

# SEG AUTO *Adapt*

0.9 - 4.0 kW, DIN, 50 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:

- 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

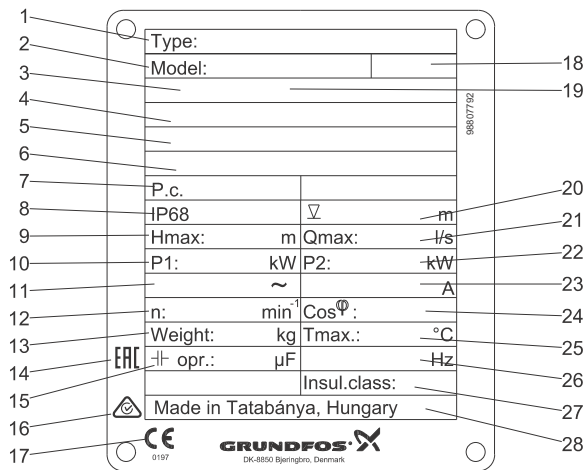


Fig. 1 Nameplate, SEG AUTO<sub>ADAPT</sub>, 50 Hz

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.

### 4.2 Type key

The type key covers the entire Grundfos SEG AUTO<sub>ADAPT</sub> 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.

Example: **SEG.40.12.E.Ex.2.1.502**

Code	Explanation	Designation
SE	Grundfos sewage pumps	Pump type
G	Grinder system in the pump inlet	Impeller type
40	Nominal diameter of outlet port [mm]	Pump outlet
12	Code number from type designation / 10 [kW]	Output power
[ ]	Standard, without equipment	
E	Electronic version with AUTO <sub>ADAPT</sub> functions	Sensor version
[ ]	Standard pump	Pump version
Ex	Explosion-proof pump	
2	2-pole	Number of poles
1	Single-phase motor	Number of phases
[ ]	Three-phase motor	
5	50 Hz	Frequency [Hz]
02	230 V, direct-on-line starting	
0B	400-415 V, direct-on-line starting	Supply voltage and starting method
0C	230-240 V, direct-on-line starting	
[ ]	First generation	Generation*
A	Second generation	
B	Third generation	
[ ]	Standard material (EN-GJL-200)	Pump material
Z	Custom-built pump	Customisation

\* Even if the pumps belong to different design generations, they are similar in terms of power rating.

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## 5. Approvals

### 5.1 Approval standards

All versions have been approved by LGA (Notified body under the Construction Products Directive) according to EN 12050-1.

### 5.2 Explanation to the Ex approval

The explosion-proof version has been approved by DEKRA according to the ATEX directive. The explosion protection classification of the SEG AUTO<sub>ADAPT</sub> pump is Europe CE 0344  
 Ⓔ II 2 G Ex b c d ib IIB T4 Gb.

Directive/ standard	Code	Description
ATEX	CE 0344	= CE mark 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 mark.
	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 atmospheres caused by gases, vapours or mists.
Harmonised European standard	Ex	= The equipment conforms to the harmonised European standard.
	b	= Control of ignition sources according to EN 13463-6.
	c	= Constructional safety according to EN 13463-5 and EN 13463-1.
	d	= Flame-proof enclosure according to EN 60079-1:2007.
	ib	= Intrinsic safety enclosure according to EN 60079-11:2007.
	IIB	= Classification of gases according to EN 60079-0:2009. Gas group B includes gas group A.
	T4	= Maximum surface temperature is 135 °C according to EN 60079-0.
	Gb	= Equipment protection level (IEC).

### 5.3 IEC countries (Australia and other countries)

For IEC countries, such as Australia and others, the explosion-proof versions of SEG AUTO<sub>ADAPT</sub> pumps have been approved by DEKRA, certificate no IECEx DEK 11.0026X, according to IEC 60079-0:2007, IEC 60079-1:2007 and IEC 60079-11:2006.

The explosion-protection classification of the pumps is Ex d ib IIB T4 Gb.

Directive/ standard	Code	Description
IEC 60079-0, IEC 60079-1 and IEC 60079-11	Ex	= The equipment conforms to the harmonised European standard.
	d	= Flame-proof enclosure according to IEC 60079-1:2007.
	ib	= Intrinsic safety according to EN 60079-11:2007.
	IIB	= Classification of gases according to IEC 60079-0:2009. Gas group B includes gas group A.
	T4	= Maximum surface temperature is 135 °C according to IEC 60079-0:2006.
	Gb	= Equipment protection level.

## 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

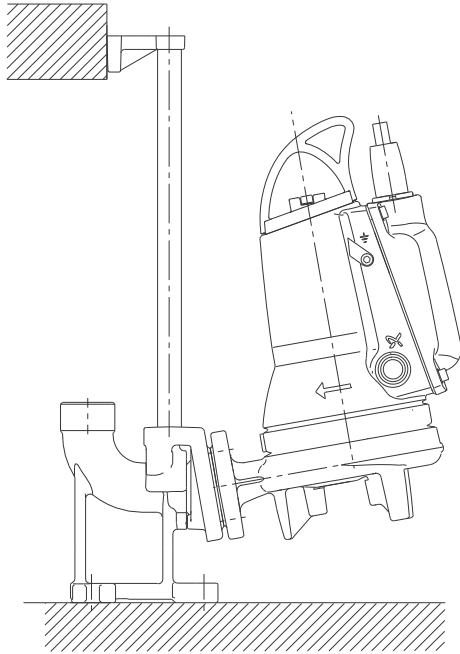


Fig. 2 Guide rail installation

#### Hookup auto-coupling

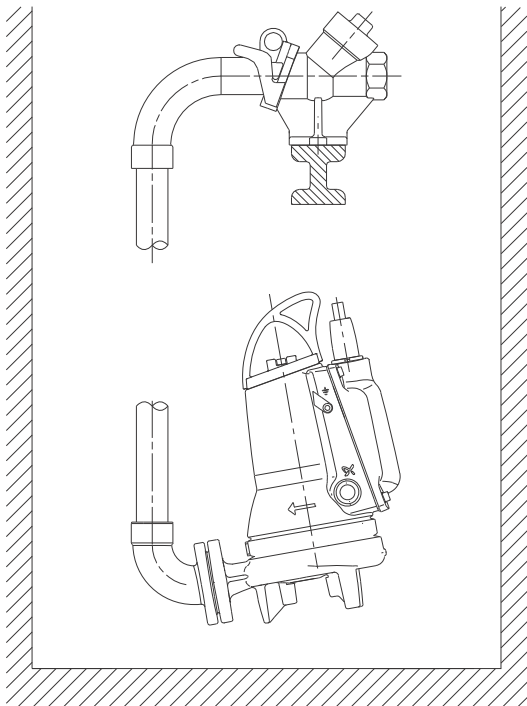


Fig. 3 Hookup auto-coupling installation

### 6.2 Free-standing submerged installation

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

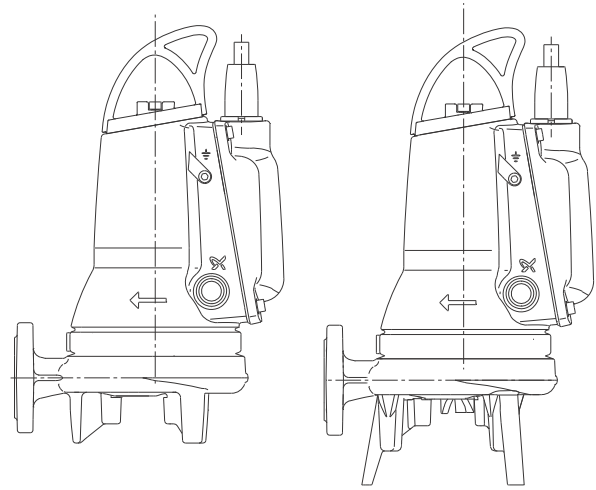


Fig. 4 Free-standing submerged installation

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## 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 cable entry.

