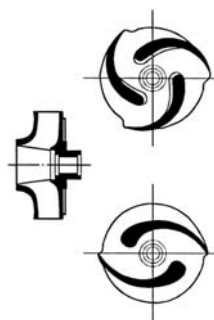




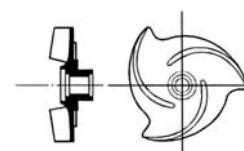
Pumps for sewage, effluents and mistures

LINE : **Mega**

TYPE : **Submersible / Vertical**



Impeller type K



Impeller type O

1. Application

The KSB Megaflow V centrifugal pump is recommended for waste water, raw sewage, chemical effluents, activated and digested sludges for the following applications: Municipal and industrial waste-water treatment, drainage, pulp and paper, food processing, sugar and alcohol, mining and manufacturing, civil construction.

2. Design

Vertical, unicellular of single suction, mounted in humid well and relied on the floor, above of the maximum liquid level. The available hydraulics and impeller types allow proper selection for the handled liquid and required application.

3. Designation

	KSB	Megaflow V	K	50 - 160
Trade mark	_____	_____	_____	_____
Mode / Type	_____	_____	_____	_____
Impeller type	_____	_____	_____	_____
Discharge nozzle diameter (mm)	_____	_____	_____	_____
Nominal impeller diameter (mm)	_____	_____	_____	_____

4. Operating data

Sizes	- DN 50 up to 300 (2"to 12")
Flow	- up to 2000 m³/h (8800 gpm)
Head	- up to 60 m (195 ft)
Temperature	- up to 90 °C (194 °F)
Speed	- up to 1750 rpm

5. Introduction

KSB has supplied you with equipment that has been designed and manufactured with the most advanced technology. Due to its simple and tough construction it will not need much maintenance. With the aim of providing our clients with a satisfactory, trouble free operation, we recommend to install and care our equipment according to the instructions contained in this service manual. This manual has been prepared to inform the end user about the construction and operation of our pumps, describing the adequate procedures for handling and maintenance.

We recommend that this manual should be handled by the maintenance supervision.

This equipment should be used in the operational conditions for which it was selected as to: flow rate, total head, speed, voltage, frequency, and temperature of pumped liquid.

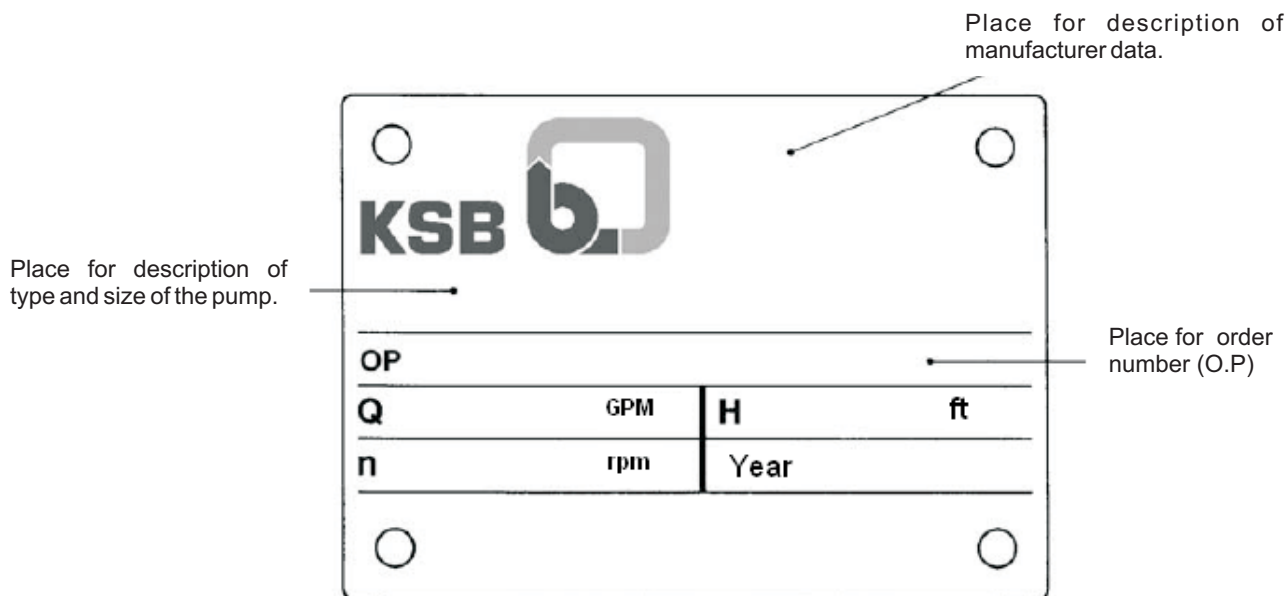


Fig.01 - Nameplate

For requests about the product, or when ordering spare parts, please indicate the type of pump and the production order n° (serial n°). This information can be obtained from the nameplate on the actual pump. If the nameplate is not available, the PO n° is engraved in low relief on the suction flange, and on the discharge flange you may find the impeller diameter.

ATTENTION: This manual contains very important instructions and recommendations. **Its careful reading is an obligation** before installation, electrical connections, first starting and maintenance.

Contents

Designation	Chapter	Designation	Chapter
Application	1	Accessories	11
Design	2	Operation	12
Designation	3	Maintenance	13
Operating data	4	Operational abnormalities and probable causes	14
Introduction	5	Sectional drawing / Parts list	15
Technical data	6	Parts list and materials	16
Constructive details	7	Interchangeability of spare parts	17
Transportation	8	Recommended spare parts	18
Preservation / Storage	9		
Installation	10		

6. Technical data

Size		UNIT	50-160	50-200	65-200	80-250	65-315	100-250	100-315	80-400	100-400	150-315	200-315	125-500	150-500	200-400	250-500	300-500	250-500 (2)	300-500 (2)	250-500 (2)	300-500 (2)	
Technical data																							
Bearing housing		--	V 30	V 40R		V 50			V 60				V 06			V 08							
Impeller type	K	--	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	O	--	-	X	-	X	X	X	-	X	X	X	-	-	X	X	-	-	-	-	-	-	
Maximum allowed solid diameter	K	mm	34	30	30	50	35	54	47	40	45	85	80	50	60	80	75	95	75	95	75	95	
	O		-	25	-	35	18	44	-	22	30	60	-	-	55	80	-	-	-	-	-	-	
Rotating element with water (only pump bowl)		Kg.m²	0,031	0,064	0,095	0,215	0,418	0,270	0,598	1,100	1,230	0,720	0,867	2,620	2,850	2,060	4,750	5,900	4,750	5,900	4,750	5,900	
Hydrostatic test pressure (1)		bar	10																				
Max. discharge pressure		bar	10																				
Max. temperature		°C	90																				
Axial thrust balancing		--	Back vanes																				
Min. / Max. Flow		--	0,1 Qopt / see characteristics curve																				
Rotation direction		--	Clockwise, seen from the drive side																				
Discharge nozzle		--	ANSI B 16.5 150# RF																				
Bearing housing data	Column	--	V 30	V 40R		V 50			V 60				V 06			V 08		V 10		V 12			
	Bearing		6310 C3		6314 C3					2x 7313 BUA			2x 7319 BUA										
Max. Permissible P/n	SAE 1045	CV/rpm	0,0182	0,0469		0,1053			0,1347				0,2040			0,6530							
	AISI 316		0,0109	0,0311		0,0698			0,0893				0,1122			0,3591							
Axial thrust lubrication			Grease																				
(4) Max. speed as per radial bearings lubrication	Pumped liquid or (3) clean water from external source	rpm	1750	1750		1450			1450				1450			725	580	960		1450			
	Grease. One connection per bearing		1750	1750		1450			1160				960			725	580	725		725			
	Grease. Two connections per bearing. (Max. 3 bearings above sump level)		--	--		--			1450				1160			725	580	725		725			
Radial (column) bearings lubrication	Water flow and pressure per bearing	l / min.	1,5											2,0									
		bar	0,5																				
	Grease qty per bearing	g / h	4,0																				

Table 01

Notes:

- (1) Parts under hydrostatic test:
 - volute casing
 - discharge column
- (2) Under consult.
- (3) Lubrication liquid with 20 p.p.m of impurities and 10µm of particle size.
- (4) Valid for max. impeller diameter at following conditions:

$$\delta = 1,0 \text{ kg / dm}^3 \text{ e } 0,3 \text{ Qopt} \leq Q \leq 1 \text{ Qopt}$$

7. Constructive details

7.1 Casing

Vertical one piece casted volute casing, radial splitted and with replaceable wear plate on suction side.

