

Operating & Maintenance Instructions for 1000 Series Direct & Indirect Calorifiers

Introduction

The Series 1000 Calorifier is only suitable for use in a vented system. This means that it must be supplied indirectly from a header tank in the cold water system, and a vent pipe must be provided.

IT IS NOT SUITABLE FOR DIRECT CONNECTION TO THE COLD WATER MAIN.

General Requirements

Important: Please read and understand these instructions before installing the water heater. Incorrect installation may invalidate the guarantee.

A competent person who is familiar with the current version of the building regulations should install the heater.

Water Supply

The mains water supply to the property will be supplying both the hot and cold water requirements simultaneously. It is recommended that the maximum water demand be assessed and the water supply checked to ensure that this demand can be met satisfactorily. On standard heaters the maximum working head is 15 metres.

Water quality can seriously affect the life of the immersion heater. Failure of the immersion heater due to the accumulation of solid material and lime deposits is not covered by warranty. If water quality warrants, a properly maintained lime inhibitor or water treatment facility should be installed with this unit. It is the owner's responsibility to properly maintain the equipment.

Installation – General

Lifting. Lifting eyes are provided at the top of large calorifiers and those fitted with 'M' type lagging. This form of insulation is not suitable for lifting by straps, which can crush the outer casing. Avoid the use of chains, particularly with light gauge copper vessels or where screwed connections may be damaged by the links. When transporting or lifting vertical storage calorifiers keep them in the upright position.

Foundations. Calorifiers should be mounted on prepared foundations which are level. Even a slight tilt can cause an airlock inside the tubes, which will restrict the flow of heat. It is also important that the vessels stand firmly on the ground to prevent movement when immersion heaters are removed or other forms of maintenance is undertaken. Horizontal calorifiers are normally supported by loose cradles, which need to be positioned clear of the drain connection and leave access to any flanges for the tightening of bolts.

Pipework. Check for compatibility of materials between pipework and calorifier. In particular avoid the combination of copper and galvanised mild steel. Make sure pipework flanges are square with those on the calorifier and correctly spaced before bolting up. See that the weight of the pipework is taken by external supports and not by the vessel. Allowance should be made for the expansion of pipes either by suitable bends or flexible joints. Tighten the bolts in a diametrically opposite sequence and not consecutively around the flange.

Note: under no circumstances should the calorifier be plumbed directly to the cold water main.

Screwed Connections. All screwed connections on the calorifier are screwed BSP female except the primary

connections on indirect models which are BSP male. Screwed connections may be sealed with hemp and paste, or PTFE tape, providing the male thread is tapered. Parallel threads, such as found on primary connections to double tube heaters, require a backnut and a joint ring. Use TWO spanners when joining screwed connections to avoid undue torque on the calorifier fittings.

Relief Valve. When a relief valve is fitted, it is recommended that a short length of pipe is fitted to the discharge side of the valve to deflect the fluid in a safe direction. A long pipe may restrict the discharge, raise the blow off pressure and prevent an operator from detecting a weeping valve.

Cold Feed. The cold water supply must be from a header tank with a suitable valve to enable the calorifier to be isolated for draining down. With storage calorifiers the pipe carrying the cold feed make up should be at least equal in size to the secondary flow and a check made to see that there are no unnecessary restrictions on the supply side.

Secondary Vent. The outlet pipework should be run in a diameter that matches the secondary connections. Most calorifiers have their secondary outlet situated at the top of the cylinder, which prevents air collecting at the top of the shell. It is necessary to provide an atmospheric vent at the high point in the system. Outlets sited higher than the cylinder will have outlet pressures less than those on the same level as the vessel. No outlet should be sited at a height closer than 1 metre from the bottom of the header tank.

Primary Vent. It is equally important to make provision for venting the primary system.

Liquid Expansion. Changes in volume with temperature of the primary and secondary water must not be overlooked. The system pressure will rise dramatically if there is nowhere to which the water may expand, and can cause catastrophic failure of the vessel.

Thermostat. Direct units with screwed immersion heaters should be fitted with an additional over-temperature thermostat. Flanged immersion heaters are fitted with both a control and a manual master thermostats.

Indirect units should be fitted with an over-temperature thermostat and a cylinder control thermostat.

Fitting. Before filling the secondary system with water, check the drain valve is closed and all air vents open. *Do not fill the circuit too quickly* otherwise pockets of air may be trapped. Subsequent release of these air bubbles can cause violent shock waves which may exceed the working pressure of the calorifier. Similarly, when filling a primary hot water circuit allow time for the air to vent freely. Flush out the system before installing the control valve to remove any foreign matter. Close any manual air vents and run the circulating pumps. Crack the vents the release air accumulated by the motion of the water.

Direct Units

Water heaters are fitted with either flanged immersion heater(s) that each have a control thermostat and a manual reset over-temperature thermostat, or, screwed immersion heater(s) with a control thermostat and a separate manual reset over-temperature thermostat fitted at high level in the cylinder.

Note: The electric heat unit should always be mounted in the vessel such that the thermostats are at the top of the immersion heater.

Electrical Installation

All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E. Wiring Regulations.

The thermostats supplied have a maximum switching capability of 15 Amps/240V/1Ph.

For all single-phase immersion heaters in excess of 3kW and ALL three phase immersion heaters a suitably rated interposing contactor must be installed.

A suitably rated isolator and protection fuse(s) should be fitted to protect both the load and control circuits.

Operation It is recommended that the control thermostat(s) be set to 60-65°C and that the over-temperature thermostat be set to 80°C.

Note: Water scald temperature is 66°C.

DO NOT bypass the over temperature thermostat in any circumstances.

Indirect units

Indirect water heaters are fitted with a fixed “double tube” copper heat exchanger.

Boiler selection

- i) The water heater is suitable for use with all forms of boiler compatible with vented systems.
If in doubt, consult the boiler manufacturer.
- ii) The boiler used can be either an open vented type or a sealed system having a maximum primary circuit pressure of 3 barg
- iii) The primary flow from the boiler should be pumped. Gravity circulation is not recommended due to poor heating performance.
- iv) The boiler flow temperature should be set at a maximum of 90 deg. C

Indirect cylinder control thermostat

The control thermostat should be wired in series with a suitable control valve (not supplied) in the primary circuit to give temperature control of the stored water.

Indirect over-temperature (master) thermostat

The master thermostat, mounted at high level, **MUST** be wired to a suitable motorised valve (not supplied) or some other suitable device to shut off the primary flow of the indirect coil should be fitted.

Electrical Installation

All electrical wiring should be carried out by a competent electrician and be in accordance with the latest I.E.E. Wiring Regulations.

The control thermostat and master thermostat must be wired in series with a motorised valve installed in the primary flow, such that the power supply is interrupted should either device operate, cutting off the primary flow.

A suitable switch and fuse should be provided to give protection to the electrical wiring and components.

The master thermostat **MUST NOT** be bypassed.

On models where an additional electric immersion heater has been fitted, this can be used either as an independent alternative heat source or to boost the output during peak loads.

Immersion Heaters

All immersion heaters are thoroughly dried out before leaving the factory. Storage conditions after despatch are not always ideal and moisture may collect in the heater, particularly if commissioning is some months after supply. Immersion heaters are supplied with bags of silica gel crystals to absorb moisture. During long periods prior to commissioning the bags need to be removed, dried out and replaced in the heater(s).

Before connecting an immersion heater to the mains check all the connections for tightness – **DO NOT** over tighten. Carry out an insulation test between each of the phases on each heater stage, both to earth and to each other. If the insulation resistance is less than 500,000 Ohms, the heater must be dried out by placing in a low temperature oven (100°C) or by passing a low voltage

current through the elements in air. This voltage should not exceed 25% of the working voltage. Do **NOT** allow the heater element sheath to rise above 60°C. Switch off at intervals to avoid overheating.

High concentrations of Chlorine on the immersion heater elements can cause premature failure of the immersion heater, which is **NOT** covered by warranty. All immersion heater elements should be thoroughly rinsed following sterilisation and prior to use. Rinsing of the immersion heater elements should be undertaken immediately after sterilisation has been completed.

Commissioning

Filling. Ensure that all fittings are in place and tightened.

- i) Check that the drain valve is closed.
- ii) Open the tap furthest from the storage cylinder.
- iii) Open the valve in the cold water supply and fill the system at a steady rate to allow entrapped air to escape through the opened tap. When water issues from the tap, allow the water to run for a few minutes to flush through any dirt and extraneous material.
- iv) Open successive hot taps to purge any remaining air from the system. When satisfied that the system is free of air close the taps.
- v) Check all connections for leaks and rectify as necessary.

Direct Units. Switch on the electrical supply to the immersion heater(s) and allow the unit to heat up. Check that the control thermostat operates correctly. When the desired temperature has been reached, check around all connections, as they may have slackened off due to expansion.

Indirect Units. Fill the indirect (primary) circuit in accordance with the boiler manufacturers commissioning instructions. To ensure that the primary tube in the Series 1000 is filled, manually open the motorised valve until the filling sequence is completed. When the primary circuit is full release the valve to its normal position. Switch on the boiler. Allow the cylinder to heat up and check that the cylinder control thermostat and the motorised valve operate correctly. When the desired temperature has been reached, check around all connections, as they may have slackened off due to expansion.

User Instructions

WARNINGS

Temperature control.

Immersion heaters – the control thermostat on the immersion heater(s) can be set between 40° and 80°C. Adjustments can only be made by removing the immersion heater cover.

DO NOT remove the cover without first switching off the electrical supply.

Indirect Units – are fitted with a cylinder thermostat that controls the motorised valve (not supplied) in the primary circuit, and hence the temperature of the water in the storage cylinder.

The thermostat can be set between 40° and 80°C.

DO NOT remove the cover without first switching off the electrical supply.

If in any doubt consult a competent electrician.

Maintenance

To ensure the continued optimum performance of the heater it should be regularly maintained. This is of particular importance in hard water areas or where the water supply contains particulate matter. Maintenance should be carried out only by a competent person. Any replacement parts used should be authorised Heatrae Industrial spare parts. It is recommended that maintenance be carried out at least every 12 months. In hard water areas consideration should be given to periodically descaling the immersion heater elements. To do this the cylinder will need to be drained.

Safety Valves. Where fitted, the easing lever on the relief valve should be operated occasionally to ensure that it is free to operate and has not become “furred up”.

WARNING: The water discharged may be very hot.

Draining. Switch off the electrical supply to the immersion heater(s) and shut down the boiler on indirect units.

Turn off the cold water supply. Attach a hosepipe to the drain valve having sufficient length to take the water to a suitable discharge point. Open the highest draw off point to the water heater to prevent a vacuum being created. Open the drain valve.

Descaling. Isolate the electrical supply.

Remove the cover from the immersion heater(s) and disconnect the wiring, carefully noting the wiring sequence.

Remove the immersion heater from the cylinder by using a "C" spanner (for screwed immersion heaters) or a socket spanner (for flanged immersion heaters).

Carefully remove the scale from the surfaces of the elements and thermostat pockets by mechanical or chemical means. **DO NOT** use a sharp implement as damage to the element surface could be caused.

Ensure that boss threads/flange faces are clean and replace the immersion heaters(s). A new gasket should be used.

Re-wire in the same sequence noted before removing the immersion heater.

Refilling. DO NOT switch on the immersion heater(s) or boiler until the system has been completely refilled.

Close the drain tap. Follow the filling sequence. The electrical supply can now be switched on.

Fault finding

IMPORTANT NOTES

- i) Servicing should only be carried out by a competent person.
- ii) Any spare parts used **MUST** be authorised Ormandy Electric Heaters parts.
- iii) Disconnect the electrical supply before removing any access covers.
- iv) **NEVER** bypass any over-temperature thermostats. Hot water can scald. Care should be taken when drawing water from the units.

Spare Parts

A range of spare parts and accessories is available for the Series 1000.

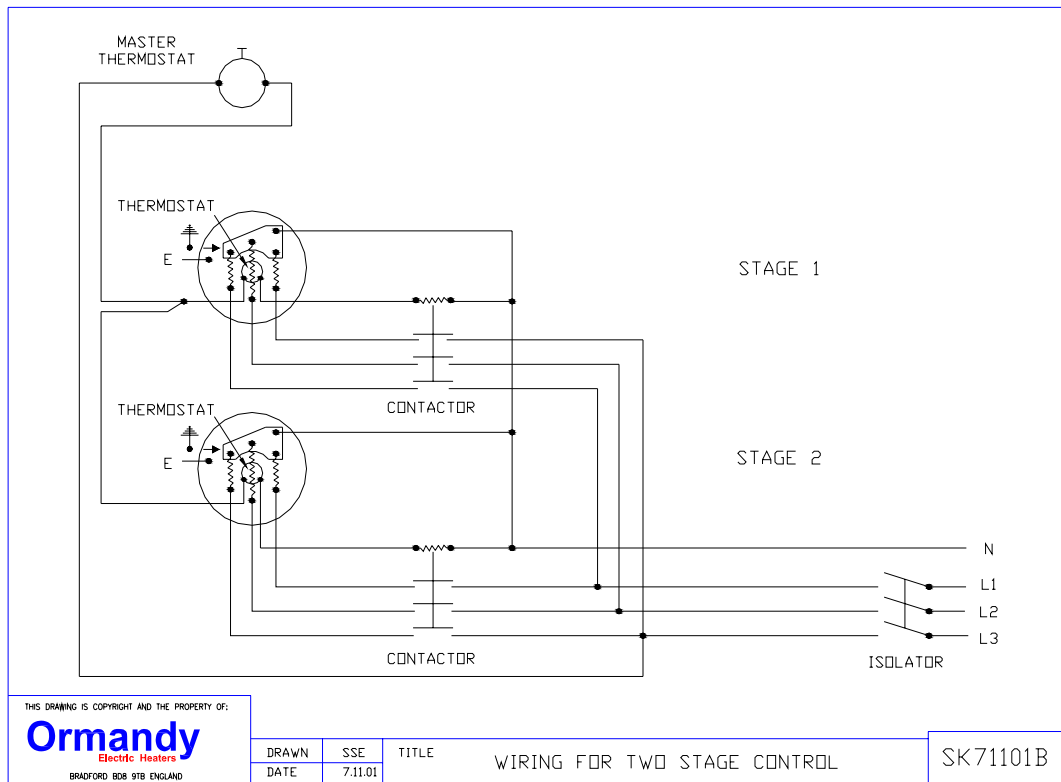
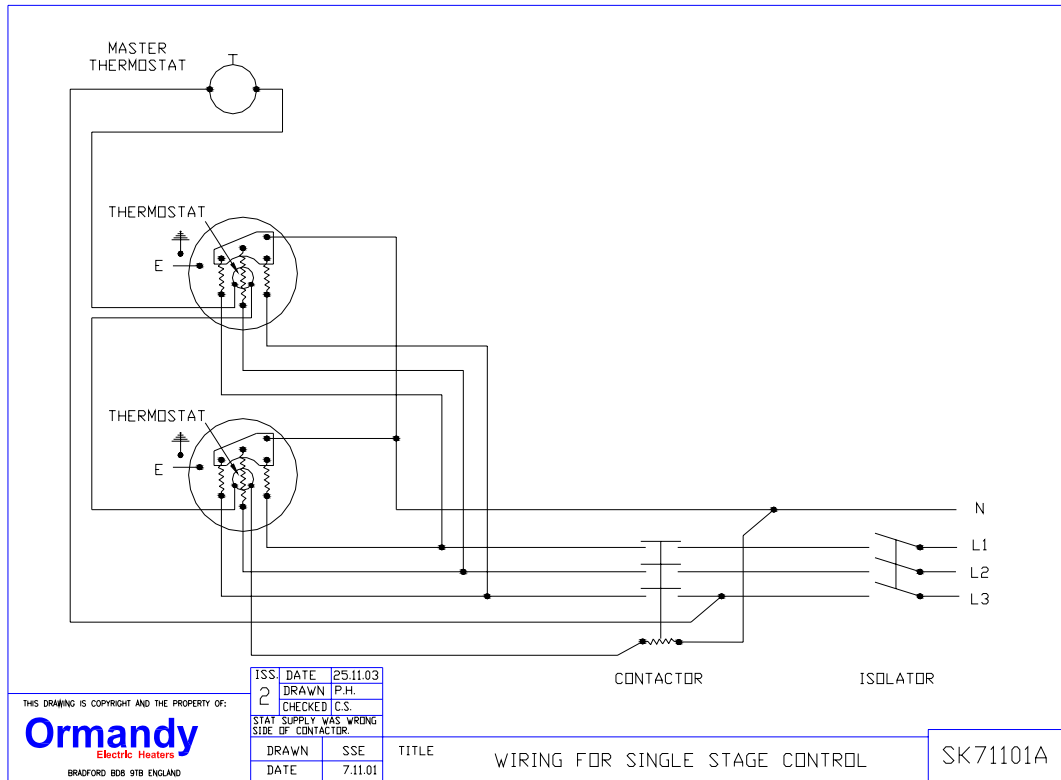
When ordering spare parts the serial number on the unit should be quoted.



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These instructions are given without prejudice and may from time to time be amended as considered necessary. We cannot be held responsible for any claims out of incorrect interpretation of these recommendations.

Drawings and Diagrams



Piping Diagrams