### 7.2 Transporting the product

Make sure that all lifting equipment is rated for the purpose. Check the lifting equipment for damage before making any attempts to lift the pump. Do not exceed the rating data under any circumstances. For pump weights, see the pump nameplate, section [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.

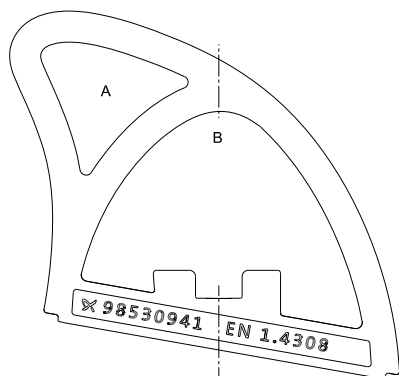
### 7.3 Lifting the product

The SEG AUTO<sub>ADAPT</sub> pumps weigh between 38 kg and 65 kg without accessories. It is therefore essential to use the correct lifting equipment.



Rate all lifting equipment for the purpose and check it 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. 5.



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Fig. 5 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	5 x 5 x 12	-	-	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
90b	O-ring	1	D180.0 x 4	D180.0 x 4	-	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	2	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
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	18 ± 2	-
	Screw (shaft seal carrier)	2	M8 x 25	M8 x 25	16 ± 2	-
	Screw (oil chamber)	2	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	18 ± 2	-
198	O-ring	1	D34.2 x 3	D34.2 x 3	-	Rocol Sapphire
285a	O-ring	4	D29.74 x 2.95	D29.74 x 2.95	-	Rocol Sapphire
285b	Set screw	2	M6 x 18	M6 x 18	5.5 ± 0.5	-
287b	O-ring	2	D20.2 x 3	D20.2 x 3	-	-
287c	Set screw	1	M6 x 18	M6 x 18	5.5 ± 0.5	-

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

Soapy water.

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

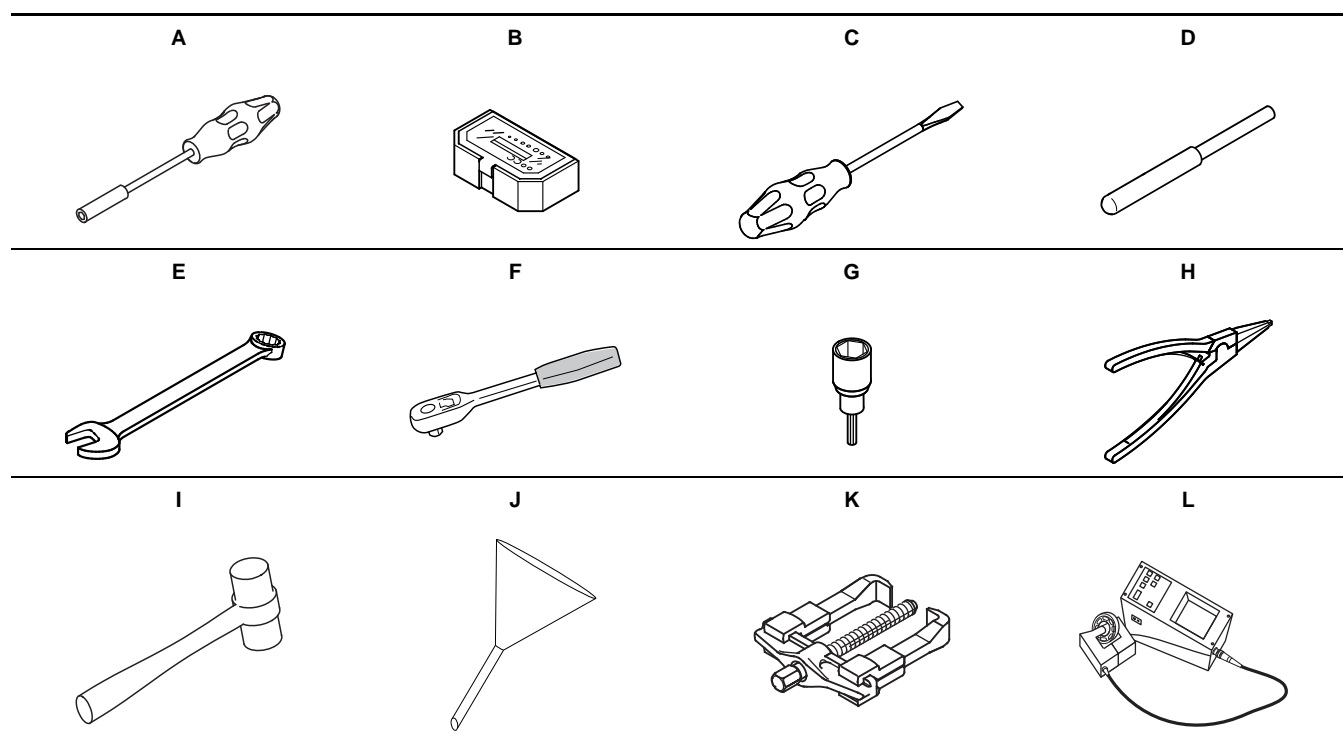
Motor oil: Shell Ondina X420, product number 96586753 (1 l).

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



## 9. Service tools

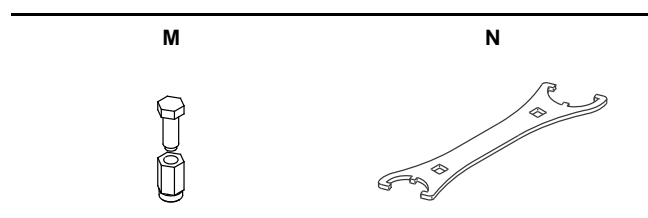
### 9.1 Standard tools



#### Standard tools

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

### 9.2 Special tools



#### Special tools

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

### 9.3 Tightness test tools

Designation	Description	Part No
Grundfos PC Tool	PC Tool link USB	97655366
Test plug	M48 x 1.5 - 6G	-
Test plug	M12 x 20	-

## 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 the 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 13. *Drawings*. Position numbers of tools (letters) refer to section 9. *Service tools*.

