

DPK

DPK 0.75 - 22 kW, 50/60 Hz, 1/3~

Service instructions



Original service instructions

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1. Symbols used in this document

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.

**DANGER**

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.

**WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.

**CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:

**SIGNAL WORD****Description of hazard**

Consequence of ignoring the warning.
- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

2. Identification

The nameplate is fitted to the top cover of the pump. Fix the extra nameplate supplied with the pump at the installation site or keep it in the cover of this booklet.

2.1 Nameplate

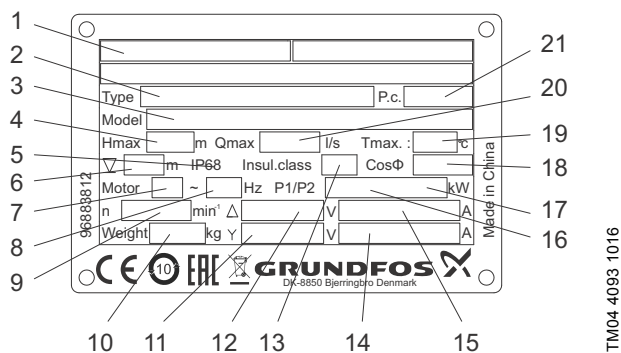


Fig. 1 Nameplate

Pos.	Description
1	Notified body
2	Type designation
3	Product number and serial number
4	Maximum head [m]
5	Enclosure class
6	Maximum installation depth [m]
7	Number of phases
8	Frequency [Hz]
9	Speed [min^{-1}]
10	Weight [kg]
11	Rated voltage [V] Star
12	Rated voltage [V] Delta
13	Insulation class
14	Rated current [A] Star
15	Rated current [A] Delta
16	Motor input power P1 [kW]
17	Motor output power P2 [kW]
18	Power factor
19	Maximum liquid temperature [$^{\circ}\text{C}$]
20	Maximum flow [l/s]
21	Production code (year/week)

2.2 Type key

Code	Example	DPK	.V	.65	.80	.22	.S	.4	.5	0D	Z
DPK	Drainage pump										
	Impeller design										
[]	Semi open impeller										
V	Vortex impeller										
	Free passage										
65	Maximum solids size [mm]										
	Pump outlet										
80	Nominal diameter of pump outlet port [mm]										
	Code for output power, P2										
22	P2* = Code number from type designation / 10 [kW]										
	Equipment										
-	Standard										
S	With extra sensor**										
	Motor pole no.										
2	2-pole motor										
4	4-pole motor										
	Frequency										
5	50 Hz										
6	60 Hz										
	Voltage and starting method										
0D	380-415 V, DOL										
1D	380-415 V, Y/D										
0E	220-240 V, DOL										
1E	220-240 V, Y/D										
Z	Custom-built variant										

* Exception: Code 075 = 0.75 kW.

** Only for 0.75 to 3.7 kW, except for 3.0 kW.

3. Tightening torques

Position numbers (refer to figures in sections 5. *Dismantling* and 6. *Assembly*).

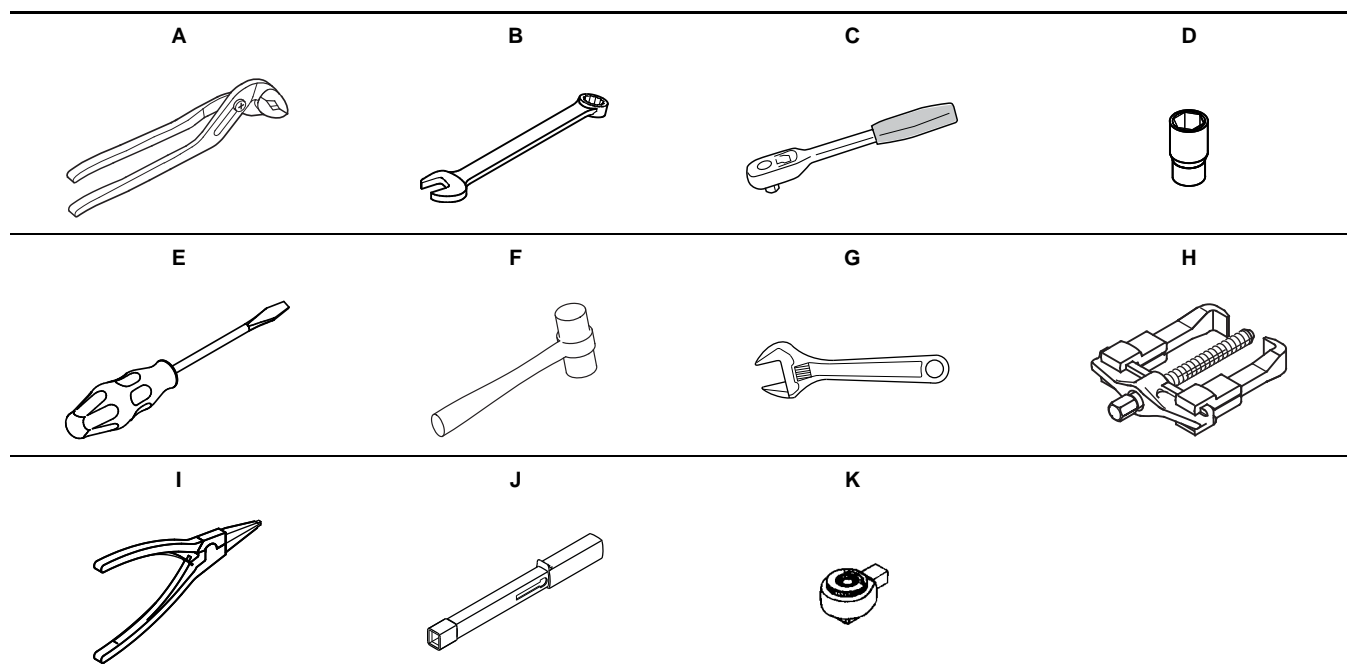
Pos.	Pump type	Designation	Dimension	Torque [Nm]	Lubricant
All	All	O-rings			Rocol
35	DPK	Screw		25	
60a	All	Screw		20	
88	DPK.V	Screw	M10	50	
			M12	75	
105b	All	Socket-head screw		15	
178	DPK.10.XX DPK.15.XX (3.0 kW only) DPK.15-20.XX DPK.V.65.80.15.2 DPK.V.65.80.22.2 DPK.V. others	Screw		20	
				25	
				20	
				25	
				25	
181a	DPK.10.XX DPK.15.XX (3.0 kW only) DPK.15 -20.XX DPK.V.65.80.15.2 DPK.V.65.80.22.2 DPK.V others	Screw		12	
				25	
				12	
				25	
				25	
182	All	Socket-head screw		30	
183	DPK.10.XX DPK.15.XX (3.0 kW only) DPK.15 -20.XX DPK.V.65.80.15.2 DPK.V.65.80.22.2 DPK.V others	Screw		30	
				45	
				30	
				45	
				45	
183b	DPK.20.150.XX	Screw		45	
184	DPK.10.XX DPK.15 -20.XX DPK.V.65.80.15.2 DPK.V.65.80.22.2 DPK.V	Screw		30	
				45	
				30	
				45	
				45	
188	DPK.10.XX DPK.15.XX (3.0 kW only) DPK.15 -20.XX DPK.V	Nut		55	
				60	
				70	
				55	
188a	DPK.10.50.XX DPK.15.XX DPK.20.100.XX DPK.20.150.XX DPK.V.65.80.15.2 DPK.V.65.80.22.2 DPK.V	Screw		25	
				45	
				30	
				25	
				25	
				45	
190b	DPK.20.150.XX	Screw		45	
193	All			15	

THREAD-EZE, part number SV9997 (0.5 litre).

Gardolube L 6034, part number SV9995 (1 litre).

Rocol 22, part number RM2924 (1 kg).

4. Service tools



4.1 Standard tools

Pos.	Description	Further information	Part number
A	Multigrip pliers		SV0150
		10 mm	SV0083
B	Ring/open-end spanner	13 mm	SV0055
		17 mm	SV0056
		19 mm	SV0063
		24 mm	SV0122
C	Ratchet handle		96777072
		17 mm	SV0417
D	Hexagon socket	19 mm	SV0419
		24 mm	SV0424
		30 mm	
		36 mm	
E	Screwdriver		
F	Rubber mallet		
G	Adjustable wrench		SV0349
H	Puller for bearing		SV0335
I	Circlip pliers		SV2014

4.2 Torque tools

Pos.	Description	Further information	Part number
J	Torque wrench	9 x 12 mm - 4-20 Nm	SV2092
		9 x 12 mm - 20-100 Nm	SV0269
K	Ratchet insert tool	9 x 12 mm - 1/2"	SV0295

5. Dismantling

5.1 General information

If the pump needs to be dismantled, either because it is choked or damaged, follow the instructions in the following sections.

Parts are signalled by a position number and refer to drawings and parts lists. Tools are signalled by a letter and refer to section 4. *Service tools*.

Before dismantling the pump

- Disconnect the power supply to the motor.
- Remove the power cable in accordance with local regulations.
- Be aware of the centre of gravity of the pump in order to prevent it from overturning.
This is especially important in the case of high pumps.

Before assembly

- Clean and check all parts.
- Replace defective parts by new parts.
- Order the necessary service kits.
- Always replace gaskets and O-rings when the pump is overhauled.

During assembly

- Lubricate and tighten screws and nuts to correct torque. See section 3. *Tightening torques*.

5.2 Oil change

After 3000 operating hours or once a year, change the oil in the oil chamber as described below.

If the shaft seal has been changed, the oil must be changed as well.

WARNING

Pressurised system



Death or serious personal injury

- When loosening the screws of the oil chamber, note that pressure may have built up in the chamber. Do not remove the screws until the pressure has been fully relieved.

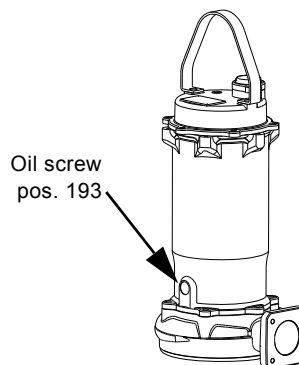


Fig. 2 Position of oil screw on DPK

1. Place the pump on a plane surface with the oil screw pointing downwards.
2. Place a container under the pump. The container must be able to hold the oil of the specific pump. The quantity of oil for the specific pump appears from the table below.

CAUTION

Biological hazard



Minor or moderate personal injury

- Dispose of used oil in accordance with local regulations.

3. Remove the oil screw (pos. 193 - M12 x 20) and let the oil drain into the container.
If 20 % of the liquid in the container is water, the shaft seal is defective and must be replaced. You can see this at once as water and oil will separate almost immediately.



If the same shaft seal is still used, the motor will be damaged within a short time.

4. Turn the pump so that the oil filling hole is pointing upwards.

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5. Add the appropriate quantity of oil to the specific pump. See the table below.

Pump type	No. of poles	Shaft power [kW]	Oil capacity [l]
DPK	2-pole	0.75	0.40
		1.5	
		2.2	
		3.0	
		3.7	0.92
		5.5	
		7.5	
		11	
		15	
		19	
22	2.20		
2.2		0.44	
3.7			
5.5			
7.5			
DPK.V	2-pole	1.5	0.88
		2.2	
		3.7	
		5.5	1.84
		7.5	
		4-pole	1.5
2.2			
3.7	1.82		
5.5			
7.5			

6. Clean the O-ring seats on the pump and on the oil screw (193).
7. Lubricate and mount a new O-ring (194) on the oil screw. Lubricate and tighten the oil screw to correct torque. See section 3. [Tightening torques](#).

5.3 Removing impeller and pump housing

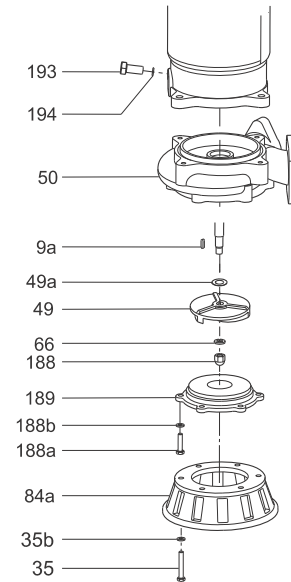


Fig. 3 Removing the impeller and pump housing

1. Drain oil from the oil chamber. See section 5.2 [Oil change](#).
2. Remove the inlet strainer/ring stand (84a).
3. Remove the inlet cover (189).
4. Remove the impeller (49).
5. Remove the key (9a) from the shaft.
6. Remove the pump housing (50).

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5.4 Removing shaft seals

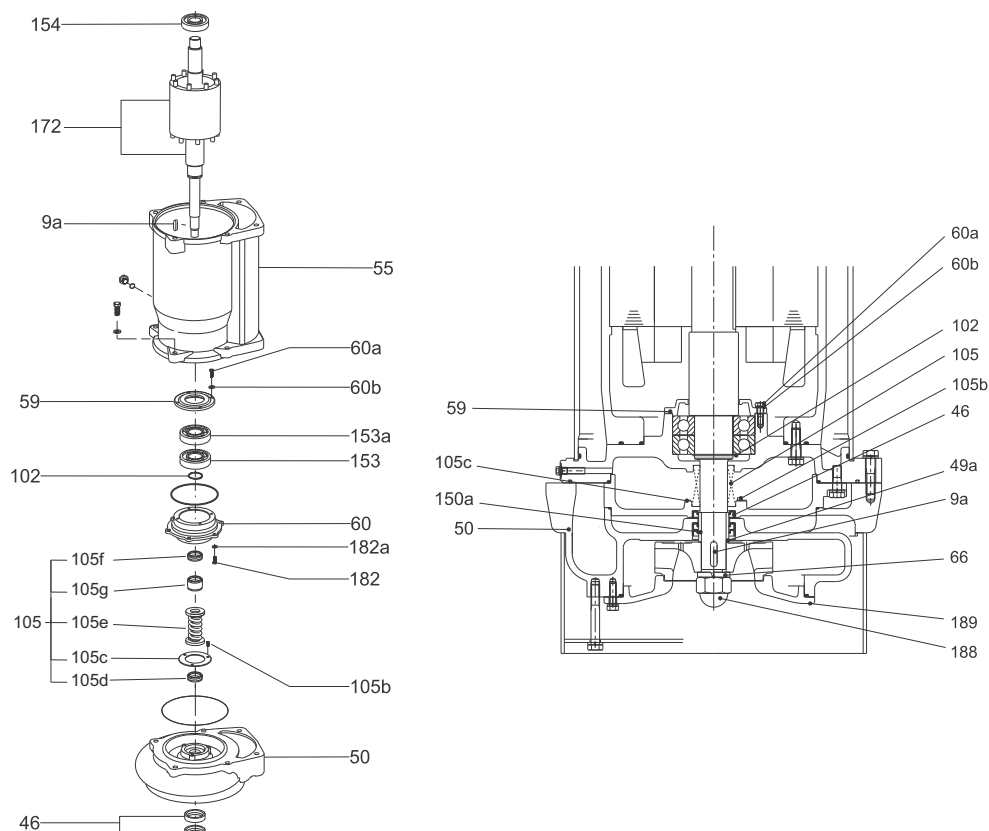


Fig. 4 Removing the shaft seal and bearings

1. Drain oil from the oil chamber. See section [5.2 Oil change](#).
2. Remove the impeller and pump housing. See section [5.3 Removing impeller and pump housing](#).
3. Remove the stationary shaft seal part (105d) of the shaft seal (105) from the pump housing (50).
4. Remove the lip seals (46) from the pump housing or cover for the oil chamber if fitted.
5. Remove rotating parts of the shaft seal (105e and 105g) from the shaft.
6. Remove the lower bearing bracket (60) and the rotor (172).
7. Remove the cover for bearings (59).
8. Remove the stationary shaft seal part (105f) from the lower bearing bracket (60).

5.5 Removing bearings

1. Drain oil from the oil chamber. See section [5.2 Oil change](#).
2. Remove the impeller and pump housing. See section [5.3 Removing impeller and pump housing](#).
3. Remove the lower bearing bracket (60) and the rotor (172).
4. Remove the cover for bearings (59) from the lower bearing bracket.
5. Remove the lower bearing (153 and 153a), if mounted, from the shaft using a puller for bearings (H).
6. Remove the upper bearing (154) from the shaft using a puller for bearings (H).

5.6 Removing cable

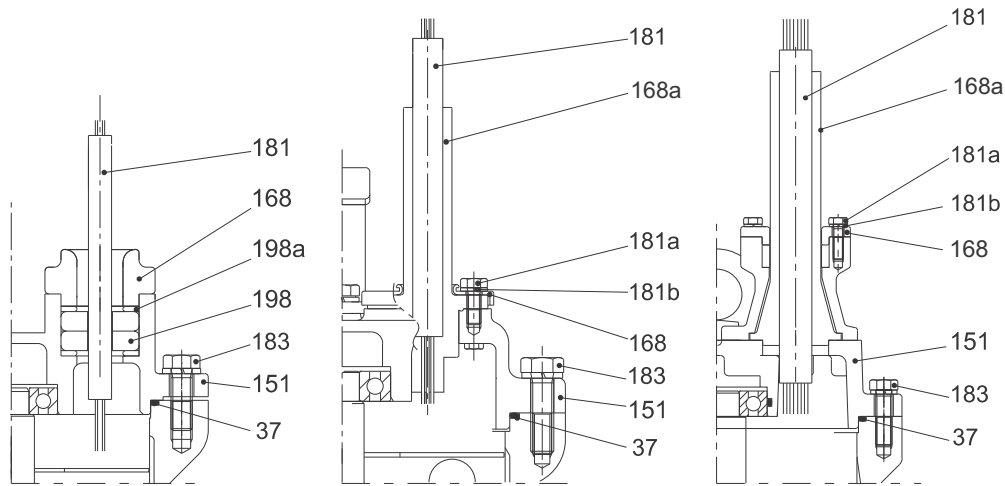


Fig. 5 Cable entries

1. Disconnect the power supply to the motor.
2. Remove the top cover (151).
3. Disconnect power and signal conductors from the top cover.
4. Remove the cover for the cable entry (168).
5. Remove the cable (181).



