CHAPTER OVERVIEW

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Attachment .....

A

B

C

D

Manufacturer in terms of 97/23/EC

The full name and address of the manufacturer is:

Lenhardt & Wagner GmbH

An der Tuchbleiche 39
68623 Hüttenfeld / Germany

Phone: +49 (0) 62 56 - 85 88 0 - 0
Fax: +49 (0) 62 56 - 85 88 0 - 14

E-Mail: service@lw-compressors.com
Internet: www.lw-compressors.com

CE

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.

A

Operating Instructions

Breathing Air Compressor

LW 170 E Nautic / AL

LW 170 D Nautic / AL

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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.

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.

Drive motors

LW 170 E Nautic / AL

4,0 kW E-motor / 400V / 3 phase / 50 Hz (or 60 Hz), fully wired with cable and 16A CEE plug.

LW 170 D Nautic / AL

Air cooled diesel engine (4,8 kW), separat stainless steel fule tank, pull start and 12V electric start

Scope of Delivery LW 170 E Nautic / AL

The user-friendly LW 170 E Nautic with electric drive is ideal for mobile applications or occasional filling operations. It comes wired with power cable, plug and phase selector.

Versions

Filling pressure versions:

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

Specifications

- Electro Motor (Standard: 400V,3 phase,50Hz)
- Power cable with plug and phase selector
- Start/Stop Switch
- Hour counter
- Steel frame
- Manual condensate drain
- Pressure maintaining and non return valve
- 2x Filling hose c/w filling valve and pressure gauge
- Intermediate coolers
- Stainless steel pipes
- Oil- / Water separators after 2nd and 3rd stage
- Safety valves after each stage
- Filling pressure to your choice (200 or 300 bar)
- Connections to your choice (DIN 200 bar or 300 bar, CGA 200 bar or 300 bar and INT)
- Breathing air purification an accordance to EN 12021

Options

- Additional filling hose c/w filling valve
- Automatic stop at final pressure
- Automatic condensate drain
- Automatic start system
- Switch over device for 200 or 300 bar
- Motor protection switch
- Special voltages / frequencies on request
- Additional HP-Outlet
- Aluminium Frame

Scope of Delivery LW 170 D Nautic / AL

The user-friendly compressor with diesel engine in a compact frame is a popular alternative for expeditions and safaris. The LW 170 D Nautic is portable and therefore ideal for mobile applications or occasional filling operations.

Versions

Filling pressure versions:

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

Specifications

- Air cooled diesel engine (4,8 kW) with separate stainless steel fuel tank. Pull start and 12V electro start
- Steel frame
- Manual condensate drain
- Hour counter
- Pressure maintaining and non return valve
- 1x Filling hose c/w filling valve and pressure gauge
- Intermediate coolers
- Stainless steel pipes
- Oil- / Water separators after 2nd and 3rd stage
- Safety valves after each stage
- Filling pressure to your choice (200 or 300 bar)
- Connections to your choice (DIN 200 bar or 300 bar, CGA 200 bar or 300 bar and INT)
- Breathing air purification an accordance to EN 12021

Options

- Additional filling hose c/w filling valve
- Additional HP-Outlet
- Automatic condensate drain
- Automatic stop at final pressure
- Switch over device for 200 or 300 bar
- Motor protection switch
- Aluminium Frame

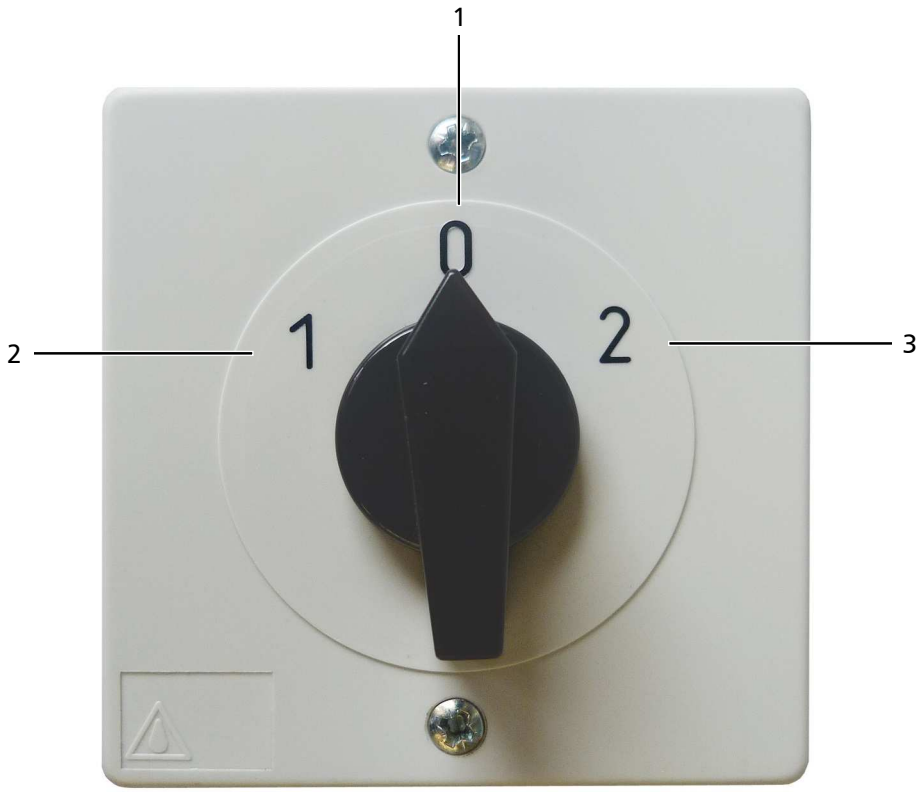
Technical Data

Technical Data	LW 170 E Nautic	LW 170 D Nautic
Capacity [l/min]:	170	170
Max. Operating Pressure [bar]:	330	330
RPM [min^{-1}]:	1530	1530
Number of Pressure Stages:	3	3
Cylinder Bore 1st Stage [mm]:	Ø 72	Ø 72
Cylinder Bore 2nd Stage [mm]:	Ø 28	Ø 28
Cylinder Bore 3rd Stage [mm]:	Ø 14	Ø 14
Medium:	Industrial Air / Breathing Air	
Intake Pressure:	atmosphaeric	
Oil Capacity [l]:	0.8	0.8
Intake Temperature [°C]:	0 < +45	0 < +45
Ambient Temperature [°C]:	+5 < +45	+5 < +45
Cooling Air Volume [m^3/h]:	> 1200	> 1650
Voltage:	400V / 3 phase / 50 Hz	-
Protection Class Drive Motor:	IP 54	-
Drive Power [kW]:	4,0	4,8
RPM Motor [min^{-1}]:	2,890	2,890
Start:	Start / Stop switch	Electric +Hand start
Noise level [dB(A)]:	85	92
Dimensions W x D x H [mm]:	1030 x 500 x 730	1030 x 500 x 730
Weight [kg]:	approx 135	approx 150
Content Volume Filter housing [l]:	0.5	0.5

Unit Assembly LW 170 E Nautic / AL

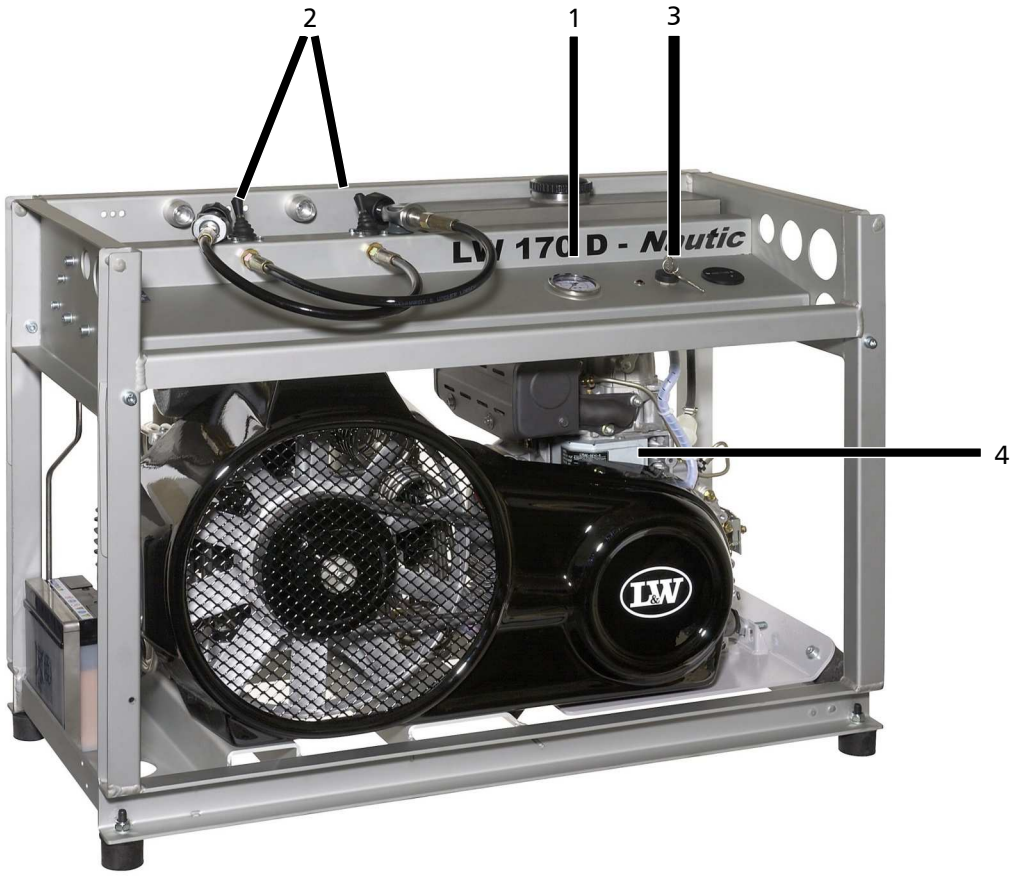
No.	Designation
1	Pressure gauge
2	Lever filling valve with hose and filling connection
3	Start/Stop button with operating lamp
4	Phasen selector switch

Phase selector switch LW 170 E Nautic / AL



No.	Designation
1	Switch position 0 - OFF
2	Switch position 1 - ON - Rotation 1
3	Switch position 2 - ON - Rotation 2

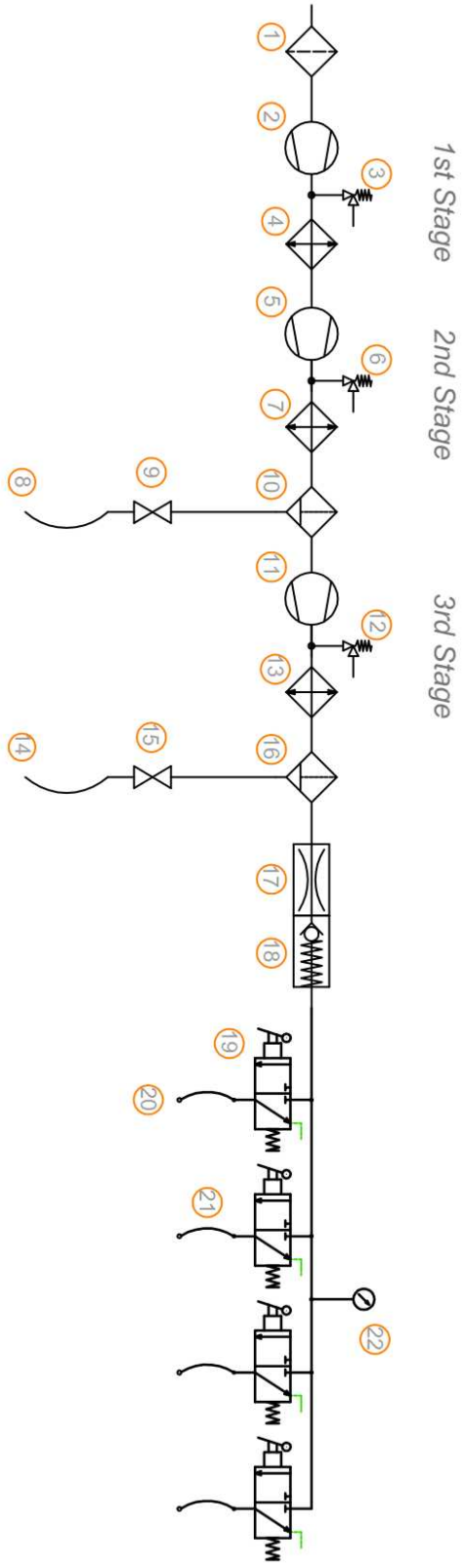
Unit Assembly LW 170 D Nautic / AL



No.	Designation
1	Pressure gauge
2	Lever filling valve with hose and filling connection
3	Electrical start (Start/Stop key)
4	Diesel engine

A

Flow chart



FLOW DIAGRAM

1 Air Intake Filter
2 1st Pressure Stage
3 Safety Valve 1st Stage
4 Cooling Pipe 1st Stage
5 2nd Pressure Stage
6 Safety Valve 2nd Stage
7 Cooling Pipe 2nd Stage
8 Condensate Release Hose
9 Condensate Release Valve
10 Oil-/Water Separator
11 3rd Pressure Stage
12 Endpressure-Safety Valve
13 Cooling Pipe Final Stage
14 Condensate Release Hose
15 Condensate Release Valve
16 Oil-/Water Separator
17 Pressure Maintaining Valve
18 Non-Return Valve
19 Self-Venting Lever Valve
20 Filling Connector
21 Filling Hose
22 Pressure Gauge (Filling Pressure)

SAFETY PRECAUTIONS

Intended Use

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

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

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

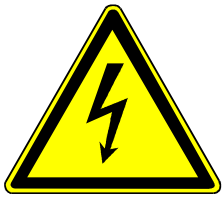
Qualified personnel are persons who are entitled to repair, service, modify and maintain the system.

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 instructions on the unit

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



Warning

High voltage!

Note

Ensure correct direction of rotation!

General Safety Precautions

- Read the Operating Instructions of this product carefully prior to use.
- Read the Operating Instructions of the diesel engine carefully prior to use. (LW 170 D Nautic)
- 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.

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 is 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.
- Check all additional safety notices for the diesel engine in the specific handbook (LW 170 D Nautic Versions)

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.
- Any work on the diesel engine should be done in accordance with ist specific handbook. (LW 170 D Nautic Versions)

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.
- Even minor relocation please disconnect the machine / system from 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.

INSTALLATION

Installation in closed rooms - LW 170 E Nautic / AL

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:

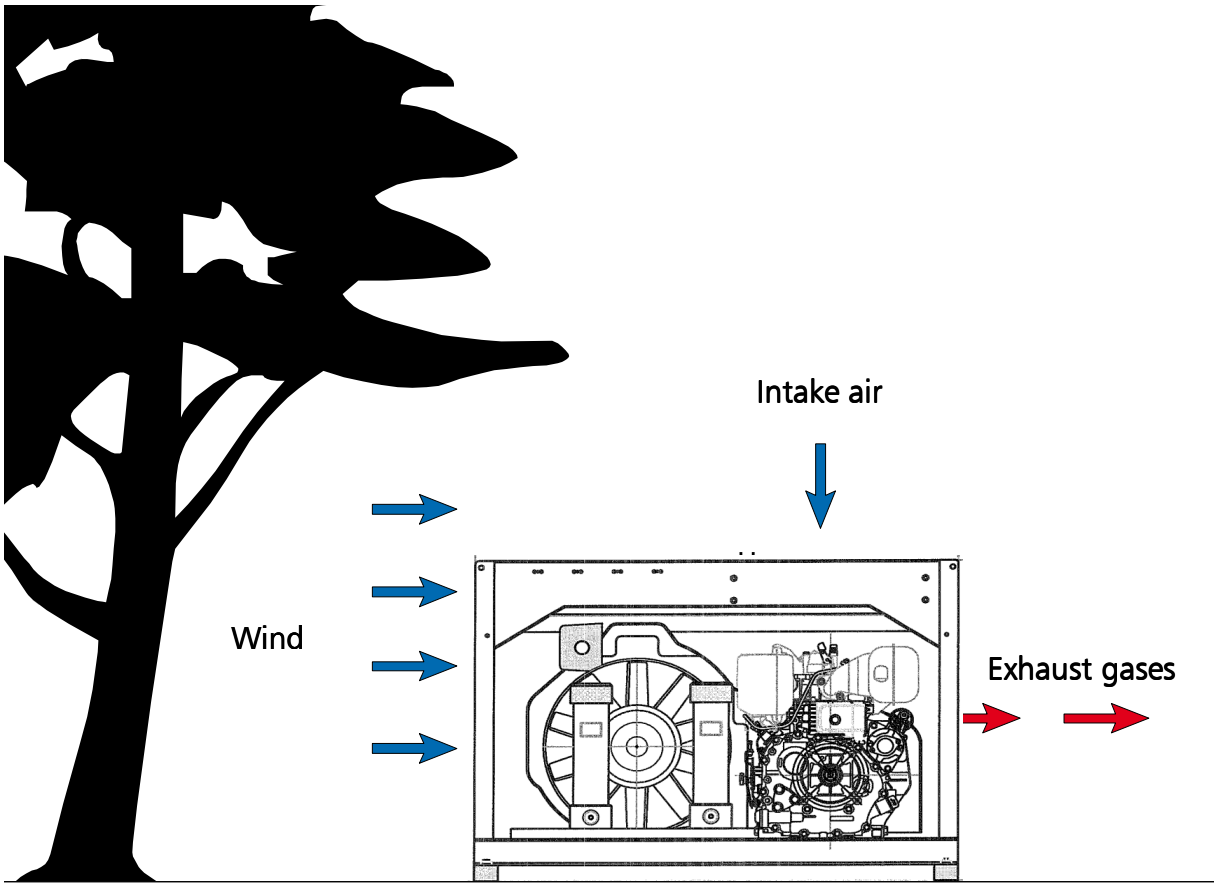
- Install the unit horizontally and level. The floor must be vibration-free and capable of taking the load of the system weight.
- The compressor room must be clean, dry, dust free and as cool as possible. Avoid direct exposure to sunlight. If possible, install unit in such a manner that the compressor 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^3 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 LW 170 D Nautic

Danger
Compressors with petrol or diesel motors must only be located outdoors, never indoors, not even in partially closed rooms however large they may be.

For outside installation 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.
- On units employing petrol or diesel motors, it is most important that only clean air is used. Position compressor in direction of wind so that exhaust fumes are blown away from the unit.
- Intake air must be free from noxious gas e.g. smoke, solvent vapours, exhaust fumes etc.
- Observe the specified operating temperature (see "Technical Data")!



Dimensions LW 170 E Nautic / AL

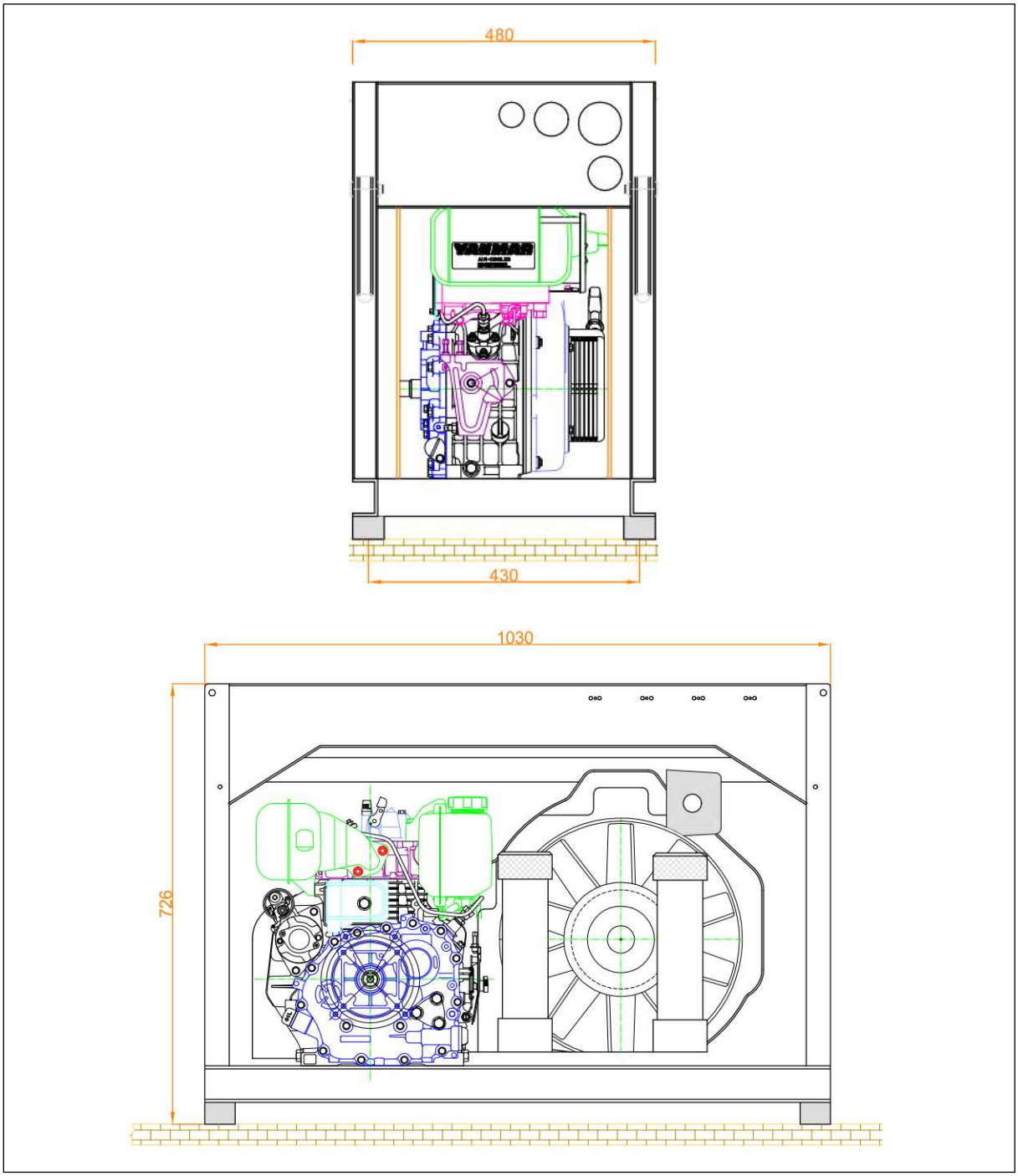


Fig. Dimensions

Dimensions LW 170 D Nautic / AL

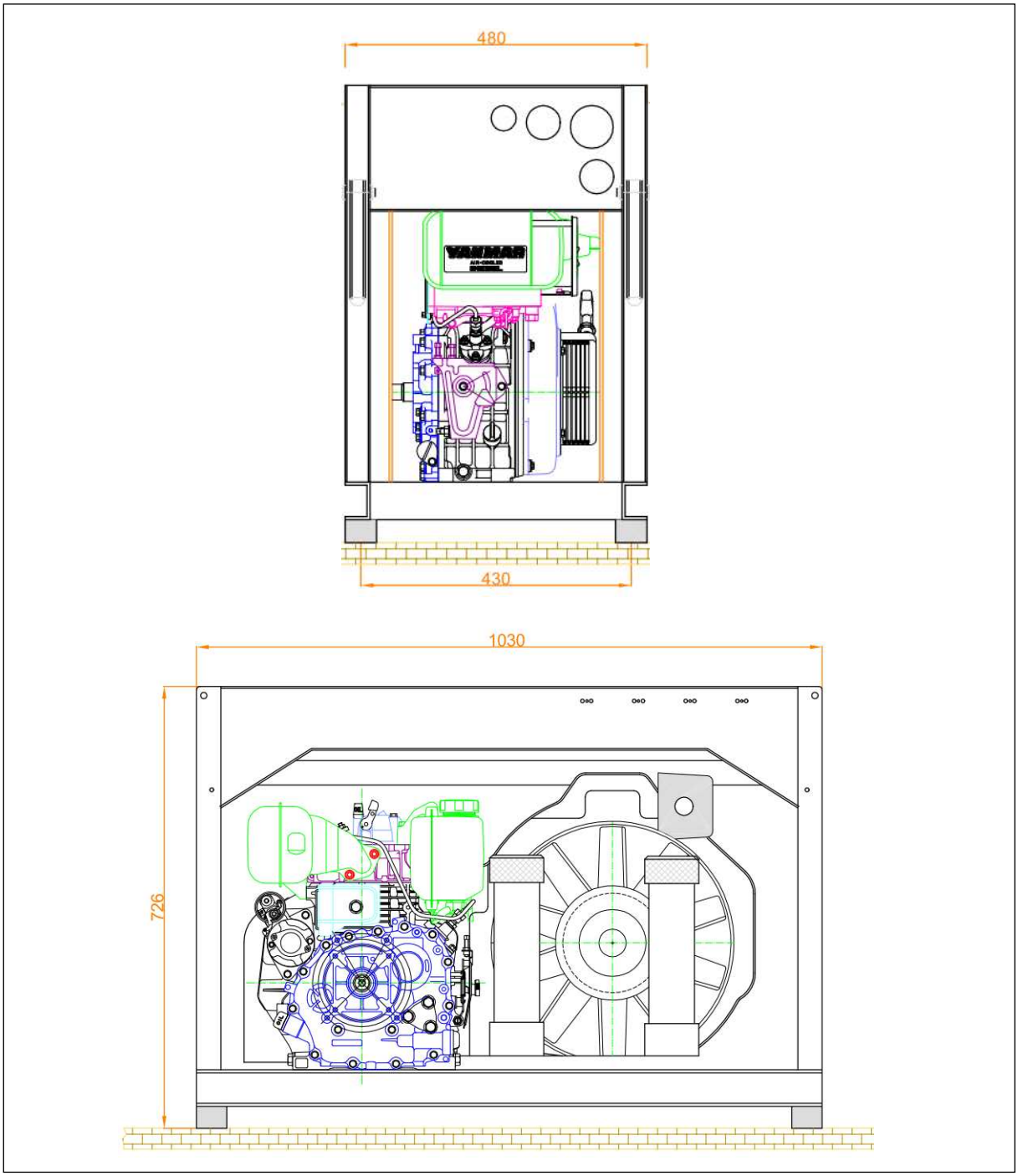


Fig. Dimensions

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. 500 mm, rear side min. 500 mm. Avoid anything in this area which can restrict the cooling air flow.
- No minimum distances are required at the side panels.

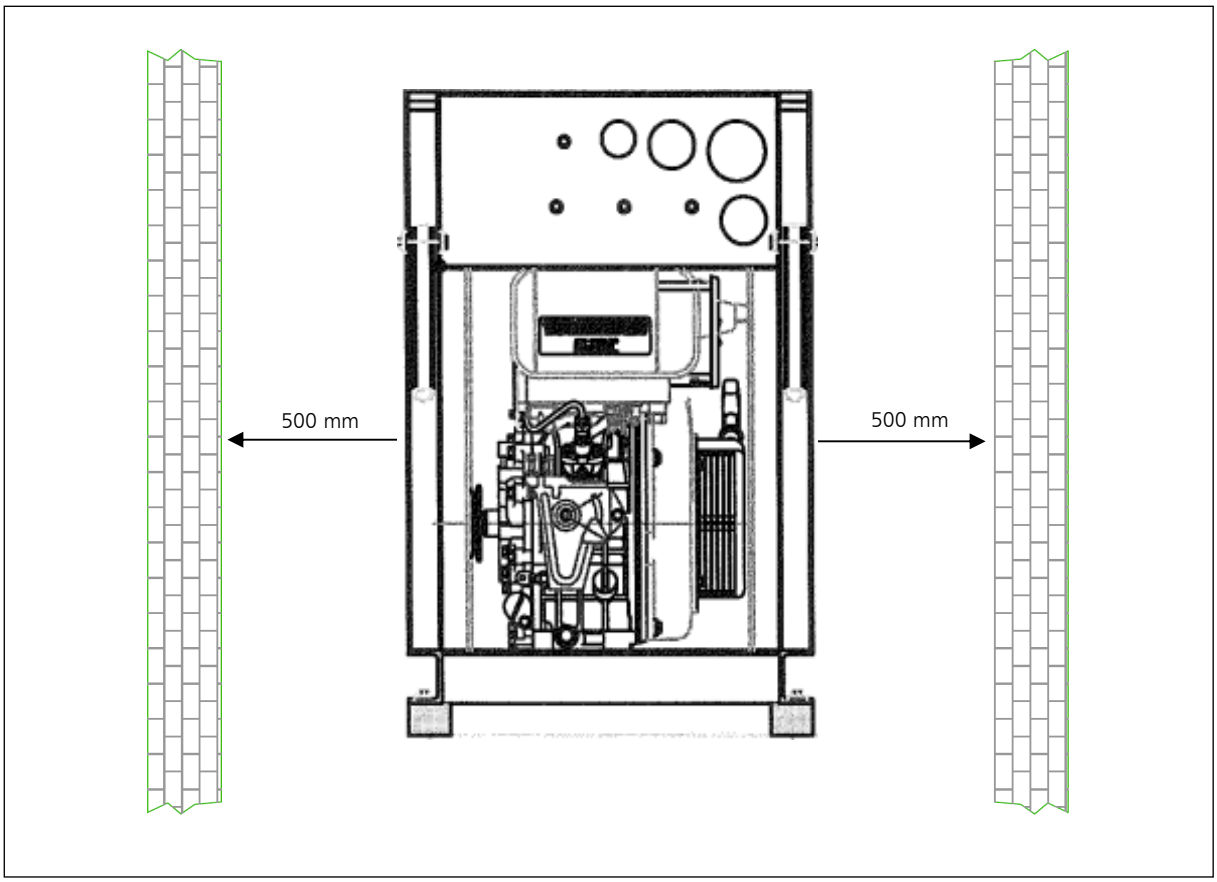


Fig. Minimum distances LW 170 E Nautic

Hinweis
Do not use LW 170 D Nautic in closed rooms!

Ventilation LW 170 E Nautic

- 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 x drive power [kW] = required cooling air flow [m³/h]
  Example 11kW motor: 300 x 11kW = 3300 m³/h = 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.

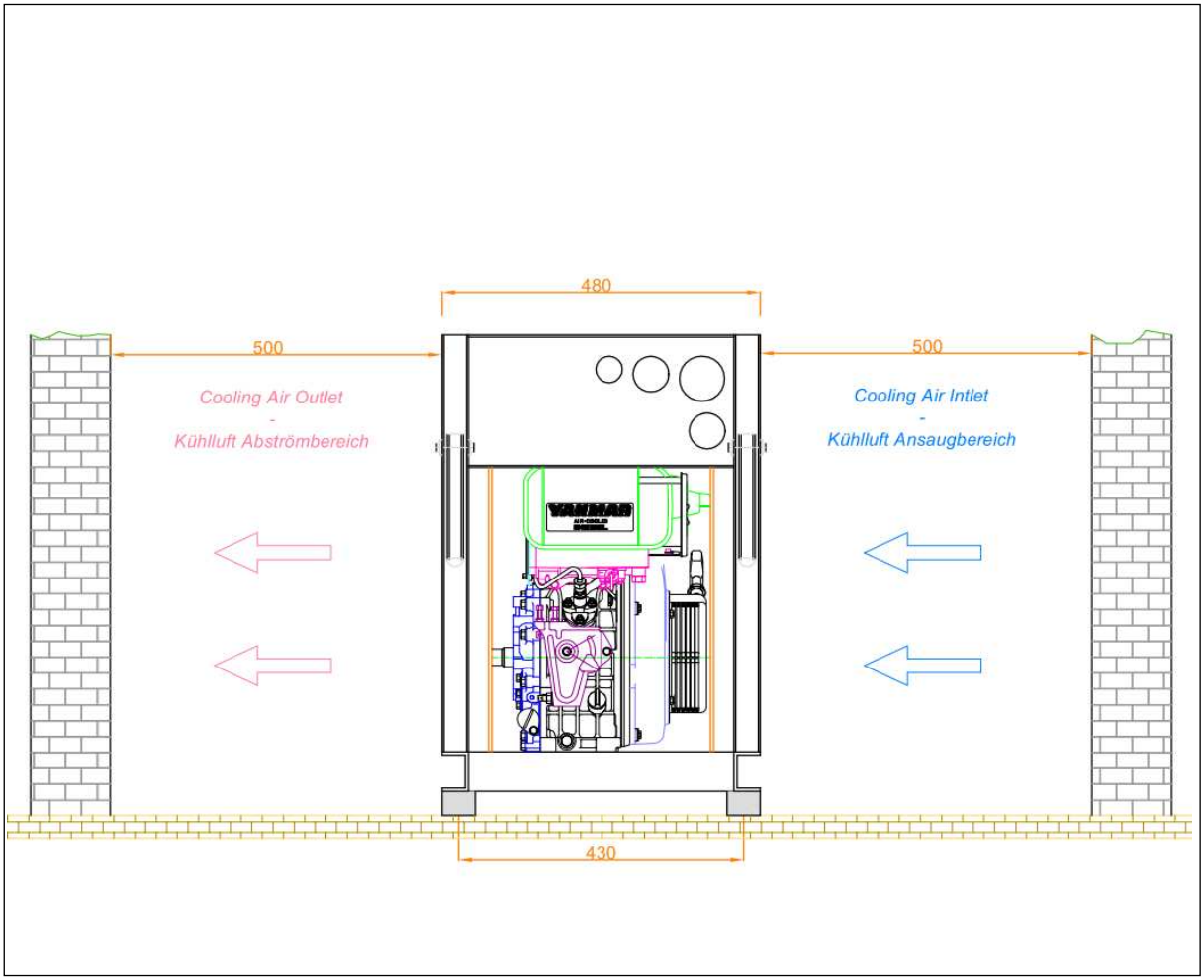


Fig. Ventilation via ventilation stack

Electrical Installation LW 170 E Nautic / AL

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 "Operation -> First commisioning - LW 170 E Nautic).
- Fuse the motor correctly (see table; use slow-blow fuses).

Electrical Installation LW 170 E Nautic

The compressor comes fully wired with cable and plug. An installation is not necessary.

Recommended fuses for 360 - 500 V operating voltage

Nominal motor power		Fusing start A		Connection in mm²	
[kw]	[A]	Direct	Star/Delta	Contactor supply	S/D* to Motor
2.2	5	10	-	1.5	1.5
4	8.5	20	-	2.5	1.5

Recommended fuses for 220 - 240 V operating voltage

Nominal motor power		Fusing start A		Connection in mm²	
[kw]	[A]	Direct	Star/Delta	Contactor supply	S/D* to Motor
2.2	8.7	20	-	1.5	1.5
4	14.8	25	-	2.5	1.5

* S/D - Star / Delta.

OPERATION

Important operation instructions

Danger
On petrol or diesel engines, operation unit must only be located outdoors, never indoors, not even in partially closed rooms however large they may be.

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.

Prior to first commissioning, observe the following:

- Ensure that cooling air can flow freely.
- Check compressor oil level (see "Service and Maintenance").
- 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 "Service and Maintenance").
- Check if all filling valves are closed. Open one filling valve and hold tight manually!

Compressor start

1. Start the compressor by switching position 1 of phase selector switch.
2. Check turning direction - see the rotary direction arrow on the compressor block (see next pages). If the turning direction is wrong, immediately stop the compressor by switching in position 0 and start the compressor by switching in position 2.

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. Run the compressor for about 2 minutes.
4. Close the open filling valve carefully.
5. Run the compressor up to maximum pressure and check the function of the final pressure safety valve. If the compressor is equipped with an automatic stop system please check the automatic shut down at final pressure. If the final pressure switch does not shut off, switch off the compressor by placing the switch at position 0 (see chapter "Remedying faults").
6. Check the compressor unit for leaks (see "Service and Maintenance").
7. Check the condesate drain valves:
   Standard: Open the condensate drain valves carefully (see "Service and Maintenance").
   Option: Automatic condensate drain:
   - Fix the black condensate hoses
   - Drain test - press the test button
   - If correct, air escapes
8. Stop the compressor by switching in position 0.
9. Open all filling valves carefully to vent.

Check turning direction - LW 170 E Nautic / AL

Warning
Wrong 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 compressor block).

If the direction of rotation is wrong, the cooling air flow will not be sufficient, with the consequence that the pistons will be damaged.

Rotation direction arrow on the compressor block

Rotation direction change - LW 170 E Nautic / AL

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

In case of a wrong rotation direction there is the possibility to change the switching position of the phase selector switch. In case of wrong rotation direction in switching position 1, start the compressor in switching position 2. In case of wrong rotation direction in switching position 2, start the compressor in switching position 1.

Prior to first commissioning, observe the following:

- Ensure that cooling air can flow freely.
- Position compressor in direction of wind so that exhaust fumes are blown away from the unit.
- Take protection measures to avoid damages or injury by exhaust gases/exhaust pipe.
- Check fuel capacity.
- Check drive motor oil level.
- Check the oil level of the compressor.
- Check all connections and tighten if necessary.
- Check if a filter cartridge is in place. (see "Service and Maintenance")
- Check V-belt tension. (see "Service and Maintenance")
- Read carefully the handbook of the diesel engine.
- Ensure that all filling valves are closed. Open one filling valve and hold tight manually!

Fig. 1 - Manual condensate drain

Start the compressor

1. Fix the filling connectors in the aluminium holder
2. Open the lever filling valves
3. Open the manual condensate valves
4. Turn the start/stop key to the right side until the motor run completely (Fig. 2)
5. Close the manual condensate valves
6. Run the compressor for about 2 minutes
7. Close the lever filling valves
8. Run the compressor up to maximum pressure and check the function of the final pressure safety valve. If the compressor is equipped with an automatic stop system please check the automatic shut down at final pressure. If the final pressure switch does not shut off, stop the compressor with the start/stop key.
9. Check the compressor for leaks.
10. Standard: Check the manual condensate drain valves.
    Option: Check automatic Condensate Drain.
    - Fix the black condensate hoses
    - Drain test - press the test button
    - If correct, air escapes
11. Stop the compressor by the start/stop key

Fig. 2 - Start/Stop key

Prior to daily operation observe the following:

LW 170 E Nautic

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

LW 170 D Nautic

- Ensure cooling air can flow freely.
- Position compressor in direction of wind so that exhaust fumes are blown away from the unit. (see Installation -> Installation LW 170 D Nautic)
- Take protection measures to avoid damages or injury by exhaust gases/exhaust pipe.
- Check the compressor oil level.
- Check if filter cartridge is in place / observe filter cartridge life!
- Check fuel capacity.
- Check drive motor oil level.
- Ensure toxic-free, pure intake air.

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
5. When filling pressure gauge increases, open filling valves slowly.
6. Fill the compressed air cylinders to the desired pressure; close slowly the valves of the cylinders.
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.

Switch off the compressor

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

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 switching the phase selector switch in position 0.

Switch off the compressor unit LW 170 E Nautic

- Stop compressor by switching the phase selector switch in position 0.

Switch off the compressor unit LW 170 D Nautic

- Stop compressor by the toggle switch.
- Close fuel shut-off valve.

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"

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

Automatic condensate drain defective
Only valid with the option - Automatic Condensate Drain

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
Only valid with the option - Automatic Condensate Drain

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
Only valid with the option - Automatic Condensate Drain

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

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

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.

Any work on the diesel engine should be done in accordance with ist specific handbook.

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.

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	LW 170 E Nautic	1	001375
	LW 170 D Nautic	1	001463
Operate unit to final pressure and check function of final pressure switch	-	-	-

Weekly or as needed

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	-	-	-
Check condition of the Battery	-	-	-
Check condition of fuel hose	-	-	-

Annually

Maintenance work	Type	Quantity	Order No.
Oil change, if less than 250 operating hours	-	0.8	000001
Check safety valve function + refill oil	-	1	008500
Clean the coolers	-	-	-
Clean all oil/water separators, if less than 250 operating hours	-	-	-
Service intake filter (depends on condition - if less than 500 operating hours)	-	-	-
Check lever filing valves	-	Rep. Small Rep. Big	002451 002452

At 10 operating hours

Maintenance work	Type	Quantity	Order No.
Oil change	-	0.8	000001

At 30 operating hours

Maintenance work	Type	Quantity	Order No.
Oil change	-	0.8	000001

At 100 operating hours

Maintenance work	Type	Quantity	Order No.
Oil change	-	0.8	000001

Every 100 operating hours

Maintenance work	Type	Quantity	Order No.
Oil change	-	0.8	000001

Every 250 operating hours

Maintenance work	Type	Quantity	Order No.
Clean oil/water separators	-	-	-

Every 500 operating hours

Maintenance work	Type	Quantity	Order No.
Replace V-belt	LW 170 E Nautic (50Hz)	2	000148
	LW 170 E Nautic (60Hz)	2	-
	LW 170 D Nautic	2	000148
Replace o-ring of the DIN filling connector	-	1	001237
Replace o-ring of the revolvable filling hose	-	1	001224
Change intake filter	-	1	000119
Change o-ring of intake filter housing	-	1	000012
Replace o-ring of the water separator	O-Ring	2	000016
Replace o-ring of the final filter housing	O-Ring	2	000016
	O-Ring	2	003099
	O-Ring	1	003692
Replace o-ring of the condensate drain vlave	-	2	000043
Check pressure maintaining / non-return valve	-	-	-
Check all connections for leaks	-	-	-

Every 1000 operating hours

Maintenance work	Type	Quantity	Order No.
Replace o-rings and gaskets of 1st, 2nd and 3rd stage	Silicon gasket (1. Stufe)	2	000033
	o-ring valve (2nd stage)	1	000035
	o-ring valve (3rd stage)	1	000034
Replace all inlet and outlet valves incl. Gaskets	1st stage inlet valve	1	000026
	1st stage outlet valve	1	000029
	2nd stage (incl. gasket)	1	000031
	3rd stage (incl. gasket)	1	000032

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

Service Kits LW 170 E Nautic for 50 Hz

Compressor	Frequency	Operating Hours	Order No.
LW 170 E Nautic	50 Hz	500 h	006883
LW 170 E Nautic	50 Hz	1000 h	006884

Service Kits LW 170 D Nautic

Compressor	Frequency	Operating Hours	Order No.
LW 170 D Nautic	-	500 h	006883
LW 170 D Nautic	-	1000 h	006884

Check V-belt tension

The compressors LW 170 E Nautic and LW 170 D Nautic are driven by V-belts. Check correct V-belt tension regularly, adjust if necessary. The V-belt could lose tension during transportation. Please check the V-belt tension before starting the compressor.

Tension V-belts

- Switch off the compressor unit, pull the plug if necessary.
- Tilt the compressor slightly aside.
- Loosen mounting screws of the motor flange (Fig. 1+2).
- Turn clamp nut until correct V-belt tension (Fig. 3).

  Rotation direction clockwise: increase V-belt tension.

  Rotation direction anti-clockwise: reduce V-belt tension.

- Tighten mounting screws of the motor flange.
- Check V-belt tension and adjust if necessary.

