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Workshop Manual

MINEX & MINETTE

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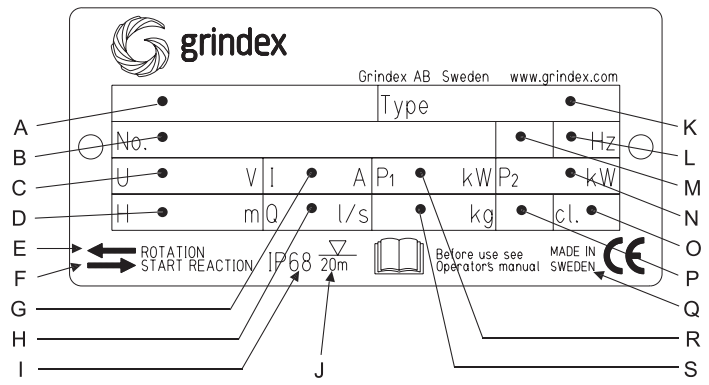
Contents

Data plate interpretation



A Pump model
B Serial No.
C Rated voltage
D Maximum height
E Direction of impeller rotation
F Direction of start reaction
G Rated current
H Maximum capacity
I Degree of protection
J Maximum submersion depth
K Pump type No.
L Frequency
M Phases, type of current
N Rated shaft power
O Thermal class
P Locked rotor code letter
Q Country of origin
R Maximum power consumption
S Weight

How to use the Workshop manual

This Workshop manual describes how to dismantle and assemble pump Minex and Minette.

This operative part of the manual has a description of the operations and numbered illustrations of different work operations.

Grindex renounces all responsibility for the work done by untrained, unauthorized personnel.

Safety precautions

Safety symbols

DANGER!

Is used when there will be a risk to cause severe injury to people, death or considerable damage to property.

WARNING!

Is used when there can be a risk to cause severe injury to people, death or considerable damage to property.

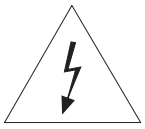
CAUTION!

Is used when there will be or is a risk to cause smaller injury to people, or smaller damage to property.

NOTE!

Is used to pay intention to installation, use, operation or service information that is important but not involved with any risk.

Following symbols are used in this manual:



For electrical related warnings.

For all other warnings.

Precautionary measures

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

1. Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.
2. 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.
3. Make sure that the lifting equipment can handle the weight you want to lift and that it is in good condition.
4. Don't work under suspended load.
5. Carry out the work on a sturdy workbench.
6. Bear in mind the danger of electrical accidents.
7. Check that tools and other equipment are in good condition.
8. Bear in mind health hazards. Observe strict cleanliness.
9. When carrying out repair work take care to avoid injury by cutting or pinching.
10. Make sure you have a first-aid box near at hand.

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

Safety regulations for the owner/operator

All government regulations, local health and safety codes shall be complied with.

All dangers due to electricity must be avoided (for details consult the regulations of your local electricity supply company).

Unilateral modification and spare parts manufacturing

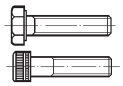
Modifications or changes to the unit/installation should only be carried out after consulting with Grindex.

Original spare parts and accessories authorized by the manufacturer are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

Recycling

Local and/or private laws and regulations regarding recycling must be followed.

Tightening torque

Material / Thread	Stainless (A2, A4)	
	Property class 80	
	Nm	ft-lb
M5	5.4	4
M6	9.3	6.9
M8	22	16
M10	44	32
M12	76	56
M16	187	138
M20	364	268
M24	629	464
Type of screw		

Oil

Oil type: A paraffin oil close to ISO VG 32 is recommended.

Fill the oil chamber. Approximate volumes,

Minex (0.22 litres) (0.23 US quarts)

Minette (0.31 litres) (0.33 US quarts)

Tools

Most of the tools needed for servicing the pump are tools normally included in every serviceman's tool kit. However, there are some special tools exclusively for this pump type without which the servicing of the pump will be difficult and the pump can be very easily damaged.

Part No.	Denomination	Remarks
51 084 00	Spring puller	Spring removal
410 164	Puller	Main bearing
410 165	Puller	Support bearing
410 166	Bearing mounting set	Bearings

Winding data

Minex

50 Hz 1~

Stator No.	Ohm/phase
50 934 03 110V	1.07
50 913 00 220-240V	4.28

50 Hz 3~

Stator No.	Ohm/phase
50 933 00 220-230V D/ 380-415V Y	7.15
50 933 01 500-550V D	12.1

60 Hz 1~

Stator No.	Ohm/phase
50 934 01 115V	0.775
50 913 02 230V	3.10

60 Hz 3~

Stator No.	Ohm/phase
50 933 02 230V Y// 460-480V Y SER	3.57*
50 934 01 220V D 380V Y	4.71
50 933 01 575-600V Y	12.1

**Resistance per half phase*

Minette

50 Hz 1~

Stator No.	Ohm/phase
50 913 00 220-240V	1.77

50 Hz 3~

Stator No.	Ohm/phase
50 912 00 220-230V D 380-415V Y	3.06
50 912 01 500-550V Y	4.69

60 Hz 1~

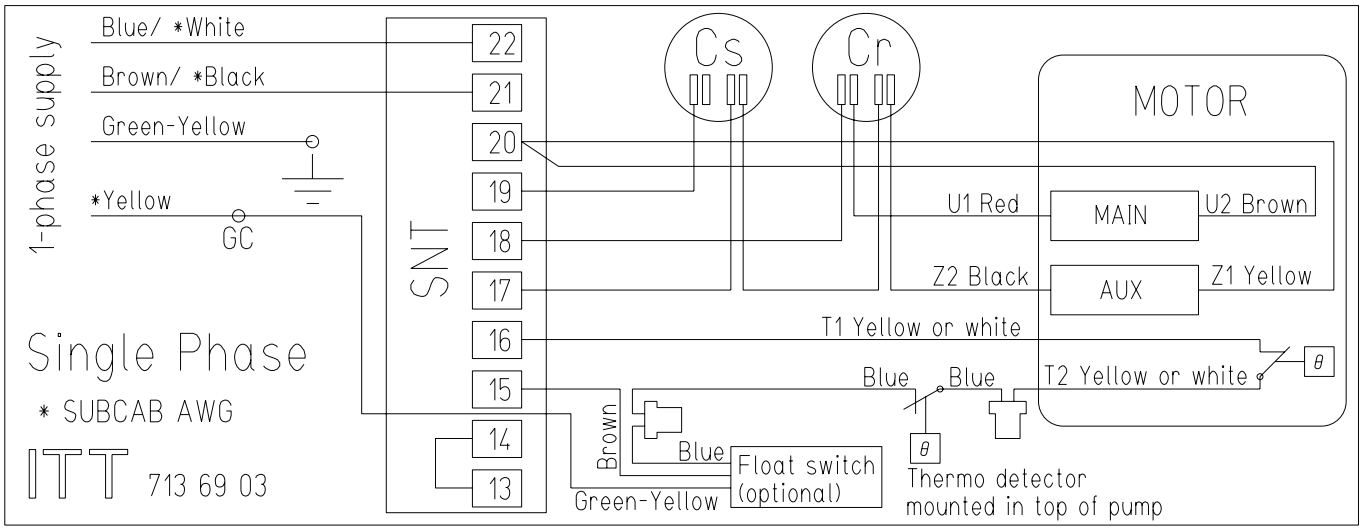
Stator No.	Ohm/phase
50 913 02 220-240V	1.34

60 Hz 3~

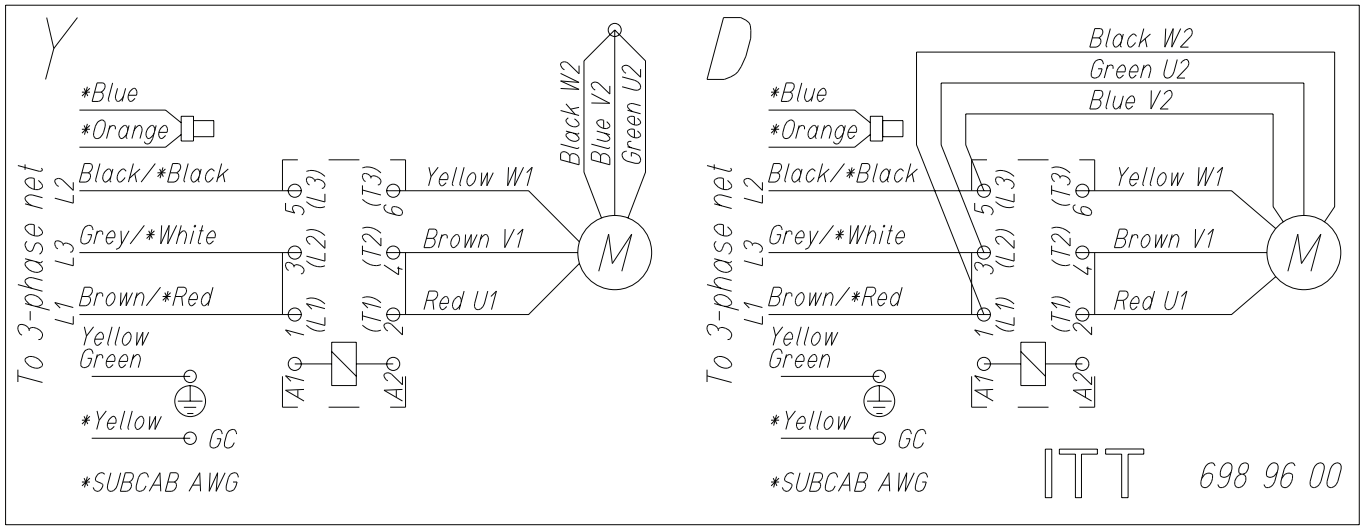
Stator No.	Ohm/phase
50 912 03 220V D 380V Y	1.99
50 912 02 230V Y// 460-480V YSER	1.38*
50 912 00 460-480V D	3.06
50 912 01 575-600V Y	4.69

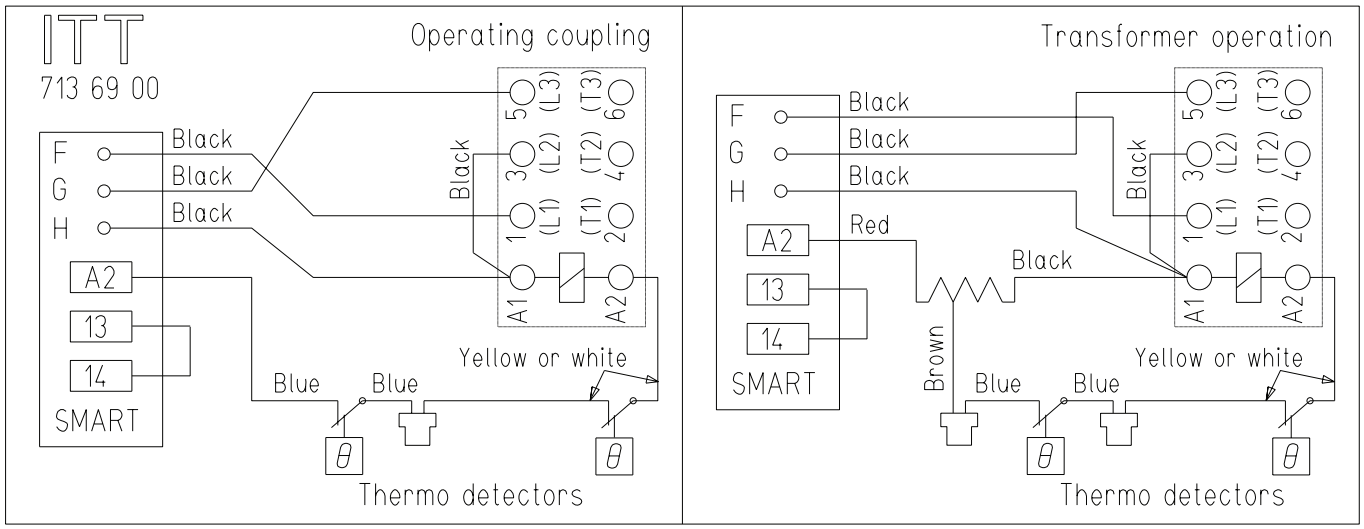
**Resistance per half phase*

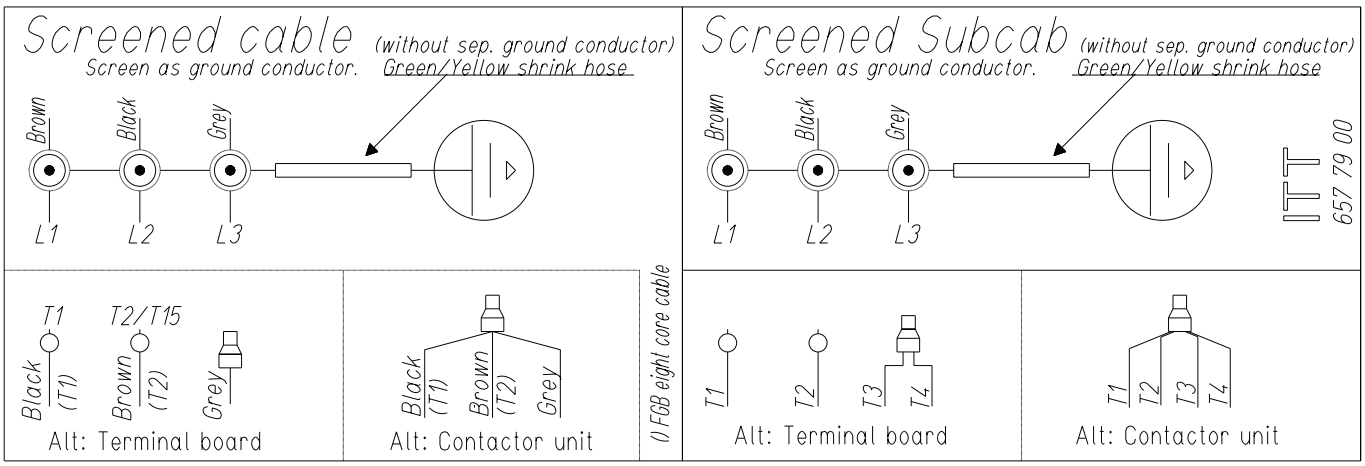
50/60 Hz 1~, SUBCAB®/SUBCAB® AWG
with contactor unit, with or without level regulator



