

FLUKE®

Calibration

2590
Multiplexer
Operators Guide

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To obtain warranty service, contact your nearest Fluke authorized service center or send the product, with a description of the difficulty, postage, and insurance prepaid (FOB Destination), to the nearest Fluke authorized service center. Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that the failure was caused by misuse, alteration, accident or abnormal condition or operation or handling, Fluke will provide an estimate or repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

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1 Before You Start

1.1 Symbols Used

Table 1 lists the symbols that may be used on the instrument or in this manual and the meaning of each symbol.

Table 1 Symbols

Symbol	Description	Symbol	Description
	AC (Alternating Current)		PE Ground
	AC-DC		Hot Surface (Burn Hazard)
	Battery		Read the User's Guide (Important Information)
	Complies with European Union directives		Off
	DC		On
	Double Insulated		Standby Indication
	Electric Shock		Canadian Standards Association
	Fuse		C-TICK Australian EMC mark
	Ground		The European Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) mark.

1.2 Safety Information

This instrument is designed for indoor use only. 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

- **DO NOT** use this unit in environments other than those listed in the manual.
- Follow all safety guidelines listed in the manual.
- Calibration equipment should only be used by trained personnel.
- This instrument can measure extreme temperatures. Precautions must be taken to prevent personal injury or damage to objects. Probes may be extremely hot or cold. Cautiously handle probes to prevent personal injury. Carefully place probes on a heat/cold resistant surface or rack until they reach room temperature.
- **DO NOT** operate near flammable materials.

- **DO NOT** use this instrument in combination with any probe (PRT or thermistor) to measure the temperature or resistance of any device where the probe might come in contact with a conductor that is electrically energized. Severe electric shock, personal injury, or death may occur.

1.2.2 CAUTIONS

- If the instrument is dropped, struck, or handled in a way that causes internal or external physical damage, immediately unplug the instrument, discontinue use, and contact a Fluke Authorized Service Center for repair. Do not attempt to disassemble or repair the instrument. Refer repairs or replacement of components to a Fluke Authorized Service Center.
- **DO NOT** connect AC voltage to any input terminal on the instrument. Permanent damage to the instrument will result.

1.3 Authorized Service Centers

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

Fluke Corporation

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

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

1.4 CE Comments

1.4.1 EMC Directive

Hart Scientific's 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.

The instrument was designed specifically as a test and measuring device. Compliance to the EMC directive is through IEC 61326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements (1998).

As noted in the IEC 61326-1, the instrument can have varying configurations. The instrument was tested in a typical configuration with shielded and grounded probe and RS232 cables. Emissions may, in non-typical applications, exceed the levels required by the standard. It is not practical to test all configurations, as the manufacturer has no control over the probes the user may connect to the instrument.

1.4.1.1 Immunity Testing

The instrument was tested to the immunity requirements of the IEC 61326-1 according to Table 1 – Minimum immunity test requirements. Criterion B was used for Conducted RF (IEC 61000-4-6) and Electric Fast Transit (EFT, Burst, IEC 61000-4-4). Therefore, the operation of the instrument may be affected by excessive electromagnetic interference and may not perform within the normal specification limits under these conditions.

1.4.1.2 Emission Testing

The instrument fulfills the limit requirements for Class A equipment but does not fulfill the limit requirements for Class B equipment. The instrument was not designed to be used in domestic establishments.

2 Introduction and Specifications

2.1 Introduction

The 2590 ten-channel scanner, from Fluke Calibration’s reference temperature product line is designed to add additional measurement channels to the Super-Thermometer family of temperature readouts. Up to five scanners can be connected to the 1590 Super-Thermometer for a total of 50 additional channels while up to two scanners can be connected to the 1594A and 1595A Super-Thermometers for a total of 20 additional channels.

The 2590 design provides reliable, stable switching through its hermetically sealed, low thermal EMF, high isolation resistance relays. The user is able to easily select a channel by pressing one of the channel selection keys or program the Super-Thermometer to automatically scan the channels.