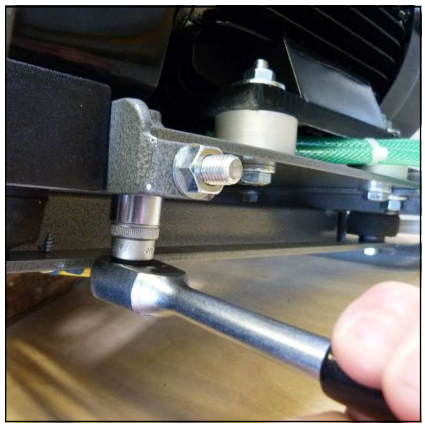


Fig. 1 - Loosen mounting screws of the motor flange

Fig. 2 - Loosen mounting screws of the motor flange

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.

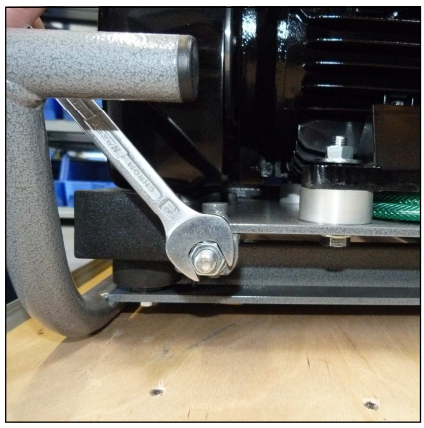


Fig. 3 - Turn clamp nut until correct V-belt tension

Settings

Motor Type	Initial Installation	Operation after running in
E-motor 50Hz	400 N	300 N
E-motor 60Hz	350 N	250 N
Bencine	400 N	300 N

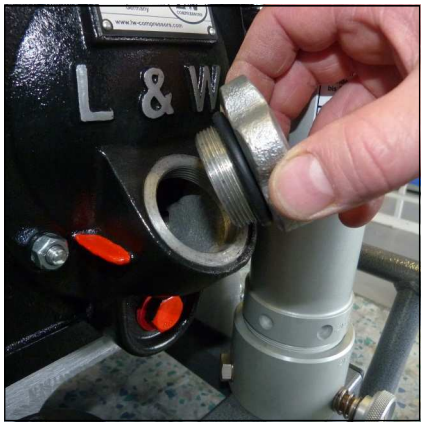
Compressor Lubrication

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

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.



Oil cover

Oil level check as follows:

- Pull out oil cover.
- The oil level should reach the upper edge of the threaded hole. For better realize just use a tool.
- Insert the oil cover.

In case of the oil level should not reach the upper maximum, please do refill new compressor oil.

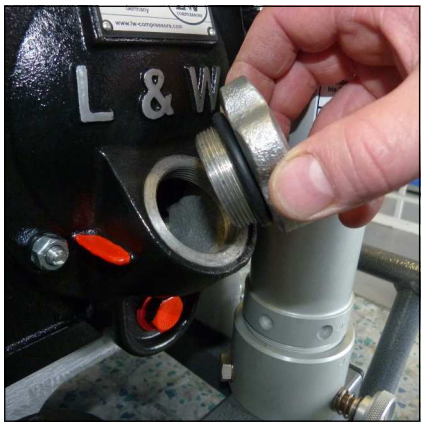
Oil level

Oil change

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

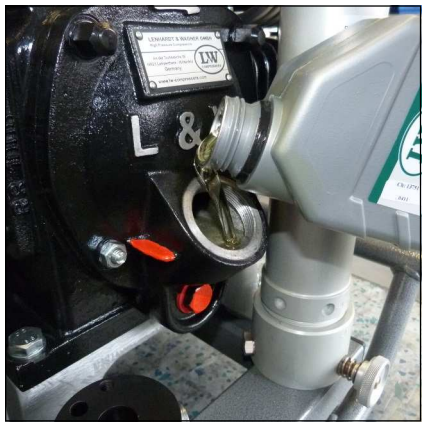
Oil change as follows:

- Run compressor warm for about 2 minutes.
- Switch off and vent compressor.
- Tilt the compressor aside.
- Place a suitable oil drain tray under the drain plug (red marked hexagon bolt).
- Screw off red oil drain plug carefully.
- Drain oil.
- Screw in red oil drain plug and tighten.
- Pull out oil cover (Fig. 1) and fill with oil. (Fig. 2)
- Check oil level.
- Check condition og oil cover o-ring and insert the oil cover.



(Fig.1) Oil cover

The oil change is now completed.



(Fig.2) Fill with oil

Maintenance intervals

- First oil change at 10 operating hours (total hours).
- Second oil change at 30 operating hours (total hours).
- Third oil change at 100 operating hours (total hours).
- All further changes after each 100 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. (P/N: 000001)

Only LW 170 D Nautic

Drive motor oil change intervals: see manufacturer's specification for the drive motor.
(L&W P/N: 000004)

Manual condensation dump system

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

Fig. 1 - Condensate drain valve 2nd stage

Oil- / water separators

The compressor comes as standard with a manual condensation dump system. Drain condensate separators every 15 to 30 minutes, depending to air moisture.

Option Automatic Condensate Drain: To release the complete condensate through the black plastic hoses we recommend using a 10 l container at least.

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

Fig. 2 - Oil- / water separator 3rd stage

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 valve of the 2nd stage oil / water separator (Fig. 1) 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 inside every 250 operating hours or at least once a year, to check for corrosion damage and to replace o-rings if necessary (not the o-ring of the valve spindle).

All oil / water separators have integrated o-rings which need to be replaced every 500 operating hours (incl. o-ring of the valve spindle).

Oil- / water separator 2nd stage - maintenance

Note
Clean all parts thoroughly before assembly.

Maintenance / cleaning of oil / water separators 2nd stage as follows:

- Loosen mounting screws of the cooler bracket (Fig. 1) and pipe connections (Fig. 2+3), extract cooler afterwards.
- Open lock ring with the filter key and remove it (Fig. 4), change o-ring afterwards.
- Screw lock ring slightly, place cooler and screw pipe connections slightly.
- Tighten mounting screws of the cooler bracket (Fig. 1) and pipe connections (Fig. 2+3).
- Tighten lock ring with the filter key (Fig. 5).
- Turn off condensate drain valve, change o-ring and turn in condensate drain valve completely (Fig. 6).

The oil / water separator maintenance is now completed.

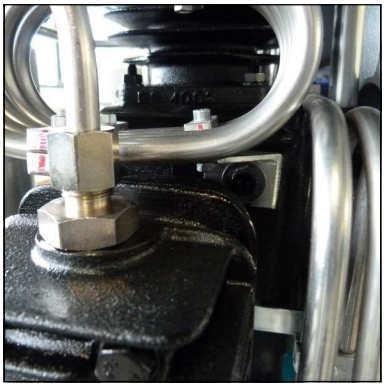


Abb. 1 - Mounting screw

Abb. 2- Pipe connection

Abb. 3 - Pipe connection

Abb. 4 - Remove lock ring and change o-ring

Abb. 5 - Tighten lock ring

Abb. 6 - O-ring, condensate drain valve

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.

The cartridges of diesel-driven versions are equipped with additional CO/CO_2 filters.

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.

Maintenance Intervals

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

- 19 hours for LW 170 E Nautic (P/N: 001375)
- 13 hours for LW 170 D Nautic (P/N: 001463)

Filter cartridge change

Filter cartridge change as follows:

- Stop the compressor and open carefully the drain valves. Please wait till the filter housing is completely vented; this procedure takes approx. 1 - 2 minutes.
- When no air discharges from the condensate release hoses, the pressure vessels are depressurized.
- Remove the end filter cover (Fig. 1 / Fig. 2). Remove the filter cover by using the filter tool. The housing can not be opened when it is still under pressure.
- After opening the housing, pull out spring and filter cartridge (Fig. 3).
- Check the condition of the o-ring, and replace if necessary.
- Open the packaging of the new filter cartridge and place it into the filter housing (press slightly).
- Put on the spring (Fig. 3).
- Screw in the filter cover with help of the filter tool.

The filter cartridge change is now completed.

Fig. 1 - Filter housing with filter tool

Fig. 2 - Filter housing without filter cover

Fig. 3 - Filter cartridge and spring

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

P/N	Filtering	Models
001375	DIN EN 12021 (Breathing air)	LW 170 E Nautic
001463	DIN EN 12021 (Breathing air) incl. CO/CO2	LW 170 D Nautic

Filter housing - maintenance

Note
Grease all o-rings and clean all parts thoroughly before assembly.

Filter housing maintenance as follows:

- Open filter cover with the filter key, extract it (Fig. 1) and pull out spring and filter cartridge (Fig. 2).
- Change o-ring and turn off the filter housing with the filter key (Fig. 3).
- Change o-ring (Fig 4), remove duct collar and also change the other o-rings (Fig. 5).
- Push in duct collar, place filter housing and tighten with the filter key.
- Insert filter cartridge, place spring and tighten filter cover with the filter tool.
- Turn off condensate drain valve completely, change o-ring and turn in condensate drain valve completely (Fig. 6).

The oil / water separator maintenance is now completed.

Abb. 1 - Open filter cover

Abb. 2 - Remove filter cartridge

Abb. 3 - Turn off filter housing

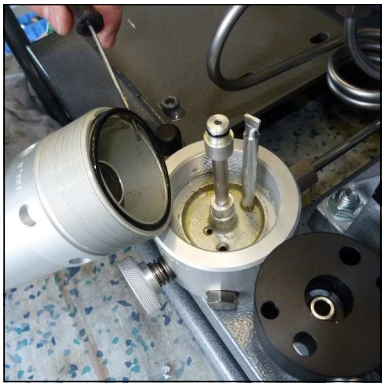


Abb. 4 - Remove lock ring

Abb. 5 - Remove duct collar and change o-rings

Abb. 6 - Change o-ring

Inlet Filter

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

A paper dry filter is used for the inlet filter.
Check air inlet filter regularly or replace it. Depending on the degree of contamination, the filter inlet can be cleaned by compressed air. Defective air inlet filters should be immediately replaced with a corresponding filter.

Intake filter

Maintenance intervals

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

Check or change filter inlet

Note
Clean all parts thoroughly before assembly.

To properly change the filter inlet, proceed as follows:

- Loosen mounting screw (Fig.1).
- Remove intake filter housing cover (Fig.2).
- Change O-Ring.
- Change intake filter (Fig. 3).
- Put on the intake filter housing cover (Fig. 2).
- Tighten mounting screws (Fig.1).

The filter inlet change is now completed.

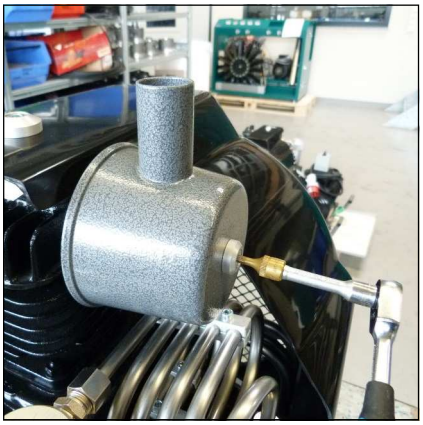


Fig. 1 - Iloosen mounting screw

Fig. 2 - Remove intake filter housing cover

Fig. 3 - Change intake filter

Valve heads and valves

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

Valves are subject to normal wear and tear and have to be replaced at specified intervals (depending on specific operating conditions). Dismount valve heads to change valves. In 1st stage there is an inlet valve and an outlet valve in use. The valves of 2nd and 3rd stage are combined valves; inlet and outlet valves are a single unit.

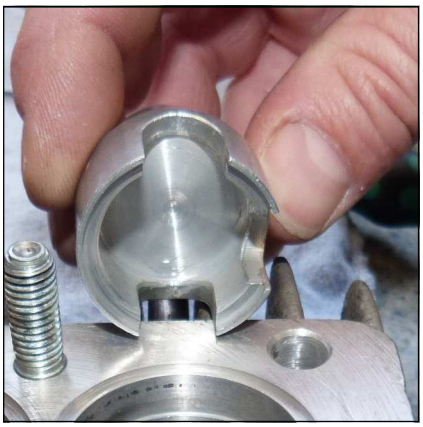


Fig. 1 - Outlet valve holder 1st. stage

To change the inlet– and outlet valves it is necessary to remove the fan protection cover!

Fig. 2 - In – and outlet valve c/w gaskets 2nd stage (top) und 3. Stufe (below)

Fan protection cover dismantling

Dismantle the fan protection cover as follows:

- Remove top mounting screw (Fig. 1).
- Remove protection plate (Fig. 2).
- Tilt the compressor aside.
- Loosen both bottom mounting screws (Fig. 3).
- Remove fan protection cover.

The fan protection cover dismantling is now completed.

Mounting the fan protection cover

Mount the fan protection cover as follows:

- Tilt the compressor aside.
- Place the fan protection cover.
- Tighten both bottom mounting screws.
- Position the compressor upright.
- Adjust the protection plate between cylinder head and cover.
- Tighten top mounting screw (Fig. 1).

The fan protection cover mounting is now completed.

Fig. 1 - Remove top mounting screws

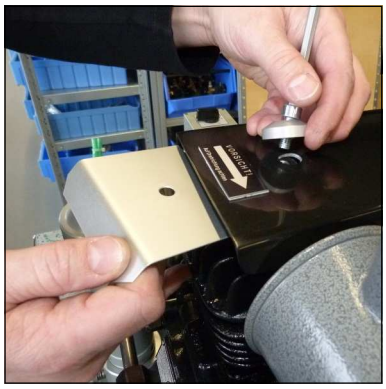


Fig. 2 - Remove protection plate

Fig. 3 - Loosen both bottom mounting screws

Replace inlet and outlet valve 1st stage

Note

The figures can differ from the delivered parts.

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

- Remove spring wire clamp of the crankcase ventilation hose (Fig. 1) remove hose.
- Loosen pipe connections (Fig. 2).
- Remove valve head and valve head cover screws (Fig.3+4).
- Remove valve head and check if defective (Fig. 5).
- Spring plate (Fig. 5), remove inlet and outlet valve bracket (Fig. 6).
- Remove inlet and outlet valve.

Install inlet / outlet valve - see following page

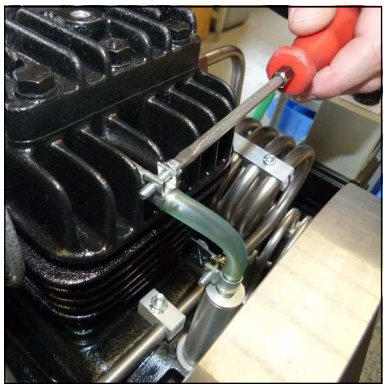


Fig. 1 - Spring wire clamp

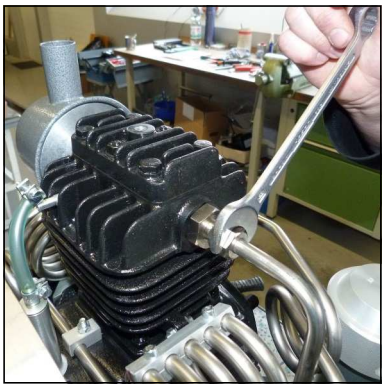


Fig. 2 - Pipe connection

Fig. 3– Valve head screws

Fig. 4 - Valve head cover screws

Fig. 5 - Spring plate inside the valve head

Fig. 6 - Inlet valve braket

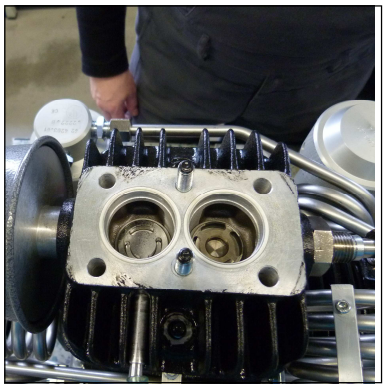


Fig. 7 - Inlet and outlet valve inside the valve head

Replace inlet and outlet valve 1st stage

Note

The figures can differ from the delivered parts.

Install inlet and outlet valve 1st stage as follows:

- Place the inlet and outlet valve. Ensure the correct position of the valve (Fig. 1+2).
- Insert inlet and outlet valve bracket and place valve head cover. Ensure the correct position of the valve (Fig. 3).
- Change valve gaskets (Fig. 4) and spring plate. Ensure the correct position of the spring plate (Fig. 5).
- Tighten valve head and cover screws crosswise (Fig. 6).
- Tighten pipe connections. (Fig. 7)
- Fix hose and spring wire clamp.

The inlet and outlet valve change is now completed.

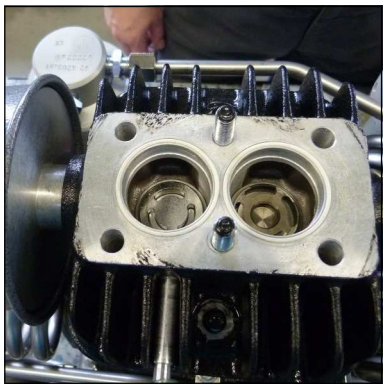


Fig. 1 - Positioning from above

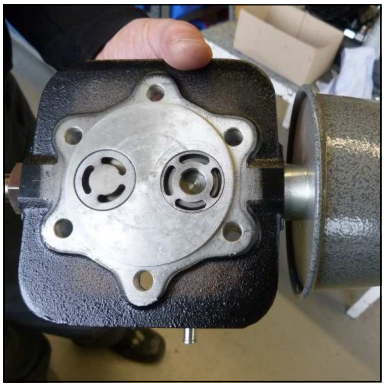


Fig. 2 - Positioning from the bottom

Fig. 3 - Valve bracket positioning

Fig. 4 - Change valve gasket

Fig. 5 - Spring plate positioning

Fig. 6 - Tighten valve head

Fig. 7 - Tighten pipe connections

Replace inlet and outlet valve 2nd stage

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

- Loosen pipe connections (Fig. 1).
- Loosen valve head screws (Fig. 2).
- Remove valve head (Fig. 3) 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 centre pin).
- Change upper valve gasket (o-ring).
- Change lower valve gasket (aluminium gasket).
- Insert new inlet and outlet valve into the valve head (Fig. 4). CAUTION: Observe correct position between valve centre hole and valve head centre pin.
- Place the valve head with the new inlet and outlet valve.
- Place pipe connections.
- Tighten valve head screws crosswise (Fig. 2).
- Tighten pipe connections (Fig. 1).

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

Fig. 1 - Loosen pipe connections

Fig. 2 - Loosen valve head screws

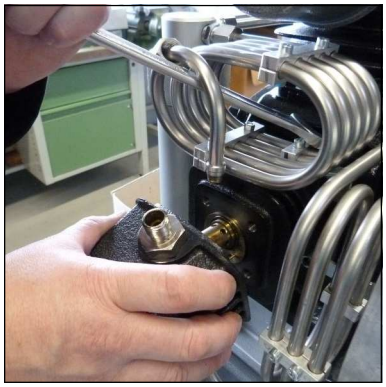


Fig. 3 - Remove valve head

Fig. 4 - Ensure correct valve position (centre pin)

Replace inlet and outlet valve 3rd stage

Replace the inlet and outlet valve 3rd stage as follows:

- Loosen pipe connections of the water separator 2nd stage and the filter housing (Fig. 1+2).
- Remove mounting screws from the cooling pipe bracket (Fig. 3).
- Loosen valve head screws.
- Remove valve head (Fig. 4) Observe that the lower valve gasket is also pulled out. It can still stick inside the compressor.
- Remove inlet / outlet valve.
- Check valve head if defective (check locating pin).
- Change upper valve gasket (o-ring).
- Change lower valve gasket (aluminium gasket).
- Insert new inlet and outlet valve into the valve head (Fig. 5). CAUTION: Observe correct position between valve centre hole and valve head locating pin.
- Place the valve head with the new inlet and outlet valve.
- Tighten pipe connections.
- Tighten valve head screws crosswise (Fig. 2).
- Tighten mounting screws of the cooling pipe bracket (Fig. 3).
- Tighten pipe connections (Fig. 1+2).

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

Fig. 1 - Loosen pipe connections of the water separator

Fig. 2 - Loosen pipe connections of the filter housing

Fig. 3 - Remove mounting screws from the cooling pipe bracket

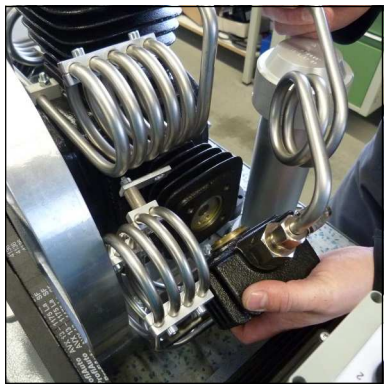


Fig. 4 - Remove valve head with inlet and outlet valve

Fig. 5 - 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.

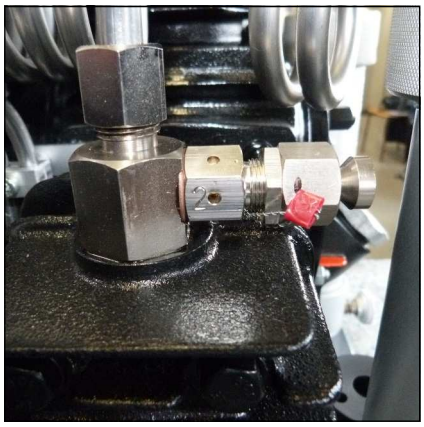


Fig. 1 - Safety valve 2nd stage

Safety valves are adjusted to:

- 1st Stage: 14 bar
- 2nd Stage: 80 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.

Fig. 2 - Safety valve 3rd stage

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!

Final stage safety valve

The safety valve must periodically - in accordance with the currently valid Pressure Equipment Directives - checked on operation and reliability.

Figure 1: Position for oil refill

Refill annually lubricating oil

- Oil filling position:
  Hole on the spacer (see arrow, Figure 1)
- Oil level:
  Fill the lubrication oil into the hole until oil runs out.

