

Cartridge/Insertion Heaters



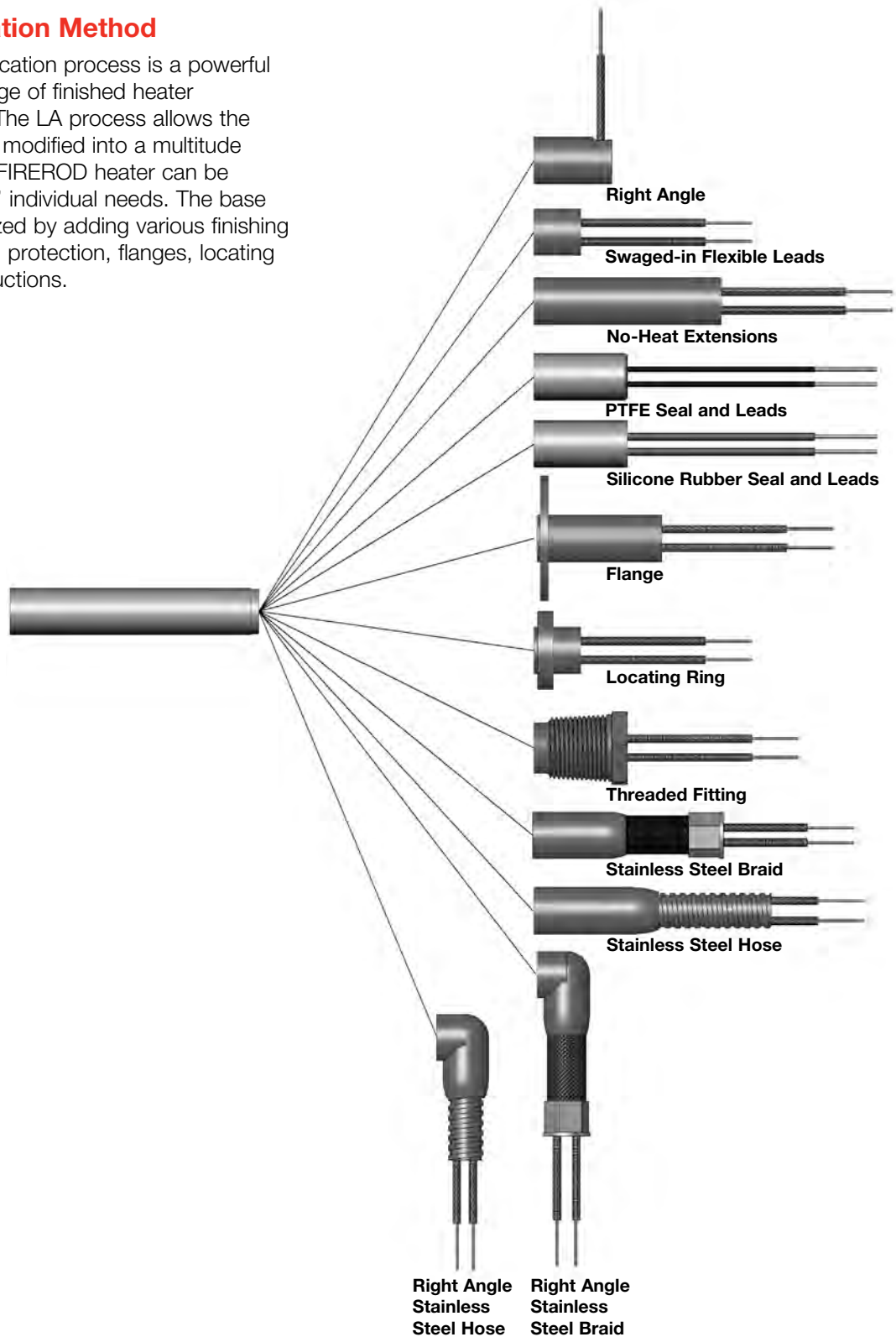
FIREROD Cartridge Heaters

Lead Adapter (LA)

Options

Patented LA Modification Method

The lead adapter (LA) modification process is a powerful tool for providing a wide range of finished heater configurations very quickly. The LA process allows the base FIREROD heater to be modified into a multitude of configurations. The base FIREROD heater can be selected to meet customers' individual needs. The base heater can then be customized by adding various finishing options like lead length, lead protection, flanges, locating rings and right-angle constructions.



