FLYGT

Workshop Manual

3171

Flygt

ITT Industries

CONTENTS

SAFETY PRECAUTIONS

In order to minimize the risk of accidents in connection with service work, the following rules should be followed:

- **Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.**
- **Bear in mind the risk of accidents. Make sure that the machine or parts of the machine cannot roll or fall over and injure people or damage property.**
- **Make sure that the lifting equipment can handle the weight you want to lift and that it is in good condition.**
- **Make continuously sure that, in the course of the work, the pump and / or pump components stand steadily and cannot fall down and cause damage.**
- **Don't work under suspended load.**
- **Carry out the work on a sturdy workbench.**
- **Bear in mind the danger of electrical accidents.**
- **Bear in mind health hazards. Observe strict cleanliness. When carrying out repair work take care to avoid injury by cutting or pinching.**
- **Make sure you have a first-aid box near at hand.**
- **Check that tools and other equipment are in good condition.**

Follow all other health and safety regulations, local codes and ordinances.

General rules

Wash the outside of the pump thoroughly.

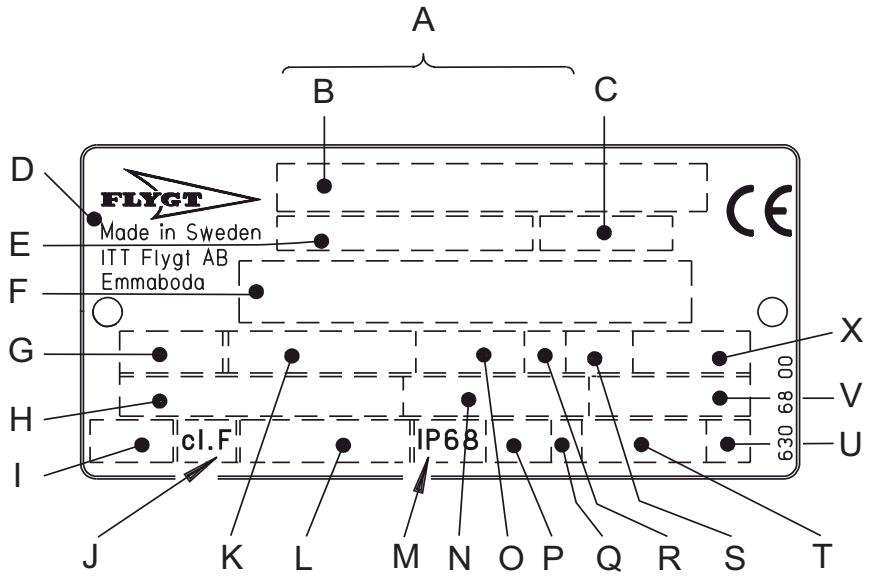
Before assembly:

- Clean all parts thoroughly, particularly O-ring grooves.
- Always change all O-rings, gaskets, washers and seals.
- Lubricate all springs, screws and O-rings with grease.

ITT Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

DATA PLATE INTERPRETATION

General data plate



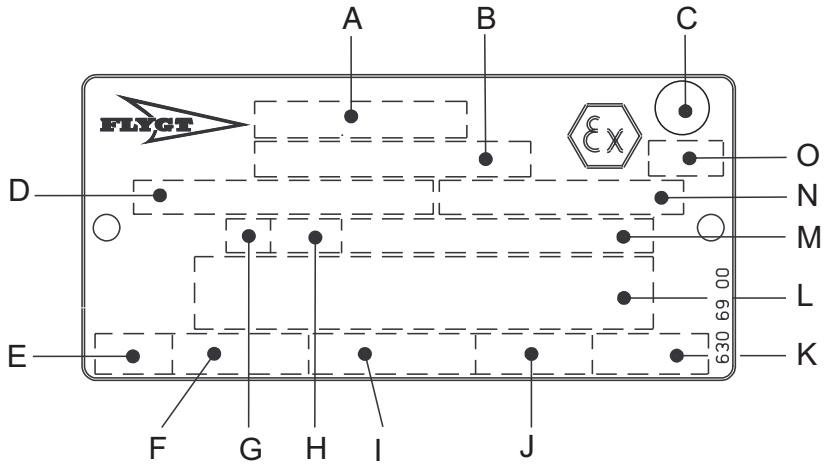
A Serial number
B Product code + Number
C Curve code / Propeller code
D Country of origin
E Product number
F Additional information
G Phase; Type of current; Frequency
H Rated voltage
I Thermal protection
J Thermal class
K Rated shaft power
L International standard
M Degree of protection
N Rated current
O Rated speed
P Max. submergence
Q Direction of rotation: L=left, R=right
R Duty class
S Duty factor
T Product weight
U Locked rotor code letter
V Power factor

DATA PLATE INTERPRETATION

Approval plates

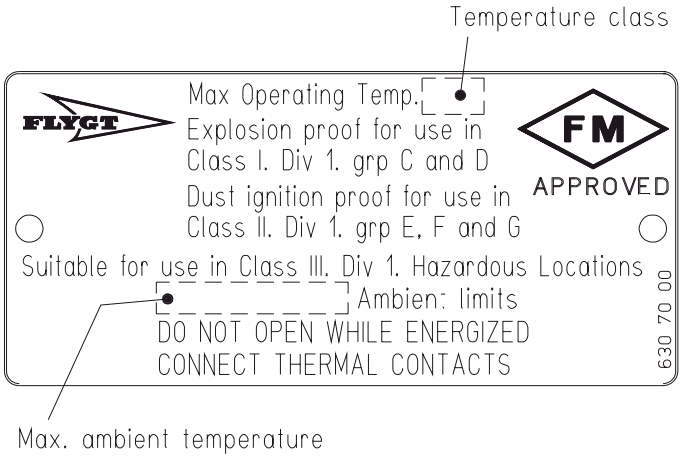
These approval plates apply to an explosion proof submersible Flygt pump and are used together with the general data plate on the pump.

EN: European Norm
ATEX Directive
European standards EN 50014, EN 50018 and EN 1127-1
EEx d II B T3 for ambient temperatures ≤ 40°C



A Approval
B Approval authority + Approval Number
C Approval for Class I
D Approved drive unit
E Stall time
F Starting current / Rated current
G Duty class
H Duty factor
I Input power
J Rated speed
K Controller
L Additional information
M Max. ambient temperature
N Serial number

FM: Factory Mutual according to standard 3615 as:
Class I Div. I Grp C and D
Class II and III Div. I Grp E, F and G



TECHNICAL DATA

Weights

The weight varies depending on the version:

3171 270-399 kg (594-878 lb)

For the pump's current, voltage, power ratings, and speed, please refer to the data plate of the pump.

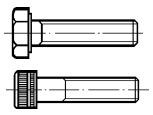
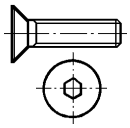
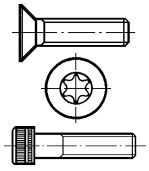
Coolant

A mix of water and stabilized monopropyleneglycol in a mixture ratio of 70/30 % volume part. Known trade marks of monopropyleneglycol are: Dowcal N (individual components are approved by FDA), Dowcal 20. These are non-poisonous, heat-and-cold resistant and inhibiting of corrosion.
Use of other type of glycol will jeopardize the function of the pump.

Tightening torques

RECOMMENDED TIGHTENING TORQUE FOR FLYGT STANDARD SCREWS IN Nm AND ft-lb

Chart valid only for lubricated screws. Use lubricant 90 18 00 or 90 20 59.

Material / Thread	Stainless (A2, A4)					
	Property class					
	70				80	
	Nm	ft-lb	Nm	ft-lb	Nm	ft-lb
M5	4,1	3	2,0	1,5	5,4	4
M6	7	5,2	4,1	3	9,3	6,9
M8	17	12,5	7	5,2	22	16
M10	33	24,3	17	12,5	44	32
M12	57	42	33	24,3	76	56
M16	140	103	57	42	187	138
M20	273	201	100	74	364	268
M24	472	348	140	103	629	464
Type of screw						

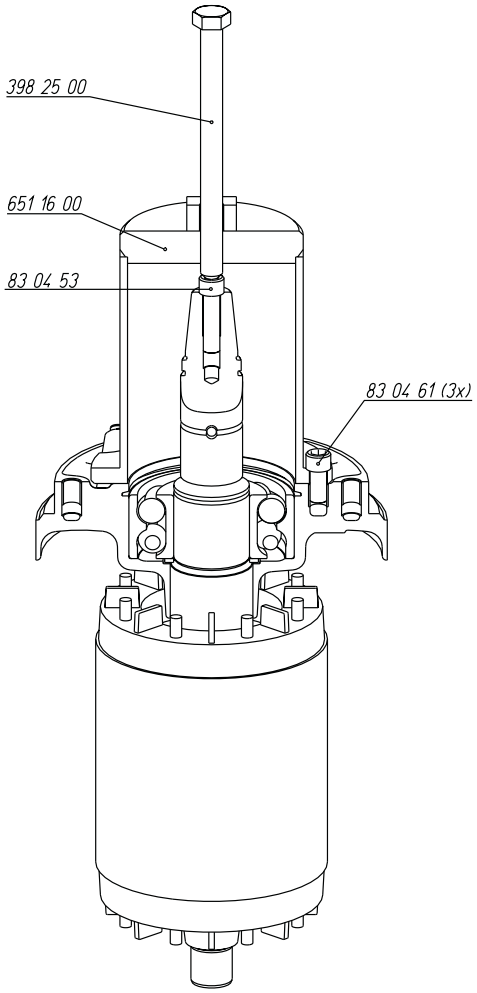
All Flygt standard screws are made of stainless steel. Size M6 belongs to Property class 70 while all other sizes belong to class 80.

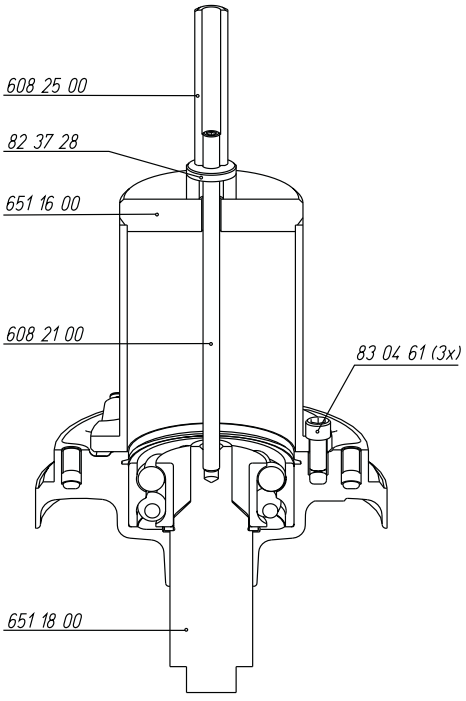
TOOLS

Partno	Denomination	Range of use
83 95 42	Pump	Inspection room
84 08 02	Circlip plier (SGA 19-60 mm)	Mechanical seal unit
84 08 11	Circlip plier (SGH 85 165 mm)	Outer bearing
84 08 60	Crow bar (2x)	Mechanical seal unit
84 10 16	Ratchet handle	Sockets
84 11 40	Combination wrench	Level switch
84 13 03	Hexagon bit adapter	Terminal´s rail, earthing
84 13 05	Hexagon bit adapter	Plugs, connection cover, lift handle
84 13 06	Hexagon bit adapter	Impeller screw, cable entry, seal housing cover
84 13 01	Hexagon bit adapter	Pump housing
84 13 62	Puller	Inner bearing
84 14 80	Hexagon bit adapter	Impeller
84 14 89	Allen keys set (9x)	Mechanical seal unit
84 15 55	Extension bar (L= 125 mm)	Sockets
332 91 00	Puller	Spring
398 57 00	Mounting sleeve	Mechanical seal unit
651 19 00	Mounting/dismounting tool	Main bearing
608 23 00	Stand	Pump fixation

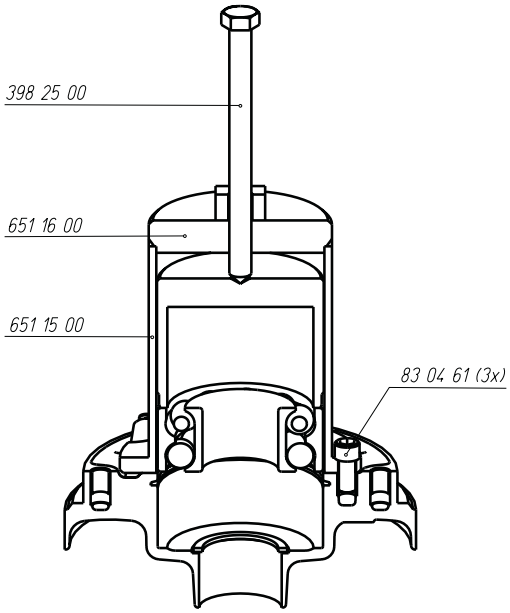
Dismantling/Assembling tool 6511900

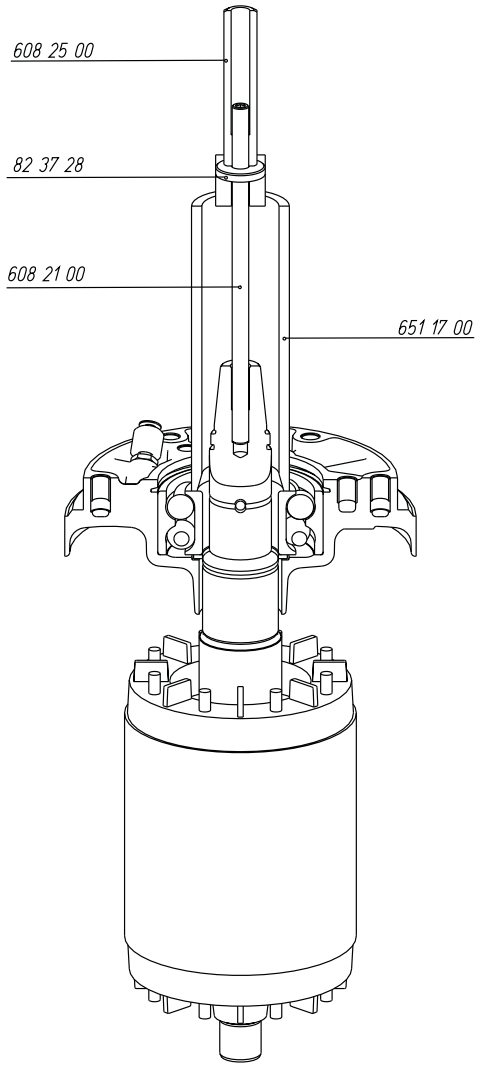
Dismantling





Assembling





SERVICE AND INSPECTION

Service/Inspection

ITT Flygt recommends a preventive maintenance program based on Intermediate and Major Services at regular intervals. For standard sewage applications, where FLS10 is correctly connected and in use and the temperature of the pumped liquid is 40°C (104°F) or less, an *Intermediate Service* should be performed every 8000 hours or every 2 years, whichever occurs first. The time between *Major Service* could vary considerably depending on operating conditions and the need for a Major Service will be determined during the regular Intermediate Services.
However, a minimum of 20 000 hours of operation could be anticipated.

