

# FLUKE®

## 80PK-2A Type K Immersion Probe

### Instruction Sheet

#### WARNING

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

#### INTRODUCTION

The 80PK-2A Type K Thermocouple Immersion Probe is designed for use in liquids or gels. The probe can also be used as a general purpose temperature probe. The thermocouple junction is protected from tip to handle by an Inconel sheath. The 4-foot cable is terminated with a Type K miniature thermocouple connector with 0.792-mm (0.312-in) pin spacing. The 80PK-2A can be used with any temperature-measuring instrument that is designed to accept Type K thermocouples and has a miniature connector input.

#### NOTE

*The 80PK-2A is not recommended for use in food or beverage preparation.*

#### SPECIFICATIONS

**Type:** K Standard grade Ni-Cr vs. Ni-Al (Chromel vs. Alumel)

**Measurement Range:** -196°C to 1090°C (-320°F to 1994°F)

**Accuracy:** (With respect to ANSI MC96.1-1982-Standard Limits of Error)

#### NOTE

*All error calculations should be done in °C, then scaled to °F.*

<b>RANGE</b>	<b>ACCURACY (% of reading)</b>
-196°C to -110°C (-320°F to -166°F)	±4% (°C)
-110°C to -40°C (-166°F to -40°F)	±4.4°C
-40°C to 275°C (-40°F to 527°F)	±2.2°C
275°C to 1090°C (527°F to 1994°F)	±0.75% (°C)

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

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

**Measurement Time:** (Time Constant): .75 seconds in 100°C still water at sea level pressure. Complete step change equals 5 time constants (3.75 seconds).

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

**Maximum Temperature of Tip:** 1090°C (1994°F)

### **Sheath:**

Material: Inconel 600

Dimensions:

Diameter: 3.175 mm (1/8 in)

Length: 20.32 cm (8 in)

**Grounding:** Junction welded to sheath.

### **Cable:**

Length: 1.2 meters (4 ft) Insulation

Material: PVC

Maximum Temperature: 105°C (220°F)

Jacket Color: Gray

### **Conductors:**

Type: K

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

### **Handle:**

Material: Gray Hytrel

Maximum Temperature: 125°C (257°F)

### **Connector:**

Type: Mini-thermocouple connector with .792 mm (0.312 in) pin spacing

Material: Yellow Hytrel

Maximum Temperature: 125°C (257°F)

**Overall Length:** 31.75 cm (12.5 in) from probe tip to end of cable strain relief.

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

## **MEASUREMENT CONSIDERATIONS**

### **Instrument Compatibility**

The 80PK-2A is 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 must be considered along with the 80PK-2A accuracy specification to determine the overall accuracy of the combination.

### **Temperature Limitations**

The probe tip of the 80PK-2A has a continuous temperature rating of 1090°C (1994°F). However the opposite end of the sheath nearest the handle should not be subjected to temperatures greater than 125°C (257°F). This is the maximum temperature limitation of the handle.

### **Media Limitations**

The sheath material of the 80PK-2A is Inconel, an alloy of chromium and nickel. It has excellent resistance to oxidation and corrosion at high temperatures, but it should not be used in the presence of sulfur above 537°C (1000°F).

## **OPERATION**

Use the 80PK-2A as follows:

1. Connect the 80PK-2A to a compatible Type K temperature measuring instrument using the miniature (0.312-inch pin spacing) 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 tip of the probe, the measuring instrument should display the ambient (room) temperature. If the instrument does not read out properly, refer to the TROUBLESHOOTING paragraphs below.

## **MINIMIZING THERMAL SHUNTING**

The 80PK-2A Immersion Probe should be inserted at least 6.35 cm (2.5 in) into the environment to be measured to minimize the shunting effect of the sheath.

## **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. The temperature-measuring instrument should have a yellow input connector and / or be marked with a "K" either on the case or on the display.
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 Temperature-measuring instruments have this feature.) Refer to the owners manual accompanying the measuring instrument to see if this feature is available.

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.

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

## **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:

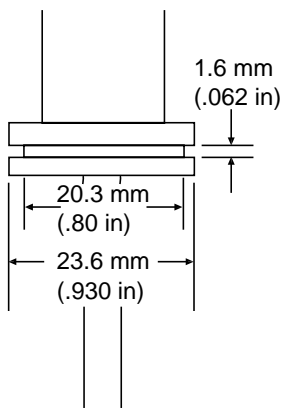
$$(^{\circ}\text{F} - 32) \times 0.5556 = ^{\circ}\text{C}$$

## **PROBE MOUNTING GROOVE**

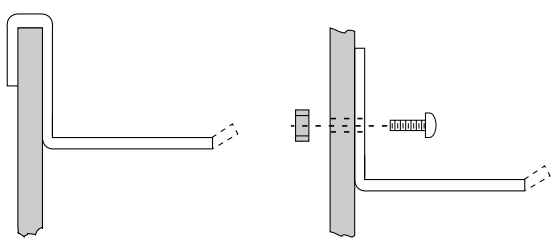
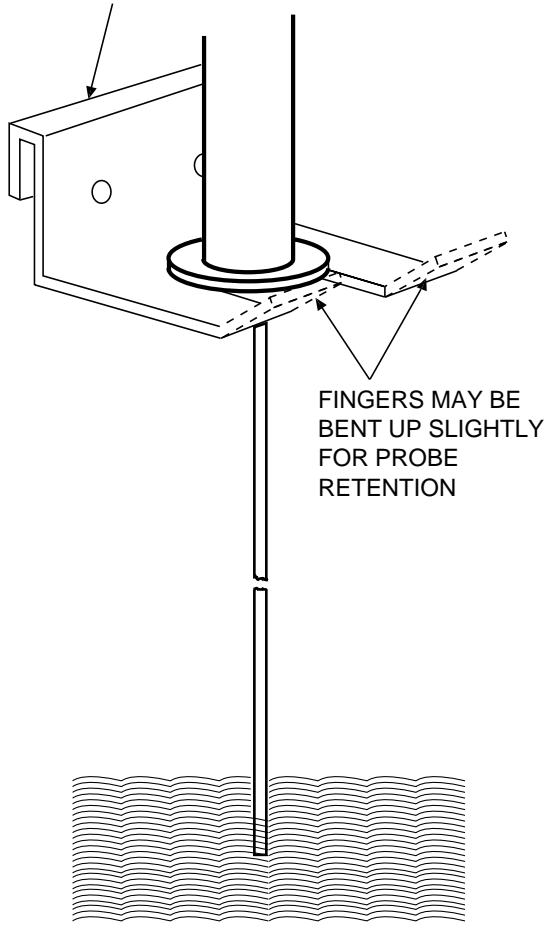
The probe finger guard contains a groove to simplify mounting the probe in a fixed position. The figure below shows nominal dimensions for the finger guard and groove, and suggests a temporary quick mounting method. However, any mounting method should be carefully designed to prevent damage to the probe or the measured medium.

### **CAUTION**

**The handle and plug of the probe are made of material that may deteriorate when exposed to some solvents on a long-term basis.**



CLIP NOT INCLUDED WITH PROBE



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