MACHINE SOLUTIONS INC.

VelaTechnologies
3D UV curing solutions

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

WELCOME

Thank you for purchasing your new Minicure 3D. At Machine Solutions Inc. (MSI), we are dedicated to bringing innovative process development solutions to both medical device and nonmedical organizations. MSI looks forward to helping your organization provide life-improving devices to your customers, today and tomorrow.

MACHINE DESCRIPTION

The MiniCure3D (MC3D) systems are true three-dimensional curing systems for assembling or coating small devices with UV-cured adhesives or coatings. The heart of the MC3D is the VelaCure curing chamber. This chamber produces extremely uniform irradiation on the parts being cured, resulting in uniform cure of all surfaces on the part. Simply place your part in the MC3D chamber, close the lid and expose it. No rotation of the part or light source is required. The MC3D cures all the surfaces, all at once.

The uniformity allows precise knowledge of the irradiance on the part during cure. Prior to the VelaCure technology, only the exitance from the light guide could be measured; the irradiance on the part could only be inferred. This is a revolution in 3D curing, providing you with confidence that your parts are being cured consistently and completely.

The user interface is a simple, user-friendly touch screen control panel; no programming is required. Once the user-input target time or dose is reached, the MC3D terminates the exposure automatically.

All versions of the MC3D (excepting the "manual" version) include automatic control of the exposure by measuring the UV being within the chamber. There are two exposure modes: TIME and DOSE. In DOSE control mode, the MC3D-LED monitors the chamber irradiance and exposes your parts until the user-input dose (in J/cm^2) has been reached. If for any reason, the chamber irradiance declines, the MC3D will extend the exposure time to compensate for the loss of irradiance. This ensures a consistent curing cycle exposure after exposure. In TIME mode, the exposure runs for the user input time.

During exposure, the chamber is locked closed to prevent unintentional opening and spoiling of product.

As an added advantage, the LED version of the MiniCure3D has the light source integrated into the MiniCure itself. Depending on what model you choose, there are either six or eight internal LEDs coupled to the curing chamber to produce the wavelength(s) compatible with your adhesive or coating. Commonly available wavelengths are 365nm, 385nm, and 405 nm. Any combination of LED wavelengths can be provided.

The MC3D may be calibrated using a NIST traceable radiometer compatible with UV source being used.

Both models are supplied with mounting accommodation for user designed fixturing to hold parts during treatment. Additionally, the MC3D may be mounted in a vertical orientation if desired. The touch screen interface may be rotated in 90° increments to accommodate vertical orientation.

This manual applies to all versions of the MiniCure3D. Commonalities are presented in the main sections; see the Appendices for discussion on options and information related to your particular MiniCure (including customizations if any). Due to the variety of MiniCure versions offered, some photos may not match your version.

SAFETY

Warnings, Cautions and Notes used here guide have the following meanings:

⚠️ **WARNING:** **Indicates procedure or situation that may result in injury or death if instructions are not followed.**

⚠️ **CAUTION:** **Indicates procedure or situation that may result in damage to equipment or property if instructions are not followed.**

ℹ️ *NOTE: Emphasizes important information.*

Interlock. When an exposure is underway, UV radiation is present within the MiniCure3D chamber. All MiniCure3D units are provided with a magnetic lid locking system as well as an interlock switch designed to inhibit the UV source when the lid is opened.

⚠️ **WARNING:** **The lid locking and interlock mechanisms should be tested periodically to ensure proper operation**

UV radiation. When in use, the MC3D systems will produce UV radiation. Eye and skin damage may result from viewing direct or reflected UV radiation. Always wear proper UV protective equipment when operating a MC3D. In particular, always wear UV protective eyewear and gloves.

⚠️ **WARNING:** **UV radiation is present inside the MC3D when the LEDs are energized. Wear proper protective equipment to shield eyes and skin from UV exposure. Never look directly into the MC3D chamber when UV is present.**

UV Curable Materials. Please consult your UV materials supplier for recommended precautions regarding the proper handling, use and disposal of these products.
Do not cure large quantities of UV curable materials that may have spilled inside the chamber; the exothermic reaction may cause thermal damage to the MC3D chamber floor. See Care and Maintenance section for proper cleaning procedures.

⚠️ **CAUTION:** **This system is intended for use on assemblies with small quantities of UV curable material. Do not cure large volumes of UV curable material inside the MC3D. Do not cure large spills inside the chamber.**

MINICURE3D VERSIONS & OPTIONS

Versions

Table *1*. MiniCure3D variations lists the various versions of the MiniCure3D.

Table 1. MiniCure3D variations

UV Source	MiniCure3D Version	Chamber dimension (LxDxH, inches)	Control method	Wavelengths
External light guided spot cure lamp	MiniCure3D-4B	4x3x3	None; uses lamp controls	Per lamp
	MiniCure3D-4E	4x3x3	Integrated controller w/touchscreen	
	MiniCure3D-9E	9x3x3		
	MiniCure3D-9E With "HiTop" Option	9x3x4		
Internal LEDs	MiniCure3D-4L	4x3x3	Integrated controller w/touchscreen	6 LEDs: 365, 385, 405 nm (specify at order)
	MiniCure3D-9L	9x3x3		8 LEDs: 365, 385, 405 nm (specify at order)
	MiniCure3D-LED/9L With "HiTop" Option	9x3x4		

Options

All integrated controller versions are available with an optional internal NIST traceable calibrated radiometer. This eliminates the need for daily calibration checks.

Additionally, LED versions are available with remote control and live dimming options.

Options are discussed in the Appendices.

Contact Machine Solutions for information on these options.

SETUP

The MC3D and the MC3D-9E/9L incorporate different bushing options for handling your part. Both have mounting accommodation for custom fixturing, whereas the MC3D is provided with configurable Delrin bushings, and any options specified at purchase. Please review the following figures to familiarize yourself with the MiniCure systems.

Read and follow these instructions to prepare your MiniCure3D for use.
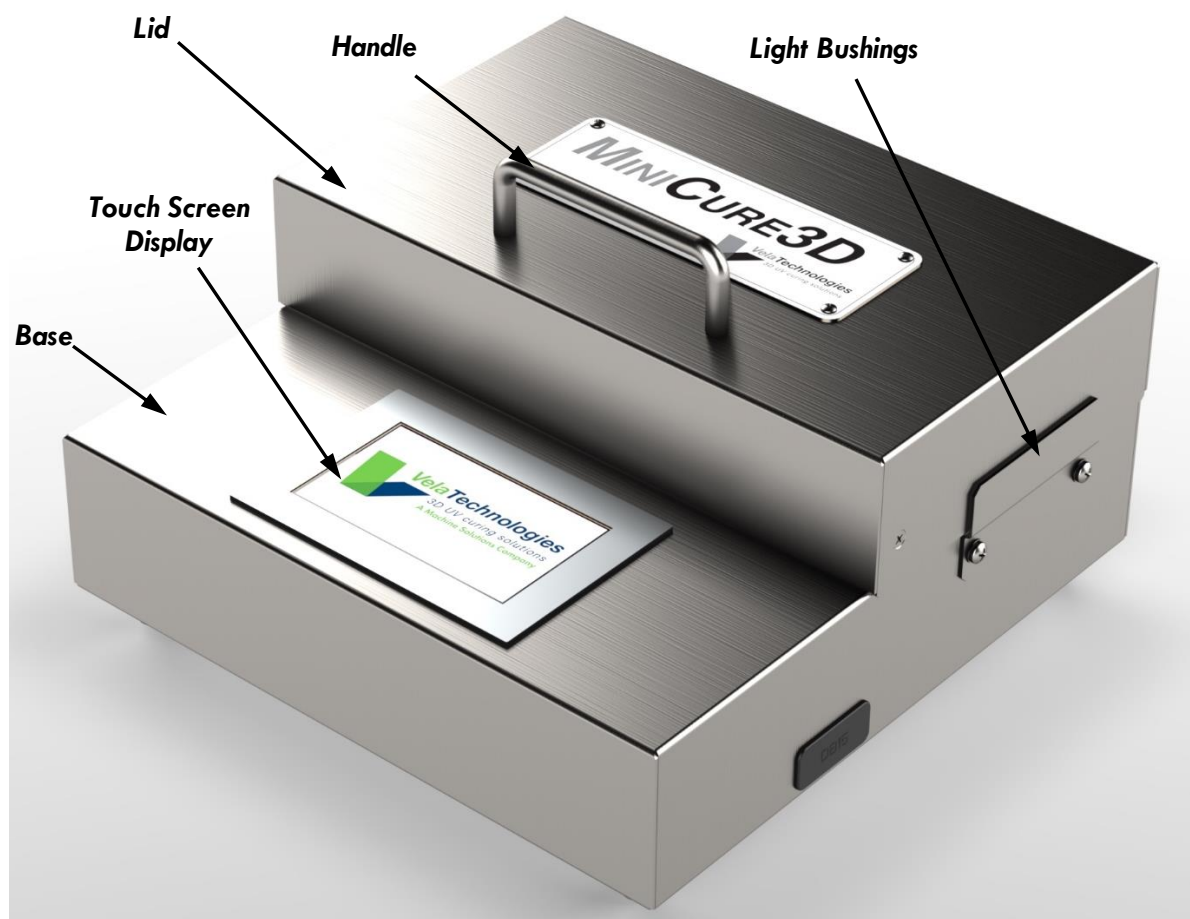
Figure 1. Front View of MiniCure3D-9E/9L

Power Adapter. Your MiniCure unit is provided with an AC adapter.

Connect the AC adapter cable to the connector on the rear of your MC3D unit. Connect to the rear of the MC3D unit and then connect to the power source.

⚠️ **WARNING:** **Connect AC adapter connection to the MC3D unit prior to connecting to the power source.**

⚠️ **CAUTION:** **Connect only the power source supplied with your MC3D. Using other supplies may result in damage to the unit.**

