
INSTRUCTION MANUAL

LW 320 ES
SILENT

BREATHING AIR COMPRESSOR



L E N H A R D T & W A G N E R G M B H

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Technical Data		LW 320 ES Silent
Delivery Capacity:		320 l/min (11.3 cfm)
Max. Pressure:		350 bar
RPM Compressor:		1,300 min ⁻¹
No of Pressure Stages:		3
Cylinder Bore 1st Stage:		Ø 95 mm
Cylinder Bore 2nd Stage:		Ø 40 mm
Cylinder Bore 3rd Stage:		Ø 18 mm
Stroke:		44 mm
Medium:		Air
Intake Pressure:		atmospheric
Oil Pressure:		+3.0 bar (+/- 0.5 bar)
Oil Capacity:		1.8 ltr
Intake Temperature:		0 < + 45°C
Ambient Temperature:		+ 5 < + 45°C
Cooling Air Requirement:		> 2,250 m ³ /h
Voltage: (Special Windings on Request)		400 V / 3-Phase / 50 Hz
Protection Class Drive Motor		IP 54
Motor Power:		7.5 kW
RPM Motor:		2,890 min ⁻¹
Start:		Star / Delta
Noise level:		83 dB[A] @ 1m distance

Dimensions:	
Depth:	900 mm (35.4") (incl. Filter housing: 1,030 mm)
Length:	760 mm (29.9")
Height:	1,630 mm (46")
Weight:	approx. 320 kgs
Capacity Filter Housing:	1.7 ltr.

S A F E T Y P R E C A U T I O N S

General Notice

This instruction manual contains the operation and maintenance procedures necessary to safely run your L&W compressor. We strongly recommend to read this manual thoroughly prior 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.

Be sure to pay attention to the following points:

- Fill only tanks with a valid hydrostatic test date
- Never exceed the working-pressure rating indicated on the tank
- Carry out proper maintenance on the compressor and filtration system
- Care must be taken to avoid the intake of contaminated air in to the compressor
- Do not exceed maximum operating temperatures

Safety Precautions

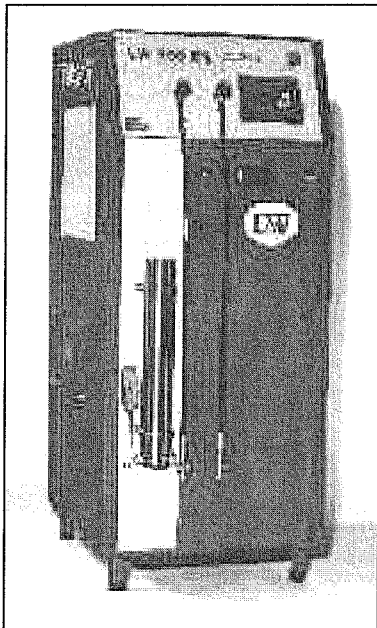
- Read the operation manual of your compressor carefully
- Allow only qualified personnel to run the compressor
- Do not place any objects on compressor while in operation
- Make sure no person or object can accidentally touch any moving parts while running
- Take care that the intake-air is pure and free of toxic gases
- All work on compressor must be carried out while compressor is disconnected for the power supply and depressurized
- Check unit regularly for air- & oil leaks
- Never weld damaged high-pressure tubes
- Filling-hoses must be in perfect condition; special attention should be paid to the connecting fittings
- Do not touch any hot compressor / engine parts while doing maintenance work as these may cause injury by burning. Wait until unit has cooled down.

S P E C I F I C A T I O N

- Automatic Dewatering System
- Automatic End-Pressure Stop
- Start / Delta Start
- Emergency Stop Switch
- Pressure Maintaining / Non-Return Valve
- Stainless Steel Water Separators
- High Pressure Filter Housing mounted on Front Side
- 2 Cooling Fans
- Automatic Pressure Release after switching off Unit
- Plastic coated Steel Housing
- Filling devices: depends on customer requirements
- Compact Dimensions

Breathing Air Quality according to:

DIN 3188 - EN 12021 - ISO 2533 - BS 4001 & BS 4275



LW 320 ES Silent

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- Fill only tanks with a valid hydrostatic test date
- Never exceed the working-pressure rating indicated on the tank
- Do proper maintenance to the filtration system
- Avoid contaminated air to reach the air intake
- Do not exceed maximum operation temperatures

Installation

The compressor should only be connected by a qualified electrician. Use a 16 Ampere plug for installation.

NOTE:

Check direction of rotation immediately after the first start. If it is wrong the pistons may cease due to lack of lubrication! Furthermore the unit would not be cooled properly. When facing the front of the compressor - direction of rotation should be clockwise (open front door and check additional fan).

Always ensure good room ventilation and pure intake air!

Breathing Air Compressor
LW 320 ES Silent



F U N C T I O N A N D O P E R A T I O N

Electronic Drive Motor

Compressor units can be delivered with various drive motors depending on customer requirements. Standard specification is:

7,5 kW (LW 320 ES Silent)

400 V / 3-Phases / 50 Hz, rpm 2890 min⁻¹. - *special windings on request* -

How to tension the V-belts

Attention: Always disconnect main plug before starting any maintenance work (Compressor can start automatically if in automatic mode!!)

- Stop compressor & disconnect main plug
- Remove front door
- Loose the 4 screws of fan sheet / frame
- Remove back door of compressor cabinet
- Loose nuts of motor flange (*use 17mm spanner*)
- Loose lower motor tensioning bolt
- Adjust upper motor tensioning bolt till correct V-belt tension is achieved
- Screw in lower tensioning bolt till motor is back in horizontal position
- Tighten nuts of motor flange
- Check tension of V-belts (*readjust if necessary*)
- Close back door of cabinet
- Readjust fan sheet - *make sure that additional fan does not touch the fan housing*
- and tighten the 4 screws

ATTENTION:

Insufficient V-belt tension leads to higher vibrations and increases the noise level while running. Replace faulty V-belts immediately.

Automatic Dump System

LW 320 ES Silent compressors come as standard with an auto dump system. Two solenoids open and drain three condensate separators (about every 15 minutes). We recommend the use of a 20 litre container to collect all condensate. It can then be disposed of like discarded oil. The drain noise is kept to a minimum with a silencer.

Intake Filter

A micro filter cartridge is used as an air intake filter. We recommend to replace it every 100 working hours (*depends on pollution*) but at least every two years. A dirty, contaminated filter restricts the airflow, reduces the compressors capacity and causes overheating.

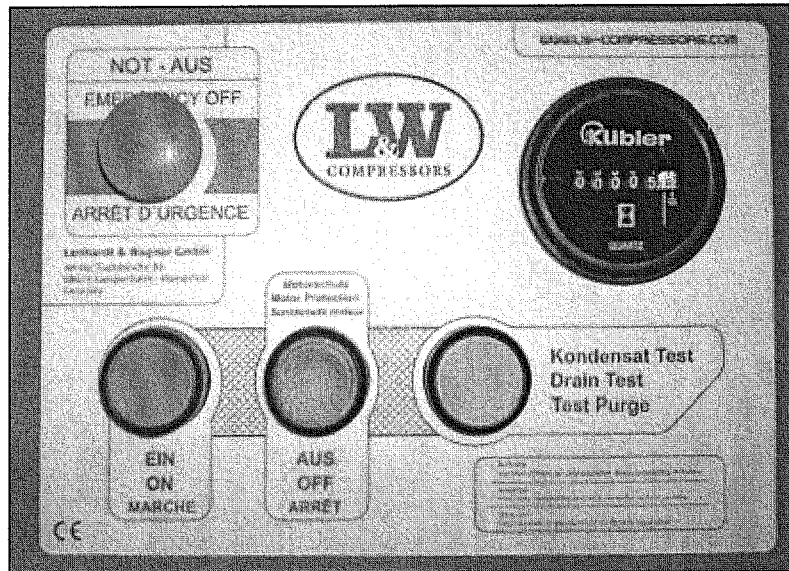
Cylinder Heads and Valves

Inlet and outlet valves are located inside the cylinder heads. The inlet valve opens on the down stroke. The outlet valve opens on the upstroke. All valves should be replaced after 6000 working hours due to normal wear and tear. To replace valves the cylinder heads have to be removed. All three valves are combined valves. Inlet and outlet valves form one unit. The first stage valve is of plate valve design. The second & third stage valves use a spring operated piston inside a brass cylinder, sealing is done by alloy-ring & cap. To change valves no special tools are required (*2nd & 3rd stage valves have a M6 thread in the body centre use a bolt to pull out*)

Lubrication

The crankshaft & 1st stage cylinder are lubricated by oil splash.
2nd & 3rd stage cylinders are lubricated by mechanical oil pump.
1.8 litre of synthetic compressor oil (order no. 000001) is required for an oil change.
NOTE: Oil level should be at least at middle of oil level dip stick (*non-running machine*) - located on the crankcase

Starting the Compressor for the first Time



Start / Stop Keys & Condensate Drain Test Button (non-ECC system)

- Place the compressor in a distance of at least 50 cm to any walls (air temperature max. +45°C)
- Check compressor oil level
- Check if gas filter cartridge is in place
- Make sure all filling valves are closed (if attached)
- Start compressor by green push button (Standard Version)
- Check direction of rotation - immediately after the 1st start
- Run compressor to max. pressure
- Check if end-pressure switch works at max. pressure
- Check compressor unit for air leaks
- Check auto dump valves for function by pushing the blue push button on the dash panel (standard version)
- Turn off compressor by red push button (Standard Version)
- Release pressure by filling valves

Safety Valves

Every pressure-stage is equipped with its own safety valve.

They protect the unit from over -pressure / load.

Safety valves are adjusted to:

1st Stage: 8 bar

2nd Stage: 60 bar

3rd Stage: final pressure

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

NOTE: A faulty safety valve has to be replaced immediately!

Oil / Water Separator

Oil / water separators (condensate separators) are fitted after every compression stage which were automatically drained every 15 minutes [*by solenoids (auto dumps)*]. Integrated sinter filters protect the compressor system from unwanted deposits. We recommend to clean separator bodies and replace the sinter filters (plus required O-rings) every 1000 working hours.

Final Air Purifier (Mole Carbon Filter)

The mole carbon filter housing is mounted to the front side of the compressor cabinet *capacity: 1.7 litre, P_{max}: 350 bar*. Inside the filter housing a jet blows air to the housing body. Oil and water mist condenses and flows to the bottom of the housing. Air then flows through the mole carbon filter cartridge, which purifies the air from moisture and odours.

