MicroCure
And
MicroCure Plus
Instruction Manual

MicroCure Radiometers and DataReader

MicroCure And MicroCure Plus Instruction Manual

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Application of Council Directive 89/336/EEC Electromagnetic Compatibility Standards
to which conformity is declared: EN55011: 1991 and EN50082-1: 1992.

Introduction

The MicroCure and MicroCure Plus radiometers are electro-optical devices that measure the ultraviolet light that a work piece receives in a UV curing system. The MicroCure measures UV dosage while the MicroCure Plus measures dosage *and* peak intensity. Both units are spectrally responsive to the UVA range (320-390nm). Their compact size makes it possible to get measurements in curing applications that were previously inaccessible to radiometers - label, bottle, or CD printing, container decorating, and many web press applications. The MicroCure is inserted into a process before the UV source and then extracted immediately afterward, prior to reaching areas such as print stations or die cutters.

Figure 1. MicroCure

Handling Precautions

Due to the radiometer's case configuration and the applications for which it was designed, the following precautions should be observed to ensure the radiometer's performance:

- Do not let the MicroCure radiometers travel through print stations, die cutters, pinch rollers, or other processes which may damage either the radiometers or your equipment.

- Do not short the two case sides of a MicroCure together. Doing so will reset the unit and clear any stored data.

- Do not allow MicroCure radiometers to touch each other. Data loss or corruption may occur.

- Do not mark or label the MicroCure radiometer case.

Operation

Operation of the MicroCure and MicroCure Plus is the same, except that the MicroCure Plus is also capable of measuring peak irradiance.

WARNING!

Risk of exposure to ultraviolet light. Although this product is not a source of UV light, it is used in a UV environment. Refer to the UV source's documentation for recommended protective measures.

1. Insert the MicroCure into the slot in the upper left side of the DataReader.

2. Press the RESET button to turn on the unit. The DataReader will briefly display the software version (Px.xx), "rxx" where "xx" is the number of unit resets, then "0.00" to indicate that the unit is ready to take a reading.

3. Place the MicroCure into the UV process with the optics aperture facing the direction of the UV source.

<u>NOTE:</u>

The MicroCure must be exposed to UV light within four minutes after being reset. Otherwise, it will go into standby. The DataReader automatically shuts down after thirty seconds of inactivity.

4.   Remove the MicroCure from the UV environment and place it back into the slot in the DataReader.

5.   Press the SELECT button. For a standard MicroCure radiometer, the DataReader will display the UV dosage in Joules per square centimeter (J/cm^2). For a MicroCure Plus radiometer, the DataReader will display either the dosage or the intensity (in W/cm^2). Press and hold the SELECT button to toggle between dosage and intensity.

6.   Press the RESET button when the reading is displayed to clear the current reading and set the MicroCure for its next reading.

Error Messages

The DataReader displays error messages if there is a problem with it or the MicroCure.

If "----" is displayed, communication between the MicroCure and the DataReader has failed. Re-insert the MicroCure in the DataReader and try again.

If "LO BATT" is displayed, the MicroCure's battery is low. If this occurs within its 200-reading/ 1 year limitation, the unit or battery may be defective. Contact EIT for assistance.

When the DataReader's battery is low, it will scroll the word "LO" ten times and then shut down. Refer to the Maintenance section of this manual for replacement instructions.

If the DataReader displays a numeric error code, contact EIT for assistance.

Applications

<u>Establishing A Cure Or Process Window</u>

A cure or process window is a set of parameters that defines equipment settings and run conditions to ensure proper curing. A cure window gives the user an edge in troubleshooting deficiencies in a UV process. Ideally, tests are run for every combination of coating and substrate so that a history can be obtained. This history helps establish baseline parameters for various chemical/material combinations and provides important information for process control. The operator can compare a current measurement to the cure window and adjust his process to get the desired curing results.

<u>The Process Value</u>

The process value is often defined as the total dosage or total energy produced by the system. It is the mathematical integration of lamp intensity over time. The MicroCures derive this value by measuring instantaneous lamp intensities during the run and then summing them together. The process value must be maintained to get complete UV curing every time.

<u>Bottle Printing, Can Decorating, CD Printing</u>

The small size of the MicroCure radiometer provides extra flexibility to read UV light in a variety of ways that were previously impossible. They can be placed inside cans, tubes or bottles, put into CD nests, or mounted on odd-shaped items which require UV curing.

<u>Web Presses</u>

The MicroCure is able to travel vertically and between idler rollers. This makes it ideal for narrow and wide web applications. Mounting the MicroCure to a web can be as simple as using double-sided tape to attach it and a shunt or arm to remove it. A set of devices designed specifically for the insertion and removal of

MicroCures is available from EIT, and is described later under Optional Accessories.
Caution should always be exercised when inserting or removing MicroCures from web applications.

<u>High Speed Applications</u>

The MicroCure's sample rate of 2000 samples per second produces accurate readings at high system speeds. Ideally, a MicroCure is jogged through a web process to make its application and removal from the process easier. Since dosage readings are directly proportional to exposure time, a reading for a high-speed system can be derived from a reading taken at a slower speed. For example, if the system speed is usually 600 feet per minute, jog the system down to 60 fpm and take a dosage reading. This reading represents the UV dosage of the system at 1/10th the speed. To translate this to 600 fpm, simply divide the dosage reading by 10.

NOTE:
Irradiance readings with the MicroCure Plus should be consistent and are not dependent on speed. The MicroCure Plus should register similar irradiance readings when consistent data collection techniques are followed.

Maintenance

<u>MicroCure Radiometer</u>

Clean the radiometer's aperture with a cotton swab and isopropyl alcohol.

Use isopropyl alcohol and a soft cloth to clean the case of the radiometer.

Do not open the radiometer's case. There are no user-serviceable parts inside the unit.

The MicroCure radiometer is given a one-time calibration before it is shipped from EIT. It is specified to take 200 readings or last for one year. Once the unit meets one of these conditions, it must be replaced.

<u>DataReader</u>

The only maintenance required for the DataReader is occasional battery replacement. The DataReader will indicate a low battery condition by scrolling "LO" across its display.

Remove the two screws from the plate on the left side of the DataReader.

Remove the battery and replace it with a new 9-Volt lithium or alkaline battery.
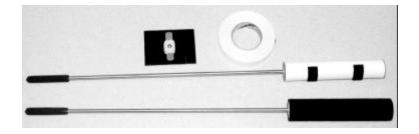
Reinstall the access plate and screws.

Standard Equipment
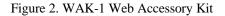
The MicroCure and MicroCure Plus basic sets consist of:

- 1 – MicroCure or MicroCure Plus radiometer
- 1 – DataReader display unit
- 1 - Carrying Case
- 1 - User's Manual

Optional Accessories

Replacements and spares of any item listed above may be ordered directly from EIT, Inc. or any of its authorized representatives.

A Web Accessory Kit, shown in Figure 2, is available for placing and removing MicroCures in UV systems.

Figure 2. WAK-1 Web Accessory Kit

Ordering Information

The following is a list of the MicroCure family of products and their EIT model numbers. Please use these numbers when placing your order.

MicroCure Radiometer High Power	MC - 10
MicroCure Radiometer Low Power	MC - 2
MicroCure Plus Radiometer High Power	MCP - 10
MicroCure Plus Radiometer Low Power	MCP - 2
DataReader	MCR - 2000
Carrying Case	CC1
DataReader Battery	DRB
Web Accessory Kit	WAK - 1

Table 1. Model Number List

Specifications

MicroCure and MicroCure Plus Radiometers	
Power Range	Low Power (-2): 100mW/cm^2 to 2W/cm^2; High Power (-10): 500mW/cm^2 to 10W/cm^2 Display flashes if over-ranged.
Spectral Response	UVA (320-390nm)
Sample Rate	2000 samples per second
Total Energy	0 to 9999 Joules/cm^2. Display flashes if over-ranged.
Energy Accuracy	+/-7% typical @25°C. -0.2% per ^{o}C over operating range
Peak Irradiance (MicroCure Plus only)	Low Power: 100mW/cm^2 to 2W/cm^2; High Power: 500mW/cm^2 to 10W/cm^2 Display flashes if over-ranged.
Peak Irradiance Accuracy	+/-7% typical @25°C. -0.2% per ^{o}C over operating range
Spatial Response	Approximately cosine
Operating Temperature Range	15-70°C internal
Time-out Period	4 minutes nominal after last UV exposure
Batteries	Permanent lithium cell
Battery Life	200 readings with typical use or 1 year
Dimensions	1.30" long x 1.0" wide x 0.25" high (33.0mm x 25.4mm x 6.4mm)
Weight	0.33 oz (9.4 grams)
Materials	Plated aluminum, nylon
DataReader	
User Interface	Push button switches allow user to display data or reset the unit.
Display	4 digit liquid crystal display
Dimensions	5.75" long x 4.38" wide x 1.2" high (139.7mm x 108mm x 25.4mm)
Weight	11.75 oz. (333.11 grams)
Operating Temperature Range	0-70°C
Timeout	30 seconds
Battery	9Volt Lithium; 36,000 readings or 5 years Alkaline battery life not specified.
Materials	Steel, nylon, polycarbonate

Specifications subject to change.

Table 2. MicroCure and DataReader Specifications

Case Dimensions

The physical dimensions of the MicroCure radiometer and the DataReader are shown in Figure 3, below.
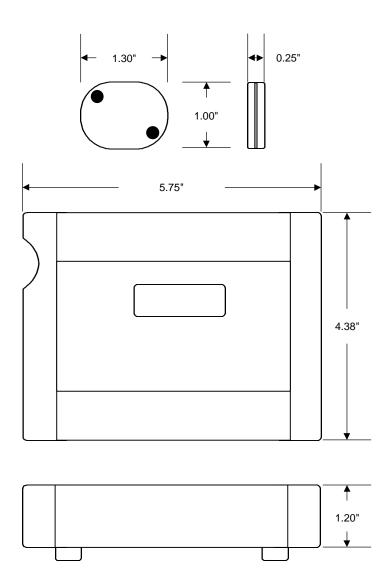
Figure 3. MicroCure and DataReader Case Dimensions

Warranty and Returns

<u>Contacting EIT</u>

EIT, Inc. can be contacted for customer service support via the following means:

EIT, Inc. - Instrument Markets
108 Carpenter Drive
Sterling, VA 20164

Voice: (703) 478-0700
Fax: (703) 478-0815
E-mail: uv@eitinc.com
Internet: www.eitinc.com

<u>New Equipment Warranty</u>

EIT, Inc. warrants that all goods described in this manual (except consumables) shall be free from defects in material and workmanship for a period of six months after delivery to the buyer.

At its discretion, EIT will replace or repair the defective goods. EIT will provide all repair support at no cost to the buyer only if the defective goods are returned, freight prepaid, to EIT during the warranty period.

EIT, Inc. shall be relieved of all liabilities under this warranty if:

1. Upon inspection, the goods show evidence of becoming defective due to abuse, mishandling, accident, alteration, negligence, lack of routine maintenance, or other causes beyond our control.

2. The goods have been repaired, altered, or modified by other than EIT authorized personnel.

3. The buyer does not return the defective goods, freight prepaid, to EIT within the applicable warranty period.

There are no warranties that extend beyond the description on the face hereof.

This warranty is exclusive of any and all other warranties, expressed or implied. This includes merchantability and fitness, as well as any and all other obligations or liabilities of EIT, Inc. EIT, Inc. shall not be responsible for consequential damages resulting from malfunctions of the goods described in this manual.

This warranty shall not apply to any item not manufactured by EIT, Inc.
<u>Calibration and Repair Warranty</u>

The warranty for repair service and periodic calibration is as stated previously for new units, except that the warranty period is ninety (90) days.

Following are the instructions for warranty returns.

<u>Warranty Returns</u>

When returning the equipment under warranty, include any accessories sent with the equipment so that EIT can verify correct operation of these accessories.

Please return the equipment in the original (or equivalent) packaging. If the original packaging is not used, you will be responsible for damage incurred from inadequate packaging.

The purchaser is responsible for insuring the unit during transportation to EIT, Inc.

Equipment repaired under warranty will be returned to the user with no charge for the repair or shipping. EIT will notify you of repairs not covered by warranty and their cost prior to performing any work on the equipment.

EIT, Inc. reserves the right to make changes in design at any time without incurring any obligation to install the same on units previously purchased.

Ship the unit, freight prepaid, to:

> EIT, Inc. - Instrument Markets
> 108 Carpenter Drive
> Sterling, VA 20164

A Return Material Authorization is not needed when shipping the unit back for warranty service. Include your company name, address, telephone number, fax number, and/or e-mail address on your shipping documents. You will be advised of the RMA number and expected turnaround time after the unit is received at EIT.

Non-warranty Returns

Repair service is provided by the Instrument Markets group of EIT. Repair service on calibrated units includes calibration after the repairs are effected.

Please return the equipment in the original (or equivalent) packaging. If the original packaging is not used, you will be responsible for damage incurred from inadequate packaging.

The customer is responsible for insuring the unit during transportation to EIT, Inc.

Ship the unit, freight prepaid, to:

> EIT, Inc. - Instrument Markets
> 108 Carpenter Drive
> Sterling, VA 20164

A Return Material Authorization is not needed when shipping the unit back for calibration or repair. Include your company name, address, telephone number, fax number, and/or e-mail address on your shipping documents. You will be advised of the RMA number and expected turnaround time after the unit is received at EIT.