

# FCI Aerospace Division

## Temperature Element Series: Model AS-TE

### Aerospace and Military Applications



#### FCI's Temperature Elements and Sensors

FCI Aerospace Division provides a complete line of temperature elements and sensors that feature Resistance Temperature Detectors (RTD) and thermistors. The RTD provides a positive linear resistance response (ohms) to temperature. The slope of resistance change versus temperature is available in a number of values to meet a wide variety of customer requirements. The base resistance ( $R_0$ ) is also available in a wide range of values (30 to 1000 ohms at 0°C). The elements are available as point sensors that measure the temperature at the tip of the element, or as continuous sensors that average the temperature over the entire length of the element.

FCI also provides sensors that use thermistors as temperature elements. Thermistors (THERMally sensitive resISTORS) are solid-state devices used for temperature measurement. FCI has integrated Positive Temperature Coefficients (PTC) and Negative Temperature Coefficient (NTC) thermistors into the temperature sensors. An NTC thermistor's resistance changes inversely with a temperature rise, and a PTC thermistor's resistance changes proportionally to a temperature rise. Thermistors have a larger delta R vs. T change than platinum devices. NTC devices have a larger delta R vs. T than PTC devices. The base resistance of thermistors is typically documented at 25°C. FCI has worked with thermistors with base resistances from 1k ohms, up to 100k ohms.

The RTDs and Thermistors are packaged in metal thermowells available with or without threaded or flanged mounting connections. The threaded mounting connections include straight threads that seal with O-rings and gaskets, or National Pipe Threads (NPT) that seal with pipe sealant or tape. The flanged mounting is available in a number of arrangements that will mate with virtually any customer's mating connection. Mounting methods are also available for external and internal surfaces by using brackets and clip attachments. The typical material for the thermowell is 316 stainless steel, but is available in aluminum, titanium and other thermally conductive material.

#### FCI's Temperature Element Features

- » No Moving Parts
- » High reliability
- » Wide Range
- » Simple Installation
- » Durable sensor solution
- » Military standard connectors and connections
- » Exceptional corrosion and abrasion resistance

#### Wide Variety of Mounting Options

The temperature element can be tailored to meet a variety of applications. The insertion length of the thermowell may be specified with a flush mounted configuration that does not penetrate the sensing environment or with an extended length element up to 40 inches or longer. The customer specifies the length that best meets the requirements.

FCI supplies its temperature element product line with variable length flying leads (pigtail cable) or with a wide variety of commercial or military connectors. The connectors and leads may be specified to meet two, three and four wire lead sensing requirements. The customer may specify the material and style of the leads or connectors. FCI Aerospace Division Temperature Elements and Sensors are designed to meet the demanding requirements of our aerospace and military customers. FCI has sensors that have been fully qualified to meet the high vibration, severe shock, and high acceleration environments that customers expose them to. They have been fully tested to perform after exposure to over 100,000-temperature cycles from -40°F to over 300°F, and can survive temperatures of -85°F to over 400°F. High temperature designs are available for service to 1,000+ °F.

FCI's Aerospace design team uses the latest in computer aided engineering technology and has access to FCI's extensive test facilities to fully analyze and test sensor under a variety of conditions. Custom designs are available for any application. FCI fully tests each sensor to customer requirements before shipping them. FCI strives to continually meet and exceed customer expectations and requirements for products and services.

#### Temperature Element Applications

- » Environmental Cooling Systems
- » Bleed Air
- » PACK air
- » Coolant
- » Hydraulic Oil
- » Potable water
- » Fuel
- » Cabin Air Thermostat
- » Refrigerant

Visit FCI Aerospace Division on the Web: [www.fluidcomponents.com](http://www.fluidcomponents.com)

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## Temperature Element Series: Model AS-TE

### Specifications

**Service:** Temperature monitoring for liquid or gas

**Material of construction:** All welded, 300 series stainless steel; aluminum, titanium or other alloys optional.

**Electrical Connection:** Military or commercial electrical connector; pigtail cable of customer specified type and length.

**Process Connection:** Threaded or flanged:

Typical threaded process connections

AS 930 .250 -18 Dryseal NPTF

AS4395 .375 -18 Dryseal NPTF

MS33656

**Insertion Length:** .160 to 4.0 inches

**Temperature Sensor Performance:**

Typical electrical properties of RTD sensors.

Base Resistance - (R <sub>0</sub> )	90.38 ohms ±0.40 ohms at 0°C
Resistance Change to temperature	PER MIL-T-7990
Base Resistance - (R <sub>0</sub> )	100 ohms ±0.10 ohms at 0°C
Resistance Change to temperature	.000385 ohms/ohms/°C
Base Resistance - (R <sub>0</sub> )	500 ohms ±0.545 ohms at 0°C
Resistance Change to temperature	.000385 ±0.00001ohms/ohms/°C

Typical electrical properties of Thermistor sensors.

Base Resistance - (R <sub>25</sub> )	10,000 ohms at 25°C
Resistance Change to temperature	Curve -4.4%/°C @ 25°C
Base Resistance - (R <sub>25</sub> )	100,000 ohms at 25°C
Resistance Change to temperature	Curve -4.9%/°C @ 25°C

**Weight:** .062 to .14 lbs.

**Proof Pressure:** up to 5000 psig as required by application.

**Operating Temperature:** -50° to +800°F [-18° to +427°C] (wider temperature range optionally available)

**Accuracy:**

Repeatability: ±0.05% of reading

Interchangeability: ±0.3°C at 0°C

Operating Temperatures: -40°F to +800°F

Survival Temperatures: -80°F to +1,000°F

**Typical Time Response Constants:**

Air: 10 seconds in flowing application

Liquid: 3 seconds in flowing application

**Qualifications:**

MIL-STD-130

MIL-STD-810

MIL-STD-461/462

MIL-STD-7990B

Markings

Environmental

Testing

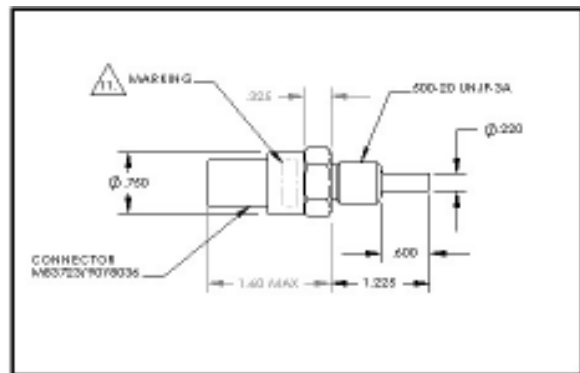
EMI

Temp Transmitter

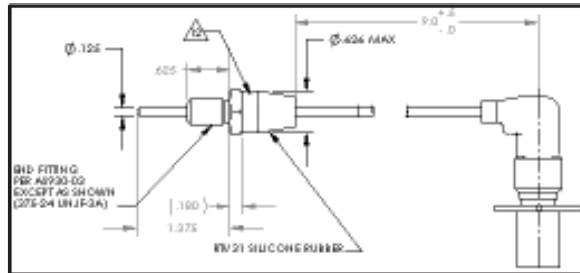
**Quality Systems Approval:**

ISO 9001

AS 9000



Temperature Sensor With a Military Connection



Temperature Sensor With a Pigtail Cable



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