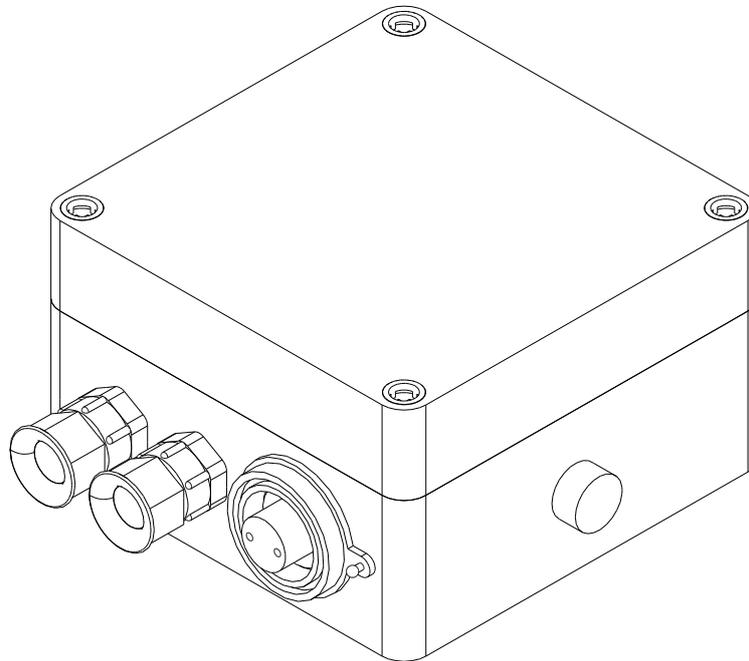


Thermaster Thermostatic Controller

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

These instructions should be carefully read and understood by all operators before installing and commissioning the equipment. Failure to comply with instructions could invalidate the warranty. The Thermaster controller is manufactured from high performance materials and should give trouble free service provided it is installed, operated and maintained in accordance with these instructions



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Warning - This controller operates on Mains Voltage

- Always disconnect supply before removing cover or attempting connections.
- The output lead (marked with a red warning label and fitted with a protective cap) becomes live once the mains supply lead is connected. **Always connect output lead first.**
- The output relay of the controller is rated at 5 amps, however, it is recommended that any heater should be connected through a contactor as shown in Figs 2 and 3.
- The mains supply must be fused with the correct size circuit breaker or fast blow fuse for the load.

Note: Failure to connect the Earth may result in a serious safety hazard.

- The casing of the Thermaster is manufactured to IP65 standard. If the cover is removed ensure that the gasket is firmly seated in the locating groove before replacing the cover and tightening the retaining screws.

INSTALLATION

1 Mounting

Remove the clear plastic cover by undoing the 4 plastic screws at the corners. The controller should be fixed to a suitable surface within reach of the probe lead using suitable screws through the 4 fixing holes in the corner pillars.

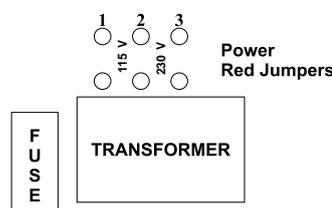
2. Electrical Connection

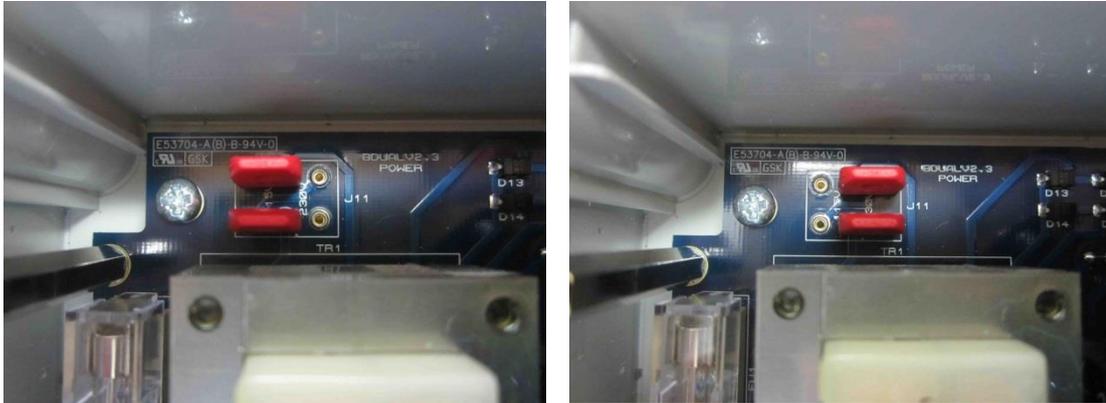
The controller is fitted with flying leads for easy connection. The output lead is marked with a red warning label and is fitted with a protective cap. The other lead is the mains supply.

