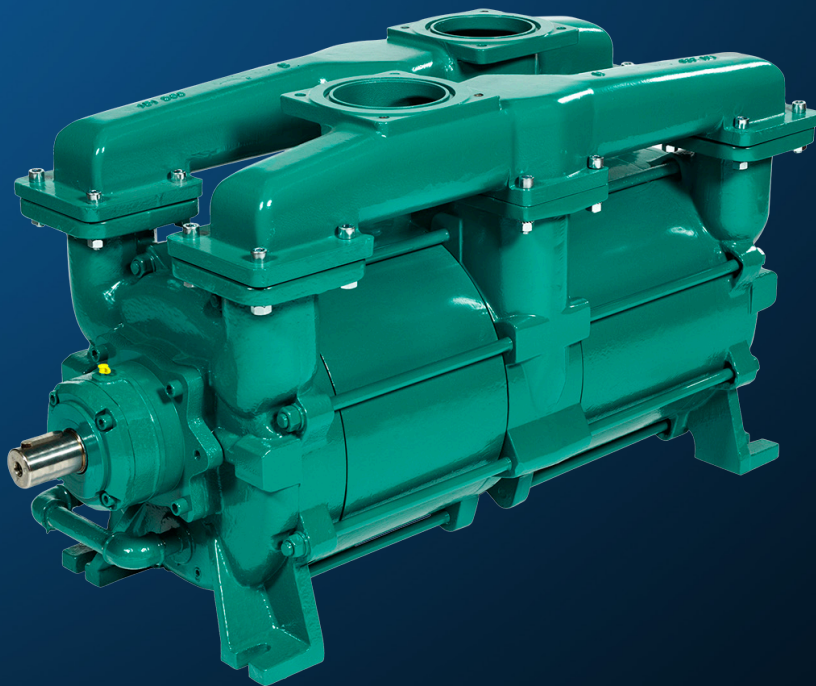


# KS1800



**OPERATION &  
MAINTENANCE**

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# 1 INTRODUCTION

## 1.1 Declaration of conformity

<b>SAMSON PUMPS</b>	
<b>Declaration of Conformity</b>	
Annex IIA	
<b>Samson Pumps A/S</b> Petersmindevej 21 DK-8800 Viborg	
Hereby declares that the following products:	
<b>Liquid ring pump</b> <b>KS500, KS510, KS625, KS725, KS910, KS1025, KS1800</b>	
Conforms to the directive:	
<b>Machinery Directive 2006/42/EC</b>	
I hereby declare, that the liquid ring pumps are in conformity with the following harmonized standards:	
DS/EN ISO 12100:2011	Safety of machinery - General principles for design - Risk assessment and risk reduction
DS/EN 1012-2 + A1:2009	Compressors and Pumps - Safety requirements - Part 2: Vacuum pumps
The standards above only apply to the extent that it is relevant for the purpose of the pump. The product must not be used before the complete system, which it must be incorporated in, has been conformity assessed and found to comply with all relevant health and safety requirements of 2006/42/EC and other relevant directives. The product must be included in the overall risk assessment.	
Viborg, <u>09.03.2017</u>	 Kelvin Storm Jensen R&D Manager Samson Pumps A/S
DOC4022B	

## 1.2 Explanation of warning symbols

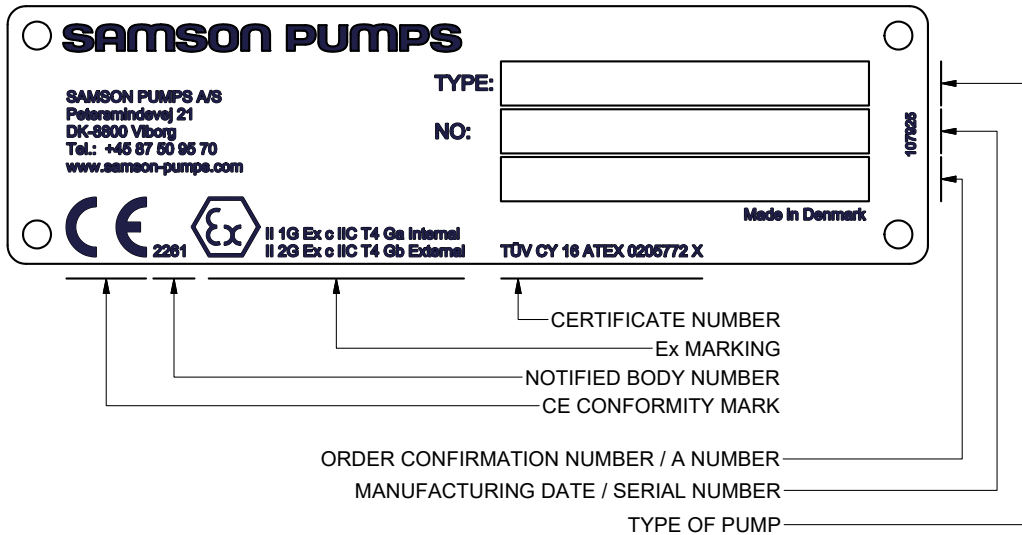
Important technical and safety instructions is showed by symbols. If instructions not performed correctly, may lead to personnel injury or incorrect function of the pump.



