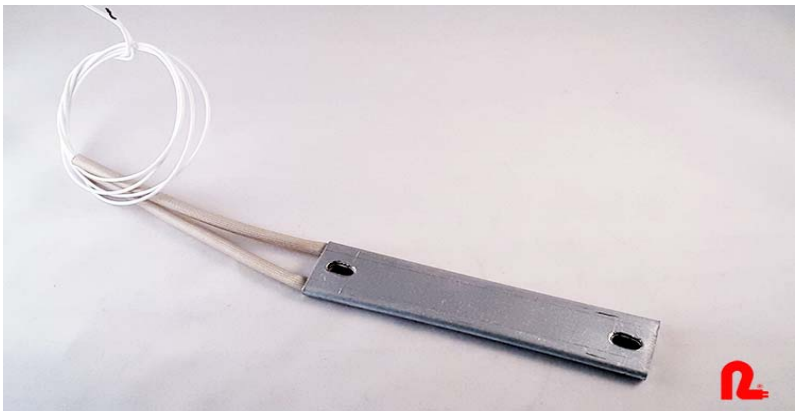
RAMA CORPORATION
BAND AND STRIP HEATERS

ESTABLISHED
1947



RAMA CORPORATION

"INNOVATION THROUGH EXPERIENCE"

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Design and Construction

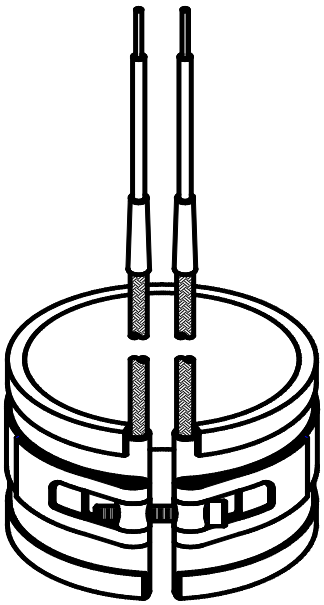
Rama®Band and Rama®Strip heaters are computer-designed and verified to Rama standards and customer specifications. Highest quality materials are used in manufacturing to assure long useful service life.

RAMA® BAND HEATERS

Mica Insulation
- Uniform thickness with excellent electrical insulation
- Mica sheets with excellent resistance to moisture

Resistance Wire
- Precision wound by solid state turn counting winder for high repeatability and accuracy
- Nickel/chromium
- Uniform heat distribution

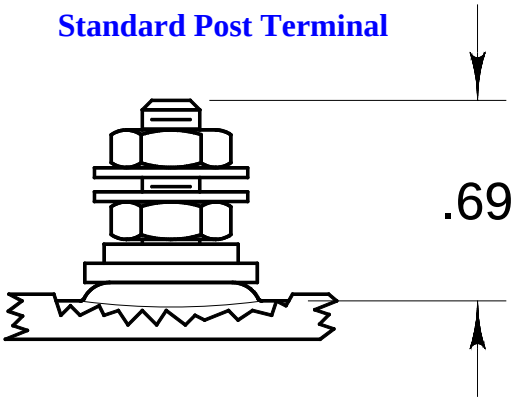
High Emissivity Sheath
- Aluminized steel
- Temperature range to 900°F
- Rust resistant
- Approximately .130” thick



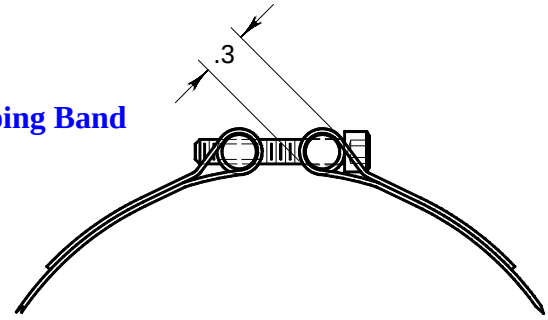
Clamping Band
- Rugged stainless steel construction
- Design holds heater tightly against cylinder wall to maximize heat transfer
- Standard gap is 1/4”

Leadwires
- UL recognized rating
- Continuous 450°C service
- Standard leadwires are 12”

Standard Post Terminal

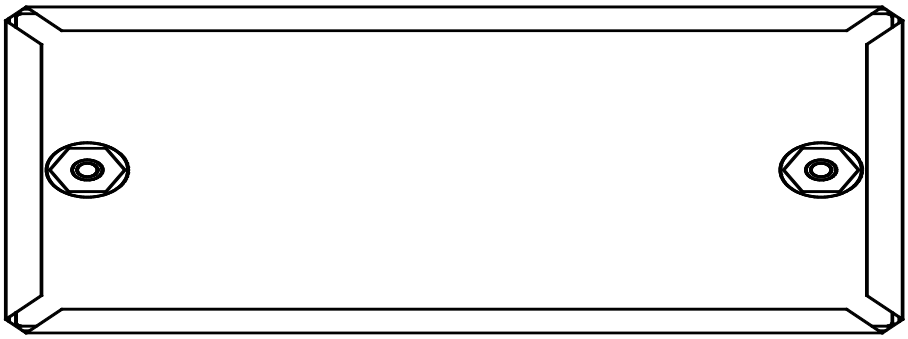


Standard Clamping Band



RAMA®STRIP HEATERS

- Resistance ribbon/wire
- Approximately .188” thick
- Stainless steel or aluminized sheath



Guide to Design Selection

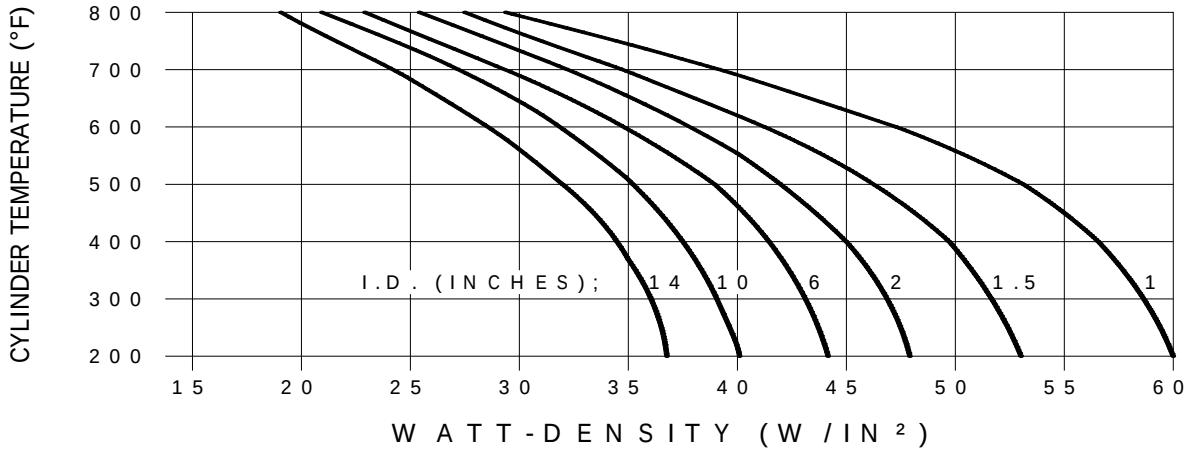
Rama®Band

1. Select heaters with diameters closely matching your cylinder or barrel, allow a gap between ends to prevent touching when they are clamped. Standard gap is 1/4”.
2. Calculate the surface area of your cylinder to be heated.
3. Using the curves shown, determine the recommended watt density for your operating temperatures. For heaters 2-1/2” or wider decrease watt density by 15%. Decrease watt density by 30% when using “on/off” thermostats instead of solid controllers.
4. Multiply surface area by watt density to determine required wattage for your heater.
5. Select correct combination of heaters from standard designs.

Watt Density Formula for Band Heaters

Watt Density for heater with leads= $\frac{\text{Wattage}}{(\text{Heater ID} \times 3.14) - .75 \times \text{width}}$

Watt Density for heater with posts= $\frac{\text{Wattage}}{(\text{Heater ID} \times 3.14) - 1.75 \times \text{width}}$



Rama®Strip

Using the calculations in the Engineering Section, calculate the power requirements for your strip heater.

Watt Density Formula for Strip Heaters

Watt Density for heater with leads= $\frac{\text{Wattage}}{(\text{Length-Cold}) \times \text{Width}}$

Watt Density for heater with posts= $\frac{\text{Wattage}}{(\text{Heater length-Cold}) \times \text{Width}}$

Clamping Rama®Band Heaters

Rama uses extra strength full band clamps, the standard, low-profile design utilizes a 22 gauge stainless steel with continuous strap and spot welded turnover. These provide full strength clamping with minimum heat distortion. In addition, Rama also provides a 90° facing clamp, which is an integral part of the heater sheath, and the pin and-screw clamp, which is spot welded to the heater sheath and does not require a clamping band. These latter two designs are available upon request. All standard designs are supplied with the standard full clamp band.