Make sure that the stator will not be damaged when dropping out of the stator housing.

5.7 Removing stator

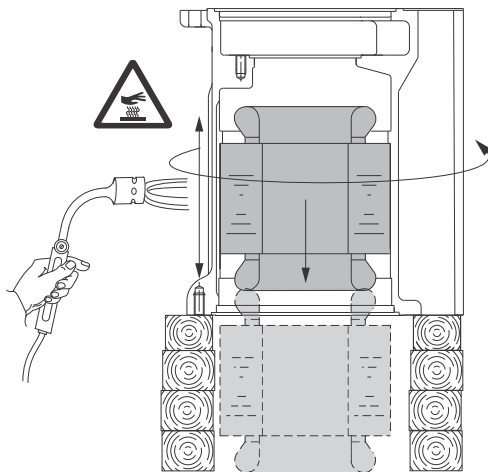


Fig. 6 Heating up the stator housing in order to remove the stator

1. Drain oil from the oil chamber. See section [5.2 Oil change](#).
2. Remove the impeller and pump housing. See section [5.3 Removing impeller and pump housing](#).
3. Remove the lower bearing bracket (60) and the rotor (172).
4. Remove the cover for bearings (59) from the lower bearing bracket.
5. Remove the top cover (151).
6. Disconnect power and signal conductors from the top cover.
7. Protect the free conductors from the heat of the stator.
8. Mark the position of stator conductors on the stator housing for later refitting the stator in the same position.
9. Block up the stator housing in upside-down position as shown in fig. 6.
10. Slowly heat up the stator housing evenly until the stator drops out.

WARNING

Hot surface

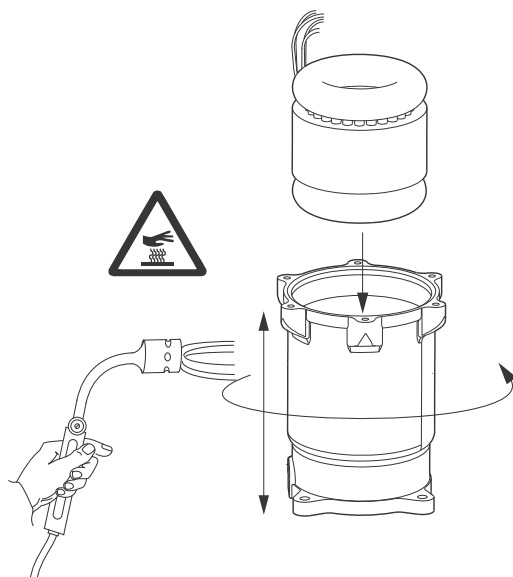
Death or serious personal injury

- Make sure not to touch the surface of the stator housing to avoid burns or personal injury.



6. Assembly

6.1 Fitting stator



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Fig. 7 Heating up the stator housing before fitting the stator

1. Place the stator housing in upright position.
2. Protect the free conductors from the heat of the stator.
3. Slowly heat up the stator housing evenly to approximately 200 °C.

WARNING



Hot surface

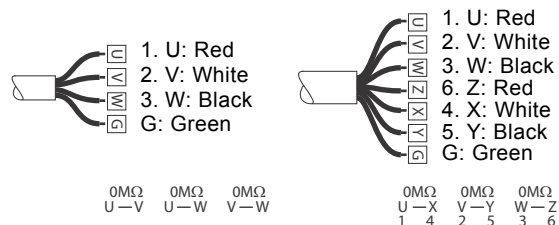
Death or serious personal injury

- Make sure not to touch the surface of the stator housing to avoid burns or personal injury.

4. Make sure the stator is placed in correct position according to section 5.7 *Removing stator*, point 8.
5. Lower the stator into the preheated stator housing.
6. Make sure the stator reaches the bottom recess in the stator housing.
7. Let the stator housing cool down by natural cooling.

6.2 Fitting cable

1. Fit the cable in the top cover (151).
2. Fit and lubricate the O-ring (37) on the top cover (151). See section 3. *Tightening torques*.
3. Connect power and signal conductors to the top cover. See figs 8 to 10.
4. Check the connection again. See fig. 8.
5. Fit the top cover (151) on the stator housing, tighten the screws (183) according to torques in section 3. *Tightening torques*.
6. Fit the cable entry (168), tighten the screws (181a) according to torques in section 3. *Tightening torques*.



When checking pumps wired star-delta to DOL, see the list below.

- | | | | |
|------|--------|---|----------------|
| U, Z | (1, 6) | → | L ₁ |
| V, X | (2, 4) | → | L ₂ |
| W, Y | (3, 5) | → | L ₃ |

Fig. 8 Marking of conductors

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6.3 Fitting bearings

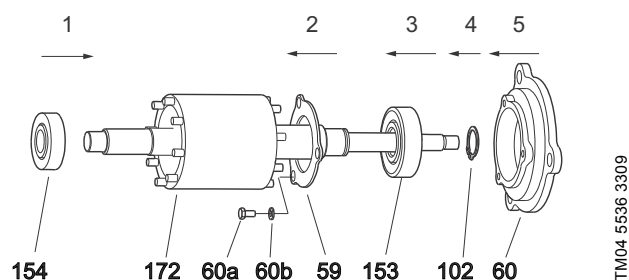


Fig. 11 Fitting bearings

1. Fit the upper bearing (154) on the shaft.



Only press on the inner bearing ring.

2. Fit the bearing cover (59) on the shaft.
3. Fit the lower bearing (153) on the shaft. Some pump models have two lower bearings (153 and 153a).



Only press on the inner bearing ring.

4. Fit the stop ring (102) behind the lower bearing/bearings.
5. Fit the lower bearing bracket (60).

6.4 Fitting shaft seals

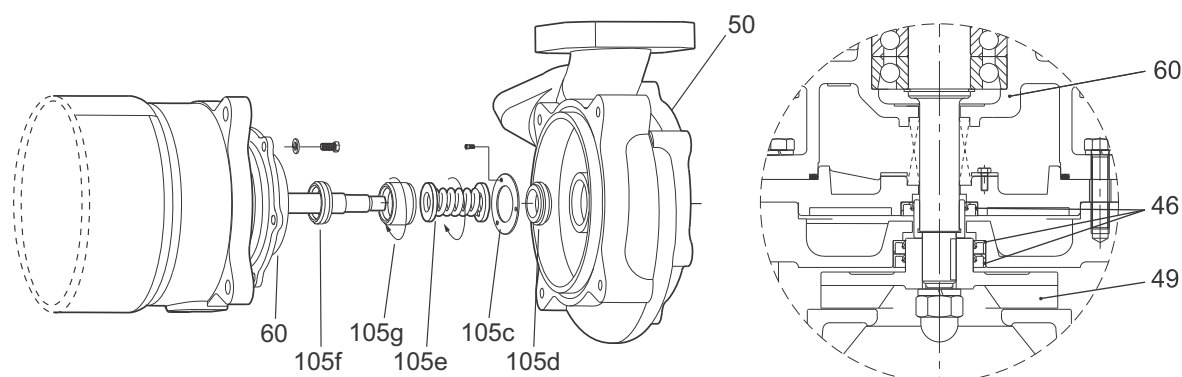


Fig. 12 Fitting the shaft seal

1. Fit the stationary shaft seal part (105f) into the lower bearing bracket (60).
2. Fit the bearing bracket (60) on the shaft and press it against the bearing till the bearing is pressed home in the bearing bracket.
3. Mount the rotor with the shaft and bearing bracket in the stator housing.
4. Fit the stationary shaft seal part (105d) into the pump housing (50).
5. For pumps with lip seals (46), fit the lip seals into the pump housing and cover for the oil chamber.
6. Mount rotating shaft seal parts (105g and 105e) on the shaft.
7. Mount the pump housing on the stator housing.

6.5 Fitting impeller and pump housing

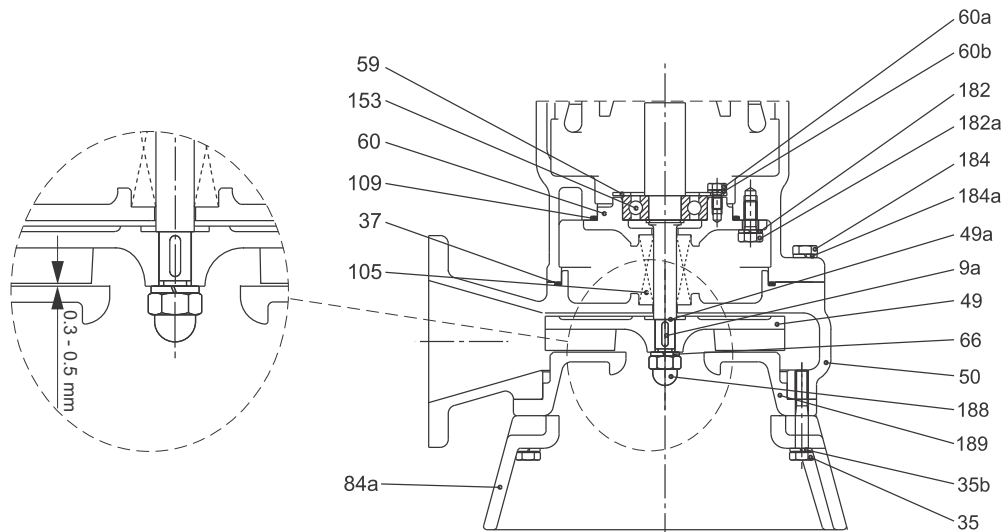


Fig. 13 Impeller and pump housing assembly and impeller clearance

1. Fit and lubricate the O-ring (37 or 39) on the pump housing (50).
2. Fit the pump housing (50) and tighten the screws (184) according to torques in the table in section [3. Tightening torques](#).
3. Fit spacer rings (49a) to the shaft.
4. Fit the key (9a) in the shaft.
5. Fit the impeller (49) on the shaft and tighten the nut (188) according to torques in the table in section [3. Tightening torques](#).
6. Fit the inlet cover (189) to the pump housing and tighten the screws (188a) according to torques in the table in section [3. Tightening torques](#).
7. Check the impeller clearance. See fig. 13. The impeller clearance must be between 0.3 and 0.5 mm. If the impeller clearance is outside this range, dismantle the impeller and add or remove spacer rings to obtain the right clearance. Then check the clearance again.
8. Fit the inlet strainer or ring stand (84a) and tighten the screws (35) according to torques in the table in section [3. Tightening torques](#).

7. Fault finding

DANGER

Electric shock



Death or serious personal injury

- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.



For pumps with sensor, start fault finding by checking the status on the GU01 or GU02 front panel. See installation and operating instructions for GU01 or GU02.

Fault	Cause	Remedy
1. The motor does not start, fuses blow or the motor protector trips immediately. Caution: Do not try to start again.	a) Supply failure; short-circuit; earth-leakage fault in cable or motor winding.	Have the cable and motor checked and repaired by a qualified electrician.
	b) Fuses blow due to use of wrong type of fuse	Fit fuses of the correct type.
	c) The impeller is blocked by impurities.	Clean the impeller.
	d) An air bell, float switch or electrode is out of adjustment or defective.	Check the air bells, float switches or electrodes, and make adjustments or replace or repair the defective parts, if any.
	e) Motor phase malfunction	Inspect the motor and connections.
2. The pump operates, but the motor protector trips after a short while.	a) Low setting of thermal relay in the motor protector.	Set the relay in accordance with the specifications on the pump nameplate.
	b) Increased current consumption due to large voltage drop.	Measure the voltage between two motor phases. Tolerance: - 10 %/+ 6 %.
	c) The impeller is blocked by impurities.	Clean the impeller.
	d) Wrong direction of rotation.	Check the direction of rotation and possibly interchange any two phases in the power supply.
3. The thermal switch of the pump trips after a short while.	a) Too high liquid temperature. Inadequate cooling.	Improve cooling or lower the liquid temperature.
	b) Too high viscosity of the pumped liquid.	Dilute the pumped liquid.
	c) Fault in the electrical connection. (Y-connection of the pump to D-connection results in considerable undervoltage)	Check and correct the electrical connection.
4. The pump operates at below-standard performance and power consumption.	a) The impeller is blocked by impurities.	Clean the impeller.
	b) Wrong direction of rotation.	Check the direction of rotation and possibly interchange any two phases in the power supply.
5. The pump operates, but gives no liquid.	a) Air in the pump.	Vent the pump twice.
	b) The outlet valve is closed or blocked.	Check the outlet valve and possibly open and/or clean.
	c) The non-return valve is blocked.	Clean the non-return valve.
6. The pump is clogged.	a) The liquid contains large particles.	Select a pump with a larger size of passage.
	b) A float layer has formed on the surface.	Install a mixer in the tank.

8. Components and material specification

The position numbers in the table below refer to the sectional drawings on the following pages.

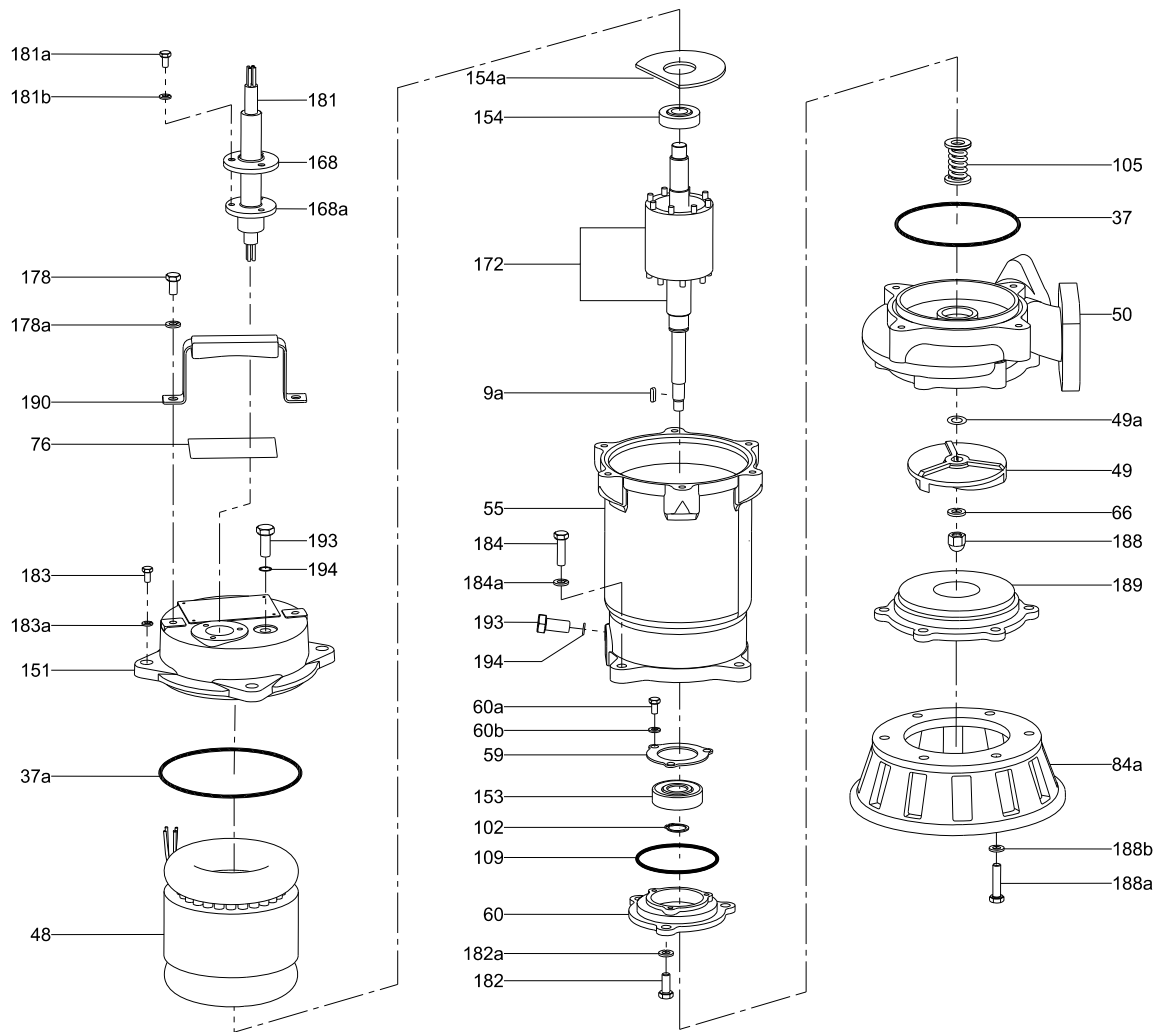
Pos.	Designation	Material		
		KS	ASTM	DIN
9a	Key	STS410	ANSI 410	17440
12	Flange	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
13	Hose connection	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
26	O-ring	NBR	NBR	NBR
26a	Washer	STS304	A276-304	1.4301
26b	Screw	SM25C	A108-1025	-
35	Hexagon head-cap screw	STS304	A276-304	1.4301
35a	O-ring	NBR	NBR	NBR
35b	Spring washer	STS304	A276-304	1.4301
35c	Gasket	NBR	NBR	NBR
37	O-ring	NBR	NBR	NBR
37a	O-ring	NBR	NBR	NBR
37b	O-ring	NBR	NBR	NBR
37c	O-ring	NBR	NBR	NBR
37e	Gasket	NBR	NBR	NBR
39	O-ring	NBR	NBR	NBR
39a	O-ring	NBR	NBR	NBR
39b	O-ring	NBR	NBR	NBR
39c	O-ring	NBR	NBR	NBR
39e	Gasket	NBR	NBR	NBR
46	Lip seal	SCP1	SCP1	SCP1
46a	Lip seal	SCP1	SCP1	SCP1
48	Stator	-	-	-
48a	Cable inlet cover	GC250	A48-CL35	GG25
49	Impeller ²	GCD450/ Hi-Cr	A536-77/ Hi-Cr	GGG45/ Hi-Cr
49a	Spacer ring	SS400	A283-Gr.D	-
50	Pump housing ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
55	Motor housing ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
59	Bearing cover ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
60	Lower bearing bracket ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
60a	Hexagon head-cap screw	SM25C	A108-1025	-
60b	Spring washer	SM25C	A108-1025	-
66	Spring washer	STS304	A276-304	1.4301
76	Nameplate	STS304	A276-304	1.4301
84a	Inlet strainer/ ring stand	SS400	A283-Gr.D	-
84b	Hexagon head cap screw	STS304	A276-304	1.4301
84c	Spring washer	STS304	A276-304	1.4301
88	Hexagon-socket head-cap screw	-	-	-
102	Stop ring	STS304	A276-304	1.4301
105	Mechanical shaft seal	-	-	-
105b	Hexagon head-cap screw	SM25C	A108-1025	-
105c	Shaft seal retainer	STS304	A276-304	1.4301
107	O-ring	NBR	NBR	NBR
108	Sealing washer	STS304	A276-304	1.4301
108a	O-ring	NBR	NBR	NBR
109	O-ring	NBR	NBR	NBR
109a	O-ring	NBR	NBR	NBR
150	Shaft sleeve	STS304	A276-304	1.4301
150a	Sleeve	-	-	-
150b	Sleeve	-	-	-
150c	Slide bearing	Bronze	Bronze	Bronze
151	Head cover (DPK) ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
153				
153a	Lower bearing	-	-	-

