

**FLUKE®**

# **50S & 50D**

Thermometer

**Users Manual**

PN 1278540

September 1999

© 1999 Fluke Corporation, All rights reserved. Printed in USA

All product names are trademarks of their respective companies.

## **LIMITED WARRANTY & LIMITATION OF LIABILITY**

This Fluke product will be free from defects in material and workmanship for 1 year from the date of purchase. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, send your defective tester to the nearest Fluke Authorized Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

Fluke Corporation  
P.O. Box 9090  
Everett WA  
98206-9090

Fluke Europe B.V.  
P.O. Box 1186  
5602 B.D. Eindhoven  
The Netherlands

# ***50S & 50D***

## ***Introduction***

The Fluke Models 50S and 50D Thermometers (“the thermometer”) are microprocessor-based, digital thermometers designed to use external J-and K-type thermocouples (temperature probes) as temperature sensors.

Use the thermometer only as specified in this manual. Otherwise, the protection provided by the meter may be impaired.

## ***Replacement Parts and Accessories***

<b>Accessory</b>	<b>Part Number</b>
Battery, 9V (NEDA 1604, 6F22, or 006P)	696534
80PK-1 K-Type Bead Thermocouple	773135
Service Manual	802413
Holster	890298

## ***Contacting Fluke***

To order accessories, receive assistance, or locate the nearest Fluke distributor or Service Center, call:

1-888-993-5853 in USA & Canada

+31-402-678-200 in Europe

+81-3-3434-0181 in Japan

+65-738-5655 in Singapore

+1-425-446-5500 from other countries

Address correspondence to:

Fluke Corporation

P.O. Box 9090

Everett, WA 98206-9090

USA

Fluke Europe B.V.

P.O. Box 1186

5602 BD Eindhoven


The Netherlands

Visit us on the World Wide Web at: [www.fluke.com](http://www.fluke.com)

## ***Safety Information***

### **Warning**

A Warning identifies conditions and actions that pose hazards to the user. To avoid electrical shock or personal injury, follow these guidelines:

- Before using the thermometer inspect the case. Do not use the thermometer if it appears damaged. Look for cracks or missing plastic. Pay particular attention to the insulation around the connectors.
- Disconnect the thermocouple(s) from the thermometer before opening the case.
- Replace the batteries as soon as the battery indicator () appears. The possibility of false readings can lead to personal injury.
- Do not use the thermometer if it operates abnormally. Protection may be impaired. When in doubt, have the thermometer serviced.
- Do not operate the thermometer around explosive gas, vapor, or dust.
- Do not apply more than the rated voltage, as marked on the thermometer, between the thermocouple(s), or between any thermocouple and earth ground.

#### Warning (cont.)

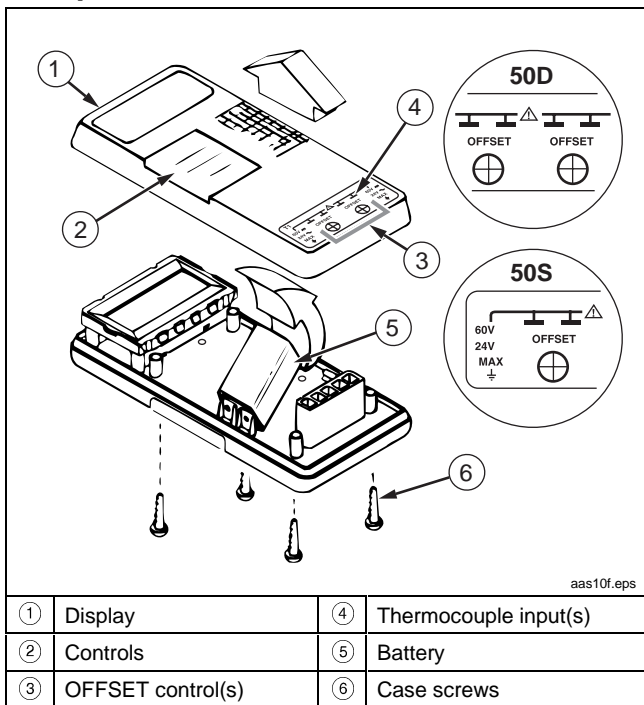
- **Model 50D:** Measurement errors may occur if voltages on the measurement surfaces result in potentials greater than 1 V between the two thermocouples. When potential differences are anticipated between the thermocouples, use electrically insulated thermocouples.
- Do not operate if any voltage is present at the measurement surface.
- When servicing the thermometer, use only specified replacement parts.
- Do not use the thermometer with any part of the case or cover removed.

#### Caution

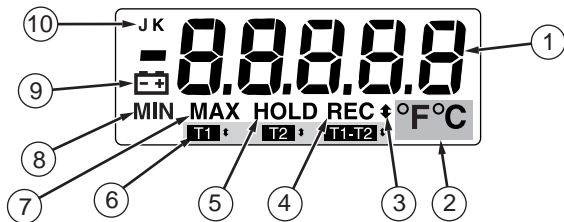
To avoid damaging the thermometer or the equipment under test.