### 10.2 Yearly maintenance

Check pumps running normal operation 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*.
- **Electronic unit**  
See section 11.3 *Electronic unit*.
- **Sensors**  
See section 11.5 *Replacing the sensors*.
- **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 product 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 an authorised Ex workshop.

- **O-rings and similar parts**

During service or replacement, make sure 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 hours 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

1. Place the pump with the oil level screw pointing downwards.  
See fig. 6.

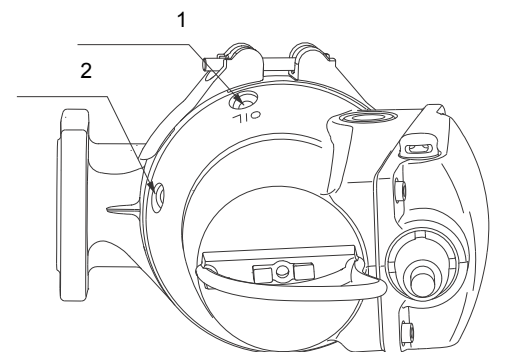


Fig. 6 Oil screws

Pos.	Description
1	Oil filling screw
2	Oil level screw

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- 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 gives 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, method 1

- 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. 6.
- 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. See section [8. Torques and lubricants](#).
- Clean the pump for spilled oil.

#### Filling the oil chamber with oil, method 2

- Place the pump in the upright position on a plate.
- Measure the correct amount of oil in the container and pour the oil into the oil chamber (*M*). See fig. 7.

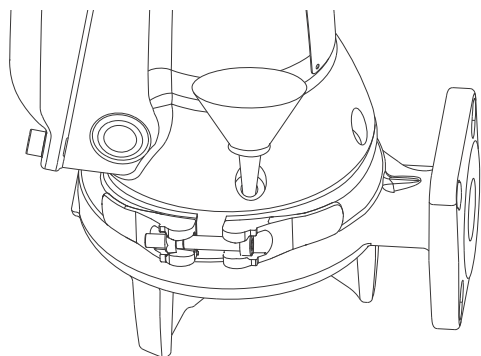


Fig. 7 Oil filling

- Fit and tighten the screws (193) and the seal washers (194). See section [8. Torques and lubricants](#).
- 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.

#### 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 hook spanner (*B*).
- Insert two screwdrivers (*E*) into the groove and prise the cable out of the cable entry. See fig. 8.

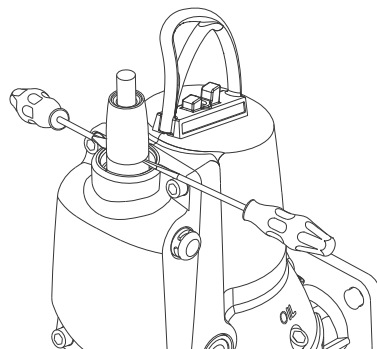


Fig. 8 Removing the supply cable

- 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

##### DANGER

##### Electric shock

Death or serious personal injury

- Make sure that the plastic pin on the cable is intact. In case the pin is damaged, replace 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.

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## 11. Dismantling and assembling the product

### General information

Position numbers of parts (digits) refer to section [13. 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 on 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. 9.

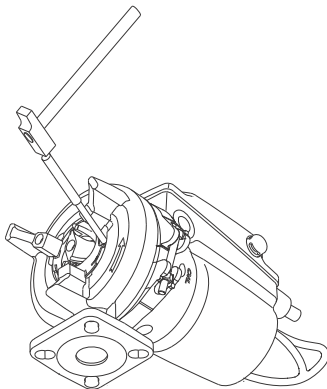


Fig. 9 Dismantling the grinder ring

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) from the shaft end. Remove the locking ring (66). See fig. 10.

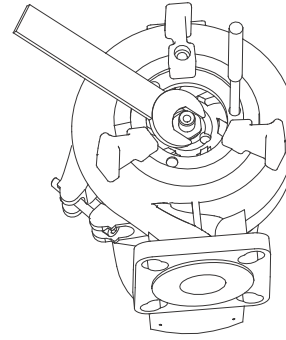


Fig. 10 Dismantling the screw and grinder head

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. 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 on the impeller and the grinder head.

1. See section [11.1.3 Removing the pump housing](#).
2. Insert the punch (F) in the impeller (49) to prevent it from moving during dismantling.
3. Remove the adjusting nut (68).
4. Fit the puller (A) on the shaft. See fig. 11.

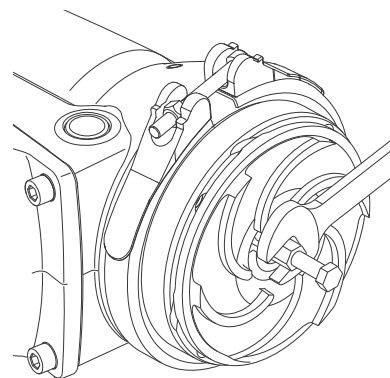


Fig. 11 Fitting the puller on the impeller

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 AUTO<sub>ADAPT</sub> 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](#).
2. Remove the retaining ring (112a).
3. 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.
4. Remove the shaft seal carrier (58) by means of the two screws (188a).
5. Remove the retaining ring (112a).
6. Pull out the shaft seal assembly (105).
7. 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).
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. Pull the lower bearing (153) out of the oil chamber (155).
9. Pull the upper bearing (154) off the rotor/shaft (172) using a puller.
10. 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](#).

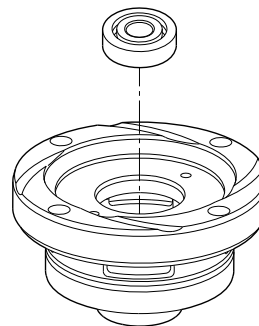
#### 11.2.1 Fitting the bearings



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. 12](#). Press and let the oil chamber cool. Use a heat-resistance punch.
4. Allow the assembly to cool.



**Fig. 12** 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.

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- 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. 13.

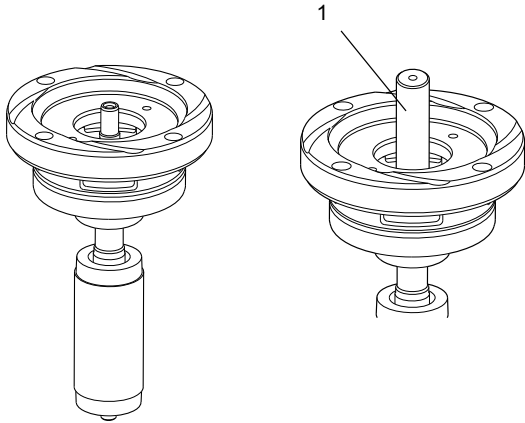


Fig. 13 Fitting the oil chamber on the rotor/shaft

Pos.	Description
1	Punch

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

**Upper bearings**

- Fit the corrugated spring (158) on the stator housing (55).
- Fit the upper bearing (154) on the rotor/shaft (172) by pressing on the inner ring.
- Make sure that the O-ring (159) is fitted in the groove of the stator housing (55).
- Fit the corrugated spring (158) on the upper bearing (154).
- Lubricate the groove for the O-rings (37a).
- Fit and lubricate the O-rings (37a).
- Make sure that the spring pins (6a) are fitted on the stator housing (55).
- 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).
- Fit the screws (188a) to attach the oil chamber (155) to the stator housing (55). See section 8. *Torques and lubricants*.

