

# Mineral Insulated Band Heaters

## High Performance Heater—More Efficient Heat Transfer

The mineral insulated (MI) band heater from Watlow® is a high-performance heater that incorporates Watlow's exclusive mineral insulation. This material offers much higher thermal conductivity than mica and hard ceramic insulators that are used in conventional heaters.

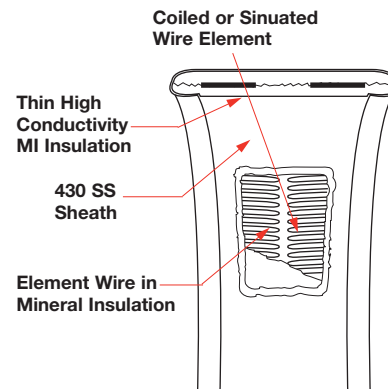
A thin layer of high thermal conductive MI material electrically insulates the element wire from the inside diameter of the heater sheath. The result is more efficient heat transfer, which lowers element wire temperatures and increases heater life.

### Performance Capabilities

- Heater operating temperatures up to 1400°F (760°C)
- Watt densities up to 100 W/in<sup>2</sup> (15.5 W/cm<sup>2</sup>) available on large diameter barrel bands
- Maximum voltage up to 480V

### Typical Applications

- Extruders
- Blown film dies
- Injection molding machines
- Other cylinder heating applications
- External tank and vessel heating



### Features and Benefits

#### High thermal conductivity of MI and low mass construction

- Provides an almost instant response to temperature control
- Eliminates thermal lag and temperature overshoot associated with ceramic insulated heaters
- Lasts longer at higher watt densities/temperatures than mica band heaters

#### Operating temperatures up to 1400°F (760°C)

- Allow safe melting of resins such as PEEK™, Teflon®, Ultem® and Zytel®

#### Higher watt densities

- Contribute to faster heat-up and throughput for increased productivity

#### Stainless steel cover and side fold design

- Resists contamination from overflow of plastic or other free-flowing materials

#### Attached clamp bars

- Eliminates cumbersome clamping straps to ease installation

### Your Support Office Locations:

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## Applications and Technical Data

### General Limitations

- Maximum width of 1 in. (25 mm) diameter heater is 1½ in. wide (38 mm)
- Maximum heater width: 2x heater diameter
- Minimum I.D. for Type B, C, E and H leads: 1 in. (25 mm)
- Minimum I.D. for Type B—90° leads: 1⅛ in. (29 mm)
- Maximum lead amperes: 12.5A per pair
- SLE maximum: 17.0A
- Maximum amperes (post terminals): 30A per pair

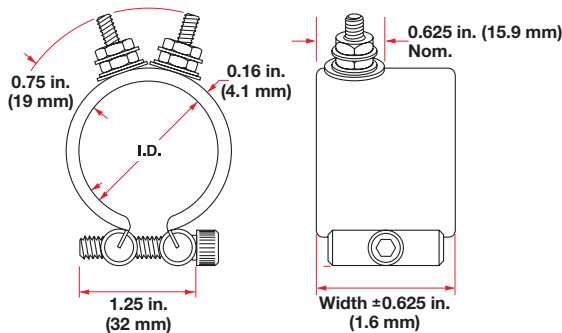
- Minimum diameter and width for SLE: 4 in. x 1½ in. (102 x 38 mm) width
- 90° leads not available over 250VAC
- Minimum I.D. for post terminals: 1¼ in. (32 mm)

### Gaps

- ≤ 3 in. = ⅛ in. nominal
- 3 in. ≤ 6 in. = ¼ in. nominal ±⅛ in.
- 6 in. ≤ 14 in. = ⅜ in. nominal ±⅛ in.
- >14 in. = ½ in. nominal ±¼ in.

## Termination Variations/Post Terminals

### Stock



Post terminals provide optimum connections. Screw thread is 10-24. To order, specify **post terminals** (metric threads are available).

## Termination Variations/Lead Wire

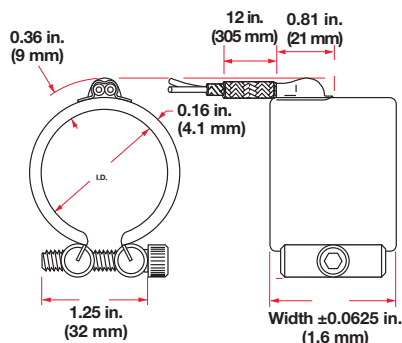
Heaters rated at less than 250VAC use UL® approved lead insulation for operations to 480°F (250°C) as standard. Lead insulation UL® rated for operation to 840°F (450°C) is available for high-temperature applications where the leads are shrouded or enclosed with the heater. These leads are available in any of the Type B with loose braid as well as Types E, F and H lead configurations. All heaters rated at more than 250VAC use this wire. When ordering, specify **850°F (450°C) wire**.

### Types B and C

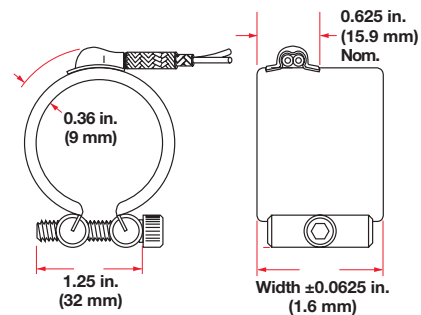
Leads Type B, Type B - 90° rotation, Type B - 180° rotation or Type C: Two fiberglass-insulated lead wires exit in a single metal braid for good abrasion protection, lead flexibility and wiring convenience. Leads are 2 in. (51 mm) longer than braid. Shipped with 12 in. (305 mm) leads, unless longer length is specified. To order, specify **type and length**.

### Type B

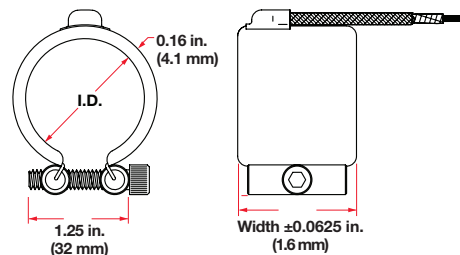
#### Stock



### Type B—90° Rotation Non-Stock

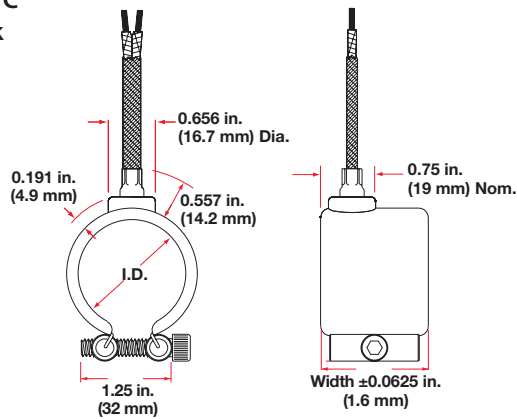


### Type B - 180° Rotation Stock



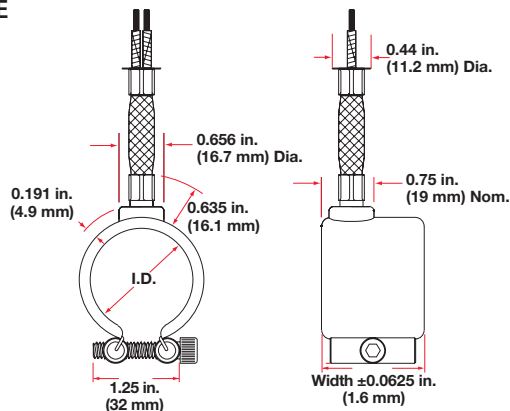
## Termination Variations/Lead Wire (con't)

**Type C  
Stock**



**Note:** Heater width dimensions and tolerances apply to functional heated portion of band heaters only. Larger variation at end closures and hinge locations due to deformation of the sheath metal may occur. Contact your Watlow representative for critical width applications.

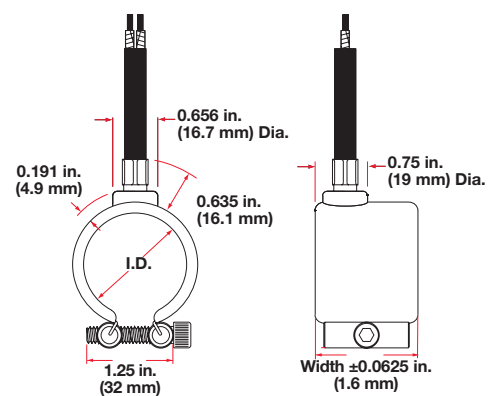
**Type E  
Stock**



Type E: A loose metal braid encloses two fiberglass leads providing good abrasion protection, lead flexibility and wiring convenience. Leads are 2 in. (51 mm) longer than the braid and are shipped with 12 in. (305 mm) leads, unless a longer length is specified. To order, specify **Type E** and **length**.

**Note:** Heater width dimensions and tolerances apply to functional heated portion of band heaters only. Larger variation at end closures and hinge locations due to deformation of the sheath metal may occur. Contact your Watlow representative for critical width applications.

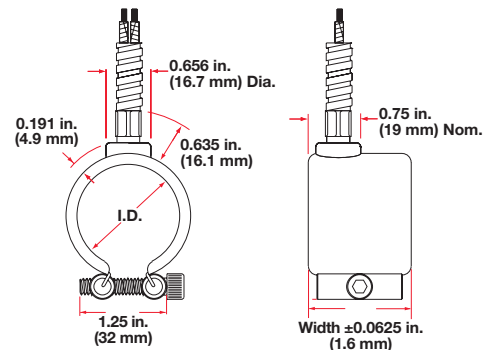
**Type F  
Stock**



Type F: A loose fiberglass sleeving encloses two fiberglass leads for additional insulation protection where high temperature or minor abrasion is present. Leads are 2 in. (51 mm) longer than the sleeving. To order, specify **Type F** and **length**.

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**Type H  
Stock**

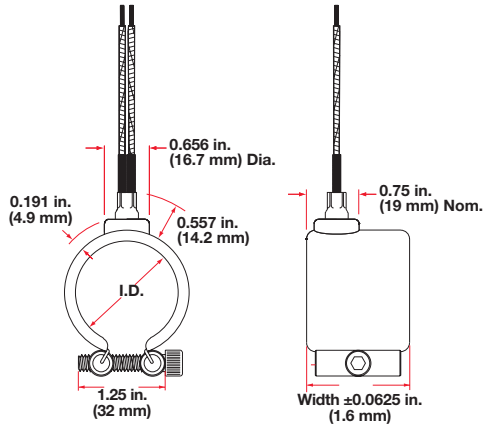


Type H: A flexible steel hose encloses the leads for maximum abrasion protection. Leads are 2 in. (51 mm) longer than the hose and are shipped with 12 in. (305 mm) leads, unless a longer length is specified. To order, specify **Type H** and **length**.

**Note:** Heater width dimensions and tolerances apply to functional heated portion of band heaters only. Larger variation at end closures and hinge locations due to deformation of the sheath metal may occur. Contact your Watlow representative for critical width applications.

## Termination Variations/Lead Wire (con't)

### Type K Stock

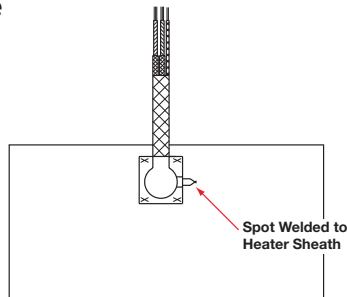


Type K: Flexible lead wires exit vertically from the heater and can be bent adjacent to the heater for a quick, easy connection. Shipped with 12 in. (305 mm) leads, unless longer length is specified. To order, specify **Type K** and **length**.

**Note:** Heater width dimensions and tolerances apply to functional heated portion of band heaters only. Larger variation at end closures and hinge locations due to deformation of the sheath metal may occur. Contact your Watlow representative for critical width applications.

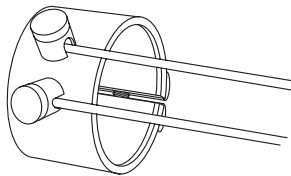
## Variations

### Thermocouple



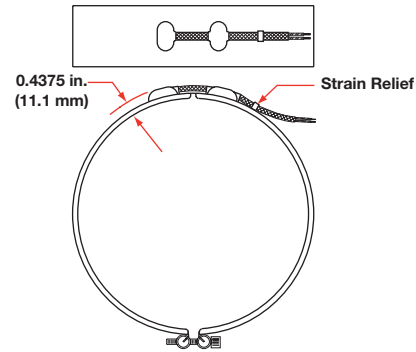
ASTM Type J or K thermocouples are available on lead Type B with loose braid and fiberglass sleeving. They are also available on E, F and H leads. The thermocouple junction, spot-welded to the heater sheath provides a signal for measuring relative heater temperature. A separate thermocouple is available.

### Ceramic Terminal Cover



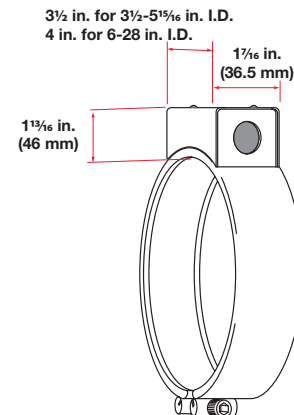
Ceramic covers, with openings for leads, are screwed on to post terminals, providing a convenient, economical insulator. To order, specify code number **Z-4918** and **quantity**. For metric sizes, specify the thread. **Note:** Ceramic terminal covers will not fit onto some stock expandable MI nozzles. Contact a Watlow representative for more information.

### Type SLE



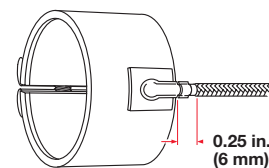
Available only on expandable construction. Two fiberglass leads with woven metal lead protection exit at a right angle. The minimum diameter capability is 4 in. (102 mm). Minimum heater width is 1.5 in. (38 mm). To order specify **Type SLE** and **length**.

### Metallic Terminal Box



Metallic terminal boxes are available from stock on 3 1/2 in. inside diameter x 1 1/2 in. wide (89 mm x 38 mm) or larger heaters. Terminal boxes, which attach directly to the heater, act as a safety feature by covering the terminals. Conduit may be attached to the box through 7/8 in. (22 mm) diameter holes in the ends of the box. Two-piece heaters require two boxes. To order, specify **terminal box**.

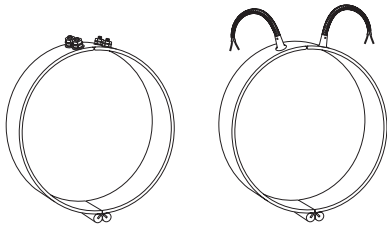
### Heavy Duty Strain Relief



Heavy duty strain relief is recommended for applications where there is great stress or continued flexing of the leads. Strain relief is available on Type B, Type B—90° and Type B—180° leads only. To order, specify **heavy-duty strain relief**. **Note:** not available with loose braid or fiberglass sleeving.

## Variations (con't)

### Expandable Heaters With Post Terminals or Leads



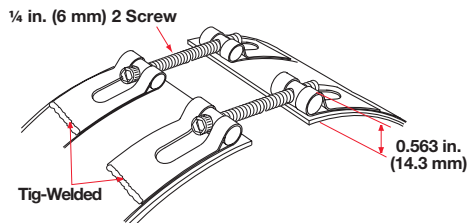
Expandable heaters are two-piece units with a common top metal allowing the heater to expand open to the full diameter of the barrel. On expandable bands, each half will be one half of the total wattage. Plus, on both expandable and two-piece bands, each half will be rated at full operating voltage, unless otherwise specified.

**MI band heaters 1½ in. (38 mm) wide or greater** have post terminals located next to the expansion joint. Leads may be located anywhere along the circumference except near the gap and at the expansion joint. Two sets of leads required.

**On 1 in. (25 mm) wide MI band heaters**, post terminals will be located 90° from the expansion joint.

## Clamping Variations

### Tig-Welded Barrel Nuts

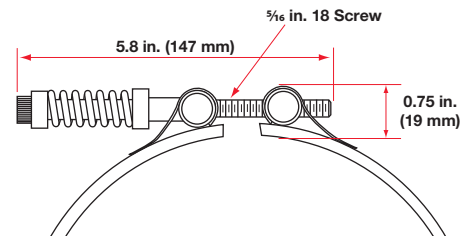


Tig-welded barrel nuts can function like a hinge to allow two-piece heaters to be more easily installed. If a large gap is specified to provide access for instrumentation, tig-welded barrel nuts can be situated in such a way that the clamp screws do not interfere with the sensor. To order, specify **gap size and sensor location**. **Note:** a gap greater than 1 in. (25 mm) wide is considered extended capability.

### Low-Profile Tig-Welded Barrel Nuts

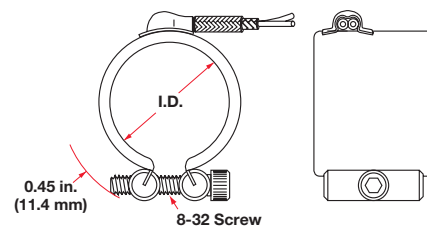
Low-profile barrel nuts are available on all widths and provide a clearance of 0.470 in. (12 mm). However, this value can be higher depending on how far the clamp screw extends past the barrel nut. To order, specify low-profile tig-welded barrel nuts.

### Tig-Welded Barrel Nuts with Spring Loaded Clamping



Welded barrel nuts with spring loaded clamping are used to maintain a tight heater fit on large barrels during start-up. This clamping variation is recommended for all MI band heaters greater than 14 in. (356 mm) in diameter and 1½ in. (38 mm) or greater in width. Refer to *MI Band Clamping Matrix Application Guide*. For smaller diameter heaters, it is an option and must be ordered separately. To order, specify **spring loaded clamping**.

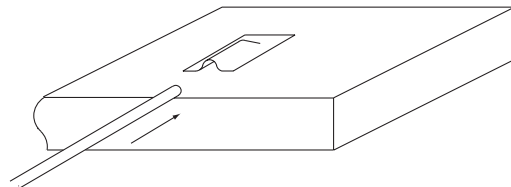
### Low-Profile Clamp Bars



Low-profile clamp bars are available on both 1 in. (25 mm) and 1½ in. (38 mm) wide heaters, for wider widths contact your Watlow representative. Watlow recommends not using low-profile clamping on diameters and widths greater than 3 in. (76 mm). The bars are ¼ in. (6 mm) diameter with an 8-32 screw. To order, specify **low-profile clamp bars**.

## Options

### Thermocouple Pocket



A thermocouple pocket welded to the surface accepts a 0.063 in. (2 mm) diameter thermocouple (not included). This option provides accurate temperature sensing of the heater and easy thermocouple replacement.