







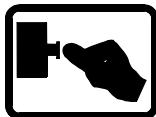



Brugsanvisning/Operating instructions
Betriebsanleitung/Mode d'emploi

GB Pump arrangement KL30S 60.0

No. 0901-525

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1 General information

1.1 Manufacturer and product information

Manufacturer: Funki
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Denmark
Tel. +45 97119600

Type designation: Pump arrangement KL30S 60.0

Much effort has been put into this manual to ensure that its contents are correct. However, if any errors or omissions are found, Funki would much appreciate being notified accordingly.

Funki assumes no liability for errors or omissions in this manual nor for the consequences hereof.

The contents of this manual are subject to change at any time without prior notice.

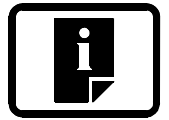
1.2 General safety notes

READ BEFORE USE!

This reliable product has been designed according to the latest technical standards and acknowledged safety regulations. However, if the product is used by unauthorized persons for other purposes than the one described under point 5.1 may involve risk to the user or third person or cause material damage.

Therefore, always read and follow the safety regulations.

- The product must be used for no other purposes than the one described under point 5.1 and the general regulations on safety and prevention of accidents must be observed.
- Only trained personnel are allowed to use the product. Young people are only allowed to use the product if they are over the age of 16, if it forms part of their education and if they are supervised by an expert.
- To ensure personal safety as well as the reliability and the high standard of the product only original Funki accessories and spare parts must be used.
- For reasons of safety, individual modifications of the product are not allowed.
- Service and repair work, especially concerning electrical parts, must only be carried out by experts and trained personnel.



1.3 Symbol explanation

If the safety notes of this manual are not observed it may involve risk to the user or damage the product and its function. Safety notes and instructions regarding trouble-free operation are marked with the following symbols:



Warning symbol according to ISO 3864 B.3.1.
Risk of mechanical destruction or personal injury.



Warning symbol according to ISO 3864 B.3.6.
Risk of electric shock.



Information symbol according to ISO 3864 8.4.
Important instructions of how to avoid damaging the product and its operation. Instructions on safe and trouble-free operation.

When these symbols appear in the text, the paragraph in question must be carefully read!

2 Conformity declaration

ACO Funki A/S hereby declares that

Machine: Pump arrangement KL30S 60.0

Utilization: The pump arrangement must only be used for incorporation in liquid feeding systems as pump for pumping out liquid feed in pipe circuits.

Type: 0300-025

is manufactured in accordance with the board's directive of 14 June 1989 (89/392/EØF) and following amendments.



3 Technical specifications

3.1 Article No.

Pump arrangement KL30S 60.0 4kW 0300-025

3.2 Range of capacity

Utilization: The pump is used for pumping out liquid feed

Mode of operation:

Pump medium: Liquid feed

Capacity: 10,000 - 11,000 l/h

Operation pressure: Suction side: flow

Delivery side: 1 - 4 bar

Pump:

Rotor: 1.4301

Stator: Perbunan

Joints: Cardan joint with rubber sleeve

Joint sealing: Perbunan

Bearing housing: Cast iron (GG25)

Shaft sealing: Face seal with oil quench

Suction nozzle: GG, flange DN65/PN16 2501

Discharge nozzle: GG, flange DN65/PN16 2501

Drive flange: Ø160 mm

Shaft: Ø30 mm

Pipe connection: Ø90 on the suction side. Ø63 on the delivery side

Drive:

Type: Helical gear drive

Brand: SEW

Type No.: RF62DV112M4TF

Rotation: 233 rpm

Mounting position: B5 T.B. 180°

Motor power output: 4 kW

Duty type: S1

Voltage: 230/400 V

Rated current: 8.8/5.1 A

Frequency: 50 Hz

Enclosure: IP 54

Temperature class: F

Motor protection: With thermistor protection

3.3 Noise emission

Each pump is manufactured and tested according to the currently applicable technical documentation. The A-evaluated permanent noise level (dB (A)) will normally be < 70 dB (A).

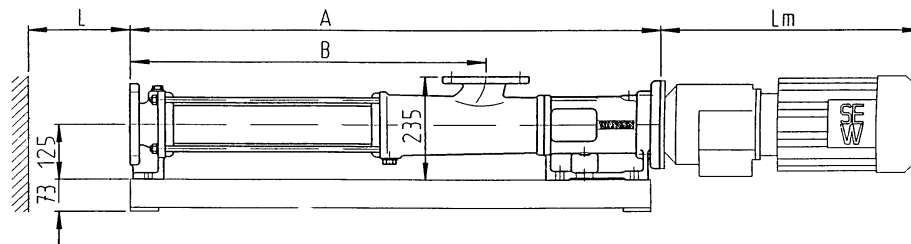
This does not include drive unit or pipe system.

It is assumed that the pump operates without cavitation and that the pump unit is properly mounted on a level concrete plate or a steel construction resistant to torsional flexing.