Note

- *Lubricating oil for the safety valve: L&W Article N°.: 008500 (content: 30 ml)*

Pressure maintaining / non return valve

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

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

Pressure maintaining/non-return valve

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 the 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.

Adjust pressure maintaining valve

- Vent filling valve and close afterwards (filling pressure gauge 0 bar)
- Start the compressor
- Observe filling pressure gauge
- When the opening pressure of the pressure maintaining valve is reached, the indicated filling pressure increases within some seconds from 0 bar up to the adjusted opening pressure.

If the opening pressure does not reach a value between 150 and 180 bar, adjust the pressure maintaining valve as follows:

Increase opening pressure:

- Vent filling valve (filling pressure 0 bar)
- Loosen clamp nut
- Turn adjusting screw clockwise by using a suitable slotted screwdriver
- Start compressor and check opening pressure, adjust if necessary
- Tighten clamp nut
- Check opening pressure again

Reduce opening pressure:

- Vent filling valve (filling pressure 0 bar)
- Loosen clamp nut
- Turn adjusting screw anti-clockwise by using a suitable slotted screwdriver
- Start compressor and check opening pressure, adjust if necessary
- Tighten clamp nut
- Check opening pressure again

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 bolt 3 full turns in).

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium

Note on safety

Special attention should be paid to statements preceded by the following signs:

⚠ **WARNING** Indicates a strong possibility of severe personal injury or death if instructions are not followed.

⚠ **CAUTION** Indicates that equipment or property damage can result if instructions are not followed.

⚠ **NOTE** Gives helpful information.

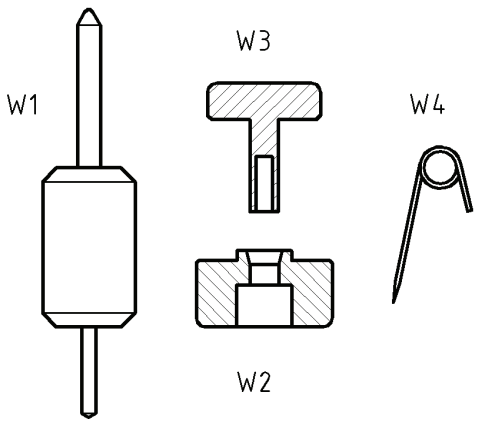
These overhaul instructions describe the dismantling and assembly of the toggle filling valve without inlet fitting and without filling tube or outlet fitting.

For overhaul and repair are available
- Gasket kit **002451** (HBV-117-A). Therein included all O-rings as used
- Maintenance kit **002452** (HBV-118-A). Therein included all wear parts and O-rings as used.
- Lubricant (grease) MOLYKOTE 111 Compound.

Available are furthermore all parts according to parts list on page 12.
Except the parts which are included in the maintenance and gasket kit.

⚠ **NOTE**
Before dismantling carefully clean the valve external, especially the inlet and outlet threads.
Clean all single parts after dismantling. Use normal mild, fat-dissolving cleaning agent.
No leach, no acid.

At assembly observe the hints concerning MOLYKOTE 111 Compound for lubrication of O-rings and sliding parts. Further observe the information concerning the tightening torques.



1. Tools, necessary

1.1 Standard Tools

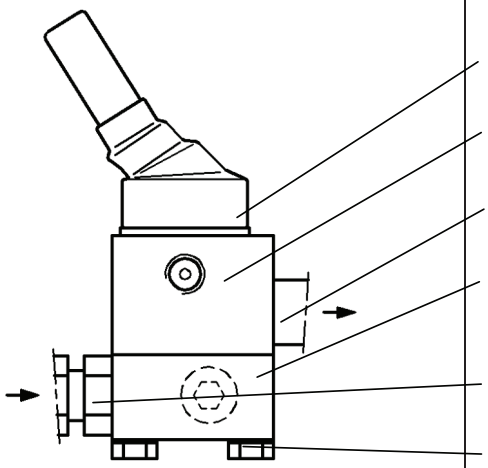
1 pcs open ended or ring spanner, jaw size 10 mm
1 pcs hexagon key L-wrench, hexagon 5 mm
1 pcs pin punch Ø 5mm
1 pcs hammer, light, 200 till 300 g

1 pcs torque wrench up to 20 Nm (2 kpm) with
1 pcs hexagon socket jaw width 10 mm
1 pcs hexagon bit , hexagon 5 mm

1.2 Special Tools

1 pcs W1 Drift Ø 5 mm combined with centering pin Ø 3mm
1 pcs W2 Retainer
1 pcs W3 Plunger
1 pcs W4 Safety pin DIN 7404 size 3, 48 mm long

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



2. Designation, Main Parts

toggle lever, moulded bellows

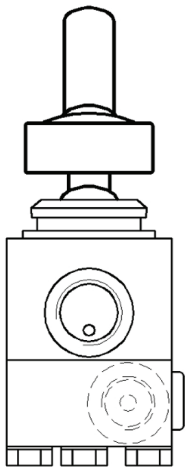
valve body upper part, with :
valve seat, valve pin, plunger

(filling tube)

valve body lower part with :
valve spring, sealing cone,
filter and retaining screw

(inlet fitting)

hexagon screw M6 x 30 mm



3. Valve, Dismantling

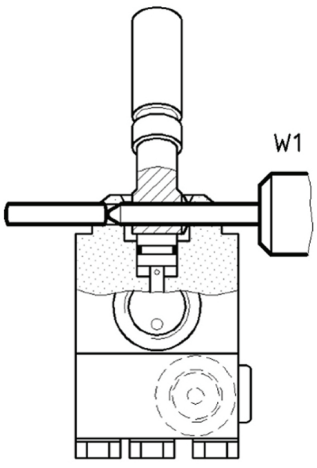
⚠ NOTE
Numbers stated behind the parts designation are related to the Parts List at page 12.

3.1 Moulded bellows -1, removal

First remove moulded bellow -1 from valve body upper part -7, than pull it from the toggle lever -2.

Check moulded bellows -1 for damages as cracks or holes.
If such existing, replace moulded bellows -1.

⚠ NOTE
Valve may be kept by hand for the above.



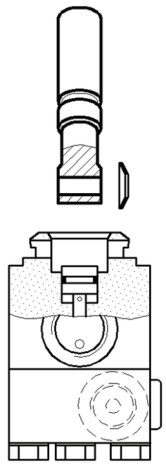
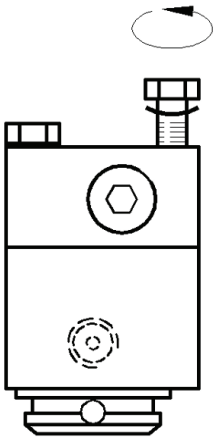
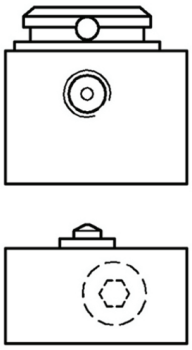
3.2 Toggle lever -2, removal

Remove pin -3 with W1 drift Ø 5 mm as shown.

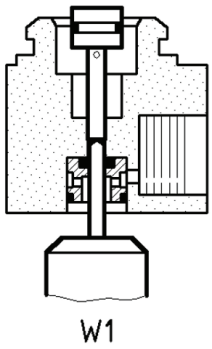
⚠ NOTE
Valve may be kept by hand for the above.

If pin -3 cannot be moved by hand, use a light hammer and a pin punch Ø 5 mm.

⚠ CAUTION
For this fix the valve in a vice with smooth vice jaws or a firm cloth.

Overhaul Instructions for Toggle Filling Valve **002449** (HBV-121-A), **002450** (HBV-122-A) **with Valve Body made from Aluminium**	
	**3.2 continued** Remove toggle lever -2 and disc spring -4.
	**3.3 Valve body upper part-7 and Valve body lower part -15, separate** ⚠ **CAUTION** For this fix the valve in a vice with smooth vice jaws or a firm cloth. Unscrew the 3 pcs hexagon screws -21 with an open ended or ring spanner, jaw size 10 mm. ⚠ **CAUTION** Press valve body upper part -7 and valve body lower part -15 together by hand at removal from the vice, to avoid the pop out of internal valve parts.
	**3.3 continued** place valve body with its lower part -15 onto a clean worktop and remove upper part -7.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



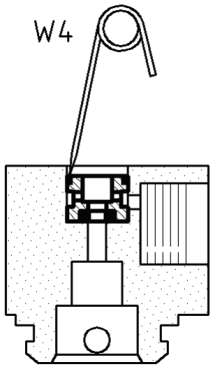
3.4 Valve pin -8 and Plunger -6, removal

Remove valve pin -8 and plunger -15 by W1 centering pin Ø 3 mm as shown.

⚠ CAUTION

Act carefully to avoid damage on the seal seat of the valve pin -8.

Remove O-ring -5, Ø 7 x Ø 1.5 mm from plunger -6.

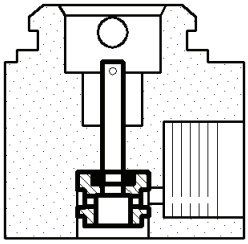


3.5 O-ring -11, removal

Remove O-ring -11, Ø 9 x Ø 1.5 mm with W4 safety pin.

⚠ CAUTION

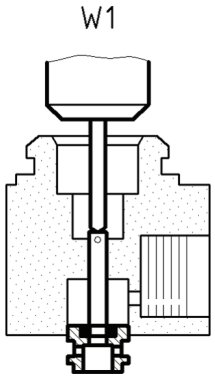
Throw away O-ring -11, Ø 9 x Ø 1.5 mm.
It is impaired by the above described procedure.



3.6 Valve seat -10, removal

Put valve pin -8, with venting bore on top, into valve body upper part -7 as shown.

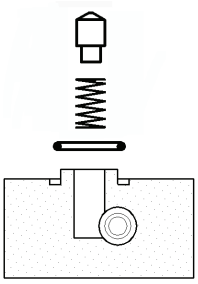
Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



3.6 continued

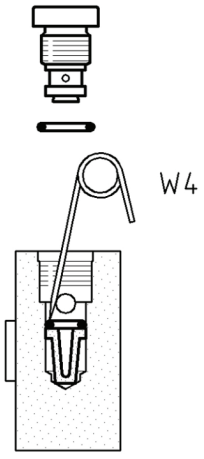
Remove valve seat -10 with W1 centering pin Ø 3 mm via valve pin -8. as shown

Remove O-ring -9, Ø 3.68 x Ø 1.78 mm, from valve seat -10.



3.7 Sealing cone -12, Valve spring-13 and O-ring -14, removal

Remove
sealing cone -12
valve spring -13
O-ring -14, Ø 10.82 x Ø 1.78 mm
from valve body lower part -15.



3.8 Retaining screw -19, O-rings -18 and -17, Filter -16, removal

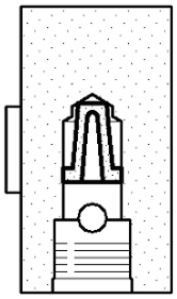
⚠ CAUTION
For this fix valve body lower part -15 with its narrow sides in a vice with smooth vice jaws or a firm cloth.

Remove retaining screw-19 by a hexagon key L-wrench, hexagon 5 mm.
Remove O-ring -18, Ø 8 x Ø 1.5 mm from retaining screw -19.

Remove O-ring -17, Ø 4.47 x Ø 1.78 mm with W4 safety pin.

⚠ CAUTION
Throw away O-ring - Ø 4.47 x Ø 1.78 mm.
It is impaired by the above described procedure.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



3.8 continued

Filter -16 removal,
for this take valve body lower part -15, with filter chamber showing down, and tap the valve body lower part -15 on a clean surface, until the filter -16 falls out.

4. Valve, Assembly

⚠ **NOTE**

Numbers stated behind the parts designation are related to the Parts List at page 12.

⚠ **NOTE**

Check all single parts for wear.
Replace all worn or faulty parts.

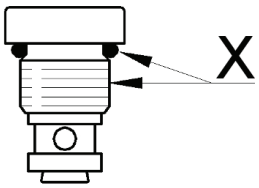
Always replace sealing cone 12.

Always replace all O-rings.

Use gasket kit HBV-117-A.

Use maintenance kit HBV-118-A.

Lightly lubricate threads and O-rings with MOLYKOTE 111 Compound

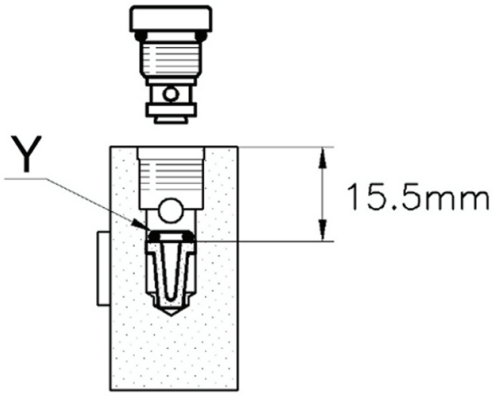


4.1 Retaining screw -19 and O-ring -18

Put O-ring -18, Ø 8 x Ø 1.5 mm on retaining screw -19.

X Lubricate O-ring 18 and thread of retaining screw -19.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



4.2 Filter -16, O-ring -17, Retaining screw -19 with O-Ring -18 , assembly

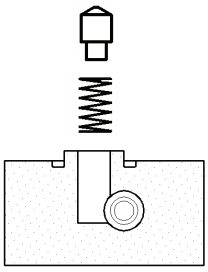
⚠ CAUTION
For this fix valve body lower part -15 with its narrow sides in a vice with smooth vice jaws or a firm cloth.

Insert filter -16, thereby do not tilt it. Move filter -16 down against block. Check mounting depth 15.5 mm.

Y Put O-ring -17, Ø 4.47 x Ø1.78 mm **not lubricated** onto filter -16.

Screw in retaining screw -19 with a hexagon key L-wrench, hexagon 5 mm.

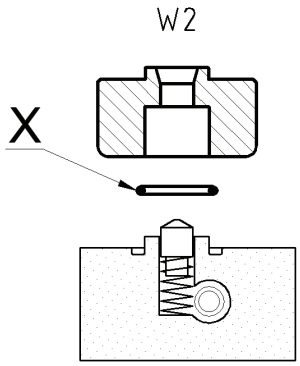
⚠ CAUTION
Fasten retaining screw -19 by a torque wrench with 8.5 Nm (0.85 kpm).



4.3 Valve spring -13, Sealing cone -12, assembly

Insert valve spring -13 and sealing cone -12 in valve body lower part -15.

⚠ CAUTION
Check sealing cone -12 for mobility with fingertip.

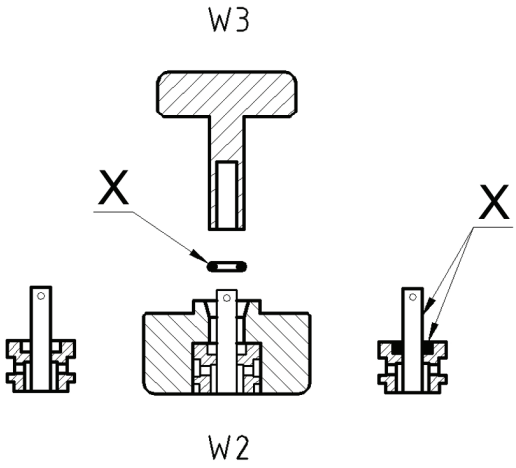


4.4 O-ring -14, assembly

X Lubricate O-ring -14, Ø 10.82 x Ø 1.78 mm.

Press O-ring -14 into groove of valve body lower part -15 with W2 retainer.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



4.5 Valve pin -8 and O-ring -9 assemble in Valve seat -10

Put valve pin -8, with venting bore on top, into valve seat-10.
Put W2 retainer over both parts as shown.

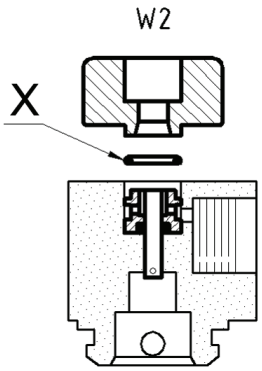
X Lubricate O-ring -9, Ø 3.68 x Ø 1.78.

Press O-Ring -9 with W3 plunger in valve seat -10.

Remove W2 retainer.

X Lubricate projecting part of the valve pin -8 and face of the valve seat -10.

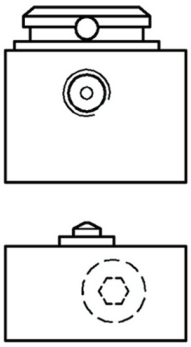
⚠ CAUTION
In this connection do not move valve pin -10 to avoid that O-Ring -9 will be pushed out of valve seat -10.



4.6 Valve seat -10 with Valve pin -8 and O-ring -9, assembly

Insert valve seat with mentioned parts into valve body upper part -7.

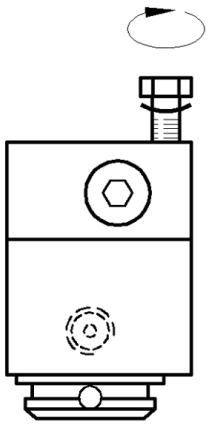
X Lubricate O-ring -11, Ø 9 x Ø 1.5 mm and push it with W2 retainer into valve body upper part -10.



4.7 Valve body upper part -7 with Valve body lower part -15, match

Place valve body upper part -7 on valve body lower part -15.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



4.7 continued

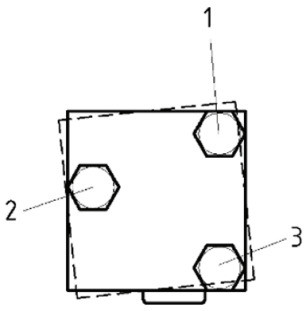
Press valve body upper part -7 and valve body lower part -15 together by hand as shown.

Screw in by hand or with an open ended or ring spanner, jaw size 10 mm, only 1 pcs hexagon screw -21 with curved spring washer -20 as shown.

⚠ CAUTION

For this fix only valve body upper part -7 in a vice with smooth vice jaws or a firm cloth.

Valve body lower part -15 should be still moveable.



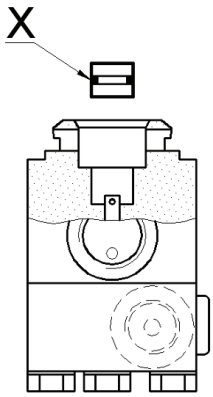
4.7 continued

Align the sides of valve body upper part -7 with the sides of valve body lower part -15.

Screw in by hand or with a open ended or ring spanner, jaw size 10 mm, the remaining 2 pcs hexagon screws -21 with curved spring washers -20

⚠ CAUTION

Tighten hexagon screws -21 in sequence 1-2-3 by torque wrench with 8.5 Nm (0.85 kpm).



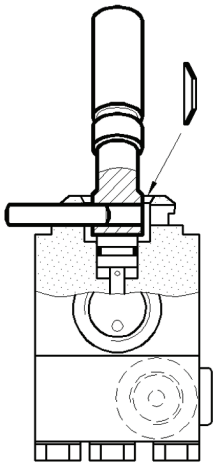
4.8 Plunger -6 and O-ring -5, assembly

X lubricate O-Ring -5, Ø 7 x Ø 1.5 mm and put it on plunger -6.

Push plunger -6 with O-ring -5 into valve body upper part -7.

Move plunger -6 with W1 drift Ø 5mm two to three times.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



4.9 Toggle lever -2, assembly

⚠ CAUTION
For this fix the valve in a vice with smooth vice jaws or a firm cloth.

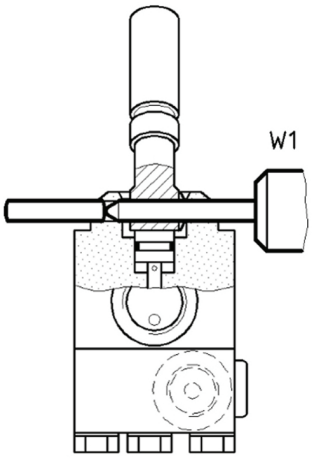
Lightly lubricate bore in toggle lever -2.

Place toggle lever -2 in the valve that it points backward, related to the valve outlet.

The bore in the valve body upper part -7 and in the toggle lever -2 should align.

Insert pin -3 to the middle of the valve and insert the disc spring -4 as shown.

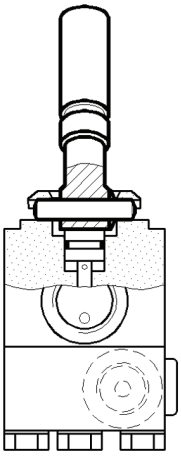
If pin -3 cannot be moved by hand, push it in with a pin punch Ø 5mm and a light hammer.



4.9 continued

Centre disc spring -4 with W1 drift Ø 5mm.

⚠ CAUTION
Thereby do not push out pin -3.

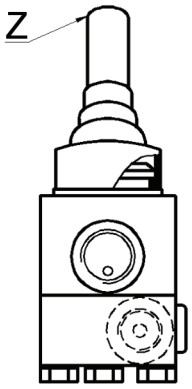


4.9 continued

Fully push in pin - 3.

If pin -3 cannot be moved by hand, push it in with a pin punch Ø 5mm and a light hammer.

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



4.10 Moulded bellows -1, assembly

Z Moisten toggle lever-2 with a little soap water.

Move moulded bellows -1 over toggle lever -2 and fix it at valve body upper part -7.

Ensure that the beaded rim of moulded bellows -1 fits the groove on the valve body upper part -7 and check that the moulded bellows -1 is not twisted in itself.

Move the toggle lever -2 several times for perfect function.
Correct the installation of moulded bellows -1 if necessary.

