

Installation and Operations Manual  
for  
*Crystal Growth Incubators*

MODEL # \_\_\_\_\_

SERIAL # \_\_\_\_\_

***MiTeGen***  
[www.mitegen.com](http://www.mitegen.com)



## IQ FOR MITEGEN REFRIGERATED INCUBATORS

NAME OF INSTALLER: \_\_\_\_\_

SUPERVISOR: \_\_\_\_\_

DATE: \_\_\_\_\_

MODEL NUMBER: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

**TEMPERATURE SETPOINT \_\_\_\_\_ °C**

INSTALLER SUPERVISOR

### REMOVE CRATE(S) FROM TRUCK: CHECK FOR VISIBLE DAMAGE

●VERIFY LEVELS ON EACH CHAMBER INDICATING IT HAS REMAINED IN UPRIGHT POSITION DURING TRANSPORT	<input type="radio"/>	<input type="checkbox"/>
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### SET UP TOP MOUNTED COMPRESSOR (IF APPLICABLE)

●MATCH UP COMPRESSOR TO CABINET BY SERIAL NUMBER	<input type="radio"/>	<input type="checkbox"/>
●CONNECT TUBING, TIGHTEN VERY FIRMLY, THEN LEAK CHECK WITH HAND SOAP. NO BUBBLES!	<input type="radio"/>	<input type="checkbox"/>

### INSTALL FOAM PADS

● AT FINAL CHAMBER LOCATION, INSTALL THE FOAM PADS. TILT CHAMBER AND SLIDE THE PADS UNDER EACH CORNER OF THE CABINET.	<input type="radio"/>	<input type="checkbox"/>
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### CONFIRM POWER SUPPLY IS CORRECT

●PLUG CHAMBER INTO COMPATIBLE WALL OUTLET	<input type="radio"/>	<input type="checkbox"/>
●SET TEMPERATURE FAILSAFES TO 50°C HIGH AND 0°C LOW (LOCATED INSIDE CHAMBER)	<input type="radio"/>	<input type="checkbox"/>
●USE UP OR DOWN ARROW ON CONTROL TO SET TEMPERATURE (GREEN LED)	<input type="radio"/>	<input type="checkbox"/>
●WHEN CHAMBER REACHES THE TEMP SETPOINT, MOVE FAILSAFES AS DESCRIBED IN MANUAL	<input type="radio"/>	<input type="checkbox"/>

### VERIFY CHAMBER REACHES AND MAINTAINS SETPOINTS

●WATCH CHAMBER PERFORMANCE FOR 30-60 MINUTES AFTER SETPOINT IS REACHED	<input type="radio"/>	<input type="checkbox"/>
●TEMPERATURE IS SETPOINT ±1°C ON WATLOW CONTROL AND OPTIONAL MONITORING DEVICES	<input type="radio"/>	<input type="checkbox"/>

INSTALLER SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

## Contents

INSTALLATION & SETUP.....	4
Uncrating .....	4
Installing Foam Pads & Leveling.....	4
Isolating the Condensing Unit .....	5
Shelves.....	7
Loading the Chamber .....	8
Plugging in the Chamber .....	8
CHAMBER OPERATION .....	9
Temperature Control.....	9
Temperature Control Calibration Offset Procedure.....	9
High and Low Temperature Failsafes .....	9
Lights.....	10
Light Switch .....	10
CARE AND MAINTENANCE .....	11
Care of Cabinet .....	11
Condenser Cleaning .....	11
Warranty .....	12
Troubleshooting.....	12
APPENDIX: WATLOW PM PLUS SERIES.....	13

## **INSTALLATION & SETUP**

### **Uncrating**

Immediately upon receiving the chamber, before signing the freight receipt, remove the cardboard crating. Lift the top cardboard piece from the crate and remove the staples that attach the bottom of the cardboard sides to the wood pallet. Lift off the cardboard piece on one side or carefully cut along one of the edges and “unwrap” the cardboard. Remove the plastic wrapping from the chamber. Examine the inside and outside of the chamber and the compressor compartment for shipping damage. If the chamber is damaged, note the damage on the freight receipt and contact Mitegen at 877-648-3436. Do not operate a damaged chamber until you have reported the damage to Mitegen and they have advised that the chamber is safe to operate.

