



# **Optima Compact Pool Heater (Touchscreen)**

## **Installation & Operating Manual**



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## Introduction

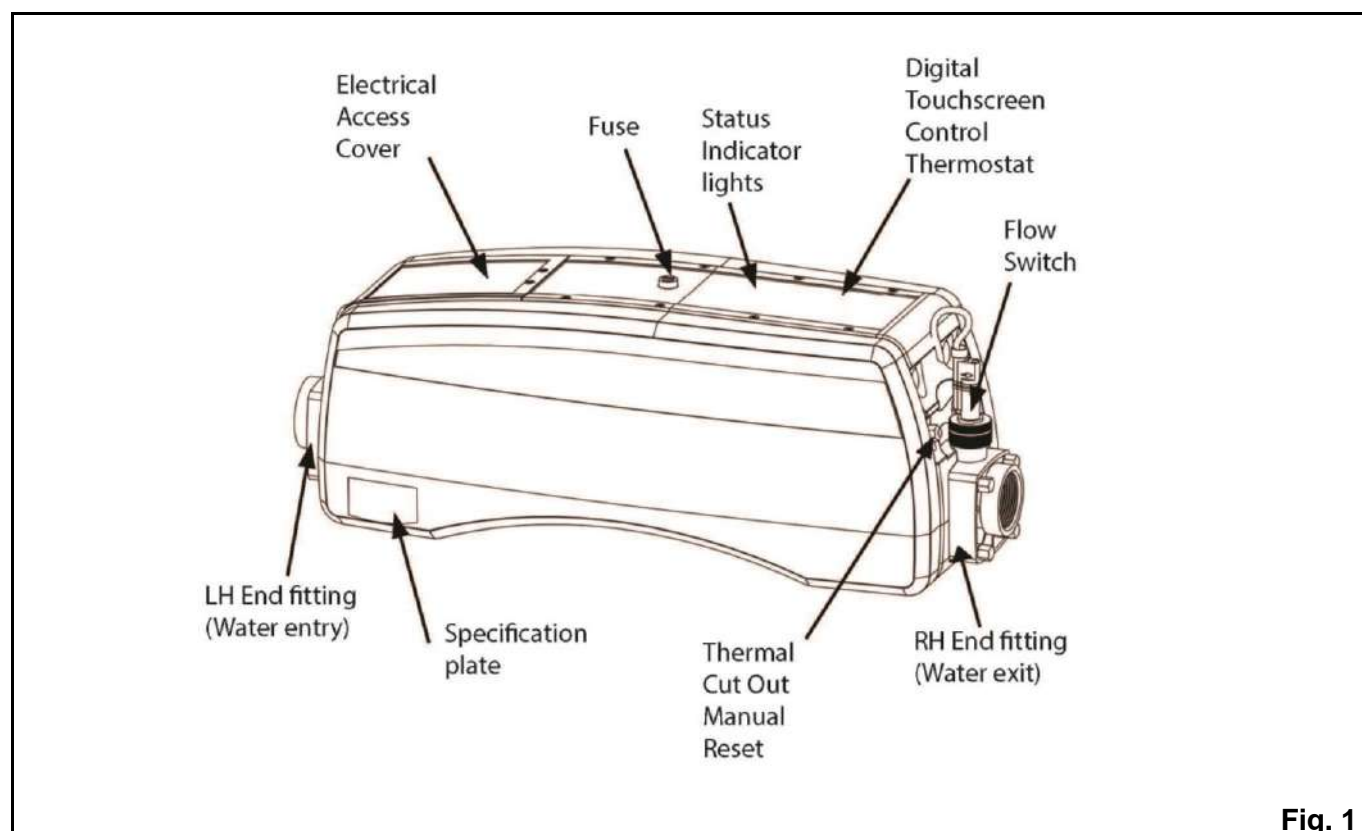
Thank you for purchasing an Optima Compact electric swimming pool heater manufactured to the highest standards in England.

To ensure years of trouble-free service, please **read and follow** these instructions for proper installation, maintenance and use.

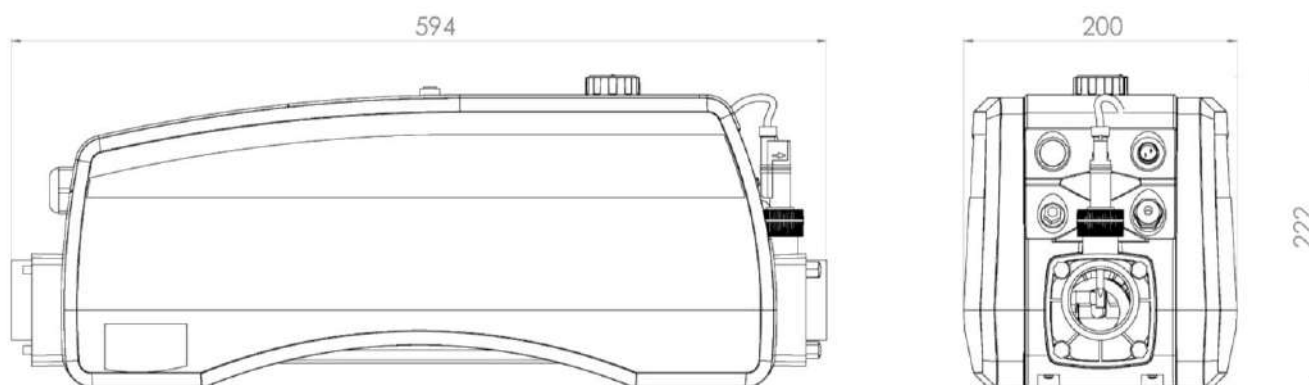
**WARNING:** Failure to install the unit correctly may result in the warranty being void.

***Please retain this manual for future reference.***

## 1. PRODUCT OVERVIEW



## Dimensions:



## 2. GENERAL INSTALLATION INSTRUCTION

### 2.1 Mounting instruction

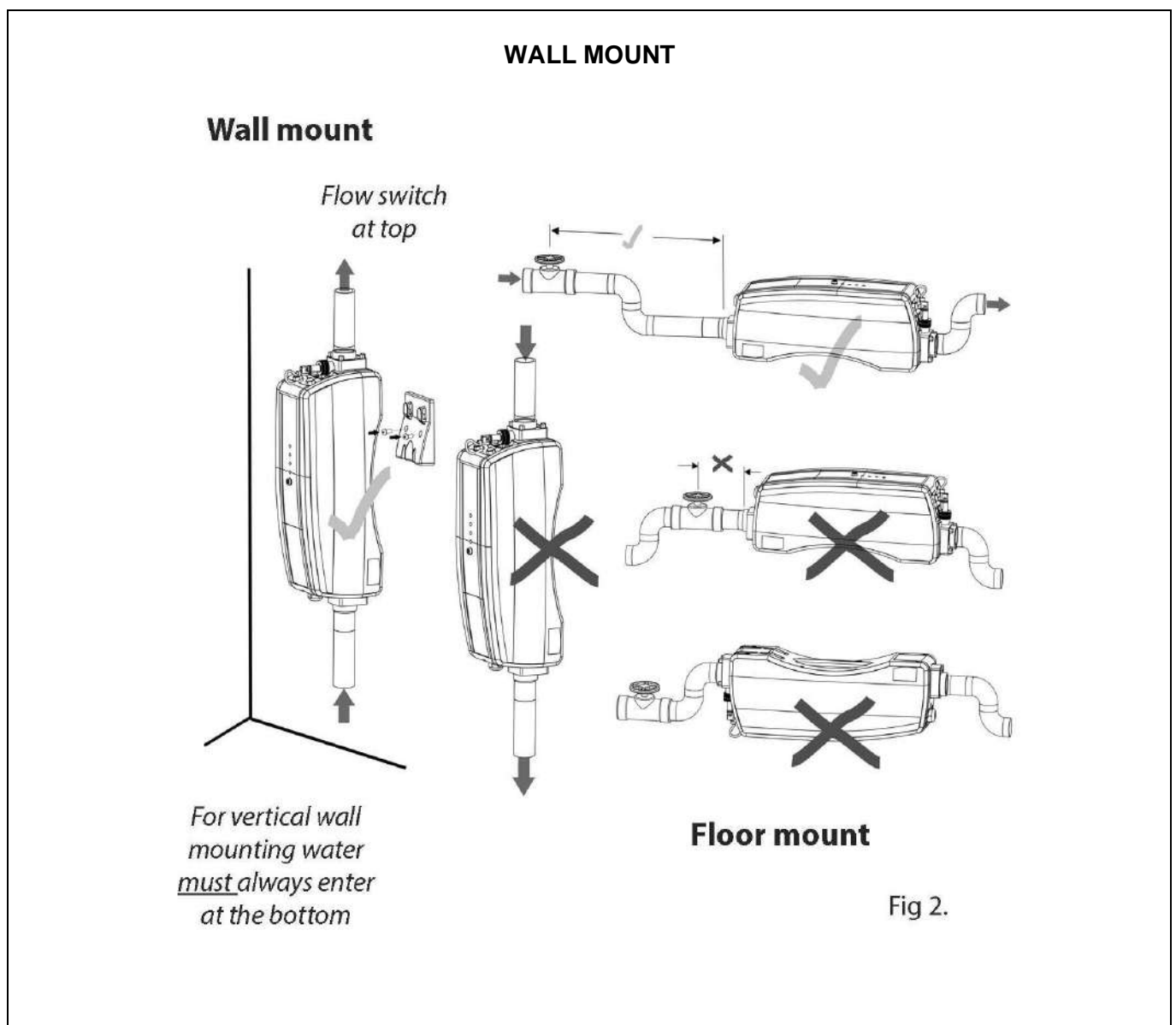
The heater should be either installed horizontally or vertically allowing enough space for the pipe connections and wiring. It should be firmly secured using screws to a firm base or wall.

