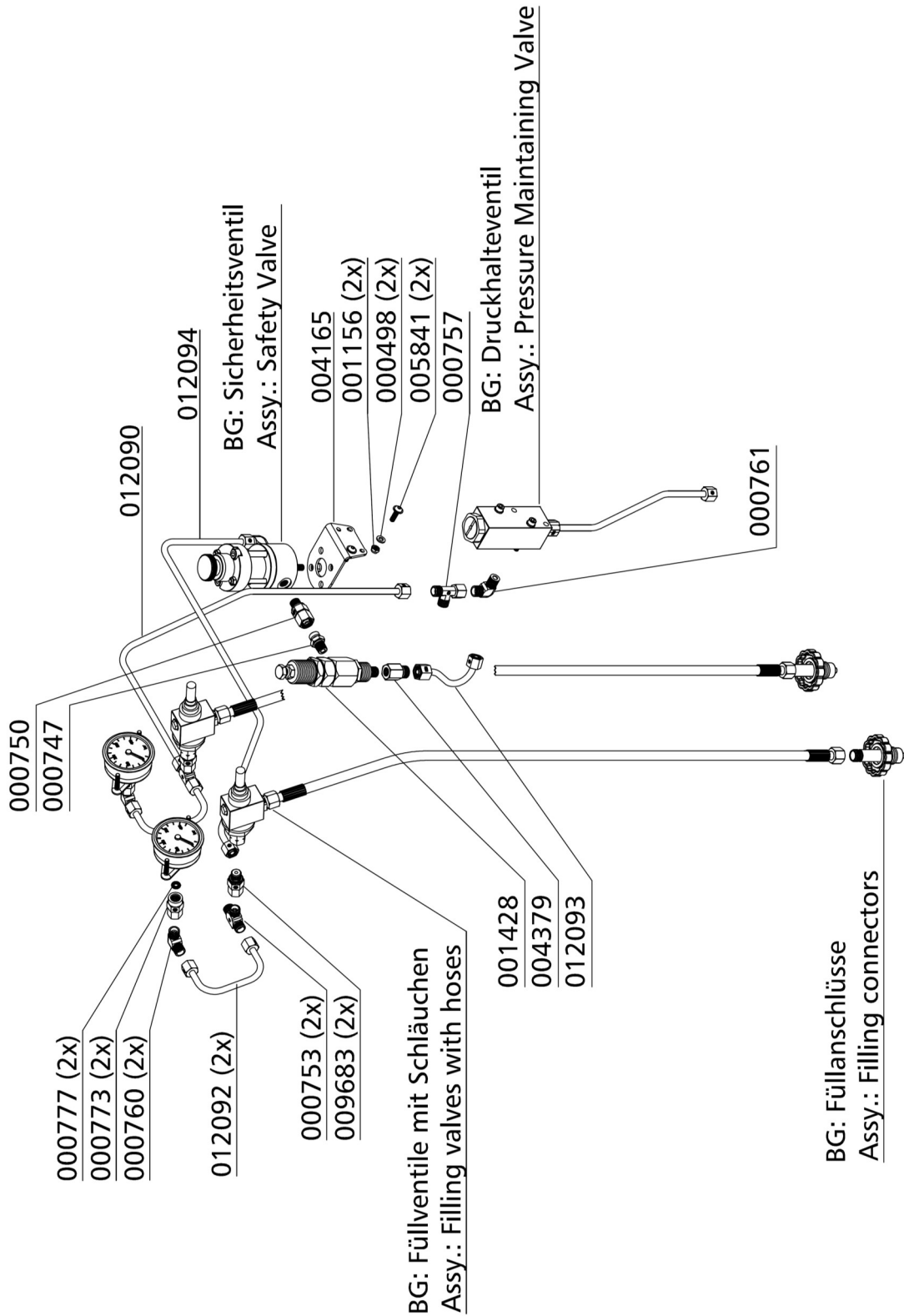
### Verrohrung 2 Druckbereiche / Spare Part List: Piping 2 Pressure Ranges

Best.-Nr. / Order No.	Benennung	Description
000498	U-Scheibe A6 DIN 125	Washer A6 DIN 125
000747	Gerade Verschraubung GE08L1/4NPTCFX	Straight Connection GE08L1/4NPTCFX
000750	Verschraubung mit fester Mutter EGE 08 PSR-ED / G1/4	Connection with fixed nut EGE 08 PSR- ED / G1/4
000753	T-Verschraubung T08L	T-Connection T08L
000757	T-Verschraubung mit fester Mutter radi- al EVL08LOMDCF	T-Connection with fixed nut EV- L08LOMDCF
000760	Verschraubung W08LCFX	Connection W08LCFX
000761	Winkerverschraubung WE08LRA3CX	Elbow Connection WE08LRA3CX
000773	Manometerverschraubung IG 1/4" MAVE 08 LR, mit fester Mutter	Connection Pressure Gauge IG 1/4" MAVE 08 LR (c/w fixed nut)
000777	Dichtring für Manometerverschraubung DKI1/4CFX	Seal Ring for Pressure Gauge DKI1/4CFX
001156	Stopfmutter M6 DIN985 ZN	Lock Nut M6 DIN985 ZN
001428	Druckminderer "High Flow" einstellbar 400 > 50 bar	Pressure Reducer-Bolt version 400 > 50 bar
004165	Halblech Sicherheitsventilsockel	Bracket for Safety valve base
004379	Verschraubung für Eingang Druckmin- derer GAI 8 PSR 1/4" NPT IG - Edelstahl	Connection GAI 8 PSR 1/4" NPT IG (inlet press. reducer)
005841	Linsenflanschschraube mit Innensechs- kant M6x20 mm, DIN 7380F, 10.9	Flange Button Head Screw M6x20 mm, DIN 7380F, 10.9
009683	Verschraubung mit fester Mutter EGE 08L RED / G1/4	Connection with fixed nut EGE 08L RED / G1/4
012090	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012092	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012093	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012094	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals

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## 200 / 300 BAR PARALLEL FILLING PRESSURE OPERATION

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



D



# INTERSTAGE PRESSURE GAUGE

D

## 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

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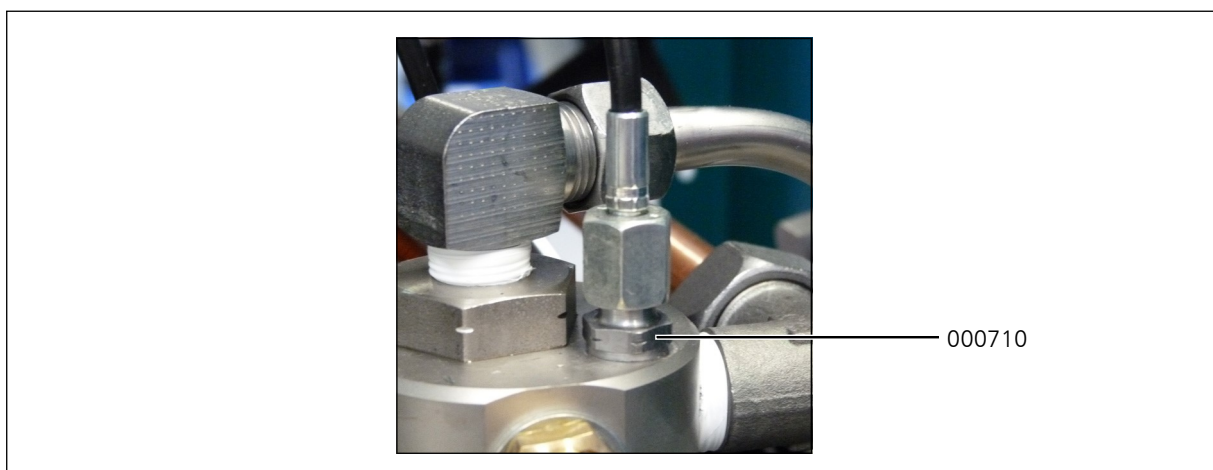
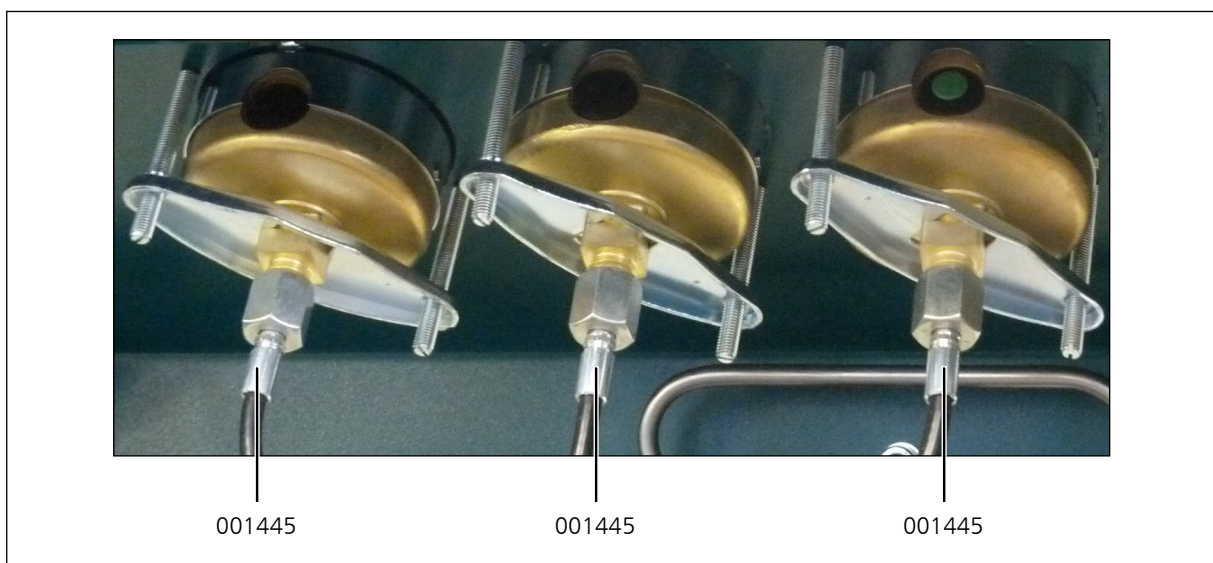
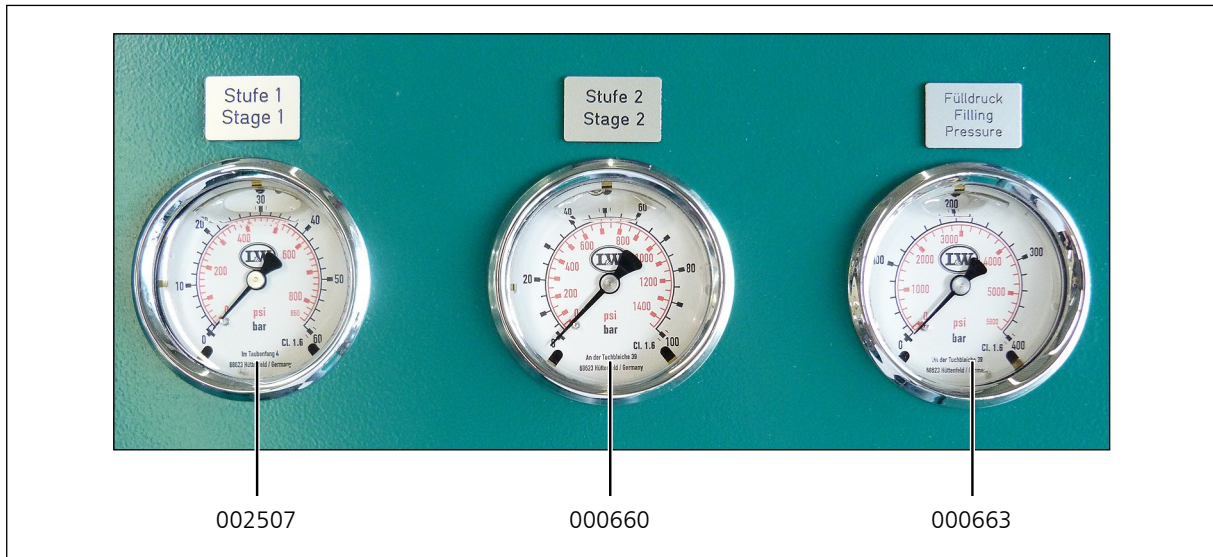
### Spare part lists

Best.-Nr. / Order No.	Benennung	Description
000660	Manometer 0-60 bar	Pressure Gauge 0-60 bar
000663	Manometer 0-400 bar	Pressure Gauge 0-400 bar
000710	Verschraubung (1/8" -> 6L)	Connection (1/8" -> 6L)
001445	6L Manometerschlauch 600 mm	6L Hose for Pressure Gauge 600 mm
002507	Manometer 0-10 bar	Pressure Gauge 0-10 bar

D

## INTERSTAGE PRESSURE GAUGE

### Spare part lists





# OIL PUMP

D

## OIL PUMP

---

### Maintenance and Service

#### Oil Sieve Change

Oil sieve change as follows:

- Loosen cover screws (Fig.1 / 4 pcs).
- Remove the cover, the cover gasket and the oil sieve.
- Clean the oil sieve with petroleum-ether or replace the defective oil sieve.
- Replace the gaskets.
- Soak the gaskets with oil before placing (respect mounting direction).
- Be sure to position the arrow from the new oil sieve opposite to inlet and return ports of the pump (see Fig.2).
- Remount the cover with the 4 cover screws. Tightening torque: 4.5 - 8 N.