2.2 Measurement Accuracy Specifications

The 2590 is designed to provide high-quality switching control and circuitry to minimally affect measurements. The following table lists the measurement accuracy specifications associated with the 2590. When using the 2590, the listed specifications are in addition to the Super-Thermometer measurement accuracy specifications

Table 2 Measurement Accuracy Specifications

Resistance Range (Sample Period)	Additional Uncertainty (ppm of reading)
95% confidence level	
0 to 400 Ω (2 second)	greater of 0.1 ppm and ratio 5.0×10^{-8}
400 Ω to 10 k Ω (2 second)	0.8 ppm
10 k Ω to 40 k Ω (2 second)	3 ppm
40 k Ω to 100 k Ω (2 second)	10 ppm
0 to 400 Ω (10 second)	greater of 0.1 ppm and ratio 5.0×10^{-8}
400 Ω to 10 k Ω (10 second)	0.4 ppm
10 k Ω to 40 k Ω (10 second)	1.5 ppm
40 k Ω to 100 k Ω (10 second)	5 ppm

Table 3 General Specifications

Number of measurement channels	10
Terminals	Patented DWF connectors
Maximum Circuit Resistance (each line)	0.5 Ω
Isolation Resistance (Between Channels and Channel to Ground)	10^{12} Ω
Standby Current Options	1 mA, 0.5 mA, 10 μ A, None
Control Cable	15-pin, D-subminiature cable
Dimensions:	
Height	178 mm (7.0 in.)
Width	515 mm (20.3 in.)
Depth	320 mm (12.6 in.)
Weight	12 kg (27 lbs)

3 Preparation for Operation

3.1 Unpacking and Inspection

The 2590 is shipped in a container designed to prevent damage during shipping. Inspect the contents of the container for damage and immediately report any damage to the shipping company. Instructions for verifying all accessories are included in the shipping container. If any items are missing, contact the nearest Fluke Authorized Service Center.

3.2 Instruction Manual

The 2590 User Guide is shipped on CD. For ordering a replacement User Guide CD, contact your local Fluke representative or service center. The User Guide is available online for download in PDF format.

3.3 Connecting to the Super-Thermometer

3.3.1 Introduction

The 2590 is designed to work the Super-Thermometer and cannot be used separately. Power and communication are provided to the 2590 through the 15-pin control cable.

Up to two 2590 scanners can be connected to the 1594A and 1595A model Super-Thermometers. A total of five 2590 scanners can be connected to a 1590 Super-Thermometer.

3.3.2 Connecting the Control Cable

Ensure the Super-Thermometer is powered off. Connect the 15-pin control cable to the 2590 Multiplexer connection on the rear panel of the Super-Thermometer. Connect the other end of the cable to the Super-Thermometer connector on the rear panel of the 2590 “Figure 1 2590 to 1590 Control Cable Connection” on page 8. Tighten the connector screws to ensure the cable stays connected during operation.