**WARNINGS:** If the heater is placed against a combustible material a fireproof barrier must be placed between the unit and the wall, this must cover a minimum of 15cm around the outside of the heater. The unit must not be covered to allow adequate ventilation.

The heater must be installed within a dry, permanent weather-proof area. In any case where water or moisture enters the enclosure the warranty will be void.

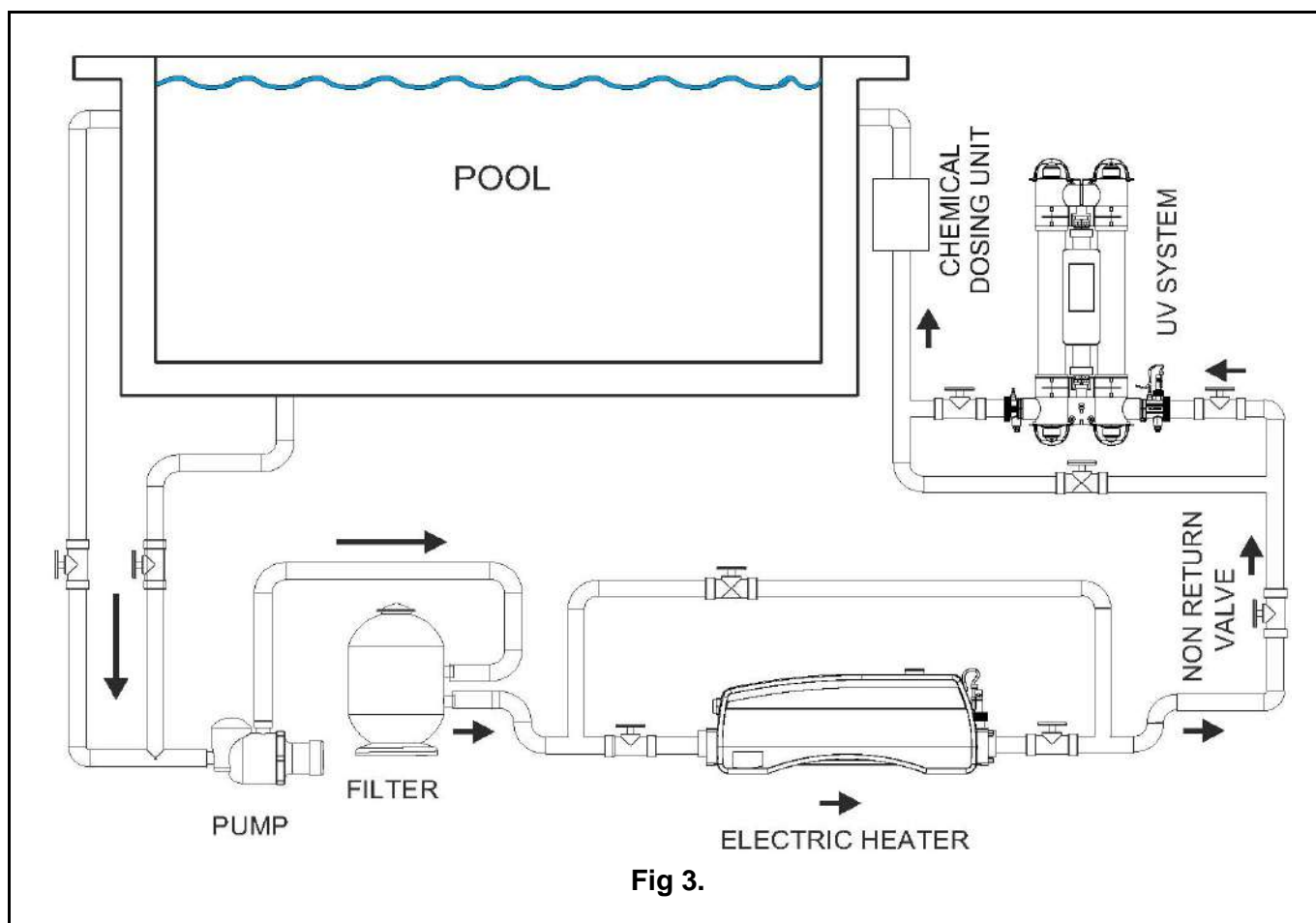
**Caution:** *If the heater is unused during the winter months, it **must be** drained to prevent frost damage. Water **must not** be allowed to freeze in the heater, as this will cause severe damage.*

See Fig. 2 for mounting instructions when securing to the wall or floor.



## 2.2 Pipe work

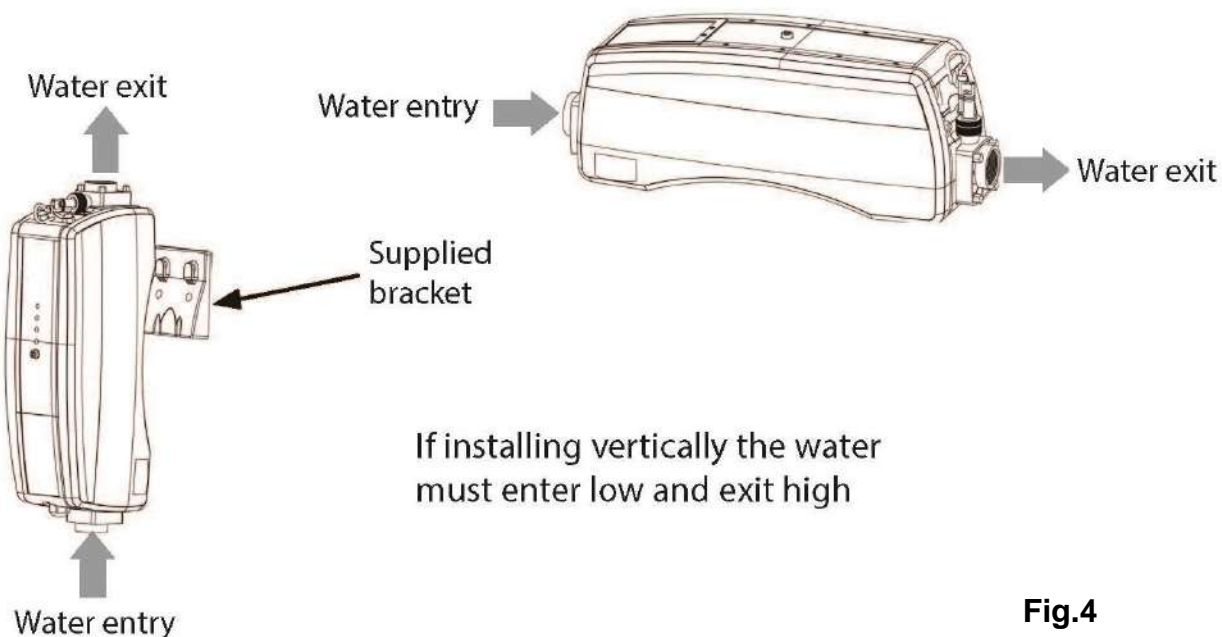
The heater should be installed at a low point in the filtration system. It should be positioned downstream of (after) the filter and upstream of (before) any dosing or other water treatment plan. (see Fig 3.).



## 2.3 Flow direction

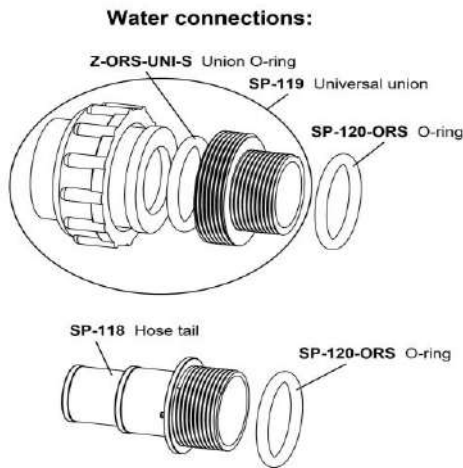
The heater can accept flow of water from only one end (See Fig. 4). If the flow direction is opposite to Fig. 4 the heater must be rotated by 180° so the flow switch is always where the water exits.

**DO NOT REVERSE THE FLOW SWITCH**

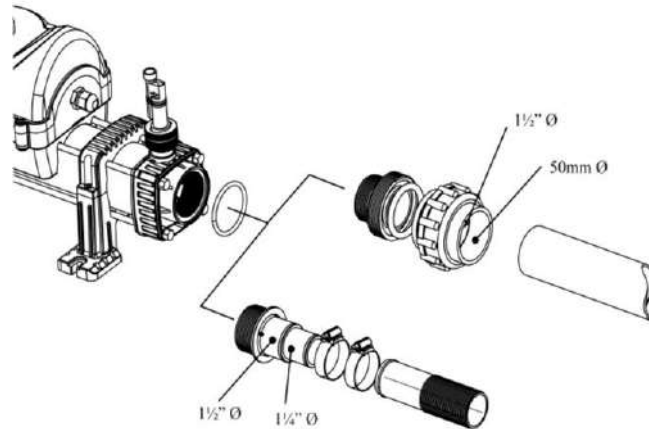


It is essential that the pipe work connecting to and from the heater has a minimum bore (internal diameter) of 32mm. To support correct air purging and to ensure the heater remains completely full of water during operation, the return pipe which carries the water back to the pool must incorporate a safety loop or 'kick-up' in the pipe as close as possible to the heater (see Fig 2.).

**NOTE:** *When coupling to a flexible pipe a safety loop can easily be formed by directing the pipe up and over an obstacle. Pipe clips should be used to securely fasten all hose connections.*



**Fig. 5**



**Fig. 6**

### **If rigid pipework is used**

There is no need to use mastic or PTFE tape to connect unions or hosetails to the heater, use the O-ring supplied which should be slid over the threaded ends (see Fig. 5).

All factory unions are made from ABS plastic, when gluing connections to an ABS pipe, an ABS cement must be used (see Fig. 6).

**NOTE:** *Be sure to apply the glue evenly and to all surfaces that will be in contact to reduce the risk of leakage.*

### **If flexible pipework is used**

Connect the pipe to the non-threaded side of the hosetail and secure using two jubilee clips (See Fig. 6).

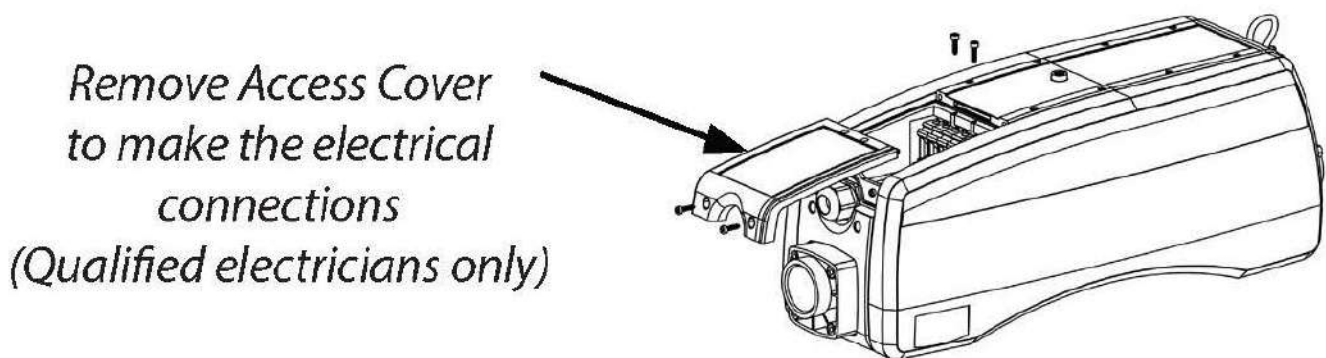
- NOTE:**
- *The hosetail may need to be cut depending on the diameter of the pipe.*
  - *Wrap PTFE tape or use silicone around the hosetail before connecting the pipe to reduce the risk of leakage.*
  - *When using non-standard pipework, the first thing to note is that the smooth end of the pipe will not fit into anything other than another fitting of the same brand. You will have to cut it off. The hose tail will push fit in to the cut end of the pipe, but it will not be watertight. You can put two jubilee clips on it but because of the ridges in the pipe it will not squeeze down tight. It will need to be sealed with a bathroom type mastic sealant.*

## 2.4 Electrical connection

- WARNINGS:**
- This device must be installed by a qualified Electrician following the instructions provided in this manual. The manufacturer will not be liable for any issues caused by poor or improper installation.
  - Any alterations made to the unit (unless stated) will affect the warranty. This also applies if components are changed for non-standard components acquired anywhere other than direct from the manufacturer.
  - Incorrect installation may result in serious damage to property/persons.
  - The heater must be installed in accordance with the country/regional requirements and regulations and an Electrical Installation Certificate must be provided on completion of the installation.
  - The power supply must be fitted with a 30mA RCD. If required, the Electrician may replace the cable entry gland supplied with a larger size to secure the cable powering the heater.

### Minimum cable sectional area

This should be calculated at 5-amp/mm<sup>2</sup> for distances up to 20 metres (these sections are indicative and should be checked and adapted if necessary, for cable lengths over 20 metres).



**Fig. 7**

### Connections

- To connect the power supply cable, remove access cover (see Fig. 7).
- Make sure that all connections to the terminal block are correct as per the label inside the heater and they are tight.
- Make sure not to expose the cable to anything which can cause damage to it i.e. sharp edges, hot surfaces, or crush hazards.
- The cable should be fixed to avoid any trip hazard.

## 2.5 Power requirements

Power Output [kW]	Voltage [V]	Current [A]
2	220-240	9
3	220-240	13
4.5	220-240	20
6	220-240	27
9	220-240	40
12	220-240	53
15	220-240	66
18	220-240	79

3 Phase Power Output [kW]	400 V Star 230 V Delta	Current [A]
6	380-415/220-240	9/15
9	380-415/220-240	13/23
12	380-415/220-240	18/31
15	380-415/220-240	22/38
18	380-415/220-240	26/46
24	380-415	35

## 3. OPERATING INSTRUCTIONS

### 3.1 Flow requirements

The flow rate of water into the heater must not exceed 17,000 litres per hour (17m<sup>3</sup>/hour/3,740 UK gallons per hour). A higher flow rate will require the installation of a bypass to prevent damage to the heater elements.

**NOTE:** The heater will not operate unless the following minimum flow rates are achieved:

1,000 litres/hour (1m<sup>3</sup>/hour/220 UK gallons/hour) for 2 to 6 – kW heaters

4,000 litres/hour (4m<sup>3</sup>/hour/880 UK gallons/hour) for 9 to 24 – kW heaters

### 3.2 Water quality

The water quality **MUST** be within the following limits:

- PH: 6.8 – 8.0
- Total Alkalinity (TA): 80 – 140 ppm (parts per million)
- Chloride Content MAX: 150 mg/litre
- Free Chlorine: 2.0 mg/litre
- Total Bromine: Max 4.5 mg/litre
- Total Dissolved Solids (TDS)/Calcium hardness: 200 – 1,000 ppm

Stainless Steel heaters are **NOT** suitable for use on saline (salt) water pools. **ONLY** heaters with titanium heating elements are suitable for use on saline (salt) water pools.

**WARNING:** Failure to meet the water quality limits will void the warranty.

Upon completion of the installation, run the water-circulating pump to purge the system and heater of air (i.e. remove any trapped air in the system and heater).

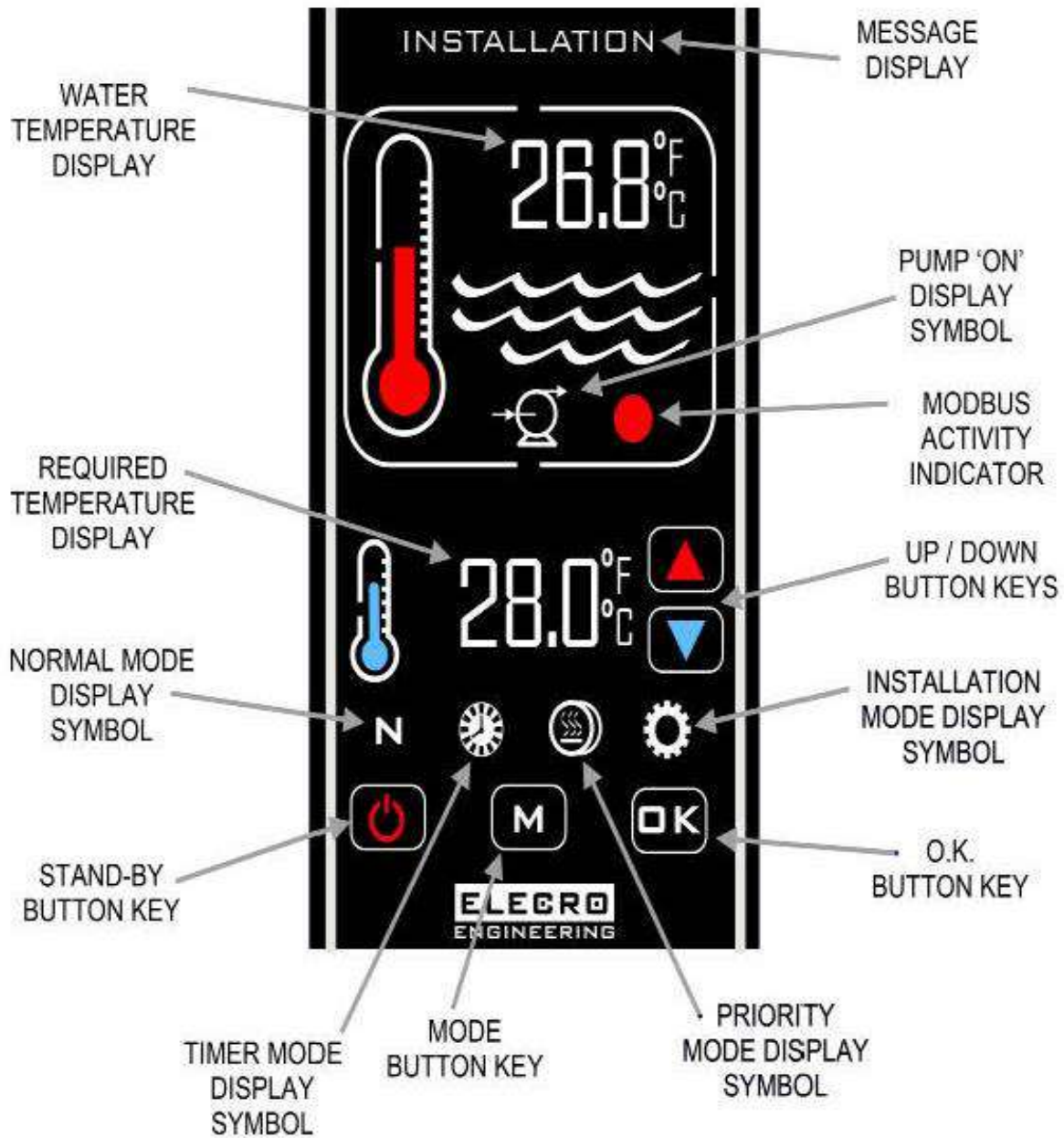
#### Useful advice:

To reduce running costs and speed up the heating process, insulate the pool wherever possible. A floating solar cover is an essential minimum to retain heat.



### 3.3 Digital touchscreen heater overview

The Touchscreen digital heater has been pre-programmed with all the necessary parameters to ensure reliable service & operation. Below is an overview indicating the heater button keys and graphical symbols.