Clamping/Derating Rama®Strip Heaters

Strip heaters should be firmly clamped to the surface to be heated to prevent expansion or bowing away from the heated surface. Clamping bars 1/4” thick are recommended spaced 3” to 4” apart. When spacing heaters as close as 3/4”, or in close proximity to bright reflective surfaces, reduce wattage by 10%.

Installation and Operation

To maximize performance of the Rama®Band and Rama®Strip heater, follow these instructions:

- Do not bend 1 piece heaters
- To provide close contact with heating surface, tighten clamping bands while taping around the outside of band heaters. After heat-up, occasionally re-tighten the clamping band.
- Match the wattage of band and strip heaters as closely as possible to avoid excessive on/off cycling.
- To tighten post terminals, bottom nut should be held in place while tightening top nut (to avoid putting stress on terminal).
- Avoid spilling oils, grease, water or molten plastic on leadwires, post terminals or ends of heaters.
- Do not pull on leadwires with a force exceeding 15 lbs.
- Make sure strip heaters fit in close contact with surface to be heated, using clamping bars as required. After heat-up be sure heater has not expanded or bowed away from surface, re-tighten as required.
- Select the band heater whose diameter most closely approximates the diameter of your part.

Configurations

Standard Designs

TYPE	COVERING	Rama®Band Rama®Strip
A	Metal Braid	Same side, each end 3/4” minimum width
B	3” Fiberglass Sleeving	
C	Metal Braid	Single point of exit perpendicular to heater surface 1” minimum width
D	3” Fiberglass Sleeving	
E	Flexible Metal Conduit	
F	3” Fiberglass Sleeving	Each end of heater on opposite sides 3/4” minimum width
G	Metal Braid	
H	3” Fiberglass Sleeving	Leadwires exit each end of heater, perpendicular to heater surface 1-1/2” min width and 1-1/2” min dia
J	Metal Braid	

MOD	LEADWIRES OR POST TERMINALS RAMA®BAND	RAMA®STRIP
N	2-piece, identical halves; any leadwire or post terminal configuration min ID 3.0”	N/A
P	WYE 3Ø, any leadwire or post terminal except Type C,D, or E	Same
Q	1-piece, bendable; any leadwire or post terminal except Type L under 3-1/2” width	N/A
R	Dual voltage/wattage; any leadwire or post terminal except Type C,D, or E (consult factory)	Same
T	90° facing clamp; any leadwire or post terminal except A,B,F, or G	N/A

TYPE	POST TERMINALS RAMA®BAND RAMA ®STRIP
K	Each end 1” min width and 1-1/2” min diameter
L	Same end, adjacent; 2” min width
M	Same end, tandem, 1” min width and 2” min diameter

Design Specifications

- Standard leadwire length for all band and strip heaters is 12”
- Max ID for 1-piece Rama®Band is normally 14-1/2”; anything over 14-1/2” would be a 2-piece design. Consult factory for longer ID requirements.
- Min ID for 2-piece Rama®Band construction is 3”.
- Standard terminal box dimensions: 1-1/2” wide, 1-1/2” depth at centerline, length may vary based on configuration. Dimensions for heaters with terminal box: Min heater Dia is 3”, min width is 1-1/2” Min Dia for 2-piece construction is 6”.
- ***Note:*** The Min Dia may be grater depending on type of terminal used on heater.
- For welded barrel nut clamps the top metal outer sheath must be stainless steel.
- Select heaters with diameters closely matching your cylinder or barrel ; allow a .25” gap between ends to prevent touching when they are clamped.
- Strip heaters under 2” wide have a full fold over.

Ordering Information

Rama®Band

- Inside diameter and width
- Wattage, voltage, and phase
- Operating temperature of cylinder or extrusion barrel
- Leadwire or post terminal design
- Leadwire length
- Type of clamping band

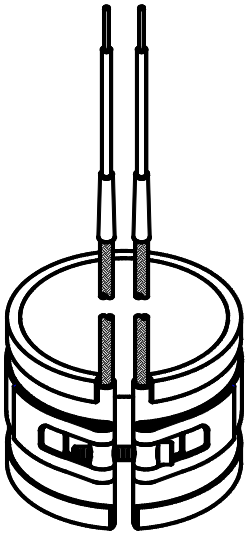
Rama®Strip

- Length and width
- Wattage, voltage and phase
- Operating temperature of plate, plaster or die block
- Leadwire or post terminal design
- Leadwire length
- Specify with or without mounting holes. Standard slots: 3/16” x 3/8”

If you require special holes, cutouts, etc. for thermostats, thermocouples or unusual shapes, please submit drawings for design configuration. Consult factory for strip heaters over 45” long or 12” wide.

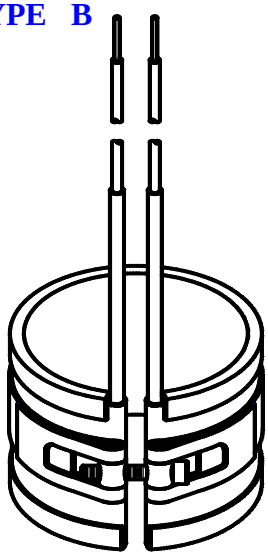
RAMA®BAND HEATER DESIGNS

TYPE A



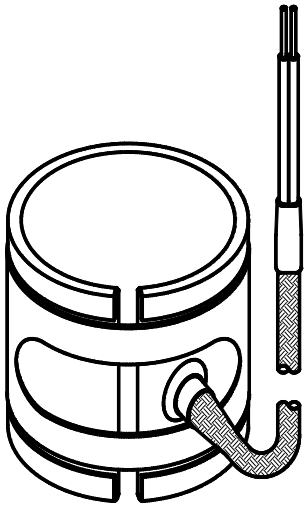
3” nominal metal braid sleeved leadwires, exit same side of each end of heater

TYPE B



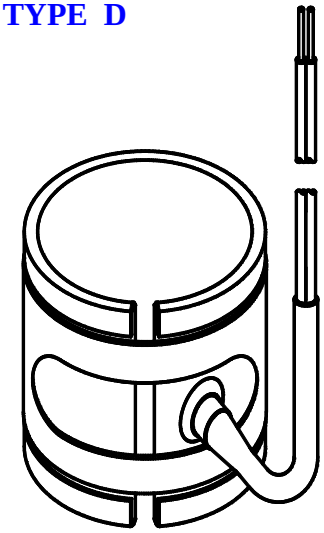
3” nominal fiberglass sleeved leadwires exit same side of heater

TYPE C



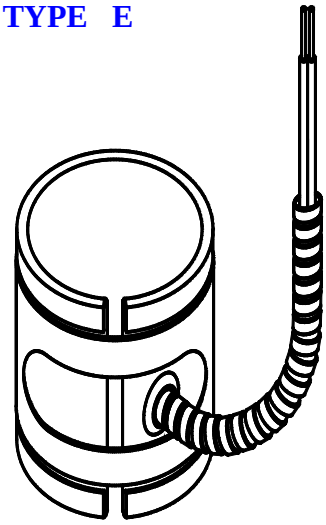
Metal braid covered leadwire exit from one point on sheath surface.

TYPE D



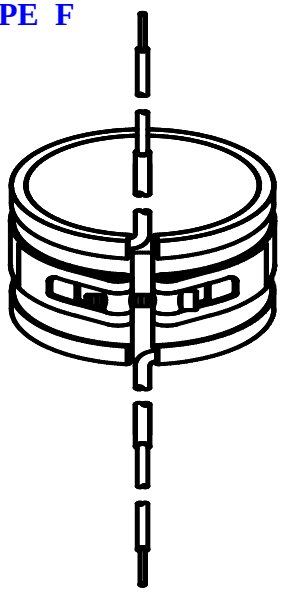
3” nominal fiberglass sleeved leadwires exit from one point on sheath surface

TYPE E



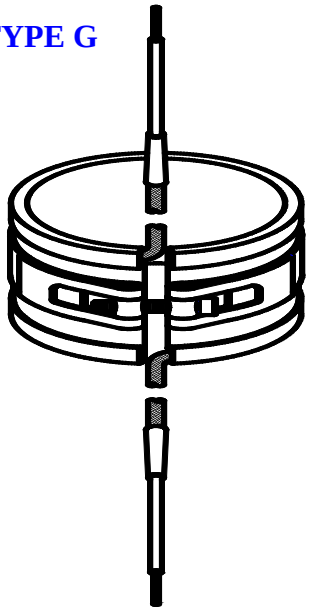
Flexible metal conduit covers leadwires, exit from one point on sheath surface

TYPE F



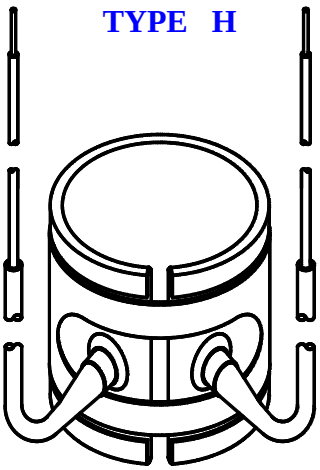
3” nominal fiberglass sleeved leadwires exit from opposite sides each end of heater

TYPE G



Metal braid leadwires exit from opposite sides at each end of heater

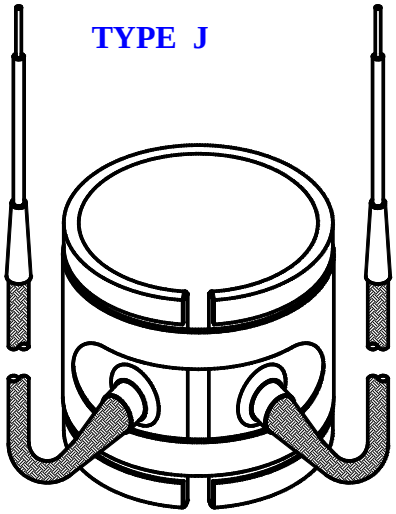
TYPE H



3” nominal fiberglass sleeved leadwires exit from sheath surface at each end of heater

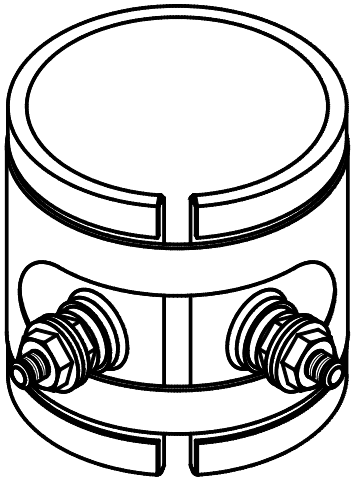
RAMA®BAND HEATER DESIGNS CONTINUED

TYPE J



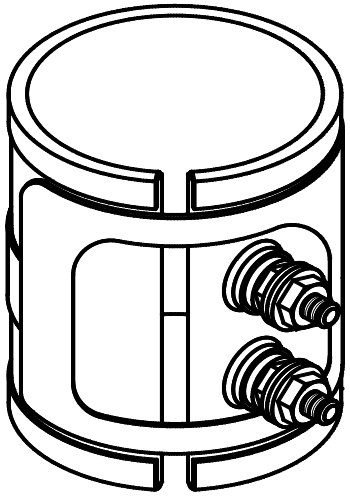
Metal braid covered leadwires exit from sheath surface at each end of heater

TYPE K



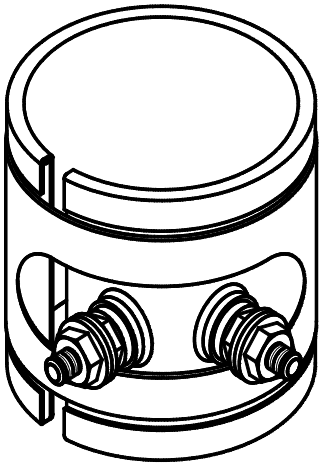
Post terminals at each end of heater

TYPE L



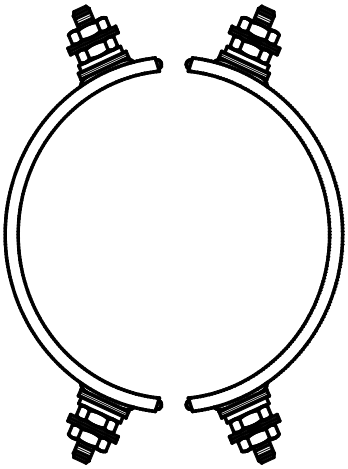
Post terminal located adjacent at one end of heater

TYPE M



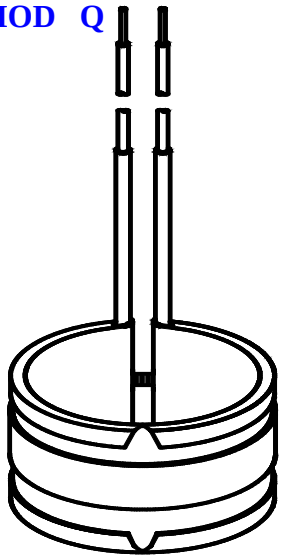
Post terminals located tandem at one end of heater

MOD N



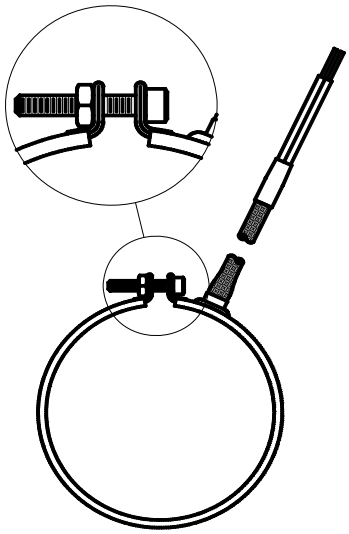
Two piece heater with post terminals or leadwires at each end of heater half. Each type N band will be rated at 1/2 total wattage. When wired in series, each half will be rated 1/2 total voltage. When wired in parallel, each half will be rated at total voltage.

MOD Q



One piece bendable heater with post terminals or leadwires at open end of heater

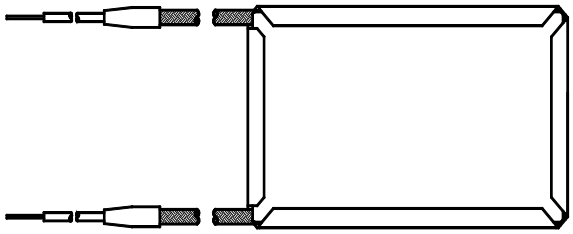
MOD T



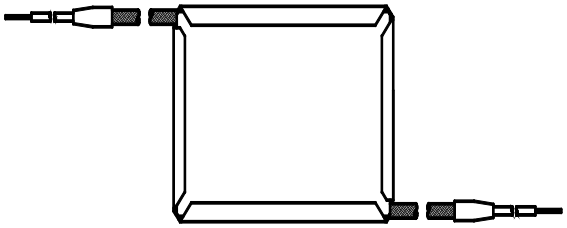
90° Facing Clamp

RAMA®STRIP HEATER DESIGNS

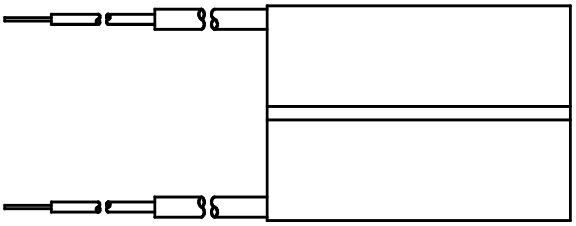
TYPE A
Metal braid covers leadwires exit same end of heater



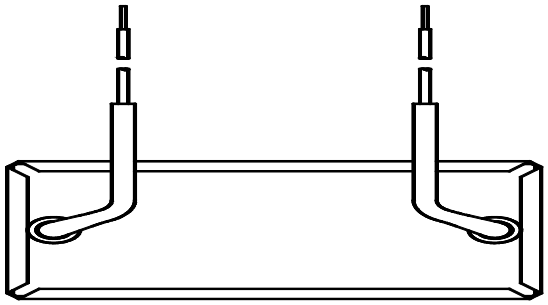
TYPE G
Metal braid covered lead-wires exit from opposite sides of each end of heater



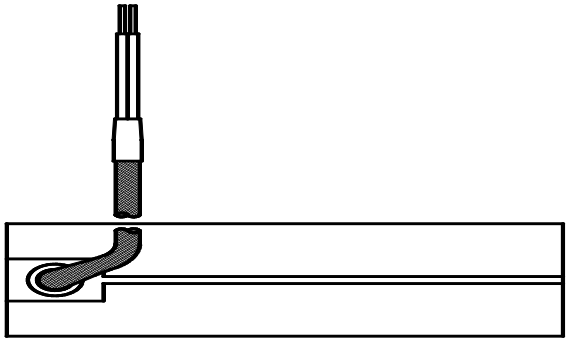
TYPE B
3” nominal standard silicone rubber fiberglass sleeved leadwires exit same end of heater