2.1) Power supply. The controller is supplied for 240V power supply as standard (unless otherwise specified) however, it can be adjusted simply for 110V operation as follows:

- Remove the transparent cover as above and then remove the faceplate by undoing the 4 screws.
- Remove the top PCB by unscrewing the 4 screws and taking care not to damage the connecting wiring underneath.
- Locate the red jumpers (J11) on the top left hand corner of the bottom board. (See Fig.1 below)
- Both jumpers should be moved to select the desired voltage i.e. Place them across pins 1 and 2 for 115V and 2 and 3 for 230V.

NB Both jumpers must be moved otherwise the PCB will be damaged.





110V Jumper position

230V Jumper position

Fig.1

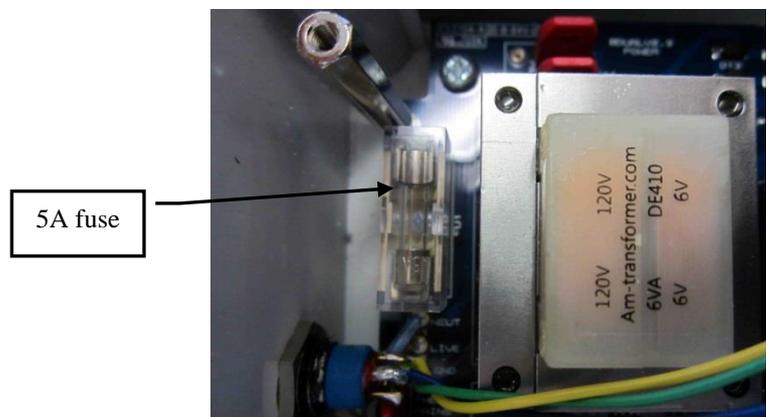
2.2) Relay Operation. Your Thermaster is fitted with a relay that will give a **live voltage** output as standard unless otherwise specified.

The controller may have been supplied with a volt free relay if requested at placement of order, and this should be clearly marked on the controller faceplate. However, if this is not the case and a volt free relay is required please contact Braude on 01252 876123 for advice.

Once the set-up is complete reassemble the controller and replace the cover, ensure the lid is correctly seated and the 4 retaining screws are firmly tightened.

2.3) Fuse

The Thermaster controller is equipped with a anti surge T LBC min fuse,5A 5x20mm BP. This is located on the bottom PCB to the left of the transformer as shown below



2.3 Wiring Connection

- a) For application where no other controllers (such as level controllers) are connected, connect as in Fig 2.

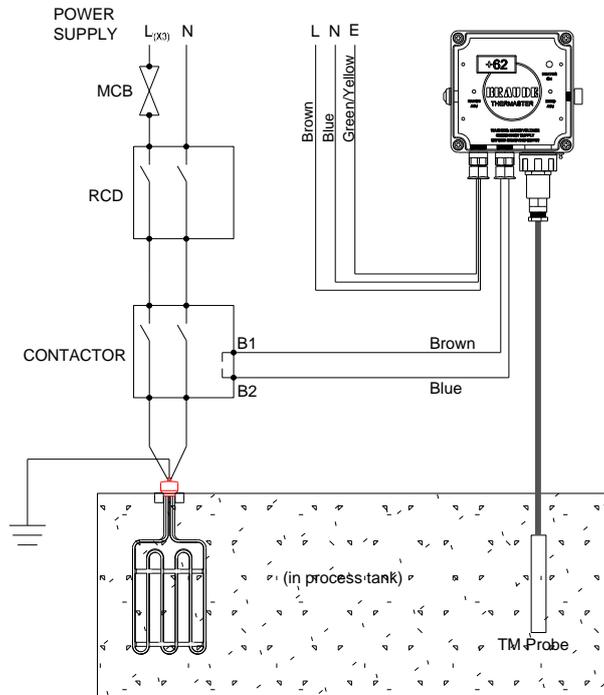


Fig 2 - Wiring diagram for Thermaster connected to Polaris heater

- b) For applications involving the use of another controller, such as level or timer connect as in Fig. 3. One of the controllers must have a volt free relay.

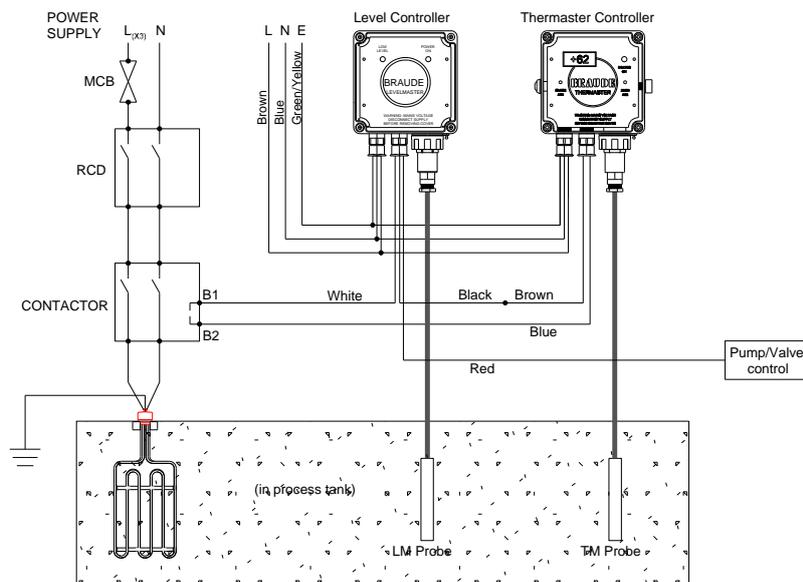


Fig 3 - Thermaster controller connected to level controller

The controller can be supplied with a 3 wire output lead (which will be in conjunction with a volt free relay). The connections are as follows:

Black - Common Red - Break on rise (MOR) for heating

White - Make on rise (MOR) for cooling

3) **Probe Mounting**

Position the probe at a suitable point in the tank where it will not be damaged and ideally at a position opposite (not right next to) the heater or cooler. The probe may be fixed using the clip provided with the black shroud above the solution level.

The probe is supplied with a two pin IP66 standard plug which should be connected to the socket on the underside of the control box. Ensure that the locking ring is tightened to secure.

Double check all connections before supply is switched on.

Operation and Setting

Switch on the mains supply. The digital display will illuminate to indicate that power is on, the 'Heater On' indicator will illuminate if the temperature of the solution is below set point.

Adjust the temperature **Set Point** to the required value as follows:

- Depress and hold the push button on the left hand side of the unit. This will display the set temperature.
- Adjust the set point temperature by rotating the control knob on the right hand side. (Clockwise rotation to **increase** set point).
- Release the push button. The controller is now operational, displaying the probe temperature.

IMPORTANT— Do not rotate the control knob without depressing the push button as this will change the Set point to an unknown value.

Once set, the THERMASTER should not require re-calibration. However, for Quality Control purposes the unit can be re-calibrated, please contact our Technical Department.

Fault Display

Should a fault occur on the probe circuit, a flashing display will be shown indicating the type of failure as follows:-

- Flashing display + 188 Fault - Probe Open Circuit
- Flashing display - 188 Fault - Probe Short Circuit

When the above faults occur and the heater is calling for heat, the heater will be switched off (fails safe)

Check connections in probe plug, secure if disconnected. Check probe and replace if there is a short or open circuit. Controller and probe can be returned to E. Braude (London) Ltd, for Calibration, Service and Repair.

CALIBRATION

Note: Thermaster controllers are calibrated for use with standard probes with 2m leads. The use of

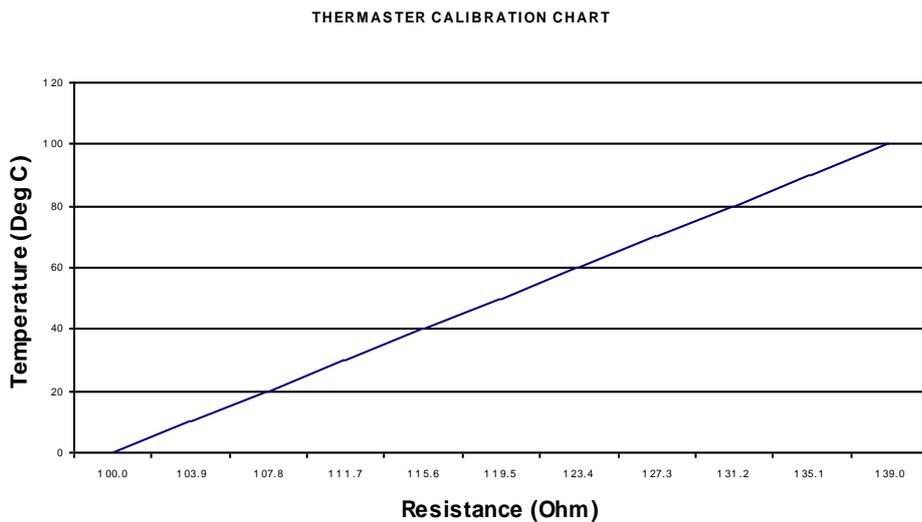
THERMAL PROCESS EQUIPMENT SPECIALISTS

probes with longer leads may necessitate recalibration of the controller against a known temperature.

- 1) If the unit is to be calibrated in situ, ensure that mains supply is connected.
- 2) If the unit is to be bench calibrated connect the mains supply ensuring that output lead is safely insulated. (See installation instructions supplied with the unit).

Resistance Method

- 3) Unplug the probe.
- 4) Undo screws and remove transparent front cover from the controller.
- 5) Apply 100 ohm resistor across the probe socket. Temperature display should read zero. If not, set to zero using zero adjust screw slot on the front panel.



Temperature (°C)	0	10	20	30	40	50	60	70	80	90	100
Resistance (ohms)	100.0	103.9	107.8	111.7	115.6	119.5	123.4	127.3	131.2	135.1	139.0

Table 1: Resistance values for PT100 sensor only (not lead)

Please note that these are the resistance values for the PT100 sensor and a correction will need to be made for the connecting wire.

- 6) Replace 100 ohm resistor with suitable resistance from the table above (e.g. 124 ohm = + 62°C) and check display. If incorrect, use the 'range adjust' screw on the front panel to set display to read correct temperature.
- 7) With no resistor in position display should flash +188.

- 8) Replace transparent cover.

Immersion method against known Temperature

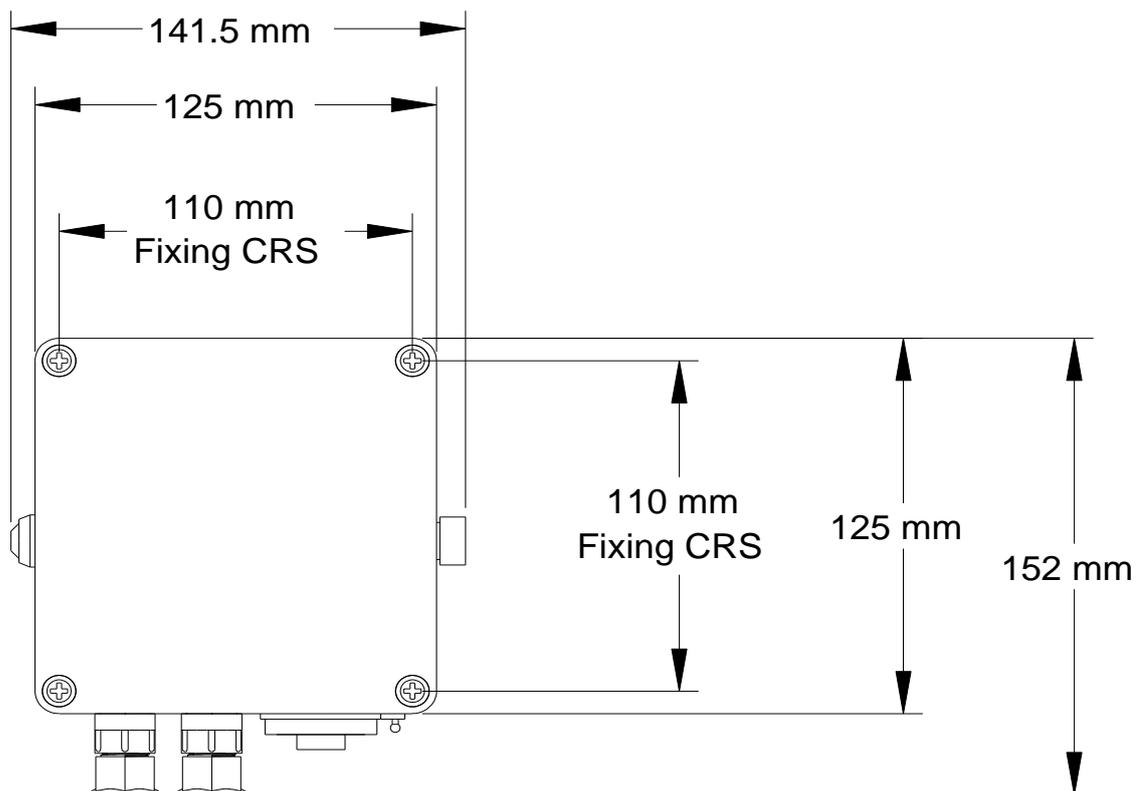
- 1) Place the probe and a thermometer in a container of ice and water and allow the probe to reach equilibrium (leave immersed approx. 10 min)
- 2) Adjust the Thermaster display to read the same as the thermometer using the **zero adjust** screw.
- 3) Place the thermometer and the sensor in a second container with water at an elevated temperature of say 70°C and allow to reach equilibrium.
- 4) Adjust the display temperature to read the same as the thermometer using the **range adjust** screw.
- 5) Repeat the above procedure until satisfied the display is stable. The unit is now calibrated.

NB The above procedures are recommendations and do not constitute part of a certifiable test. It is recommended that you contact a standard testing centre if certification is required.

All equipment supplied by Braude is subject to Braude Conditions of Sales as stated on the reverse of the Invoice/Delivery Note. Further copies may be supplied on request.

Braude do not accept liability for consequential damages that may arise as a result of use of this equipment.

Principle Dimensions



BRAUDE NON CORRODABLE EQUIPMENT

POLARIS	Non corrodable electric immersion heater 0.5 to 18kW
THERMASTER	Digital thermostatic controller to IP65
LEVELMASTER	Liquid level controller
TANKMASTER	Combined temperature and level controller
CHEMICAL TRANSFER PUMPS	self-priming select from a range of seals to suit the application
EXTERNAL ELECTRIC	Solution heating system
NAUTILUS	Tank heater/cooler for use with steam, hot water, thermal fluid or chilled water
JET STREAM	External Tank Heating/Cooling system for use where heavy workloads can damage internal tank heaters
FROGSPAWN	Thermal insulation spheres 10 – 150mm
CHEMICAL TANKS	PP, CPVC, PVDF and GRP

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