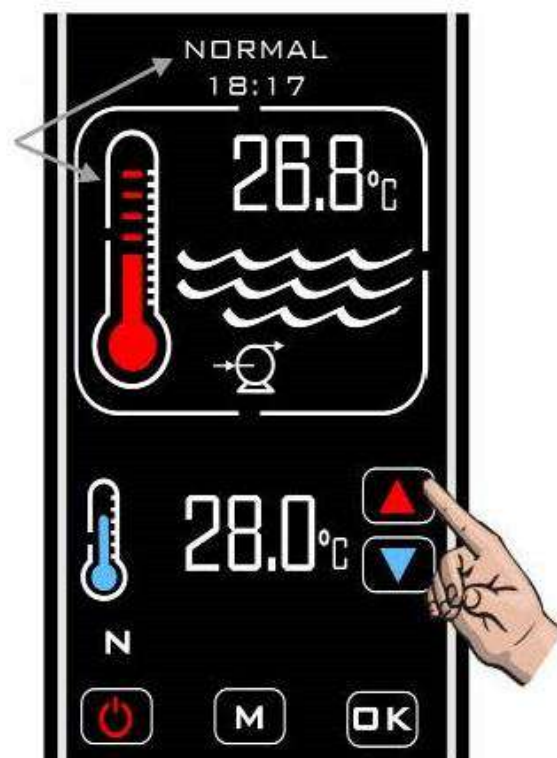


On initial power up of the heater the digital display will be illuminated.


The heating device will only be switched 'On' when the following criteria are met i.e.:

- Water circulating pump is 'On' delivering in excess of the minimum flow requirement (see page 8).
- The required temperature is set to a higher value than the actual water temperature.

The digital display will show '**NORMAL**' and the graphical red coloured thermometer will be 'Animated' whenever the heating device is switched '**ON**'.



The actual pool water temperature is shown in the upper area of the display. The required temperature is shown in the lower area of the display. The required water temperature can be adjusted by touching the '**UP / DOWN**' touch button keys until the required temperature is displayed, adjustments are in 0.1°C increments.

Priority of Heating is a function that ensures your pool water is constantly maintained at your required temperature. When Priority of Heating is activated the Symbol  will be displayed on the screen.

The heater will then monitor the pool water temperature and start both the pool circulation pump and heating process when necessary.

### Time Switching Delay

To prevent overheating of the switch components within the heater caused by frequent on/ off switching (cycling) the heater has been pre-programmed with a time delay function.

When time switching delay is activated the message display will show '**HEATER DELAY**' for 2 minutes.

### Differential

When the pool water has reached the required temperature the heating device will switch off and will not switch back on until the water temperature has fallen 0.6°C below the required temperature.

### Operating Modes

There are five operating modes:

Normal



Timer



Priority



Installation



Standby



The required Modes are selected by touching the 'M' button key, each touch causes the mode to change to the next mode. The display will indicate which mode is currently selected together with the clock time.

(Example illustrated 'INSTALLATION' mode)



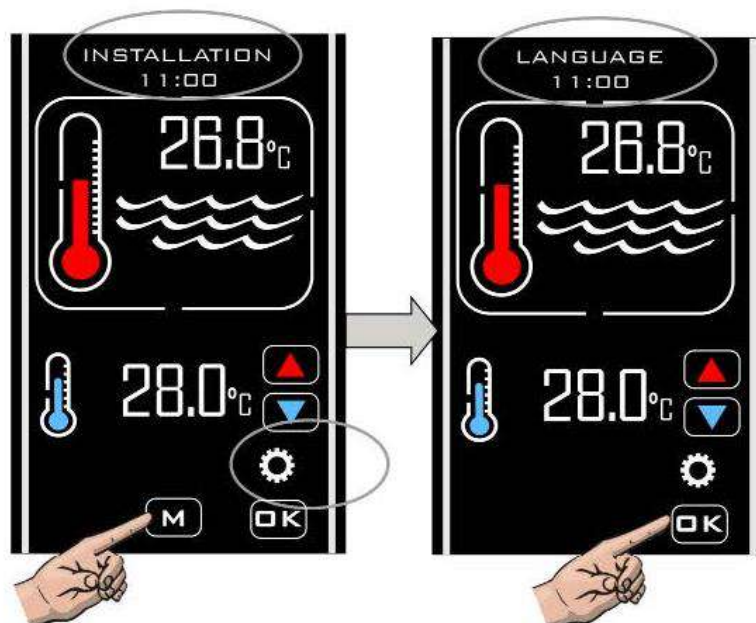
## Installation Mode

When entering Installation mode, the heater and pump will immediately be turned off (if they are on) and will not be permitted to be turned on while the heater remains in any of the setup menus. On exiting the 'Installation' mode the heater will revert to the '**Normal**' mode and follow the same procedure as if first entering that mode, the display will reflect this.

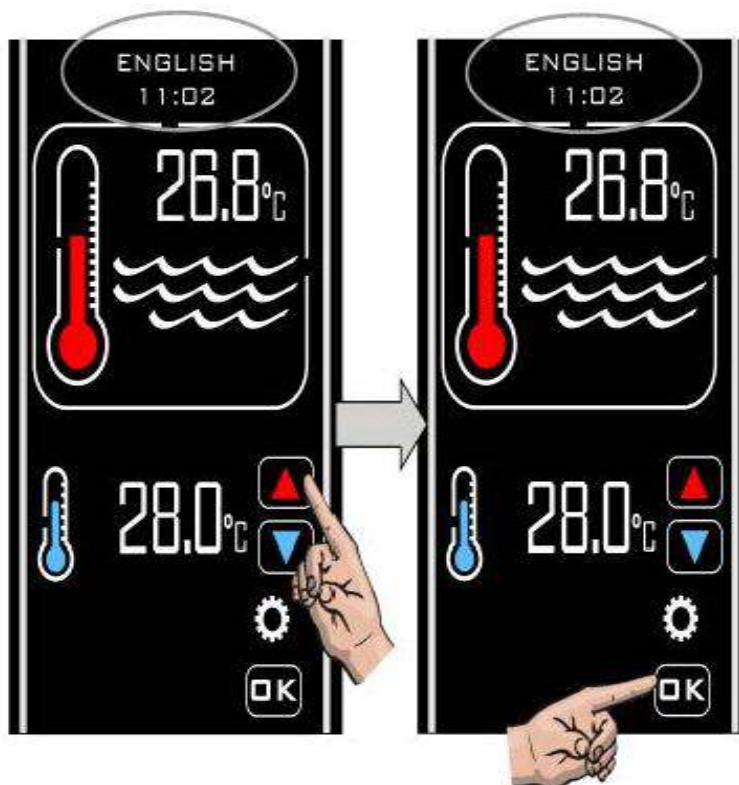
- LANGUAGE (English, French, German, Spanish and Russian)
- UNITS (temperature units; Centigrade or Fahrenheit)
- CLOCK (set current time)
- TIMER (four-time settings for switching the heating device 'On' and 'Off')
- PROBE CAL (Temperature calibration adjustment)
- MODBUS (Set Baud rate, address and parity for BMS connection)
- FACTORY (Access restricted)
- EXIT

## Language Setup

Enter the '**INSTALLATION**' mode by touching the 'M' button key repeatedly until '**INSTALLATION**' appears at the top of the display then touch the '**O.K**' button key.

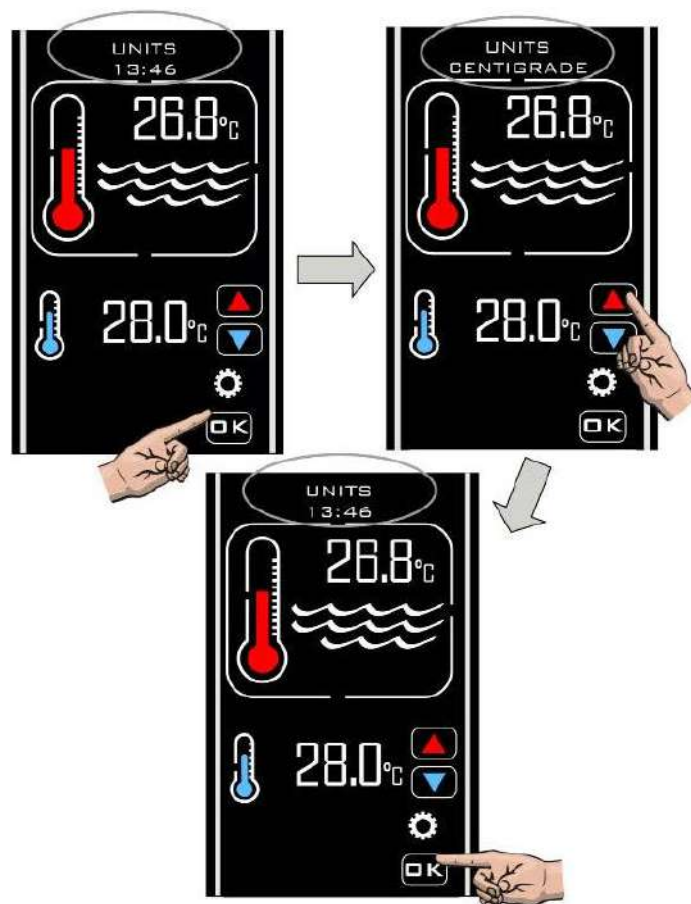


Touch the '**UP**' / '**DOWN**' button keys until the desired language is displayed then touch the '**O.K**' button key to select.



## UNITS Setup

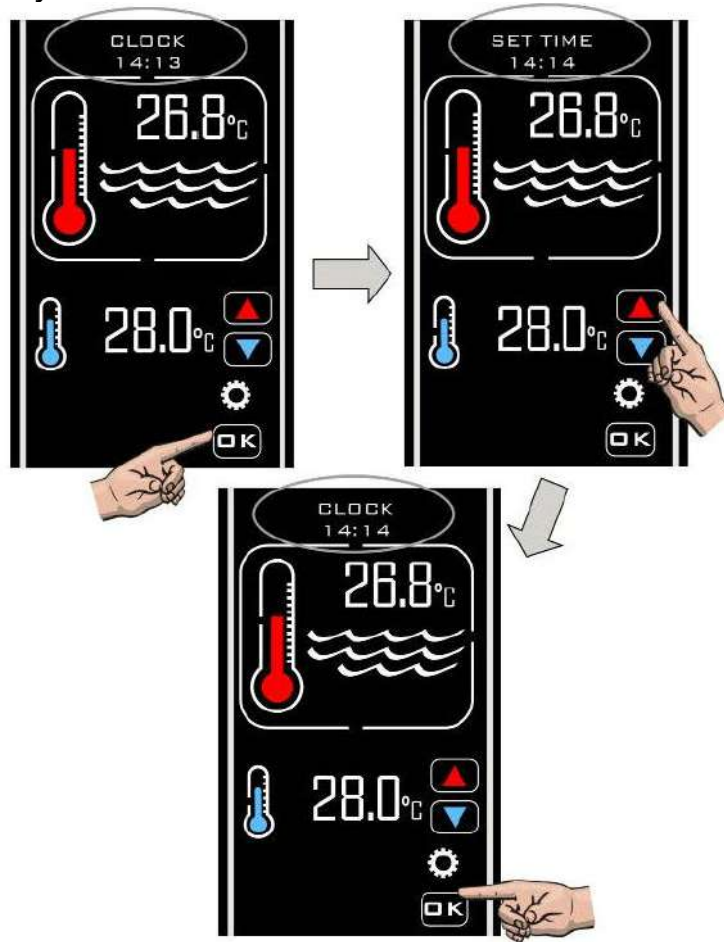
After selecting '**O.K**'. For the language setup the display will then revert back to show '**LANGUAGE**' touch the '**UP**' / '**DOWN**' button keys again to display the next option which is '**UNITS**', touch the '**O.K**' button key to select, the display will show '**UNITS**' and '**CENTIGRADE**' touch the '**UP**' / '**DOWN**' button keys to change to '**FAHRENHEIT**' if required, touch the '**O.K**' button key to select and save, the display will then revert back to '**UNITS**'.



## CLOCK Setup

Touch the **'UP' / 'DOWN'** button keys to display the next option which is **'CLOCK'** touch the **'O.K'** button key to select, the display will show **'SET TIME'** and the current clock time, touch the **'UP' / 'DOWN'** button keys to change the clock time, touch the **'O.K'** button key when the time is correct to save.

**NOTE:** The time can only be set in the 24-hour format.



## TIMER Setup

After selecting **'O.K'** for the **'CLOCK'** setup the display will then revert back to show **'CLOCK'**, touch the **'UP' / 'DOWN'** button keys until **'TIMER'** is displayed, touch the **'O.K'** button key to select, **'TIMER 1'** will be displayed, touch the **'O.K'** button key to select and **'SET TIMER 1 ON'** will be displayed, touch the **'UP' / 'DOWN'** button keys to set the required time, touch the **'O.K'** button key to save the setting, **'SET TIMER 1 OFF'** will be displayed, touch the **'UP' / 'DOWN'** button keys to set the required time, touch the **'O.K'** button key to save the required time, the display will then show.

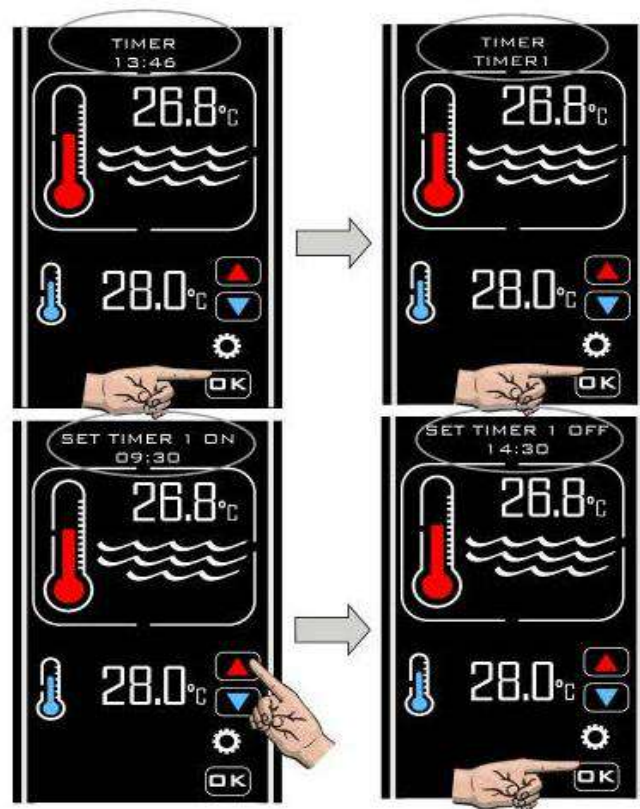
**'TIMER 2'** repeat the same procedure for all four **'ON' / 'OFF'** timer settings, select **'EXIT'**. If any Timers are not required set the **'ON / OFF'** times the same.

The timer mode allows you to set up four on and off time periods when you would like heating to take place. These can be set to take advantage of off-peak energy tariffs, or to ensure your pool is at the required temperature during specific time periods.

The heater allows you to override the time clock at any point by activating the Priority of Heating Mode explained on page 15.

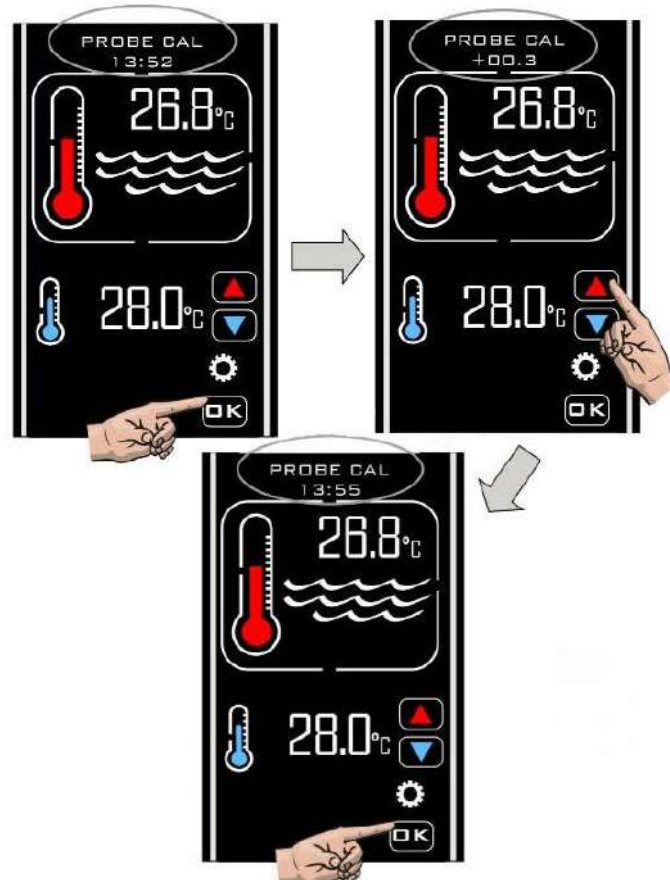
**NOTE:** The time clock will only control the heating time periods and not the filtration pump cycles.





## Probe Calibration Setup

After selecting 'EXIT' for the timer setup the display will then show 'PROBE CAL' touch the 'O.K' button key to select, touch the 'UP' / 'DOWN' button keys to increase or decrease the temperature calibration adjustment, touch the 'O.K' button key to select, the display will then revert back to show 'PROBE CAL'.

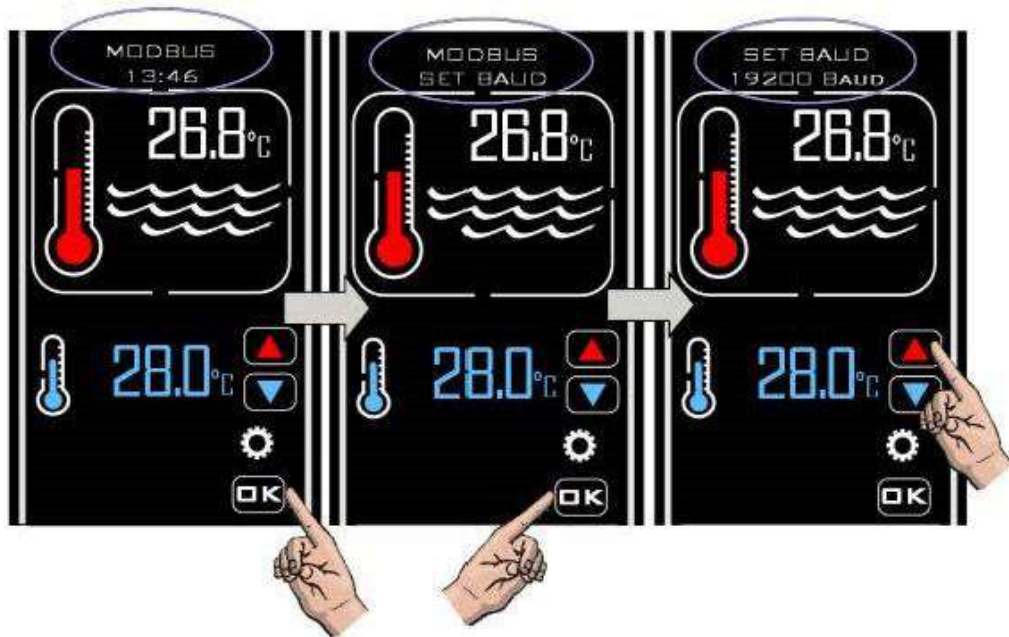


Probe calibration is usually not required. However, should you need to make an adjustment take a temperature reading from the pool water with an accurate thermometer then adjust as required.