Pos.	Designation	Material		
		KS	ASTM	DIN
154	Upper bearing	-	-	-
154a	Cover	-	-	-
155	Shaft seal housing ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
159	Rubber tube	NBR	NBR	NBR
159a	Clamping ring ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
168	Clamping ring ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
168a	Cable entry ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
172	Rotor with shaft	STS410	ANSI 410	-
178	Hexagon head-cap screw	STS304	A276-304	1.4301
178a	Spring washer	STS304	A276-304	1.4301
181	Power cable	PNCT	PNCT	PNCT
181a	Hexagon head-cap screw	STS304	A276-304	1.4301
181b	Spring washer	STS304	A276-304	1.4301
182	Hexagon-socket head-cap screw	STS304	A276-304	1.4301
182a	Spring washer	STS304	A276-304	1.4301
183	Hexagon head-cap screw	STS304	A276-304	1.4301
183a	Spring washer	STS304	A276-304	1.4301
183b	Hexagon head-cap screw	STS304	A276-304	1.4301
183c	Spring washer	STS304	A276-304	1.4301
184	Hexagon head-cap screw	STS304	A276-304	1.4301
184a	Spring washer	STS304	A276-304	1.4301
184b	Hexagon head-cap screw	STS304	A276-304	1.4301
184c	Spring washer	STS304	A276-304	1.4301
184f	O-ring	NBR	NBR	NBR
185	O-ring	NBR	NBR	NBR
186	Hexagon head-cap screw	STS304	A276-304	1.4301
186a	Spring washer	STS304	A276-304	1.4301
188	Hexagon nut	STS304	A276-304	1.4301
188a	Hexagon head-cap screw	STS304	A276-304	1.4301
188b	Spring washer	STS304	A276-304	1.4301
189	Inlet cover (DPK) ¹	GC200/ GC250	A48-CL30/ A48-CL35	GG20/ GG25
190	Lifting bracket	STS304	A276-304	1.4301
190d	Eyebolt	SM30C	A108-1030	-
193	Oil plug	STS304	A276-304	1.4301
194	O-ring	NBR	NBR	NBR
198	Cable gland	NBR	NBR	NBR
198a	Washer	STS304	A276-304	1.4301
522	Hexagon head-cap screw	STS304	A276-304	1.4301
523	Spring washer	STS304	A276-304	1.4301

¹ Materials for products up to and including 15 kW products / 19 kW and up.

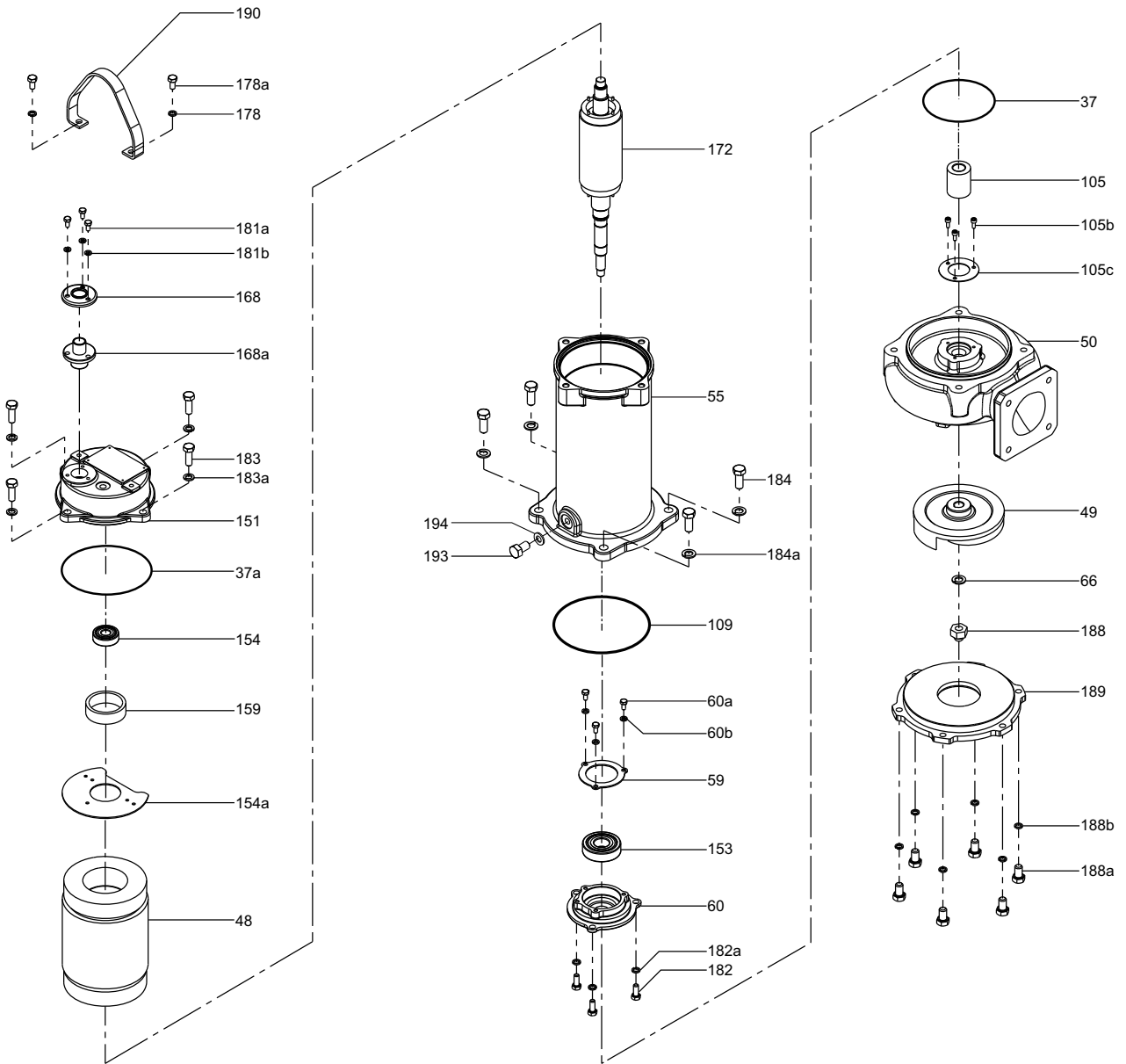
² Impeller has the material option of Hi-Cr, except for DPK 3.0 kW.

