



ISO 9001



## M345X Series

### Large Area Precision Blackbody Calibration Sources For Test and Measurement Applications

Designed to satisfy the exacting parameters of focal plane array detectors, Thermal Imaging and FLIR systems testing in static and moving scene applications, Mikron's M345X Series blackbody calibration sources combine fast slew rates, high emissivity, and unchallenged stability and uniformity. As part of an extensive range of general purpose and primary standards for testing and calibrating a wide variety of IR devices, the M345X Series embodies the accumulated expertise of almost 30 years of specialization in this discipline.

**The M345X Series Blackbody Sources** are cooled and heated by precision thermoelectric modules, (Peltier method), and are available in absolute or differential configurations. The two piece system is comprised of a 19 inch rack mount controller and a separate emitter source enclosure. The sources are available in emitter sizes ranging from 4 x 4 inch (101 x 101mm ) up to 12 x 12 inch (305 x 305mm), and in a standard temperature range of -5.00° to 170.00°C.

**Temperature Control** is carried out by either a conventional precision digital PID controller, or optionally by an advanced ultra precision PID controller incorporating 16 points of output characterization. Characterization simplifies operation by eliminating the need for reference tables to correct for differences between controller temperature display and true emitter source temperature.

**Digital Communication Output:** An optional RS232C, RS422, RS485 or IEEE/GPIB communication link is provided by the Precision PID controller, for remote control of set points and other critical parameters of the controller. Standard connecting cable allows 12 feet (3.6m) of separation between source and controller.

**Mounting:** Controller modules are designed for standard 19 inch rack mounting. Emitter source modules are equipped with an optical bench mount base plate.

**Warranty:** The M345X Series is warranted for two years against failure due to defective parts or workmanship.

**Custom Designs:** Quotations for custom designs and variations are available based on client's specification.



# M345X Specifications

	M345X4	M345X6	M345X8	M345X12
<b>Emitter Area:</b>	4" x 4" (101 x 101mm)	6" x 6" (152 x 152mm)	8" x 8" (204 x 204mm)	12" x 12" (305 x 305mm)
<b>Temperature Range:</b> Absolute Mode: standard (See note 1) Differential Mode: optional		-5.00 to 170.00°C -25.00 to 150.00°C	based on reference plate temperature of 20.0°C	0.00 to 150.00 °C -20.00 to 130.00 °C
<b>Accuracy Standard (Thermometric Method):</b>	≤ 50mK			
<b>Temperature Resolution: Standard Controller</b> Optional Ultra Precision Controller		0.01°C 0.002°C temperature range -5.000 to 75.000°C		0.01°C 0.002°C
<b>Stability: Short Term: Standard Controller</b> Optional Ultra Precision Controller		±0.04°C for 8 hour period ±0.004°C for 8 hour period	temperature range -5.000 to 75.000°C	0.000 to 75.000°C
<b>Radiometric Emitter Source Non-Uniformity:</b>	±0.15°C at 50°C within center area of 3.5" x 3.5"	±0.2°C at 50°C within center area of 4" x 4"	±0.2°C at 50°C within center area of 6" x 6"	±0.3°C at 50°C within area of 10" x 10"
<b>Emissivity (effective) :</b> (see calibration method below)	+ 0.99			
<b>Temperature Sensor:</b>	Precision Platinum RTD 1/10 DIN			
<b>Method of Control:</b>	Precision Digital PID Controller			
<b>Method of Mounting Controller:</b>	19" Rack Mount			
<b>Method of Mounting Source Emitter:</b>	Base plate for optical bench mount			
<b>Calibration Check:</b>	A hole with diameter of 0.165" (4.2 mm) provided on top of source emitter plate for insertion of user RTD			
<b>Operating Ambient Temperature:</b>	23°C ± 5°C			
<b>Storage Ambient Temperature:</b>	-20 to 50°C			
<b>Power Requirements</b>	600 Watts	1000 Watts	1200 Watts	1200 Watts
<b>Voltage Requirements:</b>	115VAC standard; 230VAC optional			
<b>Interconnecting Cable Length:</b>	12' (3.6m)			
<b>Certificate of Calibration Traceable to NIST:</b>	Standard			
<b>Digital Communication Output:</b> Optional	RS232C, RS422, RS485 or IEEE/GPIB			

## Calibration Method

There are two distinctly different methods of calibration, each with its own application advantages. These methods are described as follows:

### Thermometric Method:

In this method, the surface temperature of emitting surface is precisely measured and controlled. The sensor is an ultra precision platinum RTD that closely monitors the temperature of the emitting surface. This method is widely used in aerospace industries, since it provides an easy method of periodically verifying calibration. A deep hole with a 0.165" (4.2 mm) diameter is provided for customer insertion of calibration RTD. Knowledge of emitter emissivity characteristic is needed for correct radiated energy computation.

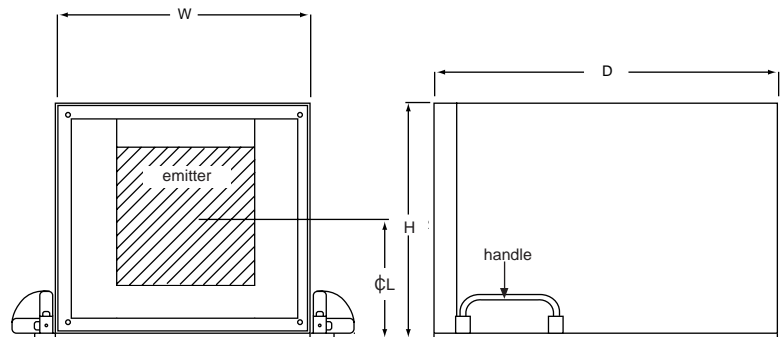
### Radiometric Method:

In this method, calibration is based on the energy radiated from the emitter surface at a desired spectral band. This emitted radiation is compared with the primary blackbody calibration source with emissivity of greater than 0.998, using a precision transfer standard. The advantage of this technique is that the characteristic of emitter emissivity has already been calibrated into the system. An effective emissivity of greater than +0.99 can be achieved. Recalibration or field calibration using this technique is more difficult and elaborate since highly precision primary blackbody calibration sources and transfer standard are needed.

## Emitter Source Weight and Dimensions

Model	Emitter Area	Dimensions W x H x D x $\phi$ L	Weight
M345X4	4" x 4" (101 x 101mm)	6" x 6" x 6" x 3.1"	12 lbs. (5.4kg)
M345X6	6" x 6" (152 x 152mm)	11" x 10" x 15" x 5.1"	29 lbs. (13kg)
M345X8	8" x 8" (203 x 203mm)	11" x 10" x 15" x 5.1"	35 lbs. (16kg)
M345X12	12" x 12" (305 x 305mm)	15.75" x 15.75" x 14" x 7.6"	52 lbs. (24kg)

## Blackbody Emitter Source



**Note 1:** Differential mode models are preferred for applications to determine minimum resolvable temperature difference (MRTD).

Mikron reserves the right to change specifications to reflect the latest changes in technology and improvements at any time without notice. These changes will be reflected in subsequent editions of our literature when warranted.



**MIKRON INFRARED, INC., 16 Thornton Road, Oakland, NJ 07436 USA**  
 Tel. +1-201-405-0900 • Fax: +1-201-405-0090  
 Tel. 1-800-631-0176 USA only  
 E-mail: info@mikroninfrared.com • Web Site: www.mikroninfrared.com