**11.2.2 Fitting the shaft seal**

**0.9 to 1.5 kW**

- Check and clean the oil chamber (155).
- Lubricate the groove for the O-rings (107).
- Fit and lubricate the two O-rings (107) on the shaft seal.
- Make sure that the O-ring (102) is fitted inside the bush (103).
- Cover the shaft end and lubricate the shaft.
- Fit the bush (103) in the seal ring (104) of the shaft seal (105).
- Fit a new shaft seal (105) using the mounting bush included in the shaft seal kit. See fig. 14.

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

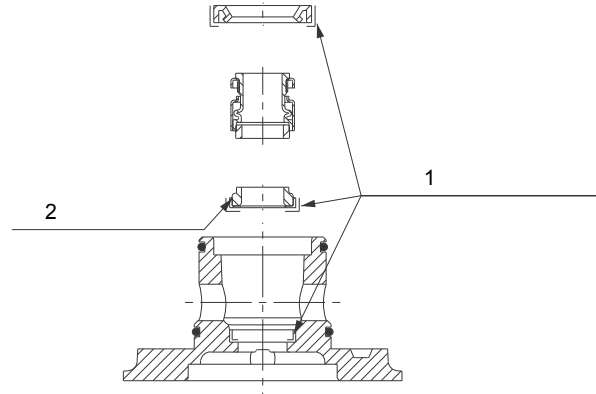


Fig. 14 Shaft seal assembly, 0.9 - 1.5 kW

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.

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

**2.6 to 4 kW**

- Lubricate the shaft surface on the point where the seal is fitted.
- Fit the locking washer (153a).
- Fit the shaft seal (105a) to the shaft. Make sure that the pin of the shaft seal engages with the shaft groove. See fig. 15.

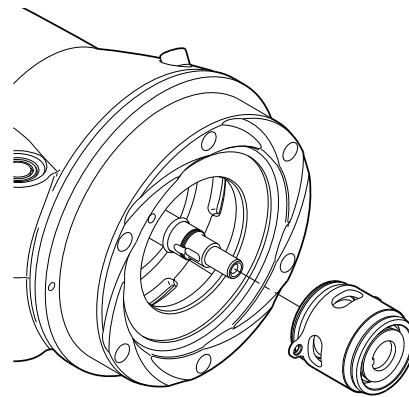


Fig. 15 Fitting the shaft seal, 2.6 - 4 kW

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

- Lubricate the groove for the O-ring (107) on the shaft seal carrier (58).
- Fit and lubricate the O-ring (107).
- Fit the shaft seal carrier (58) with screws (188a). See section 8. *Torques and lubricants*.
- Fit the retaining ring (112a).
- Fit the key (9a).

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### 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).
7. See section 12.1 *Tightness tests*.

### 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 10.3 *Checking and changing the motor oil*.

## 11.3 Electronic unit

### 11.3.1 Opening the electronic unit

1. Clean the pump around the electronic unit to protect the electronic parts from dirt when opening the electronic unit.
2. Place the pump on the side with the level sensor pointing upwards. See fig. 16.



Be careful not to disconnect the wires.

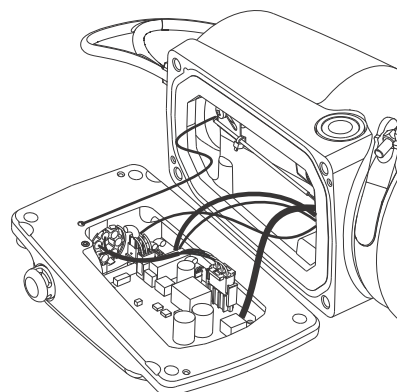


Fig. 16 Correct opening of the electronic unit

3. Remove the four screws (188a) and place the electronic unit next to the pump on a block or similar support. See fig. 17.

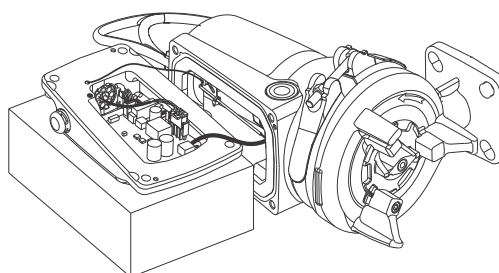


Fig. 17 Electronic unit on a block

4. Raise the pump to the vertical position. See fig. 18.

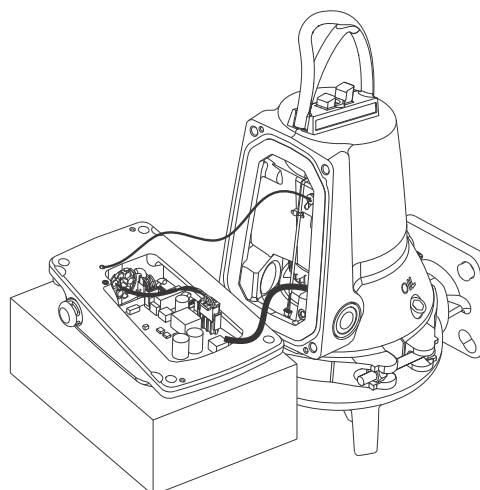


Fig. 18 Pump in the vertical position

5. Remove the O-ring (90b) from the electronic unit.
6. Clean the contact surfaces of the stator housing and the electronic unit. Clean the O-ring groove.

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### 11.3.2 Replacing the electronic unit

1. See section [11.3.1 Opening the electronic unit](#)
2. Remove the wires of the dry-running sensor, Pt1000 sensor and capacitor (single-phase pumps) as well as the earth lead.
3. Cut the motor leads between the electronic unit and the stator housing in the middle.
4. Remove the level sensor (see section [11.5.2 Replacing the level sensor](#)) and the cable plug (see section [11.6 Replacing the cable plug](#)) from the old electronic unit and fit them in the new one.
5. Remove approximately 60 mm of the insulating sheath of the cable from the new electronic unit so that approximately 75 mm of the three leads are stripped.
6. Cut away 5, 30 and 55 mm of the three leads from the electronic unit and from the stator housing so that the joints are displaced from each other. See fig. 19. For instance, if 5 mm of the red lead from the electronic unit are cut away, 55 mm of the red lead from the stator housing must be cut away.

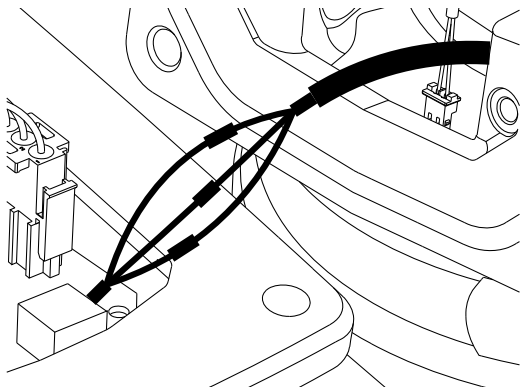


Fig. 19 Leads with connectors

7. Strip the three leads from the electronic unit and from the stator housing using a cable stripper.



Do not use side-cutting pliers due to the risk of pulling the leads out of the stator housing.

8. Pull a new 16 mm insulation sheath over the original insulating sheath of the motor leads. See fig. 20.

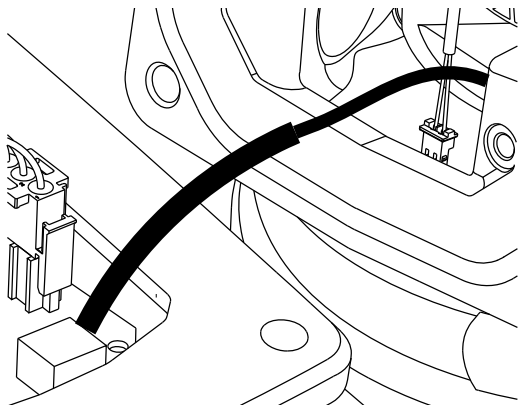


Fig. 20 Insulating sheath on the three leads

9. Pinch connectors on the three leads with a crimping tool.



The leads must be connected in such a way that the colours from the electronic unit and the stator housing match.

10. Grab the leads on each side of the connector and pull a little to check the joints.
11. Carefully pull the new insulating sheath over the joints and fix it with a cable clip.
12. Connect the wires from the dry-running sensor, Pt1000 sensor and capacitor (single-phase pumps) as well as the earth lead.
13. Fit the electronic unit. See section [11.3.2 Replacing the electronic unit](#). [11.3.3 Closing the electronic unit](#).

### 11.3.3 Closing the electronic unit

1. Lubricate the O-ring (90b) and the contact surfaces of the stator housing and the electronic unit.
2. Fit the O-ring in the stator housing.
3. Place the wires in the hollow space and fit the electronic unit on the stator housing.



Make sure that the wires are not pinched between the stator housing and electronic unit.

4. Fit the four screws (188a). See section [8. Torques and lubricants](#).

## 11.4 Replacing the run capacitor, single-phase pumps

### 11.4.1 Dismantling the run capacitor

1. Open the electronic unit. See section [11.3.1 Opening the electronic unit](#).
2. Disconnect the capacitor wire from the electronic unit.
3. Remove the Pt1000 plug from the PC board.
4. Remove the earth lead from bracket (161c).
5. Remove the capacitor bracket with capacitor from the stator housing.

### 11.4.2 Assembling the run capacitor

1. Fix the capacitor wire on the PC board.
2. Fit the earth lead on the new bracket.
3. Fit the new Pt1000 sensor.
4. Fit the electronic unit. See section [11.3.3 Closing the electronic unit](#).

## 11.5 Replacing the sensors

### 11.5.1 Replacing the dry-running sensor

Observe the bar code on the sensor wire, for example 96892923-01-039-01192. In case the bar code contains the figure 01, replace the sensor with a new one, version 02.

#### Dismantling the dry-running sensor

1. Open the electronic unit. See section [11.3.1 Opening the electronic unit](#).
2. Remove the sensor wire from the PC board.
3. Remove the set screw (285b).
4. Press the sensor out of the stator housing with a screwdriver (E). Do not reuse the sensor.
5. Clean the sensor hole.

#### Assembling the dry-running sensor

1. Lubricate and fit the O-rings (285a).
2. Lubricate the sensor hole.
3. Press the sensor home in the stator housing.
4. Connect the sensor wire to the PC board.
5. Fit a new set screw. See section [8. Torques and lubricants](#).
6. Fit the electronic unit. See section [11.3.3 Closing the electronic unit](#).

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### 11.5.2 Replacing the level sensor

#### Dismantling the level sensor

1. Open the electronic unit. See section [11.3.1 Opening the electronic unit](#).
2. Remove the sensor wire from the PC board.
3. Remove the set screw (287c).
4. Press the sensor out of the electronic unit.
5. Clean the sensor hole.

#### Assembling the level sensor

1. Lubricate and fit the O-ring (287b).
2. Lubricate the sensor hole.
3. Press the sensor home in the electronic unit.
4. Connect the sensor wire to the PC board.
5. Fit a new set screw. See section [8. Torques and lubricants](#).
6. Fit the electronic unit. See section [11.3.3 Closing the electronic unit](#).

### 11.6 Replacing the cable plug

#### 11.6.1 Dismantling the cable plug

1. Open the electronic unit. See section [11.3.1 Opening the electronic unit](#).
2. Remove the earth lead screw and the washer.
3. Remove the two plugs from the electronic unit.
4. Press in the three barbs and press the cable plug out of the electronic unit.
5. Clean the cable entry.

#### 11.6.2 Assembling the cable plug

1. Press the cable plug into the cable entry.



Be careful not to damage the three barbs.

2. Check that the three barbs have engaged with the electronic unit.
3. Connect the two plugs to the PC board.
4. Fix the earth lead with the screw. Do not forget to fit the washer.
5. Fit the O-ring (26a)
6. Fit the electronic unit. See section [11.3.3 Closing the electronic unit](#).

## 12. Testing the product



Maintenance and service work on explosion-proof pump must be carried out by Grundfos or a service workshop authorised by Grundfos.

### 12.1 Tightness tests

#### 12.1.1 Testing the motor

Carry out a tightness test if the motor has been dismantled. Proceed as follows:

1. Secure the pump in vertical position.
2. Remove the cable, if assembled. See section [11.6.1 Dismantling the cable plug](#).
3. Fit the test plug. See section [9.3 Tightness test tools](#).
4. Pressurise the chamber with 0.6 bar.
5. Observe the pressure approximately 1 minute to detect possible leaks.
6. If the pressure drops, dismantle the pump, and find and correct the cause of the leak.
7. Remove the pressure.
8. Remove the test plug.
9. Fit the cable plug. See section [11.6.2 Assembling the cable plug](#).

#### 12.1.2 Testing the oil chamber

Carry out a tightness test if the motor has been opened, and before refilling the oil. Use nitrogen gas to test the tightness. Proceed as follows:

1. Secure the pump in vertical position.
2. Remove one oil plug (193), including the washer (194).
3. Fit the test plug instead of the oil plug (193).
4. Pressurise the chamber with 0.6 bar.
5. Observe the pressure approximately 1 minute to detect possible leaks.
6. If the pressure drops, dismantle the pump, and find and correct the cause of the leak.
7. Remove the pressure from the oil chamber.
8. Remove the test plug.
9. Fill with oil. See section [10.3 Checking and changing the motor oil](#).

### 12.2 Testing the operation of the motor

Proceed as follow:

1. Connect the pump to Grundfos PC Tool.
2. Connect the pump to the power supply.
3. Check the line current and phase values with the operation report.  
Line current (L1, L2 and L3): 0.1 ~ 0.2 A  
Average of line voltages: ~400 V  
Phase voltage (L1, L2 and L3): ~230 V.
4. If the stator is in normal condition, the values are close to each other (between 0.1 and 0.2). If the values differ too much from each other, then test the stator by means of the motor tester.

## 12.3 Testing the sensors

In case the pump software version is old, we recommend that you update it to the latest one.

### 12.3.1 Dry-running sensor (dry test)

1. Place the pump in horizontal position.
2. Connect Grundfos PC Tool to the pump.
3. Connect the pump to the power supply, but do not start it yet.



Make sure that the pump base is clear from objects.

4. Clean the dry-running sensor.
5. Cover the sensor with wet cloth and start the pump.
6. Let the pump run for a maximum of 5 seconds.
7. Remove the wet cloth and dry the sensor.
8. Turn off the power supply.
9. Disconnect the power supply cable and PC Tool.

### 12.3.2 Dry-running and/or level sensor (submersion test)

1. Connect the pump to Grundfos PC tool.
2. Connect the pump to the power supply.
3. Secure the pump in vertical position.
4. Lower the pump carefully into the test basin.
5. Start the pump and find the start level.  
In case the pump does not start automatically within 5 seconds, reverse the phase connections.
6. Observe the pump data through PC Tool in case of sensor warnings.
7. Pump water into the test basin until the pump start level is reached.

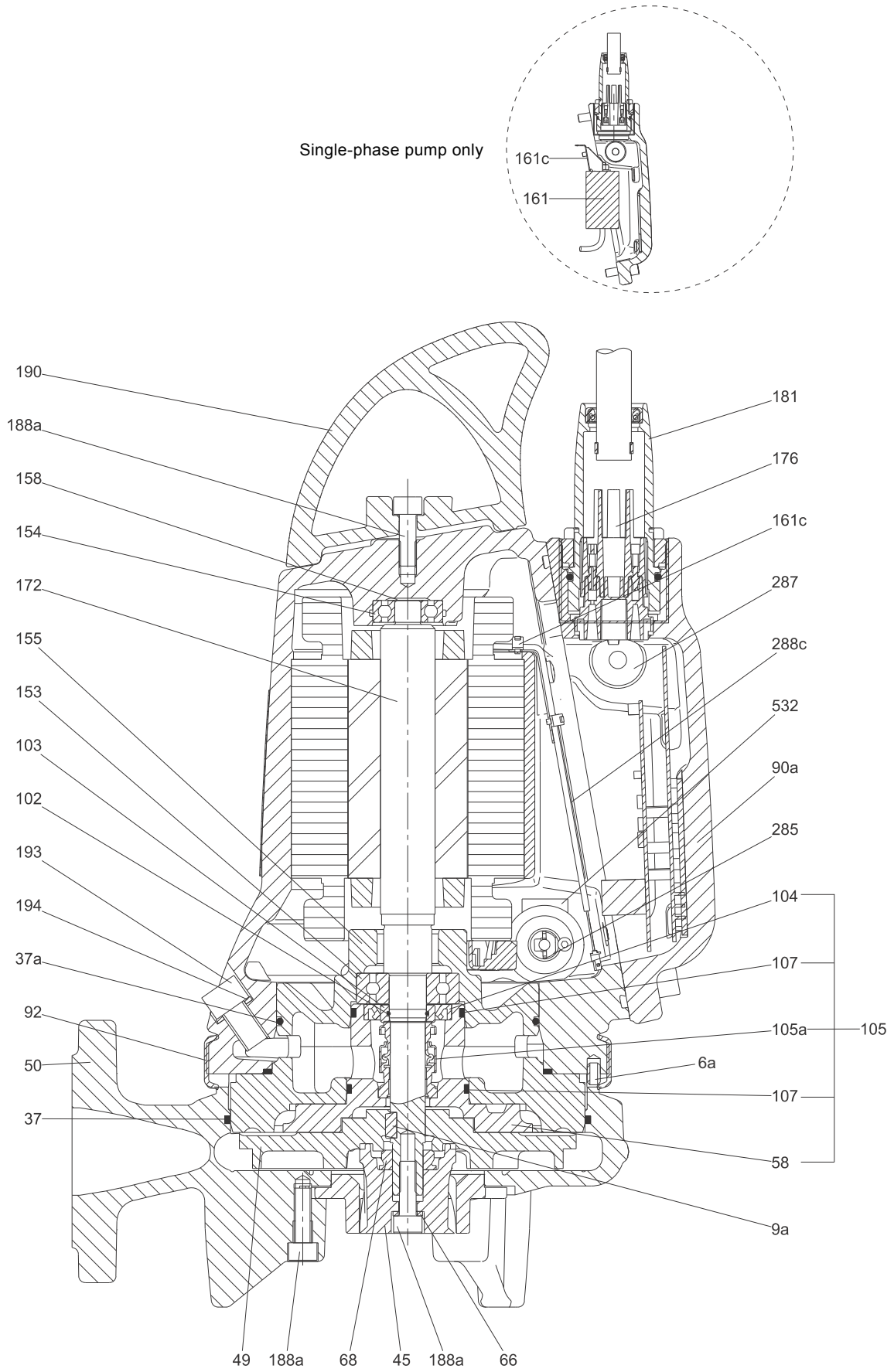


Make sure that the flow is lower than the pump capacity when the liquid is pumped into the test basin.

8. The pump starts to pump down to the stop level.
9. Let the pump start a few times to make sure that it operates correctly.
10. Remove the pump from the test basin.
11. Remove the power supply cable and PC Tool.

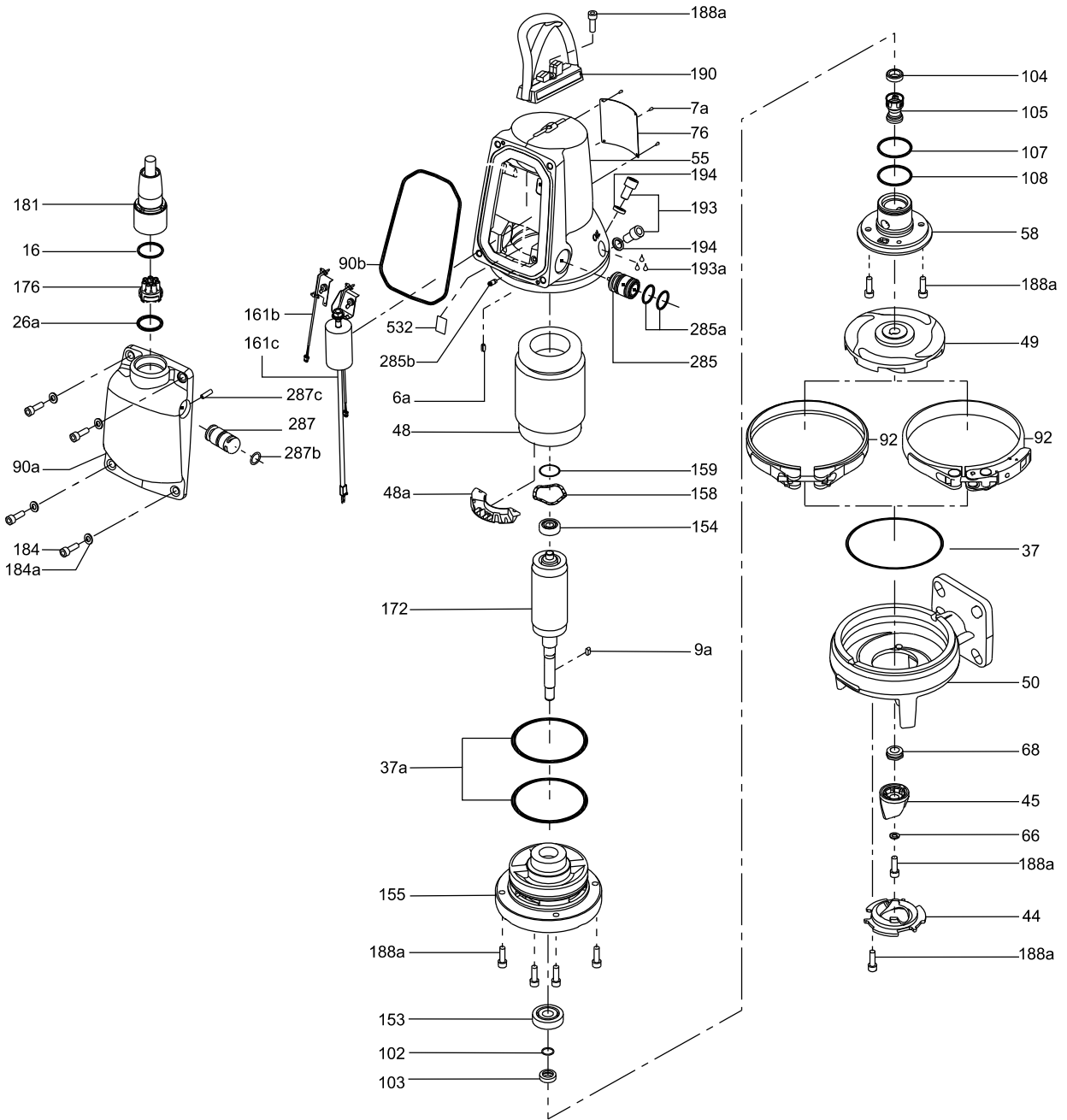
### 13. Drawings

#### 13.1 Sectional drawing, 0.9 to 1.5 kW



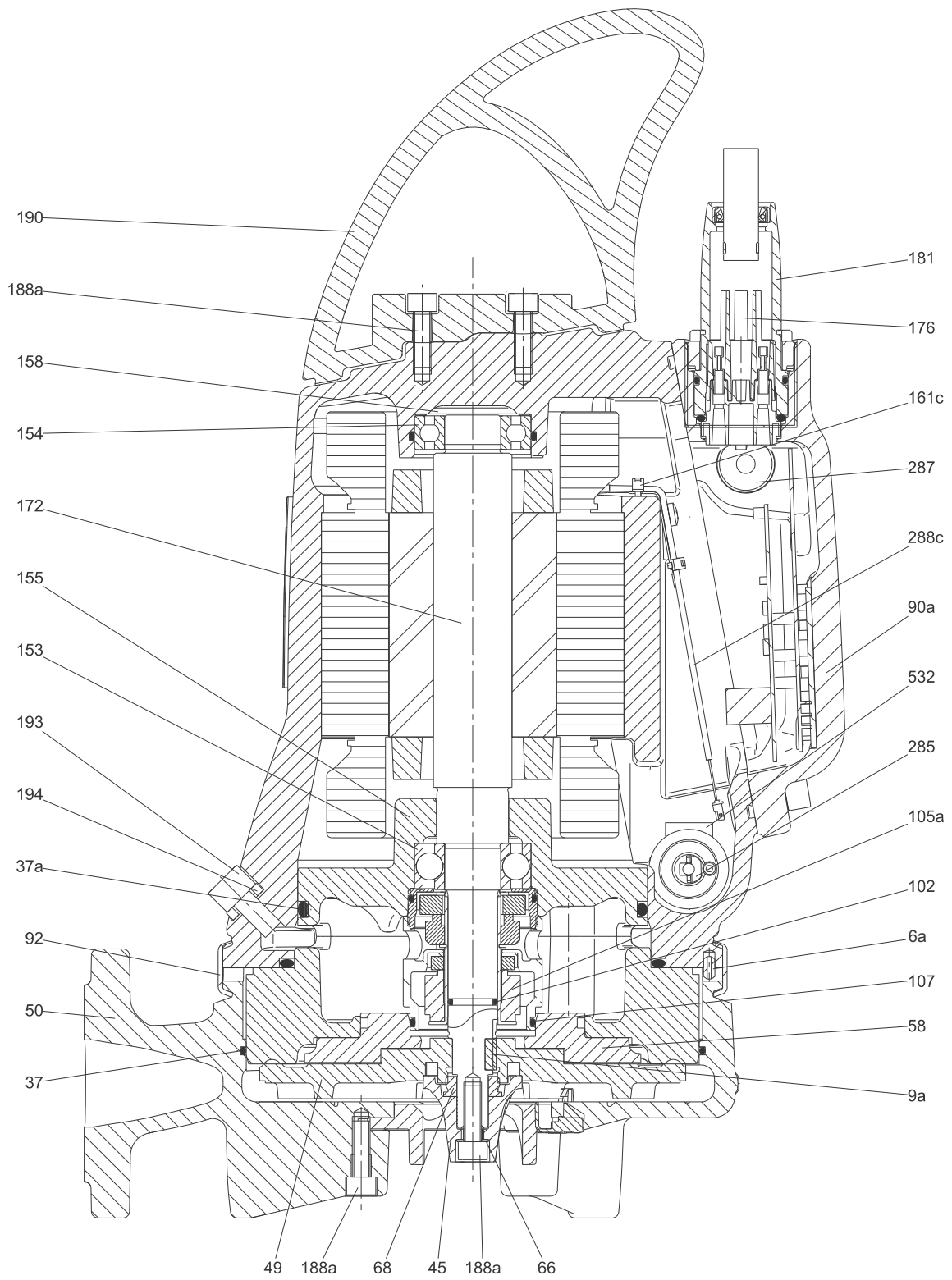
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13.2 Exploded view, 0.9 to 1.5 kW



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13.3 Sectional drawing, 2.6 to 4.0 kW



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13.4 Exploded view, 2.6 to 4.0 kW

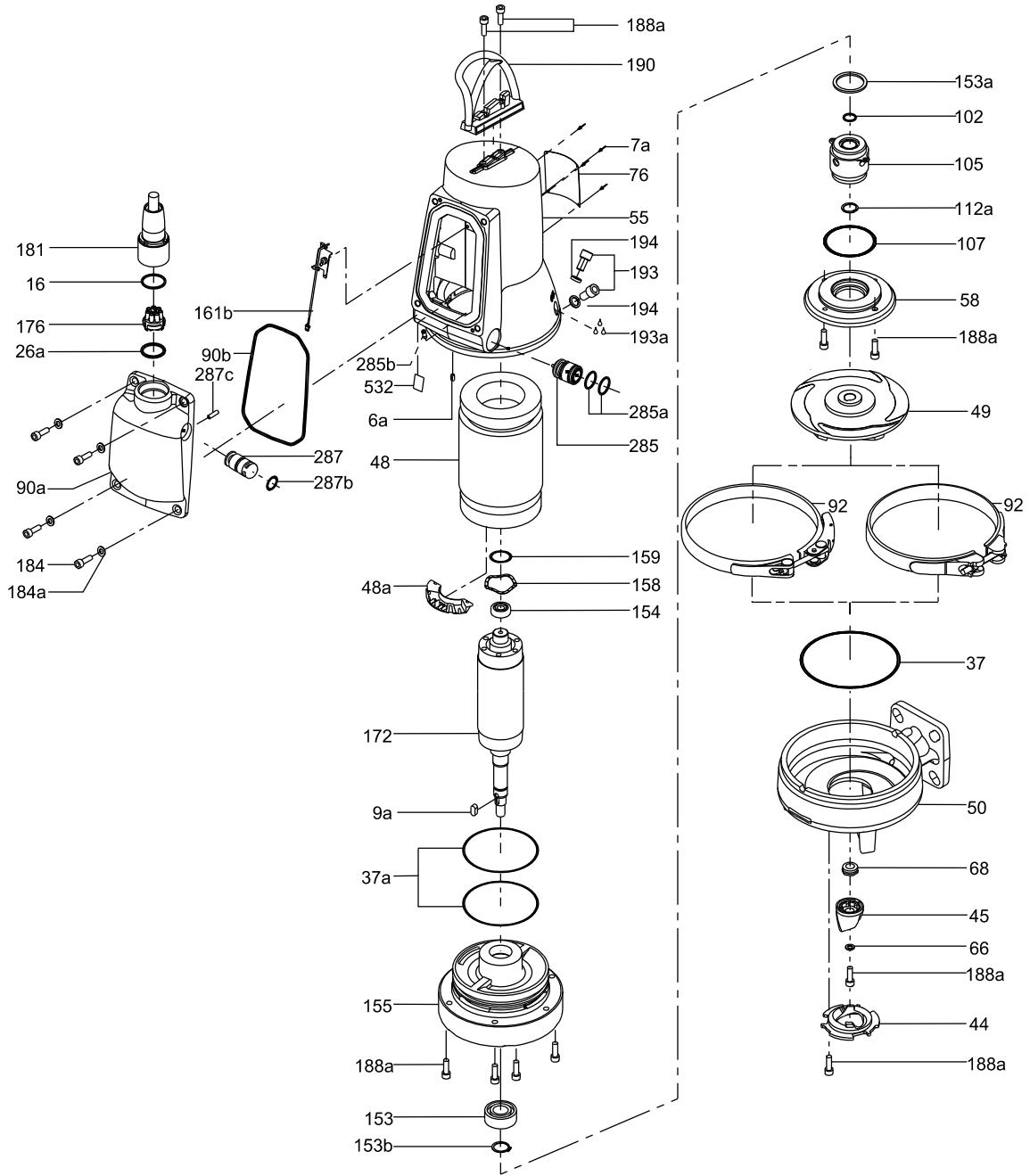


Fig. 21 SEG AUTO<sub>ADAPT</sub>, 2.6 - 4 kW

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## 13.5 Material specification

Pos.	Description	Material	EN standard	AISI/ASTM
6a	Pin	Stainless steel	-	-
7a	Rivet	Stainless steel	-	-
9a	Key	Stainless steel	-	-
26a	O-ring	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	-	-	-
48a	Terminal board	-	-	-
49	Impeller	Cast iron	EN-JL-1030	-
50	Pump housing	Cast iron	EN-JL-1030	-
55	Stator housing	Cast iron	EN-JL-1030	-
58	Shaft seal carrier	Cast iron	EN-JL-1030	-
66	Locking ring	Stainless steel	-	-
68	Adjusting nut	Stainless steel	1.4057	431
76	Nameplate	Stainless steel	1.4301	304
90a	Electronic unit	-	-	-
90b	O-ring	-	-	-
92	Clamp	Stainless steel	1.4301	304
102	O-ring	NBR	-	-
103	Bush	Stainless steel	1.4057	431
104	Seal ring	NBR	-	-
105/ 105a	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	-	-
153	Bearing, lower	Up to and including 1.5 kW: 6303 2.6 kW and up: 3205	-	-
153a	Locking 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	-	-	-
158	Corrugated spring	Steel	-	-
159	O-ring	NBR	-	-
161b	Pt1000 sensor with bracket	-	-	-
161c	Run capacitor and Pt1000 sensor with bracket*	-	-	-
172	Rotor/shaft	Shaft part at rotor: steel Shaft end at hydraulics: stainless steel	1.0533 1.4301	304 -
173	Screw	Steel	-	-
173a	Washer	Steel	-	-
174	Earth screw	-	-	-
174a	Washer	-	-	-
176	Inner plug part	PET	-	-
181	Outer plug part	CR rubber, cable H07RN-F	1.4308	CF-8
188a	Screw	Stainless steel	-	-
190	Lifting bracket	Stainless steel	1.4308	CF-8
193	Oil screw	Stainless steel	-	-
193a	Oil	Shell Ondina X420	-	-
194	Gasket	Nylon	-	-
198	O-ring	NBR	-	-
199	Locking ring			

Pos.	Description	Material	EN standard	AISI/ASTM
285	Dry-running sensors**	-	1.4404	-
285a	O-ring	NBR	-	-
285b	Set screw	-	-	-
287	Level sensor	-	1.4404	-
287b	O-ring	-	-	-
287c	Set screw	-	-	-
288c	Pt1000 sensor	-	-	-
532	Silica gel	-	-	-
	Paint	Two-component epoxy	-	-

\* Single-phase pumps only.

\*\* Explosion-proof pumps have two dry-running sensors.

Subject to alterations.





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