- Use the proper thermocouples, function, and range for your thermometer.
- Do not attempt to recharge the batteries.
- To prevent explosion, do not throw batteries into a fire.
- Follow local laws or regulations when disposing batteries.
- Match the + and – polarities of the battery with the battery case.

## Components



## Display Elements



aas11f.eps

①	Temperature display.	⑥	T1; or T2 or T1-T2 ( <i>Model 50D</i> ) readings are displayed.
②	Temperature units.	⑦	Maximum readings are displayed.*
③	Stored readings are displayed.*	⑧	Minimum readings are displayed.*
④	Record mode is active.*	⑨	Low battery.
⑤	Displayed readings are frozen.	⑩	Thermocouple type.

\* *Model 50D only.*

*The display shows “- - - -” if a thermocouple is open.*



---

## **Controls**

<b>ON / OFF</b>	Turn the thermometer on or off.
<b>F / C</b>	Switch between Fahrenheit (°F) and Celsius (°C).
<b>HOLD</b>	Freeze or unfreeze the displayed readings. When pressed during power-up, changes the thermocouple type.
<b>RECORD*</b>	Toggle Record mode on and off. (Stores MIN/MAX readings.)
<b>T1*</b>	Select the T1 thermocouple input. When pressed during power-up, <b>T1</b> changes the display resolution.
<b>T2*</b>	Select the T2 thermocouple input. When pressed during power-up, selects Scan mode. (The display continuously cycles between T1, T2, and T1-T2.)
<b>T1-T2*</b>	Select the differential temperature measurement.
<b>VIEW*</b>	Toggle the MIN/MAX readings stored in Record mode on and off.
<b>OFFSET*</b>	Optimize measurement accuracy for a thermocouple at a particular temperature.
<i>* Model 50D only.</i>	

## ***Changing to the J-Type Thermocouple***

- Press **HOLD** during power-up.

## ***Changing to Low Resolution***

To select the low display resolution [1.0 °C (1.0 °F)]:

1. Turn the thermometer off.
2. Press **T1** + **ON/OFF** for 2 to 3 seconds.

The alternate resolution remains set until the thermometer is turned off.

## ***Adjusting the Offset***

To compensate for thermocouple errors:

1. Plug the thermocouple into the input connector.
2. Place the thermocouple in a known, stable temperature environment (such as an ice bath or a dry well calibrator) and allow the readings to stabilize.
3. Simultaneously push and turn the **OFFSET** control until the display shows the correct reading.

This adjustment affects calibration.

## **Specifications**


### **General**

<b>Weight</b>	280 g (10 oz)
<b>Dimensions (without holster)</b>	2.8 cm × 7.5 cm × 16.6 cm (1.1 in × 3 in × 6.6 in)
<b>Battery</b>	Standard 9V battery (NEDA 1604, 6F22, or 006P)
<b>Protection</b>	Class III as defined in IEC 348, Safety Requirements for Electronic Apparatus

### **Environmental**

<b>Operating Temperature</b>	0 °C to 50 °C (32 °F to 122 °F)
<b>Storage Temperature</b>	–40 °C to +60 °C (–40 °F to +140 °F)
<b>Humidity</b>	0 % to 90 %: 0 °C to 35 °C (32 °F to 95 °F) 0 % to 70 %: 0 °C to 50 °C (32 °F to 122 °F)

**Electrical**

<b>Measurement Range</b>	K-type: -200 °C to +1370 °C (-328 °F to +2498 °F) J-type: -200 °C to +760 °C (-328 °F to + 1400 °F)
<b>Display Resolution</b>	Low: 1.0 °C or 1.0 °F High: 0.1 °C or 0.2 °F
<b>Measurement Accuracy</b>	K-type: $\pm(0.1 \% \text{ of reading} + 0.7 ^\circ\text{C})$ $[\pm(0.1 \% \text{ of reading} + 1.3 ^\circ\text{F})]$ J-type: $\pm(0.1 \% \text{ of reading} + 0.8 ^\circ\text{C})$ $[\pm(0.1 \% \text{ of reading} + 1.4 ^\circ\text{F})]$
<b>Temperature Coefficient</b>	0.01 % of reading + 0.03 °C (0.03 °F) for [ambient temperatures from +18 °C to 28 °C (+64 °F to 82 °F) ]
<b>Maximum Differential Common Mode Voltage</b>	1 V (Maximum voltage difference between T1 and T2)
<b>Temperature Scale</b>	IPTS-68
<b>Certification</b>	CE, 
<b>Applicable Standards</b>	NBS 125, IEC 584
<p>Accuracy is specified for ambient temperatures between 18 oC (64 oF) and 28 oC (82 oF) for a period of 1 year. The above specifications do not include thermocouple error.</p> <p>Accuracy is unspecified when the input lead length is resonant with the interfering frequency.</p>	