Actual Water Temp	Heater Reading	Adjustment Required
28	30	-2.0
28	26	2.0

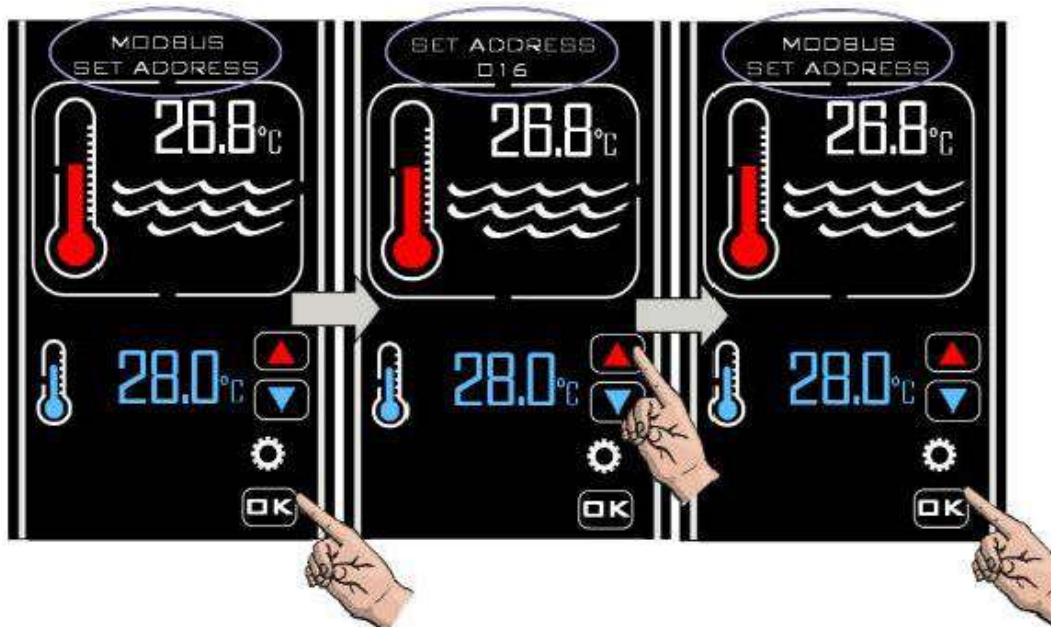
## MODBUS Setup

Refer to your BMS Management System manual for the required settings. **SET BAUD** touch the 'O.K' button key to select, '**MODBUS SET BAUD**' will be displayed, touch the 'O.K' button key to select and '**SET BAUD 19200 Baud**' will be displayed, touch the 'UP' / 'DOWN' button keys for the other option '**SET BAUD 9600 Baud**' touch the 'O.K' button key to select the required, Baud rate.



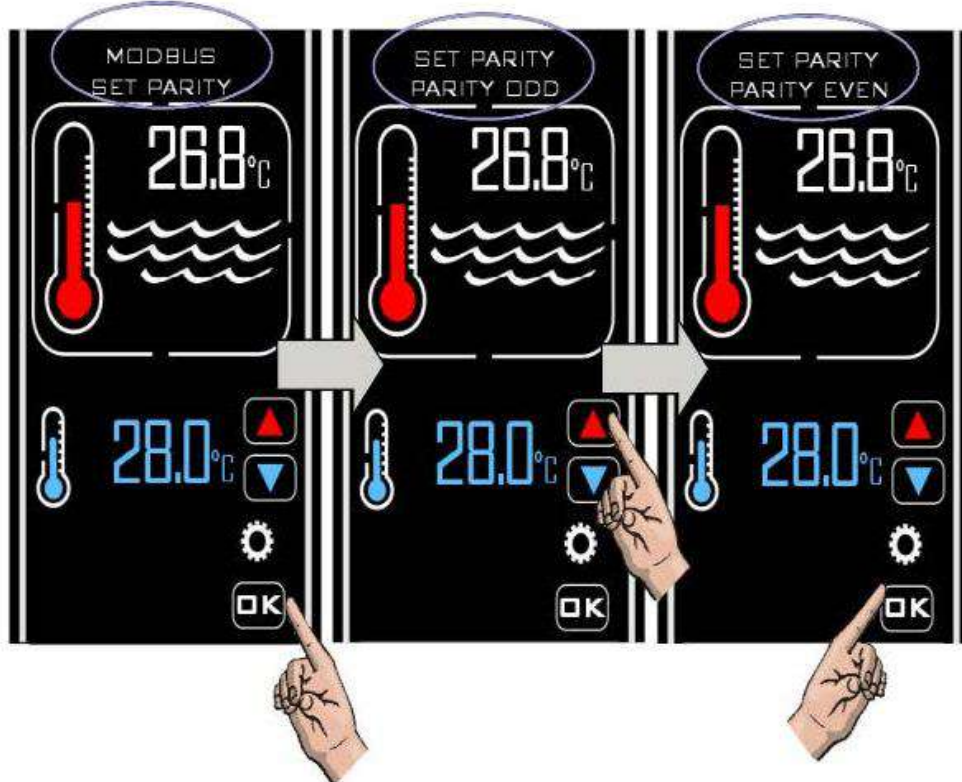
## Set Address

Touch the 'UP' button and '**MODBUS SET ADDRESS**' will be displayed, touch the 'UP' / 'DOWN' button keys to set the required address, touch the 'O.K' button key, the display will revert back to show '**MODBUS SET ADDRESS**'.



## Set Parity

Touch the 'O.K' button key to select '**MODBUS SET PARITY**' and '**PARITY ODD**' will be displayed touch the 'UP' / 'DOWN' button keys to change '**PARITY ODD**' to '**PARITY EVEN**' or '**PARITY NONE**' touch the 'O.K' button key to select the required setting, the display will now revert back to show '**MODBUS SET PARITY**' touch the 'UP' button key and '**MODBUS EXIT**' will be displayed, touch the 'O.K' button key to select '**EXIT**' and the display will show '**MODBUS**'. Touch the 'UP' button key and the display will show '**FACTORY**' touch again and '**EXIT**' will be displayed, touch 'O.K' and the heater will exit the '**INSTALLATION**' mode and revert to '**NORMAL**' mode.

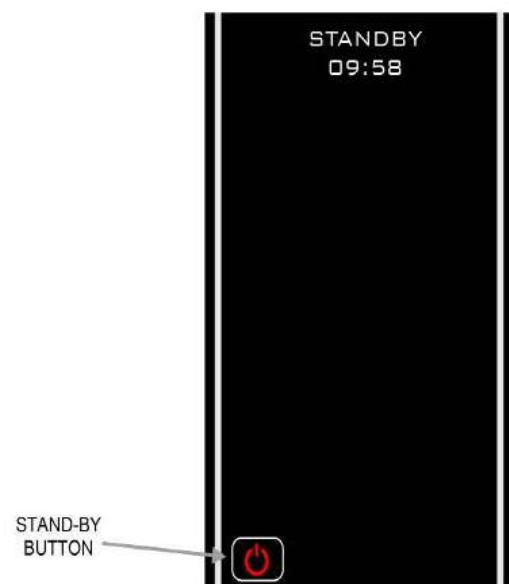


Once configured the **MODBUS** connection will enable the heater to be switched 'on' and 'off' (into and out of standby mode) remotely via an external BMS device.

## Standby Operating Mode

When in Standby mode the heater will display the text '**STANDBY**', Clock time and the Standby button key (as below).

When in this mode the internal clock continues to run but there is no other functionality apart from the Standby button key.

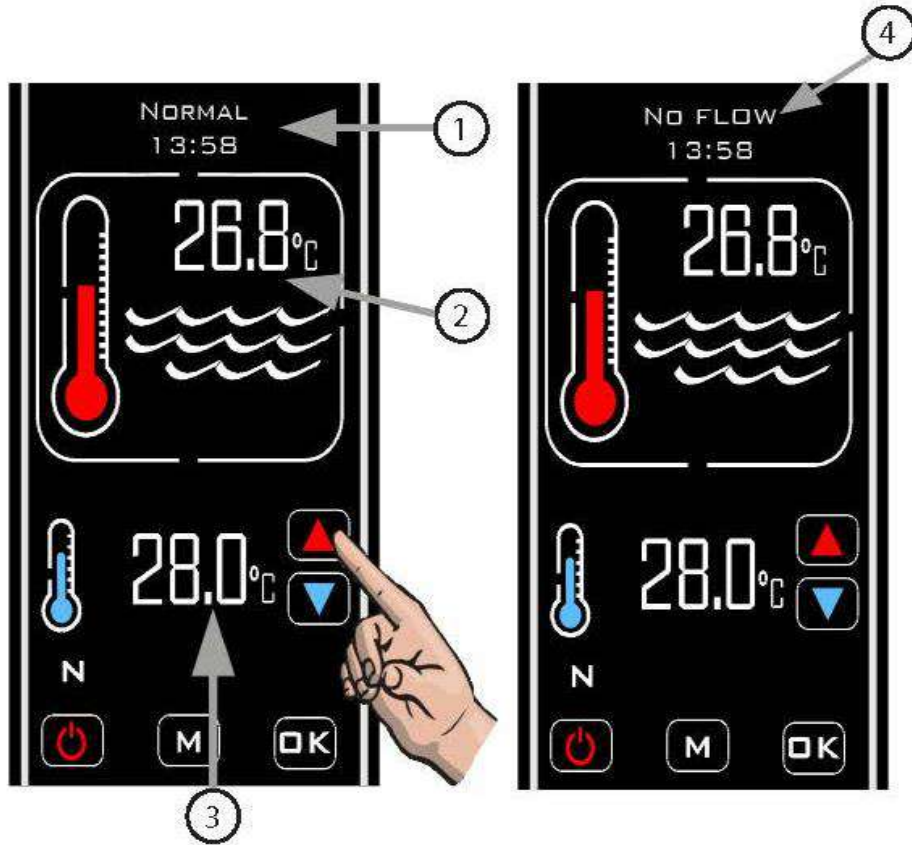





## Normal Operating Mode

Under normal conditions when the heater is connected and 'On' and flow has been detected by the flow switch the heater display will be as shown below indicating the following information:

1. 'Normal' and 'Time'
2. Actual water temperature
3. Required temperature
4. If the Flow switch does not detect sufficient flow the message 'NO FLOW' will be shown on the Display.