⚠️ **CAUTION:** **On LED units, ensure that cooling air intake on bottom of unit is not obstructed. Feet height indicates minimum open areas requirement for proper cooling.**
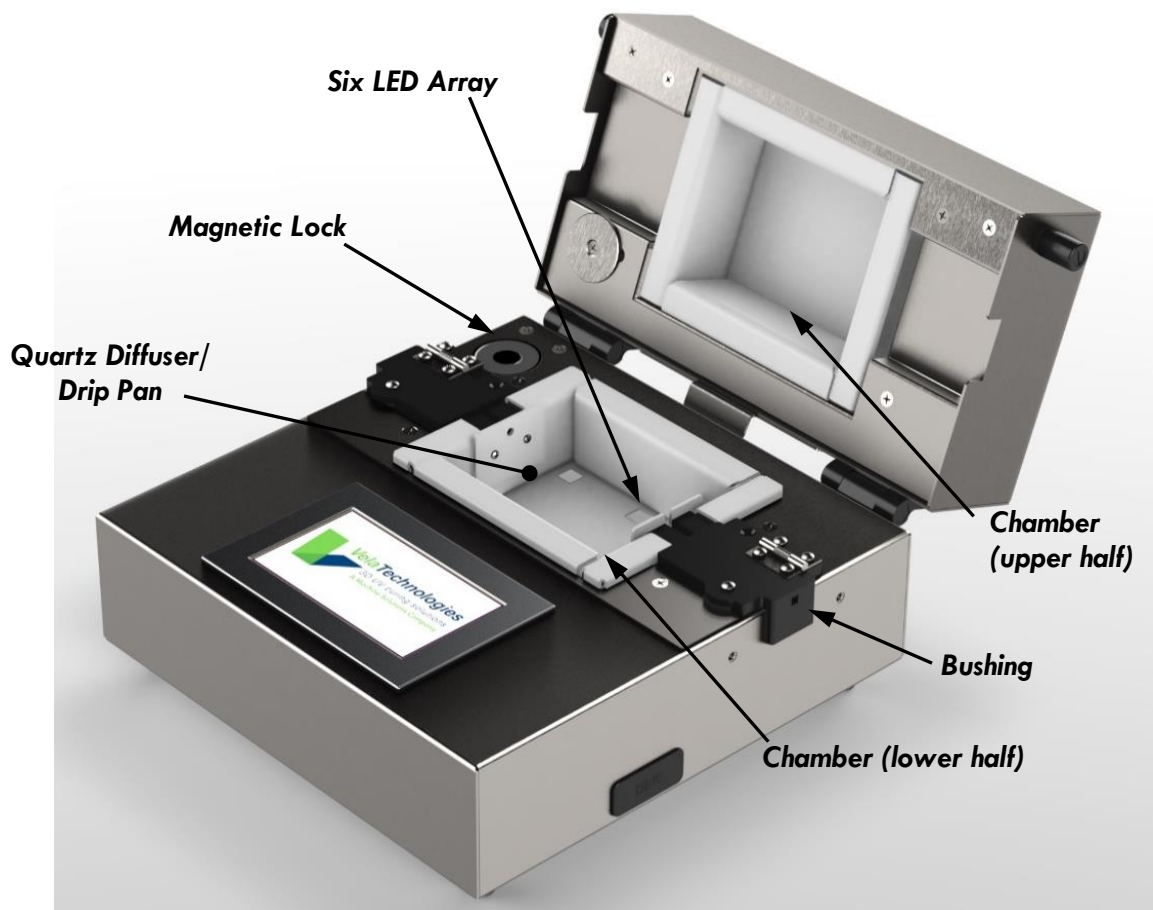

Figure 2. MC3D-LED, lid open, showing chamber and bushing details

Footswitch (optional). All MinCure3D units include an input for an optional, footswitch (3.5mm mono phone jack, or 3.5 mm TS jack, located on the unit's rear panel). The shield on the connector is common to the MC3D chassis. Only a momentary, normally open footswitch may be used.

Footswitches with an attached, terminated cable are available from Vela.

Drip pan. Your MiniCure3D unit is supplied with a drip tray pre-installed. Clean the drip tray of spills and drips as they occur; do not allow them to accumulate.

See Care and Maintenance section for drip tray cleaning instructions.

Part supports (optional). Custom part support is available; contact Machine Solutions for more information.

Hinge adjustment. The rear hinges are designed to provide a soft close. Adjust the opening and closing force as desired using the central adjusting screw on each hinge.

Figure 3. MC3D-9L, lid open, showing chamber and bushing details. Note the differences in bushing design compared to the non-9E/9L version above
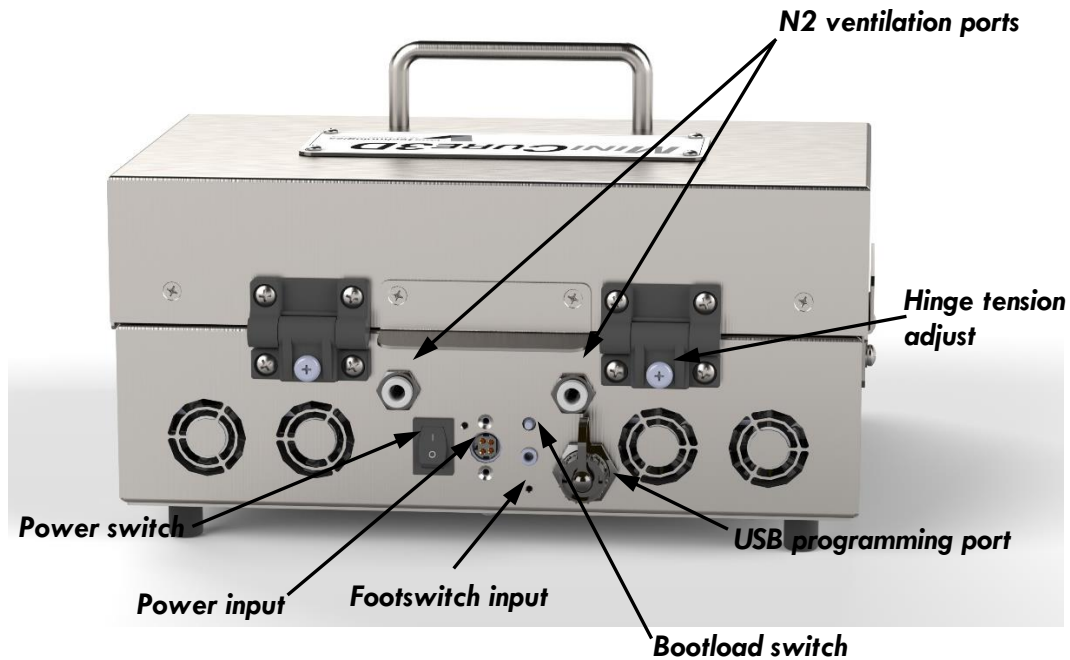
Figure 4. Rear view, MC3D-9L

