

# SEG

0.9 - 4.0 kW, DIN, 50/60 Hz

Service instructions



## Original service instructions

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## 1. Symbols used in this document

**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 text accompanying the three hazard symbols DANGER, WARNING and CAUTION is structured in the following way:

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

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



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. Returning the product for service

If you request Grundfos to service the product, contact Grundfos with details about the pumped liquid before returning the product. Otherwise Grundfos can refuse to accept the pump for service.

Costs of returning the product are to be paid by the customer.

However, any application for service, no matter to whom it may be made, must include details about the pumped liquid if the product has been used for liquids which are injurious to health or toxic.

### 2.1 Servicing pumps with explosion-proof motors

Service work on Ex pumps must be carried out by Grundfos or a workshop authorised by Grundfos. Violation of this requirement will invalidate the Ex classification of the pump.

Overhauled and repaired explosion-proof pumps are provided with a repair plate giving this information:

- the repair symbol R
- name of registered trade mark of the repairing workshop
- workshop reference number relating to the repair
- date of overhaul or repair.

In case of subsequent repairs, the existing repair plate should be replaced by a new, updated repair plated and earlier markings must be covered.

The repairing workshop must keep records of performed overhauls and repairs together with records of all previous overhauls, repairs and possible modifications. Copies of the repairing workshop's detailed records should be filed by the owner or operator together with the original type certificate of the explosion-proof motor in question.

## 3. Safety

### WARNING

#### Installation fault

- Death or serious personal injury
- Pump installation in pits must be carried out by specially trained persons.
  - Work in or near wastewater pits must be carried out according to local regulations.



### CAUTION

#### Electric shock

- Minor or moderate personal injury
- It must be possible to lock the mains switch in position 0.
  - Type and requirements as specified in EN 60204-1, 5.3.2.



We recommend that you make all maintenance and service work when the pump is placed outside the pit.

For safety reasons, all work in pits must be supervised by a person outside the pump pit.

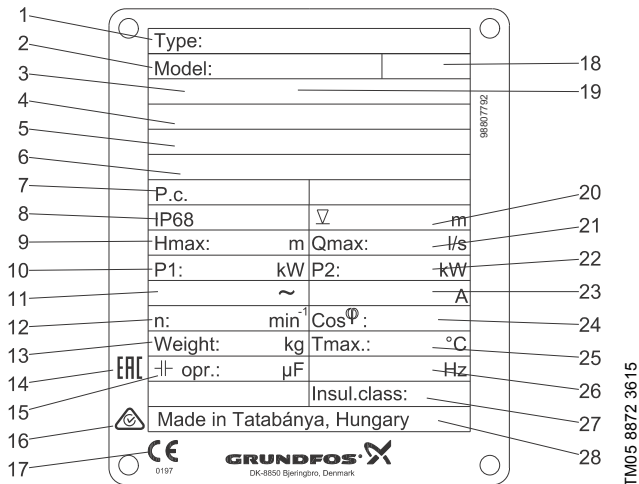
Pits for submersible wastewater pumps contain wastewater with toxic and/or disease-causing substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing and all work on and near the pump must be carried out under strict observance of the hygiene regulations in force.



Before attempting to lift the pump, make sure that the lifting bracket is tightened. Tighten if necessary.

## 4. Identification

### 4.1 Nameplate



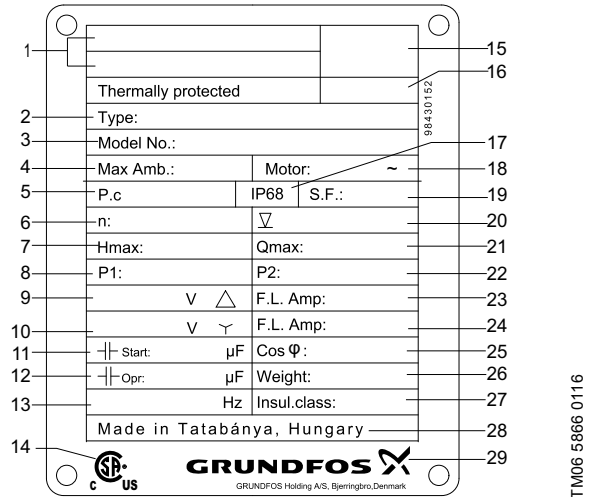
TM05 8872 3615

Fig. 1 Nameplate, SEG, 50 Hz

Pos.	Description
1	Type designation
2	Product number
3	Approval
4	ATEX certificate number
5	IEC Ex description
6	IEC Ex certificate number
7	Production code [year and week]
8	Enclosure class according to IEC 60529
9	Maximum head [m]
10	Rated input power [kW]
11	Rated voltage
12	Speed [rpm]
13	Net weight [kg]
14	EAC mark*
15	Run capacitor [μF]
16	RCM logo**
17	CE mark
18	Installation and operation instructions, publication number
19	Ex description
20	Maximum installation depth [m]
21	Maximum flow rate [l/s]
22	Rated output power [kW]
23	Maximum current [A]
24	Cos φ, 1/1 load
25	Maximum liquid temperature [°C]
26	Frequency [Hz]
27	Insulation class
28	Production country

\* For Russia only.

\*\* For Australia only.



TM06 5866 0116

Fig. 2 Nameplate, SEG, 60 Hz

Pos.	Description
1	FM description
2	Type designation
3	Product number and serial number
4	Maximum liquid temperature
5	Production code [year and week]
6	Speed [rpm]
7	Maximum head [m]
8	Rated power input [kW]
9	Rated voltage, Δ
10	Rated voltage, Y
11	Starting capacitor [μF]
12	Run capacitor [μF]
13	Frequency [Hz]
14	Electrical safety*
15	Approval
16	Mark for continuously operated motor
17	Enclosure class to IEC
18	Phases
19	Motor safety factor
20	Maximum installation depth [m]
21	Maximum flow rate (l/s)
22	Rated output power (kW)
23	Rated current, Δ
24	Rated current, Y
25	Cos φ, 1/1 load
26	Net weight [kg]
27	Insulation class/temperature rise
28	Production country
29	Grundfos logo

\* For USA and Canada.

## 4.2 Type key

The type key covers the entire Grundfos SEG range of wastewater pumps. This is why the type key has a number of empty fields for the grinder pumps. Each SEG grinder pump is identified by means of the type key below.

Please note that not all combination options are available.

Code	Description	SE	G	.40	.09	.Ex	.2	.1	.6	03
<b>Type range</b>										
SE	Grundfos sewage pumps									
<b>Impeller type</b>										
G	Grinder system in the pump inlet									
<b>Pump outlet</b>										
40	Nominal diameter of outlet port [mm], DIN PN10 flange									
50										
K40	Nominal diameter of outlet port [mm], JIS B 2239 10K / KS B 2332 10K /									
K50	KS B 1511 10K flange									
<b>Output power, P2</b>										
	P2 [100 W]									
<b>Equipment</b>										
[ ]	Standard, without equipment									
<b>Pump version</b>										
[ ]	Standard version; 60 Hz: CSA approval									
Ex	50 Hz: designed according to the ATEX standard indicated or Australian standard, AS 2430.1. 60 Hz: designed according to FM standard									
<b>Number of poles</b>										
2	2 poles									
<b>Number of phases</b>										
1	Single-phase motor									
[ ]	Three-phase motor									
<b>Frequency</b>										
5	50 Hz									
6	60 Hz									
<b>Voltage and starting method</b>										
<b>50 Hz</b>										
<b>Standard version:</b>										
02	230 V, star-delta starting									
0B	400-415 V, star-delta starting									
0C	230-240 V, star-delta starting									
<b>60 Hz</b>										
<b>Standard version:</b>										
03	208-230 V									
0G	380 V									
0H	460 V									
0M	200-230 V									
Z	<b>Custom-built products</b>									

## 5. Approvals


### 5.1 SEG, 50 Hz


The standard version of SEG pumps has been tested by VDE. The explosion-proof version has been approved by DEKRA according to the ATEX directive.