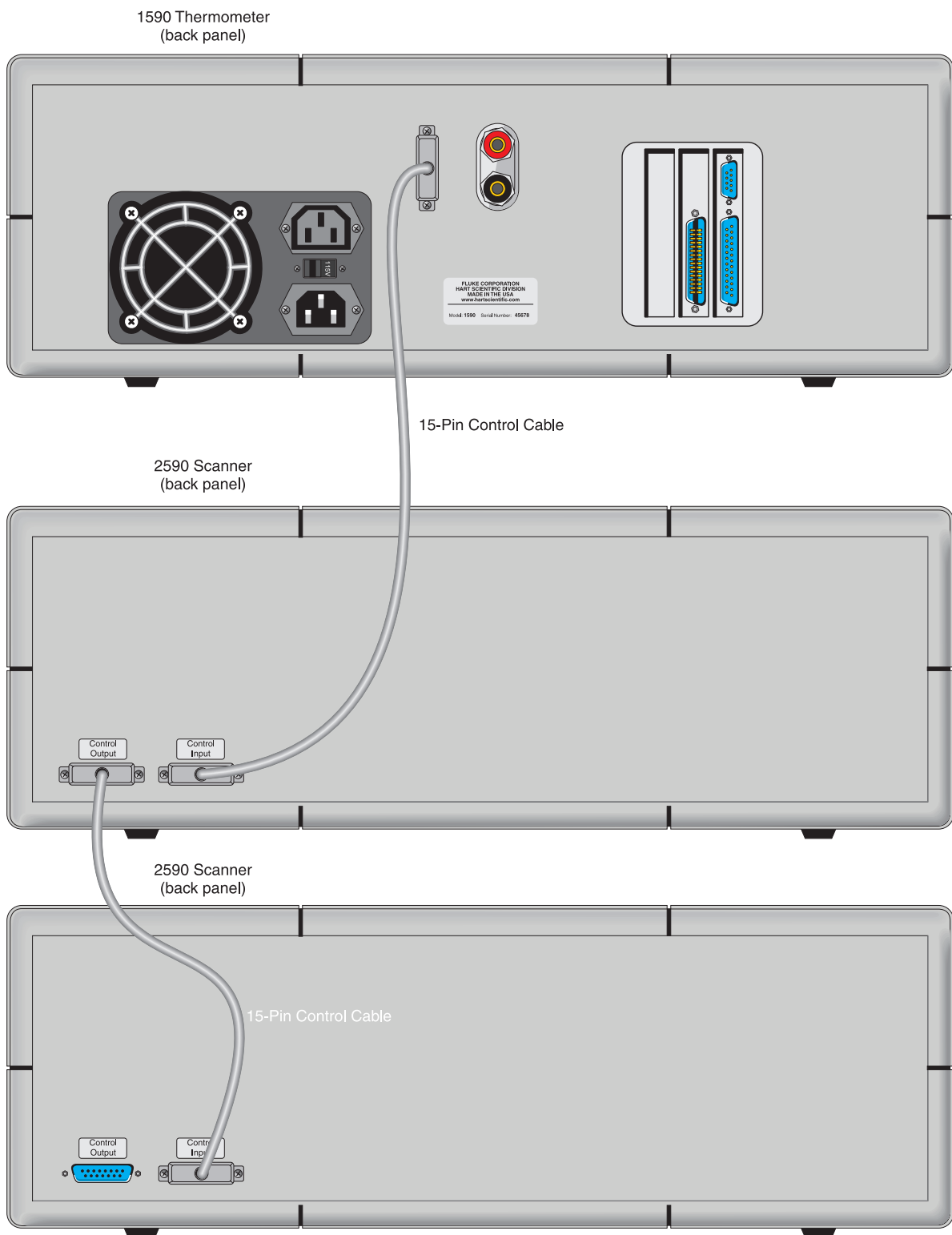


Figure 1 2590 to 1590 Control Cable Connection

3.3.3 Connecting the Measurement Cable

Connect one end of the 4-wire measurement cable to input channel 1 on the Super-Thermometer. Connect the cable guard wire to the Guard or Ground connector on the Super-Thermometer front panel.

Using the same wire color pattern, connect the other end of the measurement cable to the output terminals on the 2590 (See “Figure 2 2590 to 1590 Front Panel Connections”).

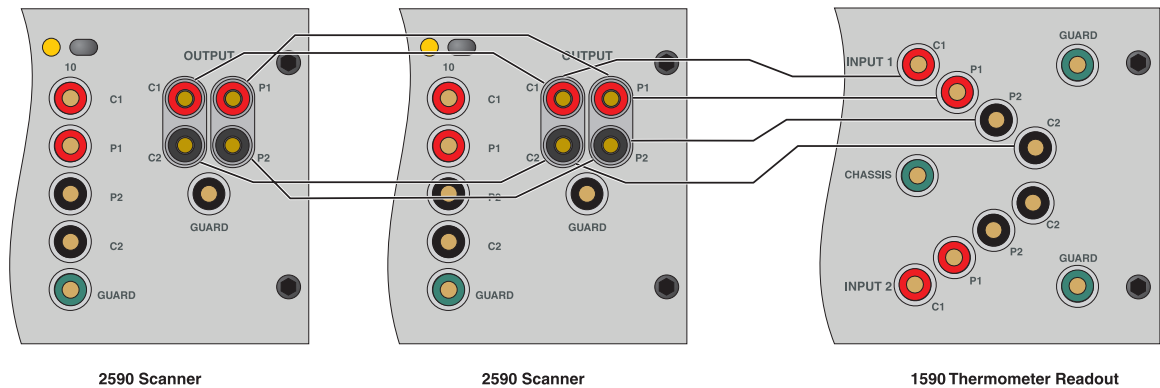


Figure 2 2590 to 1590 Front Panel Connections

3.3.4 Connecting an Additional Scanner

Additional scanners are connected by daisy chain to the first scanner. This means that only the first scanner is connected to the Super-Thermometer and each additional scanner is connected to the previously connected scanner. This applies to both the measurement cable and control cable (see Figure 1 on page 8 and Figure 2 on page 9).

3.4 Placement and Rack Mounting

In general, place the 2590 in close proximity to the Super-Thermometer in an area free of drafts and excessive electrical noise.

The 2590 is designed to be used on a bench-top or installed in a standard width rack. To be installed in a rack, it must be taken out of the outer case by removing the four front panel screws and the four rear panel screws and sliding it out the front of the case. It may be necessary to remove the screws on the left and right side of the outer case as well.

4 Features

4.1 Introduction

The 2590 has been designed to allow simple connection and operation to expand the measurement channels of the Super-Thermometer product line. This section describes the front and rear panel features of the 2590.

4.2 Front Panel Features

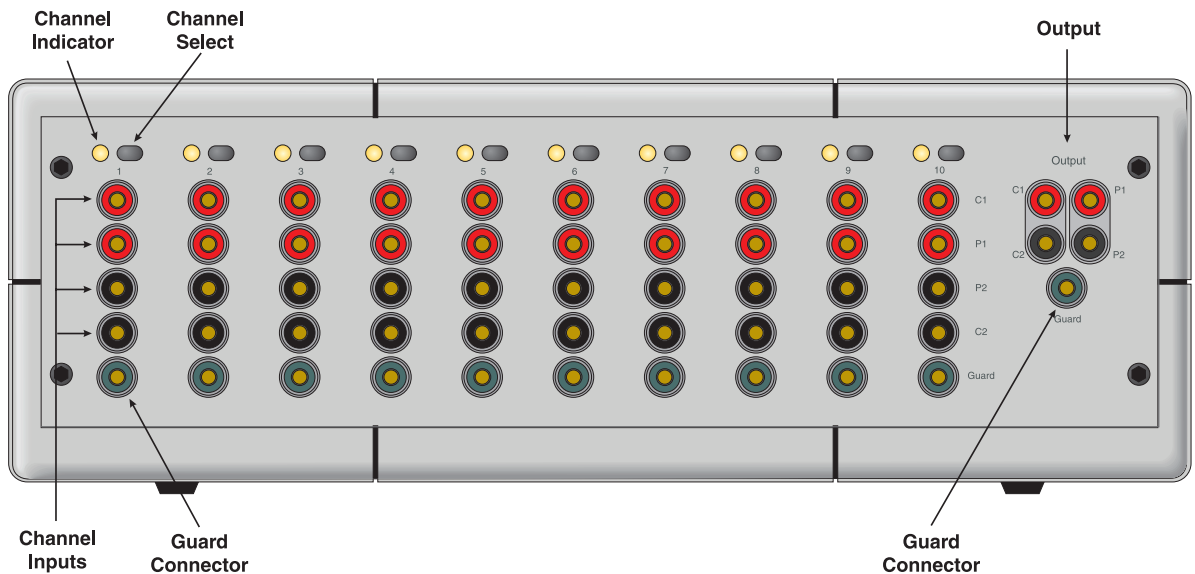


Figure 3 Front view of 2590

Measurement Input Connections

1. Measurement Output Connection
2. Channel Select Keys
3. Channel Select LEDs

4.2.1 Measurement Input Connections

Ten 4-wire measurement input channels are located on the front panel. The inputs are labeled to identify the channel number. Current (C1, C2), Potential (P1, P2) and Guard (G) terminals are labeled to facilitate correct measurement connection.

When the 2590 is connected to a 1590 Super-Thermometer the scanner input channels are identified on the display as Scanner 1, Scanner 2, etc. When additional scanners are connected the scanner channel numbers continue as Scanner 11, Scanner 12, etc.

When connected to a 1594A or 1595A, the scanner channels are displayed with a S1 (scanner 1) or S2 (scanner 2) prefix. For example, channel 1 on scanner 1 is displayed as S1-1.

4.2.2 Measurement Output Connection

The Measurement Output Connection consists of five gold-plated DWF connectors, labeled with current (C1, C2), Potential (P1, P2) and Guard (G) terminals to facilitate correct measurement connection.

4.2.3 Channel Select Keys

The measurement channel select keys allow the user to quickly select a scanner measurement channel by pressing its corresponding key. When a channel is selected, either by pressing a channel selection key or by configuring the Super-Thermometer, the channel LED will light to indicate it is being measured.

4.2.4 Channel Select LEDs

A channel select LED is located above each Channel Select Key to indicate when a channel is being measured.