See chart for intervals:

LW 320 ES Silent	1.7 ltr. Housing:	every 57 hours	(@ +20 °C)
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Furthermore the filter life strongly depends on humidity and air temperature. Cartridges are vacuum packed. We recommend to open them just before they will be fitted to the compressor, as they could be saturated with moisture just being exposed to high humidity. To change the filter cartridge stop the compressor. It will then automatically release all remaining air pressure. This can take up to two minutes. Once the unit is depressurized the filter housing cap can be unscrewed with the T-shaped filter tool delivered with the compressor. If any pressure remains in the housing, it will be almost impossible to open the filter housing cap. The filter itself can also be unscrewed with the filter tool to be replaced by a new one. Screw cap on hand tight.

Maintenance

Compressor oil level has to be checked daily.

Compressor oil change intervals:

1st oil change after 250 working hours

2nd oil change after 750 working hours and subsequently every 2.000 working hours
- but at least once a year -

Only use synthetic compressor oil (order number 000001).

About 1.8 litre of oil is required for an oil change.

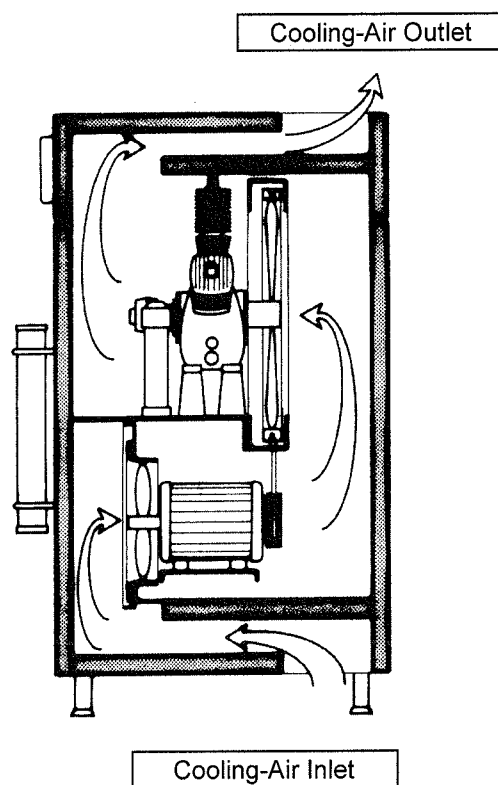
The mole carbon filter cartridge has to be changed regularly

(see change of mole carbon filter cartridge)

- Check connections for leaks every 20 working hours
- Change inlet air filter every 100 working hours
- Open & clean condensation separators (first and second stage) every 1,000 working hours
- Replace inlet / outlet valves every 1,500 working hours

Cooling-Air Flow Scheme

LW 320 ES Silent



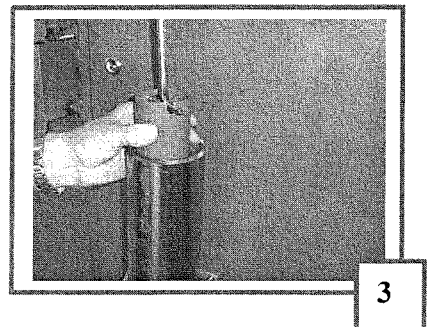
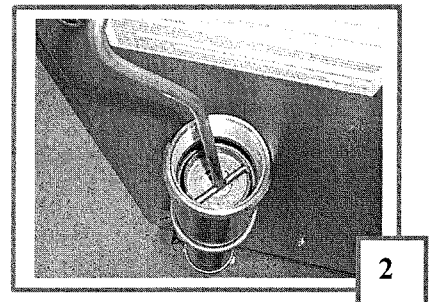
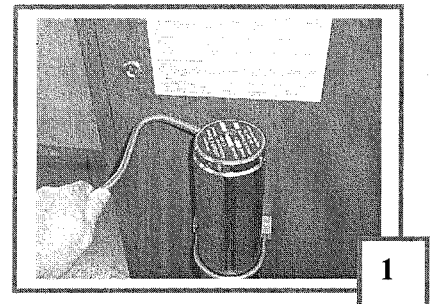


FILTERCHANGE Stationary L&W Compressors

Filter cartridge change

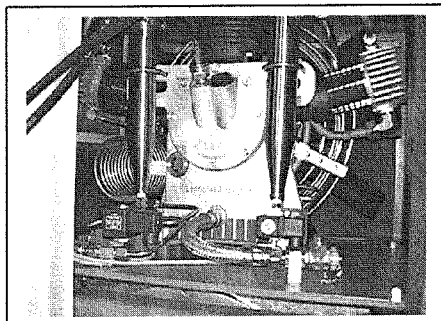
- Unscrew the filter housing cap anti-clockwise, first with the special cartridge key and later by hand (1)
- Place the other end of the cartridge key in the filter cartridge in the filter housing (2)
- Unscrew the filter cartridge anti-clockwise and pull the cartridge out of the housing (3)
- Check O-ring for wear and grease thread of top cap
- Open the sealing of the new filter cartridge and use the cartridge key to place it in the filter housing (3)
- Screw in the new filter cartridge clockwise with the cartridge key hand tight (2)
- Refit the cap of the filter housing clockwise, first by hand and then by the filter key, hand tight (1)
- Close the drain valve of the separator / filter housing if only the hand operated drain is mounted.

The filter cartridge replacement is now completed, ensure that the saturated filter cartridge is disposed of correctly at an approved waste point.





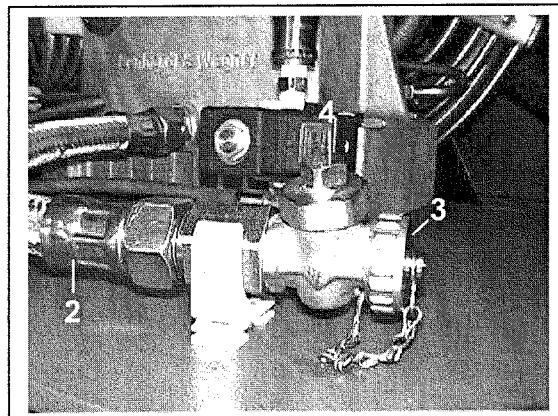
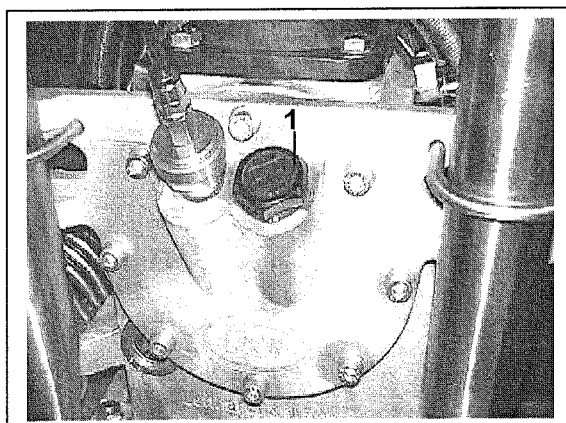
OIL CHANGE INSTRUCTIONS LW 320 ES Silent



For the periodic oil change, please follow the time schedule of the instruction manual.

Only use original L&W synthetic oil 000001 (1 ltr bottle).

Before changing the oil, be sure the compressor is switched off and cannot be inadvertently started. Disconnect it from the power supply or by switch off the starter of the gasoline or Diesel engine.



To conduct an oil change, the temperature of the oil must be at least +20°C to allow it to flow easily. In cold climates, the compressor should run first for about 15 minutes, dependent on the ambient temperature;

Oil change

- Unscrew the filling cap anti-clockwise (1)
- Remove the oil drain hose from it's holder (2)
- Unscrew the drain hose cap anti-clockwise (3)
- Hold the drain hose over a container for waste oil and open the drain valve (4)
- Let the oil drain completely, close valve (4), screw on plug (3) and relocate the hose
- Refill the block with original L&W compressor oil (appr. 1.8 ltr) by using a funnel
- The dipstick (1) should be filled up to the top mark - **DO NOT OVERFILL WITH OIL!!**
- Refit the oil filler cap

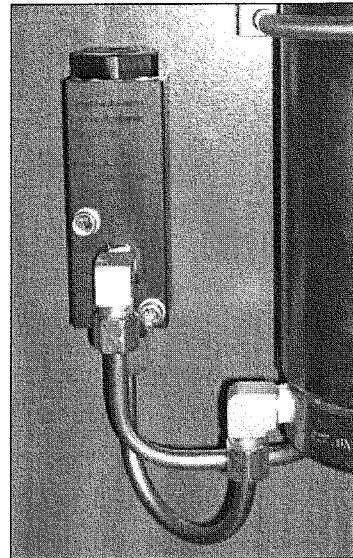
The oil change is now completed, **ensure the filling cap (1) is securely refitted.**

The schedule in the maintenance manual will indicate the next oil change or the ECC display.

Ensure the waste oil is disposed of correctly at an approved waste oil point.

Pressure maintaining and non-return valve

The combined pressure maintaining / non-return valve is located in the system directly after the final filter housing



Pressure Maintaining Valve

Pressure maintaining valve

The pressure maintaining valve serves to keep the pressure in the final filter housing at a minimum of 150 to 180 bar. This high pressure creates more condensation in the separator/housing that can be mechanically removed (opening the drain valve) before the air is finally purified in the final filter, thus extending the life of the filter cartridge.

When the compressor is started, the pressure will build up in each stage as the compressor runs. The pressure in the final filter housing will increase until the pressure maintaining valve set pressure is reached. As a result of this function, the filling pressure gauge will not show any pressure for approx 1 min after the compressor is started and no air will flow out of the filling valve if opened.

Once the pressure maintaining valve opens, the pressure gauge will respond by climbing quite rapidly (within a few seconds) to the set pressure of the pressure maintaining valve (default 150 to 180 bar).

Adjusting the pressure maintaining valve:

- Open the filling valve to vent the system completely, close the filling valve (*Pressure gauge reads 0 bar*)
- Start the compressor
- Monitor the pressure gauge
- The valve will open and the pressure the gauge climbs to quickly to the set pressure, this should be 150 – 180 bar
- If the pressure setting is outside this valve, adjust the pressure maintaining valve as follows:

Increase the pressure setting:

- Stop the compressor and open the drain valves
- Open the filling valve to vent the system after the pressure maintaining valve
(*Pressure gauge reads 0 bar*)
- Loosen the locking screw on the pressure maintain valve
- Using a suitable tool, screw the valve setting screw clockwise to increase the spring tension
- Start the compressor and check the pressure setting, adjust as necessary
- Re-tighten the locking screw
- Check the pressure maintaining opening pressure once again

Decrease the pressure setting:

- Stop the compressor and open the drain valves
- Open the filling valve to vent the system after the pressure maintaining valve
(*Pressure gauge reads 0 bar*)
- Loosen the locking screw on the pressure maintain valve
- Using a suitable tool, screw the valve setting screw anti-clockwise to decrease the spring tension
- Start the compressor and check the pressure setting, adjust as necessary
- Re-tighten the locking screw
- Check the pressure maintaining opening pressure once again

Warning:

If the pressure maintaining valve is set at a higher pressure than the maximum working pressure, the final safety valve will blow off before the pressure maintaining valve opens, the pressure gauge will read 0 bar!