#### 5.1.1 Approval standards

The standard versions has been approved by LGA according to EN 12050-1.

#### 5.1.2 Explanation to the Ex approval

The explosion protection classification of the pump is Europe CE 0344  II 2 G Ex d IIB T4.

Directive/ standard	Code	Description
ATEX	CE 0344	= CE marking of conformity according to the ATEX directive 2014/34/EU. 0344 is the number of the notified body which has certified the quality system for ATEX.
		= Explosion protection marking.
	II	= Equipment group according to the ATEX directive, defining the requirements applicable to the equipment in this group.
	2	= Equipment category according to the ATEX directive, defining the requirements applicable to the equipment in this category.
	G	= Explosive atmosphere caused by gases, vapours or mists.
Harmonised European standard	Ex	= The equipment conforms to the harmonised European standard.
	d	= Flameproof enclosure according to EN 60079-1.
	IIB	= Classification of gases according to EN 60079-0. Gas group B includes gas group A.
	T4	= The maximum surface temperature is 135 °C.

#### 5.1.3 Australia

Ex variants for Australia are approved as Ex nC II T3 according to IEC 60079-15 (corresponding to AS 2380.9).

Standard	Code	Description
IEC 60079-15:1987	Ex	= Area classification according to AS 2430.1
	n	= Non-sparking according to AS 2380.9:1991, section 3 (IEC 60079-15)
	C	= The environment is adequately protected against sparking components
	II	= Suitable for use in explosive atmospheres (not mines)
	T3	= The maximum surface temperature is 200 °C

### 5.2 SEG, 60 Hz

The standard versions of SEG 60 Hz pumps have been approved by CSA. The explosion-proof versions hold a CSA- and FM-type examination certificate, No 3053414 (U.S.) and 3053414C (Canada).

#### 5.2.1 Approval standards

CSA approval according to UL778 and C22.2 No 108, 0.4, 30, 145 and 60529.

FM approval according to FM 3600, FM3615, FM 3650 and ANSI/IEC 60529.

#### 5.2.2 Explanation to the FM approval

The classification of the SEG, 60 Hz pump is Class I, Division 1, Groups C and D hazardous locations, T4/T3C, IP68.

Standard	Code	Description
FM 3600 FM 3615 FM 3650 ANSI/IEC 60529	Class I	= Explosive atmosphere caused by gases or vapours (permitted division).
	Division 1	= Area classification (permitted division).
	Groups C and D	= Classification of gases.
	T4/T3C	= The maximum surface temperature is 135 °C/160 °C.
	IP68	= The enclosure class is according to IEC 60529.

## 6. Installation types

### 6.1 Installation on auto-coupling

Pumps for permanent installation can be mounted on a stationary auto-coupling guide rail system or a hookup auto-coupling system.

#### Auto-coupling guide rail system

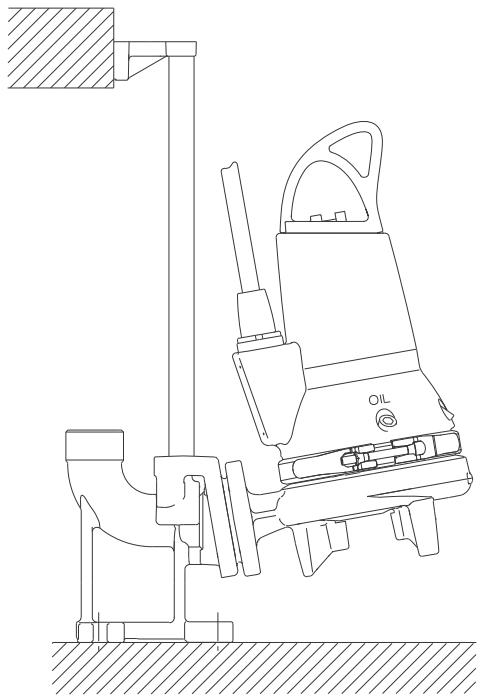


Fig. 3 Guide rail installation

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#### Hookup auto-coupling

Hookup auto-coupling installation is only available for SEG 50 Hz pumps.

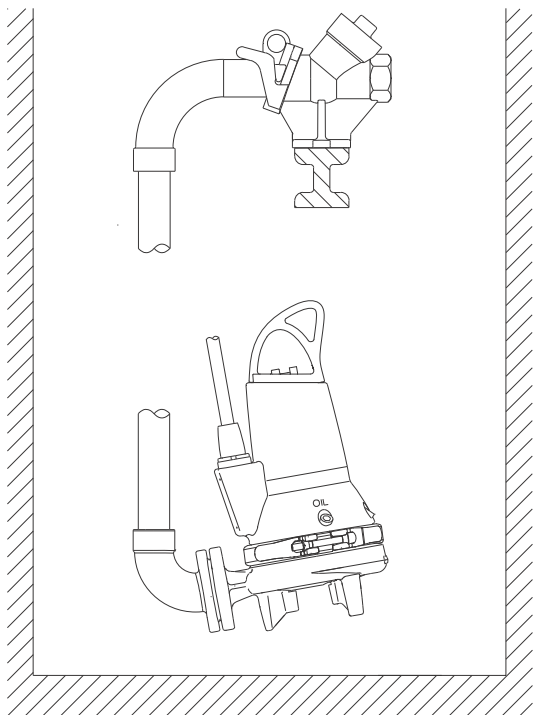
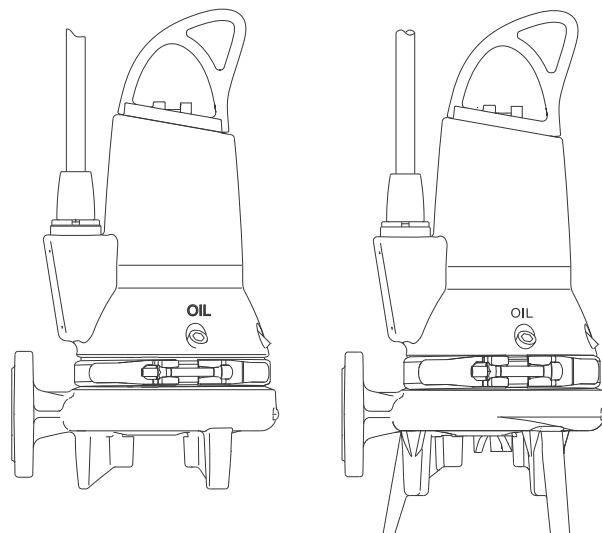


Fig. 4 Hookup auto-coupling installation

TM06 5951 0316

### 6.2 Free-standing submerged installation

Pumps for free-standing submerged installation can stand freely on the bottom of the pit or similar location.



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Fig. 5 Free-standing submerged installation

## 7. Storing and handling the product

The pump can be transported in a vertical or horizontal position. Make sure that it cannot roll or fall over.

### 7.1 Storing the product

During long periods of storage, protect the pump against moisture and heat.

If the pump has been in use, change the motor liquid before storage. See section [10.3 Checking and changing the motor oil](#).

After a long period of storage, inspect the pump before putting it into operation. Make sure that the impeller can rotate freely. Pay special attention to the shaft seals, O-rings, motor oil and the cable entry.

### 7.2 Transporting the product

Rate all lifting equipment for the purpose. Check the lifting equipment for damage before making any attempts to lift the pump. Do not exceed the lifting equipment rating under any circumstances. For pump weights, see the pump nameplate [4.1 Nameplate](#).

#### WARNING

##### Instable pump



Death or serious personal injury

- Always lift the pump by its lifting bracket or by means of a forklift if the pump is fixed on a pallet. Never lift the pump by means of the motor cable or the hose/pipe.

The polyurethane-embedded plug prevents water from entering the motor via the motor cable.

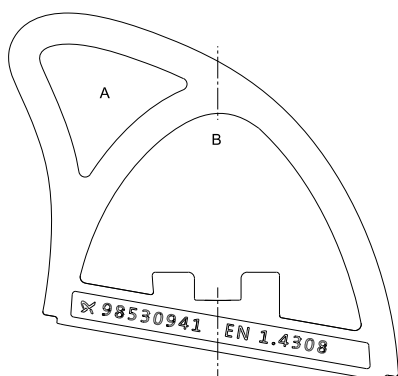
### 7.3 Lifting the product

The SEG pumps weigh between 38 kg and 81 kg without accessories. It is therefore essential to use the correct lifting equipment.



