

**FLUKE®**

**— Hart Scientific®**

**3125**  
*Detachable Hot Plate  
Users' Manual*

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### **Fluke Corporation, Hart Scientific Division**

799 E. Utah Valley Drive • American Fork, UT 84003-9775 • USA

Phone: +1.801.763.1600 • Telefax: +1.801.763.1010

E-mail: [support@hartscientific.com](mailto:support@hartscientific.com)

**[www.hartscientific.com](http://www.hartscientific.com)**

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# 1 Before You Start

## 1.1 Symbols Used

Table 1 lists the International Electrical Symbols. Some or all of these symbols may be used on the instrument or in this manual.

**Table 1** *International Electrical Symbols*

Symbol	Description
	AC (Alternating Current)
	AC-DC
	Battery
	CE Complies with European Union Directives
	DC
	Double Insulated
	Electric Shock
	Fuse
	PE Ground
	Hot Surface (Burn Hazard)
	Read the User's Manual (Important Information)
	Off
	On

Symbol	Description
	Canadian Standards Association
<b>CAT II</b>	OVERVOLTAGE (Installation) CATEGORY II, Pollution Degree 2 per IEC1010-1 refers to the level of Impulse Withstand Voltage protection provided. Equipment of OVERVOLTAGE CATEGORY II is energy-consuming equipment to be supplied from the fixed installation. Examples include household, office, and laboratory appliances.
	C-TIC Australian EMC Mark
	The European Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) mark.

## 1.2 Safety Information

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

The following definitions apply to the terms “Warning” and “Caution”.

- “Warning” identifies conditions and actions that may pose hazards to the user.
- “Caution” identifies conditions and actions that may damage the instrument being used.

### 1.2.1 Warnings

To avoid personal injury, follow these guidelines.

- **BURN HAZARD – DO NOT** touch the plate or surrounding areas of the unit. The temperature of the plate surface is the same as the actual temperature shown on the display. If the unit is set at 400°C and the display reads 400°C, the target surface is 400°C. The top sheet metal of the instrument may exhibit extreme temperatures. **DO NOT** turn off the unit at temperatures higher than 100°C. This could create a hazardous situation. Select a set-point less than 100°C and allow the unit to cool before turning it off.
- **DO NOT** operate this unit without a properly grounded, properly polarized power cord.
- **DO NOT** connect this unit to any other instrument or outlet other than the 2200 controller.
- **DO NOT** connect the 2200 to a non-grounded, non-polarized outlet.
- The 2200 Controller and the 3125 Detachable Hot Plate are a matched set. **DO NOT** mix and match sets.
- **HIGH VOLTAGE** is used in the operation of this equipment. **SEVERE INJURY OR DEATH** may result if personnel fail to observe safety pre-

cautions. Before working inside the equipment, turn the power off and disconnect the power cord.

- Always replace the fuse with one of the same rating, voltage, and type.
- This instrument is intended for indoor use only.
- Overhead clearance is required. **DO NOT** place this instrument under a cabinet or other structure.
- **DO NOT** use this unit for any application other than calibration work.
- **DO NOT** use this unit in environments other than those listed in the user's guide.
- **DO NOT** operate near flammable materials.
- Use of this instrument at **HIGH TEMPERATURES** for extended periods of time requires caution.
- Completely unattended high temperature operation is not recommended for safety reasons.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Before initial use, or after transport, or after storage in humid or semi-humid environments, or anytime the instrument has not been energized for more than 10 days, the instrument needs to be energized for a "dry-out" period of 2 hours before it can be assumed to meet all of the safety requirements of the IEC 1010-1. If the product is wet or has been in a wet environment, take necessary measures to remove moisture prior to applying power such as storage in a low humidity temperature chamber operating at 50°C for 4 hours or more.
- The instrument generates extreme temperatures. Precautions must be taken to prevent personal injury or damage to objects. Sensors may be extremely hot when removed from the instrument. Cautiously handle sensors to prevent personal injury. Carefully place sensors on a heat resistant surface or rack until they are at room temperature. Allow the surface to cool before transporting the instrument.
- Use only a grounded AC mains supply of the appropriate voltage to power the instrument. Refer to Section 3.1, Specifications for power details.
- The instrument is equipped with operator accessible system fuses. If a fuse blows, it may be due to a power surge or failure of a component. Replace the fuse once. If the fuse blows a second time, it is likely caused by failure of a component part. If this occurs, contact an Authorized Hart Scientific Service Center (see Section 1.3). Always replace the fuse with one of the same rating, voltage, and type. Never replace the fuse with one of a higher current rating.
- Follow all safety guidelines listed in the user's manual.
- Calibration Equipment should only be used by Trained Personnel.

## 1.2.2

### **Cautions**

- DO NOT plug the unit into 230V if the heater switches and fuse holder read 115V. This action will cause the fuses to blow and may damage the instrument.
- Components and heater lifetime can be shortened by continuous high temperature operation.
- DO NOT change the values of the calibration constants from the factory set values. The correct setting of these parameters is important to the safety and proper operation of the calibrator.
- DO use a ground fault interrupt device.
- Operate the instrument in room temperatures between 5 and 50°C. (41–122° F). Allow sufficient air circulation by leaving at least 6 inches of space between the instrument and nearby objects.
- Never introduce any foreign material onto the surface plate. Fluids, etc. can leak into the instrument causing damage.
- The instrument is a precision instrument. Although it has been designed for optimum durability and trouble free operation, it must be handled with care. Always carry the unit in an upright position. The instrument should not be operated in excessively wet, oily, dusty, or dirty environments. Do not operate near flammable materials.
- If a main supply power fluctuation occurs, immediately turn off the instrument. Wait until the power has stabilized before re-energizing the instrument.

## 1.3

### **Authorized Service Centers**

Please contact one of the following authorized Service Centers to coordinate service on your Hart product:

#### **Fluke Corporation, Hart Scientific Division**

799 E. Utah Valley Drive  
American Fork, UT 84003-9775  
USA

Phone: +1.801.763.1600  
Telefax: +1.801.763.1010  
E-mail: [support@hartscientific.com](mailto:support@hartscientific.com)

#### **Fluke Nederland B.V.**

Customer Support Services  
Science Park Eindhoven 5108  
5692 EC Son

NETHERLANDS

Phone: +31-402-675300

Telefax: +31-402-675321

E-mail: ServiceDesk@fluke.nl

**Fluke Int'l Corporation**

Service Center - Instrimpex

Room 2301 Sciteck Tower

22 Jianguomenwai Dajie

Chao Yang District

Beijing 100004, PRC

CHINA

Phone: +86-10-6-512-3436

Telefax: +86-10-6-512-3437

E-mail: xingye.han@fluke.com.cn

**Fluke South East Asia Pte Ltd.**

Fluke ASEAN Regional Office

Service Center

60 Alexandra Terrace #03-16

The Comtech (Lobby D)

118502

SINGAPORE

Phone: +65 6799-5588

Telefax: +65 6799-5588

E-mail: antng@singa.fluke.com

When contacting these Service Centers for support, please have the following information available:

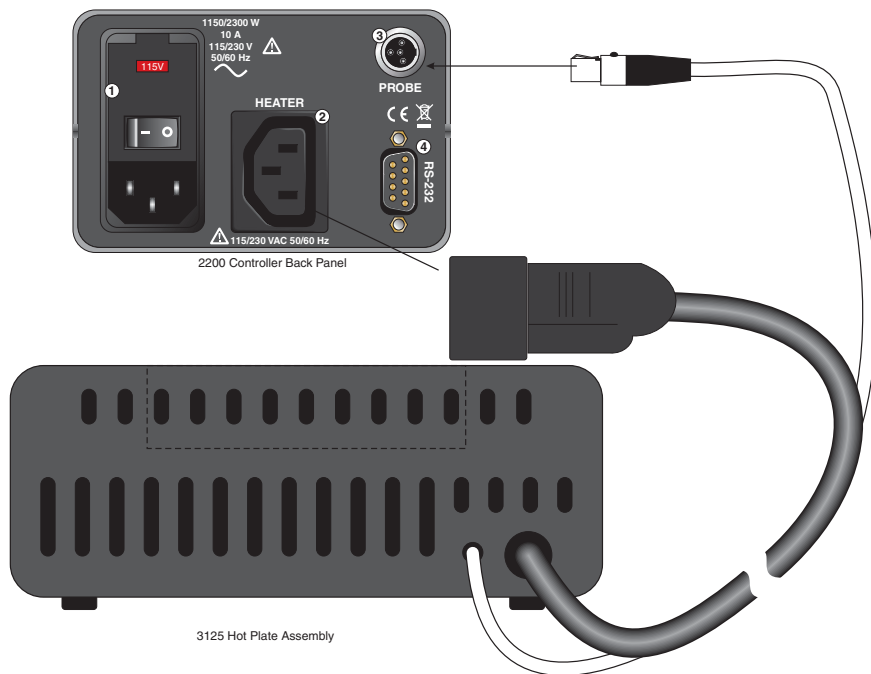
- Model Number
- Serial Number
- Voltage
- Complete description of the problem

## 2 Introduction

Hart Scientific's Model 3125 Detachable Hot Plate is controlled by Hart Scientific's 2200 controller and uses a precision platinum RTD as a sensor with a heater to control the temperature. The 3125 and 2200 are a matched set.

The controller display shows the temperature and also the set-point temperature. The temperature may be set to any temperature within the range of 35°C to 400°C in 0.01°C or °F increments by using the buttons on the control panel. The controller's multiple fault protection devices insure user and instrument safety and protection.

The Detachable Hot Plate (see Figure 1) consists of a controlled plate made of aluminum. A heater is attached to the bottom with an RTD temperature sensor used to control it. The housing consists of a top cover and a base, which serve as a clamp and strain relief point for the wiring. The Reference Well is available for use with a 3/16-inch diameter probe, which may be used to check the plate temperature. This well is used to calibrate the system.



**Figure 1** Controller and Hotplate Assembly

## 3 Specifications and Environmental Conditions

### 3.1 Specifications

Temperature Range	35°C to 400°C (95°F to 752°F)
Display Accuracy	±0.5°C to 200°C ±1.0°C to 400°C
Stability	±0.2°C to 300°C ±0.3°C to 400°C
Resolution	0.01°
Uniformity	±0.3°C at 100°C ±0.6°C at 200°C ±0.9°C at 300°C ±1.4°C at 400°C
Heating Time	25°C to 400°C: 22 minutes
Cooling Time	400°C to 100°C: 65 minutes
Stabilization Time	8 minutes
Controller	Model 2200 Microprocessor based with RS-232 serial port
Readout	°C or °F switchable
Sensor	RTD, 100Ω
Heater	325 Watt, solid state controlled
Surface Plate	6061 aluminum; top surface machine finished to 0.000032" (0.0008 mm), 3.8" (96 mm) diameter accessible
Power	115 VAC (±10%), 2.8 A or 230 VAC (±10%), 1.4 A, specify, 50/60 Hz, 325 W
Weight	7 lb. (3.2 kg) with 2200 Controller
NIST-Traceable Calibration	Data at 50°C, 120°C, 190°C, 260°C, 330°C, and 400°C
Safety	OVERVOLTAGE (Installation) CATEGORY II, Pollution Degree 2 per IEC1010-1

### 3.2 Environmental Conditions

Although the instrument has been designed for optimum durability and trouble-free operation, it must be handled with care. The instrument should not be operated in an excessively dusty or dirty environment. The instrument operates safely under the following conditions:

- temperature range: 5-40°C (41-104°F)