After repair work where the pressure maintaining valve is not yet adjusted, the basic setting is the setting screw approx 3 turns in to the housing.

Non-return valve

The non-return valve is located in the system after the pressure maintaining valve and prevent air from flowing back from the filling lines into the final filter housing/compressor block. The non-return valve is operating correctly if the pressure gauge on the filling valve remains constant when the drain valves on the compressor are opened.



Symptom	Problem	Trouble Shooting
Final pressure is not reached	Connections leaking	Re-tighten, clean and/or replace
	Final pressure safety valve blows off	Replace
	Cooling pipe leaking	Replace
	Condensation drain valves	Check tightness, clean and/or replace
	Final pressure switch cuts off (option)	Re-set final pressure cut off
Compressor vibrates excessively	V-Belt tension insufficient	Tighten V-Belts
	Compressor block and/or prime mover mounting screws loose	Re-tighten
	Shock absorbing feet worn down	Replace
	Uneven surface	Move compressor accordingly
Compressor overheats	Inlet filter cartridge blocked	Replace
	Ambient temperature too high	Improve ambient conditions or run for shorter periods
	Cooling air feed/exhaust not sufficient	Adhere to the installation data
	Inlet hose too long	Reduce the length and/or increase the diameter
	Inlet hose diameter too small	Increase diameter
	Compressor turning in the wrong direction	Ensure correct rotation (phase)
	Suction/pressure valve blocked	Clean and/or replace
Safety valve blows off	Suction / pressure valve in the following stage defect	Clean and/or replace
	Sinter filter in the following stage blocked	Replace
	Safety valve leaks	Replace (do not tamper)
Air tastes of oil	Molecular carbon filter needs replacing	Replace
	Incorrect compressor oil	Use only authorised oil type
	Non conform type of filter	Replace with correct filter
	Cylinders and / or piston rings worn	Replace
Delivery rate too low	Suction/pressure valve blocked	Clean and/or replace
	Cylinder / piston rings worn	Replace
	Also see section „final pressure is not reached“	
Automatic condensation drain not functioning (Option)	Solenoids defect	Replace
	Cable/wiring defect	Repair
	Timer defect	Replace
	Sinter filter from pneumatic valve blocked	Replace
	Piston in the pneumatic valve blocking	Dismantle pneumatic valve
Automatic condensation drain operates between cycles	Pilot pressure for pneumatic valve too low	Replace suction/pressure valve / safety valve
	Piston seat in the pneumatic valve damaged/contaminated	Clean / Replace
	Timer settings incorrect	Set default settings



Symptom	Problem	Trouble Shooting
<i>(Option)</i>	Timer defective	Replace
Compressor switches off before final pressure is reached <i>(Option)</i>	Final pressure switch not properly set	Reset
	Pressure maintaining valve set too high	Reset
	Fuse/breaker tripped	Refer to the correct fuse ratings for the supply
Filter cartridges times too short	Pressure maintain valve set too low	Reset to 170 bar
	Non conform type of filter	Use only correct filters
	Shelf life exceeded	Adhere to date of expiry
	Packing damaged and / or filter packing opened too long before use	Store properly and open immediately before use
	Ambient temperature too high	Ensure correct and sufficient cooling air feed and exhaust
	Cylinder / piston rings worn	Replace
Excessive oil consumption	Cylinder / piston rings worn	Replace
	Incorrect compressor oil	Use only authorised oil type
	Operating temperature too high	Adhere to operating parameters
	Oil leak in the compressor block	Check relevant components especially shaft seal and replace/re-tighten



Service, Repair and Maintenance

All repair, service and maintenance work is to be carried out when the compressor is stopped, isolated from the power supply and pressure free.

The unit is to be regularly checked for leaks of air/oil, air leaks can be localised using a leak detector or spray

It is recommended that only authorised L&W service technicians carry our repair and service on the bearing of the compressor (crankshaft and connecting rods)

Conservation / storage of the compressor:

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

- ✓ Run the compressor at 200 bar for approx ten minutes (control the flow with the filling valve to maintain the pressure).
 - ✓ Replace oil.
 - ✓ Open filling valve(s) and run the compressor for a few minutes.
 - ✓ Stop the compressor and open the drain valves.
 - ✓ Close the filling valves.
 - ✓ Open the final filter housing and lubricate the O-Ring with a food grade grease or silicone grease.
 - ✓ Store the compressor in a cool dry place free from dust and contamination. A cover is recommended as long as condensation can be avoided.
-
- ✓ Fuel Driven Units only: Fill up fuel tank to top level to avoid corrosion.
-

De-conservation, commissioning:

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

- ✓ If the compressor has been stored for more than 12 Months, we recommend replacing the oil before use.
- ✓ Replace the final purification filter.
- ✓ Check oil level.
- ✓ Inspect the condition of the vee belts, replace if necessary
- ✓ Inspect the filling hoses visually for signs of deterioration, replace as necessary.
- ✓ Open the filling valves and run the compressor for approx 10 minutes with the filling valves open.
- ✓ Close the filling valves and allow the compressor to build up to working pressure.
- ✓ Check the correct safety valve setting and/or pressure switch setting (option).
- ✓ Check all connections and pipe work for leaks.

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



Tightening Torques

LW 160 E	LW 190 B	LW 225 E V3	LW 245 B V3
LW 170 D - <i>Nautic</i>	LW 170 E - <i>Nautic</i>	LW 200 E - <i>Nautic</i>	

Cylinder Head Bolts	1 st Stage	22 - 24 Nm
Cylinder Head Bolts	2 nd & 3 rd Stage	28 Nm
Nuts M10	(8.8)	44 Nm
Cooling Fan Bolts	(8.8)	20 Nm
Slider Guide Bolt		10 Nm

LW 280 E / ES

LW 320 E / ES

Cylinder Head Bolts	1 st Stage	37.5 Nm
Cylinder Flange Bolts	1 st Stage	35 Nm
Cylinder Head Bolts	2 nd Stage	30 Nm
Cylinder Head Bolts	3 rd Stage	30 Nm
Guide Cylinder Flange Bolts	2 nd & 3 rd Stage	41 Nm
Block Fixing Bolts M10	(8.8)	44 Nm

LW 450 D / E / ES


LW 570 E / ES

Cylinder Head Bolts	1 st Stage	37.5 Nm
Cylinder Head Bolts	2 nd Stage	32 Nm
Cylinder Head Bolts	3 rd Stage	32 Nm
Cylinder Head Bolts	4 th Stage	32 Nm
Cylinder Flange Bolts	1 st Stage	35 Nm
Cylinder Flange Bolts	2 nd Stage	35 Nm
Cylinder Flange Bolts	3 rd Stage	35 Nm
Block Fixing Bolts M10	(8.8)	44 Nm

MAINTENANCE LIST LW 320 ES

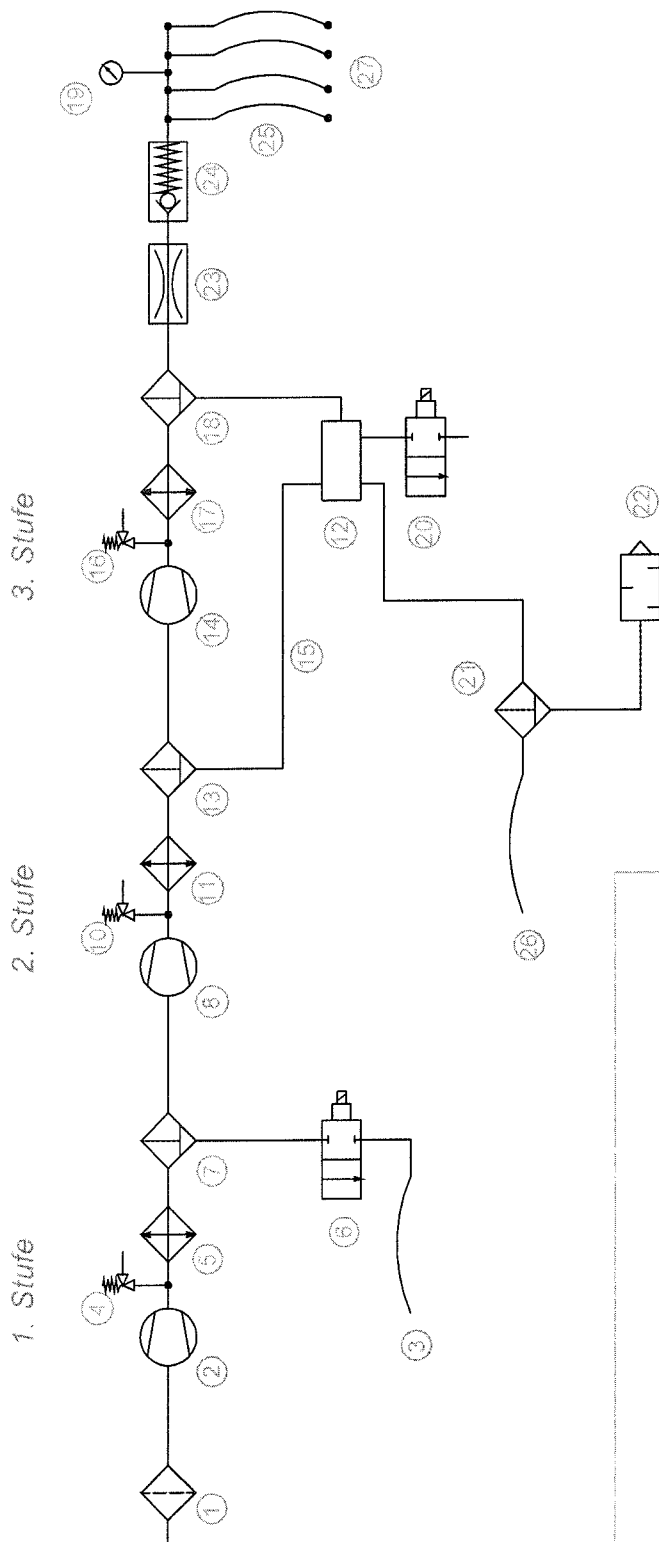
Maintenance Work	Intervals	Qty.	Order No.
Replace Filter Cartridge Filter Capacity 1.7 Itr.:	LW 320 ES: every 53 working hours (@ +20 °C)	1	000002
Check Oil Level	once a day (before 1 st Start)		
Oil Change	1 st Oil change after 50 working hours (in total) 2 nd Oil change after 300 working hours (in total) 3 rd Oil change after 1,000 working hours (in total) thereafter every further 1,000 working hours - but at least once a year	1,800 ml per oil change	000001 (1 Litre)
Replace Air Intake Cartridge	depends on pollution - but at least every two years	1	000170
Check V-Belts	every 50 working hours	2	001685
Replace In- & Outlet Valves	every 1,500 working hours		
1 st Stage		1	002093
2 nd Stage		1	000542
3 rd Stage		1	000543
Check Pressure Maintaining- / Non Return Valve	every 200 working hours		
Check Safety Devices	at least once a year This should only be done by professional engineers		
Check Pressure Pipes for Air Leaks	every 200 working hours		