To be used with all safety instructions that must be followed. A failure to follow the instructions may result in injuries and/or incorrect machine operation

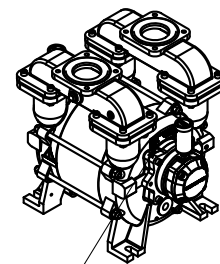
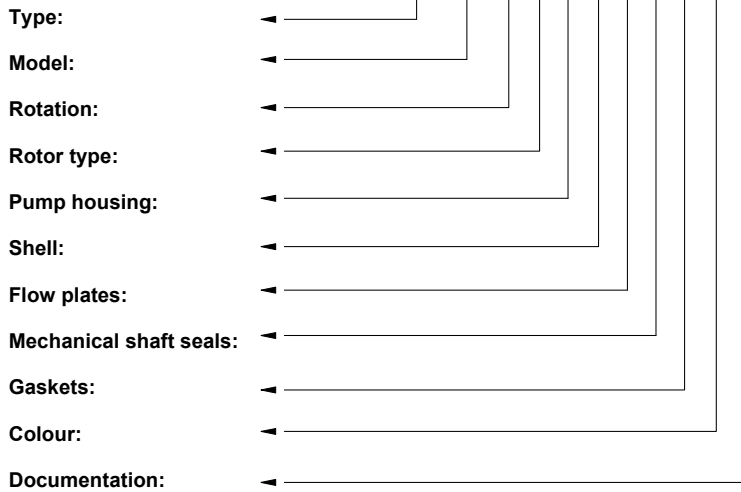
## 1.3 Marking and identification

The pump is equipped with an identification plate that is shown below.



Configuration example:

**KS 500 R 0 S S B 0 0 A X1**



Location of ID plate

DOC107925\_7

## 1.4 Field of application



- Inlet of foreign objects can damage the pump
- The pump is designed exclusively to pump gases, including atmospheric air
- **WARNING!**  
Avoid cavitation of the pump! For further information, see instruction manual for the Samson Pumps vacuum control valve (optional)

It must be ensured that the inlet gas cannot react with the service liquid and create aggressive bonds that break down the pump's components.

For other operating data, see specifications.

- The pump may only be used with media that are not aggressive to the pump's materials. See section 2.6 for components and appertaining materials.

## 1.5 Disposal

Samson's liquid ring pump is manufactured so that most of the device can be reused/recycled.

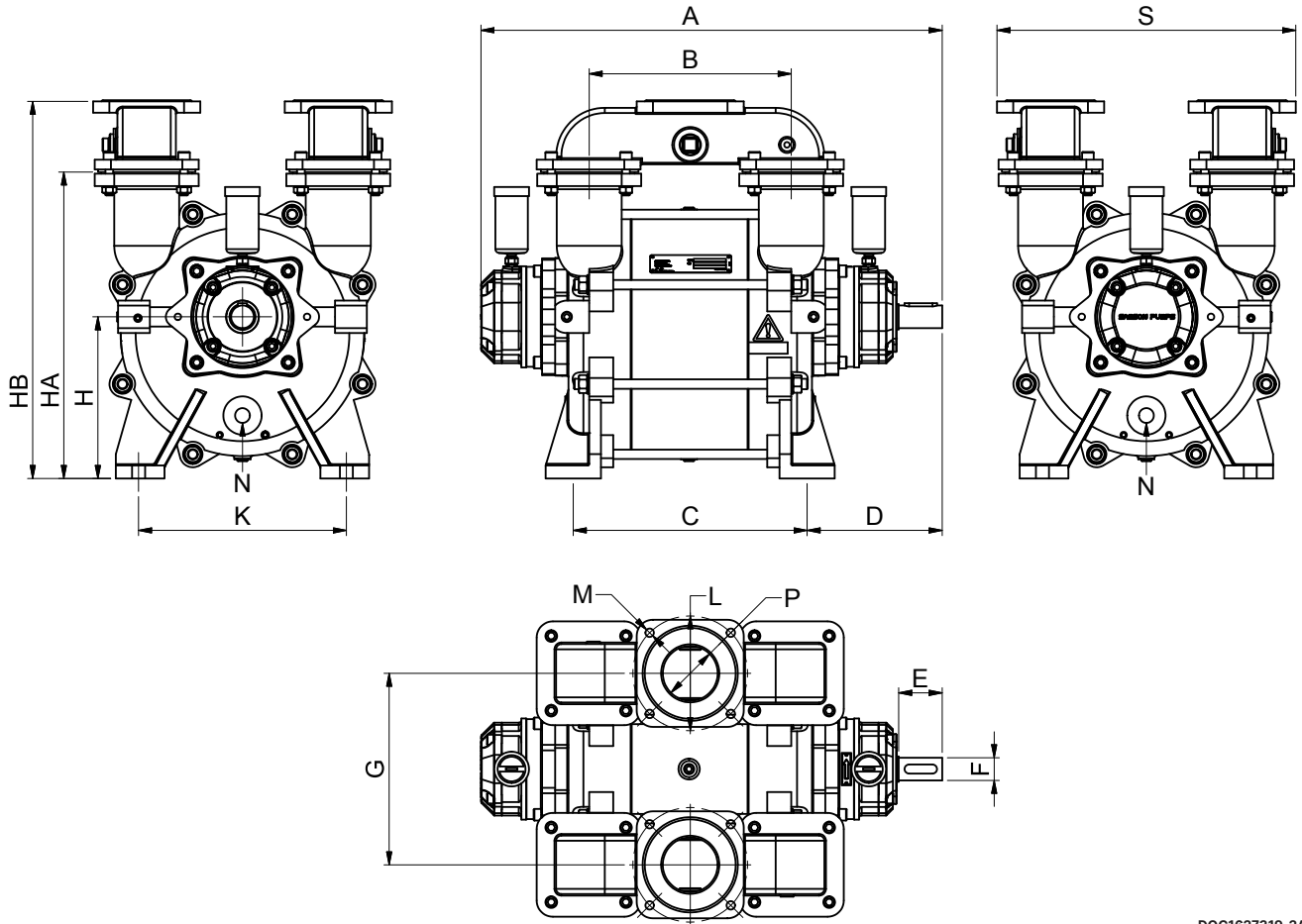
Samson Pumps thus offer users of the company's pumps the option of returning used pumps to be restored or scrapped.