8.1 DPK.10.50.075, DPK.10.50.15 and DPK.10.80.22



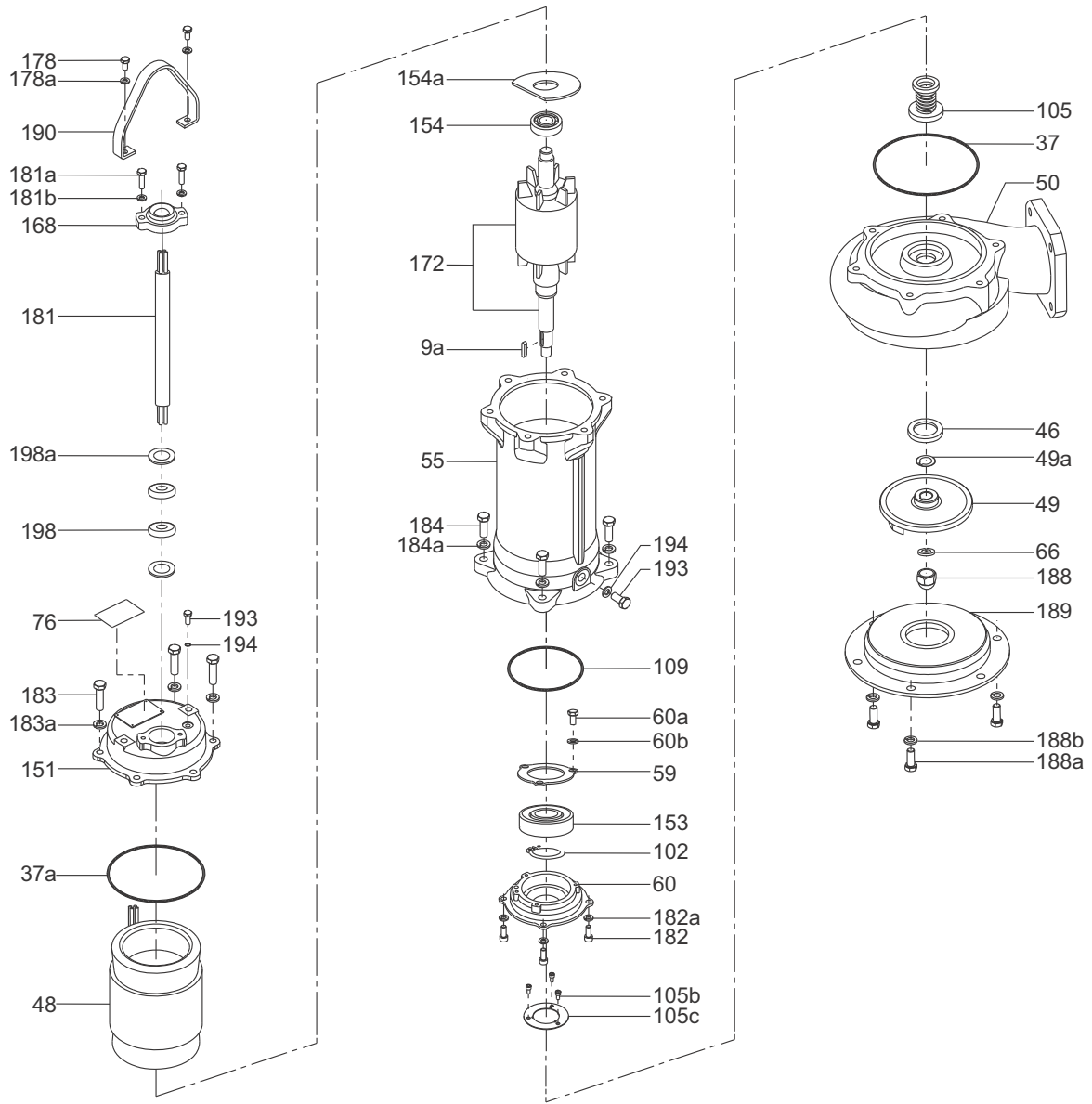
TM04 4365 4214

8.2 DPK.15.80.30

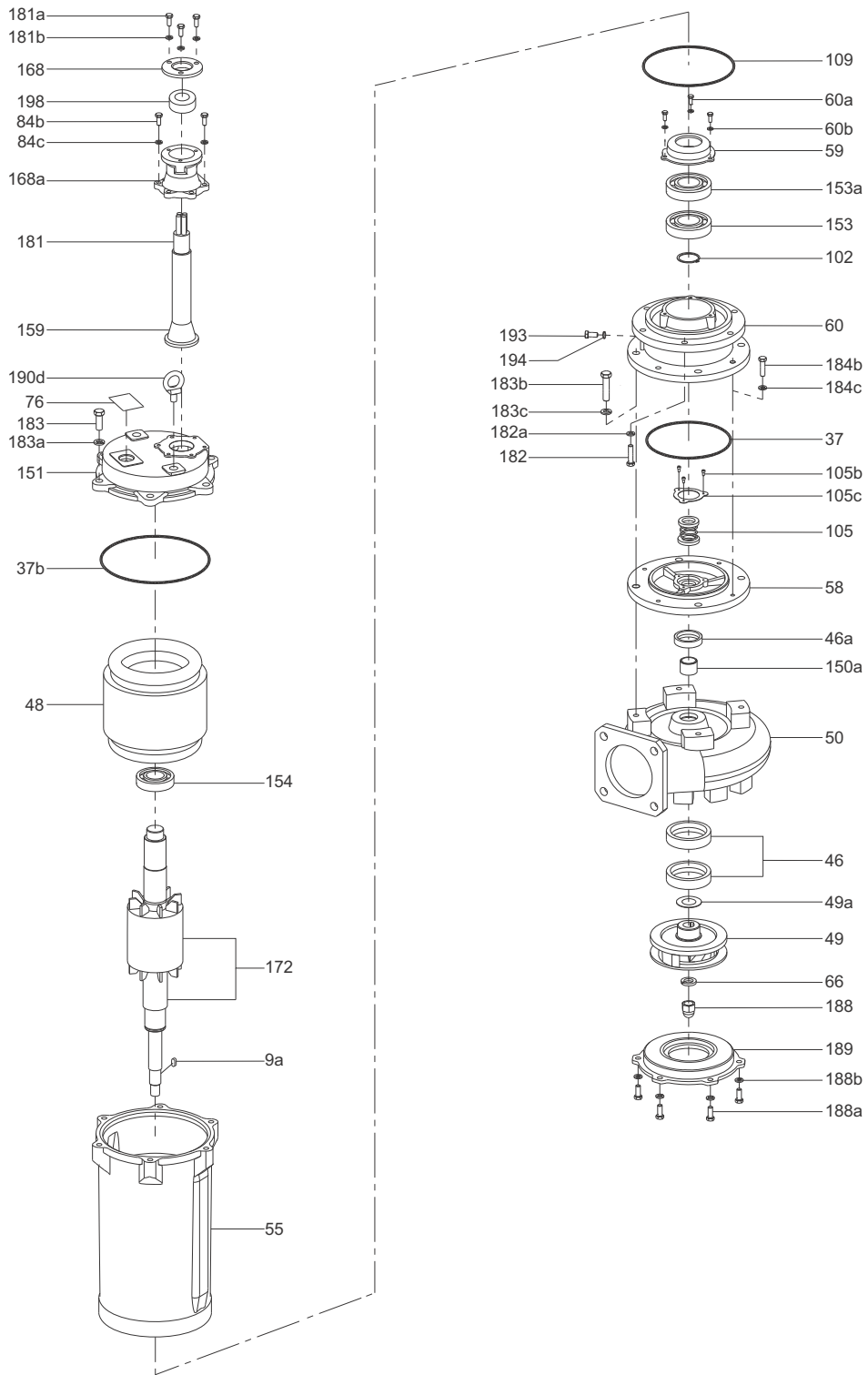


TM07 2846 0619

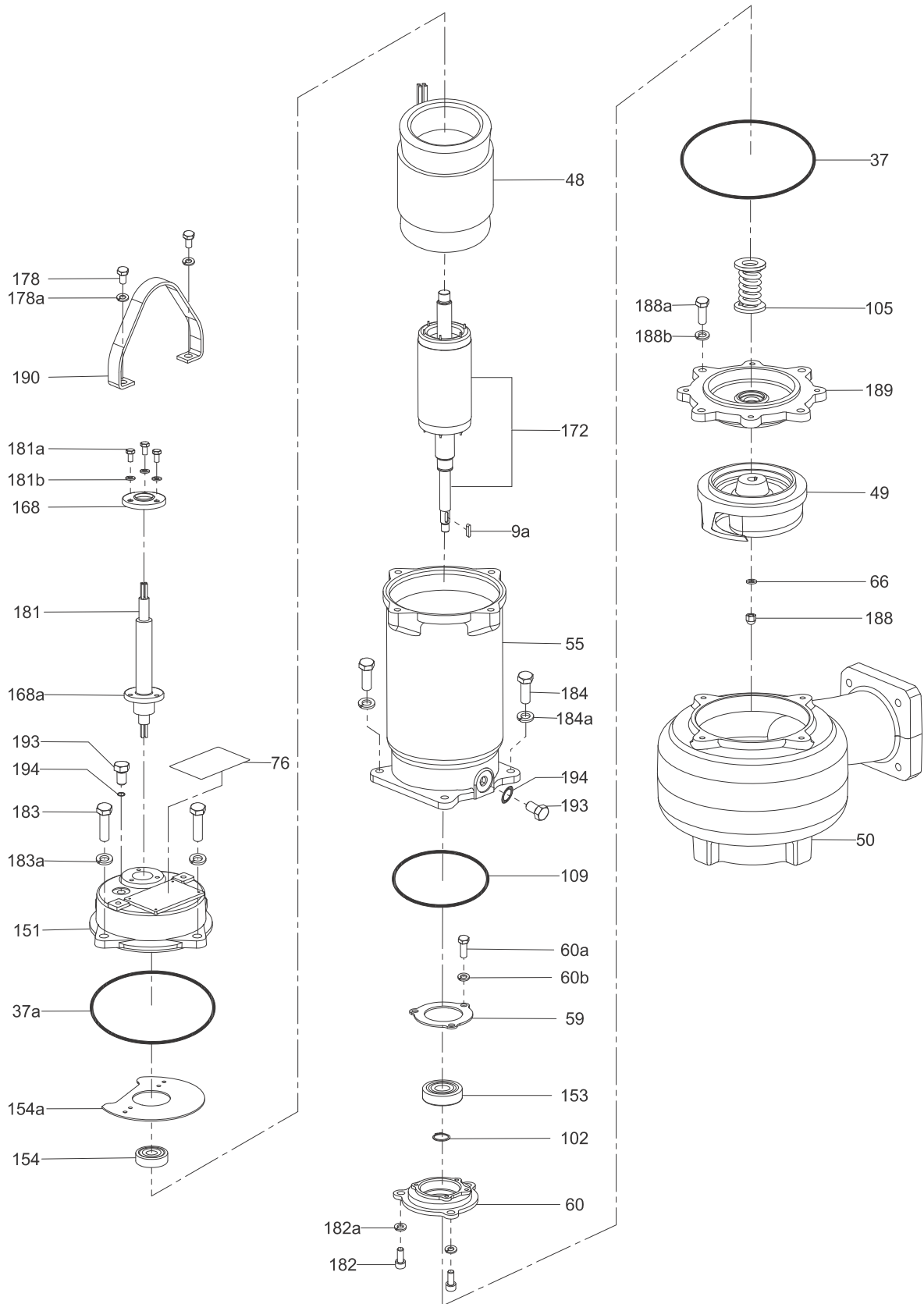
8.3 DPK.15.80.37, DPK.15.80.55, DPK.15.100.75, DPK.20.100.110 and DPK.20.100.150



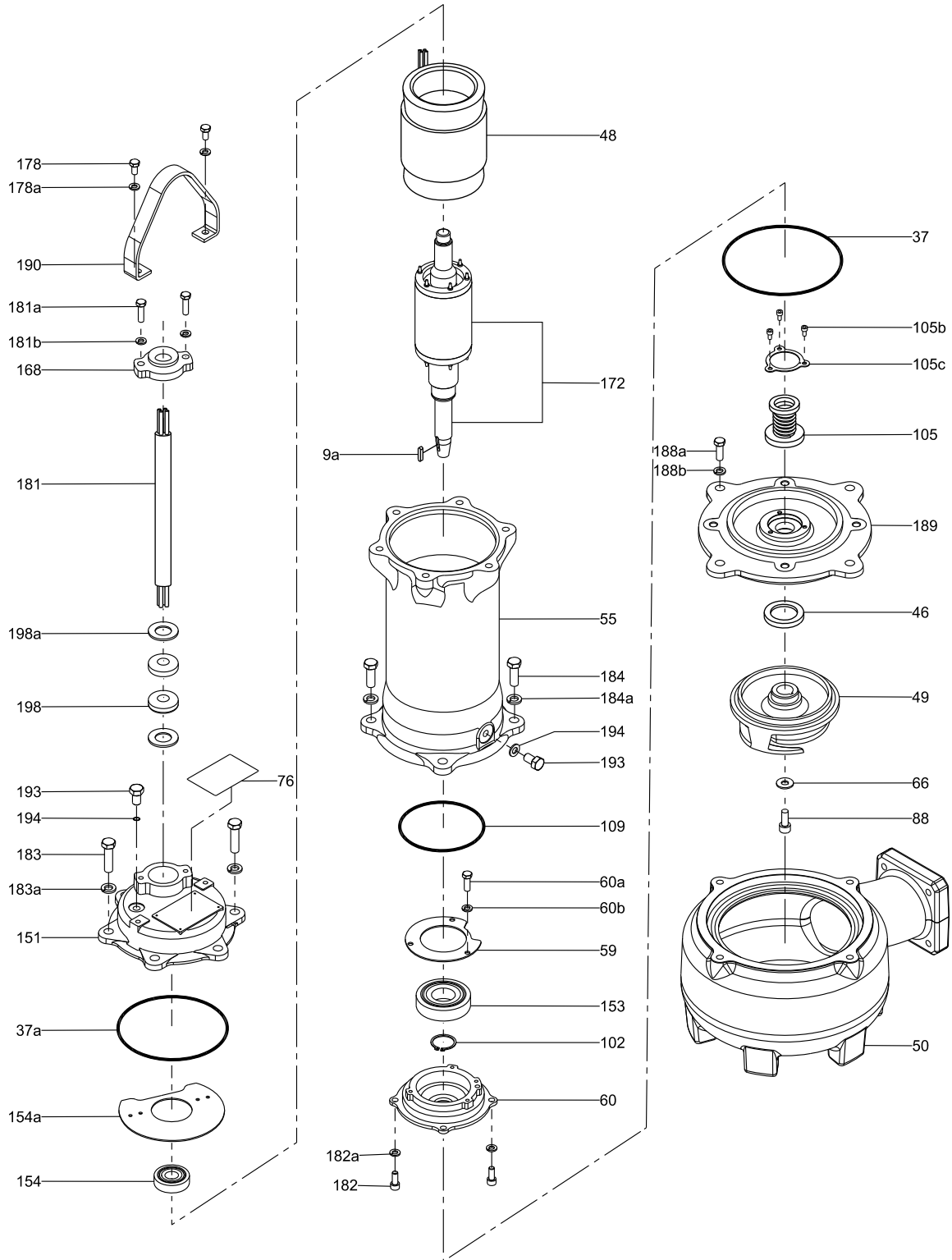
8.4 DPK.20.150.190 and DPK.20.150.220



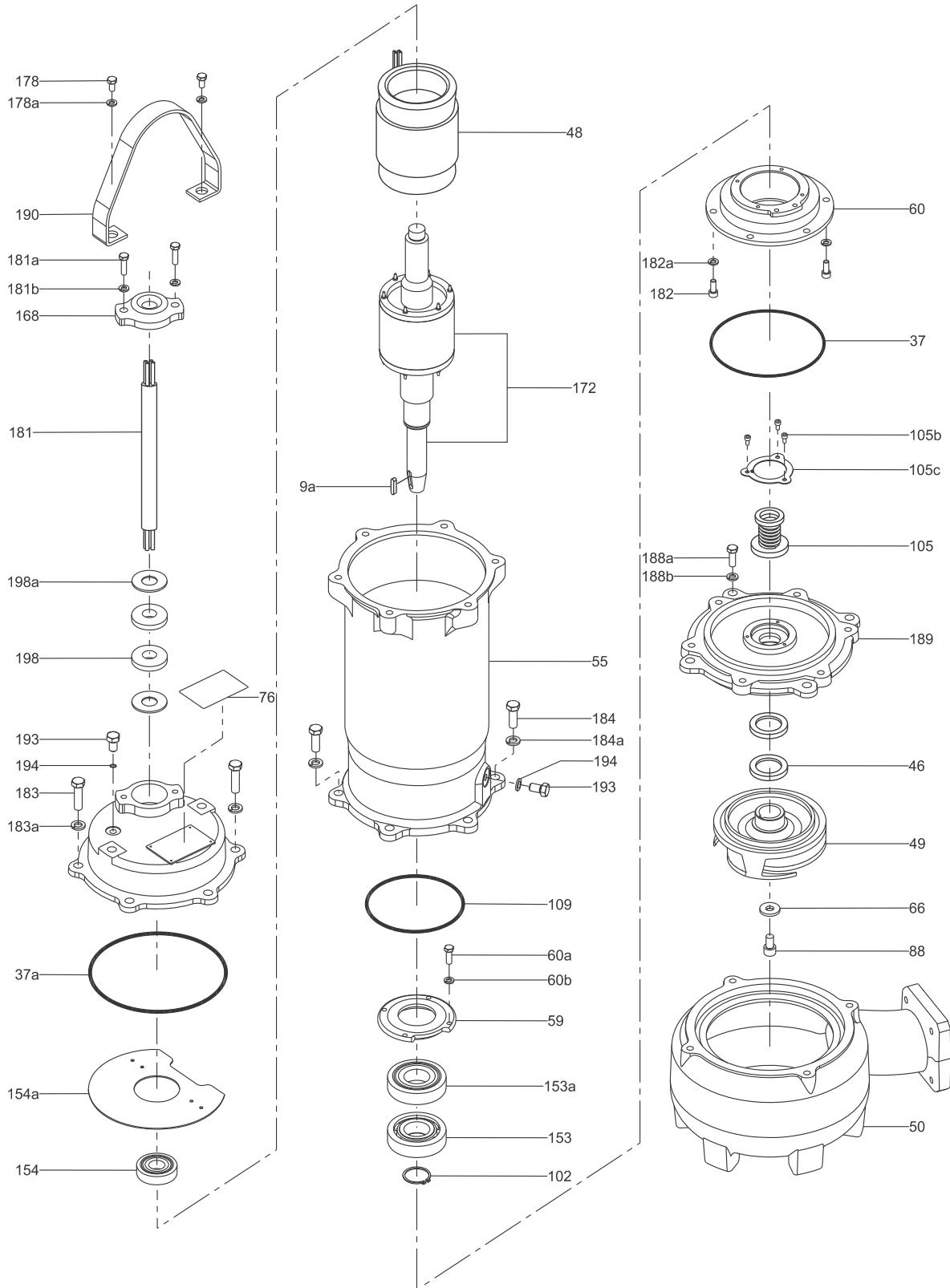
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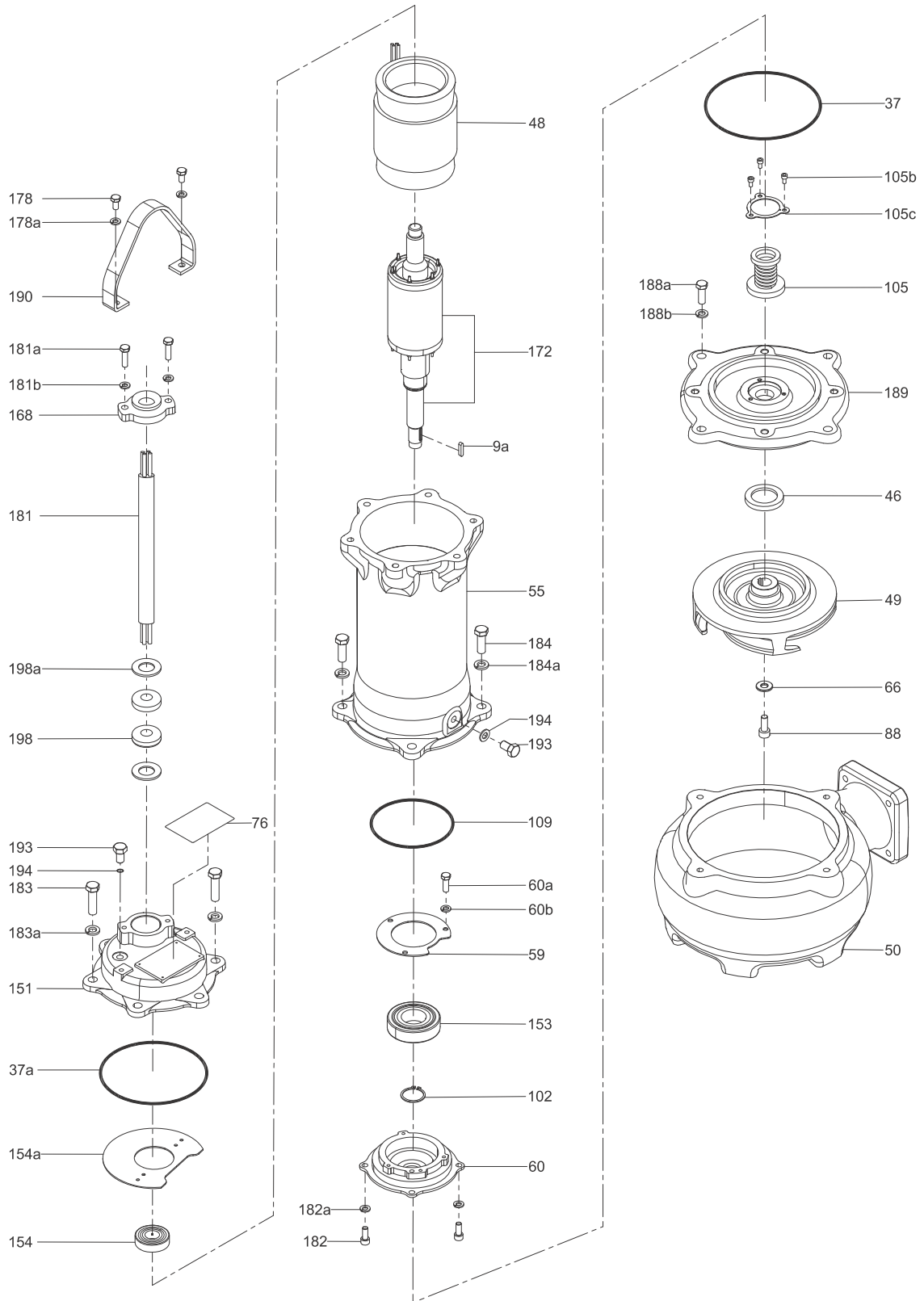
8.6 DPK.V.80.80.37.2



TM06 54/28 49/15

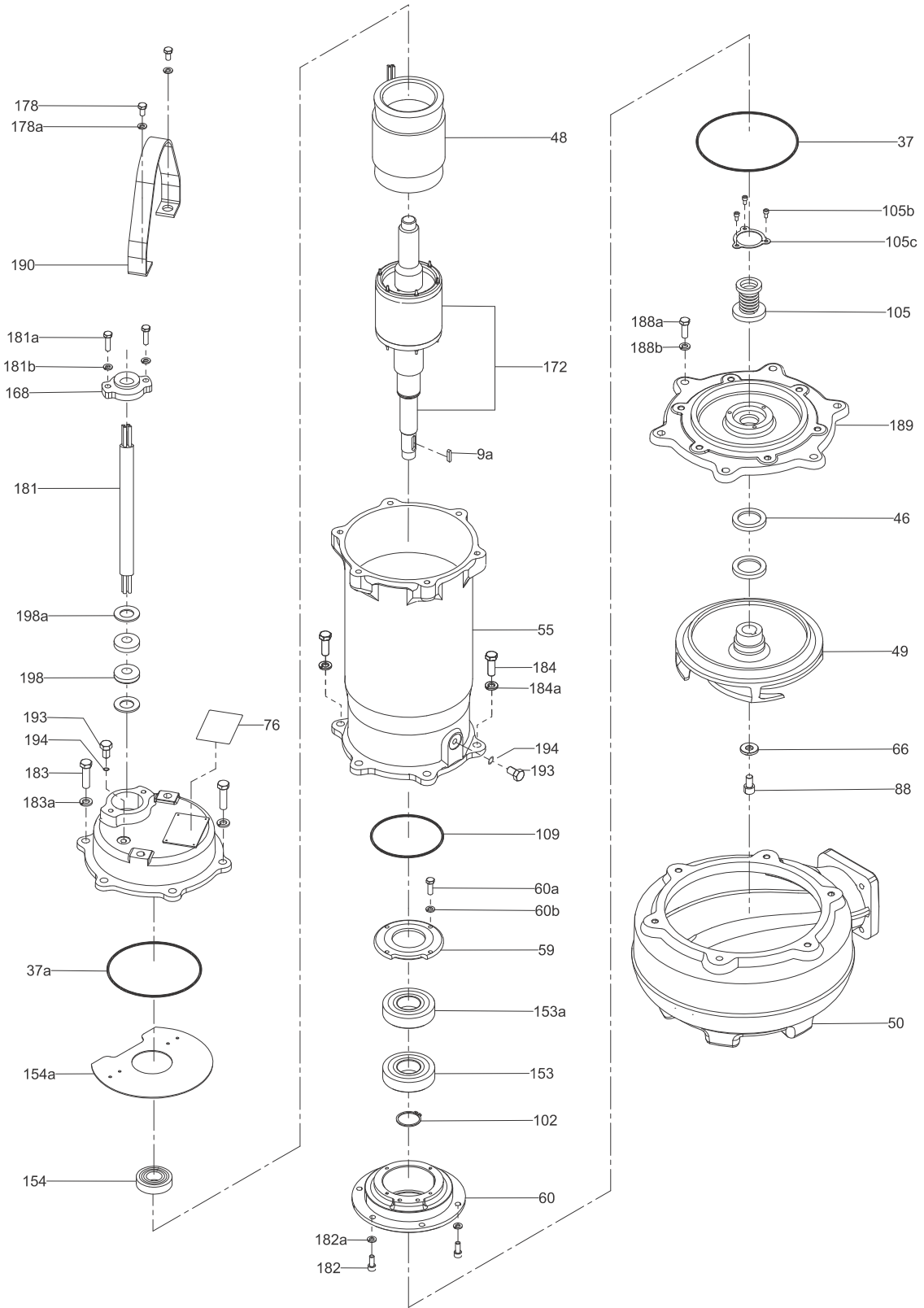


8.8 DPK.V.65.80.15.4 and DPK.V.65.80.22.4



TM06 5608 5215

8.9 DPK.V.80.80.37.4, DPK.V.80.80.55.4 and DPK.V.80.80.75.4



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