Remove the door support (U-shaped brace between the bottom of the door and the pallet). To remove the unit from the pallet, first remove the angle braces screwed to the base of the chamber and the pallet. Rock the chamber gently back and forth to walk it forward on the pallet, then tilt it forward and kick the pallet back and out of the way. Use a forklift for this instead if you have one available.

### **Installing Foam Pads & Leveling**

Cabinets are not shipped with their vibration-reducing foam pads installed. The pads need to be installed once the chamber is in its final location. The pads are packaged in a small box located inside the chamber during shipping.

To install the pads, tilt chamber to one side so the pads can be installed. Slide one pad under each corner of the chamber. Gently lower the chamber onto the pads and repeat on the other side. The photo below shows how the pads should look once in place.



Alternatively, a hand truck or forklift can do the heavy lifting, but make sure the forks do not damage the condensing unit under the chamber. Also note that the center of gravity of the chamber may not be in the middle of the cabinet.

If the chamber is not sitting squarely when a level is placed on the chamber roof, shim the chamber with large metal washers placed between the floor and the appropriate foam pad(s).

The chamber should be tilted slightly backwards to allow condensate in the fan housing to drain in the correct direction. The chamber should be level side-to-side for the doors to operate correctly.

## Isolating the Condensing Unit

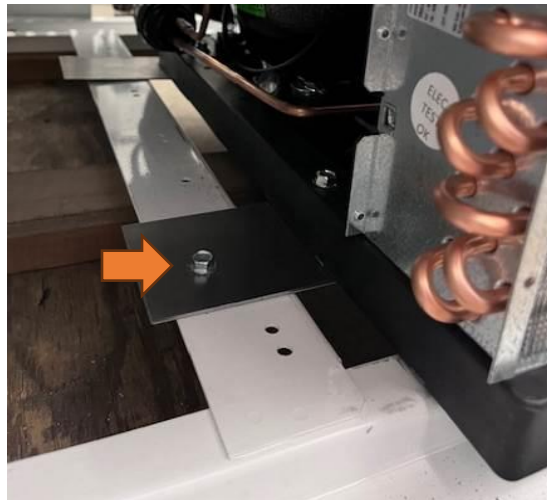
This chamber is designed to have its condensing unit lowered onto the ground beneath the chamber once it is in its final location. This will allow the chamber to be isolated from the vibration of the compressor during the cooling cycle. To accomplish this, please follow the steps below.

Tools required:

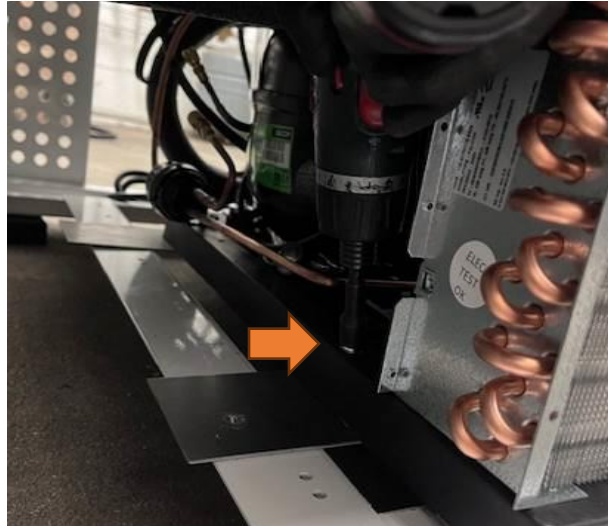
- **#2 Phillips screwdriver** or #2 Phillips screwdriver bit attached to a screw runner or drill
- **7/16" hex wrench** or 7/16" socket and ratchet or 7/16" nut driver drill attachment
- **3/8" hex wrench** or 3/8" socket and ratchet or 3/8" nut driver drill attachment
- **Work gloves**

Step 1: Once the chamber is in its final location and sitting on its foam pads, remove the grille that is located on the front of the chamber below the door. There are four #2 Phillips screws at the corners of the grille that hold it to the frame.

