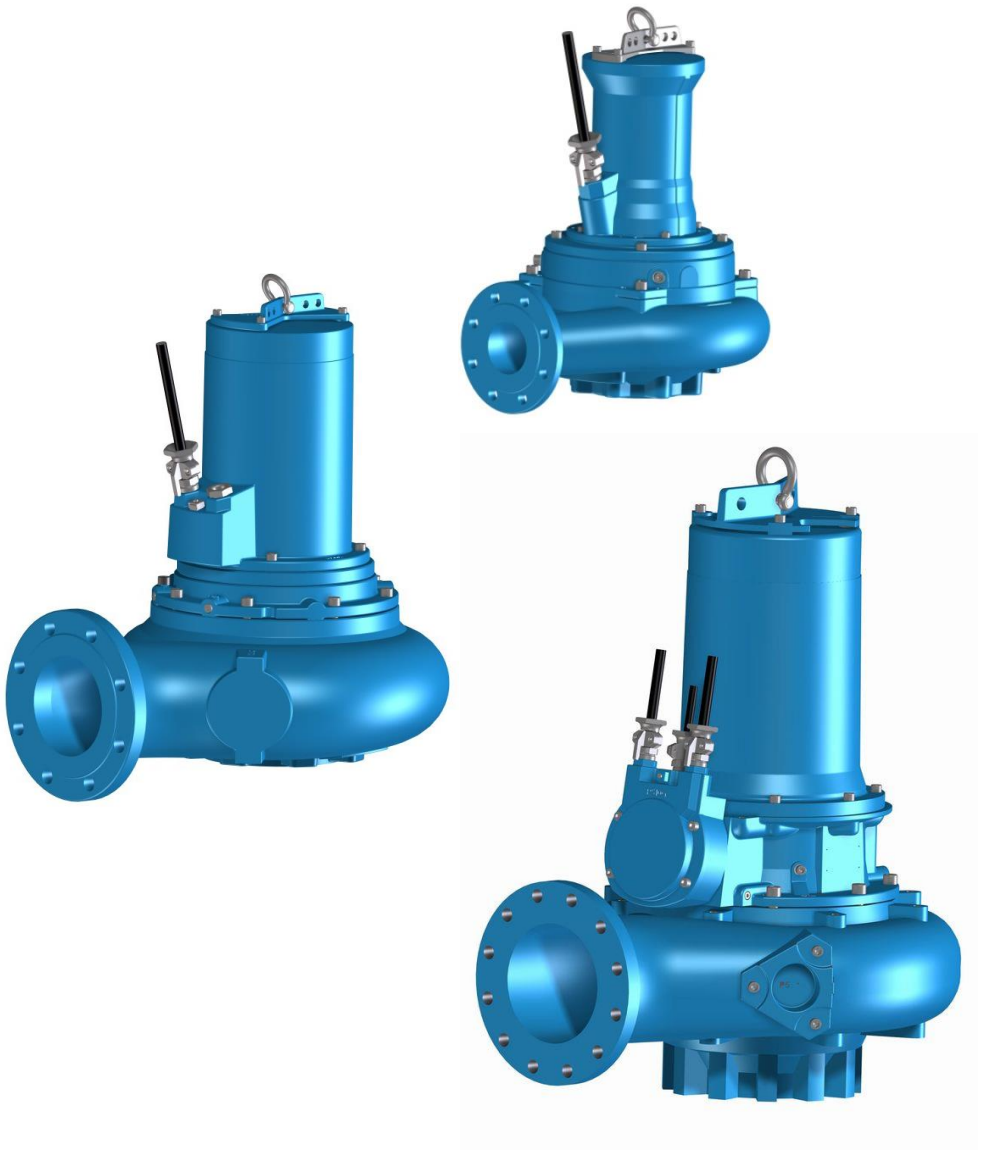
Operation & Maintenance Manual



Submersible pumps type DTP

Contents:

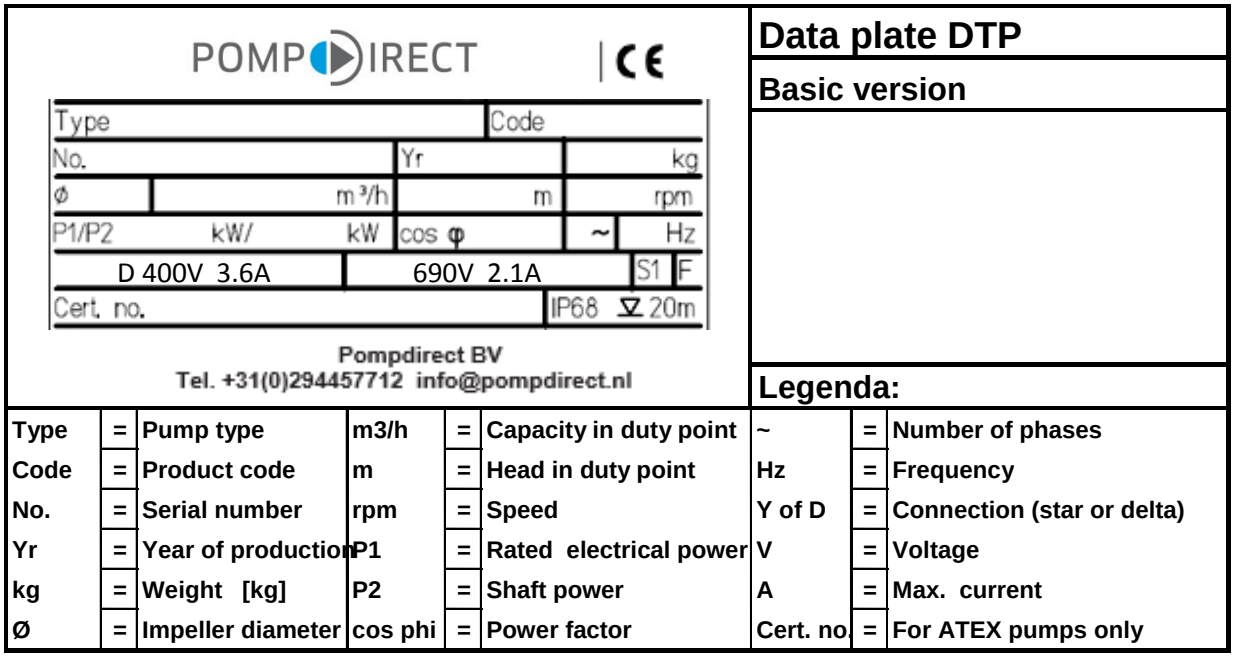
Foreword:

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 DTP pump series are typically designed to pump waste water containing long fibrous materials.
The pumps are equipped with a heavy duty Epoxy coating for long operational use.

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

Pump identification:

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



Type	**=**	**Pump type**	**m3/h**	**=**	**Capacity in duty point**	**~**	**=**	**Number of phases**
Code	**=**	**Product code**	**m**	**=**	**Head in duty point**	**Hz**	**=**	**Frequency**
No.	**=**	**Serial number**	**rpm**	**=**	**Speed**	**Y of D**	**=**	**Connection (star or delta)**
Yr	**=**	**Year of production**	**P1**	**=**	**Rated electrical power**	**V**	**=**	**Voltage**
kg	**=**	**Weight [kg]**	**P2**	**=**	**Shaft power**	**A**	**=**	**Max. current**
Ø	**=**	**Impeller diameter**	**cos phi**	**=**	**Power factor**	**Cert. no**	**=**	**For ATEX pumps only**

Power supply:

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

Usage limitations:

The pumps in Basic Version may not be installed in potential explosive atmospheres.

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 in 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 conform the legal laws and provisions, such as the specific Labor Safety Instructions for confined spaces.

Environment:

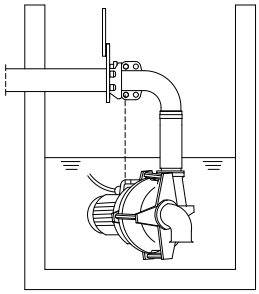
Parts which will be replaced during repair, maintenance or renewal, could contain materials which could be harmful to the environment.
Please be also aware that some of the components can be very useful for reuse.
The owner is responsible for careful disposal and processing of the materials.
Do this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

Installations:

For the DTP pumps in basic versions 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”.
The pumps are suspended in horizontal position to the coupling.

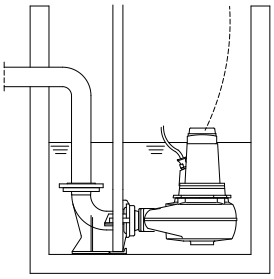


Points of attention:

- Ensure a good free passage under the pump, at least identical to the suction opening.
- 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 under water to avoid air being drawn in, a suction elbow is advised..

Installation “OWK”

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

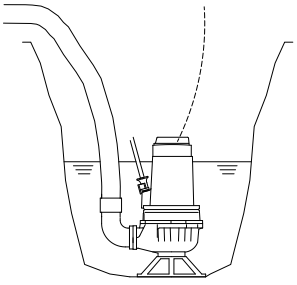


Points of attention:

- Ensure a good free passage under the pump, at least identical to the suction opening.
- Check both the vertical and parallel position of the guide bars.
  The maximum tolerance for the vertical position is ± 3^{o}.
- The installation angle for the pump in case of installation or taking out is important.
  This angle (between pump and guide bar) is about 10^{o} en 15^{o}.
  This 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 under water to avoid air being drawn in.

Installation “VRS”

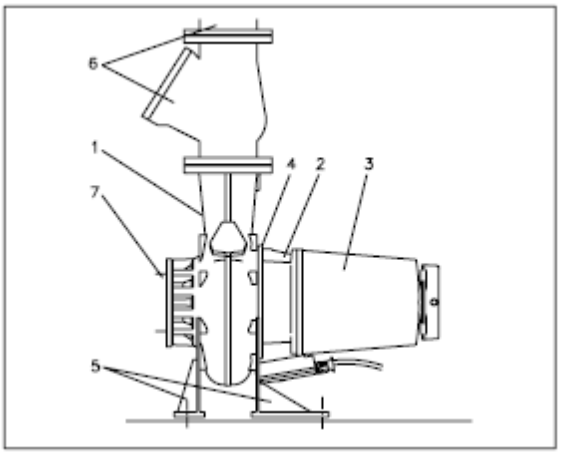
This installation represents freestanding submerged installation.

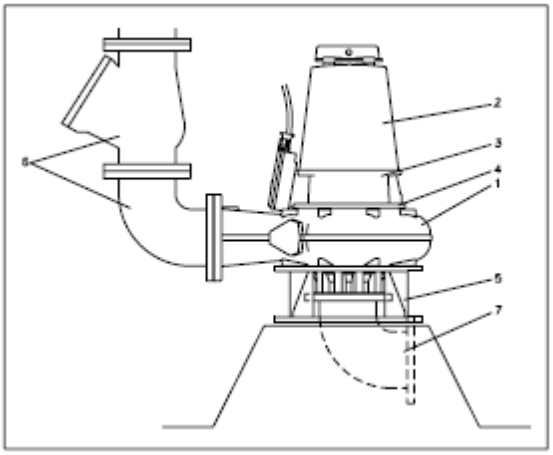


Points of attention:

- Ensure a good free passage under the pump, at least identical to the suction opening.
- 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 under water to avoid air being drawn in.

Installation “ODO”
This installation represents a dry installation where the pump is equipped with a cooling system.

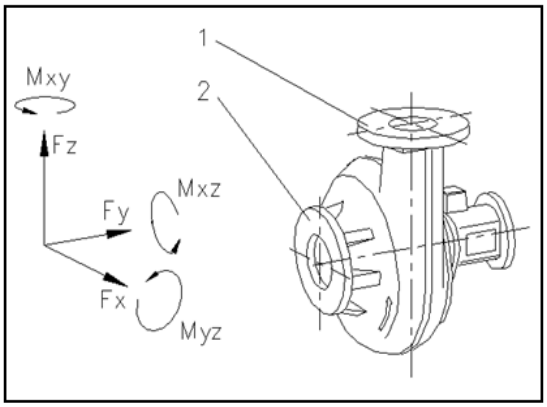




Points of attention:

- The discharge- and suction flanges should be exactly in line with the piping system.
- This installation may not create forces on the discharge- and suction flanges.
- Check the cooling system regularly for blockages.
  To do this, therefore the cooling jacket must be taken off.
  The bolts ad nuts on top of the cooling jacket, or suspension bracket must be reconnected.
  Prior to inspection, close the valves in discharge and suction pipelines!
- Adjust start- and stop levels in such a way that the motor will not make more than 20 starts per hour.

Maximum flange forces and moments:



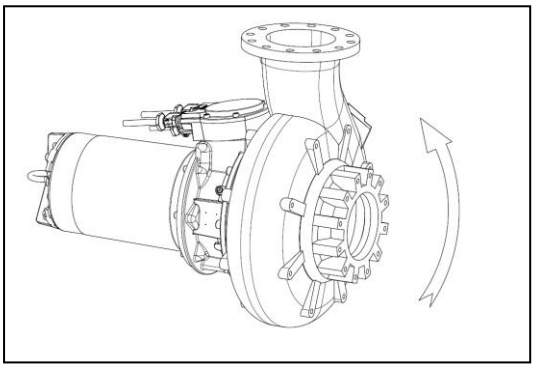
Because of the pipeline system, specific forces on the discharge and suction flanges will occur.

1. Forces Fx, Fy and Fz
2. Moments Mxy, Mxz and Myz

The forces and moments may not exceed the values stated in the table below:

Pump type	Fx [N]	Fy [N]	Fz [N]	Mxy [Nm]	Mxz [Nm]	Myz [Nm]
DTP42-30	1200	1200	2500	1000	1000	1100
DTP42-40	1200	1200	2500	1000	1000	1100
DTP42-41	1200	1200	2500	1000	1000	1100
DTP62-40	1400	1400	3000	1200	1200	1300
DTP62-50	1400	1400	3000	1200	1200	1300

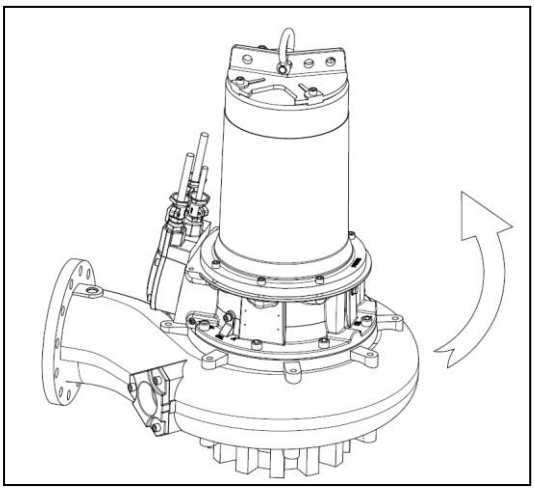
Operation checks:



Direction of rotation:

A correct direction of rotation is essential for proper operation. This can be checked as follows:

The correct direction of rotation is counter clockwise (ccw), looking at the suction opening of the pump (see picture).
Check procedure: Place the pump into horizontal position, start the pump short time, check visually the direction of rotation,
Please follow all safety measures!.



Starting the pump will give a recoil on the pump frame.
Looking at motor (in vertical position) the recoil is counter clockwise.

Take care! The recoil can be very powerful!

The pump should operate with sufficient cooling conditions.
This means for at least ⅔ part of the motor submerged.
Without this requested cooling condition, the motor runtime is limited to maximum 15 minutes, to avoid overheating. The cooling down time is twice the running time.

Noise level:

Pump installations in sumps, with closed cover, the noise level will not exceed 70 dB(A).
Dry installed pumps according to installation version ODO, the noise level sometimes may exceed 75 dB(A).

Electrical pump start options:

The different connections for the cables are specified on page 8,9 and 10.
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 personal only.
Please ensure this is done accordingly and in compliance with local regulations.

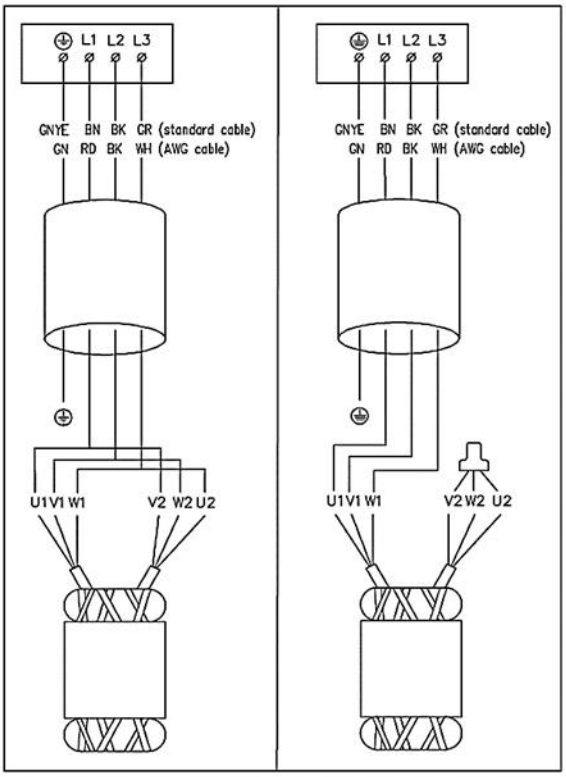
Spare parts:

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.

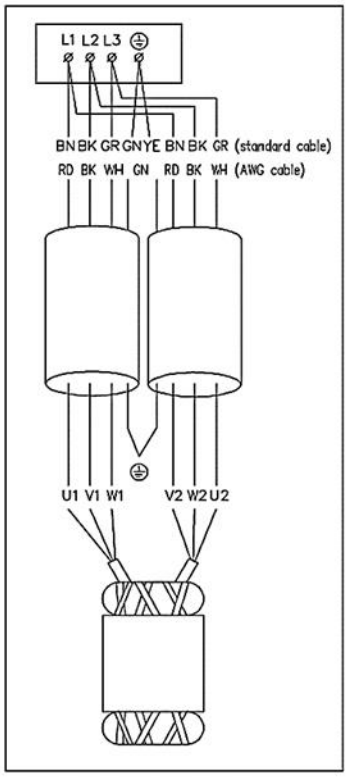
Cable connection direct start of the pump (DOL)

Without klixons and/ or water in oil detection

1x 4 core cable



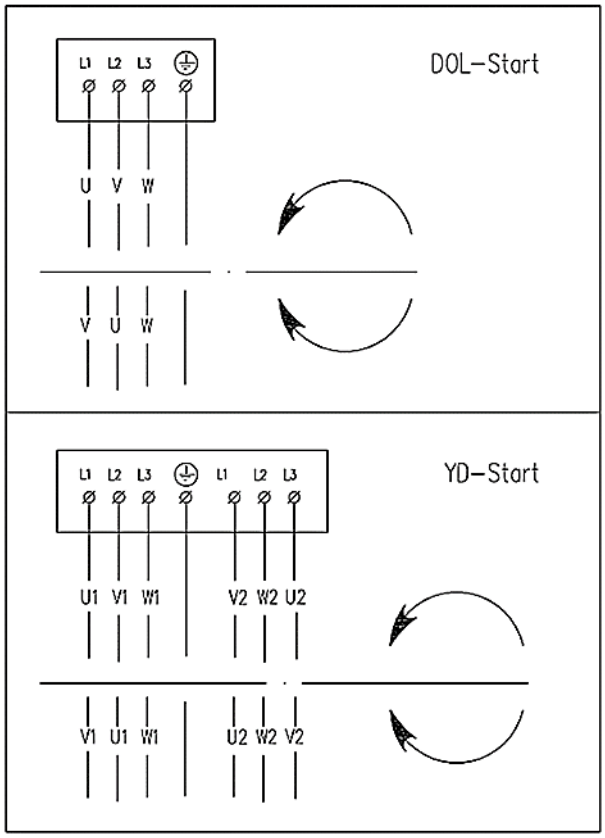
2x 4 core cable



Standard cable	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
AWG cable	
GN	Green
RD	Red
WH	White
BK	Black
L1,L2,L3	3-phase line

Motor in delta

Motor in star

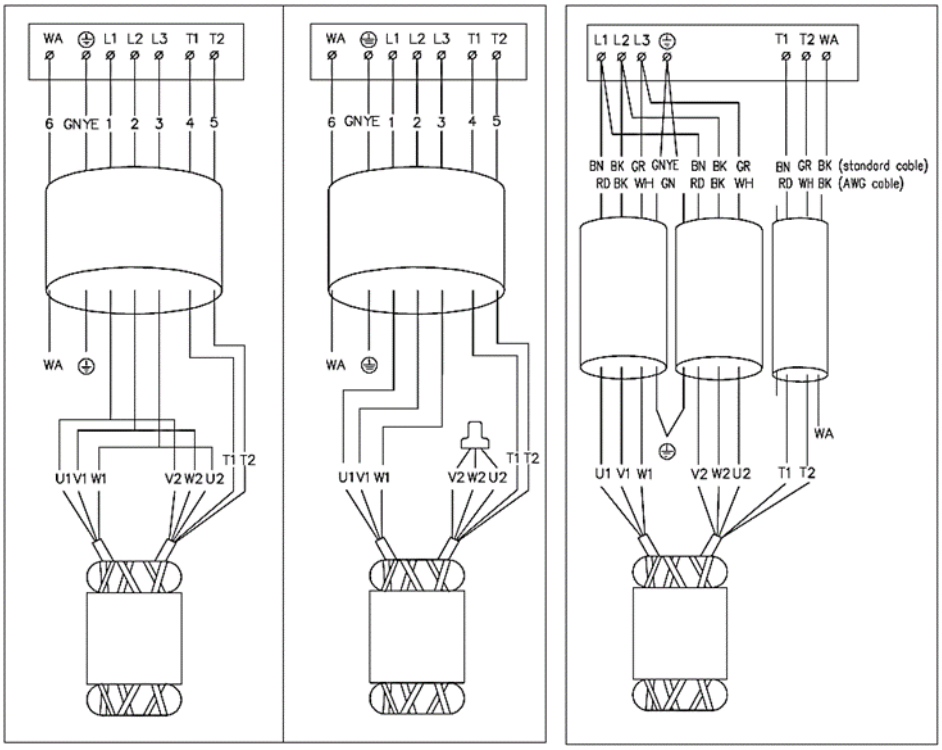


Changing the direction of rotation

Including klixons and/or water in oil detection

1x 7 core cable

3x 4 core cable

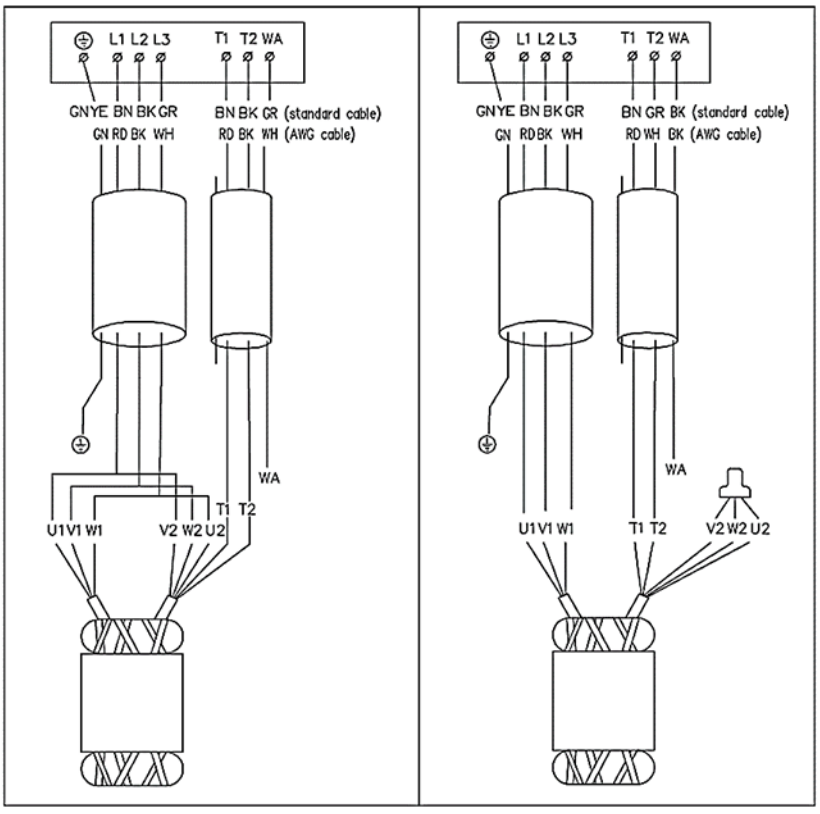


Standard cable	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
AWG cable	
GN	Green
RD	Red
WH	White
BK	Black
T1, T2	Klixons
WA	Water in oil detection
L1,L2,L3	3-phase line

Motor in delta Motor in star

Including klixons and/or water in oil detection

2x 4 core cable



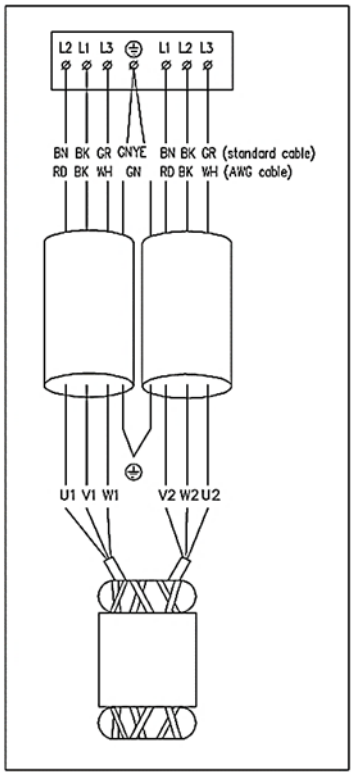
Standard cable	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
AWG cable	
GN	Green
RD	Red
WH	White
BK	Black
T1, T2	Klixons
WA	Water in oil detection
L1,L2,L3	3-phase line

Motor in delta Motor in star

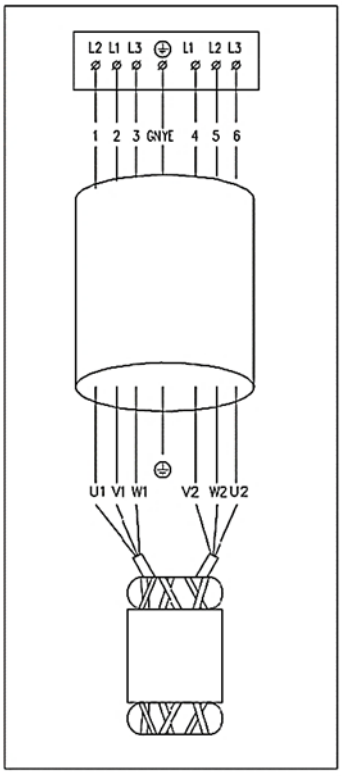
Cable connections star-delta start of the pump (YD)

Without klixons and/or water in oil detection

2x 4 core cable



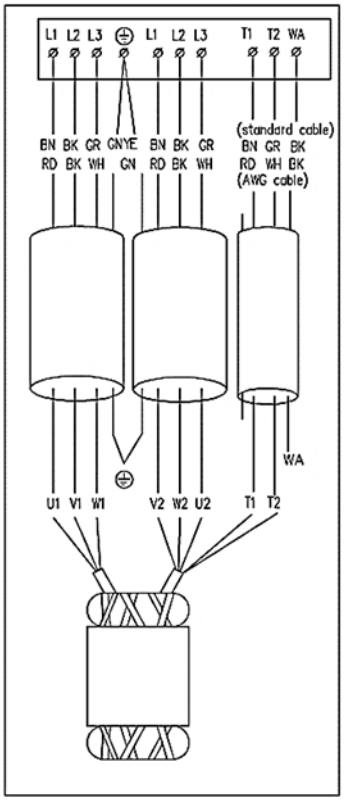
1x 7 core cable



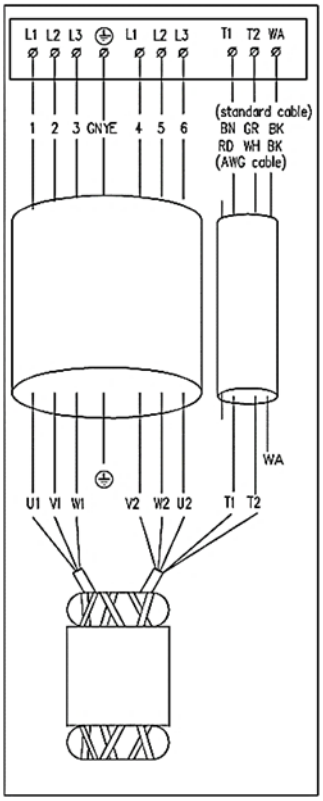
Standard cable	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
AWG cable	
GN	Green
RD	Red
WH	White
BK	Black
L1,L2,L3	3-phase line

With klixons and/or water in oil detection

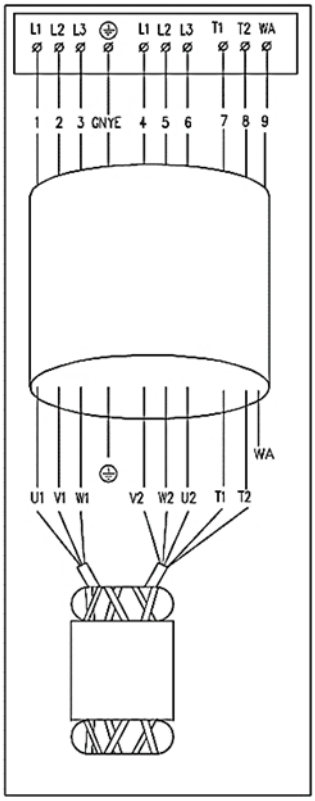
3x 4 core cable



1x 7 core cable + 1x 4 core cable



1x 10 core cable



Standard cable	
BN	Brown
GR	Grey
BK	Black
GN/YE	Green/ Yellow
AWG cable	
GN	Green
RD	Red
WH	White
BK	Black
T1, T2	Klixons
WA	Water in oil detection
L1,L2,L3	3-phase line

Checkpoint first pump start:

Before installing and start operating the pump following checkpoints are involved:

- Check on delivery
  Remove the pump from the packing and check for transport damage, such as material errors, cracks of bended 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 (according to procedures on page 12)
- 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, 9 or 10.

- Thermal protection (klixons)
  Check the pump for the presence of thermal protection, the connection values for the standard thermal protection are max. 250V-1.6A. In 'cold' condition the switch is closed.
- Thermistors (PTC), if thermistors are supplied: Resistance cold: 200-500 Ohm
  Resistance at switching temperature: 1650-4000 Ohm.
- Cable entry
  Especially when the pump has been stored for a long time. Turn the cable entry, if necessary to tighten the rubber gland of the cable entry.
- 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 taking out the pump from the installation, please switch of 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:

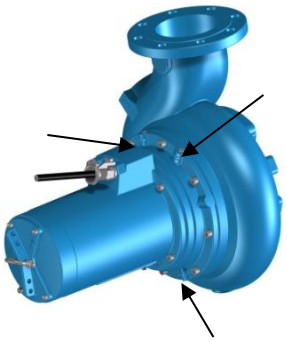
The bearings of the pump are greased for life.
Standard oil type for the mechanical seals: Shell Tellus 32, viscosity 32 cSt.
Oil quantity:
DTP22: 1.5 ltr
DTP42 : 2.0 ltr
DTP62 : 2.5 ltr.

Cable entry:

If the pump is stored for long time, the rubber gland of the cable entry 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.

Check oil level:

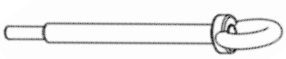
DTP22 and 42 series
Bring the pump in a horizontal position so that two hexagon socket screws are on top and one at the bottom of the seal housing. Unscrew the two on top. The oil level should be at the lower side of the openings. By turning the pump a bit this should be visible.
If the level is too low, please add accordingly.



DTP 62 series
Bring the pump into vertical position and remove the M20 filling plug, at the counter side of the cable box.
The oil level should be at the lower side of the opening.
If the level is too low, please add accordingly.
Make sure the pump cannot fall during this procedure.

Special tools:

If it is necessary to remove the impeller special screws can be used:
DTP22 and DTP42: part no. 7G8471
DTP62: part no. 7G8470



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: