

# High Density Cartridge Heater (RAC)



## DESCRIPTION

The form of construction of these heating elements, allows its use in adverse conditions, such as vibration and high temperatures and that can reach over 500 ° on the surface of the cartridge

High Density Heaters (RAC), are ideal for the installation of a high power in minimal space.

## General Specifications

- Flexible leads from inside in standard models.
- 250mm Fiberglass/Silicone leads in standard models.
- 1000mm Fiberglass/Silicone leads (with thermocouple FeCu / Ni (J), PTFE insulation), standard models.
- Standardized measures in metric diameters (mm).  
6,50 - 8 - 10 - 12,50 - 16 - 20
- Ø Tolerance: -0.02 -0.06 up to 1.000 mm heaters length, over 1.000 mm + -0.06.
- Standard diameters in inches (")

1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
6,30	7,90	9,46	12,61	15,81	19,00

- Ø tolerance: +0.02 -0.02 up to 1000 mm heaters length, over 1000 mm + -0.06.
- Length tolerance: up to 130mm +0 -2 mm; more than 130mm + 1.5%.

## Other Diameter

- We are able to supply any diameter between 3 mm and 25 mm.
- Other diameters on request.
- TIG welded stainless tube.
- Flexible fiber glass insulated nickel wires from inside (standard models).
- Core and insulation compacted magnesium oxide.
- Heating wire Ni/Cr80/20.
- Ø Tolerance for diameters from 25 mm + -0.10.

## Quality control

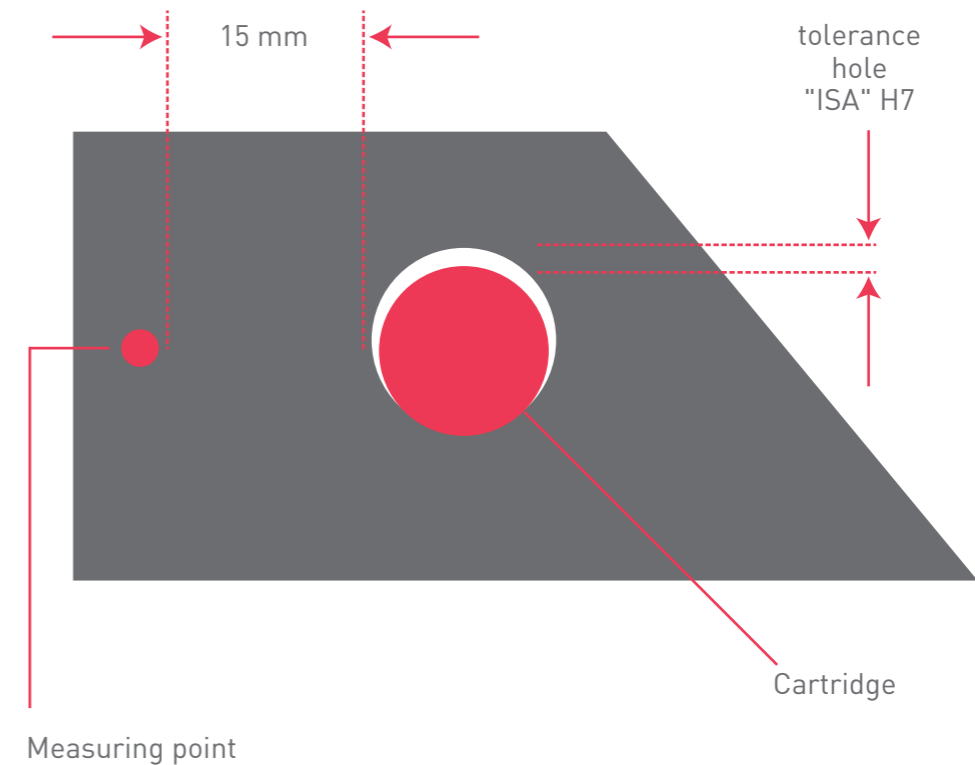
- Insulation: 5 MOhm at 500 V DC Cold (minimum).
- Dielectric strength: 1500 V 1 second.
- Nominal Power: + 5% - 10%

## Instructions (for guidance) to place and mount

HOLE TOLERANCE CHART			
More than	Till	Tolerance	Hole
3	6	-0	+0,012
6	10	-0	+0,015
10	18	-0	+0,018
18	30	-0	+0,021

The adjustment of the cartridge in the hole is very important for the proper functioning and performance.

The regulation of the temperature is essential and for this we recommend to place the measuring point not more than 15mm separately from the cartridge.



# High Density Cartridge Heater (RAC)

## Connection types for Standard cartridges with built-in thermocouple

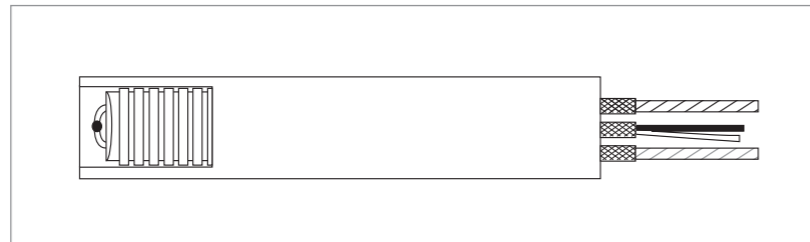
We can place thermocouple type J (Fe-CuNi)  
Type K (NiCr-Ni)  
Type T (Cu-CuNi)

If the customer says otherwise the thermal sensor is installed always insulated to avoid problems on sensitive control devices.



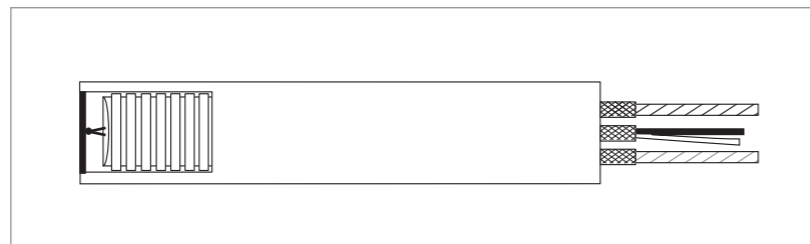
### OPTION 1. Thermocouple on the cartridge base isolated

STANDARD Placement of the thermocouple. Right choice to avoid problems sensitive control devices.



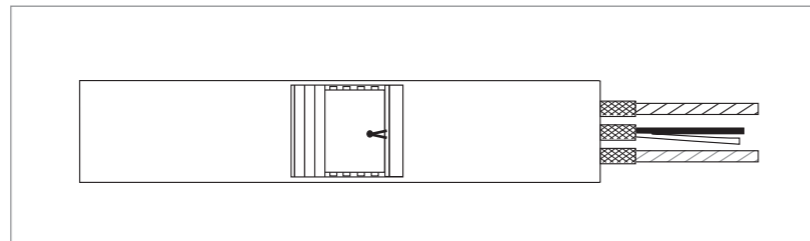
### OPTION 2. Thermocouple on the cartridge base grounded.

Option indicated when rapid measurement is required.  
NOTE: This option is not valid for highly sensitive regulation devices.



### OPTION 3. Thermocouple isolated and centered

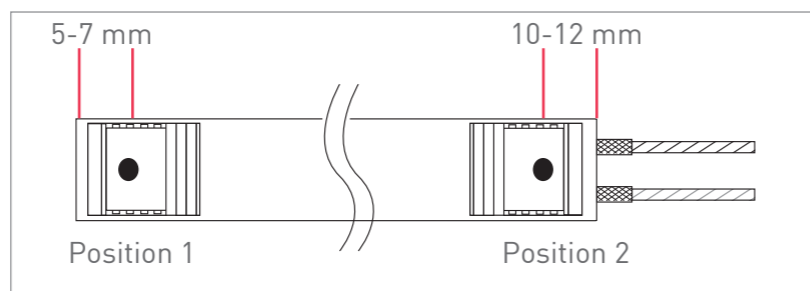
This option can be performed on elements from 3/8 "(9,46) dia.



## CARTRIDGE HEATERS WITH PT-100 SENSOR

They can be manufactured as follows:

Position 1. Starting from 6.30 mm dia  $\emptyset$ .  
Position 2. Starting from 12.50 mm dia  $\emptyset$ .



# High Density Cartridge Heater (RAC)

## CARTRIDGE HEATERS WITH POWER DISTRIBUTION

It is used where it is necessary to spread out a completely uniform temperature to a mass. It can be made with any type of connection type.



More heat at the ends



More heat in the middle



Different heating zones

# High Density Cartridge Heater (RAC)

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Cerámica 3-4 mm

Cerámica 3-4 mm

Cerámica 3-4 mm

Cerámica 3-4 mm



Standard leads length: Without thermocouple 250mm / With thermocouple J (F-Con) 1000mm.

Table of standard cartridge heaters

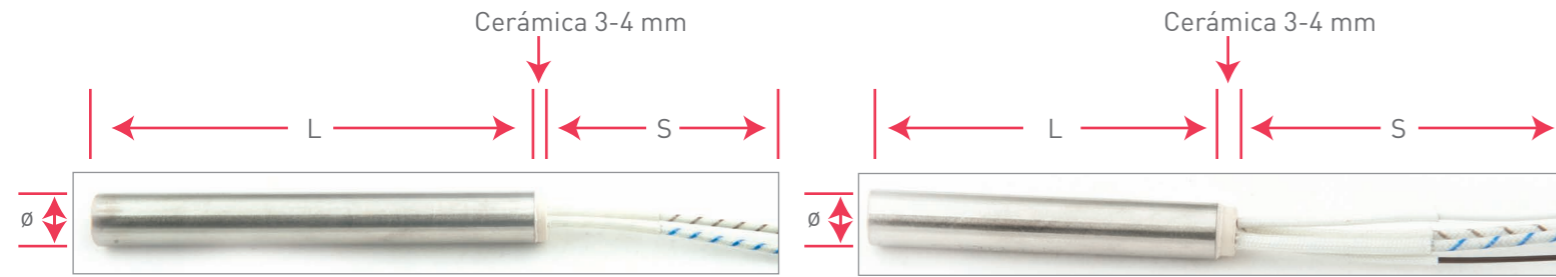
DIÁMETRO Ø MM.	LONGITUD L. MM.	WATIOS A 230 V									
6.50 -0,02 -0,06	30	160	200	300							
	40	100	125	160	175	200					
	50	100	125	150	160	200	250				
	60	125	160	180	200	250	315				
	80	125	160	180	200	250	280	315	350		
	100	100	160	200	220	250	315	350	400		
	130	220	300	350	400						
	160	250	350	400							
	180	250	350	400							
	200	350	400	500							
250	250	350	400	500							
8 -0,02 -0,06	40	100	140	160	200	250					
	50	125	160	200	250	315					
	60	100	125	140	160	200	220	250	280	315	350
	80	160	180	200	250	280	315	350	400		
	100	180	200	250	280	315	400				
	130	250	315	400							
	160	200	315	400							
	180	250	300	400	500						
	200	300	400	500							
	250	300	400	500							
10 -0,02 -0,06	40	100	125	160	175	200	250	315	400		
	50	100	125	160	175	200	250	315	400	500	
	60	125	160	180	200	250	315	350	400	450	500
	80	100	150	160	200	220	250	315	400	500	600
	100	125	150	220	250	315	350	400	500	560	630
	130	250	315	350	400	500	630	750	800	1000	
	160	160	315	400	500	600	630	750	800		
	180	300	500	600	800						
	200	250	300	400	500	600	630	1000			
	250	200	400	630	800	1000	1600				

Standard leads length: Without thermocouple 250mm / With thermocouple J (F-Con) 1000mm.

Table of standard cartridge heaters

DIÁMETRO Ø MM.	LONGITUD L. MM.	WATIOS A 230 V									
12.50 -0,02 -0,06	40	100	160	200	250	315	400				
	50	100	150	160	200	250	315	400	500		
	60	125	160	200	250	315	400	500			
	80	150	200	250	315	400	500	630	800		
	100	250	315	400	500	630	800	1000			
	130	350	400	500	630	800	1000	1250			
	160	400	500	630	800	1000	1250				
	180	500	670	800	1000	1250					
	200	500	630	800	900	1000	1250	1500			
	250	630	800	900	1000	1500					
300	600	1000	1250	1500	2000						
16 -0,02 -0,06	40	100	160	200	250	315	400	500			
	50	160	200	250	315	400	500	630			
	60	160	200	250	315	400	500	630			
	80	250	280	315	400	500	630	800	850	1000	
	100	350	400	500	630	800	1000	1250			
	130	400	500	630	700	800	1000	1100	1400	1800	
	160	500	630	800	900	1000	1250	1600	1800		
	180	600	850	1000	1250	1500	1800				
	200	500	800	1000	1250	2000					
	250	800	1000	1250	1600	2000					
300	1000	1250	1500	1800	2000						
20 -0,02 -0,06	50	200	250	315	400						
	60	200	315	400	500	630	800				
	80	315	350	400	500	800	1000	1250			
	100	400	450	500	630	800	1000	1250	1400	1600	1800
	130	500	630	900	1000	1250	1400	1800	2200		
	160	800	1000	1100	1250	1800	2200				
	180	1000	1250	1600	1800						
	200	800	1000	1250	1600	2000	2500				
	250	1000	1250	1600	2000	2500					
	300	1000	1250	1600	2000	2500					

# High Density Cartridge Heater (RAC)



Standard leads length: Without thermocouple 250mm / With thermocouple J (F-Con) 1000mm.

DIÁMETRO Ø MM.		LONGITUD L. MM.		WATIOS A 230 V													
1/4" +0,02 (6,30) -0,02	1 1/4"	31	↑	160	200	300											
	1 1/2"	38	↑	100	125	160	175	200									
	2"	50	↑	100	125	150	160	200	250								
	2 1/2"	63	↑	125	160	180	200	250	315								
	3"	76	↑	125	160	180	200	250	280	315	350						
	3 1/4"	82	↑	125	160	180	200	250	280	300	350						
	4"	101	↑	100	160	200	220	250	315	350	400						
	5"	127	↑	220	300	350	400										
	5 1/4"	133	↑	220	300	350	400										
	6"	152	↑	220	350	400											
5/16" +0,02 (7,90) -0,02	6 1/2"	165	↑	250	350	400											
	7"	177	↑	250	350	400											
	8"	203	↑	250	350	400											
	10"	254	↑	250	350	400	450										
	1 1/2"	38	↑	100	140	160	200	250									
	2"	50	↑	125	160	200	250	315									
	2 1/2"	63	↑	100	125	140	160	180	200	220	250	280	315	350			
	3"	76	↑	160	180	200	250	280	315	350	400						
	3 1/4"	82	↑	160	200	315	400										
	4"	101	↑	180	200	220	250	280	315	400							
3/8" +0,02 (9,46) -0,02	5"	127	↑	250	315	400											
	5 1/4"	133	↑	315	400	500	600	800									
	+6"	152	↑	160	315	400	500	600	630	750	800						
	6 1/2"	165	↑	400	500	630											
	7"	177	↑	400	500	600	700	800									
	8"	203	↑	250	300	400	500	600	630	1000							
	10"	254	↑	200	400	630	800	1000	1600								

# High Density Cartridge Heater (RAC)



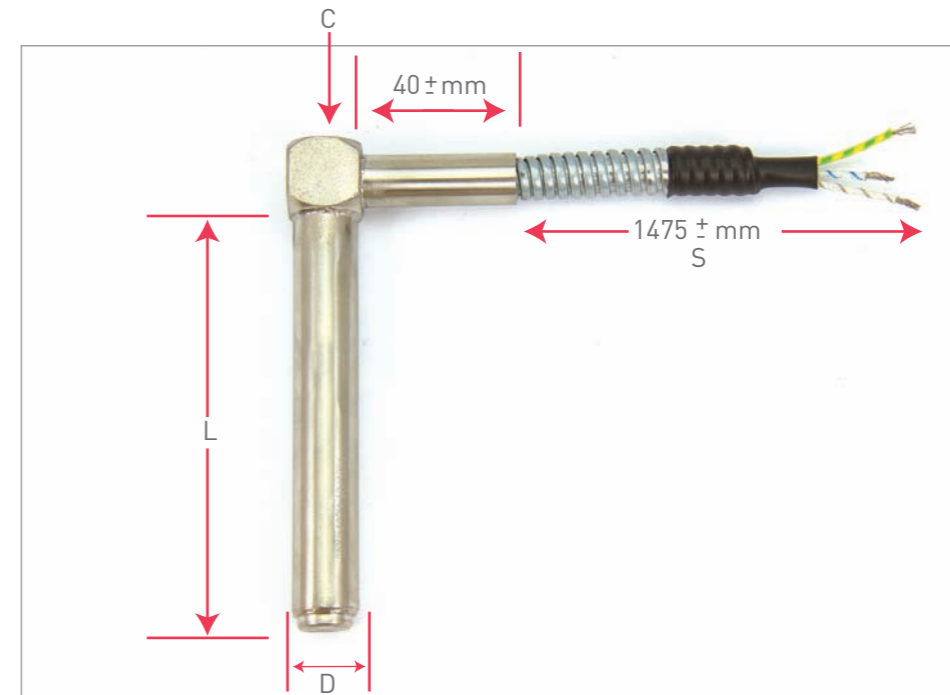
Standard leads length: Without thermocouple 250mm / With thermocouple J (F-Con) 1000mm.

DIÁMETRO Ø MM.		LONGITUD L. MM.		WATIOS A 230 V													
1/2" +0,02 (12,61) -0,02	1 1/2"	38	↑	100	160	200	250	315	400								
	2"	50	↑	100	150	160	200	250	315	400	500						
	2 1/2"	63	↑	125	160	200	250	315	400	500							
	3"	76	↑	150	200	250	315	400	500	630	800						
	3 1/4"	82	↑	160	200	315	500	630	800								
	4"	101	↑	250	315	400	500	630	800	1000							
	5"	127	↑	350	400	500	630	800	1000	1250							
	5 1/4"	133	↑	300	400	630	100	1250									
	6"	152	↑	400	500	630	800	1000	1250								
	6 1/2"	165	↑	500	800	1250											
	7"	177	↑	500	670	800	1000	1250									
	8"	203	↑	500	630	800	900	1000	1500								
5/8" +0,02 (15,81) -0,02	10"	254	↑	630	800	900	1000	1250	1500								
	12"	304	↑	600	1000	1250	1500	2000									
	1 1/2"	38	↑	100	160	200	250	315	400	500							
	2"	50	↑	160	200	250	315	400	500	630							
	2 1/2"	63	↑	160	200	250	315	400	500	630							
	3"	76	↑	250	280	315	400	500	630	800	50	1000					
	3 1/2"	88	↑	350	400	500	630	800									
	3 1/4"	82	↑	280	300	400	630	800	1000								
	4"	101	↑	350	400	500	630	800	1000	1250							
	5"	127	↑	400	500	630	700	800	1000	1100	1400	1800					
	5 1/4"	133	↑	500	700	1100	1400	1800									
	6"	152	↑	500	630	800	900	1000	1250	1600	1800						
3/4" +0,02 (19) -0,02	6 1/2"	165	↑	630	900	1600	1800										
	7"	177	↑	600	850	1000	1250	1500	1800								
	8"	203	↑	500	800	1000	1250	2000									
	10"	254	↑	800	1000	1250	1600	2000									
	12"	304	↑	1000	1250	1500	1800	2000									
	2"	50	↑	200	250	315	400										
	2 1/2"	63	↑	200	315	400	500	630	800								
	3"	76	↑	315	350	400	500	800	1000	1250							
	3 1/4"	82	↑	315	350	400	500										
	4"	101	↑	400	450	500	800	1000	1250	1400	1600	1800					
	5"	127	↑	500	630	900	1000	1250	1400	1800	2200						
	5 1/4"	133	↑	500	630	900	1000										
6"	152	↑	800	1000	1100	1250	1800	2200									
6 1/2"	165	↑	800	1000	1100	1250											
7"	177	↑	800	1000	1250												
8"	203	↑	800	1000	1250	1600	2000	2500									
10"	254	↑	1000	1250	1600	2000	2500										
12"	304	↑		1250	1600	2200	2500										

# RAC-Heater for Die Casting (ZAMAK)



90°

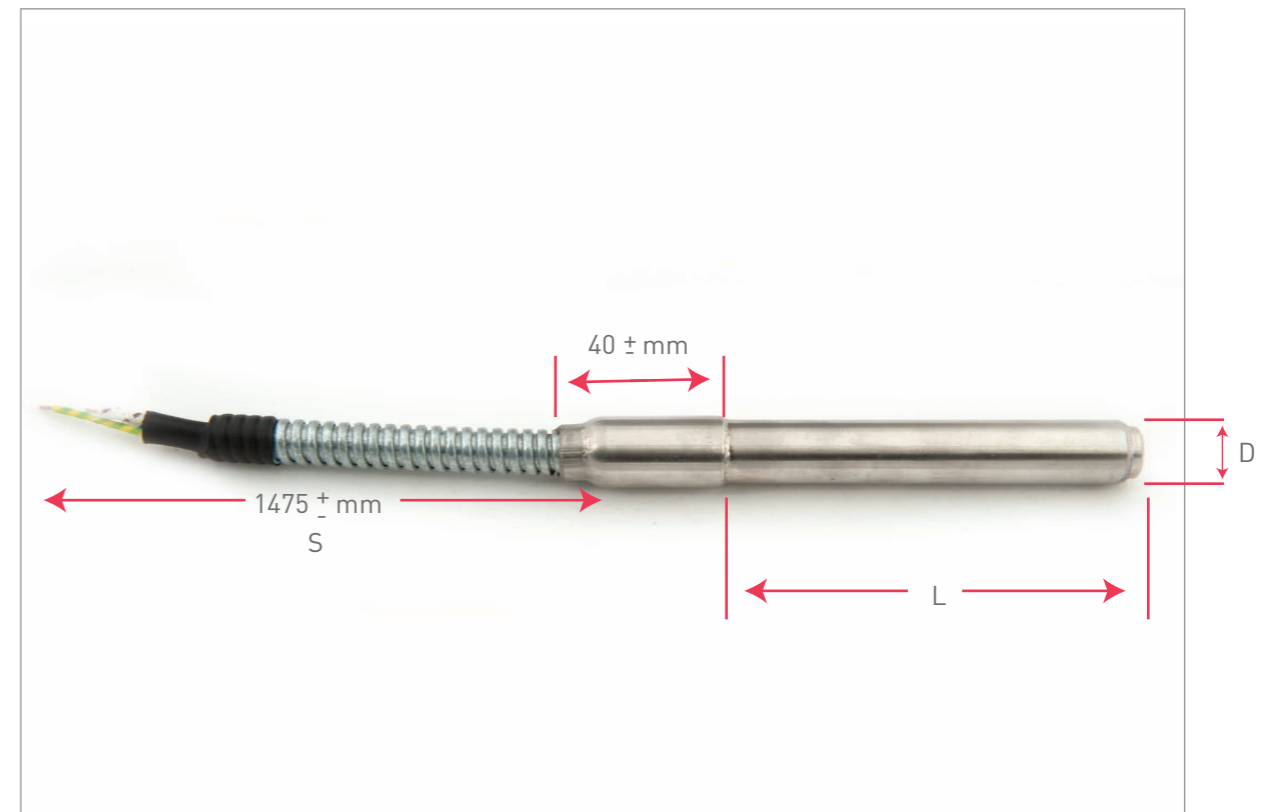


## General Properties

- Connection length 1475mm high temperature resistant
- Stainless steel pipe and tightly welded
- Cable protection with galvanized steel conduit
- Isolation of compressed MgO
- Rear pivot for extraction included in the length.
- The pivot diameter is 3 mm smaller than the diameter of the cartridge.
- On request we can make any modification.

Table of standard cartridge heaters				
Angle block C	Dia. mm D		Length mm L	Wattage at 230V
10X10X10	6,5	-0,02 -0,06	80	180 - 200
14X14X14	10	-0,02 -0,06	80	250 - 315
15X15X15	12,5	-0,02 -0,06	60	200 - 315
			80	250 - 500
			90	350 - 400
			100	300 - 500 - 800
18X18X18	16	-0,02 -0,06	80	315 - 500 - 630
			100	500 - 630 - 800
			130	600 - 1000
			160	630 - 900
			180	800 - 1000
			200	800 - 1000
25X25X25	20	-0,02 -0,06	100	630 - 1000
			160	800 - 1100

# Straight Form



## Low Density Cartridge Heater (RBC)



### Description

Low Density Cartridge Heaters, as opposed to High Density Cartridge Heaters, do not tolerate high frequencies of movement, sustained beatings or high operating temperatures above 300 ° C.

### General Properties

- Flexible connecting cables from the inside and protected with ceramic head according connection type nº 300 (Standard).
- Normalized diameter in metric (mm):

9,50 10 12 12,70 14 15 16 18 19 20 22 24 25 28 30 32 35 38 40

TTolerance  $\varnothing$ : -0,02 -0,10 hasta 1.000 mm.  
+0,10 -0,10 más de 1.000 mm.

Length Tolerance +2 -2 mm.

\*Other diameters and lengths available on request.

### Quality control

- Insulation: 5 M Ohms at 500V DC cold.
- High Voltage Test: 1500V for 1 sec.
- Rated Power: +5% -10%.

### Instructions for installation and mounting

- The adjustment of the cartridge in the hole is very important for the proper functioning and performance.
- The regulation of the temperature is essential and for this we recommend to place the measuring point not more than 15mm separately from the cartridge.

## Low Density Cartridge Heater (Square and Rectangular)



### Description

These heaters are designed with the observed profile because with this system placement through a slot, is easier. NOT SUITABLE when there are constant shock, vibration, nor when the operating temperature exceeds 300 ° C.

### General Properties

- Tube: St Steel AISI-304
- Insulation: Cordierite + MgO
- Heating Wire: Ni/Cr 80/20
- Connections Leads: Nickel, Fiberglass + Silicone

### Quality control

- Insulation: 5 M Ohms at 500V DC cold
- High Voltage Test: 1500V for 1 sec
- Rated Power: +5% -10%

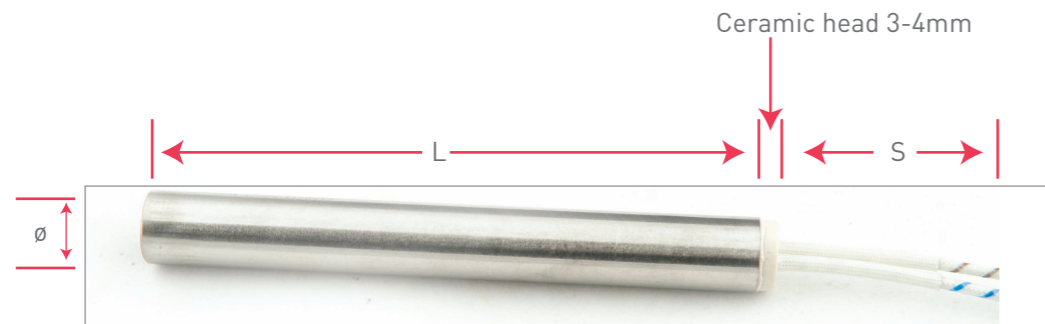
### Instructions for installation and mounting

- The adjustment of the cartridge into the slot is very important for the proper functioning and performance.
- The regulation of the temperature is essential and for this we recommend to place the measuring point not more than 15mm separately from the cartridge.

Standard Profiles	
10 X 10	20 X 10
15 X 15	20 X 15
20 X 20	30 X 10
25 X 25	30 X 15
	40 X 10
	40 X 20

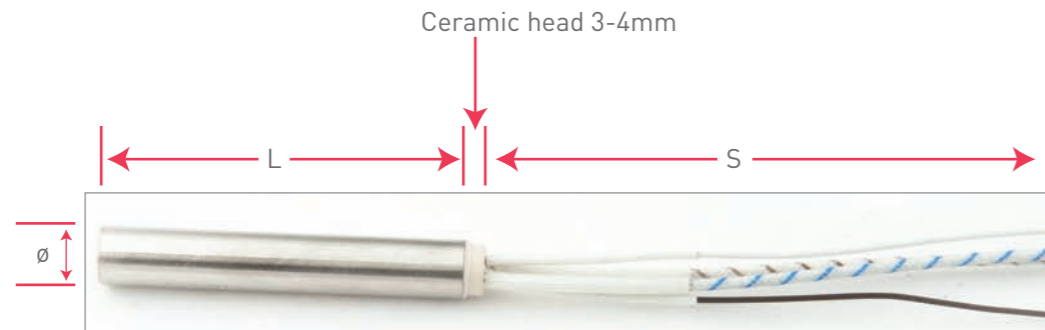
Section Tolerance  $\pm 1\%$ .

## Connection Options for Cartridge Heaters



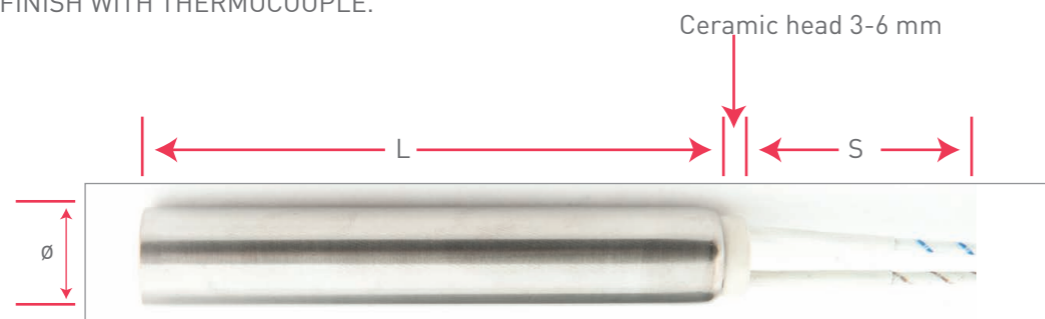
### Model Nr 10A

- Ceramic cap 3-4 mm.
- Flexible cables from the inside with fiberglass/silicone insulation + nickel conductor.
- STANDARD OPTION, HIGH DENSITY CH (RAC)



### Model Nr 20A

- Ceramic cap 3-4 mm.
- Flexible cables from the inside with fiberglass/silicone insulation + nickel conductor.
- - Thermocouple Leads type J, PFA insulated.
- STANDARD FINISH WITH THERMOCOUPLE.



### Model Nr 30A

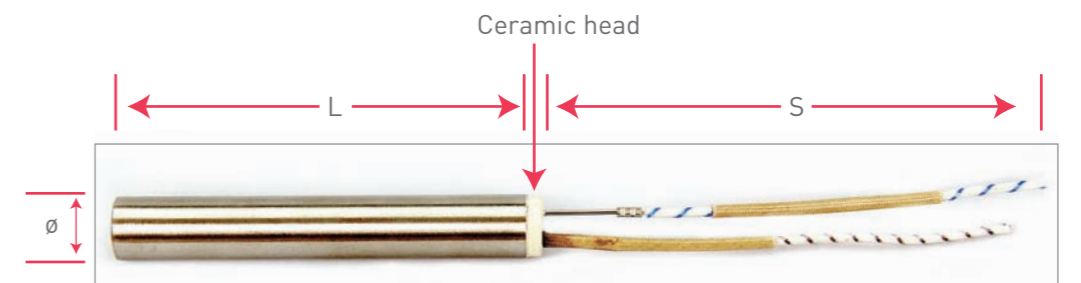
- With ceramic cap length of 3-6 mm.
- Flexible cables from the inside.
- STANDARD FINISH, LOW DENSITY (RBC).

## Connection Options for Cartridge Heaters



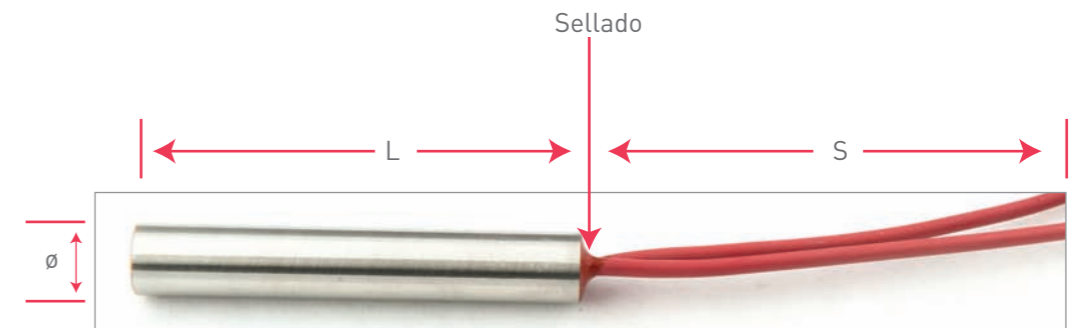
### Model Nr 40A

- Without ceramic cap.
- Sealed with cement.



### Model Nr 50A

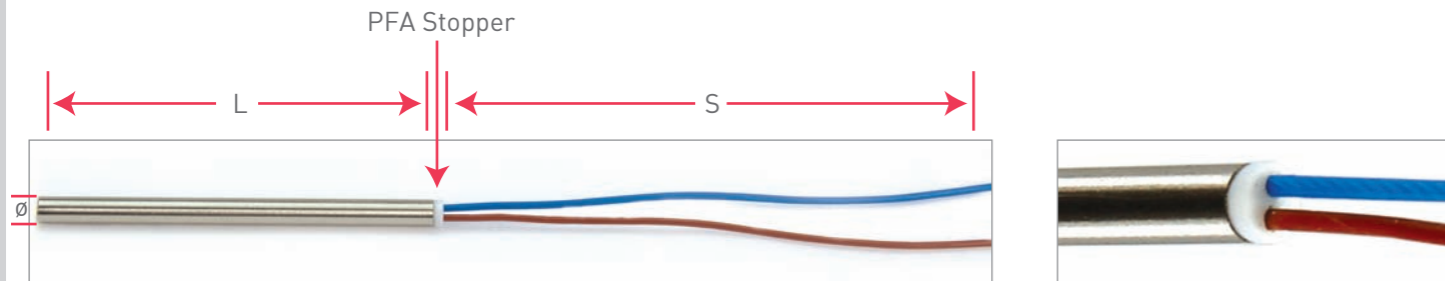
- With ceramic cap.
- Rigid and flexible cable output connection.
- Connection: welding or stapling



### Model Nr 60A

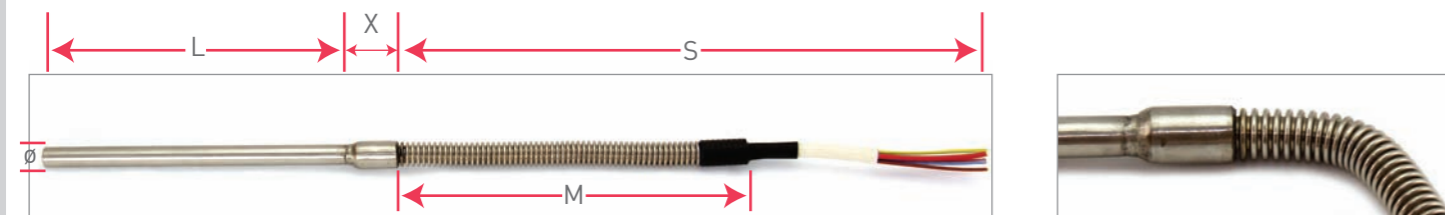
- Sealed moisture resistant.
- Cables PFA or SILICONE.
- Sealed with silicone (works up to 180°C).
- Sealed with resin (works up to 135°C).

## Connection Options for Cartridge Heaters



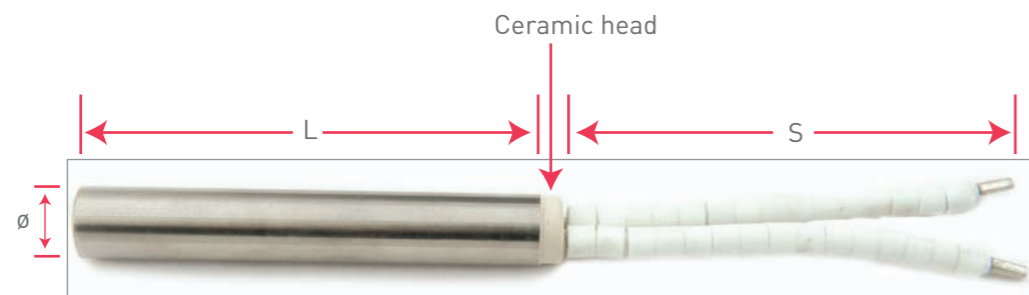
### Model Nr 70A

- Resistant to moisture.
- PFA Cables.
- With PFA cap.
- From diameter 4mm on.



### Model Nr 80A

- Gas and watertight design with stainless steel corrugated hose



### Model Nr 90A

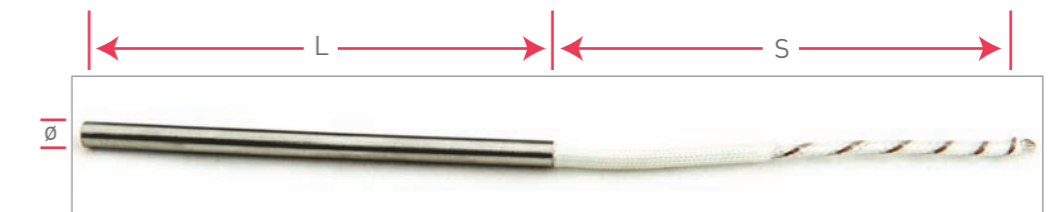
- Unions equipped with ceramic beads.
- Appropriate for high temperature areas

## Connection Options for Cartridge Heaters



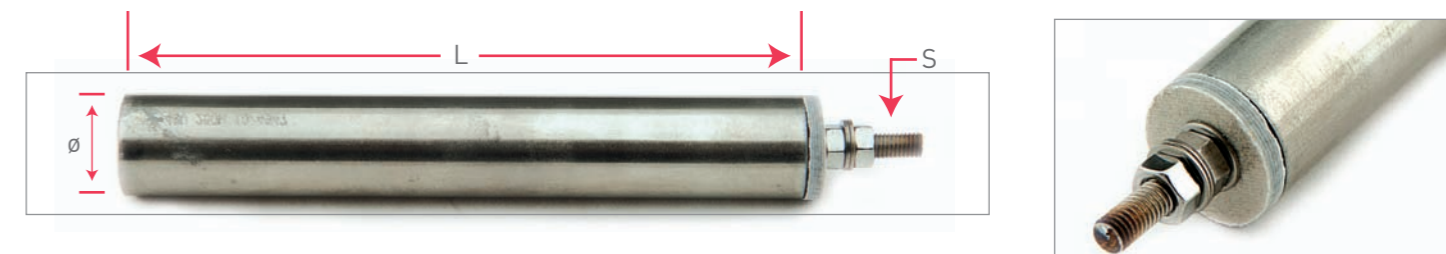
### Model Nr 100A

- Rigid exit with Nickel wire without protective sleeve.
- Appropriate for high temperature areas.



### Model Nr 110A

- A pole grounded.
- Low voltage, maximum 60V.
- Flexible Cable from inside fiberglass + silicone.

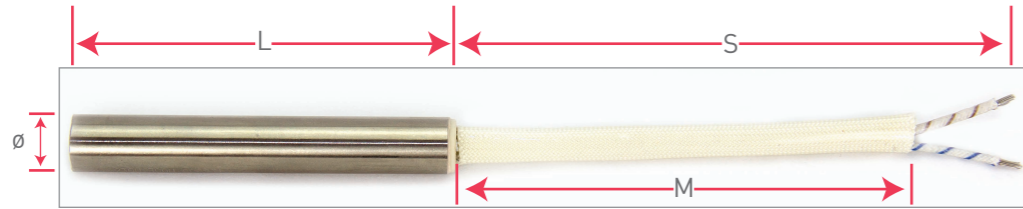


### Model Nr 120A

- A pole grounded.
- Low voltage, maximum 60V.
- Threaded pin grounded.

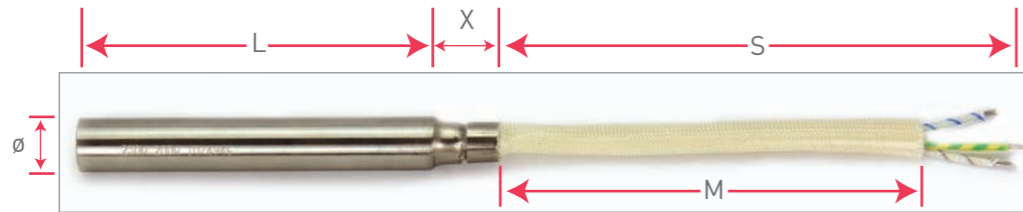


## Connection Options for Cartridge Heaters



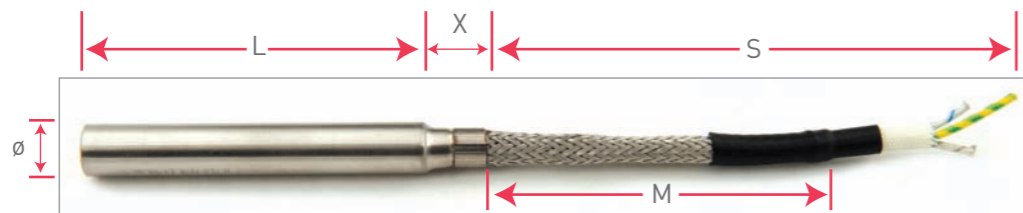
### Model Nr 130A

- Double Protection sleeve
- Sleeve glass / silicone.
- Earth wire optional



### Model Nr 140A

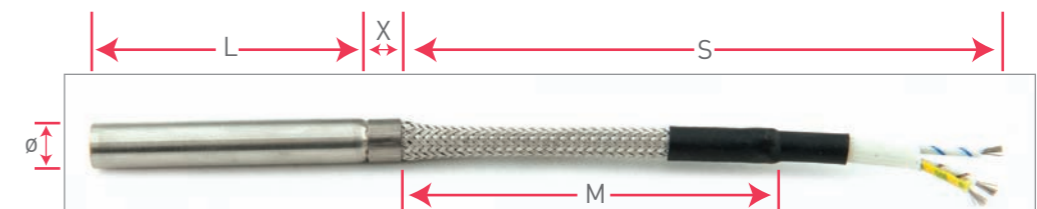
- Double Protection sleeve and reduced pipe.
- Sleeve glass / silicone.
- Earth wire optional



### Model Nr 150A

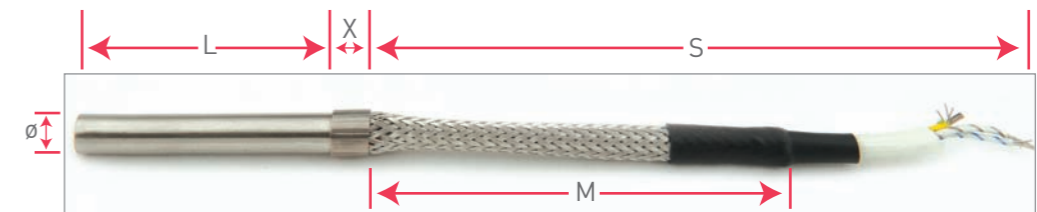
- Stainless braid hose from the inside with reduced pipe.
- Grounded.
- From  $\varnothing 12.50\text{mm}$  on

## Connection Options for Cartridge Heaters



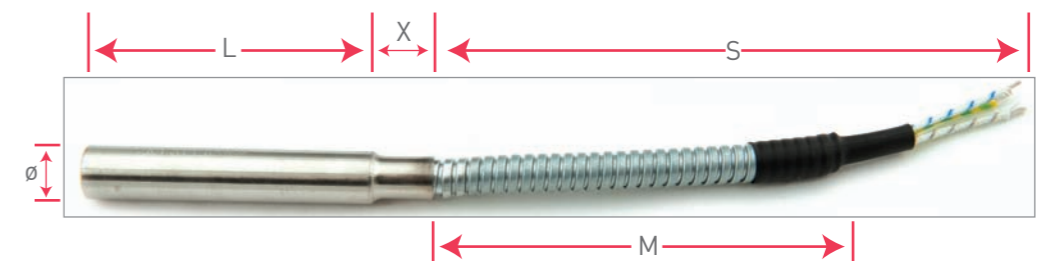
### Model Nr 160A

- Stainless Mesh from the inside.
- Grounded.
- From  $\varnothing 9.46 - \varnothing 12.61$ .



### Model Nr 170A

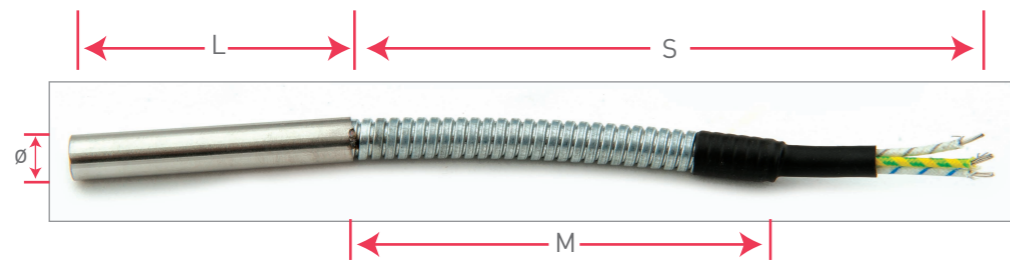
- Stainless braid hose from the outside.
- Grounded.
- From  $\varnothing 3$  to  $\varnothing 9$



### Model Nr 180A

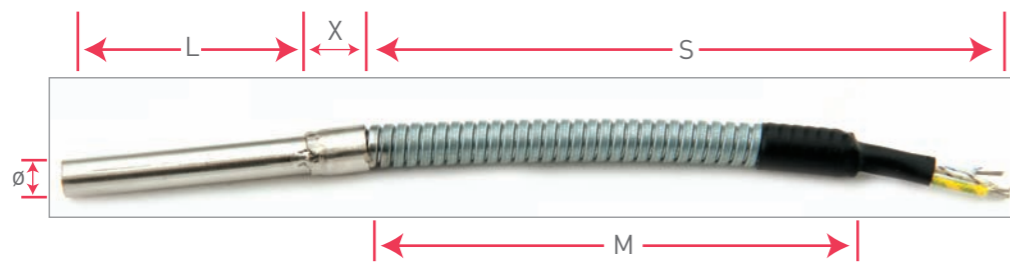
- Metal hose made from galvanized steel from inside with reduced pipe.
- Grounded.
- From  $\varnothing 12.50\text{mm}$  on

## Connection Options for Cartridge Heaters



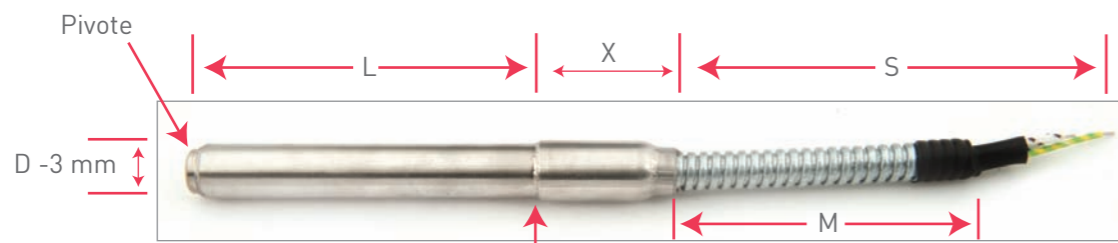
### Model Nr 190A

- Metal hose made from galvanized steel from inside.
- Grounded.
- From  $\varnothing 9.46\text{mm}$  on



### Model Nr 200A

- Metal hose made from galvanized steel from outside with pipe.
- Grounded.
- From  $\varnothing 5$  to  $\varnothing 11\text{mm}$



### Model Nr 210A

- Straight type for zamak.
- Metal hose made of galvanized steel.
- Waterproof welded.
- Pins on the bottom side to beat out the cartridge

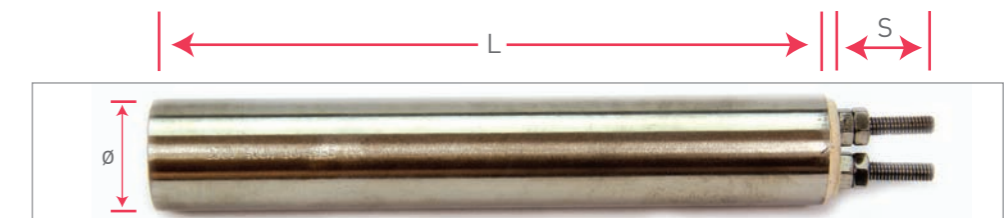
Soldaduras estancas

## Connection Options for Cartridge Heaters



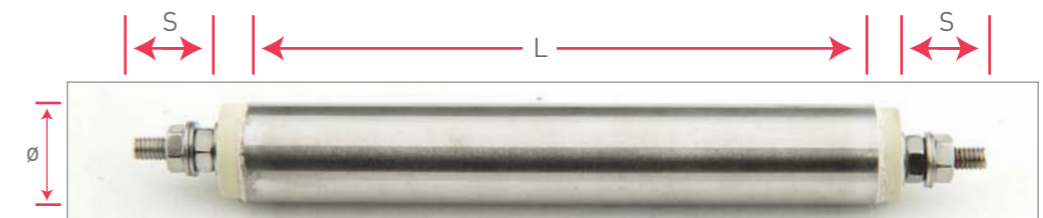
### Model Nr 220A

- Screw terminals.
- From  $10\ \varnothing$  to  $19\ \varnothing$ .



### Model Nr 230A

- Screw terminals.
- From  $19\ \varnothing$  on.



### Model Nr 240A

- Screw terminals on both sides

## Connection Options for Cartridge Heaters



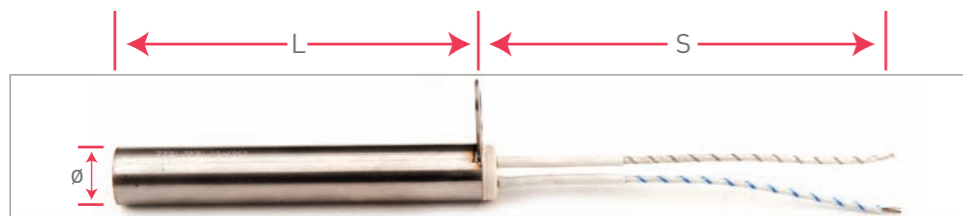
### Model Nr 250A

- Both sides.
- Flexible cables from inside fiberglass + silicone.

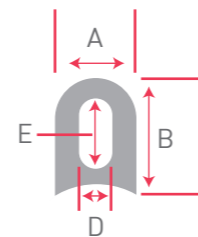


### Model Nr 260A

- Ceramic terminal block

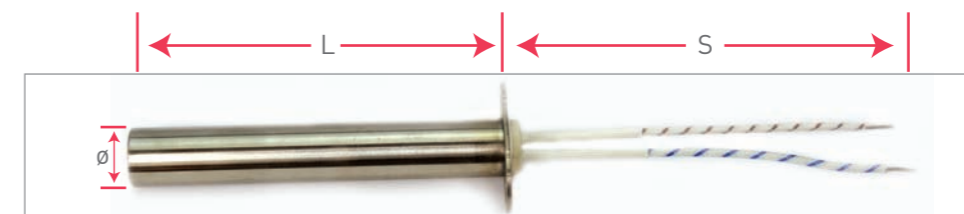


Ø RESISTENCIA	6.30 - 6.50	7.90 - 8	9.46 - 10	12.50 - 12.61	15.81 - 16	19.05 - 20
A	10	10	10	12	12	12
B	12	12	12	20	20	20
D	4	4	4	6	6	6
E	6	6	6	14	14	14

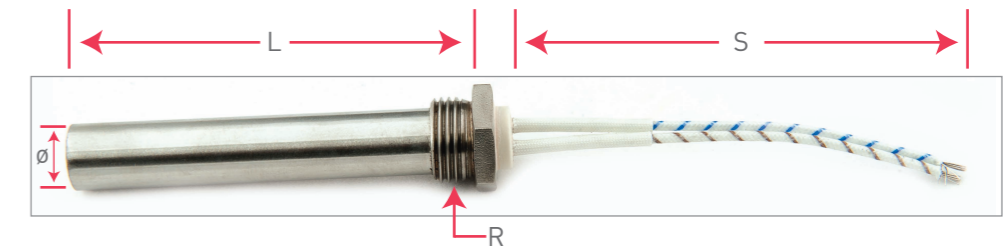


### Model Nr 270A

## Connection Options for Cartridge Heaters



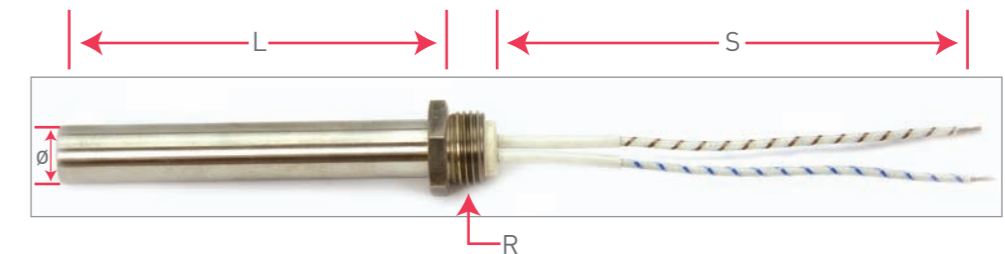
### Model Nr 280A



Thread table (R)						
Ø Cartucho	1/4" (6,30) 6,50	5/6" (7,90) 8	3/8" (9,46) 10	1/2" (12,61) 12,50	5/8" (15,81) 16	3/4" (19,05) 20
R=Paso de Rosca	1/8" M 10/100	1/4" M 12/100	1/4" M 14/150	3/8" M 16/150	1/2" M 20/150	3/4" M 28/150

### Model Nr 290A

- Threaded nipple, normal mounting position.

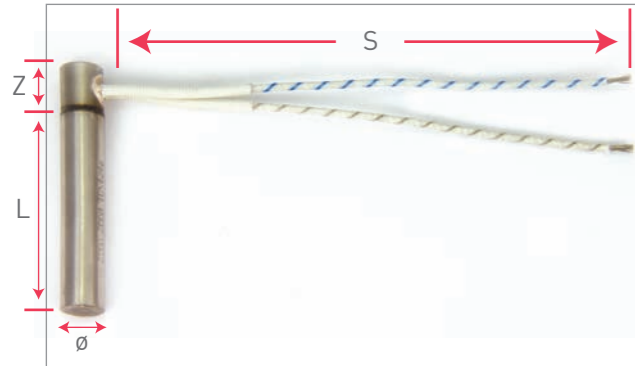


Thread table (R)						
Ø Cartucho	1/4" (6,30) 6,50	5/6" (7,90) 8	3/8" (9,46) 10	1/2" (12,61) 12,50	5/8" (15,81) 16	3/4" (19,05) 20
R=Paso de Rosca	1/8" M 10/100	1/4" M 12/100	1/4" M 14/150	3/8" M 16/150	1/2" M 20/150	3/4" M 28/150

### Model Nr 300A

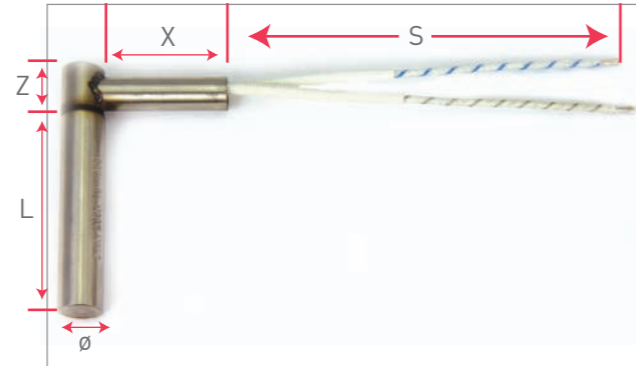
- Reverse mounting position

## Connection Options for Cartridge Heaters



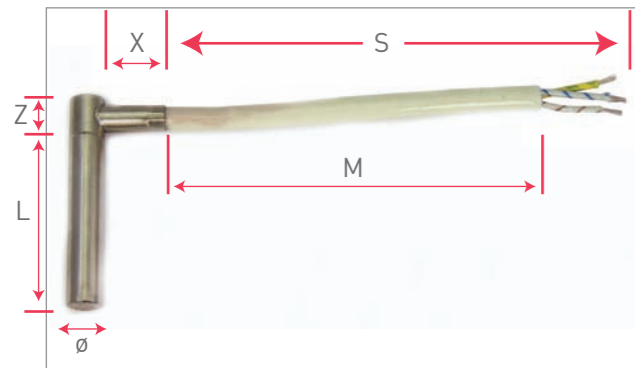
### Model Nr 310A

- 90° cylinder.
- Without leads protection.
- Flexible cables from the inside.
- Running from 6.30 Ø.



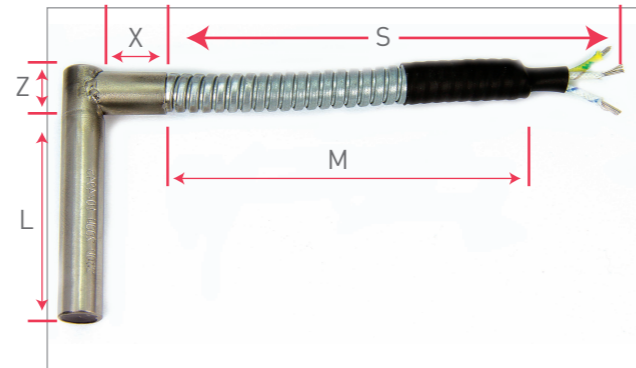
### Model Nr 320A

- 90° cylinder.
- Without leads protection.
- Flexible cables from the inside.
- Running from 9.46 Ø.



### Model Nr 330A

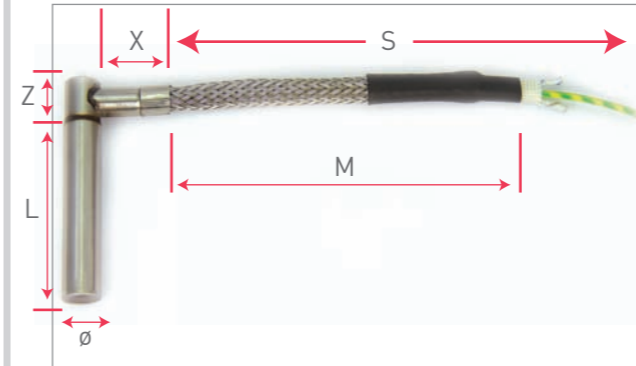
- 90° cylinder.
- Fiberglass-Silicone Sleeve.
- Grounded.
- Running from 9.46 Ø.



### Model Nr 340A

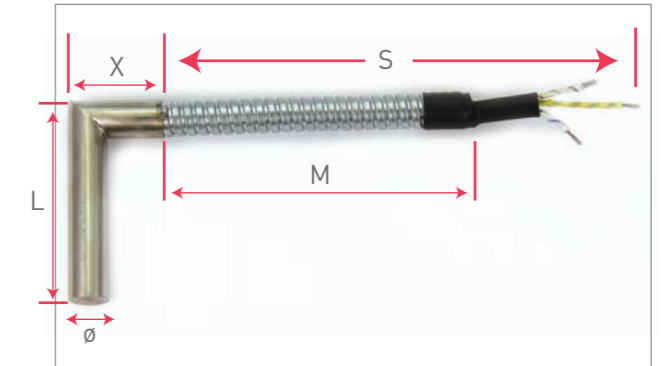
- 90° cylinder.
- Galvanized Metal Hose.
- Grounded.
- Running from 9.46 Ø.

## Connection Options for Cartridge Heaters



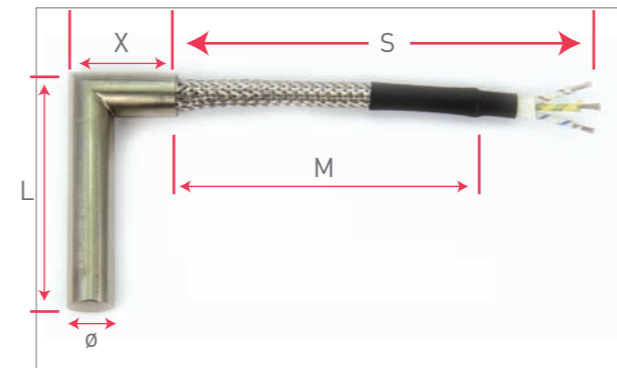
### Model Nr 350A

- 90° cylinder.
- Stainless steel braid.
- Grounded.
- Running from 9.46 Ø.



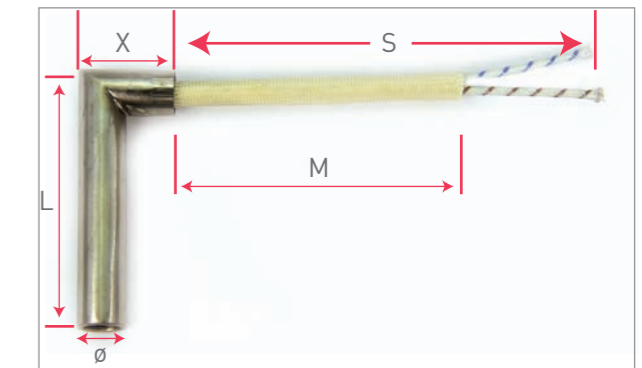
### Model Nr 360A

- Rebated.
- Galvanized Metal Hose.
- Grounded.
- Running from 6.30 Ø.



### Model Nr 370

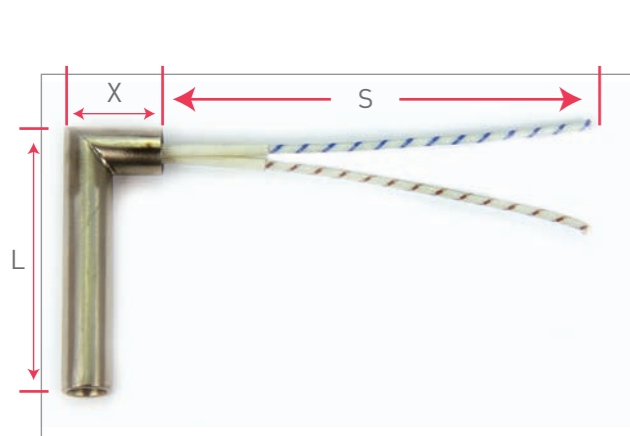
- Rebated.
- Stainless Steel Braid.
- Grounded.
- Running from 6.30 Ø.



### Model Nr 380

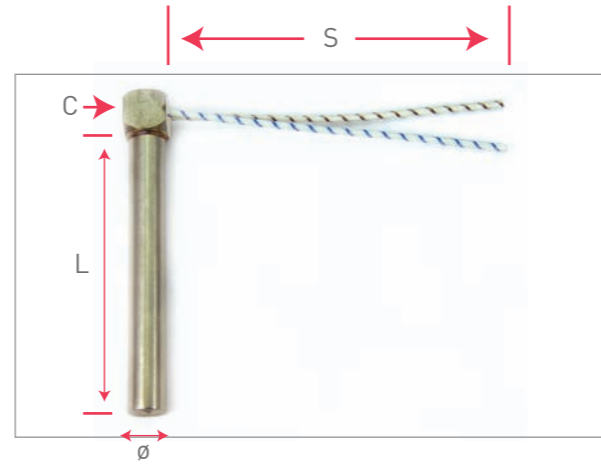
- Rebated.
- Fiberglass-Silicone Sleeve.
- Grounded.
- Running from 6.30 Ø.

# Connection Options for Cartridge Heaters



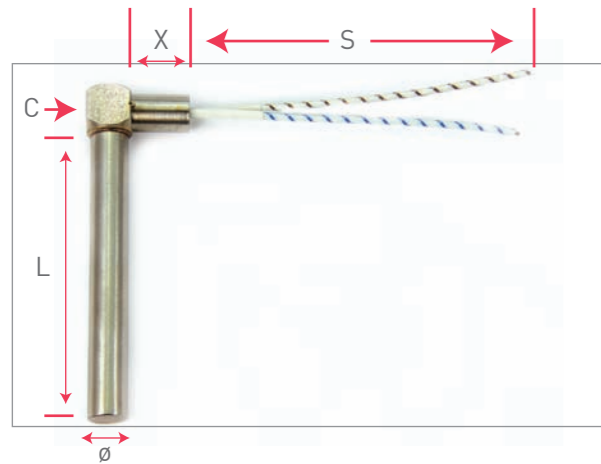
**Model Nr 390A**

- Rebated.
- Without Leads Protection.
- Leads from inside.
- Running from 6.30  $\phi$ .



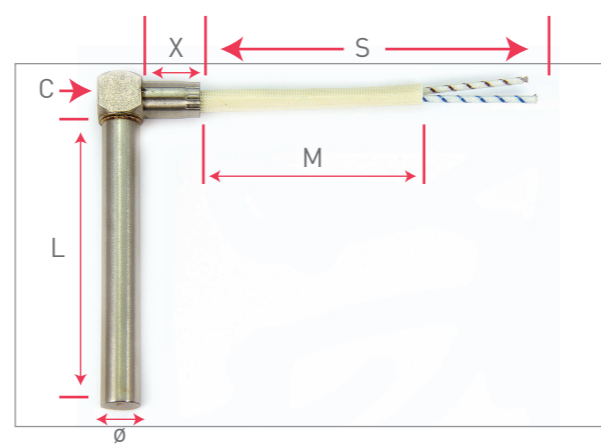
**Model Nr 400A**

- 90° Angle Block.
- Without tube and protection.
- Flexible cables from the inside.



**Model Nr 410A**

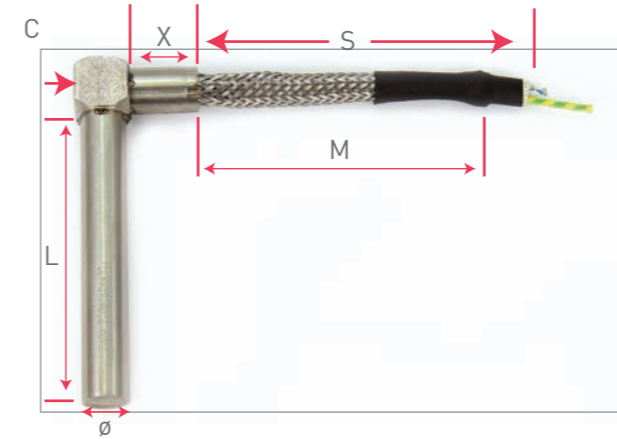
- 90° Angle Block.
- With pipe and without protection.
- Flexible cables from the inside.



**Model Nr 420A**

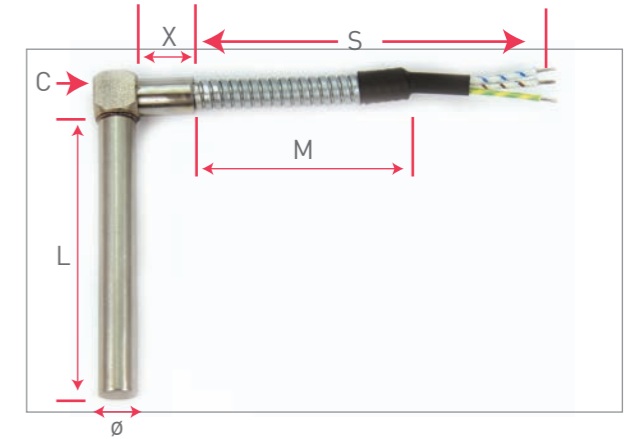
- 90° Angle Block.
- Pipe and Fiberglass-Silicone Sleeve.
- Grounded.

# Connection Options for Cartridge Heaters



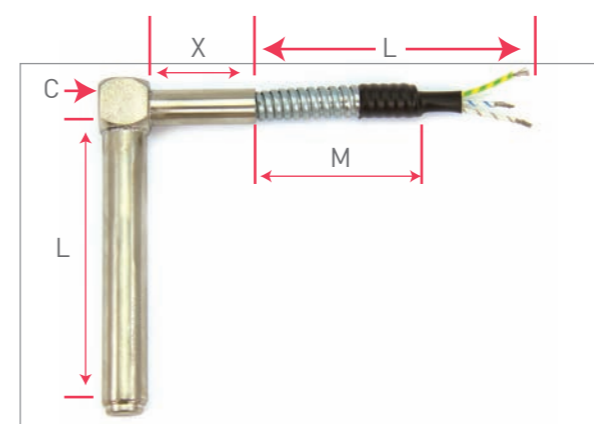
**Model Nr 430A**

- 90° Angle Block.
- Stainless Steel Braid.
- Grounded.



**Model Nr 440A**

- 90° Angle Block.
- Galvanized Metal Hose.
- Grounded.



**Model Nr 450A**

- 90° Angle Block type for zamak.
- Metal hose made of galvanized steel.
- Waterproof welded.
- Pins on the bottom side to beat out the cartridge
- Heaters length includes pin.

TABLA DE MEDIDAS DEL DADO (C) SEGÚN DIÁMETRO DEL CARTUCHO

$\phi$ Cartucho	1/4" (6,30)	5/6" (7,90)	3/8" (9,46)	1/2" (12,61)	5/81" (15,81)	3/4" (19,05)
	6,50	8	10	12,50	16	20
C=Dado	10 x 10 x 10	10 x 10 x 10	14 x 14 x 14	15 x 15 x 15	18 x 18 x 18	25 x 25 x 25