7.2 Impeller

Two types of impellers are available: K and O.

7.2.1 Impeller type O:

Multiple vane open impeller. Recommended for liquids containing air, as for example, sugar plants residues without cane trash, cellulose and paper pulp with a mass concentration up to 6%.

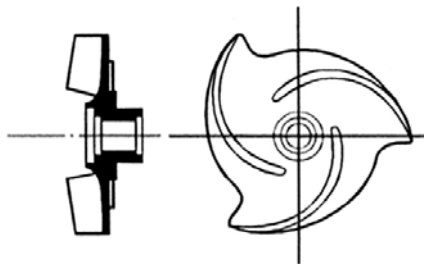


Fig.2
Impeller type O

7.2.2 Impeller type K:

Closed with two or three channels, they are specially recommended for pumping dirty or muddy liquids with no gases and without the tendency to form long fiber plaits. Also adequate for paper and cellulose pulp with a mass concentration up to 3%.

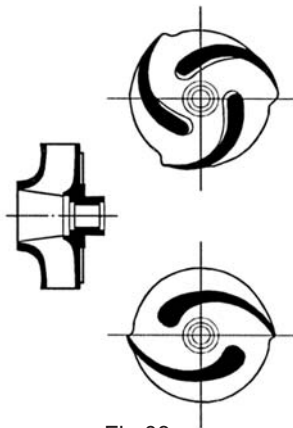


Fig.03
Impeller type K

Note: Impellers are not directly interchangeable, due to their different wear plates.

7.3 Shaft

Depending on the column length it could be necessary to use: pump shaft, intermediate shaft and driver shaft. They are coupled by thread couplings, except sizes 250-500 and 300-500 that use splitted couplings.

7.4 Radial bearings

Bushing type. Radial with shaft protecting sleeve.

7.5 Bearing lubrication

Possible executions:

a) With the pumped liquid:

When the medium has lubricating properties with maximum of 20 p.p.m. Of impurities and particles smaller than 10µm. Each bearing receives a direct injection through a line connected to the discharge flange.

b) Clean water from external source:

Water injected to all bearings through an external connection located above the sole plate.

c) Grease:

A grease pump drive by electric motor and fixed to the sole plate feeds grease to each bearing through a manifold.

8. Transportation

The transportation of the motor-pump assembly or only of the pump, should be performed with skill and good sense, observing safety regulations. The electric motor lifting lug must be used only to lift the motor and never to lift the motor-pump assembly.

a) Assembled unity (column up to 3 meters):

The assembled mounted unit should be transported and stored in the horizontal position.

The cables for hois up should only be placed in the volute casing of the pump and drive lantern. To introduce the pump in the well, to place the hoist up cables in the screw-up of the support plate and to lift the group until the vertical position.

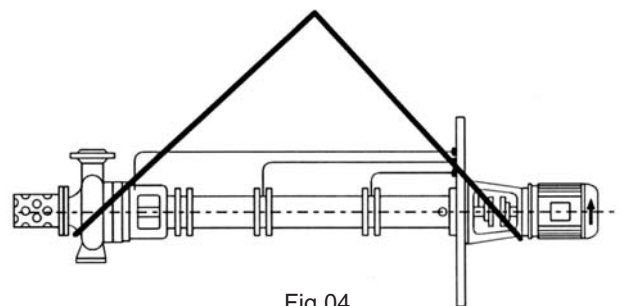


Fig.04
Assembled unity

b) Separated parts (column above 3 meters):

(Pump assembly, suspension pipe, drive lantern, soleplate, shaft, bearings, elevation-pipe).

The pump is transported disassembled partially, the separate parts should be transported like this and stored in the horizontal position, unless the drive lantern and baseplate.

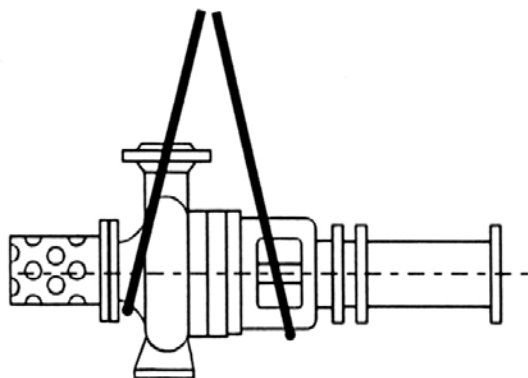


Fig. 05
Separated parts

Note: Take care that shafts do not bend and their threads be not damaged during the transport.

9. Preservation / Storage

Following procedures of preservation and storage are made by KSB and its Dealer Network and protect the equipment up to 6 months in an indoor environment. It is responsibility of the client to continue with this procedure after receiving the pump.

When the pump is not subjected to a performance test after its sale, the areas in contact with the pumped liquid which are not painted as: stuffing box housing, wear rings, flange sealing areas, etc, receive an application of RUSTILO DW-301 by brush.

When the pump is equipped with packing and is subjected to a performance test, it is drained after test without disassembly it, and then filled with RUSTILO application, after with the pump is drained.

Shaft exposed areas as: shaft end, area between the gland cover and the bearing bracket receive a brush application of TECTYL 506.

Bearings installed on brackets of oil lubricated pumps receive an application of a sprayed layer of MOBILARMA 524.

9.1 Additional procedure of service and storage of idle pumps

- Pumps stored for periods exceeding one year should be serviced every 12 months.
They should be disassembled, cleaned and the whole process described above should be repeated.
- All connections like: inlets for liquids from external sources, priming, draining, flushing and cooling should be closed.
- Suction and discharge flanges are covered with adhesive seals to prevent the entry of strange bodies.
- Assembled pumps waiting to be installed or to start operation should be turned manually every 15 days. If it is difficult to move them by hand, use a box spanner, protecting the shaft surface at the point of application.

- Wash the surface with gasoline or kerosene before applying the protecting liquids.

Characteristics of the protecting liquids:

Protecting liquid	Coating thickness(μm)	Drying time	Removal	Manufacture
TECTYL 506	From 80 to 100	1/2 up to 1 hour	Gasoline, benzine, diesel oil	BRASCOL
RUSTILO DW 301	From 6 to 10	1 up to 2 hour	Gasoline benzine	CASTROL
MOBILARMA 524	6	Does not Dry	Not necessary	MOBIL OIL

Table 02 - Protecting Liquids

10. Installation

Pumps should be installed, leveled and aligned by trained personnel. When this service is done incorrectly it can cause operational troubles, premature wear and damages beyond repair.

10.1 Soleplate grouting

Place the foundation rails in the slots in the foundation block according to the dimensions of the foundation plan.

Between the soleplate and foundation rails should be put shims, all fixed by grouting.

After the complete cure of the grout place the soleplate on the foundation block and fasten(See fig. 06).

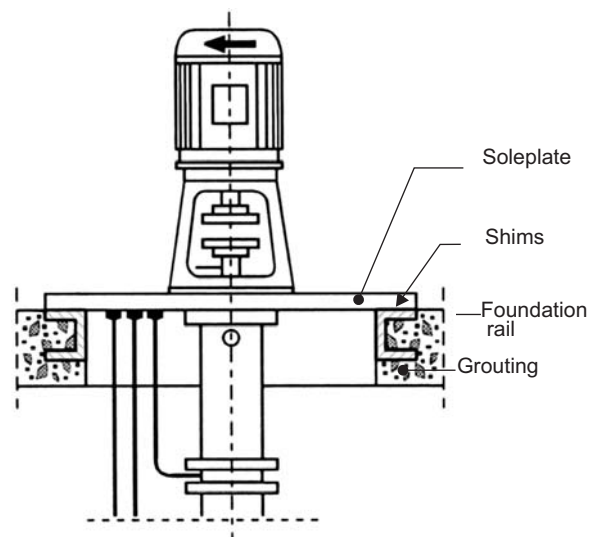


Fig. 06
Soleplate grouting

10.2 Soleplate leveling

Check if the soleplate is equally resting on its foundation rails then place and tighten uniformly the screws. Using a precision level, check the leveling of the base longitudinally and transversally.

If the base is unlevelled, loosen the screws and insert shims between the foundation rails and the soleplate in order to correct the leveling. (See fig.07).

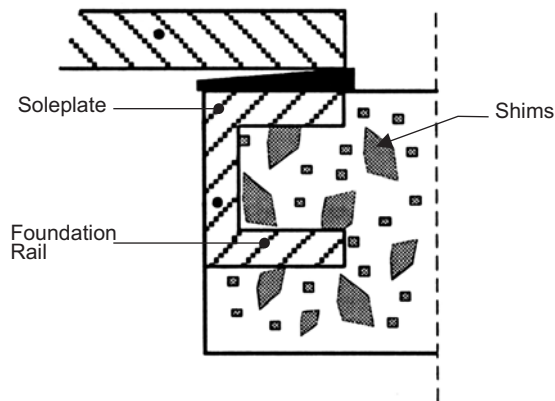


Fig. 07
Soleplate leveling

10.3 Coupling alignment

The useful life of the turning assembly and its operation free of irregular vibrations will rely on the perfect alignment between the pump and the driver.

The alignment performed at the factory must be remade because during transportation and handling, the motor-pump assembly is subjected to deformations which affect the initial alignment.

After the complete set of the grout, perform the alignment if possible, with the suction and discharge pipe lines already connected.

This alignment should be performed with the help of a dial indicator for the control of the radial and axial displacements. Fix the bottom of the instrument to the periphery of one the coupling halves, adjust the position of the feeler perpendicular to the periphery of the other half of the coupling. Move the dial to zero and move manually coupling half in which the instrument bottom is fixed, making the dial indicator to complete a 360° turn. (See fig.08).

The same procedure should be performed to control the axial displacement. (See fig.09).

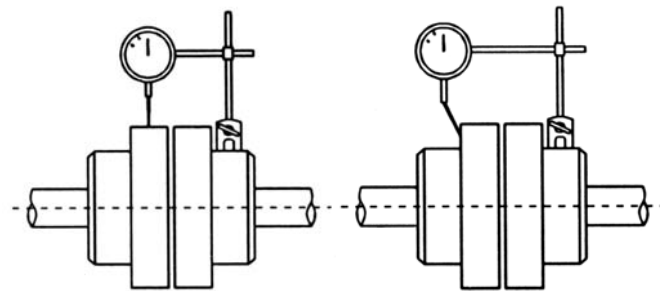


Fig.08
Radial control

Fig. 09
Axial control

To correct the alignment, loosen the driver bolts and replace driver over the side face or insert it to adjust height as required.

Axial and radial alignments should remain within the tolerance of 0,1 mm (0.004 inch) with the pump and driver set screws tighten securely.

If there is no dial indicator available, use a straight edge placed across the two rims of the sleeve coupling. To control axially use a feeler gauge. See fig. 10. Observe the sleeve coupling hub clearance specified by the manufacturer.

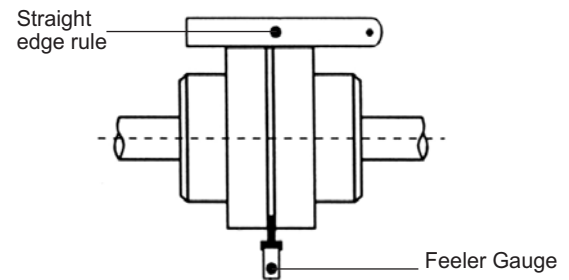


Fig. 10
Alignment with a straight edge and a feeler gauge

10.4 Suction pipe line - Recommendations

To install the suction piping follow below instructions:

- Check the minimum depth between the bottom of the well and the suction nozzle or to the suction strainer according to the installation (see foundation plan drawing).
- Check the minimum level of liquid above the suction to avoid dry operation, cavitation or vortex.
- In case of often dynamic level variation, foresee the installation of a protection system against operation below the minimum level.
- Products with solids in suspension or dirt in excess, foresee the placement of the suction strainer in the volute casing.

10.5 Discharge pipe line - Recommendation

To install the discharge pipe line follow below instructions:

- In case of long pipelines if the originated overpressures by returning liquid, exceed the limits specified for the pipe line and/or the pump water hammer control devices should be installed on the discharge pipe line.
- On places where it is necessary to bleed the air in the pipe line, vent valves should be installed.
- Tie mounting joints should be installed to absorb the system reaction forces originated from the applied loads.
- Safety valves, pressure relief devices and other operational valves should be installed if necessary for suitable operation of the pipe line.

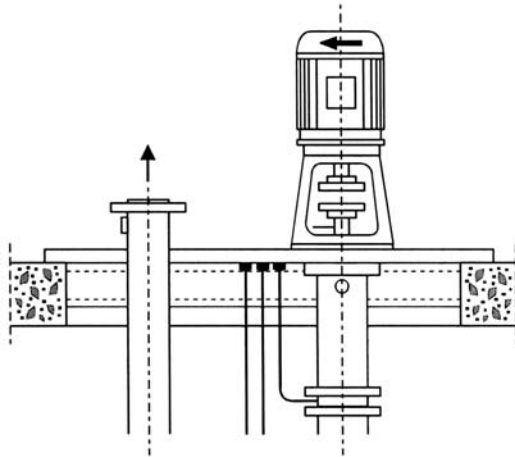


Fig. 11
Discharge nozzle

10.6 Auxiliary piping and connections

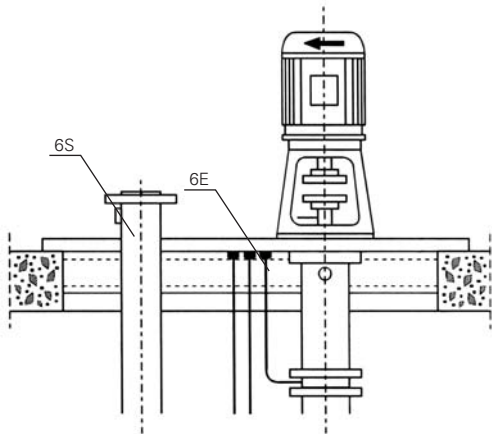


Fig. 12
Auxiliary piping and connections

Conection	Designation	Dimension - NPT Thread			
		V 30	V 40	V 50	V 60
6 E / S	Lubrication Inlet / outlet	1/4"	1/4"	3/8"	3/8"

Table 03 - Auxiliary connection

Note: Inlet / outlet piping of external source liquid should be provided with a valve and sight glass to control the flow and observe the liquid condition.

11. Accessories

11.1 Coupling sleeve

KSB Standard or other manufacturer.

11.2 Foundation rails

Soleplate is supported by two foundation rails fixed by grouting.

11.3 Coupling guard

For safety operation coupling guard should be installed. They are made according to KSB standard in steel or brass being fastened on drive lantern. It should be observed that coupling guard doesn't touch rotating parts.

12. Operation

12.1 First starting procedure

The following items must be provided for pump first start up:

- Fix the soleplate firmly.
- Fix the discharge pipe line.
- Connect and run auxiliary pipe lines and connections (if any).
- Do the electric connections, being certified that all the systems of protection of the motor is adjusted properly and working.
- Check the bearings for cleanliness and damp environment. Fill the bearing bracket with grease of quality.
- Check the driver rotation direction without coupling, the pump to prevent dry operation.
- Check by hand that the rotor assembly move freely.
- Check that the coupling alignment was performed according to Chapter 10.3.
- Install the coupling guard.

12.2 Immediate steps after start-up

Once the pump has started and is already in operation follow these instructions:

- Set the pump to its operation point (pressure and flow rate) opening slowly the discharge valve, once the driver has reached its nominal speed.
- Check the electrical motor current consumption (amperage) and the network voltage.
- Check that the pump is operating free of vibrations and abnormal noises. Vibrations evaluation criterion according to Hydraulic Institute.
- Check the temperature, it may reach 50° C above ambient temperature, however, the sum of the bearing temperature plus the ambient temperature should not exceed 90° C.

The above mentioned items should be controlled every 15 minutes during the first two hours of operation. If everything is normal, controls should be done every hour during the first 5 to 8 initial hours of operation.

Note:

1. If during this period any abnormalities were found consult chapter 14- Operational Abnormalities and Troubleshooting.

12.3 Operational supervision

Depending on the availability of personnel and the importance of the pump, we recommend the following supervision. In case of any abnormality, the maintenance supervisor must be called immediately.

12.3.1 Weekly supervision

Check:

- a) Operation point of the pump.
- b) Electric motor current consumption and network voltage.
- c) Vibrations and abnormal noises.

12.3.2 Monthly supervision

Check:

- a) Grease change interval. Consult chapter 13.1.
- b) Bearing temperature.

12.3.3 Semestral supervision

Check:

- a) Fixing bolts of soleplate and motor.
- b) Alignment of the motor-pump.
- c) Coupling lubrication (if any).

12.3.4 Annual supervision

Disassemble the pump for maintenance. After cleaning, inspect (very carefully) the condition of bearings, radial shaft seal rings, gaskets, O-Rings, impeller, shafts internal areas of the volute casing (check also thickness), wear areas and coupling.

Note: In facilities with good operation condition and not aggressive pumped liquid supervision can be made every 2 years.

12.4 Shutdown procedure

For shutdown follow below instructions:

- a) Close the discharge valve.
- b) Switch off the driver and observe the pump set gradually and smooth.
- c) Close the auxiliary piping (if there is no restriction).

13. Maintenance

13.1 Thrust bearing maintenance

Purpose of this maintenance is to extend as much as possible the useful life of the bearing system including a general inspection of the bearing, cleanliness, lubrication and careful analysis.

Bearings should be lubricated to avoid metallic contact between the rolling parts and also to protect themselves against corrosion and wear. Lubricants properties are lost due to aging and service, besides all the lubricants are contaminated in service, therefore they should be completed and changed on regular intervals (see table 04).

	Bearings			
	6310	6412	7313	7319
Qty. of Grease	25 a 26 g	26 a 27 g	23 a 24 g	45 g
Speed	Intervals lubrication			
3.500 rpm	5.000 h	--	--	--
1.750 rpm	8.000 h	--	--	--
1.450 rpm	--	9.000 h	7.000 h	600 h
1.160 rpm	--	14.000 h	1.300 h	--
960 rpm	--	--	1.500 h	--
725 rpm	--	--	--	1.700 h
580 rpm	--	--	--	2.000 h

Table 04 - Intervals lubrication

Valid for temperature up to 70°C. For temperature increase of 15°C, reduce the intervals to half of them.

Reaching the lubrication interval pump should be shutted down and correct grease should be applied in the indicated quantity. Deficient lubrication as much as excessive one results in prejudicial effects. At maximum each 2 years the bearings should be washed and all the lubricant replaced.

We recommend the use of grease of lithium basis, which should never be mixed with other greases of sodium or calcium basis.

Manufacturer	Grease
ATLANTIC	LITHOLINE 2
CASTROL	LM Grease
ESSO	BEACON 2
IPIRANGA	ISAFLEX 2
MOBIL	MOBIL Grease MP
PETROBRÁS	LUBRÁS GM A2
SHELL	SHELL ALVANIA R2
TEXACO	MULTIFAK 2

Table 05
Grease specification

13.2 Guide bearings maintenance

Guide bearings have the purpose of assuring that the line shaft doesn't suffer deflection that can influence the operation of the pump. They consist of two parts: Bearing Spider (383) and Bearing Bush (545.1). They can be lubricated by the own pumped liquid, clean water or grease from external source.

13.2.1 Bearings lubricated by the own pumped liquid

Pumped liquid should have lubricating characteristics, it cannot be aggressive and neither abrasiv solids larger than 100µm and concentration of 20 ppm maximum, it tied up the connections (720) discharge.

It is indispensable that all bearings taken a bath with pumped liquid before starting.

In case of existing bearings above the level of water start pump every 12 hours or make manual lubrication, trickling the pumped liquid by the shaft before starting the pump.

13.2.2 Bearings lubricated by liquid from external source

Liquid from external source should be connected directly to the connections (720) to lubricate the Bearing Spider (383) and Bearing Bush (545.1). Liquid should be compatible with the pumped liquid, therefore they can mix in small quantity. Characteristics defined on the item 13.2.1 should be observed.

13.2.3 Bearings lubricated by grease

A system with a reservoir and pump should be foreseen in the soleplate (893) to provide grease for all points with the necessary number of pistons acc. to quantity of lubrication points.

Quantity of grease is 4 g/h for bearing. In case of prolonged stop (upper one week) don't run the pump without manual lubrication. In any way the grease pump should run before the pump to permit a bearings pre-lubrication.

13.3 Maintenance of bearings bushes

When the clearances between bearing bush (545.1) and shaft protective sleeve (529) or between bearing bush (545.2) and shaft protective sleeve (524) are bigger than values defined on table 06 these pieces should be replaced.

Sleeves can be machined to correct superficial defects, since that clearances don't overcome below values.

Column	Minimum clearance (mm)	Maximum clearance (mm)
V 30	0,155	0,219
V 40 / V 40 R	0,155	0,219
V 50	0,170	0,274
V 60	0,180	0,284
V 06	0,150	0,243
V 08	0,243	0,333

Table 06
Original diameter clearances

13.4 Wear areas maintenance

When the pump shows wear between the casing wear plate and the external diameter of the suction side of the impeller, being casing and impeller in good conditions the wear plate must be replaced.

KSB and Dealers Network supply wear plates for repair or as spare parts for the "KSB Megaflow V" pumps.

These wear plates are supplied with their external fitting diameter within the proper tolerance and their internal diameter with 2 mm of allowance.

13.4.1 When to replace

Wear rings replacement should take place when the clearance between the wear plate and the impeller has reached 3 times the maximum clearance indicate on table 07 or when the pump presents efficiency drop.

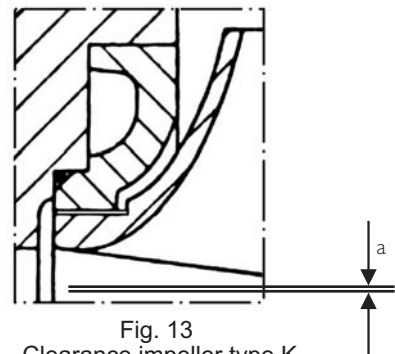


Fig. 13
Clearance impeller type K

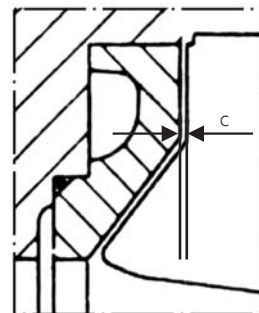


Fig. 14
Clearance impeller type O

Pump Size	Clearance (mm)		
	Impeller K (a)		Impeller O (c)
	Cast iron	Cast steel	
50-160 / 50-200 / 65-200 / 65-315 / 80-250 / 80-400 / 100-250 / 100-315 / 100-400 / 125-500 / 150-315	0,2 + 0,05	0,3 + 0,05	0,5
150-500 / 200-315 / 200-400 / 250-500	0,3 + 0,05	0,35 + 0,05	
300-500	0,4 + 0,05	0,45 + 0,05	

Table 07

13.4.2 Replacement of the casing wear plate

Centralize the impeller through the internal hole (use a mandrel) and machine the worn out area of the impeller (suction side wear plate diameter) until you obtain an uniform surface (maximum machining allowance: 2 mm on diameter). Measure the diameter after machining.

Machine the internal diameter of the wear plate according to the measurement of the impeller and observing the clearances defined on table 08. Remove the damaged plate from the casing and fit the spare wear plate with gasket (400.7) and o'ring (412) using bolts (901.9).

Note: Maximum radial and axial run-out should be 0,05 mm.

13.5 Disassembly instructions

Numbers indicated in brackets after each part name refer to the parts list and sectional drawing on chapter 15.

Due to its modern design, KSB Megaflow V pump offers maintenance advantages.

13.5.1 Sequence for the disassembly

1. Close the discharge valve.
2. Disconnect the auxiliary pipings (if any).
3. Remove the coupling guard .
4. Disconnect the coupling and displace the driver. Remove the coupling from the pump shaft with a puller, loosening first the socket head cap screw that fixes the coupling hub. Remove the key (940.1).
5. Remove the adjusting plate (893) if any, loosening it from the lantern drive (341).
6. Remove the bolts (901.1) disconnecting the soleplate from the foundation rail (89-8).
7. Remove the pump of the suction tank with suspension bolts (900) and rest it on the horizontal position.
8. Remove the screws (914.1) of the adjust nut (924) .
9. Remove the bolts (901.4) that fix the bearing cover (360) and remove it.
10. Remove the centering sleeve (526) with the radial ball bearing (321), using a puller. Remove the key (940.2).
11. Remove the drive lantern (341) from the soleplate (893), loose the bolts (901.3).
12. Remove the pipes (700), disconnect them off connections (720.1 and 720.2).
13. Remove the clamp (572) with the nuts (920.2) washers (554.2) and screws (901.2).
14. Before removing suspension pipe (713.1) from the soleplate (893), put the pump in a support. Remove the nuts (920.3) and loose the sole plate with a loffin Machine.

15. Loose the suspension pipe (713.1) with the bearing spider (383).
16. Disassemble the drive shaft (213) from the intermediate shaft (212) and pump shaft (211) that are coupled with the threaded couplings (852).
17. Remove the bearing sleeves from the shafts (529) radially fixed by screws (914.2).
18. Loose the other suspension pipes (711.2), remove the gaskets (400.1 and 400.6) and loose the discharge curve (144), if any.
19. Put the jackscrews (901.5) and remove the intermediate lantern (146).
20. Remove suction reducer (153) and gasket (400.6).
21. Take the casing (102) off the casing cover (163) and the pump shaft (211) together with the impeller (230).
22. Take off the gasket (400.3), loose the impeller nut (922) and the impeller (230) together the gasket (400.5).
23. Remove the key (940.3), gasket (400.4) and shaft sleeve (524).
24. Loose the bolts (901.9) and remove the casing (102) and wear plate (135), gasket (400.7) and o'ring (412).
25. If necessary to dismantle the bearing bush (545.2) from casing cover (163), loose the bolts (914.3) and pull it out using a puller. Bushes (545.1) of the bearing spider (383) can be taken out by a press.

Note: In case of column longer than 3 meters disassemble the pump in the own tank.

13.6. Assembly instructions

All pieces should be clean and deburred before assembling.

13.6.1 Assembly sequence

- 01 Follow the inverse sequence:
- Assemble the shaft protective sleeve (524), gasket (400.4), key (940.3), impeller (230), gasket (400.5) and impeller nut (922) on the pump shaft (211).

Notes:

- a) Replace every gaskets (400) and o'ring (412) during assembly.
- b) Impeller nut (922) has a "heli-coil" fixation system. KSB recommends replacement after 3 or 4 times of disassembly.

02. Assemble the wear plate (135) with the gasket (400.7) and o-ring (412) and fix the suction reducer (153) with the gasket (400.6) onto the volute casing (102).
03. Introduce the pump shaft set (211) into the volute casing.
04. Place the casing cover (163) and intermediate lantern (146).
05. Assemble successively bearing sleeves (529), the bearing spiders (383), suspension pipes (713.1, 713.2 and 713.3), the intermediate shafts (212) and drive shaft (213).

Note: Shafts coupled by the threaded couplings (852) should be assembled "top against top" in the center of the length of the coupling.

06. In the discharge assemble the discharge curve (144), if any with gasket (400.6) and suspension pipes (711) and gaskets (400.1).
07. Fix the sole plate in the suspension pipe (711.1) with the clamp (572) and the suspension pipe (713.1) plus bolts (90) and nuts (920.3).
08. Connect the pipe (700) on the connections (720.1 and 720.2).
09. Fix the lantern drive (341) on the sole plate (893).
10. Assemble the key (940.2), the centering sleeve (526) with the radial ball bearing (321) on the shaft.
11. Close the guide bearing with the bearing cover (360).

Note: Check the lip seal (421) condition and replace it, if necessary

12. Before coupling the driver adjust the axial clearance (see item 13.6.2).
13. Put the key (940.1) and half coupling (840). Fix it with screw to the shaft.
14. Lift the pump using the eyebolts (900) and place it on the foundation rail (89-8), fastening it with bolts (901.1).
15. Couple the motor (800), fastening it in lantern drive (592).

Note: In case of pump with columns longer than 3 meters, assemble it in the tank, following the sequence described.

13.6.2 Adjust of the axial clearance

01. Axial clearance among the impeller (230) and the casing cover (163) should be adjusted using the adjustment nut (924). Tight the nut (924) until the impeller touches the casing cover (see fig. 15).

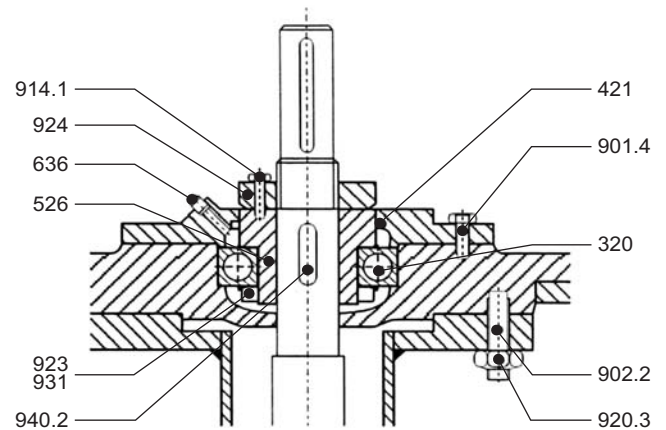


Fig. 15
Clearance and axial adjustment

02. With a depth gauge and using as reference surfaces of the shaft end and the adjustment nut, go down the shaft 1,5 mm.
03. Rotate the nut just that its fixation combines with the closest hole of the centering sleeve (526) and fasten it with the bolts (914.1).

14. Operational abnormalities and Probable causes

Abnormalities	Probable causes
- Insufficient rate of flow Driver overload	01 - 02 - 03 - 04 - 05 - 06 - 08 - 09 10 - 11 - 12 - 20
- Pump final pressure is too high	12
- Bearings overheating	15 - 16 - 17 - 18 - 19 - 22
- Pump leaking	13
- Irregular operation of the pump, abnormal noises	03 - 06 - 09 - 12 - 14 - 15 - 16 - 18 - 21 - 22 - 23 - 24

Table 08
Operational abnormalities and causes

- | | |
|---|---|
| <p>01. Pump is discharging at an excessive pressure.
● Adjust the operational point of the pump.</p> <p>02. Total head (counter pressure) higher than the pump's nominal head.
● Install an impeller with larger diameter.
● Increase driver speed (if turbine or internal combustion engine)</p> <p>03. Pump and/or suction pipe are not totally full of liquid or not air tight.
● Fill the pump and suction pipe with liquid to be pumped.</p> <p>04. Suction and/or impeller clogged.
● Remove the obstructions at suction and/or impeller.</p> <p>05. Air pockets in the pipe .
● Modify piping lay-out.
● If necessary, install a venting valve.</p> <p>06. NPSH available too low (negative suction installation).
● Check if its necessary to correct the level of the liquid being pumped.
● Install the pump at a lower level referred to the suction tank.</p> <p>07. Wrong rotation direction.
● Change one of the electric motor phase cables.</p> <p>08. Slow speed.
● Increase speed.</p> <p>09. Wear of the inner parts the pump.
● Replace worn parts.</p> <p>10. Total head (counterpressure) lower than specified when the pump was purchased.
● Adjust operational points.
● If the overloads continue, trim the impeller.</p> <p>11. Density or viscosity of the being liquid pumped is higher than the one specified when the pump was purchased.</p> <p>12. High speed.
● Reduce speed.</p> <p>13. Defective gasket between the volute casing and the discharge cover.
● Replace it.</p> | <p>14. Pump operation excessively noisy.
● Correct the suction conditions
● Increase pressure at the pump suction.</p> <p>15. The motor-pump assembly is misaligned.
● Align the motor-pump.</p> <p>16. The parts of the pump have radial and axial warp, out of specification. Suction and discharge pipe lines exerting mechanical strengths.
● Adjust the axial and radial warping of those parts or replace them.
● Eliminate those stresses, fixing properly the suction and discharge pipe lines or install flexible joints, if necessary.</p> <p>17. Excessive axial thrust.
● Clear out the balance holes on the impeller
● Replace the wear rings (impeller X casing and impeller X discharge cover).</p> <p>18. Bearing grease excess, lacking or inadequate.
● Reduce, refill or use the adequate grease, according specifications</p> <p>19. Incorrect clearance at the coupling sleeve
● Adjust to the correct clearance.</p> <p>20. The electric motor is working with two phases.
● Replace the defective fuse.
● Check electrical connections.</p> <p>21. Unbalanced impeller.
● Clean and balance the impeller.</p> <p>22. Defective bearings.
● Replace them.</p> <p>23. Insufficient rate flow
● Increase minimum flow.</p> <p>24. Friction of the stationary and turning parts.
● Check, adjust or replace the parts.</p> |
|---|---|

15. Sectional drawing / Parts list

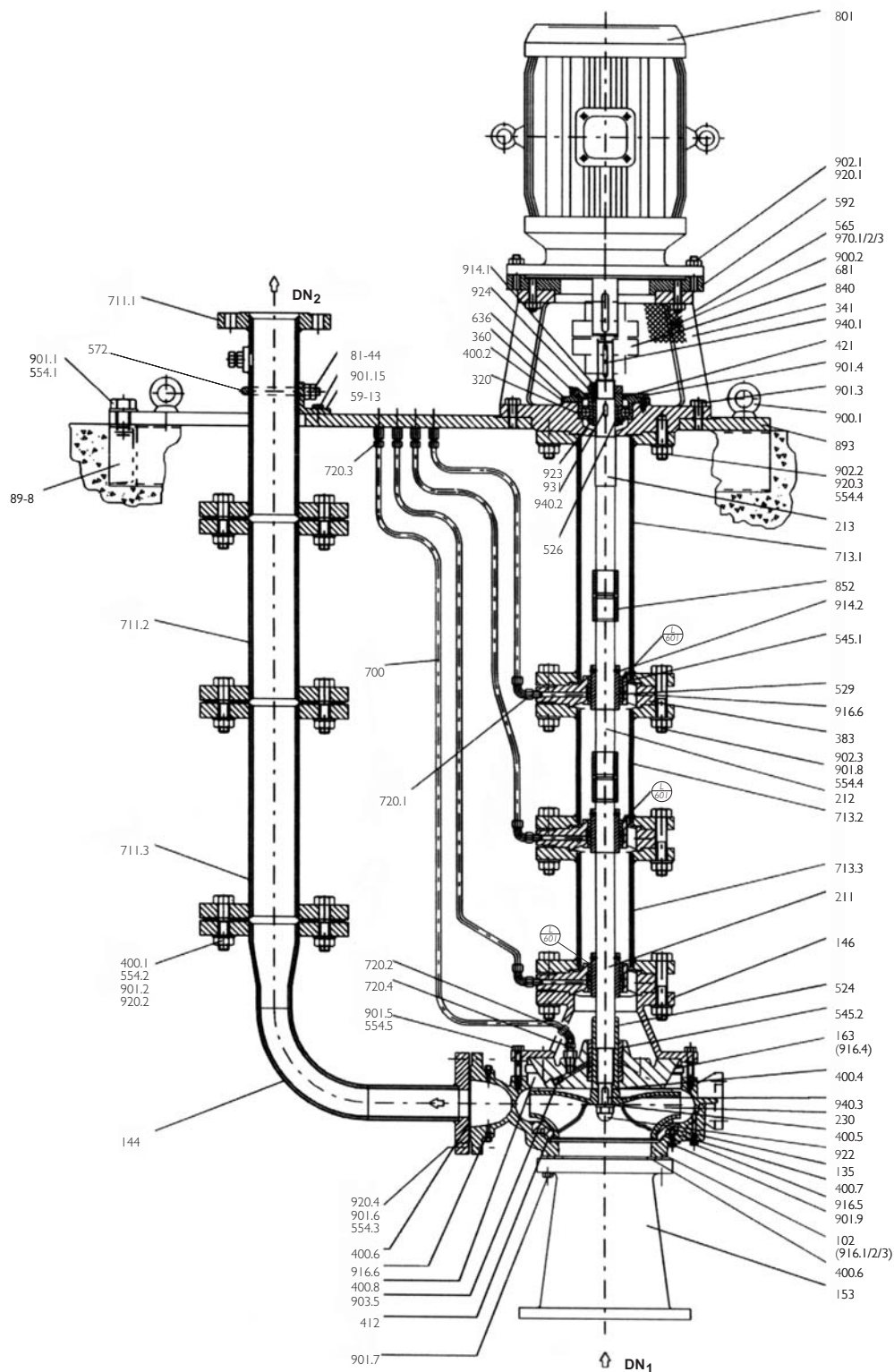
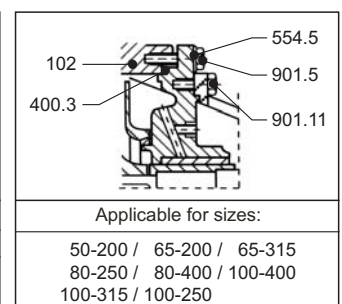
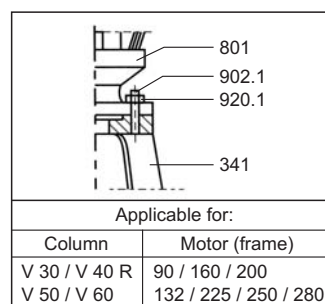
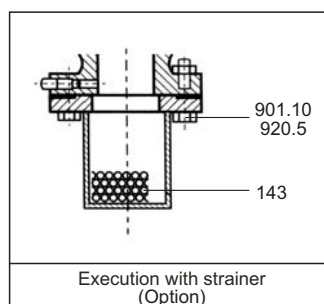
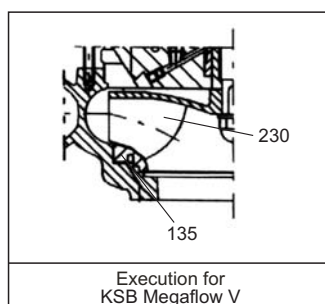


Fig.16



16. Parts list and materials

16.1 KSB Megaflow V

Description	Item	Qty.	Material Combination		
			00	01	02
Volute	102	1	A48 CL 30	A48 CL 30	A 743 CF 8M
Wear plate	135	1	A48 CL 30	A743 CF 8M	A 743 CF 8M
Suction strainer	143 (1)	1	SAE 1020	SAE 1020	AISI 316
Discharge elbow	144	1	A 36 GR A	A 36 GR A	AISI 316
Intermediate lantern	146	1	A48 CL 30	A48 CL 30	A 743 CF 8M
Suction nozzle	153	1	A48 CL 30	A48 CL 30	A 743 CF 8M
Discharge cover	163	1	A48 CL 30	A48 CL 30	A 743 CF 8M
Pump shaft	211	1	SAE 1045	SAE 1045	AISI 316
Intermediate shaft	(2) 212	1	SAE 1045	SAE 1045	AISI 316
Drive shaft	(3) 213	1	SAE 1045	SAE 1045	AISI 316
Impeller	230	1	A48 CL 30	A743 CF 8M	A 743 CF 8M
Axial ball bearing	320	1	Steel	Steel	Steel
Drive lantern	341	1	A48 CL 30	A48 CL 30	A48 CL 30
Bearing cover	360	1	A48 CL 30	A48 CL 30	A48 CL 30
Bearing spider	(4) 383	1	A48 CL 30	A48 CL 30	A 743 CF 8M
Flat gasket	(5) 400.1	1	Gasket sheet	Gasket sheet	Gasket sheet
Flat gasket	400.2	1	Gasket sheet	Gasket sheet	Gasket sheet
Flat gasket	400.3/4/5	1	Gasket sheet	Gasket sheet	Gasket sheet
Flat gasket	400.6/7/8	1	Gasket sheet	Gasket sheet	Gasket sheet
O'ring	412	1	NB 70	NB 70	NB 70
Lip seal	421	1	Rubber	Rubber	Rubber
Shaft protecting sleeve	524	1	AISI 316	AISI 316	AISI 420
Centering sleeve	526	1	SAE 1045	SAE 1045	SAE 1045
Bearing sleeve	(4) 529	1	AISI 420	AISI 420	AISI 420
Bearing bush	(4) 545.1	1	TM 23	TM 23	TM 23
Bearing bush	545.2	1	TM 23	TM 23	TM 23
Washer	554.1	4	SAE 1020	SAE 1020	SAE 1020
Washer	(6) 554.2	1	SAE 1020	SAE 1020	AISI 316
Washer	554.3	(7)	SAE 1020	SAE 1020	AISI 316
Washer	(8) 554.4	1	SAE 1020	SAE 1020	AISI 316
Washer	554.5	(9)	SAE 1020	SAE 1020	AISI 316
Rivet	565	12	AISI 302	AISI 302	AISI 302
Clamp	572	1	SAE 1020	SAE 1020	SAE 1020
Locking device	(10) 59-13	1	SAE 1020	SAE 1020	SAE 1020
Adapter plate	592	1	SAE 1020	SAE 1020	SAE 1020
Grease nipple	636	1	Galvanized steel	Galvanized steel	Galvanized steel
Coupling guard	(11) 681	1	SAE 1020	SAE 1020	SAE 1020
Pipeline	700	1	Copper	Copper	Copper
Riser pipe	711.1	1	A36 GR A	A36 GR A	AISI 316
Riser pipe	711.2	1	A36 GR A	A36 GR A	AISI 316
Riser Pipe	711.3	1	A36 GR A	A36 GR A	AISI 316
Suspension pipe	713.1	1	A36 GR A	A36 GR A	AISI 316
Suspension pipe	(14) 713.2	1	A36 GR A	A36 GR A	AISI 316
Suspension pipe	(15) 713.3	1	A36 GR A	A36 GR A	AISI 316
Special pipe part	(16) 720.1	1	Steel	Steel	Stainless steel
Special pipe part	720.2	1	Steel	Steel	Stainless steel
Special pipe part	720.3	(11)	Steel	Steel	Steel
Special pipe part	720.4	1	Steel	Steel	Steel
Electric motor	801	1			
Clamp strap	81-44	1	SAE 1020	SAE 1020	SAE 1020
Coupling	840	1			
Threaded coupling	(17) 852	1	AISI 420	AISI 420	AISI 420
Soleplate	893	1	SAE 1020	SAE 1020	SAE 1020
Foundation rail	(1) 89.8	2	SAE 1020	SAE 1020	SAE 1020
Eyebolt	900.1	4	Forged steel	Forged steel	Forged steel
Screw	900.2	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020
Hexagon head bolt	(6) 901.1/3/4	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.2	1	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.5	(9)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.6	(7)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.7	(18)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	(8) 901.8	1	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.9	(19)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.10	(20)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.11	(21)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Stud	902.1	(22)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Stud	902.2	8	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Socket head cap screw	914.1	2	SAE 1045	SAE 1045	SAE 1045
Socket head cap screw	(23) 914.2	2	SAE 1045	SAE 1045	SAE 1045
Plug	916.5	2	SAE 1020	SAE 1020	AISI 316
Plug	916.6	2	SAE 1020	SAE 1020	AISI 316
Nut	920.1	(22)	SAE 1020	SAE 1020	SAE 1020
Nut	(6) 920.2	1	SAE 1020	SAE 1020	Stainless steel
Nut	(8) 920.3	1	SAE 1020	SAE 1020	Stainless steel
Nut	920.4	(7)	SAE 1020	SAE 1020	Stainless steel
Nut	920.5	(20)	SAE 1020	SAE 1020	Stainless steel
Impeller nut	922	1	SAE 1045	SAE 1045	SAE 1045
Bearing nut	923	1	SAE 1045	SAE 1045	SAE 1045
Adjusting nut	924	1	SAE 1045	SAE 1045	SAE 1045
Lockwasher	931	1	Coil steel	Coil steel	Coil steel
Key	940.1/2	1	SAE 1045	SAE 1045	SAE 1045
Key	940.3	1	SAE 1045	SAE 1045	AISI 420
Plate	970.1/2	1	AISI 304	AISI 304	AISI 304
Plate	970.3/4	1	AISI 304	AISI 304	AISI 304

Table 09

NOTES:

- (1) OPTIONS: Suction strainer ☐ With Foundation rails ☐ With
☐ Without ☐ Without

- (2) Applicable for ET longer than
Quantity as per column length (see table)

- (3) Not applicable for ET smaller than

- (4) Quantity = S, where S is equal to the number of suspension pipes

- (5) Quantity = E, where E is equal to the number of riser pipes

- (6) ☐ DN2 32, 40, 65 and 80 mm Quantity = 4 X E
☐ DN2 100, 125 and 150 mm Quantity = 8 X E
☐ DN2 250 mm Quantity = 12 X E

- (7) ☐ DN2 32, 40, 65 and 80 mm Quantity = 4
☐ DN2 100, 125 and 150 mm Quantity = 8
☐ DN2 250 mm Quantity = 12

- (8) Quantity = 8 X S

- (9) ☐ Quantity = 6 for pump 50-160
☐ Quantity = 8 for pumps 50-200 and 65-200
☐ Quantity = 12 for pumps 65-160 / 80-250 / 100-250 and 200-315
☐ Quantity = 16 for pumps 80-400 and 100-400

Not applicable for motors:

Column	Frame
V 30 and V 40 R	90 / 160 / 180
V 50 and V 60	132 / 225

- (10) Quantity = S + 1,
where S is equal to the number of suspension pipes

- (14) Quantity as per column length (see table)

- Not applicable for ET smaller than:
(15) V 30 = V 50 =
V 40 R = V 60 =

- (16) Quantity = 2 X S

- (17) Quantity = S - 1

- (18) ☐ DN1 50 and 80 mm Quantity = 4
☐ DN1 100, 125, 150 and 200 mm Quantity = 8

- (19) ☐ Quantity = 4 for pumps with nominal impeller diameter
of 160, 200 and 250 mm
☐ Quantity = 8 for pumps with nominal impeller diameter
of 315, 400 and 500 mm

- (20) ☐ Quantity = 8 for pumps 50-160 / 50-200 / 65-200
65-315 / 80-250 / 80-400
100-250 / 100-315 and 100-400
☐ Quantity = 12 for pumps 150-315 and 200-315

- (21) ☐ Quantity = 6 for pumps column V 30 and V 40 R
☐ Quantity = 8 for pumps column V 50
☐ Quantity = 12 for pumps column V 60

- (22) ☐ Quantity = 4 for motor frames 90, 100 and 112
☐ Quantity = 8 for motor frames 132, 160, 180, 200 and 225
☐ Quantity = 12 for motor frame 315

- (23) Quantity = 2 X S - 2

17. Interchangeability of spare parts

Pump	Column	Designation									
		Part N°	Volute casing	Discharge cover	Impeller (1)	Wear plate	O'ring	Gasket	Shaft protective sleeve	Impeller nut	Key
		102									
		163									
		230									
		135									
		412									
		400.7									
		524									
		922									
		940.3									
50-160	V 30	1	1	1	1	1	1	1	1	1	1
50-200	V 40R	2	2	2	2	2	2	2	2	2	2
65-200	V 40R	3	3	3	3	3	3	3	3	3	3
80-250	V 40R	4	3	4	4	4	4	2	2	2	2
65-315	V 50	5	4	5	5	5	5	3	3	3	3
100-250	V 50	6	5	6	6	6	6	3	3	3	3
100-315	V 50	7	4	7	7	7	7	3	3	3	3
80-400	V 60	8	6	8	8	8	8	4	4	4	4
100-400	V 60	9	6	9	9	9	9	4	4	4	4
150-315	V 60	10	7	10	10	10	10	4	4	4	4
200-315	V 60	11	7	11	11	11	11	4	4	4	4

Table 10 -Interchangeability of spare parts

Note:

(1) Interchangeability for the same impeller type: K or O.

17.1 Interchangeability of the drive lantern and adapter plate

Column	Motor frame	Designation	
		Drive lantern	Adapter plate
		Part N°	
		341	592
V 30	90 L	1	X
V 40	100 L	1	1
V 40R	112 M	1	1
	132 M	1 (1)	2
V 30	160 L	2	X
V 40	180 L	2	X
V 40R	200 L	2 (1)	3
	225 S/M	2 (2)	4
V 50	132 S/M	3	X
V 60	160 S/M	3 (2)	5
	180 S/M	3 (2)	5
	200 L/M	3 (2)	5
V 50	225 S/M	4	X
V 60	250 S/M	4 (3)	6
	280 S/M	4 (3)	6
	315 S/M	4 (2)	7

Table 11 - Interchangeability of the drive lantern and adapter plate

Notes:

- (1) Different thread size.
- (2) Different PCD and hole diameter.
- (3) Different PCD and size

1 Same numbers
(Interchangeable parts)

3 Different number
4 (No interchangeable parts)

X Not existing parts

17.2 Interchangeability of soleplate, suspension riser pipes, foundation rail, intermediate lantern and suction nozzle

Pump	Column	Designation	Soleplate	Intermediate pipe (1)	(2)	Foundation rail	Intermediate lantern	Suction nozzle
		Part N°	893	713	711	89-8	146	153
32-125	V 30		1	1	1	1	1	X
32-125.1			1	1	1	1	1	X
32-160			1	1	1	1	1	X
32-160.1			1	1	1	1	1	X
32-200			1	1	1	1	1	X
32-200.1			1	1	1	1	1	X
40-125			1	1	2	1	1	X
40-160			1	1	2	1	1	X
40-200			1	1	2	1	1	X
50-125			2	1	3	1	1	X
50-160			2	1	3	1	1	1
50-200			2	1	4	1	1	X
65-125			2	1	4	1	1	X
32-250	V 40		3	2	1	2	1	X
32-250.1			3	2	1	2	1	X
40-250			3	2	2	2	1	X
50-250			4	2	3	2	1	X
65-160			4	2	4	2	1	X
65-200			4	2	4	2	1	2
80-160			5	2	5	2	1	X
40-315	V 40R		3	2	2	2	1	X
50-315			4	2	3	2	1	X
65-250			4	2	4	2	1	X
80-200			5	2	5	2	1	X
80-250			5	2	5	2	1	3
100-160			5	2	5	2	1	X
100-200			5	2	5	2	1	X
65-315	V 50		6	2	4	3	2	2
80-315			7	2	5	2	2	X
80-400			7	2	5	3	2	3
100-250			7	2	5	3	2	3
100-315			7	2	5	3	2	3
100-400			7	2	5	3	2	3
125-200			8	2	6	3	2	X
125-250			8	2	6	3	2	X
125-315			8	2	6	3	2	X
125-400			8	2	6	3	2	X
150-200			9	2	7	3	2	X
150-250			9	2	7	3	2	X
150-315	V 60		10	3	7	4	3	4
150-400			10	3	7	4	3	X

Table 12

Notes:

- (1) Suspension pipes are interchangeable if they have the same length and column denomination (see table 13).
- (2) Interchangeable for the same length.

17.3 Interchangeability of shafts, bearing bushes, centering sleeve, bearing spider, threaded coupling, adjusting nut and bearing cover

A shaft to be interchangeable with another should have the same length, which is function of suspension riser (713) length, whose standard sizes are on table 13.

Part N°	Designation	Column	Suspension pipe (mm)
213	Drive shaft	V 30 / V 40 / V 40R	500, 750, 1000 and 1250
		V 50 / V 60	750, 1000, 1250, 1500 and 1750
212	Intermediate shaft	V 30 / V 40 / V 40R	750, 1000, 1250
		V 50 / V 60	1000, 1250, 1500 and 1750
211	Pump shaft	V 30 / V 40 / V 40R	250, 500, 750 and 1000
		V 50 / V 60	500, 750 and 1000

Table 13

Column	Motor frame	Designation	Drive shaft	Intermediate shaft	Pump shaft	Bearing bush	Bearing sleeve	Centering sleeve	Bearing spider	Threaded coupling	Adjusting nut	Bearing cover
		Part N°	213	212	211	545	529	526	383	852	924	360
V 30	90 S/L		1	1	1	1	1	1	1	1	1	1
	100 L		1	1	1	1	1	1	1	1	1	1
	112 M		1	1	1	1	1	1	1	1	1	1
	132 S/M		1	1	1	1	1	1	1	1	1	1
	160 L		2	1	1	1	1	1	1	1	1	1
	180 L		2	1	1	1	1	1	1	1	1	1
	200 L		2	1	1	1	1	1	1	1	1	1
V 40R	225 S/M		2	1	1	1	1	1	1	1	1	1
	90 SL		3	2	X	2	2	2	2	2	2	2
	100 L		3	2	X	2	2	2	2	2	2	2
	112 M		3	2	X	2	2	2	2	2	2	2
	132 S/M		3	2	X	2	2	2	2	2	2	2
	160 L		4	2	X	2	2	2	2	2	2	2
	180 L		4	2	X	2	2	2	2	2	2	2
V 40	200 L		4	2	X	2	2	2	2	2	2	2
	225 S/M		4	2	X	2	2	2	2	2	2	2
	90 SL		3	2	2	2	2	2	2	2	2	2
	100 L		3	2	2	2	2	2	2	2	2	2
	112 M		3	2	2	2	2	2	2	2	2	2
	132 S/M		3	2	2	2	2	2	2	2	2	2
	160 L		4	2	2	2	2	2	2	2	2	2
V 50	180 L		4	2	2	2	2	2	2	2	2	2
	200 L		4	2	2	2	2	2	2	2	2	2
	225 S/M		4	2	2	2	2	2	2	2	2	2
	132 S/M		5	3	3	3	3	3	3	3	3	3
	160 L/M		5	3	3	3	3	3	3	3	3	3
	180 L/M		5	3	3	3	3	3	3	3	3	3
	200 L/M		5	3	3	3	3	3	3	3	3	3
V 60	225 S/M		6	3	3	3	3	3	3	3	3	3
	250 S/M		6	3	3	3	3	3	3	3	3	3
	280 S/M		6	3	3	3	3	3	3	3	3	3
	315 S/M		6	3	3	3	3	3	3	3	3	3
	132 S/M		7	4	4	4	4	4	4	4	4	4
	160 L/M		7	4	4	4	4	4	4	4	4	4
	180 L/M		7	4	4	4	4	4	4	4	4	4
V 60	200 L/M		7	4	4	4	4	4	4	4	4	4
	225 S/M		8	4	4	4	4	4	4	4	4	4
	250 S/M		8	4	4	4	4	4	4	4	4	4
	280 S/M		8	4	4	4	4	4	4	4	4	4
	315 S/M		8	4	4	4	4	4	4	4	4	4

Table 14

1 Same number
1 (Interchangeable parts)

3 Different number
4 (No interchangeable parts)

X Not existing parts

18. Recommended spare parts

Recommended spare parts for a continuous work of two years according to DIN 24296 Standard.

Part N°	Designation	Pump Quantity (includes reserves)							
		1	2	3	4	5	6 and 7	8 and 9	10 or more
		Spare parts quantity							
135	Wear plate	1	2	2	2	3	3	4	50 %
211 / 212 / 213	Shaft	1	1	1	2	2	2	3	30 %
321	Radial ball bearing	1	1	1	2	2	3	4	50 %
341	Drive lantern	--	--	--	--	--	--	1	2 units
383	Bearing spider	1	1	1	2	2	2	3	30 %
421	Radial shaft sel ring	1	2	3	4	5	6	8	50 %
502.1	Casing wear ring	1	2	2	2	3	3	4	50 %
502.2	Casing wear ring	1	2	2	2	3	3	4	50 %
524	Shaft protecting sleeve	1	1	1	1	2	2	2	20 %
529	Bearing sleeve	1	1	1	1	2	2	4	50 %
545.1	Bearing bush set	1	1	1	2	2	2	4	50 %
852	Threaded coupling	1	1	1	2	2	2	3	30 %
--	Flat gasket	4	4	5	8	9	9	12	150 %
--	O'Ring set	4	4	6	8	8	8	12	150 %

Table 15 - Recommended spare parts

KSB reserves the right to modify the information presented in this manual without prior notice.

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