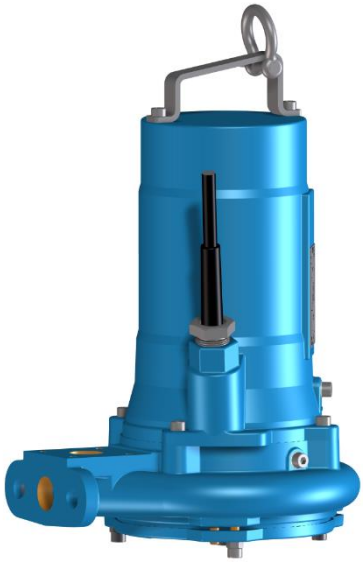
Operation & Maintenance Manual

DSP22-05/08



DSP22-04/07

Submersible cutter pumps type DSP

Contents:

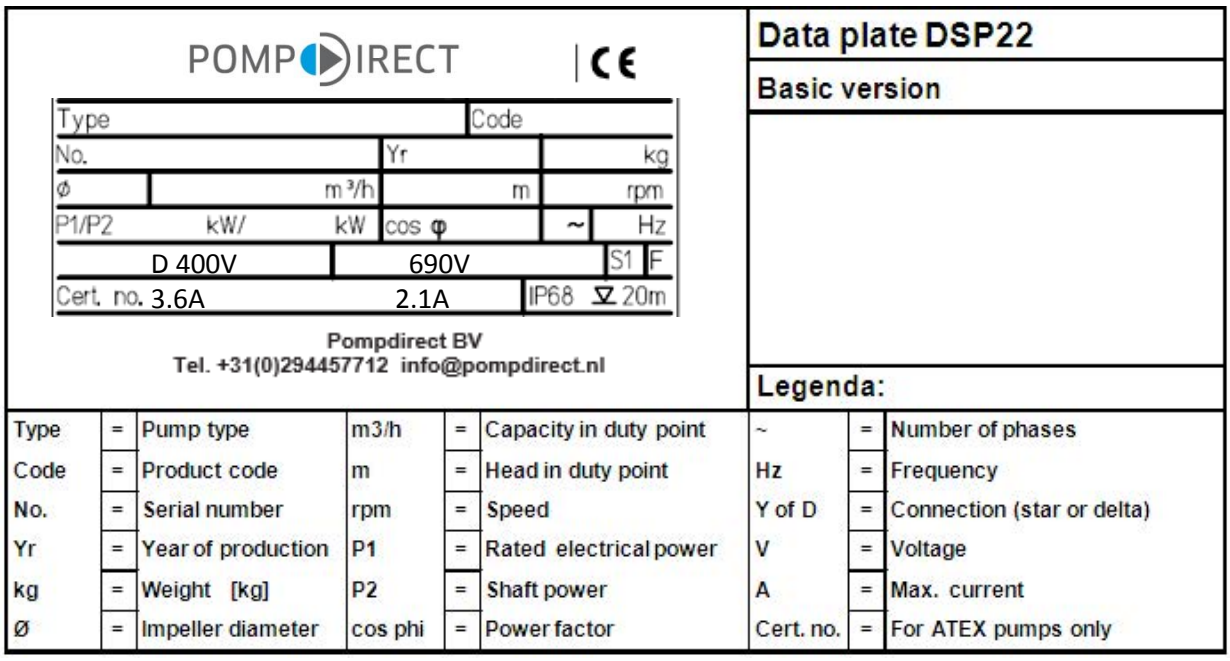
Foreword:

This manual includes several warnings, installation guidelines and safety instructions. Before installation, please read carefully to avoid dangerous situations, which can lead to severe physical injury, and which could also damage the pump.
The DSP cutter pump is typically designed to pump small quantities of waste water with high heads. Large solids are cut into small particles by triple blade rotating over a cutter plate.
The pump is equipped with a heavy duty Epoxy coating for long operational use.

The DSP pumps are designed for professional use only.
Only trained and skilled personnel may install, maintain and operate the pump.

Pump identification:

The main characteristics are given on the data plate, which is connected to the pump



Pump control:

The pump control is part of the electrical installation.
Please read carefully the specific user instructions for the electrical installation.
These instructions, including the wiring diagram, are necessary for safe installation.

Usage limitations:

The DSP cutter pump is designed to pump normal household sewage water. The cutting mechanism cuts long fibrous materials into small parts.

The DSP pump in Basic Version may not be installed in potential explosive atmospheres. For these applications use the Explosion Proof Version.

General safety instructions before installation or maintenance:

The following safety instructions should be followed up very carefully to avoid severe injury or damage.
Before maintenance or inspection, both mechanical and electrical, always switch off the pump.

Turn off the main power supply, log out and tag out according local procedures!

Remove the fuses (if applied) and store them in a safe place.
Switch off the emergency power supply if available.

Alert other people with a clear warning to make aware of this service or maintenance operation.

For servicing the pump, and replacing the oil to bring the pump into horizontal position. This position is also needed to check the rotation of the pump.
Be aware the recoil can be very powerful, don't go near rotating parts, or stand close to the pump when testing.

Never put your hand into the pump if no safety measures are taken!

When it is necessary to inspect the pump outside the sump, please close the cover of the pump sump, and take care about the following:
Check carefully the power cable for bends and jamming.
To avoid cable damage put a decent spacer between pump cover and the sump

Never use the power cable to hoist the pump!
Avoid any risk, that might damage the power supply cable.

Always use safety shoes and safety gloves when handling the pump.

Make sure all safety measures are comply with the legal laws and provisions, such as the specific Labour Safety Instructions for confined spaces.

Environment:

Parts which will be replaced during repair, maintenance or renewal, could contain materials which may be harmful to the environment.
Please be aware that some of the components can be very useful for recycling.
The owner is responsible for careful disposal and processing of the materials.
Do this in according to the local environmental regulations.

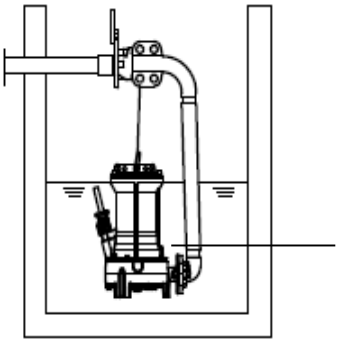
Installations:

For the DSP pumps several installation options are possible.
These options will be explained, with focus on specific points of attention.

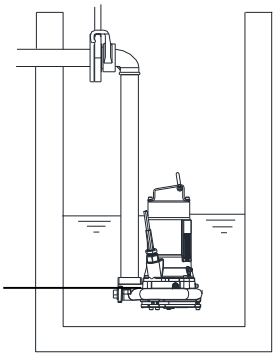
Installation “BWK”

This installation represents a permanent submerged installation using the header coupling” type “BWK” or “BWK-L”.

DSP22-05/08+BWK050



DSP22-04/08+BWK050L

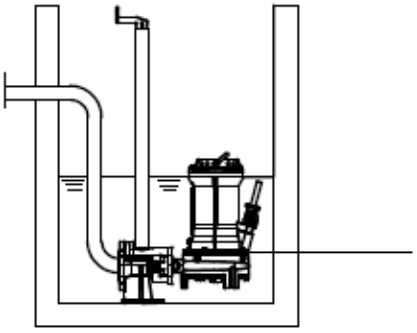


Points of attention:

- Ensure a good free passage under the pump.
- Adjust start- and stop levels in such a way that the motor will not make more than 20 starts per hour.
- Check that the motor is adequately cooled.
  At full load conditions, at least 2/3 of the motor housing should be submerged.
- The pump casing must stay submerged to avoid air being drawn in.

Installation “OWK”

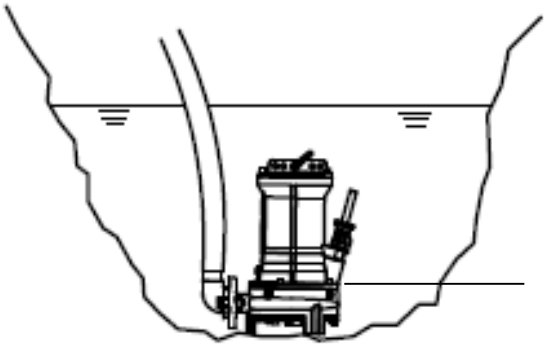
This installation represents a permanent submerged installation using the guide bar coupling” type “OWK050”.



Points of attention:

- Ensure a good free passage under the pump.
- Check both the vertical and parallel position of the guide bar.
  The maximum tolerance for the vertical position is ± 3°.
- The installation angle for the pump in case of installation or taking out is important.
  This angle (between pump and guide bar) is between 0° and 5°.
  The angle can be adjusted by changing the position of the hoisting cable.
- Adjust start- and stop levels in such a way that the motor will not make more than 20 starts per hour.
- Check that the motor is adequately cooled.
  At full load conditions, at least 2/3 of the motor housing should be submerged.
- The pump casing must stay submerged to avoid air being drawn in.

Installation "VRS"
This installation represents a permanent freestanding submerged installation.



Points of attention:

- Ensure a good free passage under the pump.
- Adjust start- and stop levels in such a way that the motor will not make more than 20 starts per hour.
- Check that the motor is adequately cooled.
  At full load conditions, at least 2/3 of the motor housing should be submerged.
- The pump casing must stay submerged to avoid air being drawn in.

Noise level:

In pump installations in sumps, with closed pump cover, the noise level will not exceed 70 dB(A).

Hoisting device:

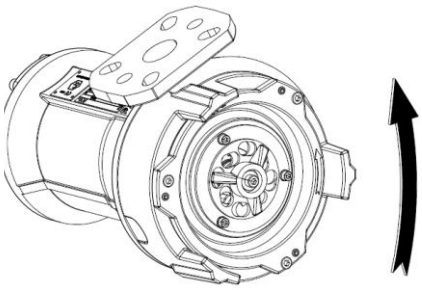
Submersible pumps can be hoisted out of the sump by means of an adequate lifting device.
Pompdirect is able to deliver this certified equipment.

Hoisting cable:

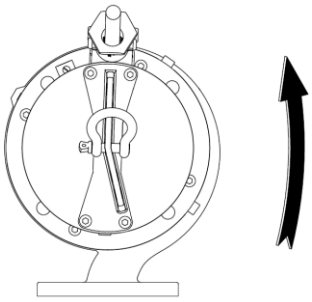
If applied, please replace the stainless steel hoisting cable every two years, or accordingly to local regulations.

Starting up:

Rotation control:



The correct direction of rotation is counter clockwise (c.c.w.), looking at the suction opening of the pump (see picture).
See also the arrow on the suction cover.
Place the pump into horizontal position,
start the pump short time,
check visually the direction of rotation,
Please follow all safety measures!.



The correct direction of rotation can also be checked by observing the recoil of the pump during start up.
Looking at the motor the recoil should be counter clockwise (c.c.w.)

Minimum water level:

The pump should operate with sufficient cooling.
This means that at least ⅔ of the motor is submerged.
Reducing this minimum level means the motor runtime is limited to a maximum of 15 minutes, to avoid overheating. The cooling down time is at least twice the running time.

Electrical pump connection:

The different connections for the cables are specified on page 8 and 9.
Check the cable type, installed on the pump and verify the data onto the pump data plate.
Check if the pump is equipped with extra leads for thermal protection and/ or water in oil detection.