For other applications than sewage water or for specifc operating conditions, other sevice intervals may be recommended.

Pump	**Intermediate Service running 8 000 h or 2 years**
Junction box	Check that it is clean and dry.
Terminal board	Check that the connections are properly tightened.
Isolation check	Check that the resistance between earth and phase lead is more than 1 M Ω.
Cable	Check that the rubber sheating jacket is undamaged.
Seal housing	Fill up with new coolant if necessary. Check freezing point (lower than -13°C/9°F).
Inspection chamber	Drain all liquid if any. Check the resistance of the FLS10. Normal value approx.1200 Ω, alarm approx. 430 Ω.
O-rings	Always replace the O-rings of the filling plugs and at the junction cover.
Thermal contacts	Check the resistance. Normally closed circuit; interval 0 - 1 Ω.
Thermistor	Check the resistance 20-250 Ω, (measuring voltage max 2 V DC).
Impeller	Check impeller clearance and adjust if necessary.
Lifting handle	Check the screws and the status of the lifting handle.
Rotation direction	Check the rotation of the impeller.
Lifting device	Check that local safety regulations are followed.
Voltage and amperage	Check running values.

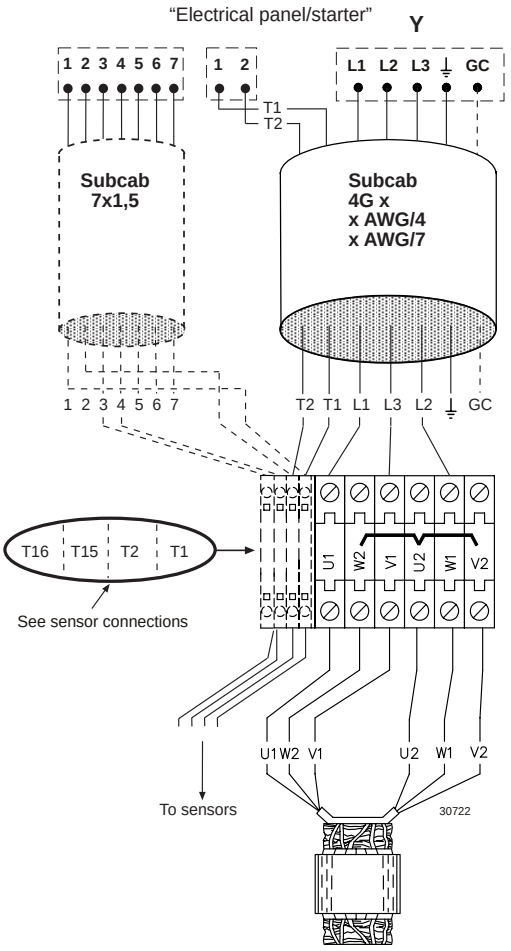
Pumpstation	**Intermediate Service running 8 000 h or 2 years**
Electrical cabinets/ panels	Check that they are clean and dry.
Connection to power	Check that the connections are properly tightened.
Overload and other protections	Check correct settings.
Personnel safety	Check guard rails, covers and other protections.
Level regulators	Check condition and function.

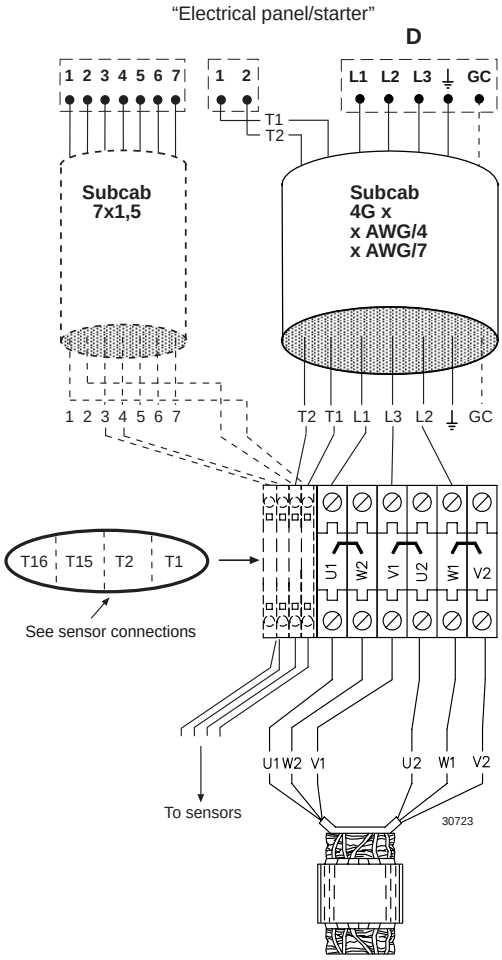
SERVICE AND INSPECTION

If any indication of alarm between inspections, please see instructions below.	**Actions**
FLS10	Drain the fluid in the inspection chamber. Fill upt with new coolant if necessary. Check freezing point (lower than -13°C/9°F). Check the inspection chamber again after one week of operation. If leakage has occured, drain the fluid and change the mechanical seal unit and replace with new coolant.
Thermistor/Thermal-contact	Check coolant level. (pump with cooling jacket) Check start and stop levels.
Overload protection	Check that the impeller can rotate freely.

ELECTRICAL CONNECTIONS

SUBCAB 4G/SUBCAB AWG*

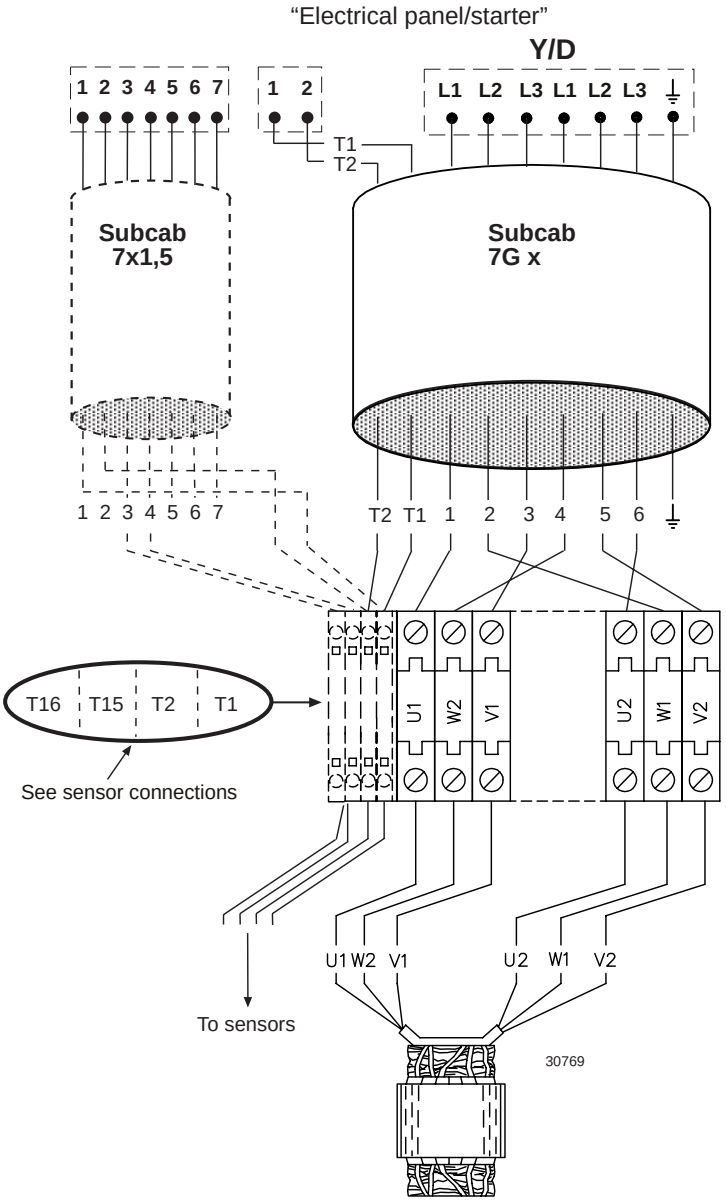




* SUBCAB AWG

Mains	Lead	Pump terminal board	Stator leads connection: Stator lead	Pump terminal board
L1	Brown/(Red*)	U1	U1, red	U1
L2	Blue (White*)	W1	W2, black	W2
L3	Black (Black*)	V1	V1, brown	V1
Earth (Ground)	Yellow/Green	⏚	U2, green	U2
Groundcheck (GC)	Yellow		W1, yellow	W1
			V2, blue	V2
Control	Cable lead			
T1	T1/orange*			
T2	T2/blue*			

ELECTRICAL CONNECTIONS

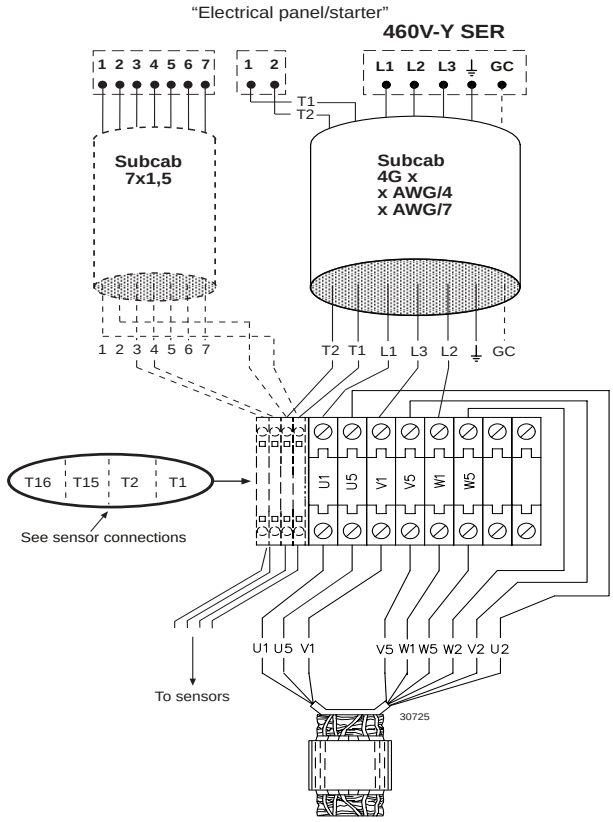


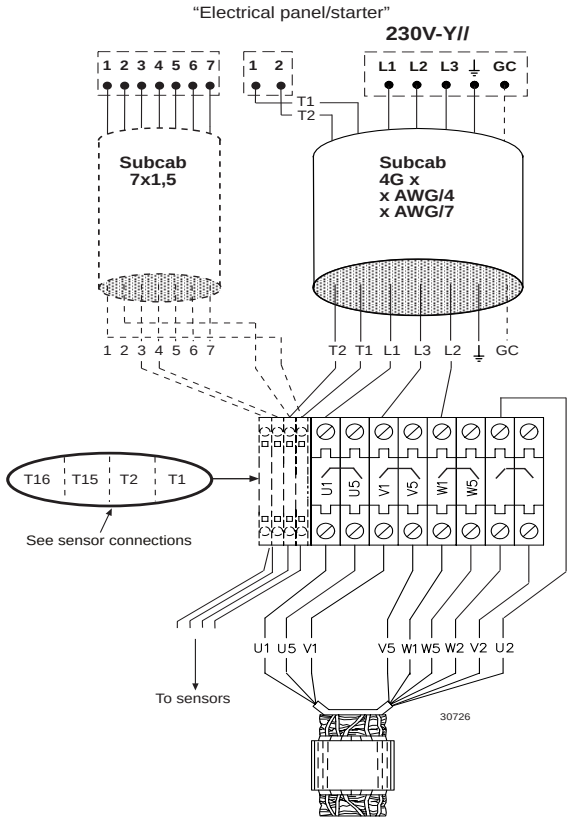
* SUBCAB

Mains	Lead	Pump terminal board	Stator lead	Pump terminal board
L1	1 black	U1	U1, red	U1
L2	2 black	W1	W2, black	W2
L3	3 black	V1	V1, brown	V1
L1	4 black	W2	U2, green	U2
L2	5 black	V2	W1, yellow	W1
L3	6 black	U2	V2, blue	V2
Earth (Ground)	Yellow/Green	⏚		
Control	Cable lead			
T1	T1 black			
T2	T2 black			

ELECTRICAL CONNECTIONS

SUBCAB 4G/SUBCAB AWG*





* SUBCAB AWG

Mains	Lead	Pump terminal board
L1	Brown/(Red*)	U1
L2	Blue (White*)	W1
L3	Black (Black*)	V1
Earth (Ground)	Yellow/Green	⏚
Groundcheck (GC)	Yellow	

Stator leads **460V-Y SER** connection:	
Stator lead	Pump terminal board
U1, red	U1
W2, black	W2
V1, brown	V1
U2, green	U2
W1, yellow	W1
V2, blue	V2
V5, brown	
W5, yellow	
U5, red	

Control	Cable lead
T1	T1/orange*
T2	T2/blue*

Mains	Lead	Pump terminal board
L1	Brown/(Red*)	U1
L2	Blue (White*)	W1
L3	Black (Black*)	V1
Earth (Ground)	Yellow/Green	⏚
Groundcheck (GC)	Yellow	

Stator leads **230V-Y//** connection:	
Stator lead	Pump terminal board
U1, red	U1
U5, red	U5
V1, brown	V1
V5, brown	V5
W1, yellow	W1
W5, yellow	W5
U2, green	
V2, blue	
W2, black	

SENSOR CONNECTIONS

Monitoring equipment

The **FLS10** sensor is installed in the inspection chamber and consists of a small float switch.

The FLS10 sensor is connected in series with the stator thermal contacts. They should be connected to an alarm relay, type Mini CAS II, in accordance with the following diagram.

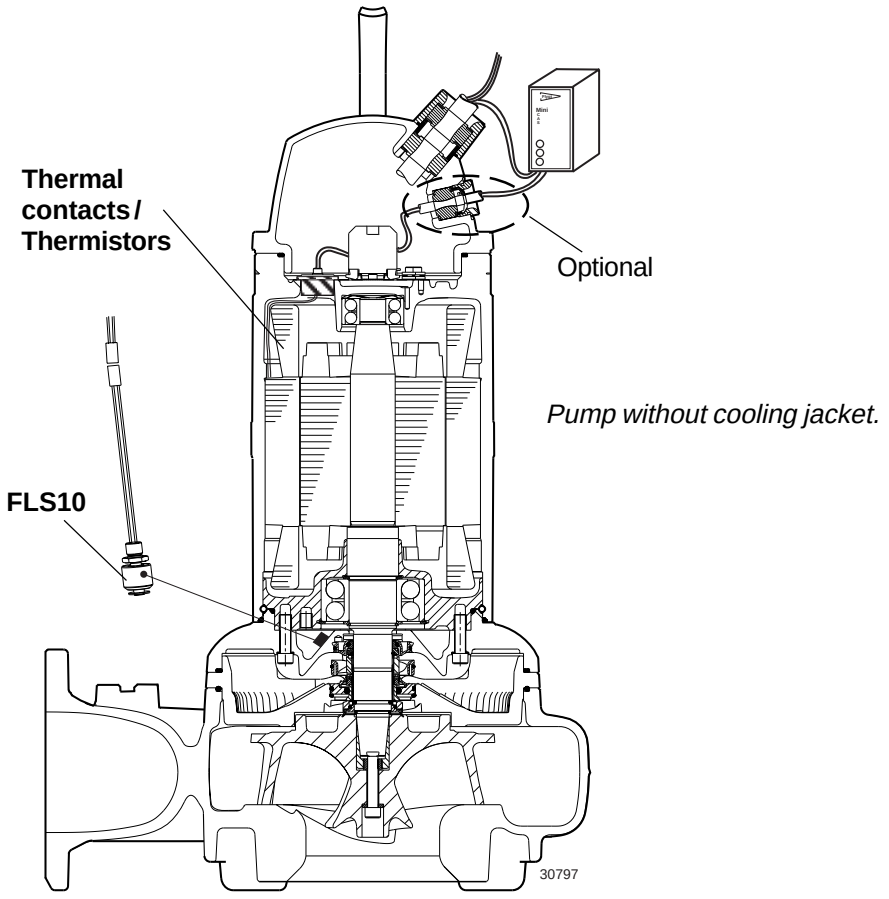
Thermal contacts are incorporated into the stator and may be used for voltages up to 250 V, rated current 10 A (cos φ =1) / 6.3 A (cos φ = 0.6). ITT Flygt recommends that they are connected to 24 V over separate fuses to protect other automatic equipment.

For a **PTC-thermistor** (PTC = Positive Temperature Coefficient), there is a significant increase in resistance at a certain temperature that can be utilized for monitoring the temperature.
PTC-thermistor

T=25 °C	R ≤ 100 Ohm
T=135 °C (T_{REF} - 5 °C)	R ≤ 550 Ohm
T=145 °C (T_{REF} + 5 °C)	R ≥ 1330 Ohm

Three thermistors are connected in series and have a resistance of approx. 150-300 ohms at room temperature.

The label in the junction box shows if the pump is equipped with optional sensors

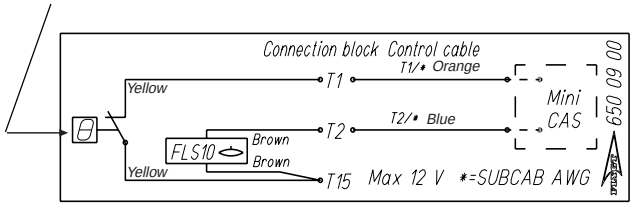


Pump without cooling jacket.

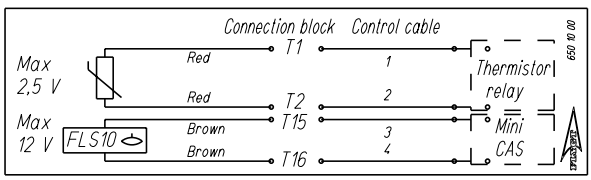
Sensor connection for standard configuration

The pump is as standard equipped with either thermal contacts or thermistors.

A)Thermal contacts



B)Thermistors



SENSOR CONNECTIONS

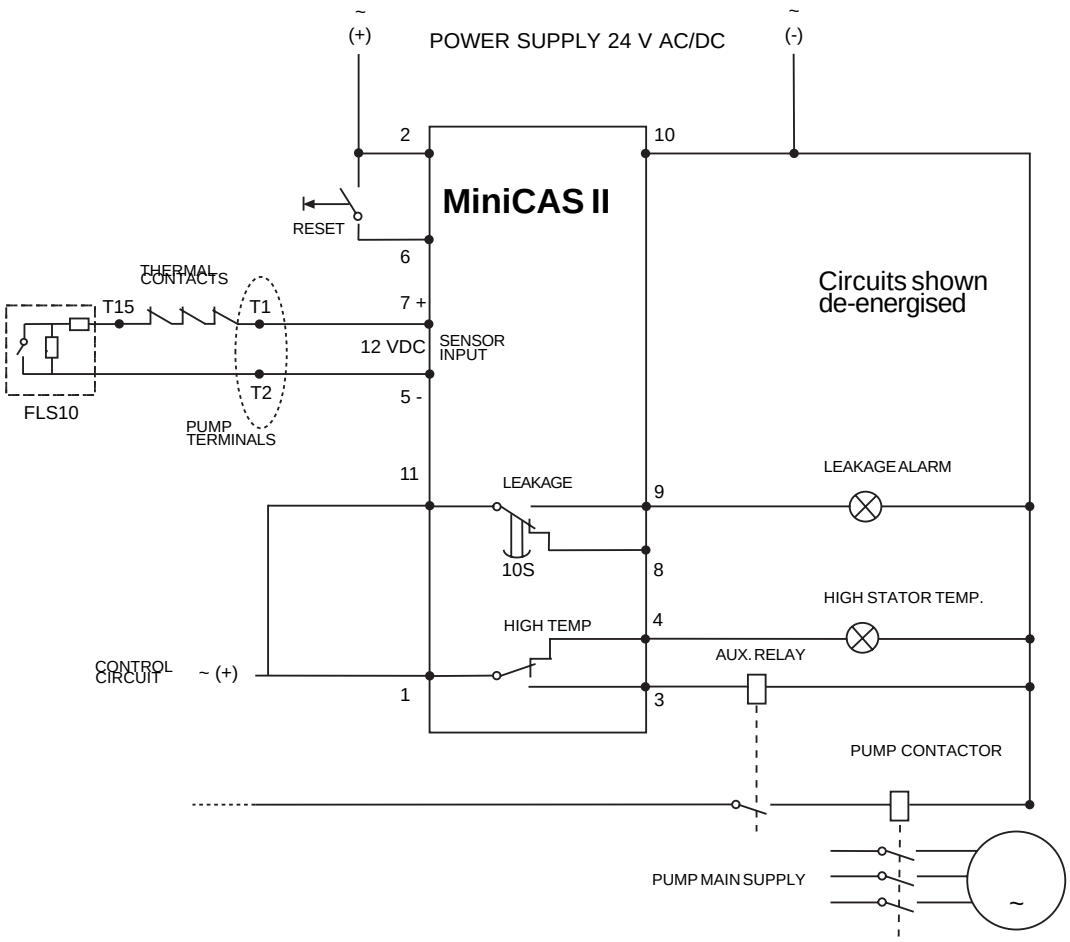
FLS10 + thermal contacts

0 mA = *Overtemperature*

10 mA = *OK*

28 mA = *Leakage*

Tolerance 10%



Sensor Connection Table

(For further information please contact Flygt representative.)

Sensor	Sensor lead	Thermal connection	Control cable	Connected to
Thermal contacts + FLS10	White Brown White+Brown	T1 T2 T15	T1/*Orange T2/*Blue = SubCab /* SubCabAWG	Mini CAS II Mini CAS II
Thermistors + FLS10	Red Red Brown Brown	T1 T2 T15 T16	1 2 3 4	Thermistor relay Thermistor relay Mini CAS II Mini CAS II

DESIGN OF THE PUMP

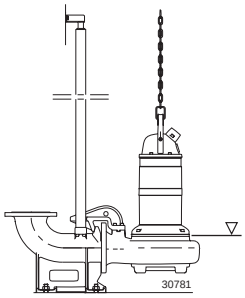
Motor
Squirrel-cage 3-phase induction motor for 50 Hz or 60 Hz.
The motor is started by means of direct on-line or star delta start.
The motor can be run continuously or intermittently with a maximum of 15 evenly spaced starts per hour.
Flygt motors are tested in accordance with IEC 34-1.

The stator is insulated in accordance with class H (180° C, 355° F). The motor is designed to supply its rated output at ± 5% variation of the rated voltage. Without overheating the motor, ± 10% variation of the rated voltage can be accepted provided that the motor does not run continuously at full load. The motor is designed to operate with a voltage imbalance of up to 2 % between the phases.

Bearings
Both the support bearing and the main bearing of the shaft are double row angular contact ball bearings.

Mechanical seal unit
The pump has one shaft mechanical seal unit consisting of two independently operating seals:

Alt I	Inner seal:	Aluminum Oxide/Carbon Al_2O_3/CSb
	Outer seal:	Corrosion resistant cemented carbide WCCR/WCCR
Alt II	Inner seal:	Corrosion resistant cemented carbide WCCR/WCCR
	Outer seal:	Corrosion resistant cemented carbide WCCR/WCCR
Alt III	Inner seal:	Aluminum Oxide/Corrosion resistant cemented carbide Al_2O_3/WCCR
	Outer seal:	Silicon Carbide RSiC/RSiC

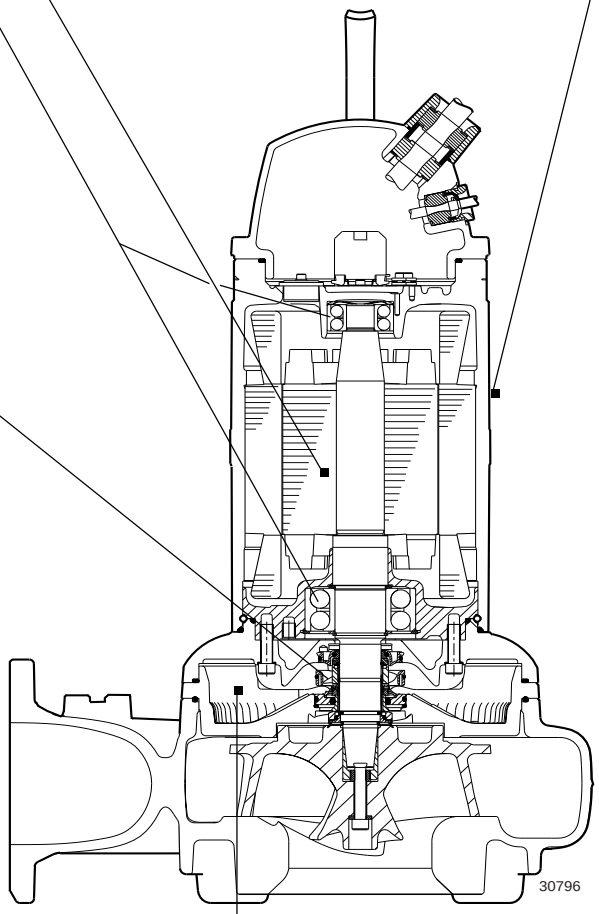


***) Lowest liquid level.**

Monitoring equipment
The stator incorporates three thermal contacts connected in series that activate an alarm at overtemperature.
The thermal contacts: open at 140° C (285 F°). The sensors shall be connected to Flygt's monitoring unit MiniCAS II or equivalent unit.
The monitoring equipment shall be of a design that makes automatic restart impossible.
The 3171 is supplied with inspection sensor FLS10 for sensing the presence of any liquid in the inspection chamber.

Cooling (without cooling jacket)
The pump is cooled by the ambient liquid. For lowest liquid level, see illustration below *).

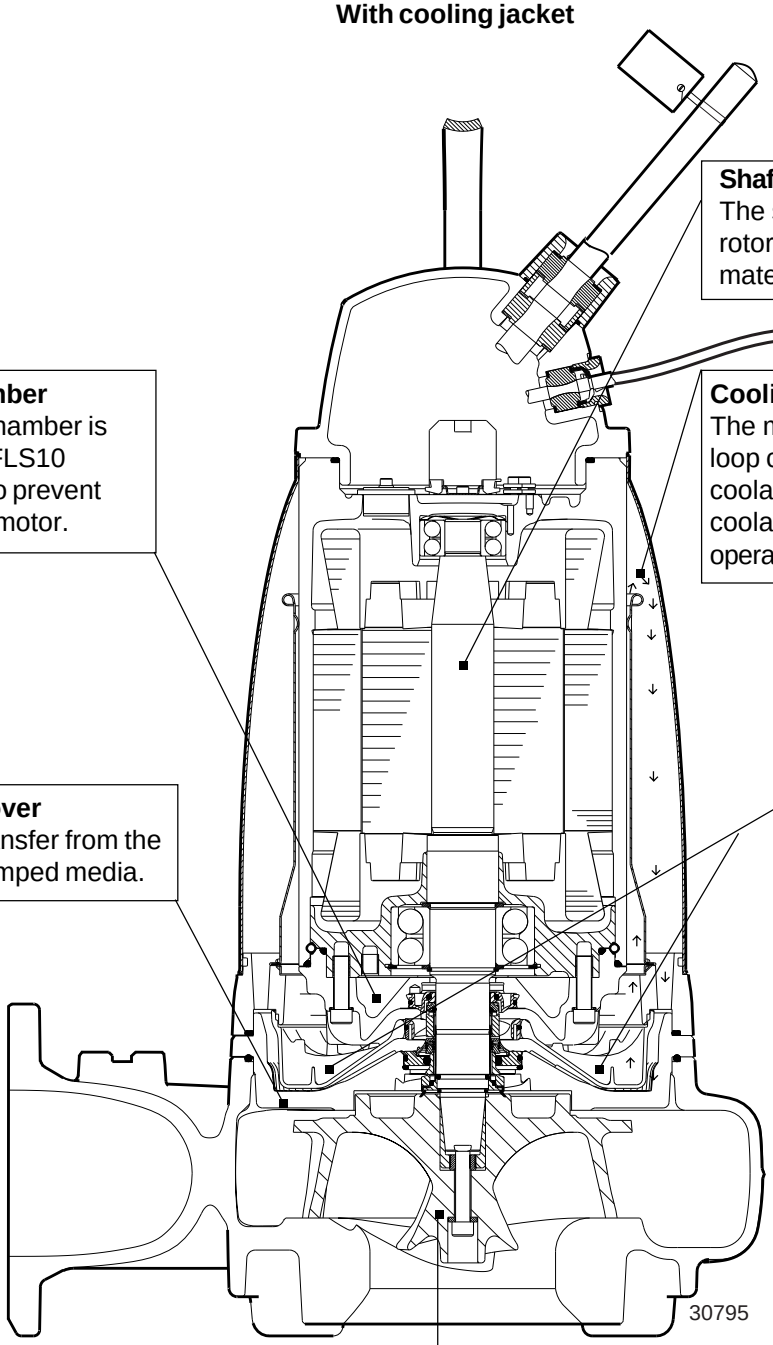
Without cooling jacket



Seal housing
A coolant fluid lubricates and cools the mechanical seal unit and acts as a buffer between the pumped media and the electric motor.

DESIGN OF THE PUMP

With cooling jacket



Shaft
The shaft is delivered with the rotor as an integral part. Shaft material; stainless steel.

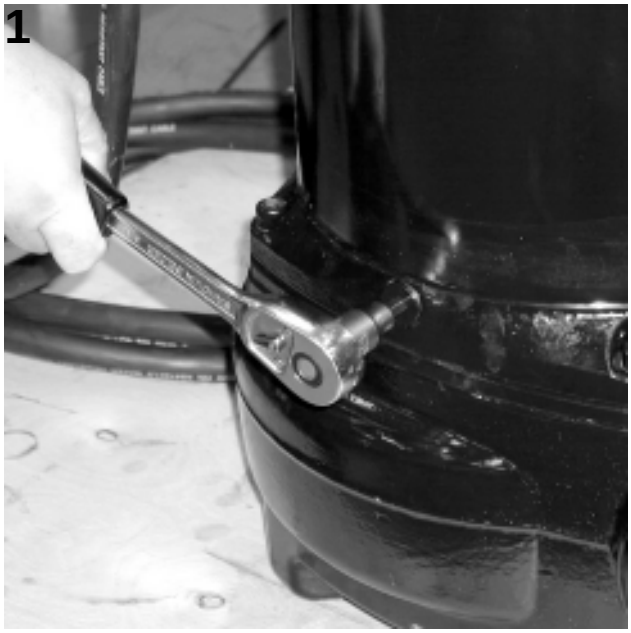
Inspection chamber
The inspection chamber is equipped with a FLS10 leakage sensor to prevent damages on the motor.

Cooling (with cooling jacket)
The motor is cooled by a closed loop cooling system. An integrated coolant pump circulates the coolant whenever the pump is operated.

Seal housing cover
Provides heat transfer from the coolant to the pumped media.

Seal housing
The coolant also lubricates and cools the mechanical seal unit and acts as a buffer between the pumped media and the electric motor.

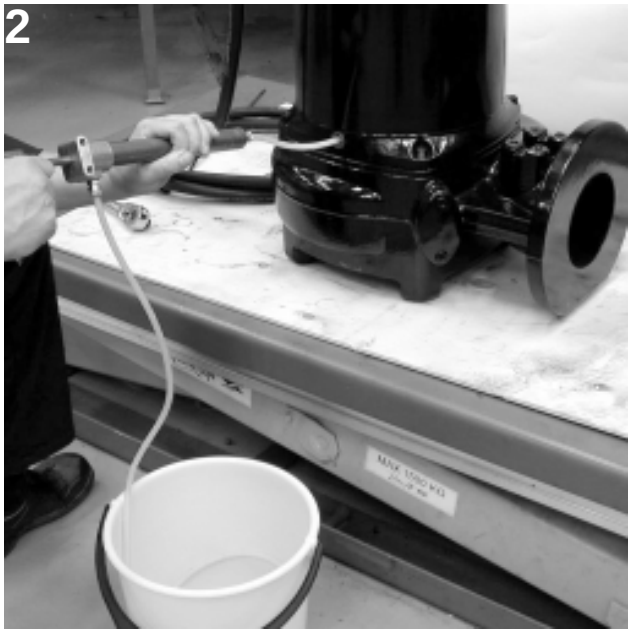
Impeller
The pump is equipped with a N-impeller, a semi-open two-vane impeller.



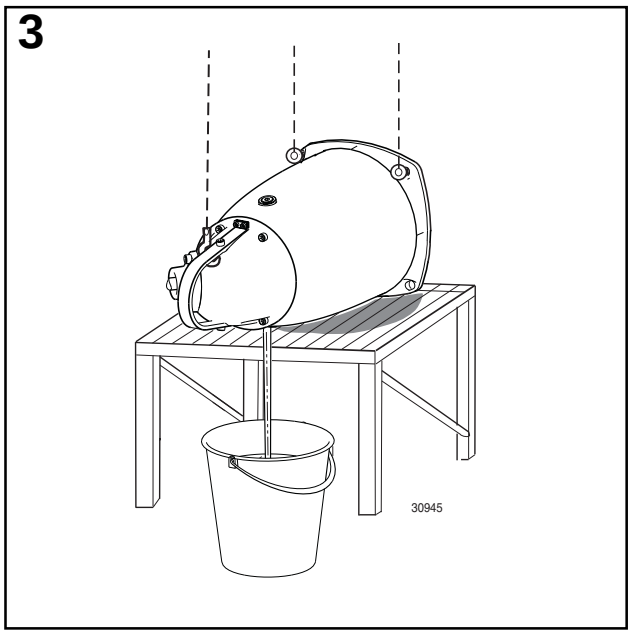
DISMANTLING

Emptying of coolant
Version with cooling jacket (Fig 1 - 3)

1. Remove the inspection plug.



2. Pump out any coolant from the inspection chamber. Refit the inspection plug and tighten it (44 Nm).

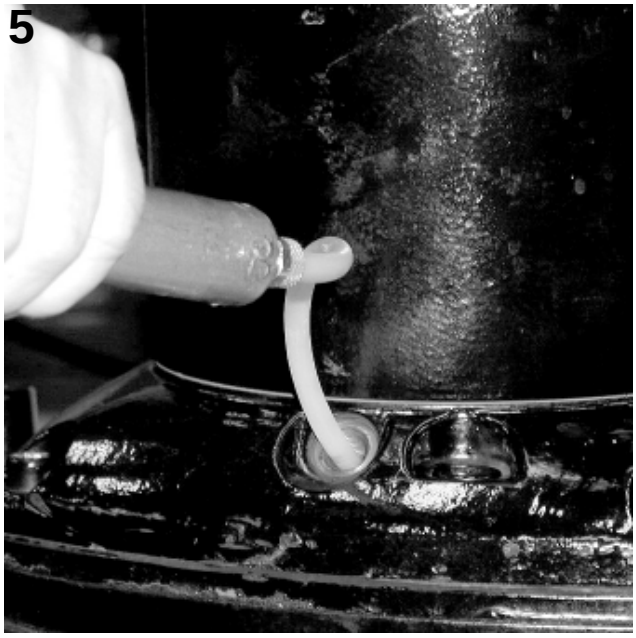


3. Remove the pump from the pump housing. Place the pump in a horizontal position. Place a container under the pump (approx. 17 litres / 18 US quarts). Remove the coolant filling plug. Remove the vent plug and empty the coolant.

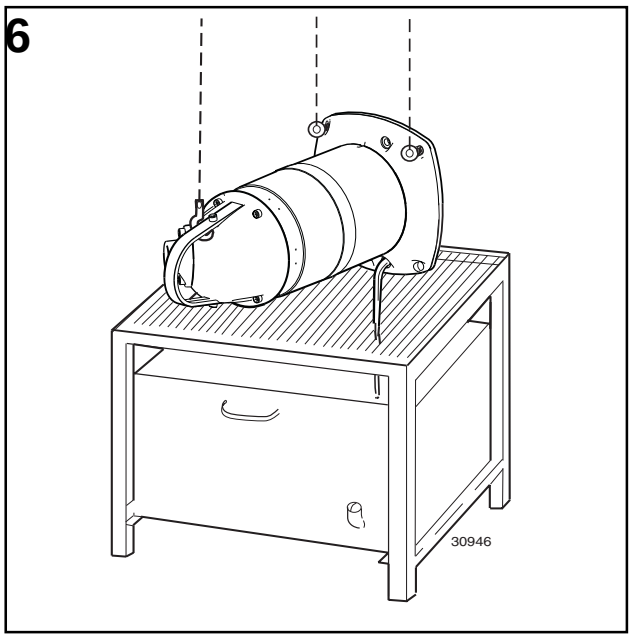
Emptying of coolant
Version without cooling jacket
(Fig. 4 -7)

4. Remove the inspection plug.

5. Pump out any coolant.



6. Remove the pump from the pump housing. Place the pump in a horizontal position. Unscrew the two filling plugs. Drain the pump (volume approx. 4,6 litres / 4,9 quarts).

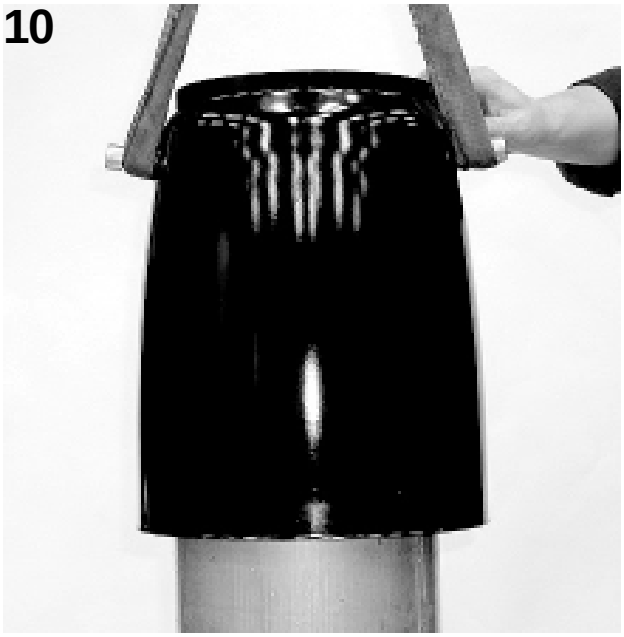


7. Alt: If pump is upright, pump out the coolant.

8. Remove the connection cover screws.

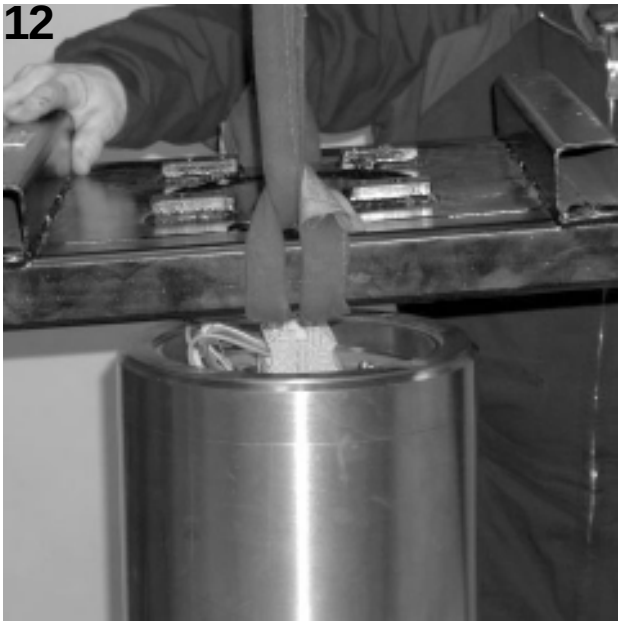
9. Lift off the connection cover. Disconnect the motor cable leads.

10. Remove the coolant filling plugs. Screw two M16 screws (about 50 mm long) into the coolant filler holes of the cooling jacket. Lift off the outer cooling jacket.

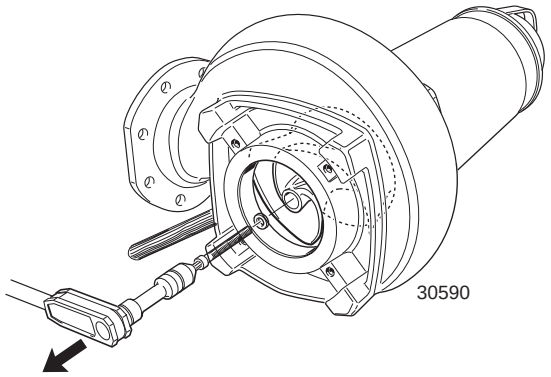


11. Remove the screws and washers retaining the inner cooling jacket. Lift off the inner cooling jacket.

12. Bolt the assembly/dismantling stand in position. Secure it by means of the screws for the connection cover.



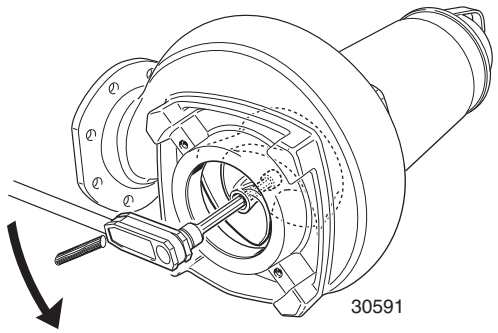
13



13. Place the pump horizontally. Remove the flush valve cover and insert a rod (wooden or plastic) through the hole . Remove the impeller screw.

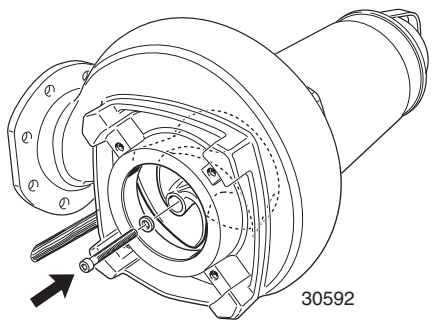
Procedure for NT-version, see pages 53-57

14



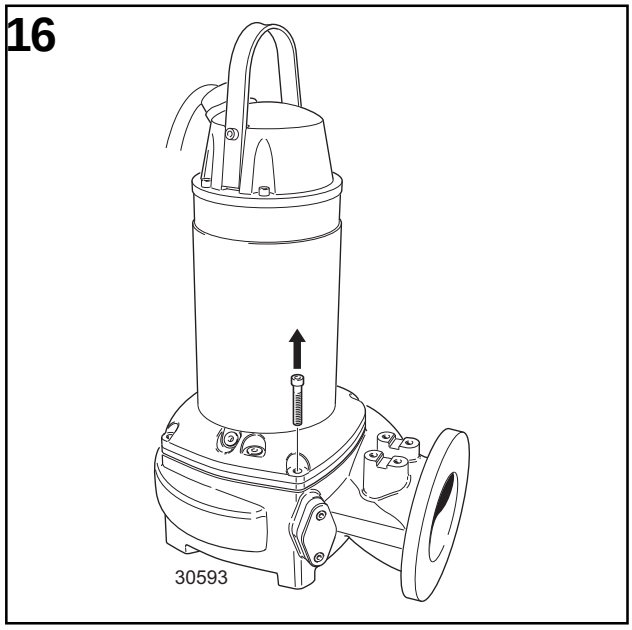
14. Turn the trim screw counter clockwise until the impeller is free from the shaft. Use a 12 mm hexagon bit adapter with a length of min. 100 mm.

15



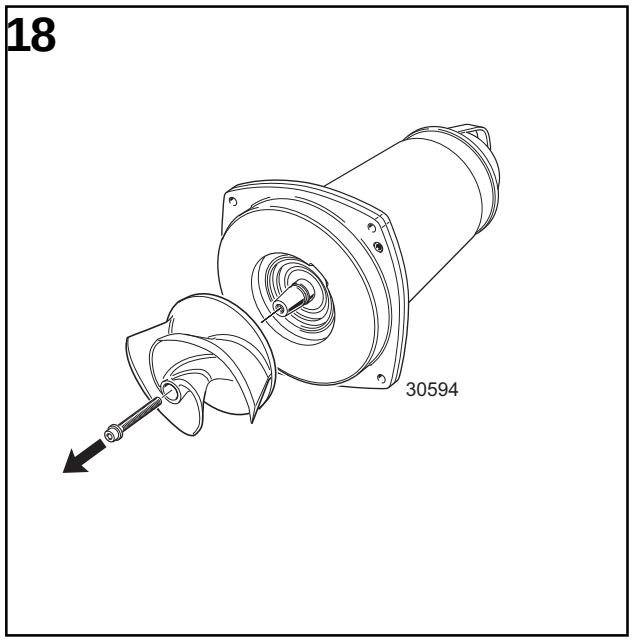
15. Refit the impeller screw by hand, just to prevent the impeller from falling off.

16. Remove the rod and raise the pump. Remove the pump housing screws.



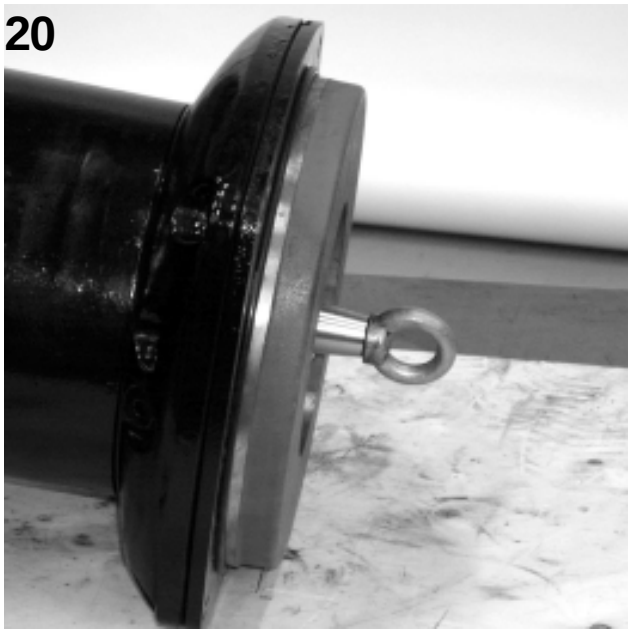
17. Lift the drive unit out of the pump housing.

18. Place the drive unit horizontally. Remove the impeller screw.



19. Remove the impeller.

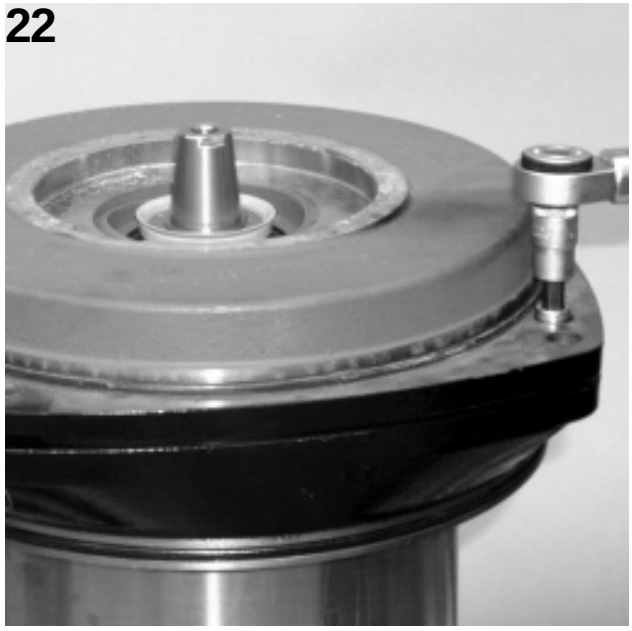
Worn impellers can have very sharp edges. Use protective gloves!



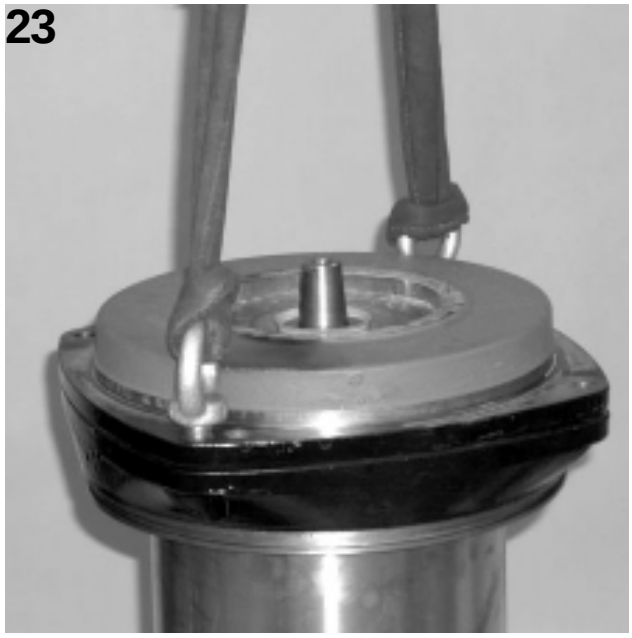
20. Screw in an M12 lifting eyebolt (55 mm long) into the shaft end.

21. Place the drive unit upside down on the stand.

22. Remove the screws retaining the seal housing cover.



23. Fit two lifting eyebolts to the seal housing bottom and remove it.



24. Remove the circlip.

25a. Remove the mechanical seal unit (picture shows version without cooling jacket).

25b. Remove the mechanical seal unit (picture shows version with cooling jacket).

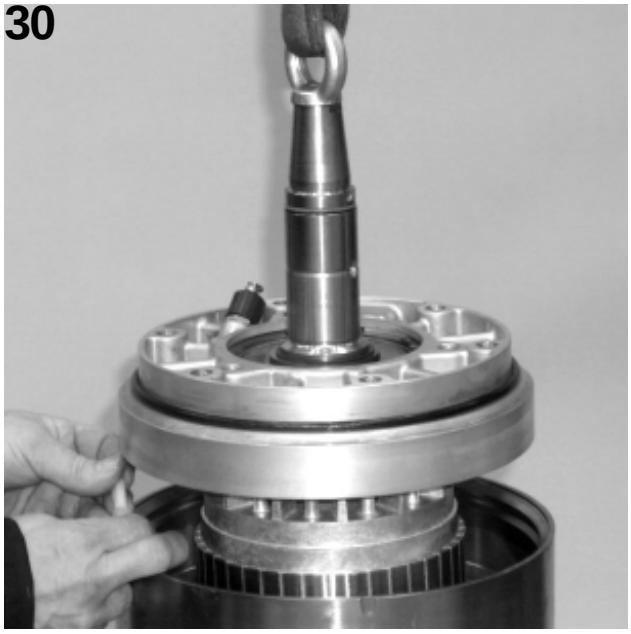
26. Remove the O-ring from the shaft.

26. Remove the flow diffuser.

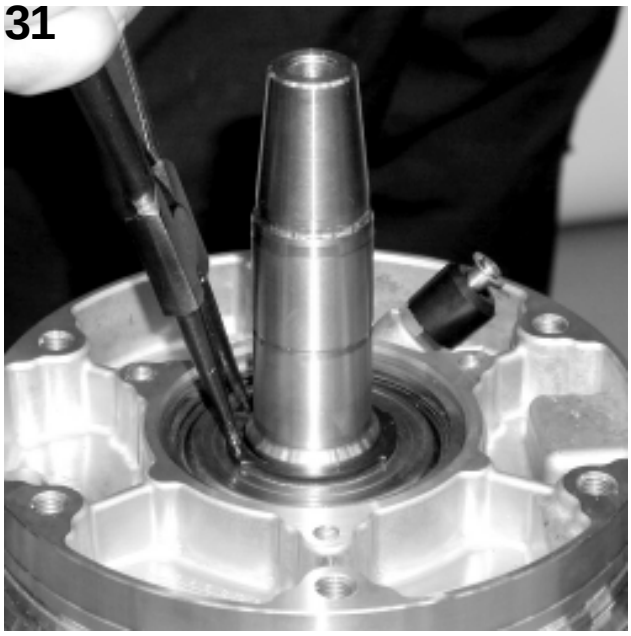
27. Remove the screws for the adapter.

28. Fit two lifting eyebolts to the adapter and lift it off.

29. Remove the spring.



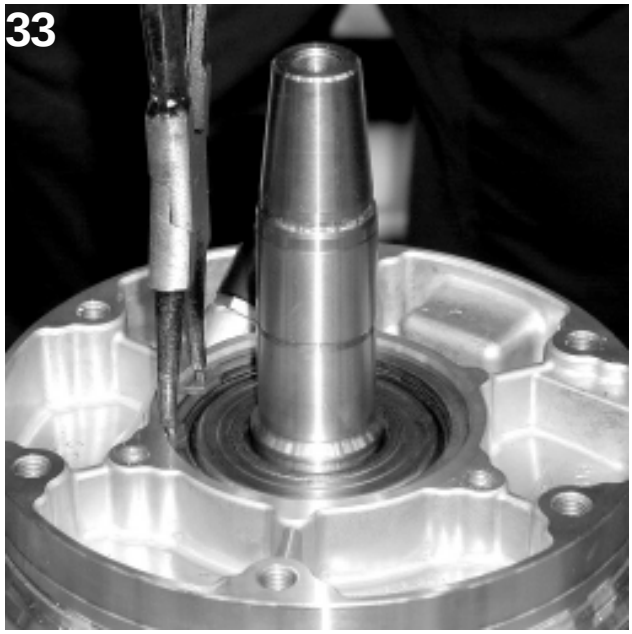
30. Screw the lifting eyebolt into the shaft end. Carefully lift out the shaft unit. Disconnect the sockets for FLS10. Lower the shaft unit back into position



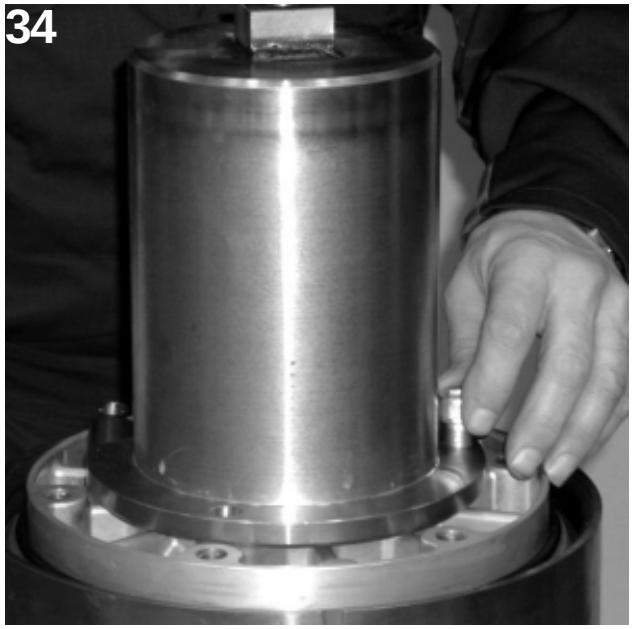
31. Remove the inner circlip.

32. Remove the washer.

33. Remove the outer circlip.



34. Bolt the puller cylinder onto the bearing holder. (For further details see dismantling tool drawing, page 8).



35. Oil the puller screw and screw it in.

36. Withdraw the bearing holder with bearing.

37. Place the puller drift in a vice. Remove the puller screw. Place the bearing holder with puller cylinder onto the puller drift. Screw in the threaded rod by hand until it bottoms.

38 . Fit the washer and screw on the long hexagonal nut.

39. Withdraw the bearing.

40. Place the rotor/shaft unit in the rotor support. Use a bearing puller to remove the support bearing.

ASSEMBLY

41. Place the rotor/shaft unit on a suitable piece of tube. Oil the shaft end.

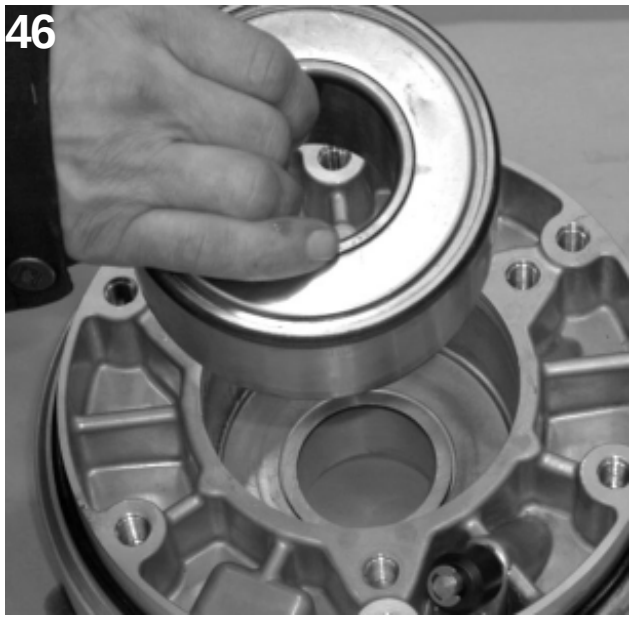
42. Place the support bearing on the shaft end, regardless of which face is up.

43. Grease the surface of the bearing. Use the bearing fitting tool (SKF) to hammer down the bearing.

44. Place the support washer in the bearing holder.

45. Oil the bearing seat.

46. Place the bearing in position, regardless of which face is up.



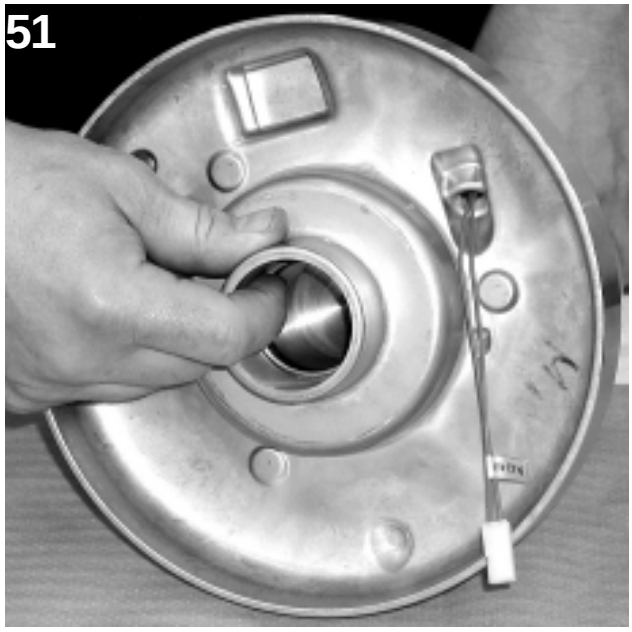
47. Place the tool piston on the bearing.
(For further details see assembly tool, page 8).

48. Place the puller cylinder over the piston.

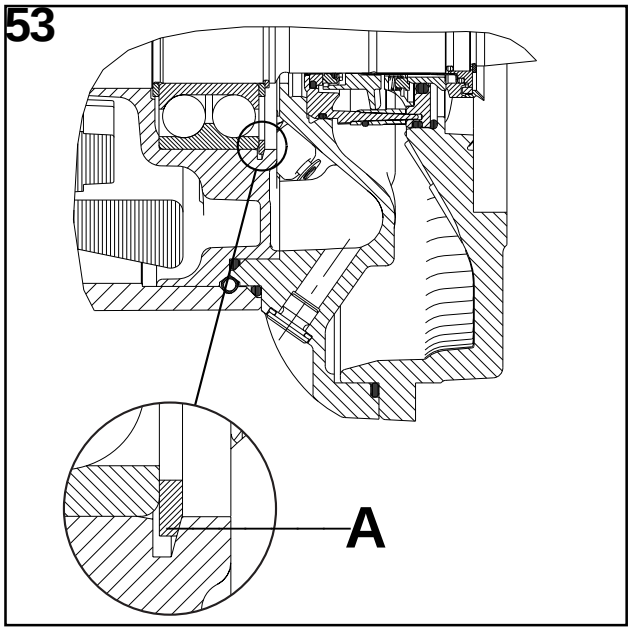
49. Bolt the puller cylinder to the bearing holder.

50. Oil the puller screw and use it to press the bearing into place.

51. Check that the support washer is in its right position.

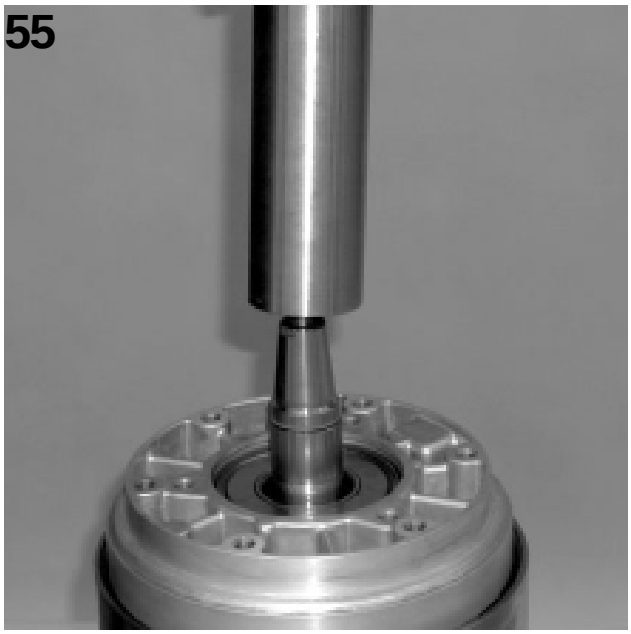


52. Fit the outer circlip. N.B. Check that the circlip taper is in contact with the corresponding taper surface on the bearing holder (see A, picture 53).



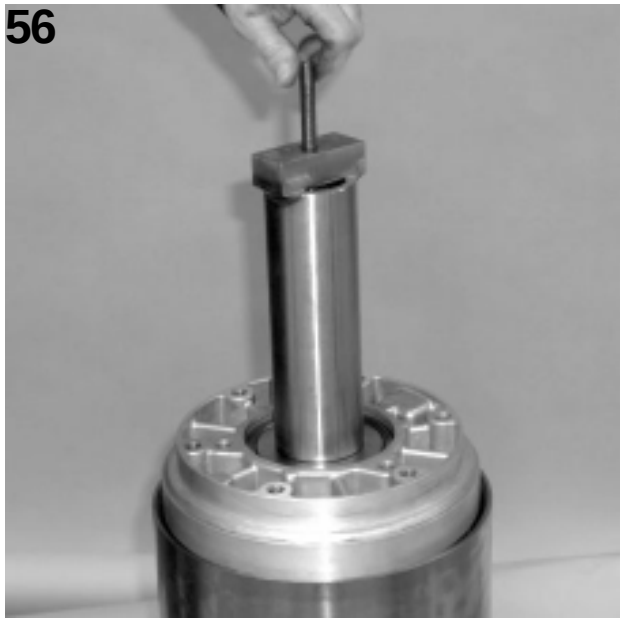
53. Bearing holder taper.

54. Oil the rotor shaft. Place the bearing holder on the shaft.



55. Place the puller tube against the bearing holder.

56. Screw in the threaded rod by hand until it bottoms.



57. Fit the washer and the long hexagonal nut. Tighten the nut by hand until it bottoms.

58. Fit the bearing and the bearing holder.

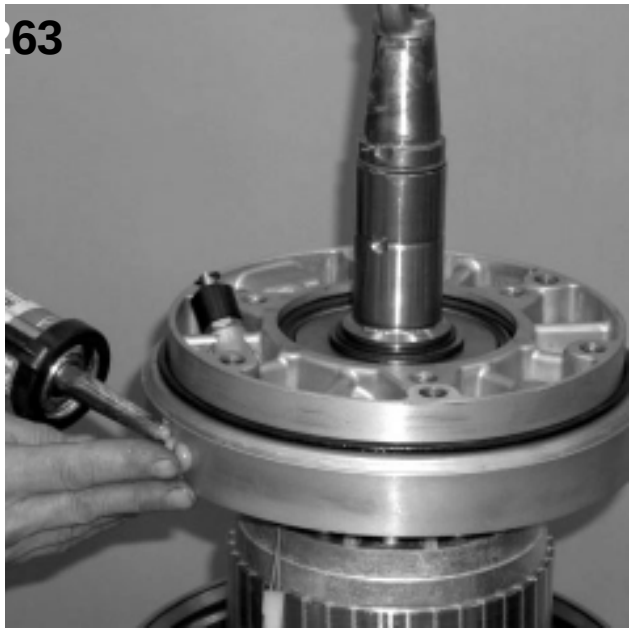
59. Fit a new greased O-ring.

60. Fit the washer.

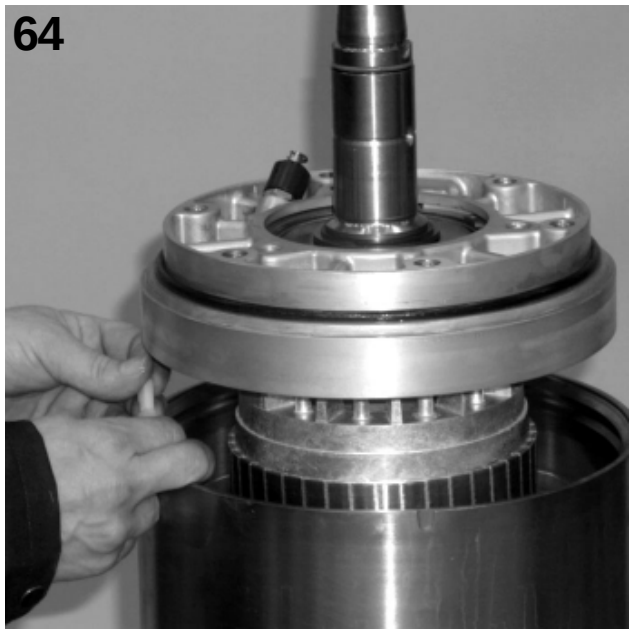
61. Fit the inner circlip.

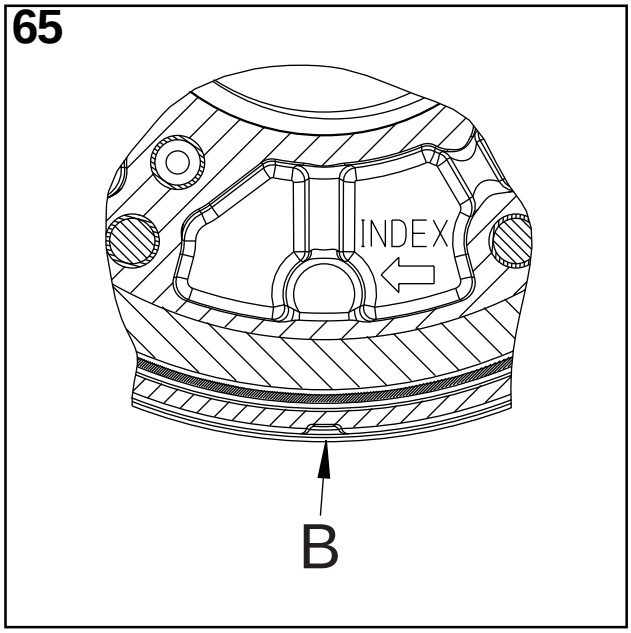
62. Fit a new, greased O-ring on the bearing holder.

63. Screw the lifting eyebolt into the shaft end. Carefully lift the rotor/shaft unit with bearing holder. Grease the surface of the bearing holder.



64. Connect the sockets for the FLS10. Lower the rotor/shaft unit, at the same time turning the bearing holder clockwise to the index mark (see B, picture 65). Check that the sockets are between the coil end and the stator housing.





65. Bearing holder index. B = in line with the mark in the stator housing.

66. Grease the spring and fit it in position.

66. Fit a new, greased O-ring at the underside of the adapter.

68. Fit a new greased O-ring at the top of the adapter.

69. Fit the adapter. Fit the screws . Tighten diametrally (76 Nm).

70. Place the flow diffuser in position. Press it down until it bottoms.

71a. Grease the shaft. Fit a new mechanical seal unit (oiled). N.B. Check that the drive pin engages in the drive groove in the shaft.
(Picture shows version without cooling jacket)

71b. See 71a. (Picture shows version with cooling jacket)

72a. Fit the circlip (picture shows version without cooling jacket).

72b. Fit the circlip (picture shows version with cooling jacket).

73. Use a suitable sleeve to press down the circlip.

74. Make sure the circlip is in position.

75. Fit new, greased O-rings to the seal housing cover.

.

76. Fit the seal housing cover.

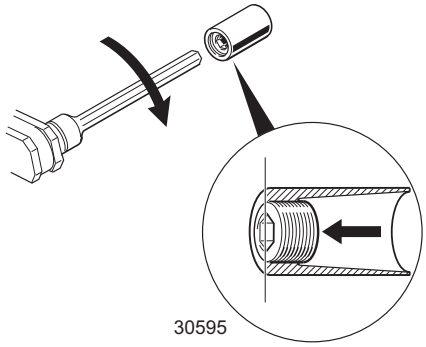
77. Tighten the screws diagonally (76Nm).

78. Grease the shaft end.

78

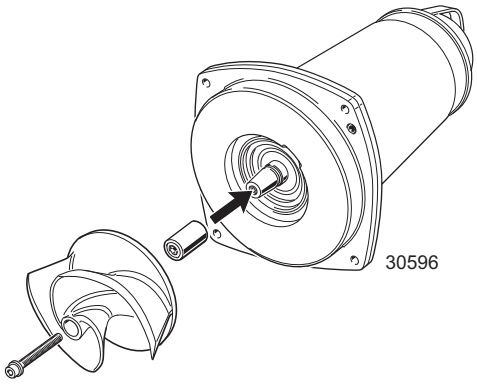
79. Grease the conical sleeve and the threads of the gland screw. Adjust the gland screw so that it is flush with the sleeve.

79

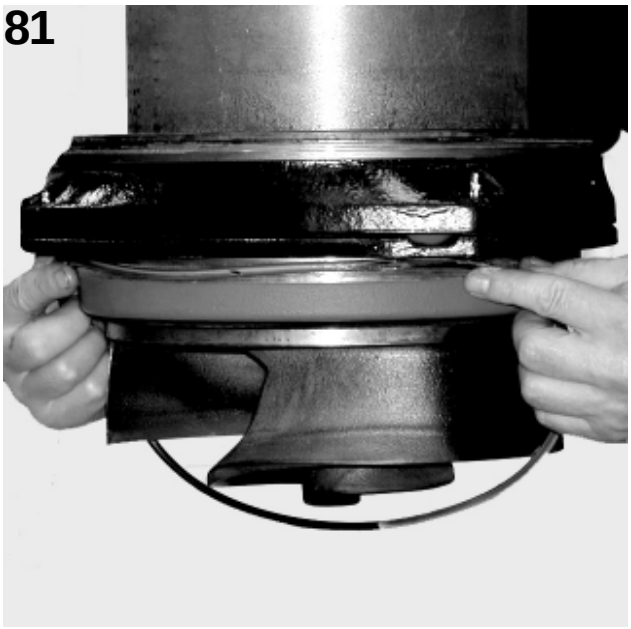


80. Fit the sleeve and impeller to the shaft. Fit the impeller screw by hand just to prevent the impeller from falling off.

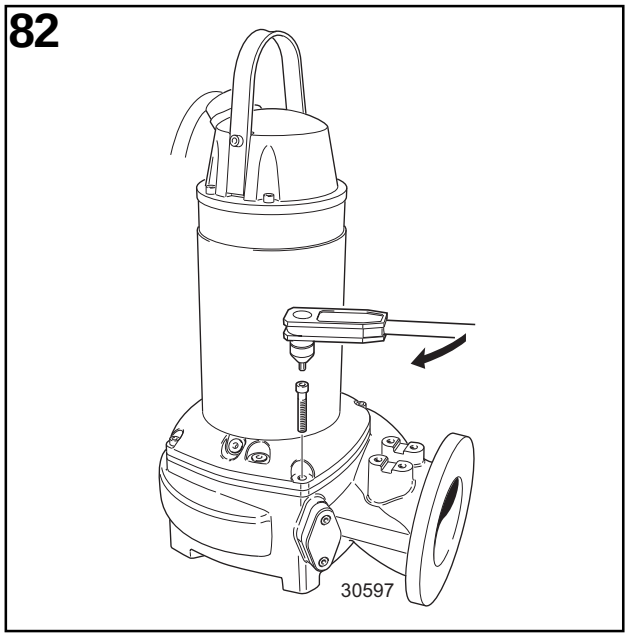
80



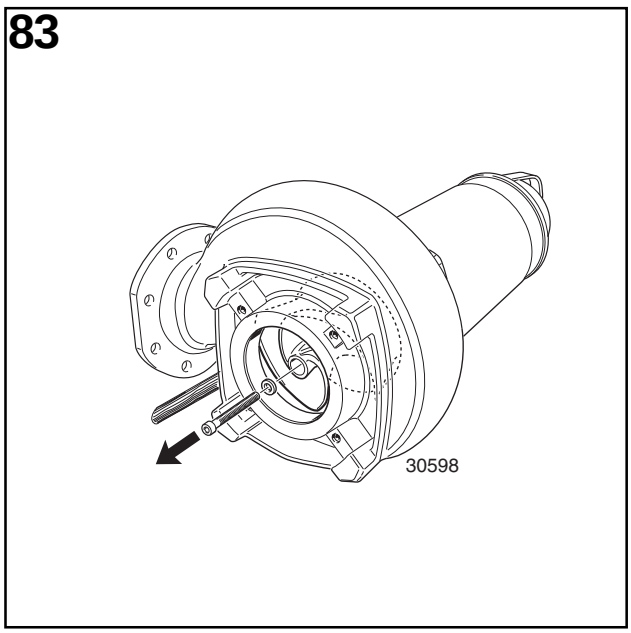
Procedure for NT-version, see pages 53-57



81. Fit a new greased O-ring to the seal housing cover.

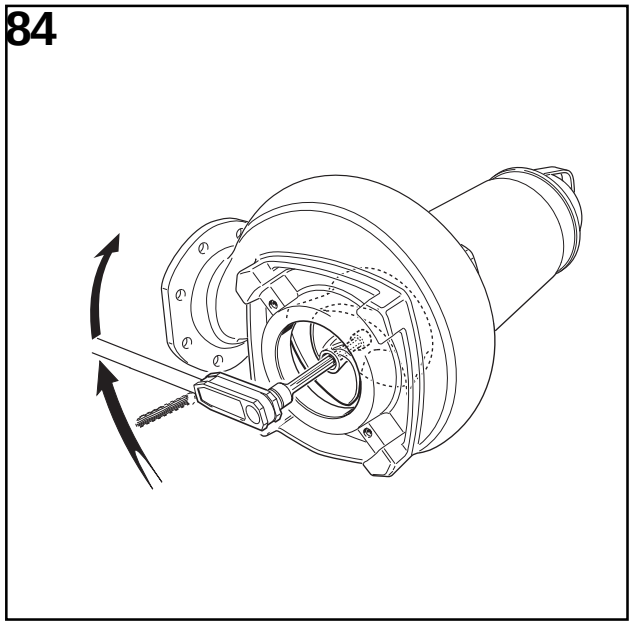


82. Place the drive unit in the pump housing. Adjust its position so that the inspection hole is on the same side as the hole for the flush valve. Tighten the screws diagonally (187 Nm).

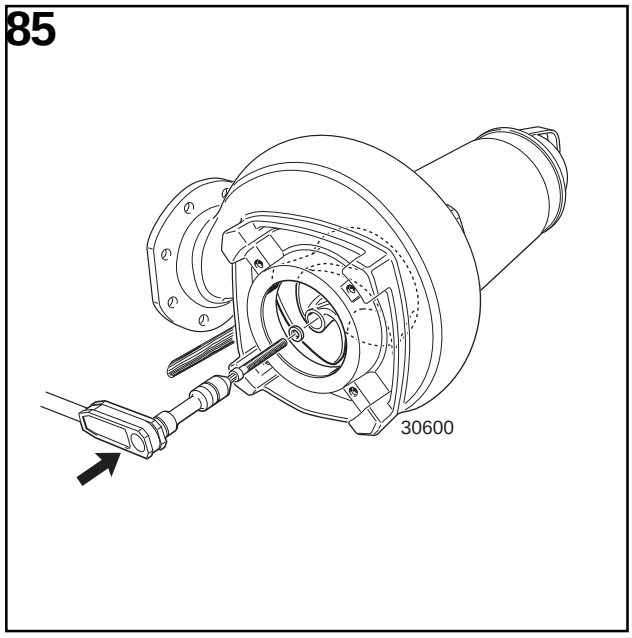


83. Remove the flush valve cover. Insert a rod (wooden or plastic) through the hole. Remove the impeller screw.

84. Turn the gland screw clockwise until the impeller is fit to the pump housing. Tighten it a further 1/8 turn.



85. Fit the washer and the greased impeller screw and tighten it (76 Nm). Check that the impeller rotates freely.



86. Raise the pump. Remove the stand. Fit a new greased O-ring to the inner cooling jacket.

87. Fit the inner cooling jacket.

88. Fit the washers and screws and tighten alternately in diagonally opposite pairs (7 Nm).

89. Fit a new greased O-ring to the adapter.

90. Fit the outer cooling jacket.

91. Fit a new greased O-ring between the stator housing and the outer cooling jacket.

92. Fit a new greased O-ring to the connection cover.

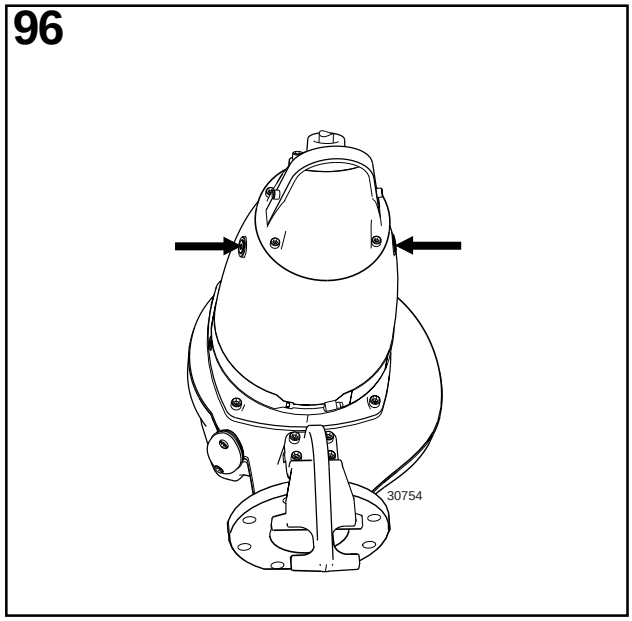
93. Connect the motor cable leads in accordance with the wiring diagram on the inside of the connection cover (see Fig. 92).

94. Fit the connection cover. Tighten the screws alternately in diagonally opposite pairs (76 Nm).

Filling with coolant
Version with cooling jacket
(Fig. 95-96)

95. Fill with coolant until it overflows through the opposite hole (approx.17 litres / 18 US quarts).

96. Tighten the coolant filling plugs (44 Nm).

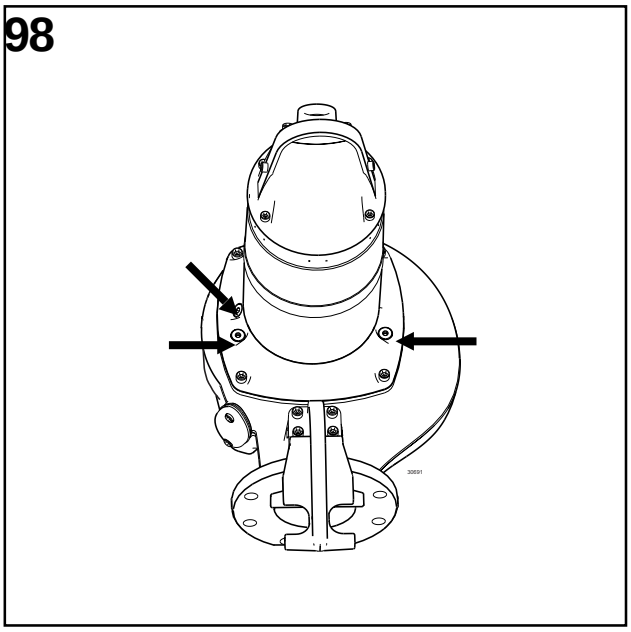


97

Filling with coolant
Version without cooling jacket
(Fig. 97-98)

97. Fill with coolant until it overflows through the opposite hole (approx.4,6 litres / 4,9 US quarts).

98

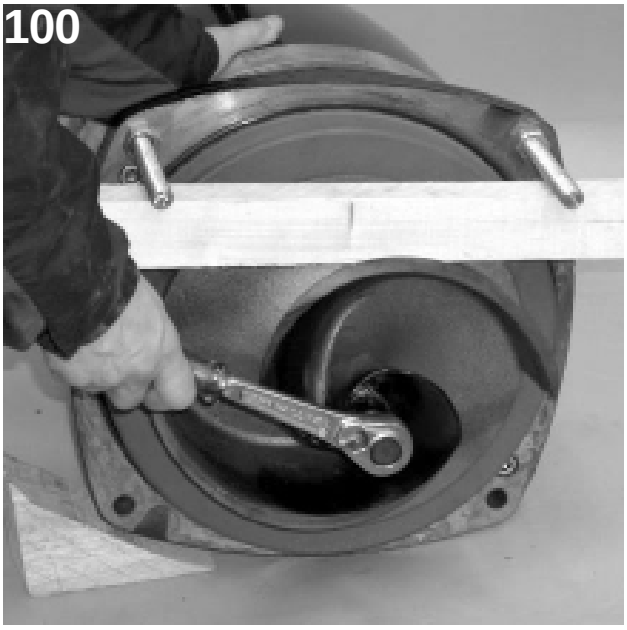


98.. Tighten the inspection and coolant filling plugs (44 Nm).

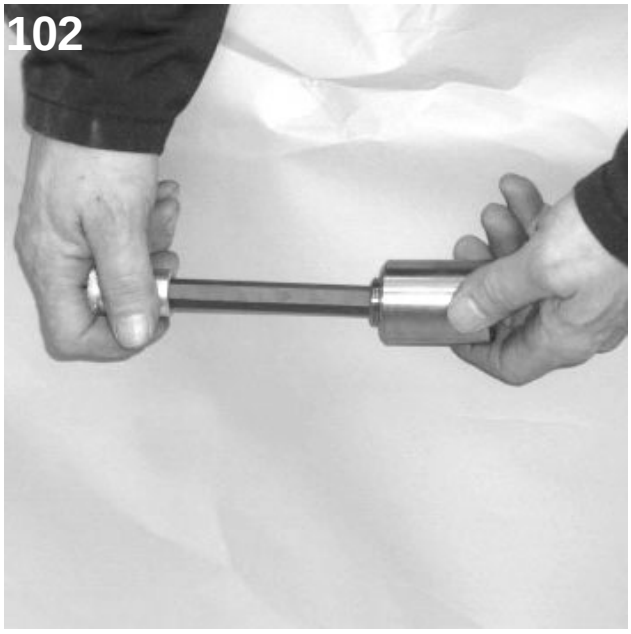
Removing/Installing/Trimming the Impeller, dry installed version

99. Remove the drive unit from the pump housing.

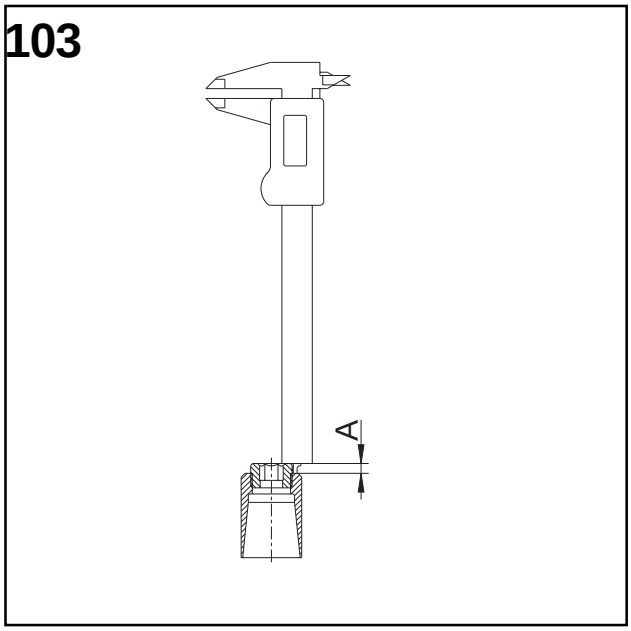
100. Remove the impeller and the conical sleeve. Turn the trim screw counter clockwise until the impeller is free from the shaft. Use a 12 mm hexagon bit adapter with a length of min. 100 mm.



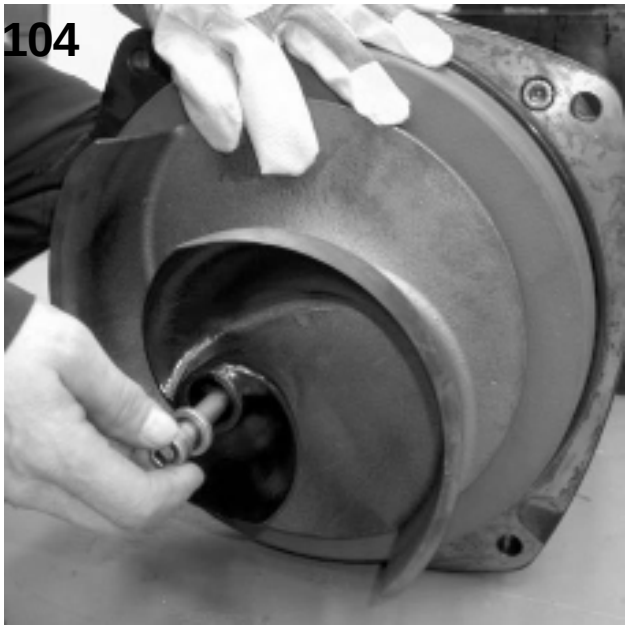
101. Grease the sleeve and the shaft end.



102. Unscrew the trim screw approximately 5 mm.

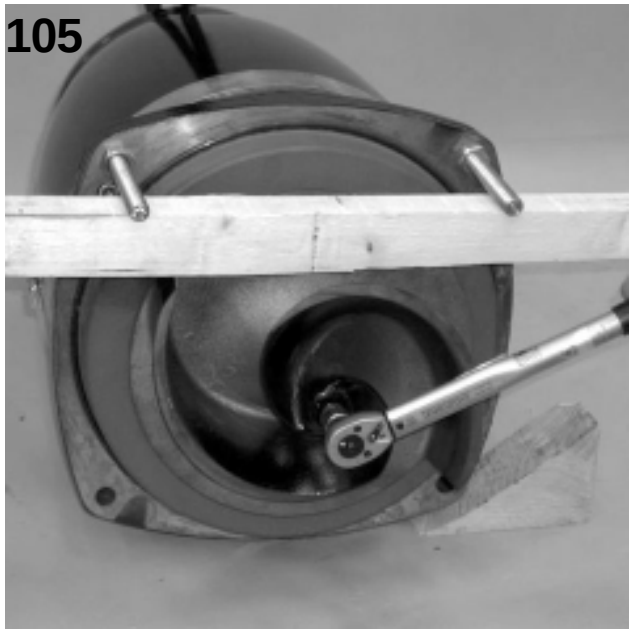


103. Measure and note the distance A. See. fig.

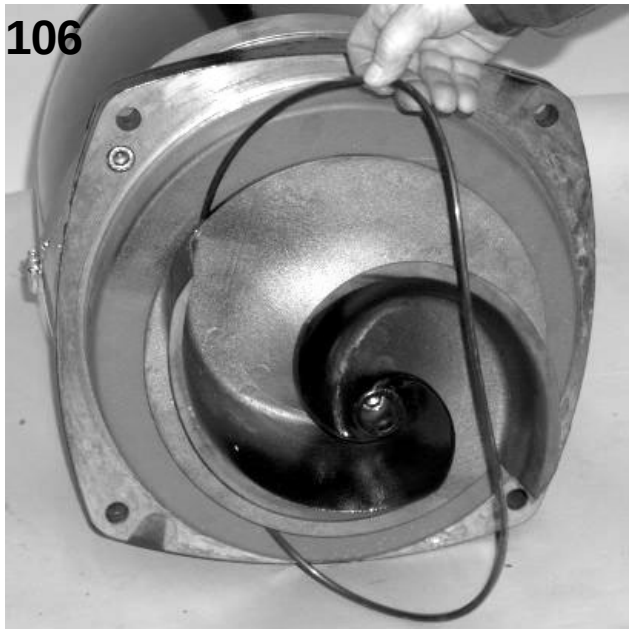


104. Fit the sleeve and the impeller to the shaft.

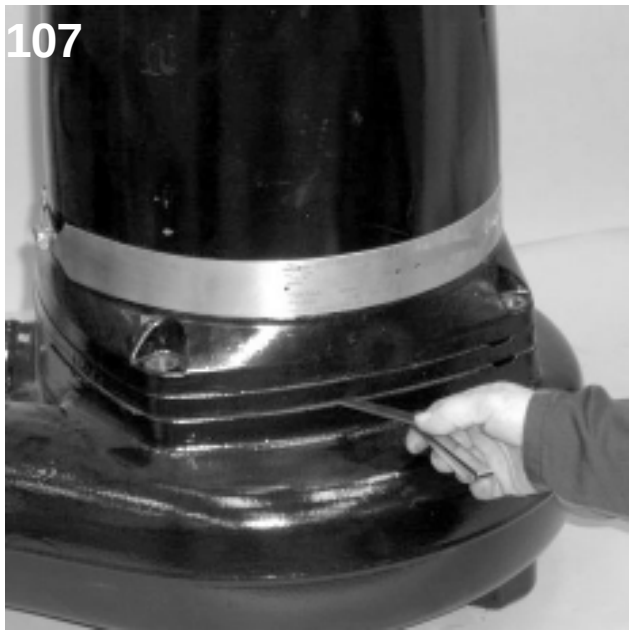
105. Fit the impeller screw with washer and tighten (76Nm).



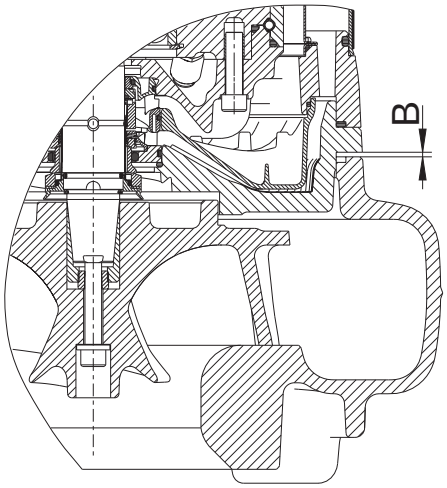
106. Make sure that the O-ring is removed from the seal housing cover.



107. Place the drive unit in the pump housing. Check the distance between the seal housing cover and the pump housing with a feeler gauge. Check diametrically at four points.



108



108. Note the largest measured distance, B. See fig.

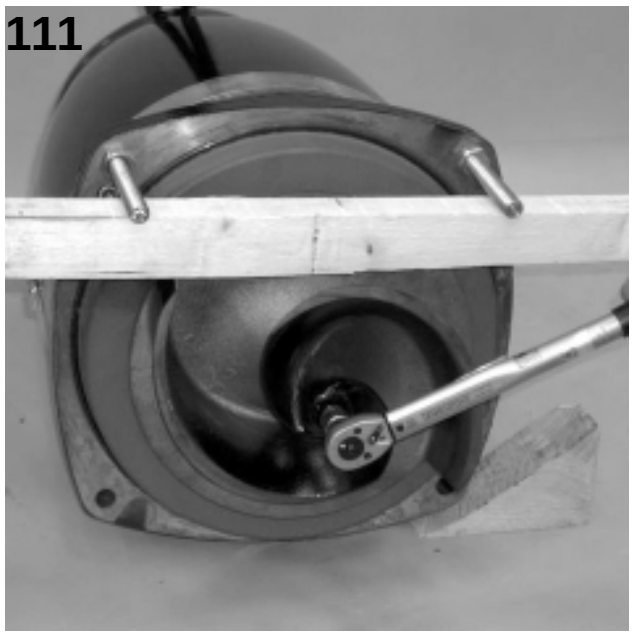
109

109. Lift the drive unit out of the pump housing and remove the impeller and conical sleeve.

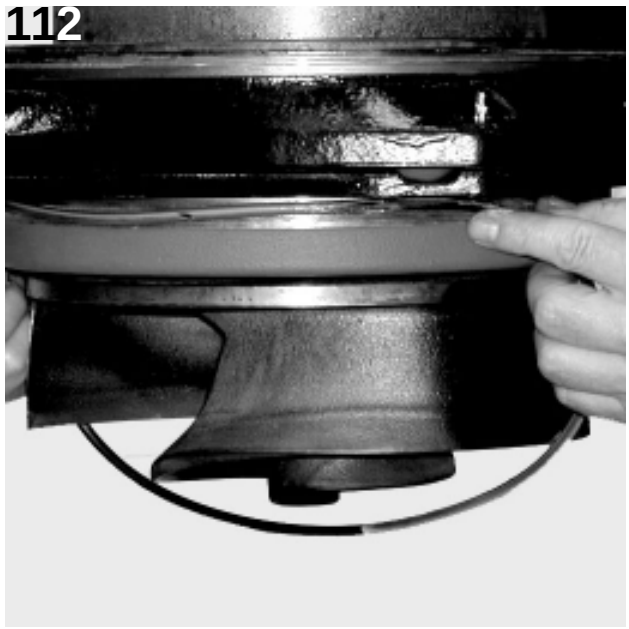
110

110. Calculate the measure C according to formula C = A - B - 0,5mm. Unscrew the trim screw until C is reached.

111. Fit the sleeve, impeller and impeller screw with washer and tighten (76 Nm).

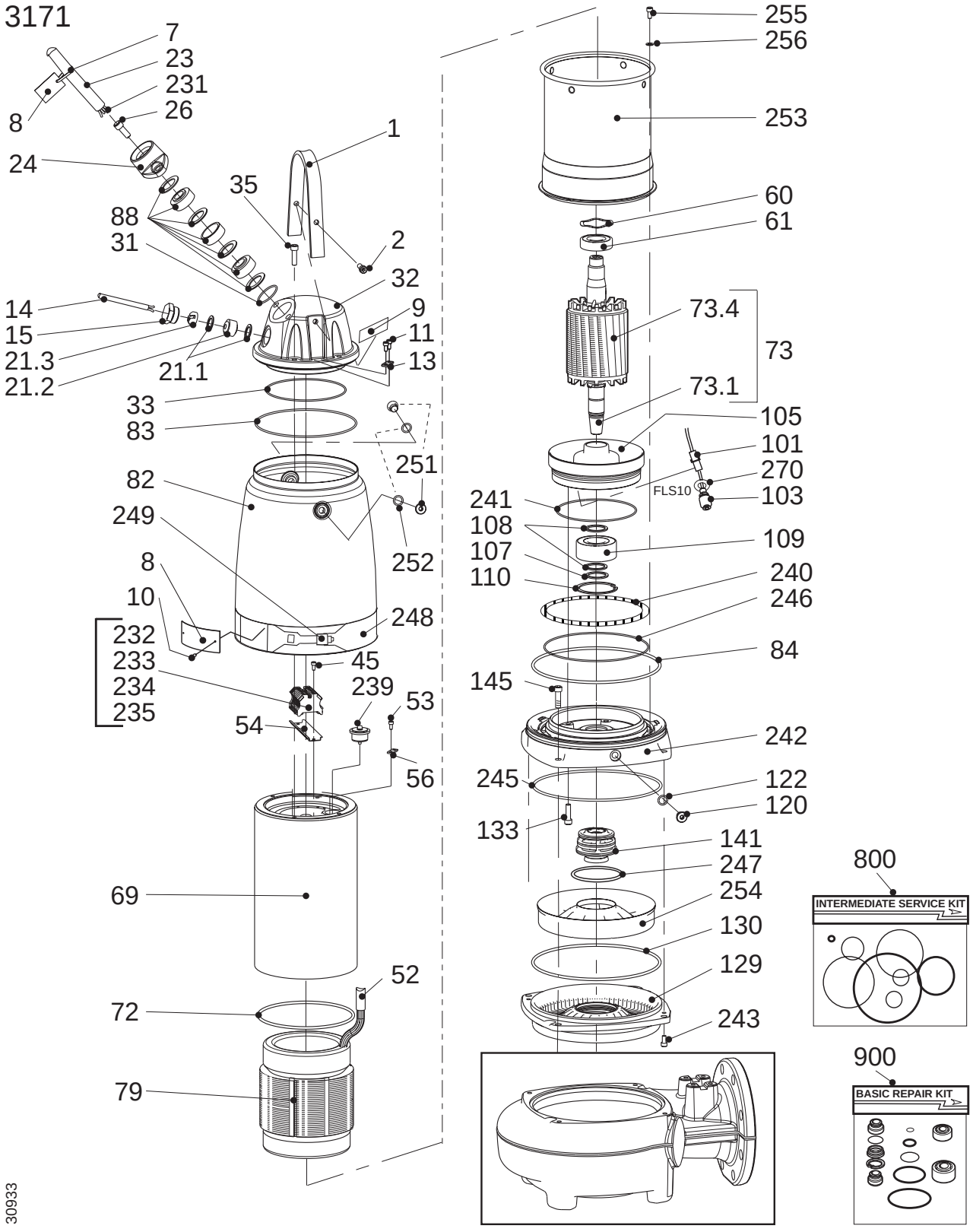


112. Fit a new greased O-ring to the seal housing cover.

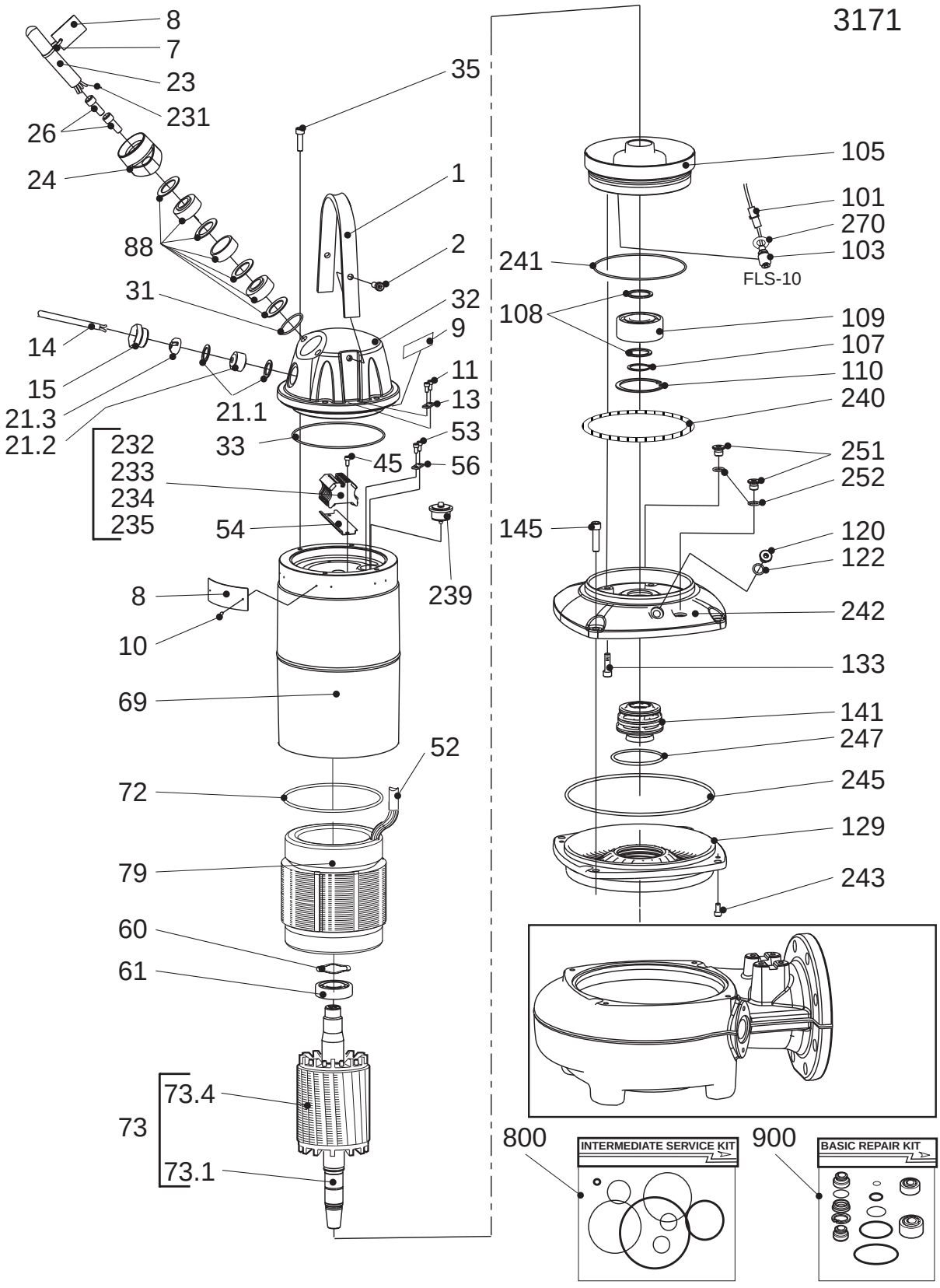


113. Place the drive unit in the pump housing. Adjust its position so that the inspection hole is on the same side as the hole for the flush valve. Tighten the screws diagonally (187 Nm).

Exploded view, version with cooling jacket



Exploded view, version without cooling jacket



Items description

Item no	Denomination
1	Lifting handle
2	Socket head screw
7	Cable tie
8	Data plate
9	Instruction plate
10	Drive screw alt. rivet
11	Socket head screw
13	Earthing plate (Ex-version only)
14	Control cable (Ex-version only)
15	Gland screw
21.1	Washer
21.2	Seal sleeve
21.3	Clamp
23	Motor cable
24	Entrance flange
26	Socket head screw
31	O-ring
32	Connection cover
33	O-ring
35	Socket head screw
45	Socket head screw
53	Socket head screw
54	Rail
56	Earthing plate
61	Ball bearing
69	Stator housing
72	O-ring
73	Shaft unit
73.1	Shaft
73.4	Rotor
79	Stator
82	Cooling jacket (outer)
83	O-ring
84	O-ring
88	Cable entry unit
105	Bearing holder
107	Retaining ring (circlip)
108	Supporting washer
109	Ball bearing
110	Retaining ring (circlip)

Item no	Denomination
120	Inspection plug (screw)
122	O-ring
129	Seal housing cover
130	O-ring
131	O-ring
133	Socket head screw
141	Mechanical seal unit
145	Socket head screw
231	Shrink hose
232	Terminal clamp
233	Terminal clamp
234	Cross connection
235	End support
239	Lead through unit
240	Spring
241	O-ring
242	Adapter
243	Socket head screw
244	Seal ring
245	O-ring
246	O-ring
247	O-ring
248	Strip
249	Clamp
251	Inspection plug
252	O-ring
253	Cooling jacket (inner)
254	Flow diffuser
255	Socket head screw
256	Washer
270	Lock washer (Ex-version only)

SERVICE LOG

Most recent service date	Pump No.	Hours of operation	Remarks	Sign.

NOTES

NOTES

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