

▶ SECTION 11: ELEMENTS

- Accurate sensing from -200 to 600°C (-328 to 1112°F)
- Wide choice of sizes and styles for application versatility
- Low cost thin-film elements
- Wire wound elements

Wire-wound elements.....	11-2
Thin-film elements	11-2
Installation.....	11-3
Extension leads.....	11-3
Design Notes	11-4

Wire-wound & Thin-film Elements

Overview: Wire-wound Elements

Use these elements for general purpose sensing in probes or equipment. PD models meet EN60751, Class B.

Specifications

Temperature range: See table below. Some elements may be used down to -269°C in certain applications. Contact factory for advice on cryogenic use.

Element Body: Glass-coated ceramic

Resistance Tolerance: ± 0.1% at 0°C

Lead Length Tolerance: ± 0.4" (10.2mm)

TCR: 0.00385 Ω/Ω/°C

Element Diameter tolerance: ±0.005" (0.13 mm)

Element Length tolerance: ±0.06 (1.5 mm)

Repeatability: ±0.1°C or better

Stability: Drift less than 0.1°C/year (normal use)

Vibration: Withstands 20 G's minimum at 10 to 2,000 Hz.

Shock: Withstands 100G's minimum sine wave shock of 8 milliseconds duration

Overview: Thin-film Elements

Thin film elements offer low cost and resistances to 10k Ω.

Specifications

Tolerance: ±0.12% (EN60751 Class B) To order optional ±0.06% tolerance (EN60751 Class A), change 12 to 06 for ±0.06% (EN60751 Class A). Not available with S101162PD, S101163PF, or S19827PS.

Material: Aluminum oxide substrate with fused glass cover.

Dimensional tolerance:

400, 600°C elements: ±0.02" (0.5 mm).

SMT models: Length x Width ±0.008 (0.2 mm),

Thickness ±0.004 (0.1 mm).

TCR: 0.00385 Ω/Ω/°C.

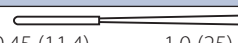
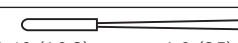



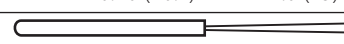
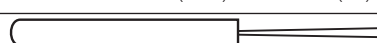
Repeatability: ±0.1°C or better.

Stability: Drift less than 0.1°C/year in normal use.






Vibration: Withstands 20 G's minimum at 10 to 2,000 Hz.

Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

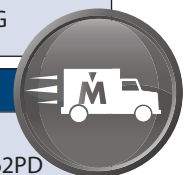
Order options: order part number from table.

Dimensions in inches (mm)	R (0°C)	Temp. range	Leads	Model		
550°C wire-wound elements						
0.040 ø (1.020) 	100 Ω	-20 to 550°C (-4 to 1022°F)	0.006" (0.15 mm) ø Platinum	S200PD		
0.058 ø (1.47) 				0.010" (0.25 mm) ø Platinum clad palladium	S201PD	
0.077 ø (1.96) 					S202PD	
0.100 ø (2.54) 		-100 to 550°C (-148 to 1022°F)	0.014" (0.35 mm) ø Platinum clad palladium	S203PD		
0.135 ø (3.43) 				S204PD		
0.077 ø (1.96) 				500 Ω	0.010" (0.25 mm) ø Platinum clad palladium	S212PG
0.135 ø (3.43) 					0.014" (0.35 mm) ø Platinum clad palladium	S214PG

All 400°C and 600°C thin-film element parts - STOCKED PARTS

0.063 (1.6)  0.126 (3.2) 0.016 (41) THICK	100 Ω	-50 to 150°C (-58 to 302°F) SMT (surface mount technology)	Solder contacts: Tin plated, 0.020" (.51 mm)	S101162PD
	1000 Ω			S101163PF
0.05 (1.3)  0.07 (1.7) 0.025 (0.7) THICK Lead length: 0.4 (10)	100 Ω	-50 to 400°C (-58 to 752°F)	0.010" (0.25 mm) ø Ag .0004 Ω / mm / lead	S100144PD12
	1000 Ω			S101503PF12
0.10 (2.5)  0.20 (5.0) 0.04 (1.1) THICK Lead length: 0.6 (15)	10000 Ω	-70 to 400°C (-94 to 752°F)	0.010" (0.25 mm) ø Ag .0004 Ω / mm / lead	S19827PS12
	100 Ω			-70 to 600°C (-94 to 1112°F)
0.08 (2.0)  0.09 (2.3) 0.05 (1.3) THICK Lead length S245: 0.6 (15) S249: 0.4 (10)	100 Ω	-70 to 600°C (-94 to 1112°F)	0.008" (0.20 mm) ø Pt/Ni .003 Ω / mm / lead	S249PD12
	1000 Ω	-70 to 400°C (-94 to 752°F)	0.010" (0.25 mm) ø Ag .0004 Ω / mm / lead	S247PF12
0.08 (2.0)  0.20 (5.0) 0.05 (1.3) THICK Lead length S247: 0.6 (15) S251: 0.4 (10)	1000 Ω	-70 to 600°C (-94 to 1112°F)	0.008" (0.20 mm) ø Pt/Ni .003 Ω / mm / lead	S251PF12

Note: Contact Minco Customer Service for quantities available



Installation & Accessories

Installation

Ceramic elements can be assembled into probes or potted inside holes in heat sinks and platens. Ceramic cement is recommended for high temperature potting. Epoxy is recommended for intermediate temperatures.

Round elements provide the best time response in round sheaths and holes. Flat thin film elements can be bonded to surfaces.

Elements are calibrated at the end of their leads. The leads have resistances ranging from 0.6 to 2.4 Ω per foot, so you should connect extension leads as close as possible to the end of the element leads to maintain tolerance.

Minco can supply elements with extension leadwires welded onto the sensor leads. Use the standard models below or contact us for a quote on your custom design.

One final note: Ceramic elements are fragile and can suffer damage or loss of accuracy from improper installation. In many cases, the best alternative is to buy a complete encased probe assembly from Minco. Take advantage of our expertise and equipment for best overall performance and value.

#8 high temperature cement

#8 comes as a powder in 1 oz. packages. Just add water to form a potting compound rated to 850°C (1562°F).



Extension leads

Extension leads

All elements are available with factory-welded extension leads insulated with PTFE, polyimide, or mica/glass.

Model AC887

Insulation: PTFE, FEP tubing over connections

Maximum temperature: 200°C (392°F).

Lead AWG	Maximum diameter over lead bundle in inches (mm)		
	2 leads	3 leads	4 leads
22	0.15 (3.8)	0.16 (4.0)	0.18 (4.6)
24	0.14 (3.5)	0.14 (3.5)	0.17 (4.3)
26	0.13 (3.3)	0.14 (3.5)	0.14 (3.5)
28	0.13 (3.3)	0.13 (3.3)	0.13 (3.3)
30	0.11 (2.8)	0.12 (3.0)	0.12 (3.0)

Model AC888

Insulation: Mica/glass, glass braid over connections

Maximum temperature: 550°C (1022°F).

Lead AWG	Maximum diameter over lead bundle in inches (mm)		
	2 leads	3 leads	4 leads
22	0.16 (4.0)	0.20 (5.1)	0.20 (5.1)

Model AC889

Insulation: Polyimide, FEP tubing over connections

Maximum temperature: 200°C (392°F).

Lead AWG	Maximum diameter over lead bundle in inches (mm)		
	2 leads	3 leads	4 leads
22	0.14 (3.5)	0.16 (4.0)	0.17 (4.3)
26	0.13 (3.3)	0.15 (3.8)	0.15 (3.8)
30	0.11 (2.8)	0.12 (3.0)	0.12 (3.0)

Model AC101828

Insulation: Glass braid, glass braid over connections

Maximum temperature: 550°C (1022°F).

Lead AWG	Maximum diameter over lead bundle in inches (mm)		
	2 leads	3 leads	4 leads
27 solid leads	0.10 (2.5)	0.12 (3.0)	0.13 (3.3)

Extension lead specification and order options

AC887	Model number
Z	Number of leads: Y = 2 leads Z = 3 leads X = 4 leads
26	Lead gauge (AWG)
L	
48	Lead length in inches
AC887Z26L48 = Sample part number	

Specify and order products at:

www.minco.com/sensors_config

Specifications subject to change

Design Notes
