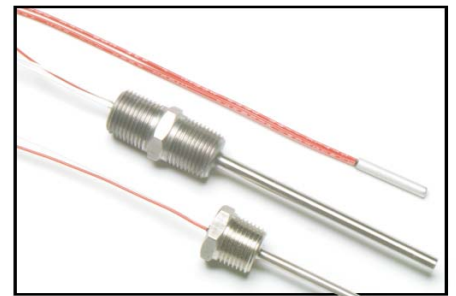
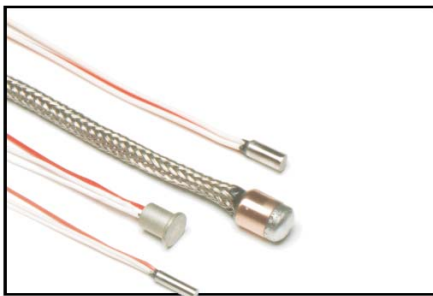
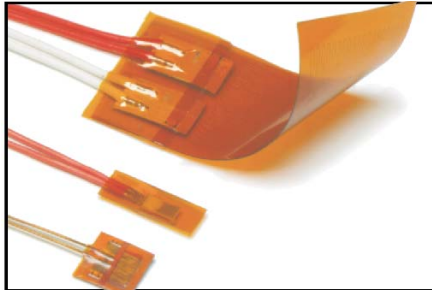
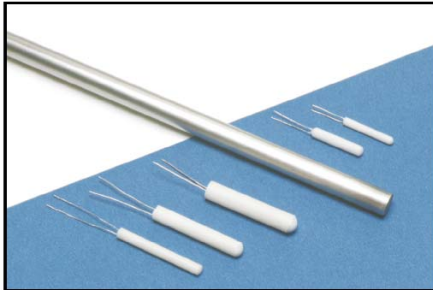
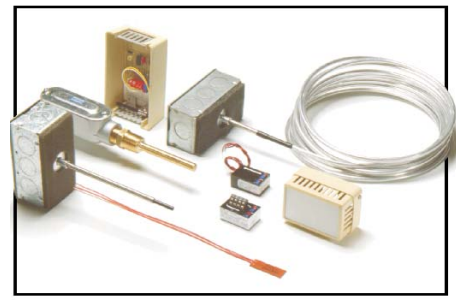
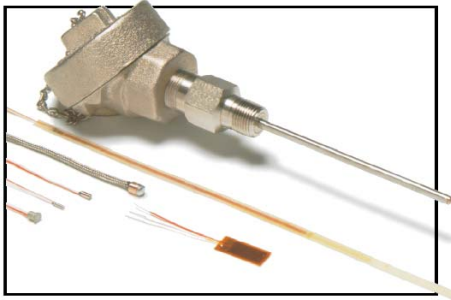


TEMPERATURE SENSORS & INSTRUMENTS



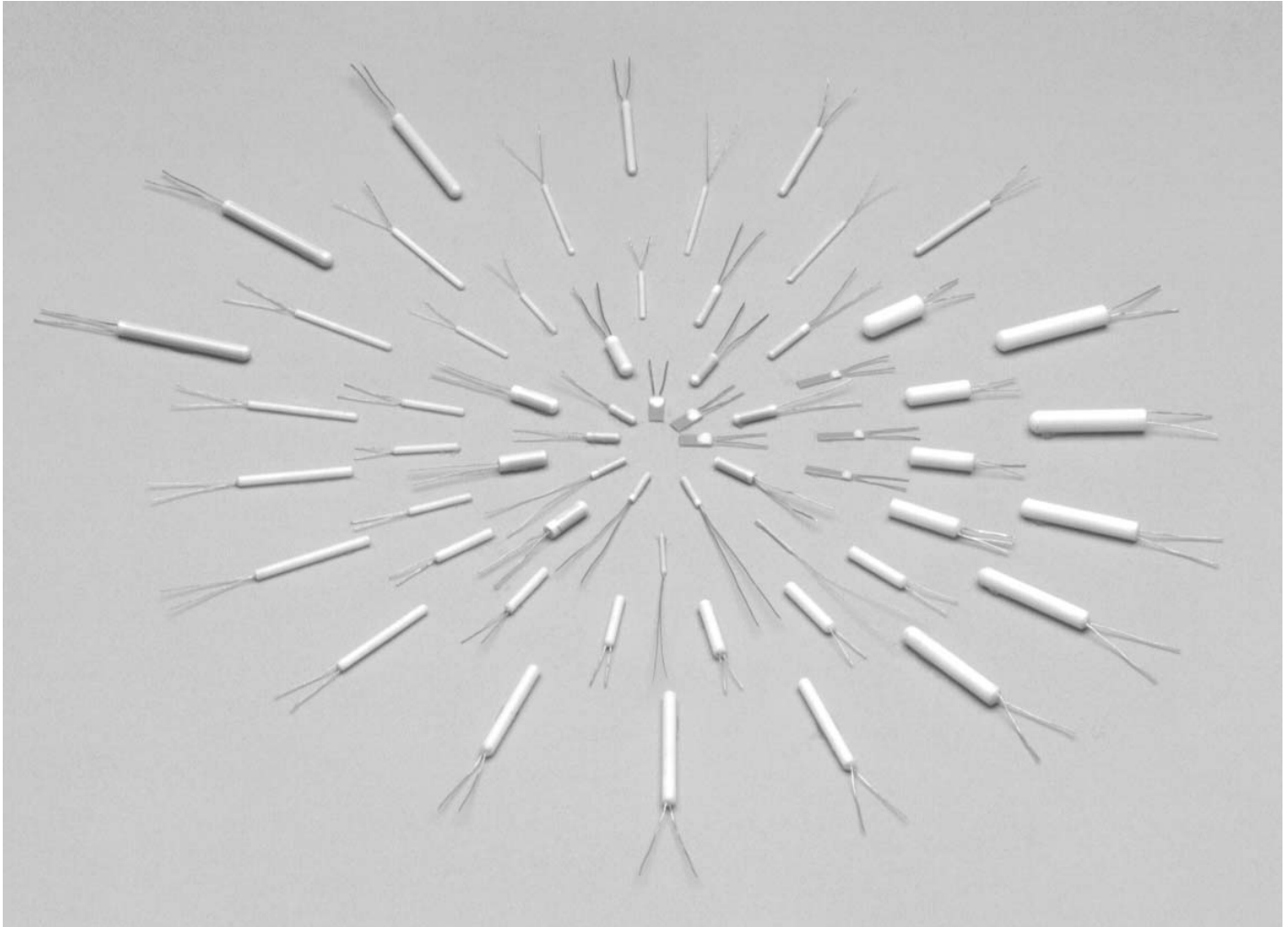
Sections included in this file are indicated below:

- A Introduction
- B Temperature Sensor & Transmitter Assemblies
- C RTD & Thermocouple Probes
- D Accessories
- E Temperature Instruments
- F Sanitary Sensors

- G Miniature Bearing Detectors
- H Stator Winding Detectors
- I HVAC/R Sensors
- J Thermal-Ribbons™
- K Ceramic Elements
- L Precision Reference Thermometers

MOD-TRONIC
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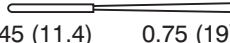
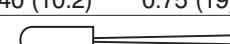
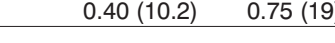
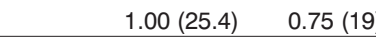
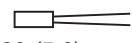
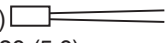
Section K: Platinum RTD Elements

- Low cost thin-film elements
- Wire wound elements
- Accurate sensing from -200 to 850°C (-328 to 1582°F)
- Wide choice of sizes and styles for application versatility
- Available from stock

550°C wire-wound elements	K-2
400°C, 600°C thin-film elements	K-2
850°C precision elements	K-3
Installation	K-4
Extension leads	K-4
Custom elements	K-4

Platinum Elements

Wire-Wound and Thin-Film Elements

Dimensions in inches (millimeters)	Model number	R (0°C)	Temperature range	Leads	
550°C wire-wound elements					
0.040 ø (1.020)  0.45 (11.4) 0.75 (19)	S200PD	100 Ω	-20 to 550°C -4 to 1022°F	0.006" (0.15 mm) ø Platinum	
0.058 ø (1.47)  0.40 (10.2) 0.75 (19)	S201PD		-100 to 550°C -148 to 1022°F	0.010" (0.25 mm) ø Platinum alloy	
0.077 ø (1.96)  0.30 (7.6) 0.75 (19)	S202PD				
0.100 ø (2.54)  0.40 (10.2) 0.75 (19)	S203PD				0.014" (0.35 mm) ø Platinum alloy
0.135 ø (3.43)  0.40 (10.2) 0.75 (19)	S204PD				0.014" (0.35 mm) ø Platinum
0.077 ø (1.96)  1.00 (25.4) 0.75 (19)	S212PG	500 Ω		0.010" (0.25 mm) ø Platinum alloy	
0.135 ø (3.43)  1.20 (30.5) 0.75 (19)	S214PG			0.014" (0.35 mm) ø Platinum	
400°C and 600°C thin-film elements					
0.05 (1.3)  0.07 (1.7) 0.025 (0.7) THICK Lead length: 0.4 (10)	S100144PD12	100 Ω	-50 to 400°C -58 to 752°F	0.010" (0.25 mm) ø Ag .0004 Ω/mm/lead	
	S101503PF12	1,000 Ω			
0.08 (2.0)  0.09 (2.3) 0.055 (1.4) THICK Lead length S245: 0.6 (15) S249: 0.4 (10)	S245PD12	100 Ω	-70 to 400°C -94 to 752°F	0.010" (0.25 mm) ø Ag .0004 Ω/mm/lead	
	S249PD12		-70 to 600°C -94 to 1112°F	0.008" (0.20 mm) ø Pt/Ni 0.003 Ω/mm/lead	
0.08 (2.0)  0.20 (5.0) 0.055 (1.4) THICK Lead length S247: 0.6 (15) S251: 0.4 (10)	S247PF12	1,000 Ω	-70 to 400°C -94 to 752°F	0.010" (0.25 mm) ø Ag .0004 Ω/mm/lead	
	S251PF12		-70 to 600°C -94 to 1112°F	0.008" (0.20 mm) ø Pt/Ni 0.003 Ω/mm/lead	
0.10 (2.5)  0.20 (5.0) 0.050 (1.3) THICK Lead length: 0.6 (15)	S19827PS12	10,000 Ω	-50 to 400°C -58 to 752°F	0.010" (0.25 mm) ø Ag .0004 Ω/mm/lead	
Other standard models: • Class A tolerance = ±0.15°C at 0°C • R(0°C) = 500 Ω • Dimensions: 1.6 × 5 mm, 2 × 10 mm • Nickel, TCR = 0.00618 Ω/Ω/°C, -50 to 150°C			Custom models: • Special dimensions or shapes • Longer leadwires (to 100 mm) • Insulated extension leads (see page K-4) • Special R(0°C), TCR, or tolerance		

550°C wire-wound elements

Use these elements for general purpose sensing in probes or equipment. PD models meet IEC 751, Class B. Order by model number. **Temperature range:** See table above. Some elements may be used down to -269°C in certain applications. Contact factory for advice on cryogenic use. **Material:** Glass-coated ceramic.

Tolerance: $\pm 0.1\%$ at 0°C . **TCR:** $0.00385 \Omega/\Omega/^\circ\text{C}$. Models with 0.00391 TCR, the U.S. industrial standard, are: S201PB, S202PB, S203PB, S204PB, S212PP, S214PP. All 0.00391 TCR models

use 0.010" (0.25 mm) diameter $\times$ 0.5" (13 mm) long platinum leads. **Diameter tolerance:** $\pm 0.005"$ (0.13 mm). **Length tolerance:** $\pm 0.06"$ (1.5 mm). **Repeatability:** $\pm 0.1^\circ\text{C}$ or better. **Stability:** Drift less than $0.1^\circ\text{C}/\text{year}$ 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.

Thin-film elements

Thin film elements offer low cost and resistances to 10k Ω . See page J-2 for the S17624 thin-film Thermal-Ribbon™.

Optional Class A tolerance: Change 12 to 06 for $\pm 0.06\%$ (IEC 751 Class A). Not available with S19827PS.

Material: Aluminum oxide substrate with fused glass cover.

Dimensional tolerance: $\pm 1.5 \text{ mm}$ (length), $\pm 0.5 \text{ mm}$ (width, thickness).

Repeatability: $\pm 0.1^\circ\text{C}$ or better.

Stability: Drift less than $0.1^\circ\text{C}/\text{year}$ in normal use.

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

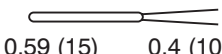
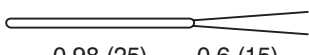
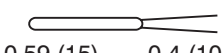
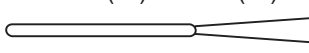
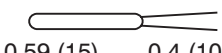
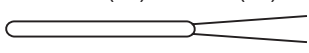
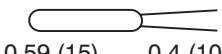
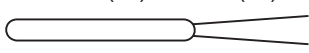
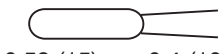
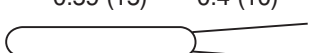
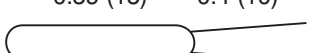
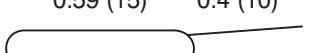
Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

IN STOCK

All 0.00385 TCR models

Platinum Elements

850°C Precision Elements

Dimensions in inches (millimeters)	Model number		Leads	Response time in seconds				Self-Heating Water, 1 m/s
	Single 1 × 100 Ω	Dual 2 × 100 Ω		Water, 0.4 m/s		Air, 1.5 m/s		
				50%	90%	50%	90%	°C/mW
0.047 ø (1.2)  	S270	S284	0.006" (0.15 mm) ø Platinum	0.06	0.15	3.5	12.5	0.100
	S271	S285	Resistance: 0.0055 Ω/mm/lead	0.07	0.20	6.0	20.0	0.040
0.062 ø (1.6)  	S272	S286	0.010" (0.25 mm) ø Platinum Resistance: 0.002 Ω/mm/lead	0.07	0.30	6.6	25.4	0.029
	S273	S287		0.08	0.35	7.0	25.0	0.020
0.079 ø (2.0)  	S274	S288		0.08	0.35	7.0	24.0	0.012
	S275	S289		0.09	0.45	7.5	25.3	0.008
0.110 ø (2.8)  	S276	S290		0.13	0.55	9.3	30.0	0.014
	S277	S291		0.16	0.70	10.5	34.1	0.011
0.155 ø (3.9)  	S278	S292	0.014" (0.36 mm) ø Platinum Resistance: 0.001 Ω/mm/lead	0.29	1.24	14.3	43.3	0.011
	S279	S293		0.35	1.55	16.0	48.0	0.010
0.177 ø (4.5)  	S280	S294		0.31	1.50	17.0	51.0	0.012
	S281	S295		0.41	1.60	18.0	54.0	0.008
0.188 ø (4.8)  	S282	S296		0.32	1.58	17.3	52.1	0.012
	S283	S297		0.43	1.65	18.4	54.8	0.008

Obtain accurate measurements over a wide temperature range. A proprietary fill material supports the element wire without straining it, giving exceptional resistance to shock, vibration, and temperature-induced hysteresis.

Specifications

Element: Platinum, 100 Ω at 0°C, TCR = 0.00385 Ω/Ω/°C.

Tolerance: IEC 751 Class A or Class B. Calibrated 1 mm from ends of leads.

Temperature range: -200 to 850°C (-328 to 1562°F).

Diameter tolerance: ±0.005" (0.13 mm).

Length tolerance: ±0.06" (1.5 mm).

Leads: Leads of second element in dual models are 2.5 mm shorter.

Repeatability: Meet IEC requirements. Typical shift less than 0.05°C (0.02 Ω) at 0°C after ten cycles from -200 to 850°C.

Stability: Meet IEC stability specifications after 250 hours exposure to extremes of temperature range. Typical drift is less than 0.05°C (0.02 Ω) at 0°C.

Vibration: Will withstand 10 to 5000 Hz at 2 G's. minimum.

Shock: Will withstand 250 mm drop onto 8 mm thick steel plate (approximately 1400 G's for 0.08 ms).

Immersion: Elements are not hermetically sealed.

How to Order 850°C Elements

S276 PD 12 **Model number from table**
100 Ω Platinum, 0.00385 TCR
Tolerance at 0°C
 12 = ±0.12%, IEC 751 Class B
 06 = ±0.06%, IEC 751 Class A
 (06 tolerance on single element models only)
 Other tolerances are available

S276PD12 ← Sample part number

IN STOCK

All single element models

Mod-Tronic Instruments Limited Tel: 1 800 794-5883 Fax: 1 800 830-7122 www.mod-tronic.com

Platinum Elements

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 for intermediate temperatures.

Round elements will 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 installations. 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

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

Model number	Insulation	Max. temperature	Lead AWG	Max. diameter over lead bundle in inches (mm)		
				2 leads	3 leads	4 leads
AC887	PTFE, PTFE tubing over connections	200°C 392°F	22	0.136 (3.45)	0.143 (3.63)	0.157 (3.99)
			24	0.122 (3.10)	0.124 (3.15)	0.147 (3.73)
			26	0.113 (2.87)	0.119 (3.02)	0.123 (3.12)
			28	0.110 (2.79)	0.116 (2.95)	0.118 (3.00)
			30	0.100 (2.54)	0.101 (2.57)	0.103 (2.62)
AC888	Mica/glass, glass braid over connections	550°C 1022°F	22	0.157 (3.99)	0.192 (4.88)	0.195 (4.95)
AC889	Polyimide, PTFE tubing over connections	200°C 392°F	22	0.123 (3.12)	0.141 (3.58)	0.148 (3.76)
			26	0.116 (2.95)	0.131 (3.33)	0.132 (3.35)
			30	0.095 (2.41)	0.102 (2.59)	0.107 (2.72)
AC101828	Glass braid, glass braid over connections	550°C 1022°F	27 solid leads	0.100" (2.54)	0.117" (2.97)	0.130" (3.30)

How to order extension leads

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 P/N

Custom elements

Shown at right are examples of custom design:

- A dual ceramic sensor used for air flow sensing
- Two resistor-style RTD's