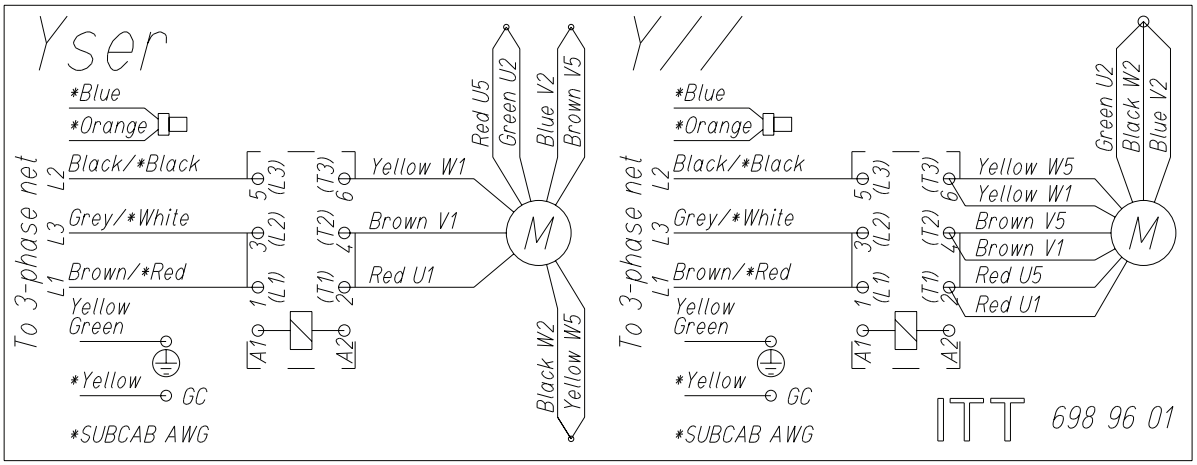
50/60 Hz 3~, SUBCAB®/SUBCAB® AWG/Screened cable with contactor unit, Y or D, with or without transformer operation

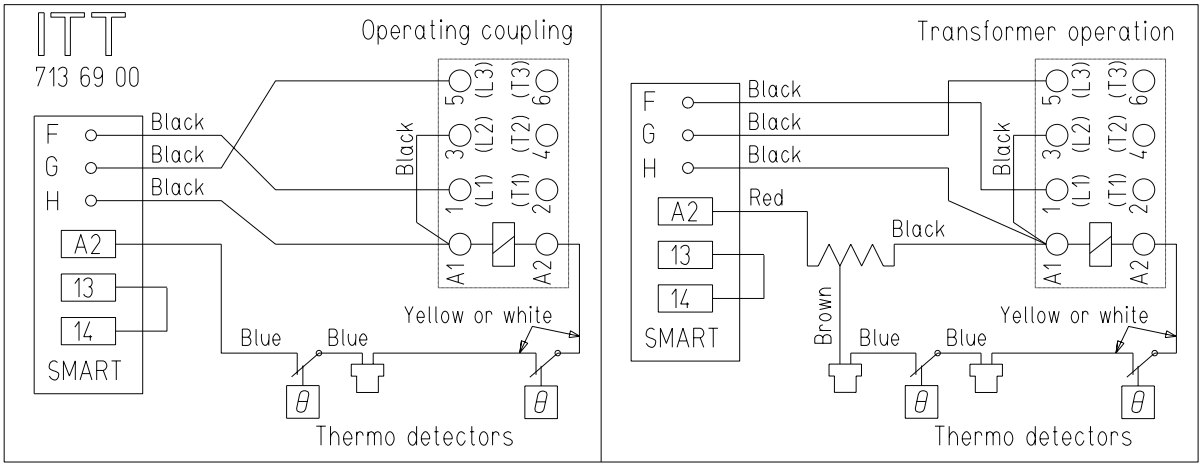


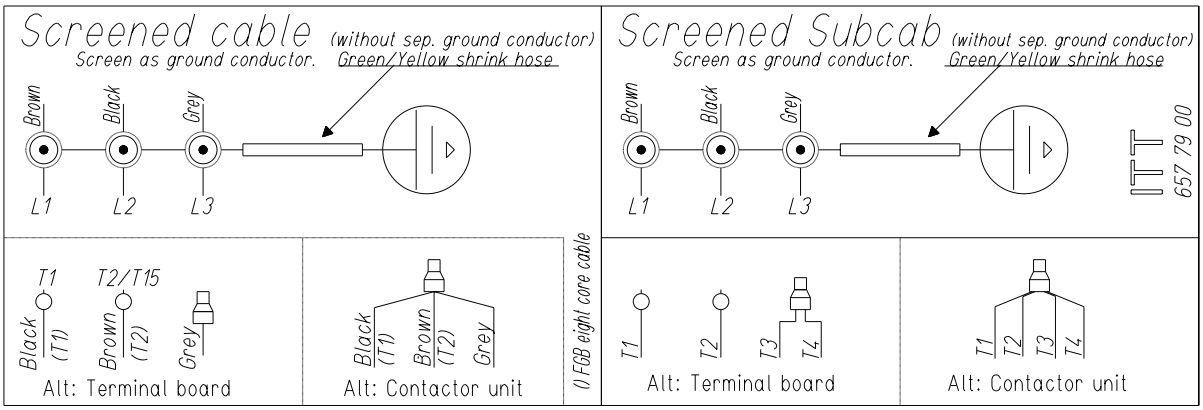




50/60 Hz 3~, SUBCAB®/SUBCAB® AWG/Screened cable with contactor unit, Yser. or Y//, with or without transformer operation







NOTE!

The thermal contacts in the winding are CSA approved only for 250 V and below. For other voltages when CSA approval is required a transformer is used to reduce the voltage over the thermal contacts.

As a consequence the transformer has to be disconnected when the connection is changed from 440-460 V Yser to 220-240 V Y// or to 230 V single phase. If the change is done from 220-240 V Y// or 230 V single phase to 440-460 V Yser the transformer has to be connected.

Dismantling

Before starting

Before starting the work on the machine, make sure that all tools are at hand and that O-rings and any other part that are to be replaced are set out.

Make sure that the product is isolated from the power supply before starting work.

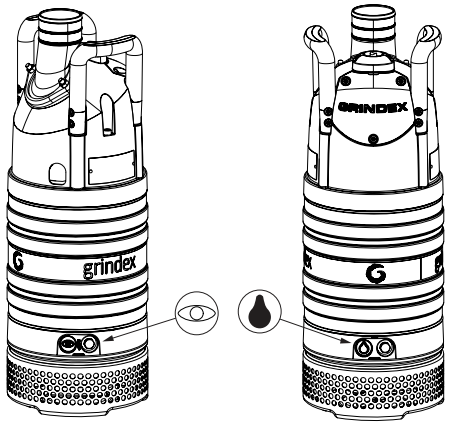
DANGER!

Before starting work on the machine, make sure that the machine is disconnected from the power supply and cannot be energized.

Explanation of symbols

= Oil screw

= Inspection plug



Drain the oil and check the inspection room

Lift the pump horizontally and place on relief table.

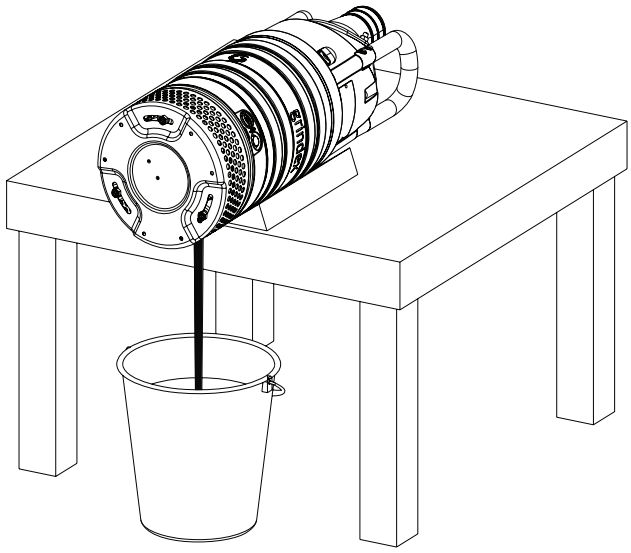
Turn the pump so that one of the oil screws faces downwards. Lock the pump with a support preventing it from rolling over.

Unscrew the oil screw.

WARNING!

If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil casing screw in order to prevent splatter.

It is easier to drain the oil if the other oil screw is also removed.



Service alternative A

1. Remove the discharge connection.

Service alternative B

When serviceing seals, bearings and the hydraulic part only, go to fig. 10 (page 13).

2. Remove the cover and the main cover.

3. Disconnect the power and the ground cable leads.

4. Remove the air valve if needed.

5. Remove the power cable.

6. Disconnect the stator leads and remove the starter unit holder.

7. Remove the cover and the outer casing.

8. Remove the protective casing.

9. Remove the ring.

10. Service alternative B.
    Place the pump upside down.

11. Remove the strainer.

12. Lock the impeller with a screw driver or similar (L= min. 200 mm/7.9"), to prevent rotation of the impeller.
    Loosen and remove the impeller screw and washer.

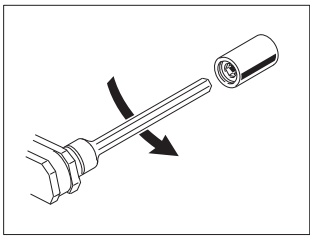
WARNING!

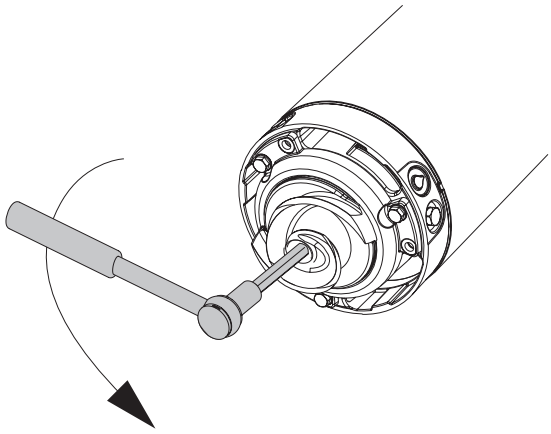
Worn impellers often have very sharp edges. Use protective gloves.

13. Disassemble the diffuser. Use a screwdriver or similar to seperate the diffuser from the intermediate piece.

14. Using a 8 mm hexagon bit adaptor (allen socket) with a 100 mm (4") extension, turn the adjustment screw counter clockwise until the impeller breaks free from the shaft.

    Remove the impeller.





15. Remove the seal housing cover.

16. Remove the retaining ring.

17. Remove the mechanical seal.

18. Remove the screws holding the intermedate piece.

19. Use two big screwdrivers to separate the drive unit including intermediate piece from the outer casing.

20. Remove the outer casing.

21. Gently hammer on the three bosses a few millimeters to expose the spring ring.

22. Remove the spring ring.

23. Remove the rotor unit.

    If the motor unit is dismantled from the cover, use a M8x60 screw to press out the rotor unit.

24. Press out the bearing housing with a press, or use the dismantling tool, (see page 5).

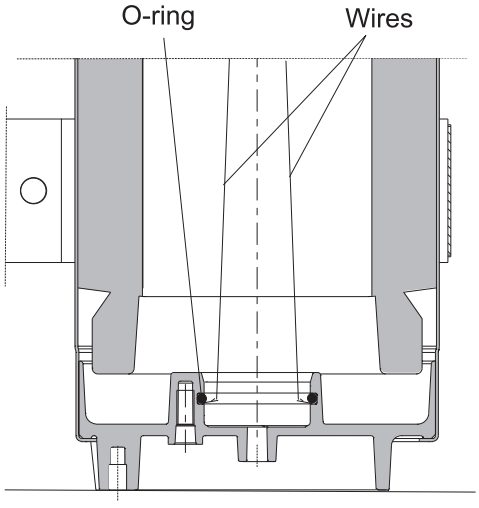
Note!

Only a puller with three claws must be used. Otherwise the bearing housing may be damaged.

25. Use a standard puller to remove the upper ball bearing.

26. Press out the lower bearing with a press, or use the dismantling tool, (see page 5).

27. Remove the O-ring from the stator housing unit.
    a. Put stator housing unit on the work-bench.
    b. Remove the O-ring from the groove.
    Tool: stiff wires
    c. Turn the stator housing upside down to get the O-ring out.



Assembly

Important!