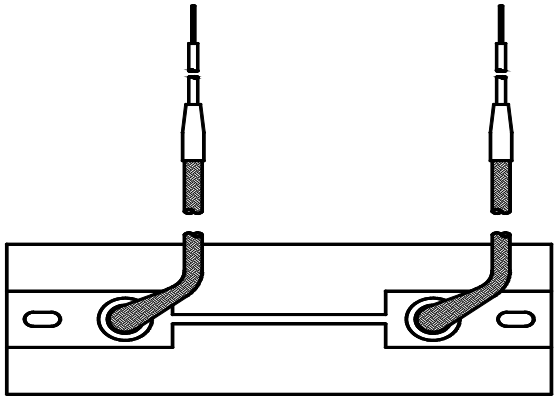
TYPE H
3” nominal standard silicone rubber fiberglass sleeved lead-wires exit from sheath surface at each end of heater



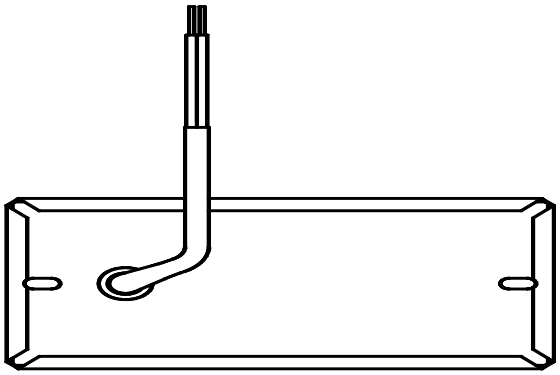
TYPE C
Metal braid covered lead-wires exit from one point on sheath surface



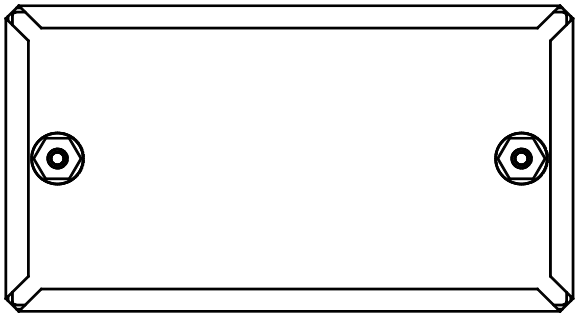
TYPE J
Utilizes metal braid covered leadwires



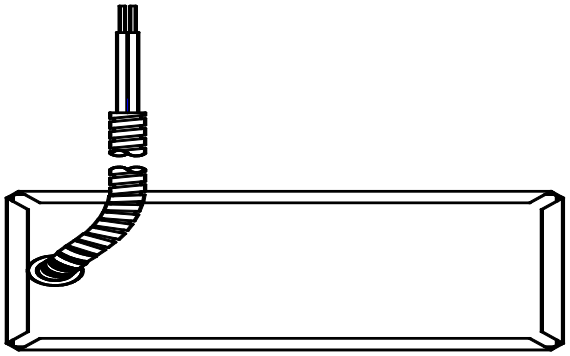
TYPE D
3” nominal standard silicone rubber fiberglass sleeved lead-wires



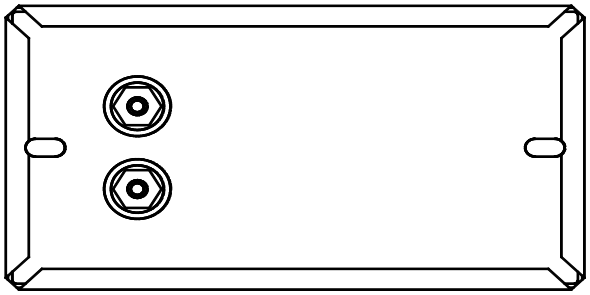
TYPE K
Post terminals at each end of heater



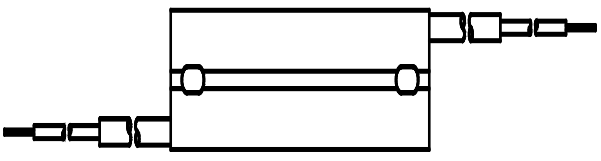
TYPE E
Flexible metal conduit covered lead-wires exit from one point on sheath



TYPE L
Post terminals located adja-cent at one end of heater



TYPE F
3” nominal standard silicone rubber fiberglass sleeved leadwires exit from opposite sides of each end of heater



TYPE M
Tandem post terminals located at one end of heater