## Timer Mode

To activate the Timer mode, touch the 'M' button key until the 'TIMER' symbol  is displayed (see below).

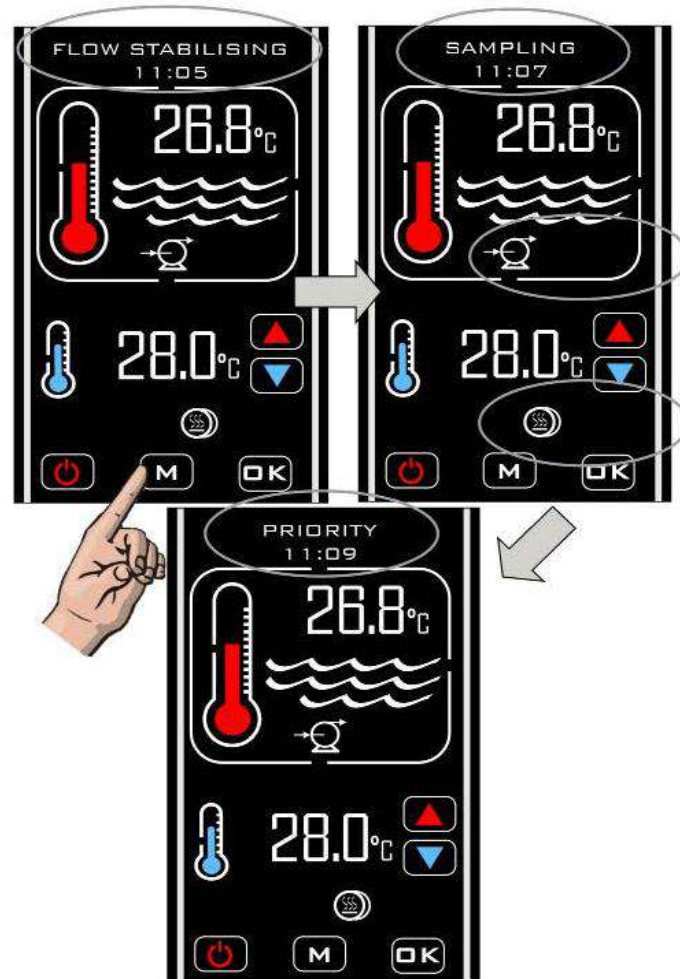


In this mode the heater will only heat during a timed-on period and when receiving sufficient flow.

If no or insufficient flow is being received no heating will take place. When in a timed off period no heating will take place.

### Priority of Heating Mode

To activate the '**Priority of Heating**' mode touch the '**MODE**' button key until the '**PRIORITY**' symbol is displayed, the message '**FLOW STABILISING**' will be displayed, after two minutes the display will change to show '**SAMPLING**' and after a further two minutes the display will change back to '**PRIORITY**'.





Once the '**Priority of Heating**' feature has been enabled the heater will take a water temperature sample every hour and the message '**SAMPLING**' will be displayed.

If the pool water temperature is below the required temperature, the heater will send a signal to the heating device to come on until the required temperature is reached. When the required temperature is reached the heater will switch the heating appliance off, followed by the filtration pump. '**Pump Delay**' will be displayed for one hour, then a new water temperature sample will be taken, if the sampled water is at or above the required temperature no heating will take place and the heater will switch the circulation pump off (pump delay will be displayed), then one hour later take a new temperature sample.

The sequence will continue to repeat until 'Priority of Heating' is switched off.

## Priority of Heating and Timer Mode

To activate the 'Priority' and 'Timer' modes together touch the 'M' button key until both symbols  and  are displayed.



In this mode the heater will heat whenever it is receiving flow during a timed-on period.

## 4. TROUBLE SHOOTING

### ➤ Quick Function Test

Observe the main electricity meter when the heater is heating and then observe it again when the heater is in the standby mode. The test should show that the meter is recording more electricity being used by the heater when it is heating. It is impossible for an electric heater to waste energy, if it is drawing power then that power will be turned into heat that will be transferred to the water.

### ➤ Accurate Function Test

If a more accurate test is required to confirm that your heater is delivering the specified heat output, two electricity meter readings will need to be taken from the property's main electricity meter, at one hourly intervals (i.e. take one-meter reading and then a second reading exactly one hour later). By subtracting the first reading from the second reading the number of units (kilo Watts kW) consumed can be calculated. Note that your heater is also rated in kW hours.

The pool pump and heater will need to be running continuously during the test. To avoid inaccurate results when performing this test, it is important to refrain from using other high current consuming appliances in the property, such as tumble dryers, showers, cookers etc. A large domestic pool pump of one horsepower will draw less than 1-kW in a one-hour period. The conclusion of the test should prove that for example a 6-kW heater and a half horsepower pump will draw between 6.3-kW to 6.5-kW in one hour.

➤ **Error codes:**

**TEMP PROBE ERROR/OUT OF RANGE** – This will appear if the temperature probe has become disconnected or the temperature is outside the limit of the probes working temperature 0-100°C.

**NO FLOW** - This will appear if the flows switch does not detect sufficient flow to activate the heater. Please refer to page 8 (3.1 Flow requirements).

**Reset Trip** – Please refer to the **Possible cause 2** on the page 20

**PUMP ON ERROR** - This will appear only when heater is in Priority of Heating mode. Make sure that this is the mode required otherwise change to NORMAL mode. In the priority of heating mode controller is take control off circulation pump and overriding current timer setting. Error message will appear if ontroller is not detecting the flow because pump is not wired correctly, one of the valves in the pipe work is closed or pipe damaged causing the leak.

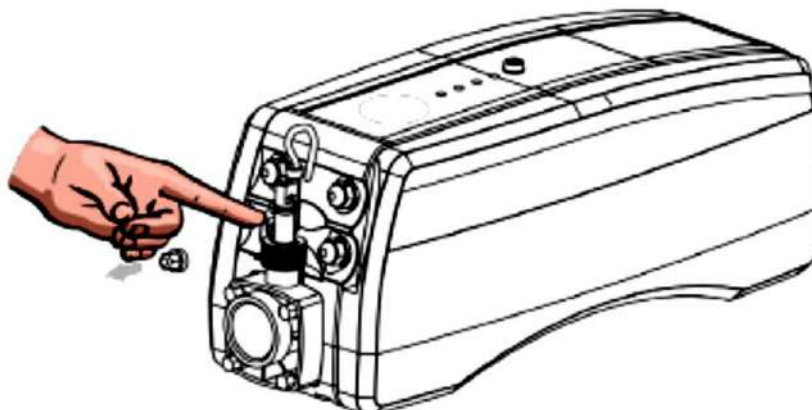
➤ **Heater will not switch to 'Heater on':**

In most cases this will be the result of one of the following not being met:

**Possible cause 1:** The required water temperature has been achieved.

**Remedy:** To confirm increase the required temperature more than 0.6°C above the current water temperature.

**Possible cause 2:** The 'thermal safety cut out' has tripped - this is shown by the backlight of the screen switching on and off (flashing) and showing the message 'Reset Trip'.



**Possible cause 3:** Insufficient flow. - if this is the cause the display will show '**No Flow**'.

**If using a cartridge filter:** Confirm this by running the system with the cartridge removed from your pump & filter unit, this will supply the heater with the maximum flow rate that your unit is capable of. If the heater then switches '**On**' a blocked cartridge can be confirmed to be the cause. The cartridge should be cleaned or replaced.

**If using a sand filter:** Check the pressure indicator on your sand filter and back wash if necessary.

**NOTE:** In some cases, the thermal safety cut-out tripping and a low flow rate can be linked i.e.: when a filter becomes choked air can be drawn into the filtration system and become trapped inside the heater so causing the cut-out to trip.

➤ **NO LIGHT APPEARS ON THE HEATER WHEN IT IS SWITCHED 'ON':**

**Possible cause:** Power failure external to the heater.

**Remedy:** Check any fuses, RCD or other switch components installed in the supply cable.

**NOTE:** The heater is fitted with a 3 Amp glass fuse located on the top control panel assembly (see Fig 1).

➤ **Heater is tripping circuit breaker (MCB) after few minutes/ hours of operation:**

If the heater is faulty it will instantly trip the circuit breaker (MCB). The most likely causes of tripping the breaker after a period of time are:

<b>Possible Cause 1:</b>	Faulty circuit breaker.
<b>Possible Cause 2:</b>	Incorrect size of the circuit breaker.
<b>Possible Cause 3:</b>	Cross section of the cable is not sufficient.
<b>Possible Cause 4:</b>	Loose connection(s) of the power supply cable. Check both ends of the power supply cable (at the distribution box and at the heater terminal block).

**Remedy:** Contact an Electrician to check installation and protection.

➤ **Heater is tripping circuit breaker (MCB) or RCD instantly:**

<b>Possible Cause 1:</b>	Short circuit caused by the wiring or faulty components.
<b>Possible Cause 2:</b>	Heating element is going to ground or is damaged.
<b>Possible Cause 3:</b>	Moisture inside the heater.

**Remedy:** Send heater back to the manufacturer. Use return form on page 23 or download it from the Elecro website.

➤ **The water entering my pool does not feel much warmer:**

The temperature gain of the water after it has passed through the heater will be directly proportional to the volume of water being pumped in relationship to the power output of the heater.

**For example:** A 6-kW heater, when connected to a 4,000 litre / hour pump, will produce a lift in temperature of approximately 1.2 °C (almost undetectable to the human hand) however, as the water being heated is re-circulated from a single body of water, the time required to heat it remains unaffected by the volume of flow. A popular misconception is that slowing down the flow rate will speed up the heating process.

➤ **For any other technical queries and support contact us by email at [Technical@Elecro.co.uk](mailto:Technical@Elecro.co.uk)**

## 5. MAINTENANCE

We recommend annual maintenance and cleaning of the heater to ensure proper operation.

**WARNING:** Before performing any maintenance on the unit isolate from the main power supply.

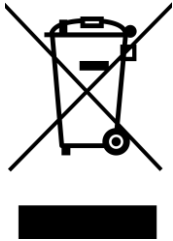
The heater should be drained, the flow tube and heating elements should be cleaned. Removing scale/sludge and any debris or blockages will extend life expectancy of the heating element(s) and avoid potential failures.

Check that electrical cable connections are properly tightened.

## 6. DISPOSAL OF ELECTRICAL/ELECTRONIC EQUIPMENT

**Do Not dispose of this product as unsorted municipal waste.**

This symbol on the product or on its packaging indicates that this product should not be treated as household waste. Instead it should be handed over to the applicable collection point for the recycling of electrical and electronic equipment.



By ensuring this product is disposed of correctly you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources.

For more information please contact your local Civic Office, household waste disposal service or the retailer where the product was purchased.

## 7. WARRANTY

**This product is guaranteed from the date of purchase against faulty workmanship and materials for:**

- **two years within Europe**
- **one year outside Europe**
- The manufacturer will replace or repair, at its discretion, any faulty units or components returned to the Company for inspection.
- Proof of purchase may be required.
- The manufacturer will not be liable in cases of incorrect installation of the heater, inappropriate use or neglect of the heater.
- Any damages occurred due to shipping must be reported within 48 hours of receipt of the product. Any claims after this time will be considered as misuse or abuse of the product and will not be covered by the warranty.
- Any glass parts, seals and water connections are considered as consumables and are not covered by the warranty.

**Elecro Engineering Ltd  
Repairs Department  
Unit 11 Gunnels Wood Park  
Gunnels Wood Road  
Stevenage  
Hertfordshire SG1 2BH  
United Kingdom**

**Customer Information: (ATTACH TO HEATER)**

**Company Name:** .....

**Contact Name:** .....

**Daytime Telephone Number:** .....

**Email Address:** .....

**Return Address:** .....

**Post/Zip Code:** .....

**Country:** .....

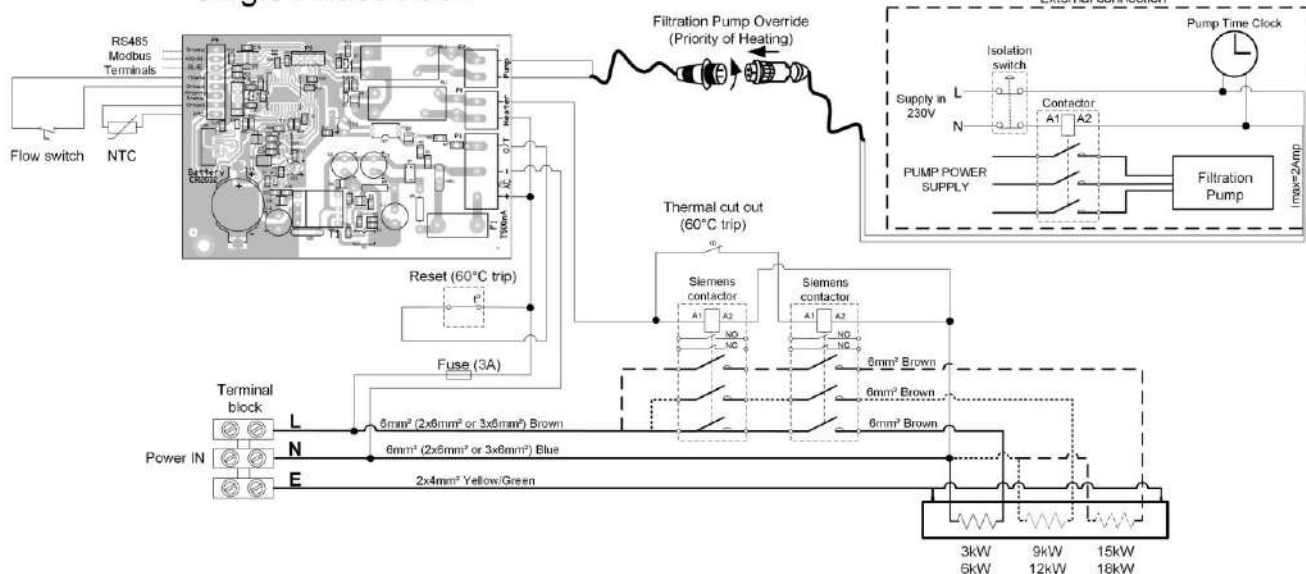
**Suspect Fault / Description of problem:**

[illegible]

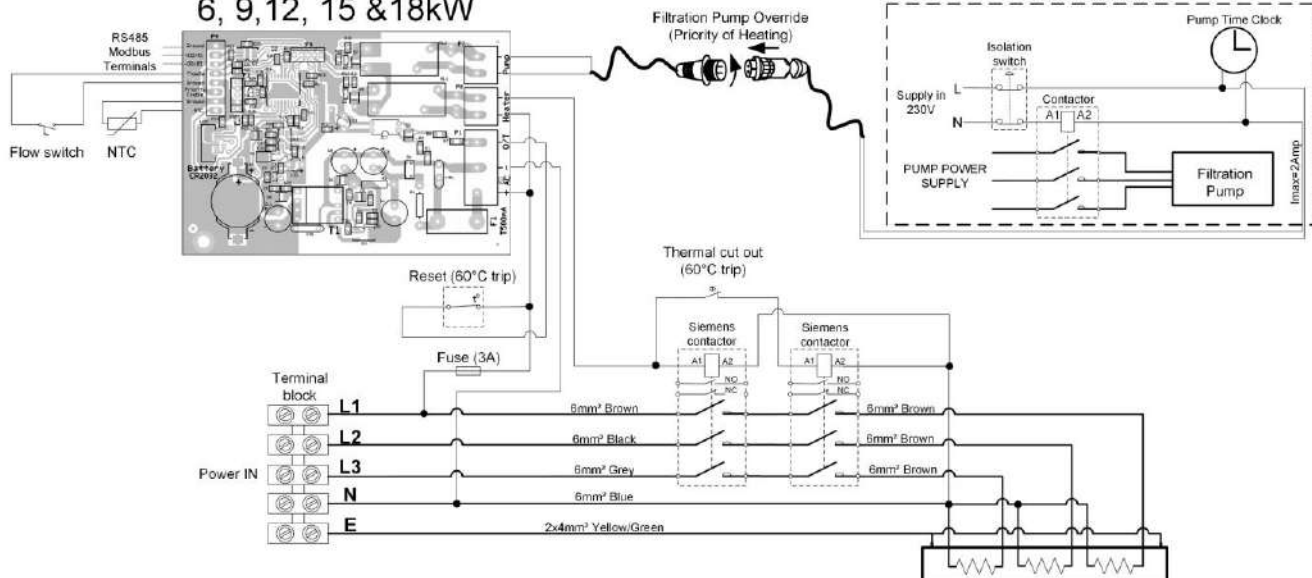


## 8. WIRING DIAGRAMS

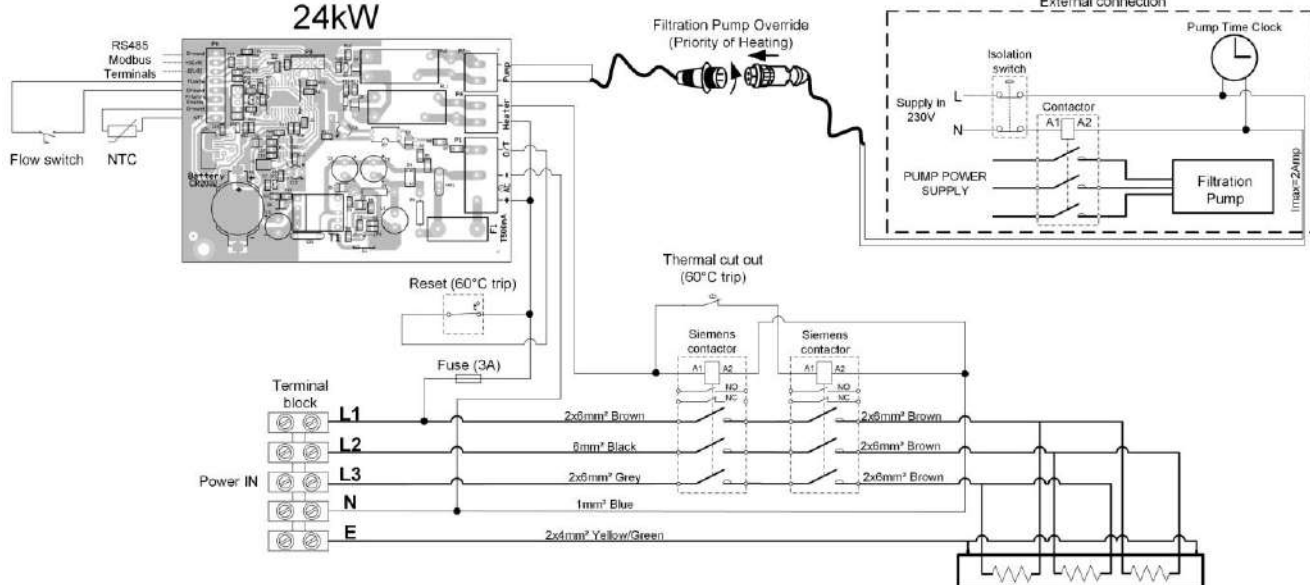
### Single Phase 230V



### 3 Phase 400V 6, 9, 12, 15 & 18kW



### 3 Phase 400V 24kW





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