⚠ **CAUTION:** **Avoid getting finger oils on the chamber walls and drip pan. When handling the chamber or drip pan, wear clean, powder-free gloves.**

⚠ **CAUTION:** **Do not press into the chamber walls; they are compressible. Accumulated compressions will degrade performance.**

⚠ **CAUTION:** **Use care when cleaning the drip tray. Do not Avoid over application of pressure as the quartz tray could crack.**

Parts Placement and Fixturing

Your parts should be located within the cure zone of the chamber. Generally, the cure zone is about 0.25 inches (6.35mm) from all chamber walls and not directly above any LED or in front of the light guide port. Fixturing placed inside the chamber should be as small as possible and fabricated from highly UV transparent (or reflective) material such as quartz (or Teflon). This will minimize the effect of the fixturing on irradiance and uniformity.

Please consult Machine Solutions for fixturing advice and engineering of custom fixtures.

MC3D OPERATION

The MiniCure3D line of curing systems includes a 4.3" touch-screen LCD display user interface (excepting the "manual" version). Each screen is identified by a title bar across the top. The main portion of each screen (below the title bar) contains icons that are used to navigate among the various screens. The larger icons are active buttons; pressing them will bring up a new screen. Generally, the smaller icons are for information only and are not active buttons.

User input settings and parameters are limited to lamp type selection, target mode selection, target value entry, LED power and calibration data. Note that lamp type for LED versions is fixed; it is user selectable for non-LED versions.

Exposures are simple. Once your parts are ready for curing, simply press RUN in the READY screen. The MiniCure3D controller will: lock the lid closed; open the external lamp shutter (or energize the internal LEDs); track the exposure dose or time; and close the external lamp shutter (or turn off the internal LEDs) once the target dose or time is reached. After you acknowledge the successful run, the lid will unlock, and the system is ready for the next run. No user interaction is required after pressing the RUN button. If a fault occurs, the controller will stop the run and identify the fault; the lid will remain locked until the fault is acknowledged.

Power up. During power-up, the processor checks the status of the system. If all is well (e.g., the lid is closed), the READY screen will be displayed. The RUN and MENU buttons along the bottom will be active (colored).

If all is *not* ready for a run (e.g., the lid is open), the WAITING screen will be displayed along with icons indicating the problem (e.g., an open-door icon indicates the lid is open). The RUN button will be inactive (grayed out). Once these issues are cleared, the READY screen will be displayed.

Password. To prevent accidental or unintended changes to the running parameters, RUN SETUP, SYSTEM and CALIBRATE screens are passcode protected. The passcode is factory set at 147 and cannot be changed.

> *NOTE: User Passcode is 147. It cannot be changed.*

Summary of Screens. Pressing MENU in the READY screen will bring up the MAIN MENU screen. This contains the following buttons:

- **RUN SETUP** – to change the run mode and target values.
  - Press the desired radio button to change the mode (TIME or DOSE)
  - Touch the displayed value to change it without changing the mode.
  - Target value units must be in seconds or J/cm2.

- **SYSTEM** – for selecting lamp type, setting LED power, AUTO RUN option and to VIEW setup parameters.

- – Non-LED versions
  - ▪ Lamp type. Select your lamp. For lamps not listed, select either "Level Trigger" or "Pulse Trigger" according to your lamp's trigger requirement.
  - ▪ AUTO RUN allows sequential curing operations to be controlled by the opening and closing of the lid; no user HMI operations are required after the first exposure.
  - ▪ ROTATE SCREEN rotates the screen 90 degrees for each touch; use this for vertical mounting installations.
  - ▪ No UV faults if for diagnostics only
  - ▪ VIEW button is for diagnosis/troubleshooting only.
  - – LED versions
    - ▪ Set LED power by selecting the "POWER" icon
    - ▪ Set each LED power individually
    - ▪ See above for regarding AUTO RUN, ROTATE SCREEN, No UV Faults and VIEW

NOTE: Some earlier models of the MC3D-LED may not allow for individual LED control.

- **CALIBRATE** – to calibrate the internal irradiance monitor
  - – Have your radiometer ready and follow the on-screen instructions.

NOTE: Be aware of your MiniCure LED wavelengths and the wavelength response band of the radiometer used for calibration.

- **EXIT** – to return to the READY, WAITING or MAIN MENU screen.

- **ABOUT** – to show unit model number, serial number, firmware revision, Vela contact information and sales and service contact information
  - – Press SERVICE in the ABOUT screen to display your Vela sales representative or distributor contact information

Status indicators. Icons displayed immediately beneath the title bar of the READY or WAITING screens tell the status of the system.
- means the lid is open. This will force the system into the WAITING screen. Close the lid to clear the fault and return to the READY screen.

Using the footswitch.
The footswitch triggers a run when it is released. It has the effect of advancing the machine state, so its meaning is context sensitive:
- If the RUN button is active, pressing the footswitch will initiate a run.

- If the CANCEL ⊗ button is active, pressing the footswitch will cancel the run.
- If the post-run or fault dialog box is displayed, pressing the footswitch will clear it
- The footswitch will both initiate a calibration and cancel one in progress depending on the active state
- Footswitch inputs are ignored in all other cases

NOTE: The footswitch must be normally open momentary type. The footswitch will be ignored if held closed for more than 5 seconds. No fault will result.

Calibration. The internal UV monitor must be correlated with a calibrated radiometer. This procedure is called "calibration" and requires a small, calibrated radiometer such as the EIT MicroCure Radiometer (not supplied). Your unit was calibrated prior to shipment; however, periodic re-calibration is recommended to ensure the chamber/lamp system is performing properly.

