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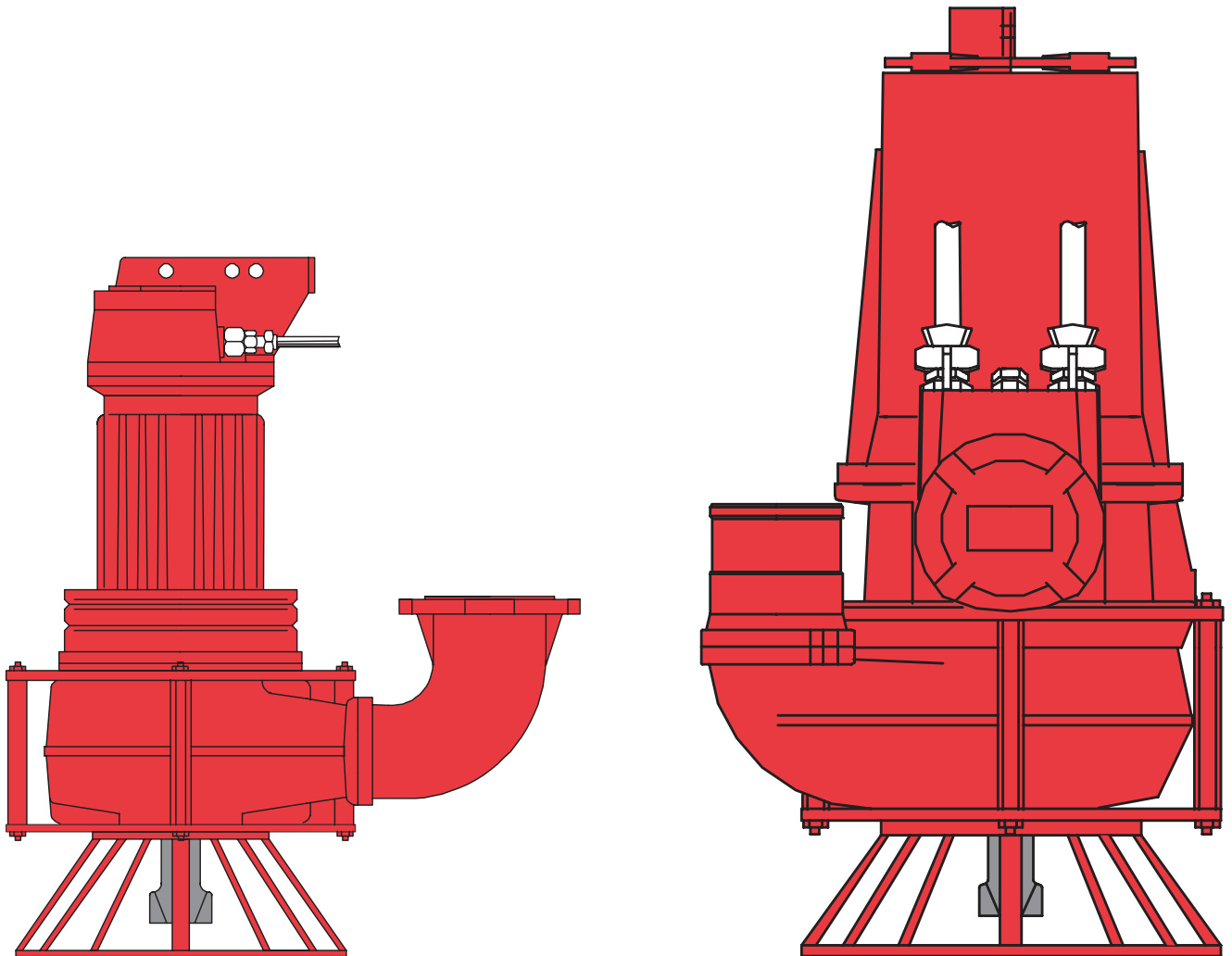
**Operation &
maintenance manual**

GRINDEX

www.grindex.com

SLURRY PUMPS

BRAVO



Congratulations on a sound choice!

Your choice of a submersible pump from Grindex has given you a pump that will serve you well for a long time to come. Grindex pumps are designed and built for continuous use in hostile working conditions.

The service life of your Grindex pump will depend to some extent on you.

If you want optimal service for the longest possible time it's important that you familiarize yourself with the advice and directions given in these instructions.

With cordial greetings

GRINDEX

Technical Manager

This GRINDEX pump has no motor protector.

The pump must be supplied with an external Motor starter fitted in the end of the pump cable.

Following Motor starters can be used:

- On/Off switch and thermal overload circuit breaker.
- On/Off switch and thermal overload magnetic circuit breaker.

For connection of motor thermal contacts circuit a Motor starter with following features must be used:

- On/Off switch, thermal overload magnetic circuit breaker and integrated thermal monitoring system.

The thermal overload circuit breaker must conform to the rated current and motor input power of actual pump.

After connection to power, always check that direction of rotation of motor is correct!

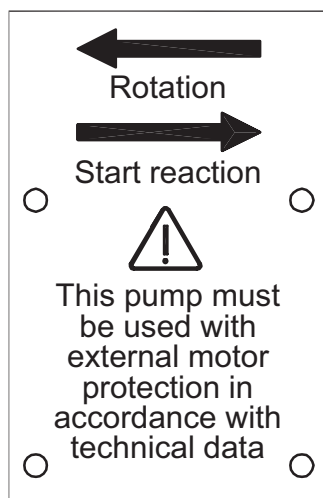
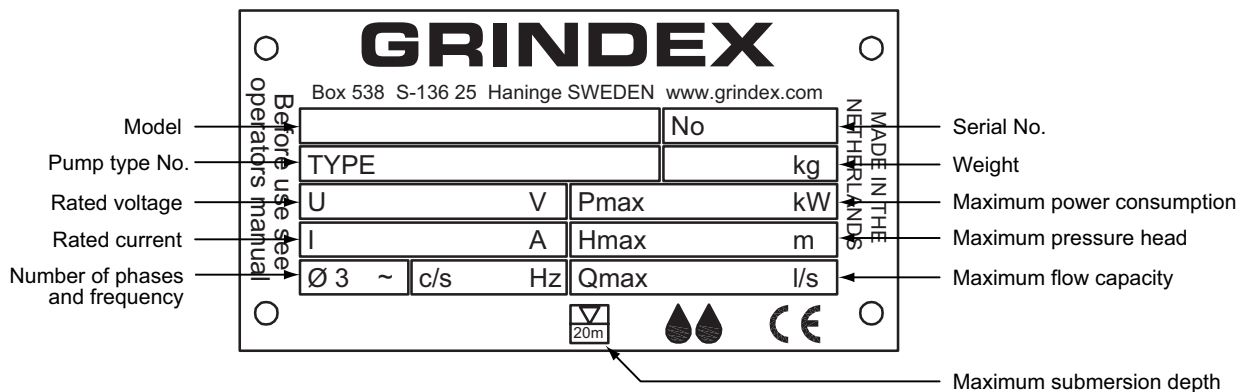
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Installation and use

Read this manual before installing the pump.

Check that you have received the right type of pump and that the pump data corresponds with what you ordered. The simplest way to do this is to check the particulars on the data plate, which you will find on the pump. The rated voltage, rated current and maximum power consumption are particularly important. On the bases of these particulars you should check that you have the right power supply, motor controller and fuse arrangement.

How to read the data plates



If you need further technical data please refer to the relevant data sheets.

Attention!

Before the pump is installed in the sump check the direction of rotation. Start reaction is counter clockwise and rotation of motor is clock-wise when the pump is viewed from top. See arrows on data plate of pump.

WARNING!

The start reaction of motor can be powerful!

Safety Precautions.

All electrical work should be performed by an authorized electrician. Follow local safety regulations and observe recommended safety precautions.

All electrical equipment must be earthed. This applies to both pump and equipment.

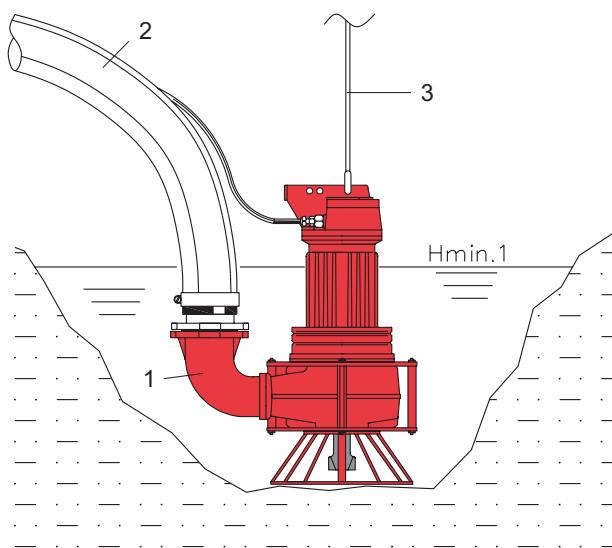
Before starting work on the pump, make sure that the pump is isolated from the power supply and can not be energized. Be sure to disconnect the power supply before attempting inspection, as pump may start automatically. Respect limitations, see page 6.

This is how to install your pump

Connect the pump to power. If rotation of motor is wrong shift two phases.

(Shift two phases in the power supply terminal or in the CEE plug, or turn the knob on phase shifter).

If the pump still doesn't start: Call a qualified electrician and ask him to check the mains and the junctions.



Except for the pump the following components are necessary:

1. Hose connection, which is fastened to the pump
2. Flexible hose
3. Lifting chain

Checkpoints before operating:

- Do not let the pump bury itself in the mud.
- Do not leave a large loop of the cable in the sump, as the pump may eventually damage it.
- Check that the motor is adequately cooled. The motorhousing should be at least 2/3 submerged for continuous operation at full load (see Hmin.1 Fig.)
- It is good practice, whenever possible, to keep the motorhousing completely under water.
- For choosing the discharge, pipe/hose inner diameter to avoid sedimentation, the following minimum critical velocities can be used as a guide.
- Contaminated water containing fine sand, the velocity should exceed 2,5 m/s.
- Water and larger solids in suspension, the velocity should exceed 3,5 m/s.

⚠ WARNING!

Switch off the current before installing or moving the pump. Make sure that suspension brackets, shackles and their means of attachment are undamaged. Before installing the pump attach a chain or wire to the suspension bracket and use it to lower the pump into the sump and lift it out again.

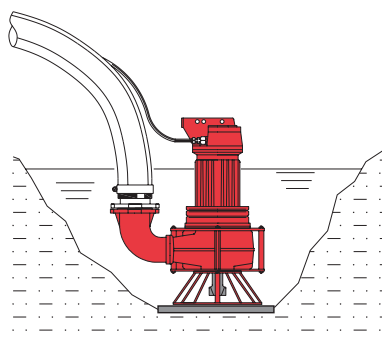
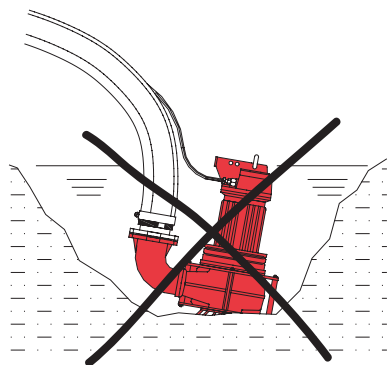
⚠ WARNING!

Never use the cable for lifting or lowering the pump.

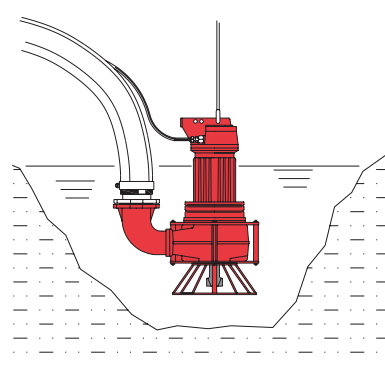
This is how the pump must stand in the sump

To attain maximum capacity and to prevent excessive wear, the pump should be positioned in one of the following ways so that it doesn't burrow itself into sand or clay.

Place the pump on a firm base which prevents it from sinking down or tilt over.

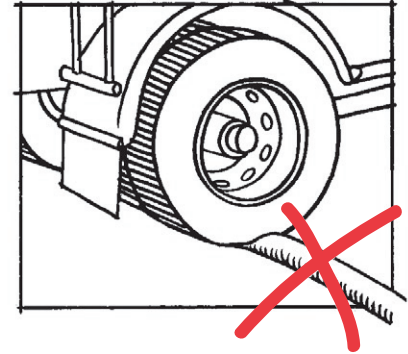
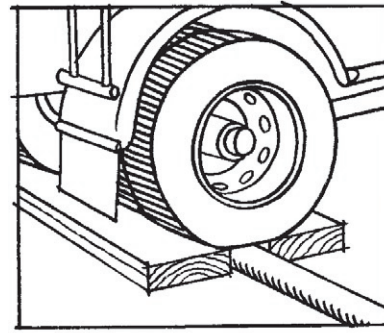
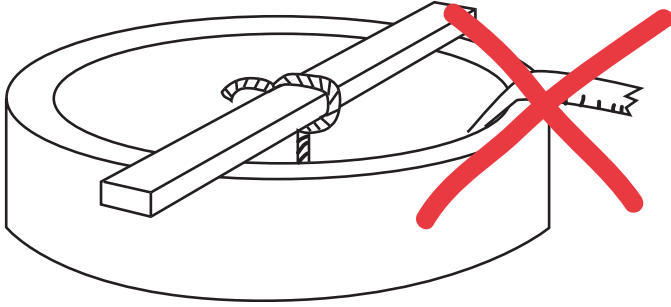


Hang the pump freely by a chain or wire



Hose

Kinks in the hose will reduce the pump capacity.



Cable and power supply

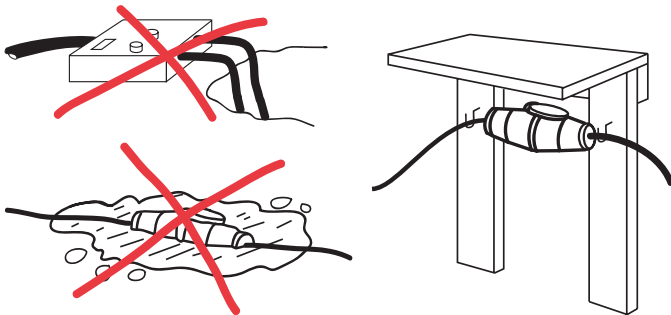
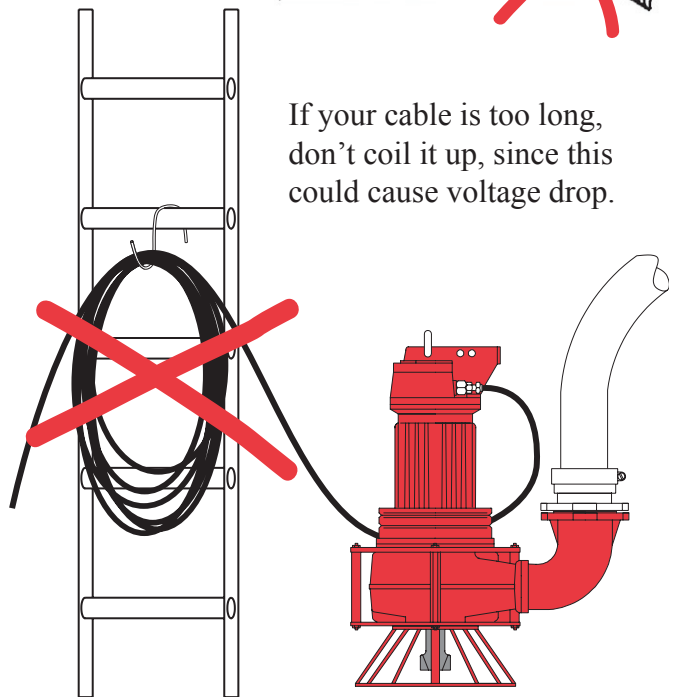
Having the right cable and handling it properly will save you from many malfunctions.

WARNING!

If the cable sheath is damaged and the cable is lowered into the water, water may enter into the junction chamber of the pump. If the cable is damaged it has to be replaced.

- If you use an extension cable, see that it is correctly dimensioned. The longer the cable, the greater the conductor cross-section you will need in order to avoid voltage drop.
- Strong sunlight can also cause voltage drops.
- If you're drawing your power from your own generator it's important that it is correctly dimensioned. Do not use the Generator setting Auto idle function.

If your cable is too long, don't coil it up, since this could cause voltage drop.



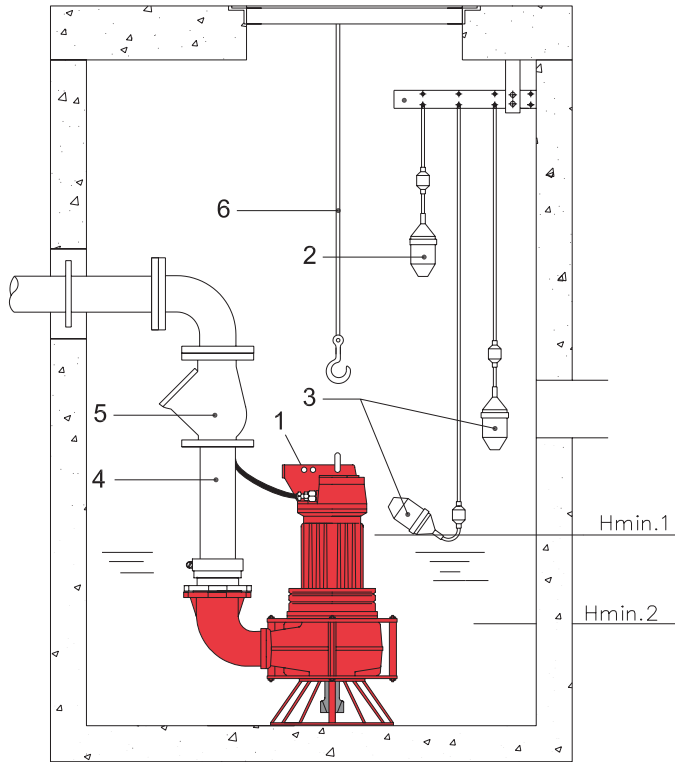
WARNING!

If persons are likely to come into physical contact with the pump or pumped media (liquid), for example on construction sites or farms etc, the earthed (grounded) socket must have an additional earth- (ground-) fault protection device (GFI) connected. When pumping near a lake (beaches, ponds and fountains etc) a safety distance of at least 20 meters (65ft) between the person and the pump is applicable.

Treat the electrical equipment with care. This will prevent both malfunctions and accidents.

- Make sure that junctions don't get into the water.
- Don't lay the starting equipment directly on the ground.

Permanent installation



1. Submersible slurry pump
2. Overflow alarm
3. Level control equipment with float switches
4. Hose
5. Non-return valve
6. Lifting tackle

In order to decide what pump would be best for a permanent installation you will need to know the following:

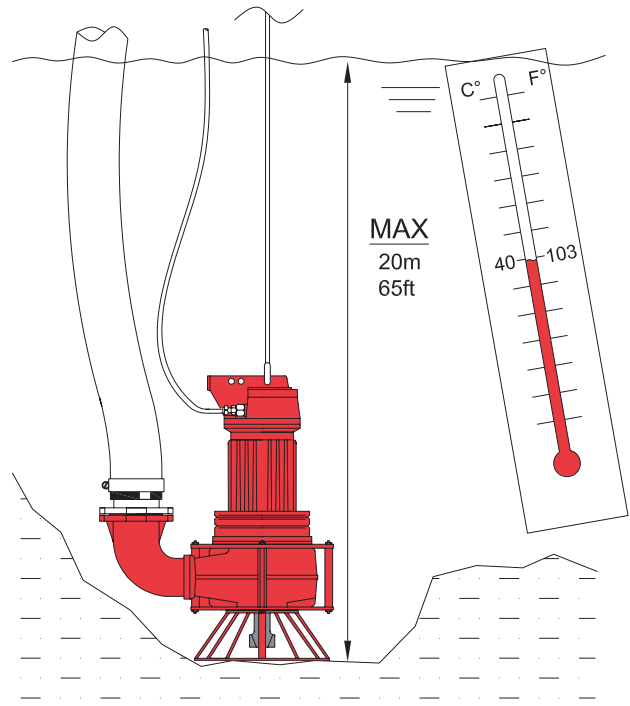
- Type of medium (sludge, abrasive, corrosive, etc.)
- Inflow of liquid
- Head
- Desired pump capacity
- Size of the pump sump
- Size and length of discharge pipe, number of bends and valves, etc., for calculation of

Respect limitations

- The pump must not be submerged to more than 20 metres/65 feet. IP-68.
- The temperature of the medium must not exceed 40°C/103°F.
- The pH-value should be between 4 and 10.
- The voltage drop in operation must not exceed 5 %.
- Maximum numbers of starts per hour: 15 evenly spread.
- Maximum cable lengths.
Excessively long cables cause voltage drops that can result in malfunctions.
- By using a cable of greater conductor cross-section you reduce the voltage drop and can therefore increase the cable length.
- Pressure losses.
Long or unnecessarily small-bore hoses give substantial pressure losses.

WARNING!

The pump should not be used in explosive or fire-risk conditions or for pumping inflammable liquids.



WARNING!

Don't go near rotating parts of the pump.

Safety and environment

In this manual



General warning
Danger!

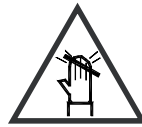


Electrical hazard!



Danger of physical injury
Rotating parts!

On the pump



Danger of physical injury
Rotating parts!



Electrical hazard!



EC-conformity symbol

General safety instructions

- The pumps must be secured and prevented from rolling during transportation.
- Approved equipment must be used for lifting and lowering the pump.
- Only trained and authorized personnel may install and maintain the pump after carefully reading this manual.
- Only use the pump for its intended purpose and under the regulated circumstances.
- Don't go near rotating parts.
- Clean the pump before maintenance and inspection.
- Observe the local regulations when working with aggressive, corrosive, toxic, and/or chemicals.
- Never remove safety signs, keep them clean.
- Always connect to a protective grounded circuit.
- Before maintenance and inspection always disconnect the pump from the power supply.
- Use a proper hoist for lifting and handling the pump.
- Do not leave a large loop of cable in the sump, as the pump may eventually damage it.
- Never drop the loose cable end in water.

The water may enter the cable and finally enter the motorhousing, eventually causing motor failure.

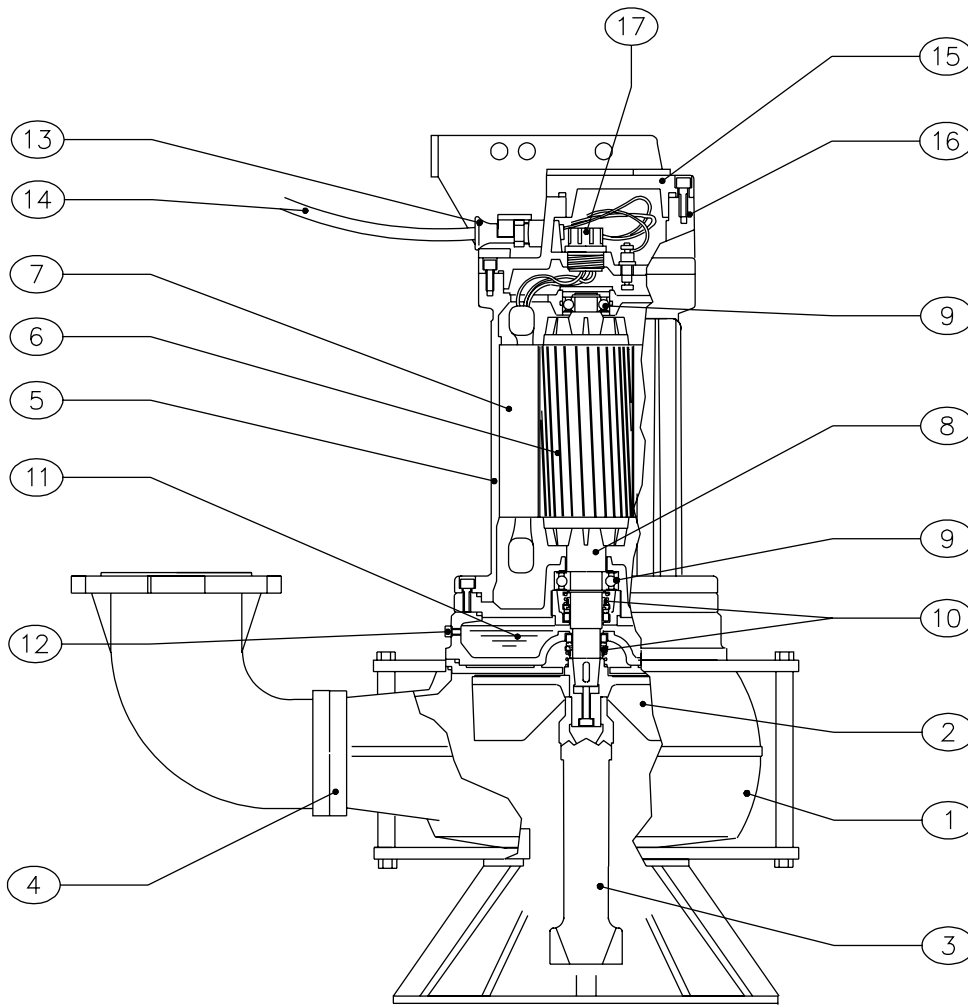
Environment

Parts which are replaced during repair, maintenance or renewal, could contain materials which could be harmful to the environment.

Please take care in the disposal of these parts.

Do this in accordance with the local environmental regulations.

Main parts



- | | |
|----|----------------------------|
| 1 | Pump casing |
| 2 | Impeller |
| 3 | Agitator |
| 4 | Discharge outlet |
| 5 | Motor housing |
| 6 | Rotor unit |
| 7 | Stator |
| 8 | Shaft |
| 9 | Bearings |
| 10 | Mechanical shaft seal (2x) |
| 11 | Oil chamber |
| 12 | Oil screw |
| 13 | Cable entry |
| 14 | Cable |
| 15 | Cover |
| 16 | Main cover |
| 17 | Terminal board |

Maintenance



Always disconnect the pump from the electrical power before inspection or disassembly.



The motor housing can be hot when the pump is just switched off.



Ensure that the pump is fully supported to prevent it from falling over !

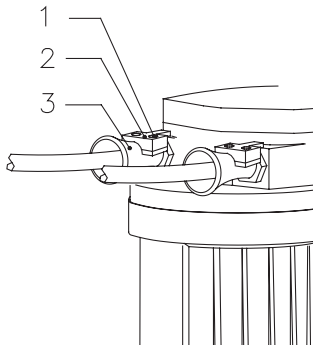
Check the oil every 6 months or 500 running hours

If there is more than a few cm³ water in the oil chamber, contact your dealer.

Change the oil every year or when it is no longer transparent.

Cable entry

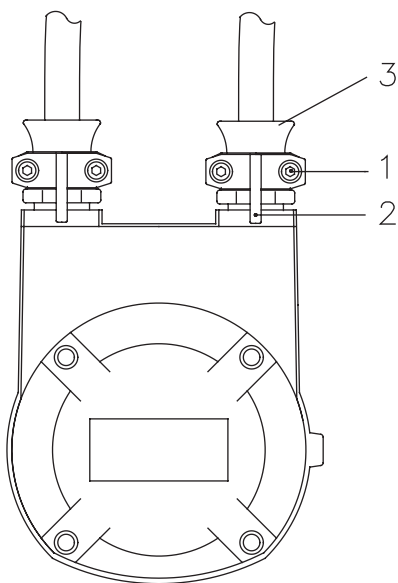
When the pump has been in use for a long time, the compression of the rubber cable seal might be diminished, which can cause leakage. By screwing-in the cable entry the seal will be retensioned.



Bravo 20, 30, 40

- Unscrew the 2 hexagon socket screws (1).
- Remove the cable clamp (2).
- Turn the hexagon head of the entry (3) clockwise, using the right tool, so far that it is possible to replace the cable clamp again.
- Screw-in the 2 hexagon socket screws (1).

It is possible that your pump is fitted with only 1 cable.

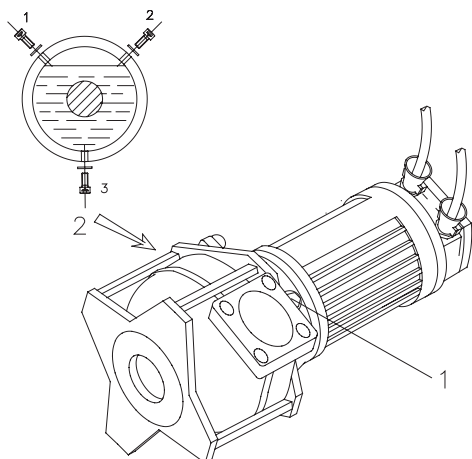


Bravo 50, 60

- Unscrew the 4 hexagon socket screws (1) from the outer cable entries.
- Remove the cable clamps (2).
- Turn the hexagon heads of the entry clockwise, using the right tool, so far that it is possible to replace the cable clamps again.
- Screw-in the 4 hexagon socket screws (1).

It is possible that your pump is fitted with only 1 cable.

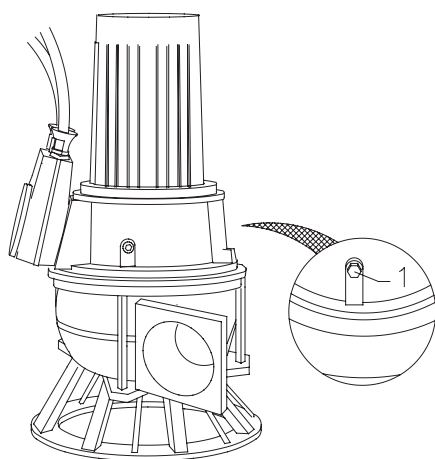
Checking the oil level



Bravo 20, 30, 40

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

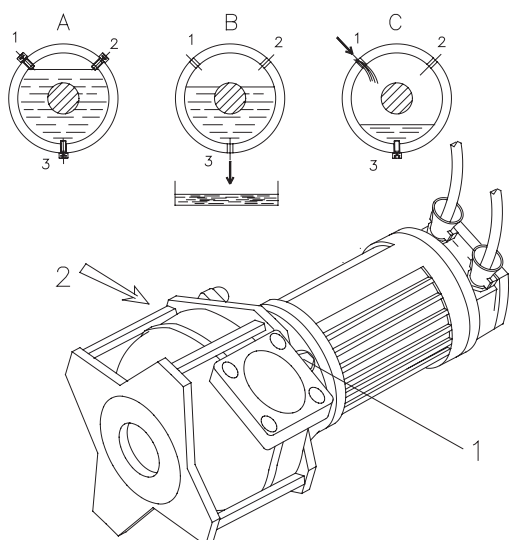


Bravo 50, 60

- Put the pump in a vertical position.
- Unscrew the M20 oil pug (1) which can be found at the opposite side of the cable entry box.
- The oil level should be at the lower side of the opening. If not so, fill up to the right level.

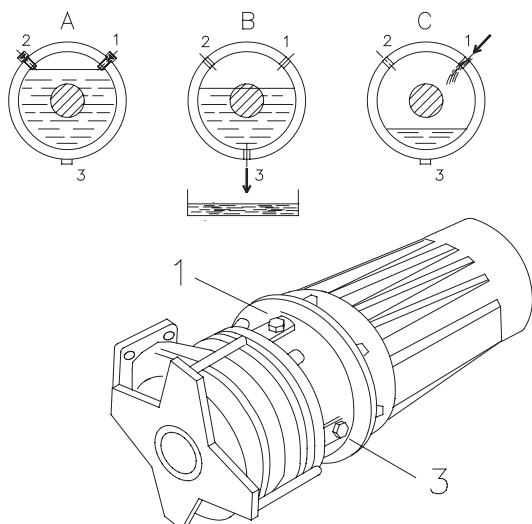
Always use the right kind of oil!

Oil change



Bravo 20, 30, 40

- Put the pump in a horizontal position so that the drain plug (3) is at the bottom.
- Remove the vent plugs (1) and (2).
- Put a receiving bin underneath the drain plug.
- Remove the plug and drain the oil.
- Replace the drain plug.
- Refill the oilhousing. The oil level should be at the lower side of the openings.
- Replace the plugs.



Bravo 50, 60

- Put the pump in a horizontal position so that the drain plug (M20) is at the bottom.
- Remove the vent plugs (1) and (2).
- Put a receiving bin underneath the drain plug.
- Remove the plug and drain the oil.
- Replace the drain plug (3).
- Refill the oilhousing through the opening (1). The oil level should be at the lower side of the opening.

Note!

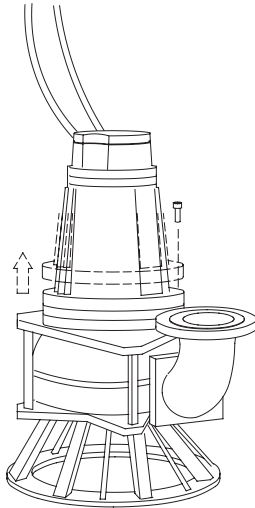
Collection, storage and removal of the oil should be done according to the regulations of the local authorities.

When necessary replace the sealing rings.

Always use the right kind of oil! See spare parts list.

Motor housing

Bravo 20, 30, 40

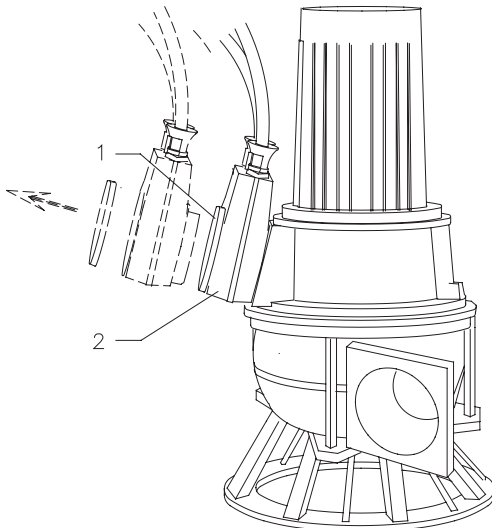


- Place the pump in a vertical position and remove the 4 hexagon socket screws of the motorhousing.
- Lift the motor unit very carefully a few cm's, see fig.

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 motorhousing and oil chamber. If so, contact your dealer.

Bravo 50, 60



- Place the pump in a vertical position and remove the 4 hexagon socket screws (1) of the cable entry box cover (2) and check the entry box.
- Remove the 4 hexagon socket screws (1) of the cable entry box and pull the cable entry box a few cm's from the pump.

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 motorhousing and oil chamber.

If so, contact your dealer.

Trouble shooting

Safety



When working on the motor, make sure that the power is switched off.



When starting the pump, ensure nobody goes near rotating parts.

Attention!

- When working on the pump, make sure it cannot start unexpectedly!
- Only qualified electricians may do the electrical work.

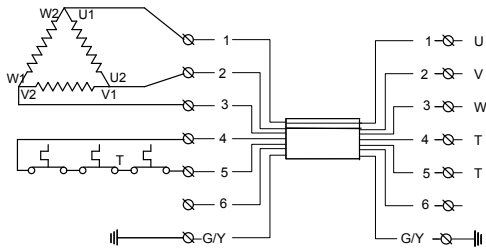
Observe local electrical and safety regulations!

Trouble shooting list

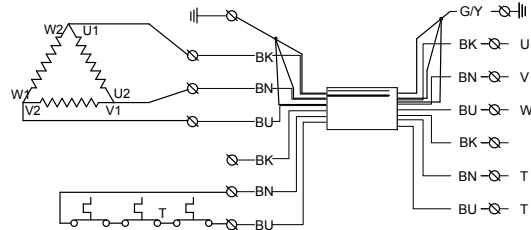
Problem	Possible cause	Required action	Checkpoints
Pump does not start	No voltage on motor terminals	Check power supply	<ul style="list-style-type: none"> • No power • Main isolator switch • Fuses
		Check motor protection	<ul style="list-style-type: none"> • Earth leakage relay • Motor protection relay • Motor temperature
	Motor failure	Check motor wiring	<ul style="list-style-type: none"> • Continuity and isolation • Phase resistance
Pump starts and stops repeatedly	Fault in power supply	Check power supply	<ul style="list-style-type: none"> • Low voltage • Not all 3 phases available • Setting of motor protection
	Motor overloaded	Check pump	<ul style="list-style-type: none"> • Wrong direction of rotation • Impeller blocked • Protection in automatic reset mode
	Motor overheated	Check cooling Check motor	<ul style="list-style-type: none"> • Continuity and isolation • Fuses
Current too high	Fault in power supply	Check power supply	<ul style="list-style-type: none"> • Low voltage • Impeller blocked
	Pump failure	Check pump	<ul style="list-style-type: none"> • Visc. or spec. gravity too high • Wrong direction of rotation
Pump runs but no flow or too low flow	Clogging or air lock	Check discharge and coupling	<ul style="list-style-type: none"> • Discharge obstructed • Valve fully or partly closed • Air pocket in pump or discharge • Coupling leaks
		Check pump	<ul style="list-style-type: none"> • Impeller or volute blocked • Pump is sucking to much air • Worn or broken impeller
	Fault in power supply	Check power supply	<ul style="list-style-type: none"> • Controlpanel • Fuses • Low voltage
	Too low capacity	Check discharge	<ul style="list-style-type: none"> • Discharge obstructed • Valve fully or partly closed • Air pocket

Pump cable connectors

DOL

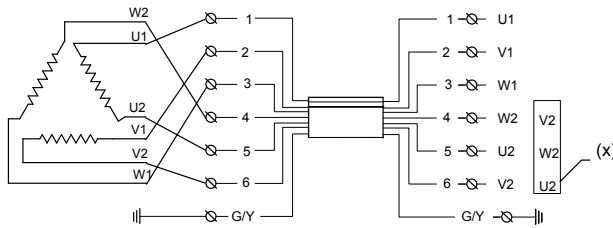


7x2.5mm²

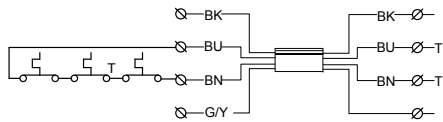


3x6mm²+3x1.5mm²
3x6mm²+3x1.5mm²

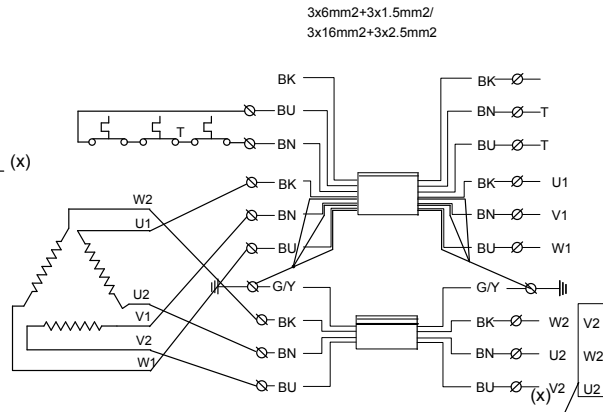
Y/D



7x2.5mm²



4x2.5mm²



3x6mm²+3x1.5mm²/
3x16mm²+3x2.5mm²

4x6mm²/
4x16mm²

BN=brown

BU=blue/Grey

BK=black

GN/YE=green/yellow

1-2-3=U1-V1-W1

4-5-6=W2-U2-V2

C1=thermal contact

C2=thermal contact

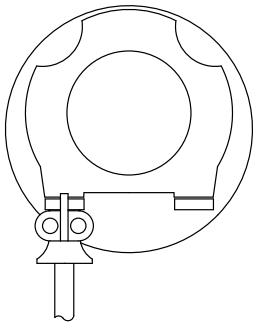
C3=not used

A=ground

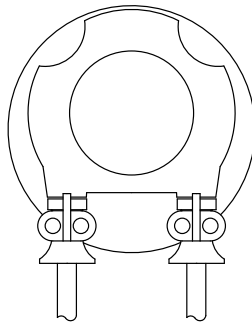
—— = The 4th conductor is split up in 3 parts, These 3 parts should be used as ground core. they have the same total cross section area as the none split core

X=Connect the cable leads in GRINDEX external starter according to this sequence.

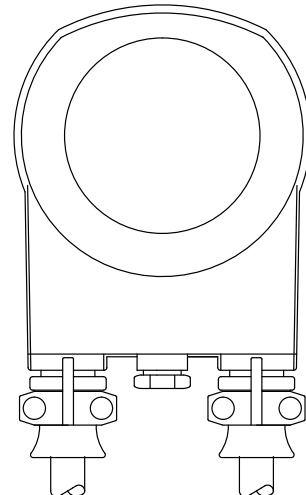
Bravo 20,30,40 DOL



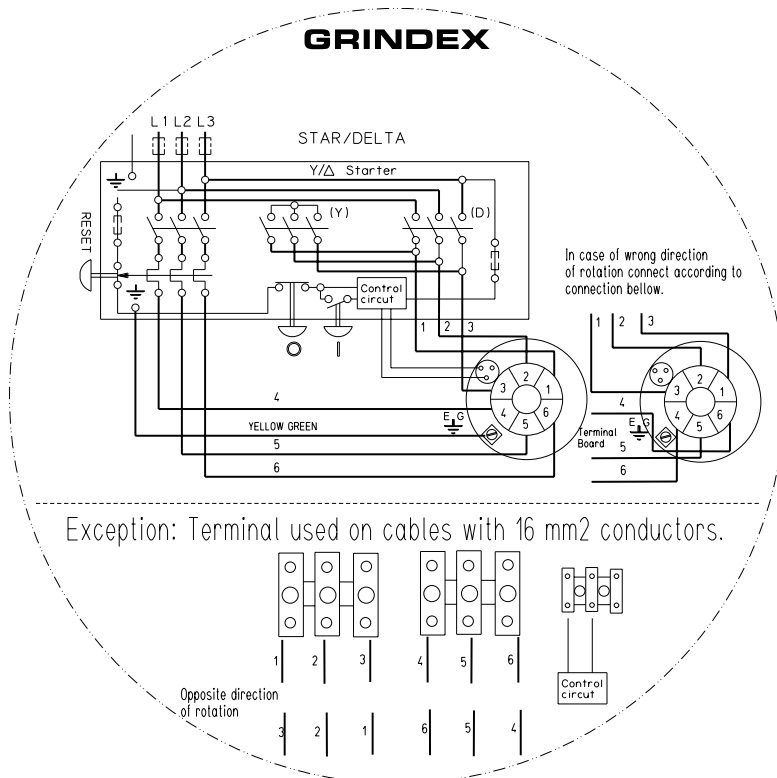
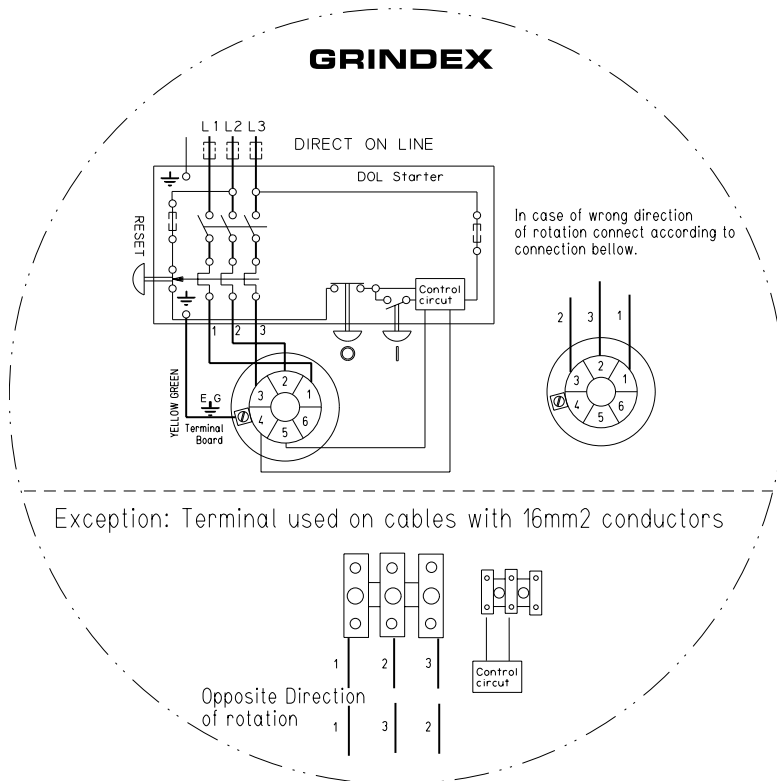
Bravo 20,30,40 Y/D



Bravo 50,60



Wiring diagrams



NOTE

The overcurrent protection should be set to AUTO. The tripping current should be max. the rated current of the pump. Note that the scales for direct online and star/delta are different. The Y/D overload relay should be set at phase current = 0,58 x line current. The Y/D time relay should be set at 3s.

Notes

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