Before starting assembly, do the following:

- Be sure to have a new O-rings kit, new Mechanical seal unit and new Pressure equalizers.
- Carefully clean all machined surfaces.
- Check that the O-ring grooves are clean and free of deep scratches, burrs or other irregularities.
- Grease the shaft and O-rings. Oil the sliding surfaces of seals.
- Lubricate all screws that have been removed before refitting them.
- Replace damaged or worn parts.
- Check the stator windings resistance.

1. Assemble the main bearing in the bearing housing.
   a. Place the bearing housing on the work bench.
   b. Fit the bearing in position with the bearing designation upwards.
   c. Knock on the outer bearing ring with a drift until bearing is in place.

   Tool: SKF B20-52 or tube (Di=42 mm, Dy=52 mm)

2. Fit the bearing housing to the shaft-rotor unit.
   a. Place the shaft-rotor unit on the work bench.
   b. Fit the bearing housing.
   c. Tap the bearing in place.

   Tool: SKF B20-52 or tube (Di=20 mm, Dy=30 mm)

3. Assemble the upper bearing to the shaft-rotor unit.

   a. Attach a tube to the screw vice.

   Tool: Tube (Di=24 mm)

   b. Place the front shaft end into the tube.

   c. Fit a new bearing to the back shaft end.

   d. Tap the bearing in place.

   Tool: SKF A12-37 or tube (Di=12 mm, Dy=19 mm)

4. Fit new O-rings to the bearing housing.

5. Fit a new O-ring to the stator housing unit.

   a. Let the O-ring slide down in place by a screw driver.

   Tool: screwdriver

   b. Use two screwdrivers to place the O-ring to the O-ring seat.

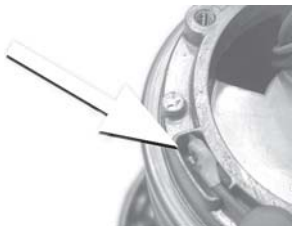
   Tool: screwdriver

6. Fit two new O-rings to the ring and mount it to the stator housing.

7. Pull the motor cables trough the protective casing.

   For versions with thermal sensor:

   Assemble the thermal sensor in the pocket on the support bearing holder.



8. Make a line on the stator housing from the arrow mark on the upper bearing holder.

9. Mount the cover, O-ring and gasket.

10. Mount the starter unit and connect the stator leads.

11. Mount the power cable to main cover.

12. Mount the air valve.

13. Mount the ground cable and connect the power cable leads to the starter unit.

14. Mount the main cover and the inspection cover.

15. Place the pump upside down. Fit the rotor unit. The arrow mark on the bearing holder should point in the same angle as the drawn line on the stator housing.

16. Gently hammer on the three bosses to get the shaft-rotor unit in place. Check that the spring groove is visible.

17. Fit the outer casing and the spring ring. Pull the shaft-rotor unit against the spring.

18. Fit new gaskets.

19. Fit two new greased O-rings on the intermediate piece.

20. Fit the intermediate piece on the drive unit.

    Make sure that the INDEX mark on intermediate piece are lining up with the "Arrow" and drawn line on the drive unit.

21. Grease the shaft.

22. Fit a new mechanical seal unit (oiled).

    Check that the drive pin engages in the drive groove in the shaft.

23. Fit the retaining ring.

24. Press down the retaining ring by using two screwdrivers or a tube in suitable size. Control that the retaining ring enters its groove properly.

25. Assemble a new set of pressure equalizers. Make sure that they don't obstruct the holes for filling/emtying oil.

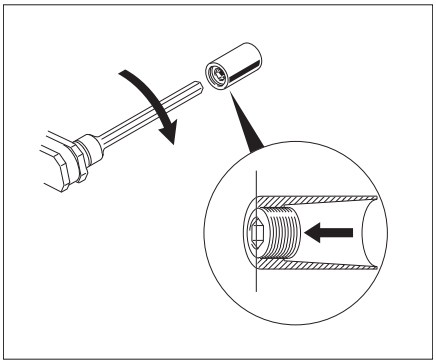
26. Fit a new greased O-ring and mount the seal housing cover.

Installing the impeller and setting clearance

27. Make sure that the end of the shaft is clean and free from burrs. Polish off any flaws with fine emery cloth. Grease end of shaft, conical sleeve and the threads of the adjustment screw. The proper lubrication is grease for bearings e.g. Exxon Mobile Unirex N3 or equivalent.

    Align the edge of the adjustment screw with the edge of the conical sleeve so that they are flush.