- ambient relative humidity: maximum 80% for temperature  $<31^{\circ}\text{C}$ , decreasing linearly to 50% at  $40^{\circ}\text{C}$
- pressure: 75kPa-106kPa
- mains voltage within  $\pm 10\%$  of nominal
- vibrations in the calibration environment should be minimized
- altitude does not effect the performance or safety of the unit

## 4 Troubleshooting

### 4.1 Troubleshooting Problems, Possible Causes, and Solutions

In the event that the instrument appears to function abnormally, this section may help to find and solve the problem. Several possible problem conditions are described along with likely causes and solutions. If a problem arises, please read this section carefully and attempt to understand and solve the problem. If the problem cannot otherwise be solved, contact an Authorized Service Center (see Section 1.3). Be sure to have the model number, serial number, and voltage of your instrument available.

Problem	Possible Causes and Solutions
Incorrect temperature reading	<p><b>Incorrect R0, ALPHA, and DELTA parameters.</b> Find the values for R0, ALPHA, and DELTA on the Report of Calibration that was shipped with the instrument (or from subsequent calibrations of the instrument). Reprogram the parameters into the 2200 memory (see the 2200 User's Guide). Allow the instrument to stabilize and verify the accuracy of the temperature reading.</p> <p><b>Controller locked up.</b> The controller may have locked up due to a power surge or other aberration. Initialize the system by performing the Factory Reset Sequence.</p> <p><b>Factory Reset Sequence.</b> Hold the SET and EXIT buttons down at the same time while powering up the instrument. After the instrument displays <code>-101E-</code>, release the buttons. The display shows <code>-101E-</code>, then displays <code>9132</code>, and then displays the firmware version. After performing the master reset sequence, all of the configuration parameters are reset to their default values. Reprogram the R0, ALPHA, and DELTA parameters into the Model 9132 memory (see Section , Calibration Parameters) and any other applicable configuration parameters. Allow the instrument to stabilize and verify the accuracy of the temperature reading.</p>
Blank display after mains power applied	<p><b>Blown fuse.</b> A fuse may have blown due to a power surge or failure of a component. Replace the fuse once. If the fuse blows a second time, it is likely caused by the failure of a component. Always replace the fuse with one of the same rating, voltage, and type. Never replace the fuse with one of a higher current rating.</p>
The Instrument heats or cools too quickly or too slowly	<p><b>Incorrect scan and scan rate settings.</b> The scan and scan rate settings may be set to unwanted values. Check the Scan and Scan Rate settings. The scan may be off (if the unit seems to be responding too quickly). The scan may be on with the Scan Rate set low (if unit seems to be responding too slowly).</p>

Problem	Possible Causes and Solutions
The display shows any of the following: <i>Err 1</i> , <i>Err 2</i> , <i>Err 3</i> , <i>Err 4</i> , <i>Err 5</i> , <i>Err 6</i> , or <i>Err 7</i>	<b>Controller problem.</b> The error messages signify the following problems with the controller. <i>Err 1</i> - a RAM error <i>Err 2</i> - a NVRAM error <i>Err 3</i> - a Structure error <i>Err 4</i> - an ADC setup error <i>Err 5</i> - an ADC ready error <i>Err 6</i> - a defective control sensor <i>Err 7</i> - a heater error Initialize the system by performing the Factory Reset Sequence describe above.
Temperature cannot be set above a certain point	<b>Incorrect High Limit parameter.</b> The High Limit parameter may be set below 400°C. Check this value as described in the 2200 User's Guide.

## 4.2        **Comments**

### 4.2.1     **EMC Directive**

Hart Scientifics' equipment has been tested to meet the European Electromagnetic Compatibility Directive (EMC Directive, 89/336/EEC). The Declaration of Conformity for your instrument lists the specific standards to which the unit was tested.

### 4.2.2     **Low Voltage Directive (Safety)**

In order to comply with the European Low Voltage Directive (73/23/EEC), Hart Scientific equipment has been designed to meet the IEC 1010-1 (EN 61010-1) and the IEC 1010-2-010 (EN 61010-2-010) standards.