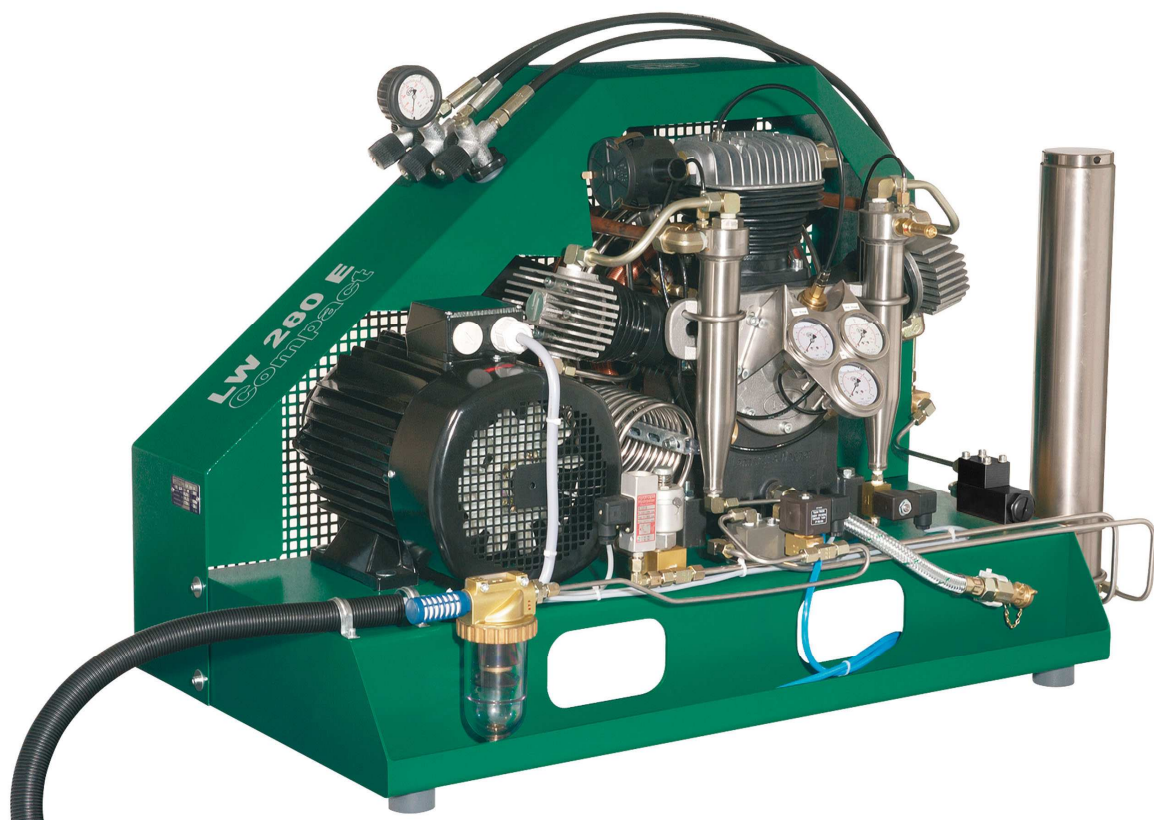


# Operating Instructions

Breathing Air Compressor

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





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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.

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### Versions

#### Filling pressure versions:

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

### Specifications

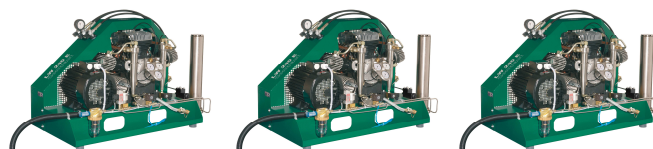
- Painted steel frame and fan belt guard (RAL 6026)
- Hour counter
- Start/ Stop and emergency stop switch
- Manual condensate drain
- 1 x Filling hose c/w filling valve
- Motor protection switch (LW 230 Optional)
- Pressure maintaining and non return valve
- All pistons c/w steel piston rings
- Low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

### Options

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

## DESCRIPTION

### Technical Data



| Technical Data                              | LW 230 E                       | LW 280 E    | LW 320 E    |
|---|--------------------------------|-------------|-------------|
| Capacity [l/min]:                           | 230                            | 280         | 320         |
| Max. Operating Pressure [bar]:              | 350                            | 350         | 350         |
| RPM [min <sup>-1</sup> ]:                   | 1080                           | 1300        | 1450        |
| Number of Pressure Stages:                  | 3                              | 3           | 3           |
| Cylinder Bore 1st Stage [mm]:               | Ø 95                           | Ø 95        | Ø 95        |
| Cylinder Bore 2nd Stage [mm]:               | Ø 40                           | Ø 40        | Ø 40        |
| Cylinder Bore 3rd Stage [mm]:               | Ø 18                           | Ø 18        | Ø 18        |
| Medium:                                     | Compressed Air / Breathing Air |             |             |
| Intake Pressure:                            | atmospheric                    |             |             |
| Oil Pressure [bar]:                         | +3.0                           | +3.0        | +3.0        |
| Oil Capacity [l]:                           | 1.8                            | 1.8         | 1.8         |
| Intake Temperature [°C]:                    | 0 < +45                        | 0 < +45     | 0 < +45     |
| Ambient Temperature [°C]:                   | +5 < +45                       | +5 < +45    | +5 < +45    |
| Cooling Air Volume [m <sup>3</sup> /h]:     | > 1650                         | > 2250      | > 2250      |
| Voltage:                                    | 400 V / 3 phase / 50 Hz        |             |             |
| Protection Class Drive Motor:               | IP 54                          | IP 54       | IP 54       |
| Drive Power [kW]:                           | 5.5                            | 7.5         | 7.5         |
| RPM Motor [min <sup>-1</sup> ]:             | 2890                           | 2890        | 2890        |
| Start:                                      | Star/Delta                     |             |             |
| Noise level from a distance of 1 m [dB(A)]: | 82                             | 83          | 83          |
| Dimensions L x W x H [mm]:                  | 1200 x 600 x 900               |             |             |
| Weight [kg]:                                | approx. 195                    | approx. 195 | approx. 195 |
| Content Volume Filter housing [l]:          | 1.7                            | 1.7         | 1.7         |

