

# Technical Note



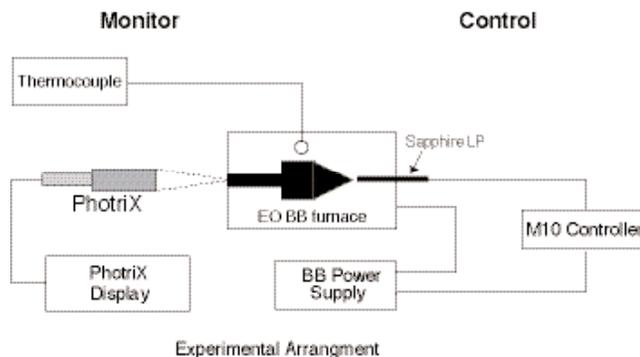
## PhotriX™ Ambient Temperature Compensation

### Introduction

Mikron's PhotriX™ Series of Infrared Thermometers (IRTs) is able to compensate for temperature variations in the ambient operating range from 10 to 60 °C with annual drift of less than 0.15 °C. Coupled with the excellent long-term stability and reproducibility of the PhotriX sensor, this provides an ideal solution for monitoring and control of application such as Furnace heating, Crystal growth and other very long processes where stability is of critical importance.

### Experimental Conditions:

An Electro-Optical Inc. Model LS-1050 black body (BB) furnace was used in this test to provide a constant 1000C temperature source. The furnace was held at a near constant temperature by a Luxtron M10 controller with a sapphire light-pipe BB sensor. An internal type K thermocouple was used to monitor the furnace temperature.

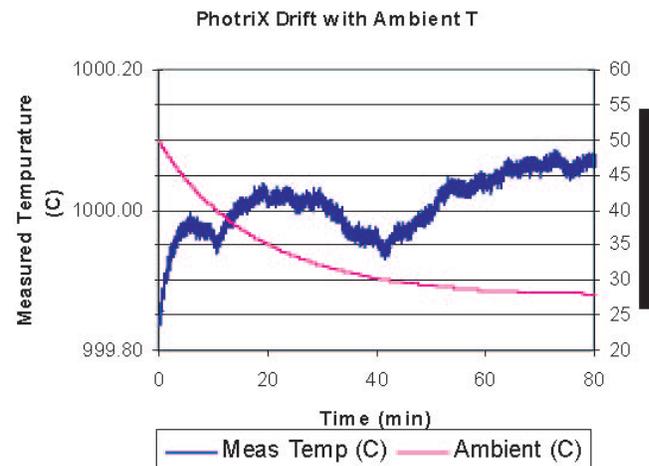


A PhotriX pyrometer, with 150mm focal length lens, was then carefully aligned to observe the BB furnace temperature through the calibration cavity of the furnace.

Over a two-hour period, the ambient temperature of the PhotriX was lowered from 50C to 28C while the observed temperature of the BB furnace was recorded as well as the temperature of the TC. Figure 1 shows a block diagram of the experimental configuration. The PhotriX ambient temperature was measured by an internal sensor which is used for the compensation of the observed output.

### Results and Conclusions:

The difference between the temperature measured by the PhotriX and the TC is shown in Figure 2 as a function of time. The ambient temperature of the PhotriX is also shown in the figure. The room temperature remained at a constant 23°C (+/-0.5°C).



It is clear that there is no significant effect on the measured black-body temperature as the ambient condition of the PhotriX unit changes. The PhotriX system displays a sensitivity of less than 0.2C over the 40C change in ambient temperature. The heat generated by the internal electronics of the PhotriX system will generally keep the system in equilibrium at approximately 27C when working under room conditions between 10 and 24C. Above 24C the PhotriX will run about +4C hotter.

At Mikron, we have an extensive background in all aspects of temperature measurement and control – from the underlying physics to heat transfer and mechanical design of sensors. If you have an application problem or question, call us. We'll be glad to assist you in selecting the proper sensors and system and to provide analytical support.