



**Chemical industry
process pump**

LINE :	Mega
TYPE :	Submersible / Vertical

1. Application

The KSB Megachem V centrifugal pump is recommended for pumping aggressive chemical products, organic and inorganic products; oil, water and other liquids in the following fields of applications: chemical and petrochemical, sugar and alcohol industry, refinery auxiliary circuits, industry auxiliary circuits in paper, food and synthetic fiber industries, drainage.

2. Design

Vertical, unicellular of single suction, mounted in humid well and relied on the floor, above of the maximum liquid level.

3. Designation

	KSB	Megachem V	100 - 250
Trade mark	_____	_____	_____
Model / Type	_____		
Discharge nozzle diameter (mm)	_____		
Nominal impeller diameter (mm)	_____		

4. Operating data

Sizes	- DN 32 up to 150
Flow	- up to 700 m³/h
Head	- up to 140 m
Temperature	- up to 90 °C
Maximum suction pressure	- up to 16 bar
Speed	- up to 3.500 rpm

5. Introduction

KSB has supplied you, an 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 user about the construction and operation for 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: rate flow, total head speed, voltage, frequency and temperatura of pumped liquid.

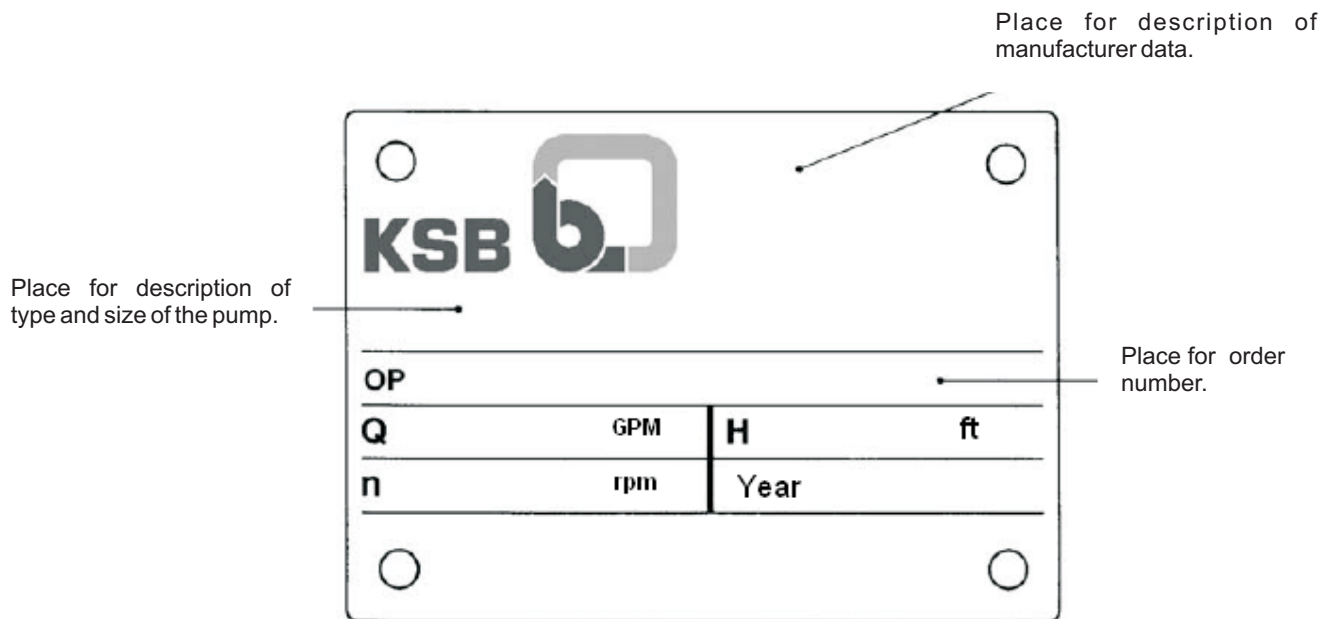


Fig.01
Nameplate

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

Attention: This instruction manual contents very important instructions and recommendations. **Its careful reading is an obligation** before installation, electrical connection, first starting and maintenance.

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6. Technical data

Pump size		Units	32-125.1 32-125 32-160.1 32-160 32-200.1 32-200 40-125 40-160 40-200 50-125 50-160 50-200 65-125 32-250.1 32-250 40-250 50-250 65-160 65-200 80-160 40-315 50-315 65-250 80-200 80-250 100-160 100-200 65-315 80-315 80-400 (5) 100-250 100-315 100-400 (5) 125-200 125-250 125-315 125-400 (5) 150-200 150-250 150-315 150-400 (5)																																						
Technical data			V 30								V 40				V 40R				V 50								V 60														
Bearing bracket		--																																							
Width of impeller passage		mm	7	9	5	5	6	6	14	14	12	9	16	20	11	25	8	8	8	12	12	17	31	9	9	13	13	13	18	13	27	23	17	40	37	30	25	59	48	39	33
WR ² with water (only pump bowl)		Kg.m ²	0,0140	0,0142	0,0224	0,0238	0,0760	0,0766	0,0144	0,0336	0,0640	0,0189	0,0394	0,0750	0,0263	0,1800	0,1820	0,1880	0,1920	0,0521	0,0985	0,0641	0,4396	0,4800	0,2232	0,1588	0,2904	0,1040	0,1800	0,5120	0,5696	1,2788	0,3172	0,6100	0,2230	0,4100	0,7740	1,6912	0,2918	0,4666	1,8600
Hydrostatic pressure test (1)	Iron	bar	19 (Acc. to ANSI B 73.1)																																						
	Steel		24 (Acc. to ANSI B 73.1)																																						
Max. discharge pressure		bar	16																																						
Max. temperature		°C	90																																						
Axial thrust balance		--	Without	Balancing holes on impeller																																					
Min. / Max. flow		--	0,1 Qopt / 1,1 Qopt																0,15 Qopt / 1,1 Qopt																						
Rotation direction		--	Clockwise, seen from drive end																																						
Max. rotation (2)		rpm	3500																1750																						
Discharge flange		--	ANSI B 16.5 150# RF																																						
Additional material for corrosion		mm	3,3																																						
Bearing bracket	Column	--	V 30								V 40				V 40R				V 50								V 60														
	Ball bearing		6310 C3																6413 C3																						
	Lubrication		Grease																																						
Drive (P/n value) (3)	SAE 1045	CV/rpm	0,0192								0,0339				0,0469				0,1053								0,1347														
	AISI 316		0,0182								0,0225				0,0311				0,0698								0,0893														
Max. rotation acc.to column bearing lubrication	Pumped liquid or clean water from external source (4)	rpm	3500								3500				1750								1750																		
	Grease with one connection for each bearing		1750 (3500 (5))								1750				1450								1160																		
	Grease with two connections for each bearing (max.3 bearings above sump level)		--								--				--								1460																		
Radial (column) bearings lubrication	Water flow and pressure per bearing (4)	l / min.	1,5																																						
		bar	0,2																0,2																						
	Grease qty per bearing	g / h	4																																						

Table 01

Notes:

(1) Following parts are hidrostatically tested:

- spiral casing
- discharge cover
- discharge piping

(2) Always check peripheral speed:

- A 48 CL30up to 40 m/s.
- A 536 GR 60-40-18 / CuSn10-C-GSup to 60 m/s.
- A 743 CF8M up to 80 m/s.

(3) For pumps with impeller material CuSn10-C-GS, despite of shaft material should be observed the values:

COLUMN	P/n
V 30	0,0097
V 40 / V 40R	0,0253
	0,0343
V 50	0,0465
V 60	0,0794

(4) Lubrication liquid could have 20 p.p.m max of impurities and particle size of the 10µm.

(5) Under request.

7 Design details

7.1 Casing

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

7.2 Impeller

Radial, closed, single suction, with replaceable wear ring on discharge side.

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.

7.4 Centering bearings

Sliding type, equipped with shaft protecting sleeve, turning guided by a bearing bush.

7.5 Centering bearing lubrication

It is possible the following executions:

a) With the pumped liquid:

When the product has lubricating properties, with maximum of 20 ppm of impurities and particles smaller than 10µm. Each bearing receives an injection through a line connected to the discharge flange.

b) Clean water from external source:

The water injection is sent to all bearings through an external connection located above the soleplate.

c) Grease:

A grease pump, driven by an electric motor and fixed to the soleplate, feeds grease to each bearing through one or two lines.

8. Transportation

The transportation of the motor-pump set or only pump should be made with ability and sound sense, according to safety standards. By the motor eyebolt only lift it, never the motor-pump set.

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

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

The cables for hoist 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.

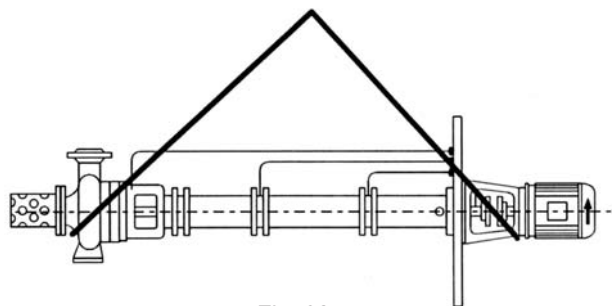


Fig. 02
Assembled unity

b) Separated parts (column above 3 meters):

(Pump assembly, suspension pipe, drive lantern, soleplate, shaft, bearings, riser 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 soleplate.

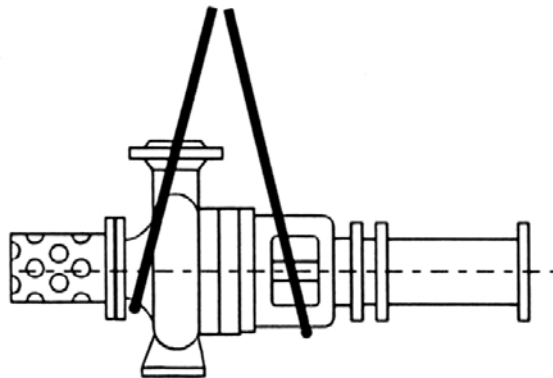


Fig. 03
Separated parts transportation

Note: Take care that the shafts don't warp and its threads can't be damaged during the transport.

9. Preservation and storage

Following procedures of preservation and storage are made by KSB and its Dealers 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 up with RUSTILO application, after which the pump is drained.

Shaft exposed areas: 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 Preservation and storage additional procedures

- Pump stored for periods exceeding 6 months must have the preservative process done each 12 months. The pumps must be disassembled, cleaned and the storage process must be done again.
- Grease lubricated bearings receive their specified grease weight for operation and do not need servicing.
- All connections as inlets for liquids from external sources, priming, draining, flushing and cooling should be closed. Suction and discharge flanges should be covered 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 protecting liquids:

Protecting liquid	Coating thickness (m)	Drying time	Removal	Manufacturer
TECTYL 506	From 80 up to 100	1/2 up to 1 hour	Gasoline, benzol, diesel oil	BRASCOL
RUSTILO DW 301	From 6 up to 10	1 up to 2 hours	Gasoline, benzol	CASTROL
MOBI-LARMA 524	≤ 6	Does not dry	Not necessary	MOBIL OIL

Table 02 - Protecting liquids

10. Installation

The pumps should be installed, leveled and aligned by trained personnel. When this service is done incorrectly, it will originate 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.

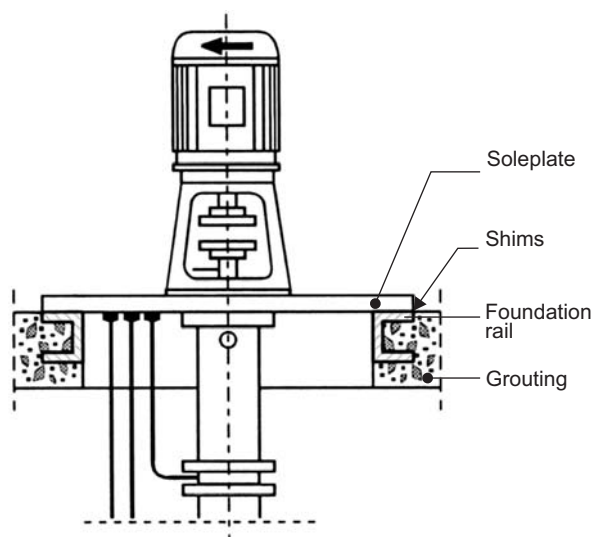


Fig. 04 - Soleplate grouting

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 as to correct the leveling. See fig. 05.

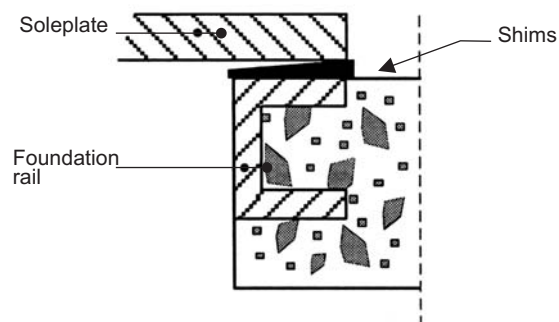


Fig. 05 - Soleplate leveling

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 exposed 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 complete a 360° turn. See fig.06.

The same procedure should be performed to control the axial displacement. See fig.07.

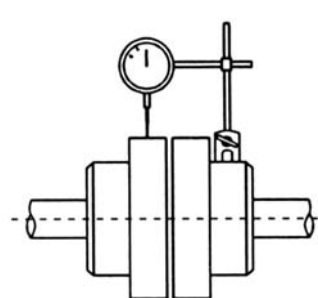


Fig. 06
Radial control

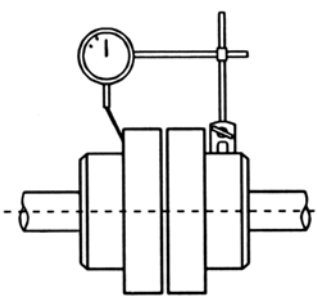


Fig. 07
Axial control

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 a tolerance of 0.1 mm (0.0039 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. Observe the sleeve coupling hub clearance specified by manufacturer. See figure 08.

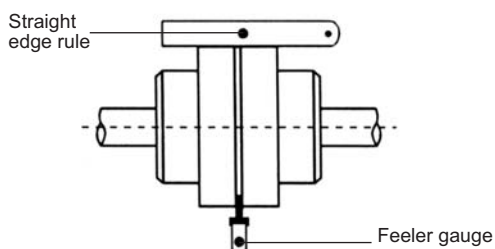


Fig. 08
Alignment with a straight edge and a feeler gauge

10.4 Suction pipe line recommendations

To install the suction piping follow these 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).
- Check the minimum level of liquid above the suction to avoid dry operation, vibration 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 these instructions:

- If the overpressures originated cause of the liquid returning in case of long pipe lines, 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 the 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 on the applied loads.
- Safety valves, pressure relief devices and other operational valves not included up to now, should be installed as necessary for adequate operation of the pipe line.

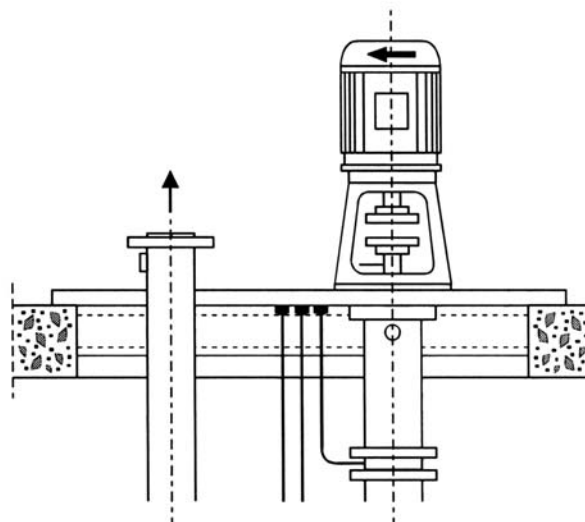


Fig. 09
Discharge pipeline

10.6 Auxiliary piping connections

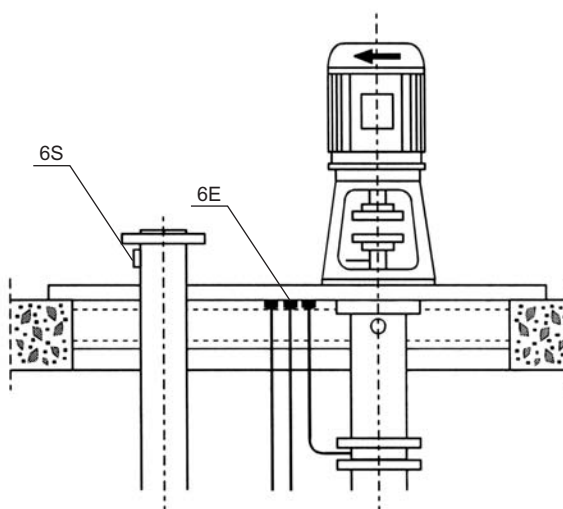


Fig. 10 - Auxiliary piping and connections

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

Table 03 - Auxiliary connection

Note: The piping for the inlet and / or outlet of the 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 from others manufacturers.

11.2 Foundation rail

The soleplate is supported by two foundations rails fastening by cement mortar.

11.3 Coupling guard

For safety operation, coupling guard should be installed. They are done according to standard, of steel or brass, being fastened in the drive lantern. It should be observed so that the coupling guard doesn't touch rotation parts.

12. Operation

12.1 First starting procedure

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

- Fix the soleplate firmly .
- Fix the discharge pipe line.
- Connect and run auxiliary pipes lines and connections (if any).
- Do the electrical connections, being certified that all the systems of protection of the motor is adjusted properly and working.
- Check bearings for cleanliness and damp environment. Fill 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 chapter 10.3.
- Install the coupling guard.

12.2 Immediate procedures 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. Vibration 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:

- If during this period any abnormalities were found consult chapter 14 Operational abnormalities and troubleshooting.

12.3 Operational supervision

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

12.3.1 Weekly supervision

Check:

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

12.3.2 Monthly supervision

Check:

- Oil change interval. Consult chapter 13.1.
- Bearings temperature.

12.3.3 Semestral supervision

Check:

- Fixing bolts in the base plate and motor.
- Alignment of the motor-pump assembly.
- Coupling lubrication (if any).

12.3.4 Annual supervision

Check:

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

Note: In facilities with good operation conditions and liquid not pumped aggressive to the materials of the pump, the supervision can be made every 2 years.

12.4 Shutdown procedure

For shutdown, follow in sequence these instructions:

- Close the discharge valve.
- Switch off the driver and observe the assembly stopping gradually and smooth.
- Close the auxiliary piping (since there is not against indication).

13. Maintenance

13.1 Thrust bearing maintenance

Purpose of this maintenance is to extend as much as possible the useful life of the bearings system, including a general inspection of the bearing, cleanliness, lubrication and careful analysis. Bearing should be lubricated with grease as specified in table 04.

	Bearings	
	6310	6413
Qty. of Grease	25 a 26 g	26 a 27 g
Speed	Intervals lubrication	
3.500 rpm	5.000 h	--
1.750 rpm	8.000 h	--
1.450 rpm	--	9.000 h
1.160 rpm	--	14.000 h

Table 04
Lubrication intervals by worked hours and quantity of lubricants (grease)

Valid for temperature up to 70° C. For each 15°C of temperature increase, reduce the time for half of it. 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 result 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 others 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 especification

13.2 Guide bearings maintenance

Guide bearings have purpose of assuring that the 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, for 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 100 µm and concentration of 20ppm maximum, it tied up the connections (720) discharge.

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

In case they exist bearing above the level of water, starting pump every 12 hours or to make hand lubrication, making to drain the liquid pumped by the shaft, before starting pump.

13.2.2 Bearings lubricated by liquid from external source

Injection with liquid from external source, tied up directly to the connections (720) lubricates the Bearing Spider (383) and Bearing Bush (545.1). Liquid from external source should be compatible with the pumped liquid, therefore they can mix in small quantity. The same characteristics defined in the item 13.2.1, should be kept for the liquid.

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.

The quantity of grease is of 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 be run before the pump to permit a pre-lubrication of the bearings.

13.3 Wear areas maintenance

When the pump shows wear between the casing wear ring and the external diameter of the suction side of the impeller hub and/or between the discharge cover and the impeller wear ring on its discharge side and both, casing and impeller are in good conditions, the wear rings must be replaced.

KSB and its Dealers Network supply wear rings for repair or as spare parts for the "KSB MEGACHEM V" pumps

These wear rings are supplied with their external finished diameter within the proper tolerance and their internal diameter with 2 mm over metal.

13.3.1 When to replace

The wear rings replacement should take place when the clearance between the wear ring and the impeller or between the wear ring and the discharge cover has reached three times the maximum clearance indicated on table 06 or when the pump shows an appreciable loss in efficiency.

Pump	Stainless steel				Cast iron / Bronze			
	Wear ring X Impeller		Wear ring. X Cover		Wear ring. X Impeller		Wear ring. X Cover	
	Máx.	Min.	Máx.	Min.	Máx.	Min.	Máx.	Min.
32-125.1	0,620	0,450	0,660	0,470	0,346			
32-160.1								
32-200.1								
32-125								
32-160								
32-200								
32-250	0,660	0,470	0,660	0,470	0,354			
32-250.1								
40-125								
40-160								
40-200								
40-250								
40-315	0,620	0,450	0,620	0,490	0,354			
50-125								
50-160								
50-200								
50-250								
50-315								
65-125	0,627	0,490	0,660	0,470	0,250			
65-160								
65-200								
65-250								
65-315								
80-160								
80-200	0,660	0,510	0,627	0,490	0,363			
80-250								
80-315								
80-400								
100-160								
100-200								
100-250	0,643	0,530	0,643	0,530	0,363			
100-315								
100-400								
125-200								
125-250								
125-315								
125-400	0,673	0,560	0,643	0,530	0,372			
150-200								
150-250								
150-315								
150-400								

Table 06 - Original clearance of impeller on diameter (mm)

13.3.2 Replacement of the casing wear ring

Centralize the impeller through the internal hole the shaft passage (use mandrel).

Machine the worn out area of the impeller (suction side of the rub) until you obtain on uniform surface (maximum machining allowance: 2 mm on diameter). Check the diameter measurement after machining.

Machine then, the internal diameter of the wear ring according to that measurement on the impeller and observing the clearances established on table 06. Remove the damaged ring from the casing and fit the spare wear ring under pressure with a piece of lead or wood.

Notes:

1. The tolerance for radial and axial warping should be at the most 0.05 mm.
2. By customer judges for auxiliary lock, may be used such as: chemical (Loctite) on even threaded pin.

13.4 Maintenance of the bearing bush

When the clearances between the bearing bush (545.1) and the bearing sleeve (529) or between the bearing buss (545.2) and the shaft protection sleeve (524) exceed the maximum values defined in table 07, these pieces should be changed. Eventual machining the sleeves to eliminate superficial imperfections can be done, since that the clearances being kept.

Column	Clearance min. (mm)	Clearance max. (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

Table 07
Original clearance on diameter

13.5 Disassembly instructions

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

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

13.5.1 Sequence for the disassembly

01. Close the discharge valve.
02. Disconnect the auxiliary piping (if any).
03. Remove the coupling guard (if any).
04. Disconnect the sleeve, displacing the driver. Remove the coupling sleeve from the pump shaft with a puller, loosening first the socket head cap screw that fixes the sleeve. Remove the key (940).
05. Remove the adjusting plate (592) if any, loosening it from the lantern drive (341).
06. Remove the bolts (901.1) and the washer (554.1), disconnecting the soleplate (893) of the foundation rail (89-8).
07. Remove the pump of the suction tank with suspension bolts (900) and placed it in the horizontal position.
08. Remove the screws (914.1) of the adjust nut (924).
09. 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 (320), using a puller. Remove the key (940.2).
11. Remove the drive lantern (341) of the soleplate (893), loose the bolts (901.3).
12. Remove the pipes (700), disconnect from them the connections (720.1 and 720.2).

13. Remove the clamp (572) with the nuts (920.2), the washer (554.2) and screws (901.2). Remove the riser pipe (711.1).
14. Before removing suspension pipe (713.1) from the soleplate (893), to wedge the pump with wood. Remove the nuts (920.3) and loose the soleplate with a lift device.
15. Loose the suspension (713.1) with the bearing spider (383).
16. As the suspension pipes (713.1, 713.2 and 713.3) was removed, disassembly the drive shaft (213) of the intermediate shaft (212) and pump shaft (211) that are coupled with the threaded couplings (852).
17. Remove the bearings sleeve from the shafts (529) that they are radial fixed by screws (914.2).
18. Loose the others suspension pipes (711.2), remove the gaskets (400.1 and 400.6) and loose the discharge curve (144).
19. Assembly the bolts (901.5) and remove the intermediate lantern (146).

Note: In case of column larger than it 3 meters, disassemble the pump from own tank according the sequence described above.

13.6 Assembly instructions

All parts must be clean and free of sharp before of the assembly.

13.6.1 Assembly instructions

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

Notes:

- a) Replace every gaskets (400) and the o' rings (412) during assembly.
- b) Impeller nut (922) has "heli-coil" fixation system. KSB recommends its substitution after 3 or 4 times of disassembly.
02. Put the rotor (acc. to item 1) in the volute casing (102).
03. Assemble the casing cover (163) with gasket (400.3) and the intermediate lantern (146).
04. Assemble successively, the bearing sleeve (529), the bearing spider (383), the suspension pipes (713.1, 713.2 and 713.3), the intermediate shafts (212) and drive shaft (213).

Notes:

The shaft coupled by screwed coupling (852) should be assembled "to against top" in the center of the length of the coupling. For control the thread couplings has one bore in it center.

05. In the discharge, assembly the curve of discharge (144) with gasket (400.6) and suspension pipes (711) with gaskets (400.1).
06. Fix the soleplate in the suspension pipe (711.1) with the clamps (572) and the suspension pipes (711) with bolts (902.2) and nuts (920.3).
07. Connect the pipe (700) in the connections (720.1 and 720.2).
08. Fix the lantern driver (341) in the soleplate (893).
09. Assemble the key (940.2), the centering sleeve (526) with the radial ball bearing (320) in the shaft.
10. Close the guide bearing with the bearing cover (360).

Note: To check the lip seal ring (421) conditions, replace it if necessary.

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

Note: In case of pumps with columns above 3 meters, assemble it in his own 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 using the adjustment nut (924). Tight the nut (924) until the impeller touches the casing cover (see fig.11).

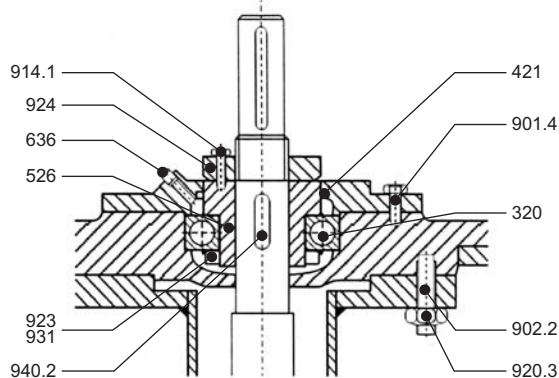


Fig. 11

Axial clearance adjust

02. With a depth gauge and using as reference surface the end of the shaft and the adjustment nut, go down the shaft 2 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. Trouble-shooting

Abnormalities	Probable causes
- Insufficient rate of flow - Driver overload	01-02-03-04-05-06-08-09 10-11-12-20
- The 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

Table 08
Abnormalities and Probable 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 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 line.
● Modify piping lay-out.
● If necessary, install a venting valve.</p> <p>06. NPSH available too low (negative suction installation).
● Check if it is 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 (counter pressure) lower than specified when the pump was purchased.
● Adjust operational points.
● If the overloads continue, trim the impeller.</p> <p>11. Specific weight or viscosity of the liquid being 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 joinings, 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 oil 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 of 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

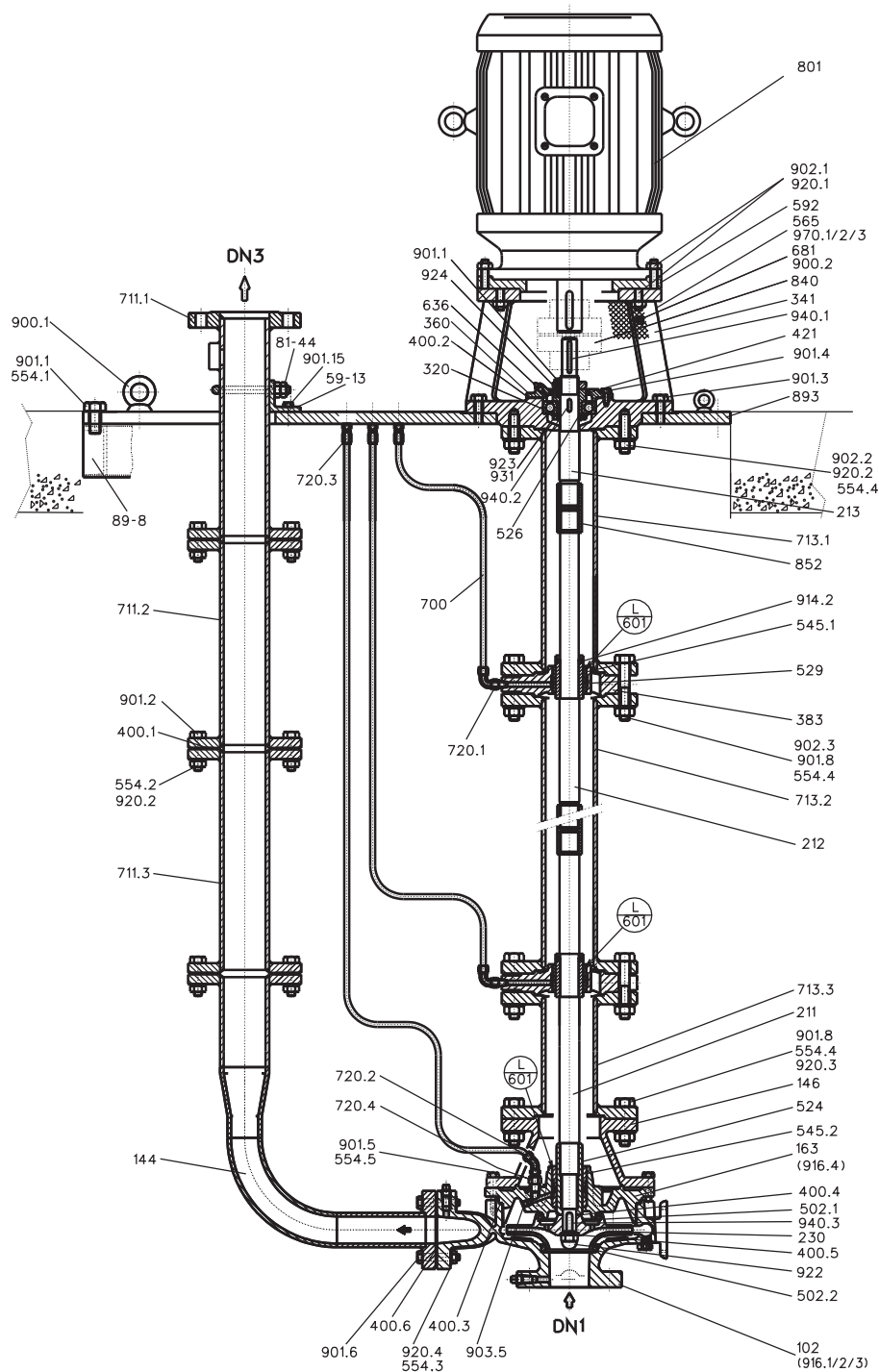
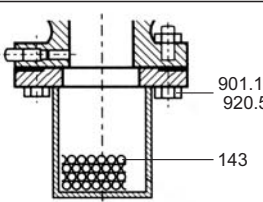
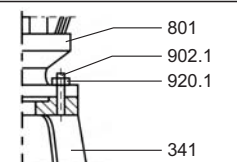
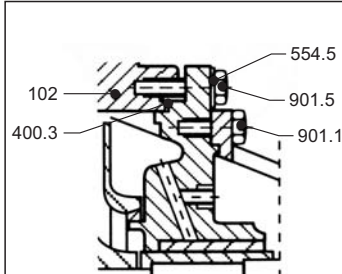


Fig. 12

 <p>901.10 920.5</p> <p>143</p> <p>Execution with suction strainer (on request)</p>	 <p>801 902.1 920.1 341</p> <p>Applicable for:</p> <table><thead><tr><th>Column</th><th>Motor (frame)</th></tr></thead><tbody><tr><td>V 30 / V 40 R</td><td>90 / 160 / 200</td></tr><tr><td>V 50 / V 60</td><td>132 / 225 / 250 / 280</td></tr></tbody></table>	Column	Motor (frame)	V 30 / V 40 R	90 / 160 / 200	V 50 / V 60	132 / 225 / 250 / 280	 <p>554.5 901.5 901.11 102 400.3</p>	<p>Applicable for sizes:</p> <table><tbody><tr><td>32-200.1 / 32-200 / 32-250</td></tr><tr><td>32-250.1 / 40-200 / 40-250</td></tr><tr><td>40-315 / 50-200 / 50-250</td></tr><tr><td>50-315 / 65-200 / 65-315</td></tr><tr><td>80-200 / 80-250 / 80-315</td></tr><tr><td>80-400 / 100-160 / 100-200</td></tr><tr><td>100-250 / 100-315 / 100-400</td></tr><tr><td>125-250 / 125-315 / 125-400</td></tr><tr><td>150-250 / 150-400</td></tr></tbody></table>	32-200.1 / 32-200 / 32-250	32-250.1 / 40-200 / 40-250	40-315 / 50-200 / 50-250	50-315 / 65-200 / 65-315	80-200 / 80-250 / 80-315	80-400 / 100-160 / 100-200	100-250 / 100-315 / 100-400	125-250 / 125-315 / 125-400	150-250 / 150-400
Column	Motor (frame)																	
V 30 / V 40 R	90 / 160 / 200																	
V 50 / V 60	132 / 225 / 250 / 280																	
32-200.1 / 32-200 / 32-250																		
32-250.1 / 40-200 / 40-250																		
40-315 / 50-200 / 50-250																		
50-315 / 65-200 / 65-315																		
80-200 / 80-250 / 80-315																		
80-400 / 100-160 / 100-200																		
100-250 / 100-315 / 100-400																		
125-250 / 125-315 / 125-400																		
150-250 / 150-400																		

16. Parts list and material

16.1 KSB Megachem V

Description	Item	QTY	Combination material		
			00	01	02
Voile casing	102	1	A48 CL 30	A48 CL 30	A48 CL 30
Suction strainer (1)	143	1	SAE 1020	SAE 1020	SAE 1020
Discharge elbow	144	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Intermediate lantern	146	1	A48 CL 30	A48 CL 30	A48 CL 30
Discharge cover	163	1	A48 CL 30	A48 CL 30	A48 CL 30
Pump shaft	211	1	SAE 1045	SAE 1045	SAE 1045
Intermediate shaft (2)	212	1	SAE 1045	SAE 1045	SAE 1045
Drive shaft (3)	213	1	SAE 1045	SAE 1045	SAE 1045
Impeller	230	1	A48 CL 30	[CuSn10-C-GS]	[A536GR604018]
Axial ball bearing	320	1	Steel	Steel	Steel
Motor stool	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	A48 CL 30
Gasket (5)	400.1	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.2	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.3	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.4	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.5	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.6	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Lip seal	421	1	Rubber	Rubber	Rubber
Casing wear ring	502.1	1	A48 CL 30	A48 CL 30	A48 CL 30
Casing wear ring	502.2	1	A48 CL 30	A48 CL 30	A48 CL 30
Spacer ring	504	1	SAE 1020	SAE 1020	SAE 1020
Shaft protecting sleeve	524	1	AISI 316	AISI 316	AISI 316
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	Bronze TM 23	Bronze TM 23	Bronze TM 23
Washer	545.2	4	SAE 1020	SAE 1020	SAE 1020
Washer	554.2	(6)	SAE 1020	SAE 1020	SAE 1020
Washer	554.3	(7)	SAE 1020	SAE 1020	SAE 1020
Washer	554.4	(8)	SAE 1020	SAE 1020	SAE 1020
Washer	554.5	(9)	SAE 1020	SAE 1020	SAE 1020
Rivet	565	12	AISI 302	AISI 302	AISI 302
Clamp	572	1	SAE 1020	SAE 1020	SAE 1020
Locking device	59-13	1	SAE 1020	SAE 1020	SAE 1020
Base (10)	592	1	SAE 1020	SAE 1020	SAE 1020
Grease nipple	636	1	Galv. Steel	Galv. Steel	Galv. Steel
Coupling guard	681	1	SAE 1020	SAE 1020	SAE 1020
Pipeline	700	(11)	Copper	Copper	Copper
Riser pipe	711.1	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Riser pipe	711.2	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Riser pipe	711.3	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Suspension pipe	713.1	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Suspension pipe (14)	713.2	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Suspension pipe (15)	713.3	1	A106 Gr.B	A106 Gr.B	A106 Gr.B
Conection (16)	720.1	1	Steel	Steel	Steel
Conection	720.2	1	Steel	Steel	Steel
Conection	720.3	(22)	Steel	Steel	Steel
Conection	720.4	1	Steel	Steel	Steel
Motor	801	1			
Clamp strap	81-44	1	SAE 1020	SAE 1020	SAE 1020
Coupling	840	1			
Screwed 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
Screw	900.1	4	Forged steel	Forged steel	Forged steel
Screw	900.2	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.1	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.2	(6)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.3	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.4	4	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	SAE 1020/5.6
Hexagon head bolt	901.6	(7)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.7	(8)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.8	1	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.10	(19)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.11	(18)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.12	(7)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Stud	902.1	(20)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Stud	902.2	8	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Stud	902.3	2	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Screwed plug	903.5	2	SAE 1020	SAE 1020	SAE 1020
Socked head cap screw	914.1	2	SAE 1045	SAE 1045	SAE 1045
Socked head cp screw (21)	914.2	1	SAE 1045	SAE 1045	SAE 1045
Screwed plug	916.6	2	SAE 1020	SAE 1020	SAE 1020
Nut	920.1	(20)	SAE 1020	SAE 1020	SAE 1020
Nut	920.2	(8)	SAE 1020	SAE 1020	SAE 1020
Nut	920.3	(8)	SAE 1020	SAE 1020	SAE 1020
Nut	920.4	(7)	SAE 1020	SAE 1020	SAE 1020
Nut	920.5	(19)	SAE 1020	SAE 1020	SAE 1020
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	1	SAE 1045	SAE 1045	SAE 1045
Key	940.2	1	SAE 1045	SAE 1045	SAE 1045
Key	940.3	1	SAE 1045	SAE 1045	SAE 1045
Nameplate	970.1/2/3	1	AISI 304	AISI 304	AISI 304

Table 09

NOTES:

- (1) On request Suction strainer ☐ With ☐ Without Foundation rail ☐ With ☐ Without
- (2) Applicable only for ET longer than
Quantity according column length (see table)
- (3) No applicable for ET less than
- (4) Quantity = S - 1,
where S is equal suspension pipe quantity.
- (5) Quantity = E, where E is equal riser pipe quantity.
- (6) ☐ DN2 de 32, 40, 65 and 80 mmQuantity = (4 X E) - 4
☐ DN2 de 100, 125 and 150 mmQuantity = (8 X E) - 8
- (7) ☐ DN2 de 32, 40, 65 and 80 mmQuantity = 4
☐ DN2 de 100, 125 and 150 mmQuantity = 8
- (8) Quantity = (8 X S) - 8
- ☐ Quantity = 6 for the pumps:
32-125 / 32-125.1 / 32-160 / 32-160.1 / 40-125 / 40-160 / 50-125
- ☐ Quantity = 8 for the pumps:
32-200 / 32-200.1 / 40-200 / 50-200 / 65-200 / 100-160 / 100-200
- ☐ Quantity = 10 for the pumps:
32-250 / 32-250.1 / 40-250 / 50-250 / 65-250 / 80-250 / 100-250
125-250 / 150-250
- ☐ Quantity = 12 for the pumps:
40-315 / 50-315 / 65-315 / 80-315 / 100-315 / 150-200 / 150-250
150-315 / 150-400
- ☐ Quantity = 16 for the pumps:
80-400 / 100-400 / 125-400 / 150-400
- No applicable for Motors:
- | Column | Motor frame |
|---------------------|----------------|
| V 30, V 40 e V 40 R | 90 / 160 / 180 |
| V 50 e V 60 | 132 / 225 |
- (10)
- (11) Quantity = S, where S is equal suspension pipe quantity
- (14) Quantity according column length (see table)
- Not applicable for ET less than:
- (15) V 30 = V 50 =
V 40 = V 60 =
V 40 R =
- (16) Quantity = S - 1
- (17) Quantity = S - 1
- ☐ Quantity = 6 for the pumps with Column V 30, V 40 e V 40 R
- ☐ Quantity = 8 for the pumps with Column V 50
- ☐ Quantity = 12 for the pumps with Column V 60
- (18)
- ☐ Quantity = 4 for pumps sizes:
32-125 / 32-125.1 / 32-160 / 32-160.1 / 32-200 / 32-200.1
40-125 / 40-160 / 40-200 / 50-125 / 50-160 / 50-200
- ☐ Quantity = 8 for pumps sizes:
32-250 / 32-250.1 / 40-315 / 50-250 / 50-315 / 65-125 / 65-160
65-200 / 65-250 / 65-315 / 80-160 / 80-200 / 80-250 / 80-315
80-400 / 100-160 / 100-200 / 100-250 / 100-315 / 125-400
150-200 / 150-250 / 150-315 / 150-400
- (19)
- ☐ Quantity = 6 for the motors frame 90, 100 e 112
- ☐ Quantity = 8 for the motors frames 132, 160, 180, 200, 225
- ☐ Quantity = 12 for the motor frame 315
- (20)
- (21) Quantity = 2 X S - 2
- (22) Quantity = S

16.2 Part list and material

KSB Megachem V

Description	Item	QTY.	Combination material		
			03	04	05
Voute casing	102	1	A48 CL 30	CuSn10-C-GS	A743 CF 8 M
Suction strainer	(1) 143	1	SAE 1020	SAE 1020	AISI 316
Discharge elbow	144	1	A106 Gr.B	A106 Gr.B	A312 Gr.304/316
Intermediate lantern	146	1	A48 CL 30	A48 CL 30	A743 CF 8 M
Discharge cover	163	1	A48 CL 30	CuSn10-C-GS	A743 CF 8 M
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	A743 CF 8 M	CuSn10-C-GS	A743 CF 8 M
Axial ball bearing	320	1	Steel	Steel	Steel
Motor stool	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	A743 CF 8 M
Flat gasket	(5) 400.1		Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.2	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.3	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.4	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.5	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Flat gasket	400.6	1	Hydraulic gasket	Hydraulic gasket	Hydraulic gasket
Lip seal	421	1	Rubber	Rubber	Rubber
Casing wear ring	502.1	1	A48 CL 30	CuSn 10-C-Gs	CuSn 10-C-Gs
Casing wear ring	502.2	1	A48 CL 30	CuSn 10-C-Gs	CuSn 10-C-Gs
Spacer ring	504	1	SAE 1020	SAE 1020	SAE 1020
Shaft protecting sleeve	524	1	AISI 316	AISI 316	AISI 316
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	Bronze TM 23	Bronze TM 23	Bronze TM 23
Bearing bush	545.2	1	Bronze TM 23	Bronze TM 23	Bronze TM 23
Washer	554.1	4	SAE 1020	SAE 1020	SAE 1020
Washer	554.2	(6)	SAE 1020	SAE 1020	AISI 316
Washer	554.3	(7)	SAE 1020	SAE 1020	AISI 316
Washer	554.4	(8)	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	59-13	1	SAE 1020	SAE 1020	SAE 1020
Seat plate	(10) 592	1	SAE 1020	SAE 1020	SAE 1020
Grease nipple	636	1	Galvanized steel	Galvanized steel	Galvanized steel
Coupling guard	681	1	SAE 1020	SAE 1020	SAE 1020
Pipeline	700	(11)	Cooper	Cooper	Copper
Riser pipe	711.1	1	A106 Gr.B	A106 Gr.B	A312 - F316
Riser pipe	711.2	1	A106 Gr.B	A106 Gr.B	A312 - F316
Riser pipe	711.3	1	A106 Gr.B	A106 Gr.B	A312 - F316
Suspension pipe	713.1	1	A106 Gr.B	A106 Gr.B	A312 - F316
Suspension pipe	(14) 713.2	1	A106 Gr.B	A106 Gr.B	A312 - F316
Suspension pipe	(15) 713.3	1	A106 Gr.B	A106 Gr.B	A312 - F316
Conection	(16) 720.1	1	Steel	Steel	Steel
Conection	720.2	1	Steel	Steel	Steel
Conection	720.3	(22)	Steel	Steel	Steel
Conection	720.4	1	Steel	Steel	Steel
Motor	801	1			
Clamp strap	81-44	1	SAE 1020	SAE 1020	SAE 1020
Coupling	840	1			
Screwed 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
Screw	900.1	4	Forged steel	Forged steel	Forged steel
Screw	900.2	4	SAE 1020/5.6	SAE 1020	SAE 1020
Hexagon head bolt	901.1	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.2	(6)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.3	4	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Hexagon head bolt	901.4	4	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	(8)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.8	1	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.10	(19)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.11	(18)	SAE 1020/5.6	SAE 1020/5.6	Stainless steel
Hexagon head bolt	901.12	(7)	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Stud	902.1	(20)	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
Stud	902.3	2	SAE 1020/5.6	SAE 1020/5.6	SAE 1020/5.6
Screwed plug	903.5	2	SAE 1020	SAE 1020/5.6	SAE 1020/5.6
Socked head cap screw	914.1	2	SAE 1045	SAE 1045	SAE 1045
Socked head cap screw	(21) 914.2	1	SAE 1045	SAE 1045	Stainless steel
Screwed plug	916.6	2	SAE 1020	SAE 1020	AISI 316
Nut	920.1	(20)	SAE 1020	SAE 1020	SAE 1020
Nut	920.2	(8)	SAE 1020	SAE 1020	Stainless steel
Nut	920.3	(8)	SAE 1020	SAE 1020	Stainless steel
Nut	920.4	(7)	SAE 1020	SAE 1020	Stainless steel
Nut	920.5	(19)	SAE 1020	SAE 1020	Stainless steel
Impeller nut	922	1	SAE 1045	SAE 1045	AISI 316
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	1	SAE 1045	SAE 1045	SAE 1045
Key	940.2	1	SAE 1045	SAE 1045	SAE 1045
Key	940.3	1	SAE 1045	SAE 1045	AISI 420
Nameplate	970.1/2/3	1	AISI 304	AISI 304	AISI 304

NOTES:

- | | | | | |
|-----|------------|---|-----------------|---|
| (1) | On request | <input type="checkbox"/> With
<input type="checkbox"/> Without | Foundation rail | <input type="checkbox"/> With
<input type="checkbox"/> Without |
|-----|------------|---|-----------------|---|

(2) Applicable only for ET longer than
Quantity according column length (see table)

(3) No applicable for ET less than

(4) Quantity = $S - 1$,
where S is equal suspension pipe quantity

(5) Quantity = E, where E is equal riser pipe quantity

(6) ☐ DN2 de 32, 40, 65 and 80 mmQuantity = $(4 \times E) - 4$
☐ DN2 de 100, 125 and 150 mmQuantity = $(8 \times E) - 8$

(7) ☐ DN2 de 32, 40, 65 and 80 mmQuantity = 4
☐ DN2 de 100, 125 and 150 mmQuantity = 8

(8) Quantity = $(8 \times S) - 8$

☐ Quantity = 6 for the pumps:
32-125 / 32-125.1 / 32-160 / 32-160.1 / 40-125 / 40-160 / 50-125

☐ Quantity = 8 for pumps:
32-200 / 32-200.1 / 40-200 / 50-200 / 65-200 / 100-160 / 100-200

☐ Quantity = 10 for the pumps:
32-250 / 32-250.1 / 40-250 / 50-250 / 65-250 / 80-250 / 100-250

(9) 125-250 / 150-250

☐ Quantity = 12 for the pumps:
40-315 / 50-315 / 65-315 / 80-315 / 100-315 / 150-200 / 150-250
150-315 / 150-400

☐ Quantity = 16 for ther pumps:
80-400 / 100-400 / 125-400 / 150-400

No applicable for Motors:

Column	Motor frame
V 30, V 40 e V 40 R	90 / 160 / 180
V 50 e V 60	132 / 225

(10) Quantity = S, where S is equal suspension pipe quantity

(14) Quantity according column length (see table)

Not applicable for ET less than:

(15) V 30 = V 50 =
V 40 = V 60 =
V 40 R =

(16) Quantity = $S - 1$

(17) Quantity = $S - 1$

(18) ☐ Quantity = 6 for pumps with Column V 30, V 40 e V 40 R
☐ Quantity = 8 for pumps with Column V 50
☐ Quantity = 12 for pumps with Column V 60

☐ Quantidade = 4 for pumps sizes:
32-125 / 32-125.1 / 32-160 / 32-160.1 / 32-200 / 32-200.1
40-125 / 40-160 / 40-200 / 50-125 / 50-160 / 50-200

(19) ☐ Quantity = 8 for pumps sizes:
32-250 / 32-250.1 / 40-315 / 50-250 / 50-315 / 65-125 / 65-160
65-200 / 65-250 / 65-315 / 80-160 / 80-200 / 80-250 / 80-315
80-400 / 100-160 / 100-200 / 100-250 / 100-315 / 125-400
150-200 / 150-250 / 150-315 / 150-400

☐ Quantity = 6 for the motor frames 90, 100 e 112

(20) ☐ Quantity = 8 for the motors frames 132, 160, 180,200 e 225,
☐ Quantity = 12 for motor frame 315

(21) Quantity = $2 \times S - 2$

17. Interchangeability of pump components

Pump	Column	Designation							
		Part N°	Volute casing	Discharge cover	Impeller	Wear ring	Wear ring	Shaft protective sleeve	Impeller nut
			102	163	230	502.1	502.2	524	922
									Key
32-125	V 30	2	1	2	1	13	1	1	1
32-125.1		42	1	39	1	13	1	1	1
32-160		4	1	3	1	13	1	1	1
32-160.1		43	1	3	1	13	1	1	1
32-200		6	2	4	1	13	1	1	1
32-200.1		44	2	4	1	13	1	1	1
40-125		7	1	5	2	13	1	1	1
40-160		8	1	6	2	13	1	1	1
40-200		9	2	7	3	13	1	1	1
50-125		10	1	8	4	13	1	1	1
50-160		11	1	9	4	13	1	1	1
50-200		12	2	10	4	13	1	1	1
65-125		13	1	11	5	13	1	1	1
32-250	V 40	15	3	12	1	3	2	2	2
32-250.1		45	3	12	1	3	2	2	2
40-250		16	3	13	2	3	2	2	2
50-250		17	3	14	4	3	2	2	2
65-160		18	4	15	5	15	2	2	2
65-200		19	5	16	6	15	2	2	2
80-160		20	4	17	7	15	2	2	2
40-315	V 40R	21	8	18	2	14	3	3	3
50-315		22	8	19	5	14	3	3	3
65-250		23	7	20	6	16	3	3	3
80-200		24	6	21	7	18	3	3	3
80-250		25	7	22	7	16	3	3	3
100-160		26	6	23	8	18	3	3	3
100-200		27	6	24	8	18	3	3	3
65-315	V 50	28	11	25	6	17	4	4	4
80-315		29	11	26	7	17	4	4	4
80-400		30	12	27	9	10	4	4	4
100-250		31	10	28	8	10	4	4	4
100-315		32	11	29	8	17	4	4	4
100-400		33	12	30	8	10	4	4	4
125-200		34	9	31	10	10	4	4	4
125-250		35	10	32	10	10	4	4	4
125-315		36	11	33	10	17	4	4	4
125-400		37	12	34	10	10	4	4	4
150-200		38	9	35	11	10	4	4	4
150-250		39	10	36	12	10	4	4	4
150-315	V 60	40	13	37	12	10	5	5	5
150-400		41	14	38	12	10	5	5	5

Table 11 - Interchangeability table

For wear rings consider the interchangeability on the horizontal direction. Eg.: wear ring 502.1 of the pump 40-200 is interchangeable with wear ring 502.2 of the following pumps: 32-250.1, 32-250, 40-250 e 50-250

17.1 Interchangeability of motor stool and seat plate

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

Table 12 -Interchangeability of motor stool and seat plate

Notes:

- (1) Change the thread size.
- (2) Change the position and bore diameter.
- (3) Change the position and size.

- | |
|---|
| 1 |
|---|

 Same numbers

1

 (interchangeable parts)
- | |
|---|
| 3 |
|---|

 Different numbers

4

 (non interchangeable parts)
- | |
|---|
| X |
|---|

 Part not existent

17.2 Interchangeability of shafts, bearing bush, centering sleeve, bearing spider, screwed coupling, adjusting nut and bearing cover

One shaft has interchangeability with another since both have the same length. This in function of suspension pipe (713) length that has the standard length as per table 13.

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

Table 13 - Standard length for suspension pipe

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	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
		225 S/M	2	1	1	1	1	1	1	1	1	1
V 40R	90 S/L	3	2	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
		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
V 40	90 S/L	3	2	3	2	2	2	2	2	2	2	2
		100 L	3	2	3	2	2	2	2	2	2	2
		112 M	3	2	3	2	2	2	2	2	2	2
		132 S/M	3	2	3	2	2	2	2	2	2	2
		160 L	4	2	3	2	2	2	2	2	2	2
		180 L	4	2	3	2	2	2	2	2	2	2
		200 L	4	2	3	2	2	2	2	2	2	2
		225 S/M	4	2	3	2	2	2	2	2	2	2
V 50	132 S/M	5	3	4	3	3	3	3	3	3	3	3
		160 L/M	5	3	4	3	3	3	3	3	3	3
		180 L/M	5	3	4	3	3	3	3	3	3	3
		200 L/M	5	3	4	3	3	3	3	3	3	3
		225 S/M	6	3	4	3	3	3	3	3	3	3
		250 S/M	6	3	4	3	3	3	3	3	3	3
		280 S/M	6	3	4	3	3	3	3	3	3	3
		315 S/M	6	3	4	3	3	3	3	3	3	3
V 60	132 S/M	7	4	5	4	4	4	4	4	4	4	4
		160 L/M	7	4	5	4	4	4	4	4	4	4
		180 L/M	7	4	5	4	4	4	4	4	4	4
		200 L/M	7	4	5	4	4	4	4	4	4	4
		225 S/M	8	4	5	4	4	4	4	4	4	4
		250 S/M	8	4	5	4	4	4	4	4	4	4
		280 S/M	8	4	5	4	4	4	4	4	4	4
		315 S/M	8	4	5	4	4	4	4	4	4	4

Table 14

1 Same numbers
1 (interchangeable parts)

3 Different numbers
4 (non interchangeable parts)

X Part not existent

17.3 Interchangeability of the soleplate, rise and suspension piping, lift piping, foundation rail and intermediate lantern

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

Table 15

Notes:

- (1) The suspension pipe has interchangeability with other if both has the same length, in this case are interchangeable for the some pump size as intermediate pipe or fixed at intermediate lantern (see table 13).
- (2) Interchangeable for same length.

1 Same numbers
1 (interchangeable parts)

3 Differentes numbers
4 (non interchangeable parts)

X Part not existent

18. Recommended spare parts

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

Part N°	Designation	Pump quantity (includes reserves)							
		1	2	3	4	5	6 e 7	8 e 9	10 or more
		Spare parts quantity							
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 unity
383	Bearing spider	1	1	1	2	2	2	3	30 %
421	Radial shaft seal 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 bush (set)	1	1	1	1	2	2	4	50 %
545.1	Threaded coupling	1	1	1	2	2	2	4	50 %
852	Flat gasket	1	1	1	2	2	2	3	30 %
--	O'ring kit	4	4	5	8	9	9	12	150 %
--		4	4	6	8	8	8	12	150 %

Table 16 - Recommended spare parts

19. Special recommendations

19.1 Machining of the external impeller diameter

All impellers of stainless steel or bronze should have their vanes adjusted (sharpened) at the outlet of the liquid being pumped, according to illustration on Fig. 13, when the impeller has trimmed its external diameter by machining.

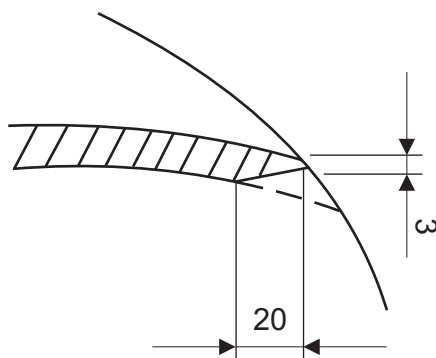


Fig. 13 - Adjusting the Impeller Vanes

The information in this manual can be altered by KSB Bombas Hidráulicas S.A., without previous notice

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