LUMASENSE® TECHNOLOGIES

MANUAL

M316

Blackbody Calibration Source

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Contents

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1 General Information

1.1 Information about the user manual

Congratulations on choosing the high quality and highly efficient Mikron blackbody.

This manual provides important information about the instrument and can be used as a work of reference for installing, operating, and maintaining your blackbody. It is important that you carefully read the information contained in this manual and follow all safety procedures before you install or operate the instrument.

To avoid handling errors, keep this manual in a location where it will be readily accessible.

1.1.1 Legend

Note: The note symbol indicates tips and useful information in this manual. All notes should be read to effectively operate the instrument.

Warnings and Cautions: The general warnings and cautions symbol signifies the potential for bodily harm or damage to equipment.

1.2 Safety

This manual provides important information on safely installing and operating the M316 blackbody. Several sections of this manual provide safety warnings to avert danger. These safety warnings are specified with a warning symbol. You must read and understand the contents of this manual before operating the instrument even if you have used similar instruments or have already been trained by the manufacturer.

It is also important to continually pay attention to all labels and markings on the instrument and to keep the labels and markings in a permanent readable condition.

Warning: The blackbody is only to be used as described in this manual. It is recommended that you only use accessories provided by the manufacturer.

1.3 Limit of Liability and Warranty

All general information and notes for handling, maintaining, and cleaning this instrument are offered according to the best of our knowledge and experience.

All Mikron blackbodies from LumaSense Technologies have a regionally effective warranty period. Please check our website at http://info.LumaSenseinc.com/warranty for up-to-date warranty information. This warranty covers manufacturing defects and faults which arise during operation, only if they are the result of defects caused by LumaSense Technologies.

The warranty is VOID if the instrument is disassembled, tampered with, altered, or otherwise damaged without prior written consent from LumaSense Technologies; or if considered by LumaSense Technologies to be abused or used in abnormal conditions.

1.4 Unpacking the Instrument

When unpacking and inspecting your system components, you need to do the following:

1. Check all materials in the container against the enclosed packing list.

Note: LumaSense Technologies cannot be responsible for shortages against the packing list unless a claim is immediately filed with the carrier. Final claim and negotiations with the carrier must be completed by the customer.

2. Carefully unpack and inspect all components for visible damage.
3. Save all packing materials, including the carrier's identification codes, until you have inspected all components and find that there is no obvious or hidden damage.

Note: Before shipment, each instrument is assembled, calibrated, and tested at the LumaSense Factory. If you note any damage or suspect damage, immediately contact the carrier and LumaSense Technologies, Inc.

1.5 Service Request, Repair, or Support

Contact LumaSense Technologies Technical Support in case of a malfunction or service request. Provide clearly stated details of the problem as well as the instrument model number and serial number. Upon receipt of this information, Technical Support will attempt to locate the fault and, if possible, solve the problem over the telephone.

If Technical Support concludes that the instrument must be returned to LumaSense Technologies for repair, they will issue a Return Material Authorization (RMA) number.

Return the instrument upon receipt of the RMA number, transportation prepaid. Clearly indicate the assigned RMA number on the shipping package exterior. Refer to Section 1.6, Shipments to LumaSense for Repair, for shipping instructions.

Technical Support can be contacted by telephone or email:

Santa Clara, California

- Telephone: +1 408 727 1600 or +1 800 631 0176
- Email: support@LumaSenseinc.com

Frankfurt, Germany

- Telephone: +49 (0) 69 97373 0
- Email: eusupport@LumaSenseinc.com

Erstein, France

- Telephone +33 (0)3 88 98 98 01
- Email: eusupport@LumaSenseinc.com

1.6 Shipments to LumaSense for Repair

All RMA shipments of LumaSense Technologies instruments are to be prepaid and insured by LumaSense assigned shipper. For overseas customers, ship units air-freight, priority one.

The instrument must be shipped in the original packing container or its equivalent. LumaSense Technologies is not responsible for freight damage to instruments that are improperly packed.

Contact us to obtain an RMA number (if one has not already been assigned by Technical Support). Clearly indicate the assigned RMA number on the shipping package exterior.

Send RMA Shipments to your nearest technical service center:

Santa Clara, California

LumaSense Technologies, Inc.
3301 Leonard Court
Santa Clara, CA 95054 USA
Telephone: +1 408 727 1600
+1 800 631 0176

Email: support@LumaSenseinc.com

Frankfurt, Germany

LumaSense Technologies GmbH
Kleyerstr. 90
60326 Frankfurt
Germany
Telephone: +49 (0)69-97373 0

Email: eusupport@LumaSenseinc.com

1.7 Transport, Packing, Storage

With faulty shipping, the instrument can be damaged or destroyed. To transport or store the instrument, please use the original box or a box padded with sufficient shock-absorbing material. For storage in hµmid areas or shipment overseas, the device should be placed in welded foil (ideally along with silica gel) to protect it from hµmidity.

The blackbody is designed for a storage temperature of -20 to 60 °C with non-condensing conditions. Storing the instrument out of these conditions can cause damage or result in malfunction of the blackbody.

1.8 Disposal / decommissioning

Inoperable Mikron blackbodies must be disposed of in compliance with local regulations for electro or electronic material.

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2 Introduction

2.1 Description

The M316 is a portable blackbody calibration source utilizing a digital indicating temperature controller that may be set to any temperature between ambient temperature to 300C (572F). A precision RTD temperature sensor is embedded in the blackbody emitter providing high accuracy and repeatability. The temperature controller uses the industry standard PID algorithms to control the emitter temperature to within +/-0.3 °C. The blackbody emitter mechanism uses a resistive heating device that provides long life, short stabilization times and stable temperature control.

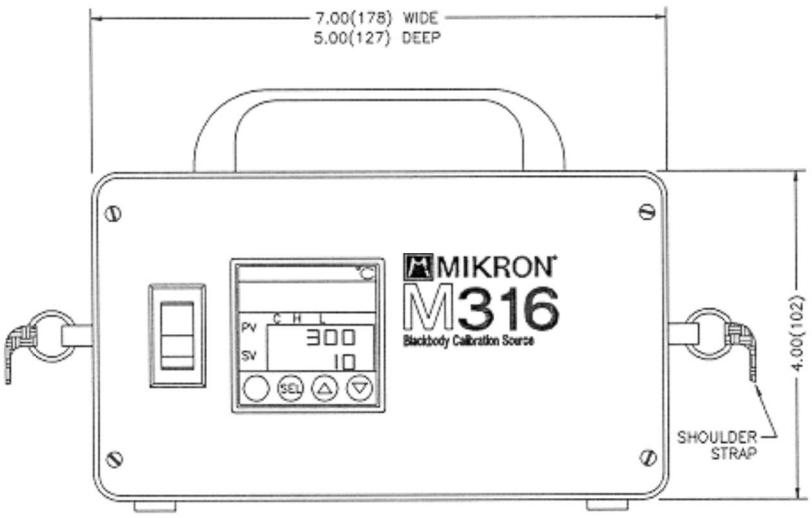
2.2 Background Influence on Blackbody Apparent Emissivity

When using a blackbody source at temperatures well above ambient, common sense dictates how the blackbody will behave. When using a source close to ambient temperatures, different things happen. Since the background such as the room, wall, and you could be warmer than the blackbody emitter, the energy emitted from the emitter is the sum of the background reflection and the emitter temperature. When emitter emissivity is less than 1.0, the background energy times (1-emissivity) reflects to the device under calibration. For this reason, the M316 may appear to have a higher "apparent emissivity" near ambient than when operated at higher temperatures.

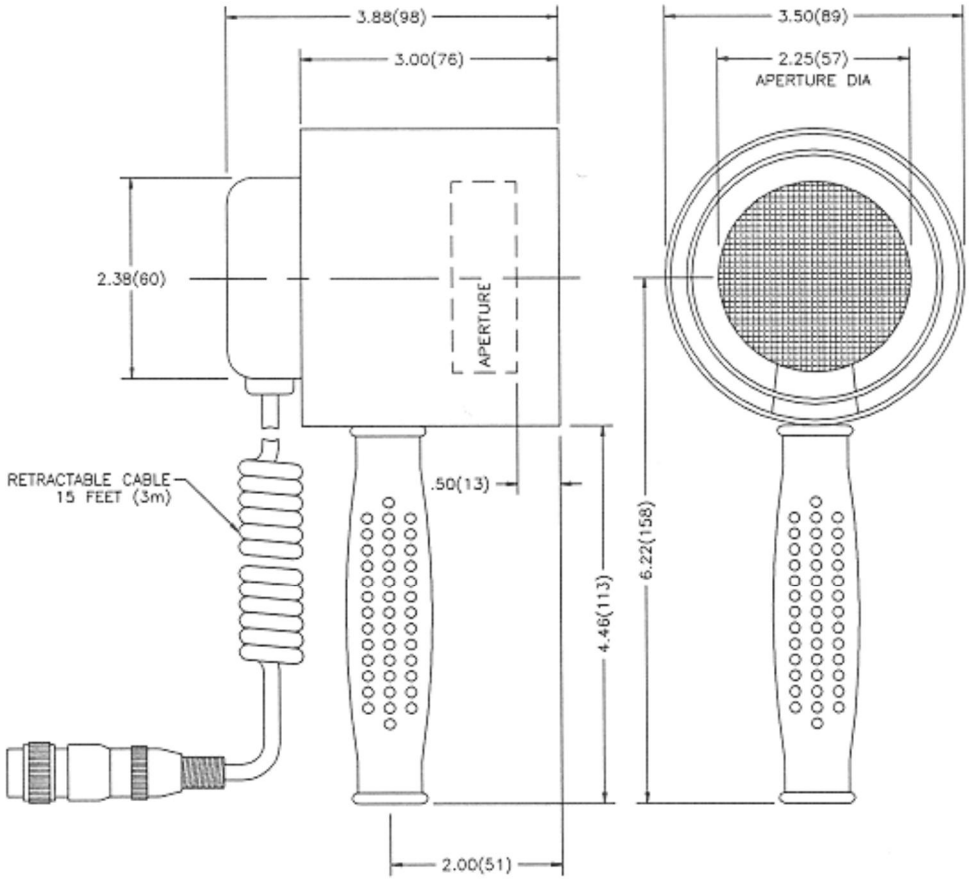
2.3 Technical Data

Temperature Range:	Ambient 10 °C to 300 °C
Accuracy:	0.5% of reading ±1 °C.
Temperature Resolution:	1 degree
Stability:	0.5 °C per 8 hour period
Aperture Diameter:	57 mm (2.25 inches)
Emissivity:	1.0 at 8-14 µm
Temperature Sensor:	Precision platinum RTD
Method of Control:	Digital PID Controller
Warm-up Time:	10 minutes from room temperature to 200 °C
Operating Ambient Temperature:	0 °C to 50 °C or 32 °F to 122 °F
Method of Mounting: Blackbody Module Control Module	 Handle Grip or 1/4 -20 tapped hole for tripod mounting Bench mount or shoulder strap for field use
Power Requirements:	115V AC ±10% 50/60 Hz 300W max. (220V AC Optional)
Dimensions:	See Section 2.4.
Weight:	Blackbody: 0.90 kg (2.0 lbs) Controller: 0.70 kg (1.5 lbs)

2.4 Dimensions



M316 Controller



M316 Blackbody

3 Installation & Operation

3.1 Installation

3.1.1 Location

The 2-piece M316 features maximum portability and flexibility for field calibration or verification without the need to remove the sensor from its location. The calibration source is contained within a compact, lightweight hand-held housing permitting the operator to position the source more easily in hard to reach locations. The indicating controller is carried via a handle or a convenient shoulder strap.

3.1.2 Line Voltage

Read the specification label on the rear panel to ensure the AC LINE voltage you are about to use matches the voltage on the M316 label (100 or 115 or 220vac at 150W maximum).

3.2 Operation

3.2.1 Powering ON

Power the M316 by turning on the power switch on the front panel. The controller will go into self test mode, and the blackbody will start to go the temperature setpoint that was last used prior to power down. The upper display is the setpoint temperature. The lower display is the current emitter temperature.

3.2.2 Changing the Setpoint

To change the temperature setpoint (upper display), Press either the up or down buttons on the controller. Each press will advance the setpoint 1 degree. To advance faster, press and hold for 5 seconds until it advances a few degrees/second. Let go when it is near the desired setpoint. Press again to bring it to the exact value desired. Note that this setpoint will be retained when power is turned off.

3.2.3 Powering OFF

To power down, simply turn the power switch off.

The temperature controller has been factory set for optimum performance. Any attempt to alter the set-up routines within may render the M316 inoperable.

3.2.4 Changing Temperature Units (C-F, F-C)

The controller has been locked out except for setpoint change to hinder tampering with important control settings. If you need further detail or clarification, please follow the controller operating instruction in the controller manual enclosed with the unit.

3.2.5 PID Tuning Constants

The PID tuning constants have been factory set for optimum performance. Altering these parameters will void the warranty and will require assistance from LumaSense to restore it.

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Index