

APPLICATION

The FE fixed element range of flange mounted immersion heaters are intended to heat water and are suitable for use in building services and industrial applications. The range features an industry standard flange and compact design for installation into storage vessels, flow heaters, etc.

The heaters are suitable for horizontal mounting only unless specifically stated otherwise in the Datasheet, however, vertical mounting heaters can be supplied. To avoid localised boiling or over heating, care should be taken to ensure that the cold zone extends beyond any neck piece.

Please check that the heater construction is suitable for your application. Please refer to the Data Sheet for the construction, specification and recommended wiring of the heater.

CONSTRUCTION

The metal sheathed elements are brazed into the industry standard brass flange which comes complete with an EDPM gasket. Support bands are fitted to the element 'bundle' to prevent the elements from bending outside the bore of the tank. Earth bonding connections are provided on the element plate, terminal enclosure and gland plate. The terminal enclosure is rated to IP41 and comes complete with a removable gland plate for on-site cable entry drilling. The standard FE models the maximum operating temperature is 90°C and the maximum operating pressure is 6 bar. The heater generally conforms to B.S.7798.

INSTALLATION

THERMOSTAT SETTINGS

In an attempt to reduce the likelihood of scalding in domestic hot water applications, we recommend that the control thermostat is set no higher than 65°C and a building regulation compliant thermostatic mixing valve (TMV) is fitted to shower and bath outlets.

To prevent the risk of legionella in water heating applications, the water storage temperature should be above 60°C.

The control thermostat is pre-set. Please refer to the Datasheet for the control thermostat set point. To avoid nuisance tripping, it is recommended that the control thermostat is set at least 15°C below the setting of the over-temperature thermostat.

The over temperature thermostat is pre-set and sealed. Please refer to the Datasheet for the over temperature set point.

The over temperature thermostat is incorporated as a safety device to protect against the control thermostat failing in the closed position. If the over temperature thermostat is not utilised, it is highly recommended that an over temperature thermostat is fitted at a suitable location elsewhere in the system.

MECHANICAL INSTALLATION INSTRUCTIONS

- 1) The heater will only heat the contents of the tank above the immersion heater.
- 2) We recommend that the thermostats are fitted external to the heater. This is to prevent excessive cycling of the control thermostat and allow more accurate temperature control. For further details please refer to our general guidance section on our website.
- 3) The heater should be installed with the thermostats above the elements.
- 4) Heaters with an immersed length of 1000mm and over should have the elements supported inside the vessel.
- 5) The heater is supplied with an EDPM gasket, ready to be bolted onto the appropriate flange on the vessel. It is not recommended that sealing compounds are used as this can make replacement of the heater difficult.
- 6) After fitting the heater into the vessel, the system should be filled and a check made for leaks around the joint. The vessel should be filled according to your standard procedure ensuring that all air

pockets are purged from the system. **It is important that the heater is immersed at all times during operation.**

- 7) If any cleaning or sterilising solutions are to be 'flushed' through the system prior to commissioning, a check should be made to ensure that the solution will not damage the heater.
- 8) Should the vessel be drained at any time and the heater removed, this installation procedure must be repeated before proceeding to switch the heater on.

Warning: Do not cover the heater terminal enclosure.

ELECTRICAL INSTALLATION INSTRUCTIONS

All electrical wiring must be carried out by a qualified person and comply with the current IEE Wiring Regulations to BS7671.

- 1) We recommend that the insulation of the heater is checked prior to installation. The minimum insulation reading between live and earth should be above 1MΩ. Refer to the procedure in the Operational Faults section if the insulation is below 1MΩ.
- 2) A terminal layout drawing is supplied on the Data Sheet to assist when wiring the heater.
- 3) The immersion heater should be connected to fixed wiring.
- 4) The circuit layout is arranged for three phase supplies. It is essential that the control equipment is compatible with the heater circuit configuration and all components are correctly rated. As a minimum, control equipment should consist of contactors, isolator, circuit protection and an appropriate control circuit. Control equipment can be supplied by Howden Electro Heating. Please contact Sales on the number below.
- 5) It is recommended that all wires are labelled with the phase and circuit number. Cable ring terminals or ferrules, depending on which is appropriate, should be used to terminate the ends of all conductors.
- 6) Prepare the cable and fit the ring terminals or ferrules.
- 7) The base of the terminal should be held securely (e.g. with pliers) when tightening or loosening a connection.
- 8) Ensure that the installation is correctly earthed. An earth bonding bar is provided inside the enclosure.
- 9) Check all electrical connections to ensure that they are tight.
- 10) Check the settings on the control and over-temperature thermostats are suitable for your requirements.
- 11) After all electrical connections have been made, replace the heater terminal enclosure.
- 12) Immersion heaters are designed to operate ONLY when the heating elements are totally immersed in water and must not be switched on when the heating elements are exposed to air.
- 13) Ensure the vessel has been filled before switching on the immersion heater.

Warning: This appliance must be earthed.

MAINTENANCE

It is recommended that routine periodic checks are performed every 6-12 months depending on the liquid being heated. Precautions must be taken against electrical shock during maintenance checks, in particular, by switching off at the isolator supplying electricity to the heater. The recommended procedure is as follows:

Warning: Always isolate the electrical power before removing the terminal enclosure.

- 1) Isolate the electrical power at the mains isolator and padlock in the 'Off' position.
- 2) Drain the vessel and inspect the elements.
- 3) Visually check all joints, ensuring no leaks are evident.
- 4) Remove the heater terminal enclosure.
- 5) Check the phase to neutral or phase to phase resistance readings. When all the elements are operating correctly these readings should be around the same value.

- 6) If the resistance readings are not approximately the same, disconnect the incoming wiring and remove the busbars/wire links. Carry out a resistance check on each element to verify element continuity.
- 7) If any elements are found to be faulty, the heater should be replaced.
- 8) We only recommend removing the heater from the vessel if the water or solution being heated is particularly aggressive or contains a high concentration of dissolved solids or if the elements are likely to be scaled or corroded.
- 9) Drain the vessel and unbolt and remove the heater from the vessel.
- 10) Visually inspect the elements for scale formation, deposits or corrosion. In extreme cases heavy scaling or deposits will cause increased element running temperatures, accelerate corrosion and eventual element failure.
- 11) Remove any heavy scale or deposits without damaging the elements.
- 12) Replace any defective parts (Refer to the Spare Parts section of this leaflet for ordering information).
- 13) Fit a new gasket to the flange.
- 14) Refer to the mechanical and electrical installation instructions section for instructions on how to re-fit the heater to the vessel.

OPERATIONAL FAULTS

Warning: Always isolate the electrical power before removing the terminal enclosure.

HEATER NOT OPERATING CORRECTLY

Check :

- 1) The control thermostat has been set correctly. To avoid nuisance tripping, the over-temperature thermostat should be set at least 15°C higher than the control thermostat.
- 2) The over temperature thermostat for a trip. If the thermostat has tripped, investigate and rectify the cause of the trip. Reset the over temperature thermostat by pressing the small button on the face of the thermostat. Note: in some instances the over temperature thermostat may be reset by means of a reset button on a control panel.
- 3) Heater circuit breakers for a trip. If the circuit breakers have tripped, check the individual elements for a short circuit.
- 4) Main electrical supply for power in all phases.
- 5) Control Thermostat for failure in the 'open' position. Check by setting the thermostat to a temperature above ambient and test to ensure that there is continuity between the two terminals.
- 6) Wiring to the heater and within the control equipment to ensure there are no loose or over-heating connections.
- 7) The thermostats are correctly sited. Please refer to Howden technical support.
- 8) Element continuity (resistance) to ensure no elements are open circuit.
- 9) In the situation where circuit breakers trip on a constant basis, the rating on the circuit breakers should be checked. The circuit breakers should be rated 10% to 20% higher than the current being drawn.
- 10) If wiring or control panel components are over-heating, they should be upgraded to a higher current rating.
- 11) If the above instructions are followed and the heat output is still below expectations it may be necessary to check the heater is correctly sized for the application.

LOW ELEMENT INSULATION

All elements are sealed prior to despatch to prevent the ingress of moisture, however storage conditions after despatch are not always ideal. In particular, if there is a long delay between purchase and commissioning there may be some degree of moisture ingress into the

elements. The operation of the immersion heater is unlikely to be affected by low insulation. To avoid problems with earth leakage monitoring devices we suggest the following procedures are carried out:

- 1) The terminals on the end of the element can be dried to remove any moisture. e.g. with a hairdryer or similar device.
- 2) When brought into operation, the element will naturally improve in insulation. If an earth leakage monitoring device such as an RCD is being used, this can be disconnected for 24 to 48 hours while the heater is switched on to allow the insulation readings to increase.
- 3) The heater can be returned to Howden Electro Heating where the insulation readings can be increased.
- 4) To maintain the insulation during periods of low use, it is advisable to switch the heater on in the vessel, while fully immersed, approximately once a month for 48 hours.

SPARE PARTS & REPLACEMENTS

All spare parts can be ordered directly from Howden Electro Heating quoting the heater list number and the serial number, if available.

To ensure the proper and safe operation of the heater it is essential that all spares and replacement parts are ordered from Howden Electro Heating quoting the list number and serial number of the heater. The serial number may be found on the nameplate which is on the terminal enclosure or stamped onto the side of the flange.

SPARE PARTS LIST

- Replacement Heater
- EDPM Gasket
- Control Thermostat
- Over Temperature Thermostat

GUARANTEE

The manufacturer will make good, by repair or at his option by the supply of a replacement, defects which, after proper selection, storage and installation of the equipment, appear in the equipment, within a period of twelve calendar months after the equipment has been delivered and which arise solely from faulty design, materials or workmanship, provided always that defective parts are promptly returned by the user, free, to the manufacturer's works. Unless otherwise arranged, the repaired or new parts will be delivered by the manufacturer free of charge provided the return address is on the UK mainland. Defects arising from inappropriate heater selection to suit the medium being heated (including inappropriate local water conditions), incorrect connection, incorrect supply voltage, use of non-Howden spare parts or modification of the equipment not authorised in writing by H.D. Howden Ltd. will invalidate the product guarantee.

The policy of H.D. Howden Ltd is that of continuous improvement and development, and the right is therefore reserved to change specifications without notice.

If you are in any way dissatisfied with this product please call sales on ++44 (0)1698 573 111 or email quality@howden-electric.com.