

TECHNIFLO

Operating Instruction

Eccentric Screw Barrel Pumps

Global Pumps

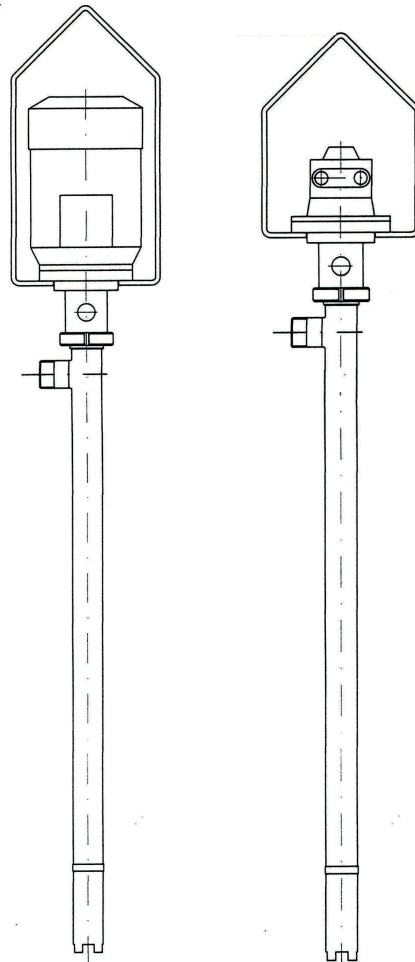
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Series

TP-700 DR



Valid as from: 01.04.2010

12 pages

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1. General safety information

The operator must read the operating instructions before starting the pump and follow these instructions during operation.

- a) The pump must not be operated in explosion proof surroundings.
- b) The pump must not be used to pump inflammable liquids.
- c) The pump may only be operated in an upright position.
- d) Check that the pump is suitable for the medium being pumped.
- e) Note the limit values for temperature, viscosity and density of the medium being pumped.
- f) The rotor must rotate in the direction indicated by the arrow.
- g) Ensure that all connections and fittings are properly tightened.
- h) Check that the motor is switched off before connecting the electric power supply.
- i) Note the maximum immersion depth.
- j) The pump may only be operated with the discharge closed if a bypass valve with return line has been installed.
- k) The pump must not be allowed to run dry. It must be switched off when the container is empty.
- l) The operator must wear suitable protective clothing when pumping hazardous liquids.
- m) Do not reach into the pump's intake port.

2. General

Each eccentric screw barrel pump comprises a drive and a pump system. The pumps are available with a mechanical seal or packing, torsion shaft and a variety of stator materials. The delivery head and volume depend on the selected pump size. This means that the most appropriate pump can be chosen for each individual application.

3. Drive versions

3.1. Three-phase drive

0,55; 0,75; 1,1; 1,5 and 2,2 kW; 700, 900 or 1.450 rpm 230/400 V, 50 Hz, type of protection IP 54 oder EExe II T 3.

Further available are gear motors with the same powers as above and speeds up to 650 rpm.

3.2. Universal motors with planetary gear

600 or 825 Watt, 230 V, 50 – 60 Hz

TP-180, 600 W, inside cooling, IP 24

TP-280, 825 W, inside cooling, IP 24

TP-280, 825 W, inside cooling, IP 24, speed controlled

TP-300, 825 W, surface cooling, IP 54

TP-300, 825 W, surface cooling, IP 54, speed controlled

TP-400, 550 W, pressure sealed, EEx de IIA T6, IP 54

3.3. Air motors

0,55; 1,1 and 2,0 kW each at 900 rpm and 7 bar air pressure.

4. Pump systems

The eccentric screw barrel pump is available in a number of different versions as regards stator, geometry and stator material. The pump is used to deliver viscous, pure, turbid, corrosive and non-corrosive liquids. The pumps **are not approved for use with inflammable liquids**. They may only be used in explosive-hazard zone 0 if the operator obtains a corresponding permit from the relevant supervisory authority (factory inspectorate, technical control board – TÜV etc.) The pump tubes may only be installed in an upright position.

4.1. Resistance

The suitability of the pump system for the medium is question must be checked with the aid of a resistance table and the following table for materials.

pump part	material
Immersion tube, rotor, torsion shaft, rotor sleeve	stainless steel 316Ti
mechanical seal	chrome/carbon/Viton alt. SiC/SiC/Viton
stator	nitrile, nitrile food grade, vCSM, Viton, PTFE

4.2. Operating temperature

The temperature of the medium must not exceed the following values:

stator	max. temperature of medium
nitrile	80 °C
nitrile food grade	80 °C
Viton	140 °C
CSM	100 °C
PTFE	140 °C
EPDM	110 °C

5. Starting up

5.1. Pump with three-phase motor, three-phase gear motor or air motor

a) Direct coupling

Pump and drive are connected with lantern. The extended motor shaft is close coupled with the rotating parts (torsion shaft and rotor).

b) Flexible coupling

The pump and drive are connected with lantern. The pump shaft is mounted in ball bearings. The torque is transmitted from the motor shaft to the pump shaft by a flexible coupling.

5.2. Pump with universal motor

The pump is with the planetary gear connected. To mount the universal motor on to the gear, the motor must be turned slightly to ensure that the driver engages correctly in the coupling. The motor is to be firmly connected by means of the handwheel.

5.3. Mains voltage, frequency

Ensure that the mains voltage and frequency are as specified in the rating plate of electric motors. **Important: Set the switch to OFF before connecting the power supply.**

5.4. Compressed air pressure

The rated power of the air motor can be achieved at 7 bar air pressure. Ensure that the air line is equipped with oiler, pressure reducer and shut-off valve. Speed control is possible by the pressure reducer.

5.5. Direction of rotation

The motor must rotate in the direction indicated by the arrow. Reverse the motor connections if necessary.

5.6. Maximum immersion depth

Ensure that the pump is not submerged further than its discharge port.

6. Operation

6.1. Dry running

The pump is said to run dry if it continues to operate without pumping any liquid whatsoever. Dry running must be avoided. This can be ensured by remaining in the attendance or with the aid of such technical means as a flow monitor, etc.

6.2. Suction funnel

At least the intake port must be completely covered with medium in order to prevent the infiltration of air while pumping. When pumping highly viscous products, care must also be taken to prevent the formation of suction funnels.

6.3. Operation with closed discharge

The eccentric screw pump is a positive displacement pump and must not be operated with closed shut-off elements, for the excessive pressure build-up may result in damage. The use of a bypass valve with return line is strongly recommended. The maximum pressure is then limited by the bypass valve.

7. Maintenance and repair

7.1. Cleaning

It is advisable to flush and clean the pump system after pumping corrosive, tacky, crystallizing or contaminated liquids. The pump must be switched off and repaired immediately if liquid leaks out below the pump motor (repair or replace mechanical seal, tighten stuffing box gland or replace).

7.2. Mechanical seal

The single-action mechanical seal is dependent on the direction of rotation and must therefore never be operated in the direction opposite to that indicated by the manufacturer's arrow. Single-action mechanical seals do not normally require any additional parts and need only be inspected and possibly replaced if major leaks occur.

7.3. Stuffing box

Stuffing boxes have the function of minimizing, but not totally eliminating the escape of medium. A lubricant or liquid coating is required to reduce the shaft wear. The stuffing box should therefore be tightened only gently by hand prior to operation. A higher initial rate of leakage should be permitted. During a 10 or 20 minute running-in time the minimum leakage should be set by tightening the gland in steps.

7.4. Lubrication

No parts of the pump need to be lubricated at short intervals. The flanged-on drive units should be serviced as follows:

- a) 3-phase motor: The ball bearings should be removed, cleaned and relubricated after 8.000 hours or two years of operation.
- b) Gear: The gear mechanism should be dismantled, cleaned and filled with fresh lubricant after 8.000 hours or two years of operation.
- c) Universal motor: Refer to the operating instruction for the motor.