Rate all lifting equipment for the purpose. Check the lifting equipment for damage before making any attempts to lift the pump. Do not exceed the lifting equipment rating under any circumstances.

When lifting the pump, use the correct lifting point to keep the pump balanced. Place the lifting chain hook in point A for auto-coupling installations and in point B for other installations. See [fig. 6](#).



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Fig. 6 Lifting points

### 7.4 Contaminated products

#### CAUTION

##### Biological hazard



Minor or moderate personal injury

- If a pump has been used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.

See section [2. Returning the product for service](#).



## 8. Torques and lubricants

Pos.	Description	Quantity	0.9 to 1.5 kW Dimensions	2.6 to 4.0 kW Dimensions	Torque [Nm]	Lubricant
9a	Key	1	-	-	-	Rocol Sapphire
26a	O-ring	1	D32.0 x 4	D32.0 x 4	-	Rocol Sapphire
37	O-ring	1	D164.5 x 3	D204.0 x 3	-	Rocol Sapphire
37a	O-rings	2	D114.0 x 3	-	-	Rocol Sapphire
66	Locking ring	2	-	-	-	Rocol Sapphire
68	Adjusting nut	1	-	-	1/4 turn	Rocol Sapphire
92	Clamp	1	-	-	12 ± 2	-
102	O-ring	1	D16.0 x 1.5	D17.3 x 2.4	-	Rocol Sapphire
105	Shaft seal	1	-	-	-	Soapy water
107	O-ring	1	D47.0 x 3	-	-	Rocol Sapphire
	O-ring	2	-	D50.0 x 3 D90.0 x 4	-	
159	O-ring	1	D32.0 x 2 D37.0 x 2*	D52.0 x 3	-	-
172	Rotor/shaft	1	-	-	-	Rocol Sapphire
173	Screw	1	M5 x 8	M5 x 8	5 ± 1	Rocol Sapphire
181	Outer plug part	1	-	-	30 ± 2	Rocol Sapphire
188a	Screw (shaft head)	1	M8 x 25	M8 x 25	20 ± 2	Rocol Sapphire
	Screw (impeller foot)	1	M8 x 25	M8 x 25	16 ± 2	-
	Screw (shaft seal carrier)	2	M8 x 25	M8 x 25	16 ± 2	-
	Screw (oil chamber)	4	M8 x 25	M8 x 25	16 ± 2	-
	Screw (lifting handle)	1	M8 x 25	-	16 ± 2	Rocol Sapphire
	Screw (lifting handle)	2	-	M8 x 25	16 ± 2	Rocol Sapphire
	Screw (lid)	4	-	M10 x 30	35 ± 2	Rocol Sapphire
193	Oil screw	2	M12 x 20	M12 x 20	16 ± 2	-
198	O-ring	1	D34.2 x 3	D34.2 x 3	-	Rocol Sapphire

\* Pumps manufactured from week 19, 2014, production code (P.c.) 1419.

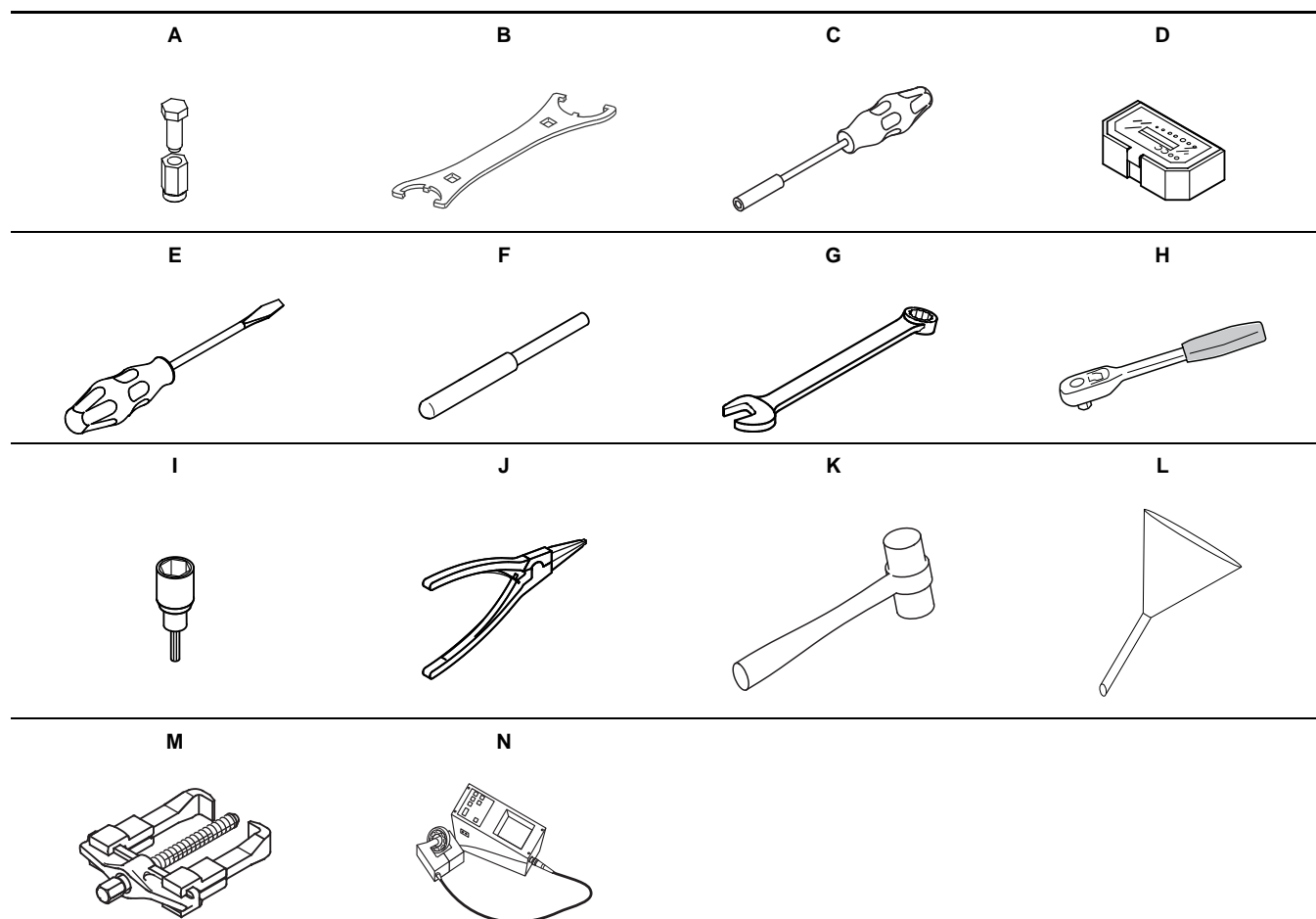
Soapy water.

Rocol Sapphire Aqua-Sil, product number 96102356 (1 kg).

Motor oil: Shell Ondina X420, product number 96586753 (1 l).

Painting: RAL 9005 black, product number 95039317 (50 ml).

## 9. Service tools



## Special tools

Pos.	Designation	Description	Part No
A	Puller for impeller	-	SV2097
B	Hook spanner for cable plug	45-50 mm	95043464

## Standard tools

Pos.	Designation	Description	Part No
C	Bit holder	1/4"	SV2011
D	Bits kit	-	SV2010
E	Screwdriver	Straight slot	-
F	Punch	∅10	-
G	Ring/open-end spanner	24 mm	SV0122
H	Ratchet handle	1/2"	96777072
I	Hexagon socket driver	M8 - 6 mm M12 - 10 mm	SV0297 SV0299
J	Locking-ring pliers	-	SV2014
K	Plastic hammer	-	SV0349
L	Funnel	-	-
M	Puller for shaft seal	-	-
N	Bearing heater	Inductor heater	-

## 10. Servicing the product

### 10.1 General information

#### DANGER

##### Crushing of hands



Death or serious personal injury

- Before starting service work, remove the fuses or switch off the power supply. Make sure that the power supply cannot be accidentally switched on.
- All rotating parts must have stopped moving.



Except for replacement or dismantling of the pump housing, shaft seal or impeller, all other service work must be carried out by Grundfos or an authorised service workshop.



The paint on the motor is part of the protection of the product. If the paint is damaged, apply new paint to keep the sealing effect of the paint intact.

All service work must be carried out by specially trained staff.

Before carrying out service, make sure that the pump has been thoroughly flushed with clean water. Rinse the pump parts in water after dismantling.

Position numbers of parts (digits) refer to section 12. *Drawings*.

Position numbers of tools (letters) refer to section 9. *Service tools*.

### 10.2 Yearly maintenance

Pumps running normal operation should be checked every 3000 operating hours or at least once a year.

If the dry solids content of the pumped liquid is very high or sandy, check the pump at shorter intervals.

Check these points:

- **Power consumption**  
See section 4.1 *Nameplate*.
- **Oil level and oil condition**  
See section 10.3 *Checking and changing the motor oil*.
- **Cable entry**  
Make sure that the cables are not sharply bent and/or pinched.  
See section 10.6 *Replacing the cable*.
- **Shaft seal**  
See section 10.4 *Checking the shaft seal*.
- **Pump parts**  
Check the impeller and pump housing for possible wear. Replace defective parts.  
See section 11. *Dismantling and assembling the product*.
- **Ball bearings**  
Check the shaft for noisy or heavy operation by turning the shaft by hand. Replace defective ball bearings. In case of defective ball bearings or poor motor function, a complete overhaul of the pump is usually required. A complete overhaul must be carried out by Grundfos or an authorised service workshop. See sections 11.1.6 *Removing the bearings* and 11.2.1 *Fitting the bearings*.



Defective bearings may reduce the Ex safety.

Bearings of explosion-proof products must only be replaced by Grundfos or a service workshop authorised by Grundfos.

- **O-rings and similar parts**

During service or replacement, it must be ensured that the grooves for O-rings and seal faces have been cleaned before the new parts are fitted.



Do not reuse used rubber parts.

- **Grinder system**

In case of frequent choke-ups, check the grinder system for wear. If worn, the edges of the grinding parts are round and worn. Compare with a new grinder system.

- **Insulation resistance**

Meggering must take place at a voltage of minimum 1000 V. The insulation resistance measured must be minimum 2 MΩ.

### 10.3 Checking and changing the motor oil

When the pump is new or after replacement of the shaft seal, check the motor liquid level and water content after one week. Change the oil in the oil chamber at least once a year or after 3000 operating hours. The number of operating hour can be read by means of a CIU XX2 and a Grundfos GO remote control.

Change the oil if the shaft seal has been replaced.

#### CAUTION

##### Pressurised system



Minor or moderate personal injury

- When slackening 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.

#### Quantity of oil

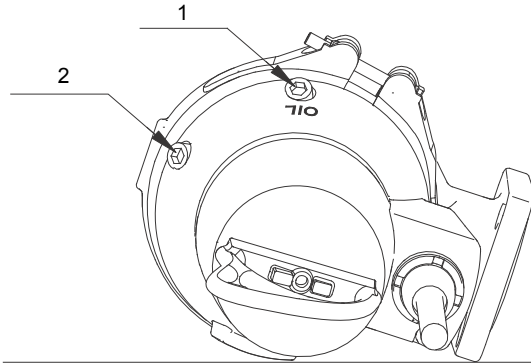
The table shows the quantity of motor oil in the cooling chamber.

Pump type [kW]	Oil in oil chamber [l]
0.9 to 1.5 kW	0.17
2.6 to 4.0 kW	0.42

Use Shell Ondina X420 motor oil (product No 96586753).

### Draining the motor oil

- Place the pump with the oil level screw pointing downwards. See fig. 7.



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Fig. 7 Oil screws

Pos.	Description
1	Oil filling screw
2	Oil level screw

- Place a container with a capacity of 0.5 litre under the pump.
- Slacken and remove both oil screws (193) and gaskets (194) to allow all the oil to drain from the chamber.
- Check the oil for impurities. This will give a good indication of the condition of the shaft seal. See section [10.4 Checking the shaft seal](#).
- Clean the pump for spilled oil.



Used motor oil must be disposed of in accordance with local regulations.

### Filling the oil chamber with oil

- Place the pump in such a position that it is lying on the stator housing and the outlet flange with the oil screws pointing upwards. See fig. 7.
- Fill oil into the oil chamber through the oil filling hole until it starts running out of the oil level hole. The oil level is now correct.
- Fit the gaskets (194) and both oil screws (193). Tighten the screws to  $16 \text{ Nm} \pm 2$ .
- Clean the pump for spilled oil.

### 10.4 Checking the shaft seal

Check the oil to make sure that the shaft seal is intact.

If the oil is greyish white like milk or contains a large quantity of water, the primary part of the seal is worn. Replace the shaft seal. If the seal is not replaced, the motor will be damaged within a short time. If the oil is clean, it can be reused.

If the shaft seal needs to be replaced, see sections [11.1.5 Removing the shaft seal](#) and [11.2.2 Fitting the shaft seal](#).

### 10.5 Adjusting the impeller clearance

#### CAUTION

##### Crushing of hands



Minor or moderate personal injury

- Before inspection, make sure that the motor is switched off and that the mains switch is locked in position 0.

To adjust the impeller, first dismantle the grinder system.

- See section [11.1.2 Removing the grinder system](#)
- Tighten the adjusting nut (68) until the impeller (49) cannot rotate any more.
- Slacken the adjusting nut (68) by 1/4 turn.
- See section [11.2.6 Fitting the grinder system](#).

### 10.6 Replacing the cable

#### DANGER

##### Electric shock



- Death or serious personal injury
- The cable must only be replaced by Grundfos or an authorized service workshop.

#### Dismantling the cable

- Remove the locking ring (199) with a hook spanner ([B](#)).
- Insert two screwdrivers ([E](#)) into the groove and prise the cable out of the cable entry.
- Carefully pull the cable out of the stator housing and disconnect the plug.



If the cable is to be reused, be careful not to damage the flash path gap and plastic pin on the cable when the cable is removed.

- Check the cable for damage.
- Remove the O-ring (26a) from the cable with a pair of pincers or similar tool.
- Remove the O-ring (198) from the cable and clean the groove.



If a new cable is not fitted, then cover the cable entry to protect the cable entry against dirt.

#### Assembling the cable

- Clean the cable entry, locking ring (199) and cable.
- Lubricate the groove for the O-ring (198).
- Fit the O-ring (198) on the plug and lubricate it.
- Fit the O-ring (26a).
- Fit the outer plug part (181). The projection must engage with the hole.
- Fit the locking ring (199). See section [8. Torques and lubricants](#). Hold the plug with a hook spanner ([B](#)) to prevent it from turning.

## 11. Dismantling and assembling the product

### General information

Position numbers of parts (digits) refer to section [12. Drawings](#).  
Position numbers of tools (letters) refer to section [9. Service tools](#).

### Before dismantling the product

- Switch off the power supply.
- Close the isolating valves, if fitted, to avoid draining the piping system.
- Disconnect the power supply cable in accordance with local regulations.
- Note the centre of gravity of the pump to prevent it from overturning.

### 11.1 Dismantling the product

#### 11.1.1 Draining the motor oil

See section [10.3 Checking and changing the motor oil](#).

#### 11.1.2 Removing the grinder system

##### DANGER

##### Sharp element

Death or serious personal injury

- Be careful of the sharp edges of the impeller, grinder head and grinder ring.

1. See section [11.1.1 Draining the motor oil](#).
2. Place the pump horizontally on the table.
3. Loosen and remove the screw (188a) in one of the pump feet.
4. Loosen the grinder ring (44) by knocking it clockwise with a punch (F). See fig. 8.

