IR-500 BLACK BODY CALIBRATOR

User Manual

Product Code

822-400

Supplied by
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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 1OO °C<Temp<350 °C
	(±0.4 °F at 212 °F<Temp<662 °F)
	±0.4°C at 200°C<Temp<500 °C
	(±O.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

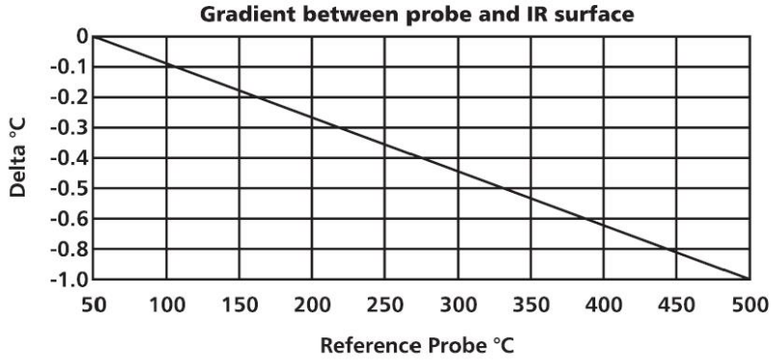
ENVIRONMENTAL CONDITIONS

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 ±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 ETI 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 11OV/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 red LED 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

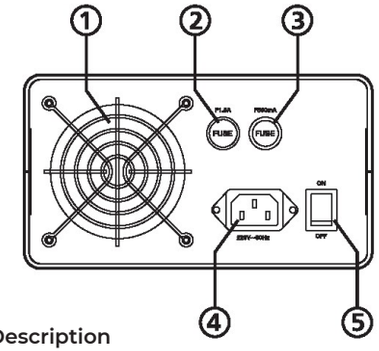


Fig 1. Back Panel Description

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.

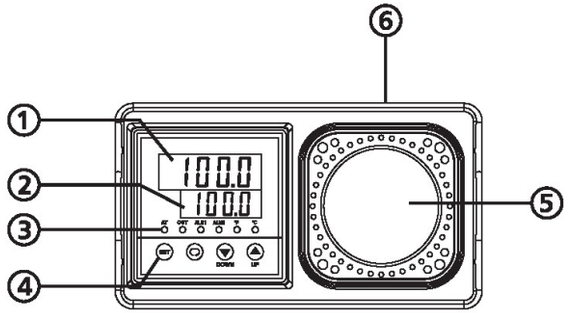


Fig 2. Front Panel Description

Controller Display
1 The red LED (the first line display) displays actual temperatures and settings for selected scale °C or °F.
2 The green LED (the second line) displays the set-point value and shows temperatures in units according to selected scale °C or °F.
3 The indicator of the operation state

- AT - Automotive parameter adjustment.(only used to factory for adjusted)
- OUT - The indicator of heat output with indication of the heating state of the target assembly
- ALM1 - 0verload alarm when the target assembly temperature 4 °C higher than the set temperature,indicates the heating power off
- ALM2 - 0verload alarm. when the target assembly temperature 4 °C higher than the set temperature,indicates the cooling with strong wind
- °F - °F temperature indicator
- 0°C - 0°C temperature indicator.

CONTROLLER KEYPAD
The four button keypad allows easy setting of the set-point temperature.

- SET - Used to confirm parameter settings.
- ↻ - The enter button .Used with the set button to enter configuration mode.
- DOWN - Used to decrease temperature value and change the unit °C to °F.
- UP - Used to increase temperature value and change the unit °C to °F.

5 Target assembly, The target assembly is 58 mm in diameter and has an emissivity at 0.95.
6 The test hole for the temperature sensor of the Reference thermometer.

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.

CHANGING DISPLAY UNITS.
The calibrator can display temperature in Celsius or Fahrenheit.
The temperature units are shipped from the factory set to Celsius and locked.

TO UNLOCK THE FACTORY SETTING:-
Press the "SET" and "↻" buttons at the same time.
After unlocking, first press the "SET" button for three seconds, the red LED on the first line will display

"CnPt", the second line green LED will display "pt2";

Release the "SET" button and press the "↻" button, the green LED on the second line will indicate the current temperature unit.

Press "DOWN" to select °F, press "UP" again to select °C. The chosen temperature unit will flash.
Press "SET" to confirm. The green LED will stop flashing, press "SET" again for the calibrator to return to operation mode.

In order to keep good operation, please lock the values after the temperature unit changed.
To do this –
- Press the "↻" button three times, red LED on the first line displays "LoC" ,the green LED on the second line displays "OFF".
- Press "UP" button two times, green LED will display "LoC2".
- Finally press "SET" to complete.

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 LED 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 LED 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 the resolution as given in the specifications. Be careful not to exceed the safe upper temperature limit of any probe inserted into the well.

- Press "UP" to increase temperature, or press "DOWN" to lower the temperature. The temperature will be changed in 0.1° increments every time the button is pressed.
  Pressing and holding down the button the temperature will change in 1° increments.
  The green LED display on the front panel will indicate the actual set temperature.
  When the set temperature changes, the values will flash.

- Release the "UP" or "DOWN" button and then press the "SET" button.

The calibrator will automatically control the target assembly temperature to reach the set temperature in the stated time. The red LED 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.