7.5. Changing the stator and rotor

Stator and rotor are wear parts. Their service life largely depends on the prevailing conditions. Unscrew stator from immersion tube anti-clockwise. Then pull stator forcibly from rotor. Replace stator and rotor as follows:

- a) Unscrew slotted nut on immersion tube (part 5) and pull immersion tube off.
- b) If worn, the rotor (part1) can be removed from the torsion shaft (part 2) with the aid of two spanners (right-hand thread).
- c) Clean and grease thread of the immersion tube.
- d) Screw new stator hand-tight, anti-clockwise and push stator and immersion tube together onto the rotor.
- e) The rotor must be fixed as follows against rotation:
3-phase or air drive: Block shaft with 6 mm screw driver.
Universal motor: Remove motor from gear and block coupling (part 16.4) manually.

7.6. PTFE stators

PTFE stators are solid stators which, in contrary to the „rubber stators“, are not firmly fixed with the stator sleeves. The special stator sleeve (part 8.2) has a pin which fits with the slot on the lower end of the stator to hold it in position.

7.7. Replacement of the shaft sealing

7.7.1. Mechanical seal

- a) Dismantle stator and immersion tube as described under 7.5.
- b) Unscrew torsion shaft (part 2) by means of a spanner from pump shaft. Block pump shaft with 6 mm screw driver.
- c) Pull off rotating parts of the mechanical seal (part 4.1 to 4.3) from the pump shaft.
- d) Remove seat and O-ring (parts 4.4, 4.5) from the seat bushing (part 26). Check sliding faces of the seal face (part 4.3) and seat (part 4.4). When the sliding faces are in order, worn out O-rings (parts 4.2, 4.4) can be the reason for the leakage.
- e) Refitting of the new parts is as simple reversal of this procedure, but work must be done very carefully to avoid damage of the polished seal face and seat. Use some silicone oil or glycerine to wet O-rings, pump shaft and seat bushing.

7.7.2. Stuffing box

- a) Dismantle stator and immersion tube as described under 7.5.

- b) Unscrew torsion shaft (part 2) by means of a spanner from pump shaft. Block pump shaft with 6 mm screw driver.
- c) Push complete stuffing box (parts 30 to 32) out of the lantern (parts 28 and 42) and pull it from the pump shaft. Unscrew packing gland (part 32) and remove packing rings (part 31). Clean stuffing box (part 30) before inserting the new packing rings.
- d) Insert packing rings into the stuffing box with the cut ends first. Make sure that the cut ends of each following ring are turned by 90°. Screw gland handtight. Then push stuffing box onto the pump shaft and into the lantern.
- e) Minimize the leakage as described under 7.3.

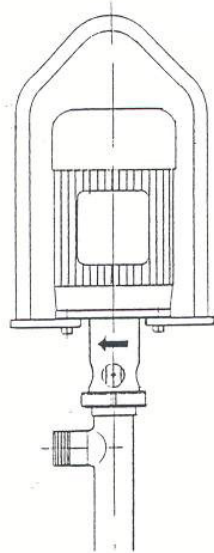
7.8. Change of the 3-phase motor or gear motor or AIR4-, AIR6- or AIR8 motor execution “close coupled”

- a) Use a hook wrench to unscrew the grooved nut of the immersion tube (item 5) until the immersion tube is free of the lantern (item 28).
- b) Secure the pump shaft (item 26) with a 6 mm screw driver against rotation.
- c) Turn the immersion tube and stator anticlockwise and pull them from the rotor (item 1). Leave the gasket (item 6) in the groove of the immersion tube head.
- d) Unscrew the worm screw in the head of the torsion shaft (item 2) and unscrew the torsion shaft from the pump shaft (item 26).
- e) Pull the rotation parts of the mechanical seal (items 4.1 to 4.3) from the pump shaft.
- f) Remove the seat ring bushing (item 29) with the seat ring of the mechanical seal (item 4.4) from the lantern (item 28).
- g) Unscrew the bolts and nuts to separate the lantern from the 3-phase or gear motor (item 25).
- h) Drive the spring pin (27) out to separate the pump shaft from the motor shaft.
- i) Push the pump shaft onto the motor shaft (up to the shaft shoulder).
- j) Drill a hole through the motor shaft; use the existing holes of the pump shaft as template.
- k) Fix both shafts with the spring pin (item 27).

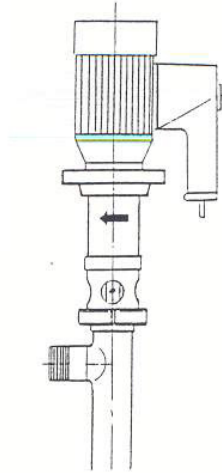
Re-assemble the pump in reverse order and mind the advices of the operating manual.

7.9. Change of the 3-phase motor or gear motor or AIR4-, AIR6- or AIR8 motor execution “flexible coupling”

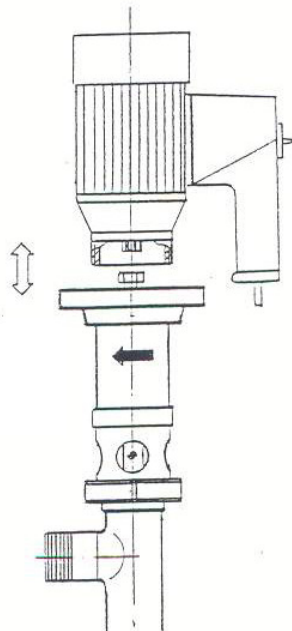
- a) Unscrew bolts and nuts to separate the lantern (item 48) from the drive motor (item 25) with motor coupling (item 40).
- b) Unscrew worm screw and pull the motor coupling from the drive shaft.
- c) Push motor coupling onto the new drive motor and fix worm screw.
- d) Use new coupling insert (item 41) before re-assembling the new drive with the lantern.



