

**MODEL 0172MA  
WIDE-RANGE IMMERSION  
TEMPERATURE SENSOR**

- > Debris Tolerant
- > Hermetically Sealed
- > Wide Temperature Range
- > Cryogenic Temperatures
- > Recommended for Launch Vehicles

**DESCRIPTION**

Model 0172MA is a platinum resistance temperature sensor designed to operate from  $-260^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$ . The sensing element changes resistance predictably and repeatedly with changes in temperature. The accuracy is assured by the strain free design of the sensing element and the purity (99.999%) of the platinum element wire. This sensor is intended to satisfy applications where a broad temperature range, ruggedness, and media compatibility are important.

**SPECIFICATIONS**

**Temperature Range**

$-260^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$ . The connector is rated to  $+200^{\circ}\text{C}$ .

**Resistance-Temperature Relationship**

Model 0172MA meets the resistance-temperature relationship to the tolerance indicated (see table on back page). For models with other ice point resistances, multiply resistance values by ice point ratios. Tolerance in  $^{\circ}\text{C}$  does not change.

**Calibration**

Each sensor is calibrated at  $0^{\circ}\text{C}$ . To establish a sensor specific R vs T table, optional multi-point calibrations are available. All calibration temperatures are traceable to NIST.

**Insulation Resistance**

At room temperature, with dry external surfaces, each sensor is given an insulation resistance test. Insulation resistance between any pin and the sensor housing shall exceed 100 megohms with 100 volts DC applied.

**Pressure**

Each sensor withstands a pressure of 10,000 psig using helium gas as the pressurizing medium.



**SPECIFICATIONS (continued)**

**Repeatability**

The sensor resistance repeats at any point within 0.10% of the temperature range over which the unit is cycled, or to  $0.10^{\circ}\text{C}$ , whichever is greater

**Current Overload**

A continuous applied current of 20 milliamperes will not damage the sensor.

**Time Constant**

Time required for a 63.2 percent response of the sensor to a step change in temperature from room temperature air is shown in the table below.

Media	Flow Rate	Response Time (sec)
Water at $76\pm 4^{\circ}\text{C}$	3 fps	1.5
#299 Dow Corning* 1.5 CTSK at $76\pm 4^{\circ}\text{C}$	3 fps	3.5
Air for $50^{\circ}\text{C}$ change	50 fps	15
Air for $50^{\circ}\text{C}$ change	10 lbm/ft <sup>2</sup> -sec (130 fps)	7.5
Air for $50^{\circ}\text{C}$ change	38 lbm/ft <sup>2</sup> -sec (500 fps)	8.0

**Self-Heating**

The sensor is capable of dissipating an I<sup>2</sup>R power of 50 milliwatts with a temperature rise of less than  $1.0^{\circ}\text{C}$  when submerged in room temperature water flowing transverse to the sensor at 3 fps. When tested in #200 Dow Corning 1.5 CTSK oil at the same conditions, an I<sup>2</sup>R power of 30 milliwatts shall cause a temperature rise of less than  $1.0^{\circ}\text{C}$ .

**Vibration**

Model 0172MA design meets the vibration requirements of MIL-STD-810C. Method 514.2, Procedure V, Levels U and AP (46.4 grms).

\* Dow Corning is a trademark of Dow Corning Corp.

# MODEL 0172MA WIDE-RANGE IMMERSION TEMPERATURE SENSOR

## SPECIFICATIONS (continued)

### Mechanical Shock

For immersion lengths of 3 inches or less, the Model 0172MA design meets the shock requirements of MIL-STD-810B, Method 516.2, Procedure IV. This test specifies the following shocks be applied in each direction along each of three perpendicular axes.

- 1) Sawtooth pulse, 100 g peak and 6 ms duration.
- 2) Half sine pulse, 100 g peak and 6 ms duration.

### Compatibility

Model 0152MA is suitable for use in any gas or liquid compatible with 304L stainless steel.

### Identification

Model and serial number are stamped on housing hexflats. In addition, the following minimum information is electroetched on the housing:

Rosemount Aerospace Inc.

Model 0172MA \_\_\_\_\_

Serial No. \_\_\_\_\_

Temperature (°C)	Resistance (Ohms)	Resistance-Temperature Relationship Table (±Ohms)	Interchangeability (±°C)
-260.0	0.23	0.08	3.7
-240.0	2.55		
-220.0	8.98		
-200.0	17.30		
-180.0	26.01	0.6	1.4
-160.0	34.65		
-140.0	43.16		
-120.0	51.54		
-100.0	59.81	1.0	2.4
-80.0	68.00		
-60.0	76.10		
-40.0	84.14		
-20.0	92.10		
0.0	100.00	1.0	2.5
20.0	107.89		
40.0	115.73		
60.0	123.52		
80.0	131.26		
100.0	138.95	1.6	4.2
140.0	154.20		
180.0	169.26		
220.0	184.13		
260.0	198.82	2.5	6.9
300.0	213.32		
340.0	227.63		
400.0	248.76	3.3	9.4

## QUALITY ASSURANCE

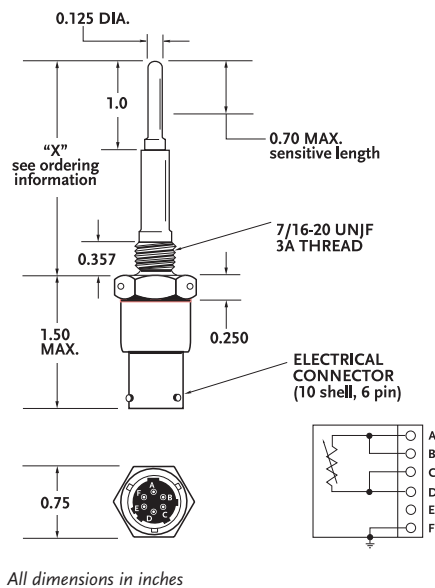
### Repair and Maintenance

This sensor is a nonrepairable item and needs no maintenance during its useful life.

### Individual Tests

Each sensor is examined for high quality workmanship, conformance to the drawing, and will undergo the tests defined or implied in the paragraphs entitled Resistance-Temperature Relationship, Calibration, Insulation Resistance and Pressure. Other tests will be proposed on request.

## CONFIGURATION DRAWING



## ORDERING INFORMATION: MODEL 0172MA WIDE-RANGE IMMERSION TEMPERATURE SENSOR

CODE	IMMERSION LENGTH "X"
150	1.50"
.	.
.	Available in 0.50" increments
600	6.00"
CODE	ICE POINT RESISTANCE
A	100 Ohms ± 0.2 Ohms
B	500 Ohms ± 1.0 Ohms
C	1000 Ohms ± 10.0 Ohms
E	2000 Ohms ± 20.0 Ohms

TYPICAL MODEL NUMBER: 0172MA 400 E



### Sensor Systems

### Goodrich Corporation

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USA

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## FOR ADDITIONAL INFORMATION

To learn more about the Model 0172MA Wide-range Immersion Temperature Sensor, call Goodrich at 651 681 8900.