The oil sieve change is now completed.

#### Maintenance intervals

- We recommend cleaning or replacing the oil sieve every 1,000 working hours.
- Service Kit oil pump (002569). Consists of: 000798—Oil sieve + 000672—oil pump cover gasket.



Fig. 1



Fig. 2





## OIL PUMP

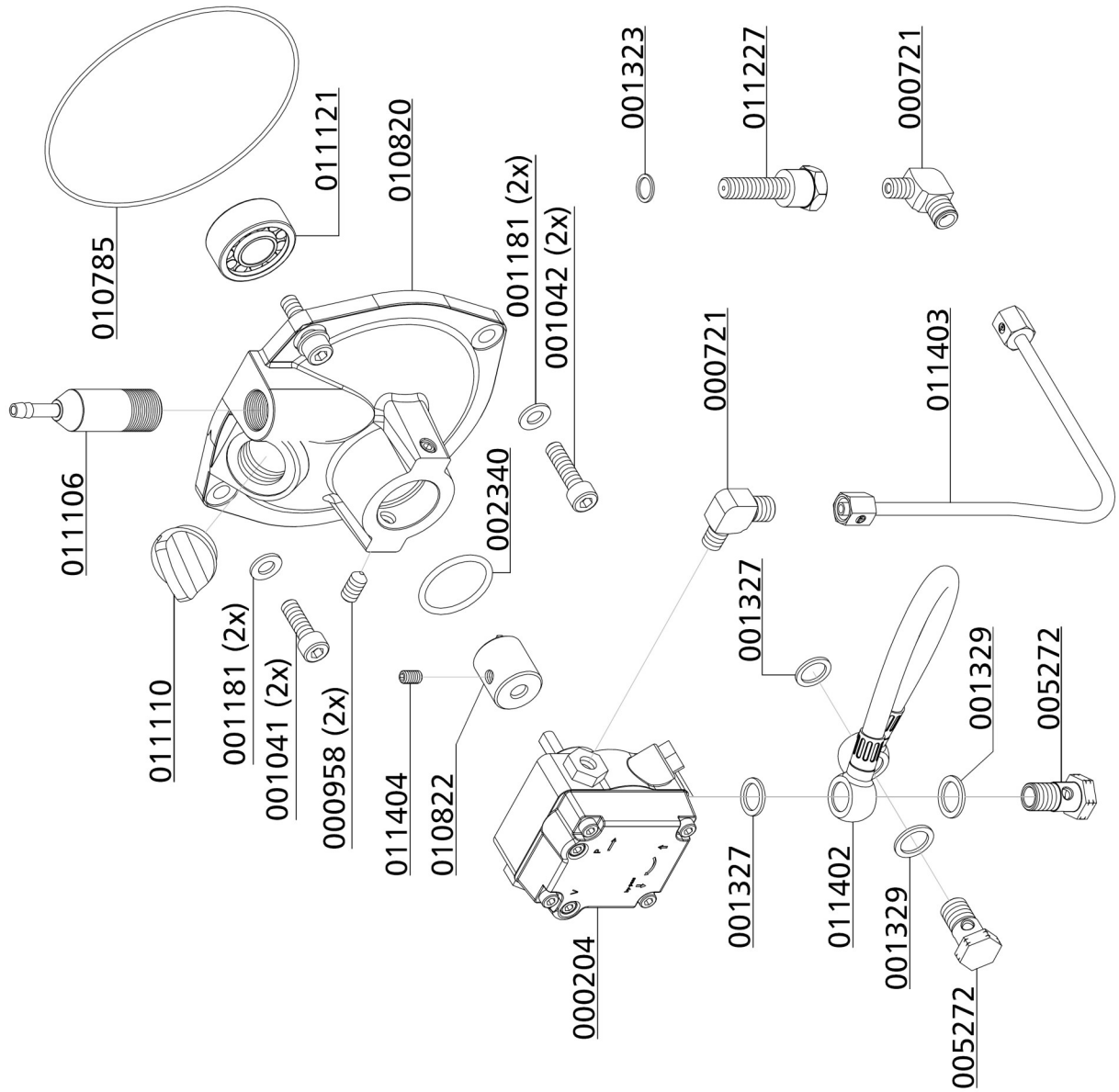
### Spare Part List

Best.-Nr. / Order No.	Benennung	Description
000204	Ölpumpe, kompl.	Oil Pump compl.
000721	Verschraubung	Connection
000958	Gewindestift, Madenschraube	Hexagon Socket Screw
001041	Zylinderschraube	Allen Screw
001042	Zylinderschraube	Allen Screw
001181	U-Scheibe A8	Washer A8
001323	CU-Ring	Copper Seal Ring
001327	CU-Ring	Copper Seal Ring
001329	CU-Ring	Copper Seal Ring
002340	O-Ring Ölpumpenflansch	O-Ring, oil pump flange
005272	Hohlschraube G1/4" - AG	Banjo Bolt G1/4" - male
010785	O-Ring	O-Ring
010820	Lagerdeckel	Bearing Cover Oil Pump Side
010822	Ölpumpen-Mitnehmer	Oil Pump Driver
011106	Anschlussadapter	Adapter Crankcase Vent
011110	Verschlusschraube GN 441, 3/4"	Plug G3/4
011121	Zylinderrollenlager 17x40x16 mm	Bearing
011227	Spezialschraube M10	Special Bolt M10
011402	Ölansaugschlauch, Block - Ölpumpe	Oil Suction Hose
011403	Rohrleitung Ø6mm, komplett mit M.&S.	Pipe Ø6mm, c/w Nut and Olive
011404	Gewindestift M6x8	Threaded Pin

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# OIL PUMP

## Detailed View



D



# 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

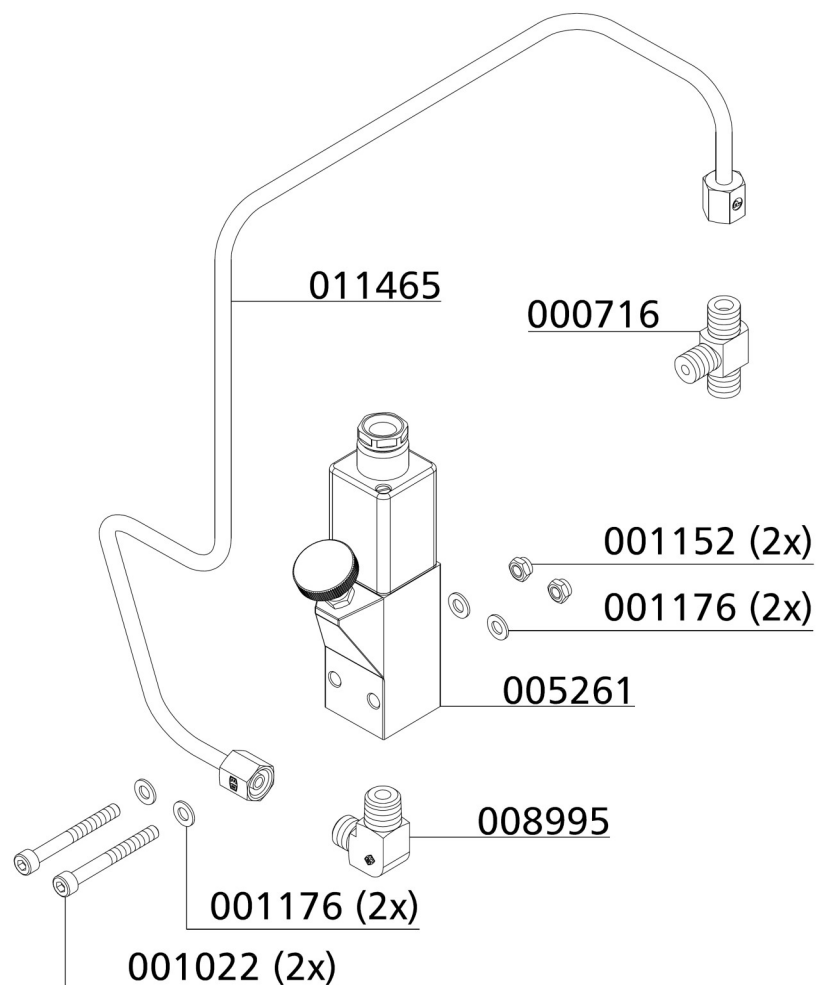
## OIL PRESSURE MONITORING

### Spare Part List

Best.-Nr. / Order No.	Benennung	Description
000716	Verschraubung TE06L	Connection w/o nut& olive seal
001022	Zylinderschraube M5x45mm	Allen Bolt
001152	Stopmutter M5	Lock Nut
001176	U-Scheibe A5	Washer
005261	Druckschalter inkl. Stecker	Oil Pressure Switch 0.2-2 bar
008995	Winkelverschraubung WE06LR1/4"	Elbow Connection
011465	Rohrleitung Ø6mm, komplett mit M.&S.	Pipe Ø6mm, c/w Nut and Olive

D

### Detailed View



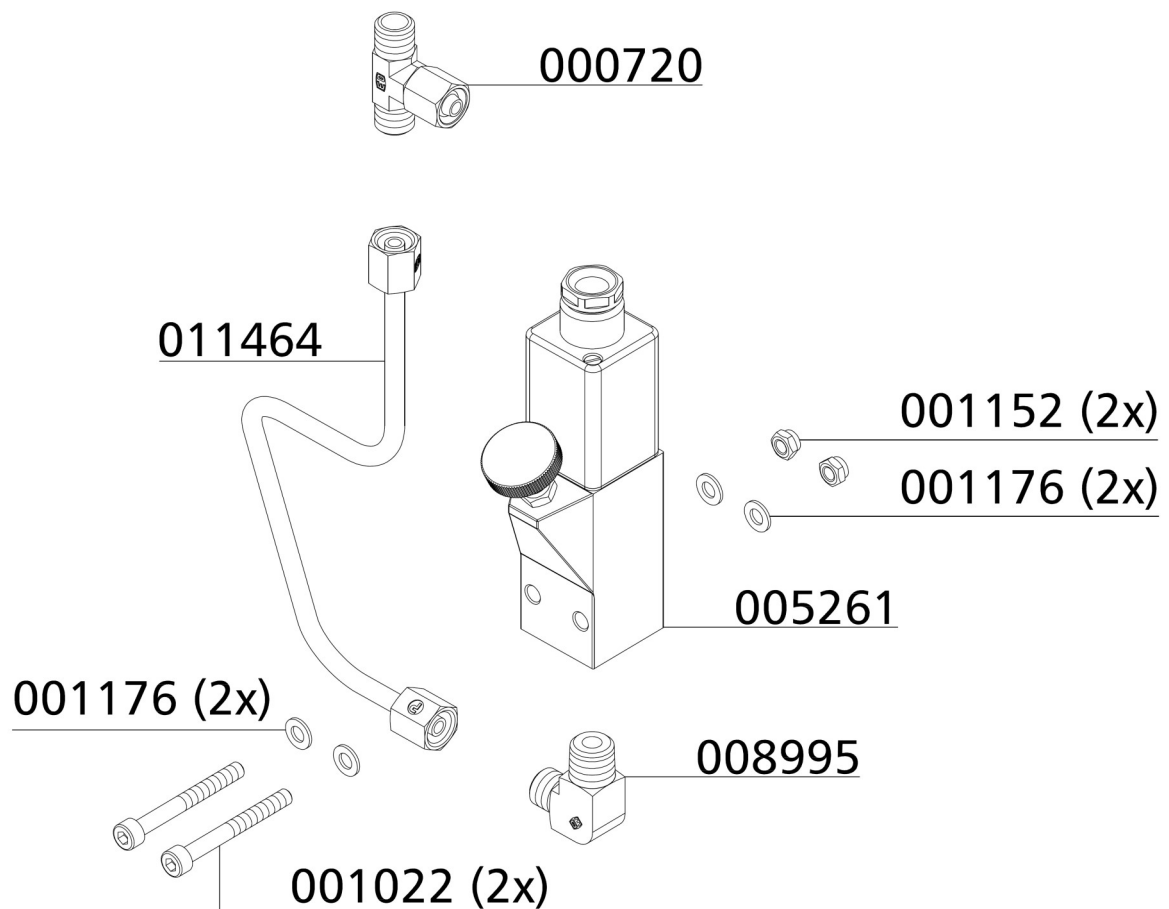
## OIL PRESSURE MONITORING WITH OIL PRESSURE GAUGE

### Spare Part List

Best.-Nr. / Order No.	Benennung	Description
000720	Verschraubung ET06L	Connection with fixed nut
001022	Zylinderschraube M5x45mm	Allen Bolt
001152	Stopfmutter M5	Lock Nut
001176	U-Scheibe A5	Washer
005261	Druckschalter inkl. Stecker	Oil Pressure Switch 0.2-2 bar
008995	Winkelverschraubung WE06LR1/4"	Elbow Connection
011464	Rohrleitung Ø6mm, komplett mit M.&S.	Pipe Ø6mm, c/w Nut and Olive

D

### Detailed View





# 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 +100 °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 Pressure Monitoring



#### Warning

Risk of burns!

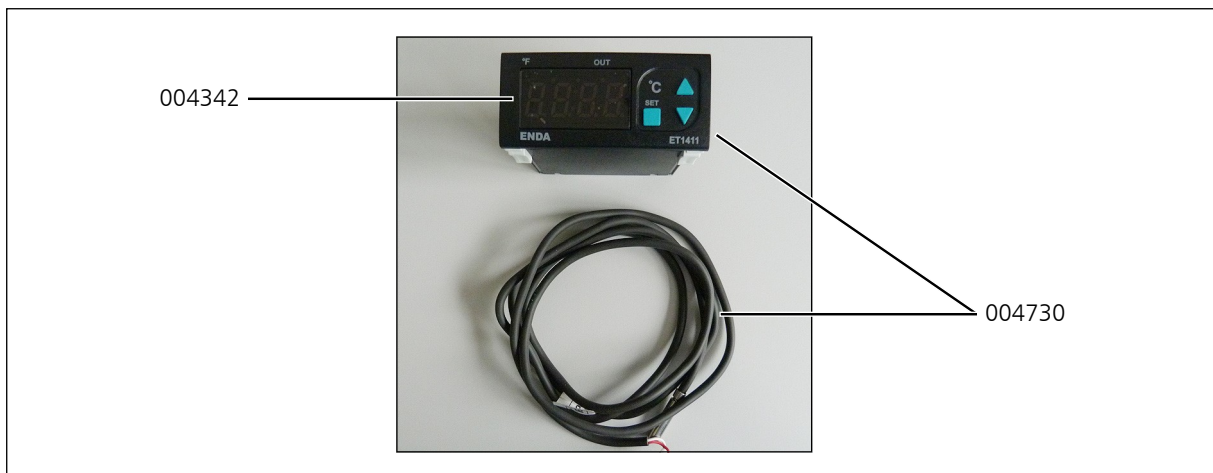
Allow the unit to cool before beginning troubleshooting.



## 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 +120° 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!

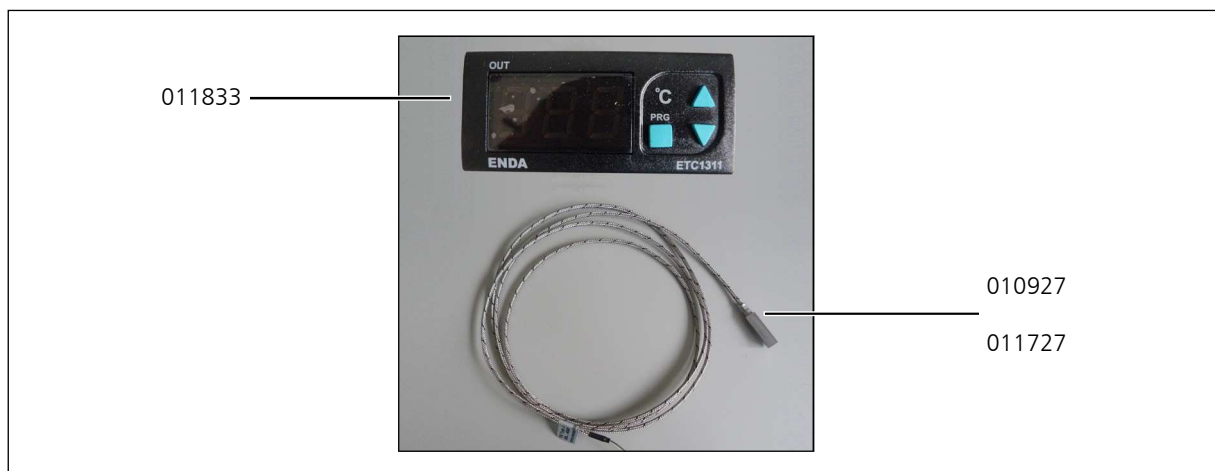
Allow the unit to cool before beginning troubleshooting.

## CYLINDER HEAD TEMPERATURE MONITORING

### Spare part lists

Best.-Nr. / Order No.	Benennung	Description
010927	Temperatursensor, ECC, RTC, Standard PT1000, 3m Kabel	Temp. Sensor Cylinder Head PT1000, 3m cable
011727	Temperatursensor, ECC, RTC, Standard PT1000, 10m Kabel	Temp. Sensor Cylinder Head PT1000, 10m cable
011833	Temperaturanzeige digital ohne Sensor	Temperature Digital Display

D





## SERVICE INTERVAL

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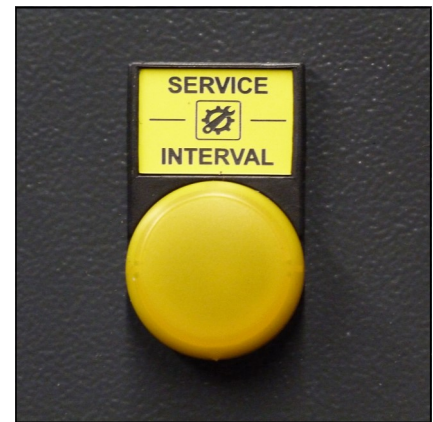
## SERVICE INTERVAL

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### Service Interval

The maintenance timer counts down from the set time X. Once the timer has reached 0, the yellow maintenance LED will be activated.

If the compressor is disconnected from the mains, the timer is reset and sets the time originally entered (e.g. the maintenance interval "oil change" 19 hours).

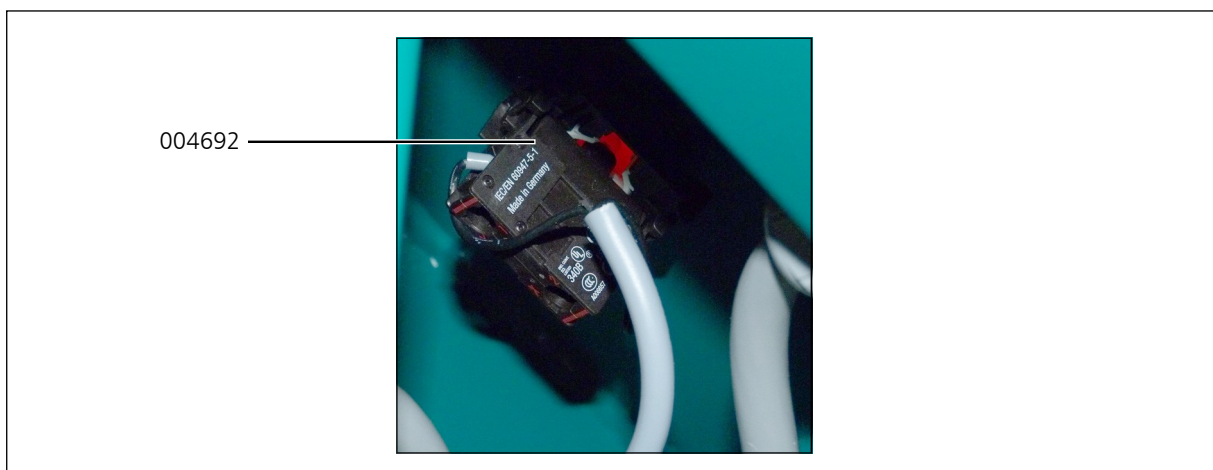
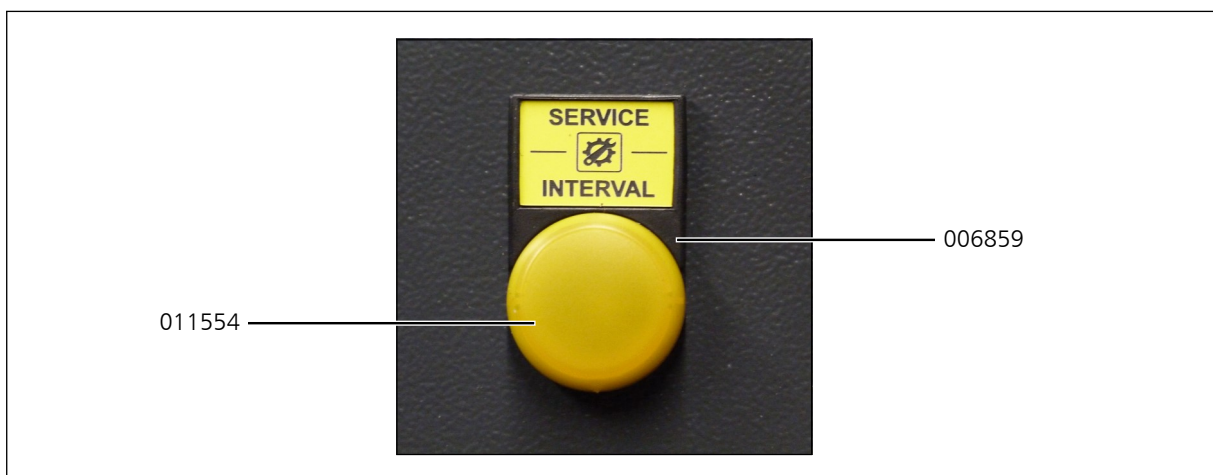


Service indicator light

## PHASE MONITORING

### Spare Part List

Best.-Nr. / Order No.	Benennung	Description
004701	Warnlampe	Warning Lamp
004704	Relais für Warnlampe	Relais for warning lamp
006859	Schildträger	Label holder
008551	Einlegeschild Phasenüberwachung	Label Phase Control



D



# FINAL FILTER SEPARATOR 2.3 LTR

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## FINAL FILTER SEPARATOR 2.3 LTR

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### Filter Housing 2.3 ltr

Inside the filter housing a jet blows air on to the wall of the housing. 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. The manual condensate drain valve needs to be opened if a drain is necessary and before filter cartridge change.

### Filter Cartridge 2.3 ltr

The high-pressure compressor is equipped with an integrated breathing air purification system. Air is compressed up to 350 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. 2.3 ltr

All breathing air filter cartridges are 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.

### Maintenance Intervals

The life of the filter cardridge is substantially depend on the operating temperature, from the state of wear of the compressor, of the filter size and the operating pressure.

We recommend to monitor the state of the filter.

D



## FINAL FILTER SEPARATOR 2.3 LTR

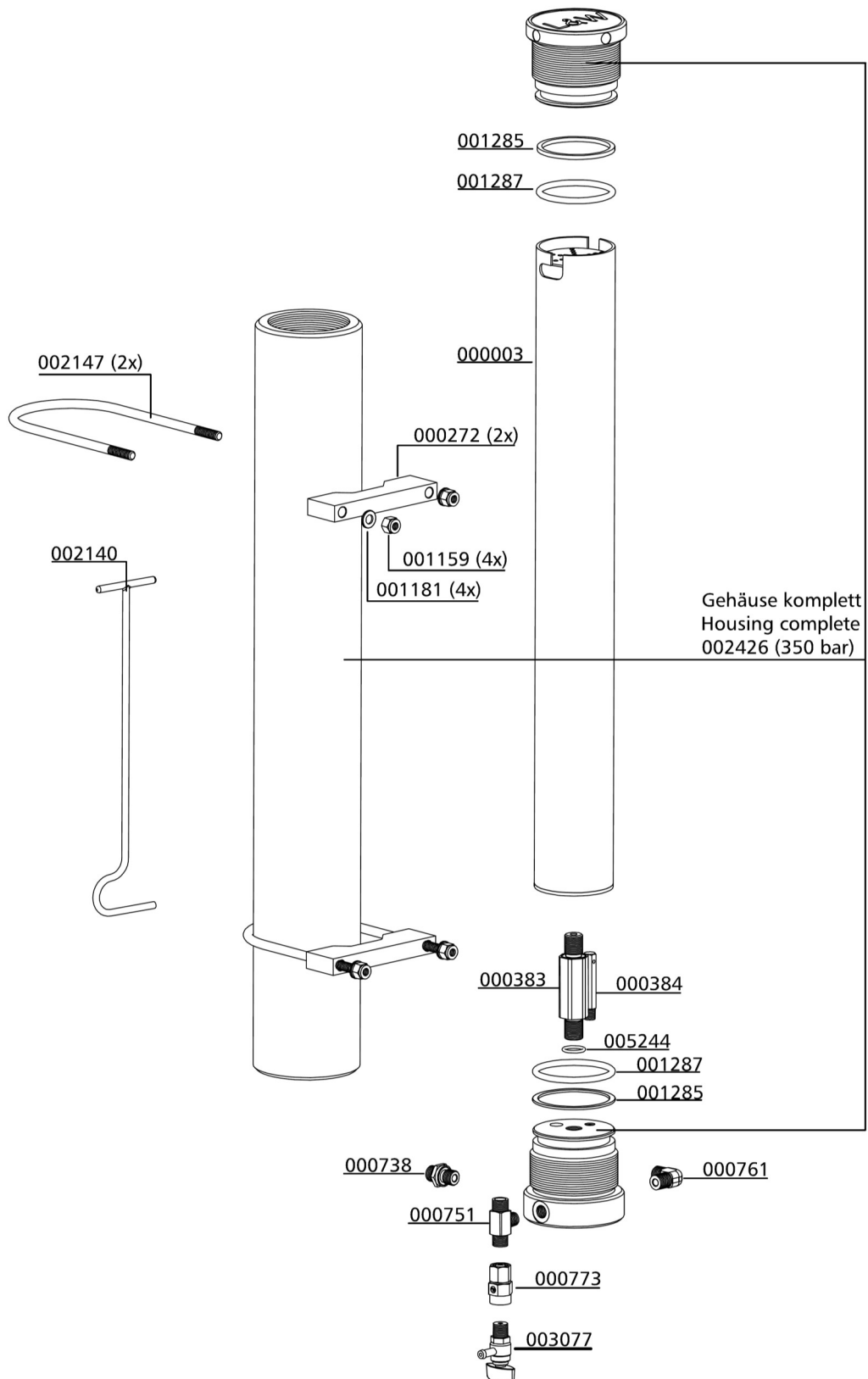
### Spare Part List

Best.-Nr. / Order No.	Benennung	Description
000003	Filterpatrone 2,3 l	Filter Cartridge 2.3 ltr
000272	Abstandshalter für Filtergehäuse	Spacer Bracket for Filtertower
000383	Messing Adapter	Brass Filter Adapter
000384	Düse Filtergehäuse	Jet Filter Housing
000738	Gerade Verschraubung GE08LRCFX	Straight Connection GE08LRCFX
000751	Verschraubung TE08LRCFX	Connection TE08LRCFX
000761	Winkelverschraubung, WE08L/1/4"	Elbow Connection, WE08L/1/4"
000773	Manometerverschraubung G1/4"/08L	Connection Pressure Gauge G1/4"/08L
001159	Stopfmutter, M8 DIN985 ZN	Lock Nut, M8 DIN985 ZN
001181	U-Scheibe A8 DIN125 ZN	Washer A8 DIN125 ZN
001285	Stützring, 63,96x4,65 NBR90, 350 bar, Filtergehäuse	Back-up Ring, 63,96x4,65 NBR90, 350 bar, Filter Housing
001287	O-Ring, 62,87 x 5,33 NBR90, Filter- gehäuse	O-Ring, 62,87 x 5,33 NBR90, filter housing
002140	Filterschlüssel 1,7 & 2,3 Liter Behälter	Filter tool 1,7 & 2,3 Litre
002147	Haltebügel für Filtergehäuse, beidseitig M8X35mm	Holder for filter housing, M8X35mm (both sides)
002426	Filtergehäuse 2,3l	Filter housing 2.3ltr
003077	Entwässerungsventil G1/4" AG	Drain valve G1/4" male
005244	O-Ring, 16 x 2,5 NBR90	O-Ring, 16 x 2,5 NBR90

D

# FINAL FILTER SEPARATOR 2.3 LTR

## Spare Part List



D

## MAINTENANCE AND SERVICE

### Filter Cartridge Replacement

Filter cartridge change as follows:

- Open the condensate valve of the final filter housing until it's depressurized (Fig.1)
- Unscrew filter housing cover by using the special filter tool (Fig.2)
- Place the T-piece end of the filter tool in the recess of the filter cartridge (Fig.3)
- Unscrew the filter cartridge anti-clockwise and pull the cartridge out of the housing (Fig.4)
- 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.



Fig. 1 - Drain tap



Fig. 2 - Unscrew the filter housing cover.



Fig. 3 - Place the T-piece end of the filter key in the top of the filter cartridge.



Fig. 4 - Pull the cartridge out of the housing.



#### Note

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

### 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

- Loose pipes 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 - Loose pipe connections and nuts



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



## MAINTENANCE AND SERVICE

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### Every 1000 operating hours

Maintenance work	Type	Quantity	Order No.
Replace o-ring of the 2.3 ltr final filter tower	-	2	001287
Replace back-up ring of the 2.3 ltr final filter tower	-	2	001285

D



## ADDITIONAL HIGH PRESSURE OUTLET

C



## ADDITIONAL HIGH PRESSURE OUTLET

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### Spare Part Lists

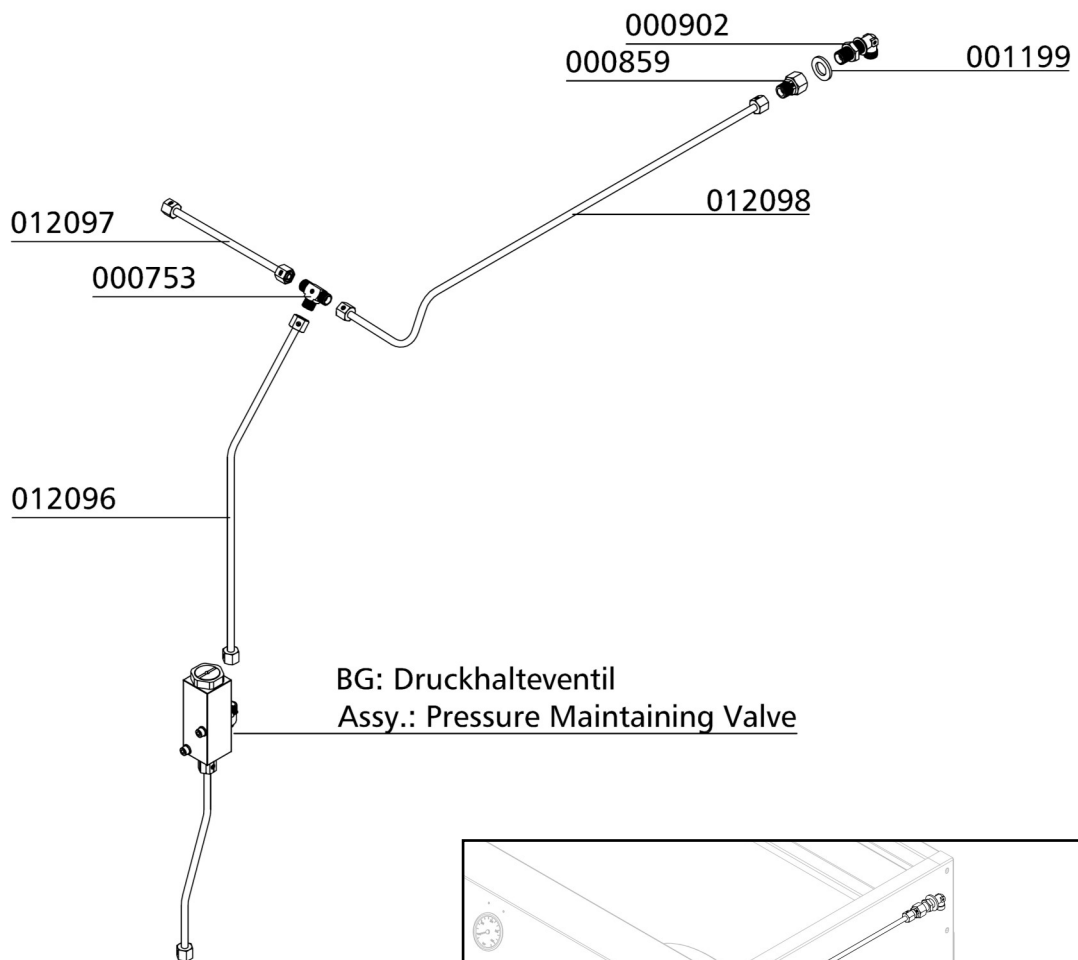
Best.-Nr. / Order No.	Benennung	Description
000753	Verschraubung T08L	Connection T08L
000859	Reduzierung mit fester Mutter RED10/08LOMDCF	Reducer with fixed nut RED10/08LOMDCF
000902	Winkelschottverschraubung WSV10LOMDCF	Elbow Bulkhead Fitting WSV10LOMDCF
001199	U-Scheibe A17 DIN-125 ZN, ISO-7090	Washer A17 DIN-125 ZN, ISO-7090
012096	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012097	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals
012098	Rohrleitung Ø8mm, komplett mit M.&S.	Pipe Ø8mm c/w nuts&olive seals

C

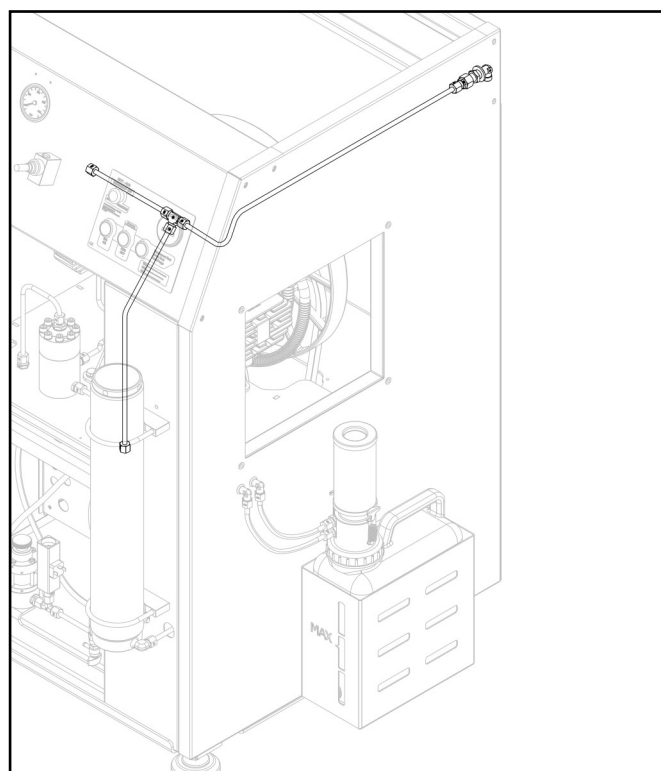


## ADDITIONAL HIGH PRESSURE OUTLET

### Spare Part Lists



C





## AIR COOLER CONNECTION KIT

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## AIR COOLER CONNECTION KIT

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### 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 U-connection at the outside and connect the air cooler according to the connection designation (inlet/outlet).

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



Air cooler connection kit

D

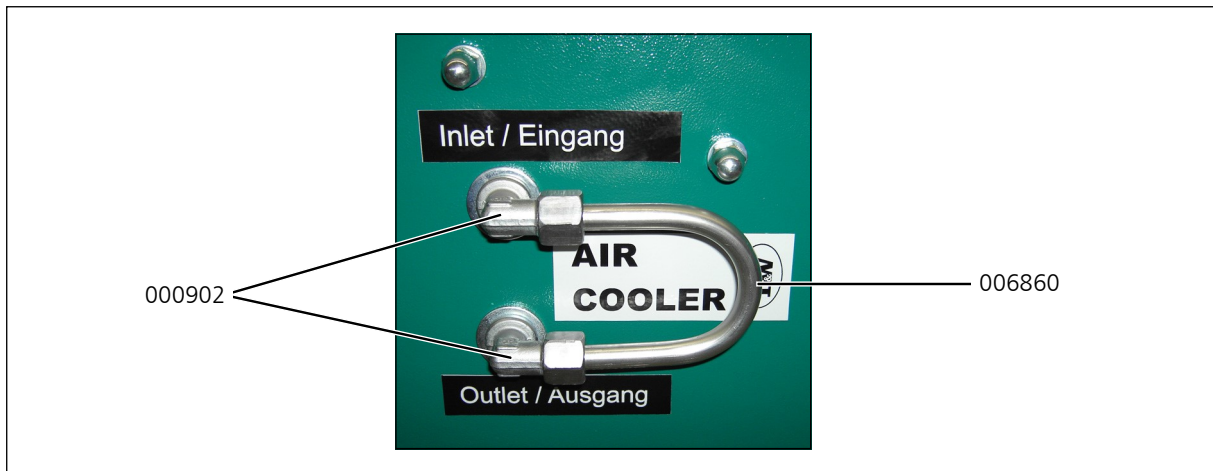
### All length of high pressure hoses available

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
000902	Schottverschraubung	Elbow Bulkhead Fitting
006860	Rohrbogen	U-Connection





# ATTACHMENT

E

**Lenhardt & Wagner GmbH**

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

www.lw-compressors.com



## Operating Instruction

### Safety valve

Typ:

**SiV2 BKZ TÜV.SV.19-1140.5.G.V.P CE 0091 AlMgSi1 F31 1100\* Lenhardt & Wagner**

<b>Set pressure:</b>	see mark (hand wheel on top of valve)
<b>Maximum outflow:</b>	Set pressure 100-159 bar: 750 l / min Set pressure 160-350 bar: 1.100 l / min
<b>Suitable media:</b>	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 screws<sup>1</sup>*
- 4) *Venting screw (hand wheel)*
- 5) *Identification serial number*
- 6) *Socket for safety valve*

Safety valve with socket

<sup>1</sup> 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.

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

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**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 quantity: 5-10 drops



Figure 1: Position for oil refill

*To be used lubricating oil for the safety valve: L&W Article N°. : 008500*

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





## CONTENTS

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## TESTING HOSE LINES

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### **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

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### **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.

<b>Type of test</b>	<b>Recommended test intervals</b>
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 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.

<b>Hose line requirements</b>	<b>Recommended replacement intervals</b>
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

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### **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



## ANNEX SCOPE OF TESTING; TEST CRITERIA

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### **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

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### **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!