For those who do not wish to take up the factory on this offer, the pump must be taken apart and sorted into its separate components. See section 2.6 for the material of which the pump is made.

These components must be disposed of in accordance with national regulations.

# 2 TECHNICAL DATA

## 2.1 Dimensions



DOC1627319\_2A

### Dimensions [mm]

Pump type	A	B	C	D	E	F	G	H	HA	HB	K	L	M	N	P	S	Weight [kg]
<b>KS1800</b>	1160	763	855	196	70	Ø45/h6	295	249	472	580	320	Ø177	Ø13	3/4"	Ø85	460	390

## 2.2 Specifications



A failure to meet these specifications may result in damage to the pump

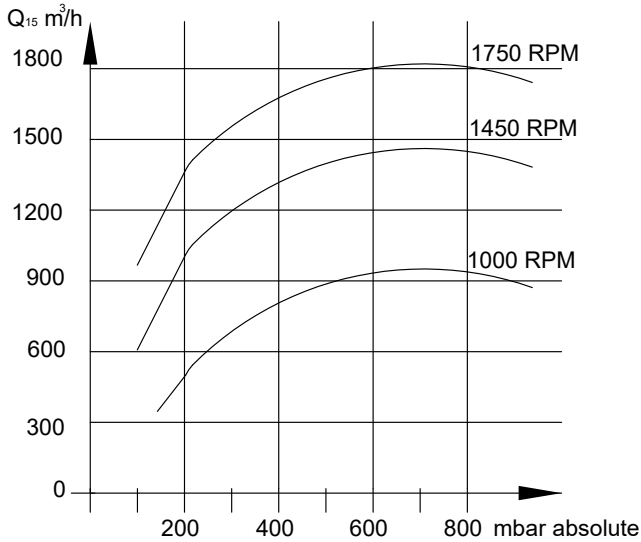
Description	Minimum	Maximum
Ambient temperature, operation	-20°C	55°C
Ambient temperature, storage	-20°C	55°C
Humidity	-	80%
Intake temperature, suction side	-	120°C
Intake temperature, service liquid	-	90°C
Service liquid pipe connection, dimension	3/4"	-
Service liquid pipe connection, length	-	6 m
Noise level	-	80 dB
Revolutions	1000 rpm	1750 rpm
Pressure	100 mbara	1 barg
Service liquid flow	3 litres/minute, self-regulating*	-
Lubricating grease	Type of grease	SKF LGHQ2
	Automatic lubrication	SKF LAGD 125/HQ2

\* -It is recommended to install liquid separator to ensure the pump is supplied with as much water as needed.

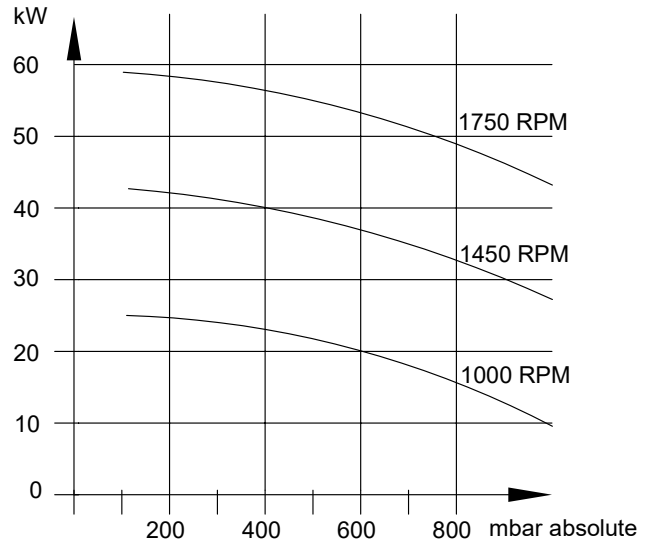
## 2.3 Power consumption and output

### 2.3.1 Vacuum

KS1800 PERFORMANCE



KS1800 POWER CONSUMPTION



The data is based on the following parameters:

- Air temperature 20°C
- Service liquid temperature 15°C
- Test performed with dry air and 1,013 mbar absolute.
- Tolerance  $\pm 10\%$

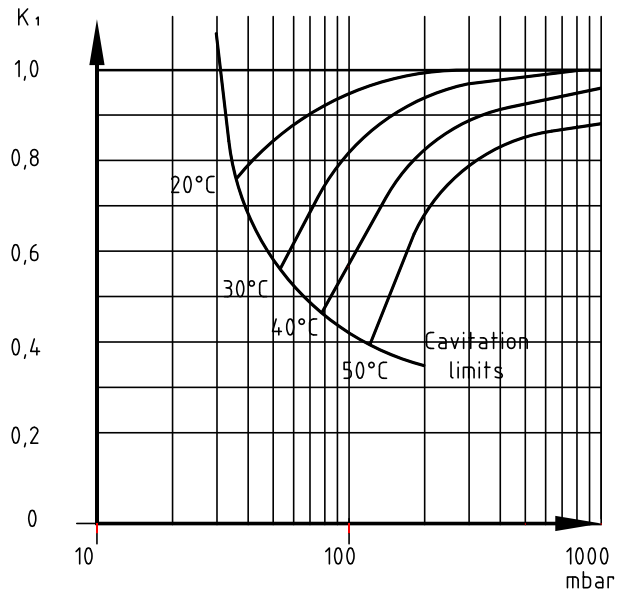
### 2.3.2 Correction factor

When the temperature of the service liquid exceeds 15°C, the pump's capacity will be affected with respect to the specified values.

To determine the output at a higher temperature, the correction factor can be used.

Capacity at service liquid temperature higher than 15°C :

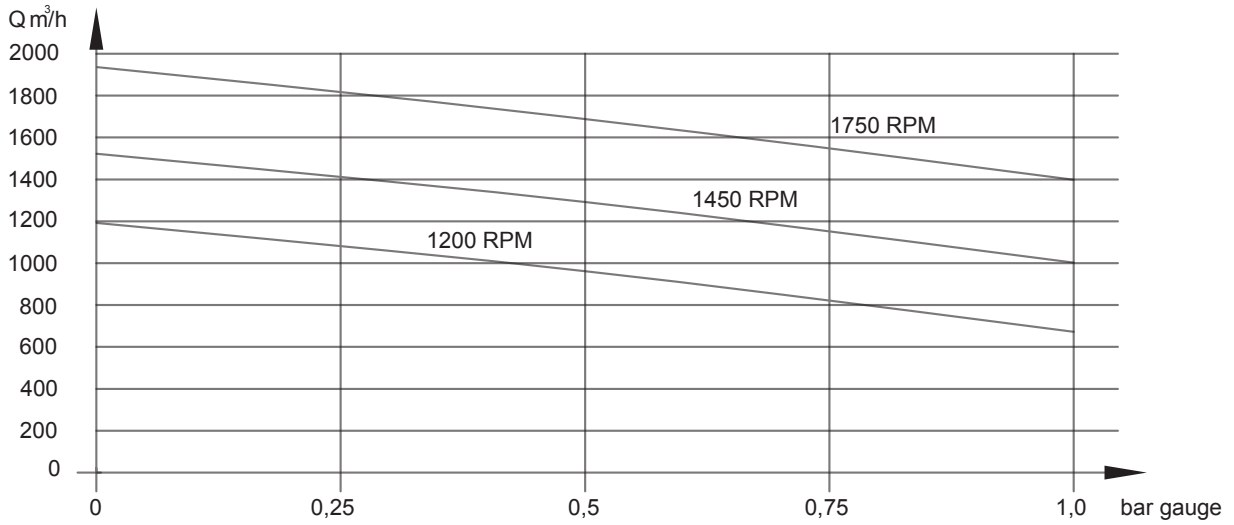
$$Q_{t>15} = Q_{15} \times K_1$$



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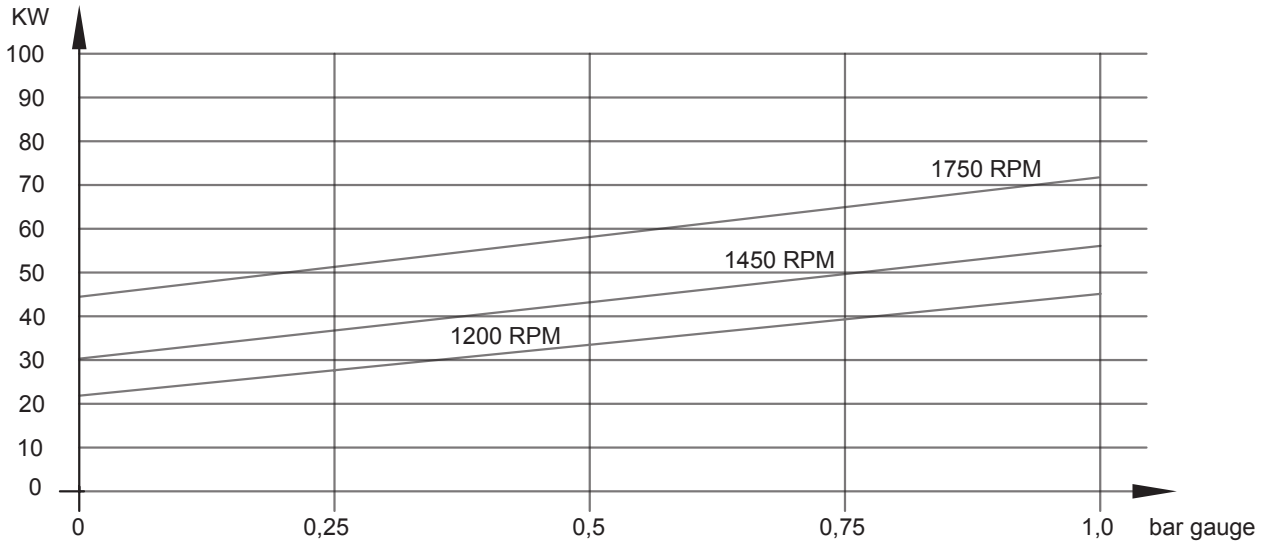
2.3.3 Pressure

KS1800 - Performance



Air temperature 20°C  
 Service liquid temperature 15°C  
 Tolerance +/- 10%

KS1800 POWER CONSUMPTION - PRESSURE



PRESSURE OPERATION:

Performance and power consumption are based on a constant service liquid flow at 1.5 m<sup>3</sup>/h. Deviations will affect the performance and power consumption. Using a liquid separator from Samson Pumps the amount of water will be regulated automatically depending on the operating pressure. At the same time, the water will be reused and will reduce the costs of operation. If operating without liquid separator the pump must be supplied with 0.2 m<sup>3</sup>/h as a minimum, in considerations to lubrication and cooling of the mechanical shaft seals.