Step 2: Locate the 7/16" hex bolts (as shown in the photo below) that are holding the unpainted metal support rails to the chamber's frame. Use a hex wrench, socket, or drill to remove the bolts. Keep the bolts just in case the chamber must be moved to a different location in the future.



Step 3: Locate the 3/8" hex bolts (as shown in the photo below) that are holding the condensing unit to the unpainted metal support rails. Use a hex wrench, socket, or drill to remove the bolts. Keep the bolts just in case the chamber must be moved to a different location in the future.



Step 4: **Having a second person to assist in this step can be helpful.** Using gloves, lift the condensing unit and slide out the unpainted metal supports (as shown in the photo below). Carefully lower the condensing unit to the ground, being careful not to damage the copper refrigerant lines. Make sure no part of the condensing unit is touching the chamber's frame. Save the unpainted metal supports just in case the chamber must be moved to a different location in the future.



Step 5: The finished result should look like the photo below. Once completed, please reinstall the grille with the four #2 Phillips screws.



## Shelves

The first (lowest) shelf should be placed at least 3 inches from the chamber floor. *No product should sit directly on the stainless-steel bottom pan.* Position the shelf clips in each corner, the same distance from the floor of the chamber and with the tang facing upwards, to hold the shelf in place. Squeeze the clips and push them into the slits in the pilasters so the shelf will be able to fully support the weight resting on it. Then, place the shelf on the clips with the truncated corners closest to the doors. Continue to install the shelves far enough apart so items at the rear of each shelf can be retrieved easily.



## Loading the Chamber

The temperature uniformity inside the chamber is dependent on good airflow down the back wall, across the bottom pan, and up through the shelves. Leave space at the back of the shelves (1-2") for air to be blown to the bottom of the chamber and arrange product or samples so air can be sucked up through them to the top of the chamber. Allow at least 3-4" of space between the bottom pan and the lowest shelf for best air circulation.

To minimize electrical consumption if the chamber is lightly loaded, fill the chamber with water bottles along the left and right side walls to create a large thermal mass. A large thermal mass keeps the temperature uniformity tight without frequent use of the refrigeration/heating systems!

## Plugging in the Chamber

Plug the chamber into a receptacle that has rated amperage greater than the amperage draw specified for the chamber. This equipment is completely automatic and designed to operate on 115 volt, 60 cycle AC (USA, Canada, Mexico, Saudi Arabia, Venezuela, and Colombia), or 230 volt, 50 cycle AC (Europe, Middle East, Asia, Africa, and Australia). The power requirements are shown on the plug tag. All chambers must be grounded. This chamber should be on its own circuit, to protect the compressor from low voltage. **Do not use an extension cord to plug the chamber into a wall outlet. Do not break off the ground pin on the plug. Either of these will void the warranty.**



## CHAMBER OPERATION

### Temperature Control

The microprocessor temperature controller (Watlow PM Plus) has a red upper display and green lower display. The Red upper display indicates the actual chamber temperature. The green lower display indicates the current temperature set point.

The temperature set point is adjustable in 0.1°C increments. To lower the temperature set point, press the white negative (-) capacitive button on the lower right side. To raise the temperature set point, press the white positive (+) capacitive button on the upper right side.



### Temperature Control Calibration Offset Procedure

The chamber temperature sensor has already been calibrated with an NIST certified temperature sensor placed next to it and the calibration offset adjusted appropriately. However, the calibration should be checked periodically, usually once per year.

To adjust the calibration offset, position an NIST certified digital sensor precisely next to the control sensor hanging on the right-side wall. Turn all chamber lights off, unless the NIST sensor is the same in material and construction as the Watlow control sensor. Allow the temperature in the chamber to stabilize. If the red Watlow display and the NIST temp display are not in agreement, proceed with a correction to the offset. Press the right arrow key and “Calibration Offset” will appear on the screen. Press the right arrow one more time to enter the calibration offset settings. Subtract the digital difference between the sensors from the digital offset shown on the display if the NIST sensor temperature is lower than the red display on the Watlow. Add the digital difference between the sensors from the digital offset shown on the display if the NIST sensor temperature is higher than the red display on the Watlow. For example, if a NIST certified probe placed beside the chamber sensor reads 2.0°C and the red Watlow display is 5.0°C, 3.0° must be subtracted from calibration offset number. If the calibration offset setting was 0.4 to start, the final setting will be -2.6 (i.e., 0.4 + -3.0).

### High and Low Temperature Failsafes

The temperature failsafe thermostats are located inside the chamber, on the fan housing. The failsafes are a safety feature designed to prevent the chamber from overheating or freezing in the event of a mechanical malfunction. They shut off the lights, fan, heating coil, and compressor until the temperature inside the chamber returns to within their range.

The temperature failsafes are bimetal type thermostats that react to the chamber temperature by expansion or contraction. They sense temperature much more slowly than an RTD type sensor, but they are extremely reliable. The failsafes should always be set at least 10°C from both the chamber’s setpoint and the ambient room temperature.

## **Lights**

The lights bulb runs vertically along the inside of the door opening. To remove the bulb, pull it away from the wall holding it at the top and bottom, without twisting it.

Replacement lights can be purchased online by entering the light model number (which is printed on the bulb) into your browser. Replacements matching the light model number may also be purchased from a local hardware or home improvement store.

## **Light Switch**

The light switch is located on the instrument panel, next to the circuit breaker.

## **CARE AND MAINTENANCE**

### **Care of Cabinet**

Chambers with a powder coated enamel exterior and/or interior should be cleaned occasionally with soap and hot water (up to 35°C) on a cotton fleece rag (or similar) and dried with a lint-free cloth. Paper towels should be avoided as they can easily scratch the painted surfaces. Borax or baking soda can be added to the water to remove any odors on the interior. A solution of 70% isopropyl alcohol may also be used as a disinfectant, however, make sure to unplug the chamber beforehand due to the potential for flammable vapors to come in contact with the interior fan motor. The same procedure may be used to clean glass doors. Rust on the stainless steel bottom pan is superficial and can be rubbed away with steel wool in the direction of the grain.

Fingerprints can be removed from stainless steel chambers by applying GOJO® hand cleanser or a commercial stainless steel cleaner. After removing the excess cleaner with a soft cloth, a thin protective film remains. If some fingerprints do appear later, they can be easily wiped away with a cloth containing some of the cleaner.

Check the MSDS on any cleaning substances you plan to use, to make sure the product does not corrode copper, aluminum, or steel. Substances containing ammonia or bleach (Clorox) compounds are not recommended due to their corrosive effects on even an E-coated coil.

### **Condenser Cleaning**

Attached to the condensing unit there is a radiator type device known as the condenser. A fan draws air across this coil to dissipate heat created from the refrigeration system. An accumulation of dirt on the condenser or restriction of air flow around it will decrease the compressor efficiency and may result in compressor damage or higher electric usage. We recommend cleaning the condenser coil every 6-12 months for optimal performance and reliability.

The compressor is in a compartment underneath the chamber. First remove the metal protective grille on the front of your chamber. The grille is attached with four #2 Phillips screws at the corners. Once the grille is removed, the coil and fan will be exposed and can be cleaned with a vacuum to remove dust buildup. A damp rag can also be used for cleaning, although a vacuum is ideal.

*Maintain air flow across the condensing unit at all times. The maximum ambient temperature at the condenser should be 27°C (80°F) or less.*

## Warranty

Chambers sold in the USA are warranted to be free from defects in material and workmanship for a period of one year from the date of shipping. The compressor motor (part only, excluding the control or relay) is warranted for an additional four years, as long as the electric source to the compressor and ambient temperature surrounding the condensing unit have been within specification ( $\pm 10\%$  of rated voltage and 60-80°F).

***We reserve the right to void the warranty if the specifications for electricity, ambient temperature at the condenser or interior heat load have been exceeded, or if a service person not hired by us has worked on the electrical or mechanical parts of the chamber within the warranty period.***

Chambers sold outside the USA may be warranted by the company that sold the chamber. During the two-year period following delivery, a defective part exchange at no charge (except return postage) is available through the company that sold the chamber.

## Troubleshooting

If you have a problem with your chamber, even if it is no longer in warranty, call the numbers below to talk directly to a knowledgeable person about your concerns. Have your chamber model and serial number ready (located on a sticker inside the chamber on the left wall, near the top) and be well informed about the problem. We will ask very specific questions about the chamber's performance to help pinpoint the problem.

If the chamber is located in the USA and is within the one year warranty period, we will contact a local service company to repair the chamber. If the chamber is located outside the USA, please contact the company that sold the chamber for service. Regardless of the location of the chamber or warranty status, we will listen to your descriptions of performance concerns and help to identify the causes if possible.

	Name	Phone	Hours
Primary	Kurt Bartholomew (Powers Scientific, Inc)	(800) 998-0500	9-5 EST
Secondary	Doug Kunkle (Powers Equipment Co.)	(215) 675-9220	9-5 EST

## APPENDIX: WATLOW PM PLUS SERIES

# Chapter 3: User Interface

## Touch Keys

- Scroll up or down lists using the + or - keys.
- Increase or decrease numeric parameters, one increment at a time, with the + or - keys. Holding down the + or - key, will slew the setting at a faster rate, when the key is held down longer.
- Increase or decrease numeric parameters with the slider.
- Select items or move to lists using the forward/select arrow.
- Return to the previous screen with the back arrow.
- Return to the home screen from any other screen by pressing the Home icon.
- Change the set point directly from the home screen using the numeric slider or the + or - keys
- The function key can be programmed to do various tasks like starting a profile.



## Home Screen

The home screen provides a shortcut to monitor or change the parameter values that you use most often. When a parameter from the Setup List or Operations List is displayed on the Home Screen, you can adjust that parameter's value in either place, using the numeric slider or +/- keys on the front of the device.

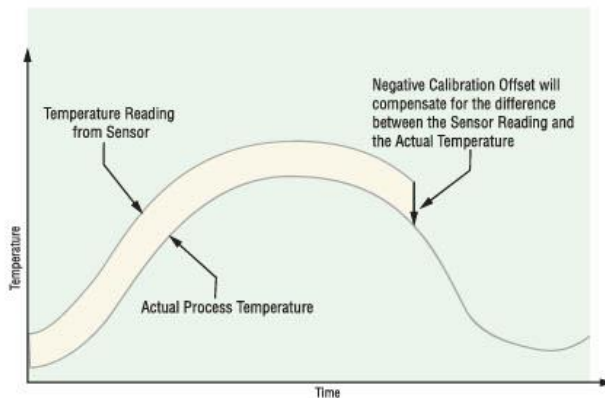
## Default Home Screen Parameters

By default, the home screen display shows the Process Value, the Set Point, and the Zone being read. The upper display is the process value, or the value of the parameter indicated in the lower display. The lower display shows the set point or manual power value, or the parameter for the value showing in the upper display.

### Use Calibration Offset

Use of the Calibration Offset parameter shifts the readings across the entire displayed range by the offset value. Use this parameter to compensate for sensor error or sensor placement error. Typically this value is set to zero.

1. Navigate to **Operations — Setup - Analog Input - Calibration Offset**
2. Set the offset to the desired value.



### Equipment required while performing calibration:

Obtain a precision source for millivolts, volts, milliamperes or resistance depending on the sensor type to be calibrated. Use copper wire only to connect the precision source to the controller's input. Keep leads between the precision source and controller as short as possible to minimize error. In addition, a precision volt/ohm meter capable of reading values to 4 decimal places or better is recommended. Prior to calibration, connect this volt/ohm meter to the precision source to verify accuracy. Actual input values do NOT have to be exactly the recommended values, but it IS critical that the actual value of the signal connected to the controller be accurately known to at least four digits.