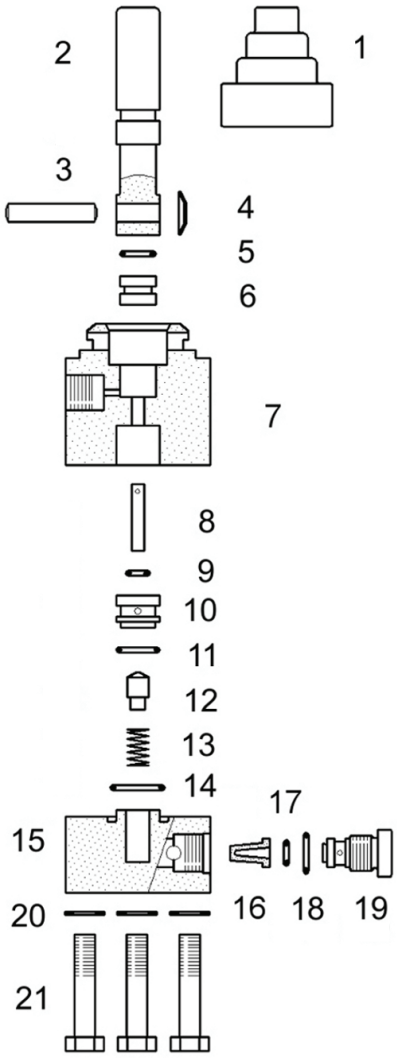
The assembly of the toggle filling valve is thereby completed.

⚠ NOTE

These Overhaul Instructions apply for toggle filling valves with serial-No. from 13 / 07501, June 2013
until

Memos:

Overhaul Instructions for Toggle Filling Valve
002449 (HBV-121-A), **002450** (HBV-122-A)
with Valve Body made from Aluminium



Parts List

Pos.	pcs.	Order-No.	Designation, Dimensions
1	1	000579	Moulded bellows, black
	or		
	1	000578	Moulded bellows, red
2	1	HBV-102-A	Toggle lever, kpl.
3	1	DIN 7	Pin, Ø 5 x 24 -A2
4	1	FDR-004-P	Disc spring
5*	1	ORI-002-P	O-ring Ø 7 x Ø 1.5
6*	1	HBV-014-P	Plunger
7	1	HBV-119-P	Valve body upper part
8*	1	HBV-115-P	Valve pin
9*	1	ORI-042-P	O-ring Ø 3.68 x Ø 1.78
10*	1	HBV-114-P	Valve seat
11*	1	HBV-004-P	O-ring Ø 9 x Ø 1.5
12*	1	HBV-116-P	Sealing cone
13	1	FDR-001-P	Valve spring Ø 5 x 11
14*	1	ORI-044-P	O-ring Ø 10.82 x Ø 1.78
15	1	HBV-120-P	Valve body lower part
16*	1	HBV-148-P	Filter, conical
17*	1	ORI-009-P	O-ring Ø 4.47 x Ø 1.78
18*	1	ORI-043-P	O-ring Ø 8 x Ø 1.5
19	1	HBV-149-P	Retaining screw G1/8
20	3	DIN 137	Spring washer A6 - A2
21	3	ISO 4014	Hexagon screw M6 x 30 - 8.8

*) = Included in maintenance or gasket kit

LENHARDT & WAGNER GMBH
Germany 68623 Lampertheim - An der Tuchbleiche 39
Tel: ..49 - (0)6256 - 85 88 00 Fax: ..49 - (0)6256 - 85 88 014
E-Mail: service@lw-compressors.com

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O-rings - filling valve and filling hose

Check o-rings from filling valve and filling hose regularly and change if necessary.

Note
Clean all parts thoroughly before assembly.

O-ring at the filling valve

- Change o-ring, previously grease new o-ring (Fig. 1)

Fig. 1 - O-ring at the filling valve

O-ring at the filling hose

- Remove filling hose from the filling valve (Fig. 2)
- Change o-ring, previously grease new o-ring
- Connect filling hose to the filling valve and tighten

.

Fig. 2 - O-ring at the filling hose

Motor change

The drive motors of the LW 170 E Nautic and LW 170 D NAutic are generally interchangeable.

Warning
Do not carry out modifications when the unit is hot.

Motor change as follows:

- Switch off the compressor unit, pull the plug if necessary
- Remove V-belt cover
- Remove mounting screws of the motor flange
- Remove motor tensioner bolt
- Remove V-belt
- Remove motor v-belt pulley
- Remove motor carefully
- Place new motor
- Mount motor v-belt pulley
- Mount flange mounting screws and tighten nuts slightly
- Insert motor tensioner bolt
- Check/Ensure the alignment of both key slots (motor & compressor)
- Tension V-belt
- Tighten flange mounting screws
- Place V-belt cover and tighten mounting screws
- Ensure clearance of the V-belt cover

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 max. 1000.

Example: Filter housing 0.5 l

Maximum operating pressure: 350 bar

Content volume: 0.5 litres

350 bar x 0.5 litres = 175

175 is smaller than the minimum of 200 -> result: Test is not 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.

Caution
The filter container (P/N: 000161) has to be replaced after 15 years!

MAINTENANCE RECORDS

Introduction form for the Operator

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

Top up oil, oil change

Date	Operating hours	Oil quantity [l]	Name

Cartridge change

Date	Operating hours	Difference	Name

Maintenance work

Description	Date, signature

Replaced Parts

Designation	Part number	Date, signature

Note
Please check the specific handbook of the diesel engine regarding conservation / storage, de-conservation and commissioning of the LW 170D Nautic compressors.

Conservation / storage of the compressor

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

- Run the compressor at 200 bar filling pressure for approximately ten minutes (control the flow with the filling valve to maintain constant pressure).
- Replace compressor oil, open filling valve(s) and run compressor for a few minutes.
- Stop compressor and open drain valves (depending on the compressor type, this may happens automatically).
- Remove top cap of final filter housing: clean threat, grease o-ring and threat 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.

Note
Please check the specific handbook of the diesel engine regarding conservation / storage, de-conservation and commissioning of the LW 170 D Nautic compressors.

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.

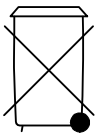
Transportation instructions

- 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

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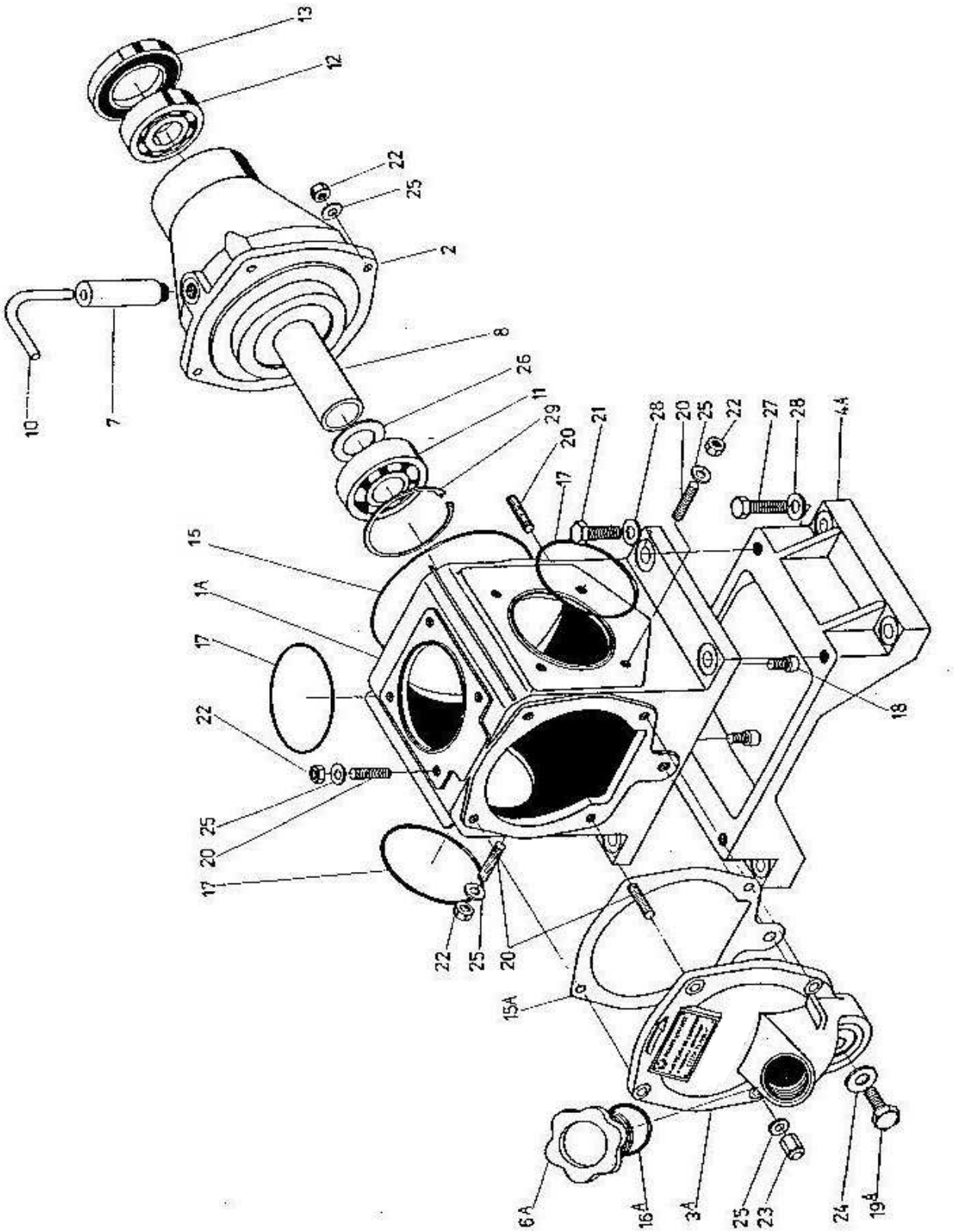
Kurbelgehäuse / Crankcase

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	008164	Kurbelgehäuse	Crankcase
2	006676	Lagerflansch, Aluminium	Main Bearing Flange, alloy
3A	002867	Gehäusedeckel	Housing Cover
4	000132	Staender für Block	Alloy Block Stand, casted
6A	004553	Oeleinfüllschraube	Oil Filler Screw
7	000073	Öldampfabscheider	Oil Steam Separator
8	000080	Distanzrohr	Spacer Tube
10	004856	Schlauch Kurbelgehäuseentlüftung	Hose (crankcase ventilation)
11	000060	Kugellager	Ball Bearing
12	000059	Kugellager	Ball Bearing
13	000018	Radial-Wellendichtung	Shaft Seal
15	000013	O-Ring 130 x 3 NBR70	O-Ring 130 x 3 NBR70
15A	005297	Papierdichtung Kurbelgehäuse	Paper Gasket Crankcase Cover
16A	003692	O-Ring	O-Ring
17	000014	O-Ring 85 x 2	O-Ring 85 x 2
18	001042	Zylinderschraube	Allen Screw
19A	001131	Sechskantschraube	Hexagon Screw
20	000960	Stiftschraube	Threaded Stud
21	001101	Sechskantschraube	Hexagon Screw
22	001158	Mutter M8	Nut M8
23	008162	Hutmutter M8, vernickelt	Domed Nut M8
24	000019	Dichtscheibe	Seal Washer
25	001181	U-Scheibe A8	Washer A8
26	000081	Unterlegscheibe	Washer
27	001102	Sechskantschraube	Hexagon Screw
28	001186	U-Scheibe A10	Washer A10
29	000024	Seegering	Circlip

B

Kurbelgehäuse / Crankcase

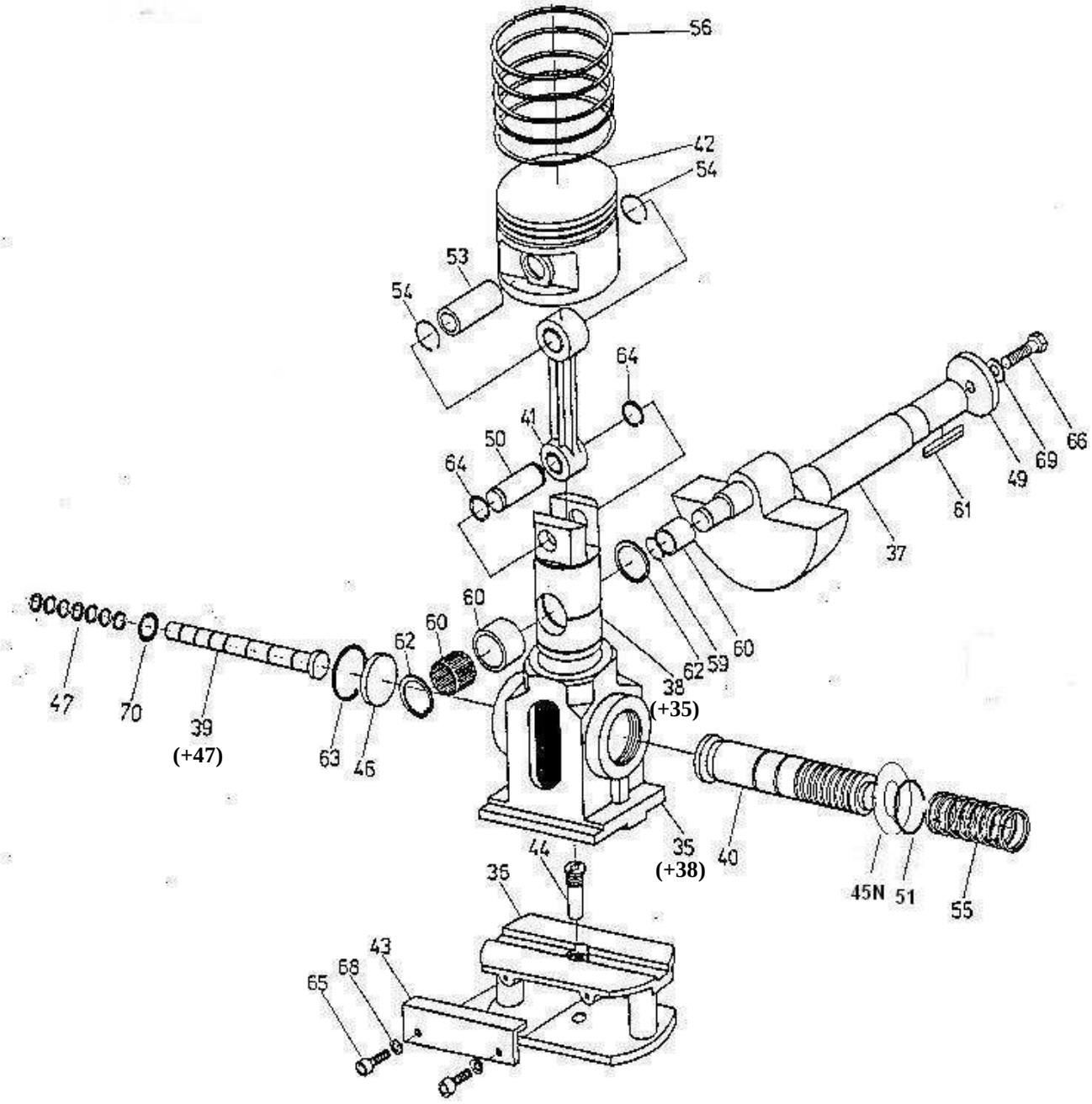


Kurbeltrieb / Crank Drive

Pos.	Best.-Nr. / P/N.	Benennung	Description
35	000097	Kreuzkopf und Kulisse	Slider & Plunger Assembly
36	000095	Gleitbrücke	Sliding Bridge
37	000062	Kurbelwelle	Crankshaft
38	000097	Kreuzkopf und Kulisse	Slider & Plunger Assembly
39	000045	Kolben 3. Stufe inkl. Kolbenringe	Piston 3rd stage incl. Piston Rings
40	000052	Kolben 2. Stufe	Piston 2nd stage
41	000057	Pleuel 1. Stufe	Conrod 1st Stage
42	000050	Kolben 1. Stufe	Piston 1st stage
43	000096	Gleitleiste	Guide Bar
44	000098	Öldüse	Oil Jet
45N	008166	Haltescheibe für Kolben	Holding Disc for Piston
46	000055	Kolbenstossplatte 3. Stufe	Piston Push Pad 3nd stage
47	000056	Kolbenringe 3. Stufe (Kompletter Satz)	Piston Rings 3rd Stage (Complete Set)
49	003983	Anlaufscheibe Schwungrad	Washer, Flywheel
50	000049	Unterer Pleuelbolzen 1. Stufe	Lower Gudgeon Pin 1st stage
51	008165	Sicherungsring I40	Circlip I40
53	001429	Kolbenbolzen 1. Stufe	Piston Pin, 1st Stage
54	001355	Sicherungsring I20	Circlip I20
55	000053	Kolbenringe 2. Stufe (Kompletter Satz)	Piston Rings 2nd Stage (Complete Set)
56	000051	Kolbenringe 1. Stufe (Kompletter Satz)	Piston Rings 1st Stage (Complete Set)
59	000021	Seegering	Circlip
60	000061	Nadellager (komplett)	Needle Bearing (Complete)
61	000079	Passfeder	Woodruff Key
62	000022	Seegering	Circlip
63	000023	Seegering	Circlip
64	000020	Seegering	Circlip
65	001029	Zylinderschraube	Allen Screw
66	001083	Sechskantschraube	Hexagon Screw
68	001148	Unterlegscheibe	Washer
69	001181	Unterlegscheibe	Washer
70	002065	O-Ring	O-Ring

B

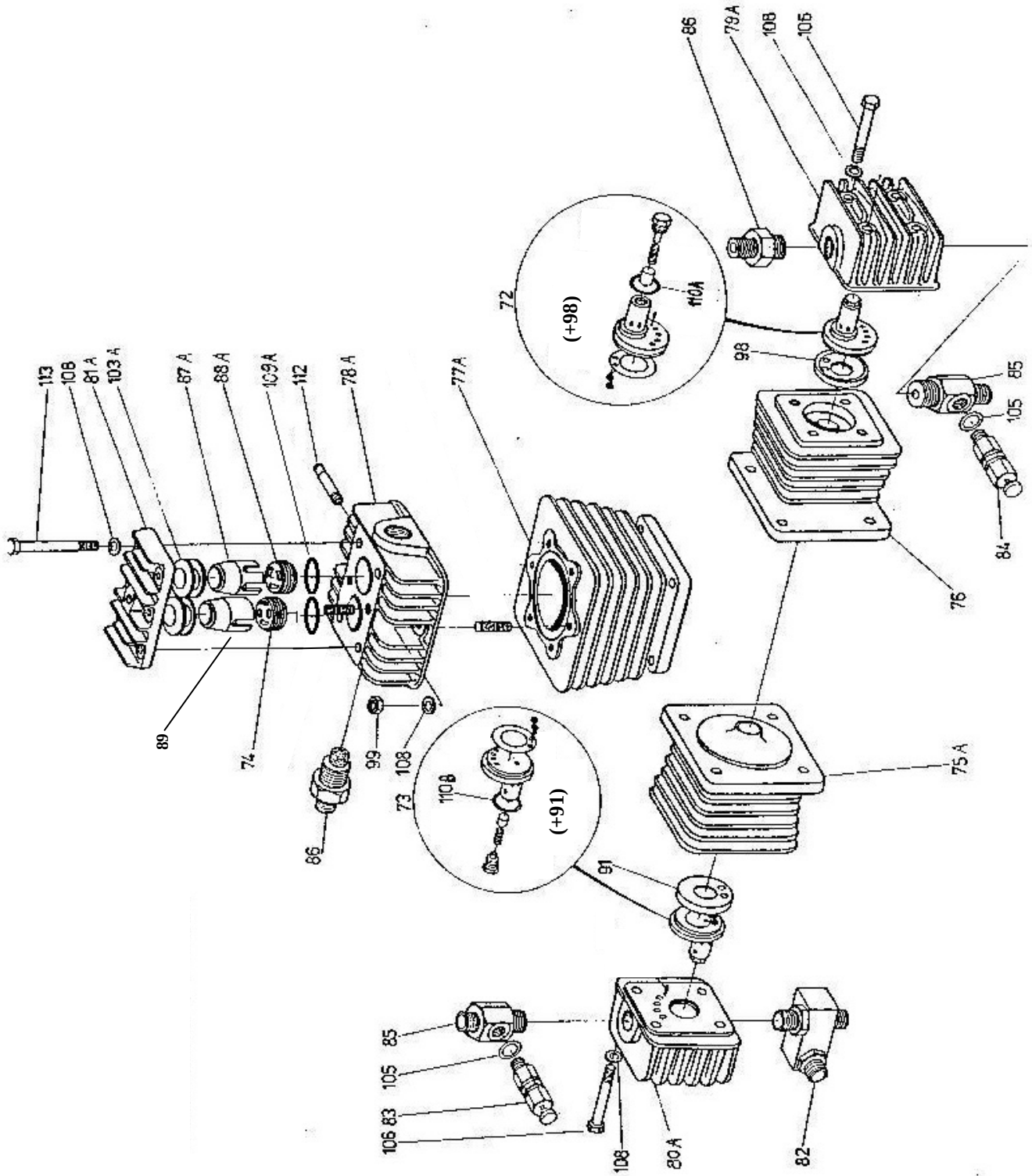
Kurbeltrieb / Crank Drive



Zylinder & Ventilköpfe / Cylinders & Valve Heads

Pos.	Best.-Nr. / P/N.	Benennung	Description
72	000031	Saug-Druckventil 2. Stufe inkl. Dichtung und O-Ring	In-& Outlet Valve 2nd Stage icl. Gasket and O-Ring
73	000032	Saug-Druckventil 3. Stufe inkl. Dichtung und O-Ring	In-& Outlet Valve 3rd Stage icl. Gasket and O-Ring
74	000029	Auslassventil 1. Stufe	Outlet Valve 1st Stage
75A	004740	Zylinder 3. Stufe	Cylinder, 3rd stage
76	000138	Zylinder 2. Stufe	Cylinder 2nd Stage
77A	000146	Zylinder 1. Stufe	Cylinder 1st Stage
78A	000141	Ventilkopf 1. Stufe	Valve Head 1st Stage
79A	000139	Ventilkopf 2. Stufe	Valve Head 2nd Stage
80A	000142	Ventilkopf 3. Stufe	Valve Head 3rd Stage
81A	000140	Ventildeckel 1. Stufe	Valve Cover 1st Stage
82	000092	Verschraubung Kreuzverschr. 3. Stufe	Connection Cross Block 3rd Stage
83	000041	Sicherheitsventil 2. Stufe	Safety Valve 2nd Stage
84	000039	Sicherheitsventil 1. Stufe	Safety Valve 1st Stage
85	000091	Verschraubung Einlass 2. Stufe	Connection Inlet 2nd Stage
86	000093	Verschraubung Auslass 1. Stufe	Connection Outlet 1st Stage
87A	000036	Einlassventilhalter	Alloy Valve Holder
88A	000026	Einlassventil 1. Stufe	Inlet Valve 1st Stage
89	000037	Auslassventilhalter	Alloy Valve Holder
91	003063	Ventildichtung unten, 3. Stufe, Alu	Lower Valve Gasket, 3rd stage, Alloy
98	003062	Ventildichtung unten, 2. Stufe, Alu	Lower Valve Gasket, 2nd stage, Alloy
99	001158	Mutter M8	Nut M8
103A	000030	Federteller, 1. Stufe	Spring washer 1st stage
105	001329	CU-Ring	Copper Seal Ring
106	001084	Sechskantschraube	Hexagon Screw
108	001181	U-Scheibe A8	Washer A8
109A	000033	O-Ring 36 x 2 Silicon	O-Ring 36 x 2 Silicon
110A	000034	O-Ring Ventildichtring	O-Ring Valve seal ring
110B	000034	O-Ring Ventildichtring	O-Ring Valve seal ring
112	002939	Entlüftungsröhrchen Eingang 1. Stufe	Ventilation pipe 1st stage
113	001060	Zylinderschraube	Allen Bolt

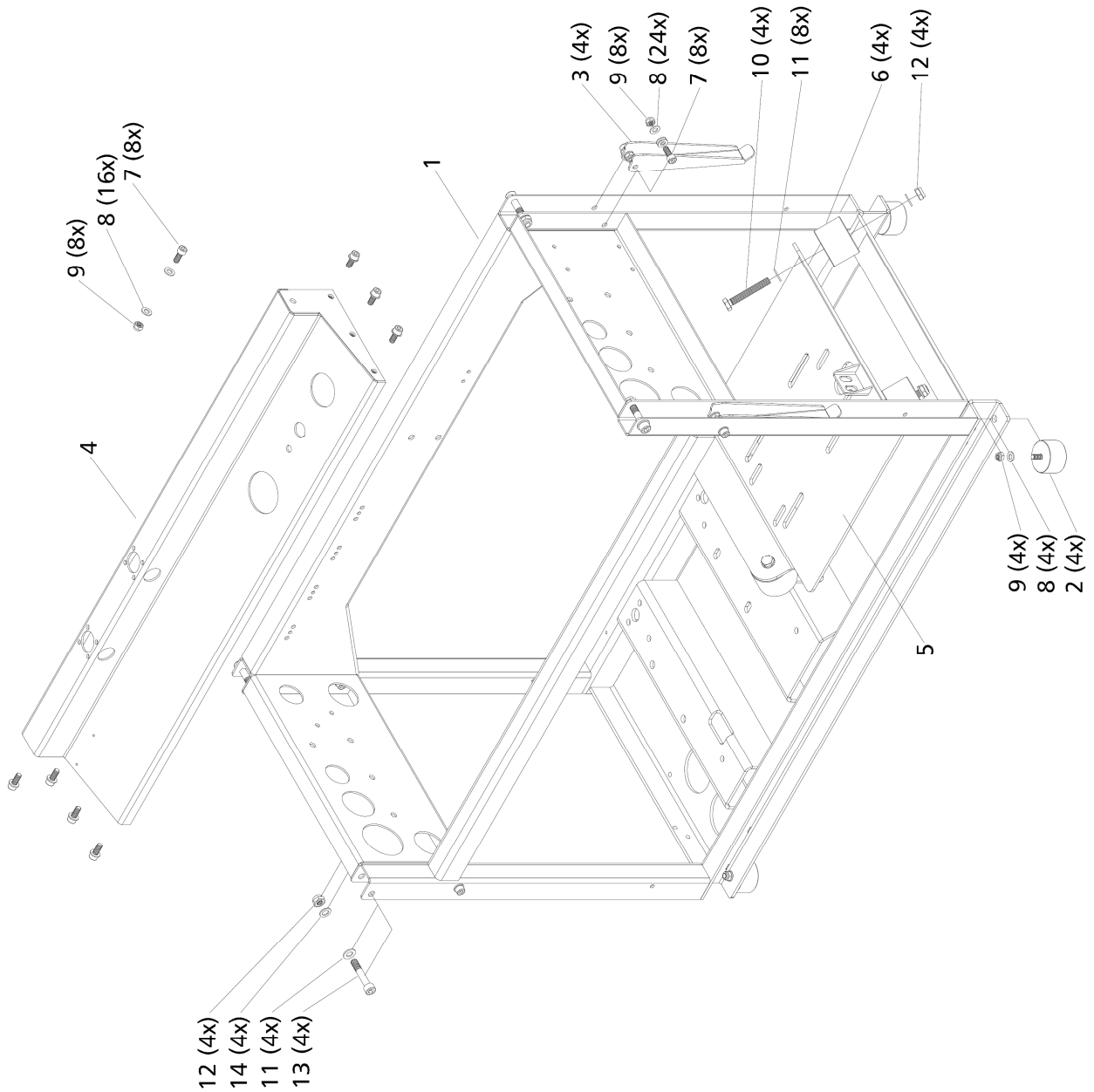
Zylinder & Ventilköpfe / Cylinders & Valve Heads



Kompressorrahmen LW 170 E Nautic / Compressor Frame LW 170 E Nautic

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	009309	Kompressorrahmen	Compressor Frame
2	000109	Gummifuß	Rubber Stand Nautic Frame
3	000113	Tragegriff	Carrying Handle
4	009891	Armaturenblech LW 170 E Nautic	Dash Panel LW 170 E Nautic
5	009307	Motorwippe	Motor Base Plate
6	000108	Plastiklager Motorwippe	Plastic Spacer Motor Plate
7	001040	Zylinderschraube M8x20mm DIN912 8.8 ZN	Allen Screw M8x20mm DIN912 8.8 ZN
8	001181	U-Scheibe A8 DIN125 ZN	Washer A8 DIN125 ZN
9	001159	Stoppmutter M8 DIN985 ZN	Lock Nut M8 DIN985 ZN
10	001107	Sechskant Schraube M10x75mm DIN933 8.8 ZN	Hexagon Screw M10x75mm DIN933 8.8 ZN
11	001186	U-Scheibe A10 DIN125 ZN	Washer A10 DIN125 ZN
12	001164	Stoppmutter M10 DIN985 ZN	Lock Nut M10 DIN985 ZN
13	001087	Zylinderschraube M10x55mm DIN912 8.8 ZN	Hexagon Bolt M10x55mm DIN912 8.8 ZN
14	001188	U-Scheibe A10,10,4mmx16mm	Washer A10, 10,4mmx16mm

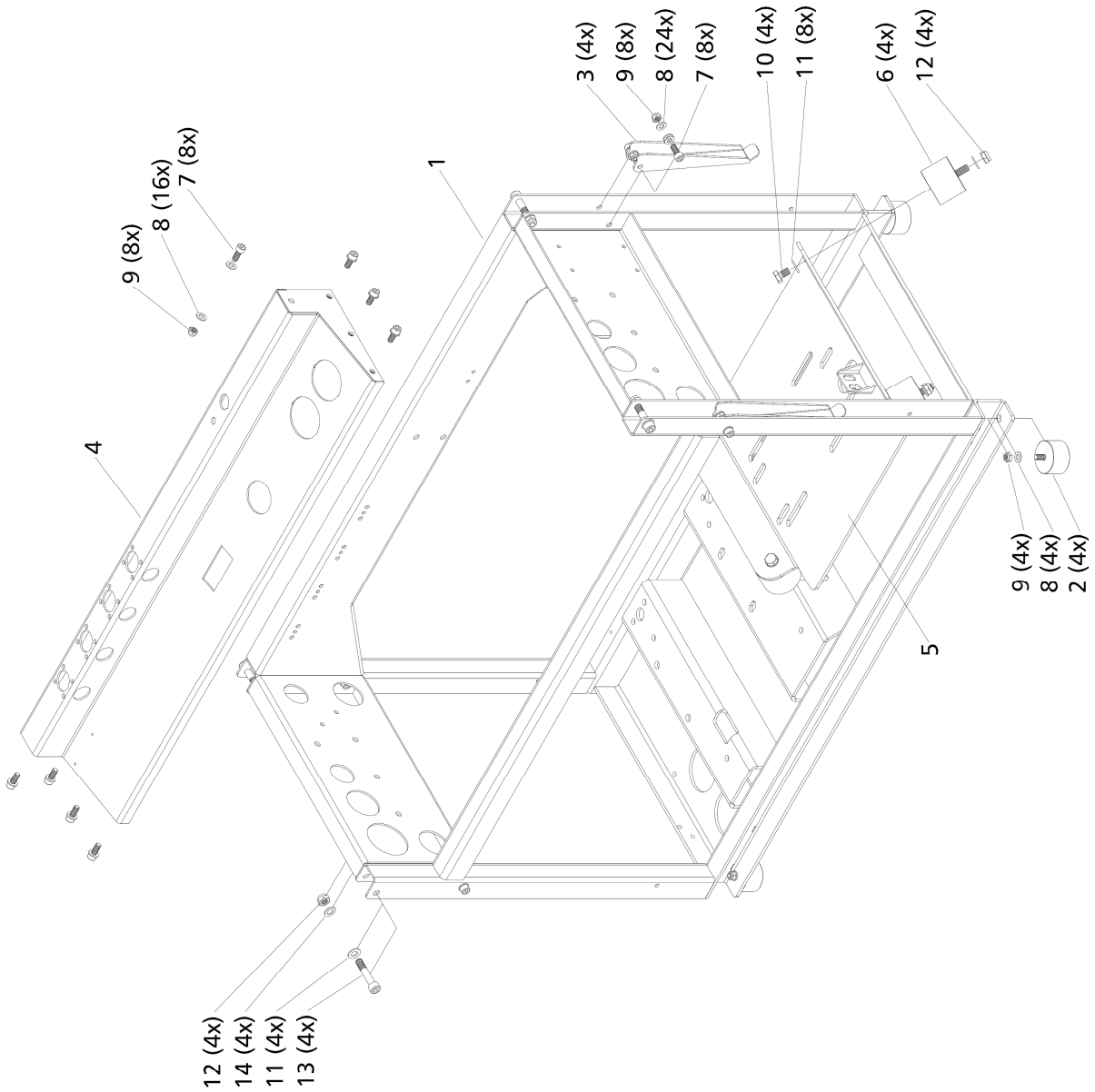
Kompressorrahmen LW 170 E Nautic / Compressor Frame LW 170 E Nautic



Kompressorrahmen LW 170 D Nautic / Compressor Frame LW 170 D Nautic

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	009309	Kompressorrahmen	Compressor Frame
2	000109	Gummifuß	Rubber Stand Nautic Frame
3	000113	Tragegriff	Carrying Handle
4	009892	Armaturenblech LW 170 D Nautic	Dash Panel LW 170 D Nautic
5	009307	Motorwippe	Motor Base Plate
6	000107	Gummilager Motorwippe	Rubber Mount Engine Base Plate
7	001040	Zylinderschraube M8x20mm DIN912 8.8 ZN	Allen Screw M8x20mm DIN912 8.8 ZN
8	001181	U-Scheibe A8 DIN125 ZN	Washer A8 DIN125 ZN
9	001159	Stoppmutter M8 DIN985 ZN	Lock Nut M8 DIN985 ZN
10	001098	Sechskant Schraube M10x16mm DIN933 8.8 ZN	Hexagon Screw M10x16mm DIN933 8.8 ZN
11	001186	U-Scheibe A10 DIN125 ZN	Washer A10 DIN125 ZN
12	001164	Stoppmutter M10 DIN985 ZN	Lock Nut M10 DIN985 ZN
13	001087	Zylinderschraube M10x55mm DIN912 8.8 ZN	Hexagon Bolt M10x55mm DIN912 8.8 ZN
14	001188	U-Scheibe A10,10,4mmx16mm	Washer A10, 10,4mmx16mm

Kompressorrahmen LW 170 D Nautic / Compressor Frame LW 170 D Nautic

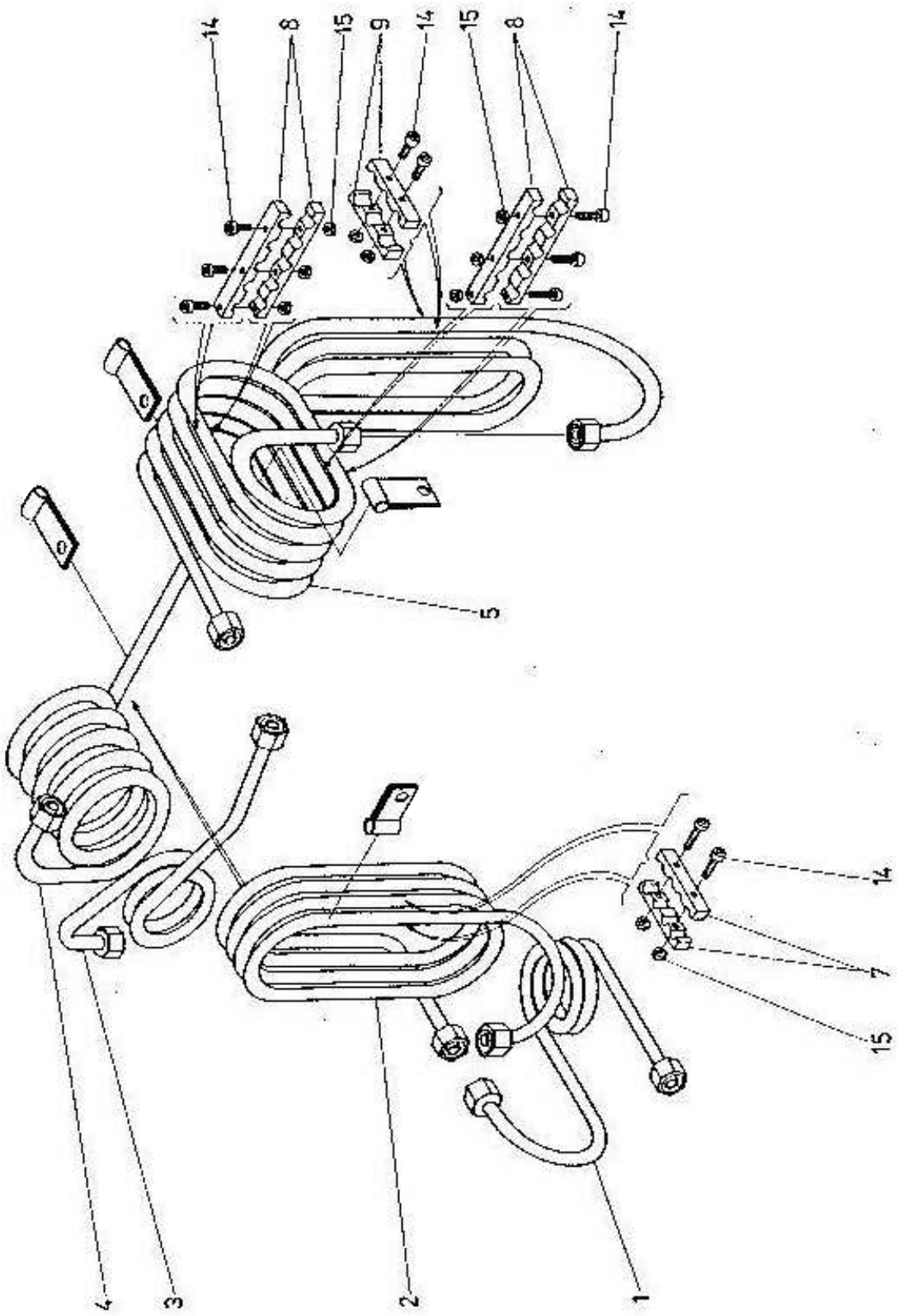


Kühlrohre / Cooling Pipes

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	000010	Filtergehäuse Kühlrohr 3. Stufe	Final Cooling Pipe 3rd Stage
2	000009	Kühlrohr komplett 3. Stufe	Cooling Pipe 3rd Stage
3	000011	Kühlrohr 2. zu 3. Stufe Wasserabscheider	Cooling Pipe 2nd to 3rd stage
4	000008	Kühlrohr 1. Stufe zu 2. Stufe	Cooling Pipe 1st to 2nd Stage
5	000007	Kühlrohr komplett 2. Stufe Wasserabscheider	Cooling Pipe 2nd Stage Water Separator
7	006677	Alu Kühlrohrhalteklammern (1 Paar)	Alloy clamp for cooling pipe (1 Pair)
8	006726	Alu Kühlrohrhalteklammern (1 Paar)	Alloy clamp for cooling pipe (1 Pair)
9	005111	Alu Kühlrohrhalteklammern (1 Paar)	Alloy clamp for cooling pipe (1 Pair)
14	001006	Zylinderschraube	Allen Screw
15	001151	Mutter M5	Nut M5

B

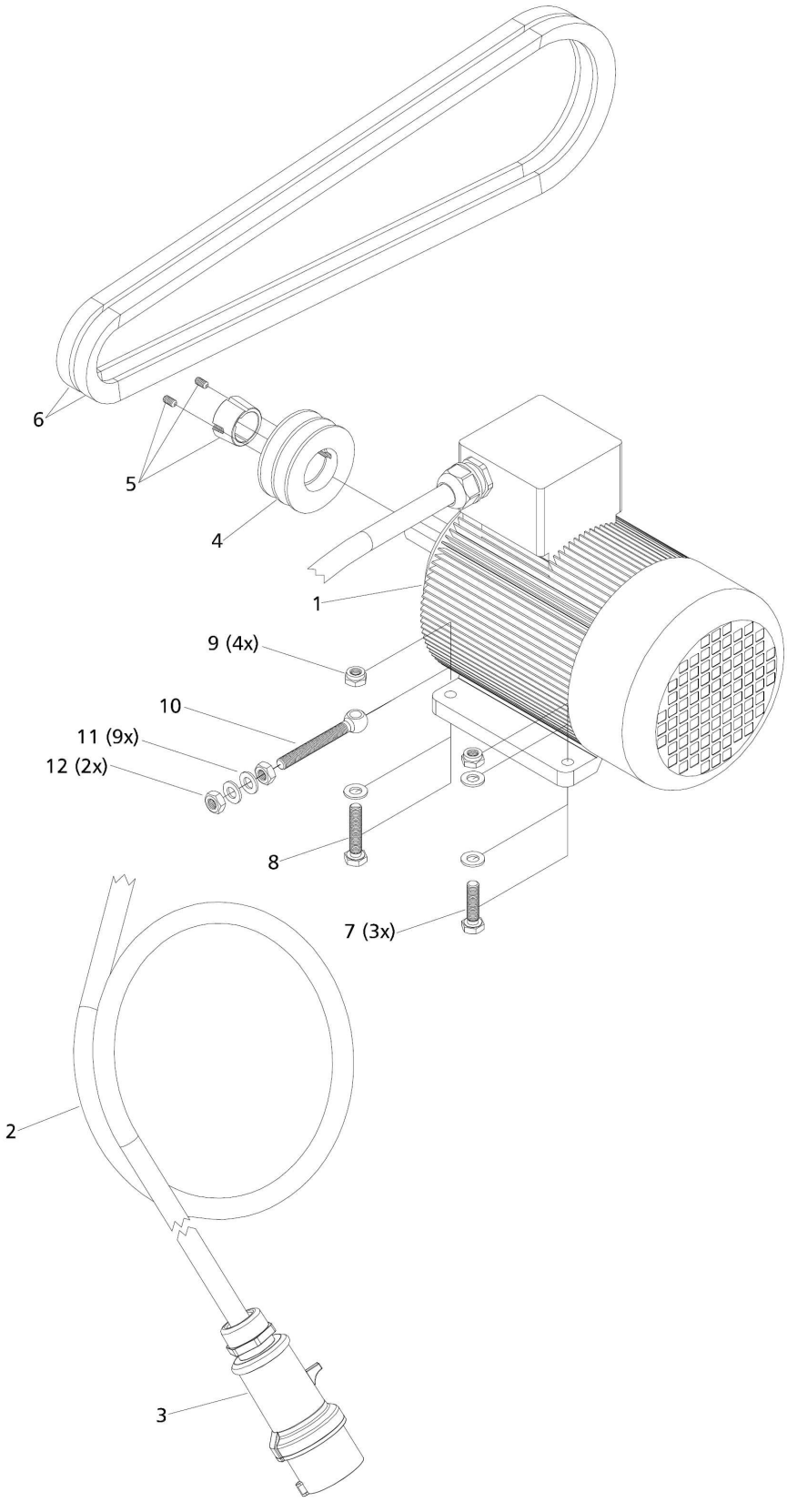
Kühlrohre / Cooling Pipes



E-Motor

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	008798	Elektromotor 4,0 kW	E-Motor, power: 4.0 kW
2	003680	Anschlusskabel,ohne Stecker, 2,5m	Cable w/o plug, 2,5m
3	002084	Stecker 16A CEE 5-polig	Plug 16A CEE 5-pole
4	009290	Riemenscheibe SPA 90-2	Pulley SPA 90-2
5	008644	Spannbuchse für Riemenscheibe 1610-28	Clamp sleeve for pulley 1610-28
6	000148	Keilriemen SPA1282	V-Belt SPA1282
7	001102	Sechskant Schraube M10x40mm DIN933 8.8 ZN	Hexagon Screw M10x40mm DIN933 8.8 ZN
8	001104	Sechskant Schraube M10x50mm DIN933 8.8 ZN	Hexagon Screw M10x50mm DIN933 8.8 ZN
9	001164	Stoppmutter M10 DIN985 ZN	Lock Nut M10 DIN985 ZN
10	006123	Augenschraube M10x90 mm, DIN444 Form B, verzinkt, 4.6	Eye Bolt M10x90 mm, DIN444 Form B, verzinkt, 4.6
11	001186	U-Scheibe A10 DIN125 ZN	Washer A10 DIN125 ZN
12	001163	Mutter M10 DIN934 ZN	Nut M10 DIN934 ZN

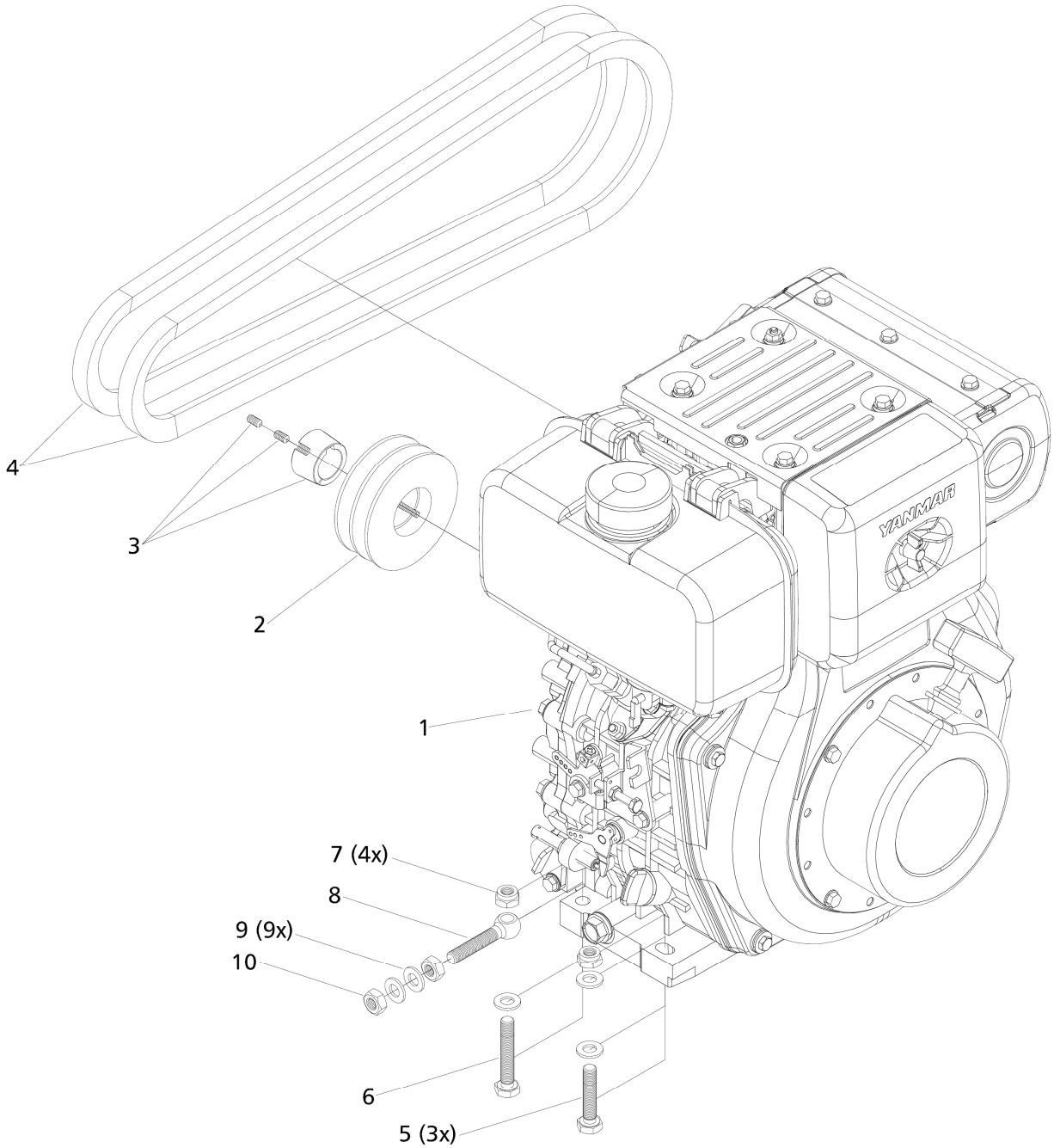
E-Motor



Diesel - Motor

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	005542	Antriebsmotor Yanmar Diesel 4,9 kW	Drive engine Yanmar Diesel 4,9 kW
2	000105	Riemenscheibe SPA 71-2	Pulley SPA 71-2
3	006934	Spannbuchse für Riemenscheibe 1108-25	Clamp sleeve for pulley 1108-25
4	000148	Keilriemen SPA1282	V-Belt SPA1282
5	001104	Sechskantschraube M10x50mm DIN933 8.8 ZN	Hexagon Screw M10x50mm DIN933 8.8 ZN
6	001105	Sechskantschraube M10x60mm DIN933 8.8 ZN	Hexagon Screw M10x60mm DIN933 8.8 ZN
7	001164	Stoppmutter M10 DIN985 ZN	Lock Nut M10 DIN985 ZN
8	006122	Augenschraube M10x60mm DIN444 Form B, verzinkt, 4.6	Eye Bolt M10x60mm DIN444 Form B, verzinkt, 4.6
9	001186	U-Scheibe A10 DIN125 ZN	Washer A10 DIN125 ZN
10	001163	Mutter M10 DIN934 ZN	Nut M10 DIN934 ZN

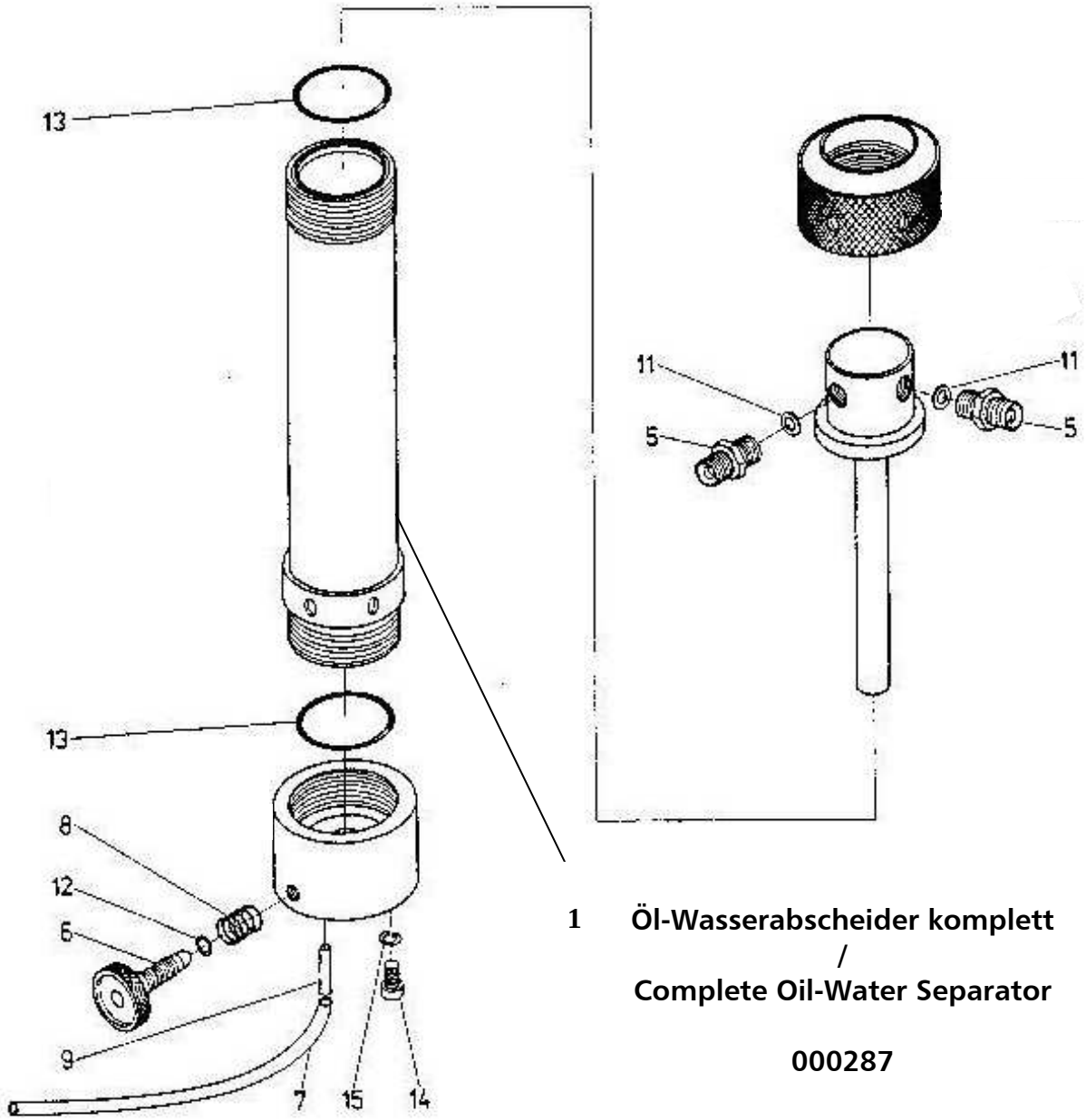
Diesel - Motor



Öl-Wasserabscheider 2. Stufe / Oil-Water Separator 2nd stage

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	000287	Öl-Wasserabscheider komplett	Complete Oil-Water Separator
5	000786	Verschraubung	Connection
6	000040	Entwässerungsspindel	Condensate Drain Spindle
7	003000	Kondensatschläuche (2Stk.)	Condensate Hoses (2pcs)
8	000042	Feder, Entwässerungsspindel	Spring, Condensate Drain Spindle
9	004398	Kondensatablaßstutzen	Condensate Outlet Sleeve
11	001321	Kupferring	Copper ring
12	000043	O-Ring Ø7,5 x 2,3 NBR90, Entwässerungsspindel	O-Ring Ø7,5 x 2,3 NBR90, Condensate Drain Spindle
13	000016	O-Ring Ø54 x 3,0 NBR90, Gehäuse	O-Ring Ø54 x 3,0 NBR90, Housing
14	001039	Zylinderschraube	Allen Screw
15	004104	Federscheibe	Lock Washer

Öl-Wasserabscheider 2. Stufe / Oil-Water Separator 2nd stage



1 Öl-Wasserabscheider komplett / Complete Oil-Water Separator

000287

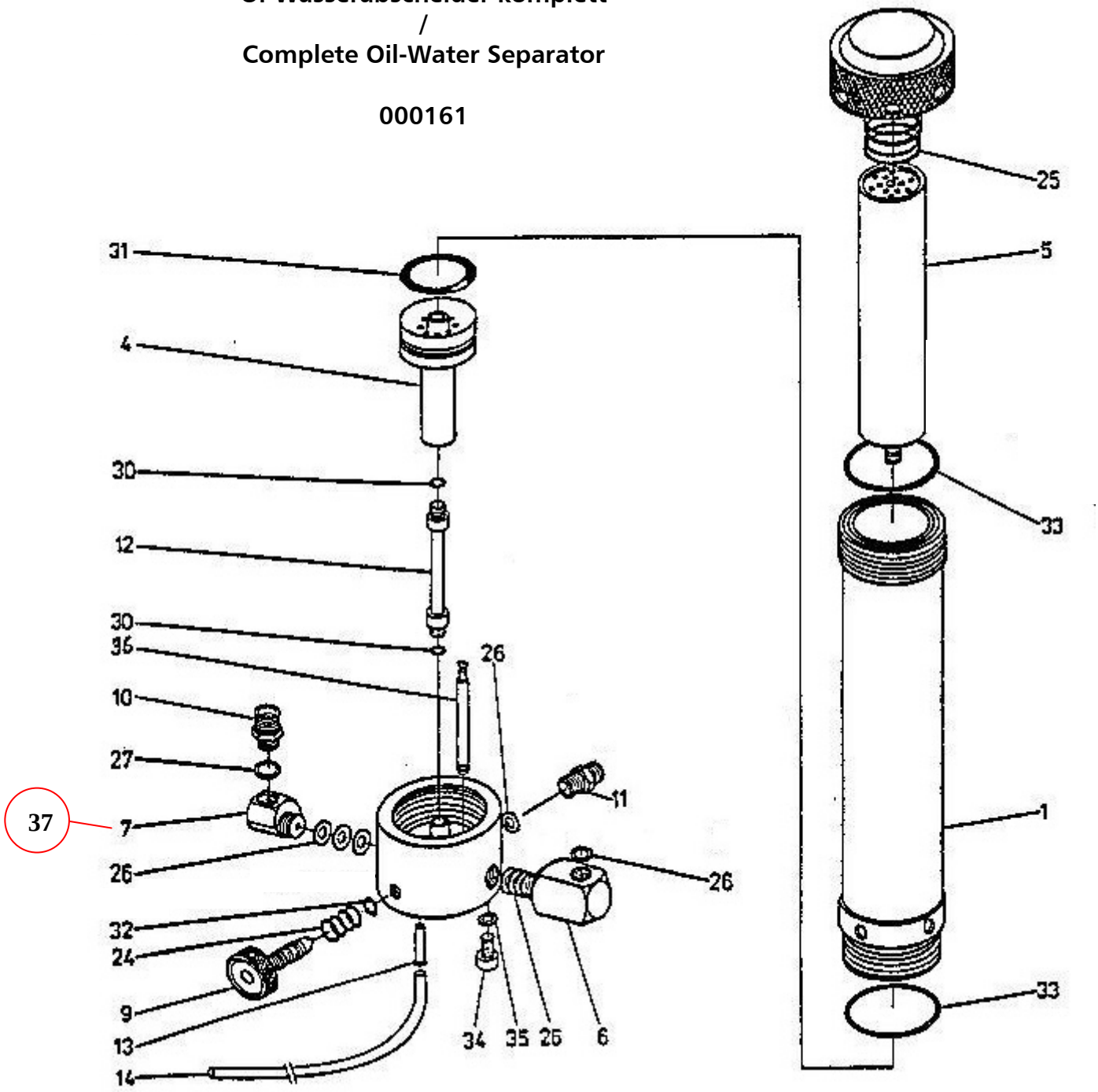
Filtergehäuse / Filter Housing

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	000161	Filtergehäuse komplett	Filter Housing Complete
4	000072	Stutzen inkl. O-Ring Filtergehäuse	Inner Manifold & O-Ring
5	001375	Filterpatrone ohne CO/CO2 Filterung	Filter Cartridge w/o CO/CO2 filtration
	001463	Filterpatrone inkl. CO/CO2 Filterung	Filter Cartridge incl. CO/CO2 filtration
6	000147	Halteklotz Sicherheitsventil (3/8" IG)	Mounting Base Safety Valve (3/8inch female)
7	000086	Druckhalteventil	Pressure Maintaining Valve
9	000040	Entwässerungsspindel	Condensate Drain Spindle
10	000087	Verschraubung Druckhalteventil	Connection Pressure Maintaining Valve
11	000090	Verschraubung	Connection
12	000070	Verbindungsstutzen, Wasserabscheider	Coupler Water Separator
13	004398	Kondensatablaßstutzen	Condensate Outlet Sleeve
14	003000	Kondensatschläuche (2Stk.)	Condensate Hoses (2pcs)
24	000042	Feder, Entwässerungsspindel	Spring Drain Spindle
25	000094	Dichtscheibe (Kupfer)	Seal Washer (Copper)
26	002809	CU-Ring (Kupfer)	CU-Ring (Copper)
27	000088	Kupferdichtung	Copper Washer
30	003099	O-Ring Ø7 x 2 NBR70	O-Ring Ø7 x 2 NBR70
31	003692	O-Ring Ø39 x 5,8 NBR70, Patronenhalte-sockel	O-Ring Ø39 x 5,8 NBR70, Cartridge Base
32	000043	O-Ring Ø7,5 x 2,3 NBR90, Entwässerungsspin-del	O-Ring Ø7,5 x 2,3 NBR90, Spring Drain Spindle
33	000016	O-Ring Ø54 x 3,0 NBR90, Filtergehäuse	O-Ring Ø54 x 3,0 NBR90, Filter Housing
34	004103	Inbusschraube	Allen screw
35	004104	Federscheibe	Lock washer
36	000069	Düse, Wasserabscheider	Jet Water Separator
37	008453	Dichtsatz Druckhalteventil	Seal Kit Pressure Maintaining Valve

Filtergehäuse / Filter Housing

1 Öl-Wasserabscheider komplett
/
Complete Oil-Water Separator

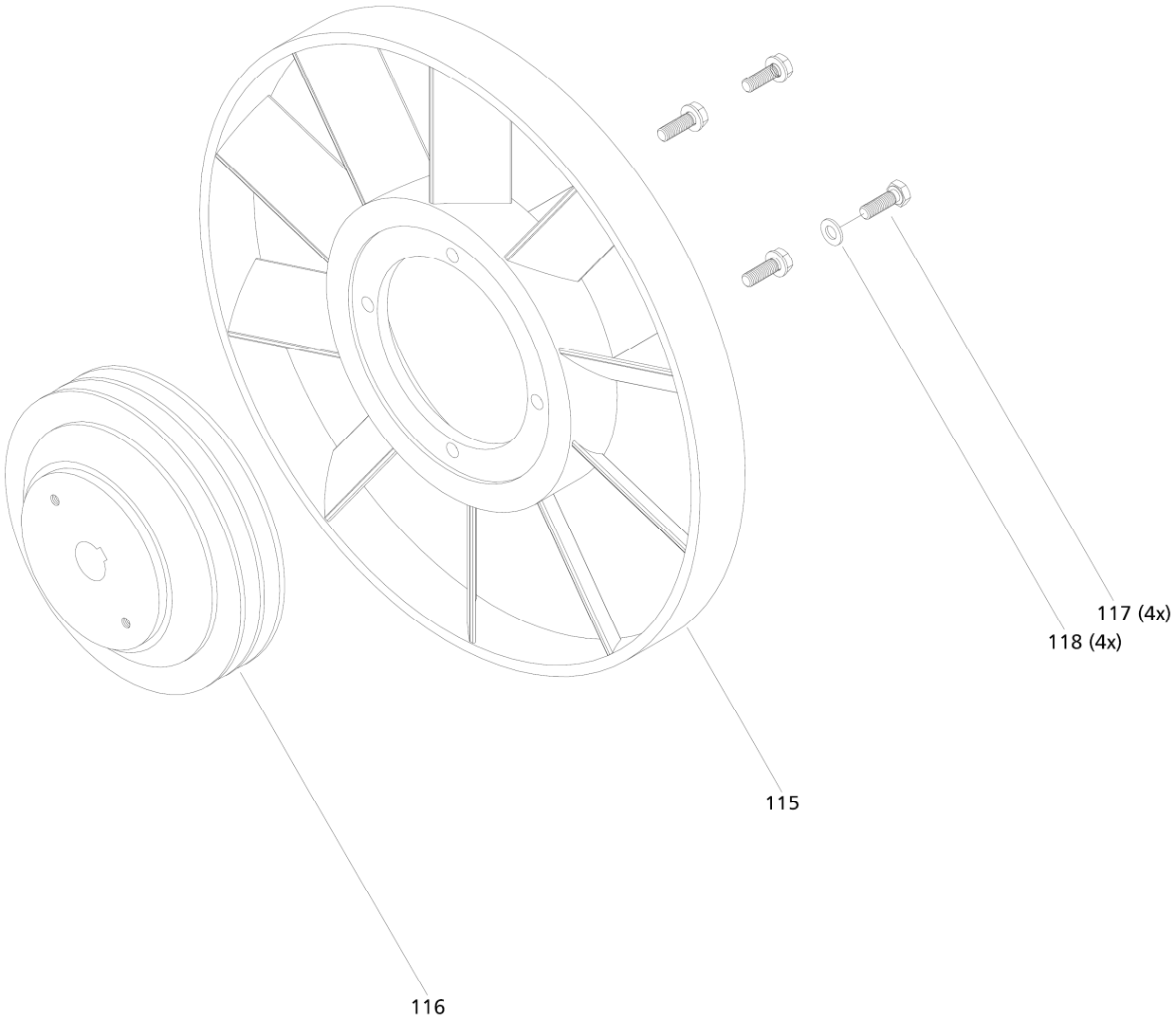
000161



Lüfterrad / Cooling Fan Wheel

Pos.	Best.-Nr. / P/N.	Benennung	Description
115	000027	Lüfterrad	Cooling Fan Wheel
116	002801	Keilriemenscheibe	V-belt pulley
117	001082	Sechskantschraube M8x25 DIN933 8.8 ZN	Hexagon screw M8x25 DIN933 8.8 ZN
118	004096	Unterlegscheibe A08 DIN 125	Washer A08 DIN 125

