

SP/SPE 18, SP/SPE 32



Service instructions



SP/SPE 18, SP/SPE 32

English (GB)

Service instructions	4
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Original service instructions

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1. General information



Read this document before you start service work on the product. Service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions in the installation and operating instructions for the product.

1.1 Hazard statements

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

**DANGER**

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

**WARNING**

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

**CAUTION**

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

The hazard statements are structured in the following way:

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

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

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



Observe these instructions for explosion-proof products.



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



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



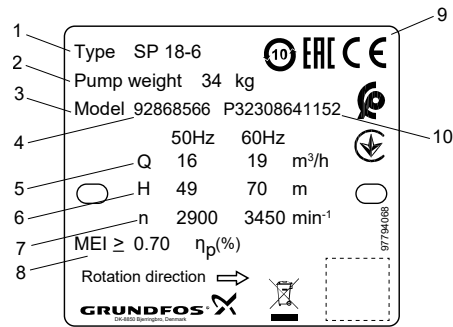
If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

2. Identification

2.1 Nameplate



TM083491

Nameplate

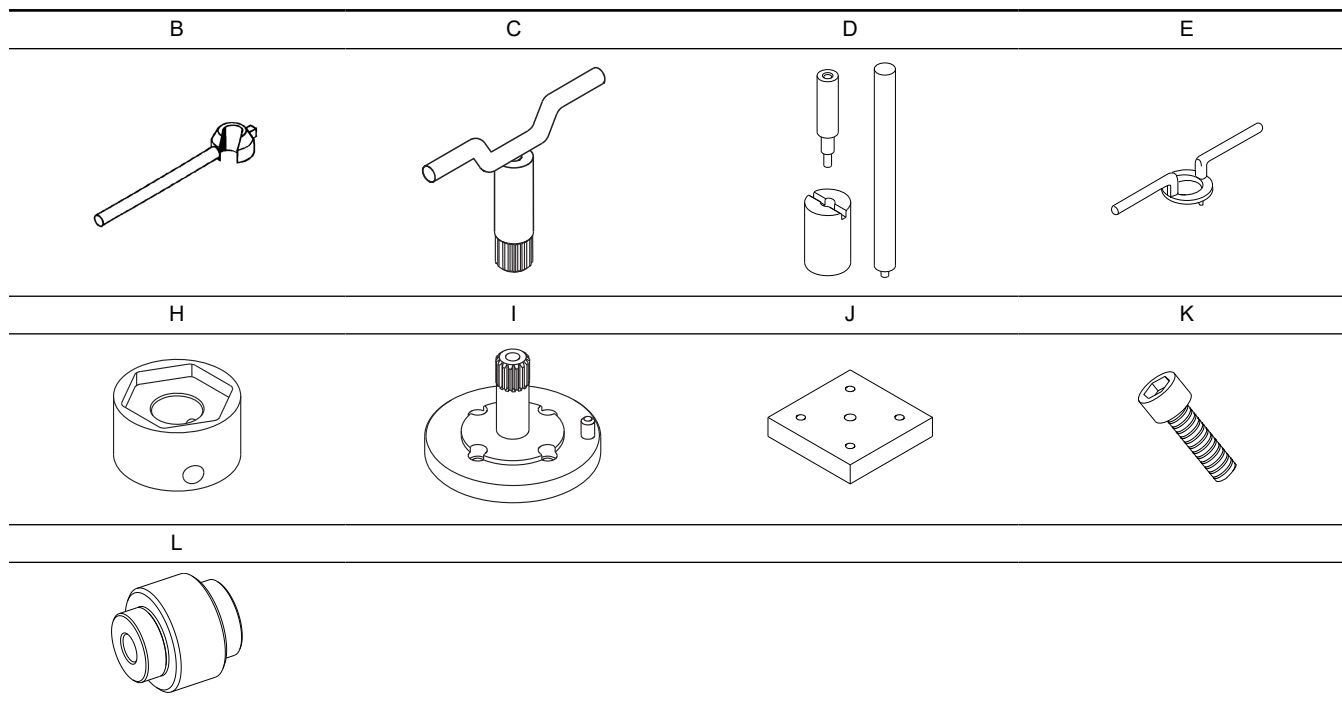
Pos.	Description
1	Type designation
2	Weight [kg]
3	Model
4	Material number
5	Rated flow [m ³ /h]
6	Head at rated flow rate [m]
7	Speed [min ⁻¹]
8	MEI index
9	CE mark and approvals
10	Production code

2.2 Type key

Example: SP 18-6 N	
Type range	SP
Rated flow rate [m ³ /h]	18
Number of stages	6
Material:	
= EN 1.4301	
N = EN 1.4401	N
R = EN 1.4539	

3. Tools

3.1 Special tools

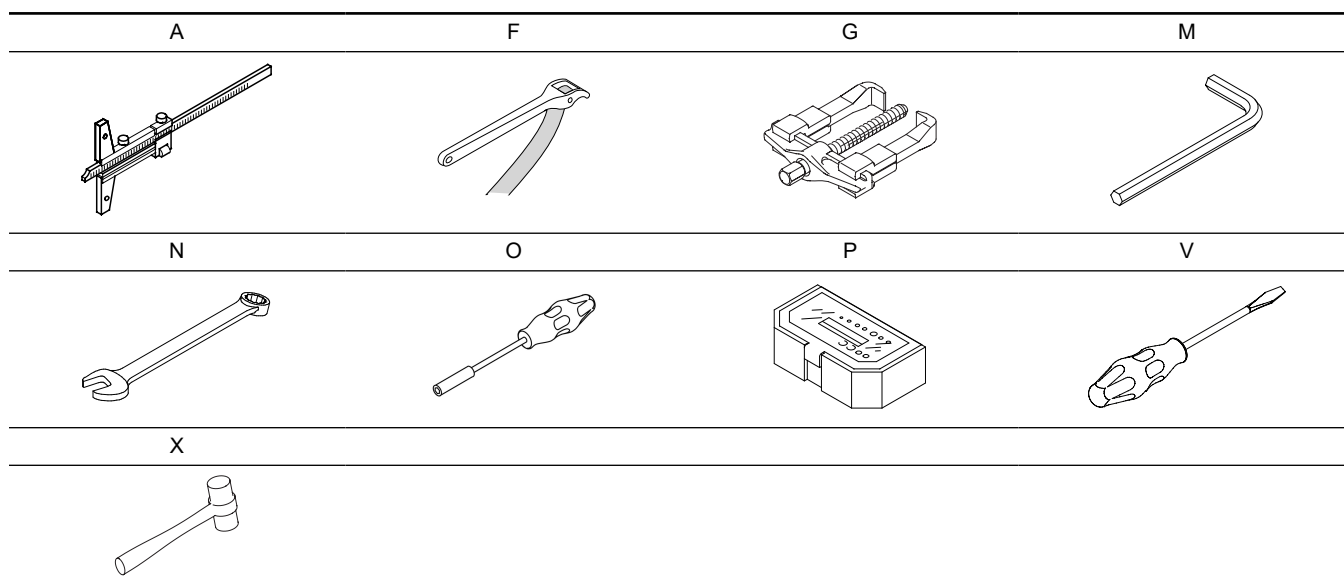


Pos.	Description	For pos.	Motor size	Further information	Part number
B	Knock-out spanner	11	4", 6", 8"	Spanner size: 46 mm	00SV0121
			4"		00SV0351
C	Splined key	16	6"		00SV0352
			8"		00SV0353
D	Punch set for guide bearing	142a	4", 6", 8"	Set consisting of support tool, punch and shaft	98163675
E	Special key for fitting of sleeve		4", 6", 8"		00SV0290
H	Spanner for retainer ring tool	S, 203	4", 6", 8"		00SV0874
			4"		97620192
I	Adaptor	14, 14a	6"		97620193
			8"		97620194
J	Mounting plate	I	4", 6", 8"		98164171
K	Set of hexagon socket head screws for mounting plate and adaptor	I, J	4", 6", 8"	4 × M8 × 20, 1 × M8 × 75, 1 × M10 × 115, 1 × M10 × 145	98287940
L	Mandrel for wear ring removal	72	4", 6", 8"		92966658

Related information

[6. Dismantling the product](#)

3.2 Standard tools



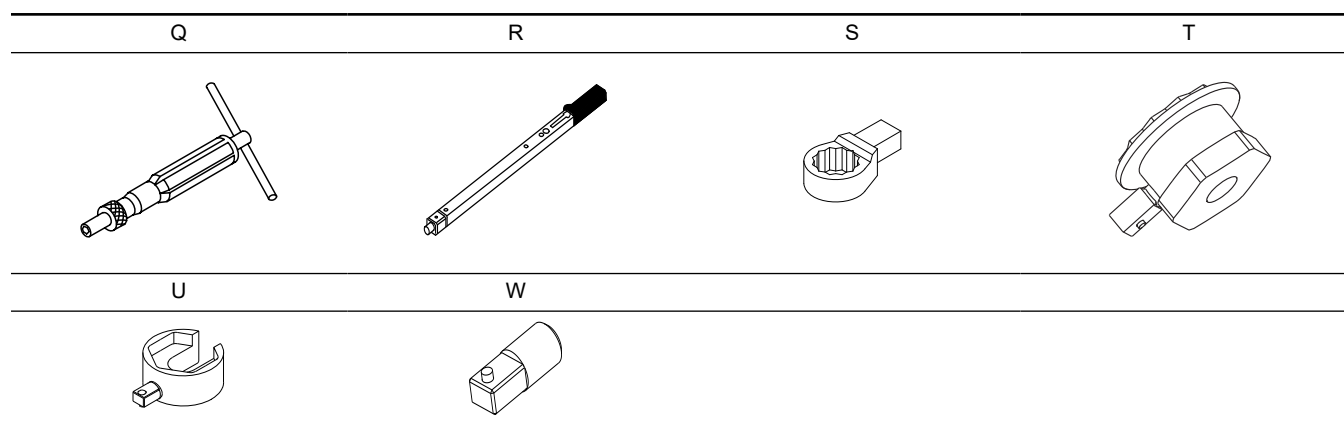
Pos.	Description	For pos.	Motor size	Further information
A	Depth gauge	14, 14a	4", 6", 8"	Measuring range up to 300 mm
F	Band pipe wrench for fitting of sleeve		4", 6", 8"	
G	Puller for wear ring	72	4", 6", 8"	
M	Hexagon key set	K	4", 6", 8"	
N	Ring spanner			Spanner size: 13 mm Spanner size: 17 mm Spanner size: 19 mm
O	Screwdriver for bits	18d	4", 6", 8"	
P	Bits kit		4", 6", 8"	
V	Flat head screwdriver	3, 7	4", 6", 8"	
X	Plastic mallet	11, 12, 142a	4", 6", 8"	

Related information

[6. Dismantling the product](#)

[7.1 Valve seat, neck ring and rubber bearing](#)

3.3 Torque tools



Pos.	DescriptionDescription	For pos.	Motor size	Further information	Part number
Q	Torque screwdriver	18d	4", 6", 8"	1-6 Nm	00SV0438
R	Torque wrench	11, 19	4", 6", 8"	20-100 Nm	00SV0269
		203	4", 6", 8"	20-200 Nm	00SV0400
S	Ring spanner for torque wrench	19	4", 6", 8"	Spanner size: 17 mm	00SV0270
		19	4", 6", 8"	Spanner size: 19 mm	00SV0519
T	Retainer ring tool for torque wrench	203	4", 6", 8"		97937290
U	Split cone spanner for torque wrench	11	4", 6", 8"		96937573
W	Tap for spanner	11	4", 6", 8"		00SV0403

Related information

6. [Dismantling the product](#)

3.4 Service animation

For additional instructions, check the following service animation:



<http://net.grundfos.com/qr/i/93008854>

4. Tightening torques and lubricants

Pos.	Description	Motor size	Quantity	Dimension	Supplementary information	Torque ¹⁾ [Nm]	Lubricant
58	Staybolt for motor	8"	4	M16			
58a	Nut for staybolt	8"	4	M16		150	
22	Bolt	6", 8"	4	M12		70	
22a	Nut for staybolt	4"	4	M8		18	
19	Nut for strap ²⁾	4", 6", 8"	4	M10	First stage	15	Klubersynth (96962902)
					Second stage	25	
					Third stage	35	
					First stage	25	
					Second stage	35	
					Third stage (pump with sleeve)	45	
11	Split cone nut	4", 6", 8"			SP 18	45	
					SP 32	80	
203	Retainer for valve seat	4", 6", 8"	1			150	
18d	Screw for clamp	4", 6", 8"	4	M4		2.5	
7	Neck ring	4", 6", 8"					Soapy water with a concentration of 3 to 5 %

1) The torque tolerance in all tightening steps is 10 % of the stated torque.

2) Tighten the nut in three steps to ensure that the pump is tightened correctly.

Related information

[6.1 Motor](#)

[7.4.2 Relieved valve casing](#)

[8.1 Bottom impeller](#)

[8.4 Chambers](#)

[8.5 Top chamber](#)

[8.7 Straps](#)

[11.2 Fitting the cable guard](#)

5. Failure analysis

Identify the failure properly and go through the check list before dismantling the product.

Related information

13. [Analysis check list](#)

5.1 Before dismantling

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply before starting any work on the product.
- Make sure that the power supply cannot be accidentally switched on.

WARNING

When lifting the pump, note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.



1. Switch off the power supply before starting any work on the product.
2. Disconnect the power cable.
3. Remove the submersible drop cable from the power supply.
4. Close the isolating valves, if installed, to avoid draining the system.

6. Dismantling the product

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply before starting any work on the product.
- Make sure that the power supply cannot be accidentally switched on.

DANGER

Toxic or radio active liquid

Death or serious 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.

WARNING

Crushing of feet

Death or serious personal injury



- Use lifting equipment which is approved for the weight of the product.
- Wear personal protective equipment.

WARNING

Crushing of hands

Death or serious personal injury



- Use lifting equipment which is approved for the weight of the product.

WARNING

Sharp element

Death or serious personal injury



- When mounting the facilitating pipe, wear personal protective equipment to avoid cutting on sharp edges on the pump.



Service must be carried out by a qualified service technician.



Be careful not to bend or damage long pump sets, when moving them.

Follow the instructions below.

Position numbers of pump components (digits) refer to section *Drawings*.

