



# Installation, care and maintenance

2075.324/334, 2075.324/334-U, 2075.324/334-W



# GUARANTEE

Flygt undertakes to remedy faults in products sold by Flygt provided:

- that the fault is due to defects in design, materials or workmanship;
- that the fault is reported to Flygt or Flygt's representative during the guarantee period;
- that the product is used only under conditions described in the care and maintenance instructions and in applications for which it is intended;
- that the monitoring equipment incorporated in the product is correctly connected;
- that all service and repair work is done by a workshop authorized by Flygt;
- that genuine Flygt parts are used.

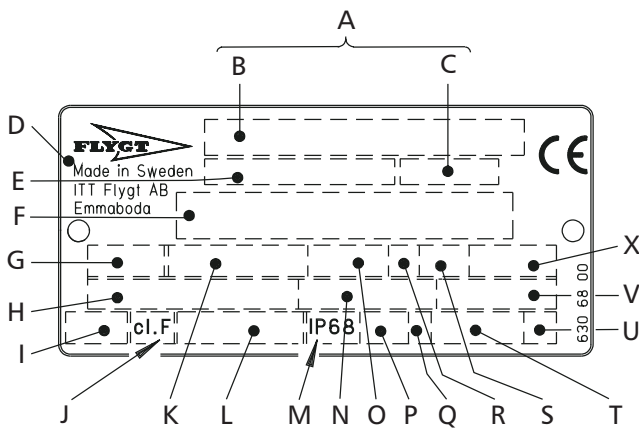
Hence, the guarantee does not cover faults caused by deficient maintenance, improper installation, incorrectly executed repair work or normal wear and tear.

Flygt assumes no liability for either bodily injuries, material damages or economic losses beyond what is stated above.

Flygt guarantees that a spare parts stock will be kept for 10 years after the manufacture of this product has been discontinued.

The manufacturer reserves the right to alter performance, specification or design without notice.

# DATA PLATE INTERPRETATION



- 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
- X Max. ambient temperature

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# PRODUCT DESCRIPTION

## Applications

2075.324/334 is intended to be used for:

- pumping of water which may contain abrasive particles

The pump is available in the following versions:

**BS** = portable, with hose connection and strainer.

The following abbreviations are used:

**MT** = medium-head version

**HT** = high-head version

**ST** = super-head version (not 2075.324/334-W)

The pump is also available in a version (2075.324/334-W) for liquid temperatures up to 90°C (195°F) and in a version (2075.324/334-U) with POLY-LIFE wear parts for extra resistance.

2075.324/334-W has certain operational limitations, which are stated on a plate on the pump.

**Liquid temperature (2075.324/334 and 2075.324/334-U):** max. 40°C (105°F)

**Liquid density:** max. 1100 kg/m<sup>3</sup> (9.2 lb per US gal.)

The pumped liquid may contain particles up to a size which corresponds to the openings in the strainer.

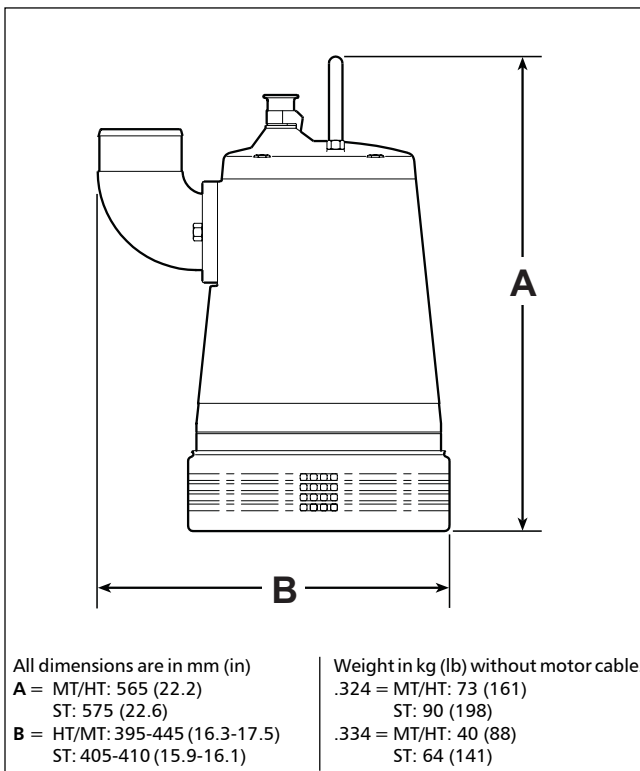
**The pH of the pumped liquid:**

**324:** 6—11, **334:** 5—8

**Depth of immersion:** max. 20 m (65 ft.).

For other applications, that the above, contact your nearest Flygt representative for information.

## Dimensions and weights



### WARNING!

The pump shall not be used in explosive or flammable environments or with flammable liquids.

## Motor data

**Rated output: 3.7 kW,**  
3~50 Hz, 2800 r/min

Voltage V	Rated current A	Starting current A
200	14.0	83.0
220	13.0	59.0
230	12.0	62.0
380	7.5	34.0
400	7.3	36.0
440	6.5	33.0
500	5.7	26.0
550	5.2	29.0

**Rated output: 4.0 kW, (5.5 hp),**  
3~60 Hz, 3400 r/min

Voltage V	Rated current A	Starting current A
200	17.0	73.0
220	15.0	82.0
230	15.0	58.0
400	8.3	37.0
440	7.5	35.0
460	7.2	34.0
575	5.8	25.0
600	5.5	28.0

**Rated output: 5.5 kW,**  
3~50 Hz, 2800 r/min

Voltage V	Rated current A	Starting current A
220	21.0	107.0
230	20.0	112.0
380	12.0	59.0
400	12.0	65.0
440	11.0	56.0
500	9.4	46.0
550	8.4	55.0

**Rated output: 6.6 kW, (9.0 hp),**  
3~60 Hz, 3300 r/min

Voltage V	Rated current A	Starting current A
200	29.0	123.0
230	25.0	119.0
460	12.0	60.0
575	10.0	45.0
600	9.4	51.0

## Materials

		DIN	BS	AISI/ASTM
Cast parts	Aluminium	1725	1490	—
	334	G-AlMg5	LM5	—
	Cast iron	1691	1452:1977	A-48-76
	324	GG 25	Gr. 260	No.40B
Shaft	Stainless steel	X8CrNiMo 27 5	—	329
Impeller	Spring steel	17221	970:5	6150
		50 Cr V4	735 A 50	
	Stainless steel	X6CrNiMo 17 12 2	970	316 Ti
			320 S 31	
Strainer	Stainless steel	X5CrNi 18 9	En 58E	304
			304 S15	
O-rings	2075.324/334:	Nitrile rubber 70°IRH		
	2075.324/334-W:	Fluorinated rubber 70°IRH		
Wear parts	2075.324/334:	Nitrile rubber 45°IRH		
	2075.324/334-U:	Polyurethane		
	2075.324/334-W:	No coating		
Mechanical face seals	Inner:	Tungsten carbide - Tungsten carbide		
	Outer:	Tungsten carbide - Tungsten carbide		
Surface treatments	324:	Priming of castings and finishing coating of synthetic resin enamel.		
	334:	One layer of aluminium paint.		

## Design

### 1. Motor

Squirrel-cage 3-phase induction motor for 50 Hz or 60 Hz.

The motor is started by means of direct-on-line start Flygt motors are tested in accordance with IEC 34-1.

The stator is insulated in accordance with class F (155°C, 310°F).

The motor is designed to supply its rated output at  $\pm 5\%$  variation of the rated voltage. Without overheating the motor,  $\pm 10\%$  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.

### 2. Bearings

The upper bearing of the rotor consists of a single row angular contact ball bearing.

The lower bearing of the rotor consists of a single row ball bearing (MT/HT) or of two single row ball bearings in tandem (ST).

### 3. Oil casing

The oil lubricates and cools the seals and acts as a buffer between the pump casing and the electric motor.

### 4. Shaft seals

The pump has two mechanical seals.

### 5. Shaft

The shaft is delivered with the rotor as an integral part.

### 6. Cooling

The stator is cooled by the pumped liquid passing through the space between the stator casing and the outer casing.

### 7. Impellers

The pump is available with the following types of impellers:

- multi-vane impeller.

### 8. Wear parts

The pumps easily replaceable wear parts are rubber covered. In the POLY-LIFE version, the wear parts are polyurethane covered.

### 9. Monitoring equipment

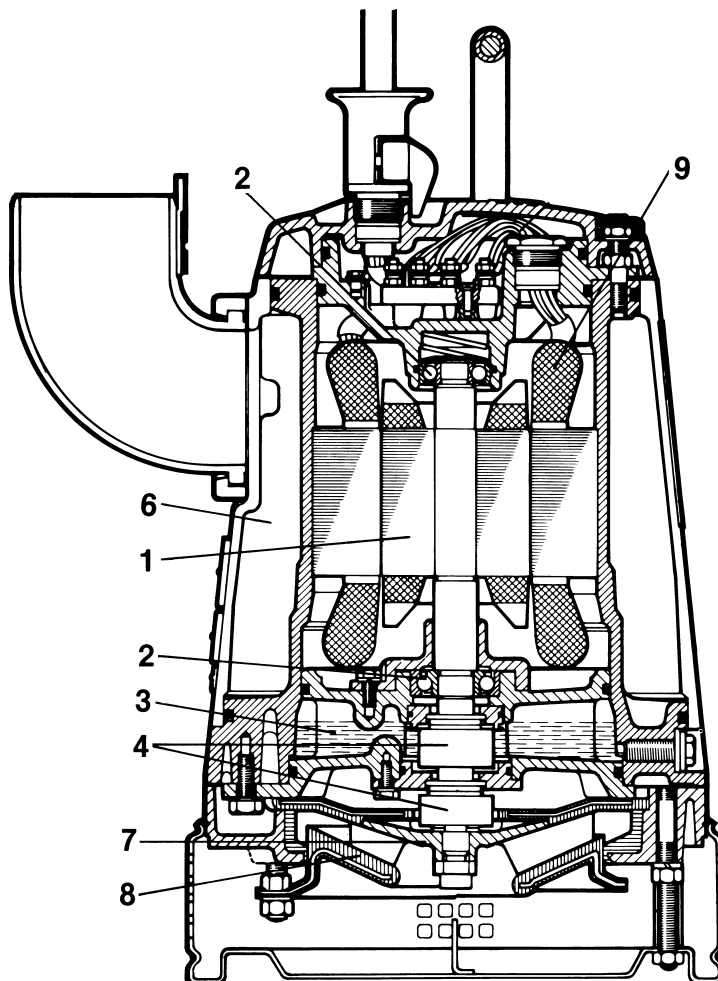
The stator incorporates two thermal switches connected in series.

The thermal protectors: open at 125°C (260°F).



#### NOTE!

Make sure that the monitoring equipment incorporated in the product is correctly connected.

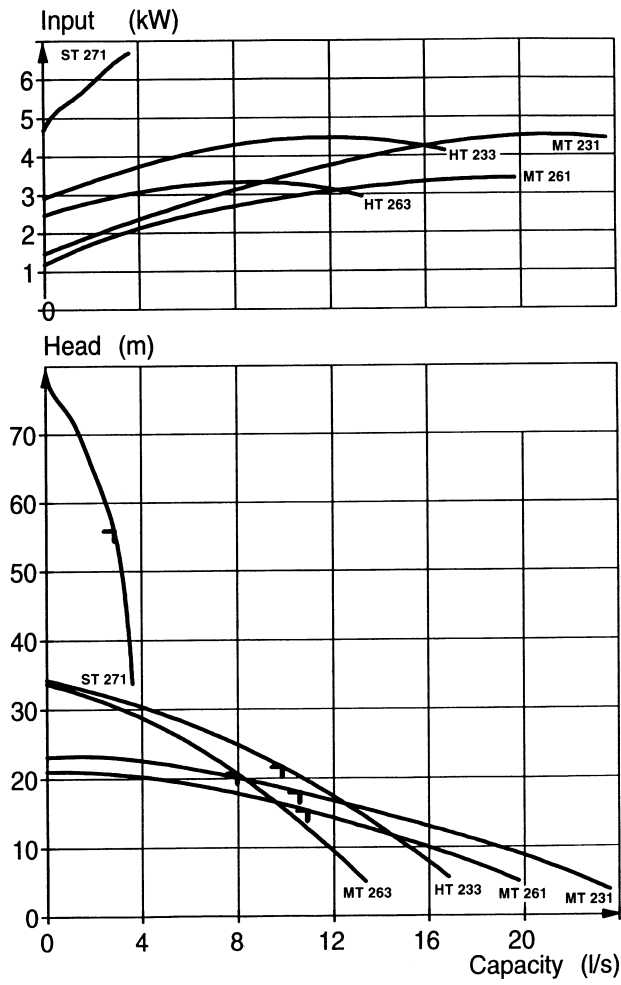


# Performance curves

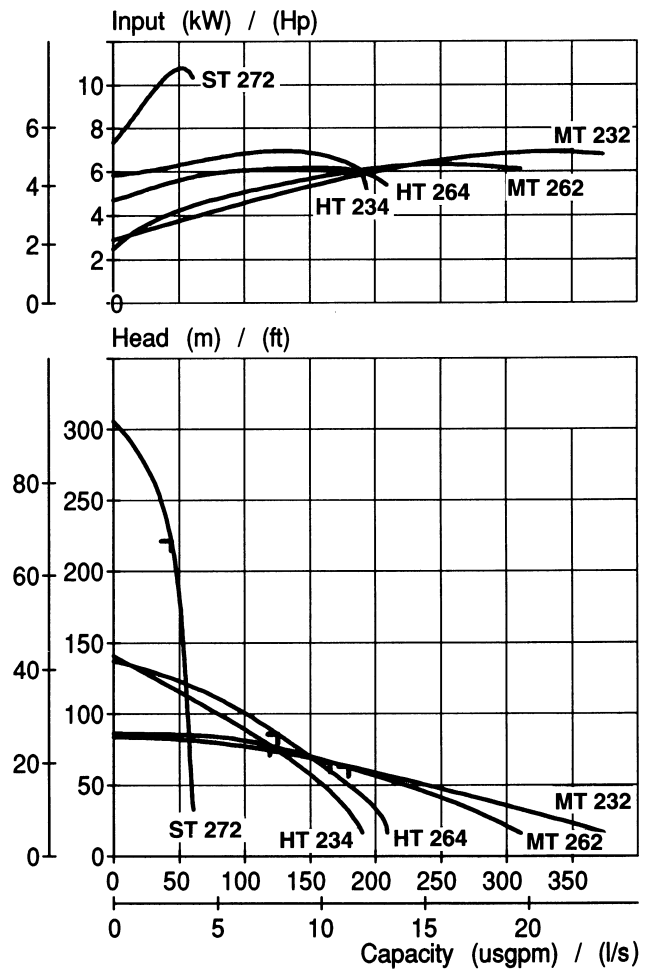
┘ = Best operating point

Each pump is tested in accordance with ISO 2548

## 50 Hz 3~



## 60 Hz 3~



# TRANSPORTATION AND STORAGE

The pump may be transported and stored in a vertical or horizontal position. Make sure that it cannot roll or fall over.



## **WARNING!**

**Always lift the pump by its carrying handle or lifting eyes, never by the motor cable or the hose.**

The pump is frostproof as long as it is operating or is immersed in the liquid. If the pump is taken up when the temperature is below freezing, the impeller may freeze. The pump shall be operated for a short period after being taken up in order to expel all remaining water.

A frozen impeller can be thawed by allowing the pump to stand immersed in the liquid for a short period before it is started. Never use a naked flame to thaw the pump.

For longer periods of storage, the pump must be protected against moisture and heat. The impeller should be rotated by hand occasionally (for example every other month) to prevent the seals from sticking together. If the pump is stored for more than 6 months, this rotation is mandatory.

After a long period of storage, the pump should be inspected before it is put into operation. Pay special attention to the seals and the cable entry.

Follow the instructions under the heading "Before starting".

# INSTALLATION

## **Safety precautions**

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

1. Make sure the lifting equipment is in good condition.
2. Be aware of the risk of electrical accidents.
3. Use a safety helmet, safety goggles and protective shoes.
4. Do not ignore the risk of drowning.
5. A first-aid kit must be available.

Follow all other health and safety rules and local codes and ordinances.



**At certain installations and operation points on the pump curve the noise level 70 dB, or for the actual pump specified noise level, can be exceeded.**

## **Pump installation**

Run the cables so that they do not have any sharp bends and are not pinched.

Connect the discharge connection and motor cable. See "Electrical connections".

Lower the pump into the sump.

Place the pump on a base which will prevent it from sinking into a soft sump bottom. Alternatively, the pump can be suspended by its handle just above the sump bottom.

For tandem connection of pumps, see "Accessories and tools".

Consult your nearest Flygt representative regarding:

- choice of ancillary equipment.
- other problems in connection with installation.

# ELECTRICAL CONNECTIONS

All electrical work shall be carried out under the supervision of an authorized electrician.

Local codes and regulations shall be complied with.



## WARNING!

All electrical equipment must be earthed. This applies to both pump equipment and any monitoring equipment. Failure to heed this warning may cause a lethal accident. Make sure that the earth lead is correctly connected by testing it.

Check that the mains voltage and frequency agree with the specifications on the pump data plate.

The motor can be connected for different voltages as shown on the data plate.

Under no circumstances may the starter equipment be installed in the pump pit.

Install the motor cable as illustrated in the figure.

To avoid leakage into the pump, check:

- that the cable entry seal sleeve and washers conform to the outside diameter of the cable. See the parts list.
- that the outer jacket on the cable is not damaged. When refitting a cable which has been used before, always cut off a short piece of the cable so that the cable entry seal sleeve does not close around the cable at the same point again.



## NOTE!

For safety reasons, the earth lead should be approx. 100 mm (4") longer than the phase leads. If the motor cable is jerked loose by mistake, the earth lead should be the last lead to come loose from its terminal. This applies to both ends of the cable.

Check on the data plate which connection, Y or  $\Delta$ , is valid for the voltage supply. Then, depending on voltage, arrange the connection on the terminal board in accordance with Y or  $\Delta$ , see figure.

Connect the motor cable to the terminal board connections U1, V1, W1 and earth.

Connect the leads from the motor control circuit to T1 and T2.

Make sure that the pump is correctly earthed (grounded).

Install the cover (1).

Tighten the screws at the cable entry (2).

Connect the motor cable to the starter equipment. Check the direction of rotation, see "Before starting".

If the direction of rotation is wrong, transpose two of the phase leads.

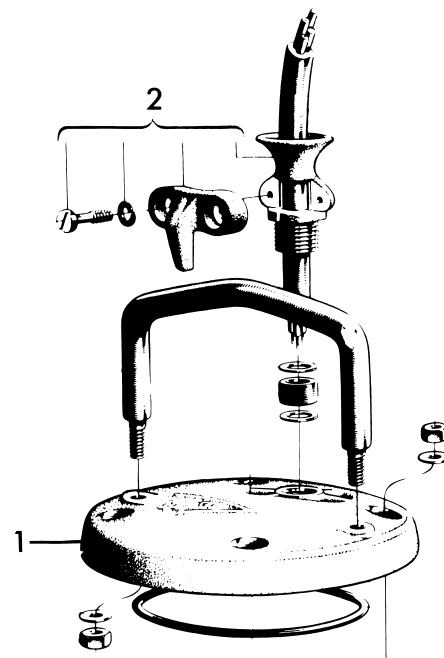
Remember that the starting surge with the direct-on-line start can be up to six times higher than the rated current. Make sure that the fuses or circuit breakers are of the proper amperage.

The table (on page 3) gives rated current and starting current. Fuse amperage and cable shall be selected in accordance with local rules and regulations. Note that with long cables, the voltage drop in the cable must be taken into consideration, since the motor's rated voltage is the voltage that is measured at the terminal board in the pump.



## NOTE!

Make sure that the monitoring equipment incorporated in the product is correctly connected.



# Electrical connections

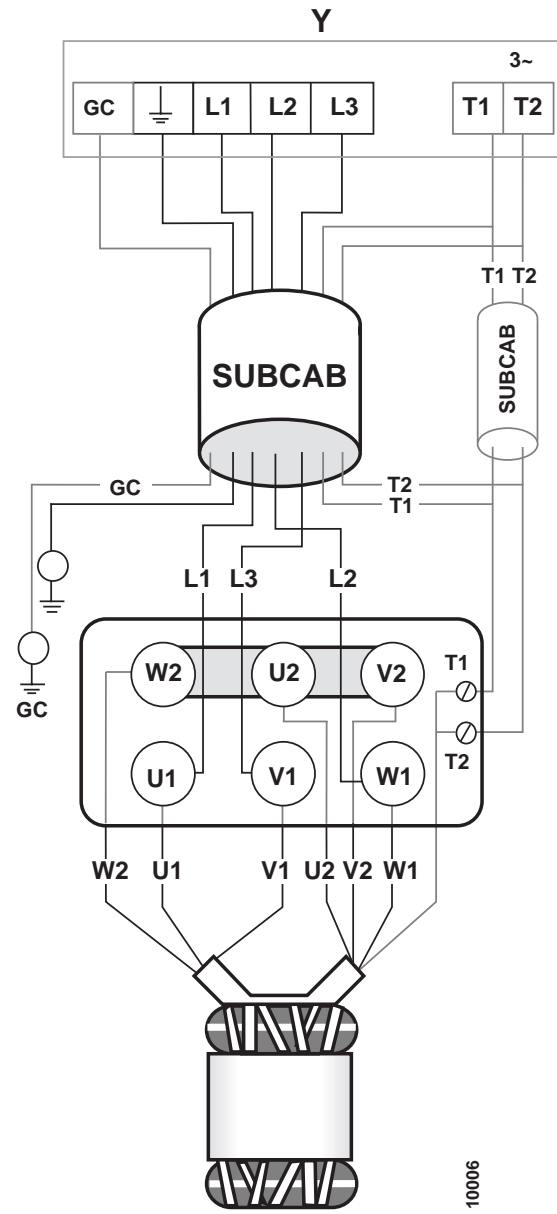
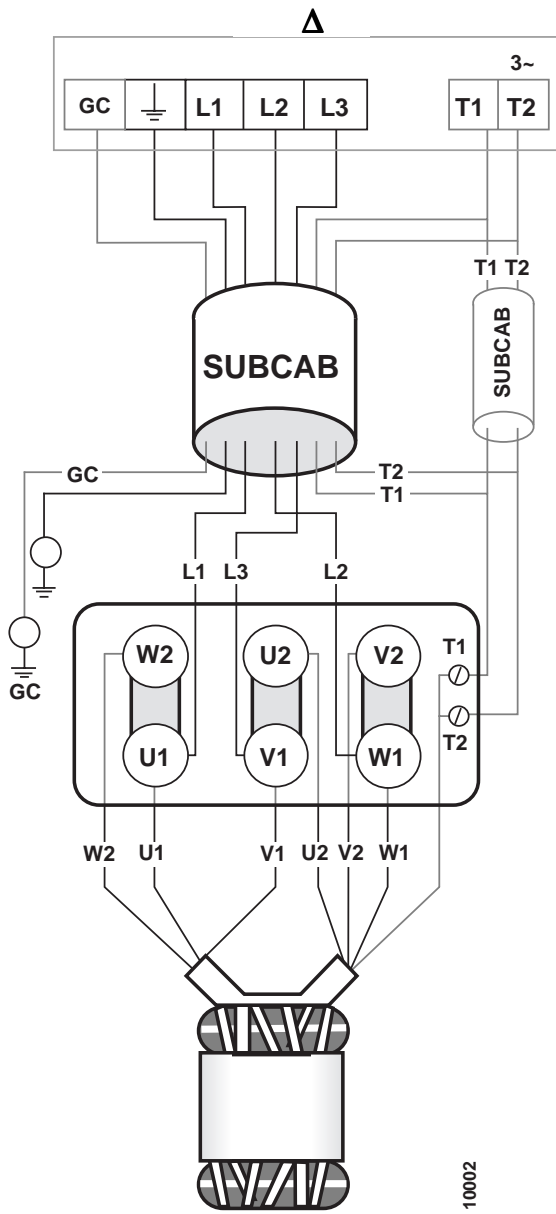
SUBCAB 4G/SUBCAB AWG\*:

Mains board	Lead	Pump terminal
L1	Brown (Red*)	U1
L2	Blue (White*)	W1
L3	Black (Black*)	V1
Earth (PE)	Yellow/Green	⊥
Groundcheck	Yellow*	GC
T1	Black/Orange*	T1
T2	Black/Blue*	T2

The stator leads are connected to the terminal board as follows:

Stator lead	Connection on terminal board
U1, red	U1
V1, brown	V1
W1, yellow	W1
V2, blue	V2
W2, black	W2
U2, green	U2

Connect the control leads from the motor control circuit to T1 and T2.





# OPERATION

## Before starting

Check the oil level in the oil casing.

Remove the fuses or open the circuit breaker and check that the impeller can be rotated by hand.

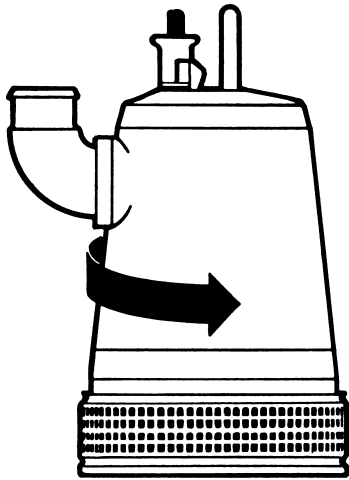
Check that the monitoring equipment (if any) works.

Check the direction of rotation. The impeller shall rotate clockwise, as viewed from above. When started, the pump will jerk in the opposite direction to the direction in which the impeller rotates. See the figure.



**WARNING!**  
Watch out for the starting jerk,  
which can be powerful.

## Starting jerk



20028

## Avoidance of sedimentation.

In order to avoid sedimentation when the pumped liquid contains solid particles, the velocity of the medium in the discharge line should be:

Mixture	Min. velocity in discharge line
1. Water + coarse gravel	4 m/s (13.2 ft./s)
2. Water + gravel	3.5 m/s (11.5 ft./s)
3. Water + sand	
Sand particles < 0,1 mm (0.004 in)	1.5 m/s (5.0 ft./s)
Sand particles < 0.6 mm (0.024 in)	2.5 m/s (8.2 ft./s)

Choose dimension of the discharge line to give the pumped liquid at least this velocity.

The pump can be provided with level regulation in order to prevent unnecessary wear on the hydraulic components.

## Cleaning

If the pump has been running in very dirty water, let it run for a while in clean water, or flush it through the discharge connection. If clay, cement or other similar dirt is left in the pump it may clog the impeller and seal, preventing the pump from working.

During a longer period out of operation, the pump must be test run every other month to prevent the mechanical seals from sticking together.

# CARE AND MAINTENANCE

The figures in parentheses are item numbers and refer to the cutaway figure.

## Safety precautions



**WARNING!**  
Before starting work on the pump, make sure that the pump is isolated from the power supply and cannot be energized.

NOTE! This applies to the control circuit as well.

The following points are important in connection with work on the pump:

- make sure that the pump has been thoroughly cleaned.
- observe good personal hygiene.
- beware the risk of infection.
- follow local safety regulations.

## Inspection

Regular inspection and preventive maintenance ensure more reliable operation.

The pump should be inspected at least twice a year, more frequently under severe operating conditions.

Under normal operating conditions, the pump should have a major overhaul in a service shop at least once a year.

This requires special tools and should be done by an authorized service shop.

When the pump is new or when the seals have been replaced, inspection is recommended after one week of operation.

### Service contract


Flygt or its agent offers service agreements in accordance with a preventive maintenance plan. For further information, please contact your Flygt representative.

### Inspection 2075.324/334-W

Pumps for hot water shall, depending on the time they have been submerged in the hot water, undergo overhaul at a service shop as follows:

Temp.	Installation	Overhaul interval
≤70°C (160°F)	Stationary	2000 hours
≤70°C (160°F)	Portable	1000 hours
≤90°C (195°F)	Stat./Port.	300 hours

## Recommended inspections:

Inspection of	Action
Visible parts on pump and installation	<p>Replace or fix worn and damaged parts. Make sure that all screws, bolts and nuts are tight. Check the condition of carrying handle/lifting eyes, chains and wire ropes.</p> <p>Replace worn parts if they impair function.</p>
Pump casing and impeller	<p>Wear on the impeller and the parts around it necessitates fine adjustment of the impeller or replacement of worn parts. See "Replacing the impeller" and "Replacing the diffuser".</p>
Oil quantity	<div style="border: 1px solid black; padding: 5px;">  <p><b>WARNING.</b> If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil casing screw in order to prevent splatter. See "Safety precautions" for additional information.</p> </div>
Condition of the oil	<p>Check that the oil reaches up to the oil hole. Add oil as needed. See "Changing the oil".</p> <p>A check of the condition of the oil can show whether there has been an increased leakage. Note! Air/oil mixture can be confused with water/oil mixture.</p> <p>Insert a tube (or hose) into the oil hole. Cover the top end of the tube and take up a little oil from the bottom.</p> <p>Change the oil if it contains too much water, i.e., is heavily emulsified (cream-like), or if the oil housing contains separated water. See "Changing the oil". Check again one week after changing the oil.</p> <p>If the oil contains too much water again, the fault may be:</p> <ul style="list-style-type: none"> <li>— that an oil screw (7) is not sufficiently tight.</li> <li>— that an O-ring (28, 33) or its sealing surface is damaged.</li> <li>— that the outer mechanical seal (45) is damaged.</li> </ul> <p>Contact a Flygt service shop.</p>
Cooling system	<p>Rinse and clean if the flow through the system has been partly restricted.</p>
Cable entry	<p>Make sure that the cable clamps are tight. If the cable entry leaks:</p> <ul style="list-style-type: none"> <li>— check that the entry is firmly tightened into its bottom position.</li> <li>— cut a piece of the cable off so that the seal sleeve (40) closes around a new position on the cable.</li> <li>— replace the seal sleeve (40).</li> <li>— check that the seal sleeve (40) and the washers (17) conform to the outside diameter of the cables.</li> </ul>
Cables	<p>Replace the cable if the outer jacket is damaged. Make sure that the cable do not have any sharp bends and are not pinched.</p>
Level sensors or other level equipment	<p>Check function. Clean, adjust, replace or repair damaged level sensing equipment. Follow the instructions for the level sensing equipment in question.</p> <p>NOTE! The level sensor might contain a mercury switch. Damaged sensors should therefore be disposed of in a proper manner.</p>
Starter equipment	<p>If faulty, contact an electrician.</p>
Rotation direction of pump (requires voltage)	<p>Transpose two phase leads if the impeller does not rotate clockwise as viewed from above. Rotation in the wrong direction reduces the capacity of the pump and the motor may be overloaded. Check the direction of rotation, during non-load every time the pump is reconnected.</p>
Pipes, valves and other peripheral equipment	<p>Repair faults and notify supervisor of any faults or defects.</p>
Insulation resistance in the stator	<p>Use insulation tester. With 1000 V-DC megger the insulation between the phases and between any phase and earth (ground) should be &gt; 1 MΩ.</p>

## Changing the oil

### Oil casing



**WARNING.** If the seal leaks, the oil casing may be under pressure. Hold a rag over the oil plug to prevent splatter.

Lay the pump on its side on a bench or over two supports.

Unscrew the oil casing screw (7).

Turn the pump so that the oil hole faces downwards.

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

Fill up with 0.6 litres (0.65 US quarts) of new oil.

A paraffin oil with viscosity close to ISO VG15 is recommended (e.g. Mobil Whiterex 309). The pump is delivered from factory with this type of oil.

In applications where poisonous properties are of less concern, a mineral oil with viscosity up to ISO VG32 can be used.

Always replace the O-rings of the oil hole screws. Put the screws back and tighten them. Tightening torque: 10—20 Nm (8—15 ft lb).



### Replacing the impeller

The POLY-LIFE version of this pump has a product code ending with U (see the pump's data plate). Make sure that spare parts with part numbers marked (U) in the parts list are used.

When fitting the new wear parts, a clearance must be provided between the impeller and the lower diffuser of at least 0.2—0.3 mm.

Check after installation that the impeller rotates freely.

The wear parts in POLY-LIFE pumps are lined with polyurethane, a highly abrasion-resistant material. If the impeller does not rotate freely the friction will generate heat. This may result in deformation of the wear parts or jamming of the impeller, leading to pump damage.

The above also applies to the hot-water version, whose rubber-line wear parts swell slightly at high temperatures.



### Removing the impeller

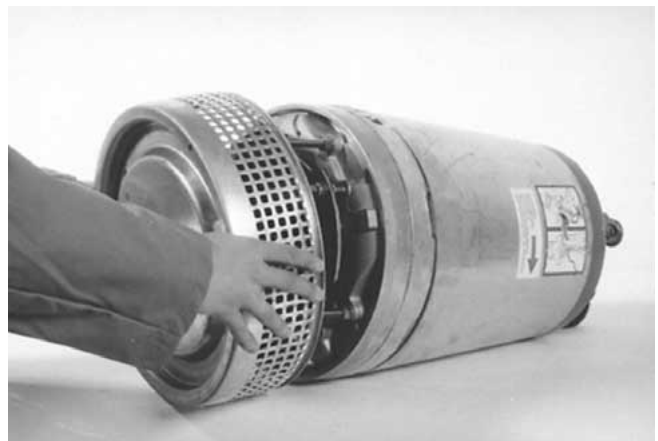


**WARNING!** Worn impellers often have very sharp edges.

**NOTE!:** All pictures show the MT/HT version. For additional information, see also the exploded view of the ST-version.

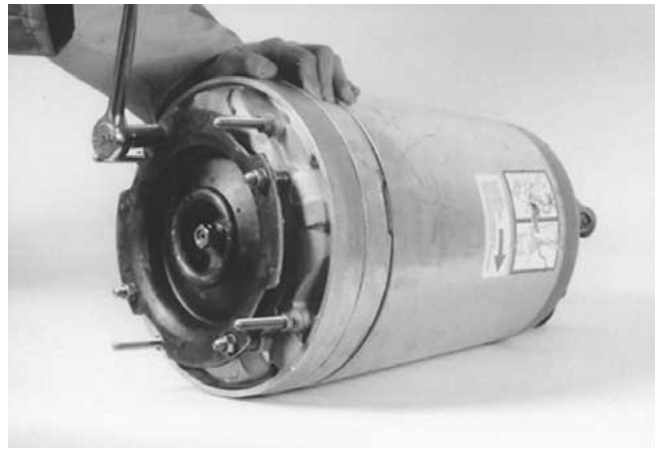
Lay the pump on its side.

Remove the nuts/screws (MT-HT/ST: 15/10), pull off the strainer (84), the lower pump casing (ST: 93) and the spacer tubes (MT/HT: 85).



Remove the nuts (15) and the washers (21) on the lower diffuser (77). Pull off the lower diffuser.

Note!: This procedure is only valid for the MT/HT-versions.



Remove the nuts (15) and the washers (21) on the diffuser ring (76). Pull off the diffuser ring.

Note!: This procedure is only valid for the MT/HT-versions.



Remove the impeller nuts (MT-HT/ST: 50/15) and the lock washer (ST: 26).



Pull off the impeller.

Use impeller puller 203 16 40 or pry off carefully with two strong screwdrivers or bars.



### Installing the impeller

Make sure that the end of the shaft is clean and free of burrs. Polish off any flaws with fine emery cloth.

Check that an appropriate number of adjusting washers (57) are on the shaft.

Grease end of shaft and impeller hub.

Fit the lockwasher (ST:26).

Press the impeller onto the shaft with the impeller nut.

Tighten the impeller nut.

Check that the impeller is firmly seated.

Check that the impeller can be rotated by hand.



### Adjusting the impeller

The clearance between the impeller and the upper diffuser (MT/HT: 79)/pump casing (ST: 94) should be minimal when the impeller is tightened. The clearance can be adjusted with the adjusting washers (57).

NOTE! On the hot water version (2075.324/334-W), the clearance between the impeller and the oil casing bottom/lower diffuser must be at least 0.3 mm. This is because the rubber lining swells slightly at high temperatures.

In order for the pump to perform at maximum capacity, the impeller must be adjusted regularly.

NOTE! The following applies only to the MT/HT-version.

Fit the diffuser ring (76).

Check that the impeller can easily be rotated by hand.

Screw the adjusting nuts (15) down toward the bottom of the studs (70).

Press the lower diffuser (77) against the impeller.

Screw the adjusting nuts (15) so that they lie flush against the lower diffuser.

Back off all adjusting nuts another half-turn (counter-clockwise).

The clearance between the impeller and the lower diffuser shall be as little as possible.

Check that the impeller can easily be rotated by hand.



More extensive repairs require special tools and should be carried out by an authorized service technician.

# FAULT TRACING (Troubleshooting)

A universal instrument (VOM), a test lamp (continuity tester) and a wiring diagram are required in order to carry out fault tracing on the electrical equipment.

Fault tracing shall be done with the power supply disconnected and locked off, except for those checks which cannot be performed without voltage.

Always make sure that there is no one near the pump when the power supply is turned on.

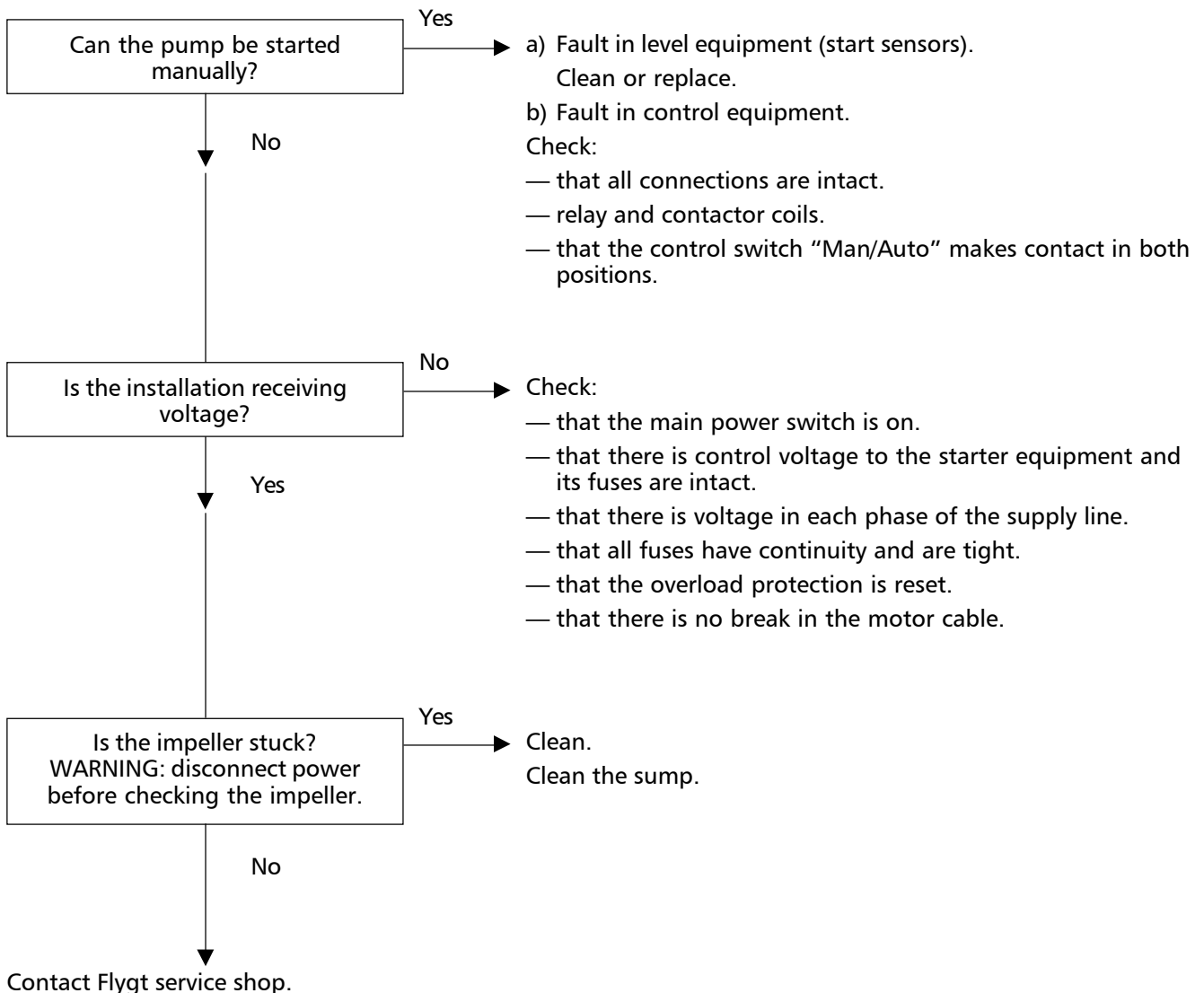
Use the following checklist as an aid to fault tracing. It is assumed that the pump and installation have formerly functioned satisfactorily.



**Electrical work shall be performed by an authorized Flygt service electrician.**

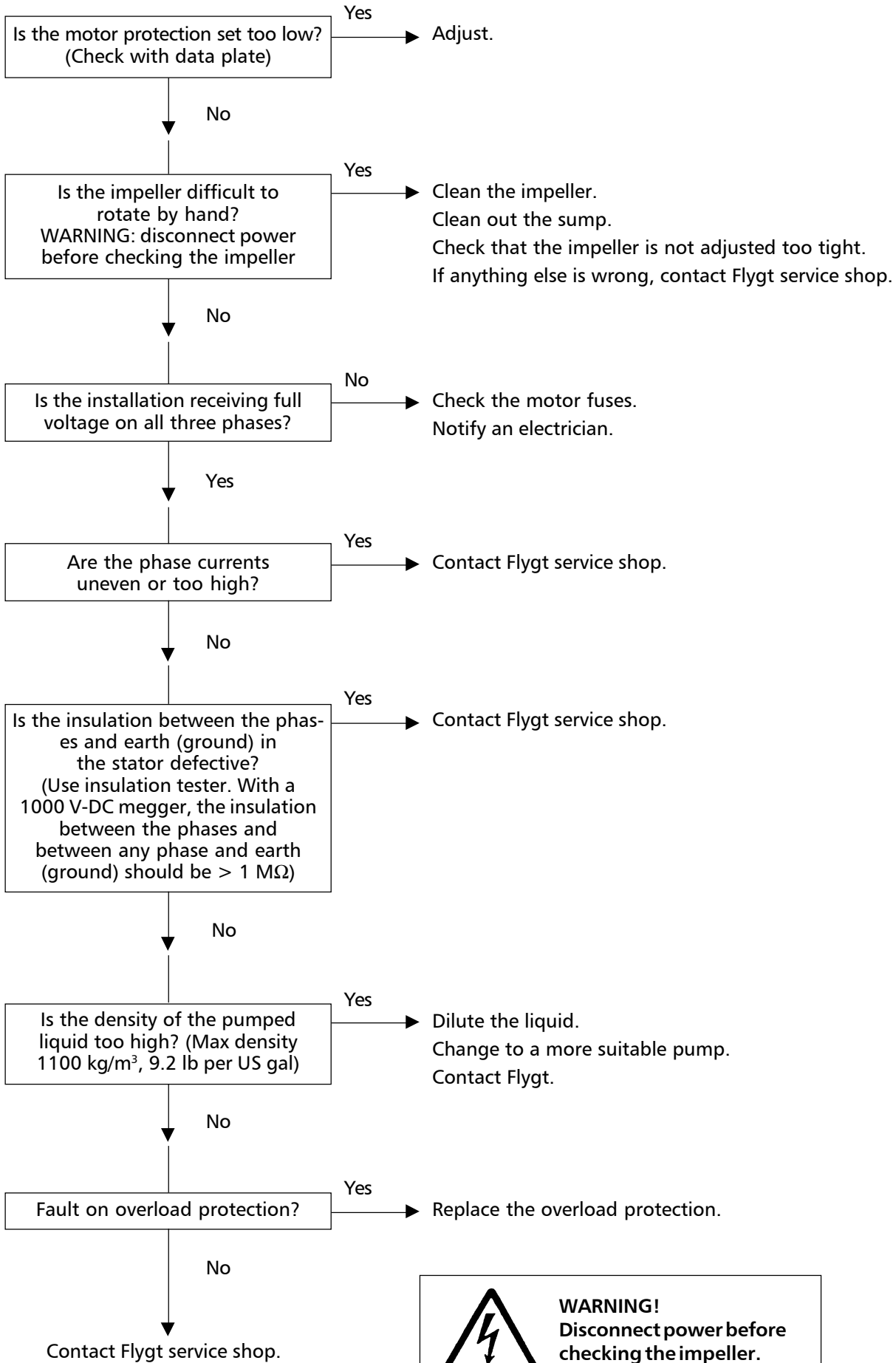
**Follow local safety regulations and observe recommended safety precautions.**

## 1. Pump fails to start



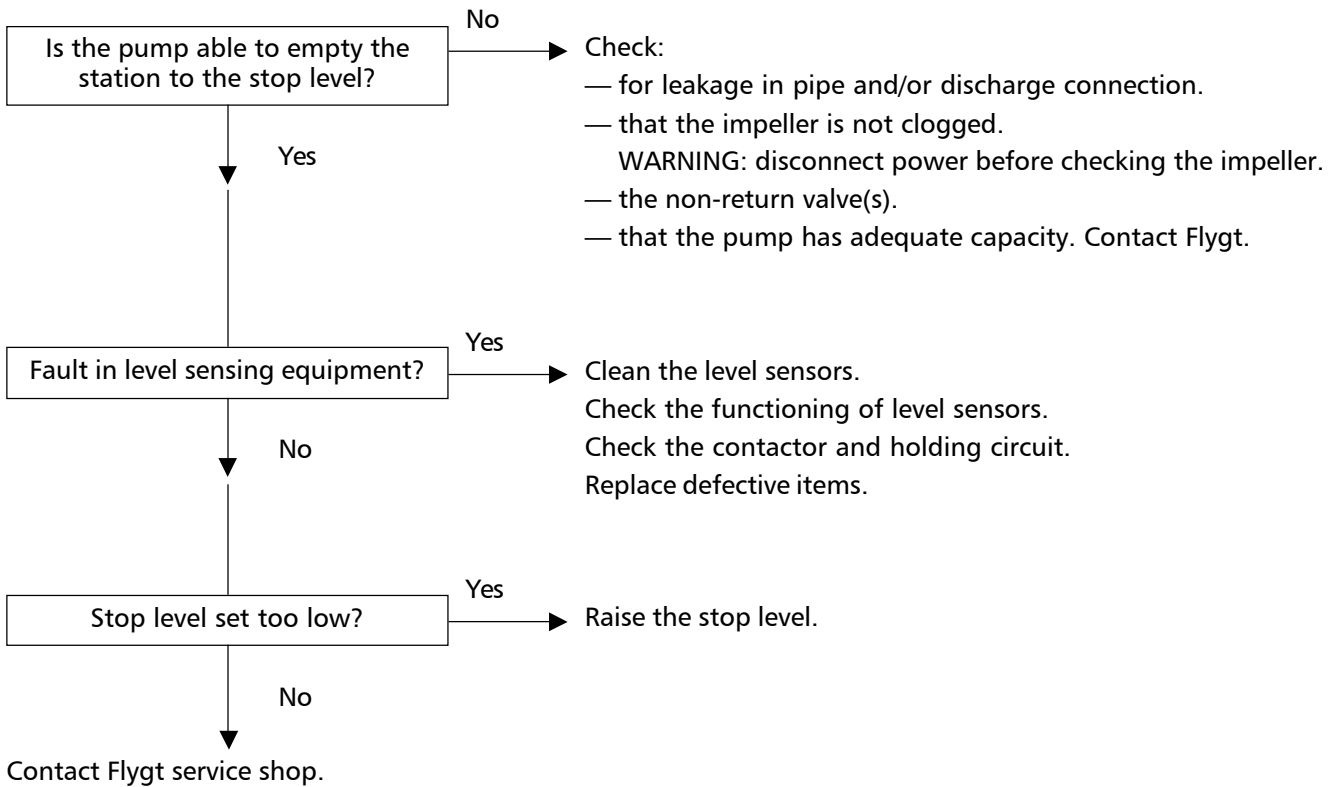
**WARNING!**  
Disconnect power before checking the impeller.

## 2. Pump starts but motor protection trips

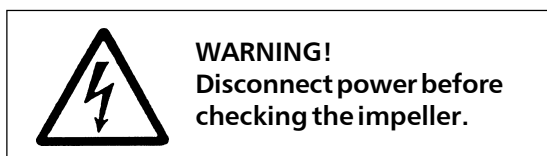
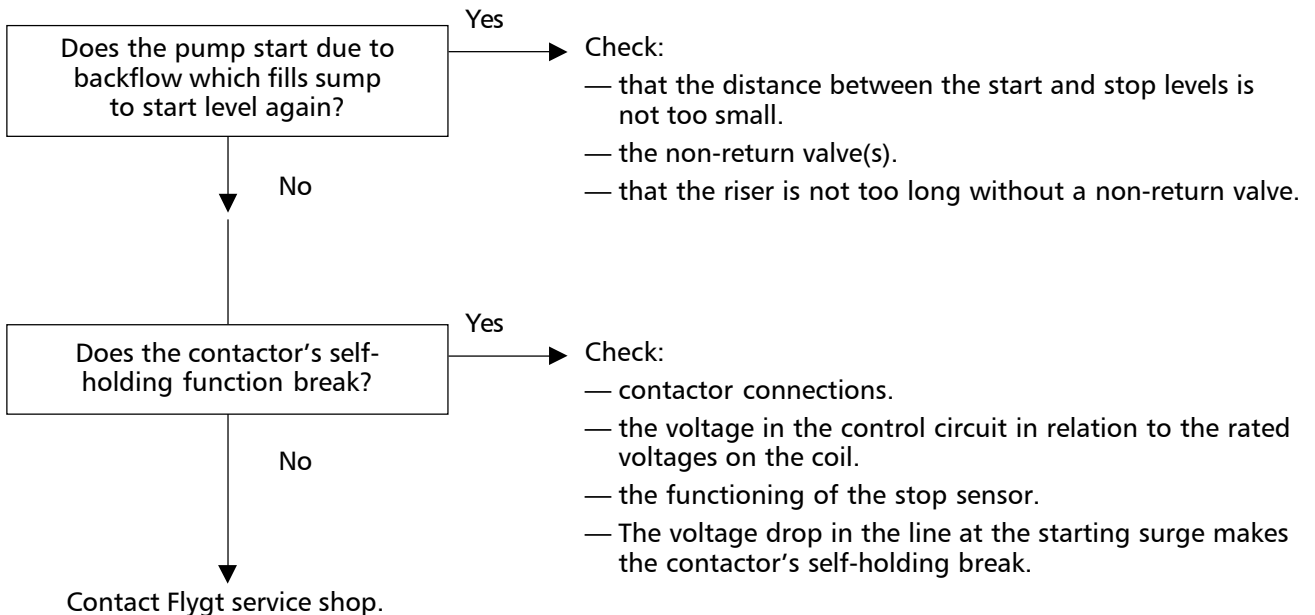




### 3. The pump does not stop (when level control is used)



### 4. The pump starts-stops-starts in rapid sequence



## 5. Pump runs but delivers too little or no water

Check:

- direction of rotation of pump, see "Before starting".
- that valves are open and intact.
- that pipes, impeller and strainer are not clogged.
- that the impeller rotates easily.
- that the suction lift has not been altered.
- for leakage in the pump installation.
- for wear on impeller, diffuser ring, diffuser.

See also under "Inspection".

**Do not override the motor protection repeatedly if it has tripped.**

# ACCESSORIES AND TOOLS

### Tandem operation

The delivery head can be increased by connecting two or three pumps in tandem.

Max. permissible operating pressure is 1 MPa (145 psi).

The vertical distances between the pumps should be approximately equal.

See special brochure that describes the procedure for tandem connection.

The following complete connection units are available for tandem connection:

Order No	Intended for
312 86 50	2075.324
312 86 60	2075.334

### Zinc anode set

In order to reduce corrosion on the pump, it can be fitted with zinc anodes.

Order No. 290 12 00

### Level sensor

Flygt supplies level sensors suited for different liquid densities and with different cable lengths. See separate brochure.

### Start and control equipment

Flygt has suitable start and control equipment for the pump.

Contact Flygt for further information.

### Tools

Besides ordinary standard tools, the following tools are required in order to perform the necessary care and maintenance of the pump:

Order No.	Description
203 16 40	Impeller puller

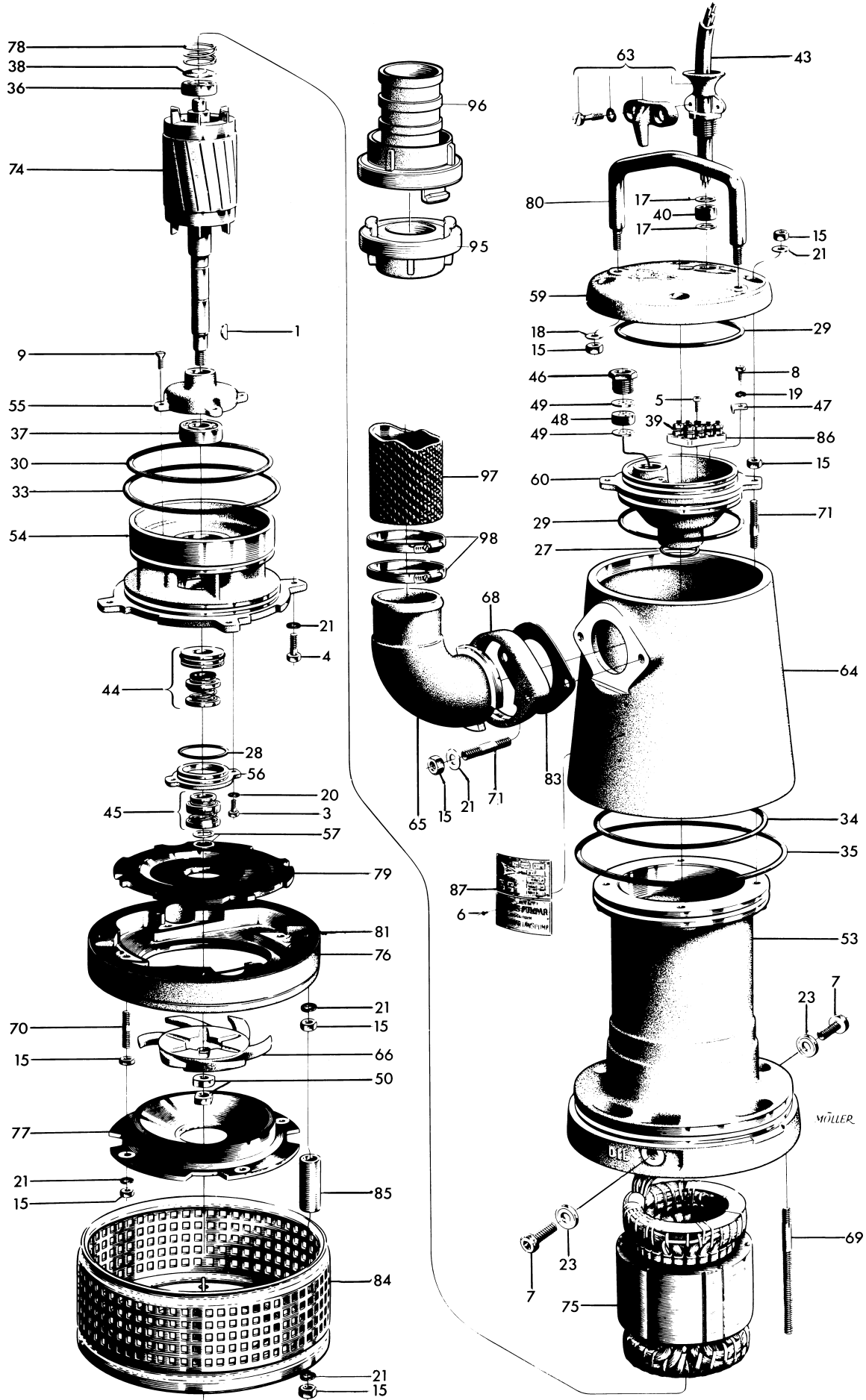
For further information on tools, see Flygt's Tool Catalogue.

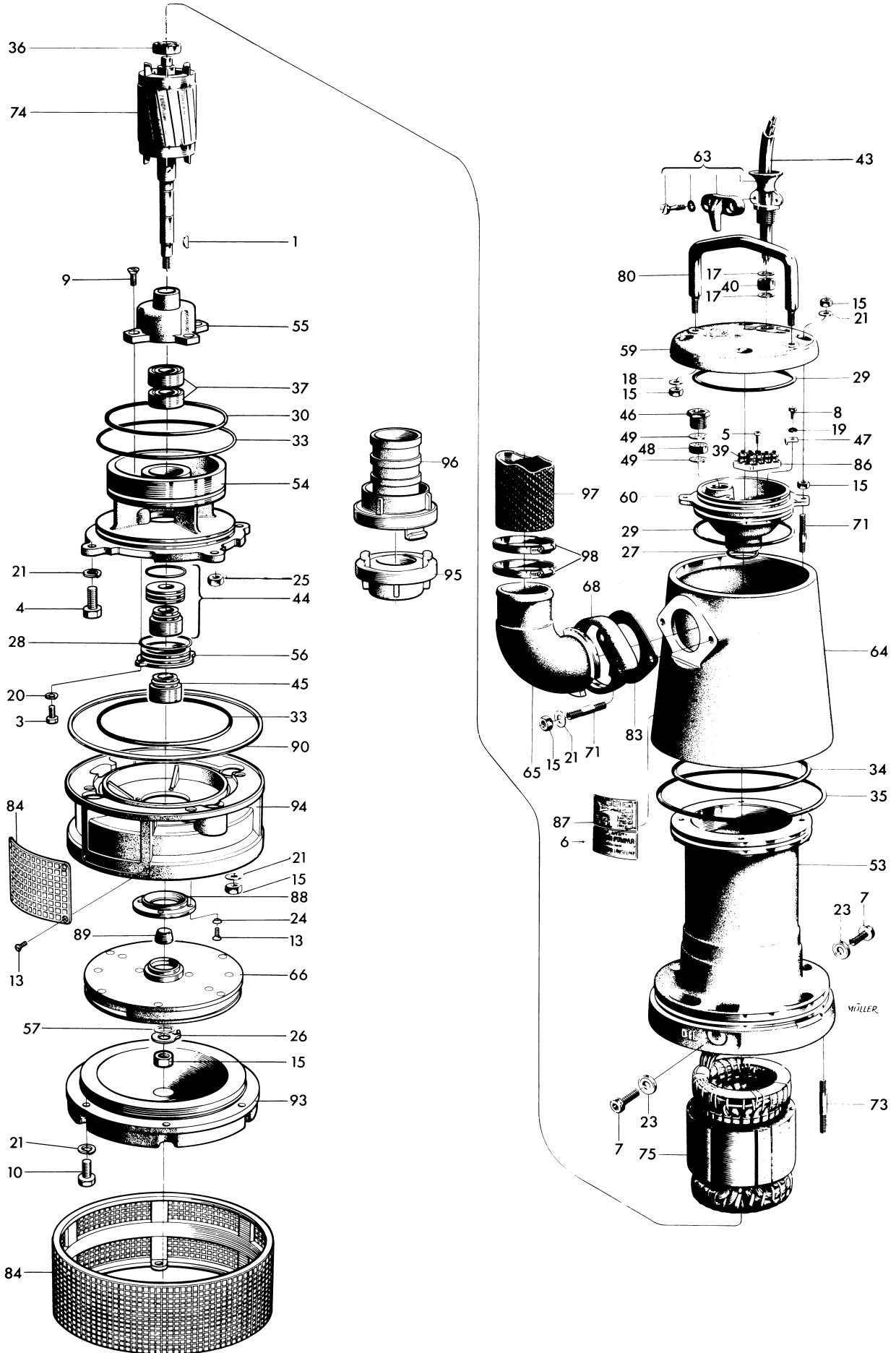
# SERVICE LOG

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

# SERVICE LOG

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





# NOTES

A series of horizontal dotted lines for writing notes.



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