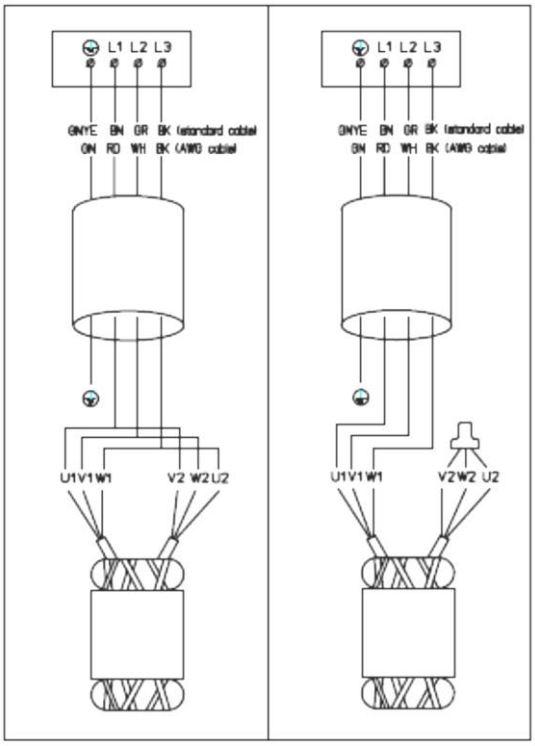
We do strongly recommend to connect the pump to the mains by authorized personnel only.
Please ensure this is done accordingly and in compliance with local regulations.

Spare parts:

For ordering spare parts please contact your supplier.
Parts list and sectional drawings are available on request.
When ordering spare parts, please specify the following data:
Pump type, product code, serial number.
This information is available on the data plate of the pump.

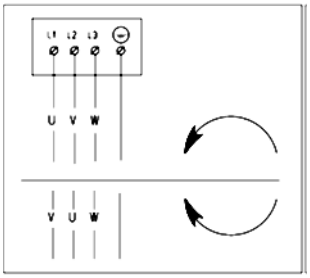
Cable connection direct start of the pump (DOL)

Without klixons and/ or water in oil detection



Motor in delta Motor in star

1x 4 core cable



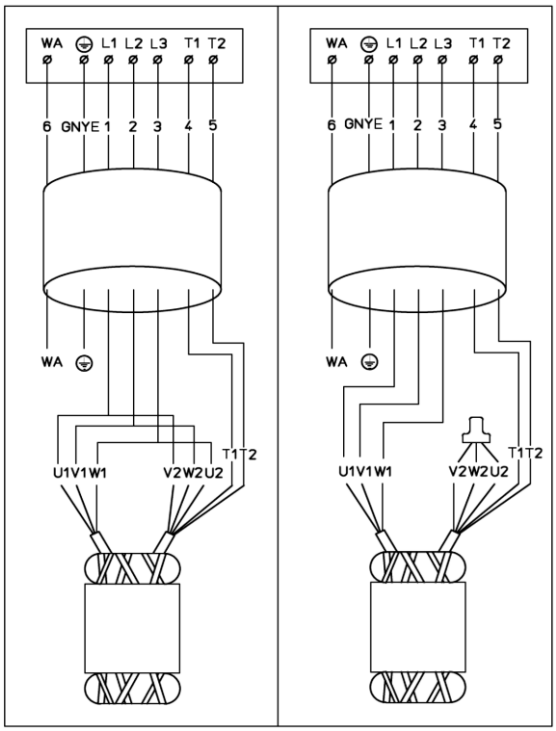
Opposite direction of rotation

Standard cable:	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
L1,L2,L3	3 phase line

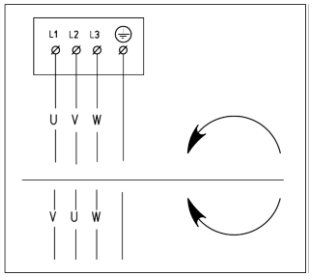
AWG cable:	
RD	Red
WH	White
BK	Black
GN	Green
L1,L2,L3	3 phase line

Including klixons and/or water in oil detection

1x 7 core cable



Motor in delta Motor in star



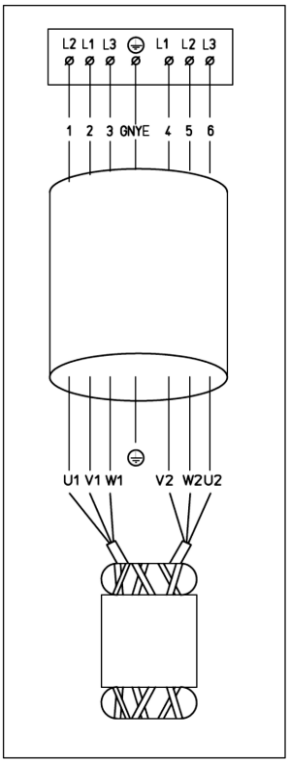
Opposite direction of rotation

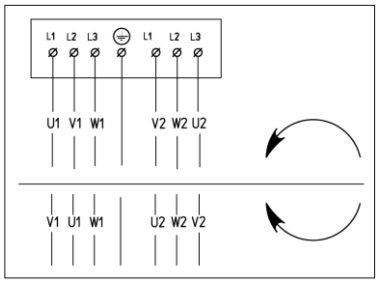
GN/YE	Green/ Yellow
T1, T2	Klixons
WA	Water in oil detection
L1,L2,L3	3 phase line

Cable connections star-delta start of the pump (YD)

Without klixons and/or water in oil detection

1x 7 core cable



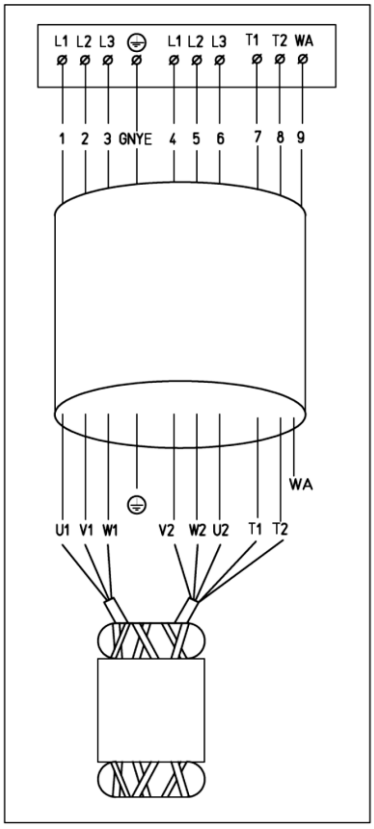


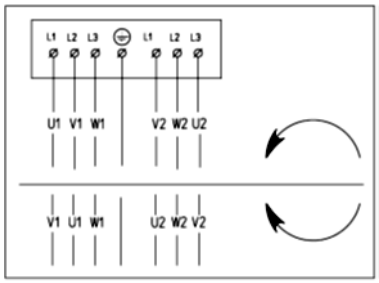
Opposite direction of rotation

GN/YE	Green/ Yellow
L1,L2,L3	3 phase line

With klixons and/or water in oil detection

1x 10 core cable





Opposite direction of rotation

T1, T2	Klixons
WA	Water in oil detection
L1,L2,L3	3 phase line

Checkpoints first pump start:

Before installing and operating the pump following checkpoints are important:

- Check on delivery
  Remove the pump from the packing and check for transport damage, such as material errors, cracks or damaged cable.
- Check for completeness of the delivery.
  If the delivery is incomplete, or damaged, please contact your supplier immediately.
- Check oil level
  Verify the oil level in the seal housing
- Check Power supply.
  Verify if voltage, frequency and starting method are according to the data as specified on the pump data plate.

Connect the pump according to the wiring diagram of the electrical cabinet.
Information about the pump cable codes can be find on page 8 or 9.

- Check for thermal protection
  Check the pump for the presence of thermal protection (Klixons), the connection values for the standard thermal protection are max. 250V-1.6A. In 'cold' condition the switch is closed.

  As an option Thermistors (PTC) can be ordered. The resistance in "cold condition" is between 200 and 500 Ohm. When the switching temperature is reached the resistance will be between 1650 and 4000 Ohm.

- Check condition cable entry
  Especially when the pump has been stored for a long time, the compression of the rubber seal might be diminished. Turn the cable entry clock wise for 1/6 turn, turn if necessary to tighten the rubber gland of the cable entry.

- Check motor protection
  Verify the presence of the motor protection circuit breaker.

  At direct start (DOL) the motor circuit breaker should be set at the current value given on the data plate of the pump.
  At star delta start (YD) the setting of the motor circuit breaker should be 0.6 of the current value on the data plate of the pump.

Maintenance:

Before removing the pump from the installation, please switch off the mains, according to the instructions on page 4.
Clean the pump adequately!
Take care! The surface of the pump can be hot, especially when is just switched off.

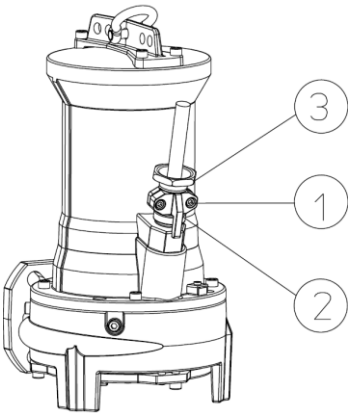
Maintenance schedule:

- After the first 100 operating hours; Check the condition of the oil.
  If too much water is mixed with the oil, please contact your supplier.
- Every 1000 operating hours or each year; - Check both the condition of the oil and the oil level.If too much water is included, please contact your supplier.
- Change the oil if not transparent.

Lubricants:

- The bearings of the pump are greased for life.
  Standard oil type for the mechanical seals: Shell Tellus 32, viscosity 32 cSt.
  Oil quantity: 0.5 Liter.

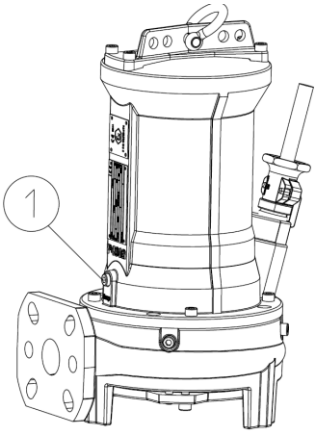
Cable entry:



If the pump is stored for long time, the elasticity of the rubber gland might be diminished.
This can lead to leakage to the motor compartment.
By turning-in the cable entry clockwise, the sealing of the gland will be secured.
Unscrew the 2 hexagon socket screws (1).
Remove the cable clamp (2).
Turn the hexagon head of the entry (3) clockwise, using
A proper tool, so far that it is possible to place the cable clamp again.
Screw-in the 2 hexagon socket screws (1).

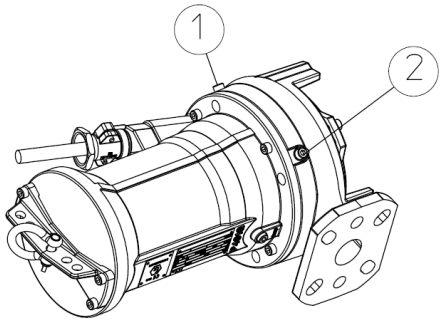
It is possible that your pump is equipped with an entry without a clamp. This depends on the used cable.

Motor housing:



Unscrew the inspection plug of the motor housing (1).
Put the pump in horizontal position with the inspection
opening downwards.
If water is present this will come out this way.
A small amount of water, due to condensation, is permissible.
More water is an indication of leakage of the construction. Oil is an indication of seal failure between motor housing and oil chamber. If so, contact your dealer.

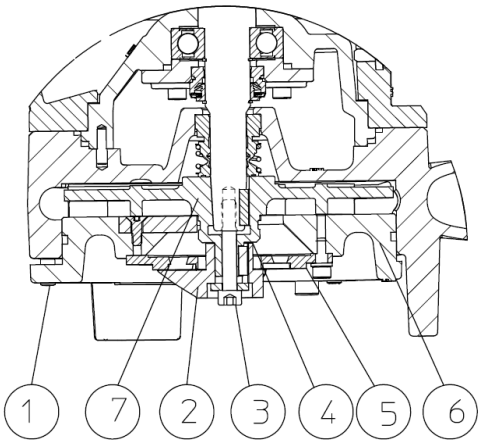
Oil level:



Put the pump in a horizontal position so that the 2 hexagonal socket screws are on top.
Unscrew the level plug (1) and the vent plug (2).
The oil level should be at the lower side of the openings.

By turning the pump a bit this should be visible.
If not so fill up to the right level.
Always use the right kind of oil !

Adjustment of the cutting mechanism:



The pump is supplied with a correctly adjusted cutter mechanism.
The adjustment is realized with shims (4) between knife (2) and impeller (7).
If due to wear the clearance between the knife and cutting disc is too large the clearance can be restored by adjusting the suction cover a bit.
For this you can use the adjusting screws and bolts (1)

If for inspection or renewal suction cover is removed, re-assembling must take place in the next sequence:

1. Fix the impeller, without knife (2), on the shaft with a temporary thrust ring and bolt.
2. Turn back the adjusting screws (1) into the suction cover (6).
3. Put the suction cover with cutting disc (5) in the pump casing, and push it down until it touches the impeller vanes.
4. Fasten the three connecting bolts (1b) by hand and unscrew them half a turn.
5. Fasten the three adjusting screws (1) , to fix the suction cover.
6. Check that the impeller can rotate without much force.
7. Remove the temporary thrust ring and bolt, mount the knife (2) **without key**. Use shims (4) to correct the clearance (max. 0.15 mm.).
8. Remount the knife **with key** and check clearance again.

Now the pump is operational again.

When unscrewing or tightening the bolt (3) use a proper tool to block the knife without damaging it.

Take care of sharp edges when removing or mounting the knife!

Special tool:

Use special tool part no. 7G8437 to remove the impeller if necessary.

Trouble shooting:

Make sure the mains are switched off during inspection.

Only trained and authorized people may install and maintain the pump.

Make sure the pump will not start unexpectedly.

Don't go near to rotating parts of the pump

Observe the local regulations for installation, maintenance and repair!

Problem:	Possible cause:	Required action:	Checkpoints:
Pomp does not start	No voltage on the terminals	Check power supply	* main switch * installation switches * all auxiliary switches * voltage relay
		Check motor protection	* earth leakage relay * the auxiliary switches * motor protection relay * water in oil relais
		Check start- and stop signals	* too low level * obstructed level switches * engaged emergency stop * general electrical error
	Wrong pump cable connection	Measure cable wires	* check motor phases
	Blockage impeller	Check pump and/or impeller	* impeller or pump jamming
Pump does not stop	No stop signal	Check level switches	* level switches * general electrical error
	Wrong start / stop signal	Check level switches	* installation switches * level switches * settings level switches
Pump start and stops repeatedly	Fault in power supply	Check power supply	* main switch * installation switches * switch thermal protection
	Level control system not stable	Check level switches	* installation switches * level switches * settings level switches
	Motor overload	Check motor protection	* wrong direction of rotation * impeller blockage * motor protection relay
Motor current too high	Supply failure	Check power supply	* voltage monitoring relay
	Pump failure	Check pump	* impeller blockage * medium specific gravity too high
No flow or too low pump capacity	Jamming or airlock in discharge pipeline	Check discharge pipeline	* wrong direction of rotation * blockage in discharge * valves half open or closed
	Pump failure	Check pump	* pump draws air * impeller blockage * impeller loose or damage
	Fault in power supply	Check power supply	* main switch * installation switches * switch thermal protection
High level alarm	Pump failure	Check pump	* impeller blockage * impeller loose or damage * pump draws air * damaged bearings
	Supply failure	Check power supply	* switch thermal protection * fuses * level switches * settings level switches

If the pump still fails please contact:

POMPDIRECT

Notes: