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# FLUKE®

## 80PK-3A

### *Type K Thermocouple Surface Probe*

### *Instruction Sheet*

#### **WARNING**

**TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 24V AC RMS OR 60 V DC ARE PRESENT. THE PROBE TIP IS ELECTRONICALLY CONNECTED TO THE OUTPUT TERMINALS.**

#### **CAUTION**

**The thermocouple strip in the tip of the probe is designed to deflect only .030" in normal operation. Any action which bends or pulls the strip out further from the tip will CONSIDERABLY reduce the life of the probe**

#### **INTRODUCTION**

The 80PK-3A Type K Thermocouple Surface Probe is designed for measuring the temperature of flat or slightly convex surfaces, with an exposed junction to allow direct contact with the surface being measured. The 40-inch (1-meter) cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (0.312 in) pin spacing. The probe can be used with any temperature-measuring instrument that is designed to accept type K thermocouples and has a miniature connector input.

#### **SPECIFICATIONS**

**Type:** K (Chromel vs Alumel)

**Measurement Range:** 0°C to 260°C (32°F to 500°F)

**Junction Accuracy:** (With respect to ANSI MC96.1):  $\pm 2.2^{\circ}\text{C}$  (3.96°F) over the range of 0°C to 260°C (32°F to 500°F)

**Restrictions:** The 260°C continuous temperature rating is primarily determined by the Teflon support piece. The Teflon insulation should not be exposed to temperatures exceeding 260°C (500°F) nor to open flame, since this can cause release of toxic material.

**Output:** 25°C (77°F) = 1.00 mV (reference junction at 0°C)

**Seebeck Coefficient:** 25°C (77°F) = 40.50  $\mu\text{V} / ^{\circ}\text{C}$

**Measurement Time:** (Time Constant): 3 sec typical on metal surface; 15 sec max. for a 260°C change. See Applications Information below.

**Maximum Voltage:** 24V ac rms or 60V dc

#### **Probe Tip:**

Maximum Temperature: 260°C (500°F)

Material: White PTFE

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**Cable:**

Length: 40 inches (1 meter)

Insulation:

Material: PVC

Maximum Temperature: 105°C (220°F)

**Conductors:**

Type: K

Size: AWG #24 stranded (7 strands of #32)

**Handle:**

Material: nylon

Maximum Temperature: 105°C (220°F)

**Connector:**

Type: Yellow mini-thermocouple connector with .792 mm (.0312 in) pin spacing

Material: Hytrel 5556

Maximum Temperature: 125°C (257°F)

**Dimensions:** 12.5 mm (1/2 inch) in diameter, 9.4 cm (3.75 inches) in length.

**Protection:** Class 3. Relates solely to insulation and grounding properties defined in IEC 348.

## **MEASUREMENT CONSIDERATIONS**

### **Instrument Compatibility**

The 80PK-3A is designed to be compatible with any temperature-measuring instrument that accepts type K thermocouples, has a miniature thermocouple connector, and has cold reference junction compensation. Accuracy of the temperature measuring instrument could be considered along with the 80PK-3A accuracy specification in order to determine the overall accuracy of the combination.

### **Temperature Limitations**

The probe tip has a continuous temperature rating of 260°C. However the rest of the assembly is rated for a lower temperature. See the specifications for further information.

### **Media Limitations**

The Type K thermocouple junction is compatible with clean oxidizing atmospheres.

### **Applications information**

At high temperatures, a surface temperature probe removes a small amount of heat from the measured surface. At 260°C on a polished metal surface, the temperature at a contact point will be lowered, typically not more than 2°C. Low temperatures at the contact point are less likely, and contact response time is quicker, on polished metal surfaces than on materials with low thermal conductivity, such as plastic and rough or contaminated surfaces. To obtain the best thermal contact and performance, the white supporting ring must make full and firm contact with the measurement surface.

## **OPERATION**

Use the 80PK-3A as follows:

1. Connect the 80PK-3A to a compatible type K temperature measuring instrument using the miniature thermocouple connector.
2. Turn on the measuring instrument, and select the appropriate range and scale.
3. Check the readout on the measuring instrument. With no heat or cold source applied to the bead, the measuring instrument should display the ambient (room) temperature. If the instrument does not read out properly, refer to the TROUBLESHOOTING section below.

## **MEASURING TECHNIQUE**

Here are some suggestions for improving the accuracy of your temperature measurements:

- When measuring higher than ambient temperatures, adjust the connection between the probe and the surface until you get the highest temperature reading.
- When measuring lower than ambient temperatures, adjust the connection between the probe and the surface until you get the lowest temperature reading.
- When measuring near ambient temperatures, make the reading when the thermometer readout is most stable.

## **TROUBLESHOOTING**

With no heat or cold applied to the probe, the measuring instrument should display the ambient temperature. If the measuring instrument does not read out properly, try the following:

1. Verify that the temperature-measuring instrument is designed to be used with Type K thermocouples. It should have a yellow input connector and / or be marked "K".

2. Check for an open circuit indicator on the measuring instrument. Some temperature measuring instruments have a built-in circuit to indicate if the connected probe is open. (All Fluke instruments have this feature.) Refer to the measuring instrument's owners manual to see if this feature is available.

If you suspect a broken connection, use an ordinary ohmmeter to check its continuity from pin to pin. The ohmmeter should read 10 ohms or less if there is continuity.

3. Short the two input pins of the measuring instrument with a piece of wire. If the instrument is functioning, it should indicate the ambient temperature.

## **SCALE CONVERSIONS**

Use the following equation to convert °C to °F:

$$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$$

Use the following equation to convert °F to °C:

$$(^{\circ}\text{F} - 32) \times 0.5556 = ^{\circ}\text{C}$$



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