

# BR125

## Blackbody Calibration Source



# 1. Description

The BR125 is a rugged calibration source and suitable for use as a primary radiation source for calibration and verification of infrared thermometers.

The blackbody calibration source is designed by excellent emitter surface uniformity; and superior accuracy. It is utilizing a digital indicating temperature controller that allows for calibration of noncontact infrared thermometers over the temperature range  $-30^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The temperature controller uses the industry standard PID algorithms to control the emitter temperature to within  $0.01^{\circ}\text{C}$  of the set points.

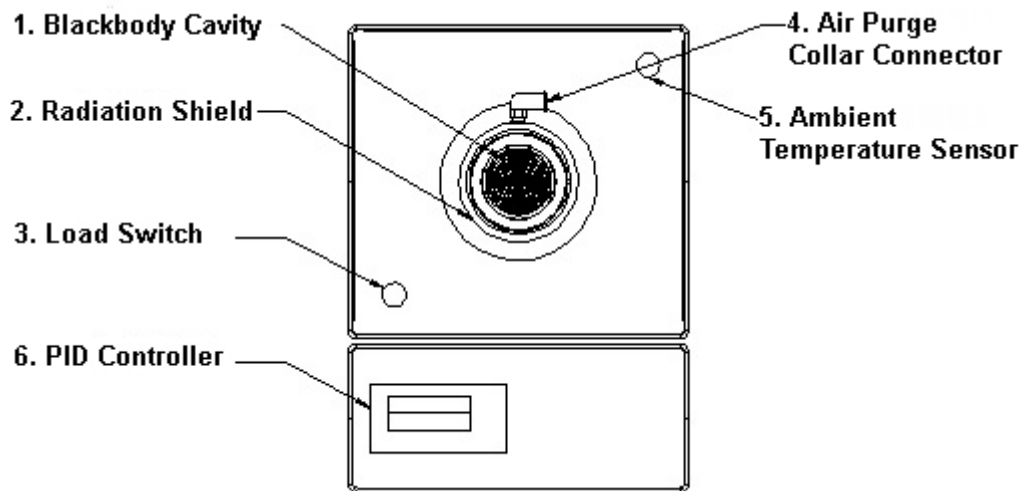
The blackbody emitter mechanism uses a semiconductor heating/cooling device that provides a long life and stable temperature control. The design and construction of this source is presented with the results of the metrological characterization of the blackbody. The special effort was made to reduce of the effect of moisture and ambient reflection.

## 2. Specification

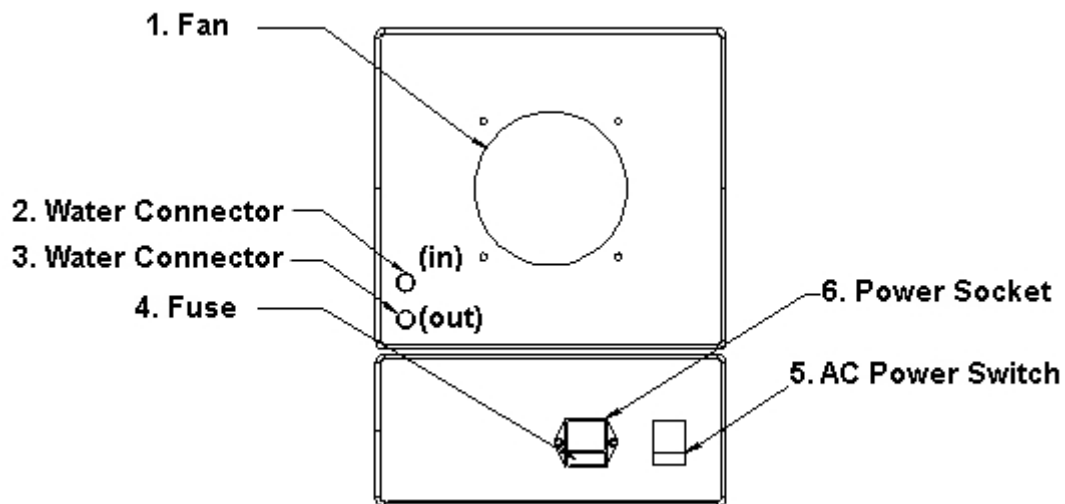
Temperature Range : -30.00°C to 125.00°C	Accuracy : ± 0.15% full scale
Temperature resolution : 0.01°C	Aperture : Φ 50mm
Emissivity : 5.00°C to 125.00°C ≥ 0.99 -30.00°C to 4.99°C ≥ 0.98	Temperature sensor : PT100
Controller : PID	Dimensions (L*W*H) : 230×230×325 mm
Warm-up time : 10°C / 15 min	Ambient Temperature : 0°C to 45°C
Stability : ±0.1°C / 30 min	Power supply : 230VAC ±10%, 50/60 Hz
Power consumption : 150 W to 200W	Weight : 7.5 kg

### 3. Introduction

#### Front Panel



## Back Panel



## 4. Cooling :

1.) When the temperature setpoint is between 0°C and -20°C, water cooling is not required; if the ambient temperature is lower than +27°C. Water cooling is recommended when the instrument is setting between -10°C and -20°C, if the ambient temperature is higher than +27°C.

Connecting the inlet water hose to a clean water supply, put the outlet water hose to an open drain and turn on the water, when the calibration temperature is setting below -20°C. The water cooling has to active and keeps the clean water running continuously; otherwise the cooling unit will be damaged easily.

## 5. Operation :

2.) Plug the power cord into a 220VAC outlet.

3.) Turn on the AC Power Switch on rear panel; the LED digitals on the PID temperature controller will light. The upper row of display shows the instrument temperature setpoint and

the lower row shows the ambient temperature.

4.) Pressing the “SET” button for 3 seconds till the upper row of display appears “SV”, to enter the setting mode. A digit will be flashing at the lower row; you can preset the temperature in this digit. Select any number of digits to set the desired temperature by pressing the button of “<”, “^”, or “v” repeatedly, and then press the SET button to confirm the setting.

5.) Turn on the Load Switch on front panel enable the calibrator starts operating.

#### **Example 1: Temperature setpoint at +40°C**

Turn the AC Power Switch on. Pressing the function button “SET” in PID controller for about 3 seconds till the upper row appears “SV” and a digit is flashing in the lower row. Set the lower row display to 40.00°C by pressing the “<” key to shift, press either “^” or “v” key respectively to raise and lower the temperature setpoint. Press the “SET” button to confirm. Enable the Load Switch, the calibrator starts to heat up. Start to calibrate after the instrument is stable at 40.00°C.

#### **Example 2: Temperature setpoint at -30°C**

Connect the water pipes first and turn the AC Power Switch on then pressing the “SET” button for 3 seconds till the upper row appears “SV”. A digit will be flashing at the lower row. You can

set the lower raw to -30.00°C by pressing the key “<” to shift, the“^” key to increase or the “v” key to decrease the temperature setpoint repeatedly, and then press the SET button to confirm the setting. Turn on the Load Switch; the calibrator starts to cool down. Starting calibration after the instrument is stable at -30°C.

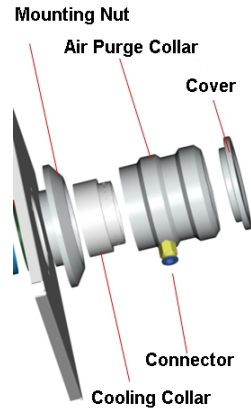
## 6. Air curtain

When the temperature setpoint is setting lower than ambient temperature, frost or condensation will form on the walls of blackbody cavity due to heat exchanging with the environment, which will reduce the emissivity and affect the accuracy of calibrator. At this condition, an air curtain needs using to prevent frost or condensation forming on the walls.

At first, you have to mount the air purge collar on the front of instrument. There is a connector on the collar; you need to connect one end of a rubber hose to the connector and the other end to the output of an air pressure regulator. Make sure screw the valve inlet of regulator to a nitrogen cylinder and slowly turn on the regulator control valve until the nitrogen gas is steadily at a pressure of 1 MPa.



Keeps the nitrogen flowing at a constant rate continuously; the nitrogen gas will produce an air curtain at the front of radiation cavity to isolate heat exchanging between the cavity and environmental. In this way, it can ensure the accuracy of calibrator.



## 7. Shutting Down

- 1.) Check the regulator outlet valve is complete shut off the nitrogen gas cylinder completely, when the calibration is finished.
- 2.) Do not turn off the water supply immediately after using the water cooling for a low temperature calibration. To prevent the inner of the hose freezing, turn off the water after the calibrator rises above 0°C.
- 3.) Make sure to reset the temperature setpoint equivalent to the ambient temperature, before turning off the Load Switch and AC Power Switch. Otherwise, the PID controller will quickly heat up or cool down the calibrator as previously setting when a new calibration is starting.
- 4.) Turn off the Load Switch and AC Power Switch.

## 8. Cautions

To avoid damage the infrared calibrator being used, follow these guidelines.

1. Maintaining a constant water flow through the instrument, when it is operating at low temperature. Keeps the water running continuously; otherwise the cooling unit will be damaged easily.
2. Do not use a dry cloth or paper towel to wipe the instrument, if there is water remaining in the cavity. This may damage the coating on radiation surface. By removing the air purge collar to pour out water then setting the temperature at 60°C. After 30 minutes, the condensed water will dry out automatically.

## 9. Package Content

- 1) BR125 blackbody calibration source
- 2) AC power cord
- 3) Two pieces of spare fuse
- 4) Inlet & outlet cooling water hose pipes
- 5) Operator's manual
- 6) Test report

## Warranty

Each product passes through a quality process. Nevertheless, if a failure occurs please contact the customer service at once. The period of warranty starts from the date of delivery of the product to the customer and shall cover a period of 12 months. This warranty shall not apply to fuses, batteries, or any product that has been subject to misuse, neglect, accident, or abnormal conditions of operation.

The manufacturer shall not be liable for any special, incidental or consequential damages, whether in contract, tort, or otherwise. If a failure occurs during the warranty period, the product will be replaced, calibrated or repaired without further charges. The freight costs will be paid by the sender. The manufacturer reserves the right to exchange components of the product instead of repairing it.

If the failure results from misuse, neglect, accident, or abnormal conditions of operation or storage, the user has to pay for the repair. In that case you may ask for a cost estimate beforehand.

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