

SCALA

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

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.

2. Identification

2.1 Nameplate

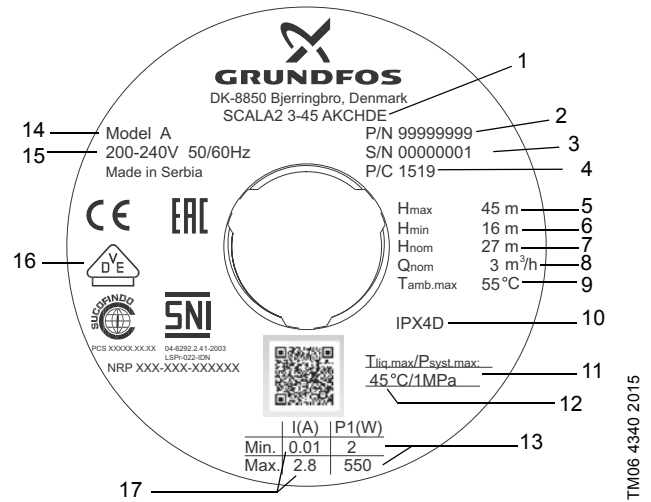


Fig. 1 Example of nameplate

Pos.	Description
1	Type designation
2	Product number
3	Serial number
4	Production code, year and week
5	Maximum head
6	Minimum head
7	Rated head
8	Rated flow rate
9	Maximum ambient temperature
10	IP class
11	Maximum operation pressure
12	Maximum liquid temperature
13	Minimum and maximum rated power
14	Model
15	Voltage and frequency
16	Approvals
17	Minimum and maximum rated current

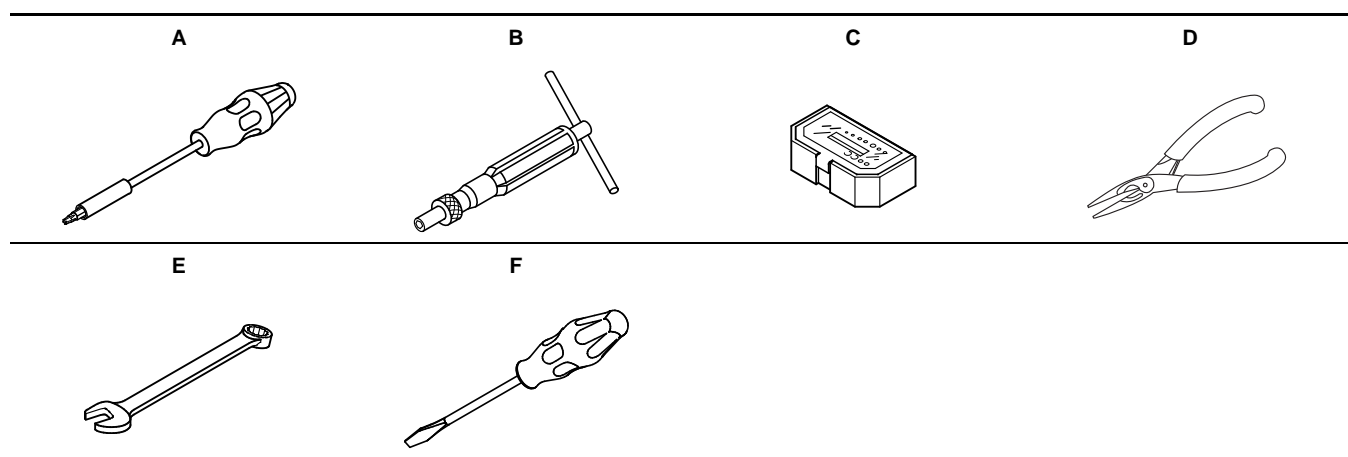
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2.2 Type key

	SCALA2	3	-45	A	K	C	H	D	E
Type range									
SCALA1 Economy									
SCALA2 Comfort									
Rated flow rate [m ³ /h]									
Maximum head [m]									
Material code									
A: Standard									
Supply voltage									
K: 1 x 200-240 V, 50/60 Hz									
M: 1 x 208-230 V, 60 Hz									
V: 1 x 115 V, 60 Hz									
W: 1 x 100-115 V, 50/60 Hz									
Motor									
C: High-efficiency motor with frequency converter									
Power supply cable and plug									
A: Cable with plug, IEC type I, AS/NZS3112, 2 m									
B: Cable with plug, IEC type B, NEMA 5-15P, 6 ft									
C: Cable with plug, IEC, type E&F, CEE7/7, 2 m									
D: Cable without plug, 2 m									
G: Cable with plug, IEC type G, BS1363, 2 m									
H: Cable with plug, IEC type I, IRAM 2073, 2 m									
J: Cable with plug, NEMA 6-15P, 6 ft									
Controller									
D: Integrated frequency converter									
Thread									
A: R 1" EN 1.4308									
C: NPT 1" EN 1.4308									
E: R 1" composite material									
F: NPT 1" composite material									

3. Service tools

3.1 Standard tools



Standard tools

Pos.	Range	Designation	Description	Part number
A	All	Torx screwdriver	-	-
B	All	Torque screwdriver	1-6 Nm	SV0438
C	All	Bits kit	5 mm hexagon	SV2010
D	All	Needle-nose pliers	-	-
E	All	Ring/open-end spanner	M89 - 13 mm	SV0055
F		Flat-blade screwdriver	-	-

4. Lubricants

If nothing else is specified, all O-rings are to be lubricated with Rocol Sapphire Aqua-Sil.

Product	Product number
Rocol Sapphire Aqua-Sil, 1 kg	RM2924
Castrol Optimol Paste White T, 0.5 kg	V6001176

5. Dismantling and assembly

5.1 General information

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.



5.1.1 Before dismantling

- Disconnect the power supply to the motor.
- Remove the power cable in accordance with local regulations.
- Open a tap to release the pressure in the pipe system.
- Gradually loosen the non-return valve (65a) to release the pressure in the pump.
- Remove the drain plug (7) to drain the pump.

5.1.2 Before assembly

- Always replace gaskets and O-rings when you overhaul the pump.
- Clean and check all parts.
- Replace defective parts.

5.2 Removing the control box cover



Always use an antistatic service kit when handling electronic components. This will prevent static electricity from damaging components.

1. Remove the six pan-head torx screws in the cover (164a).
2. Carefully lift off the control box cover and disconnect the HMI plug.

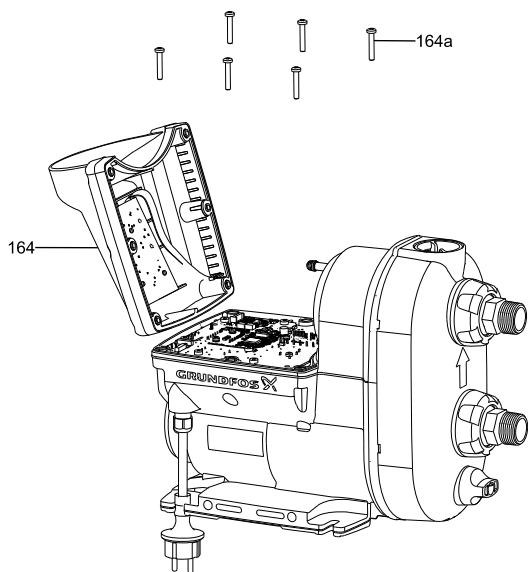


Fig. 2 Removing the control box cover

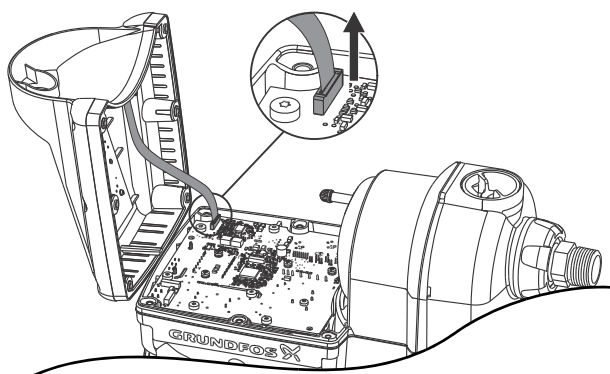


Fig. 3 Disconnecting the HMI plug

5.3 Removing the pressure tank

1. Slowly unscrew the non-return valve (65a) to release any pressure in the pump.
2. Remove the drain plug (7).
3. Remove the union nut (100) by turning it counterclockwise by hand.
4. Pull out the nipples (100a).
5. Pull out the non-return valve (65) from the inlet.
6. Remove the O-rings from the nipples, valves and plugs.
7. Carefully remove the pump cover (403) using a flat-blade screwdriver.



To avoid damage to the connection part, insert the flat-blade screwdriver in the top slots and pop the cover loose by moving the screwdriver handle towards the pump body. See fig. 4.

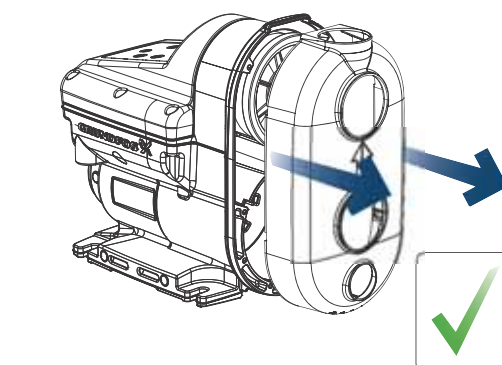
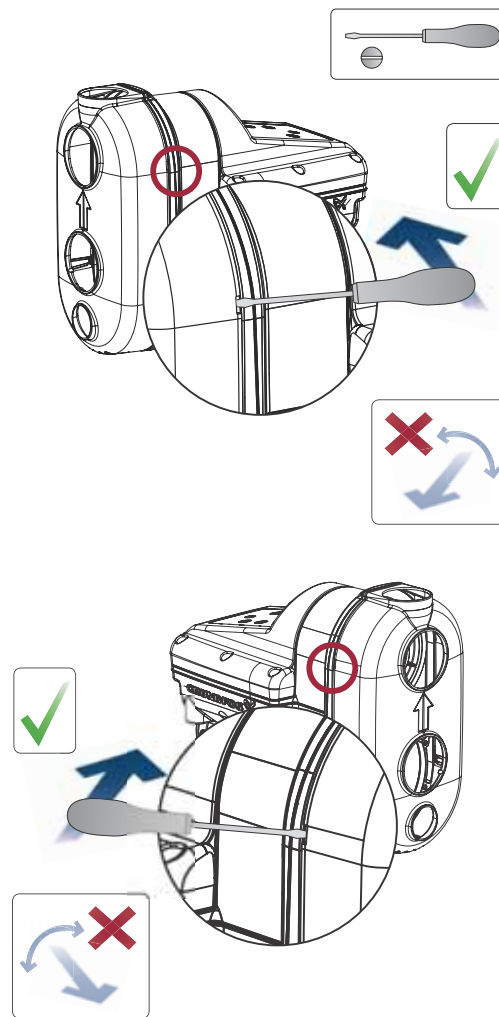


Fig. 4 Removing the cover

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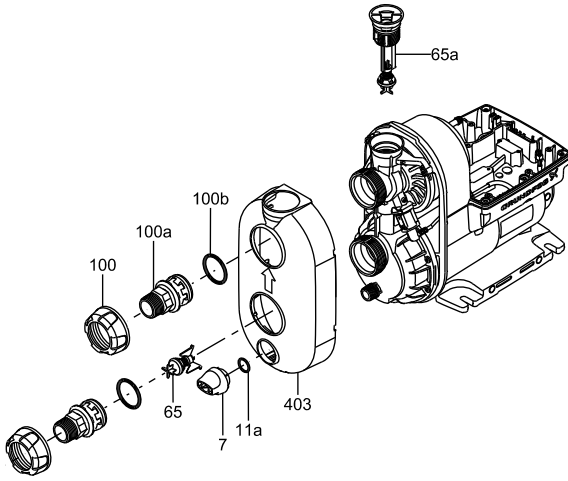


Fig. 5 Removing the nipples and the cover

8. Remove the retaining clip (175) for the sensor and remove the sensor (174a).
9. Remove the sensor (174a).

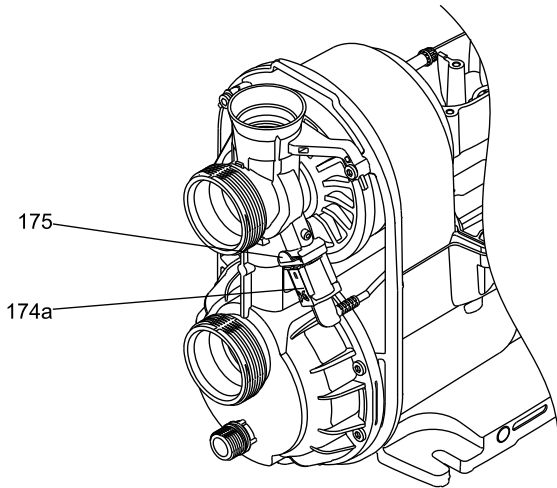


Fig. 6 Sensor and retaining clip

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10. Remove the screws (26) that hold the connection part. Note that one of the screws holds the earth connection bracket (173c) and washer.
11. Remove the connection part and the pressure tank.
12. Remove the seal ring (44a).

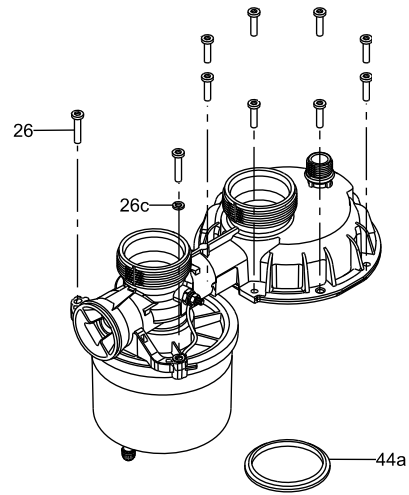


Fig. 7 Removing the connection part

13. Remove the self-priming valve (10) and O-ring (37).

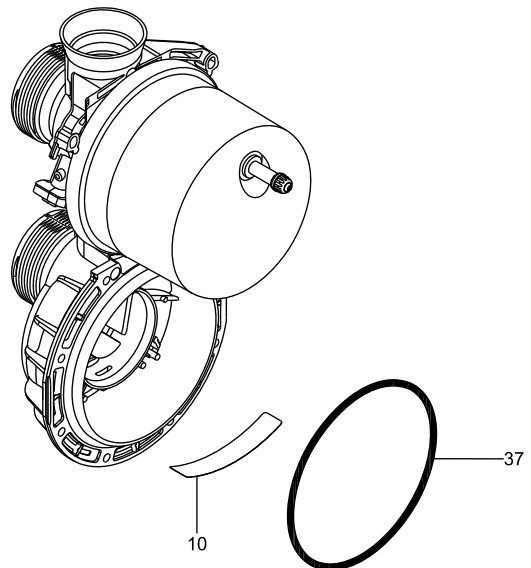
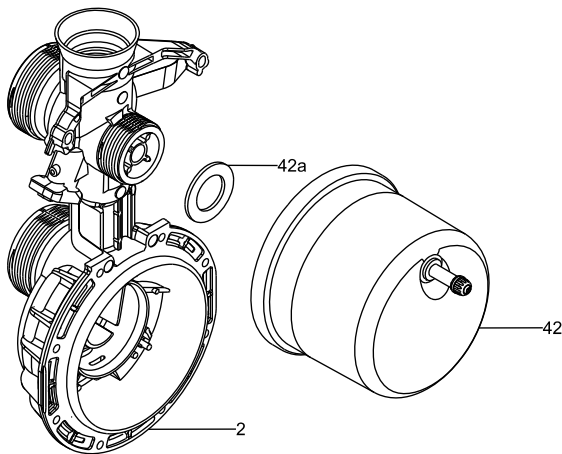


Fig. 8 Self-priming valve and O-ring for connections part

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14. Unscrew the pressure tank (42) counterclockwise and remove the gasket for the tank (42a).

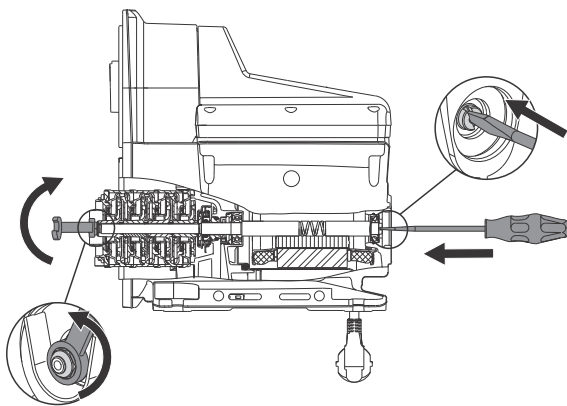


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Fig. 9 Removing the pressure tank

5.4 Removing the chamber stack

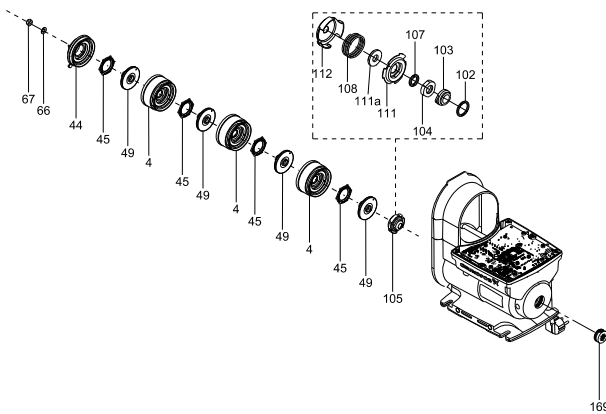
1. Remove the plug (169) on nameplate to access the shaft end.
2. Remove the locking nut (67) and the washer (66). Hold the shaft with a screwdriver in the shaft end.



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Fig. 10 Loosening the locking nut for the chamber stack

3. Remove the chamber stack.



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Fig. 11 Chamber stack and shaft seal

5.5 Removing the shaft seal

1. Remove the rotating shaft seal face (104).
2. Remove the stationary seat (103) using a needle-nose pliers.

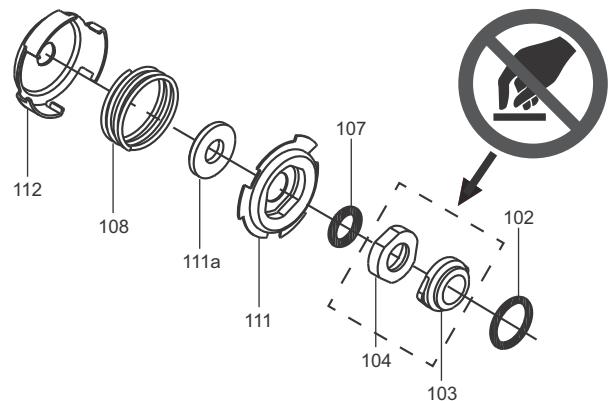


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Fig. 12 Removing the stationary shaft seal

6. Fitting the shaft seal

1. Fit the stationary seat (103) with the O-ring (102) against the pump housing.



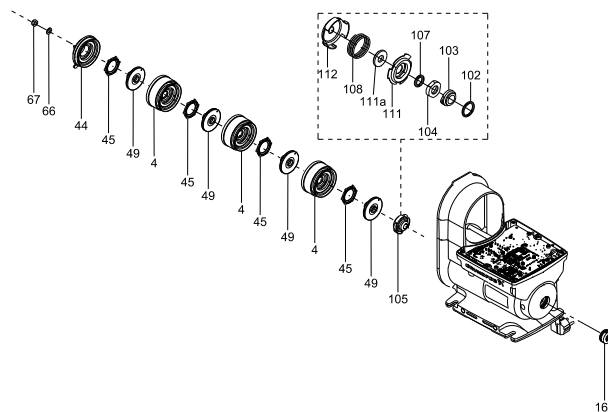
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Fig. 13 Shaft seal complete



Do not touch the ceramic faces of the shaft seal.

2. Fit the rotating shaft seal face (104).



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Fig. 14 Fitting the shaft seal and the chamber stack

6.1 Fitting the chamber stack

1. Fit the impellers (49), the seal (45) and the chambers (4). Fit the seal ring (44a) last.
2. Fit the washer (66) and the locking nut (67) and tighten it to 5 Nm. Hold the shaft end using a screwdriver.

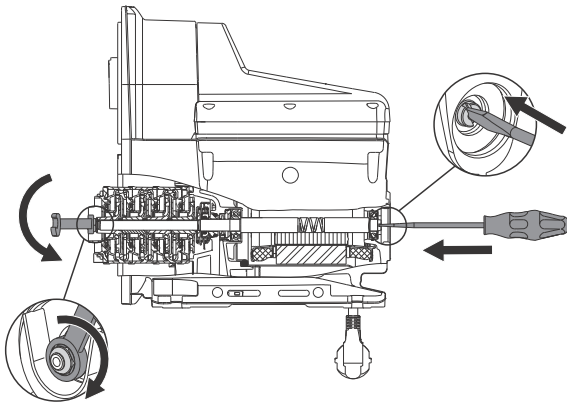


Fig. 15 Tightening the nut of the chamber stack

6.2 Fitting the pressure tank

1. Fit the flat gasket (42a) and screw the pressure tank (42) on to the connection part (2) by hand.

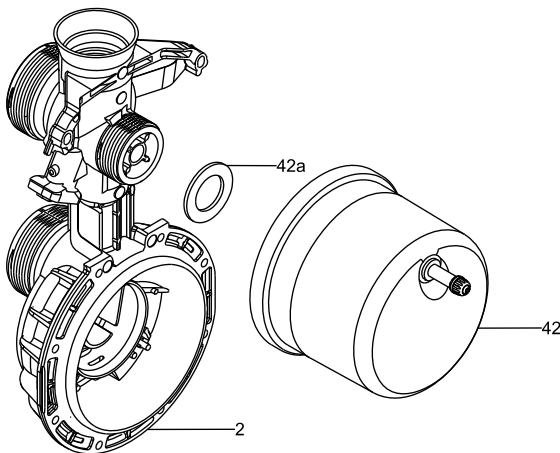


Fig. 16 Fitting the pressure tank

2. Fit the self-priming valve (10) and the O-ring (37).

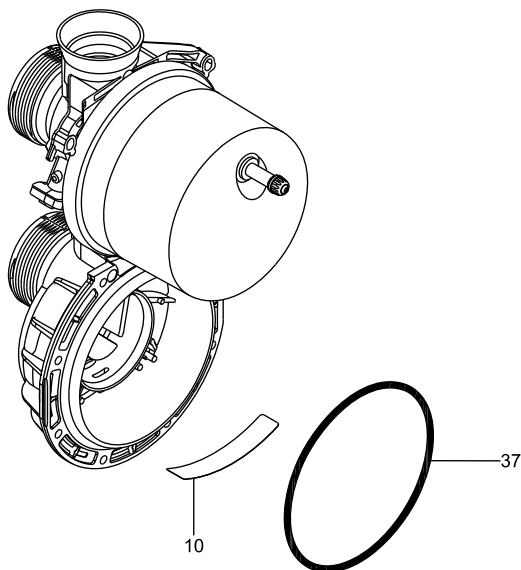


Fig. 17 Fitting the self-priming valve and the O-ring

3. Check that the self-priming valve is fitted correctly.

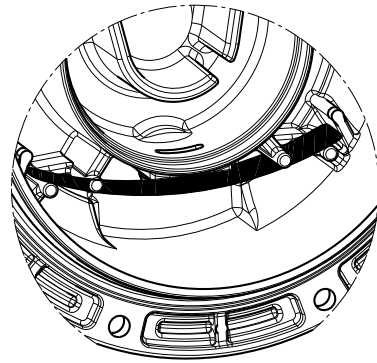


Fig. 18 Correct position of the self-priming valve

4. Fit the connection part to the pump housing. Note that one screw holds the earth connection bracket and the washer.
5. Cross-tighten the screws according to table below.

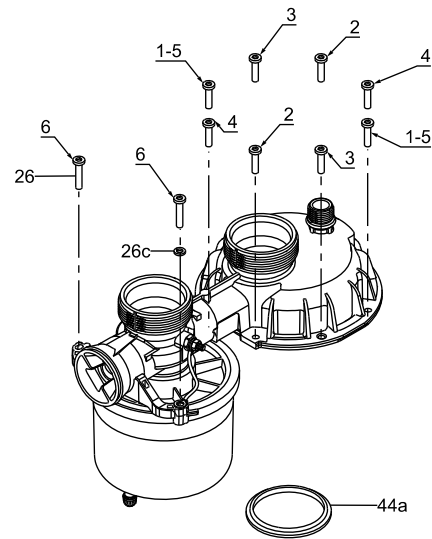


Fig. 19 Fitting the connection part

Sequence	Torque [Nm]
1	
2	
3	
4	3 ± 0.5
5	
6	

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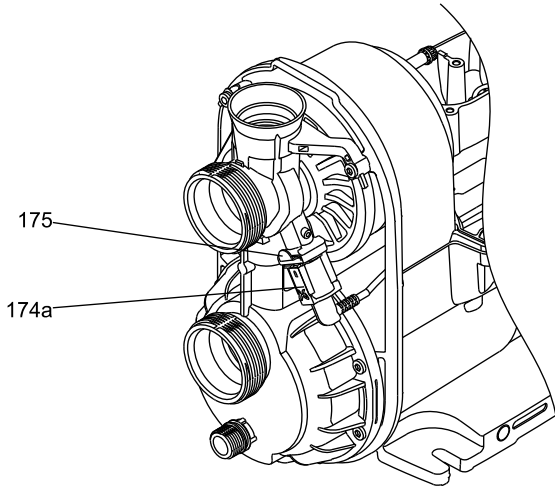
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- Fit the sensor (174a) and fasten it by means of the retaining clip (175).



Check that the rubber sensor pocket is seated correctly.



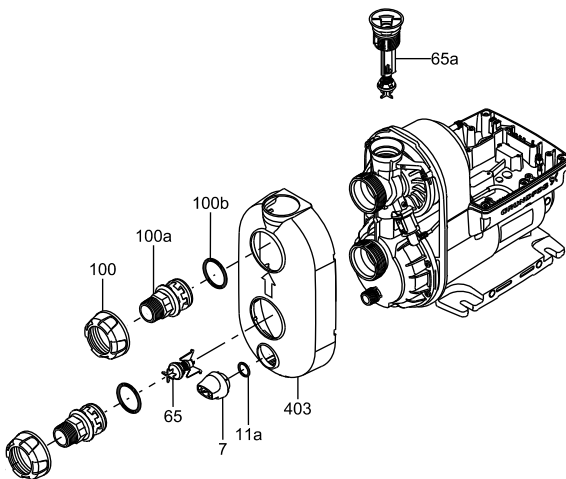
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Fig. 20 Sensor and retaining clip

- Press the pump cover back onto the pump housing.
- Fit new O-rings to the valves, nipples and plugs.
- Fit the inlet valve in the connection part.
- Press the nipples into the connection part, fit the union nuts and tighten them by hand.
- Fit the drain plug (7) and the non-return valve (65a).



Always tighten plastic nuts and plugs by hand so as not to break the material.

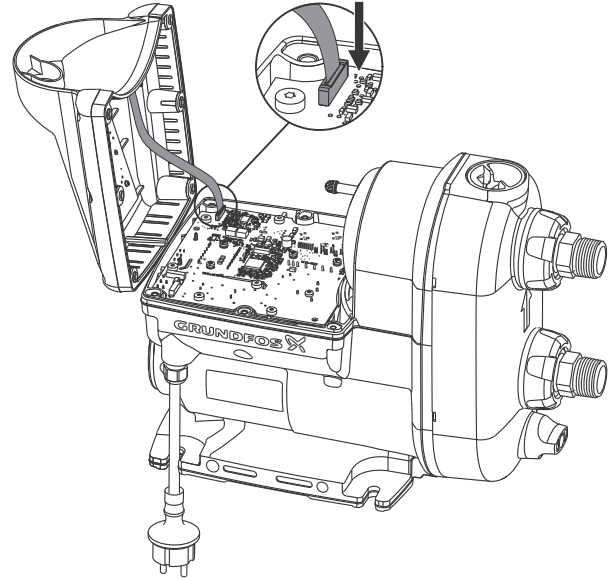


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Fig. 21 Fitting the nipples and the cover

6.3 Fitting the control box cover

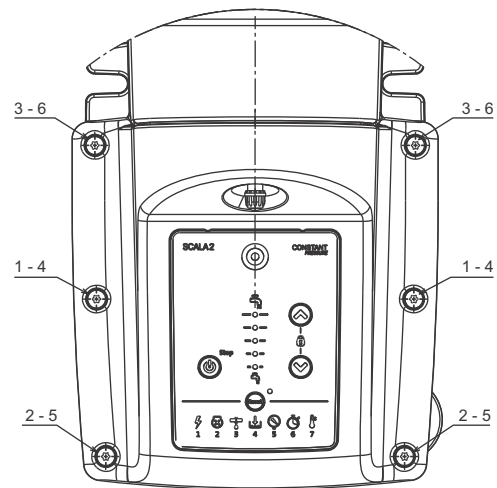
- Connect the HMI plug and place the control box cover on the pump.



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Fig. 22 Connecting the HMI plug

- Cross-tighten the six pan-head torx screws according to the table below.









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Fig. 23 Tightening sequence

Sequence	Torque [Nm]
1	
2	
3	
4	2 ± 0.25
5	
6	


7. Fault finding the product

7.1 Grundfos Eye operating indications

Grundfos Eye	Indication	Description
	No lights are on.	The power is off. The pump is not running.
	Two opposite green indicator lights running in the direction of rotation of the pump.	The power is on. The pump is running.
	Two opposite green indicator lights at a 45 ° angle is the icon used throughout this document for pump running.	The power is on. The pump is running.
	Two opposite green indicator lights permanently on.	The power is on. The pump is not running.
	Two opposite red indicator lights flashing simultaneously.	Alarm. The pump has stopped.
	Two opposite red indicator lights is the icon used throughout this document for pump stopped.	Alarm. The pump has stopped.

7.2 Fault resetting

You can reset a fault indication in one of the following ways:

- When you have eliminated the fault cause, reset the pump manually by pressing the  button. The pump then reverts to normal duty.
- If the fault disappears by itself, the pump attempts to reset automatically and the fault indication disappears if automatic reset is successful and provided that you have enabled "Auto reset" in the service menu.

7.3 Fault finding chart

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.

Fault	Grundfos Eye	Indicator light	Automatic reset	Cause	Remedy
1. The pump is not running.		-	-	Power supply failure.	Switch on the power supply. Check the cables and cable connections for defects and loose connections and check for blown fuses in the electrical installation.
			Yes	The power supply is out of the prescribed voltage range.	Check the power supply and the pump nameplate. Reestablish the power supply within the prescribed voltage range.
			No	The shaft seal has seized up.	Remove the end cover plug and deblock the shaft seal by turning the shaft by means of a screwdriver.
			No	The pump is blocked by impurities.	Contact Grundfos Service if the problem persists.
			Yes	Dry running.	Check the water source, and prime the pump.
			No	The maximum runtime has been exceeded.	Check the installation for leakage and reset the alarm.
			No	The internal non-return valve is defective or blocked in completely or partly open position.	Clean, repair or replace the non-return valve.
2. The pump is running.			-	Leakage from the pipes, or the non-return valve is not properly closed due to impurities.	Check and repair the pipes, or clean, repair or replace the non-return valve.
			-	Small continuous consumption.	Check the taps and reconsider the usage pattern (ice machines, water evaporators for air-conditioning, etc.).
			-	The temperature is below the freezing point.	Consider protecting the pump and the installation against frost.
3. Pump performance is insufficient.		-	-	The pump inlet pressure is too low.	Check the inlet conditions of the pump.
		-	-	The pump is undersized.	Replace the pump with a bigger pump.
		-	-	The inlet pipe, the inlet strainer or the pump is partly blocked by impurities.	Clean the inlet pipe or the pump.
		-	-	Leakage in the inlet pipe.	Repair the inlet pipe.
		-	-	Air in the inlet pipe or the pump.	Prime the inlet pipe and the pump. Check the inlet conditions of the pump.
		-	-	The required outlet pressure is too low for the installation.	Increase the pressure setting (arrow up).
			Yes	The maximum temperature has been exceeded and the pump is running at reduced performance.	Check the cooling conditions. Protect the pump against direct sunlight or any nearby heat sources.

Fault	Grundfos Eye	Indicator light	Automatic reset	Cause	Remedy
4. System overpressure.			Yes	The setpoint has been set too high. The difference between the outlet pressure and the inlet pressure must not exceed 4 bar (58 psi). Example: If the required outlet pressure is 5 bar (73 psi), the minimum inlet pressure must be 1 bar (14.5 psi).	Reduce the setpoint to 4 bar (58 psi) plus positive inlet pressure.
			Yes	The maximum pressure has been exceeded and the inlet pressure is higher than 6 bar, 0.6 MPa (85 psi)	Check the inlet conditions.
			Yes	The maximum pressure has been exceeded. Equipment elsewhere in the system causes a high pressure at the pump (e.g. water heater or defective safety equipment).	Check the installation.
5. You can reset the pump, but the pump runs only for a few seconds.			Yes	Dry running or water shortage.	Check the water source, and prime the pump.
			Yes	The inlet pipe is blocked by impurities.	Clean the inlet pipe.
			Yes	The foot or non-return valve is blocked in closed position.	Clean, repair or replace the foot or non-return valve.
			Yes	Leakage in the inlet pipe.	Repair the inlet pipe.
			Yes	Air in the inlet pipe or the pump.	Prime the inlet pipe and the pump. Check the inlet conditions of the pump.
6. You can reset the pump, but the pump starts repeatedly, immediately after stopping.			No	The internal non-return valve is defective or blocked in completely or partly open position.	Clean, repair or replace the non-return valve.
			No	The tank precharge pressure is not correct.	Adjust the tank precharge pressure to 70 % of the required outlet pressure.

8. Exploded view

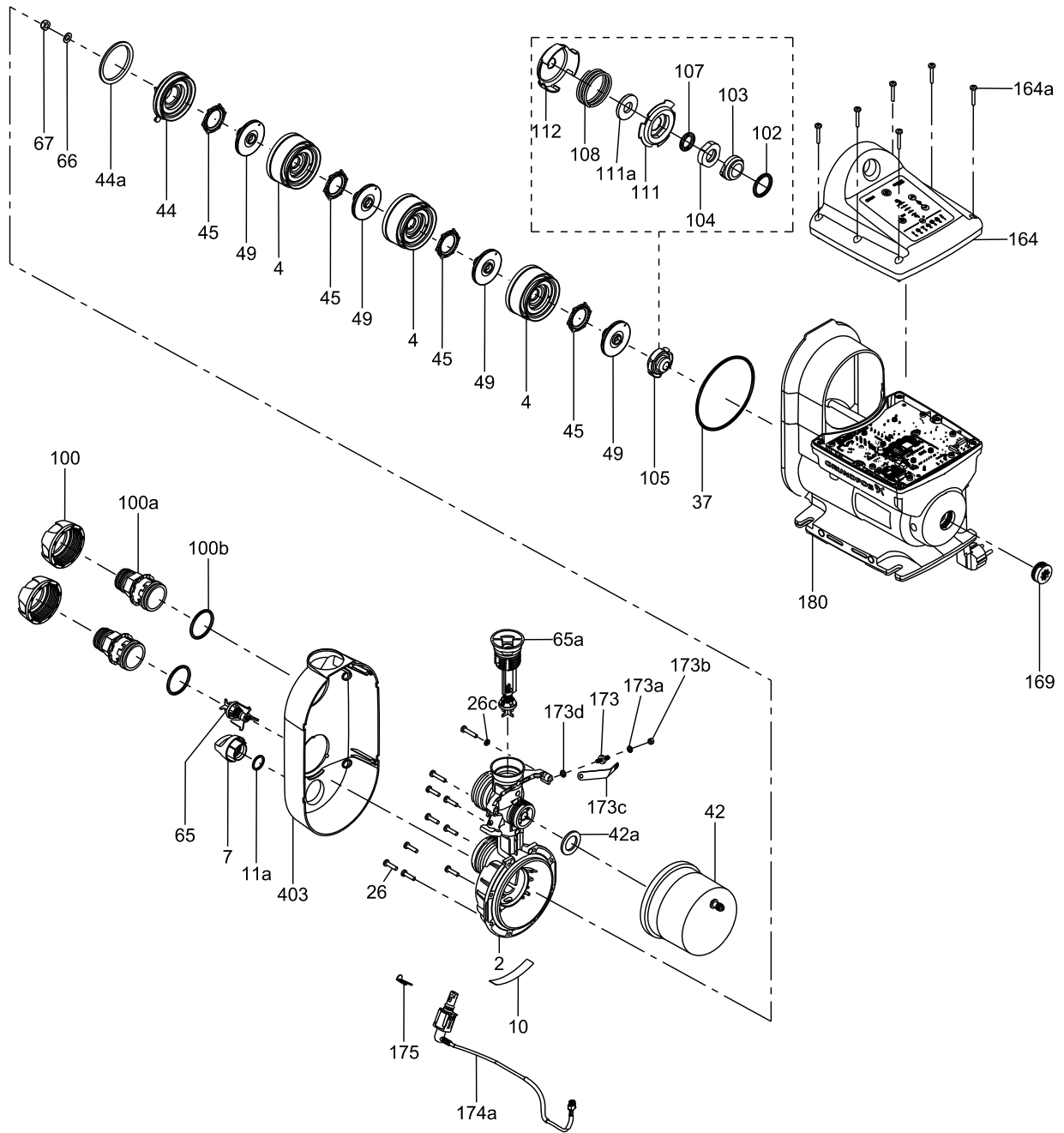


Fig. 24 Exploded view

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Position number list

Pos.	Description
2	Connection part
4	Chamber
7	Drain plug
10	Self-priming valve
11a	O-ring
26	Screw
26c	Lock washer
37	O-ring
42	Tank complete
42a	Flat gasket
44	Inlet part
44a	Seal ring
45	Seal
49	Impeller
65	Non-return valve, inlet
65a	Non-return valve, outlet
66	Washer
67	Locking nut
100	Union nut
100a	Nipple
100b	O-ring
102	O-ring
103	Stationary seat
104	Rotating seal face
105	Shaft seal complete
107	O-ring
108	Spring
111	Seal driver
111a	Washer
112	Seal driver
164	Control box cover
164a	Pan-head torx screw
169	Plug
173	Double-end stud bolt
173a	Lock washer
173b	Hexagon nut
173c	Earth connection bracket
173d	O-ring
174a	Sensor complete
175	Retaining clip
180	Combined pump and stator housing
403	Pump cover

Subject to alterations.

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