4.3 Rear Panel Features

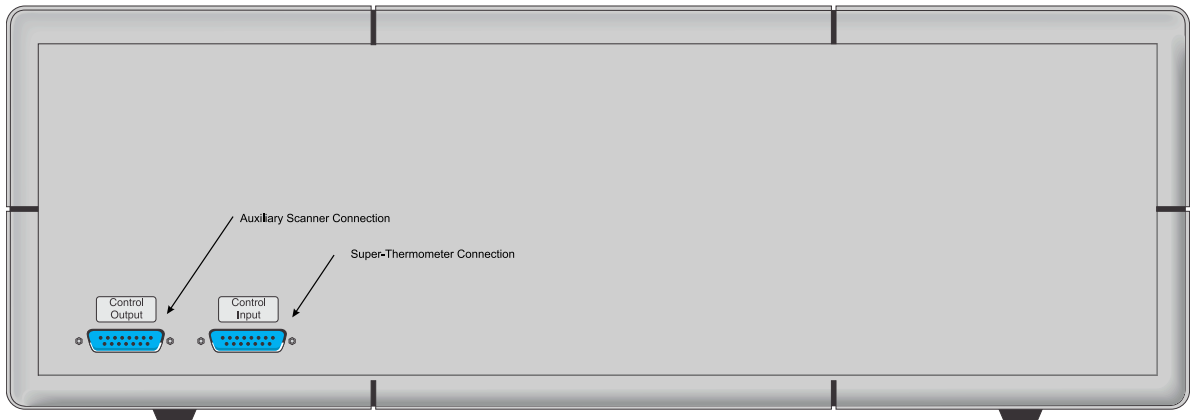


Figure 4 2590 Rear View Connections

4.3.1 Super-Thermometer Connection

The Super-Thermometer communication connection is a 15-pin socket. It provides power and communication from the Super-Thermometer. Refer to the Preparing for Operation section of this manual before connecting the communication cable.

4.3.2 Auxiliary Scanner Connection

An additional scanner can be connected to the 15-pin scanner connection. Refer to the Preparation for Operation section of this manual for instructions related to connecting an auxiliary scanner.

5 Getting Started

5.1 Powering On the Super-Thermometer and 2590

With the 2590 connected, power the Super-Thermometer on. The channel LEDs on the front panel of the 2590 will each light momentarily during the power-on sequence to verify proper connection with the Super-Thermometer.

After power is on, check the Super-Thermometer channel configuration or channel selection screen to verify the additional scanner channels are recognized by the Super-Thermometer and available for measurement.

When the 2590 is connected to a 1590, the scanner input channels are identified on the display as Scanner 1, Scanner 2, etc. When additional scanners are connected the scanner channel numbers continue as Scanner 11, Scanner 12, etc. up to Scanner 50 if all five scanners are connected.

When connected to a 1594A or 1595A, the scanner channels are displayed with a SC1 (scanner 1) or SC2 (scanner 2) prefix. For example, channel 1 on scanner 1 is displayed as S1-1.

If the scanner is not recognized by the Super-Thermometer and/or the LEDs do not light correctly, check the control cable for proper connection. If the problem cannot be resolved, contact the nearest Fluke Authorized Service Center for additional help.

5.2 Selecting a Scanner Channel

A scanner channel can be selected for measurement by pressing one of the channel select keys on the front panel. The Super-Thermometer will immediately begin measuring the selected channel and the channel select LED will light unless measurement has been stopped. If a channel select key is pressed when measurement is stopped, the selected channel will be measured when measurement is resumed.

A scanner channel can also be selected in the Channel menu of the Super-Thermometer. Refer to the Super-Thermometer manual for these instructions.

5.3 Scanning Channels

The 2590 scanner can be configured for channel scanning. When connected to a 1594A or 1595A Super-Thermometer that is operating in scan mode (Scan Enable is On), pressing a channel select key on the 2590 will add the channel to the scan sequence. The channel will be measured when it comes up in the scan sequence. The channel can also be added to the scan sequence from the Super-Thermometer menu system. Refer to the Super-Thermometer manual for information regarding scan sequence configuration.

6 Maintenance

Avoid operating the instrument in excessively wet, oily, dusty, or dirty environments. If the outside of the instrument becomes soiled it may be wiped clean with a damp cloth and mild detergent. DO NOT use harsh chemicals on the surface that may damage the paint or plastic.

Periodically inspect the measurement cable for damage. Repair or replace the cable if the gold spades become loose or damaged or if the cable jacket is damaged.

The instrument should be handled with care. Avoid knocking, dropping, or vibrating the instrument.