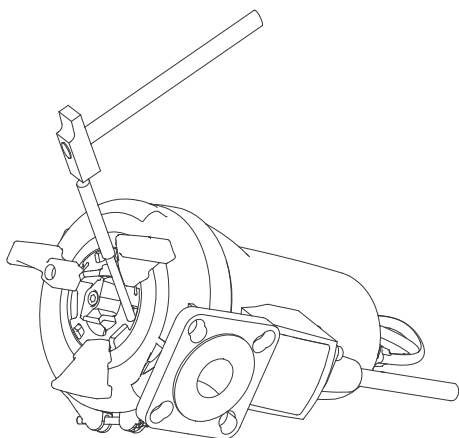


Fig. 8 Dismantling the grinder ring

5. Gently remove the grinder ring (44) from the pump housing using a screwdriver (E).



Make sure that the grinder ring does not get stuck against the grinder head.

6. Insert the punch (F) into the hole to hold the impeller to prevent it from moving during dismantling.
7. Remove the screw (188a). Remove the locking ring (66). See fig. 9.

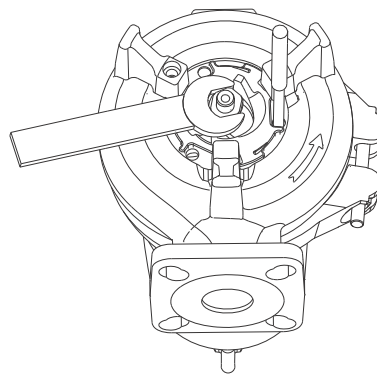


Fig. 9 Dismantling the screw and grinder head

8. Remove the grinder head (45).

#### 11.1.3 Removing the pump housing

1. See section [11.1.2 Removing the grinder system](#).
2. Place the pump vertically.
3. Support the pump from the lifting bracket (190) with a hoist.
4. Loosen the clamp (92) holding the pump housing (50) and stator housing (55) together.
5. Lift the pump housing (50) off the stator housing (55) including the O-ring (37) and the impeller (49). Place the pump horizontally.
6. Clean the pump housing (50).



Clean the pump housing (50). Grind the surfaces slightly with emery cloth, if necessary.

#### 11.1.4 Removing the impeller

##### CAUTION

##### Sharp element

Minor or moderate personal injury

- Be careful of the sharp edges of the impeller and the grinder head.

1. See section [11.1.3 Removing the pump housing](#).
2. Insert the punch (F) into the impeller (49) to prevent it from moving during dismantling.
3. Remove the adjusting nut (68).
4. Fit the puller (A) on the shaft.
5. Fit the M8 screw in the puller and pull out the impeller (49).
6. Remove the key (9a).
7. Clean the shaft and key.



Clean the impeller. Grind the surfaces slightly with emery cloth, if necessary.

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### 11.1.5 Removing the shaft seal



The shaft seal is a complete unit for all SEG pumps.

#### 0.9 to 1.5 kW

1. See section [11.1.4 Removing the impeller](#).
2. Remove the two screws (188a) in the middle securing the shaft seal carrier (58), and fit them into the tapped extractor holes in the shaft seal carrier.
3. Remove the shaft seal assembly by means of the two screws (188a).
4. Pull out the shaft seal assembly (105).
5. Check the condition of the shaft where the secondary seal of the shaft seal touches the shaft. The bush (103) fitted to the shaft must be intact.

#### 2.6 to 4.0 kW

1. See section [11.1.4 Removing the impeller](#). Remove the retaining ring (112a).
2. Remove the two screws (188a) in the middle securing the shaft seal carrier (58), and fit them into the tapped extractor holes in the shaft seal carrier.
3. Remove the shaft seal carrier (58) by means of the two screws (188a).
4. Remove the retaining ring (112a).
5. Pull out the shaft seal assembly (105).
6. Check the condition of the shaft where the secondary seal of the shaft seal touches the shaft. The bush (103) fitted to the shaft must be intact.

### 11.1.6 Removing the bearings



Bearings of explosion-proof products must only be replaced by Grundfos or a service workshop authorised by Grundfos.

1. See section [11.1.5 Removing the shaft seal](#).
2. Remove the four screws (188a) from the oil chamber (155).
3. Remove the oil chamber (155) from the stator housing (55) using screwdrivers (E). If the fitting is tight, remove the oil chamber assembly by gently tapping the screwdrivers with a plastic hammer (K). See fig. 10.

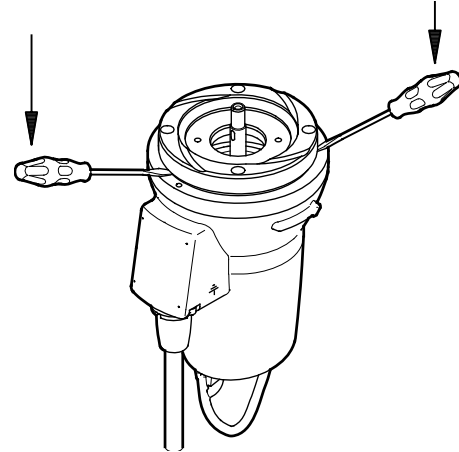


Fig. 10 Removing the oil chamber

4. Place the oil chamber assembly in a vice and check that the rotor is not damaged.
5. Remove the O-rings (37a) from the oil chamber (155).
6. Pull out the bush (103) including the O-ring (102) from the rotor/shaft (172).
7. Pull the oil chamber (155) out of the rotor/shaft (172) using a puller.



If you remove the rotor/shaft from the oil chamber, it will break the lower bearing. Replace the broken bearing.

8. Remove the O-rings (37a) from the oil chamber (155).
9. Pull the lower bearing (153) out of the oil chamber (155).
10. Pull the upper bearing (154) off the rotor/shaft (172) using a puller.
11. Remove the corrugated spring (158).

## 11.2 Assembling the product

### Before assembling the product

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

### During assembly

Lubricate and tighten screws and nuts according to section 8. [Torques and lubricants](#).

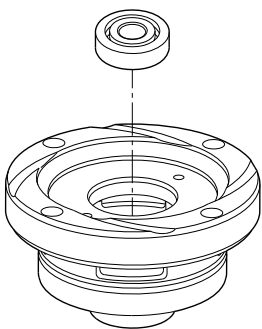
#### 11.2.1 Fitting the bearings



Bearings of explosion-proof products must only be replaced by Grundfos or a service workshop authorised by Grundfos.

#### Lower bearings

1. Clean the bearing in the oil chamber (155).
2. Heat the oil chamber (155) up to 100 °C.
3. Press the cold lower bearing (153) into the heated oil chamber (155). See fig. 11. Press and let the oil chamber cool. Use a heat-resistant punch.
4. Allow the assembly to cool.



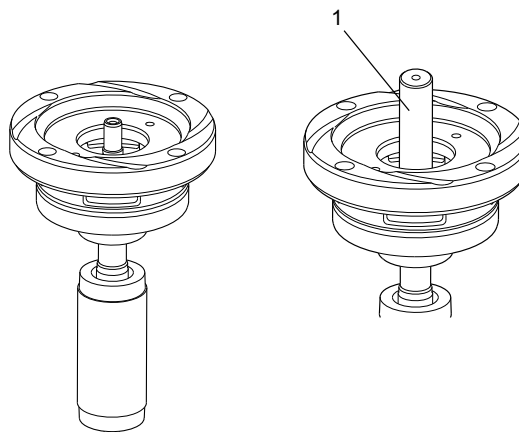
**Fig. 11** Fitting the lower bearing in the heated oil chamber

5. Fix the rotor/shaft (172) in a vice with the shaft pointing upwards.



To avoid damaging the rotor, do not overtighten the vice. Use protection between vice and rotor.

6. Fit the oil chamber (155) with bearing (153) on the rotor/shaft (172). Fit the punch (F) on the inner ring and tighten gently. See fig. 12.



**Fig. 12** Fitting the oil chamber on the rotor/shaft

Pos.	Description
1	Punch

7. Turn the assembly horizontally in the vice.
8. Press the bearing home on the journal.

#### Upper bearings

1. Fit the corrugated spring (158) on the stator housing (55)-
2. Fit the upper bearing (154) on the rotor/shaft (172) by pressing on the inner ring.
3. Make sure that the O-ring (159) is fitted in the groove of the stator housing (55).
4. Fit the corrugated spring (158) on the upper bearing (154).
5. Lubricate the groove for the O-rings (37a).
6. Fit and lubricate the O-rings (37a).
7. Make sure that the spring pins (6a) are fitted on the stator housing (55).
8. Fit the rotor assembly to the stator housing (55). The pin on the stator housing (55) must engage with the hole in the oil chamber (155).
9. Fit the screws (188a) to attach the oil chamber (155) to the stator housing (55). Tighten the screws to 16 Nm ± 2.

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## 11.2.2 Fitting the shaft seal

### 0.9 to 1.5 kW

1. Check and clean the oil chamber (155).
2. Lubricate the groove for the O-rings (107).
3. Fit and lubricate the two O-rings (107) of the shaft seal.
4. Make sure that the O-ring (102) is fitted inside the bush (103).
5. Cover the shaft end and lubricate the shaft.
6. Fit the bush (103) in the seal ring (104) of shaft seal (105).
7. Fit a new shaft seal (105) using the mounting bush included in the shaft seal kit. See fig. 13.



Make sure that the shaft seal parts are concentric. Wrong orientation breaks the seal parts when they are pressed home.

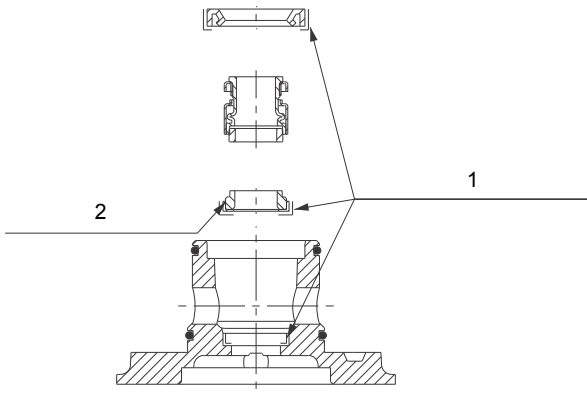


Fig. 13 Shaft seal assembly, 0.9 - 1.5 kW

Pos.	Description
1	Lubricate with soapy water only. Do not use oil.
2	No soap or oil between the SiC ring and the rubber seal.

8. Remove the screw (188a) from the shaft end.
9. Fit two screws (188a) in the shaft seal carrier (58). See section 8. *Torques and lubricants*.
10. Fit the key (9a) on the shaft (172) and lubricate the surface of the key.

### 2.6 to 4 kW

1. Lubricate the shaft surface on the point where the seal is fitted.
2. Fit the locking washer (153a).
3. Fit the shaft seal (105a) to the shaft. Make sure that the pin of the shaft seal engages with the shaft groove.



Make sure that the shaft seal parts are concentric. Wrong orientation breaks the seal parts when they are pressed home.

4. Lubricate the groove for the O-ring (107) on the shaft seal carrier (58).
5. Fit and lubricate the O-ring (107).
6. Fit the shaft seal carrier (58) with screws (188a). Tighten the screws to 16 Nm  $\pm$  2.
7. Fit the retaining ring (112a).
8. Fit the key (9a).

## 11.2.3 Fitting the impeller



### CAUTION Sharp element

Minor or moderate personal injury  
- Be careful of the sharp edges of the impeller.

1. Fit the impeller (49).
2. Fit and tighten the adjusting nut (68). See section 8. *Torques and lubricants*.

## 11.2.4 Fitting the pump housing

1. Fit the grinder head (45). Make sure that the projections on the back of the grinder head engage with the holes in the impeller (49).
2. Fit the locking ring (66) on the screw (188a). Make sure that the locking ring is fitted correctly.
3. Turn the motor to the vertical position and lift it up with a hoist.
4. Fit the motor on the pump housing (50).



The pump housing must engage with the guide pin. The pump outlet must point in the opposite direction to the electronic unit.

5. Close the clamp (92). See section 8. *Torques and lubricants*.
6. Turn the pump to the horizontal position with a hoist. Remove the screw (188a), locking ring (66) and grinder head (45).

## 11.2.5 Adjusting the impeller clearance

See section 10.5 *Adjusting the impeller clearance*,

## 11.2.6 Fitting the grinder system

1. Fit the grinder head (45). Make sure that the projections on the back of the grinder head engage with the holes in the impeller (49).



Pay special attention to assembling the grinder head. Moving the grinder head may also move the adjusting nut resulting in wrong impeller clearance.



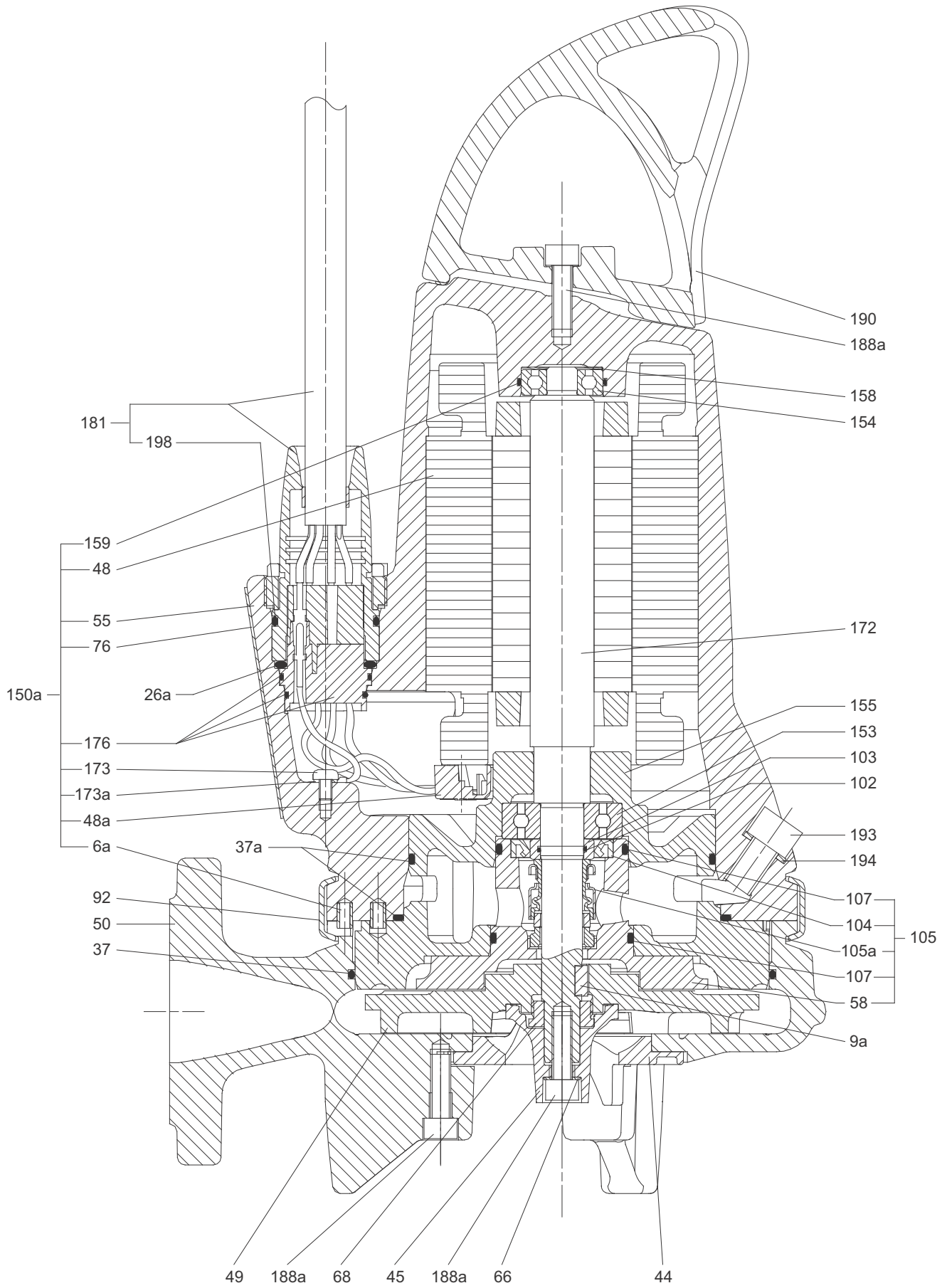
Make sure that the grinder head rotates freely and noiselessly.

2. Fit the locking ring (66) on the screw (188a). Make sure that the washer is fitted correctly.
3. Fit the screw (188a) including locking ring (66) to the shaft end and tighten to 20 Nm  $\pm$  2. Insert the punch (F) to prevent the impeller from moving.
4. Fit the grinder ring (44). Make sure that the grinder head does not drag on the grinder ring.
5. Fit the screw (188a) on the feet of the pump housing. See section 8. *Torques and lubricants*.
6. Fill oil into the oil chamber. See section 10.3 *Checking and changing the motor oil*.

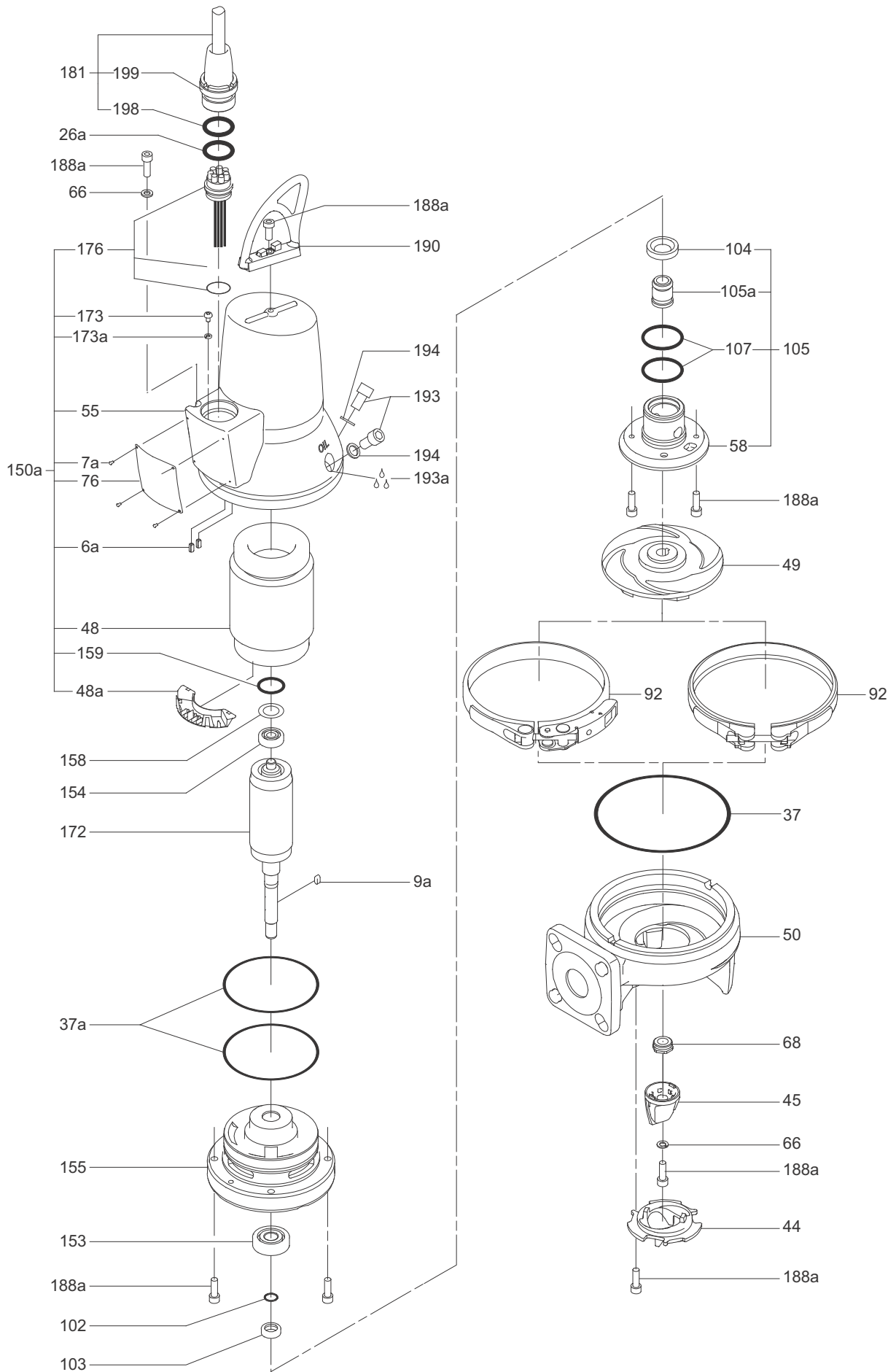


## 12. Drawings

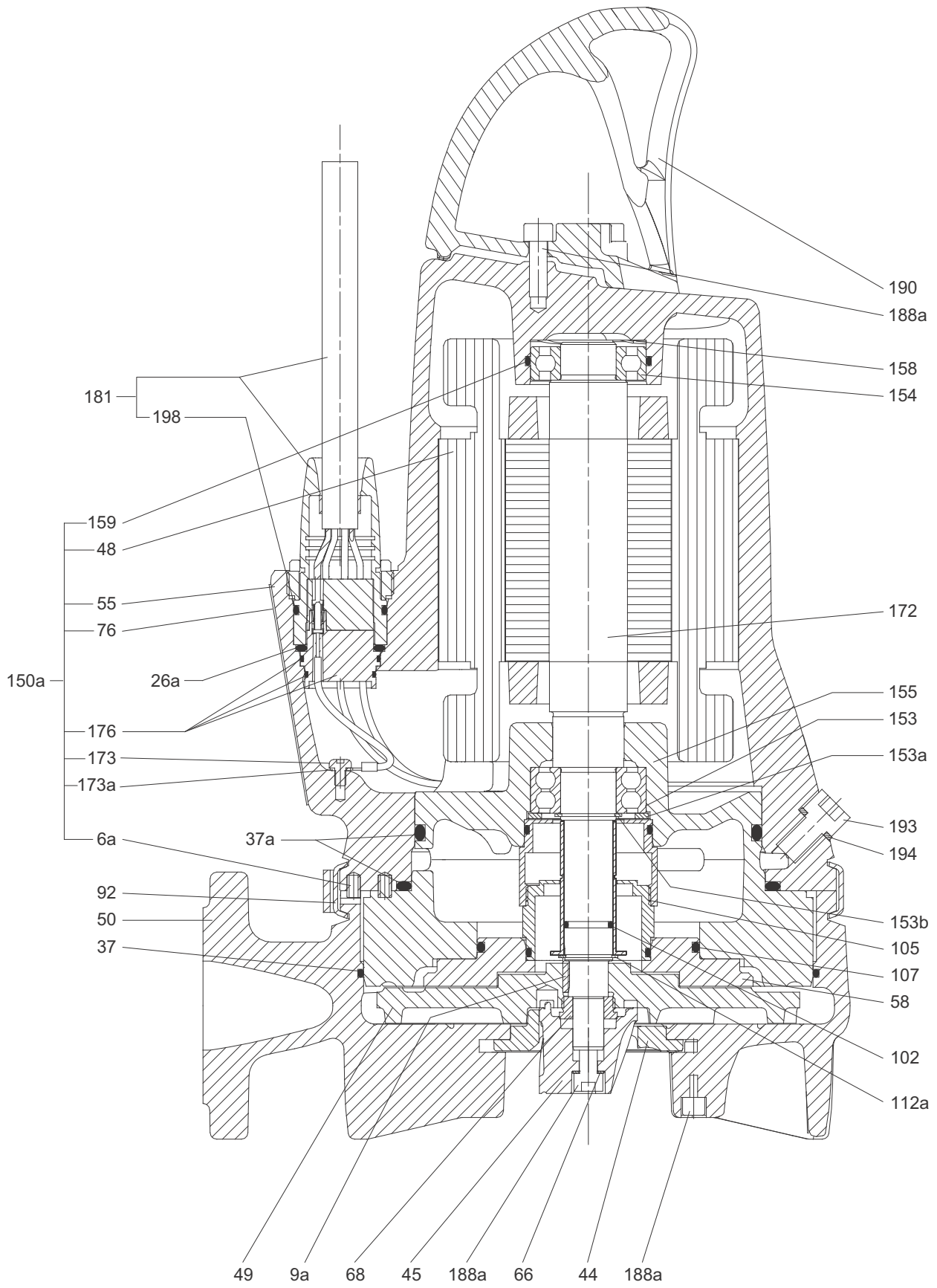
### 12.1 Sectional drawing, 0.9 to 1.5 kW



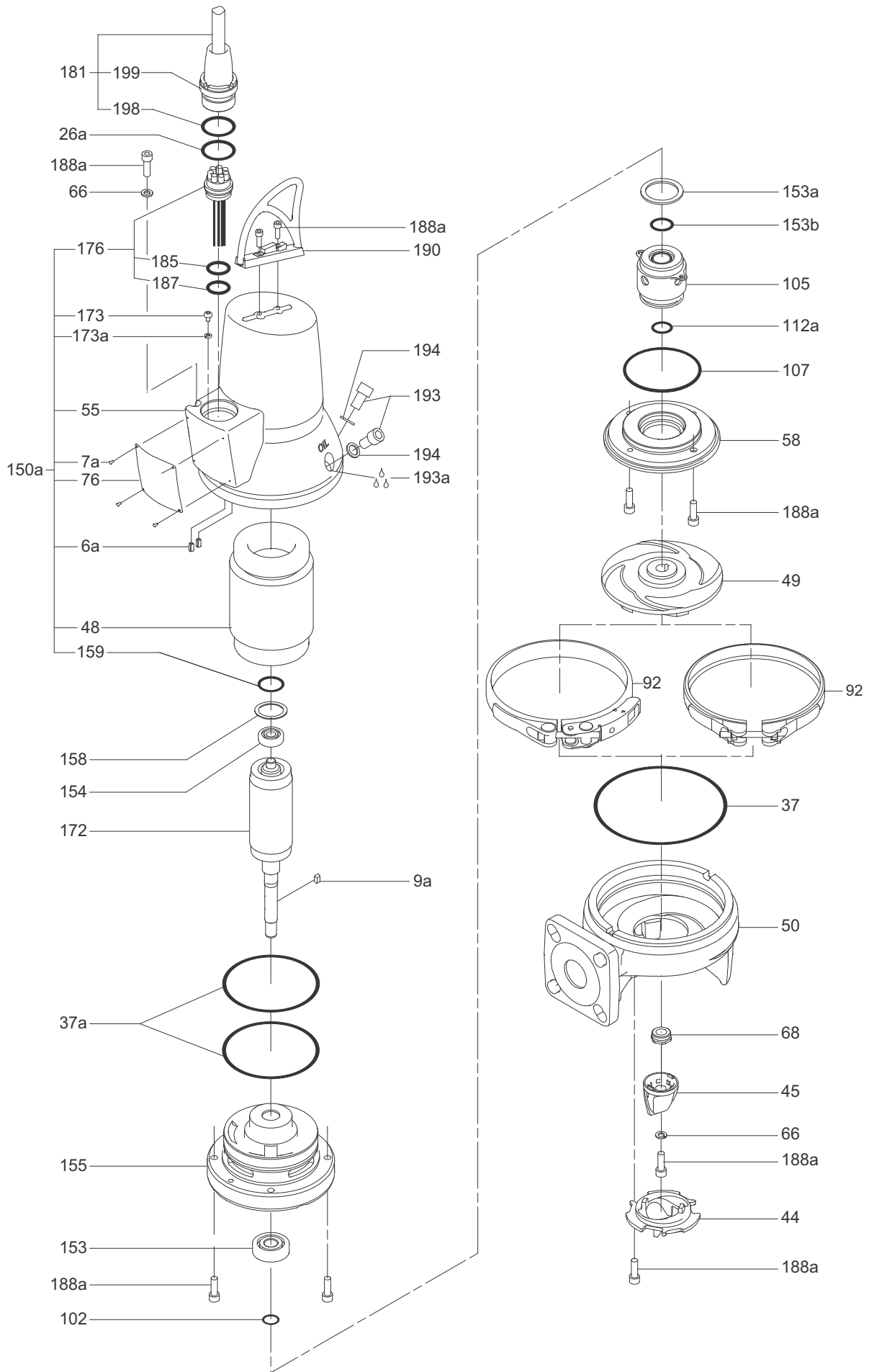
12.2 Exploded view, 0.9 to 1.5 kW



12.3 Sectional drawing, 2.6 to 4.0 kW



12.4 Exploded view, 2.6 to 4.0 kW



## 12.5 Material specification

Pos.	Description	Material	50 Hz pumps (EN/AISI/STM)	60 Hz pumps (EN/AISI/STM)
6a	Pin	Stainless steel		
7a	Rivet	Stainless steel		
9a	Key	Stainless steel		
26a	O-rings*	NBR		
37	O-ring*	NBR		
37a	O-rings	NBR		
44	Grinder ring	Stainless steel		1.4542 / 630
45	Grinder head	Stainless steel		1.4542 /630
48	Stator	-		
49	Impeller	Cast iron	EN-JL-1030	EN-GJL-200
50	Pump housing	Cast iron	EN-JL-1030	EN-GJL-200
55	Stator housing	Cast iron	EN-JL-1030	EN-GJL-200
58	Shaft seal carrier	Cast iron	EN-JL-1030	EN-GJL-200
66	Locking ring	Stainless steel		
68	Adjusting nut	Stainless steel	1.4057 / 431	1.4057 / 431
76	Nameplate	Stainless steel	1.4301 / 304	1.4301 / 304
92	Clamp	Stainless steel	1.4301 / 304	1.4301 / 304
102	O-ring	NBR		
103	Bush	Stainless steel	1.4057 / 431	1.4057 / 431
104	Seal ring	NBR		
105	Shaft seal	Primary seal (0.9 to 1.5 kW): SiC/SiC Secondary seal (0.9 to 1.5 kW): lip seal, NBR Primary seal (2.6 to 4.0 kW): SiC/SiC Secondary seal (2.6 to 4.0 kW): carbon/ aluminium oxide  Other components: NBR, stainless steel		
107	O-rings	NBR		
112a	Retaining ring	Stainless steel		
150a	Stator in housing complete	-		
153	Bearing, lower	Up to and including 1.5 kW: 6303 2.6 kW and up: 3205		
153a	Lock washer	Stainless steel		
153b	Retaining ring	Stainless steel		
154	Bearing, upper	Up to and including 1.5 kW: 6201 2.6 kW and up: 6205		
155	Oil chamber	Cast iron		EN-GJL-200
158	Corrugated spring	Steel		
159	O-ring	NBR		
172	Rotor/shaft	Shaft part at rotor: steel Shaft end at hydraulics: stainless steel	1.0533 / 304 1.4301	1.1181 / 304 1.4301
173	Screw	Steel		
173a	Washer	Steel		
176	Inner plug part	PET		
181	Outer plug part	CR rubber, cable H07RN-F	1.4308 / CF-8	1.4308 / CF-8
185	O-ring	NBR		
187	O-ring	NBR		
188a	Screw	Stainless steel		
190	Lifting bracket	Stainless steel	1.4308 / CF-8	1.4308 / CF-8
193	Oil screw	Stainless steel		
193a	Oil	Shell Ondina X420		
194	Gasket	Nylon		
198	O-ring	NBR		
199	Locking ring	-		
	Paint	Two-component epoxy		

\* Only in 60 Hz pumps.

Subject to alterations.



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