

Operating instructions and safety information

hotset heating elements – Type hotrod / hotspring / hotslot / hotflex / hottube / hotcast

hotset heating elements for use with nominal voltages above 50 V (AC) and 75 V (DC) meet the requirements of directive 2014/35/EU of THE EUROPEAN PARLIAMENT AND THE COUNCIL.

The heating elements are components, not fully operational equipment. The intended use is for heating solid bodies in industrial electrothermal machinery.

The heating elements were electrically and mechanically tested by the manufacturer and were shipped from the factory in a perfect technical condition. For proper and safe operation, these installation and storage instructions must be followed.

Safety information

General information

Heating elements should be installed by qualified personnel. The customer is responsible for correct installation of the heating element.

For proper operation and safety, the heating element and heated block must be connected and grounded according to DIN EN 60204-1. Use of additional grounded connections may be required even if the heating element is equipped with a ground connection wire.

Upon commissioning of the heating element within an existing system or machinery, an inspection protocol according to DIN EN 60204-1, VDE 0100-610 or adequate local law must be issued.

Hazards

Hazards resulting from contact with live parts

- The contacts of the heater should be executed so they are safe to touch, particularly in the case of heating elements, which upon request are delivered with bare lead wires.
- Statutory rules and trade association rules must be observed during installation and when troubleshooting.
- When working on the heating elements they should be separated from the power supply and secured from being switched on again.

Hazards resulting from contact with parts that are live during a malfunction

- The heating elements must be secured with protective devices which switch off in case of malfunction. The corresponding rated currents must be observed.
- The heating elements are to be connected to the potential equalization in accordance with the electrical regulations.
- The operator must regularly check his system and the installed heating components for damage. If faults are detected, the heating elements must be replaced or professionally repaired.
- If possible, use soft start controllers so that residual moisture can escape slowly from the heating element.

Hazards as a result of the insulation failing

- The wiring must be done according to the insulation. The leads of the heating elements must be installed so that they are not damaged.
- Minimum bending radii of the leads must comply with hotset specifications.
- Leads with fiberglass insulation are intended for fixed installation and they should not be mechanically stressed on a permanent basis.
- Leads must skirt over sharp edges.
- Observe the maximum temperatures of the terminal area and cables (for details, see the product data sheet).

Contact with hot parts

- The heating elements should be installed so that they cannot be easily reached. Protection devices should be installed in order to prevent accidental contact.
- The hot surfaces should be marked with warning signs in the vicinity of the heating elements / protective covers.

Hazards as a result of fire, burning or the ignition of materials

- Never place flammable materials near heating elements.
- The heating elements should be protected against excess current and/or overheating using protective devices.

Notes for installation and commissioning

Please check the accuracy of your ordered article. The connection voltage must not exceed the operating voltage (nominal voltage) of the heating element. The heating elements should be stored at room temperature in a dry atmosphere.

Since the insulating material of the heating elements is hygroscopic, before connecting the heating element, it may be necessary to check the insulation resistance with a suitable measuring instrument (megaohmmeter with 500 V DC test voltage, $R_{min} = 5 \text{ M}\Omega$), depending on the type of heating element and the storage conditions (e.g. high humidity). If necessary, the heating element should be dried at an increased temperature (at about 120 °C in the oven. Time: some hours, until acceptable measured values are reached).

Exceptions include moisture-proof heating elements in accordance with IP 67 or higher, which may be operated directly.

Heating element terminals must be protected from liquid contamination (e.g. oils, plastics, grease) and gases from the user.

→ Risk of electrical flashover!

Product-specific installation notes

hotrod heating elements

For surface loads up to 20 W/cm² we recommend bore-hole tolerance ISO H7 (low surface roughness).

For surface loads > 20 W/cm² an interference fit with divided bore-holes must be provided (this facilitates replacement of the heating elements).

For easy removal, provide through bore-holes (possibly stepped). For heating elements with a thermocouple at the bottom, we recommend blind bore-holes for more accurate measurement.

Electrically conductive sprays and pastes must not come in contact with the terminal area of the heating element (our recommendation: hotset Isolite Spray).

hotspring and hotslot heating elements

Observe minimum bending radius; do not bend back the bent areas.

The connecting head plus 5 mm of the unheated zone is not bendable.

The connecting head of the hotspring must not be used as a handle/lever.

Only heat the hotspring and hotslot heating elements when they are installed. These elements are very sensitive to mechanical stress due to thin wall thickness and precise fit.

hotflex and hottube heating elements

The groove for insertion of hotflex/hottube must be equipped with a chamfer. Observe minimum bending radii (for recommended groove geometry and radii see product data sheet).

Do not bend the unheated ends of the hotflex over a length of 35 mm except for a hotflex delivered with special bendable unheated ends.

Do not bend back the bent areas of the heater.

Terminals M2.5 and M4: In order to attach a cable lug to the threaded pin, lock the two nuts one against the other at 1 Nm tightening torque.

hotflex: The center of the hotflex is marked. When inserting into a groove, start at this mark in both directions. Do not use sharp-edged tools. The heater can be bent manually and fixed into the groove by plastic mallet.

Please note that at high power levels, due to the faster warming of the heater and the related thermal expansion relative to the tool, additional fixing of the heater in the groove may be required.

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