## DESCRIPTION

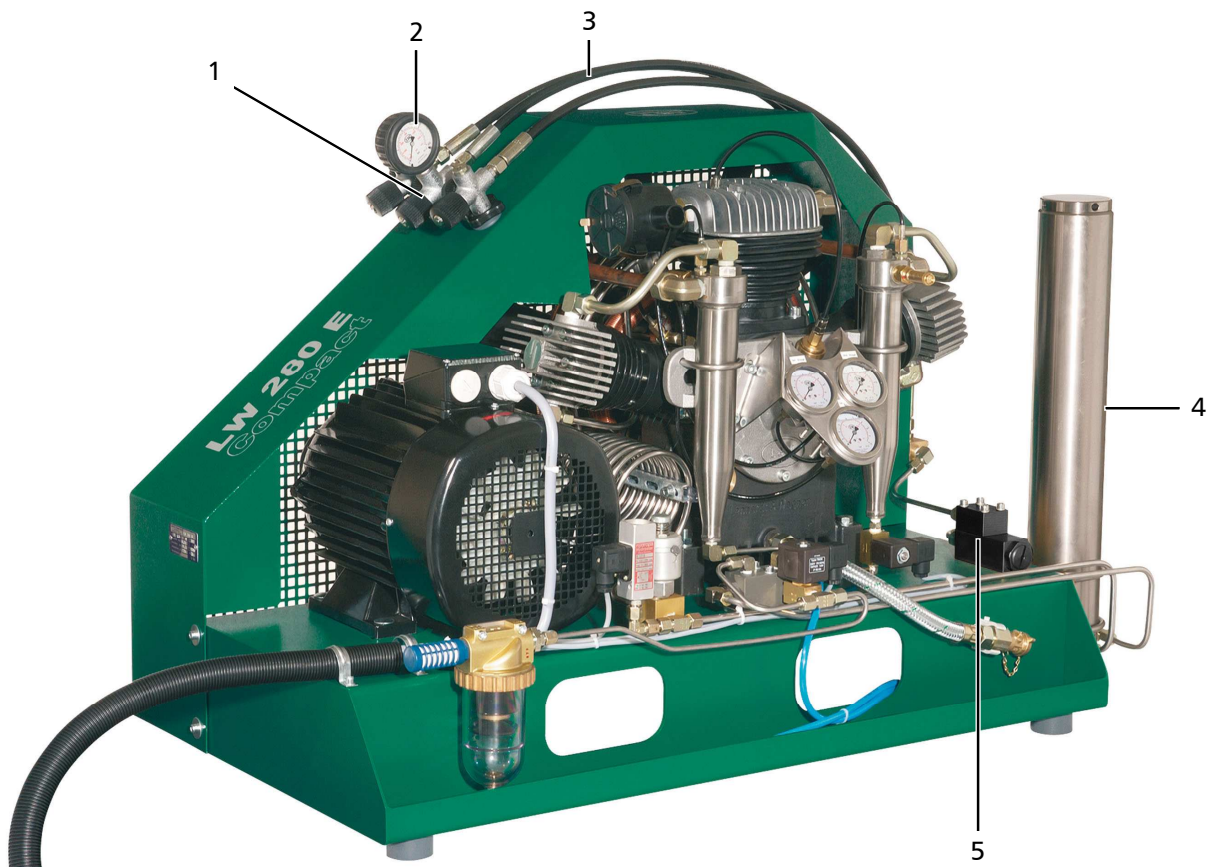
### Unit Assembly



#### Note

Following options for the shown compressor:

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

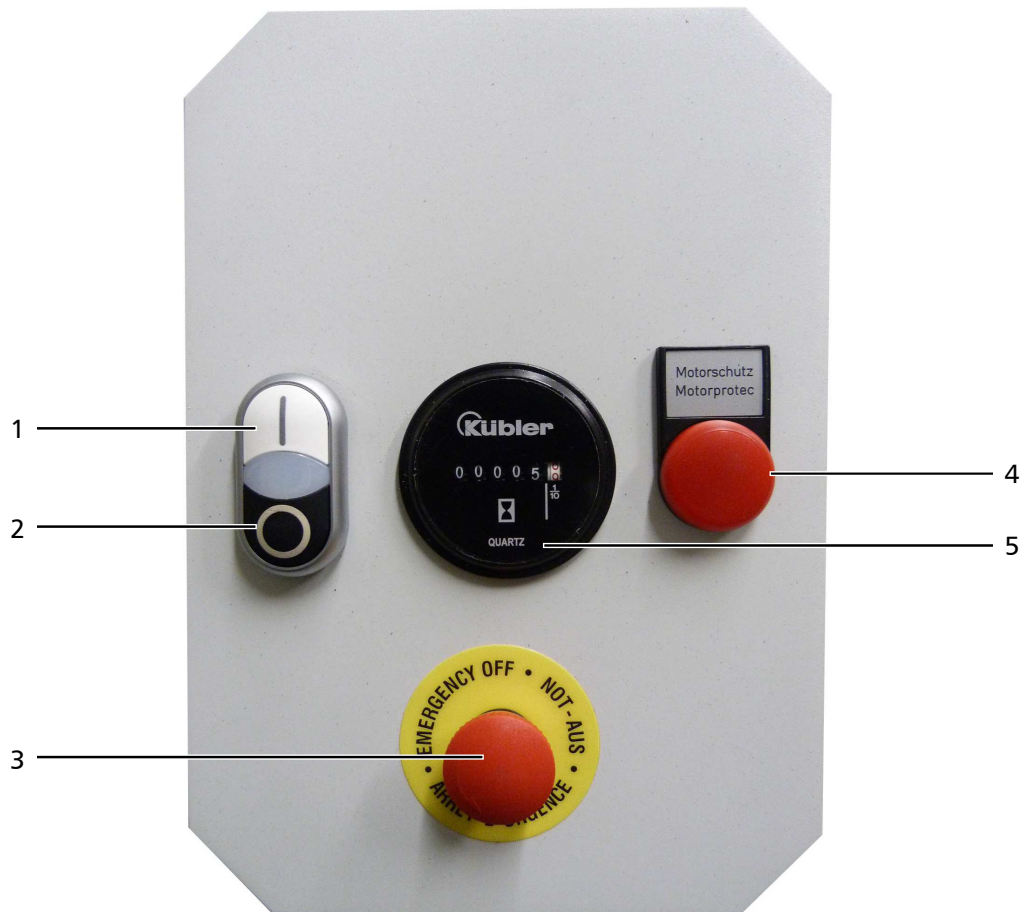


| No. | Designation                             |
|-----|---|
| 1   | Filling valve                           |
| 2   | Filling pressure gauge                  |
| 3   | Filling hose                            |
| 4   | Filter housing                          |
| 5   | Pressure maintaining / non return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

## DESCRIPTION

### Switchboard

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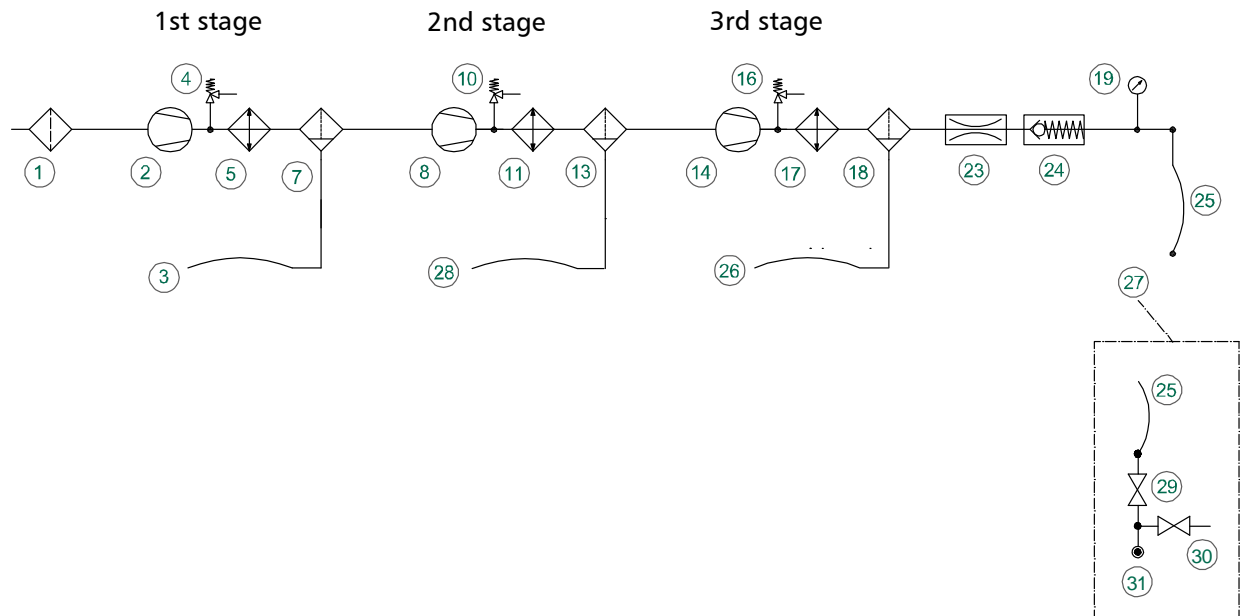


| No. | Designation                    |
|-----|--------------------------------|
| 1   | ON button                      |
| 2   | OFF button                     |
| 3   | Emergency shut-off switch      |
| 4   | Motor protection warning light |
| 5   | Hour counter                   |



## DESCRIPTION

### Flow chart



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



A

# SAFETY PRECAUTIONS



## **SAFETY PRECAUTIONS**

---

**A**

### **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**

---

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

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

**A**



**Warning**  
High voltage!



**Note**  
Ensure correct direction of rotation!



## **SAFETY PRECAUTIONS**

---

### **General Safety Precautions**

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

**A**



## **SAFETY PRECAUTIONS**

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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.



## 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

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### Installation in closed rooms



#### **Danger**

No operation in explosion-hazard areas.

The unit is not approved for operation in areas prone to explosion.

A

#### **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")!

## INSTALLATION

### Dimensions

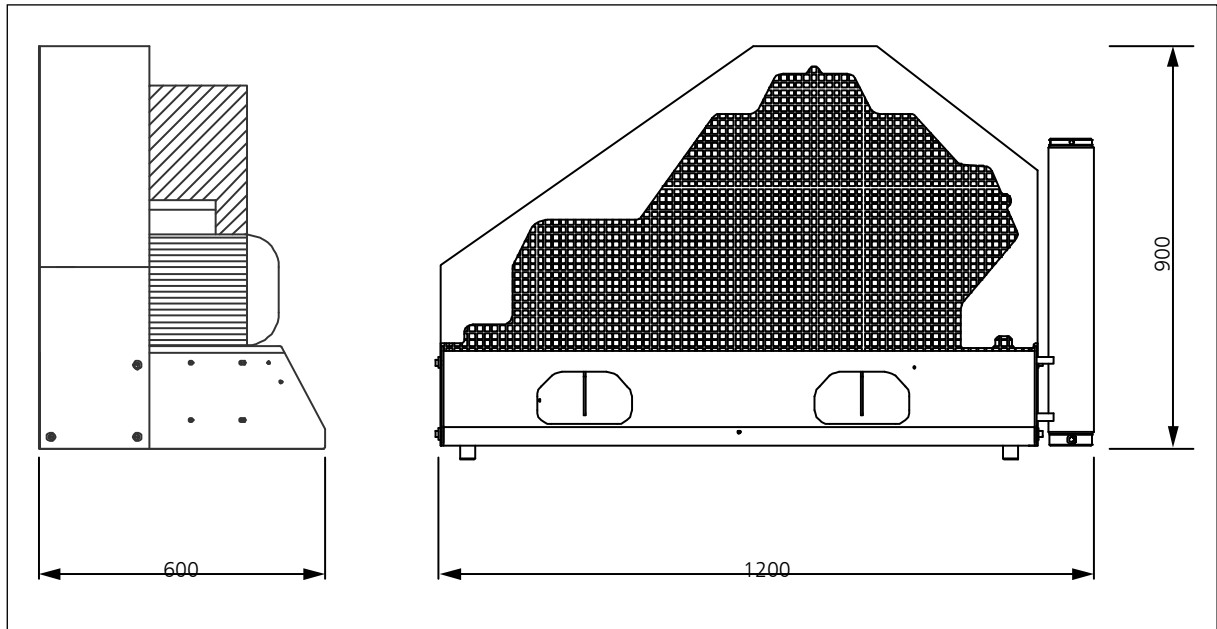


Fig. Dimensions

A

## INSTALLATION

### Minimum distances



#### Note

Minimum distances must be adhered!

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

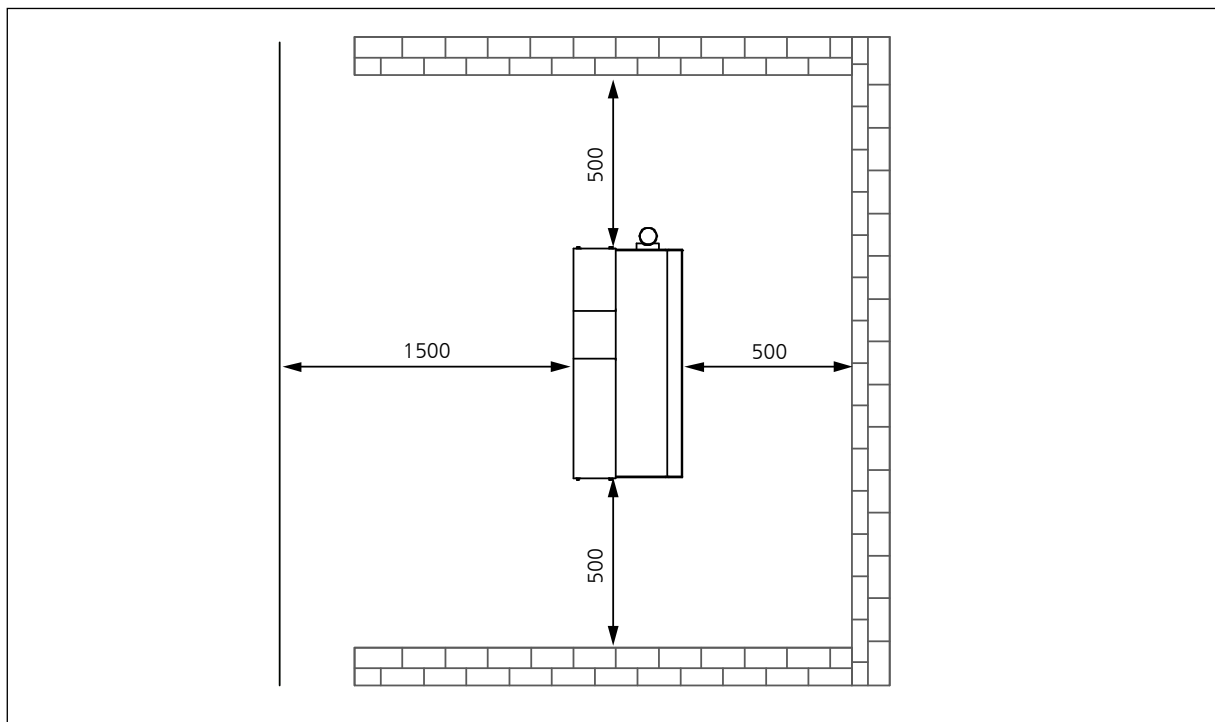


Fig. Minimum distances

## INSTALLATION

### Ventilation

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

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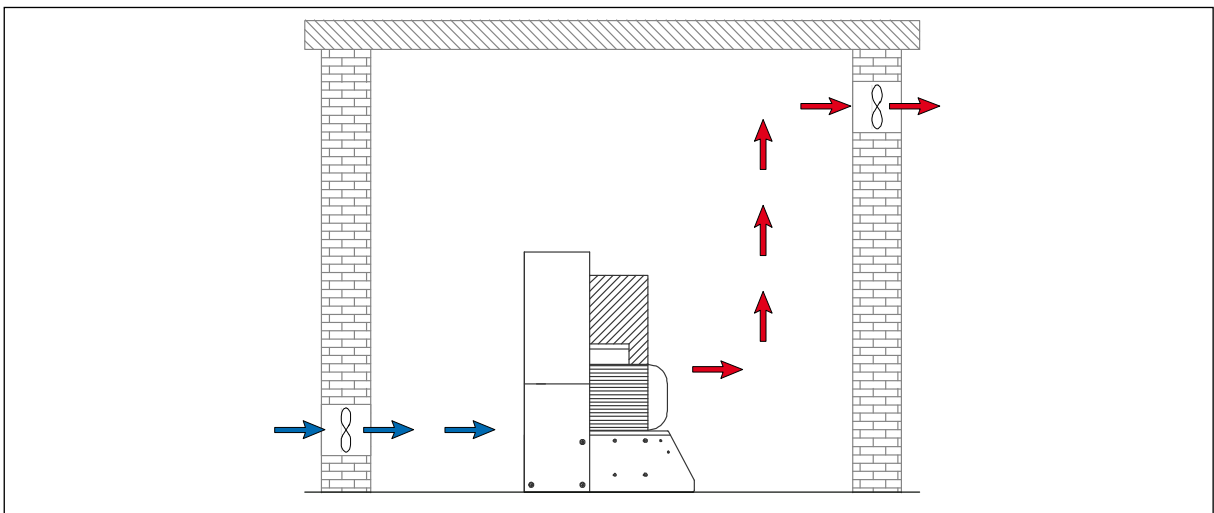


Fig. Ventilation through facade

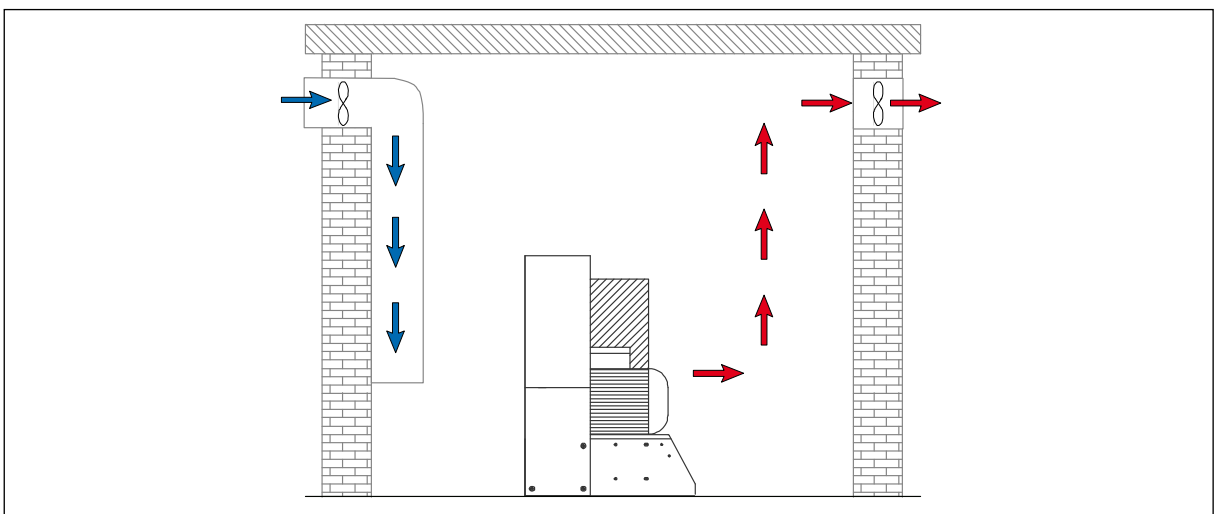


Fig. Ventilation via ventilation stack

## INSTALLATION

### Electrical Installation



#### Warning

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

For installation of electrical equipment, observe the following:

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

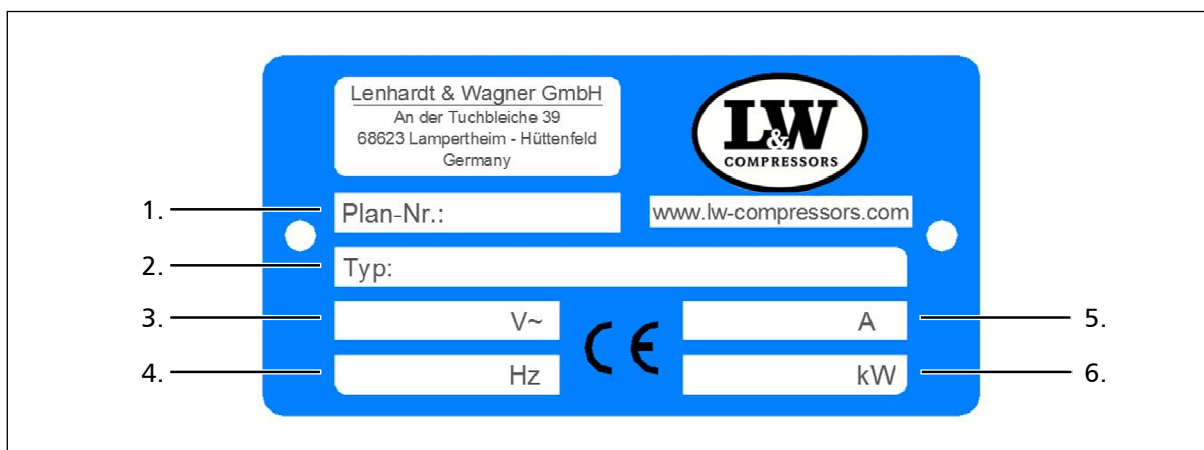


Fig. Compressor name plate

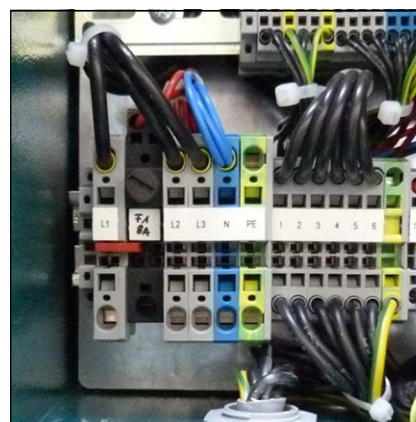
| No. | Designation               |
|-----|---------------------------|
| 1.  | Circuit diagram number    |
| 2.  | Compressor type           |
| 3.  | Power supply              |
| 4.  | Frequency                 |
| 5.  | Motor current consumption |
| 6.  | Nominal motor power       |

## INSTALLATION

### Electrical Installation

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

Fig. - Connection to the switch box



A

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

| Nominal motor power |      | Fusing start A |            | Connection in mm <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        |



A

# OPERATION





## OPERATION

---

### Important operation instructions



#### Note

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



#### Wear hearing protection

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

A

## FIRST COMMISSIONING

---

### Prior to first commissioning, observe the following:

Necessary steps are described on the next page.

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

### Start the compressor

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



#### Warning

Wrong impeller rotation direction!

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

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

## FIRST COMMISSIONING

### Check oil level



#### Warning

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

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

#### Oil level check as follows:

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

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



Oil dipstick

### Check V-belt tension

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

#### Tension V-belts

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

We recommend using a V-belt tension gauge.

#### Correct V-belt tension

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

### Settings

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

## FIRST COMMISSIONING

---

### Check turning direction



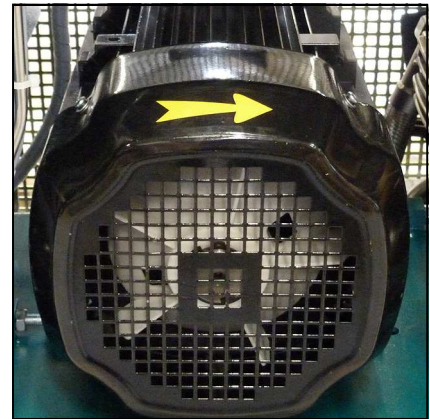
#### Warning

Wrong impeller rotation direction!

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

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

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



Rotation direction arrow

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## DAILY COMMISSIONING

---

### **Prior to daily operation observe the following:**

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

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

**Caution**

Vent condensate drain valves every 15-30 minutes manually.

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



## OPERATION

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### Switch off the compressor

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

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



#### Note

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

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# REMEDYING FAULTS





## REMEDYING FAULTS

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### Final pressure can not be reached

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

### Strong compressor vibration

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

### Air supply too low

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



## REMEDYING FAULTS

### Compressor overheated

| Cause of fault                                   | Remedy  |
|--|---|
| Inlet filter cartridge contaminated              | Replace   |
| Ambient temperature too high                     | Improve room ventilation /<br>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,<br>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                    |

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## 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<br>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 | -    | -        | -         |

### 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                      | -    | -        | -         |

### Annually

| Maintenance work  | Type | Quantity | Order No. |
|---|------|----------|-----------|
| Oil change, if less than 1000 operating hours                                   | -    | 1.8      | 000001    |
| 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   | -    | -        | -         |

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## MAINTENANCE AND SERVICE

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### Every 500 operating hours

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

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## MAINTENANCE AND SERVICE

### Every 1000 operating hours

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| Maintenance work  | Type              | Quantity | Order No. |
|---|-------------------|----------|-----------|
| Replace V-belt  | LW 230 EC (50Hz)  | 2        | 003694    |
|   | LW 230 EC (60Hz)  | 2        | 000148    |
|   | LW 280 EC (50Hz)  | 2        | 001685    |
|   | LW 280 EC (60Hz)  | 2        | 003694    |
|   | LW 320 EC (50Hz)  | 2        | 001685    |
|   | LW 320 EC (60Hz)  | 2        | 003694    |
| Replace sintered metal filter element of water separators   | 1st and 2nd stage | 2        | 002123    |
| Replace o-rings of water separators                         | 1st and 2nd stage | 2        | 001255    |
| Replace o-ring of oil separator                             | -                 | 1        | 001294    |
| Replace silencer  | -                 | 1        | 000178    |
| Replace sintered metal filter of oil separators             | -                 | 1        | 000184    |
| Replace sintered metal filter of pneumatic condensate valve | -                 | 1        | 000188    |
| Replace o-rings of the final filter housing                 | -                 | 2        | 001287    |
| Replace back-up rings of the final filter housing           | -                 | 2        | 001285    |
| Replace sintered metal filter of oil filter                 | -                 | 1        | 000184    |
| Replace o-ring of oil filter                                | -                 | 1        | 000435    |
| Oil change  | -                 | 1.8      | 000001    |



## MAINTENANCE AND SERVICE

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### Every 2000 operating hours

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

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## MAINTENANCE AND SERVICE

### Service Kits

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

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



Service Kits

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### Service Kits LW 230 E / 280 E / 320 E Compact for 50 Hz

| Compressor       | Frequency | Operating Hours | Order No. |
|------------------|-----------|-----------------|-----------|
| LW 230 E Compact | 50 Hz     | 1000 h          | 004656    |
| LW 230 E Compact | 50 Hz     | 2000 h          | 005168    |
| LW 280 E Compact | 50 Hz     | 1000 h          | 004329    |
| LW 280 E Compact | 50 Hz     | 2000 h          | 003921    |
| LW 320 E Compact | 50 Hz     | 1000 h          | 004329    |
| LW 320 E Compact | 50 Hz     | 2000 h          | 003921    |

### Service Kits LW 230 E / 280 E / 320 E Compact for 60 Hz

| Compressor       | Frequency | Operating Hours | Order No. |
|------------------|-----------|-----------------|-----------|
| LW 230 E Compact | 60 Hz     | 1000 h          | 006757    |
| LW 230 E Compact | 60 Hz     | 2000 h          | 006758    |
| LW 280 E Compact | 60 Hz     | 1000 h          | 004656    |
| LW 280 E Compact | 60 Hz     | 2000 h          | 005168    |
| LW 320 E Compact | 60 Hz     | 1000 h          | 004656    |
| LW 320 E Compact | 60 Hz     | 2000 h          | 005168    |



## MAINTENANCE AND SERVICE

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### Check V-belt tension

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

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### Tension V-belts

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

We recommend using a V-belt tension gauge.

### Correct V-belt tension

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

### Settings

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

## MAINTENANCE AND SERVICE

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### Check oil level



#### Warning

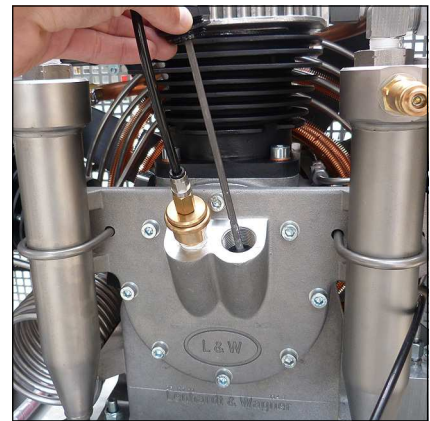
Check oil level daily. Never start the compressor with a too low oil level. Risk of accidental loss, destruction or deterioration.

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

#### Oil level check as follows:

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

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



Oil dipstick



## MAINTENANCE AND SERVICE

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### Oil change



#### Note

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

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#### Oil change as follows:

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

The oil change is now completed.

#### Maintenance intervals

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

#### Oil and oil capacity

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

### Oil filter maintenance



#### Caution

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



#### Note

Clean all parts thoroughly before assembly.

#### Oil filter maintenance as follows:

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

The oil filter maintenance is now completed.



Fig. 1 - Loosen mounting screws

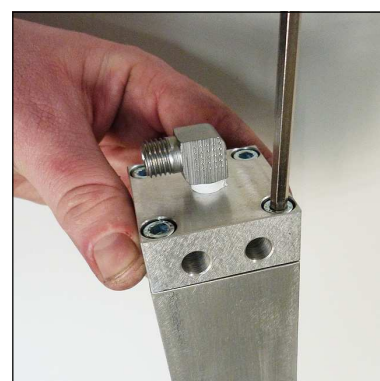


Fig. 2 - Loosen mounting screws of the filter cover

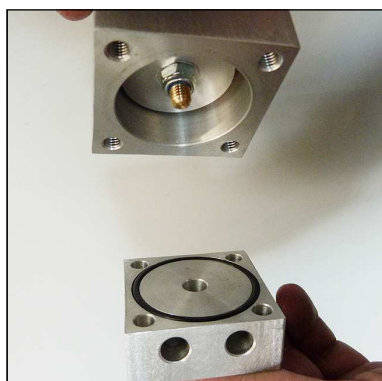


Fig. 3 - Change o-ring

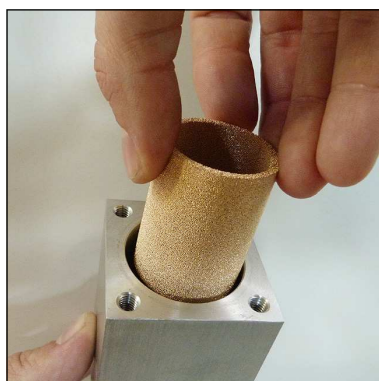


Fig. 4 - Change sinter filter



Fig. 5 - Place filter washer and washer

## MAINTENANCE AND SERVICE

### Manual condensation dump system



#### Note

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

### Oil- / water separators

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

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

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

### Manual drain



#### Warning

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

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

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

Then close valve spindle clockwise.

### Maintenance intervals

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

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

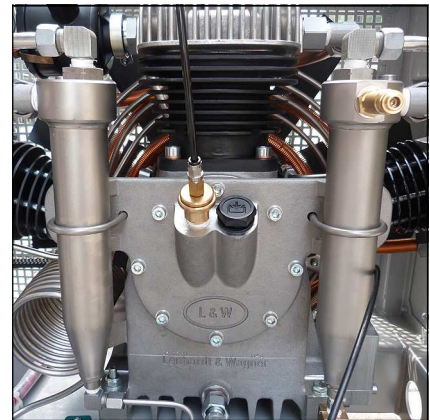


Fig. 1 Oil / water separators 1st and 2nd stage with automatic condensate drain system



Fig. 2 - Condensate drain valve of the filter housing



Fig. 3 - Condensate drain valve

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



#### Note

Clean all parts thoroughly before assembly.

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

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

The oil / water separator maintenance is now completed.

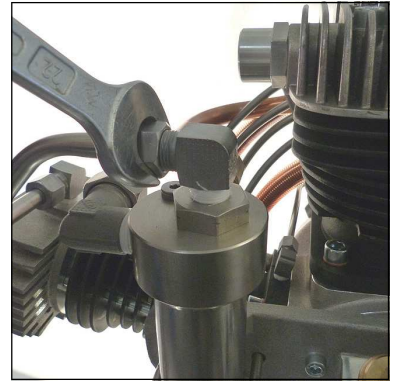


Fig. 1 - Loosen pipe connections

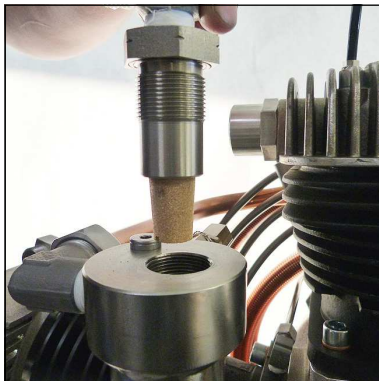


Fig. 2 - Remove sinter filter holder



Fig. 3 - Change sinter filter



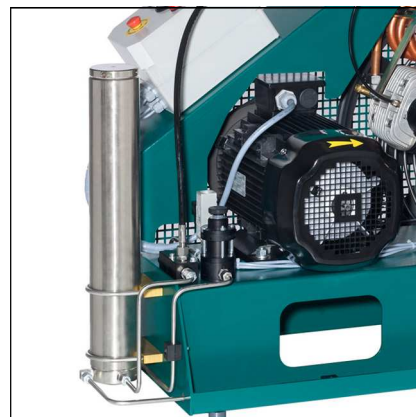
Fig. 4 - Change o-ring

## MAINTENANCE AND SERVICE

### Filter housing

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

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



Filter housing

### Filter cartridge

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

Cartridge capacity: approx. 1.7 l

All breathing air filter cartridges are factory vacuum sealed.

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

| P/N              | Filtering   | Models   |
|------------------|---|--|
| 000002<br>000003 | DIN EN 12021 (Breathing Air)                      | For models with 1.7 ltr Filter housings<br>For models with 2.3 ltr Filter housings |
| 001459<br>001461 | DIN EN 12021 (Breathing Air) incl. CO/CO2         | For models with 1.7 ltr Filter housings<br>For models with 2.3 ltr Filter housings |
| 001466<br>001467 | Only oil / odour removal (<0,1mg/m <sup>3</sup> ) | For models with 1.7 ltr Filter housings<br>For models with 2.3 ltr Filter housings |
| 001464<br>001462 | Only drying (<15mg/m <sup>3</sup> )               | For models with 1.7 ltr Filter housings<br>For models with 2.3 ltr Filter housings |
| 001468           | CNG filter ( drying and oil removal)              | For models with 2.3 ltr Filter housings  |

### Maintenance intervals

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

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

## MAINTENANCE AND SERVICE

### Filter cartridge change

Filter cartridge change as follows:

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

The filter cartridge change is now completed.



#### Note

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



Fig. 1 - Unscrew the filter housing cover.



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



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

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### Filter housing - maintenance



#### Note

Clean all parts thoroughly before assembly.

#### Filter housing maintenance as follows:

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

#### Dismount filter housing

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

#### Mount filter housing

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

The filter housing maintenance is now completed.



Fig. 1 - Open Filter cover

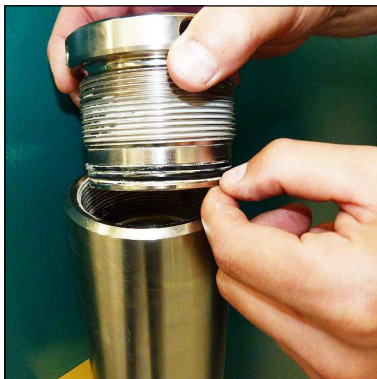


Fig. 2 - Change o-ring and back-up rings

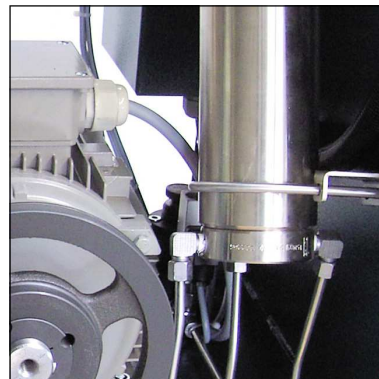


Fig. 3 - Loosen pipe connections and nuts



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

## MAINTENANCE AND SERVICE

### Inlet filters



#### Note

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

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

### Maintenance intervals

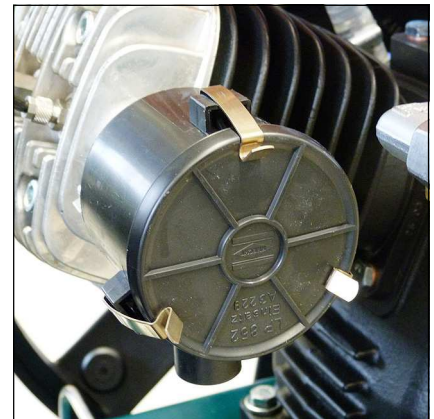
We recommend that the filter cartridge should be replaced every 500 working hours (depending on pollution grade).

### Inlet filter cartridge change

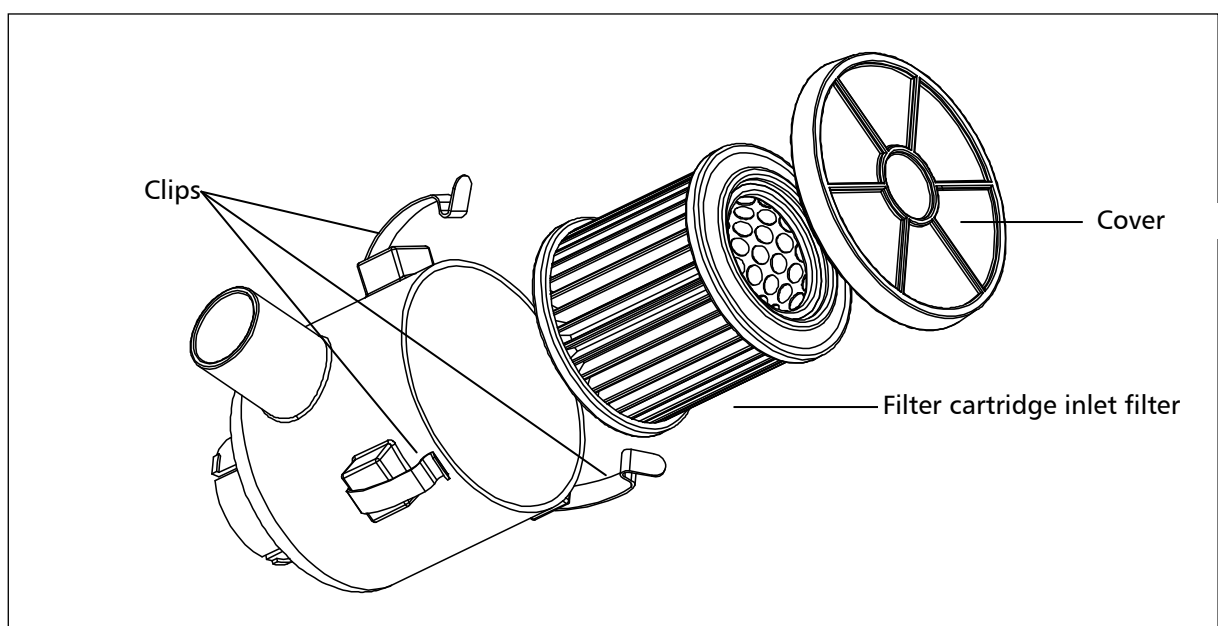
Inlet filter cartridge change as follows:

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

The inlet filter cartridge change is now completed.



Air filters



Filter cartridge inlet filter

## MAINTENANCE AND SERVICE

### Cylinder heads and valves

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

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



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

### Maintenance intervals

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

### Available special tools

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

Order number: 006847



Special tool

### Replace inlet and outlet valve 1st stage



#### Note

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

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

#### Remove Inlet / Outlet Valve

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

Install Inlet / Outlet Valve - see following page

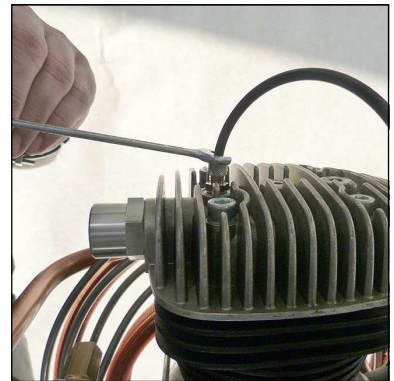


Fig. 1 - Loosen valve head screws

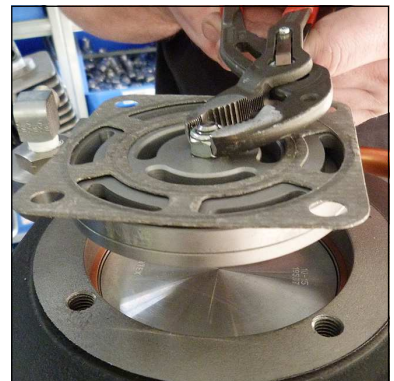


Fig. 2 - Pull out inlet and outlet valve

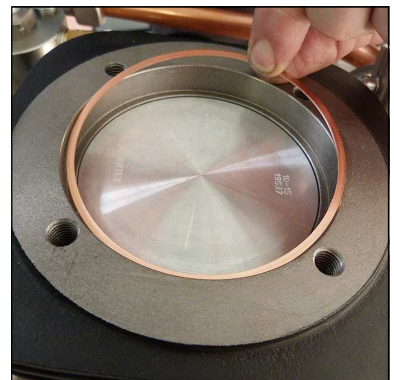


Fig. 3 - Copper valve ring

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



#### Warning

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

#### Install Inlet / Outlet Valve

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

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

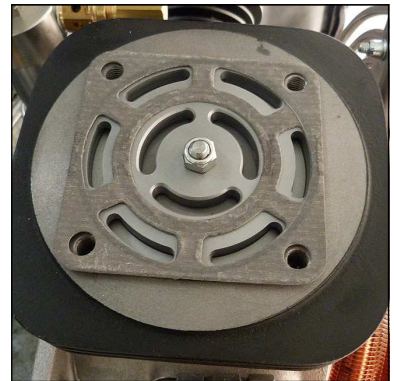


Fig. 4 - Place and align upper valve gasket

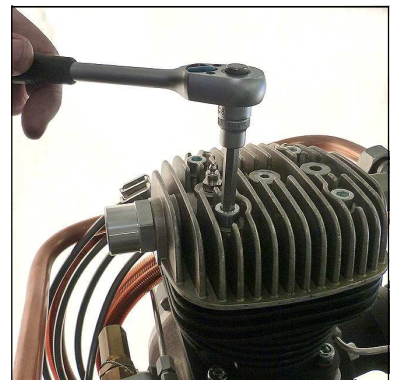


Fig. 5 - Screw valve head screws in



Fig. 6 - Connect pipe connections and tighten



## MAINTENANCE AND SERVICE

### Replace inlet and outlet valves 2nd and 3rd stage



#### Note

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

#### Inlet and outlet valves change as follows:

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

The inlet and outlet valves change is now completed.

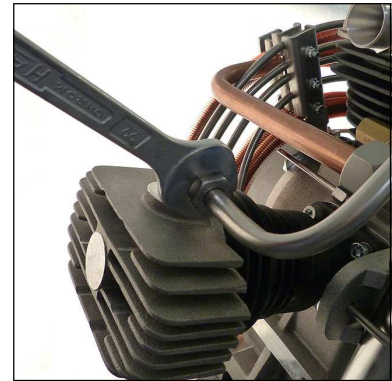


Fig. 1 - Loosen pipe connections



Fig. 2 - Loosen valve head screws

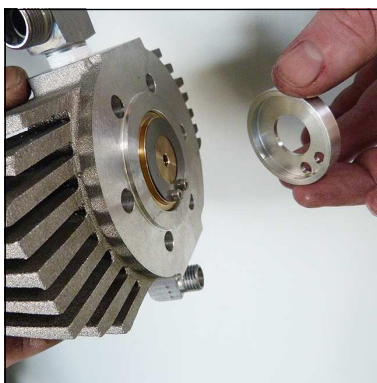


Fig. 3 - Remove lower valve gasket



Fig. 4 - Remove inlet and outlet valve



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

## MAINTENANCE AND SERVICE

### Safety valves

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

#### Safety valves are adjusted to:

- 1st Stage: 8 bar
- 2nd Stage: 50 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.

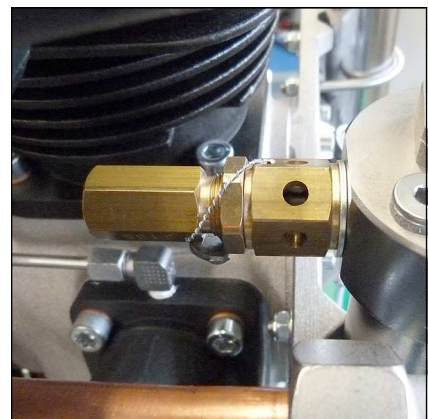
Turning the knurled screw clockwise could vent the valve completely and therefore the final filter housing.

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.



Safety valve 1st stage



Safety valve 2nd stage



Safety valve 3rd stage



#### Note

Replace defective safety valves immediately!

### 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 mole carbon filter housing. It maintains a pressure of at least 150 bar inside the filter housing - this optimises filter efficiency.

#### Pressure maintaining valve

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

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

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

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



Pressure maintaining/non-return valve



## MAINTENANCE AND SERVICE

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### Test of pressure equipment

According to the Pressure Equipment Directive (PED 97/23/EC) and TÜV Darmstadt (German supervising authorities). State: 10th of December, 2005

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.



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# MAINTENANCE RECORDS



## MAINTENANCE RECORDS

### Introduction form for the Operator

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| No. | Surname, Name | Date | Place | Signature | Instructor |
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By adding themselves to this list, the person that signs it confirms having been given a yearly introduction/instruction about the function and operation of the compressor unit. Furthermore, they have 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**

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

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## Cartridge change

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

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### Maintenance work

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## MAINTENANCE RECORDS

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### Replaced Parts

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## STORAGE

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### **Conservation / storage of the compressor**

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

- Run the compressor at 200 bar for approx. ten minutes
- Drain warm oil and replace by new oil.
- Open filling valves and run the compressor for a few minutes.
- Stop the compressor and open the drain valves.
- Close filling valves.
- Open the final filter housing and lubricate the O-Ring with a food grade grease or silicone grease.
- Store the compressor in a cool dry place free from dust and contamination. A cover is recommended as long as condensation can be avoided.

### **De-conservation, commissioning**

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

- Replace the final purification filter.
- Check oil level, replace oil if necessary. Fuel Driven Units only: Fill up fuel tank to top level to avoid corrosion.
- Inspect the condition of the v-belts, replace if necessary
- Inspect the filling hoses visually for signs of deterioration, replace as necessary.
- Fix filling valves by e.g. cable strips to avoid whipping around wildly. Open filling valves.
- Open the filling valves and run the compressor for approx 10 minutes with the filling valves open.
- Close the filing valves and allow the compressor to build up to working pressure.
- Check the correct safety valve setting and/or pressure switch setting (option).
- Check all connections and pipe work for leaks, retighten if necessary.

Once the above steps are completed to satisfaction, the unit is ready to use.

## STORAGE

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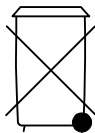
### Transportation instructions

- 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.