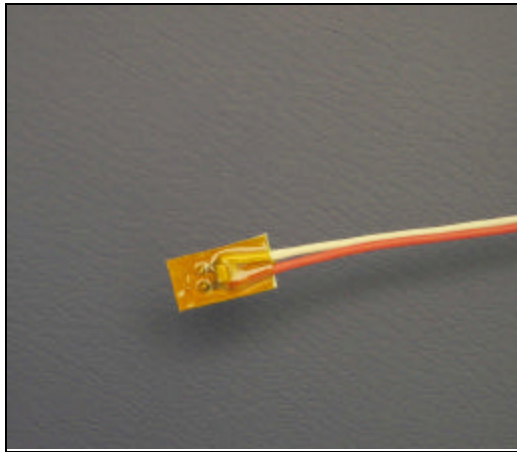




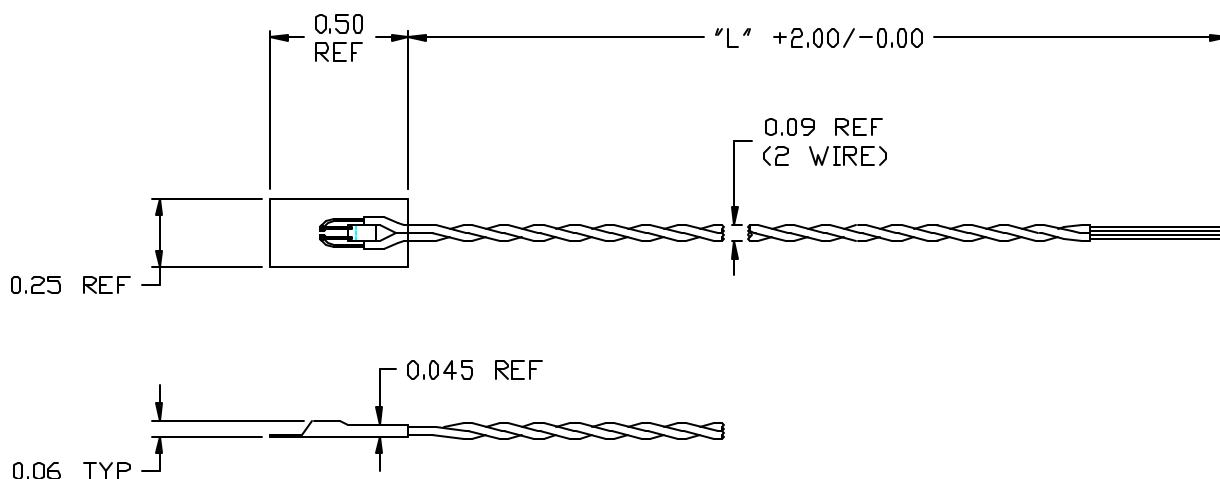
SEALED PLATINUM SURFACE TEMPERATURE SENSOR MODEL 29399



This low cost, sealed platinum surface RTD is the world's toughest for surface temperature measurement. The IEC 751 sensor is refractory sealed for $\pm 0.05^{\circ}\text{C}$ stability. Its small strong design allows this package to conform on curved surfaces for accurate response in milliseconds. Leads welded within the sealed RTD provide this sensor's durability. Moisture resistance for condensing environments is provided by Kapton® lamination that encapsulates the assembly. Standard operating range is -50°C to 150°C .

- Strong welded leads
- Full platinum RTD stability
- Tough
- Moisture resistant

- Strain isolated
- Temperature range is -50°C to 150°C
- Time constant is 0.3 seconds on metal surfaces
- Long-term stability better than $\pm 0.05^{\circ}\text{C}$ (0.02Ω) per 5 years



Performance Specifications

Temperature Range

-50°C to 150°C (-60°F to 300°F)

Sensing Element

International grade thin film platinum
 $\alpha = 0.00385 \Omega/\Omega/^\circ\text{C}$

Ice Point Resistance

$1000 \pm 1.2\Omega$, ($\pm 0.3^\circ\text{C}$)
International Class B, ($\pm 0.12\%$)

Time Constant

<0.3 Seconds on metal surfaces

Self-Heating

>15 mW/°C mounted

Interchangeability

$\pm(0.3^\circ\text{C} + 0.005|t|^\circ\text{C})$,
IEC 751 Class B

Long Term Stability

Better than 0.05°C (0.02Ω) per 5 years

Insulation Resistance

>50 MegOhms at 50VDC at 25°C

Maximum Current

2 mA for limited self heating

Recommended Current

1 mA maximum

Case Material

Kapton®, Sensor is refractory passified overall before lamination

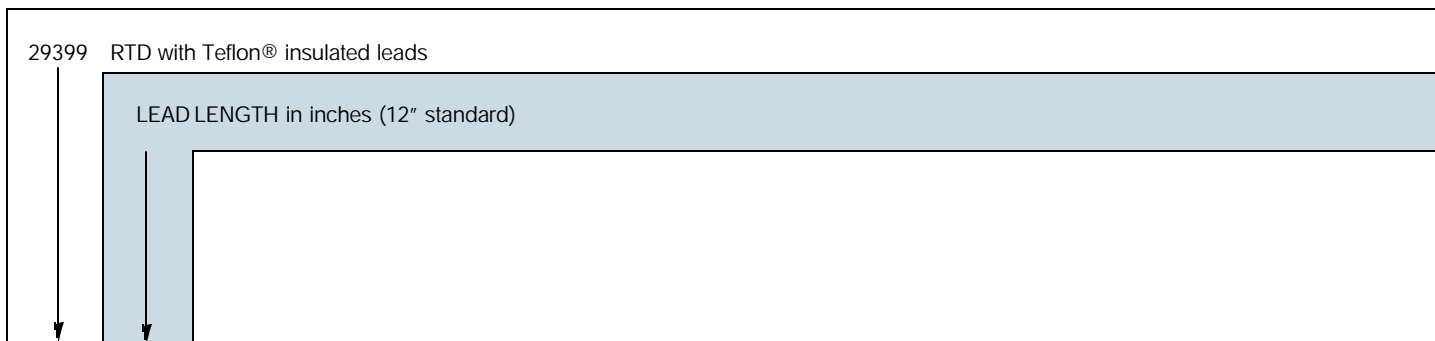
Lead Material

26 AWG nickel-plated, stranded copper
TFE Teflon® insulated twisted leads

Size Reference

0.25" wide x 0.5" long
Thickness over sensor: 0.06"
Thickness over leads: 0.045"

Ordering Specifications



29399 - 12 - Typical write-up for 29399



Specialists in
Temperature
Measurement



Proudly
manufactured
in USA

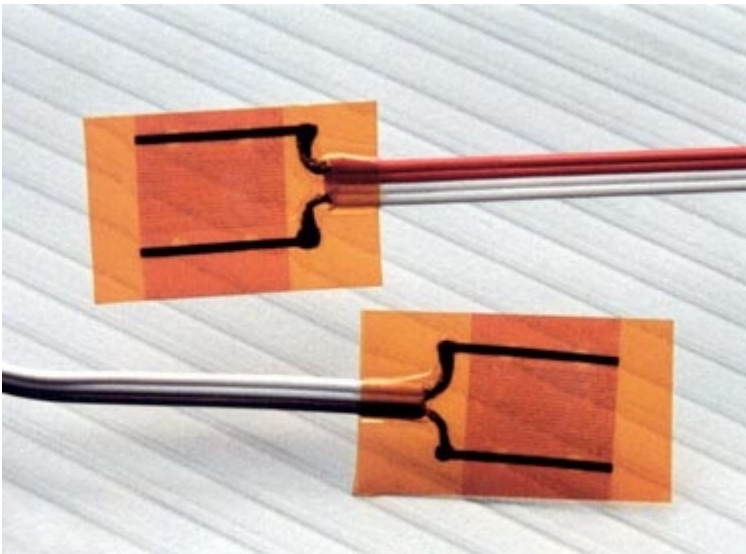


AS9100
ISO 9001:2000
CERTIFIED COMPANY

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Polyimide Insulated Flexible RTD Stikon® Surface Sensor

MODEL**22810**

Model 22810 is a polyimide insulated surface sensor designed to provide a practical method for measuring surface temperature. These sensors are small, flexible, and their low mass has minimal thermal effect on the material being measured. They are ideally suited for applications where the device can be permanently mounted using adhesives or other mechanical mounting methods.

Performance Specifications

Operating Temperature Range

The useful range of operation for Model 22810 is:
-200°C to +232°C
(-320°F to +450°F)
with permissible exposure to 260°C (500°F) for short periods clamped.

Sensing Element

The standard sensing element is platinum with a resistance of 100 ohms at 0°C with a temperature coefficient of 0.00385 $\Omega/\Omega/^\circ\text{C}$ nominal (IEC751).

Accuracy

Standard (22810-1)
 ± 0.50 ohms 0.50% of temperature
Optional (22810-2)
 ± 0.22 ohms 0.25% of temperature

Stability

The sensor will have less than 0.2°C drift per year at rated service temperature with proper mounting.

Time Response

<200 milliseconds lag on metal surfaces.

Self-Heating

The bare sensor will rise less than 1°C while dissipating an I^2R power of 15 milliwatts on metal surfaces.

Lead Wire

#26 AWG stranded
nickel-plated copper conductors,
PFA Teflon® insulated
3 or 4 conductor ribbon cable.

Insulation Resistance

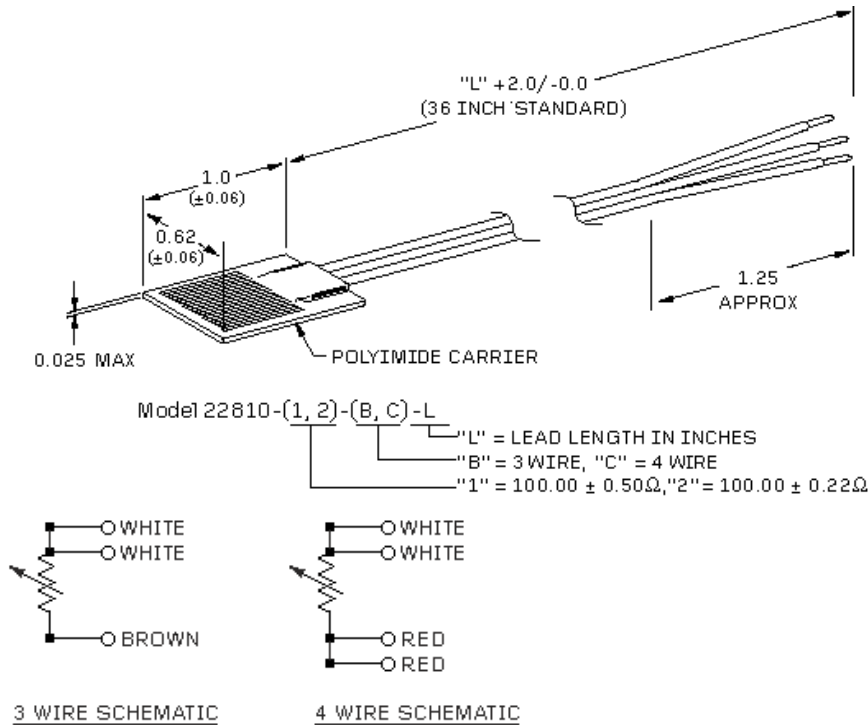
The insulation resistance between outer sensor insulation clamped between two metal plates and the common lead wire is:
50 megohms minimum with 50 VDC applied to a dry sensor at room temperature.
(ASTM-E-644)

Mounting

Will conform to surfaces with radii down to 3/8 inch transverse to the element winding and 1 1/2 inch longitudinal to the winding.

Caution Only bend transverse to grid axis. fer to [AN-S \(PN 22810\)](#) for further information.

Dimensional Drawing



Temperature Resistance Ratio Characteristics

Temperature Coefficient 0.00385ohms/ohms/°C – Nominal IEC751

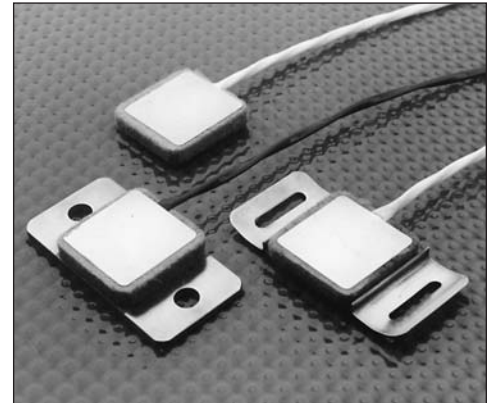
°C ±Class B	R/R ₀	°C ±Class B	R/R ₀	°C ±Class B	R/R ₀
-200	0.185	50	1.194	300 ±1.8	2.120
-190	0.228	60 ±0.6	1.232	310	2.156
-180 ±1.2	0.271	70	1.271	320	2.191
-170	0.313	80	1.309	330	2.227
-160	0.355	90	1.347	340 ±2.0	2.262
-150	0.397	100 ±0.8	1.385	350	2.297
-140 ±1.0	0.439	110	1.423	360	2.332
-130	0.480	120	1.461	370	2.367
-120	0.521	130	1.498	380 ±2.2	2.402
-110	0.562	140 ±1.0	1.536	390	2.436
-100 ±0.8	0.603	150	1.573	400	2.471
-90	0.643	160	1.610	410	2.505
-80	0.683	170	1.648	420 ±2.4	2.540
-70	0.723	180 ±1.2	1.685	430	2.574
-60 ±0.6	0.763	190	1.722	440	2.608
-50	0.803	200	1.759	450	2.642
-40 ±0.5	0.843	210	1.795	460 ±2.6	2.676
-30	0.882	220 ±1.4	1.832	470	2.709
-20	0.922	230	1.868	480	2.743
-10	0.961	240	1.905	490	2.776
0 ±0.3	1.000	250	1.941	500 ±2.8	2.810
10	1.039	260 ±1.6	1.977	510	2.843
20	1.078	270	2.013	520	2.876
30	1.117	280	2.049	530	2.909
40 ±0.5	1.155	290	2.085	540 ±3.0	2.942



ISO 9001 CERTIFIED

WIDE RANGE STRAPON RTD SENSORS MODELS 22391, 22392 & 22393

- **Platinum Surface RTD**
- **Wide Temperature Range**
- **Non Penetrating**
- **Low Cost Installation**
- **Sensor Sealed for Condensing or Wet Environments**
- **Stable: Drift is Less Than $\pm 0.05^{\circ}\text{C}$ Over 5 Years**
- **Permanently Bonded Assemblies**
 - **Metal Contact Plate Under Sensor**
 - **High Performance Bonded Fiber Insulation Over Sensor**
- **Mount by Bonding (22391), Bolt (22392) or Strap (22393)**



Performance Specifications

Wide Operating Temperature Range:

-200°C to $+232^{\circ}\text{C}$ (-320°F to $+450^{\circ}\text{F}$) continuous as mounted. 260°C (500°F) short term clamped.

Sensing Element:

International grade thin film platinum.

$$\alpha = 0.00385\Omega/\Omega/^{\circ}\text{C}$$

Industrial grade thin film platinum.

$$\alpha = 0.00375\Omega/\Omega/^{\circ}\text{C}$$

Ice Point Resistance:

$100 \pm 0.12\Omega$ or $1000 \pm 1.2\Omega$; Class B ($\pm 0.12\%$)

Interchangeability:

$\pm 0.3^{\circ}\text{C}$ or 0.6% of temperature. IEC 751 Class B above -50°C

Long Term Stability:

Less than 0.05°C drift per 5 years above -50°C

Time Constant:

Less than 1/2 second for the sensor to reach 63.2% of a change in temperature

Self Heating:

The bare sensor will rise less than 1°C while dissipating 25 milliwatts mounted.

Insulation Resistance:

The insulation resistance between outer sensor insulation clamped between two metal plates and the common leadwire is 50 megohms minimum with 50 Volts DC applied.

Maximum Current:

$100\Omega = 5\text{mA}$, $1000\Omega = 2\text{mA}$ for limited self heating

Recommended Current:

1mA

Body Materials:

Stainless Steel and flexible polyimide fiber insulation

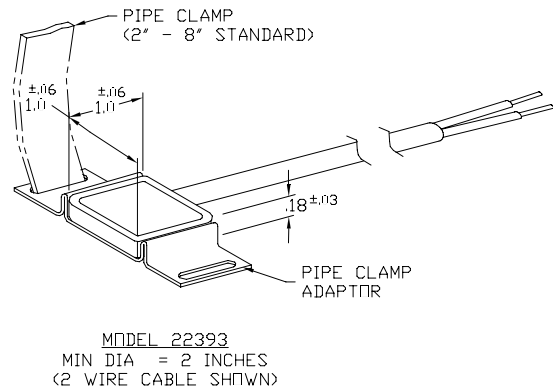
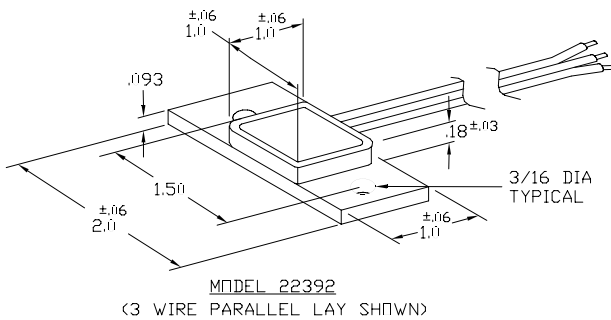
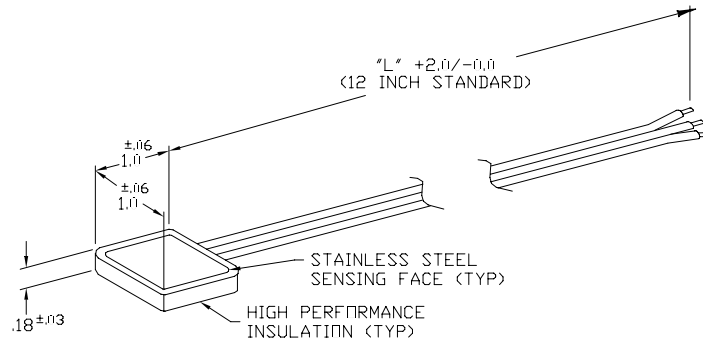
Lead Materials:

Nickel plated, stranded copper cable insulated as follows:

2 wire: 22 AWG FEP Teflon[®], black and red twisted pair FEP overall

3 wire: 26 AWG PFA Teflon, white, plus brown for 3 wire, fused parallel

Drawings



Ordering Specifications

- 22391 Strapon® for adhesive or tape mounting
- 22392 Strapon® for bolt down with 3/16, #8 or 4.5mm
- 22393 Strapon® for curved surface >2" dia. with pipe clamp

Resistance Specification

- T01 100Ω ± 0.12Ω@ 0°C, (α = 0.00385Ω/Ω/°C Int'l Grade IEC 751 Class B)
- T10 1000Ω ± 1.2Ω@ 0°C, (α = .00385Ω/Ω/°C Int'l Grade IEC 751 Class B)
- H10 1000Ω ± 1.2Ω@ 0°C, (α = .00375Ω/Ω/°C Industrial Grade Class B)

Number of Leads

- A 2 wire
- B 3 wire

Lead length in inches (12" standard)

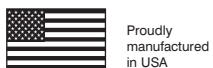
- Pipe Clamp 22393 Only
- 1 Pipe Dia. 2" to 8" (standard)
 - 2 Pipe Dia. 8" to 10"
 - 3 Pipe Dia. 10" to 16"
 - 4 Pipe Dia. 16" to 24"
 - 5 Pipe Dia. 24" to 36"

Typical Write Up

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ISO 9001 CERTIFIED

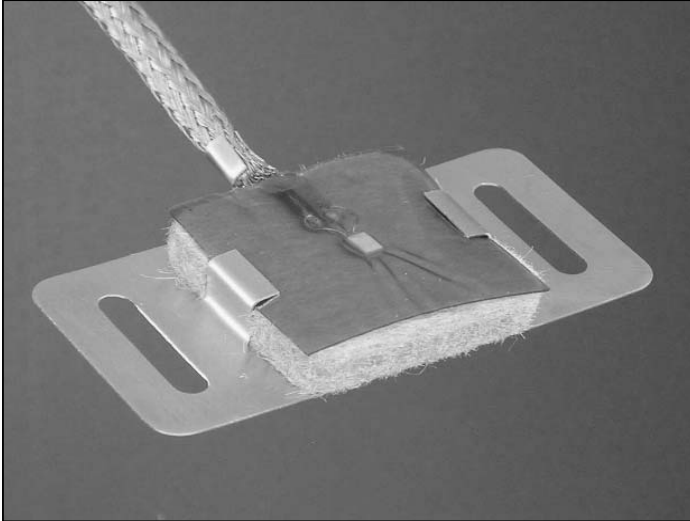


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WIDE RANGE PLATINUM STRAPON® RTD SENSORS PN 22525, 22526



- **Platinum surface temperature sensor**
- **Wide Temperature Range**
-200°C to 260°C
- **Non-penetrating**
- **Low-cost installation**
- **Sensor sealed for condensing or wet environments**
- **Adhesive-less mounting**
- **High-performance bonded fiber insulation over sensor**
- **Mount by bolt (22525) or strap (22526)**

Performance Specifications

Operating Temperature Range

-200°C to +232°C (-320°F to +450°F) -1 Sensor
Continuous as mounted (300°C short term)

-200°C to +260°C (-320°F to +500°F) -2 Sensor
Continuous as mounted (300°C short term)

Sensing Element

International grade thin film platinum
 $\alpha = 0.00385 \Omega/\Omega/^\circ\text{C}$ nominal (IEC751)

Ice Point Resistance

100 \pm 0.12 Ω , (\pm 0.3°C) @ 0°C

1000 \pm 1.2 Ω , (\pm 0.3°C) @ 0°C

Interchangeability

\pm (0.3°C + 0.005|t|°C), IEC 751 Class B
Above -50°C

Time Response

<300 milliseconds lag on metal surfaces

Stability

Better than 0.05°C (0.02% of resistance)
per 5 years, -50°C to 200°C

Self-Heating

The bare sensor will rise less than 1°C
while dissipating power of 15mW
(ASTM-E-644)

Insulation Resistance

The insulation resistance between outer sensor insulation clamped between two metal plates and the common lead wire is 50 megohms minimum with 50 VDC applied to a dry sensor at room temperature (ASTM-E-644)

Mounting

Will conform to 2 inch minimum diameter
(see ordering data)

Body Material

Stainless steel and flexible bonded fiber insulation

Lead Wire

-1 Sensors

#22 AWG tin-plated, (2-wire) FEP Teflon® over each twisted black/red, FEP overall

#24 AWG tin-plated, (3-wire) FEP Teflon® over each twisted white/2 red, FEP overall

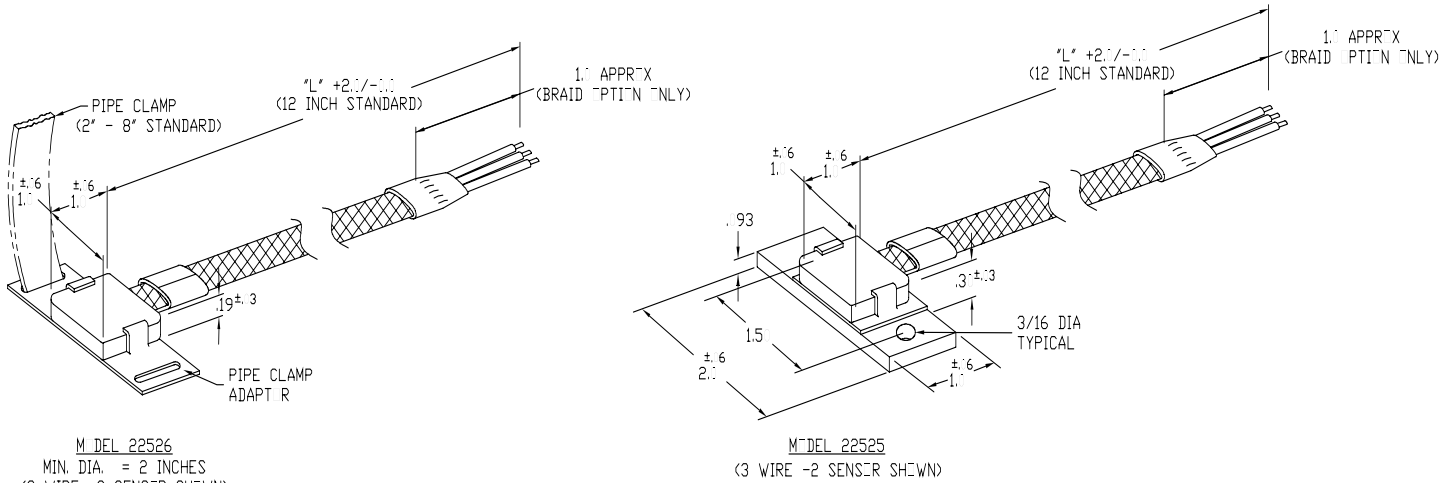
-2 Sensors

#26 AWG stranded nickel-plated copper conductors, PFA Teflon® insulated 2 (2 white), 3 (2 white/brown), or 4 (2 white/2 red) conductor ribbon cable,

Specialists in Temperature Measurement



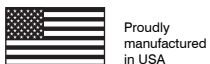
Dimensional Drawing



Ordering Specifications

22525	Strapon® for bolt down with 3/16, #8 or 4.5 mm
22526	Strapon® for curved surface >2" minimum diameter with pipe clamp (see ordering data)
SENSOR TYPE 1 (-200°C to 232°C) PARALLEL RIBBON CABLE 2 (-200°C to 260°C) TWISTED LEADS WITH OVERJACKET	
RESISTANCE SPECIFICATION @ 0°C T01 100Ω ± 0.12Ω @0°C (α = 0.00385Ω/Ω/°C) T10 1000Ω ± 1.2Ω @0°C (α = 0.00385Ω/Ω/°C)	
NUMBER OF LEADS A 2 Wire B 3 Wire C 4 Wire (-2 Sensors only)	
LEAD LENGTH IN INCHES (12" STANDARD) (ADD "X" SUFFIX FOR SST BRAID OPTION)	
PIPE CLAMP - 22526 ONLY 1 Pipe diameter 2" to 8" (standard) 2 Pipe diameter 8" to 10" 3 Pipe diameter 10" to 16" 4 Pipe diameter 16" to 24" 5 Pipe diameter 24" to 36"	

22526 - 2 - T01 - B - 12X - 1 - Typical write-up for 22526-2

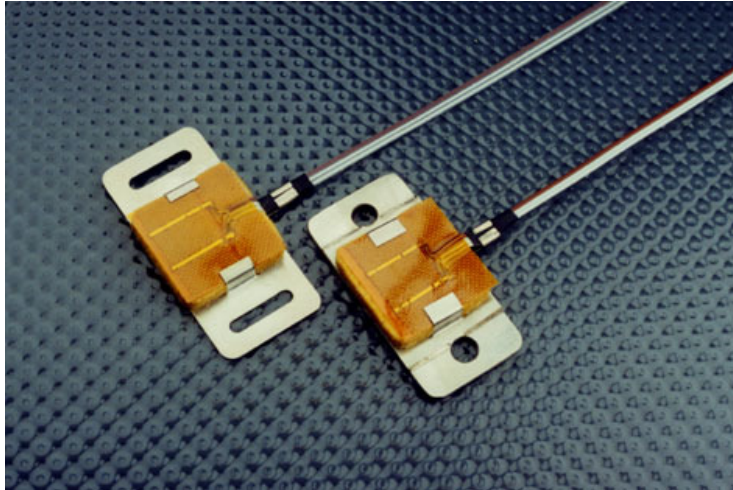


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WIDE RANGE WIRE WOUND STRAPON® RTD SENSOR PN 22488, 22489



- Wire-wound platinum surface RTD
- Wide Temperature range -270°C to 260°C
- Non-penetrating
- Low-cost installation
- Sensor sealed for condensing or wet environments
- Adhesive-less mounting
- High-performance bonded fiber insulation over sensor
- Mount by bolt (22488) or strap (22489)

Performance Specifications

Operating Temperature Range

-270°C to $+260^{\circ}\text{C}$ (-452°F to $+500^{\circ}\text{F}$)
Continuous as mounted (300°C short term)

Sensing Element

The standard sensing element is platinum wire with a resistance of 100 ohms at 0°C with a temperature coefficient of $0.00385\Omega/\Omega/^{\circ}\text{C}$ nominal (IEC751) or $0.00391\Omega/\Omega/^{\circ}\text{C}$ reference grade

Accuracy

Standard $(-1, -3) \pm 0.50$ ohms or 0.50% of temperature, whichever is greater
Optional $(-2, -4) \pm 0.22$ ohms or 0.25% of temperature, whichever is greater

Time Response

<200 milliseconds lag on metal surfaces

Stability

The sensor will have less than 0.02°C drift per year at rated service temperature with proper mounting

Self-Heating

The bare sensor will rise less than 1°C while dissipating power of 25mW (ASTM-E-644)

Insulation Resistance

The insulation resistance between outer sensor insulation clamped between two metal plates and the common lead wire is 50 megohms minimum with 50 VDC applied to a dry sensor at room temperature (ASTM-E-644)

Mounting

Will conform to 2 inch minimum diameter (see ordering data)

Body Materials

Stainless steel and flexible polyimide fiber insulation

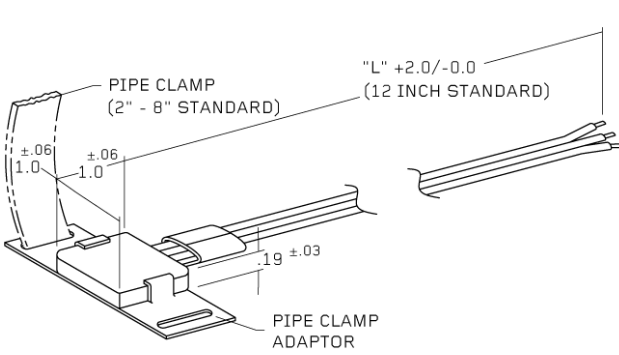
Lead Materials

#26 AWG stranded nickel-plated copper conductors, PFA Teflon® insulated 3 or 4 conductor ribbon cable
Teflon® is a registered trademark of Dupont

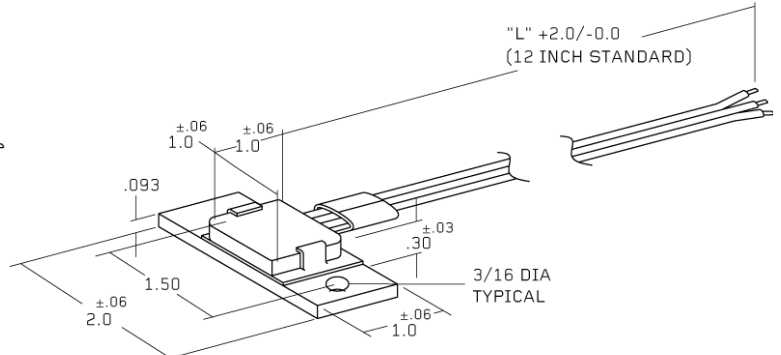
Specialists in Temperature Measurement



Dimensional Drawing



MODEL 22489
MIN. DIA. = 2 INCHES
(3 WIRE PARALLEL LAY SHOWN)



MODEL 22488
(3 WIRE PARALLEL LAY SHOWN)

Ordering Specifications

- 22488 Strapon® for bolt down with 3/16, #8 or 4.5 mm
- 22489 Strapon® for curved surface >2" minimum dia. with pipe clamp (see ordering data)

RESISTANCE SPECIFICATION @ 0°C

- 1 100 ± 0.50Ω @0°C, α = 0.00391 Reference grade platinum
- 2 100 ± 0.22W @0°C, α = 0.00391 Reference grade platinum
- 3 100 ± 0.50Ω @0°C, α = 0.00385 (IEC 751) International Grade Platinum
- 4 100 ± 0.22Ω @0°C, α = 0.00385 (IEC 751) International Grade Platinum

NUMBER OF LEADS

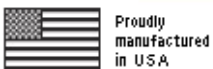
- A 3 Wire
- B 4 Wire

PIPE CLAMP - 22489 ONLY

- 1 Pipe diameter 2" to 8" (standard)
- 2 Pipe diameter 8" to 10"
- 3 Pipe diameter 10" to 16"
- 4 Pipe diameter 16" to 24"
- 5 Pipe diameter 24" to 36"



22489 - 1 - A - 1 - Typical write-up for 22489



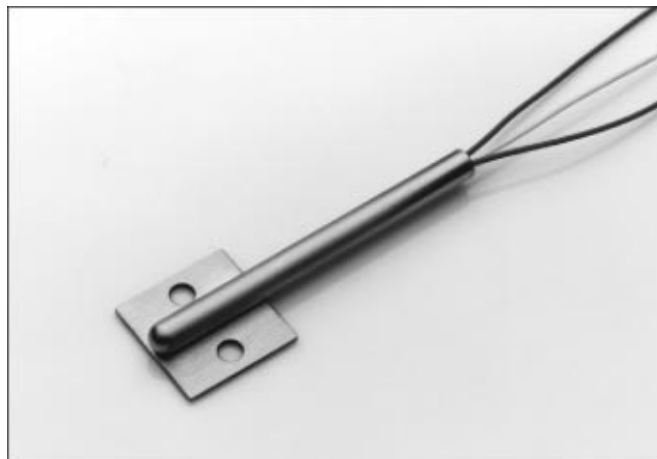
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HEAVY DUTY INDUSTRIAL SURFACE FLANGE MOUNT RTD MODEL 22802

- Heavy Duty for Hostile Environments
- Non-penetrating
- Weld, Bolt or Clamp in Place



Performance Specifications

Operating Temperature Range

For **S** [standard]: -200°C to 260°C (-320°F to 500°F),
For **H** [high]: 0°C to 480°C (32°F to 900°F)

Sensing Element

The standard sensing element is platinum with a resistance of 100Ω at 0°C with a temperature coefficient of resistance 0.00385 Ω/Ω/°C nominal (IEC 751).

Interchangeability

±0.1Ω (±0.25°C) or 0.4% of temperature, whichever is greater.

Stability

The sensor will have less than 0.05°C drift per year at rated service temperature with proper mounting.

Time Response

8 seconds for the sensor to reach 63.2% of a step change in temperature in water flowing at 3 feet per second transverse to the sensor.
(TM-E-644)

Self-Heating

The bare sensor will rise less than 1°C while dissipating power of 35 milliwatts in still air.
(ASTM-E-644)

Insulation Resistance

The insulation resistance between outer sensor housing and the common leadwires is: 50 megohms with 50 VDC applied to a dry sensor at room temperature.
(ASTM-E-644)

Lead Wire

S: #22 AWG stranded nickel plated copper TFE Teflon® insulated, 3-wire configuration.
H: #22 AWG stranded nickel plated copper fiberglass insulated, 3-wire configuration.

Mounting

Sensors can be bolted, clamped or welded into place.

Reference Data

For installation and mounting considerations refer to [Application Note AN-S](#)

Teflon® is a registered trademark of Dupont

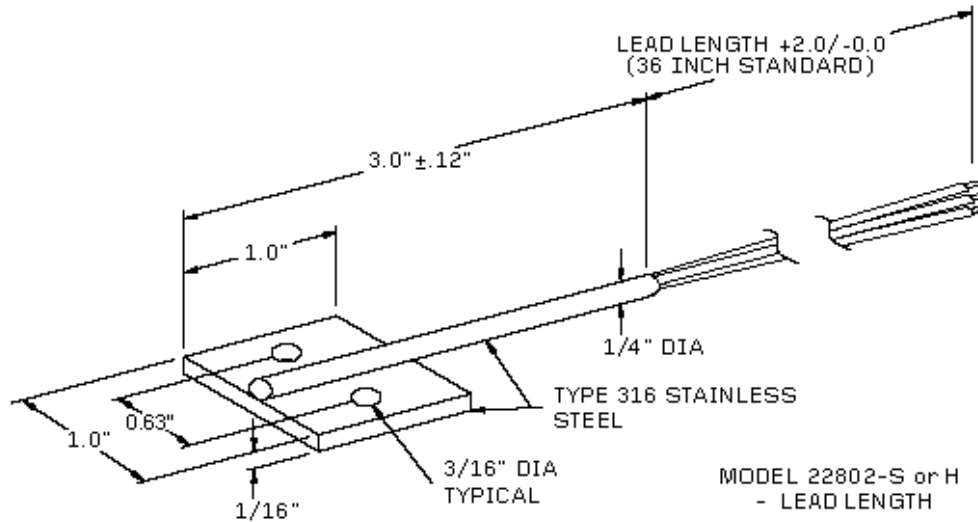
Specialists in Temperature Measurement



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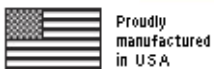


Dimensional Drawing



Ordering Specifications

22802	Heavy Duty Surface RTD
	Operating Temperature Range
S	Standard (-200°C to +260°C)
H	High (0°C to 480°C)
	Lead Length (36 inch standard) - Specify in Inches
22802	- S - 36 - Typical Write-Up for 22802



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