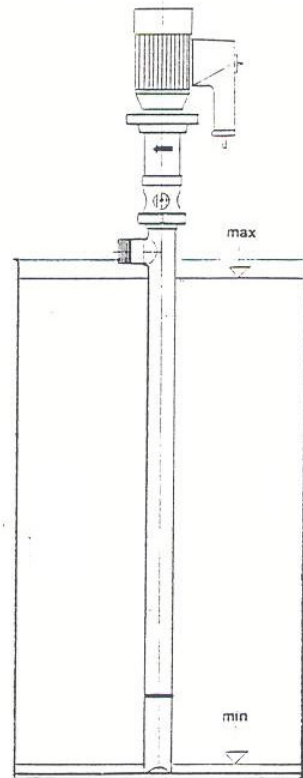
Three-phase drive



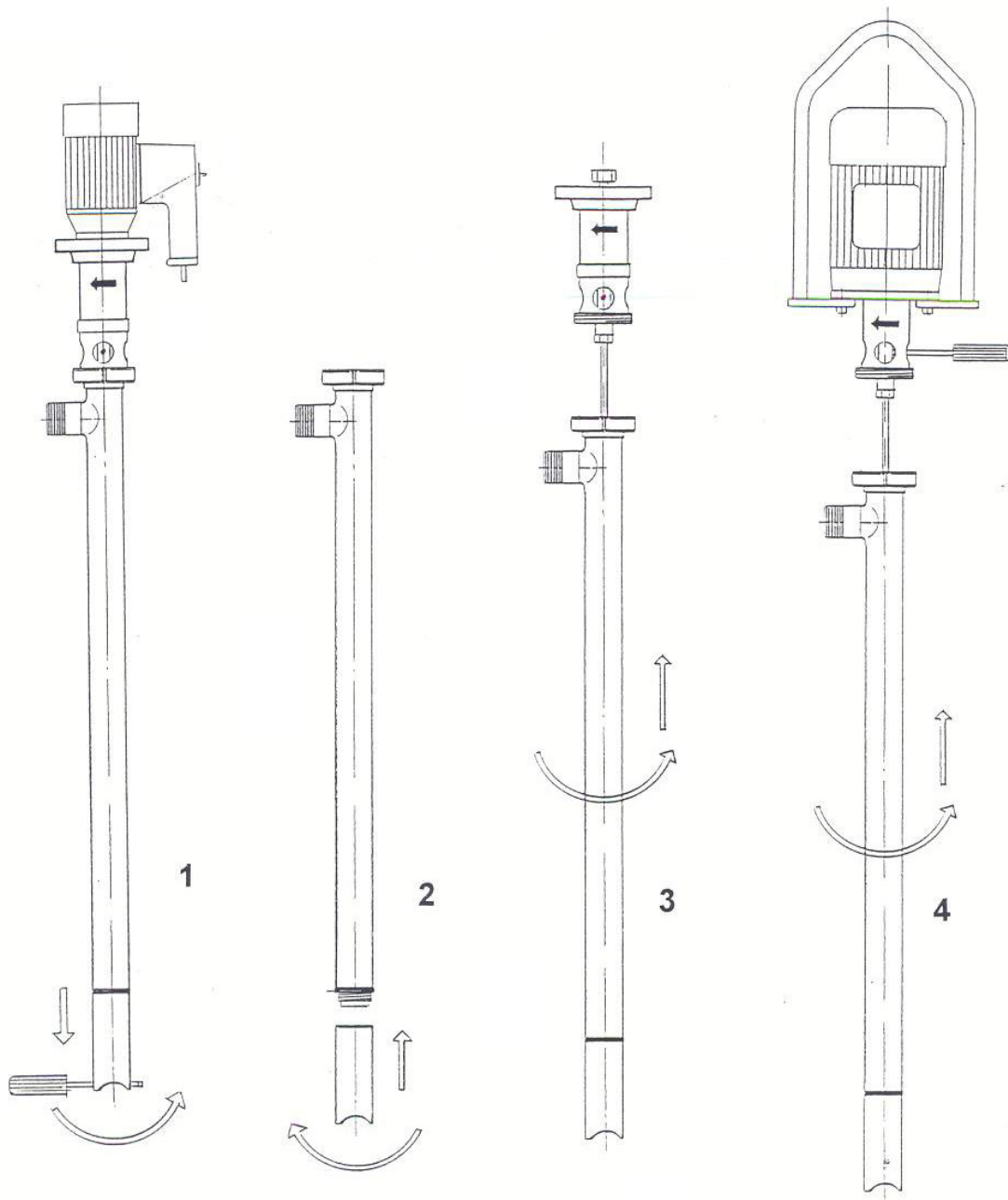
Universal motors with gear



Mounting of Universal motor



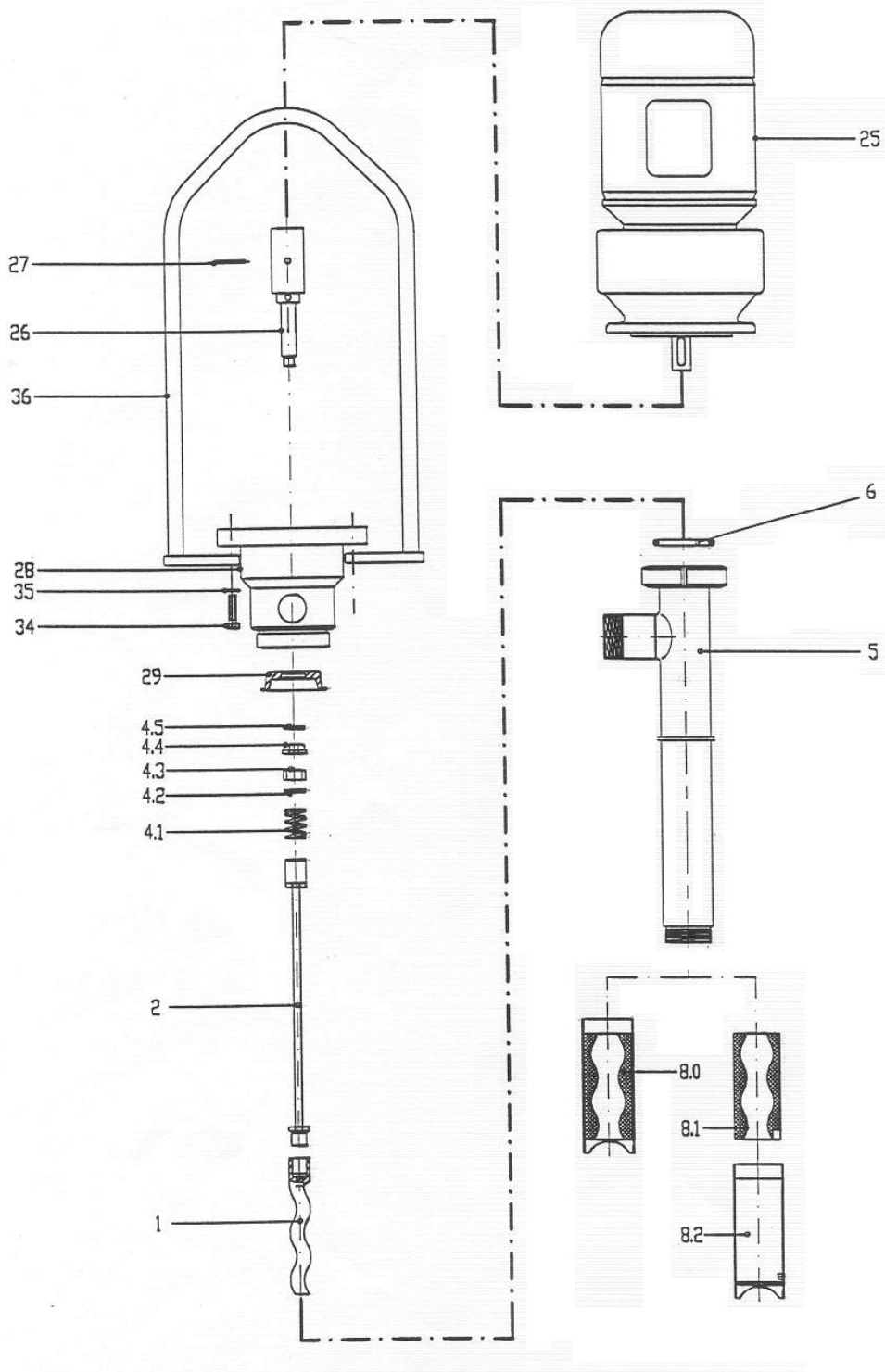
Maximum immersion depth



1. Unscrew stator from immersion tube
2. Screw stator onto immersion tube
3. Screw stator and immersion tube onto rotor
4. Block shaft with screw driver

Drive 3-phase or air motor - close coupled

Mechanical seal



Spare parts list

Drive 3-phase or air motor – close coupled, mechanical seal (ms)

Series: 12.1, 12.2, 25.1, 25.2, 50.1

<i>Item.</i>	<i>Qty.</i>	<i>Description</i>	<i>Material</i>
1	1	rotor	ss 316Ti
2	1	torsion shaft	ss 316Ti
4.1	1	ms: spring	ss 316Ti
4.2	1	ms: O-Ring	Viton
4.3	1	ms: seal face	chrome
4.4	1	ms: seat ring	carbon
5	1	immersion tube	ss 316Ti
6	1	gasket	viton alt. PTFE
8.0	1	stator	NBR, nitrile, nitrile food grade, CSM, Viton, EPDM
8.1	1	stator	PTFE
8.2	1	stator sleeve	ss 316Ti
25	1	3-phase, gear or air motor	
26	1	motor shaft	ss 316Ti
27	5	spring pin	ss 316Ti
28	1	lantern	polyamide
29	1	seat ring bushing	ss 316Ti
34	4	hex head screw	
35	4	spring washer	
36	1	hanger	ss 304



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