MAINTENANCE LIST LW 320 ES

Maintenance Work	Intervals	Qty.	Order No.
Clean Pressure Pipes	depends on pollution - but at least every two years		
Check Condition of Filling Hoses	once a day (before the 1 st fill)		
Replace Sinter Filter of Condensate Valve	1 st change after 1,000 working hours thereafter every 2,000 working hours	1	000188
Clean Oil-/Water Separators	every 1000 working hours - but at least once a year		
Replace Sinter Filters of Water Separators 1 st Stage 2 nd Stage 3 rd Stage	every 1,000 working hours every 1,000 working hours every 1,000 working hours	1 1 1	002123 002123 000184
Replace Silencer	every 500 working hours	1	000178
Check / Re-torque Connections & Bolts	after 15 working hours - thereafter every 500 working hours		

FLOW DIAGRAM

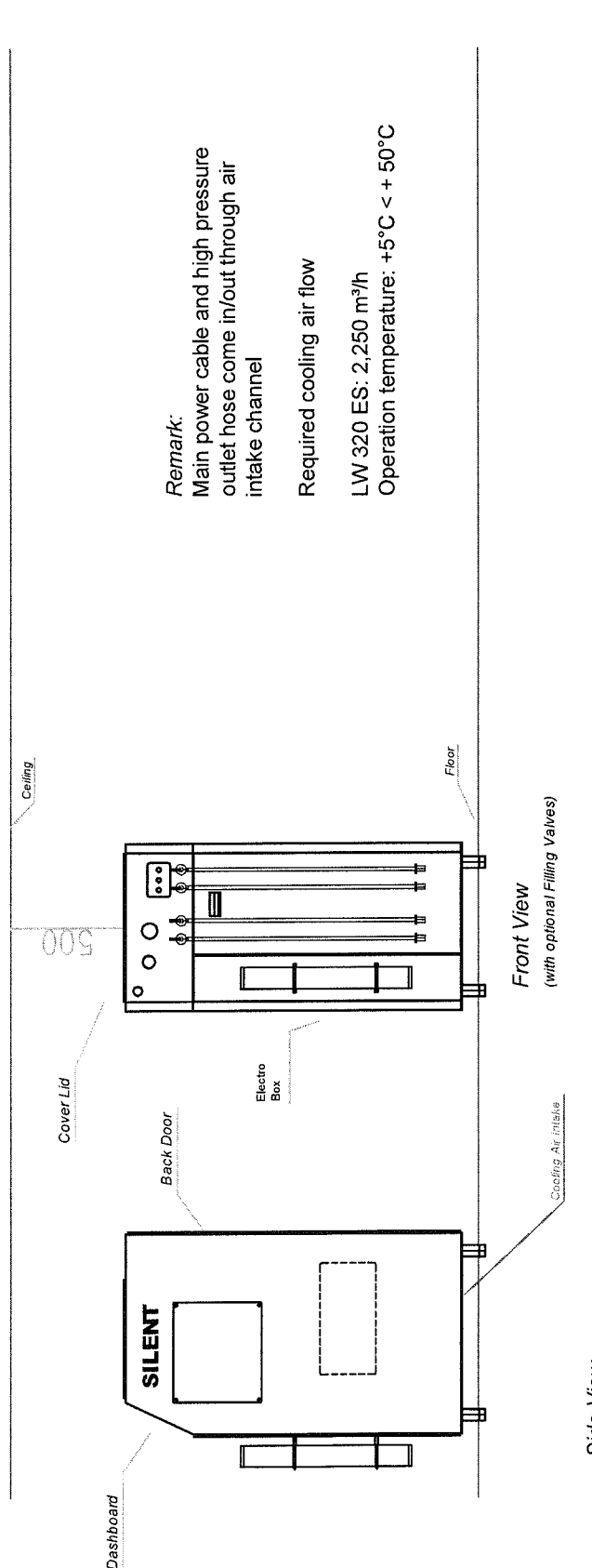
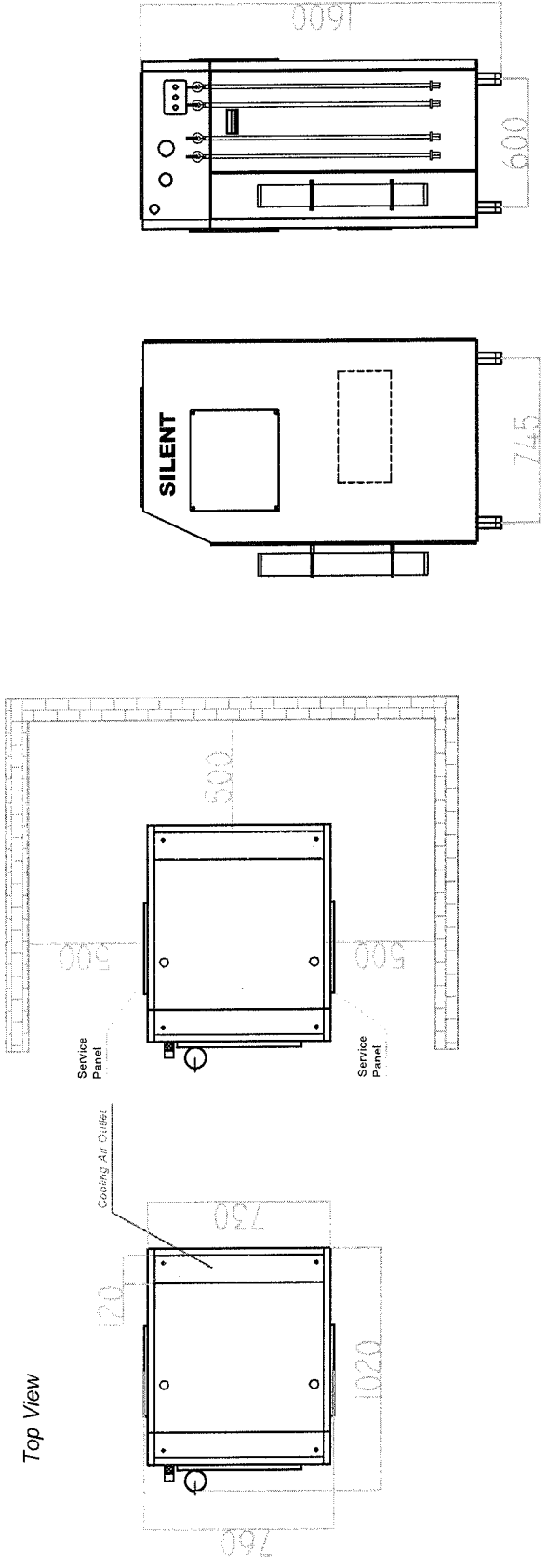
- 1 Intake Filter
- 2 1st Pressure Stage
- 3 Condensate Drain Hose
- 4 Safety Valve 1st Stage
- 5 Heat Exchanger
- 6 Condensate Solenoid
- 7 Oil- / Water Separator
- 8 2nd Pressure Stage
- 9 Condensate Drain Hose
- 10 Safety Valve 2nd Stage
- 11 Heat Exchanger
- 12 Pneumatic Condensate Valve
- 13 Oil- / Water Separator
- 14 3rd Pressure Stage
- 15 Control Pressure 2nd Stage
- 16 Safety Valve 3rd Stage
- 17 Heat Exchanger
- 18 Oil- / Water Separator
- 19 Pressure Gauge
- 20 Solenoid
- 21 Condensate Drain Final Stage
- 22 Silencer
- 23 Pressure Maintaining Valve
- 24 Non-Return Valve
- 25 High Pressure Hose
- 26 Condensate Drain Hose
- 27 Tank Connector (DIN / Yoke or CGA)



LW 230 E / LW 280 E
LW 230 ES / LW 280 ES
LW 300 B
LW 300 E
LW 320 ES

LENHARDT & WAGNER GMBH

Installation LW 320 ES Silent



SPARE PARTS LIST**LW 320 ES**

Qty.	Description	Order No.	Comments
2	Filling Connector DIN 200 bar	4044	
2	Hand Wheel 200 bar - Black	4045	
2	Hand Wheel 300 bar - Red	4046	
2	Filling Connector DIN 300 bar	4048	
1	Safety Valve 225 bar <i>(with test certificate and TÜV)</i>	4052	
1	Safety Valve 330 bar <i>(with test certificate and TÜV)</i>	4053	
1	Sinter Filter for Condensation Valve	4200	
8	Washer	LW 160/190 276	
4	Washer	LW 160/190 276	
1	Side Cover left	LW 260 0001	
1	Side Cover right	LW 260 0002	
2	Service Access Panel	LW 260 0003	
1	Switch Box Cover	LW 260 0004	
1	Top Cover	LW 260 0005	
1	Rear Access Door	LW 260 0006	
1	Rear Housing Panel	LW 260 0007	
1	Strengtheners for Rear Housing Panel	LW 260 0008	
1	Front Instrument Panel	LW 260 0009	
1	Strengtheners for Front Instrument Panel	LW 260 0010	
1	Front Access Door	LW 260 0011	
1	Hand Hold	LW 260 0012	
1	Mounting Clip	LW 260 0013	
1	Front Plate	LW 260 0014	
1	Strengtheners for Front Plate	LW 260 0015	
1	Base Plate	LW 260 0016	
4	Shock Absorber	LW 260 0017	
1	Cooling Fan Plate	LW 260 0018	
1	Main Frame	LW 260 0019	
6	Catch & Lock complete	LW 260 0020	
1	Upper Floor	LW 260 0021	
1	Lower Floor	LW 260 0022	
1	Insulation Side Cover left	LW 260 0023	
1	Insulation Side Cover Right	LW 260 0024	
1	Insulation Top Cover	LW 260 0025	
1	Insulation Rear Access Door	LW 260 0026	
1	Insulation Rear Housing Panel	LW 260 0027	
1	Insulation Front Instrument Panel	LW 260 0028	
1	Insulation Front Access Door	LW 260 0029	
1	Insulation Front Plate	LW 260 0030	
2	Insulation Service Access Panel	LW 260 0031	

SPARE PARTS LIST**LW 320 ES**

Qty.	Description	Order No.	Comments
1	Insulation Upper Floor	LW 260 0032	
1	Insulation Lower Floor	LW 260 0033	
1	Insulation Main Frame	LW 260 0034	
2	V Drive Belt	LW 260 0035	
1	Bolt	LW 260 0036	
1	Locking Washer	LW 260 0037	
1	Prime Mover Pulley Wheel	LW 260 0038	
1	Prime Mover 7,5 kW (LW 280 ES)	LW 260 0040	
1	Prime Mover 5,5 kW (LW 230 ES)	LW 260 0041	
4	Dome Headed Bolt	LW 260 0042	
2	Tensioning screws	LW 260 0043	
1	Flywheel	LW 260 0044	
11	Ventilator Blade	LW 260 0045	
1	Mounting Ring	LW 260 0046	
1	Oil Pump Cover	LW 260 0047	
1	Shaft Seal Ring	LW 260 0048	
1	Pump Drive	LW 260 0049	
2	Roller	LW 260 0050	
1	Pump Cover	LW 260 0051	
1	O-Ring	LW 260 0052	
1	Bearing Flange	LW 260 0053	
1	O-Ring	LW 260 0054	
2	Main Bearing	LW 260 0055	
1	Spacer	LW 260 0056	
1	Woodruff Key Crankshaft	LW 260 0057	
1	Crankshaft	LW 260 0058	
3	Big End Bearing	LW 260 0059	
1	Thrust Washer	LW 260 0060	
1	Circlip	LW 260 0061	
12	Cylinder head Bolt	LW 260 0062	
1	Cylinder Head, 3 rd Stage	LW 260 0063	
1	Valve Assembly, 3 rd Stage complete	LW 260 0064	
1	Cylinder, 3 rd Stage	LW 260 0065	
2	O-Ring	LW 260 0066	
2	Guide Cylinder, 3 rd Stage	LW 260 0067	
2	O-Ring	LW 260 0068	
1	Piston Ring Set, 3 rd Stage	LW 260 0069	
1	Piston, 3 rd Stage	LW 260 0070	
4	Circlip	LW 260 0071	
1	Guide Piston	LW 260 0072	
1	Circlip	LW 260 0073	
2	Small End Bearing	LW 260 0074	
2	Piston Pin	LW 260 0075	

SPARE PARTS LIST**LW 320 ES**

Qty.	Description	Order No.	Comments
2	Connecting Rod, 2 nd & 3 rd Stage	LW 260 0076	
1	Crankcase	LW 260 0077	
1	Seal	LW 260 0078	
1	Crank Case Cover	LW 260 0079	
1	O-Ring	LW 260 0080	
1	Piston, 2 nd Stage	LW 260 0081	
1	Piston Ring Set 2 nd Stage complete	LW 260 0082	
1	Cylinder, 2 nd Stage	LW 260 0083	
1	Valve Assembly, 2 nd Stage complete	LW 260 0084	
1	Cylinder head, 2 nd Stage	LW 260 0085	
1	Connecting Rod, 1 st Stage	LW 260 0086	
1	Small End Bearing	LW 260 0087	
1	Piston, 1 st Stage	LW 260 0088	
1	O-Ring	LW 260 0089	
1	Cylinder, 1 st Stage	LW 260 0090	
8	Screw	LW 260 0091	
4	Screw	LW 260 0091	
1	Valve Assembly, 1 st Stage complete	LW 260 0092	
4	90° Connection	LW 260 0093	
4	Sealing ring	LW 260 0094	
4	Nut	LW 260 0095	
1	Connection pipe	LW 260 0096	
1	Connection pipe	LW 260 0097	
5	90° Connection	LW 260 0098	
14	Sealing ring	LW 260 0099	
12	Nut	LW 260 0100	
1	T-Piece	LW 260 0101	
1	Connection	LW 260 0102	
1	Oil Pressure Feed 2 nd Stage	LW 260 0103	
1	Oil Pressure Feed 3 rd Stage	LW 260 0104	
1	Oil Pump supply pipe	LW 260 0105	
1	Cooling Spiral 1 st Stage	LW 260 0106	
1	Cooling Spiral 2 nd Stage	LW 260 0107	
1	Cooling Spiral 3 rd Stage	LW 260 0108	
3	Cooling Spiral Mount	LW 260 0109	
3	Cooling Spiral Mount	LW 260 0110	
6	Cooling Spiral Mount	LW 260 0111	
6	Cooling Spiral Clamp	LW 260 0112	
8	Bolt	LW 260 0113	
4	Bolt	LW 260 0114	
1	Hose, Crank Case Breather	LW 260 0115	
1	Oil Filling Cap	LW 260 0116	

SPARE PARTS LIST**LW 320 ES**

Qty.	Description	Order No.	Comments
1	Pressure Relief Valve, 2nd Stage - 60 bar	LW 260 0117	
2	Sinter Filter Housing	LW 260 0118	
2	O-Ring Guide	LW 260 0119	
2	O-Ring, Sinter Filter	LW 260 0120	
2	Sinter Filter (incl. O-Ring Sinter Filter)	LW 260 0121	
2	Clamp	LW 260 0122	
2	Water Separator	LW 260 0123	
2	Plug	LW 260 0124	
1	90° Connection	LW 260 0125	
2	Nut	LW 260 0126	
1	Condensation Drain Pipe 2nd Stage	LW 260 0127	
1	Condensation Connecting Pipe	LW 260 0128	
1	T-Piece	LW 260 0129	
1	Magnet Valve 2nd Stage	LW 260 0130	
2	90° Connection for Hose	LW 260 0131	
1	Condensation Drain Hose, 1st Stage	LW 260 0132	
1	Cooling Spiral	LW 260 0133	
1	Mounting Bracket	LW 260 0134	
1	Mounting Plate	LW 260 0135	
1	Mounting Block for Safety Valve w/o cert. 3/8"	LW 260 0136	
1	Mounting Block for Safety Valve with cert.	LW 260 0137	
2	High Pressure Hose	LW 260 0138	
1	Condensation Drain Hose, 2nd & 3rd Stages	LW 260 0139	
1	Condensation Drain Hose	LW 260 0140	
1	Pipe	LW 260 0141	
1	Reducer	LW 260 0142	
1	Pipe	LW 260 0143	
2	Lever Filling Valve complete	LW 260 0144	
2	Mounting Nut Filling Valve	LW 260 0145	
1	Pressure Sensor	LW 260 0146	
1	Crush Washer	LW 260 0147	
1	Pressure Sensor Connection	LW 260 0148	
1	Pipe	LW 260 0149	
1	Bulk Head Connection	LW 260 0150	
1	Pipe	LW 260 0151	
1	Pipe	LW 260 0152	
11	Screw	LW 260 0153	
8	Screw	LW 260 0154	
8	Screw	LW 260 0155	

SPARE PARTS LIST**LW 320 ES**

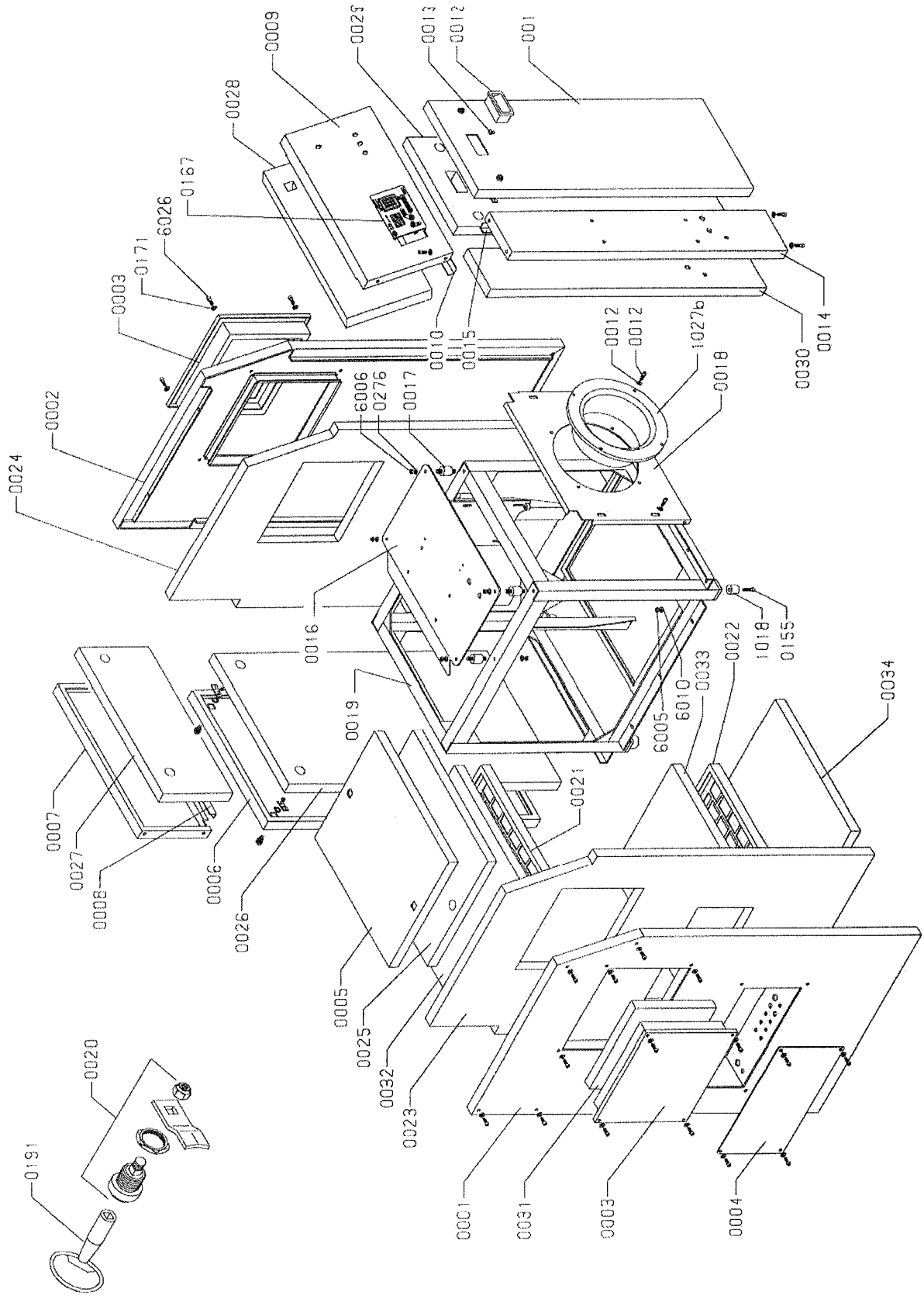
Qty.	Description	Order No.	Comments
2	Connection	LW 260 0156	
8	Screw	LW 260 0157	
2	T-Piece	LW 260 0158	
1	Crank Case Breather	LW 260 0159	
2	Bolt	LW 260 0160	
1	Seal, Safety Valve w/o cert.	LW 260 0161	
11	Washer	LW 260 0162	
1	ECC Display Unit, complete	LW 260 0167	
1	O-Ring	LW 260 0168	
2	High Pressure Filling Hose	LW 260 0169	
1	Seal	LW 260 0170	
1	Union Condensation Valve	LW 260 0171	
4	Washer	LW 260 0171	
2	Nut	LW 260 0172	
2	Screw	LW 260 0173	
2	Screw	LW 260 0174	
1	O-Ring	LW 260 0189	
1	O-Ring	LW 260 0190	
3	Nut	LW 260 0191	
3	Lamp Holder	LW 260 0192	
1	LED White	LW 260 0193	
1	LED Glass Yellow	LW 260 0194	
1	LED Glass Red	LW 260 0195	
1	Lamp Glass White	LW 260 0196	
1	Lamp Glass Yellow	LW 260 0197	
1	Lamp Glass Red	LW 260 0198	
4	Screw	LW 300/450 0155	
1	Sinter Filter	LW 300/450 10004	
1	Magnet Valve 1 st Stage	LW 300/450 2009	
1	Condensation Bleed Off Valve	LW 300/450 2011	
1	Repair Kit for Condensation Valve	LW 300/450 2011a	
1	Silencer	LW 300/450 2014	
1	Oil/Water Separator 2 nd /3 rd Stage	LW 300/450 2015	
1	Inlet Flange	LW 300/450 3000	
4	90° Connection	LW 300/450 3001	
1	Reducer	LW 300/450 3002	
3	Connection	LW 300/450 3004	
3	90° Connection	LW 300/450 3010	
2	Double Nipple	LW 300/450 3013	
1	Hose Connection	LW 300/450 3015	
1	Connections	LW 300/450 3022	
4	Nut M8	LW 300/450 6005	
14	Nut M10	LW 300/450 6006	

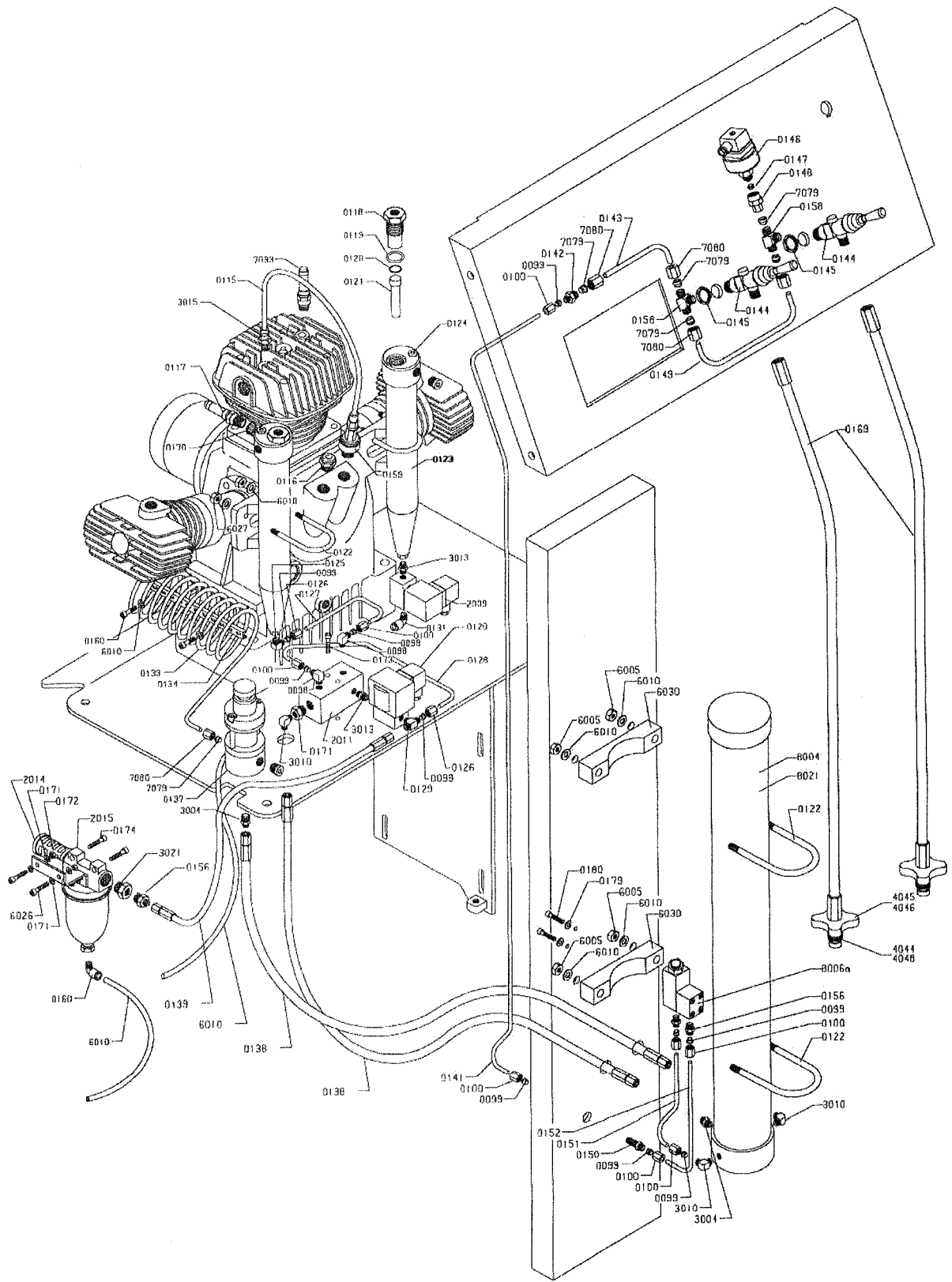
SPARE PARTS LIST**LW 320 ES**

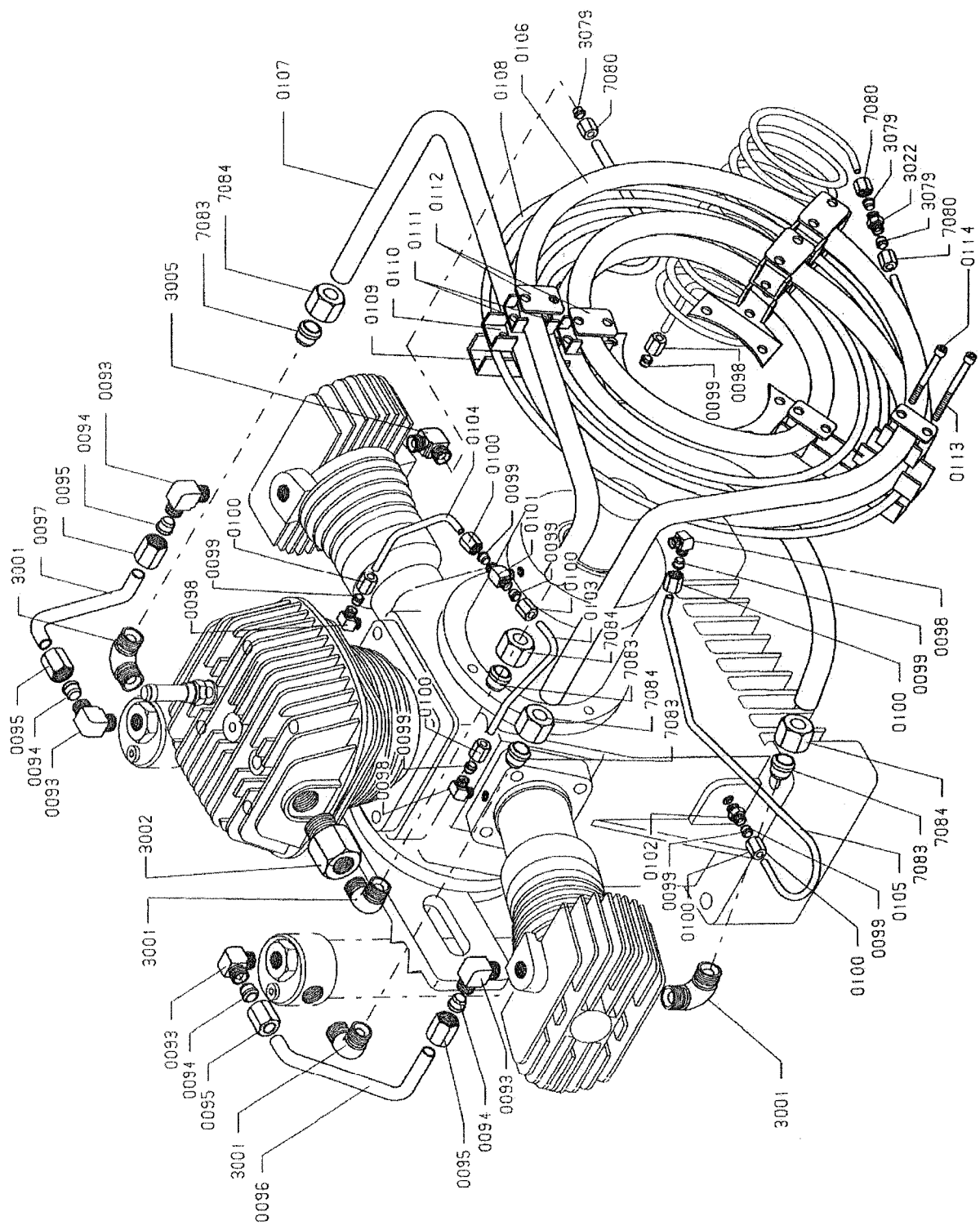
Qty.	Description	Order No.	Comments
28	Washer	LW 300/450 6010	
2	Clamp	LW 300/450 6021	
6	Lock Nut	LW 300/450 6027	
2	Mounting Block, Filter Housing	LW 300/450 6030	
1	Safety Valve 225 bar (without test certificate)	LW 300/450 7007	
1	Safety Valve 330 bar (without test certificate)	LW 300/450 7008	
1	Inlet Filter Housing, complete.	LW 300/450 7016	
1	Clamp	LW 300/450 7016a	
1	Inlet Filter Cover	LW 300/450 7016b	
1	Inlet Filter Cartridge	LW 300/450 7017	
1	Oil Level Glass	LW 300/450 7021	
2	Circlip	LW 300/450 7026a	
1	Piston Pin	LW 300/450 7026b	
1	Piston Ring Set, 1 st Stage complete	LW 300/450 7027	
1	Copper Seal, 1 st Stage Valve	LW 300/450 7030a	
1	Upper Gasket, Valve 1 st Stage	LW 300/450 7030b	
1	Cylinder Head, 1 st Stage	LW 300/450 7031	
1	Pressure relief Valve 1 st Stage	LW 300/450 7033	
4	Cylinder Head Bolt	LW 300/450 7045	
16	Lock Washer	LW 300/450 7047	
11	Sealing ring	LW 300/450 7079	
11	Nut	LW 300/450 7080	
4	Sealing ring	LW 300/450 7083	
4	Nut	LW 300/450 7084	
4	Screw	LW 300/450 7087	
1	Filter Housing 1,7 ltr., P _{max} : 350 bar	LW 300/450 8004	
1	Pressure Maintaining & Non Return Valve	LW 300/450 8006a	
1	Filter Housing 2,3 ltr., P _{max} : 350 bar	LW 300/450 8021	
2	Key	LW 300/450ES 0191	
4	Foot	LW 300/450ES 1018	
1	Cooling Fan Fairing	LW 300/450ES 1027b	
1	90° Connection	LW 300/450ES 3005	
1	Hose Connection	LW 300/450ES 3015	
4	Nut M8	LW 300/450ES 6005	
4	Washer	LW 300/450ES 6010	
4	Washer	LW 300/450ES 6010	
4	Washer	LW 300/450ES 6010	
1	Connection	LW 300/450ES 7067	
1	Oil Drain Hose	LW 300/450ES 7068	
1	Plug	LW 300/450ES 7069	

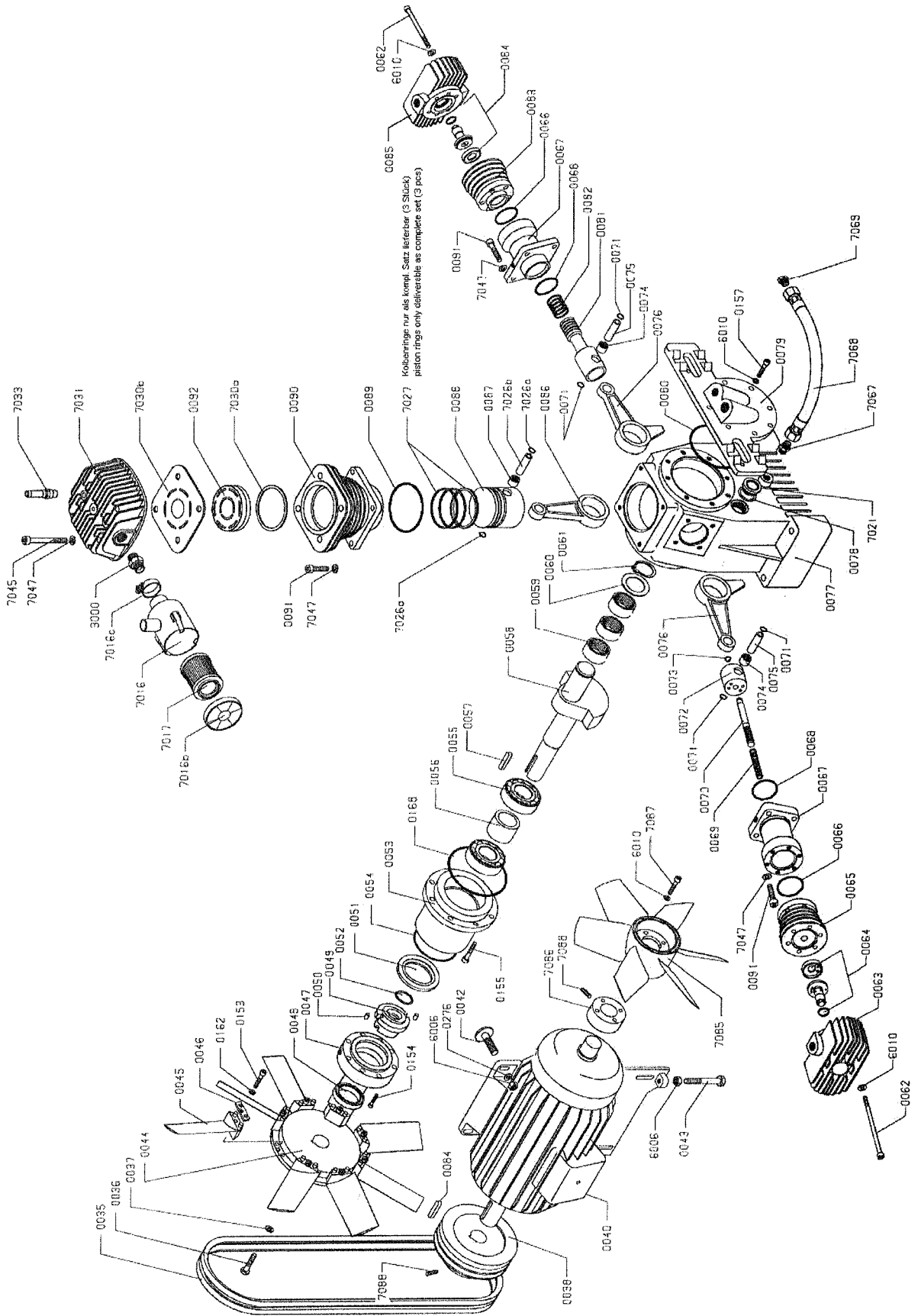
SPARE PARTS LIST**LW 320 ES**

Qty.	Description	Order No.	Comments
1	Woodruff Key	LW 300/450ES 7074	
1	Fan	LW 300/450ES 7085	
1	Fan Flange	LW 300/450ES 7086	
1	Grub Screw	LW 300/450ES 7088	
4	Connection	LW 450 3016	
2	Mounting Screws	LW 450 6026	

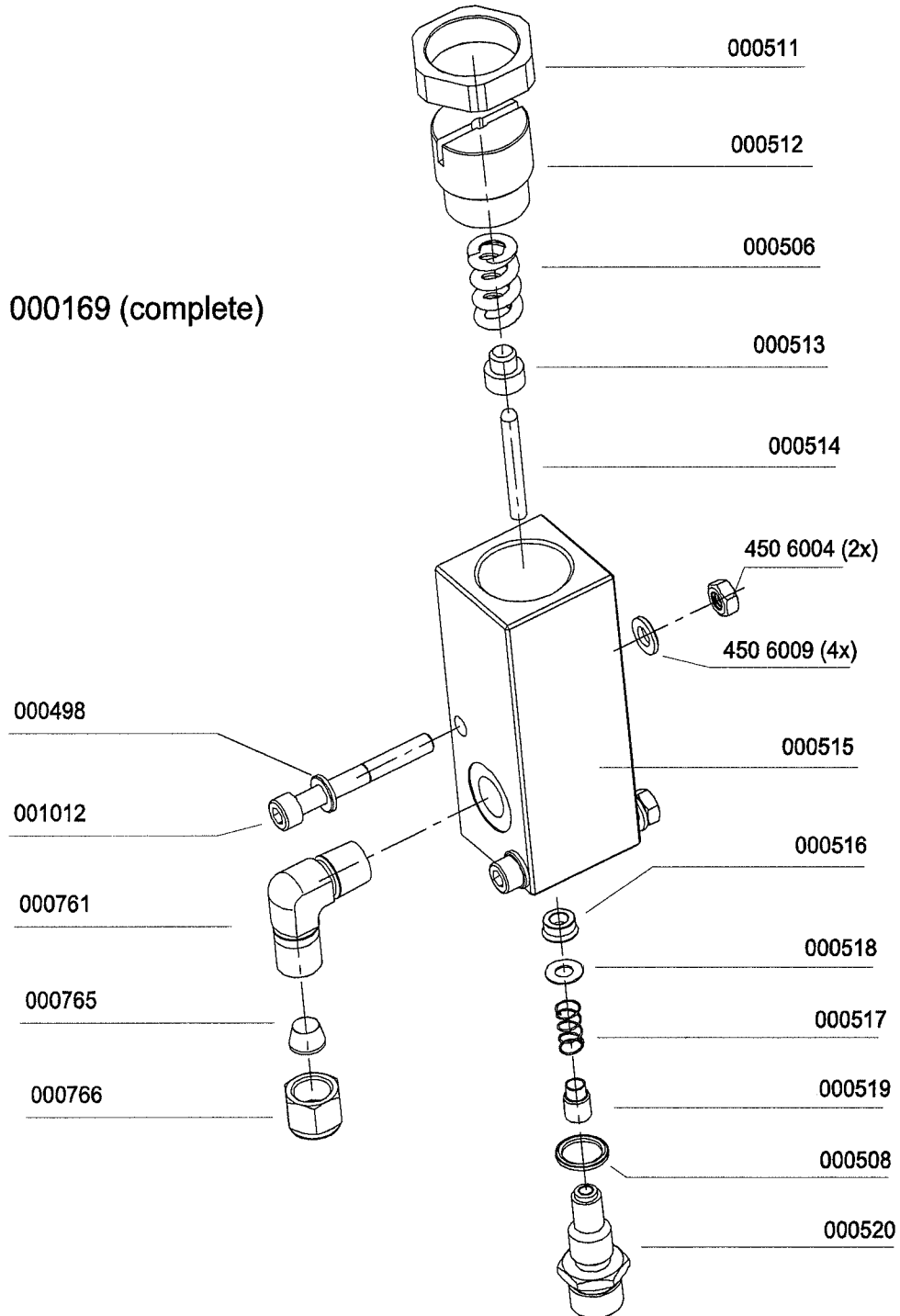


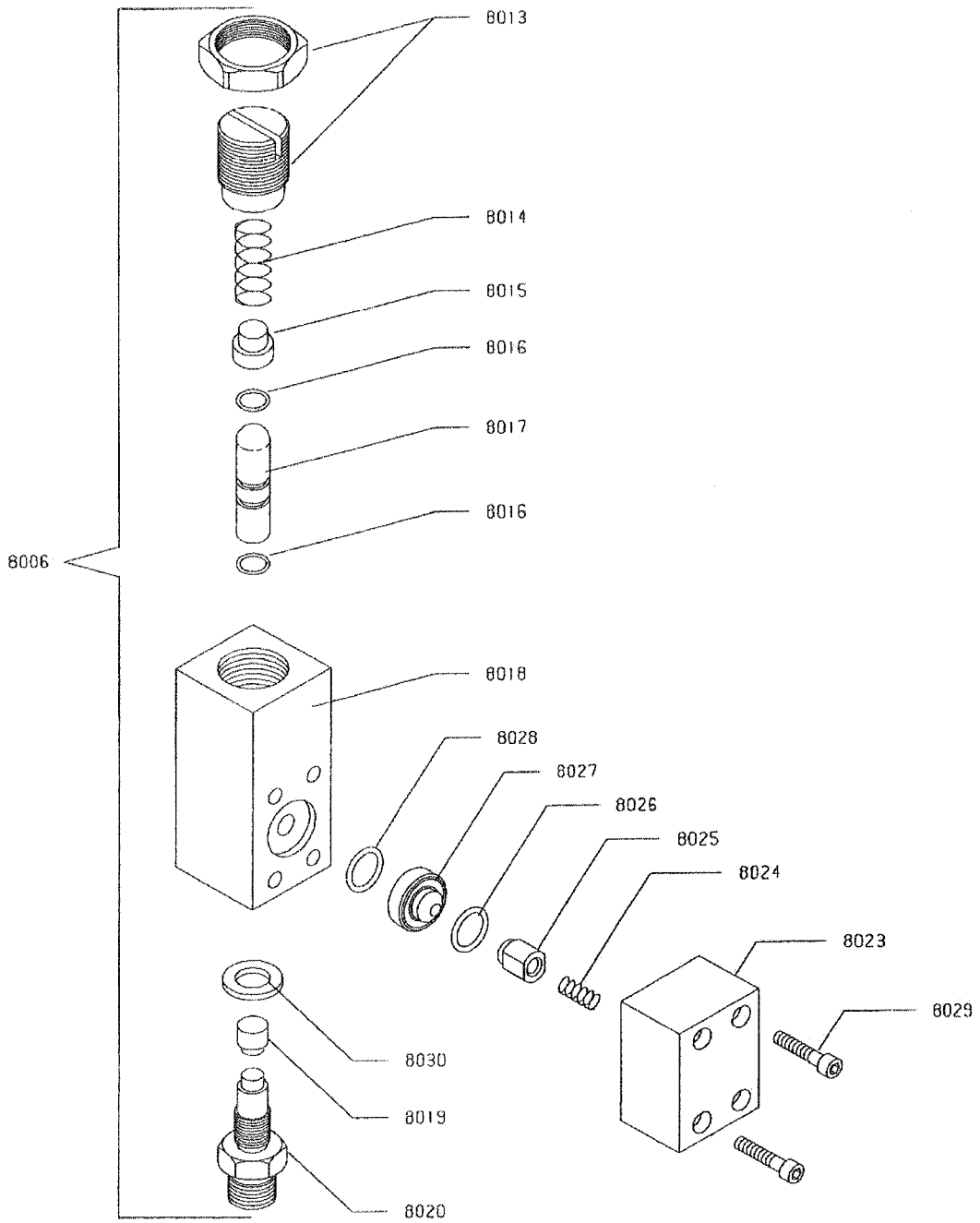


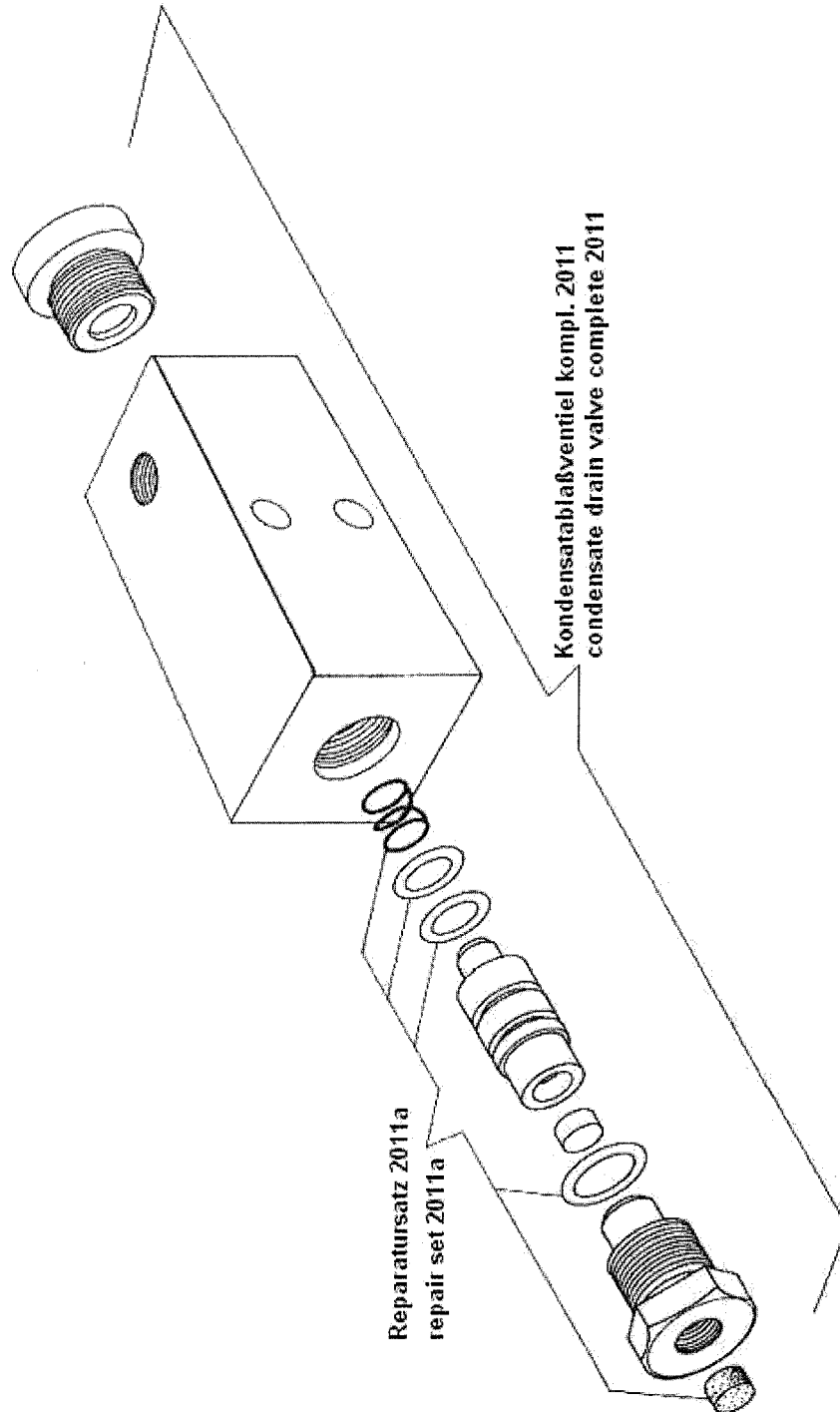




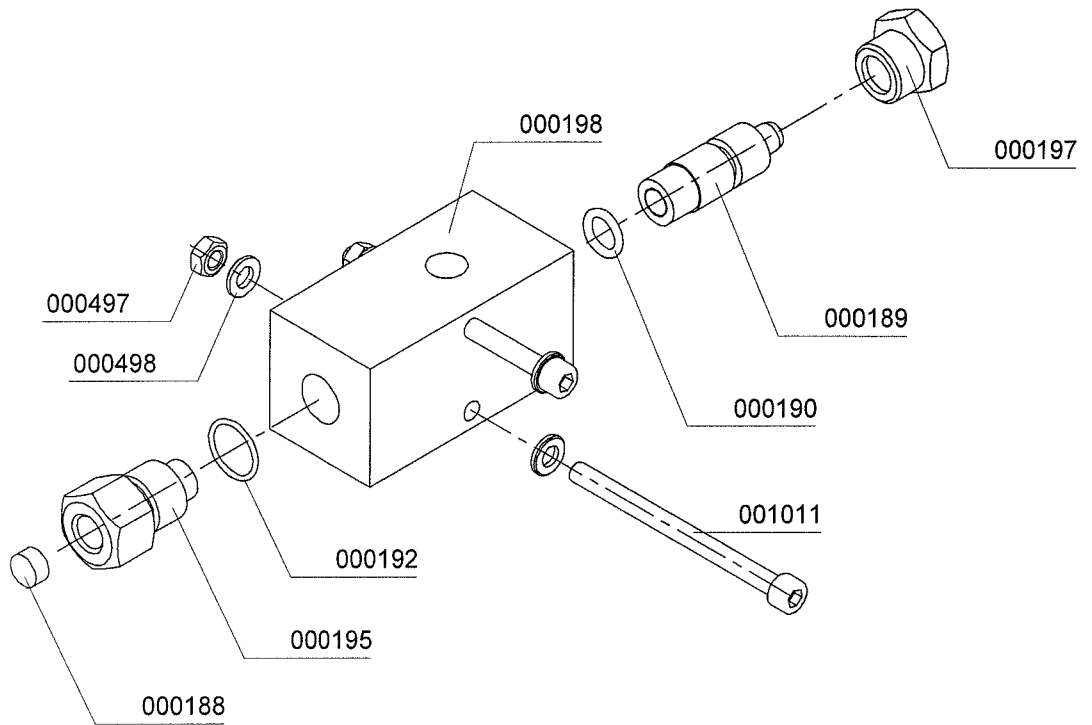
Baugruppe: Druckhalteventil
Assembly: Pressure Maining Valve



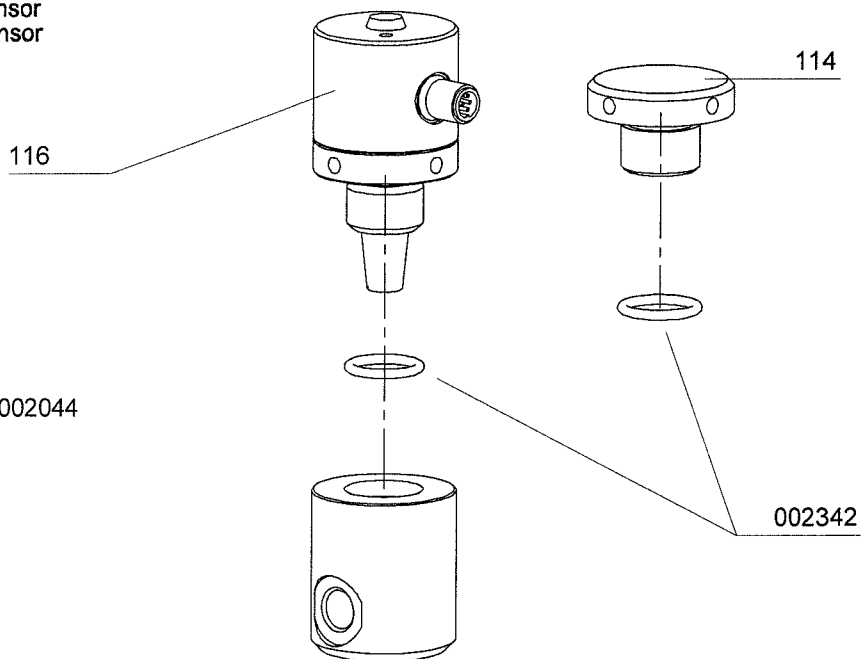




Baugruppe: Kondensatabscheidung
Assembly: Condensat-Separator



Baugruppe: Puracon-Sensor
Assembly: Puracon-Sensor



Complete Puracon Unit: 002044

Baugruppe: Sicherheitsventil
Assembly: Safety Valve

Druck / Pressure	SV-Ventile mit CE-Prüfung Safety Valves with CE-Approval	SV-Ventile mit TÜV-Prüfung Safety Valves with TÜV-Approval
225 bar	001814	000553
250 bar	001815	000554
285 / 300 bar		000555
330 bar	001816	000556
350 bar	001817	000557

