



IR-500 BLACK BODY CALIBRATOR



User Manual

Product Code

822-400

SAFETY INFORMATION

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

Please note the warnings and cautions listed below.

WARNINGS

BURN HAZARD- DO NOT touch the IR target surface of the unit.

The temperature of the IR target surface is the same as the actual temperature shown on the display. If the unit is set at 500 °C and the display reads 500 °C, the target surface is 500 °C. The top of the instrument case may exhibit extreme temperatures for areas close to the IR target surface.

DO NOT turn off the unit at temperatures higher than 50 °C. This could create a hazardous situation.

DO NOT connect and operate this unit without a properly grounded, properly polarized power cord.

HIGH VOLTAGE is used in the operation of this equipment. Severe injury or death may result if personnel fail to observe safety precautions. Before working inside the equipment, turn the power off and disconnect the power cord. Overhead clearance is required.

DO NOT place this instrument under a cabinet or other structure.

DO NOT use this unit in conditions other than those listed in the environmental conditions section (page 5).

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.

CAUTIONS

To avoid possible damage to the instrument, follow these guidelines.

DO NOT plug the unit into 220V if the heater switches and fuse holder read 110V. This action will cause the fuses to blow and may damage the instrument.

DO NOT use fluids to clean the target surface.

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.

INTRODUCTION

The IR-500 Calibrator is mainly structured by 58 mm diameter target assembly and dry-well temperature system controlled by a microcomputer. The external reference thermometer is a metal cone with good heat-conducting ability, on the surface of thermometer there is a oxide film with emissivity 0.95.

The IR-500 Calibrator contains a class-A PT100 sensor with a temperature control system and wind-cold device. The calibrator has rapid heating and cooling functions and is switchable between °C/°F, which can be used for different temperature unit calibrations.

The calibrator operates over a range of 50 °C to 500 °C with a temperature display resolution of 0.1 °C.

3.GENERAL SPECIFICATIONS

Range	50 °C to 500 °C (122 °F to 932 °F)
Resolution	0.1 °C
Accuracy	±1 °C below 100 °C ±2 °C from 100 °C to 200 °C ±3 °C from 200 to 500 °C
Stability	±0.1°C at Temp<100 °C (±0.2 °F at Temp<212 °F) ±0.2 °C at 100 °C<Temp<350 °C (±0.4 °F at 212 °F<Temp<662 °F) ±0.4°C at 200°C<Temp<500 °C (±0.8 °F at 392 °F<Temp<932 °F)
Heating Time	40 minutes to max
Cooling Time	30 minutes to 100 °C (212 °F)
Emissivity	0.95 fixed
Target Size	Ø58 mm
Power	110 volt AC, 3A or 230 volt AC (±10%), 1.5A
Dimensions	114 x 180 x 233 mm
Weight	2682 grams

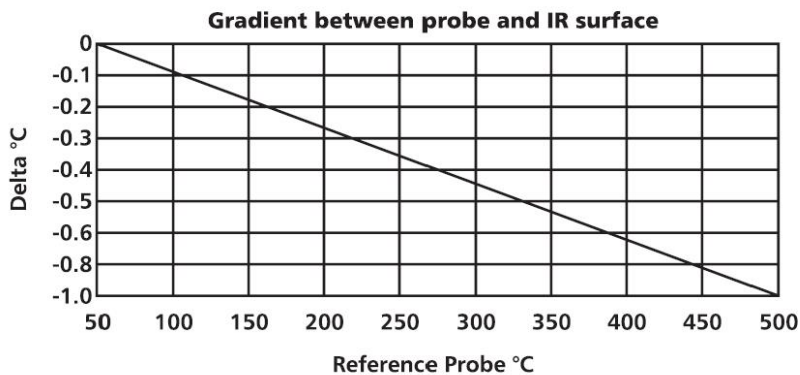
ENVIRONMENTAL CONDITIONS

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.

Maintenance and cleaning recommendations can be found in the Maintenance section of this manual.

The instrument operates safely under the following conditions:



OPERATING CONDITIONS

Temperature range:	5-35 °C (41-95 °F)
Ambient relative humidity:	15-80%
Pressure:	75kPa - 106kPa

Mains voltage within $\pm 10\%$ of nominal.
Vibrations in the calibration environment should be minimized.

QUICK START

UNPACKING

Unpack the calibrator carefully and inspect it for any damage that may have occurred during shipment. If there is shipping damage notify Electronic Temperature Instruments Ltd immediately.

Verify that the following components are present:

- Calibrator
- Power Cord
- User Manual

SET UP

Place the calibrator on a flat surface with at least 8 inches of free space around the instrument. The stand may be swung down to raise the front of the instrument from a horizontal position. Plug the power cord into a grounded mains outlet (Note: this calibrator has two power specifications of one model NO:220V/AC and 110V/AC, please make sure the power value is suitable for the instrument before operation.)

Turn on the power to the calibrator by toggling the power switch on. The fan should begin quietly blowing air through the instrument and the controller display should illuminate after 3 seconds. After a brief self-test the controller should begin normal operation. If the unit fails to operate please check the power connection.

The heater will start operating to bring the temperature of the calibrator to the set-point temperature and the display will begin to show the actual target temperature.

The unit should be used with a secondary certified reference thermometer (E.g. ETI Reference Thermometer product code 222-055)

SETTING THE TEMPERATURE

1. Press "**UP**" or "**DOWN**" to change the set-point value.
2. Then press "**SET**". The calibrator will automatically control the target assembly temperature to reach the set temperature in the stated time. The orange LCD display will indicate the temperature of the target assembly. When the set-point temperature is changed the controller switches the well heater on or off to raise or lower the temperature. The displayed well temperature gradually changes until it reaches the set-point temperature. The well may require 5 to 10 minutes to reach the set-point depending on the span. Another 5 to 10 minutes is required to stabilise within ± 0.1 °C of the set-point. Ultimate stability may take 15 to 20 minutes more of stabilisation time.

PARTS AND CONTROLS

The user should become familiar with the calibrator and its parts.

BACK PANEL

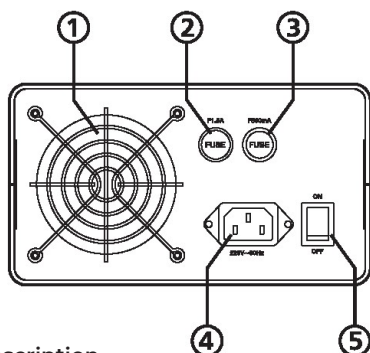


Fig 1. Back Panel Description

The back panel (**Figure 1**) consists of the power cord inlet, power switch, heater voltage switch, and fan.

- 1** Wind input
- 2** Fuse of heater
- 3** Fuse of temperature control system
- 4** Power Input
- 5** Power switch

Power Inlet - At the rear of the calibrator is the removable power cord inlet that plugs into an IEC grounded socket.

CAUTION: Do not plug the unit into 220V if the unit is indicated as 110V. This action will cause the fuses to blow and may damage the instrument.

Fan - The fan inside the calibrator has two speeds and runs continuously when the unit is being operated to provide cooling for the instrument. The fan runs slow for heating and maintaining operation and runs fast for rapid cooling. Slots are provided for airflow. The area around the calibrator must be kept clear to allow adequate ventilation. The airflow is directed out the front and can be extremely hot

FRONT PANEL

The front panel(**Figure 2**) consists of the controller display, controller keypad, and target assembly.

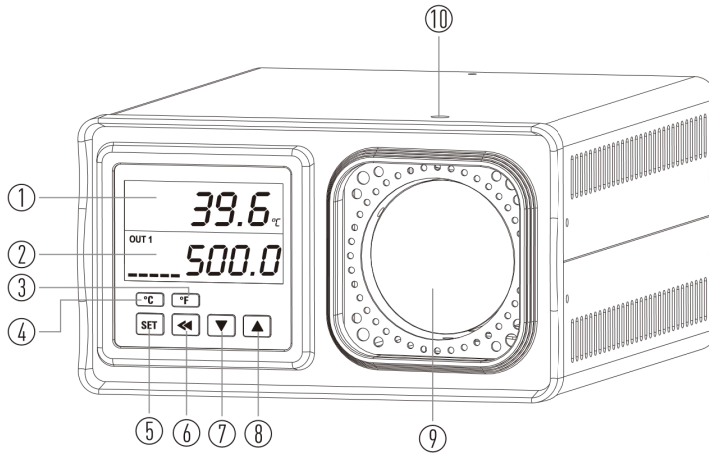


Fig 2. Front Panel Description

- 1 The Orange LCD (The first line display) displays actual temperatures and settings for selected scale °C or °F.
- 2 The Green LCD (The second line) displays the set-point value and shows temperatures in units according to selected scale °C or °F.
- 3 The °F Button, which is used to change the temperature unit to Fahrenheit.
- 4 The °C Button, which is used to change the temperature unit to Celsius.
- 5 The **SET** Button, which is used to adjust and limit the temperature setting.
- 6 The "◀" (Carry) button allows you to adjust individual digits of the target temperature, such as the units, tens, or hundreds place, enabling faster and more precise temperature setting.
- 7 The **DOWN** (▼) button is used to decrease the temperature value.
- 8 The **UP** (▲) Button is used to increase the temperature value.
- 9 The Target assembly has a diameter of 58 mm and an emissivity of 0.95,
- 10 The test hole for the temperature sensor of the Reference thermometer.

- Press the °C button to select Celsius (°C) as the temperature unit. Press the °F button to select Fahrenheit (°F) as the temperature unit..
- The four-button keypad allows easy adjustment of the set-point temperature. The control buttons (**SET**, "◀", **UP**, and **DOWN**) are used to configure and adjust the calibrator temperature quickly and accurately.
- The control temperature can be adjusted in increments of 0.1 °C or 0.1 °F, allowing for precise temperature setting and calibration.

GENERAL OPERATION

Place the calibrator on a flat surface with at least 8 inches of free space around the instrument, with the instrument facing the user.

- Connect the calibrator to the power supply, ensuring correct voltage (110V or 220V).
- Press the "on" button to power the unit on.

TO TURN THE UNIT OFF

Turning off the power at high temperature will damage the sensor/heating parts of the calibrator, therefore reduce the temperature to 50 °C after measurement. When the temperature is reduced to 50 °C the user can then turn off the power.

CONTROLLER OPERATION

This section shows you in detail how to operate the instrument temperature controller using the front control panel. Using the front panel key-switches and LCD display the user may monitor the well temperature, the heater output power and adjust the controller proportional band. The control buttons (**SET**, "**◀◀**", **DOWN**, **UP**) are used to set the calibrator temperature set-point.

WELL TEMPERATURE

The digital LCD display on the front panel allows direct viewing of the actual well temperature. This temperature value is normally shown on the display. The temperature is displayed in units, °C or °F, to the right.

TEMPERATURE SET-POINT

- The temperature set-point can be set to any value within the range and with resolution as given in the specifications. Be careful not to exceed the safe upper temperature limit of any device inserted into the well.
- Press the **UP** button to increase the temperature setting or press the **DOWN** button to decrease it. The temperature will be changed to 0.1 ° increments every time the button is pressed.
- Press the "**◀◀**" button once, then press the **UP** or **DOWN** button to adjust the temperature by 1 °C or 1 °F with each press. Press the "**◀◀**" button twice, then press the **UP** or **DOWN** button to adjust the temperature by 10 °C or 10 °F with each press. Press the "**◀◀**" button three times, then press the **UP** or **DOWN** button to adjust the temperature by 100 °C or 100 °F with each press. The green LCD display on the front panel will show the current set temperature.
- When the set temperature changes, the value will flash. Release the **UP** or **DOWN** button, then press the **SET** button. The calibrator will automatically control the target assembly and adjust the temperature to the set value within the specified time.
- After completing the measurement, reduce the temperature below 100 °C. Once the temperature is below 100 °C, the power can be turned off safely.

WARNING: Turning off the power while the calibrator is at a high temperature may damage the unit. Allow the calibrator to cool down using the built-in fan, and switch off the power only after the temperature has fallen below 100 °C.

The calibrator will automatically control the target assembly temperature to reach the set temperature in the stated time. The orange LCD display will indicate the temperature of the target assembly.

MAINTENANCE

The calibrator has been designed with the utmost care. Ease of operation and simplicity of maintenance have been a central theme in the product development. Therefore, with proper care the instrument should require very little maintenance. Avoid operating the instrument in dirty or dusty environments.

If the outside of the instrument becomes dirty, it can be wiped clean with a damp cloth and mild detergent. Do not use harsh chemicals on the surface, as they may damage the paint.

The calibrator should be handled with care. Avoid knocking or dropping the unit.

If the instrument is used in a manner not in accordance with the equipment design, the operation of the instrument may be impaired and/or safety hazards may arise.



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