Cartridge/Insertion Heaters



FIREROD Cartridge Heaters

LA

Options (Continued)

Modifying Basic FIRERODs Using the LA Process for Swaged-in Leads

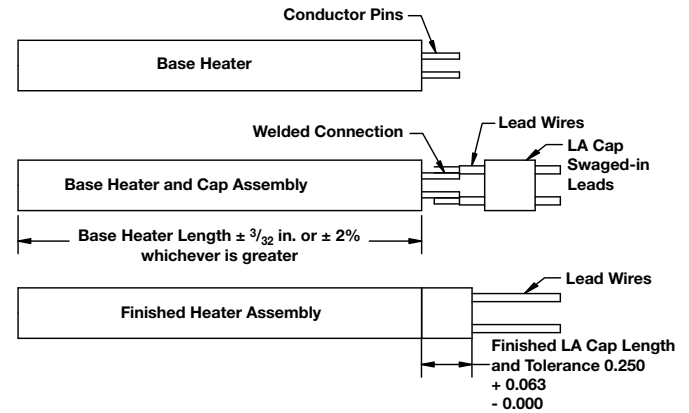
Watlow:

- Shortens conductor pins
- Welds lead wires to pins
- Places an LA cap over the lead end of the heater
- Reduces the diameter of the LA cap over the lead end of the base unit to produce a rugged integrated heater assembly

Notes:

- Other LA construction options use a similar modification process
- Maximum temperature of LA cap is 1000°F (538°C)

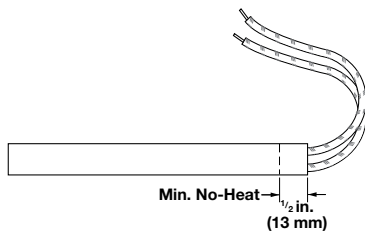
Length Tolerance for Stock Heaters With LA Options



Note: Base heater tolerance + LA cap tolerance = total tolerance for assembly

Termination Options

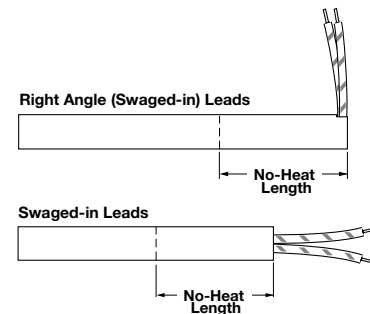
LA Swaged-in Flexible Leads



LA swaged-in flexible leads are used in applications where a high degree of flexing exists or the leads must be bent sharply adjacent to the heater without exposing or breaking the conductor. The stranded wire leads are connected internally and exit through the lead end. The overall length of the heater is extended by 1/4 in. (6 mm). To order, specify **length adder code E** bringing the total lead end no-heat to 1/2 in. (13 mm).

This LA option is not available on 1/8 in. (3 mm) diameter FIRERODs. On 1/8 in. (3 mm) diameter FIRERODs, leads are connected externally using a solid conductor lead wire. If stranded wire is desired on 1/8 in. (3 mm) diameter units, contact your Watlow representative.

No-Heat Extensions



No-heat extensions are recommended in applications where leads may be exposed to excessive heat and require a cooler lead end. They are also used when heat is not required along the entire length of the FIREROD.

No-heat extensions are available for most LA options in diameters of 3/8, 1/2, 5/8 and 3/4 in. (10, 13, 16 and 19 mm). These extensions are designed to provide a total no-heat length of 1, 1 1/2, 2 or 2 1/2 in. (25, 38, 51 or 65 mm) at the lead end of FIRERODs only. Contact your Watlow representative for available LA options.

Cartridge/Insertion Heaters

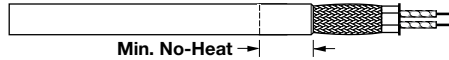


FIREROD Cartridge Heaters

LA

Termination Options *(Continued)*

LA Straight Stainless Steel Braid

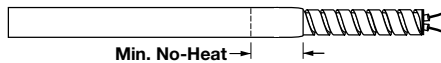


The LA straight stainless steel braid is designed to protect leads from abrasion against sharp edges. It is the most flexible Watlow protective lead arrangement.

Unless specified, a 12 in. (305 mm) braid is supplied. Leads are 2 in. (51 mm) longer than the braid, but longer leads are available.

The minimum lead end no-heat required is $\frac{3}{4}$ in. (19 mm). This option adds $\frac{1}{2}$ in. (13 mm) to the overall length. To order, specify **option code C**.

LA Straight Stainless Steel Hose



An LA straight stainless steel hose provides the best protection against abrasion from sharp edges. It also offers ease of handling and wiring in abrasive environments. Unless specified a 12 in. (305 mm) hose is supplied. Leads are 2 in. (51 mm) longer than the hose but, longer leads are available.

The minimum lead end no-heat required is $\frac{3}{4}$ in. (19 mm). This option adds $\frac{1}{2}$ in. (13 mm) to the overall length. To order, specify **option code H**.

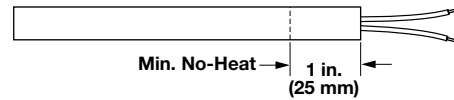
LA Straight Stainless Steel Hose with PTFE Leads and Seal



An LA straight stainless steel hose with PTFE leads and seal is the ultimate combination for providing abrasion protection and a moisture resistant seal. Unless specified, a standard 12 in. (305 mm) hose is supplied. Leads are 2 in. (51 mm) longer than the hose, but longer leads are available. This seal is effective up to 392°F (200°C) under continuous operation.

The minimum lead end no-heat required is 1 in. (25 mm). This option adds $\frac{3}{4}$ in. (19 mm) to the overall length. To order, specify **option code G**.

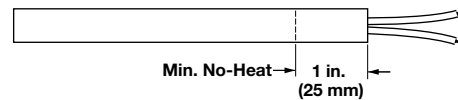
LA Silicone Rubber Seal and Leads



The LA silicone rubber seal and leads protect the heater against moisture and contamination from lubricating oil, cleaning solvents, plastic material, fumes and organic tapes. This seal is effective to 302°F (150°C) under continuous operation.

Please note when ordering this option, that a minimum no-heat section is required to allow for construction. Additional no-heat may be required to keep the seal below effective temperatures. The minimum lead end no-heat required is 1 in. (25 mm). The LA cap adds $\frac{3}{4}$ in. (19 mm) to the overall length. To order, specify **option code P**.

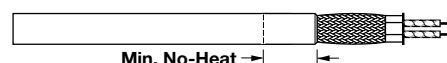
LA PTFE Seal and Leads



The LA PTFE seal and leads protect the heater against moisture/contamination from lubricating oil, cleaning solvents, plastic material or fumes and organic tapes. This seal is effective to 392°F (200°C) under continuous operation.

Please note when ordering this option, that a minimum no-heat section is required to allow for construction. Additional no-heat may be required to keep the seal below effective temperatures. The minimum lead end no-heat required is 1 in. (25 mm). The LA cap adds $\frac{3}{4}$ in. (19 mm) to the overall length of the heater. To order, specify **option code T**.

LA Straight Stainless Steel Braid with PTFE Leads and Seal



The LA straight stainless steel braid with PTFE leads and seal is Watlow's most flexible lead protection with a moisture resistant seal. Unless specified, a 12 in. (305 mm) braid is supplied. Leads are 2 in. (51 mm) longer than the braid, but longer leads are available. This seal is effective up to 392°F (200°C) under continuous operation.

The minimum lead end no-heat required is 1 in. (25 mm). This option adds $\frac{3}{4}$ in. (19 mm) to the overall length. To order, specify **option code F**.

Cartridge/Insertion Heaters



FIREROD Cartridge Heaters

LA

Right Angle Options

LA Right Angle Leads



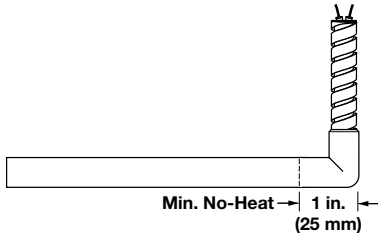
LA right angle leads are used in applications with a high degree of flexing and when space limitations are critical. Stranded lead wires are connected internally (swaged-in) and exit at a 90 degree angle at the end of the heater.

To order, specify **option code R**.

Minimum No-Heat Required in. (mm)					
Dia.	1/4	3/8	1/2	5/8	3/4
In. (mm)	13/16 (21)	3/4 (19)	13/16 (21)	13/16 (21)	13/16 (21)

To order right angle leads with PTFE leads and seals, specify **option code B**.

LA Right Angle Stainless Steel Hose



The diameter of the right angle extension is equal to the nominal diameter of the heater.

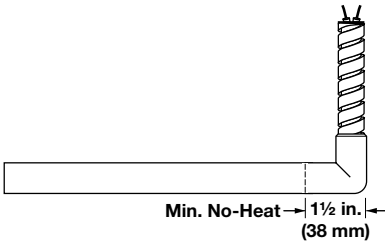
An LA right angle stainless steel hose is provided for wiring convenience. Like the LA straight stainless steel hose, it protects leads from abrasion against sharp edges. Unless specified, a 12 in. (305 mm) hose is supplied. Leads are 2 in. (51 mm) longer than the hose, but longer leads are available.

Diameter	3/8	1/2	5/8	3/4
Adder length in. (mm)	3/4 (19)	3/4 (19)	3/4 (19)	7/8 (22)
Min. no-heat in. (mm)	1 (25)	1 (25)	1 (25)	1 1/8 (29)

To order specify **option code W**.

Note: This option is not available on 1/4 in. (6 mm) diameter.

LA Right Angle Stainless Steel Hose with PTFE Leads and Seal



The diameter of the right angle extension is equal to the nominal diameter of the heater.

An LA right angle stainless steel hose with PTFE leads and a seal is the ultimate combination for providing abrasion protection and a moisture resistant seal with wiring convenience. Unless specified, a 12 in. (305 mm) hose is supplied. Leads are 2 in. (51 mm) longer than the hose but longer leads are available. This seal is effective to 392°F (200°C) under continuous operation.

The minimum lead end no-heat required is 1 1/2 in. (38 mm). This option adds 1 1/4 in. (32 mm) to overall length on stock units.

To order, specify **option code M**.

Note: This option is not available on 1/4 in. (6 mm) diameter.

Cartridge/Insertion Heaters

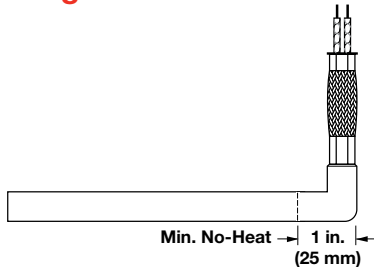


FIREROD Cartridge Heaters

LA

Right Angle Options *(Continued)*

LA Right Angle Stainless Steel Braid



The diameter of the right angle extension is equal to the nominal diameter of the heater.

An LA right angle stainless steel braid is provided for wiring convenience. It protects leads from abrasion against sharp edges.

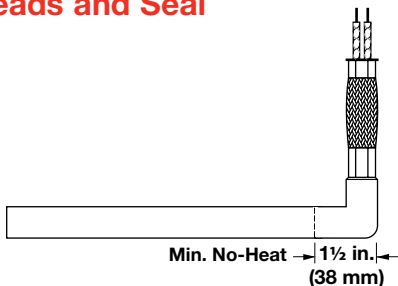
Unless specified, a 12 in. (305 mm) braid is supplied. Leads are 2 in. (51 mm) longer than the braid, but longer leads are available.

Diameter	3/8	1/2	5/8	3/4
Adder length in. (mm)	3/4 (19)	3/4 (19)	3/4 (19)	7/8 (22)
Min. no-heat in. (mm)	1 (25)	1 (25)	1 (25)	1 1/8 (29)

To order, specify **option code Y**.

