

▶ SECTION 10: 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

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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.






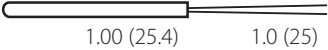
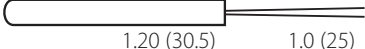
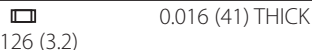



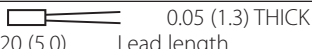
Repeatability: ±0.1°C or better.

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)  | | | ▼ S203PD | |
| 0.135 ø (3.43)  | | | S204PD | |
| 0.077 ø (1.96)  | | | ▼ S212PG | |
| 0.135 ø (3.43)  | | | ▼ S214PG | |
| 400°C and 600°C thin-film elements | | | | |
| 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 | | | ▼ S245PD12 |
| 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

Specifications subject to change

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 | |

▼ = **STANDARD OPTIONS**
Specifications subject to change