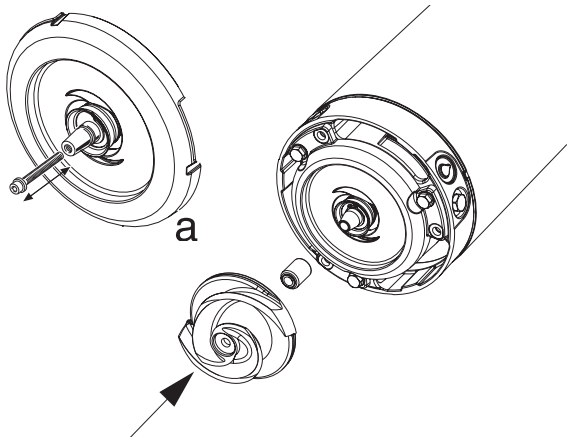
    Grease the threads of the screw and the washer. The proper lubrication of the screw and washer is lubricating grease for assembly of bolts etc. e.g. Kluber ALTEMP Q NB 50 or equivalent.



NOTE!

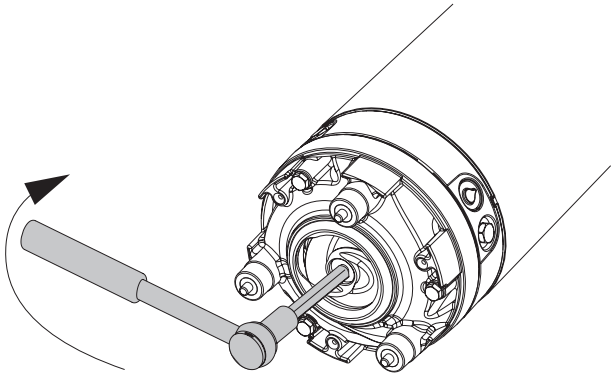
Remove surplus grease from conical surfaces of the shaft and the sleeve thoroughly.

28. Before assembly, check that the impeller screw is clean and easy to screw into the shaft end (a). This to prevent the shaft to rotate with the impeller screw. Assemble the conical sleeve and the impeller onto the shaft.



29. Fit the diffuser.

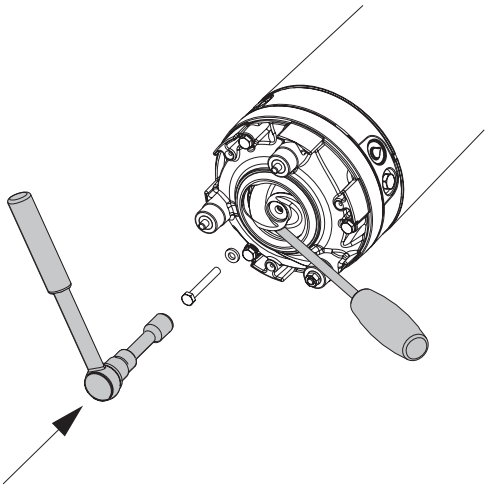
30. Using a 8 mm hexagon bit adaptor (allen socket) with a 100 mm (4") extension, turn the adjustment screw clockwise until the impeller makes contact with the suction cover. Tighten it further 1/8 turn, 45°. This will ensure the correct clearance between the impeller and the suction cover in the next step.



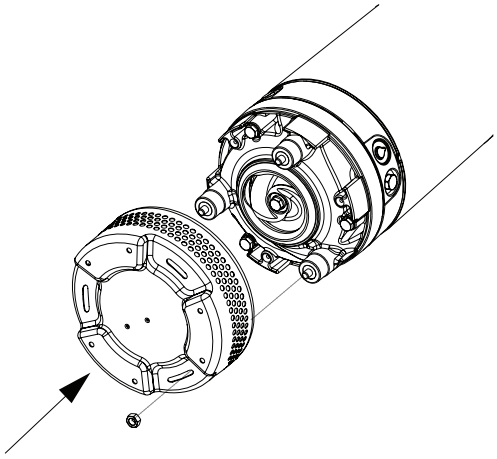
31. Lock the impeller with a screw driver or similar (L= min. 200 mm/7.9 inch), see fig., to prevent rotation of the impeller. Fit the washer and the greased impeller screw and tighten, torque to 22 Nm (16 lbf-ft).

    Check that the impeller rotates freely.

    When changing an impeller or after service, we recommend that the screw is first tightened to the prescribed torque and then turned **an additional 1/8 (45°) of a revolution**. The screw will be loaded to its yield point and the load capacity of the jonit will be higher.



32. Mount the strainer and nuts, tightening torque 17 Nm (12.5 ft lb).



33. Put one of the oil screws back and tighten it.
    Fill up with new oil.
    Put the other oil screw and inspection plug back and tighten them.

34. Fit a new O-ring in the discharge connection.

35. Asseble the connection flange on the discharge connection and tighten the connection flange to the cover.

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