INSTRUCTION MANUAL
AIR COMPRESSOR

GB

HV2/200

SPERRE

PREFACE

Sperre has produced this instruction manual in order to provide users of its compressor equipment with information about the compressor's construction and operation, as well as basic information about inspection and maintenance.

It is important that the operator should familiarise himself with the contents of this instruction manual, so as to ensure that installation, use and maintenance work is carried out in a correct and safe manner from the outset.

The maintenance intervals and individual technical data are average values based on experience, and may vary, depending on the compressor's operational parameters.

The supplier accepts no responsibility for damage resulting from careless operation or inadequate maintenance. Keep the compressor in good mechanical condition, and remember that preventive maintenance of the equipment reduces the danger of damage and unnecessary operational interruptions.

Sperre reserves the right to modify details without prior warning.

Ellingsøy, October 2002
Sperre Industri A/S

CONTENTS

1. PERSONAL SAFETY

The installation, operation and maintenance of the compressor must be carried out by trained personnel who are familiar with the contents of this instruction manual.

The compressor must only be used to compress air.

Unauthorised remodelling or modification of the compressor may result in a safety hazard, and are not permitted.

Before any form of work is commenced on the compressor the electrical power must be turned off at the starter panel and at the main switchboard, and the switch on the main switchboard must be marked with a notice indicating that repair work is in progress. The discharge valve of the compressor must be closed, and the pressure must be released in all pressurised parts of the compressor.

The safety valves for LP and HP air, the bursting disc in the water mantle and any other safety equipment must be inspected regularly. Damaged components should be replaced with new, original parts. Adjustment of the safety valves shall only be carried out by authorised personnel. The compressor must never be used if the safety equipment is defective.

2. ABOUT THE COMPRESSOR

2.1 Construction

The compressor described in this instruction manual is constructed as a two cylinder, two stage single action water cooled compressor. The principles of its construction are illustrated in Figures 2.1 and 2.2.

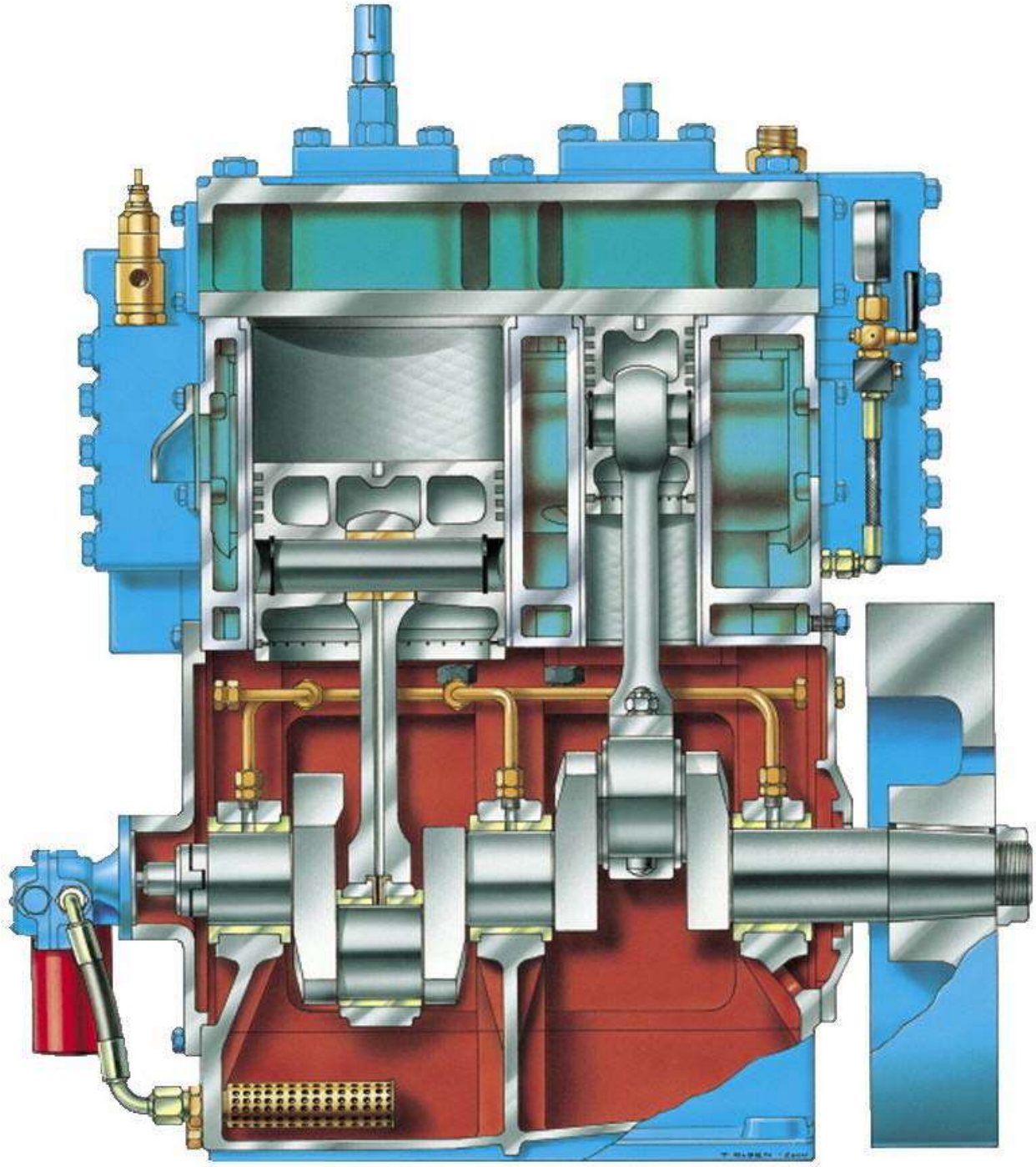
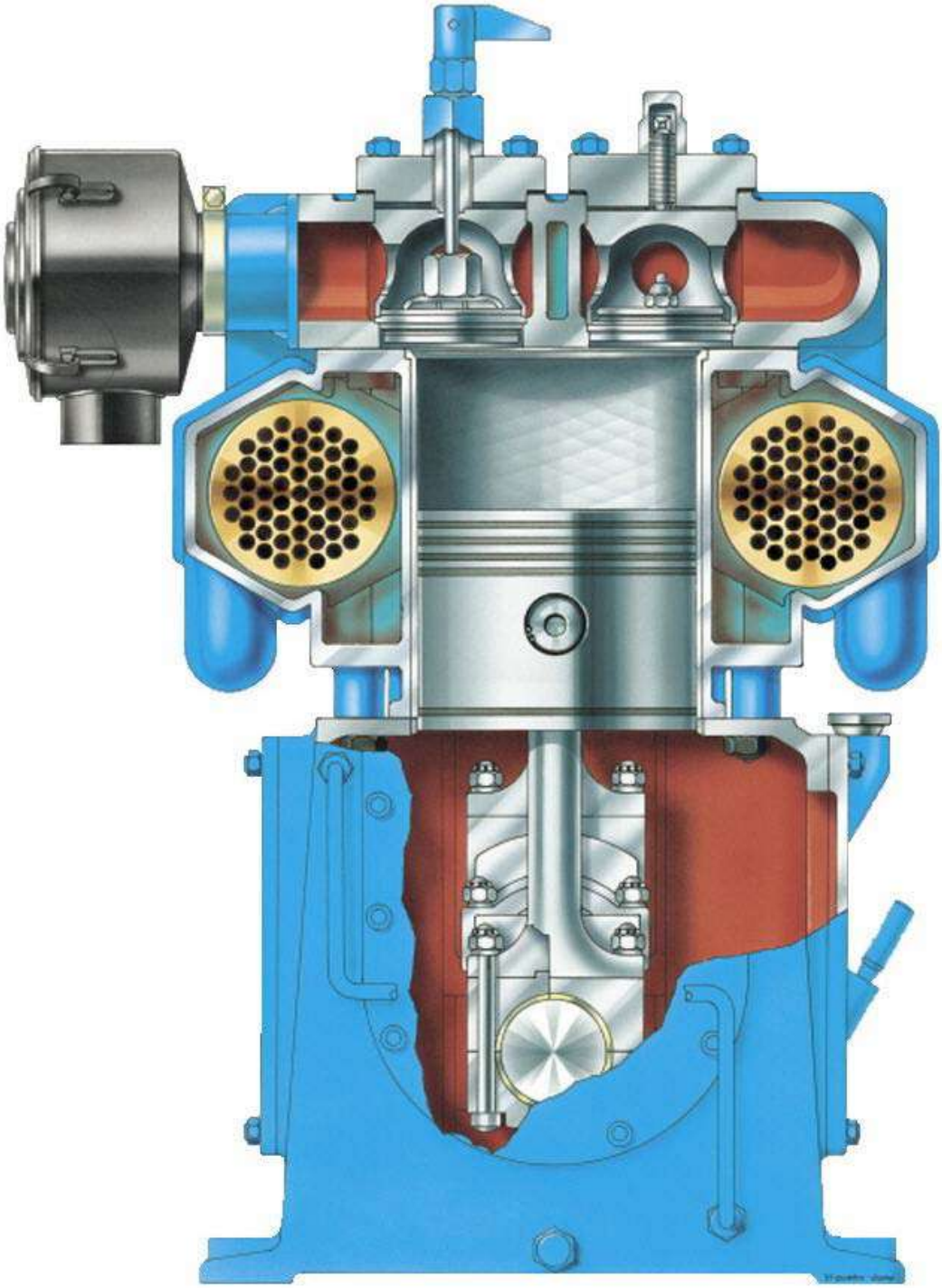


Fig. 2.1 Construction principles



The compressor's first stage is often referred to as the low pressure (**LP**) stage, and the second stage is called the high pressure (**HP**) stage. The circulation of air through the compressor is shown in Figure 2.2.

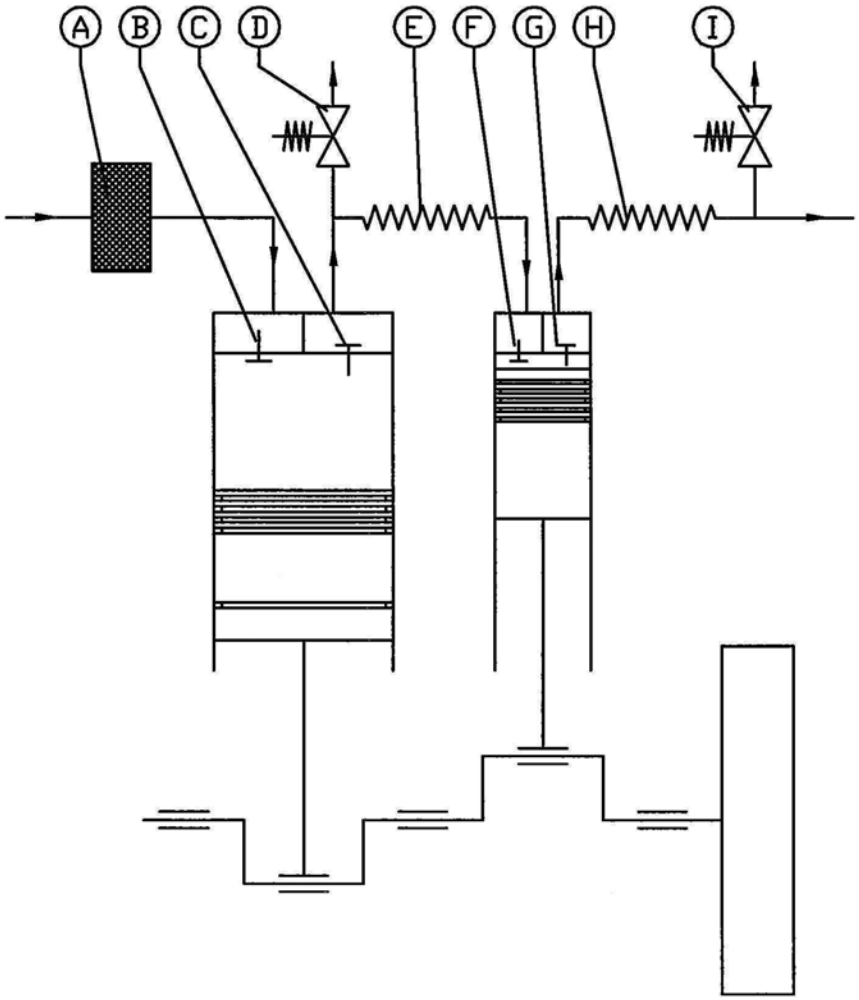


Fig. 2.2 Air circulation

Explanation of symbols:

A Intake filter
B LP suction valve
C LP delivery valve
D LP safety valve
E LP cooler (intercooler)
F HP suction valve
G HP delivery valve
H HP cooler (aftercooler)
I HP safety valve

All bearings in the compressor are pressure lubricated by means of a gear pump connected directly to the end of the crankshaft.

Two replaceable pipe coolers are mounted in the compressor's cylinder block, one of which cools the compressed air after first-stage compression, while the other cools it after second-stage compression.

The intake and discharge of the cooling water is arranged so that it circulates through the cylinder block and ensures effective cooling of the air and the compressor's cylinder walls.

The compressor increases the pressure of air from atmospheric pressure to a specified pressure, up to a maximum of 35 bar.

The compressor is normally fitted with an electric motor or other source of motive power on a well-braced base-plate, with a flexible coupling between the compressor and the motor.

All compressors are test run before delivery from the factory, and all installations with motors will have been correctly aligned.

This compressor, which is used to produce pressurised air for compressed air tools and instruments as well as starting air, satisfies the requirements of the certification companies.

2.2 Safety equipment

The compressor is fitted with safety valves after first-stage compression and second-stage compression.

These safety valves are pre-adjusted upon delivery of the compressor to suit the working pressure specified by the customer, ensuring that the pressure does not exceed the limit for which the compressor and compressed air system are dimensioned.

A bursting disc is mounted on the cylinder block cooling water mantle, which ruptures if the coolant chamber is subjected to abnormally high pressure. The bursting disc must only be replaced with original plates supplied by the compressor supplier.

Important: ***The safety valves, bursting disc and any other safety equipment must be inspected regularly. Damaged components should always be replaced with original parts. Adjustment of the safety valves shall only be carried out by authorised personnel.***

The compressor must not be used if the safety equipment is defective.

The compressor's automatic control system includes a pressure switch which stops the compressor if the pressure of the lubricating oil falls below a specified minimum level.

3. INSTALLATION AND OPERATION

3.1 Installation instructions

All deliveries of compressor installations are accompanied by documentation of the installation's dimensions and mounting points. The documentation will also include installation instructions, showing the recommended assembly of equipment and pipe connections.

To achieve problem-free operation, it is important that the base-plate is sufficiently rigid and free from vibrations caused by other machinery. The base of the compressor must lie flat on the base-plate. After installation of the compressor, the alignment between the compressor and its drive motor should be checked.

The compressor installation should be located where the ambient air is as cold as possible. Warm intake air reduces the capacity of the compressor and increases the risk of coking. The ambient temperature for the electrical components must not normally exceed 45°C. The base of the compressor must lie flat on the base-plate. After tightening the fixings, the alignment between the compressor and motor must be checked as described in Section 5.6. (Even if the installation is mounted on vibration dampers, it is recommended that the alignment is checked after installation.)

The cooling water pipes must be installed in such a way the air pockets cannot occur.

The compressor installation should not be closely surrounded by other equipment which would hinder maintenance work.

3.2 Cooling water system

A reliable and adequate cooling water supply is important for the functioning and life-expectancy of the compressor. The necessary cooling water capacities are specified in Table 6.1, and apply both to seawater and freshwater cooling.

Whether the compressor is connected to a central cooling system or is equipped with a separate cooling water pump, it is important to ensure that cooling water circulation is maintained, and the indication of cooling water pressure by the manometer alone is not sufficient proof of this. It is recommended that the cooling water circulation be shut off when the compressor is not running, to avoid the precipitation of condensation in the crankcase.

Too low temperature of the cooling water entering the compressor may lead to an increase in internal condensation formation, and if this occurs, the temperature of the cooling water should be increased. If it is not possible to increase the temperature, for example by recirculation, condensation formation may be reduced by reducing the amount of cooling water within the limiting values specified in Table 6.2.

A thermometer is mounted in the cooling mantle on the cylinder head to monitor the cooling water temperature.

3.3 Start-up

In connection with the first start-up or after prolonged downtime, the following procedure should be used:

A Check oil level.
B Check that the oil does not contain water or other substances which will impair its quality.
C Check the compressor valves and apply oil to the cylinders.
D Turn over the compressor by hand, removing the suction valve load by means of the manual unloader. (Set the lever in the vertical position.)
E Check the cooling water circulation.
F Check that the non-return valve between the compressor and the air reservoir is open.
G Set the manual drain valves in the open position.
H Start the compressor.
I If everything functions correctly, the drain valves and the unloader should be set to the operating positions. (Set the unloader lever in the horizontal position.)
The compressor should be allowed to run for a few minutes before subjecting it to maximum working pressure.

3.4 Operation

Under normal operation the pressure and temperatures should be as specified in Table 6.2. Minor deviations may exist for some of the values which are directly influenced by conditions at the working location.

The operation of the compressor is normally monitored by the starter installation's automated system, which provides, for example, pressure switch monitoring of the lubricating oil pressure and thermostatic monitoring of the cooling water temperature and air temperature. However, it is recommended that the operation and automatic functions of the compressor be inspected regularly.

Under any operating conditions, condensation will precipitate from the compressed air in the HP cooler of the compressor. A water separator is integrated in the HP exhaust manifold to remove this condensation, which is drained through a solenoid valve each time the compressor is stopped. In areas of high atmospheric humidity it is recommended that the solenoid valve also be opened periodically during operation (for example two seconds of draining every ten minutes). It is not necessary to install a water separator in the pipe system between the compressor and the air tank in addition to the compressor's integrated separator.

In areas of high atmospheric humidity, precipitation of condensed water may also occur in the LP cooler. It is important to prevent this condensation from accompanying the air flow into the high pressure cylinder, where some of the water may penetrate into the crankcase and contaminate the lubricating oil. The compressor is therefore fitted with a water separator after the low pressure cooler which effectively removes condensed water and prevents water droplets from accompanying the air flow into the HP cylinder. The water is drained automatically by a float chamber.

3.5 Stopping

To stop the compressor manually for short periods, the following procedure should be used:

A Flip the compressor's manual unloader to the vertical position to unload the LP suction valve.
B Open the drain valves.
C Stop the compressor.

When stopping the compressor before prolonged downtime, use the following procedure:

A Drain old oil, clean the crankcase sump and fill with new oil.
B Apply a suitable corrosion inhibiting oil to the compressor valves, non-return valves, cylinder walls and open surfaces of the crankshaft.
C If there is a danger of frost, drain the cooling water.
D Set the manual unloader in the horizontal position so that there is no load on the compressor's suction valve.
E Turn over the compressor by hand once a week.
F The starter panel and other electrical equipment must be similarly protected against corrosion damage.

4. OPERATIONAL FAILURES

Some of the faults which may occur during operation are summarised below:

	Fault symptom	Possible cause	Remedy
A	The compressor has poor capacity and/or does not produce full pressure.	Dirty, worn or damaged valves.	Inspect and clean all valves. Replace defective parts.
		Piston rings have stuck in the ring grooves, or are damaged/broken.	Disassemble the rings. Clean grooves and rings and replace defective parts. Reassemble, applying oil to the cylinder walls.
		Leaking safety valve.	Replace safety valve.
		Defective cylinder head gasket.	Replace gasket.
		Clogged air filter.	Clean filter.
B	LP safety valve blows.	HP suction valve damaged or dirty.	Inspect and clean valves and replace defective parts.
		Leaking seal in HP suction valve.	Replace seal.
		LP safety valve defective or damaged.	Replace safety valve.
C	HP safety valve blows.	Stop valve in the air line is closed.	Open the stop valve.
		Clogged non-return valve.	Remove and clean non-return valve. Replace defective parts.
		HP safety valve defective or damaged.	Replace safety valve.
D	Valves need overhauling too often.	Overheating.	Check cooling water circulation and temperature. Inspect and if necessary clean coolers.
		Polluted intake air.	Inspect intake filter.
		Poor lubricating oil.	Change oil grade. (See Section 5.3 for recommended oil grades.) Further information can be obtained from Sperre.
		Valve clamp bolts not tightened enough.	Tighten the clamp bolts to the correct torque. (See Table 6.3)
E	Overheating and/or abnormal noise in crankcase.	Defective bearings.	Inspect bearings and check clearances.
		Low oil level or condensation in oil.	Drain and clean crankcase sump, fill with new oil.
		Jamming crankshaft bearing.	Check bearing clearances. Replace defective parts.
F	Piston overheating and friction.	Incorrect fitting of piston or crosshead bearing.	Replace defective parts, check piston clearances, ring clearances and crosshead bearing.
		Cooling malfunction.	Check cooling water circulation and temperature.
G	Increased oil consumption.	Worn piston rings.	Replace piston rings.
		Leakage.	Check the exterior of the compressor.

H	Oil emission from crankcase ventilation.	Defective or worn piston rings.	Remove and check piston and if necessary replace defective piston rings.
		Defective ventilating valve.	Replace valve.
I	Ruptured bursting disc.	Cooling water pressure too high.	Check that pressure is within the specified limits (See Table 6.2).
		Cooling water temperature too high.	Check that temperature is within the specified limits (See Table 6.2).
		Pressure pulses in cooling water system.	Determine what is causing pulses and eliminate.
J	Worn rubber lamina in the coupling between compressor and motor.	Poor alignment of compressor and motor shafts.	Correct alignment of coupling. (See Section 5.6).

5. INSPECTION AND MAINTENANCE

5.1 Maintenance intervals

The maintenance intervals set out below are intended as guidance for normal maintenance. Since the operating conditions of the compressor may vary strongly according to the working location, it is important that the periods used are adapted to the experience of the individual operator.

Routine	Maintenance period	Inspect	Overhaul	Replace
A	After first 200 operating hours	– Bolts in base-plate		Change oil and clean crankcase with lint-free cloth before filling with new oil.
B	Daily	– Lubricating oil pressure – Oil level – Cooling water circulation and temperatures – Automatic functions – Draining of condensation in sump		
C	Every 500 hours	– LP delivery valve – HP delivery valve – Bolts in base-plate		Defective parts
D	Every 1000 hours	– LP suction valve – HP suction valve – Cylinder through valve openings – Pipe connections – Safety valves – Bursting plate in water mantle	– LP delivery valve – HP delivery valve – Oil filter – Clean air filter	Change oil and clean crankcase with lint-free cloth before filling with new oil.
E	Every 3000 hours	– Crankshaft bearings – Piston and cylinder walls (through valve openings) – Flexible coupling	– LP suction valve – HP suction valve	Defective parts
F	Every 9000 hours		– Clean coolers	Defective parts
G	Every 12000 hours	– Frame bearing – Pistons, bolts and piston rings – Crosshead bearing – Oil pump		Defective parts

Only original parts should be used when replacing. Please see Chapter 7, regarding ordering spares.

Important: ***Before any form of work is commenced on the compressor the electrical power must be turned off at the starter panel and at the main switchboard. The switch on the main switchboard must be marked with a notice indicating that repair work is in progress.***

See Chapter 1. PERSONAL SAFETY

5.2 Valves

***Important:** The valves are an essential part of the compressor and it is important for operational safety that all parts have the correct material specifications and machining tolerances. Even the smallest defect in a valve component may lead to overheating and consequent damage. The supplier accepts no responsibility for damage to the compressor resulting from the use of non-original parts.*

The spare part documentation shows each valve both assembled with an individual part number and disassembled with part numbers for the individual components.

After overhaul or renewal of parts, the assembly should be performed in the order shown in the diagram of the disassembled valve.

When assembling valves, use the correct tightening moment for greased nuts and valve bolts as indicated below:

Dimension	Minimum moment *[Nm]*	Maximum moment *[Nm]*
M10	20	24
M12	35	43
M14	56	68
M16	88	108

***Important:** When inspecting the valves, loosen the clamp bolt on the valve cover before removing the cover.*

Following inspection and any overhaul of the valves, it is extremely important that the clamp bolt, which retains the valve in its seat, is tightened with an Allen key to the moment specified in Table 6.3.

Valve overhaul and maintenance

The performance and safety of the compressor depends upon the regular and effective maintenance of the valves. We therefore recommend that the following guidelines are followed:

A When cleaning the valve externally for subsequent disassembly, never apply a vice directly to the valve when loosening the nut on the centre bolt. A clamp jig for this purpose to fit all valves can be supplied by Sperre upon enquiry. A simple temporary clamp may be made by fixing two rods in a vice fitting the outer seat grooves of the valve.

B Thoroughly inspect and clean all valve components.
NB! Keep sharp objects away from sealing surfaces and plate parts.

C Replace any parts which are worn or which show even faint scratches. Check all fixing pins. The maximum wear tolerance is 10% of the total thickness of a part.

D If a spring or spring plate in a valve is weakened all the springs must be replaced, since damage may result if some springs act further than others. It is recommended that all springs be replaced after approximately 5000 operating hours, even if they do not appear damaged.

E The seals on the valve seats must be reconditioned if they show any signs of impact marks or scratching. Most valves have pre-drilled holes for the fixing pins and spare holes for new pins. The fixing pins may be knocked out with a suitable tool. If it is impossible to remove a broken pin, use a spare hole.

F When removing a valve centre bolt, drill out the locking pin after first marking the locating point in the centre of the pin with a centre punch. Then remove the centre bolt. After reassembling the bolt, a hole must be drilled for the locking pin so that this can be knocked firmly into place and then the ends opened up to prevent the pin from falling out.

G After replacing the fixing pins in their respective holes in the valve seat and/or valve cover, check that the ends of the pins do not touch the opposing parts.

NB! Use *only* original spare parts when replacing.
The valve nut must always be replaced with a new one after disassembly of a valve.

Rebuilding the valve requires accuracy and care. Use the correct number of parts and make sure that the various parts are located correctly. Compare them with the parts documentation to ensure that the correct number of parts are used. The total lift height of the valve plate is specified in Table 6.4.

5.3 Lubrication system

The lubricating oil pump is a gear pump and will normally tolerate long operating times without overhaul. The pump is driven directly from the end of the camshaft, and the oil pressure is regulated by means of a bypass valve. When inspecting, loosen the mounting flange and withdraw the pump.

A lubricating oil filter is located between the discharge side of the pump and the compressor.

***Important:* Condensation collection in the crankcase can be a serious problem under certain operating conditions, and it is important that the operator regularly checks the compressor for condensed water in the lubricating oil. (See also Sections 3.2 and 3.4). If the lubricating oil does not emulsify with the condensation water, it may separate and there is a risk that the compressor may be lubricated with water.**

The choice of lubricating oil is also very important for reliable operation. The supplier has tested several oil types and the list below shows the recommended oils.

Synthetic oil	Mineral oil
ANDEROL 555	BP ENERGOL RC 68
BP ENERSYN RX 100	CASTROL AIRCOL PD 100
CASTROL AIRCOL SN 100	CALTEX RPM COMPR. OIL 68
COSMO RECIPRO SX 100	ESSO / EXXON EXXCOLUB 77
DAPHNE MARINE COMPR. 100	COSMO RECIPRO 100
ESSO / EXXON ZERICE S 100	FAMM COMPRESSOR OIL EP VDL 100
ESSO / EXXON SYNNESTIC 68	GENERAL COMPOL A 100
FAMM CETUS DE 100	MITSUBISHI COMPR. OIL 100
MOBIL RARUS 827	MOBIL RARUS 427
NIPPON OIL CO. FAIRCOL SA 100	PHILLIPS COMPR. OIL 68
STATOIL FRIDGEWAY S 100	SHELL CORENA P 68
SHELL CORENA AP 68	STATOIL COMPWAY 68
TOTAL LUBMARINE BARELF AL 100	TOTAL DACNIS P

Further information on lubricating oils may be obtained upon enquiry from Sperre Industri AS or from the oil manufacturers.

5.4 Bearings

The compressor crankshaft is fitted with replaceable, two-piece sleeve bearings. The central frame bearing also controls movement of the shaft in the axial direction.

The crosshead bearings are one-piece sleeve bearings which are pressed into the connecting rods. Tolerances and clearances for the crankshaft, frame and crosshead bearings are set out in Table 6.4.

All the sleeve bearings are pressure lubricated.

Following inspection or replacement of the crankshaft or frame bearings, it is important to ensure that the bearing bushes do not pinch the crankshaft. It should be possible to turn over the compressor by hand.

New two-piece bearings are treated with a running-in coating.

Assembling a crosshead bearing liner on a connecting rod:

A Remove old liner using a hydraulic press or puller.
B Push in new liner.
C After assembly of the bearing bush, a hole must be drilled for the oil supply and locking screw. Drill diameter: 6.8 mm.
D The hole for the locking screw must have M8 thread.

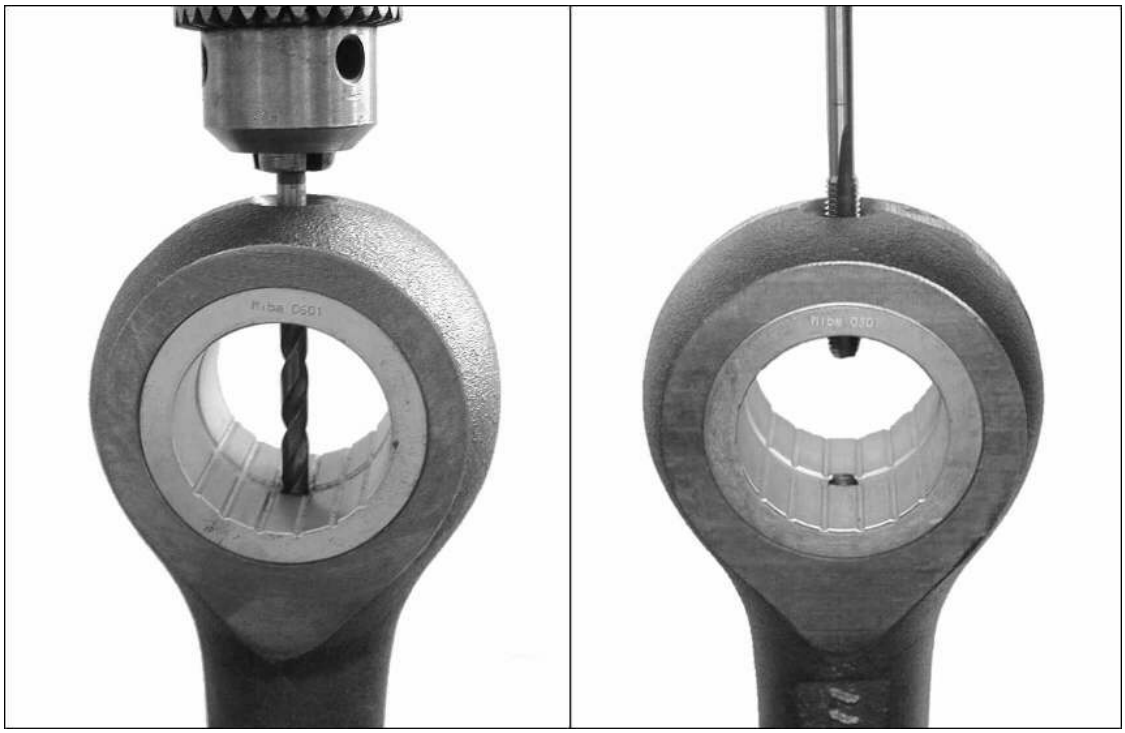


Fig. 5.1 Assembling crosshead bearing liner

5.5 Pistons and piston rings

To disassemble a piston:

LP piston

A **Remove all cooler covers except the cover for the air outlet.**
B Remove the cylinder cover. (It is not necessary to remove the valves.)
C Loosen the crankshaft bearing bolts and remove the crankshaft housing.
D Extract the piston and connecting rod from cylinder.

HP piston

A Loosen the crankshaft bearing bolts and remove the crankshaft bearing housing.
B Rotate the crank pin to the bottom and remove the connecting rod and piston through the crank case.

Important: **It is very important to protect the crank pins, since even minor damage may necessitate replacement of the crankshaft. Therefore, always wrap a cloth around the exposed crank pins while working in the crankcase.**

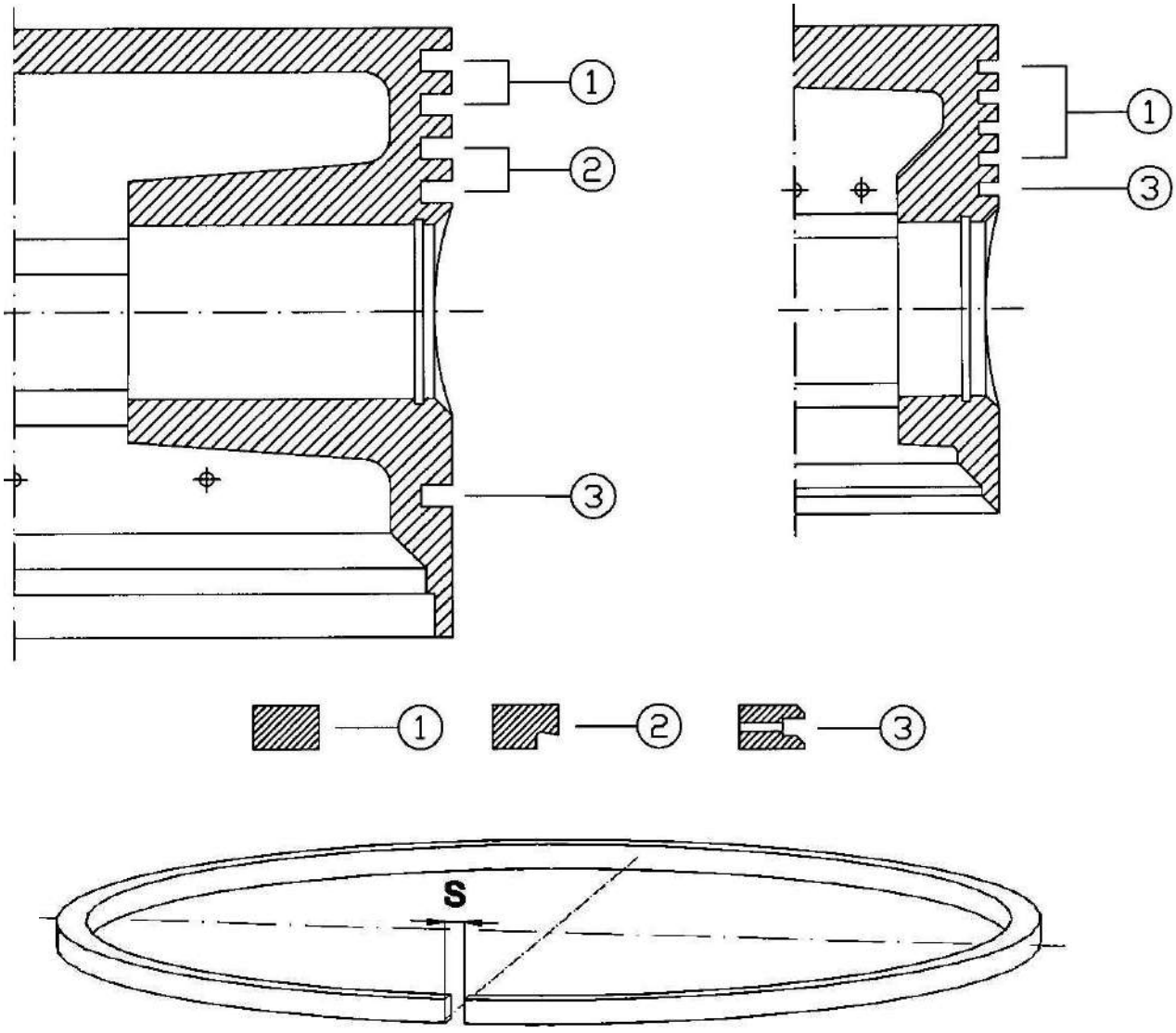


Fig. 5.2 Piston rings

Permitted end clearance (S) is specified in Table 6.5.

5.6 Elastic coupling

The compressor flywheel acts as one of the coupling halves.

Disassembling the coupling:

A Loosen the nuts on each coupling half and tap these sharply with a hammer before removing the nuts completely. This will cause the bolts to loosen from the conical holes in the coupling halves.
B Remove the bolts and withdraw the coupling plate. Avoid getting oil on the coupling plate.

The coupling half on the motor is attached by shrinking onto the shaft and is located in a keyway.

Alignment:

The principle and dimensions for alignment are illustrated in Figure 5.3.

Tolerance:

Parallel (A1) ±0.05 mm
Angular (A2) ±0.05 mm

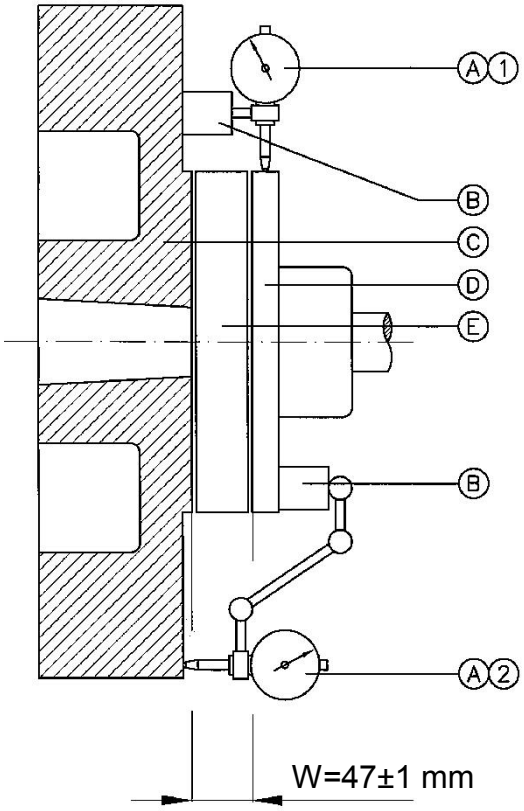


Fig. 5.3 Alignment

A Micrometer gauge
B Magnetic base
C Flywheel
D Motor half coupling
E Coupling plate
F Dividers

The distance W should be checked with dividers or **vernier**calliper.

The **parallel displacement (A1)** between the two halves of the coupling is checked with a micrometer gauge on a magnetic base around the circumference of the coupling half (D).
The **angular displacement (A2)** is checked with a micrometer gauge on a magnetic base around the circumference of the flywheel.

Over/under and side/side measurements are made. The deviation in both parallel displacement and angular displacement shall not exceed ±0.05 mm from side to side when the flywheel is rotated 180°.

5.7 Coolers

It is important for correct operation of the compressor that the LP and HP coolers are kept clean of coke deposits and other deposits from the cooling water. Inadequate cooling will result in a higher temperature of the compressed air, which will cause the progressive formation of coke.

The pipes are attached to the plates at each end of the coolers by rolling.

The seals in the ends of the coolers are of O-ring type of special quality, and only original O-rings shall be used. To remove the pipes, first loosen the cooler covers at both ends. The entire pipe assembly can now be removed with the aid of two control rods which are pushed through the pipes. Reassembly takes place in the reverse order.

When the pipe assembly is removed, care must be taken to ensure that the locating surfaces of the O-rings are not scratched. Any such scratches which may occur can be removed with fine emery powder.

All seals and O-rings must be renewed after the cooler cover has been removed from the compressor.

If the cooler pipes show any signs of corrosion or wear, they should be replaced.

5.8 Filters

The **air filter** is cleaned using a high quality degreasing agent. Clean the filter with compressed air and apply a thin layer of compressor oil.

The **oil filter** should be replaced as a single unit. The recommended replacement interval is every 1000 operating hours.

6. TECHNICAL DATA

6.1 Cooling water capacities

Speed	**[rpm]**	**580**	**725**	**875**	**975**
Cooling water volume at 7-15 bar g working pressure	[l/min]	14	18	22	26
Pressure drop across compressor	[mm w.c.]	90	140	20	280
Cooling water volume at 15-35 bar g working pressure	[l/min]	18	23	28	32
Pressure drop across compressor	[mm w.c.]	140	220	350	440

6.2 Recommended pressures and temperatures

Recommended minimum inlet temperature, cooling water	30°C
Recommended maximum inlet temperature, cooling water	60°C
Recommended cooling water differential temperature, inlet/outlet	10 - 20°C
Recommended cooling water pressure	0.5 - 3.0 bar g
Recommended oil pressure for warm compressor	2.0 bar g
Recommended set point, oil pressure switch	0.8 bar g
Normal first stage working pressure at 0 -10 bar discharge pressure	1.5 - 3.5 bar g
Normal first stage working pressure at 10 - 35 bar discharge pressure	4.0 - 6.0 bar g
Maximum working pressure	35 bar g
Low Pressure safety valve set point	9 bar g
High Pressure safety valve set point	5% above working pressure
Normal temperature at air outlet	30 - 65°C

6.3 Torque

Component	**Threads**	**Torque** *[Nm]*	**Comments**
Cylinder head	M20	196	
Cooling mantle	M16	147	
Cooling mantle	M12	78	
Valve cover, HP and LP	M16	147	
Valve clamp bolts, LP and HP	M20	117	Unbrako
Cap nuts, LP and HP	M20	98	
Crank shaft bearing bolts, LP and HP	1/4" BSP	88 -107	
Frame bearing	M12	78	
Crankcase end shield	M10	39	
Cylinder block/crankcase	M22	245	
Cleaning hatch, air filter hatch	M12	78	
Crankcase hatches	M10	39	

6.4 Clearances

Suction valve, LP, lifting height	1,2 mm
Discharge valve, LP, lifting height	1,2 mm
Suction valve, HP, lifting height	1,1 mm
Discharge valve, HP, lifting height	1,4 mm
Clearance, LP cylinder/piston	0,30 mm
Clearance, HP cylinder/piston	0,25 mm
Clearance, LP piston/cylinder head	0,9 -1,8 mm
Clearance, HP piston/cylinder head	0,9 -1,8 mm
End clearance, crankshaft/control bearing	0,3 - 0,5 mm
Clearance, frame bearing/shaft	0,08 - 0,12 mm
Clearance, crankshaft bearing	0,08 - 0,11 mm
Clearance, crosshead bearing	0,03 - 0,04 mm

6.5 Piston rings

	Compression stage	
	LP	**HP**
Number of compression rings	2	4
Number of scraper rings	2	0
Number of oil rings	1	1
Minimum end clearance (S)	1,0 mm	0,6 mm
Maximum end clearance (S)	1,3 mm	0,9 mm
Wear limit (S)	1,9 mm	1,55 mm

End clearances (S) apply to new rings in new cylinders.

6.6 General data

Number of cylinders	2
LP piston diameter	200 mm
HP piston diameter	93 mm
Stroke	110 mm
Crank pin diameter	63 mm
Frame bearing pin diameter	63 mm
Diameter, LP cross bolt	40 mm
Diameter, HP cross bolt	40 mm
Number of LP valves	2
Number of HP valves	2
Sump oil capacity	8 litres

7. ORDERING SPARE PARTS

Parts lists and drawings will be found in Chapters 8 and 9.

When ordering spare parts, the following must be quoted:

A The type designation of the compressor.
B The serial number of the compressor.
C Part number and designation.
D Number of parts ordered.
E The operating pressure of the compressor.

The type designation (**A**), serial number (**B**) and operating pressure (**E**) are specified on the nameplate of the compressor (Figure 7.1), which is attached to one of the crankcase hatches.

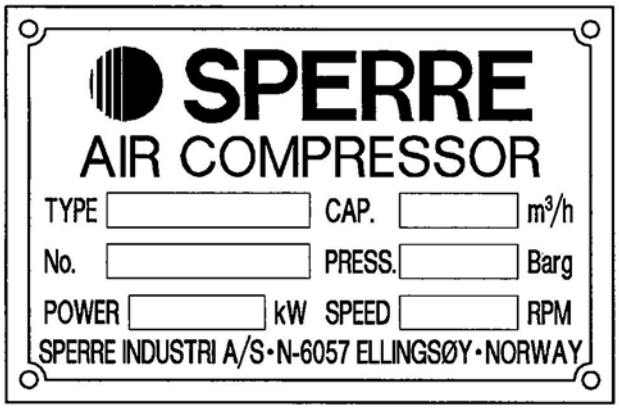


Fig. 7.1 Name plate

Please note that Sperre does not manufacture over-dimensioned or under-dimensioned spare parts, or parts intended for further machining or fitting.

Sperre accepts no responsibility for damage resulting from the use of non-original parts.

Address for ordering parts:

Sperre Industri A/S
N-6057 Ellingsøy
NORWAY

Tel. : +47 70 16 11 00
Fax : +47 70 16 11 10
E-mail : industri@sperre.com
URL : www.sperre.com

Original parts can also be ordered from:

Sperre Rotterdam BV
Glasblazerstraat 12B
NL-2984 BL Ridderkerk
NETHERLANDS

Tel. : +31 180 463 299
Fax : +31 180 463 264
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8. Parts list

Article No.	Description	Number
1012	Crankcase	1
1038	Crankcase cover	1
1041	Crankcase cover, dipstick side	1
1058	Bearing cover, flywheel side	1
1062	Bearing cover, oil pump side	1
1076	Flywheel	1
1101	Cylinder block	1
1153	Frame bearing housing	3
1163	Crankshaft bearing housing	4
1171	Cooler cover, Position 1	1
1175	Cooler cover, Position 3	1
1231	Frame, bursting disc	1
1255	Cylinder head	1
1297	Air filter muff	1
1316	Valve cover, HP	2
1318	Valve cover, LP intake side	1
1319	Valve cover, LP discharge side	1
1330	Flywheel nut	1
1366	No-return valve cover	1
1382	Connecting flange	1
1414	Connecting rod, LP	1
1415	Connecting rod, HP	1
1440	Inspection hatch	2
1441	Inspection hatch, 1/2" opening	1
1463	Clamp fitting, HP valve	2
1471	Clamp fitting, LP intake valve	1
1472	Clamp fitting, LP discharge valve	1
1516	Counterweight	1
1530	Orifice plate	1
2012	Crankshaft assembly	1
2998	Non-return valve	1
3245	Valve unloader, complete	1
3304	Unloader cover	1
3311	Unloader cylinder	1
3318	Unloader piston	1
3329	Crankshaft bearing bolt	4
3335	Crankshaft bearing nut	4
3340	Split-pin	4
3382	Piston, LP	1
3398	Piston, HP	1
3446	Connecting flange, pump	1
3465	Gudgeon pin, LP	1
3468	Gudgeon pin, HP	1
3485	Compression/oil ring, LP	2
3505	Compression ring, HP	4
3518	Compression ring, LP	2
3533	Oil ring, HP	1
3543	Oil ring, LP	1
3577	Ball, lubricating oil pump	1
3583	Valve spring, lubricating oil pump	1
3606	Adjusting screw, lubricating oil pump	1
3634	Oil level sight glass	1
3643	Manometer panel	1
3654	Cooler unit	2
3677	Cotter pin	1
3696	Cap nut, clamp screw	3
3697	Cap nut, oil pump	1
3700	breather valve	1
3713	Air filter, complete	1
3716	Flange, air outlet	1
3718	Air filter, insert	1
3722	Oil filter	1
3728	Oil screen	1
3731	Oil filter holder	1
3741	Clamp bolt, HP	2
3742	Clamp bolt, LP	1
3746	Dipstick	1
3770	Manometer, cooling water/oil	2
3771	Manometer, LP air	1
3773	Manometer, HP air	1
3775	Spacer	2
3781	Thermometer	1
3783	Thermometer nipple	1
3810	Circlip	4
3821	Crosshead bearing liner, LP	1
3822	Crosshead bearing liner, HP	1
3832	Crankshaft bearing bushes, pair	2
3852	Shaft seal, oil pump	1
3861	Shaft seal, crankshaft	1
3906	Valve gasket	5
3909	Valve gasket	2
3921	Frame bearing, end	2
3922	Frame bearing, centre	1
3925	Copper gasket	4
3927	Copper gasket	8
3928	Copper gasket	5
3929	Copper gasket	22
3930	Copper gasket	6
3932	Copper gasket	4
3934	Copper gasket	2
3937	Lock washer	4
3946	Screw, oil pump	4
3950	Screw, manometer panel	2
3960	Bursting disc	1
3965	Oil pipe set	1
3974	O-ring, air coolers	4
3979	O-ring, valve unloader	1
3995	Gasket, cylinder head	1
4028	Gasket, crankcase/cylinder block	2
4033	Gasket, crankcase cover	2
4034	Gasket, cover, pump side	1
4035	Gasket, cover, flywheel side	1
4053	Gasket, air outlet flange	1
4057	Gasket, HP valve cover	2
4058	Gasket, LP valve cover	2
4059	Gasket, oil pump	1
4068	Gasket, bursting disc	4
4085	Gasket, air filter muff	1
4099	Gasket, cooler cover	3
4132	Lock nut	1
4142	T-piece	1
4189	Stud screw, crankcase cover	34

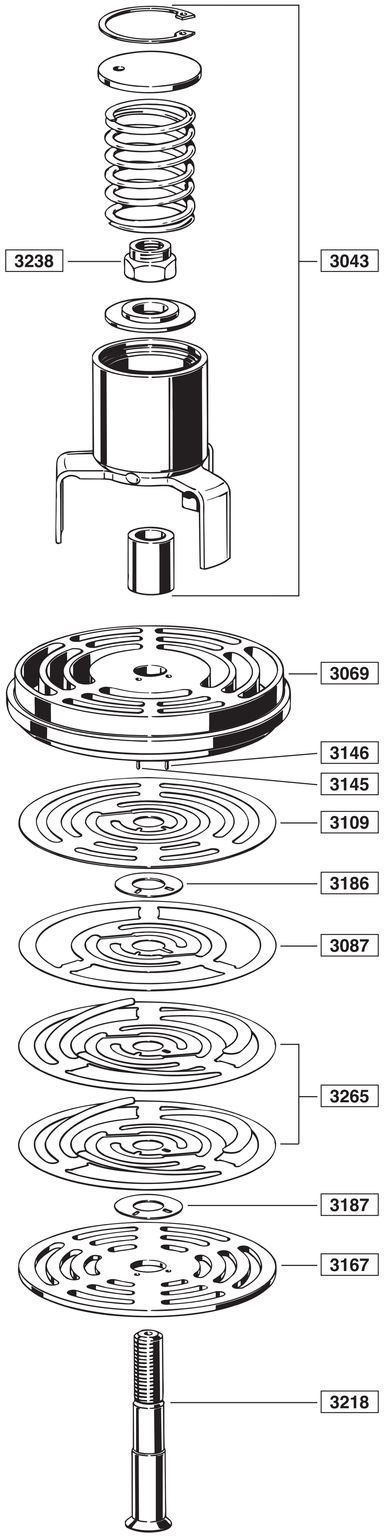
4192	Stud screw, inspection hatch	16
4193	Stud screw, bursting disc	4
4197	Stud screw, bearing cover	6
4198	Stud screw, LP separator	1
4202	Stud screw, cooler cover	10
4204	Stud screw, cooler cover	2
4208	Stud screw, valve cover	16
4209	Stud screw, cooler cover	12
4215	Stud screw, cylinder block/crankcase	8
4219	Stud screw, cylinder head	6
4236	Nut, drain plate	4
4237	Nut, crankcase cover	34
4238	Nut, inspection hatch, cooler cover	32
4240	Nut, cooler cover, valve cover	44
4242	Nut, cylinder head	6
4253	Lock nut, frame bearing	6
4257	Lock nut, cylinder block/crankcase	8
4268	Set screw, counterweight	1
4269	Nipple	1
4271	Nipple	4
4273	Nipple	2
4275	Nipple, cooling water intake	1
4276	Nipple, cooling water discharge	1
4280	Nipple	2
4294	Plug	3
4296	Plug	7
4297	Plug	1
4298	Plug	1
4361	Manometer tube	1
4364	Manometer tube	2
4367	Manometer tube	1
4372	Nipple	3
4374	Reduction nipple	1
4388	Oil pipe	1
4391	Oil pipe	1
4407	Screw, counterweight	2
4414	Washer, manometer panel	2
4416	Washer, cooler cover	8
4420	Safety valve, HP	1
4421	Safety valve, LP	1
4441	Oil pump	1
4446	Set screw	1
4447	Set screw	1
4449	Screw	2
4451	Nipple	2
4471	T-piece	2
4487	Connecting bolt	6
4523	Coupling plate	1
4624	Screw, non-return valve flange	4
4673	Screw, crosshead bearing liner	2
7589	Screw, counterweight cover	4
7591	Cooler cover, Position 2	1
7593	Cooler cover, Position 4	1
7595	Separator	1
7609	Cyclone pipe	1
7620	Stud screw, cooler cover, Position 2	6
7645	Drain plate	1
7648	Gasket, drain plate	1
7651	Drain plate	1
7654	Drain nipple	1
7655	Guide pin	1
7657	Plug	1
7659	Cap nut	1
7660	Gasket	1
7664	Stud screw, drain plate	4
7665	Swivel nipple	2
7747	Stud screw, cooler cover, Position 4	6
7750	Plug	2
7754	Nipple	1

Valve parts

Article No.	Description	Number
3012	Discharge valve, HP, complete	1
3020	Intake valve, LP, complete	1
3021	Discharge valve, LP, complete	1
3043	Gripper, LP, complete	1
3049	Intake valve, HP, complete	1
3061	Valve seating, HP intake	1
3062	Valve seating, HP discharge	1
3069	Valve seating, LP intake	1
3070	Valve seating, LP discharge	1
3087	Damper plate, LP	2
3092	Spring, HP intake	3
3106	Valve plate, HP valve	2
3109	Valve plate, LP valve	2
3133	Washer	2
3135	Washer	1
3141	Guide pin	1
3142	Guide pin	1
3145	Guide pin	2
3146	Guide pin	2
3161	Valve cover, HP intake	1
3162	Valve cover, HP discharge	1
3167	Valve cover, LP intake	1
3168	Valve cover, LP discharge	1
3181	Spacing washer	1
3182	Spacing washer	1
3186	Spacing washer	3
3187	Spacing washer	1
3206	Bolt, HP intake	1
3207	Bolt, HP discharge	1
3214	Bolt, LP discharge	1
3218	Bolt, LP intake	1
3237	Nut	2
3238	Nut	2
3260	Spring, HP discharge	6
3265	Spring, LP discharge	6

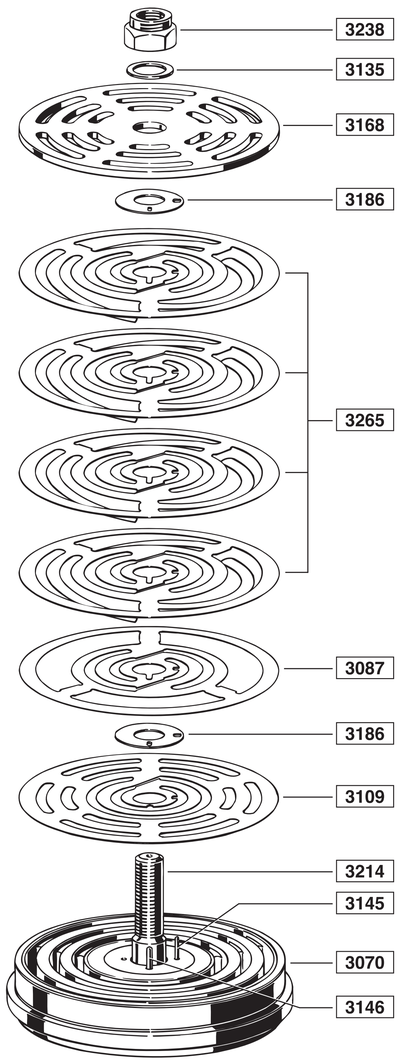
HV2/200 – HV2/210 – HV2/219

NOV. 2001



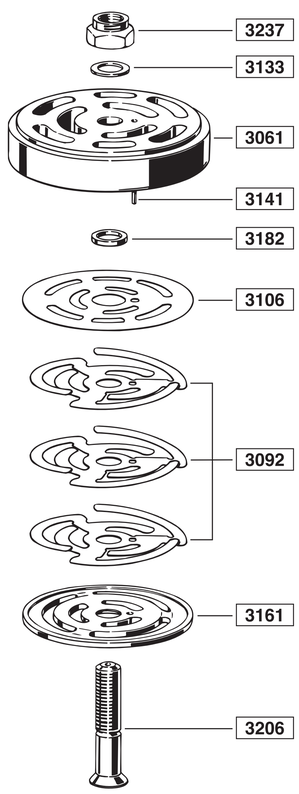
Low pressure suction valve

3020



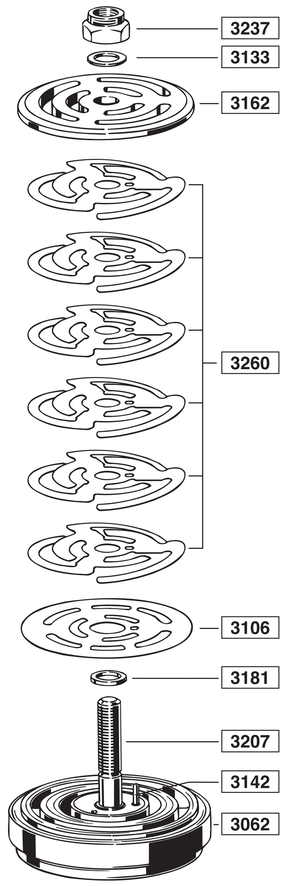
Low pressure delivery valve

3021



High pressure suction valve

3049

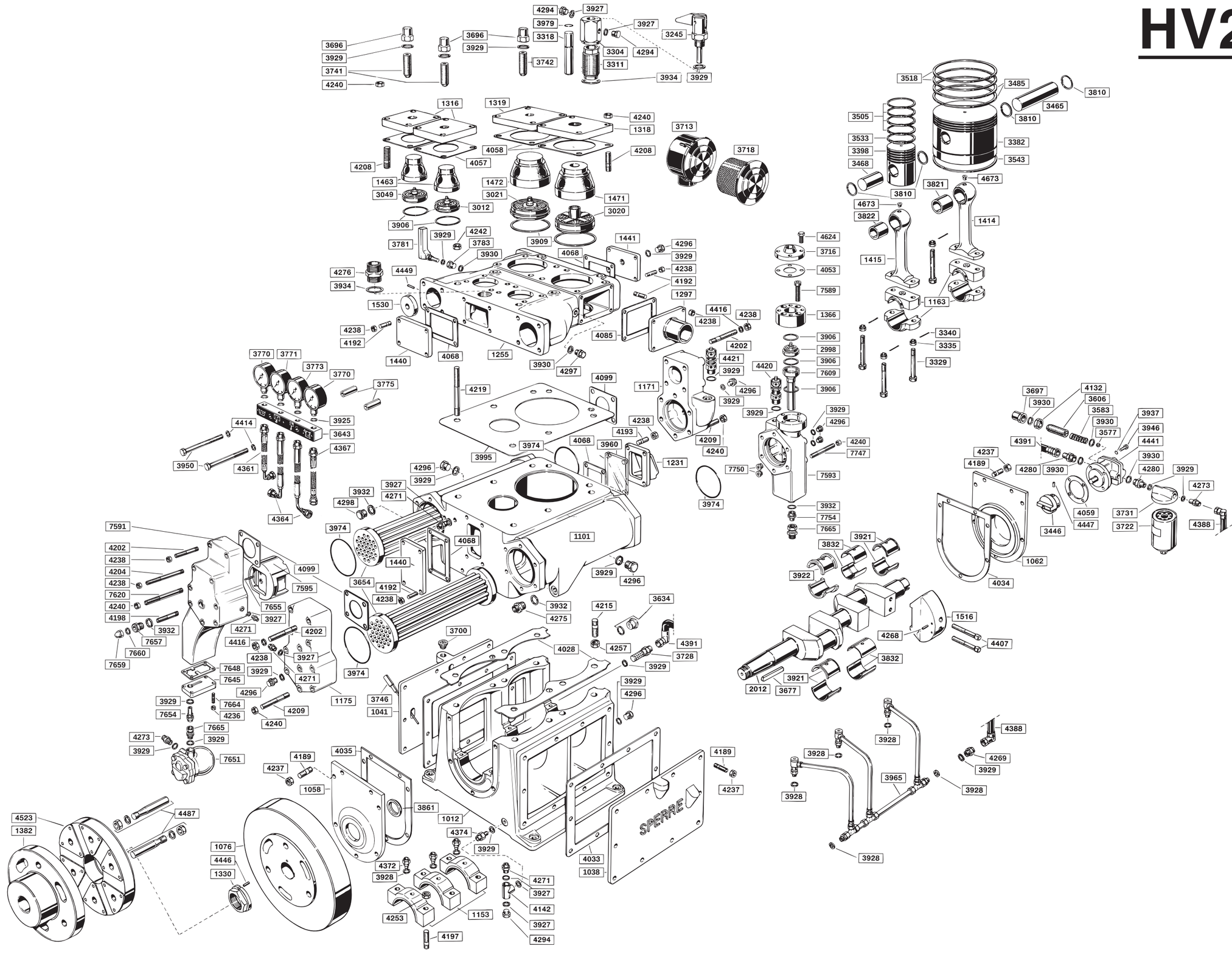


High pressure delivery valve

3012

HV2/200

APRIL 2002



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