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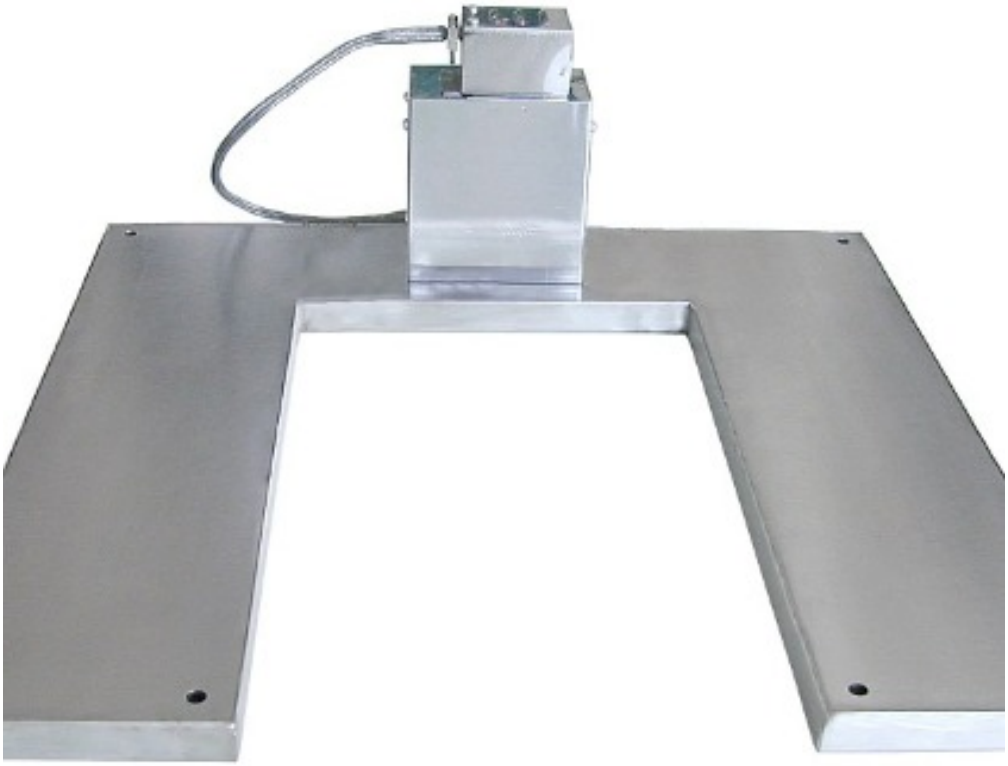
Технические характеристики на плоские керамические нагреватели KERASTRIP компании MASTERWATT

KERASTRIP CERAMIC FLAT HEATERS



KERASTRIP ceramic flat heaters

KERASTRIP heaters are flat heater with ceramic insulation that are employed in several applications: they are best suited to heat by conduction flat surfaces or, inserted in appropriate slots, to heat metallic masses. They can therefore be used in: extusion dies, moulds for plastic materials, press moulding plates, vacuum plastic moulding machines, ovens, packing installations and in many other applications. They are recommended when the operational temperature exceeds 280°C and in all cases presenting severe operational conditions. Thanks to the most advanced technical solutions, to the selection of the most appropriate materials and to the severe quality control procedures, they are characterised by:

- Optimum heat conduction and uniform heat distribution
- High electrical insulation
- Constant Efficiency during lifetime
- Easy installation
- Tight manufacturing tolerances
- Long Operational Life

KERASTRIP

- Flat Heaters with Ceramic Insulation for Industrial Applications -

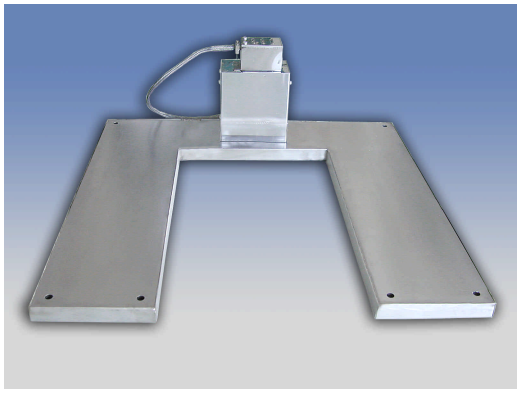
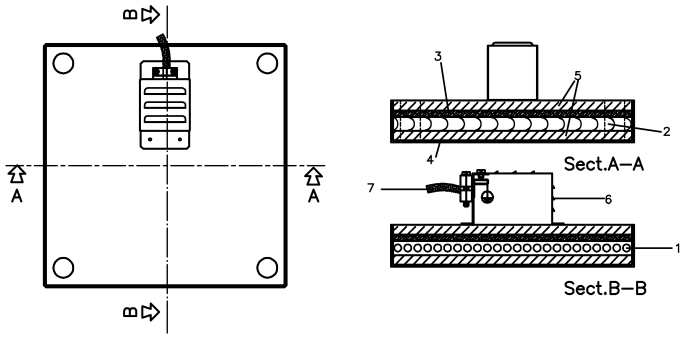


Figure 1 .



GENERAL CHARACTERISTICS

The continuous technological development in the moulding of plastic materials demands to all the machine components high performances and reliability. The long experience in this field and a specific technical solution allowed us to produce a family of heaters which fulfils these tight requirements. They have imposed throughout the market and have made us leaders in this field.

KERAPLAST heaters belong to the new generation of electrical heaters for the plastic industry and have become components of primary importance for the smooth operation of the moulding machine. The selection of the best materials, allows to reach very high heating power values and presents several advantages. In particular it is worth to mention:

- **Long Operational Life**
- **Energy saving**
- **Fast heat conduction**
- **Uniform heat distribution**
- **High electrical insulation**
- **Easy installation**
- **Great mechanical resistance to shocks and to tearing applied to the cables**
- **Tight manufacturing tolerances**

The heaters undergo dimensional and electrical controls all along the production phase, as requested by the company Quality Control System that is certified in accordance with ISO 9001:2000 Standard. A 100 % electrical acceptance test allows to verify the compliance of each single heater to the requirements specified in the applicable CEI/EN/UL Specification. In particular, the following tests are performed:

- Verification of the earth connector efficiency
- Measurement of the Insulation resistance
- Measurement of the dielectrical rigidity
- Measurement of the dispersion current
- Measurement of the resistance ohmic value

APPLICATIONS

These heaters are employed in many applications: they are best suited to heat by conduction flat surfaces. In other cases they are inserted in appropriate slots to heat metallic masses. The operational temperature should not exceed 400 °C.

Amongst the applications the following can be listed:

- Extusion dies
- Moulds for plastic materials
- Press moulding plates
- Vacuum plastic moulding machines
- Ovens
- Incubators
- Boilers
- Test benches
- Packing Installations
- Heated desks for food
- Electrical cabinets (anti-condensatin)

TECHNICAL DATA (see Figure 1)

1. **RESISTIVE WINDING** spiral made of Nickel/Chrome 80/20 DIN 17470, material n° 4869, characterised by large section and consequent low power density, executed with automatic tools which insure long duration. The spiral is uniformly distributed within the circuit which is realised by a mosaic of ceramic blocks. This solution guarantees a perfect distribution of the heat
2. **ELECTRICAL INSULATION** made of high purity ceramic KER 221 DIN 40685 which presents a high resistance to thermal shocks and a high dielectrical rigidity. The peculiar internal structure of the ceramic insures a rapid and uniform transmission of the heat. Thanks to the high temperatures which are reached and to the particular shape of the mosaic, the heat is transmitted both by conduction and radiation.
3. **THERMAL INSULATION** made of high purity continuous mica with a very low presence of binder. The material complies to UL (94 V-O) Specification.
4. **COVER SHEATH** (optional) made of galvanically treated steel. Thanks to its high thermal conductivity, it insures the best heat transmission thanks to its compressing action exerted onto the heating surface. Heaters without external sheath (I.e. composed only by the mosaic, the heating circuit and the power supply cable) can be produced too. In this case the customer shall foresee an adequate slot to insert the heater in
5. **COUNTER-FLANGES** (optional) made of galvanically treated steel, 5 mm thick. These flanges allow the installation of the heater onto the mounting structure and are provided unless different requests are specified by the customer

6. **CERAMIC TERMINAL BOARD** connecting the power supply cables to the internal electrical circuit. A special metallic cover protects the ceramic board from shocks and tearings applied to the cables
7. **POWER SUPPLY CABLE** (optional) suitable for high temperatures, with internal conductors in nickel-plated copper or in pure nickel (for the most severe applications). Internal insulation made of fibreglass and Teflon. Externally protected by a metallic braid sheath.

DIMENSIONS
KERASTRIP heaters can be manufactured starting from a minimum dimension of 100 x 20 mm. There are no specific limitations for the maximum length. The maximum width is 750 mm.

POWER
KERASTRIP heaters are normally manufactured with a specify power of 4 ÷ 6 W/cm^2. In specific applications values as high as 8 W/cm² can be obtained.

HOLES
Holes or slots can be realised onto the heater surface as required. Their dimensions, in any case, shall be coherent with the overall dimensions of the heater.

POWER SUPPLY
KERASTRIP heaters can be provided with mono-phase power supply and also with star (minimum width 53 mm) and delta (minimum width 120 mm) three-phase power supply. Solutions with double mono-phase power supply are possible too.

ELECTRICAL CONNECTION
To connect the internal heating circuit to the power supply cable, several terminal boards have been developed. They are provided with specific metallic covers and insure optimum mechanical resistance, easy mounting of the power supply cable, high electrical insulation, efficient electrical contact (also at high temperatures) and minimum envelope.
Different typologies are available. They are summarised in Figure 2. The constructive details of each terminal board are provided in the Electrical Connections Catalogue.

INSTALLATION
The KERASTRIP heater requires, for its installation, the presence of a fixation counter-flange that is in charge of keeping constantly pressed the heater onto the surface to be heated. This component can be procured separately, directly by the customer, or can provided as integral part of the heater (standard solution in case no specific requirements are detailed by the customer).
If the heater has to be installed in a slot that Is already available in the component to be heated, it is possible to produce it without any external sheath: only mosaic, heating circuit and power supply cable.

TO ORDER A KERASTRIP HEATER PLEASE SPECIFY (see Figure 3):

- The length L
- The width H
- The power supply voltage
- The heating power
- The position of the power supply interface
- The terminal board type
- The length of the power supply cable (if required)
- The position of the holes (if any)

Note: to specify the position of the power supply interface and of the holes (if any) please follow the example in Figure 3 to define the coordinates.

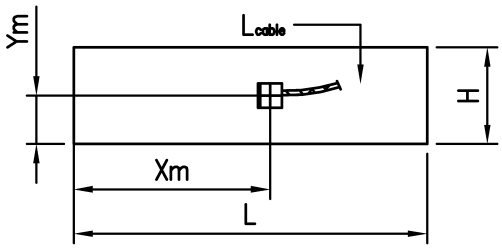
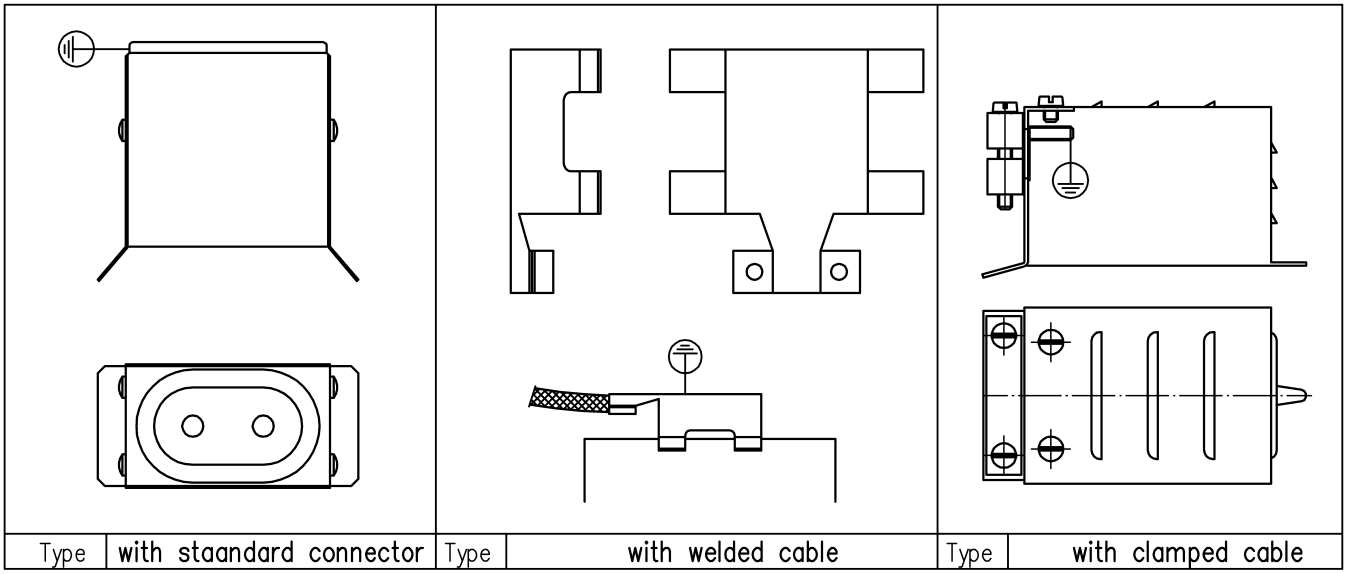


Figure 3: reference system to define power supply desired position

Figure 2: different typologies available for the electrical connection



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