Instruction Manual

Black Body Source

Model: BBSH

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About this manual

The structure of the manual

This reference manual is aimed at users who are familiar with **E Instruments'** Temperature Calibrators, as well as those who are not. The manual is divided into 9 chapters. These describe how to set up, operate, service and maintain the calibrator. The technical specifications are described and spare parts may be ordered from the list of spare parts.

Safety symbols

This manual contains a number of safety symbols designed to draw your attention to instructions that must be followed when using the instrument, as well as any risks involved.

Warning

Events that may compromise the safe use of the instrument and result in considerable personal or material damage.

Caution….

Event that may compromise the safe use of the instrument and result in slight personal or material damage.

Note…

Special situations which demand the user's attention.

List of contents

1.0 Introduction

Congratulations on your new E Instruments Temperature Calibrator!

E Instruments' Temperature Calibrator Model **BBSH** is a simple, easy to use, compact, lightweight, portable / Bench mounted System.

The calibrator can be used to calibrate non contact infrared radiation Pyrometers.

Applications

Suitable for Calibration of all make IR Pyrometers both in Field and Laboratory use.

Features

- Compact, Light Weight, Portable
- Low Power Consumption
- Excellent Stability and Accuracy
- Cost Effective – Best value for money
- Bench mount / Portable
- RS 232 Interface (Optional)
- Calibration Software (Optional)

Certification

E Instruments certifies that the bath is a quality product and meets its intended use and satisfies the published specifications at the time of shipment.

Technical Assistance

Please contact the manufacturer if you require technical assistance.

Guarantee

1 Year factory warranty

This guarantee only covers manufacturing defects and becomes invalid if the instrument has been subjected to unauthorized intervention and / or use.

2.0 Safety Instructions

Read this manual carefully before using the instrument

Please follow the instructions and procedures described in this manual. They are designed to allow you to get the most out of your calibrator and avoid any personal injuries and /or damage to the instrument.

Warning

- *The calibrator **must not** be used for any purposes other than those described in this manual.*

- *The calibrator is designed for **interior use only** and should **not be used in risk-prone areas,** where vapour or gas leaks, etc, may constitute an explosive hazard.*
- *The calibrator is designed to offer a minimum of **Basic Insulation** only*
- *Suitable for Installation within **Category II** and **Pollution Degree 2.***

Caution – Hot Surface

This symbol is printed on the Printed Front Panel.

- **Do not touch** the front plate as the calibrator is heating up – this may be very hot.

Note….

The product liability only applies if the instrument is subjected to a manufacturing defect. This liability becomes void if the user fails to follow the maintenance instructions set out in this manual or uses unauthorized spare parts.

3.0 Setting up the Calibrator

3.1 Receipt of the Calibrator

When you receive the instrument….

- Carefully unpack and check the calibrator and the accessories and the optionals.
- Check the parts against the list shown below. If any of the parts are missing or damaged, please contact us.

You should receive

- Calibrator
- Instruction Manual
- Calibration Certificate
- Mains Power Cord
- Optionals
  - CD-ROM containing Software Package “Cal Temp”
  - RS 232 Serial Cable
  - Cal Temp Manual

When reordering please specify the part number found in the list of spare parts, section 9.0

3.2 Preparing the Calibrator

Warning

- *The calibrator must **not** be used in areas prone to explosive hazards.*
- *The calibrator **must** be kept clear within an area of 20 cm on all three sides and 1 meter at the front side.*
- *Allow free air circulation around the black body source module to permit adequate cooling*

Note….

The Instrument must **not** be exposed to draughts.

When setting up the calibrator, you must….

Place the calibrator on an even horizontal surface in the spot you intend to use it.

Don’t place the instrument vertically.

Caution…

- Make sure you allow enough room in front of the Blackbody Source to accommodate the minimum focal lengths of all Pyrometers you plan to calibrate. The Pyrometer lens must be in a direct line with the aperture of the Black-body Source.
- **Do not** use the instrument if the Cooling fan located at the back of the instrument is out of order.
- **Ensure** a free supply of air to the Fan Grill located at the back of the instrument.
- Check that earth connection for the instrument is present and attach Power Cord.
- The calibrator is now ready for use.

3.3 Thermocouple Connection

Type K Thermocouple is factory wired in the receptacle at the rear of the Black Body Source. Use the Type K compensating / Extension cable to connect the receptacles to the indicator.

Warning

Never attempt to connect external voltage to the Thermocouple receptacle at the rear.

3.4 Sighting and Focussing the Calibrator

Before Sighting and Focusing the Calibrator, please note the following important warning.

Warning

Keep all flammable substances and fumes away from the Black Body calibration system.

Do not touch the handle of the calibrator during use – it may be hot.

The Calibrator is now ready for use.

4.0 Operating the Calibrator

4.1 Display Panel

Green Display : Process Temperature or Program

Green LED (flashing green bulleted Square in the top left corner)**:** Output Indicator

4.2 Operational Procedure

a) Connect the power cable to the Black Body Calibration System

b) Switch on the instrument

c) Set the required temperature in the PID Controller as follows.

d) Press "*" key and "▲" key simultaneously to increase the set temperature.

e) Press "*" key and "▼" key simultaneously to decrease the set temperature.

f) Place the Pyrometer which is to be calibrated at the specified focal length in line with the Black Body Source

g) Allow the bath to stabilize at the set temperature.

h) Connect Thermocouple Output from the source to the indicator and note down the readings of the Pyrometer.

i) Repeat Steps d to h for other set of calibration points.

j) After calibration is over, set the bath temperature to ambient and allow the bath to cool

k) After reaching the ambient temperature, switch off the power supply.

4.1 To Select the Unit (°C / °F)

a) Press the "▲&▼" key together and hold for 3 seconds.

b) Use the ▲ or ▼ key to locate the LEVEL Function

c) Press and hold the ***** key and use the ▲ or ▼ key to get LEVEL 2.

d) Use the ▲ or ▼ key to get "Unit" on the display

e) Press and hold the ***** key and use the ▲ or ▼ key to get the required Unit (°C or °F)

f) Press ▲ or ▼ key together for 3 seconds to exit setup.

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5.0 Storing and transporting the Calibrator

Caution….

The following guidelines should always be observed when storing and transporting the calibrator. This will ensure that the instrument remain in good working order.

Switch off the calibrator using the power control switch. Turning off the calibrator during the calibration process will not damage the instrument

The following routine must be observed before switching off the instrument.

Over 100˚C / 212˚F

If the calibrator has been heated upto temperatures above 100˚C / 212˚F, you must wait until the instrument reaches a temperature at **10˚C / 50˚F above ambient** before you switch off.

Warning

*If you intend to store the calibrator in the Packing Box after use, you **must** ensure that the instrument has cooled to a temperature **at 10˚C / 50˚F above ambient*** before *placing it in the Packing Box.*

6.0 Replacing the Fuses

Warning
The fuse box must not be removed from the Socket until the power cord has been disconnected. The fuses should be replaced by same type and rating.

1. Locate the main fuse in the fuse box of the mains Socket.
2. Open the lid of the fuse box using a screwdriver.
3. Replace the fuse. Fuse ratings is

   - **6.3 A F** (Main Fuse)

1. Locate the Heater Fuse and Control Fuse in the corresponding fuse holders marked in the enclosure of the equipment.
2. Open the fuse holder cap by rotating it in the anti clockwise direction.
3. Replace the fuse. Fuse ratings are

   - **6.3 A T** (Heater Fuse)
   - **500mA F** (Control Fuse)

Warning
Ensure the power cord has been disconnected from the equipment before removing the fuse lid from the box..
The fuse should be replaced by same type and rating.

If the fuse blows immediately after you have replaced them, the calibrator should be returned to the manufacturer for service.

6.1 Returning the calibrator for Service

When returning the calibrator to the manufacturer for service, please enclose a fully completed service information form. Simply copy the form on the following page and fill in the necessary information. The calibrator should be returned in the original packing.

Note….
E Instruments' liability ceases if:

- Parts are replaced / repaired using spare parts which are not identical to those recommended by the manufacturer.
- Non-original parts are used in any way when operating the instrument.

E Instruments' liability is restricted to errors that originated from the factory.

Service info

Customer data: **Date:**

Customer name and address:

_____

_____

Attention and Dept:

_____

Fax no. / Phone no.:

_____

Your order no.: _____

Delivery Address:

_____

_____

Instrument data:

Model and Serial No. _____

Warranty Claimed Yes: _____ **No:** _____ **Original Invoice No. :**_____

Calibration

Check

Service

If Service problem encountered, please mention briefly._____

_____

_____

Diagnosis data / Cause for return:

Diagnosis / Fault description:

_____

_____

_____

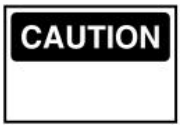
Special requests:

_____

Safety precautions: If the product has been exposed to any hazardous substances, it must be thoroughly decontaminated before it is returned to E Instruments. Details of the hazardous substances and any precautions to be taken must be enclosed.

7.0 Maintenance

7.1 Cleaning



Caution…

Before cleaning the calibrator, you must switch it off, allow it to cool down to ambient temperature and remove all cables.

Users should/must carry out the following cleaning procedures as and when required.

- **The exterior of the instrument –** Clean using water and a soft cloth. The cloth should be wrung out hard to avoid any water penetrating the calibrator and causing damage.
- **The Black Body Core –** Insert a soft bristled brush into the aperture of the Black Body Source Core. Slightly brush away any residue /dust on the black body core from the front side.

7.2 Adjusting and calibrating the instrument

You are advised to return the calibrator to E Instruments or an accredited laboratory at least once a year for calibration.

8.0 Technical Specifications

All specifications are given with an ambient temperature of 25˚C /77.0˚F ±3˚C/5.4˚F

General Specifications

MECHANICAL SPECIFICATIONS

Dimensions H x D x W	380 x 365 x 205 mm (14.96” x 14.4” x 8.1”)
Weight	8 Kgs. (17.6 lbs)
Aperture	25mm (0.98”)

POWER SUPPLY

Line Voltage / frequency	230 VAC ±10% / 60Hz (Optional 115v / 60Hz)
Power Consumption	1000 Watts

RS232 COMMUNICATION INTERFACE

Type of connection	9 pole, D sub male

OPTIONAL

Software	Calibration Software

ENVIRONMENT

Ambient operating temperature range	15 – 40˚C
Storage Temperature Range	10 –50˚C
Humidity Range	40 – 75% RH
Protection Class	IP10

READOUT SPECIFICATIONS

Temperature Units	˚C / ˚F
Resolution (Manual Selection)	1 ˚C / 1 ˚F

THERMAL SPECIFICATIONS

Maximum Temperature	1200°C / 2192° F
Minimum Temperature	500˚C / 932 ˚F at ambient temperature 30˚C /86°F
Basic Accuracy	Within 0.5% of indicated temperature with a minimum of 3°C
Stability	±1.5°C
Heating Time to max.	60 minutes (Ambient to 1200°C / 2192° F)
Cooling time	75 min from 1200°C / 2192° F to 500˚C / 932 ˚F
Emissivity	Better than 0.97

9.0 List of Spare Parts

All parts listed in the list of spare parts can be obtained from the factory.

Please contact E Instruments for assistance if you require parts which don't appear on the list.

List of Spare Parts

Spare parts	Spare Parts No.
Fuses • Main Fuse 6.3A T • Heater Cartridge Fuse 6.3 A T • Control Fuse 500mA F	BBSHF001 BBSHF003 BBSHF004
Heater	BBSHH001
K Type Duplex Thermocouple	BBSHS001
Core	BBSHC001
Thermocouple Connection	BBSHTC001
PID Controller	BBSHP001
Solid State Relay	BBSHSSR001
Cooling Fan	BBSHC001
LED	BBSHL001