Lüfterrad / Cooling Fan Wheel



Sicherheitsventil / Safety Valve

Best.-Nr. / Order No.	Benennung	Description
000234	Sockel für Sicherheitsventil mit TÜV/CE	Base f. Safety Valve TÜV
000553	Sicherheitsventil - Bauteilgeprüft	Safety Valve TÜV 225 bar
000554	Sicherheitsventil - Bauteilgeprüft	Safety Valve TÜV 250 bar
000555	Sicherheitsventil - Bauteilgeprüft	Safety Valve TÜV 300 bar
000556	Sicherheitsventil - Bauteilgeprüft	Safety Valve TÜV 330 bar
000557	Sicherheitsventil - Bauteilgeprüft	Safety Valve TÜV 350 bar
000838	Verschlussstopfen 1/4“	Plug 1/4“
000893	Doppelnippel 3/8X1/4FF33MS	Double Nipple 3/8X1/4FF33MS
001058	Zylinderschraube	Allen Bolt
001244	O-Ring	O-Ring, flange safety valve
001814	Sicherheitsventil - Bauteilgeprüft	Safety Valve
001815	Sicherheitsventil - Bauteilgeprüft	Safety Valve
001816	Sicherheitsventil - Bauteilgeprüft	Safety Valve
001817	Sicherheitsventil - Bauteilgeprüft	Safety Valve
007569	Kupferring	Copper Ring

Sicherheitsventil / Safety Valve

SV-Ventil mit CE-Prüfung
Safety Valve with CE

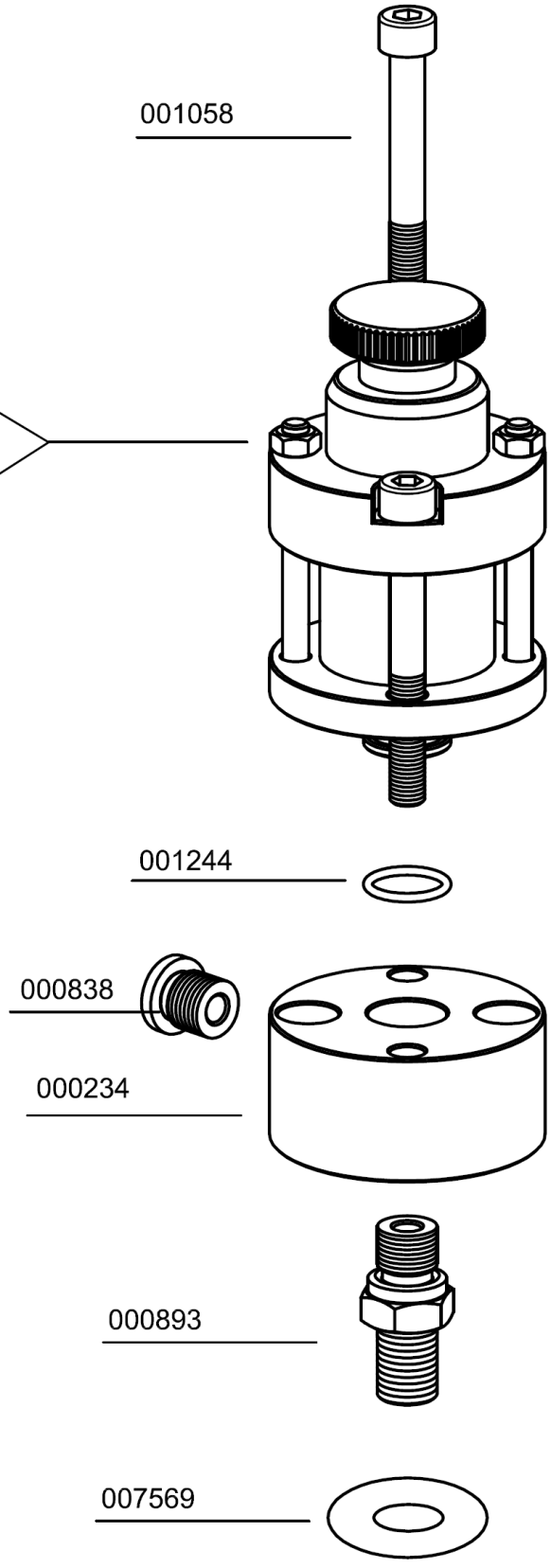
225 bar	001814
250 bar	001815
285/300 bar	----------
330 bar	001816
350 bar	001817

Sonder-Einstelldrücke auf Anfrage! /
Special relieve pressures are available on request!

SV-Ventil mit TÜV-Prüfung/
Safety Valve with TÜV

225 bar	000553
250 bar	000554
285/300 bar	000555
330 bar	000556
350 bar	000557

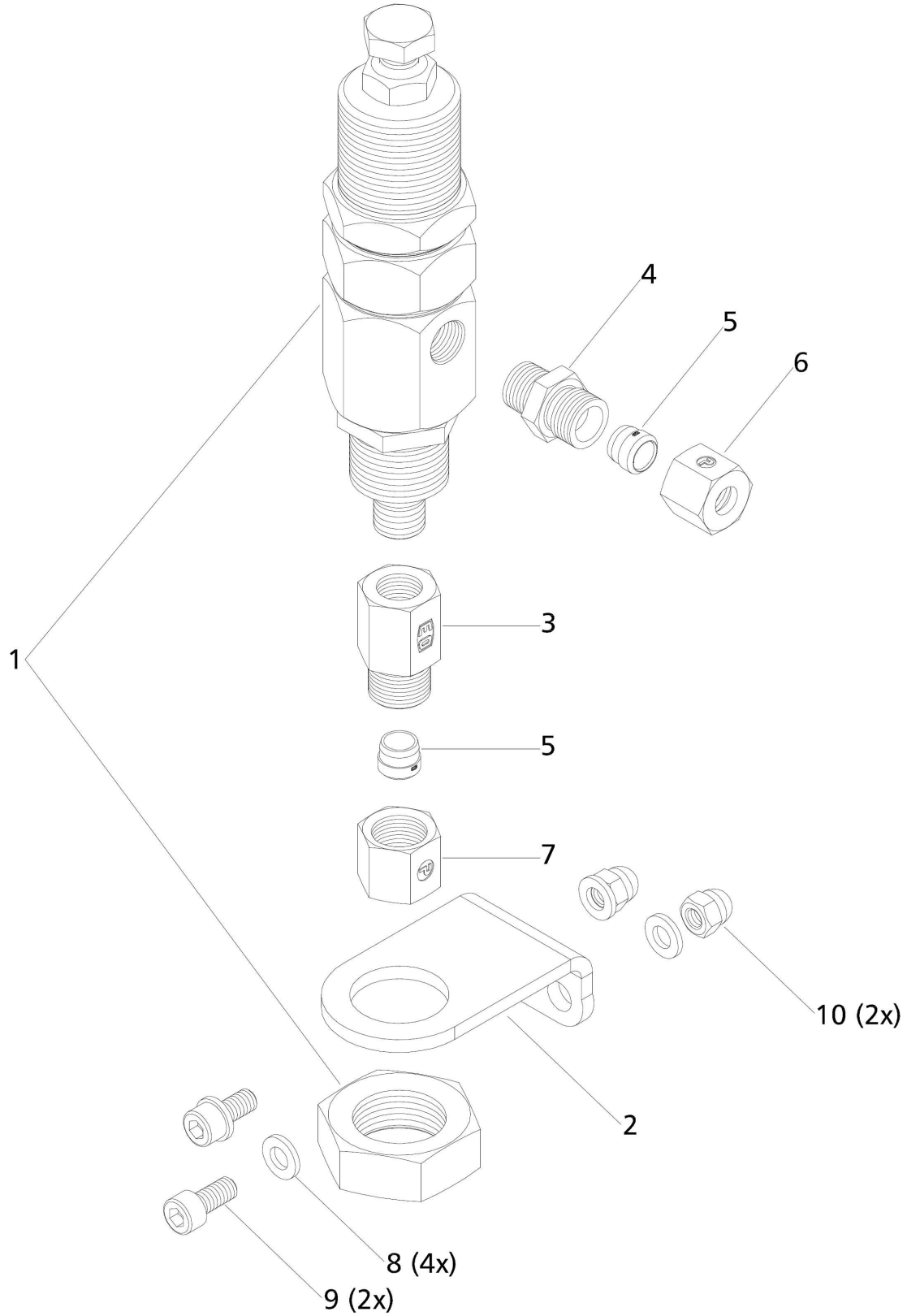
Sonder-Einstelldrücke auf Anfrage! /
Special relieve pressures are available on request!



Druckminderer / Pressure Reducer

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	001428	Druckminderer mit Mutter	Pressure Reducer-Bolt version c/w nut
2	004925	Halterung für Druckminderer 001428	Bracket Pressure Reducer 001428
3	004932	Verschraubung für Druckminderer 001428	Connection for Pressure Reducer 001428
4	000747	Verschraubung GE08L1/4NPTCFX	Connection GE08L1/4NPTCFX
5	000765	Schneidring PSR 08 LX	Olive Seal PSR 08 LX
6	000766	Mutter M08LCFX	Union Nut M08LCFX
7	000767	Mutter 8S M16x1,5	Union Nut 8S M16x1,5
8	000498	U-Scheibe A6	Washer A6
9	001030	Zylinderschraube M6x16mm DIN912 8.8 ZN	Allen Bolt M6x16mm DIN912 8.8 ZN
10	001157	Hutmutter M6 DIN1587 ZN	Domed Nut M6 M6 DIN1587 ZN

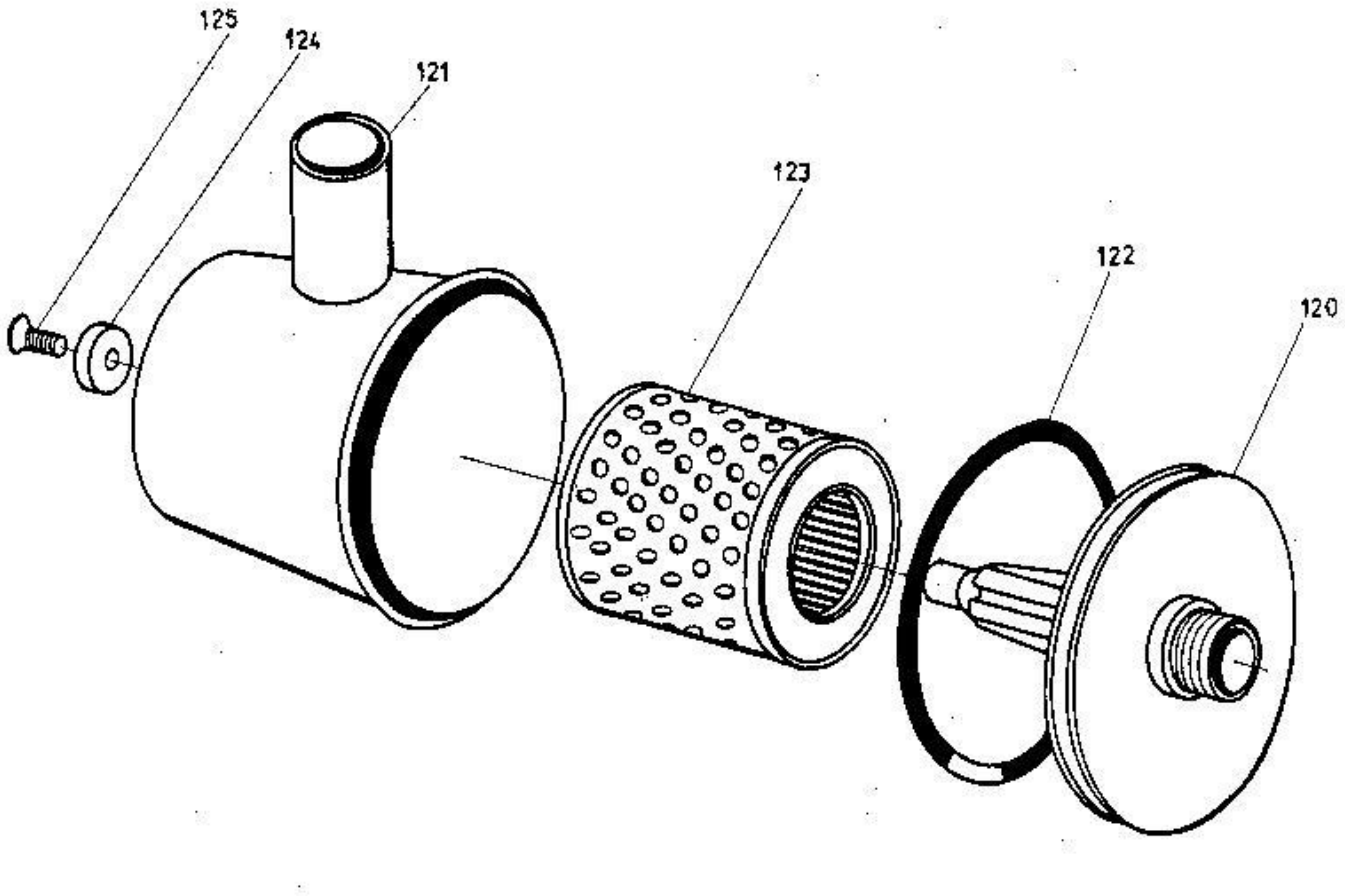
Druckminderer / Pressure Reducer



Baugruppe: Ansaugfilter / Assembly: Intake Filter

Pos.	Best.-Nr. / P/N.	Benennung	Description
120	000084	Flansch Ansaugfilter	Air Intake Flange
121	000068	Blechgehäuse, Ansaugfilter	Metal intake filter housing
122	000012	Dichtring Ansaugfiltergehäuse	Sealing Rubber Intake Filter housing
123	000119	Ansaugfilter	Intake Filter
124	000083	Unterlegscheibe	Washer
125	000082	Senkkopfschraube	Counter sunk screw

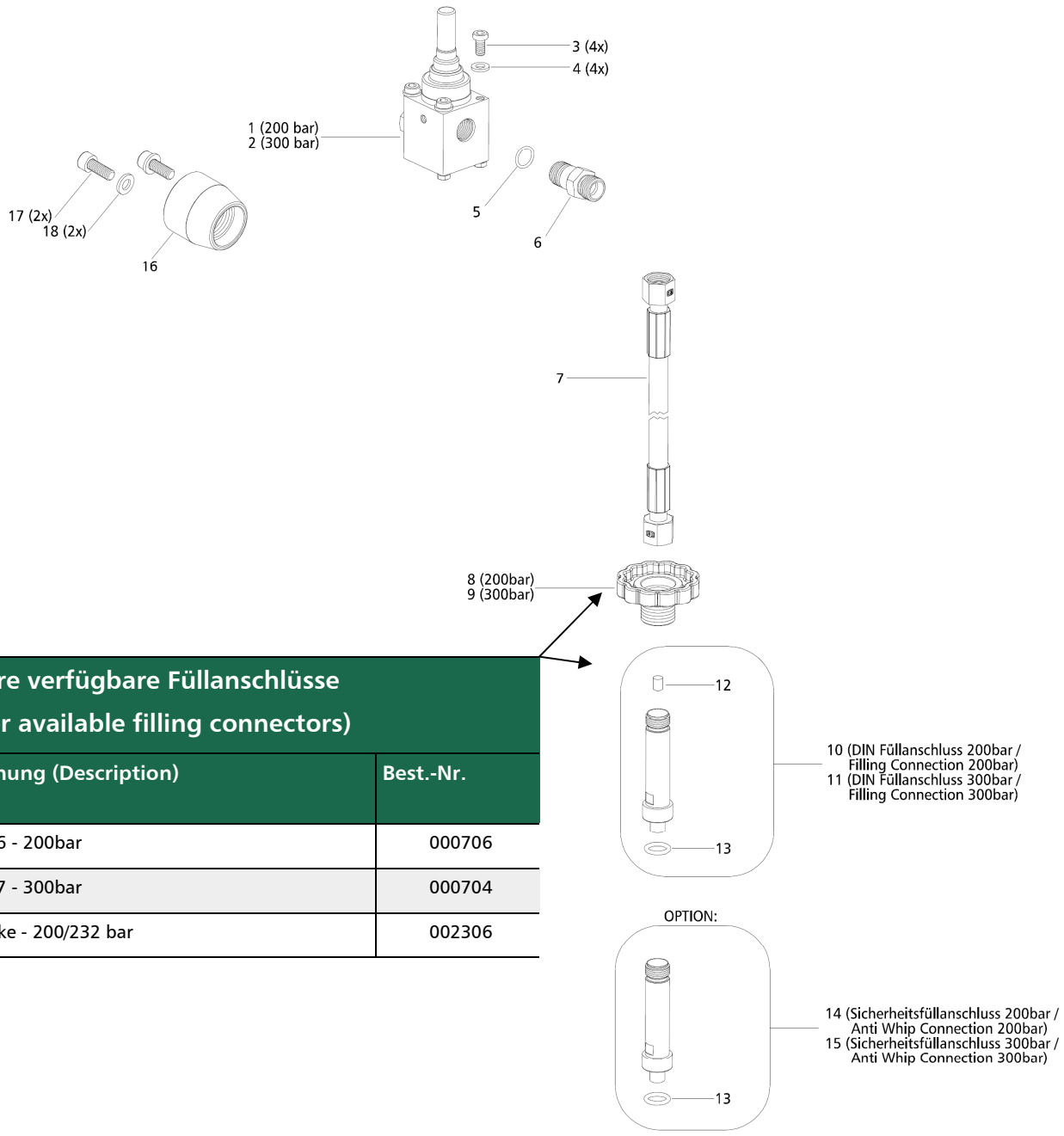
Baugruppe: Ansaugfilter / Assembly: Intake Filter



Kipphebelventil mit Füllschlauch / Lever Valve c/w Filling Hose

Pos.	Best.-Nr. / P/N.	Benennung	Description
1	002449	Kipphebelventil 200 bar	Lever Valve 200bar
2	002450	Kipphebelventil 300 bar	Lever Valve 300bar
3	000949	Flachkopfzylinderschraube M6x12mm DIN6912 8.8 ZN	Pan Head Bolt M6x12mm DIN6912 8.8 ZN
4	000498	U-Scheibe DIN 125 A6	Washer DIN 125 A6
5	001238	O-Ring Ø12,42 x Ø1,78 NBR90	O-Ring Ø12,42 x Ø1,78 NBR90
6	005439	Verschraubung GE M16x1,5/10L - 19mm, s/s	Connection GE M16x1,5/10L - 19mm, s/s
7	001470	Hochdruckschlauch, 800 mm, beidseitig 10L	HP-Hose, 800 mm, both sides 10L
8	000213	Handrad, 200 bar, schwarz	Hand Wheel, ,200 bar, black
9	000215	Handrad, 300 bar, rot	Hand Wheel, ,300 bar, red
10	000695	DIN Füllanschluss 200 bar	DIN Filling Connection 200 bar
11	000697	DIN Füllanschluss 300 bar	DIN Filling Connection 300 bar
12	002911	Sinterfilter DIN Flaschenanschluss	Sintered filter, DIN filling connection
13	001237	O-Ring Ø12,37 x Ø2,62 NBR90	O-ring Ø12,37 x Ø2,62 NBR90
14	000701	Sicherheitsfüllanschluss, ohne Handrad 200bar	Anti Whip Connection w/o handwheel 200bar
15	000702	Sicherheitsfüllanschluss, ohne Handrad 300bar	Anti Whip Connection w/o handwheel 300bar
16	000102	Halter DIN Füllanschluss G5/8	Bracket DIN Filling Connector G5/8
17	001047	Zylinderschraube M6x12mm DIN912 8.8 ZN	Allen Bolt M6x12mm DIN912 8.8 ZN
18	000498	U-Scheibe DIN 125 A6	Washer DIN 125 A6

Kipphebelventil mit Füllschlauch / Lever Valve c/w Filling Hose



Andere verfügbare Füllanschlüsse (Other available filling connectors)	
Benennung (Description)	**Best.-Nr.**
CGA 346 - 200bar	000706
CGA 347 - 300bar	000704
INT / Yoke - 200/232 bar	002306

ATTACHMENT

D

Lenhardt & Wagner GmbH

An der Tuchbleiche 39
D-68623 Lampertheim – Hüttenfeld

www.lw-compressors.com

Operating Instruction

Safety valve

Typ:

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

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

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

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

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

Safety valve with socket

1) ***Identification of set pressure***
2) ***Seal***
3) ***Fixing screws***[1]
4) ***Venting srew (hand wheel)***
5) ***Identification serial number***
6) ***Socket for safety valve***

[1] und die Anforderungen des AD 2000 Merkblatts W7 erfüllen. Schaftlänge 70mm. 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 before further use to the manufacturer for repair / adjustment.

In addition, the safety valve has a venting device (hand wheel).
In the rotation direction clockwise, the safety valve and herewith also the filter housing of the final stage could be completely vented.

During normal operation, the screw is unscrewed to the upper stop anticlockwise, an integrated safety ring prevents that the screw can be completely unscrewed.

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

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 blowoff 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 6mm 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

Contakt: **E-Mail: service@lw-compressors.com**
Web: www.lw-compressors.com
Tel.: +49 (0) 6256 – 85880 0
Fax: +49 (0) 6256 – 85880 14

Note:
Use the safety valve only in a technically perfect condition, for its intended purpose, safety and danger awareness, in compliance with the operating instructions!
Especially disorders which could affect safety must be remedied 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:

- The safety valve is periodically - in accordance with the currently valid Pressure Equipment Directives - to check on operation and reliability.

- Refill annually lubricating oil:
  Oil filling position:
  Hole on the spacer (see arrow, Figure 1)

- Oil level: Fill oil into the hole until oil comes out of the hole.

Figure 1: Position for oil refill

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