Note: This option is not available on 1/4 in. (6 mm) diameter.

LA Right Angle Stainless Steel Braid with PTFE Leads and Seal



The diameter of the right angle extension is equal to the nominal diameter of the heater.

The LA right angle stainless steel braid with PTFE leads and seal is Watlow's most flexible lead protection with a moisture resistant PTFE seal and wiring convenience. Unless specified, a 12 in. (305 mm) braid is supplied. Leads are 2 in. (51 mm) longer than the braid, but longer leads are available. This seal is effective up to 392°F (200°C) under continuous operation.

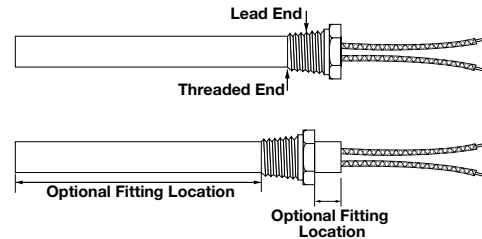
The minimum lead end no-heat required is 1 1/2 in. (38 mm). This option adds 1 1/4 in. (32 mm) to the overall length on stock units.

To order, specify **option code A**.

Note: This option is not available on 1/4 in. (6 mm) diameter.

Mounting Options

LA Stainless Steel Threaded Fittings



Fitting overlaps the unheated section and is silver soldered to the sheath.

Threaded fittings allow fast, water-tight installation of the heater into a threaded hole. These fittings are 304 stainless steel, other stainless steel alloys are available upon request. Double threaded fittings are also available. Please see page 27 for threaded fitting specifications. Provide the location of the fittings if no-heat extension option is requested.

Lead Arrangement	Minimum Distance ^① Between Threaded End and Lead End in. (mm)	
Crimped Leads	1/4	(6)
Swaged-in Leads	5/16 ^{②④}	(8)
STR SS Hose	1/2 ^③	(13)
STR SS Braid	1/2	(13)
PTFE Seal & Leads	7/8	(22)
Silicone Seal & Leads	7/8	(22)

① The location of the threaded fitting from the thread end of the fitting to the lead end of the heater.

All optional fitting locations are available only with LA no-heat extensions. Contact your Watlow representative for details.

② On 1/4 in. diameter FIREROD only "A" dimension is 7/16 in. (11.1 mm).

③ On 1/4 in. diameter FIREROD only "A" dimension is 5/8 in. (15.9 mm).

④ On 5/8 in. and 3/4 in. the fitting is located at 7/8 in. from the lead end using a 3/4 in. no-heat extension. In order to locate at 5/16 in., the fitting must be epoxied.

Note: Minimum distance between threaded end and heated section is 1/4 in.

Cartridge/Insertion Heaters

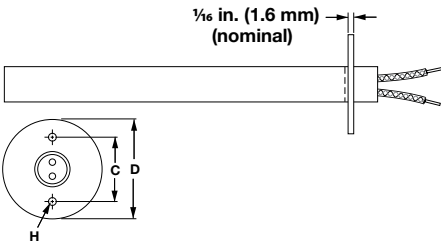


FIREROD Cartridge Heaters

LA

Mounting Options *(Continued)*

Flanges



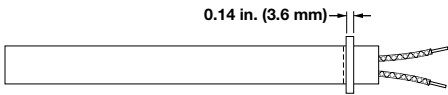
Stainless steel flanges are a convenient mounting method to position a heater within an application. The flange is staked on and located 1/4 in. (6 mm) from the lead end. The flange can be located up to 2 1/4 in. (57 mm) from the lead end if it is over a no-heat section. Use this option in combination with most LA configurations.

To order, specify **flange**, size and locations.

Flange Specifications

FIREROD Diameter in.	Flange Size	in. (mm)		
		D	C	H
1/4, 3/8, 1/2	FS	1 (25)	3/4 (19)	0.144 (4)
1/4, 3/8, 1/2 5/8, 3/4	FM	1 1/2 (38)	1 1/8 (29)	0.156 (4)
5/8, 3/4	FL	2 (51)	1 1/2 (38)	0.201 (5)

Locating Ring



A stainless steel locating ring can be used as a retaining collar to position a FIREROD if mounting requirements are not critical.

For LA, specify the location if the no-heat extension option is requested. On FIRERODs with crimped on leads without the LA option, the locating ring will be located on the last 1/4 in. (6 mm).

To order, specify **locating ring**.

Locating Ring Specifications

Diameter	1/4	3/8	1/2	5/8	3/4
Ring O.D. in. (mm)	1/2 (13)	5/8 (16)	3/4 (19)	7/8 (22)	1 (25)

Cartridge/Insertion Heaters



FIREROD Cartridge Heaters

LA

LA Options

Option	Minimum Length Adders Per Diameter Per Option in. (mm)						Option Code
	1/4 (6)	3/8 (9.5)	1/2 (13)	5/8 (15.9)	3/4 (19)		
Heater Diameter							
Swaged-in leads	E 1/4 (6)	E 1/4 (6)	E 1/4 (6)	E 1/4 (6)	E 1/4 (6)		None
Right angle leads	K 9/16 (14)	J 1/2 (13)	K 9/16 (14)	K 9/16 (14)	K 9/16 (14)		R
PTFE seal and leads	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)		T
Right angle PTFE seal and leads	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)		B
Silicone seal and leads	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)		P
Straight hose	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)		H
Right angle hose	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	R 7/8 (22.2)		W
Straight hose with PTFE seal and leads	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)		G
Straight braid	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)	J 1/2 (13)		C
Right angle braid	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	R 7/8 (22)		Y
Right angle braid with PTFE seal and leads	— —	1E 1 1/4 (32)	1E 1 1/4 (32)	1E 1 1/4 (32)	1E 1 1/4 (32)		A
Straight braid with PTFE seal and leads	— —	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)	N 3/4 (19)		F
Right angle hose with PTFE seal and leads	— —	1E 1 1/4 (32)	1E 1 1/4 (32)	1E 1 1/4 (32)	1E 1 1/4 (32)		M

LA options are available as shown in the table above. To order any of these options, please build the order number by specifying the Watlow part number, length adder code, option code and lead length.

Lead Type Codes

Type	Maximum Temperature	Option Code
GGs	482°F (250°C)	None
MGT	842°F (450°C)	H
PTFE	392°F (200°C)	T

Note: Available for LA fiberglass leads.

No-Heat Length Adder Codes

No-Heat Option in. (mm)	Length Adder Code
3/4 (19)	N
1 1/4 (32)	1E
1 3/4 (44)	1N
2 1/4 (56)	2E

Cartridge/Insertion Heaters



FIREROD Cartridge Heaters

Non-LA

Modification Coding

Watlow offers heaters in various diameters, lengths and volt-wattage combinations that are ready for shipping. Basic modifications can be made and heaters are shipped the same day. Modifications include flanges, threaded fittings, locating rings, ceramic beads and crimped on leads. Following is a list of all available non-LA mounting and pin option codes.

Mounting Option Codes

- BA - Small flange FS (available on 1/4, 3/8 and 1/2 in.)
- BB - Medium flange FM (available on 1/4, 3/8, 1/2, 5/8 and 3/4 in.)
- BC - Large flange FL (available on 5/8 and 3/4 in.)
- BD - Locating ring (available on 1/4, 3/8, 1/2, 5/8 and 3/4 in.)
- BG - Single stainless steel fitting
- BH - Double stainless steel fitting
- BY - Stainless steel reversed

Pin Option Codes

- AA - Short pins 3/8 in. (10 mm)
- AB - Medium pins 5/8 in. (16 mm)
- AC - Long pins 1 3/4 in. (45 mm)
- AD - Stagger pins
- AE - Ceramic beads 1/2 in. (13 mm)
- AF - Ceramic beads 3/4 in. (19 mm)
- AG - Ceramic beads 1 in. (25 mm)
- AH - Ceramic beads 1 1/4 in. (32 mm)
- AJ - Ceramic beads 1 1/2 in. (38 mm)



Crimped-on Leads



Ceramic Beads



Locating Ring



Threaded Fitting