3.4 Dimensioned sketch

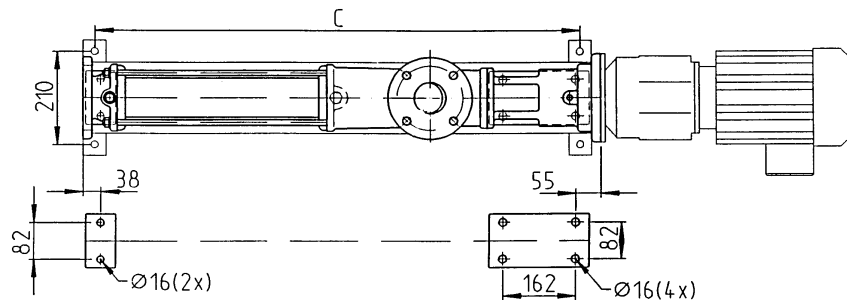
Dimensions of helical rotor pump in mm.				
Type	A	B	C	L
KL30S 60.0	1027	649	960	330



The measurement L_m depends on the gear drive. We supply with SEW RF60-DV112-M4 4 kW, meaning that $L_m = 560$ mm.

L = minimum space requirement at repair work

Drill elevation



3.5 Dimensions

Length = 1587 mm Height = 308 mm Width = 210 mm

3.6 Weight

Net weight: approx. 120 kg

3.7 Supply (power supply)

Voltage: 230/400 V
 Motor power output: 4 kW
 Frequency: 50 HZ
 Rated current: 8.8/5.1 A

4 Handling

4.1 Handling in general

The product must not be exposed to shocks.

4.2 Packing during transport

The product is delivered packed and must only be unpacked at the site. Examine the pump immediately upon receipt for any transportation damage. If any such damage is found, immediately inform Funki. Damaged products must not be put in operation.

Note the following points:

- Only use lifting gear and load lifting facilities with sufficient load carrying capacity for loading / unloading!
- Lift pumps only by correct means as specified in this manual (attachment points / lugs for load lifting facilities, etc.) using appropriate lifting gear.
- Lift horizontal pumps only by means of the mounting bores in the base plate or lifting lugs, using suitable load lifting facilities.
- Lift horizontal pumps without base plate via their centre of gravity on the pump housing.
- Lift vertical pumps by means of a lifting bracket or the mounting points on the bearing pedestal.



Please note that some drive units may cause pump assemblies to be very top-heavy. Never use the eyebolts of the drive unit to lift the entire assembly. These attachment points are to be used only for the engine and/or transmission!



Disconnect from all external energy supplies, even for just a slight change to be made to machine or plant position! Before any restart, reconnect the machine properly to its mains supply!



4.3 Storage

If the pump is to be stored for a longer period, prepare the unit as follows:

- Smear stator with silicon oil or glycerine (factory preservation of new pumps).
- Clean the pump for remaining medium, especially in cases where the medium will settle or harden.
- Protect pump against dust, dirt, and other damaging environmental influences. All non-painted surfaces are to be covered by acid-free and resin-free grease.
- For pumps with rotors from 1.2436, remove the stator and cover the rotor in grease.
- If the pump is to be taken out of use for periods in excess of 6 months, remove the stator in order to avoid pressure marks in the elastomer material.

5 Warnings

5.1 Prescribed use

The helical rotor pump must only be used for incorporation in liquid feeding systems as pump for pumping out liquid feed in pipe circuits.

If the product is used for other purposes, Funki does not assume any liability and all guarantee obligations lapse.

5.2 Special safety notes



In the event of improper usage or non-compliance with safety instructions, live-voltage-carrying, pressurized, pressure-carrying, and rotating or moving machine components may cause serious or even fatal injuries.

Please note therefore at all times:

- Installation and startup as well as service/maintenance and repair tasks may be carried out by qualified specialist personnel only.
- Safety devices may not be rendered ineffective or modified and/or impaired in their intended operational effect.
- All currently applicable national and international regulations and directives for accident prevention as well as all general technical safety requirements.
- Local construction supervision regulations, and any resulting conditions for the operation of pumps and pump assemblies.
- Notes/instruction labels affixed directly on the machine (arrow indicating direction of rotation, etc.).

5.3 Qualified personnel

Qualified personnel are persons who due to their education / training, experience, instruction received, as well as knowledge of relevant standards and regulations, accident prevention regulations, and operating environments have been authorized by the responsible plant safety officer to carry out the activities required, and who are able to recognize and prevent potential hazards and risks (IEC 364).

5.4 Safety notes for maintenance, inspection and installation tasks



Prior to carrying out any work on the machine, this must be shut down. Switch the drive unit into a voltage-free condition and secure against any unauthorized and accidental restart. Before opening up the pump, ensure that the plant has been depressurized. When opening up the pump, comply with all regulations concerning the flow medium. Refit all safety devices before restarting the pump. When restarting the machine, follow the instructions and safety notes contained in point 7.1, "Startup".



5.5 Intended design use

This machine has been designed and manufactured according to the state of the art and all recognized technical safety rules. Nevertheless, its use may involve hazard and risks for life and limb of the user or third parties, or an impairment of the machine and other property. The machine may be used in a technically faultfree condition only, as well as in line with its intended design use, and a general safety and risk awareness in compliance with this manual. In particular faults which may be detrimental to safety are to be remedied IMMEDIATELY.

See point 3.2 “Technical specifications” for correct use and defined values.

In the event of a change in the flow medium or the design of the plant, it will be necessary to test for the suitability of the pump in these changed operating conditions. This will be the case especially for aggressive, toxic, or otherwise hazardous substances.

The following points are to be noted:

- Materials of components coming into contact with the flow medium.
- Seal design, shaft sealing.
- Pressure and temperature of the flow medium.
- Installation position and environment.

A change in delivery conditions (e. g. delivery rate, delivery path, pressure level, pipe diameter, throttle devices) may cause major changes in the operating conditions. In such cases, compare the new operating conditions with the details provided on the type plate. If the changed conditions should exceed the details provided on the type plate it will be necessary to contact the manufacturer for advice.



Do not modify, extend, and/or convert the machine/plant in any way likely to impair its operational safety. Obtain approval by the manufacturer. This also applies to fitting and adjusting safety devices and safety valves, as well as to welding work on load-bearing members.

5.6 Operating restrictions

The helical rotor pump is a positive displacement pump which is theoretically capable of building up an infinitely high pressure. In the event of a pressure line being closed, pressure built up in this way can reach a multiple of permissible plant pressure values. This may cause serious damage to plant components and involve a risk of personal injury.



Do not operate against closed shutoff devices. There is a risk of fracture as well as personal injury. Secure the pump by means of approved safety devices (excess pressure protection).



Do not use a non-operative pump as a shutoff device. With a shutdown drive unit, any onesided pressurization of the pump may cause to rotate independently. Damage to the pump cannot be excluded in such cases.



When dangerous media are transported with the pump, the prevailing safety and handling regulations for the medium in question must be observed.



Medium contamination by foreign matter (metal parts, stones, etc.) may cause damage to the pump elements. Take suitable action to ensure that no foreign matter or particles likely to cause damage can ingress into the pump.

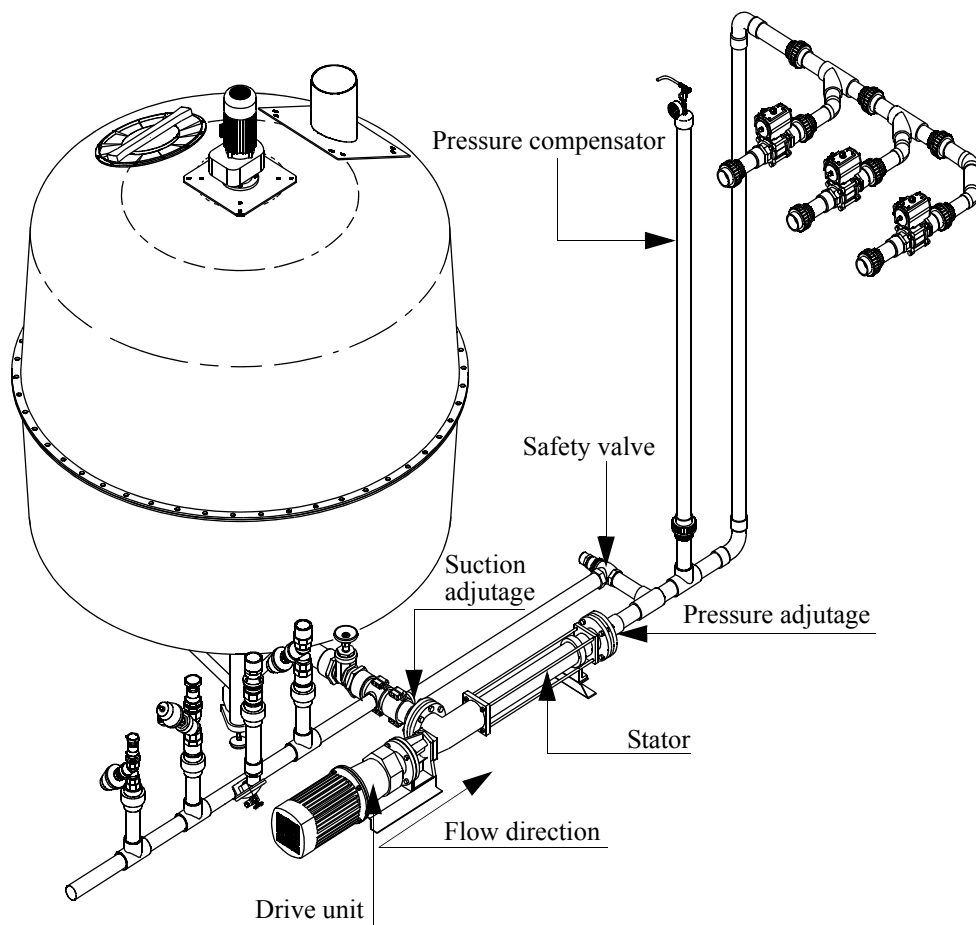
Comply with all statutory regulations applying to the delivery and storage of hazardous substances, all local construction supervisory regulations, and any resulting conditions and restrictions for the operation of helical rotor pumps (requirements regarding dry-run protection, drive unit equipment etc.).

In their standard version, helical rotor pumps are no flame penetration protection devices.



6 Installation instructions

6.1 General drawing



6.2 Erection

On delivery, the pump suction adjustage will be turned to the left when looking at the helical rotor pump from the motor end. If required, the adjustage can be turned to the right (clock- or counter-clockwise).

6.3 Space requirement

Please note that free space is required for operating and maintenance task purposes.

This free space must be at least:

- in flow direction: pump width multiplied by 1.5 times the stator length
- on drive unit: pump width multiplied by one drive unit length
- at each pump end: pump width multiplied by one width of unit

6.4 Control

Flush out pipe system and supply devices before fitting, and remove all foreign matter.

6.5 Pipe connections

When making pipe connections, please note:

- The pipe circuit must be made in such a way that the pump is not emptied when out of operation.
- Install block valves in the suction and delivery sides
- The pump might be connected to the pipe circuit by means of a pressure compensator (see point 6.1)



The pump must never run dry. Even few rotations without liquid may cause stator breakdown. When pressure testing the pipe circuit, the pump must not be exposed to heavier pressure than its test pressure.

6.6 Installation of safety valve

- Always install a safety valve (diaphragm valve or another pressure control valve, see point 6.1) on the pipe circuit from the pressure adjutage of the pump.
- Make sure that the opening pressure of the safety valve is correct (max. 4-5 bar).
- There must be no leakage through flow valves before the safety valves open.

6.7 Installation of pump unit

- Clean the pipe circuit before installing and connecting the pump.
- Note ventilation to the drive motor.
- Suction and pressure adjutages are assembled tension-free to the pipe circuit (note flow direction of the pump medium).

The pump is mounted by means of the mounting lugs on the base plate or the mounting holes in the bearing pedestal and the pressure adjutage by means of the bolt connections (anchor dowels) that must be taken into consideration in connection with the installation.

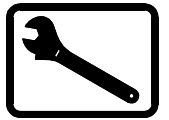
The pump is to be mounted on firm and level ground.

6.8 Electrical connection

Before connecting the motor, make sure that your actual mains voltage and frequency correspond to the details provided on the type plate of the motor.

For connecting the motor, always follow the instructions provided by the drive unit manufacturer, as well as all current regulations for electrical means of operation (e.g. motor protection, mains switch).

Before connecting the motor, check phase sequence with regard to the direction of rotation.



7 Operating instructions

7.1 Startup

Before starting the pump, check for contamination and any foreign matter.

Filling and starting procedure:

1. Fill the pump with your medium
2. Valves on suction and pressure sides are fully opened.
3. Check the rotation direction of the pump by starting the drive motor for a few seconds. The arrow on the pump will show the rotation direction.
4. Start the pump

If medium is not pumped out into the pipe system after the first startup, stop the pump immediately in order to prevent it from running dry.

Make sure that there is liquid in the pump, then restart it. If the pump fails to pump out medium into the pipe system again, pump and system must be checked.

When the error has been corrected, repeat the filling and starting procedure.



Normally, the stator has been preserved by means of silicon oil. If the medium to be pumped is not compatible with silicon, the pump must be cleaned before it is first taken into service.

The helical rotor pump is a positive displacement pump which is theoretically capable of building up an infinitely high pressure. In the event of a pressure line being closed, pressure built up in this way can reach a multiple of permissible plant pressure values. This may cause serious damage to the pump and plant components, and involve a risk of personal injury.



Do not operate against closed shutoff devices. There is a risk of fracture as well as personal injury. Secure the pump by means of approved safety devices (excess pressure protection).



8 Maintenance

8.1 Service after startup

Following approximately 50 hours of operation, all bolt connections on the pump or pump unit should be checked, excepting only one packing box seal. Retighten, if necessary.

8.2 Inspection and service intervals

Interval	Component	Task	Point
Actual wear is significantly influenced by different media and pressure requirements Calculate the necessary inspection/service intervals on a plant-specific basis.	Stator	Replace if worn	8.10
	Rotor		8.11
	Joint		8.13
	Shaft sealing	Check for leakage, if it leaks all the time, replace	8.14
	Bearing	Replace after 20,000 hours or 5 years, whichever occurs first	8.16
According to manufacturer	Drive unit/motor	Relubricate / replace bearing	

8.3 Lubrication

No fixed lubrication intervals are defined for this pump.

- The bearing points are equipped with maintenance-free roller bearings lubricated for life that should be replaced after the time intervals stated.
- Lubricate all drive unit bearings in accordance with the instructions provided by the manufacturer.

8.4 Joint maintenance

The joints do not require any regular servicing or maintenance.

Universal joint: Renew the oil filling when replacing the sleeve (see Table of Lubricants).

Flange joint: Lubricate this joint at the lubrication points provided by means of 2 -3 applications from the grease gun when opening the pump or replacing the sleeve.

8.5 Face seal

Check the oil level of the drive seal at predefined regular intervals by means of the oil level inspection device. If necessary, replenish the existing oil (see Table of lubricants).



8.6 Operational failure

Faults on pumps and pump units may be attributed to a whole range of very different causes:

- Hydrodynamic causes.
- Mechanical causes.
- Electrical causes.

8.7 Check list for mechanical and hydrodynamic faults

Type of Fault	Possible Cause	Remedy
Pump does not start	Blockage caused by foreign matter	Remove foreign matter
	Deposits after shutdown	Immediately clean pump
	Medium hardens (due to temperature or chemical conditions)	
	Solids contents are too high	Check delivery conditions. If necessary, change engineering data.
	Stator swollen up	Check temperature of medium Check resistance of stator elastomer relative to the medium
	Plant pressure too high	Compare pump nominal pressure to plant conditions; if necessary, change engineering data
Delivery rate decreases or is no longer reached	Shutoff devices partially closed Blockage in the pipe	Fully open shutoff devices Remove blockage
	Stator and/or rotor worn	Replace
	Air locks in medium	Check intake pipe, media supply and seals
	Seals are defective	Replace seals

Pump does not take in medium	Incorrect direction of rotation	Correct direction of rotation Observe direction arrow
	Intake pipe blocked	Clean
	Dry running stator poss. damaged	Replace stator Check dry-run protection for correct connection
Excessive pump noise	Joints are worn	Replace
	Cavitation Speed too high or intake pipe too narrow	Check engineering data. If necessary, select lower speed increase pipe cross-section

8.8 Electrical faults

Faults in the electrical drive system of the pumps or pump unit may have many different causes (mains connection, dimensioning of the drive unit, motor protection, etc.).

Remove faults in connection with the electrical drive system by following the instructions contained in the attached manufacturer's operating and maintenance manual.

8.9 General safety notes for repairs

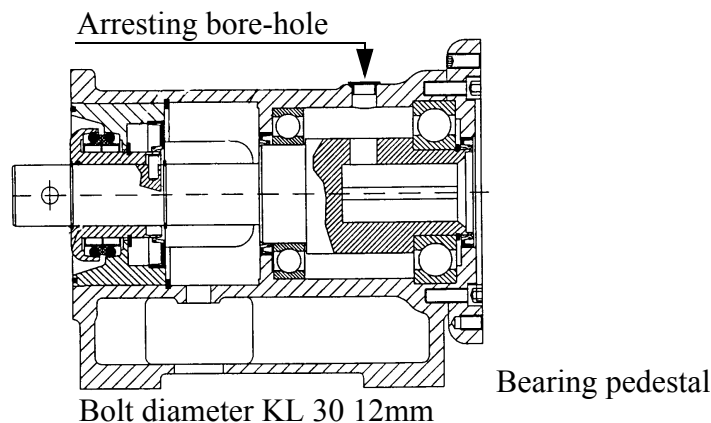
Observe the following safety notes with regard to all repair tasks:



Switch the drive unit into a voltage-free condition and secure for the duration of any maintenance work against accidental and unauthorized re-activation!

Drain the pump and all connected pipes, and check surface temperature before opening the pump system.

Lock the drive set into position by inserting a bolt into the bore provided for this purpose at the top of the bearing pedestal (remove protective cap). Turn drive train to engage the bolt into the drive shaft bore. The drive set will then be secured against any further rotational movement.





Do NOT forget to remove this locking bolt before restarting the pump. If the drive unit is switched on when in a locked condition, there is a risk of fracture and a personal injury hazard!



Always use a new plug to close off the locking bolt bore.
Always renew the O rings that have been removed.

In the following repair instructions, pos.Nos. will appear and refer to the isometric exploded drawing at the end of this point.

8.10 How to change the stator

1. Undo and remove the mounting bolts of pressure connection (pos. No. 5). Unscrew tie rod nuts (pos. No. 15) and remove pressure connection (pos. No. 5) complete with insertion ring (pos. No. 12).
2. Unscrew tie rods (pos. No. 13).
3. Withdraw stator (pos. No. 9) toward the front by means of a rotary movement (opposite to the rotational direction of the pump). For large stators it is recommended to use chain tongs for this purpose.
4. Place insertion ring (pos. No. 12) complete with inserted O rings onto suction casing flange (adjust by means of stud bolts).
5. Smear rotor with lubricant (e.g. silicon oil), and slide on stator (pos. No. 9) by means of a rotary movement (use a piece of wood for support). Ensure that the stator slides into insertion ring (pos. No. 12) on the suction casing flange.
6. Remove stud bolts (start with the bottom bolts), and screw in tie rods (pos. No. 13).
7. For two-part pump sets, insert intermediate ring (pos. No. 16) complete with O rings after the first stator has been fitted, then slide on the next stator.
8. Place second insertion ring (pos. No. 12) complete with inserted O rings onto stator.
9. Fit pressure connection and evenly tighten tie rod nuts. Ensure that the stator sits correctly in its insertion rings and that no O ring is pressed outward.
10. Remount all other parts in reverse order.



Make sure that the stator slides into the intermediate rings without damaging the O rings.

8.11 How to replace the rotor

1. Remove stator (see point 8.10)
2. Undo and remove nuts (pos. No. 24) between suction casing and bearing pedestal, and remove suction casing.
3. Unscrew screw pin (pos. No. 18) at the rotor end and drive out the opposite half of the screw pin by means of an impact.
4. Withdraw the rotor from the joint and install the new rotor. Make sure that holes in joint and rotor match.
5. Mount in reverse order.

8.12 How to replace a sleeve (joint sleeve)

1. Remove rotor (see point 8.11).
2. Remove existing clamps by opening clamp locks. Then withdraw sleeve.
3. Check joints. Replace, if necessary (see point 8.13).
4. Slide new sleeve over joint and mount clamps. (The clamps will be closed by means of a trade standard BAND-IT closing tool).
5. Refit all other parts by following the above instructions in reverse order.

8.13 How to replace a joint

1. Remove rotor (see point 8.11).
2. Unscrew screw pin (pos. No. 18) with the set screw at the drive end from the joint and drive out the opposite half of the screw pin by means of an impact.
3. Withdraw joint from drive shaft.
4. Slide new joint onto drive shaft and connect to rotor. Ensure that the connection bores are all in alignment.
5. Refit all other parts by following the above instructions in reverse order.



8.14 How to replace the LWD cartridge

1. Remove joint (see point 8.13).
2. Rotate seal casing downwards by means of plug. Open and collect all the oil draining out.
3. Remove retaining ring (pos. No. 36). Withdraw LWD cartridge from shaft. (If necessary, carefully knock bearing pedestal complete with shaft onto a wooden support in cases where the LWD cartridge should prove difficult to withdraw).
4. Renew O ring (pos. No. 37). Clean and lightly grease drive shaft (pos. No. 26) and seal seat in the bearing pedestal.
5. Slide on new LWD cartridge and mount retaining ring (pos. No. 36).



Groove of seal seat (pos. No. 42) must engage in tension pin (pos. No. 40).

6. Rotate seal housing in an upward direction (top edge - bearing pedestal window) and fill with oil (see Table of Lubricants). Screw in plug and press on protective cap.
7. Refit all other parts by following the above instructions in reverse order.

8.15 Disassembly of drive unit

Flange diameter 160 mm:

1. Use lifting gear to secure drive unit against tilting over.
2. Undo and remove mounting bolts (pos. No. 35) with spring ring (pos. No. 41) on drive unit flange.
3. Prise off drive unit by placing two levers into the recesses provided in the drive unit flange for this purpose.

Flange diameter 200 mm and larger:

1. Use lifting gear to secure drive unit against tilting over.
2. Undo and remove mounting bolts (pos. No. 35) with spring ring (pos. No. 41) on drive unit flange.
3. Screw in prise-off bolts into the drive unit flange.
4. Disassemble drive unit by evenly tightening these bolts.

8.16 How to replace drive shaft and roller bearings

1. Remove joint (see point 8.13).
2. Remove sealing unit (see point 8.14).
3. Remove drive unit (see point 8.15).



Make sure that the drive unit cannot tilt.

4. Undo and remove flange bolts (pos. No. 32) and remove drive unit flange (pos. No. 41). Remove shaft seal and replace by a new seal when refitting.
5. Use a press to press out drive shaft (pos. No. 26) in drive end direction.
6. Remove retaining ring (pos. No. 33) and withdraw drive end bearing (pos. No. 31).
7. Press out roller bearing (pos. No. 29).
8. Replace shaft seal (pos. No. 28).
9. Press new roller bearings (pos. No. 29/31) onto the new drive shaft.



Heat roller bearing to approximately 90□□□□□□□□□□□□□□°C before fitting.

10. Use retaining rings to mount bearing onto shaft.
11. Press drive shaft complete with roller bearings into the bearing pedestal.
12. Mount bearing pedestal flange and tighten bolts.
13. Slide in drive unit and tighten flange bolts.
14. For pump reassembly follow the above instructions in reverse order.



Shaft seals must be replaced.



8.17 Table of lubricants

In most cases helical rotor pumps do not require any special maintenance action. Their bearing points are equipped with maintenance-free roller bearings that have all been lubricated for life.

It is recommended to replace these bearings after 20.000 hours of operation or at the latest after 5 years, whichever occurs first.

In the interests of a long service life of your pump you should introduce shortened replacement intervals in particular in connection with difficult operating conditions such as:

- high relative humidity
- aggressive environment
- major temperature variations

The encapsulated joints of helical rotor pumps are maintenance-free.

Helical rotor pumps complete with drive unit seal (LWD) are provided in the factory with an oil filling. This oil filling is to be regarded as providing a lubrication for life. In the event of a repair or a replacement of the drive unit seal this oil filling needs to be replaced. To this end, the sealing case will be filled up to a 2/3 level (check actual level in oil level inspection glass). The lubricant quantities required for this purpose will be as listed in the table on the next page.

The drive unit seals have been filled at the factory with OEST Gearol CLP 68. Use the original oil only, or the alternative lubricants listed in the table on the next page.

Replacement lubricants for OEST Gearol CLP 68.

Manufacturer	Lubricant description
ARAL	Degol BG 46
BP	Energol GR XP 68
ESSO	ATF D 21611
Mobil	D.T.E. 15 M
Shell	Tellus oil T 32
Klüberoil	GEM 1 - 68
Tribol	1100/68
Wintershall	Ersolan 68

Lubricant quantity for drive unit seal (LWD).

Assembly	Series	Lubricant quantity in l
Bearing pedestal/sealing unit	KL 30S/T/R GL 30 S	0.05
Bearing pedestal/sealing unit	KL 50S/T/R/RQ GL 50 S	0.1
Bearing pedestal/sealing unit	KL 80S/R/RQ	0.3
Shaft seal (add. shafts)	RQ/RÜ	0.1



Do not mix synthetic lubricants neither with each other nor with mineral lubricants!



8.18 Replacement parts stock

Wear and thus the service life of the major pump components is significantly influenced by various different factors such as:

- operating pressure
- condition of the delivery medium
- duration of plant operation

The most important replacement parts that should normally be kept in stock for each pump in order to achieve low MTTR values (Mean Time To Repair), are listed in the table below (recommendation according to DIN 24 296).

F.- No.	Replacement parts	Number of pumps (for 2, 3, 4 pumps only if these pumps are within the same plant subsystem or even redundant)			
		1	2	3	4 and more
		Number of replacement parts			
	Stator	1	1	1	2
	Rotor	1	1	1	2
	Set of seals (O-rings)	1	1	1	2
	Joint	1	1	1	2
	Connecting bolts (complete)	2	2	2	4
	Joint sleeve	2	4	6	8
	Face seal (cartridge)	1	1	1	2

8.19 How to order replacement parts

When ordering replacement parts always state

- pump type
- pump number

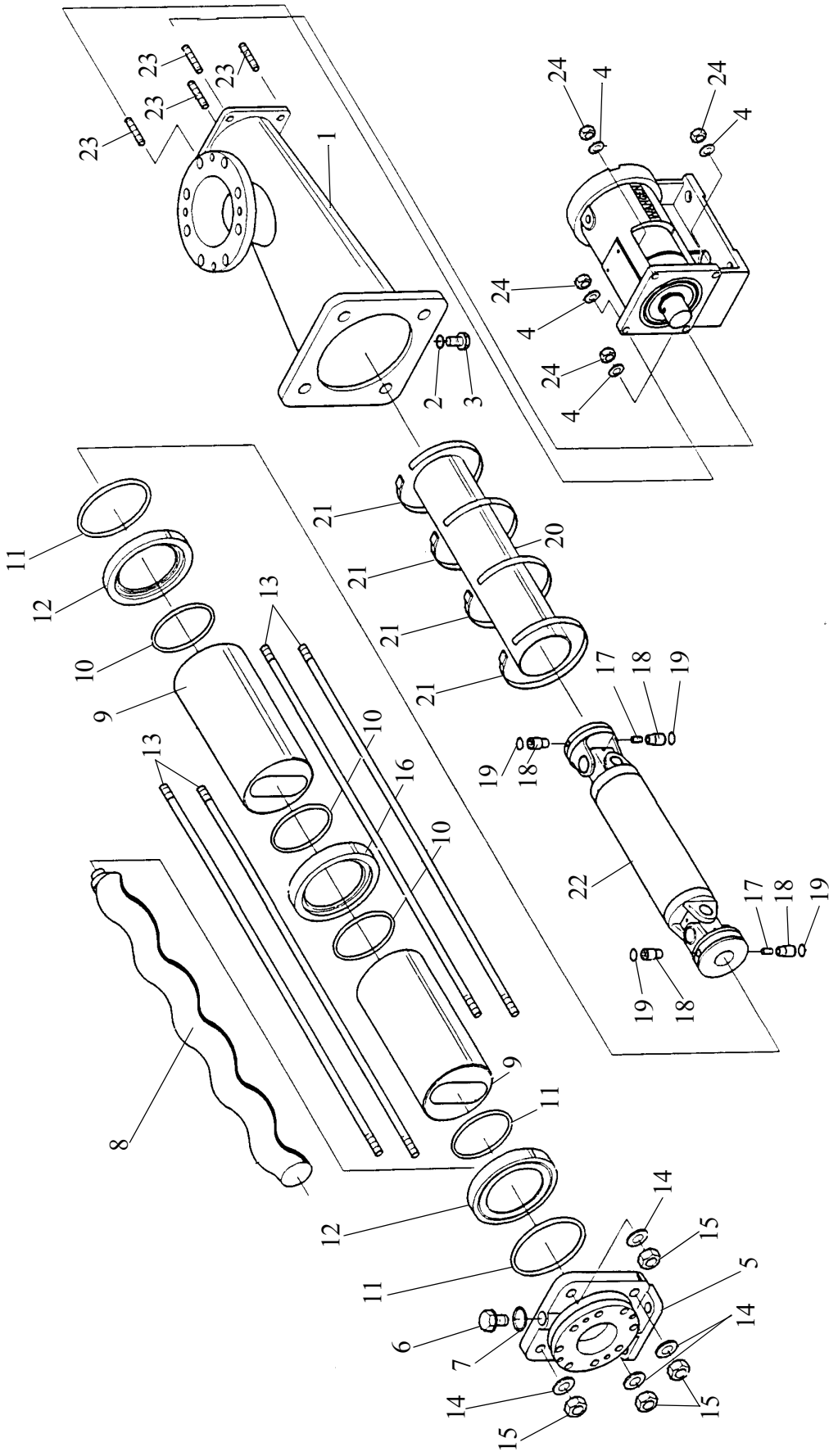
The required details can be found in the pump type plate. In addition, the pump number is stamped into the top of the bearing pedestal near its transition to the suction casing.

Funki is not liable in any way for any incorrect deliveries due to the details provided being incorrect.



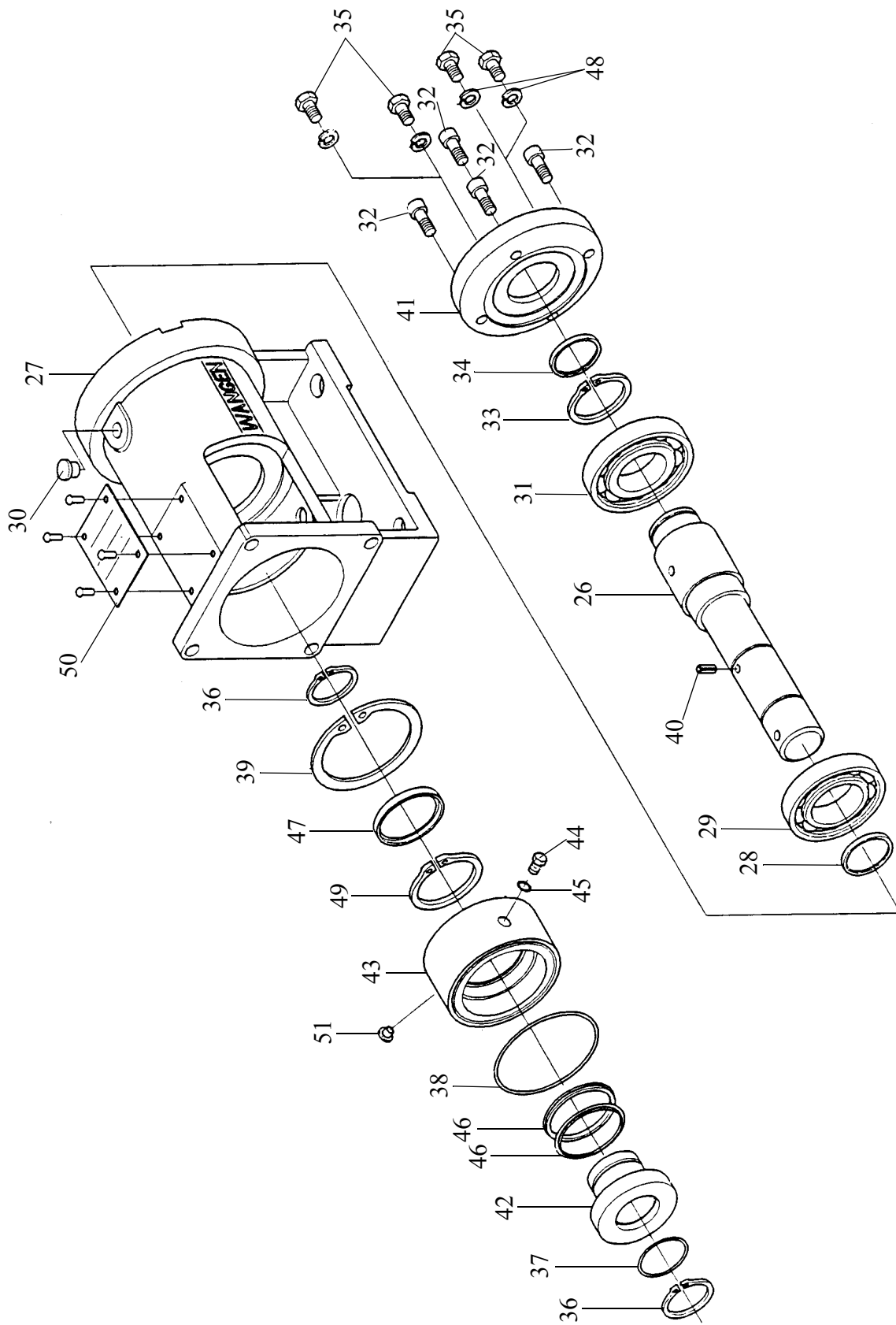
8.20 Part list for KL-S

Pos. No.	Description
1	Suction housing
2	Joint ring, plug screw
3	Plug screw
4	Washer
5	Suction nozzle
6	Plug screw
7	Joint ring
8	Rotor
9	Stator
10	O-ring
11	O-ring
12	Spacer ring
13	Tie rod
14	Washer
15	Hexagon nut
16	Intermedia ring
17	Set screw
18	Stud
19	O-ring
20	Sleeve
21	Band clamp
22	Cardan joint
23	Stud
24	Hexagon nut
25	Bearing support, complete



8.21 Part list for drive shaft KL

Pos. No.	Description
26	Drive shaft
27	Bearing support
28	Packing ring, pump side
29	Bearing
30	Plug
31	Bearing
32	Socket head cap screw
33	Circlip
34	Packing ring, drive flange
35	Screw
36	Circlip
37	O-ring
38	O-ring
39	Circlip
40	Dowel pin
41	Drive flange
42	Drive recording, face seal
43	Housing recording, face seal
44	Breather plug with cap
45	Joint ring, breather plug
46	Face seal
47	Packing ring
48	Spring ring
49	Circlip
50	Type plate
51	Oil level glass



8.22 Log file

Date	Init.	Actions



Date	Init.	Actions

9 Disposal

Housing components, rotors, shaft sealing rings are to be disposed of as scrap steel (VA-Schrott)

Stators, O rings, and parts of the mechanical seal made of carbon/ceramics are to be disposed of as residual waste materials.

Oil from joints and seals is to be collected and to be disposed of according to local regulations.



10 Wiring diagrams