The calibration procedure is described in detail in the Calibration section.

Contact your sales representative or Vela for NIST traceable radiometers specifically designed for the MiniCure3D system.

NOTE: Calibrate the MiniCure periodically. Please note that many currently available radiometers are not ideally suited for certain LED wavelengths or the MiniCure. Care must be taken when calibrating to an absolute value. Please contact Vela for further information.

AUTOMATIC EXPOSURE CONTROL

All MiniCure3D units may be used as an assembly and dispensing station as well as a curing station. This section only describes curing procedures.

Larger parts will take more time to reach the same dose as smaller parts, regardless of the amount of curable material used.

Common operations. Following are detailed directions for some of the more common tasks. Not all password prompts are listed.

Set the run mode and target value:
- Bring up the MAIN MENU screen
    - From the READY (or WAITING) screen, press MENU
    - The MAIN MENU screen will display
- Bring up the RUN SETUP screen
    - Press RUN SETUP
    - Enter the passcode
    - The RUN SETUP screen will display
- Select the mode (time or dose) and enter the target value.
    - Press the radio button adjacent to the desired mode icon (TIME or DOSE)
    - Enter the target value in the popup keypad and press ENTER
    - Press OK to return to the READY (or WAITING) screen with the new mode and target values (confirm popup)
    - Press CANCEL to return to the READY (or WAITING) screen without making any changes
- Once back in the READY screen, the system is ready for the next exposure
    - The selected mode will be displayed (for TIME or for DOSE) along with the target value.

NOTE: Pressing the mode icon (or) or the target value in the READY or WAITING screen brings up the RUN SETUP screen (after entering the password). This bypasses the MAIN MENU screen.

NOTE: Pressing the target value in the RUN SETUP screen rather than the radio button will allow you to change the value without changing the mode.

Perform an exposure (Auto Run OFF):
- Ensure the desired mode and target are shown on the READY screen
- Prepare your part
    - Place fixture in chamber, assemble part, dispense UV curable material
    - Close lid when complete
    - The READY screen will display
- From the READY screen
    - Press RUN (or the footswitch)

- – RUNNING screen displays with a progress bar
  - – RUN COMPLETED dialog displays after a successful run. The dialog box will display run time and dose regardless of operating mode setting.
- • Press OK to return to the READY screen
  - – Once back in the READY screen, the system is ready for the next exposure

Perform an exposure (Auto Run ON):
- • Ensure the desired mode and target are shown on the READY screen
- • Prepare your part
  - – Place fixture in chamber, assemble part, dispense UV curable material
- • Close the lid to start the exposure
  - – RUNNING screen displays with a progress bar
  - – RUN COMPLETED dialog displays after a successful run. The dialog box will display run time and dose regardless of operating mode setting.
  - – No need to touch OK; doing so will require confirmation you want to cancel Auto Run
- • Open the lid. The screen will return to Waiting
  - – Closing the lid at this point will automatically start the next exposure

NOTE: The first exposure after engaging Auto Run must be initiated by pressing RUN or footswitch. Subsequent exposures will start automatically upon lid closure.

Stop a run in progress:
- • In the RUNNING screen
  - – Press CANCEL (or the footswitch)
  - – "Run Cancelled by User" dialog displays.
  - – Press OK (or the footswitch) to return to the READY screen
- • Once back in the READY screen, the system is ready for the next exposure

NOTE: Do not intentionally stop a run by opening the lid.

CALIBRATION

For optimal performance, your MiniCure should be calibrated regularly. This is the process for correlating the internal MiniCure UV sensor with an external, independently calibrated radiometer.

NOTE: Due to potential mis-match between radiometer wavelength response and narrow band emission LEDs, obtaining absolute values during calibration can be difficult. Be aware of the response curve of your radiometer compared to the LED wavelengths in your MiniCure.

To calibrate your 4L or 9L MC3D-LED:

- Prepare the chamber
    - Remove all parts and fixtures from the chamber
    - Leave the drip pan in place
    - Place the radiometer in the center of the chamber with the sensor port looking up
    - Place the Teflon cover over the radiometer (see Figure 5. Calibrated radiometer and cover)
    - Close the lid
- Prepare system for calibration run
    - From the READY screen, press MENU
    - Enter passcode
    - The MAIN MENU screen will display
    - Press CALIBRATE
    - CALIBRATE screen will display, showing the most recently used radiometer value (in J/cm^2) and the present calibration factor derived from that value.
- Calibrate
    - Press CAL
    - The most recent exposure will determine the duration of the calibration cycle (see note below)
    - Open lid
    - Remove and read radiometer
    - Enter radiometer dose value at prompt (units must be J/cm^2)
    - The new calibration factor will be displayed; press OK
    - MAIN MENU screen is displayed
    - Press EXIT to return to READY (or WAITING) screen
- Once back in the READY screen, the system is ready for the next exposure

NOTE: Calibration uses the most recent run duration to set the calibration exposure time. If the target value has changed since the last run, the Calibration routine will default to 60 second exposure. It is best to perform a run prior to calibrating to ensure you are calibrating at your operating point.
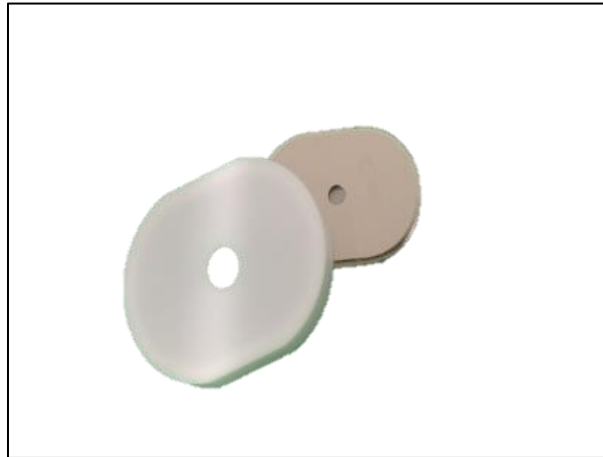
Figure 5. Calibrated radiometer and cover
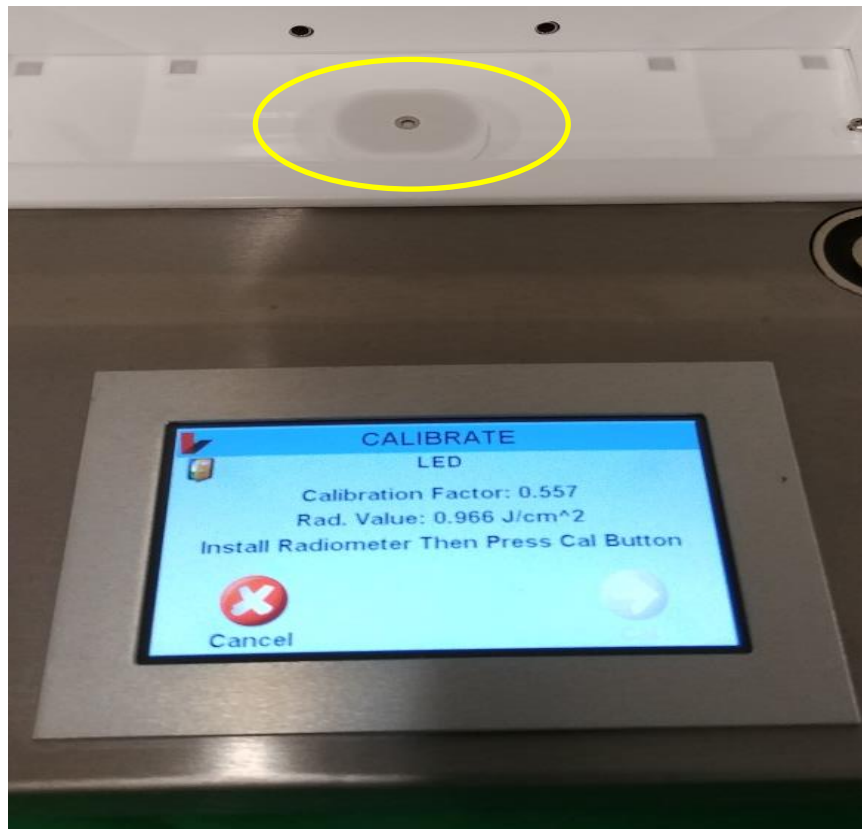
Figure 6. Covered radiometer inserted in chamber

TROUBLESHOOTING

Certain conditions will either prevent a run starting or stop one in progress. The former types are not considered faults, so will simply put the system in the WAITING state. They must be corrected before it can advance to READY.

Faults. These are conditions that can cause an unsafe situation or disturb the curing cycle. All faults are identified in the pop-up window that pops up when the fault occurs. Press OK to clear the pop up. However, the fault must be corrected before you can advance to a new state; if not, the pop-up fault identifier will simply re-appear because the fault condition still exists.

Faults will cause the LEDs to turn off and the exposure to stop. The lid will remain locked until the pop-up window is acknowledged.

Parameter view and reset. The VIEW button in the SYSTEM SETTINGS screen will show you certain parameters that will be useful in troubleshooting, including certain configurable items. Pressing the RESET button will overwrite existing values and reset them to the defaults. You must enter the passcode to perform a reset.

REPLACING COMPONENTS

A single MiniCure unit may be used at a variety of assembly/curing stations or for a variety of applications by replacing customized part holders. Contact Machine Solutions for more information or spare parts.

Bushing. (non-9E/9L versions only). To replace a bushing, remove the two flat head Phillips screws securing the bushing to the deck. (One screw is covered by the bushing lid when closed.) Install the desired bushing and replace the screws. Store the unused bushings safely to protect the white bushing tips from dirt and deformation. The 9E/9L types have no bushings.

Bushing Covers. Remove the bushing cover using a small Phillips screwdriver. Install a new cover and replace the bushing. On non-9E/9L versions, the bushing covers are attached to the bushings; on 9E/9L units they are mounted directly to the chamber wall.

Drip Tray/Diffuser. There are two drip tray designs, depending on the vintage of your MiniCure.
Older models. The drip tray and diffusers are integrated into one quartz plate. To remove it:
- Remove the bushings or bushing covers so the drip pan does not catch on the bushing tips.
- Remove the drip tray/diffuser by first removing the screws holding it in place. Next, insert a small Allen wrench with the short leg under the drip tray and pull upward. Grasp one edge with your (gloved) fingertips or tweezers, taking care not to compress the chamber walls or get finger oils onto the diffuser. Lift the drip tray out and clean prior to replacement. Reinstall the bushings. (MC3D only).

Newer models. The diffuser is a separate part from the drip tray and cannot be removed. To remove the drip tray:
- Remove the bushings (MC3D) or bushing covers (9E/9L) so the drip pan does not catch on the bushing tips.
- Remove the drip tray by inserting a small Allen wrench with the short leg under the drip tray and pulling upward. Grasp one edge with your (gloved) fingertips or tweezers, taking care not to compress the chamber walls or get finger oils onto the diffuser. Lift the drip tray out.

CARE AND MAINTENANCE

Please follow these guidelines during use to maintain the quality and performance of your MiniCure3D:

- Always clean spilled adhesive immediately; follow the directions below.
- Take care not to touch the chamber walls, bushing tips and drip tray with bare fingers. Handle these surfaces only when wearing clean, powder-free gloves.
- Do not use sharp objects such as pen tips to press buttons on the touch screen.

Chamber cleaning

The MiniCure3D requires minimal maintenance. Occasional cleaning of the chamber walls and bushing tips is recommended. To clean any of the white reflective surfaces:

- Lightly dampen a lint-free wipe with isopropyl alcohol. Do not saturate the wipe.
- Gently wipe the reflecting surfaces. Do not compress the material; be particularly careful not to allow fingernails to press into the material.
- Let dry. If the wipe is properly lightly wetted, the surfaces will dry within seconds.
- If isopropyl alcohol is not effective, acetone may be used following the same procedures. Do not saturate the wipe or chamber walls. Do not use acetone on the touch screen.

Spills inside the chamber. Spills that are allowed to cure to the chamber surfaces will permanently degrade chamber performance. Therefore, spills must be cleaned as they occur.

Do not expose large quantities of UV curable materials that may have spilled inside the chamber; the exothermic reaction may cause thermal damage to the MC3D chamber floor.

Most of the spilled material will be confined to the drip pan. Remove as much of it as possible before removing the drip pan so the drip pan can be removed without spilling the remaining material. After removing the drip pan, clean the chamber surfaces as directed above. Replace the drip pan with a new one. Dispose of the soiled drip pan as recommended by your UV curable material supplier.

Please consult your UV materials supplier for recommended precautions regarding the proper handling, use and disposal of these products.

Exterior cleaning. The exterior (non-chamber) surfaces are either stainless steel (body), anodized aluminum (display bezel if installed) or plastic (bushings, light guide collar). All surfaces may be cleaned with water or isopropyl alcohol. Do not use acetone on exterior surfaces for cleaning. Do not apply cleaning fluid directly to the surfaces being cleaned. Do not use abrasive cleaners. Do not immerse the MC3D in liquid.

Touch-screen display (if installed). Clean the touchscreen with a wipe lightly wetted with distilled water or isopropyl alcohol. Do apply cleaning fluid directly to the display. Do not allow ingress of any liquid. Do not use abrasive cleaners.

⚠️ **CAUTION:** Follow these cleaning instructions. Failure to do so may result in damage to the chamber, surfaces and performance.

⚠️ **CAUTION:** Avoid getting finger oils on the chamber walls. When handling the chamber or drip pan, wear clean, powder-free gloves. Do not press into the chamber walls; they are compressible. Accumulated compressions will degrade performance.

⚠️ **CAUTION:** Do not allow the ingress of any liquid into the MC3D units. Do not clean by spray down. Do not immerse.

SPECIFICATIONS

Table 2. Specifications

Specifications	

Input power
      Non-LED versions
      LED versions
	
	100 – 240 VAC, 24 W, 50/60 Hz
	100 – 240 VAC, 160 W, 50/60 Hz

LED Wavelengths (if applicable)	365 nm, 385 nm, 405 nm; factory configurable per user requirement

Dimensions (LED & non-LED types)
      MC3D
      MC3D-9E/9L
      MC3D-9E/9L with Hi-Top option
	
	5.1" x 11.1" x 10.3" (107 x 249 x 262 mm, HWD)
	6.5" x 11" x 11.3" (165 x 279 x 286 mm, HWD)
	7.5 x 11" x 11.3" (191 x 279 x 286 mm, HWD)

Weight (LED & non-LED types)
      MC3D
      MC3D-9E/9L
      MC3D-9E/9L with Hi Top option
	
	~10 lb (4.5 kg)
	~12 lb (5.5 kg)
	~13 lb (5.9 kg)

MC3D-9E/9L Specific Information (LED & non-LED)

The MC3D-9E/9L is a large chamber version of the standard MiniCure3D. Operation and maintenance are the same as the MC3D with the exceptions noted here.

The MC3D-9E/9L has a 9 x 3 x 3 inch chamber and eight factory configurable LED wavelengths. It has a few features that are not available on the smaller MC3D-LED:

- Inlet/exhaust ports for curing in a nitrogen environment
- Larger part entry cutouts in chamber ends and mounting holes for side-mounted bushings
- Two light guide entry ports
- Light-guide attached diffusing ferrule
- Optional "HiTop" lid to increase chamber height from 3 inches to 4 inches

This section describes the differences in operation of the MC3D-9E/9L compared to the standard MC3D described above.

The MC3D-9L is available with advanced options; see Appendices.

Larger chamber. The chamber length is increased from 4 to 9 inches to accommodate longer fixture and cure region requirements of some devices. The larger chamber also gives more room for assembly and adhesive dispensing with the part and fixtures in place in the chamber.

You must be careful to minimize light absorbing surfaces inside the chamber to maintain high irradiance. This includes the part being cured and part fixturing.

Nitrogen inerting. On the rear of the MC3D-9E/9L are two ports for introducing nitrogen into the chamber during cure. A low flow of low pressure N_2 is sufficient.

Bottom mounting. The chassis bottom has a screw pattern for mounting to your fixturing if needed. The pattern is detailed in Figure 7. Bottom view of MC3D-9E/9L showing mounting hole pattern.

Part entry cutouts. These are larger in the MC3D-9E/9L than in the standard MiniCure3D to allow for larger parts/fixturing to pass through into the chamber.

No bushings are supplied with the MC3D-9E/9L. There are two tapped holes on the chassis sides at each part entry cutout for mounting external bushings or fixturing. See Figure 8. Side view of MC3D-9E/9L showing part entry cutout and fixture mounting hole pattern for details.

"HiTop" option. This allows you to convert the 3" chamber height to 4" for accommodating taller parts or fixtures. to 5.25 inches.

Maintenance. Follow the maintenance for the standard 4E with these additions.
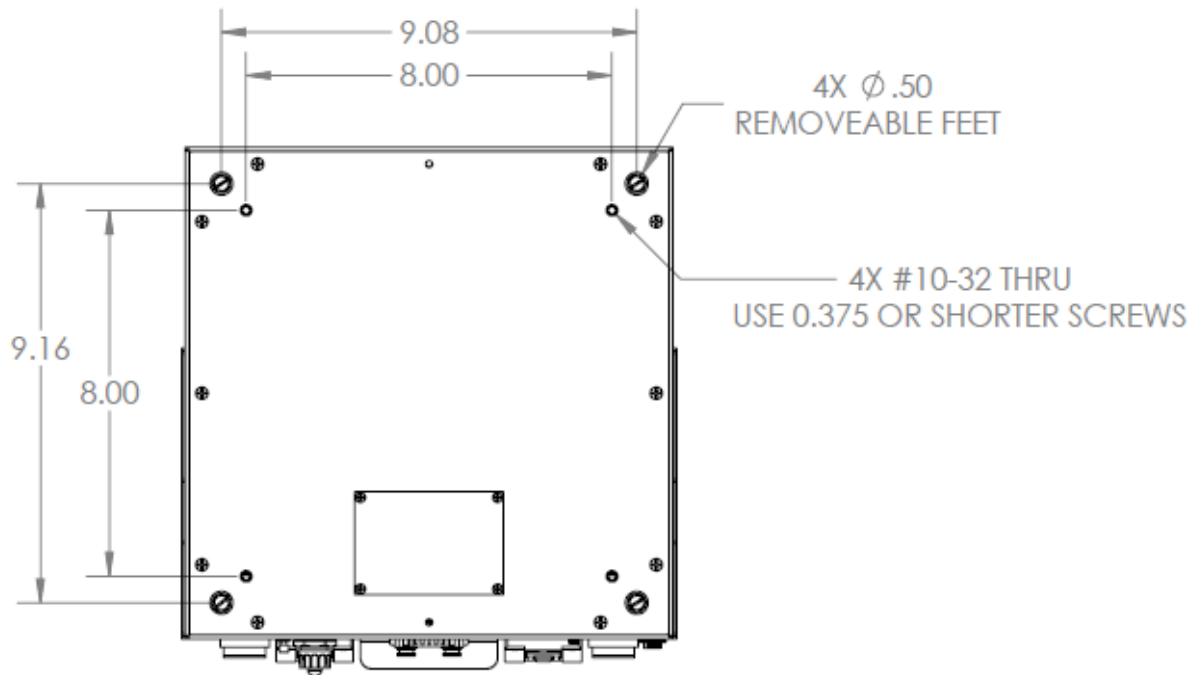
Figure 7. Bottom view of MC3D-9E/9L showing mounting hole pattern
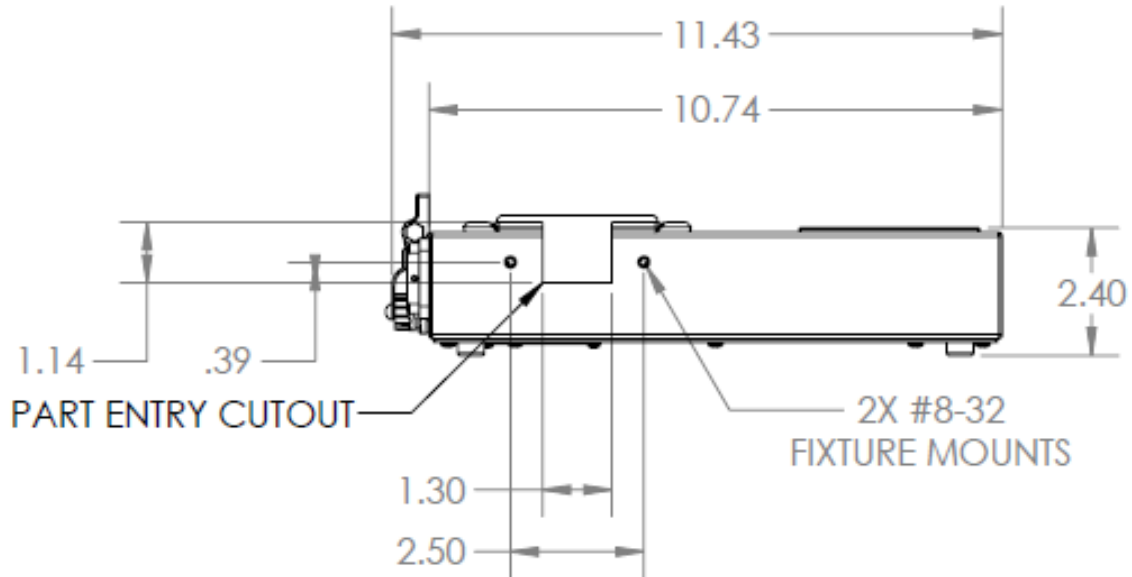
Figure 8. Side view of MC3D-9E/9L showing part entry cutout and fixture mounting hole pattern

CUSTOMER SUPPORT AND SATISFACTION

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Machine Solutions Inc. welcomes your comments and inquiries about our products and services.

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