

**Fig. 23: Bearing brackets P03ax to P06x**

Centrifugal pump parts 80-250					
Item	Qty	Drawing reference	Part Number	Description	Scope of Supply & Notes
1	1	2021090		Centrifugal pump	Complete pump
2	1	101	3400101	Impeller housing	with joint ring 411.01(If any) /.02(If any) /.03125) /.10, hexagon head bolt
3	1	135.01	3413501	Inlet wear plate	with joint ring 411.13, O-ring 412.05/.75, hexagon head bolt 901.03, socket head cap screw 914.05 (Note: for 250-315, the wear plate is replaced by casing wear ring 502,01)
4	1	163	3400163	Stuffing box housing	(A-type cover) for models with mechanical seal
5	1	183	3400183	Rear support	with gasket 400.05, joint ring 411.26, hexagon head bolt 901.22
6	1	210	3400210	Impeller shaft	with keywayed nut 920.21, lockwasher 931.01, key 940.01/.02
7	1	230	3400230	Impeller	with gasket 400.04
8	2	320.02	3432002	Ball bearing	
9	1	322.01	3432201	Front bearing	
10	1	330	3400330	Bearing hsng	with bearing cover 360.01, bearing carrier 382, gasket 400.01, joint ring 411.46, O-ring 412.02, lip seal 421.01/.02, support disc 550.23, constant level oiler 638, vent plug 672, screw plug 903.46, socket head cap screw 914.01/.02, circlip 932.01/.03
11	1	344	3400344	Spacer hsng	with forcing screw 901.31, stud 902.04, hexagon nut 920.04
12	1	360.01	3436001	Front bearing plate	with gasket 400.01, socket head cap screw 914.01
13	1	382	3400382	Rear bearing hsng	with O-ring 412.02, grub screw 904.01, socket head cap screw 914.02, circlip 932.03
14	1	400.01	3440001	Packing	
15	1	411.01	3441101	Drain plug	
16	1	411.03	3441103	Plug	
17	1	411.10	3441110	O-ring stuffing box hsng	
18	4	411.13 *	3441113	Hex bolt wear plate	
19	1	411.46	3441146	Oil drain plug	
20	1	412.02	3441202	O-ring rear bearing hsng	
21	1	412.03*	3441203	Impeller cap screw	
22	1	412.05	3441205	O-ring inlet wear plate	
23	1	412.06	3441206	Impeller O-ring	
24	1	412.75	3441275	O-ring inlet wear plate	
25	1	421.01	3442101	Lip seal	
26	1	421.02	3442102	Lip seal rear bearing hsng	

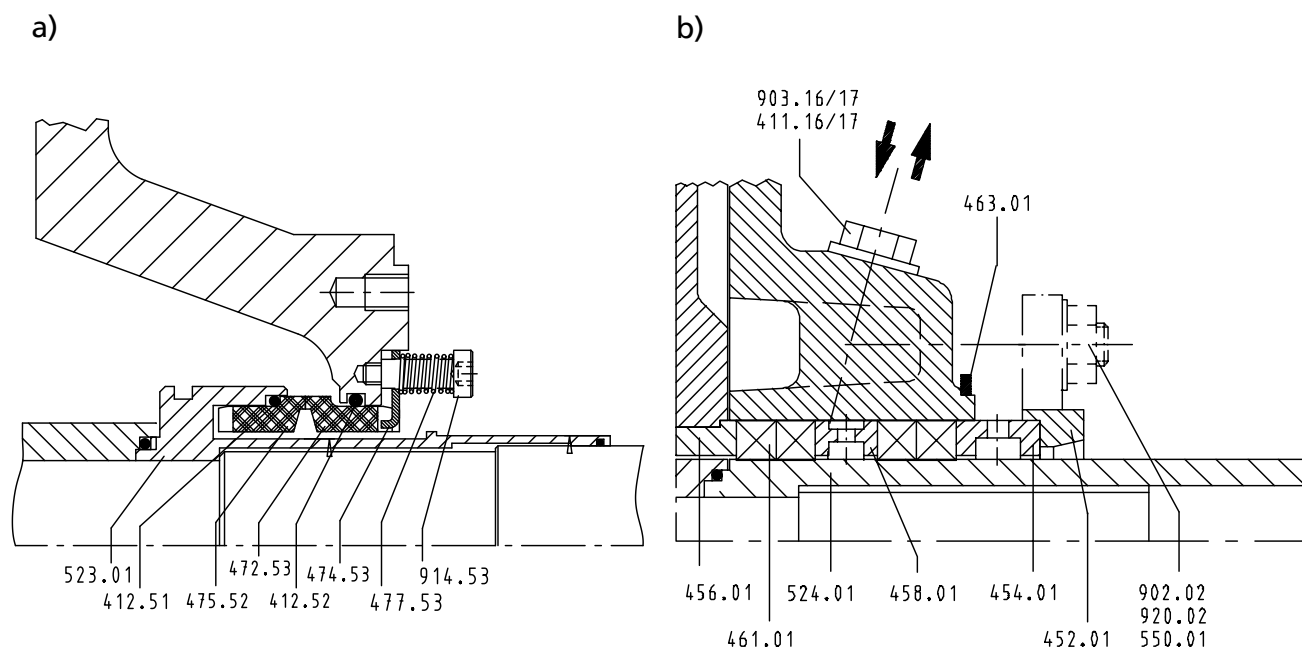
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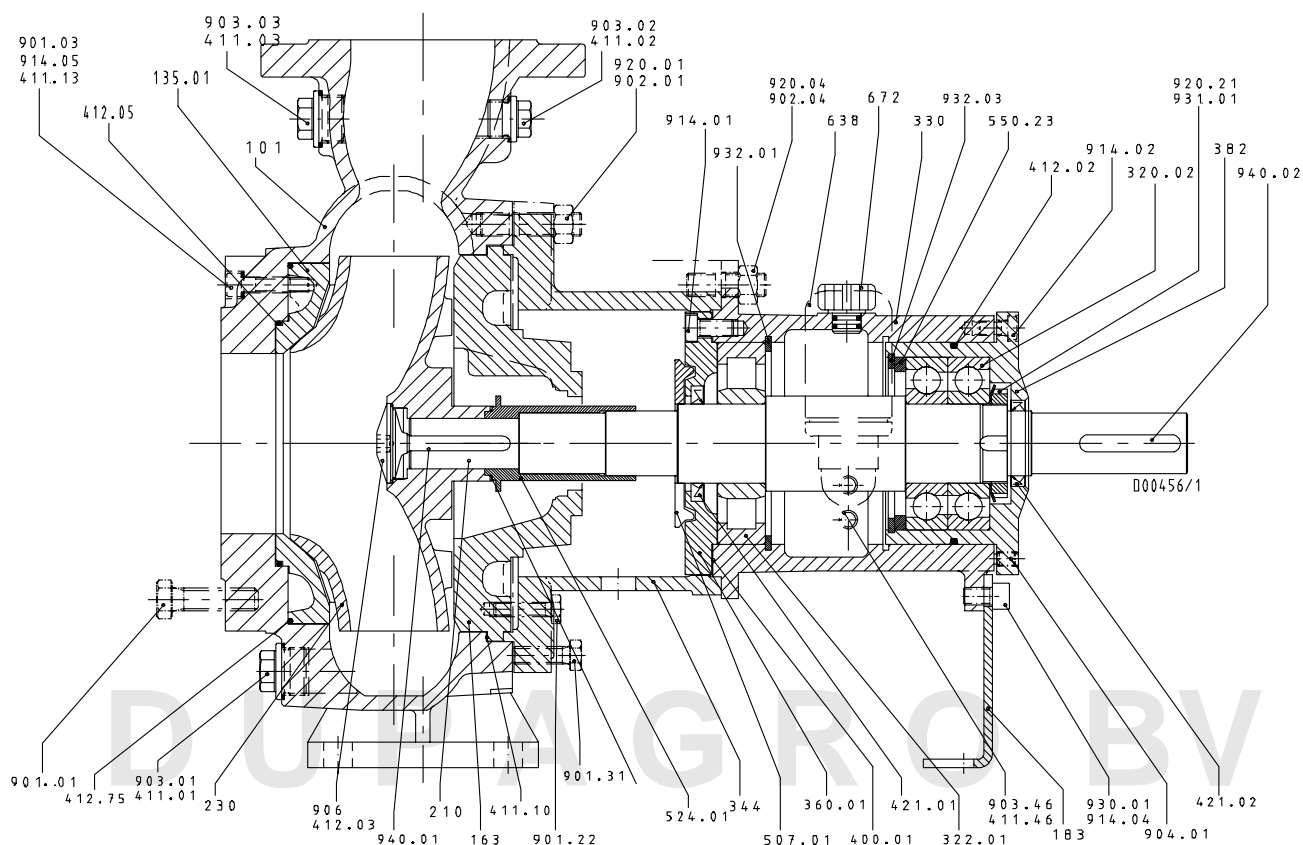
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**Fig. 24:** a) 4K mechanical seal ; b) coolable gland packing

Shaft Seal					
Item	Qty	Drawing	Part	Description	Scope of Supply & Notes
27	1	433.02	3443302	Mechanical seal	with O-Ring 512.51/52, primary ring 472.53, thrust ring 474.53, mating ring 475.52, spring 477.53, socket head cap screw 914.53, shaft sleeve 523.01
28	1	451.01	3445101	Stuffing box housing	/w gasket 400.05, joint ring 411.16/.17/.18/.19/.26, drip plate 463.01, disc



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Item	Qty	Drawing reference	Part Number	Description	Scope of Supply & Notes
29	1	452.01	3445201	Gland follower	550.01, stud 902.02, screw plug 903.16/.17/.18/.19, hexagon nut 920.02
30	1	545.01	3445401	Stuffing box ring, split	
31	1	456.01	3445601	Neck bush	
32	1	458.01	3445801	Lantern ring, split	
33	4	461.01	3446101	Packing ring	
34	1	507.01	3450701	Thrower	
35	1	524.01	3452401	Shaft protecting sleeve	with O-ring 412.06
36	1	906	3400906	Impeller screw	with O-ring 412.03
37		99-9	3400999	Set of sealing elements	with gasket 400.01/.02/.03/.04, joint ring 411.01/.02/.03/.10/.13/.46, O-ring 412.02/.03/.05/.06/.75
38	1	550.23	3455023	Spacer bearing	
39	1	638	3400638	Oil sight glass	
40	1	672	3400672	Oil vent	
41	8	901.01	3490101	Flange mounting bolt	
42	2	901.22	3490122	Bolt stuffing box hsng	
43	3	901.31	3490131	Bolt dis-assy	
44	12	902.01*	3490201	Nut assy impeller hsng	
45	4	902.04	3490204	Nut assy	
46	2	904.01	3490401	Set screw	
47	4	914.01	3491401	Bolt assy spacer hsng	
48	3	914.02	3491402	Bolt rear bearing hsng	
49	1	914.04*	3491404	Mounting bolt rear support	
50	1	931.01*	3493101	Set ring bearing	
51	1	932.01	3493201	Snapping front bearing	
52	1	932.03	3493203	Snap ring	
53	1	940.01	3494001	Impeller key	
54	1	940.02	3494002	Driver key	

## 8 Trouble-shooting

- A** Pump delivers insufficient flow rate
- B** Motor is overloaded
- C** Excessive pump discharge pressure
- D** Increased bearing temperature
- E** Leakage at the pump
- F** Excessive leakage at the shaft seal
- G** Vibrations during pump operation
- H** Impermissible rise of temperature inside the pump

**Table 27:** Trouble-shooting

A	B	C	D	E	F	G	H	Possible cause	Remedy <sup>23)</sup>
X								Pump delivers against an excessively high discharge pressure.	Re-adjust to duty point.
x								Excessively high back pressure.	Check plant for impurities. Fit a larger impeller. <sup>24)</sup> Increase the speed (turbine, I.C. engine).
X						X	X	Pump or piping are not completely vented or primed.	Vent and/or prime.
X								Supply line or impeller clogged.	Remove deposits in the pump and/or piping.
X								Formation of air pockets in the piping.	Modify the piping. Fit a vent valve.
			X		X	X		Pump is warped or sympathetic vibrations in the piping.	Check pipeline connections and secure fixing of pump; if required, reduce the distances between the pipe clamps. Fix the pipelines using anti-vibration material.
X						X	X	Suction head is too high, NPSH <sub>available</sub> (positive suction head) is too low.	Check/alter liquid level. Fully open the shut-off valve in the suction line. Change suction line if the friction losses in the suction line are too high. Check any strainers installed/suction opening. Observe permissible speed of pressure fall.
			X					Increased axial thrust. <sup>24)</sup>	Correct rotor adjustment.
X								Air intake at the shaft seal.	Fit new shaft seal.
X								Wrong direction of rotation.	Interchange two of the phases of the power supply cable.
X	X							Motor is running on two phases only.	Replace the defective fuse. Check the electric cable connections.
X								Speed is too low. - Pump operation with frequency inverter - Pump operation without frequency inverter	- Increase voltage/frequency at the frequency inverter in the permissible range. - Check the voltage.
						X		Defective bearing(s)	Fit new bearing(s).
			X			X	X	Flow rate is too low.	Increase the minimum flow rate.
X						X		Wear of internal pump parts	Replace worn components by new ones.
	X							Density or viscosity of the fluid pumped is higher than stated in the purchase order.	Contact KSB.
					X			Use of unsuitable materials.	Change the material combination.
	X	X						Speed is too high.	Reduce speed. <sup>24)</sup>

<sup>23)</sup> Pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure.

A	B	C	D	E	F	G	H	Possible cause	Remedy <sup>23)</sup>
				X				Tie bolts/gasket defective.	Fit new gasket between volute casing and discharge cover. Re-tighten the bolts.
					X			Worn shaft seal.	Fit new shaft seal.
X					X			Score marks or roughness on shaft protecting sleeve / shaft sleeve	Replace shaft protecting sleeve / shaft sleeve. Fit new shaft seal. Check the balancing line. Check throttling bush / throttle sleeve clearances.
					X			Lack of cooling liquid or dirty cooling chamber.	Increase cooling liquid quantity. Clean out cooling chamber. Purify/clean cooling liquid.
	X				X			Gland follower too tight or askew.	Correct.
	X					X		Pump back pressure is lower than specified in the purchase order.	Re-adjust to duty point.
					X			Vibrations during pump operation	Correct suction conditions. Re-align the pump set. Re-balance the impeller. Increase pressure at the pump suction nozzle.
			X		X	X		The pump set is misaligned.	Re-align the pump set.
			X					Insufficient or excessive quantity of lubricant or unsuitable lubricant.	Top up, reduce or change lubricant.
			X					Non-compliance with specified coupling distance.	Correct distance according to the general arrangement drawing.
	X							Operating voltage is too low.	Increase voltage. Check voltage drop in the power supply cable.
						X		Rotor is out of balance.	Clean impeller. Re-balance impeller.

<sup>23)</sup> Pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure.