

Operations Manual

SS-VFD-SD Control Panels



This operations manual is intended for the electric mobile pumps equipped with a soft starter (SS), variable frequency drive (VFD) or automatic star-delta switch (SD). This manual has been created by and is the property of BBA Pompen & Buizen BV.

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This manual reflects the state of the art at the time of issue and before. BBA Pumps reserves the right to make interim changes to both technical and implementation specifications without prior notice.

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Preface

This operations manual contains information on the use of control panels. These apply to fully delivered BBA pump sets driven by electric motors, unless otherwise agreed. If you have any questions, please contact BBA pumps BV.

BBA Pumps can never be held responsible for accidents and / or damage resulting from failure to observe the instructions in this manual.

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1. Safety

1.1 Safety symbols

This manual contains warnings and safety instructions. Don't ignore these instructions. They are given to protect your health and safety and to prevent damage to the environment, the control panel and the pump set.



WARNING

When the warning symbol with the text WARNING is displayed, it indicates information of great importance to those concerned and the pump set. Ignoring this information could cause injury or lead to (serious) damage to the pump set.



DANGER

When the hazard symbol with the text DANGER is shown, information is given that is of great importance for the safety of those involved. Ignoring this information can cause (serious) injury or even death.

1.2 Automatic stop-start system



This control panel is equipped with an automatic motor stop-start system, which enables the motor to start or stop at any time without warning or notification. It is the user's responsibility to provide labels, visual and audible warnings to alert the user that the motor is about to start.

1.3 Motor protection



Before connecting the power supply, always check that the emergency stop is "pulled out" and that the motor protection devices and fuses are "on".

1.4 Emergency stop



If the pump set is equipped with an emergency stop, it should only be used to shut down the pump set in an emergency situation.

1.5 Work safely



Even when the main switch is off, there can still be 400 volts on the electrical components. To ensure safe working, the power supply must always be completely disconnected.

1.6 Malfunctions



In the event of malfunctions or abnormal operation, immediately switch off the pump / motor to avoid a dangerous situation or damage to the pump set.

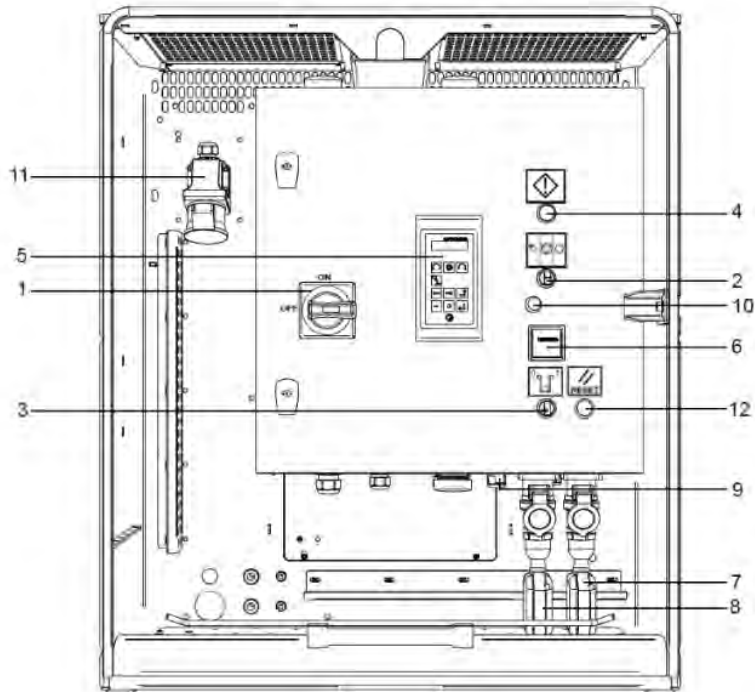
1.7 Direct Online (DOL) Delivery



With a DOL delivery, the BBA electric pump set is delivered bare without a lockable compartment or motor control. To avoid pump damage, the user must equip the pump with a practical solution for starting the motor.






2. Softstarter

2.1 Motor control panel

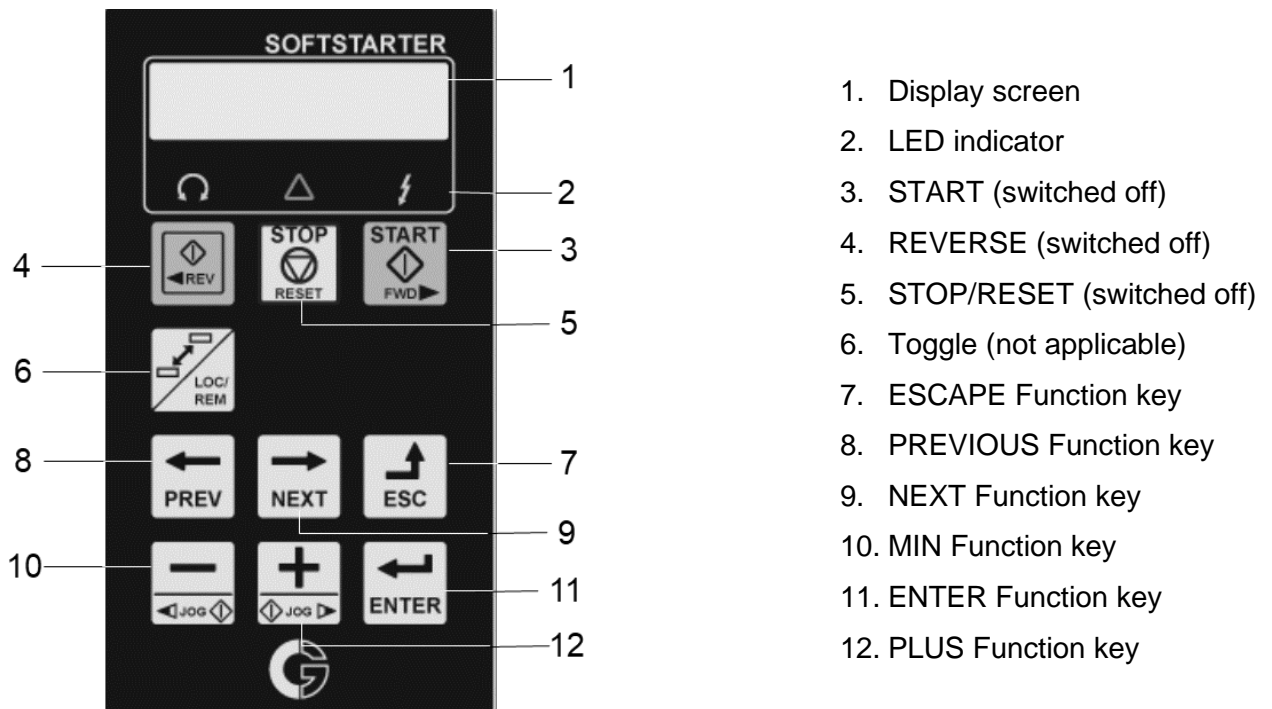


- | | |
|------------------------|-------------------------------------|
| 1. Main switch | 7. High level float (right) |
| 2. Control switch | 8. Low level float (left) |
| 3. Transducer switch | 9. Transducer connector |
| 4. Warning light (red) | 10. Rubber stopper |
| 5. Display | 11. WCD power supply (up to 63A-5P) |
| 6. Hour counter | 12. Reset button |

2.2 ISO symbols

	Stop		Manual
	Stand-by		Reset
	Warning/alarm		

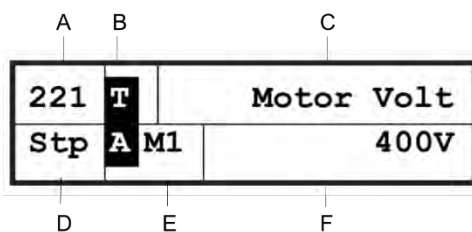
2.3 Display



1. Display screen
2. LED indicator
3. START (switched off)
4. REVERSE (switched off)
5. STOP/RESET (switched off)
6. Toggle (not applicable)
7. ESCAPE Function key
8. PREVIOUS Function key
9. NEXT Function key
10. MIN Function key
11. ENTER Function key
12. PLUS Function key

2.3.1 Display screen

The display screen is divided into six areas. The different areas on the display are described below:



- A. Active menu (3 or 4 digits)
- B. Constant L "local operation"
- C. Description active menu
- D. Softstarter status (3 letters)
- E. Active parameter (not applicable)
- F. Shows the setting or selection in the active menu.
Displays warnings and alarms.

2.3.2 LED indicators

The three LED indicators indicate the status of the softstarter and pump set. Depending on the operating mode, the TRIP and RUN indicators will also flash here to warn the user of an upcoming event or action.

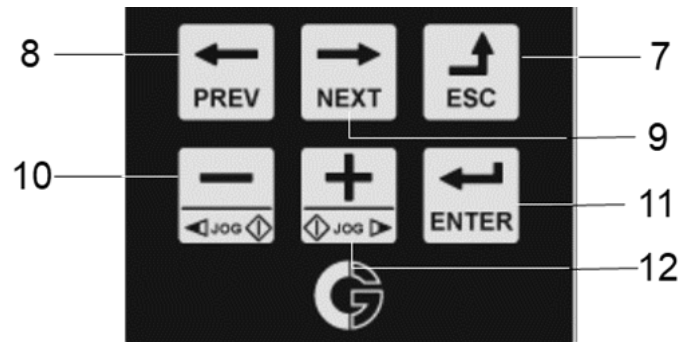


- RUN: Pump set in operation
- TRIP: Error (see § 2.5)
- POWER: Power is connected

2.4 Basic menu

The basic menu consists of 3 or 4 digits, shown on the display screen in section A (top left). A table with menu numbers and descriptions can be found in the extensive manual of Emotron, the supplier of the equipment.

In this manual we will discuss only the most common menus. As soon as you supply power to the pump set, the basic menu 100 will appear.



- Use the **PREV / NEXT** buttons to scroll forward or backward.
- To enter the menu, select **ENTER**, selecting **ESC** takes you back one step.
- Select a parameter using the **PLUS** or **MINUS** buttons.

TIP!

To move the cursor quickly, press **PLUS** or **MINUS** to activate until the cursor flashes. Press **NEXT** or **PREV** to move to the desired location. Use **PLUS** or **MINUS** to select the correct number.

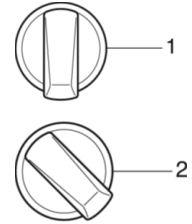
2.4.1 Set Language (211)

- Press **NEXT** to go to menu **200**, confirm with **ENTER**.
- Press **ENTER** again and you will access menu **211**.
- Use the **PLUS** or **MINUS** function buttons to select the desired language.
- Confirm the desired language using the **ENTER** key.

2.5 Operation

2.5.1 Manually starting the pump set

- Connect the **power supply**.
- **Red warning** light turns on.
- Turn the **control switch** to the center position (1).
- Press the **reset button twice** (the red light turns off).
- Turn the **main switch** clockwise to the right (ON).
- Turn the **control switch** anti-clockwise to the left (2).



Note

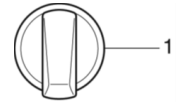
The main switch cannot be switched on while the warning light is on.



Warning: The pump set will start immediately. Check that the direction of rotation of the motors rotation is correct.

2.5.2 Manually stopping the pump set

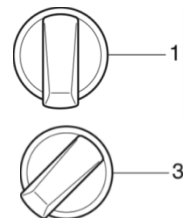
- Turn the **control switch** back to the middle position (1).
- Turn the **main switch** anti-clockwise to the left (OFF).
- Disconnect the **power supply**.



2.5.3 Automatic stop / start by means of floats

The pump set is supplied with two identical floats as standard. When installing, make sure there is sufficient distance between both floats so that the pump set starts up a maximum of four times per hour.

- Connect the **power supply**.
- **Red warning** light turns on.
- Turn the **control switch** to the center position (1).
- Press the **reset button twice** (the red light turns off).
- Turn the **main switch** clockwise to the right (ON).
- Turn the **control switch** clockwise to the right (3).
- The pump set will now start and stop according to the float settings.

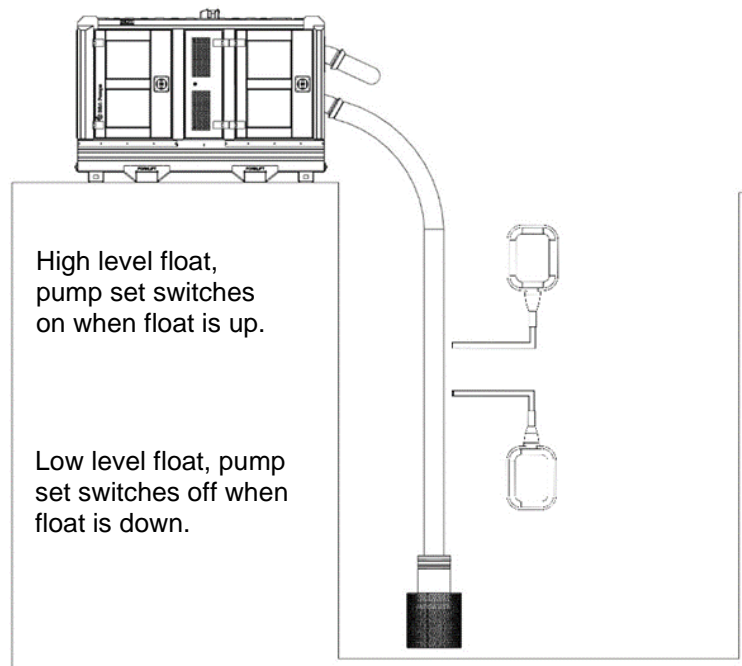


Note

The main switch cannot be switched on while the warning light is on.



Danger: In the auto start mode, the motor can start or stop at any time without warning or notification. Provide labels, visual and audible alerts to alert the user that the pump set is about to start.



2.5.4 Automatic stop / start by means of a level transducer

A level transducer is optionally available, the softstarter is factory set to 7 mwc (700 cmwc). When entering the set points, do not start the pump set more than four times per hour.

- Connect the **power supply**.
- **Red warning** light turns on.
- Turn the **control switch** to the center position (1).
- Press the **reset button twice** (the red light turns off).
- Turn the **main switch** clockwise to the right (ON).
- Turn the **control switch** clockwise to the right (3).
- Turn the **level transducer** switch clockwise to the right.

Note

The main switch cannot be switched on while the warning light is on.



Danger: In the auto start mode, the motor can start or stop at any time without warning or notification. Provide labels, visual and audible alerts to notify the user that the pump set is going to start.

Setting the high set point (6112 | CA1NivoHi)

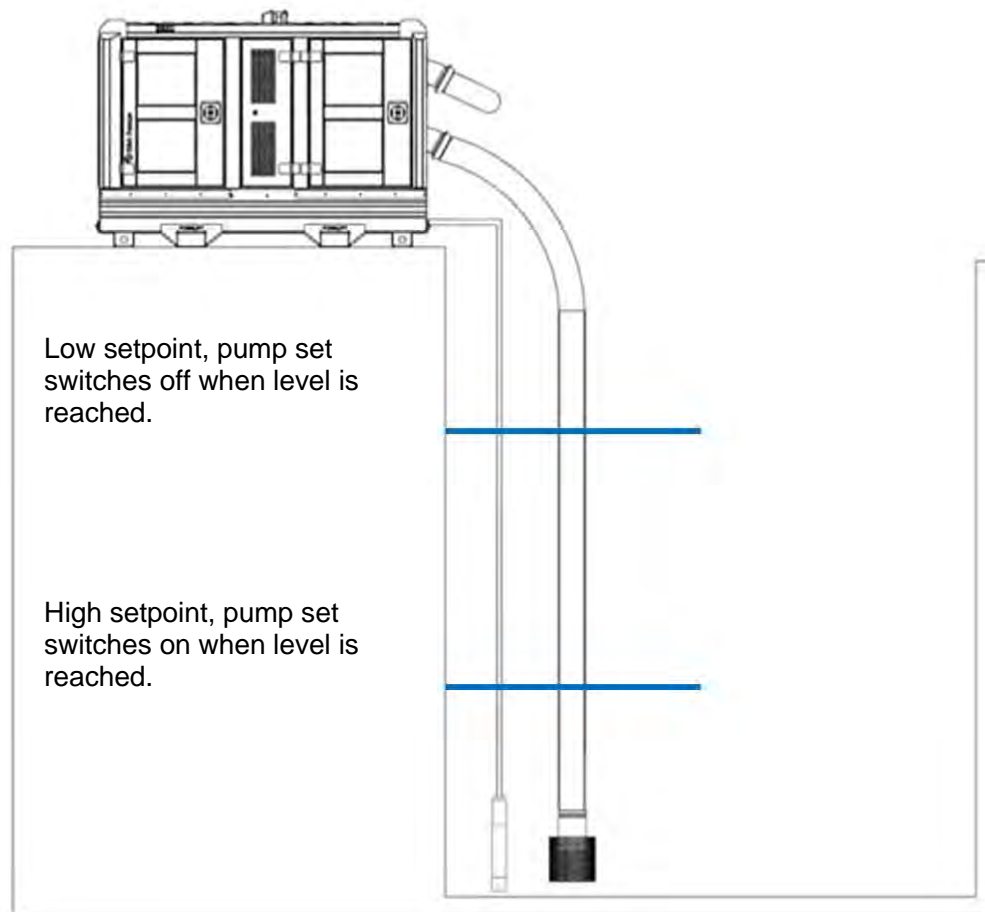
- Press **NEXT** until you reach menu **600**, confirm with **ENTER**.
- Press **ENTER** two further times and you're in menu **6111**.
- Press **NEXT** for menu number **6112**.
- Select the value of the high set point using the **PLUS** or **MINUS** function keys.
- Confirm the desired set point by pressing **ENTER**.

Setting the low set point (6113 | CA1NivoLo)

- From the high set point menu press **NEXT** to access menu **6113**.
- Using functions **PLUS** or **MIN** to select the low set point.
- Confirm the desired set point by pressing **ENTER**.

Reading actual depth value of the level sensor

- Submerge the level sensor in the liquid.
- Press **NEXT** until you reach **300**, confirm with **ENTER**.



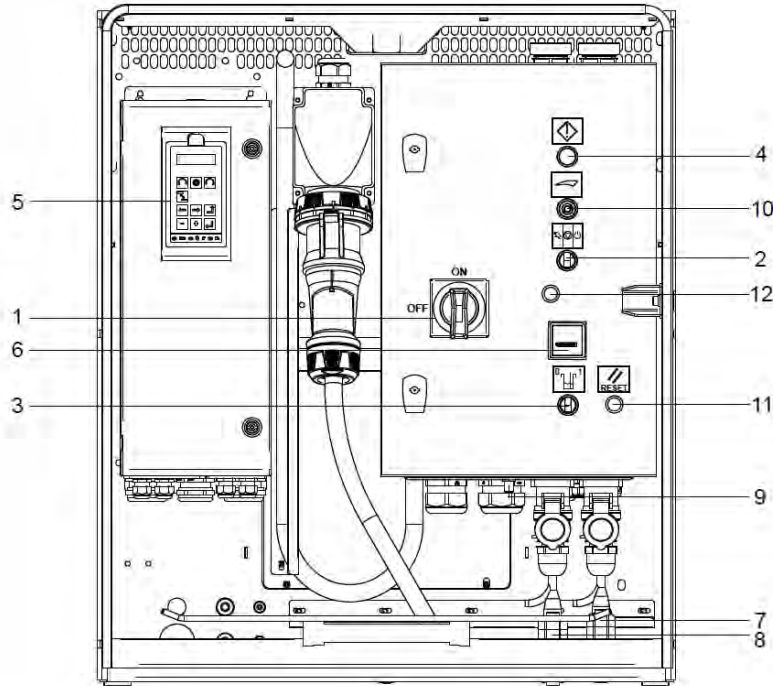
2.6 Error table

Problem	Possible Cause	Solution
Pump does not work.	Emergency stop is pressed and main switch is in "TRIP" position.	Make sure that everything is safe, then set the control switch to the "0" position and pull the emergency stop out and back into the operating position . Then turn the main switch first anti-clockwise to the (OFF) position and then clockwise to the right (ON). Reset the display by pressing the 5 button STOP .
	No power connection to the softstarter.	Check the power supply, the main switch and the emergency stop. Then check whether fuses F2 and F4 are in order.
Main switch will not turn on (returns to "TRIP" position).	No 24V DC on the voltage coil.	Check the power supply and the emergency stop. Then check whether fuses F1 and F5 are in order.
Warning light (red) is lit.	General error	Press the reset button twice Check if fuses F2 and F3 are in order and check if the softstarter is in "TRIP", then see menu 800*
The vacuum pump does not switch on.	No voltage on the motor relay.	Check whether fuse F3 is in order.
Fans are not rotating.	No voltage on terminal 8/9.	Check in successive order that the fuses F1 , F5 , F6 and F7 are in order.
Display errors	Possible cause	Solution
Display shows "EXT Alarm 1 Trp" message.	No voltage on the 400 / 230V AC transformer.	Check the fuses F1 and F4 are in order.
Display shows "EXT Alarm 2 Trp" message.	Emergency stop is active. Or the safety circuit is not enabled.	Check the emergency stop, and press the reset button twice.
Display shows "Mon MinAlarm".	The pump is running dry or is not filled.	Check that the pump does not run dry, for example with a leakage in the suction hose or a blockage.
Display shows "Mon MaxAlarm".	The pump performs badly.	Check that the pump is not blocked.
Display shows "PTC Alarm".	The motor is overloaded.	Check that the motor does not get too hot, for example because the operating point does not cover the curve.

* **Menu 800**: see the error menu section of the Emotron softstarter manual. Menu 810 is always the current (last) fault. Press "ENTER" to read the current value, such as I-Nom, recorded power consumption, etc. at the time of the TRIP error message.

3. Variable Frequency Drive

3.1 Motor control panel

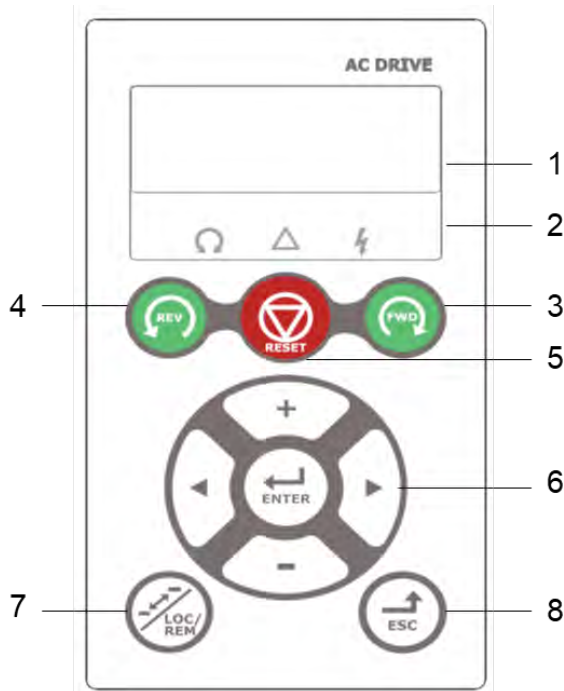


- | | |
|------------------------|-----------------------------|
| 1. Main switch | 7. Float high level (right) |
| 2. Control switch | 8. Float low level (left) |
| 3. Transducer switch | 9. Transducer connector |
| 4. Warning light (red) | 10. Potentiometer |
| 5. Display | 11. Reset button |
| 6. Hour counter | 12. Rubber stopper |

3.2 ISO symbols

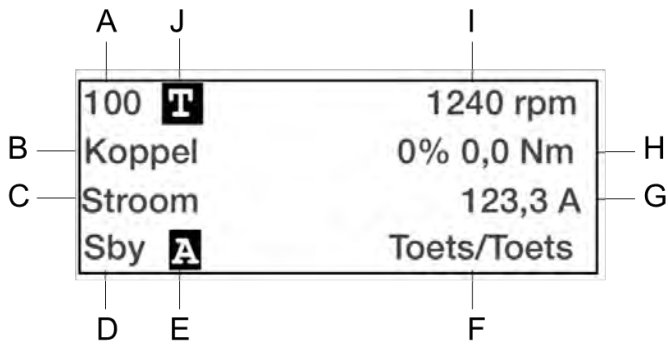
	Stop		Manual
	Stand-by		Reset
	Warning/alarm		

3.3 Display



1. Display screen
2. LED Indicator
3. FWD (switched off)
4. REV (switched off)
5. STOP/RESET (switched off)
6. Function keys
7. Toggle (not applicable)
8. ESCAPE function key

3.3.1 Display screen



- A. Active menu (3 of 4 digits)
- B. Menu name (except in menu's modus 100+)
- C. Active parameter
- D. Frequency inverter status
- E. Active parameter set
- F. Active control signal source
- G. Preferred value (menu 130)
- H. Preferred value (menu 120)
- I. Preferred value (menu 110)
- J. T in toggle (not applicable)

3.3.2 LED indicators

The three LED indicators indicate the status of the variable frequency drive and pump set. Depending on the operating mode, the TRIP and RUN indicators will also flash here to warn the user of an upcoming event or action.



- RUN: Pump set in operation
- TRIP: Error (see § 3.5)
- POWER: Power supply connected

3.4 Basic menu

The basic menu consists of 3 or 4 digits, shown on the display screen in section A (top left). A table with menu numbers and descriptions can be found in the extensive manual of Emotron, the supplier of the equipment.

3.4.1 Language settings (211)

- Press the **ARROW >** (function key 6) to go to menu **200**, confirm with **ENTER**.
- Press **ENTER** again and you are in menu **211**.
- Use function keys **PLUS** or **MIN** to choose your preferred language.
- Confirm the selection by pressing **ENTER**.

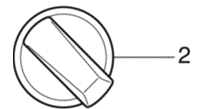
3.5 Operation



Warning: After connecting the power supply and turning the main switch, wait 10 seconds before starting the pump set. The system must first complete a startup sequence.

3.5.1 Manually starting the pump

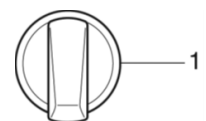
- Connect the **power supply**.
- Turn the **main switch** clock wise to the right (ON).
- Wait 10 seconds for the system to complete the startup sequence.
- **Red warning light** is lit.
- Press the **reset button** (the red light turns off).
- Turn the **control switch** anti-clockwise to the left (2).
- Set the desired pump / motor speed with the potentiometer.



Warning: The pump set will start immediately. Check that the direction of the motors rotation is correct.

3.5.2 Manually stopping the pump

- Turn the **control switch** back to the middle position (1).
- Wait for the pump set to come to a complete stop.
- Turn the **main switch** anti-clockwise to the left (OFF).
- Wait until the variable frequency drive display is off.
- Disconnect the **power supply** from the pump.



3.5.3 Adjusting the pump / motor speed

The display shows the selected speed (reference value).

- Turn the **potentiometer** to the right to increase the speed.
- Turn the **potentiometer** to the left to reduce the speed.



Warning: Check the specifications of your pump set and that the available motor power is suitable for the speed selected.

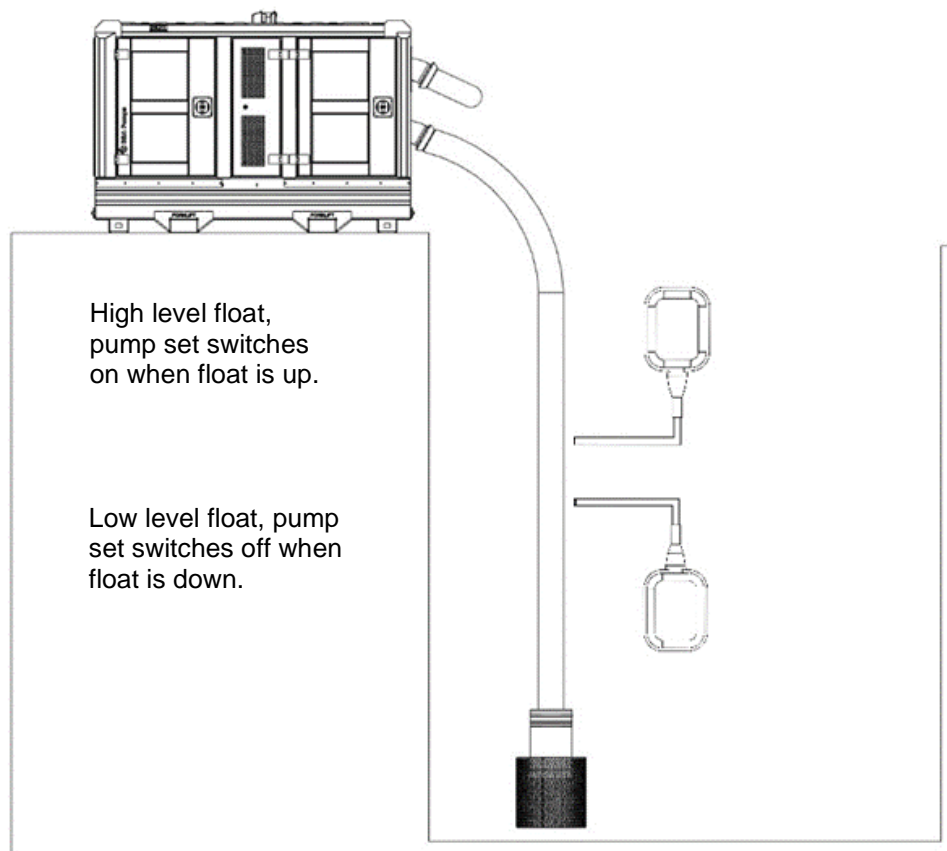
3.5.4 Automatic stop/start through use of floats

The pump set is delivered as standard with two identical floats. When installing, make sure there is sufficient distance between both floats so that the pump set starts up a maximum of four times per hour.

- Connect the **power supply**.
- Turn the **main switch** clockwise to the right (ON).
- Wait 10 seconds for the system to complete the startup sequence.
- **Red warning light** is lit.
- Press the **reset button** (the red light turns off).
- Turn the **control switch** clockwise to the right (3).
- Select the desired pump speed using the potentiometer.
- The unit will now stop and start according to the float settings.



Danger: In the automatic start-stop mode, the motor can start or stop at any time without warning or notification. Provide labels, visual and audible alerts to notify the user that the pump set is going to start.



3.5.5 Automatic stop/start through use of a level transducer

A level transducer is available as an optional extra and works with a PID level control. The variable frequency drive is factory set to a level difference between 0-700 cmwc. When setting the target point, do not turn on the pump set more than four times per hour.

- Connect the **power supply**.
- Turn the **main switch** clockwise to the right (ON).
- Wait 10 seconds for the system to complete the startup sequence.
- **Red warning light** is lit.
- Press the **reset button** (the red light turns off).
- Turn the **control switch** clockwise to the right (3).
- Turn the **level transducer** switch clockwise to the right.



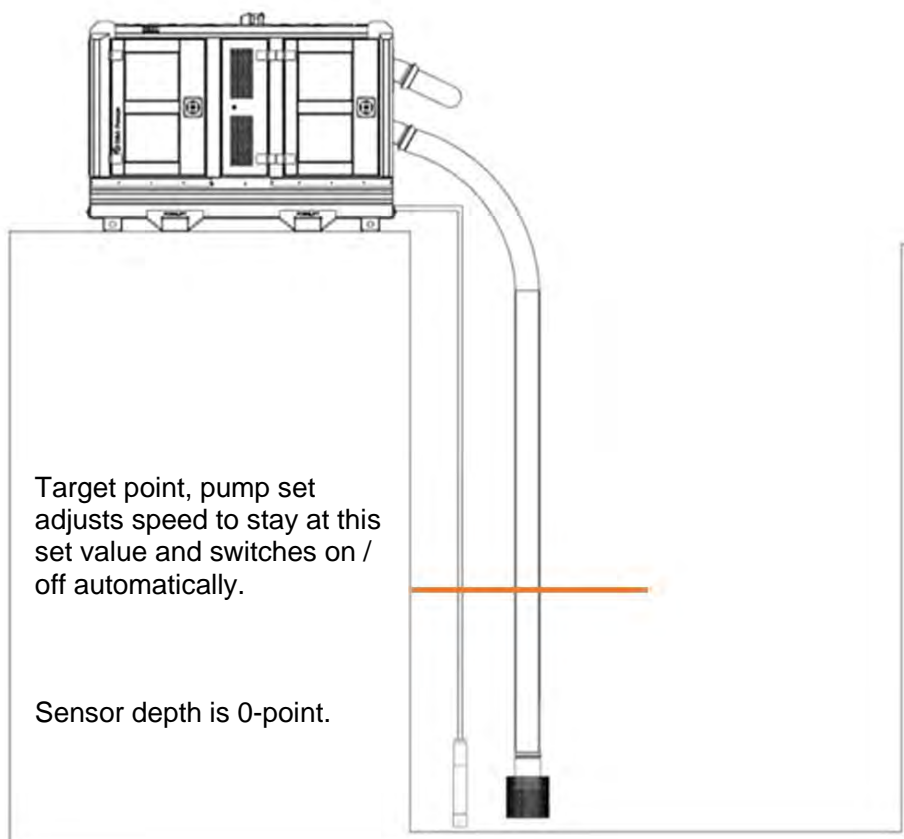
On the display you will see in line 1 the actual liquid level (above the sensor). In line 2 you can see the set target point and in line 3 the current.



Danger: In the automatic start-stop mode, the motor can start or stop at any time without warning or notification. Provide labels, visual and audible alerts to notify the user that the pump set is going to start.

3.5.6 Set or change target point

- Turn the **potentiometer** to the right to set the target point higher.
- Turn the **potentiometer** to the left to lower the target point.



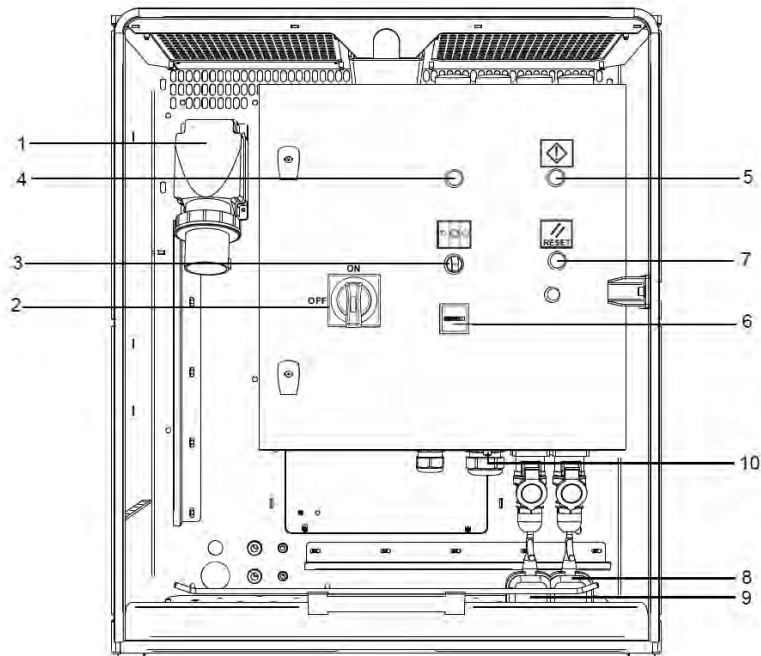
3.6 Error table

Problem	Possible cause	Solution
Pump does not work.	Emergency stop is depressed.	Ensure that everything is safe, set the control switch to the “0” position and pull the emergency stop out and back into the operating position .
	No voltage on the variable frequency drive.	Check the power supply, the main switch and the emergency stop. Then check whether fuse F1 is in order.
Warning light (red) is lit.	General error.	Press the reset button. Check that the emergency stop is not pressed. Check that the fuses F1 and F2 are in order, check if the variable frequency drive is in “TRIP”, then see menu 800*
The vacuum pump doesn't switch on.	No voltage on the motor relays.	Check the fuse F2 is in order
The fans dont turn.	No voltage on terminal 5/6.	Check successively that the fuses F3, F4, F6 and F7 are in order
Display error	Possible cause	Solution
Display is “out”.	No voltage.	Check that the F1 fuse is in order.
Display shows “Mon MinAlarm”.	The pump runs dry or is not filled.	Check that the pump does not run dry, check for leakages in the suction hose or blockages.
Display shows “Mon MaxAlarm”.	The pump performs badly.	Check that the pump is not blocked.
Display shows “PTC Alarm”.	The motor is overloaded.	Check that the motor does not get too hot, for example because the operating point does not cover the curve.

* **Menu 800**: see the error menu section of the Emotron variable frequency drive manual. Menu 810 is always the current (last) fault. Press "ENTER" to read the current value, such as I-Nom, recorded power consumption, etc. at the time of the TRIP error message.






4. Star-delta switch

4.1 Motor control panel



- | | |
|--|--------------------------------|
| 1. WCD Power supply (up to 63A-5P) | 6. Time counter |
| 2. Main switch | 7. Reset button |
| 3. Control switch | 5. Float high level (optional) |
| 4. Direction of rotation warning light | 6. Float low level (optional) |
| 5. Warning light (red) | |

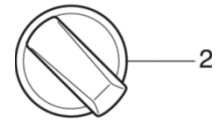
4.2 ISO symbols

	Stop		Manual
	Stand-by		Reset
	Warning/alarm		

4.3 Operation

4.3.1 Starting the pump manually

- Connect the **power supply**.
- **Red warning** light turns on.
- Turn the **control switch** to the center position (1).
- Press the **reset button twice** (the red light turns off).
- Turn the **main switch** clockwise to the right (ON).
- Turn the **control switch** anti-clockwise to the left (2).



Note

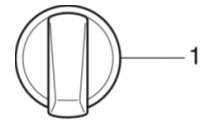
The main switch cannot be switched on while the warning light is on.



Warning: The pump set will start immediately. Check that the direction of rotation of the motor is correct.

4.3.2 Stopping the pump manually

- Turn the **control switch** back to the middle position (1).
- Turn the **main switch** anti-clockwise to the left (OFF).
- Disconnect the **power supply**.



4.3.3 Automatic stop / start through the use of floats (optional)

The pump set is supplied as an option with two identical floats. When installing, make sure there is sufficient distance between the floats so that the pump set starts up a maximum of four times per hour.

- Connect the **power supply**.
- **Red warning** light turns on.
- Turn the **control switch** to the center position (1).
- Press the **reset button twice** (the red light turns off).
- Turn the **main switch** clockwise to the right (ON).
- Turn the **control switch** clockwise to the right (3).
- The unit will now start and stop according to the float settings.



Note

The main switch cannot be switched on while the warning light is on.



Danger: In auto-start mode, the motor can start or stop at any time without warning or notification. Provide labels, visual and audible alerts to notify the user that the pump set is about to start.

4.4 Error table

Problem	Possible cause	Solution
Pump does not work at all.	Emergency stop is pressed and main switch is in "TRIP" position.	Check that everything is safe, set the control switch to the "0" position and pull the emergency stop out and back into the operating position . Then turn the main switch first anti-clockwise to the (OFF) position and then clockwise to the right (ON) .
	No voltage on the star-delta switch.	Check the power supply, the main switch and the emergency stop. Then check whether thermal protection fuse F2 is in order.
Main switch will not turn on (returns to "TRIP" position).	No 24V DC on the voltage coil.	Press the reset button twice. Check the power supply and the emergency stop. Then check whether thermal protections fuse F1 and F4 are in order.
Warning light is lit red.	General error.	Check that thermal protectors fuse F2 and F3 are in order.
The vacuum pump doesn't switch on.	No voltage on the motor relays.	Check that thermal protector fuse F3 is in order.

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