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

Related information

3.1 [Special tools](#)

3.2 [Standard tools](#)

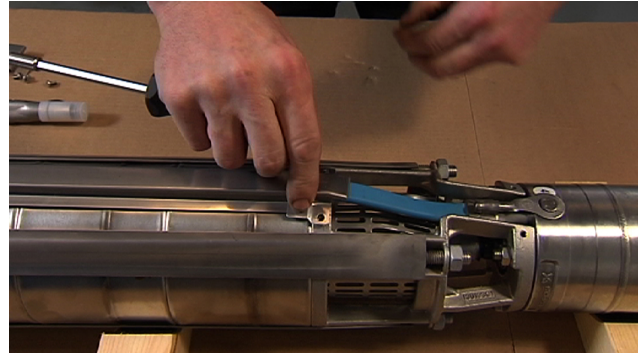
3.3 [Torque tools](#)

12.1 [Exploded view](#)

12.2 [Sectional drawing](#)

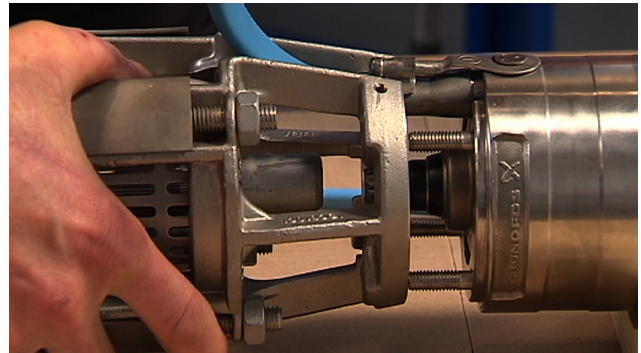
6.1 Motor

1. Remove screws (18d) and then remove top and bottom cable guard clamps (18b/18c) with a screwdriver (O+P)



TM054172

2. Remove cable guard (18). Do not remove the motor cable from the motor, unless required. The sealing might be damaged.
3. Cross-loosen the nuts (22a) holding the motor with a ring spanner (N).
4. Pull the motor off the pump.



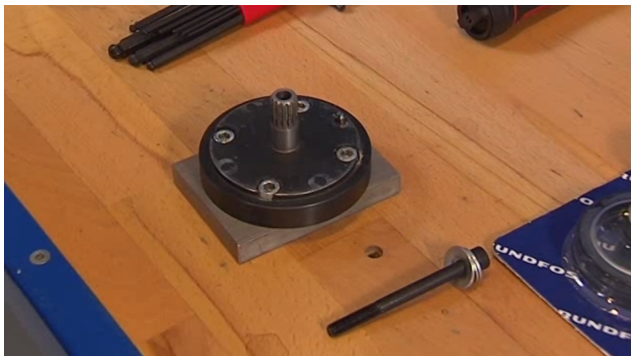
TM054173

Related information

4. [Tightening torques and lubricants](#)

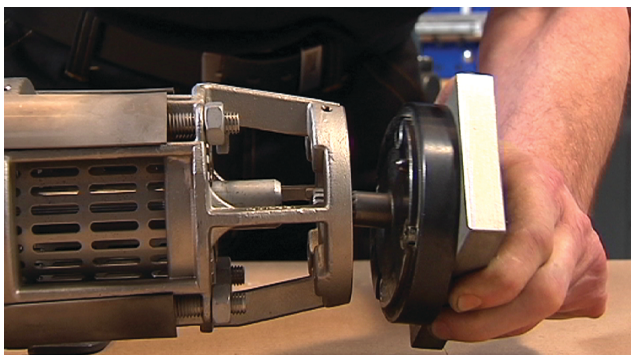
6.2 Straps

1. Fasten the adaptor (I) to the mounting plate (J) with the hexagon socket head screws (K).



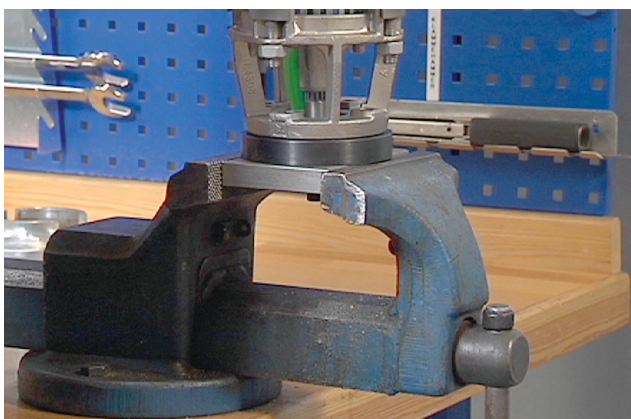
TM054504

2. Fasten the adapter to the chamber stack.
 - a. Place the adaptor as shown in the picture below.
 - b. Insert the correct screw (K) through the adapter.
 - c. Check that the groove of the adapter fits into the groove of the suction interconnector (14/14a).
 - d. Tighten the screw with a hexagon key (M).



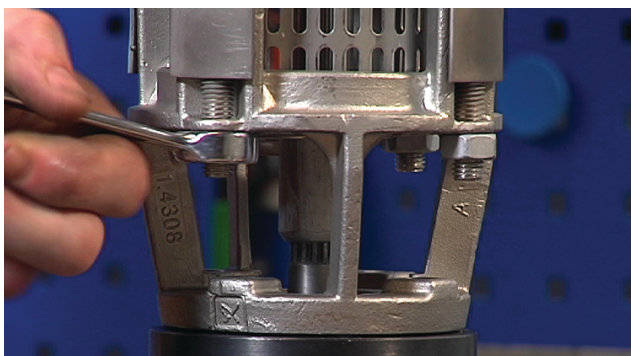
TM054174

3. Fix the mounting plate with chamber stack in a vice.



TM054175

4. Cross-loosen the nuts (19) with a ring spanner (N) and remove them from the straps (17).



TM054176

5. Remove the straps.



TM054177

6.3 Valve casing

1. Remove valve casing (1/1a), valve cup (2) and top chamber (4/4a). In large pump models, the valve casing, valve seat and valve cup are combined in a relieved valve casing (1a).



TM054178

2. Carefully place all parts on a table covered with cardboard to avoid damage to the sealing face on the chambers.



6.4 Top impeller

1. Loosen the split cone nut 1-2 turns (11) with the knock-out spanner (B).



TM054179

2. Turn the knock-out spanner upside down and knock on the nut with a plastic mallet (X). The split cone (12) will then loosen its grip on the shaft.

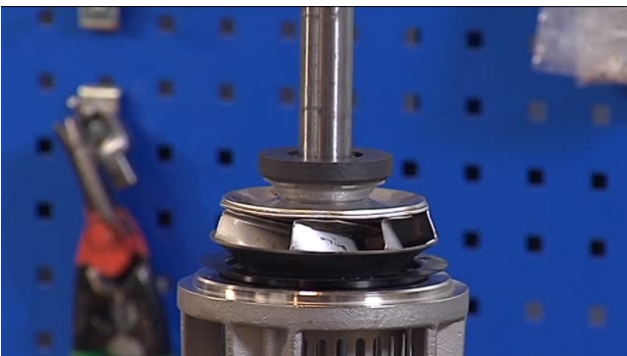


TM054180

3. Remove impeller (13).

6.5 Chambers

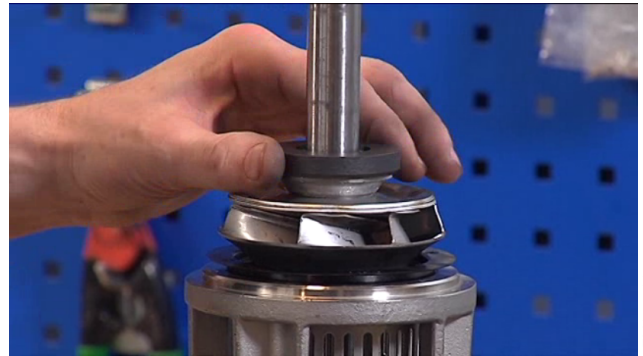
1. Continue the dismantling as described in the previous section until the upthrust bearing (8a) is reached.



TM055468

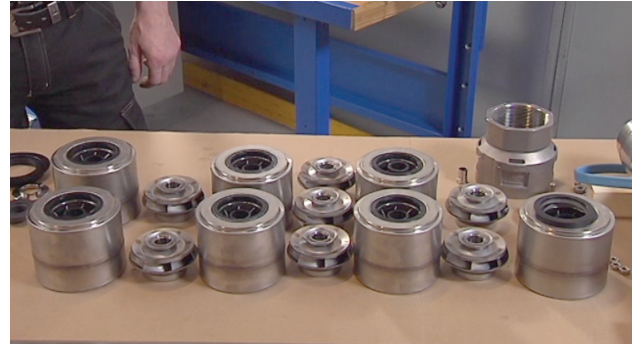
6.6 Bottom chamber with upthrust bearing

1. Remove the upthrust bearing from the shaft.



TM055469

2. Loosen the split cone nut with the knock-out spanner.
3. Turn the knock-out spanner upside down and knock on the split cone nut with a plastic mallet. The split cone will then loosen its grip on the shaft.
4. Remove the bottom impeller.
5. Carefully place all parts on a table covered with cardboard to avoid damage to the sealing face on the chambers.



7. Replacing the wear parts

- Make sure that all parts from the given service kit are available.
- Make sure to replace all neck and O-rings.
- Before replacing, clean and check all parts.

7.1 Valve seat, neck ring and rubber bearing

1. Remove the valve seat/neck ring (3/7) with a screwdriver (V). Note that the valve seat pos. 3 is different from the neck rings pos. 7.



TM055479

2. Remove the rubber bearing (8) with a screwdriver.



TM055480

3. For SP32 bottom chamber: remove the bearing pos. 6b from the bottom chamber. Note that this bearing is different from all the other bearings



4. Clean its groove.
5. Lubricate the groove with soapy water, and place the new rubber bearing.



TM055482

6. Make sure that the bearing is fitted properly in the chamber.
7. Carefully clean the groove for the valve seat/neck ring.



TM055501

8. When the neck ring has been replaced, the text "This side up" on the neck ring must point upwards.
9. Lubricate the valve seat/neck ring with soapy water, place and knock the new neck ring in its groove.



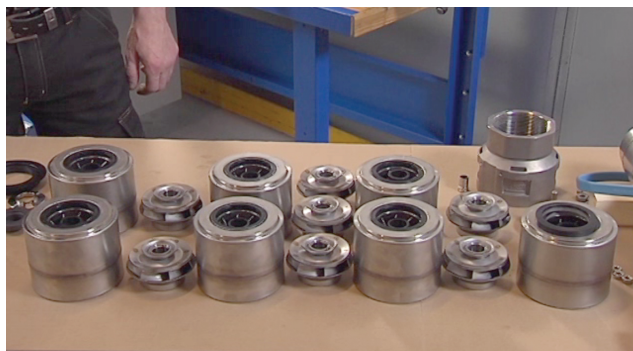
TM055481

Related information

[3.2 Standard tools](#)

7.2 Neck ring, rubber bearing and chambers

1. Replace all neck rings and rubber bearings in the chambers.



TM054189

7.3 Wear ring and impeller

1. Remove the wear ring (72) with the puller (G) and the mandrel (L).



TM084943

2. Ensure the pullers grip on the wear ring by placing it between the jaws of a vice.



TM084944

3. Clean and lubricate the impeller skirt.
4. Carefully press the new wear ring into the impeller skirt with a hydraulic or manual punch press.



TM054191

5. Make sure that the wear ring is placed properly and that the impeller is not deformed.



TM089318

7.4 Valve casing

7.4.1 Standard valve casing

1. Position the valve casing (1) upside down on the support tool from the punch set (D).



TM054194

2. Centre the guide bearing (142a) with the hole in the support tool.



TM054195

3. Position the punch in the centre of the guide bearing and knock it out with a plastic mallet.



TM054196

4. Turn the support tool upside down so that its recess is pointing upwards.
5. Position the valve casing on top of the tool with the outlet pointing upwards.



TM054197

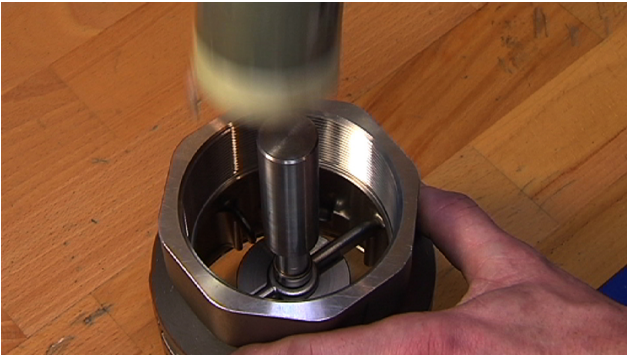
6. Fit the new guide bearing on the punch.



TM054198

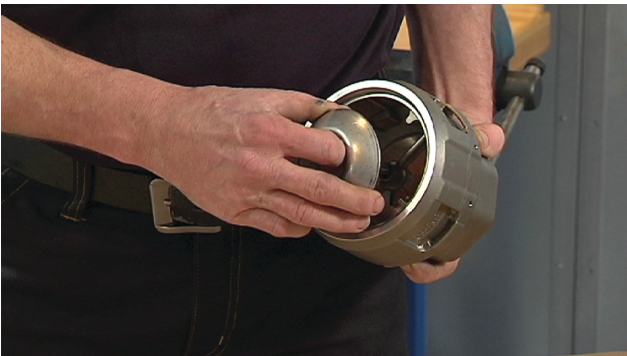
7. Position the new guide bearing in the valve casing.

8. Knock the guide bearing in the hole with a plastic mallet.



TM054199

9. Insert the valve cup into the valve casing.



TM054200

7.4.2 Relieved valve casing

1. Fix the relieved valve casing (1a) upside down in a vice.

2. Fit the retainer ring tool (T) in the retainer ring (203) for valve seat.



TM054201

3. Place the spanner (H) over the retainer ring tool and loosen the retainer ring.



TM054202

4. Remove the retainer ring and valve cup.



TM054203

5. Position the valve casing upside down on the support tool from the punch set.



TM054203

6. Centre the guide bearing with the hole in the support tool.



TM054204

7. Position the punch tool in the centre of the guide bearing and knock it out with a plastic mallet.



TM054205

8. Turn the support tool upside down so that its recess is pointing upwards.

9. Position the valve casing on top of the support tool with the outlet pointing upwards.



TM054206

10. Position the new guide bearing in the valve casing.

11. Knock the guide bearing in the hole with a plastic mallet.



TM054207

12. Remove the O-ring (37) from the retainer ring with a screwdriver.



TM054208

13. Fix the retainer ring in a vice and knock out the valve seat (3).



TM054209

14. Clean the O-ring groove.

15. Lubricate the groove with soapy water, and fit a new O-ring.



TM054210

16. Clean the groove where the valve seat was fitted.

17. Lubricate the groove with soapy water, and place the new valve seat.



TM054211

18. Fix the valve casing in a vice.

19. Fit the valve cup and retainer ring in the valve casing.



TM054212

20. Tighten the retainer ring with the specified torque, using a torque wrench (R).



TM054213

Related information

4. *Tightening torques and lubricants*

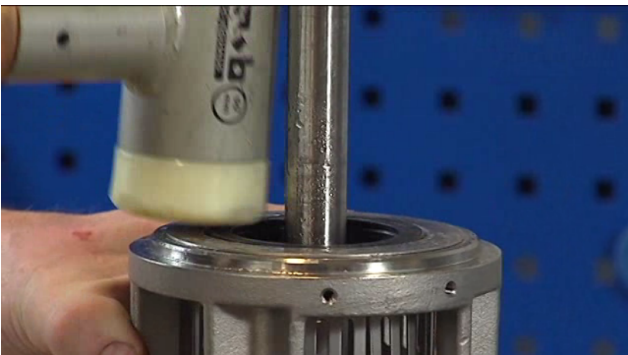
7.5 Suction interconnector

1. Remove the neck ring (7) with a screwdriver.



TM055502

2. Clean its groove.
3. Lubricate the groove with soapy water, and fit the new neck ring. Make sure that the text "This side up" on the neck ring is pointing upwards.



TM055503

8. Pump assembly

WARNING Crushing of hands

Death or serious personal injury



- Use lifting equipment which is approved for the weight of the product.
- Wear personal protective equipment.

WARNING Crushing of hands

Death or serious personal injury



- Use lifting equipment which is approved for the weight of the product.

WARNING Sharp element

Death or serious personal injury



- When servicing the pump, wear personal protective equipment to avoid cutting on sharp edges on the pump.



Be careful not to bend or damage long pump sets, when moving them.

8.1 Bottom impeller

1. Fit the bottom impeller.



TM055504

2. Tighten the split cone nut with the specified torque, using a torque wrench (R) together with the split cone spanner (U). See section Tightening torques and lubricants.



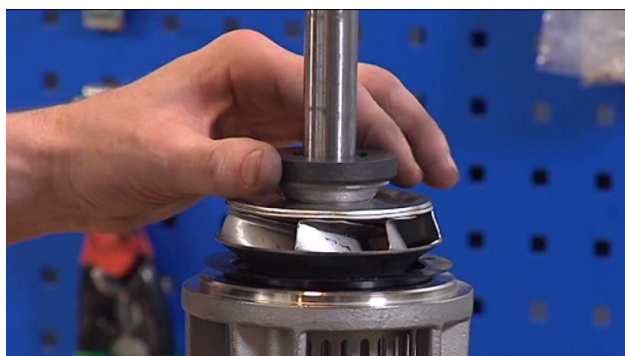
TM055505

Related information

4. [Tightening torques and lubricants](#)

8.2 Bottom chamber with upthrust bearing SP/SPE 18

1. Fit the upthrust bearing on top of the bottom impeller.



TM055469

2. Fit a chamber (9) to the suction interconnector.



TM084018

8.3 Bottom chamber with upthrust disc SP/SPE 32

1. Fit the upthrust disc (pos. 8a) on top of the bottom impeller.



TM055470

2. Fit the bottom chamber (pos. 10) to the suction interconnector (pos. 14/14a). Make sure that the stop ring (pos. 8b) is fixed inside the bottom chamber before the chamber is fitted.



TM055487

8.4 Chambers

1. Fit an impeller to the bottom chamber.



2. Tighten the split cone nut with the specified torque, using a torque wrench together with the split cone spanner.
3. Repeat this procedure until all impellers and intermediate chambers have been fitted.

Related information

4. [Tightening torques and lubricants](#)

8.5 Top chamber

1. Fit the top chamber. Note: the one with the valve seat.

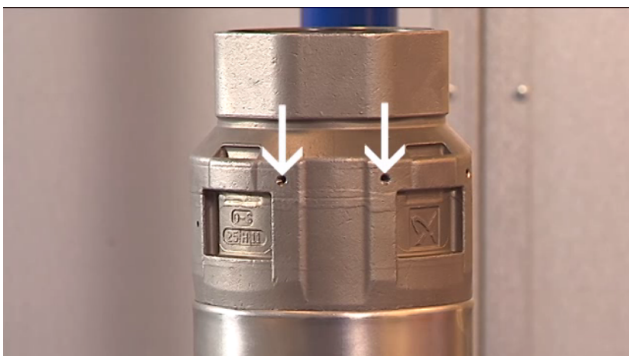


Related information

4. [Tightening torques and lubricants](#)

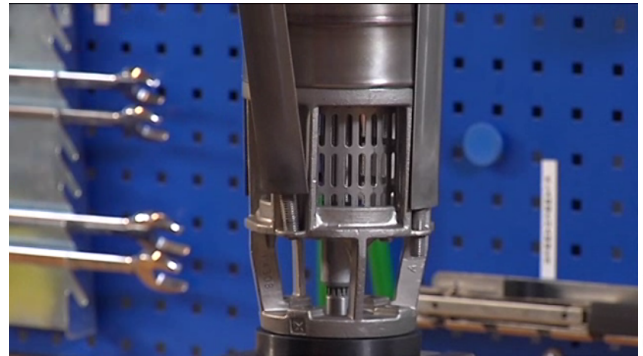
8.6 Valve casing

1. Fit the valve casing/relieved valve casing on the top chamber.
2. Position the valve casing so that the threaded holes for the cable guards are in line with the threaded holes in the suction interconnector.



8.7 Straps

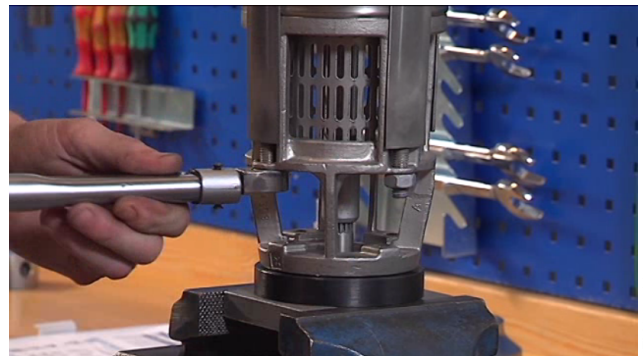
1. Fit the straps in the suction interconnector.



2. Lubricate the thread of the straps with grease.
3. Fit the strap to the valve casing.



4. Fit nuts and cross-tighten them in three steps with the specified torque, using tools S and R.



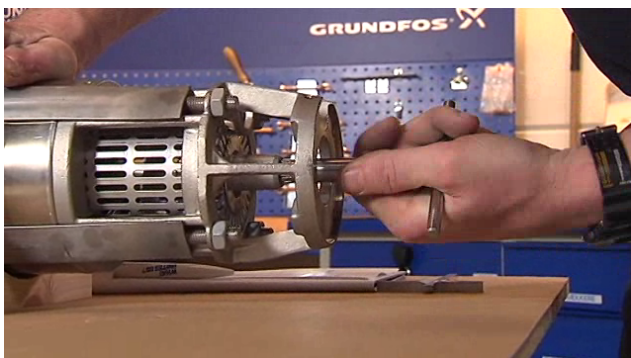
Related information

4. [Tightening torques and lubricants](#)

9. Quality control

9.1 Rotating the shaft

1. Position the pump so that it the shaft is easy to turn.
2. Insert the spline key (C) into the shaft spline.
3. Make sure that the shaft rotates easily by turning the spline key twice clockwise then counter-clockwise.

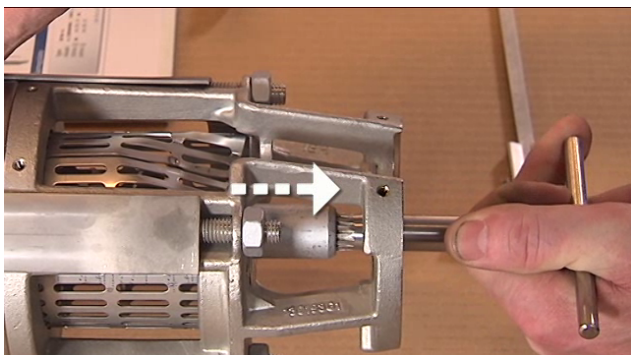


TM055463

9.2 Checking the pump axial clearance

9.2.1 Axial clearance, shaft in top position

1. Press the shaft in top position with the spline key.



TM055464

2. Measure the top axial clearance from the bottom of the coupling to the end of the suction interconnector with a depth gauge (A).

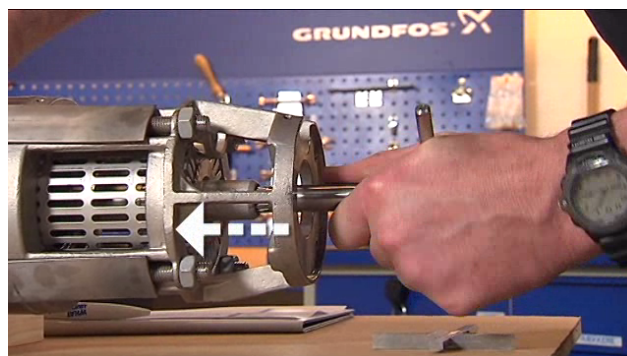


TM055465

3. Note down the measured axial clearance.

9.2.2 Axial clearance, shaft in bottom position

1. Turn the shaft with the spline key while pulling the shaft into bottom position.



TM055466

2. Measure the bottom axial clearance from the bottom of the coupling to the end of the suction interconnector.



TM055467

3. Note down the measured axial clearance.

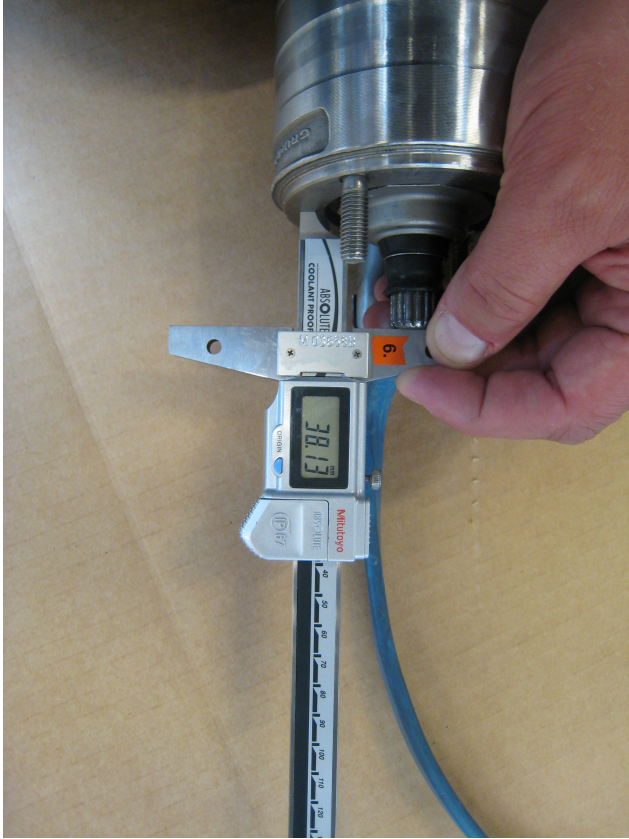
9.2.3 Check list

If there is no clearance (end play) or the measured clearance differs from the values in the following table, the pump has been assembled incorrectly.

Motor size	Axial clearance [mm]	
	Shaft in bottom position	Shaft in top position
4"	35.5 - 36.5	39.0 - 41.5
6"	70.5 - 71.5	74.0 - 76.5
8"	99.5 - 100.5	103.0 - 105.5

9.3 Checking the motor shaft height

1. Make sure that the motor shaft is in the bottom position. Measure the shaft height from the top of the shaft to the motor frame.



TM054233

2. Note down the measured shaft height.

9.3.1 Check list

If the measured shaft height differs from the value in the following table, adjust the axial bearing in the motor.

Motor size	Motor type	Tolerated shaft height [mm]
4"	Grundfos	38.15 + 0.15 / - 0.15
	Franklin	38.18 + 0.12 / - 0.12
6"	Grundfos	73.00 + 0.00 / - 0.40
	Mercury	73.00 + 0.03 / - 0.35
	Franklin	73.00 + 0.02 / - 0.12
8"	-	101.00 + 0.60 / - 0.34

10. Checking the motor

Service instructions for a specific motor can be found in the Grundfos Product Center.

10.1 Insulation resistance

DANGER Electric shock

Death or serious personal injury



- Switch off the power supply before starting any work on the product.
- Make sure that the power supply cannot be accidentally switched on.

WARNING



When lifting the pump, note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.

1. Switch off the power supply before starting any work on the product.

2. Disconnect the power cable.
3. Remove the submersible drop cable from the power supply.
4. Measure the insulation resistance from each phase to earth (frame). Make sure that the grounding is carried out properly. If the insulation resistance is lower than 0.5 MΩ, the motor should be removed for motor or cable repair. Local regulations may specify other values for the insulation resistance.

For further instructions, see the Grundfos Product Center at www.grundfos.com.

10.2 Winding resistance

DANGER Electric shock

Death or serious personal injury



- Switch off the power supply before starting any work on the product.
- Make sure that the power supply cannot be accidentally switched on.

WARNING



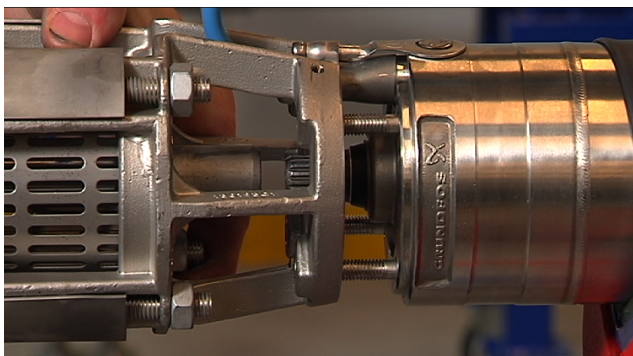
When lifting the pump, note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.

1. Switch off the power supply before starting any work on the product.
2. Disconnect the power cable.
3. Remove the submersible drop cable from the power supply.
4. Measure the winding resistance between the leads of the drop cable. For three-phase motors, the deviation between the highest and the lowest value should not exceed 10 %. If the deviation is higher, pull out the motor. Measure motor, motor cable and drop cable separately, and repair or replace defective parts.
Note: On single-phase, 3-wire motors, the operating winding will assume the lowest resistance value.

11. Mounting the motor and cable guard

11.1 Mounting the motor

1. Mount the motor on the chamber stack.



2. Lubricate the motor staybolts with grease.
3. Fit the nuts on the staybolts.
4. Cross-tighten the nuts in three steps with the specified torque, using tools S and R.

11.2 Fitting the cable guard

1. Place the cable along the chamber stack, and position the cable guard over the cable.



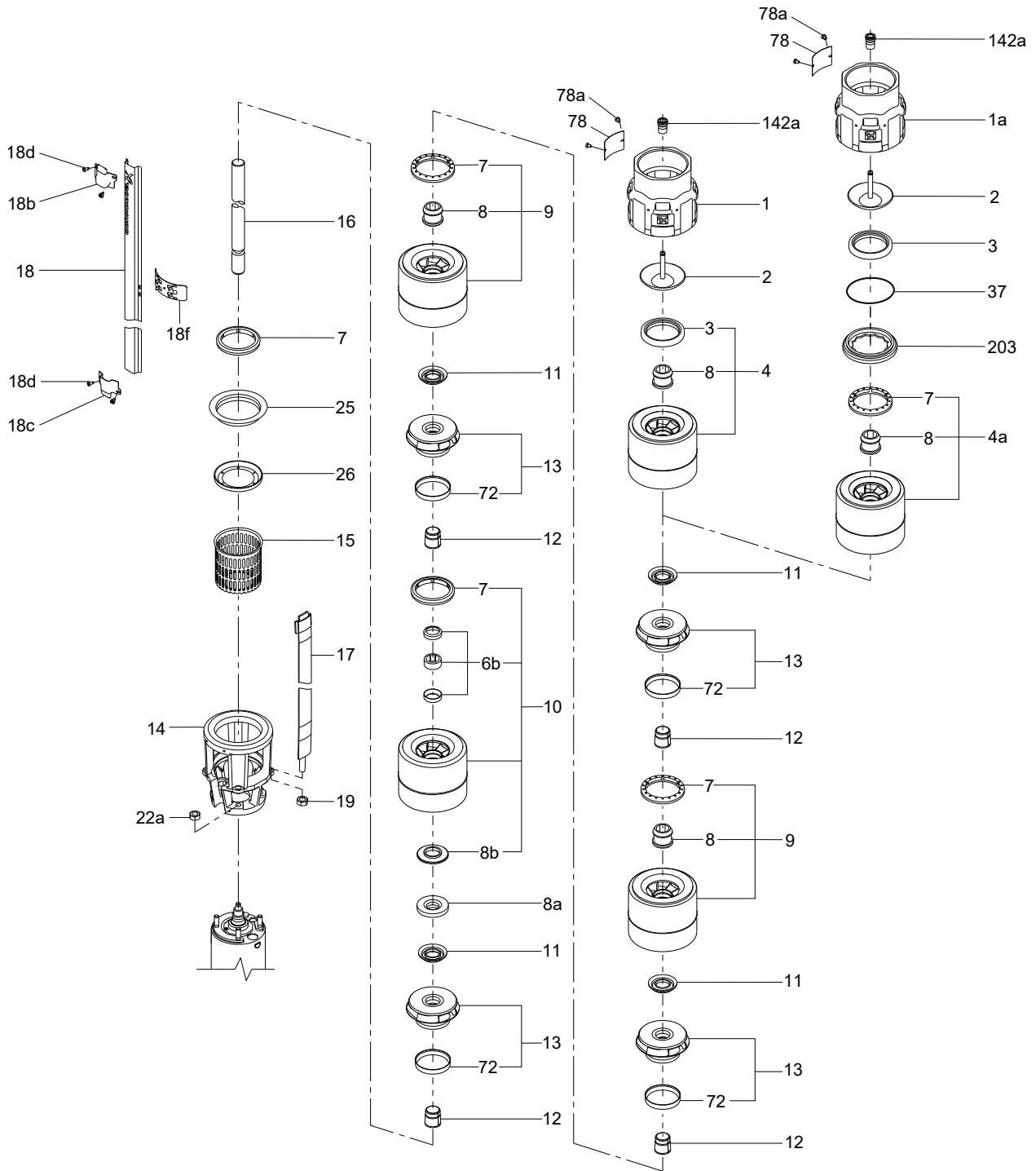
2. Fit the clamps at the top and bottom of the chamber stack.



3. Fit the screws in the top and bottom clamps. Tighten the screws with the specified torque, using a torque screwdriver (Q+P).

Related information

4. [Tightening torques and lubricants](#)

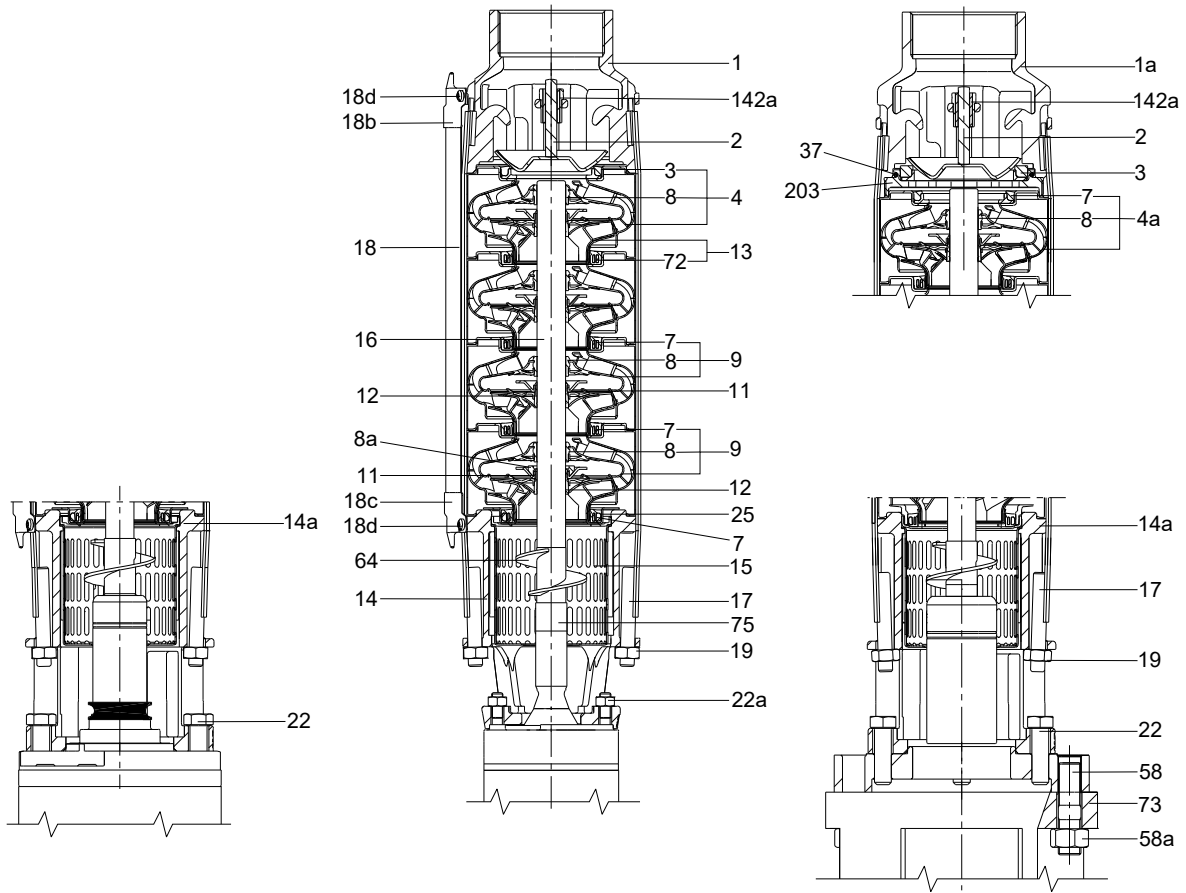


SP32

Related information

[6. Dismantling the product](#)

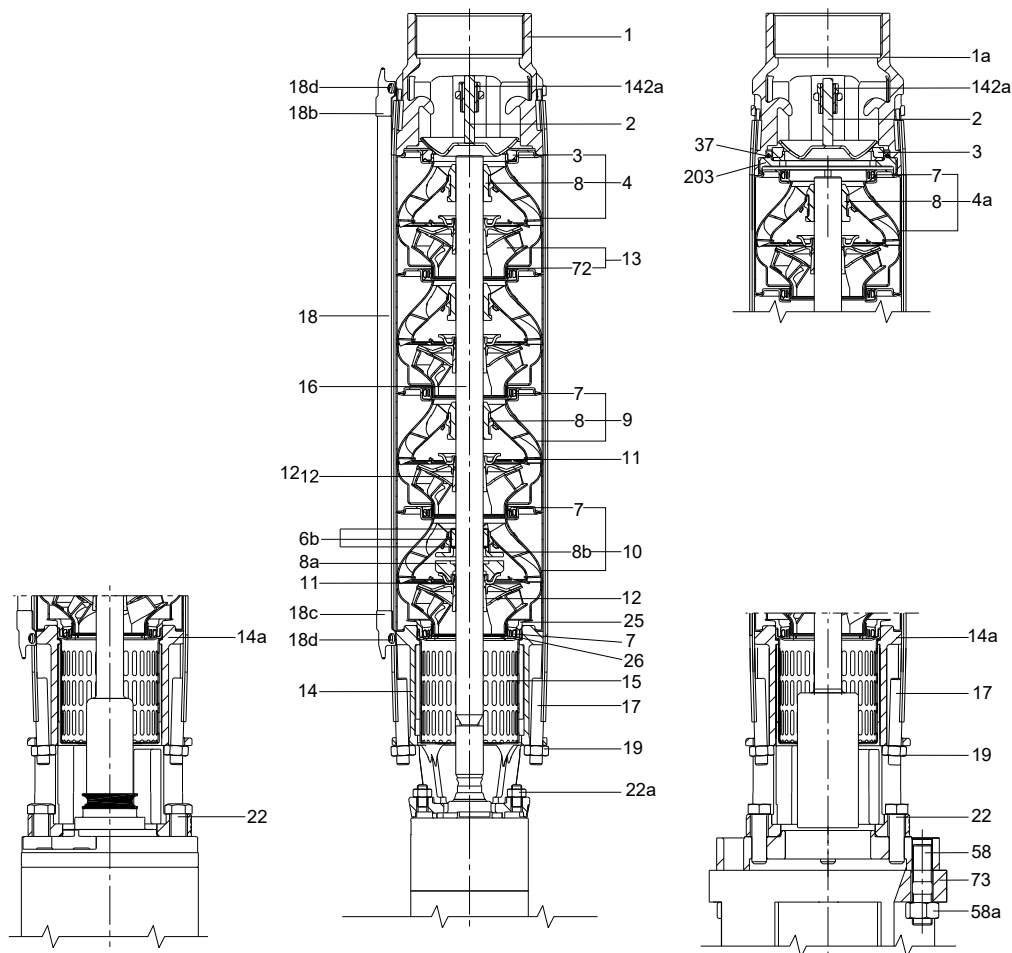
12.2 Sectional drawing



TM083265

SP18

Pos.	Description	Pos.	Description
1	Standard valve casing	18b	Clamp, top
1a	Relieved valve casing	18c	Clamp, bottom
2	Valve cup	18d	Screw
3	Valve seat	18	Bracket for cable guard
4	Top chamber, complete (for standard valve casing)	19	Nut
4a	Top chamber, complete (for relieved valve casing)	22	Bolt
7	Neck ring	22a	Nut
8	Rubber bearing	25	Retainer for neck ring
8a	Upthrust bearing	37	O-ring
9	Chamber, complete	58	Staybolt
11	Split cone nut	58a	Nut
12	Split cone	64	Priming screw
13	Impeller, complete	72	Wear ring
14	Suction interconnector, 4"	73	Connecting piece, 8"
14a	Suction interconnector, 6"	75	Bush
15	Strainer	78	Nameplate
16	Shaft	78a	Rivet
17	Strap	142a	Guide bearing
18	Cable guard	203	Retainer ring



SP 32

TM083485

Pos.	Description	Pos.	Description
1	Standard valve casing	17	Strap
1a	Relieved valve casing	18	Cable guard
2	Valve cup	18b	Clamp, top
3	Valve seat	18c	Clamp, bottom
4	Top chamber, complete (for standard valve casing)	18d	Screw
4a	Top chamber, complete (for relieved valve casing)	18g	Bracket for cable guard
6b	Bottom bearing set	19	Nut
7	Neck ring	22	Bolt
8	Rubber bearing	22a	Nut
8a	Uphrust disc	25	Retainer for neck ring
8b	Stop ring	26	Supporting plate
9	Chamber, complete	37	O-ring
10	Bottom chamber, complete	58	Staybolt
11	Split cone nut	58a	Nut
12	Split cone	72	Wear ring
13	Impeller, complete	73	Connecting piece, 8"
14	Suction interconnector, 4"	78	Nameplate
14a	Suction interconnector, 6"	78a	Rivet
15	Strainer	142a	Guide bearing
16	Shaft	203	Retainer ring

Related information

6. Dismantling the product

13. Analysis check list

Component	Problem	Yes/No	Comment
Check before dismantling			
Motor	Are there any dents on the motor?		
	Is the motor cable damaged?		
	Is the cable plug intact?		
	Is the motor or submersible drop cable joint damaged?		
	Is the submersible drop cable damaged?		
	Are there any signs of corrosion? ³⁾		
Pump	Is the strainer broken or damaged?		
	Is the non-return valve functional?		
	Are there any loose straps?		
	Are there any dents in the pump?		
	Are there any signs of corrosion? ³⁾		
Inspect during dismantling			
Motor	Is the motor coupling undamaged?		
	Measure shaft height [mm]		
	Does the shaft rotate easily?		
Pump	Is the pump coupling undamaged?		
	Measure axial clearance, top position [mm]		
	Measure axial clearance, bottom position [mm]		
	Does the shaft rotate easily?		
Valve casing	Is there any wear on the valve cup and the guide pin?		
Valve casing, relieved	Is there any wear on the valve seat and the O-ring?		
Top chamber and impeller	Is there any wear on the rubber bearing?		
	Are the chamber guide vanes intact?		
	Is there any wear on the valve seat or the neck ring?		
	Is there any wear on the split cone and the nut?		
	Is there any wear on the impeller wear ring?		
	Are the impeller blades intact?		
	Are there any signs of corrosion? ³⁾		
Intermediate chambers and impellers	Is there any wear on the rubber bearing?		
	Are the chamber guide vanes intact?		
	Is there any wear on the neck ring?		
	Is there any wear on the split cone and the nut?		
	Is there any wear on the impeller wear ring?		
	Are the impeller blades intact?		
Bottom chamber and impeller	Are there any signs of corrosion? ³⁾		
	Are the chamber guide vanes intact?		
	Is there any unexpected wear on the neck ring?		
	Are the chamber guide vanes intact?		
	Is there abnormal wear on stop ring?		
	Are the bearing cups free of dents and wear?		
	Is the upthrust disc intact?		
	Is there any wear on the split cone?		
	Is there any wear on the nut for stop ring?		
	Is there any wear on the impeller wear ring?		
Are the impeller blades intact?			
Are there any signs of corrosion? ³⁾			
Suction interconnector	Is there any wear on the neck ring?		
	Are there any signs of corrosion? ³⁾		

Component	Problem	Yes/No	Comment
Shaft	Is the shaft damaged?		
	Is the shaft straight?		
	Are there any signs of corrosion? ³⁾		

³⁾ In case of corrosion, specify the area in the comments section.

Related information

[5. Failure analysis](#)

14. Document quality feedback

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