## 2.4 Handling and transport



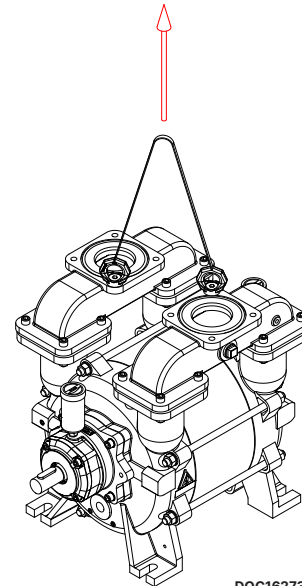
A failure to meet these specifications may result in damage to the pump

The pump must be transported in such way that is not exposed to vibrations and impacts that can overload the bearings.

The pump must be inspected for damages upon delivery. If the pump is damaged, it may not be used and the damage must be reported to the dealer.

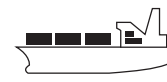
Ensure that the pump's identification plate is intact and that the marking of the pump corresponds to its use.

The pump may only be handled using approved lifting eyes, in accordance with nationally applicable regulations and only in a vertical motion.



DOC1627310\_1

The pump can be transported in the following ways:



DOC11093A

## 2.5 Service liquid requirements

Only water-based liquid may be used as service liquid.

For operating conditions where there is a risk of ice formation in the service liquid system, a suitable anti-freeze must be used.

## 2.6 Pump storage



A failure to comply with the requirements for storing the pump may result in internal damage to the device



If the temperature is below freezing point of the water, it could damage the pump. Under these conditions, the pump must be drained completely



All plugs and protective covers must be fitted during storage

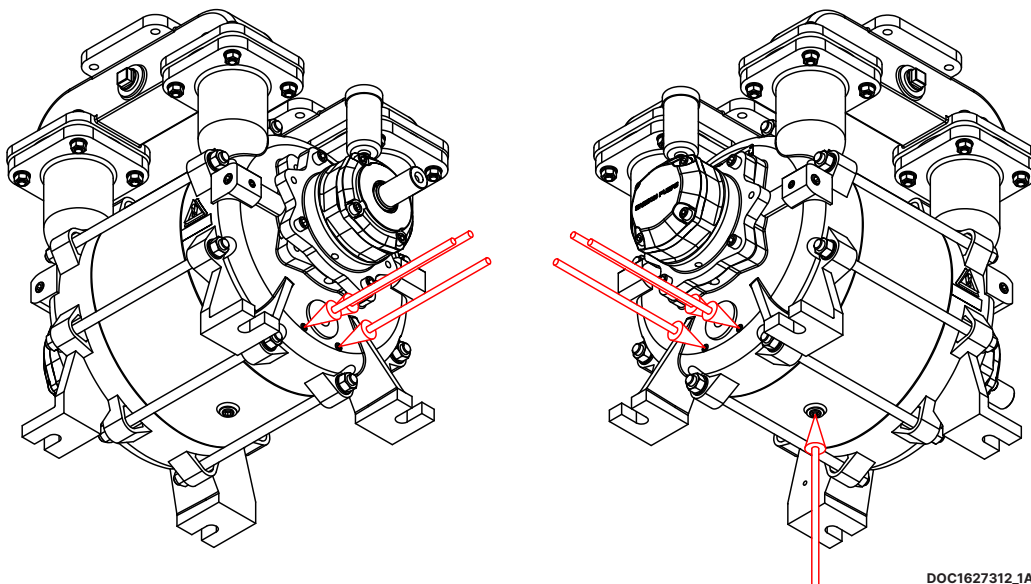
The pump's service liquid is drained on delivery, and the pump can be immediately stored in accordance with the technical specifications.

After operation, the pump can be stored for 30 days without further action.

If the pump remains out of operation for a longer period of time after use, its service liquid must be drained, and the liquid supply to the pump must be shut off.

When emptying the pump, it is important that all compartments inside the pump are emptied.

The pump can be fitted with valves in the draining connections. See below.



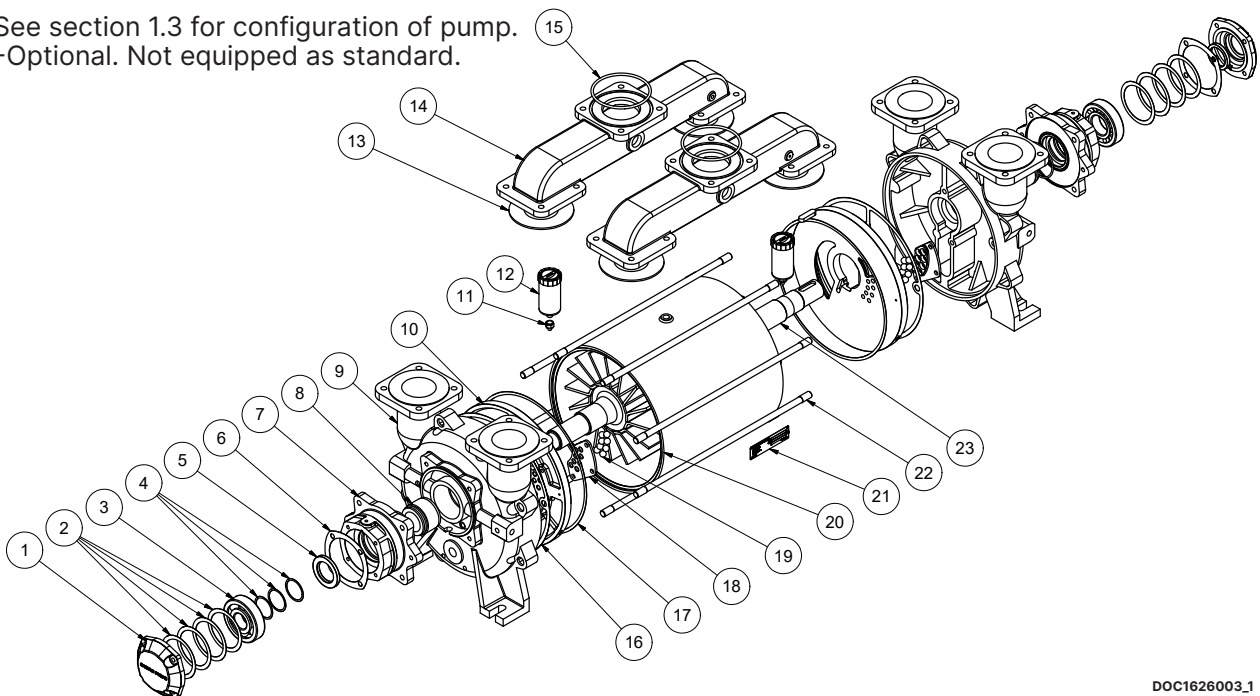
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## 2.7 Materials

Term	Pos.	Material	Description
Bearing cover	1	Cast iron	EN-GJL-250; EN1561
Shim	2	Spring steel	-
Ball bearing	3	Chrome steel	W.Nr.1.3505
Shim	4	Spring steel	-
Radial shaft seal	5	Rubber	Type CB NBR; DIN 3760A
Paper gasket	6	Paper	Oakenstrong
Bearing housing	7	Cast iron	EN-GJL-250; EN1561
Mechanical shaft seal	8	NBR / AISI / Carbon	-
Pump housing	9	Cast iron	EN-GJL-250; EN1561
Flow plate*	10	Bronze	GC-CU Sn10 DIN 1705
		Cast iron	EN-GJL-250; EN1561
Fitting**	11	Brass	-
Automatic lubricator LAGD 125/WA2**	12	Polyamide	PA6
Rubber gasket	13	Rubber	NR 70
Branch pipe	14	Cast iron	EN-GJL-250; EN 1561
O-ring	15	Rubber	NBR 70; DIN 3771
Paper gasket	16	Paper	Oakenstrong
Paper gasket	17	Paper	Oakenstrong
Shell*	20	Stainless steel	AISI 316
		Cast iron	EN-GJL-250; EN1561
Identification plate	21	Stainless steel	AISI 316
Stay Bolt	22	Carbon steel	W.Nr.1.1181
Rotor	23	Stainless steel	W.Nr.1.4418 / 1.4404

\*-See section 1.3 for configuration of pump.

\*\*-Optional. Not equipped as standard.



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# 3 RECOMMENDED SERVICE, MAINTENANCE AND INSPECTION INTERVALS



- Check for foreign objects in the pump and physical damage on pump
- Gaskets to be handled with highest degree of caution
- Gasket and sealing surfaces must be cleaned before assembly

Section	Operation	Interval
3.1	Drain liquid separator to remove contaminants	Weekly
3.2	Check grease cartridges (if equipped)	Weekly
3.3	Lubrication of bearings	Per 500 duty hours
3.4	Inspection and cleaning of service liquid's supply pipe	Monthly

## 3.1 Draining the liquid separator

While the pump is stopped, the liquid separator must be drained to remove contaminants.

## 3.2 Check grease cartridges

If the pump is equipped with an automatic lubrication feature. It must be inspected and replaced as needed.

When the pump is commissioned for the first time, the cartridges must be activated by turning the arrow in the clockwise direction.

The cartridge is set to 12, which corresponds to an emptying time of 12 months. The cartridge must be replaced when empty.



DOC3707

It is only allowed to use automatic lubricator of type **SKF LAGD 125/HQ2**.

## 3.3 Lubrication of bearings



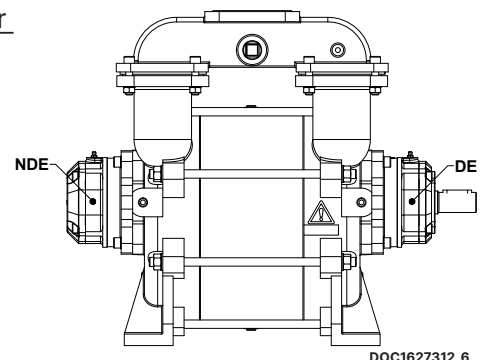
Over-lubrication of bearings may result in bearing failure! Do NOT exceed the amount of grease specified below!

The bearings must be lubricated with grease of type **SKF LGHQ2**, per 500 duty hours.

It is recommended to lubricate the bearings while pump is running.

### Lubrication interval per 500 duty hours

Drive end (DE)	16 g
Non drive end (NDE)	8 g



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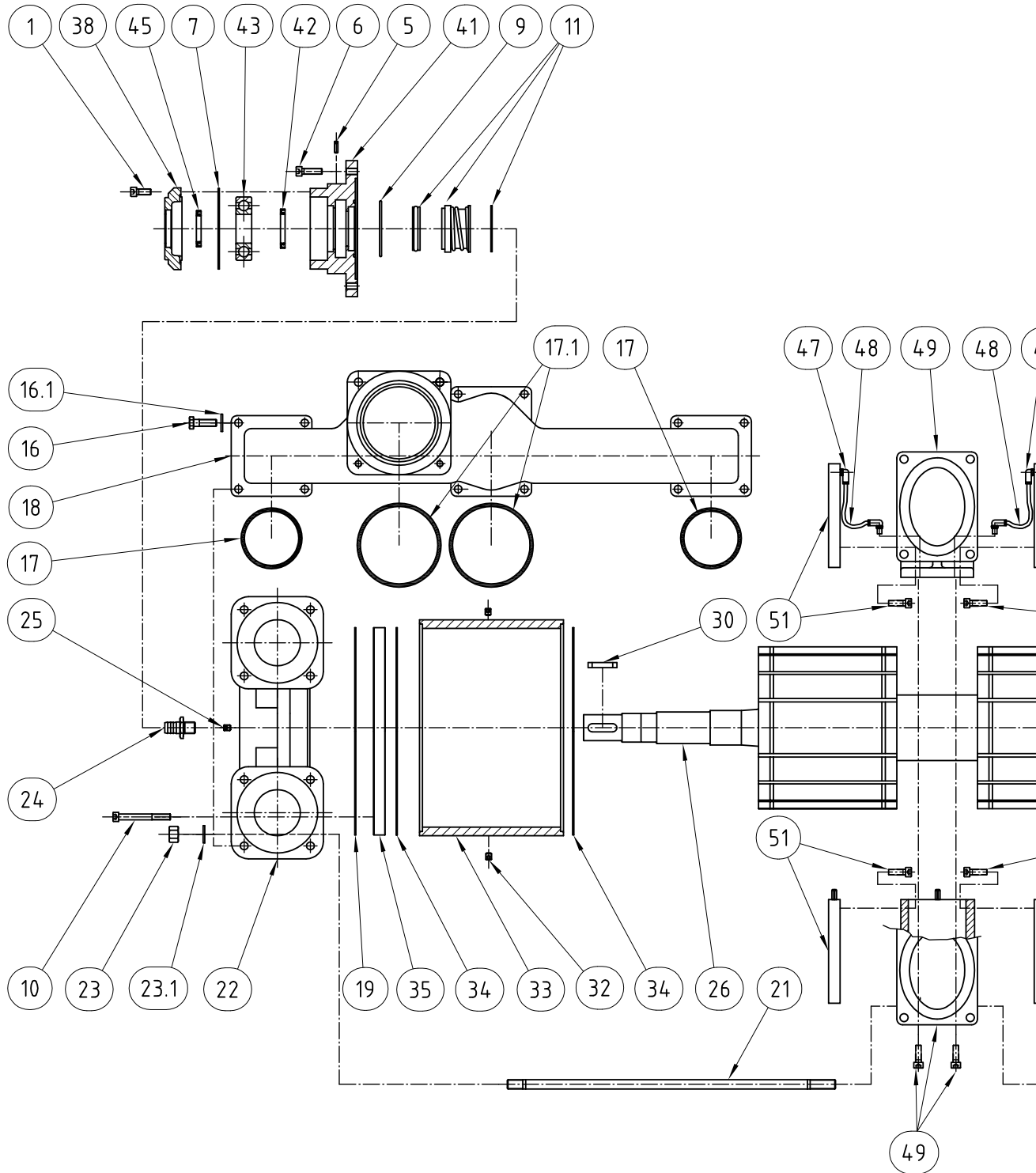
## 3.4 Inspection and cleaning of service liquid's supply pipe

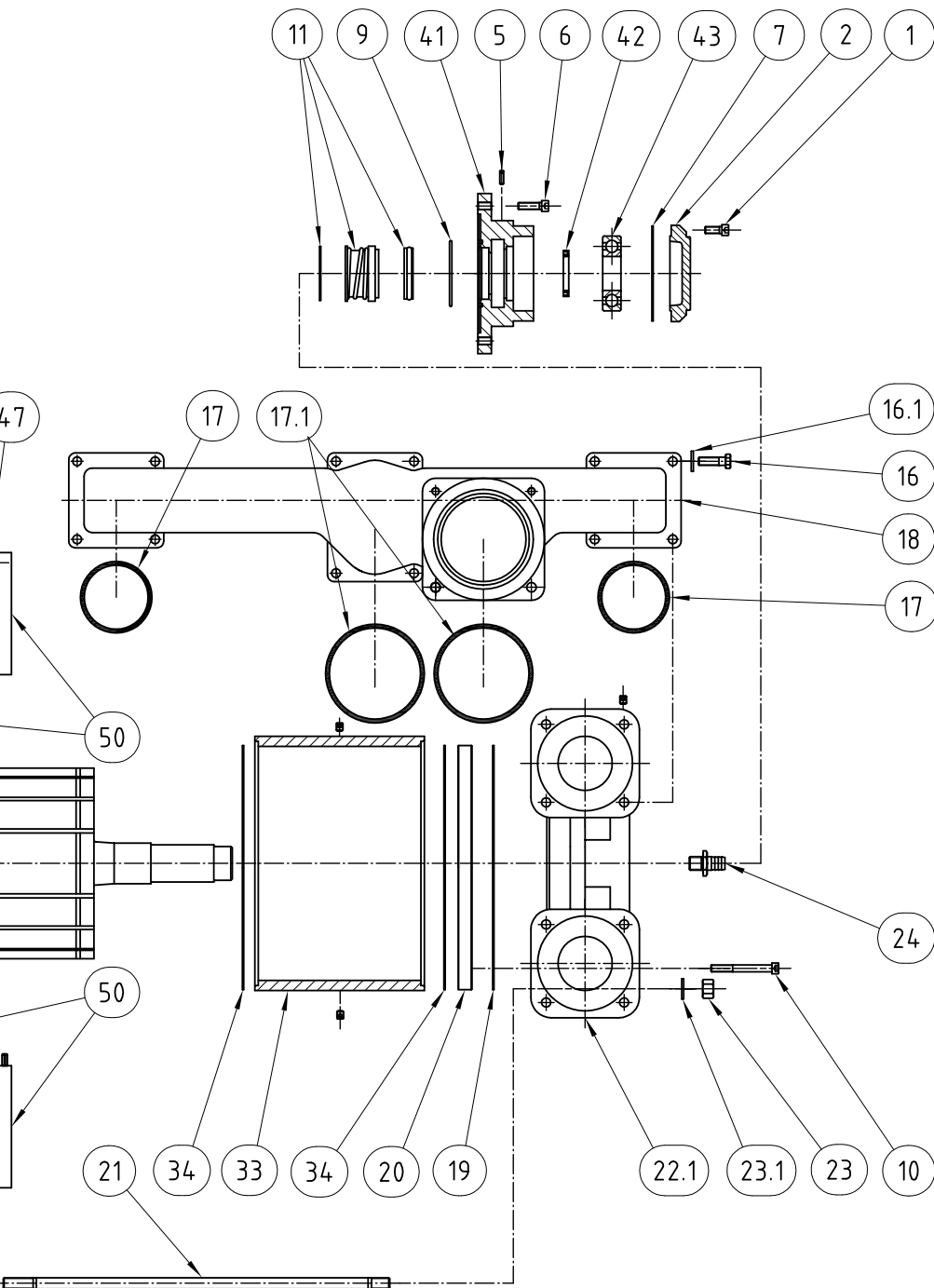
The pipe connection between the liquid separator and pump must be inspected at least once a month, and any contaminants must be removed.

## 4 TROUBLESHOOTING

Problem	Cause	Effect	Corrective measure
<b>The pump is unable to create a vacuum</b>	<ul style="list-style-type: none"> <li>The pump is not receiving enough service liquid</li> <li>The temperature of the service liquid is too high</li> </ul>	<ul style="list-style-type: none"> <li>Reduced output</li> <li>The pump can become damaged during cavitation</li> </ul>	<ul style="list-style-type: none"> <li>Check the liquid supply</li> <li>Stop the pump and wait until the temperature has dropped to a sufficient level, or lower the temperature of the service liquid inlet.</li> </ul>
<b>Power consumption too high during operation</b>	<ul style="list-style-type: none"> <li>The pump is receiving too much service liquid</li> </ul>	<ul style="list-style-type: none"> <li>The pump can become worn</li> </ul>	<ul style="list-style-type: none"> <li>Check the liquid supply</li> </ul>
<b>The start-up power is too high</b>	<ul style="list-style-type: none"> <li>Too much service liquid in the pump prior to start-up</li> </ul>	<ul style="list-style-type: none"> <li>Noise at start-up and possible overload of the power supply</li> </ul>	<ul style="list-style-type: none"> <li>Check the stop valves in the liquid supply for leakage</li> </ul>
<b>Noise during operation</b>	<ul style="list-style-type: none"> <li>Cavitation</li> </ul>	<ul style="list-style-type: none"> <li>Severe damage to the pump and potential risk of breakdown</li> </ul>	<ul style="list-style-type: none"> <li>Increase the suction pressure or lower the temperature of the service liquid</li> </ul>
<b>Leakage from the bearing housing's drain holes</b>	<ul style="list-style-type: none"> <li>Damaged shaft seal</li> </ul>	<ul style="list-style-type: none"> <li>Bearings may become damaged</li> <li>Potential risk of explosive gas leak</li> </ul>	<ul style="list-style-type: none"> <li>Stop the pump and contact the manufacturer</li> </ul>

# 5 SPARE PARTS





Pos.	Description	Qty.	Dimensions
1	Allen screw	8	M10×25
2	Bearing cap	1	
5	Lubricator nipple	2	M8
6	Allen screw	8	M12×35
7	Gasket	2	0,4 mm
9	O-ring	2	88,49×3,53 mm
10	Allen screw	4	M10×90
11	Mechanical shaft seal Ø55	2	
16	Allen screw	24	M12×55
16.1	Lock washer	24	M12
17	O-ring	4	94,20×5,70 mm
17.1	O-ring	4	134,30×5,70 mm
18	Branch pipe vacuum/pressure	2	
19	Gasket	2	Ø359×0,4 mm
20	Flow plate - cast iron	1	
20	Flow plate - bronze	1	
21	Staybolt	16	M16×370
22	Pump housing, Drive end	1	
22.1	Pump housing, Non drive end	1	
23	Nut	16	M16
23.1	Lock washer	16	Ø17 mm
24.1	Hose nipple	2	3/4"
25	Plug	6	1/4"
26	Rotor w/shaft KS1800 right	1	
26	Rotor w/shaft KS1800 left	1	
30	Key	1	14×9×50 mm
32	Plug	6	3/8"
33	Shell, cast iron	2	
33	Shell, stainless steel	2	
34	Gasket	4	Ø360/346×0,4 mm
35	Flow plate - cast iron	1	
35	Flow plate - bronze	1	
38	Bearing cap	1	
41	Bearing housing	2	
42	Sealing ring	2	55×80×8 mm
43	Bearing	2	Ø50/110×27 mm
45	Sealing ring	1	50×65×10 mm

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<b>Pos.</b>	<b>Description</b>	<b>Qty.</b>	<b>Dimensions</b>
47	Fittings, swivel	4	1/8"x ø6
48	Tecalon tube	2	6×4 mm
49	Intermediate housing	1	
50	Flow plate cpl. - cast iron	1	
50	Flow plate - bronze	1	
51	Flow plate cpl. - cast iron	1	
51	Flow plate - bronze	1	

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