

Microclimate Control System
for Museum Display and Storage

MINI ONE

OPERATOR'S MANUAL ver. 9

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INTRODUCTION

The Preservatech's Mini One is a miniature humidity control device for museum showcases and similar, small sealed enclosures. This extremely efficient unit can reliably control humidity for individual or multiple enclosures.

When properly installed, this Microclimate Control system will typically maintain the relative humidity level in a sealed enclosure to within one percent (or less) of an operator determined value. Depending upon the ambient temperature conditions and enclosure construction, relative humidity levels of less than thirty five to over eighty percent can be attained.

The Mini One can be installed in a number of possible configurations for differing applications; performance characteristics will vary with installation and enclosures. In its most common application, the unit will provide a constant flow of air at a stable relative humidity level to maintain desired humidity levels in museum display and storage enclosures.

This manual will assist you in installing and setting up the unit, and attaching all necessary connections. As well, it contains complete instructions on operating the unit. Please note the cautions and warnings, as the unit may not provide optimum performance if all directions are not carefully followed. Some installation errors, such as the lack of adequate cooling for the unit may result in unit failure and will void the warranty.

GENERAL OPERATING PRINCIPLES

This Microclimate Control system maintains a constant Relative Humidity (RH) level in the enclosure by automatically increasing or decreasing the moisture content of a stream of supply air sent to the enclosure.

Ambient gallery air is taken into the unit (the use of a filter for pollutants is optional) and pumped through a proprietary mechanism that adjusts the relative humidity (RH) to an operator preset value. Air is either humidified or dehumidified as needed in the mechanism. This air is directed through a small flexible tube to an input port in the showcase or enclosure. The humidity adjustment mechanism uses a Peltier cell to maintain a small water reservoir at an appropriate temperature. Exhaust heat from this cooling mechanism is fan-forced out of the unit and must be removed from the vicinity of the Mini One unit.

The Mini One can be operated in a variety of modes, depending on enclosure characteristics and acceptable control limits. Output from one unit may be distributed to more than one case, or multiple units may be used on a single case when more capacity is needed. The unit may be placed immediately next to the enclosure, or at some distance away.

Operational mode may be changed from Compensatory to Non Compensatory (see below) and the unit may be used in combination with a humidity buffer. This unit may be used in conjunction with a flow of oxygen free gas to control humidity levels in anoxic showcases or for pest control.

PACKING LIST

Mini One Generator



Pump to Mini One Hose



Sensor/Valve unit



Sensor Cable



Air Pump



Mini One to Case Hose



Exhaust Termination



Funnel



Exhaust Hose



Power Cable



Sensor

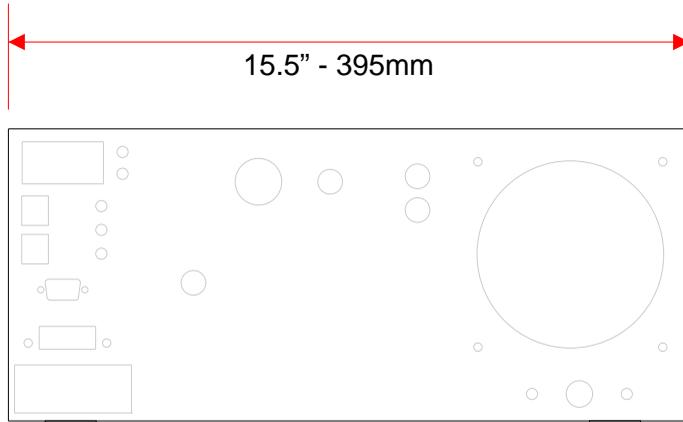


FRONT VIEW

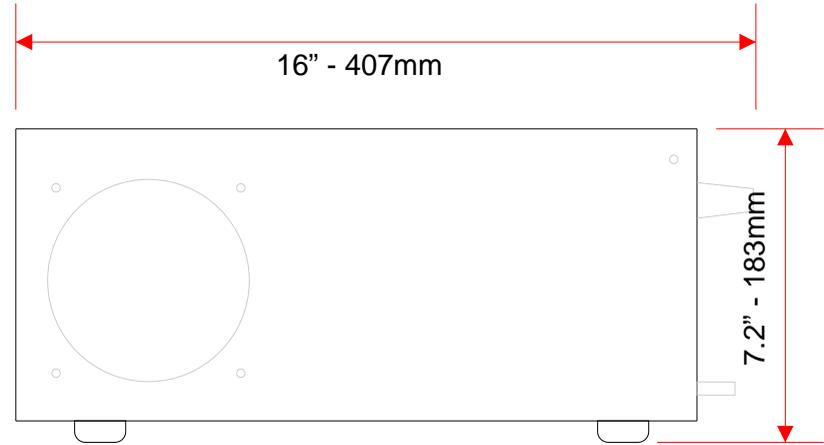


Unit may not look exactly as shown

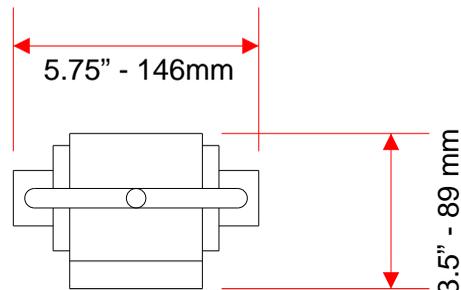
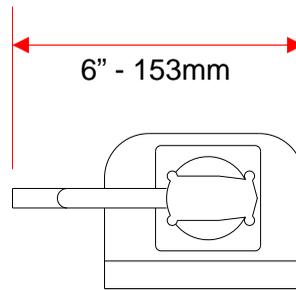
DIMENSIONS



Main Unit - Front



Main Unit - Side



Pump

DETAILED INSTALLATION RECOMMENDATIONS

An improper installation can severely compromise the operation of the unit. A level operating surface, adequate ventilation, and good access are imperative.

Power Supply:

Supply a reliable 110/220 Volt, 50/60 Hz AC power supply with ground, capable of supplying approximately 250 Watts. Voltage is set at the factory. We recommend a dedicated power supply with surge protection for all units.

Floor plate and Unit Placement:

Provide a flat level surface so that the front of the unit is easily accessed and maintained. The access panel or door should allow easy removal of the machine in case of emergency. If possible, allow at least 6 inches / 15 cm space around the units. No space need be provided above the units, but be sure to allow adequate space for installation and emergency removal. Some accommodation may be needed for filling the reservoir. The pump unit and the main unit may be placed side by side, or separated up to ten feet / three meters from each other. Should you wish to stack the units, be sure to place the pump unit ABOVE the main unit. Should you need to separate the pump from the main unit by more than the amount allowed by the supplied power supply cord and hose, be sure to use at least a 16 gauge wire to carry power, and do not separate the units by more than ten feet without consulting the manufacturer

Access:

Provide a door or panel that allows easy access, installation, and removal of the unit. The front plate of the unit should be completely visible when the access is open.

HUMIDITY CONTROL BY ADDITION (COMPENSATORY MODE)

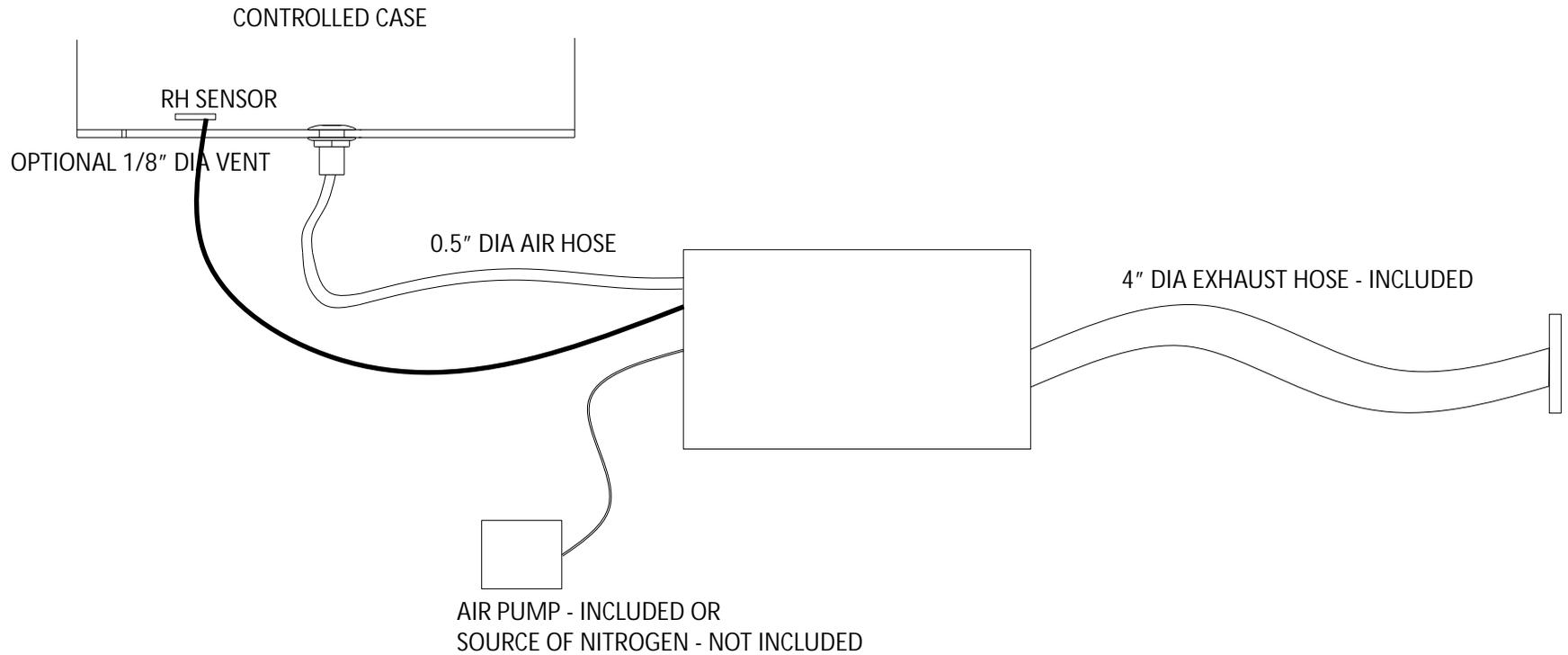
In Compensatory operation, the unit can be used to effectively maintain RH levels in larger sealed enclosures by initially adding air at complementary humidities to adjust showcase RH levels, defaulting to non compensatory operation only when the target RH has been achieved. This is in contrast to Non Compensatory mode, where the unit displaces out of range air with a constant flow of air at the target humidity level at all times .

In Additive (Compensatory) mode, a flow of either humid or dry air is added to the case to compensate for incorrect RH levels in the enclosure. This is accomplished by directing air from the unit directly into the case, bypassing the input sensor which is placed within the case. Humidity levels in the showcase are transmitted by a sensor to the unit, which will adjust the airflow humidity to compensate for any variation above or below the target humidity.

As the sensor is no longer directly reading the air flow some variation and lag (hysteresis) about the set point will be evident. It is normal for humidity levels to fluctuate until equilibrium has been achieved. The degree of variation about the set point will vary with sensor placement, contents of the enclosure, size of the enclosure, showcase leakage rate, and other factors, and variation may be minimal, irregular or substantial.

NOTE THAT THE SAFETY VALVE FEATURE IS NOT PROVIDED IN COMPENSATORY MODE. AN OUT OF RANGE ALARM CAN BE PROVIDED, BUT THE UNIT WILL NOT AUTOMATICALLY CEASE OPERATION OR LIMIT AIRFLOW.

HUMIDITY CONTROL BY ADDITION - LAYOUT

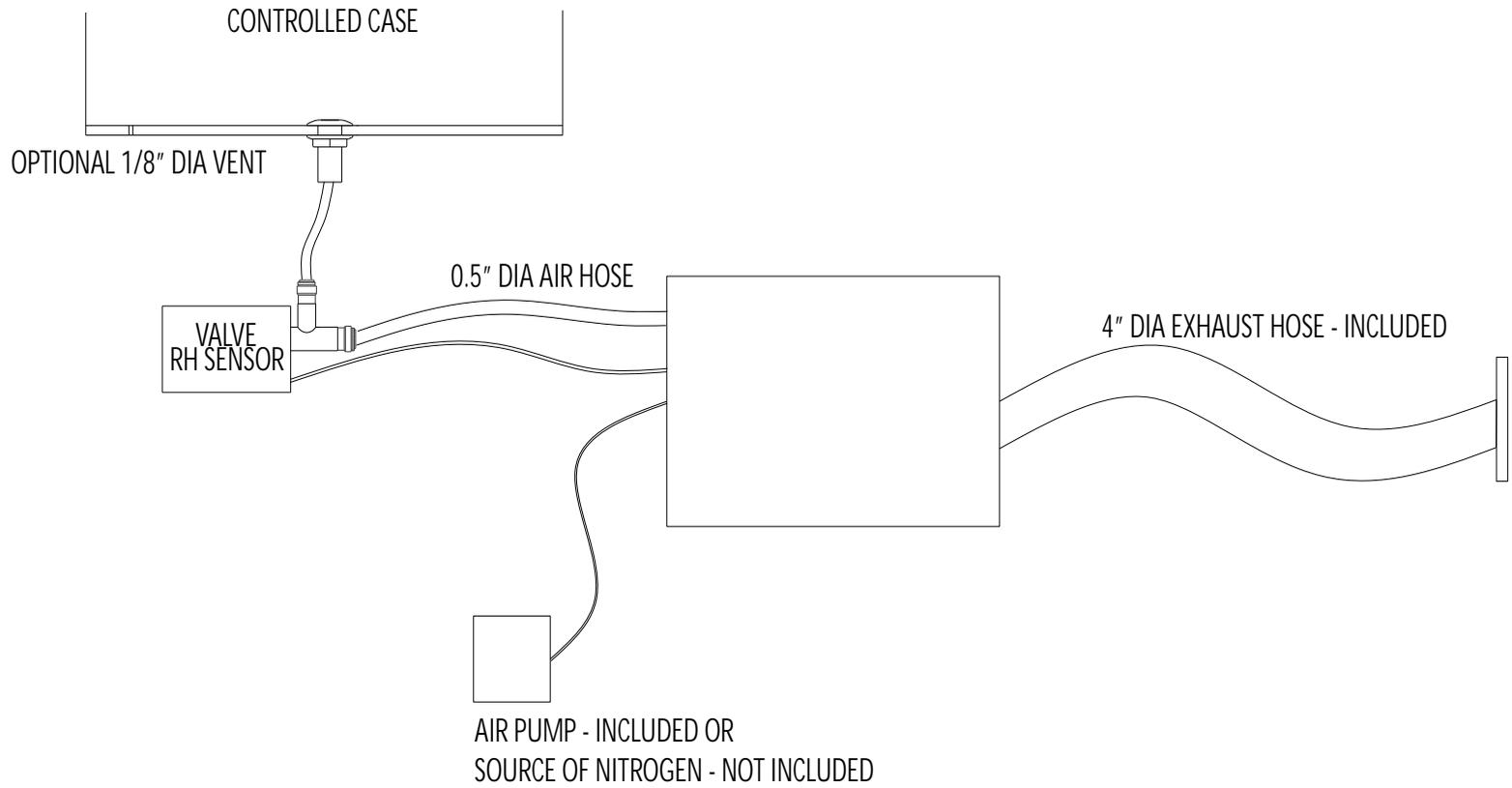


HUMIDITY CONTROL BY DISPLACEMENT (NON COMPENSATORY MODE)

This mode of humidity control displaces and replaces existing air in the enclosure. In normal applications, the unit provides humidity control for a single enclosure, usually not exceeding five cubic metres. In these applications the unit will typically provide extremely accurate humidity control, even as ambient temperatures vary by feeding air into the showcase at the target humidity. A sensor mounted in the input port on the enclosure base or wall measures the RH of the unit's output. A processor in the unit compares the input air humidity to the preset value and maintains constant RH output, regardless of temperature variation. Depending on ambient temperatures, output RH levels of less than 35% to over 80% can be achieved.

In Non Compensatory operation, the unit displaces air in the enclosure by using a positive pressure airflow, replacing air in the case with air at the desired humidity. The slight positive pressure generated in a well sealed case will prevent the influx of pollutants, and excess pressure will be vented out through cracks and leaks. Performance will vary with pollutant filtering and air distribution systems, showcase volumes, showcase contents, ambient gallery humidity levels and showcase air exchange rates. Generally, if the input of the unit exceeds the showcase air exchange rate by a factor of three or more, the RH levels in the enclosure will remain stable with extremely small variations, even as exterior humidity and temperature levels vary.

HUMIDITY CONTROL BY DISPLACEMENT - LAYOUT



MULTIPLE ENCLOSURES APPLICATIONS

Output from a single unit can be used to treat multiple showcases. See the detailed installation instructions below. Consult the manufacturer for guidance.

MULTIPLE UNITS ON SINGLE ENCLOSURE

When the output from a single unit is not adequate for humidity control, any number of multiple units can be used in Positive Pressure Displacement mode.

No interconnection of units (master/slave) is needed as each unit will control its own output. Note that sensors vary, and some fine adjustments may be needed -we recommend the use of a calibrated sensor to fine tune outputs. Consult the manufacturer for guidance.

LOW OXYGEN (ANOXIA) APPLICATIONS

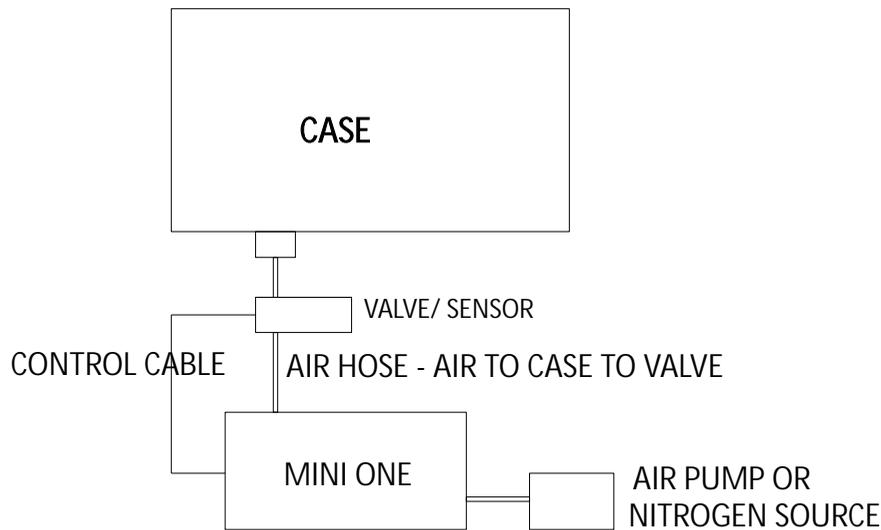
When using with nitrogen or argon flow to create or maintain anoxic conditions, it will be necessary to bypass the pump, and carefully control the gas flow. Please consult the manufacturer before attempting any modifications to the unit.

SINGLE ENCLOSURE OPERATION

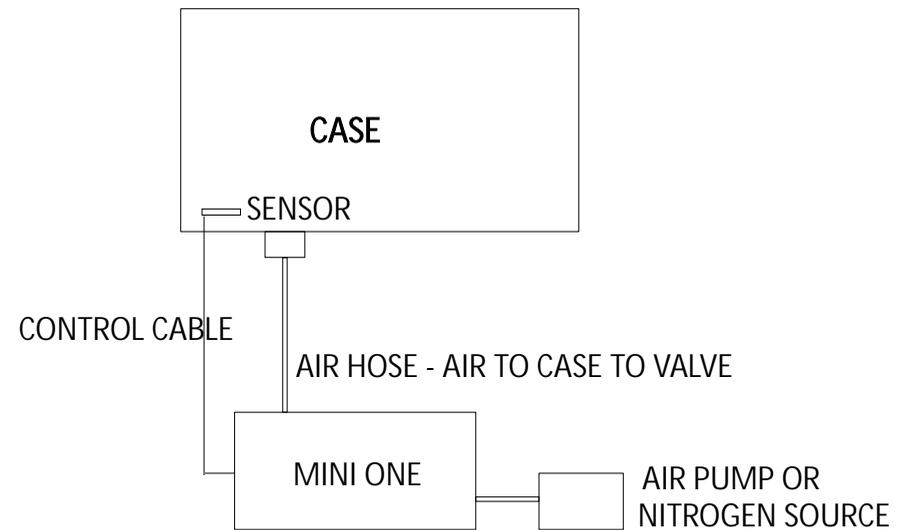
Run a length of hose (eg rigid 1/2 inch polyethylene tubing, or a combination of polyethylene and silicone or other flexible hose) from the “Air To Case” port on the unit to the case (addition mode) or to the valve unit (displacement mode). Avoid tight bends, and be careful not to kink the hose.

Length of hose connecting Sensor/Valve with main unit should be no less than 3' - 1 m. Too short hose can cause an incorrect RH reading.

If hose longer than 10' (3.5 m) is needed, larger diameter hose (3/4") should be used.



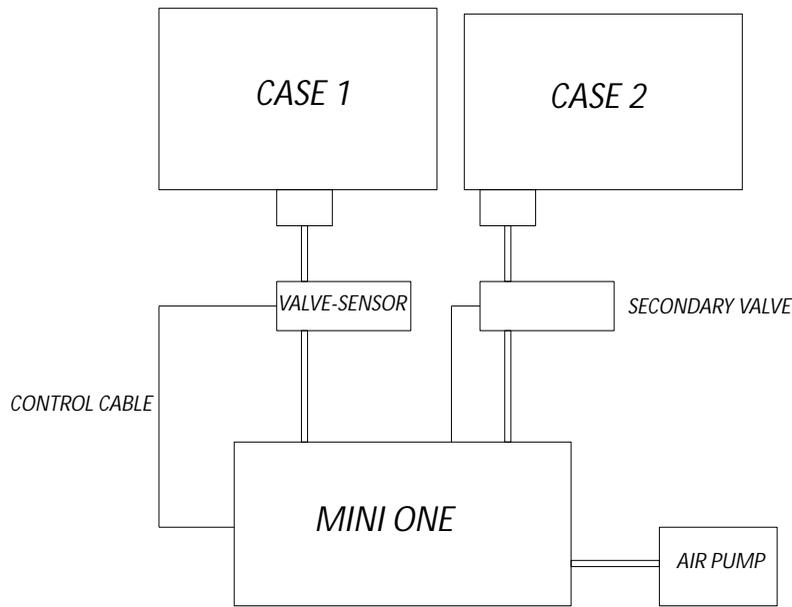
HUMIDITY CONTROL BY DISPLACEMENT



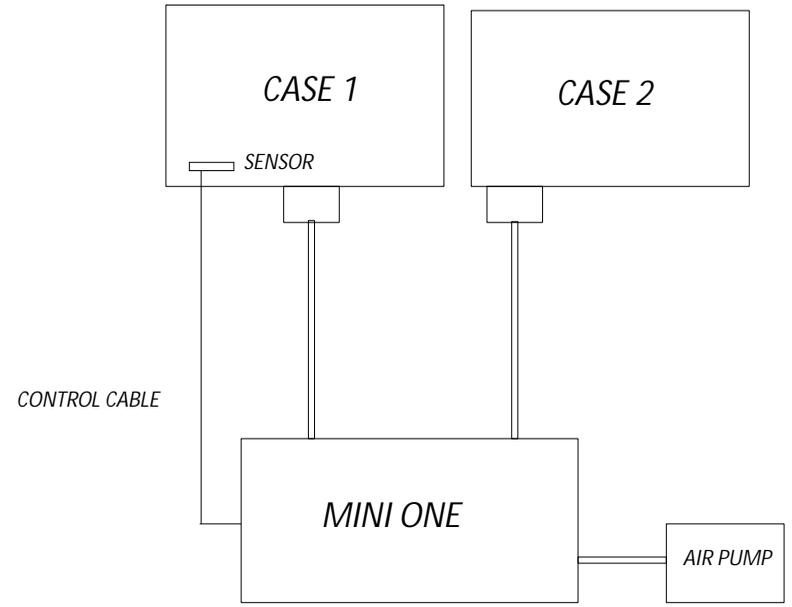
HUMIDITY CONTROL BY ADDITION

MULTIPLE ENCLOSURES OPERATION

Note that when multiple outlets are used in displacement mode, a secondary valve is needed in line to protect the other vitrine(s). This valve may be placed or mounted immediately next to the unit. Supplemental valves and other components are available from the manufacturer.



HUMIDITY CONTROL BY DISPLACEMENT

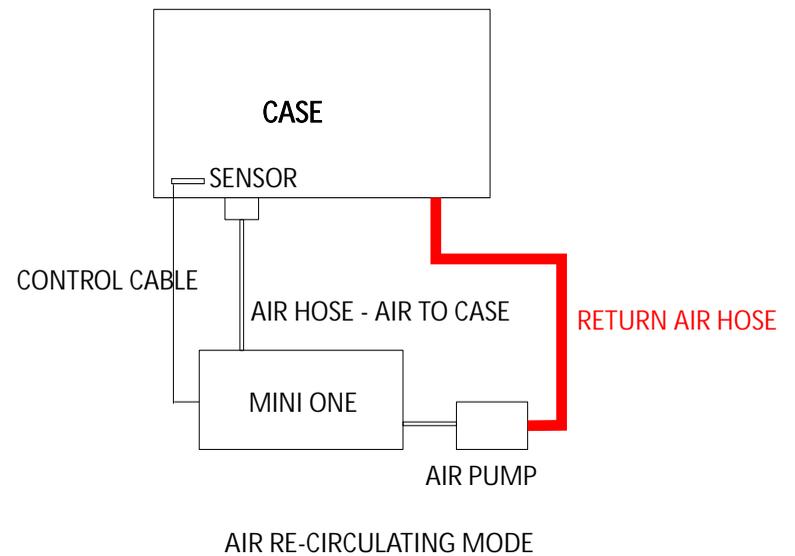
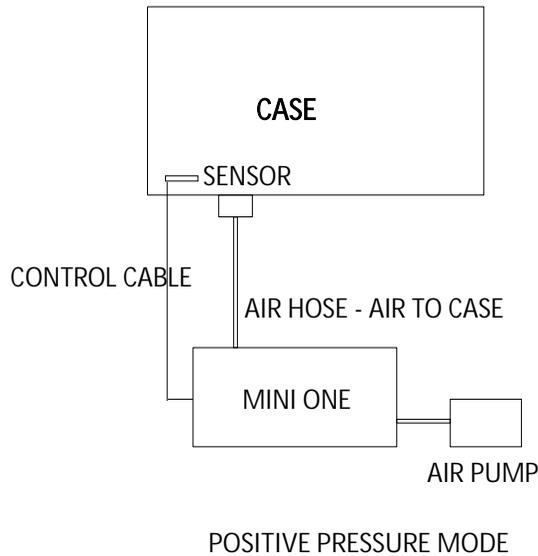


HUMIDITY CONTROL BY ADDITION

AIR RE-CIRCULATING MODE

As a standard, Mini One is installed as a positive pressure device. (no return air hose installed)
 In some situations the air re-circulating mode is a better option. In that mode one hose is delivering RH controlled air into the display case and another hose is returning air from the case to the air pump.

Since the air pump is delivered in positive pressure mode, it is necessary to make some modification to it. Please see page 35 for detailed instructions.



BEFORE INSTALATION

Hole for air entry unit.

Hole for valve installation must be located in the bottom of the case or in any of the walls. Hole diameter : 1.05" - 1.25" hole position: no closer then 3" from the wall.
 For installation and future service, 6" clearance is needed between the floor and the bottom of the case.
 Please contact manufacturer for alternate installations if those prerequisites cannot be meet.

Exhaust termination.

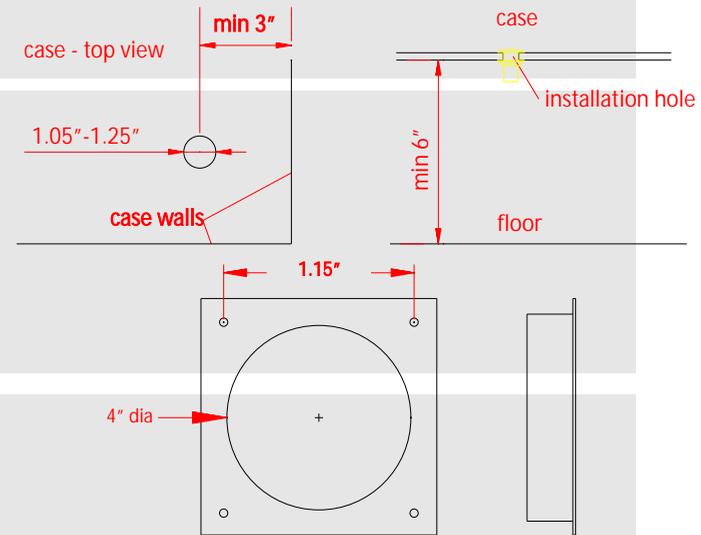
If a Mini One is installed in small enclosed area (ex. base of the case) its necessary to install a exhaust hose. The Mini One includes a exhaust hose and exhaust termination.
 See drawing for size of termination flange and necessary vent hole.

Proper ventilation.

If the unit is placed in an enclosed area, a source of fresh air for cooling must be provided. This should be an unobstructed vent or louver of at least 16 square inches / 100 cm²

External low water level light.

In addition to the front panel "low water: indicator, there is a possibility of installing an additional external LED light (ex. in the base wall). The supplied LED needs a 0.25" diameter hole for installation.



CONNECTING MAIN UNIT

Place the units on level surface. If units are to be stacked, place the pump module ABOVE the main module.

NEVER INSTALL PUMP MODULE BELOW MAIN UNIT.

Attach the air line and power supply connecting the main module to the pump module.



Connect the showcase air supply line, exhaust hose, control cable and power cord.

Ensure that the end of the overflow port drips into a wide flat tray, or an adequate container. (Some water will escape during filling, this is normal.)

Turn on the power using the switch on below the power cord receptacle. Slowly fill the reservoir with DISTILLED WATER. You will hear an intermittent noise as a water pump transfers the water from the reservoir to the treatment tank. Note the water level with LED level indicators; do not overfill.

Follow the detailed instructions below to set the desired humidity and alarm settings.

VENTILATION

If the unit is not enclosed, be sure that there is adequate air available for cooling. For most effective operation, do not allow ambient temperatures around the unit to get above 75 F / 24 C.

Should the unit be mounted in an enclosure (e.g. beneath the showcase), provide at least TWO ventilation holes. A flexible exhaust hose must be attached to the four inch / ten centimetre mounting on the rear of the unit, and directed out of the enclosure through one of the ventilation holes or warranty is invalid.

Adequate fresh air for cooling must be provided, through a hole (or holes) totalling at least 16 square inches / 100 sq. cm. All ventilation holes must be unimpeded (do not cover with any cloth, mesh, or perforated metal). Avoid re-circulating exhaust air by separating the holes as widely as possible. For example, provide an upper hole for exhaust and a lower hole for fresh air intake. Be aware of walls or obstructions which might trap and re-circulate exhaust air into the fresh air intake.



NO VALVE SENSOR INSTALLATION (STANDARD)

Sensor can be installed inside the case without a valve unit. The valve unit would need to be replaced with a small, sensor control box. In this situation, with out of range RH, air flow to the case is not cut off (there is no valve in line) Only the alarm will be indicating improper RH level. Valve unit need to be replaced with small, sensor control box.



Sensor termination box.



Sensor.

NOTE THAT THE SAFETY VALVE FEATURE IS NOT PROVIDED IN COMPENSATORY MODE.

AN OUT OF RANGE ALARM CAN BE PROVIDED, BUT THE UNIT WILL NOT AUTOMATICALLY CEASE OPERATION OR LIMIT AIRFLOW.

VALVE/SENSOR INSTALLATION

Install supplied flange in the hole. [\(see hole specification\)](#)
As a standard, straight flange is supplied with the Mini One. If necessary, 90 degree flange, can be also supplied.

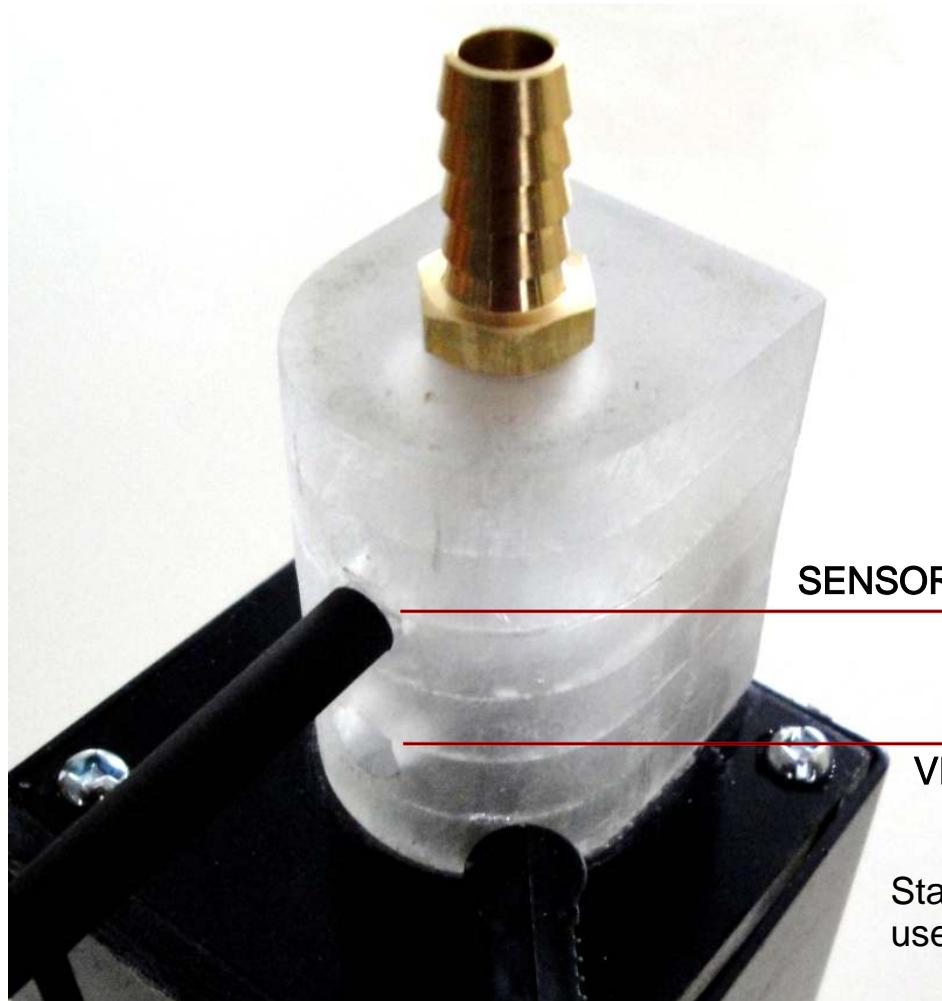


Using a short piece of supplied hose, connect flange to the side connector on the valve box. Hose should be no longer than 6”.

Another connector on the valve, must be connected to the Mini One OUTPUT connector. The connecting hose cannot be shorter than 5 ‘ and no longer than 75’ (23 m). Contact manufacturer if length of hose must be higher than 75’.

Note: Minimum length of hose (5’) is critical for proper operation of the Mini One.

VALVE/SENSOR INSTALLATION



SENSOR HOLE

VENT - do not block

Sensor must be installed into sensor hole on the back of the valve and connected to the connector on the side wall of the valve.



Standard, straight 9 pin, male/male serial cable is used to connect valve with the Mini One.

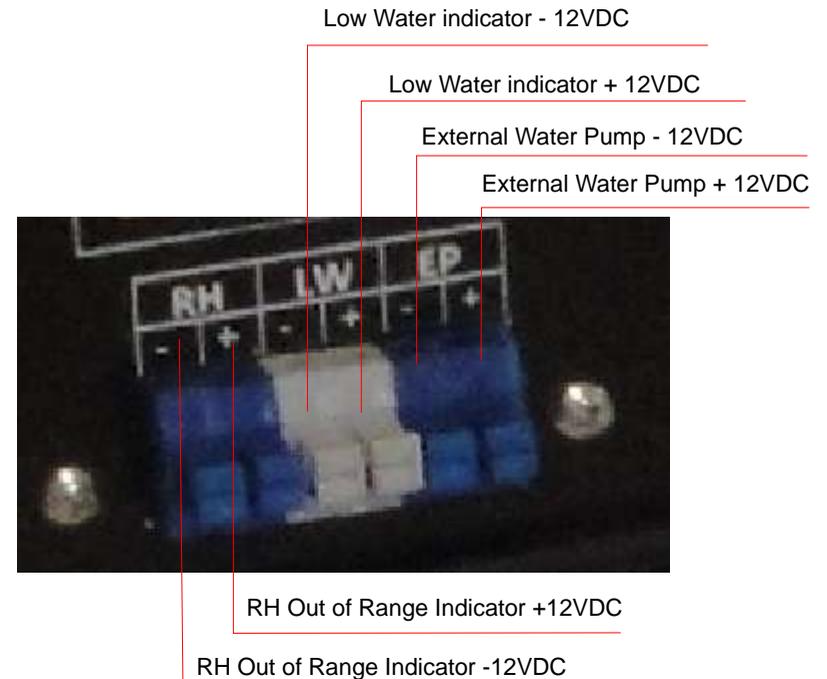


EXTERNAL CONNECTORS

The “RH out of range” contact, gives the user the option of connecting outside indicator e. g. LED light or other 12VDC device.

The remote "Low Water Indicator" light and “Out of Range” (RH) light must be connected with the proper polarity. The RED wire must be connected to the positive (+) connector and the BLACK or wire must be connected to the negative (-) connector.”

A connection for an External Water Pump is also supplied. This optional equipment pumps water into the Mini One from an external water tank. This option is recommended if ambient RH levels are considerably lower then the unit's RH set point.



COMMUNICATION PORTS

The Mini One is equipped with a standard RS 485 data ports.

Using the supplied software, user can set, read, monitor and log all controller data.

The cable to connect a single machine with a computer is available from the manufacturer. Computer must be equipped with a standard USB port. Cable connects to one of the available com ports.

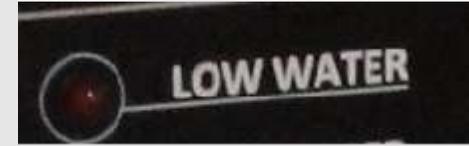
To monitor multiple machines, its necessary to connect all of the machines together using a standard RJ 11 cable.

PIN 3 - Data +
PIN 4 - Data -



Filling the Reservoir

A minimal amount of water must be maintained at all times in the microclimate generator's treatment tank for optimum performance. As water is transferred to the treatment tank from the reservoir, an optional alarm will indicate that water is needed in the reservoir. The reservoir may be filled at any time. Note that the unit will continue to operate with an empty reservoir until the water in the treatment tank is exhausted.



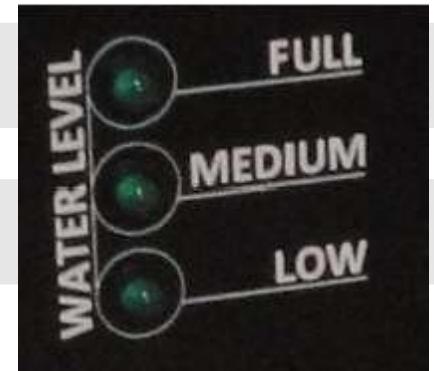
You will need a hose, a funnel or some other means of transferring water into the hose, a cloth to deal with spills and overflow, and about two liters of distilled or deionized water (do not use tap water).

Turn the unit on. Attach a hose to the Fill port and slowly add water through the hose. (You may wish to attach a funnel to the end of the hose, or create your own fill system.) You will hear the internal pump transfer the water to the treatment chamber, and you will see the water level change on LED water level indicator. Stop when the pump stops and the water reaches the "FULL" indicator. Excess water will flow back through overflow located below Waterfill connector.



\Some water will escape from the overflow port during filling. This is normal.

See below for details on using external water supplies to extend periods between replenishing the Mini One's reservoir.



OVERFLOW PORT

As the unit removes moisture from the air, the resulting condensate water will be deposited in the treatment tank reservoir.

When the tank is full, the excess water drip from the unit at the overflow port.

You may collect this condensate in a container, or simply allow it to evaporate from a shallow tray.

In most cases, a tray will allow all condensate to evaporate away with no need for draining the condensate pan.

You may extend the overflow port with a very short hose (less than 2 inches / 5 cm) to place the end in a more convenient location. The hose outlet should remain at the same level (or lower) as the overflow port.



ADJUSTING THE RH SETTING

The control panel indicates two values.

The display on the left (glowing red and marked PV or Process Value) is the actual RH being measured at the sensor, display on the right (glowing green and marked SV or Set Value) indicates the target humidity.



The four buttons below are “Enter”, “Cycle”, “Down”, and “Up”. To set the target humidity, press and hold the up or down arrow until the desired RH is displayed. Then press the enter button to lock the setting in.

The AutoTune function should be set every time the target humidity is changed. To set AutoTune depress the Enter  button for about one second and release, when the display shows “off”, use the up or down arrow to change setting to “on”, then press the enter key again. 

The display will return to showing the PV and SV values and small green dot on the left (marked AT) will blink.

CONTINUE ON THE NEXT PAGE

ADJUSTING THE RH SETTING

Note that temperatures and sensor calibrations will vary, and it is unlikely that two humidity sensors side by side will ever agree.

We suggest you use the value indicated on the Mini One display as an approximate indicator of the RH of the air being supplied to the enclosure. (Variations in sensor calibration and air input temperature may influence the RH sensor's readings).

Use an accurate instrument in the case (near your objects) if you wish to have a reliable determination of your actual case environment. Adjust the Mini One output as needed to provide appropriate conditions in the enclosure.



It is normal for the output to take up to four hours to reach mid range humidity output (45 – 55%) at initial start up. Achieving very low humidity (less than 35% will take even longer (overnight).

TURNING ON/OFF ALARM

In some situations, the operator may want to disengage the alarm function. (This forces the valve to remain open at all times.)



To turn OFF alarm:

Press and hold Enter button until display changes to: CnPt. Then press Cycle button till display show: ALA 1.

Using arrows change to 0 and press Enter button twice. Display should go back to regular values.

Same procedure must be used to turn alarm back ON, ALA1 must be changed to 1.

To change the allowable limits of the alarm (factory set to 5)

- Press CYCLE button till display shows: ALA1H, using arrows change value and press Enter button.

Press Cycle button again to ALA1L display and change value for the low limits.

Press Enter twice to go back to the normal display.

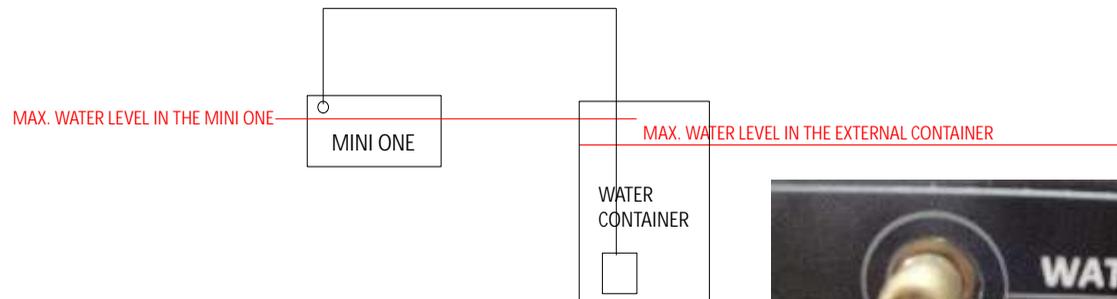
EXTERNAL WATER PUMP

As an optional accessory, we offer a remote water pump to use in an external reservoir (supplied by client). The water pump should be located in the bottom of the external reservoir, and must be connected through a water feed hose to the "Water Fill" fittings on the Mini One.

The electrical cable must be connected to the external connector located on the Mini One.

The pump will automatically engage to replenish the internal reservoir when the water level in the Mini One falls.

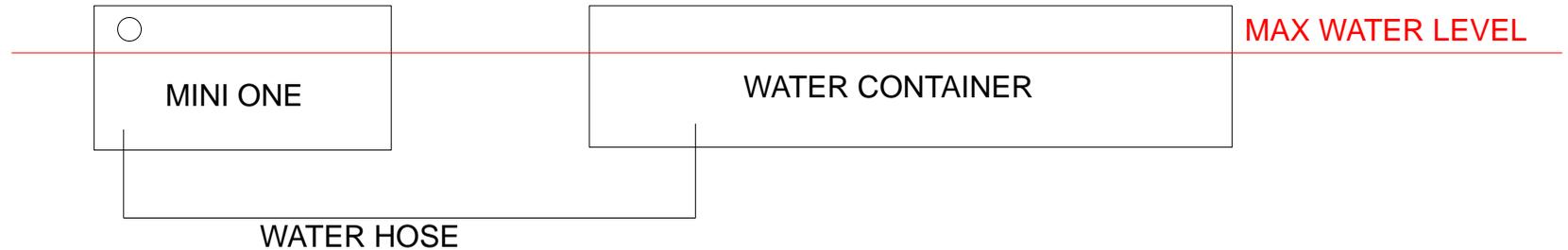
Notes: Water level in the external container, must be BELOW max. water level in the Mini One to exclude possibility of siphoning effect.



EXTERNAL, GRAVITY FEED WATER CONTAINER

As a optional accessory, we are offering a additional external water container which can be connected to drain connectors of the Mini One. Container must be placed on the same level as the Mini One and maximum water level must be no higher than max water level in the Mini One.

Please contact the manufacturer for more info.



Hose connecting external water container, must be connected to the drain fitting on the Mini One. Right valve must be always open when external container is in use.



AUTOMATIC WATER FEED

As an option we are offering a automatic water feed.

This option is available **ONLY** for installation of the Mini One in the machine room where there is an access to the water source and a drain.

Please contact the manufacturer for more info.

REPLACING MANIFOLD IN THE AIR PUMP

If you receive the air pump in a separate shipment or you are replacing a faulty air pump, it is necessary to replace the original manifold with a new one, included in the machine shipment.



Remove the original manifold from the pump.

Install a new manifold shipped with the machine.



▶ Air pump with replaced manifold, ready to use.

NEW SENSOR SETUP

Each Mini One generator is shipped with a pre configured humidity sensor. There is no need to make any changes within the sensor setup.

If for any reason, the sensor is replaced with a new one, it is necessary to enter a new configuration associated with the specific sensor. Each shipped sensor has an attached tag with two numbers: one positive, usually over 100 and the other one, negative, usually lower then -20. Please carefully follow calibration procedure.

On the controller, press and hold  for 3 sec.

Display will change to “CnPt u5”

Using  go to “tP-H” and using arrows, change to higher number on the tag
eg.133.6. Press  to save.

Using  go to “tP-L” and using arrows change number to the lower number on
the tag eg. -27.8.

Press  twice to save and return to the regular display.



AIR RE-CIRCULATING MODE - PUMP ADJUSTMENT

Pumps are shipped in NON RECIRCULATING MODE. If pump will be used in recirculating mode, some modification is needed.

Brass or stainless steel plug located on the back wall of the pump, should be removed and replaced with a brass fitting supplied with the pump.



Also small hole on the top of the pump, must be blocked. Hole should be blocked with metallic tape supplied with a pump.



PUMP ADJUSTED TO USE IN RECIRCULATING MODE GENERATES HIGH NOISE IF HOSE IS NOT CONNECTED.

FACTORY SETTING

If for any reason it is necessary to reset controller to factory setting, please follow procedure below.

1. Press  till display shows “**SP**” - using arrows, change parameter to `1` and press  to save.
2. Press and hold  till display shows “**CnPt**” - using arrows change parameter to “**u5**” and press .
2. Using  continue to “**tP-H**” and using arrows change this parameter according to number attached to the sensor. end press  to save.
3. Using  continue to `tP-I` and change this parameter according to number attached to the sensor (this is a negative number) and press  to save.
4. Continue to `Ctrl` and change parameter to **Pid**. Press  to Save.
5. Continue to `S-HC` and set it to **Cool**. Press  to save.
6. Continue to **ÀLA1** and set to **0**. Press  to save.
13. Press  again to enter regular display mode.

LIMITED MICROCLIMATE GENERATOR WARRANTY

This quality product is warranted to be free from manufacturer's defects in material and workmanship, provided that the unit is used under the normal operating conditions intended by the manufacturer, and in accordance with the Requirements for Proper Operation as outlined in this Installation and Operating Manual.

This warranty is available only to the client to whom the unit was originally sold by authorized distributor of Preservaech Inc., and is non-transferable.

TERMS OF WARRANTY

During the first year, any electrical parts of this product found to be defective, including any sealed system units, will be repaired or replaced, at warrantor's option, at no charge to the ORIGINAL purchaser.

To obtain service, contact Preservaech Inc. at the address below, who will provide you with instructions. Service must be performed by a qualified service technician, or with the express permission of Preservaech Inc. If service is performed on the units by anyone other than an authorized service depot or agent, all obligations of Preservaech Inc. under this warranty shall be at an end.

EXCLUSIONS

Save as herein provided by Preservaech Inc., there are no other warranties, conditions, representations or guarantees, express or implied, made or intended by Preservaech Inc. or its authorized distributors and all other warranties, conditions, representations or guarantees, including any warranties, conditions, representations or guarantees under any Sale of Goods Act or like legislation or statute is hereby expressly excluded. Save as herein provided, Preservaech Inc.

shall not be responsible for any damages to persons or property, including the unit itself, howsoever caused or any consequential damages arising from the malfunction of the unit and by the purchase of the unit, the purchaser does hereby agree to indemnify and save harmless Preservaech Inc. from any claim for damages to persons or property caused by the unit.

GENERAL PROVISIONS

No warranty or insurance herein contained or set out shall apply when damage or repair is caused by any of the following:

- 1) Damage in transit or when moving the appliance.
- 2) Improper power supply such as low voltage, power surges, defective wiring or inadequate fuses.
- 4) Accident, alteration, abuse or misuse of the appliance such as an inadequate supply of cooling air, or abnormal operating conditions.
- 5) Use of a unit that has been optimized for a particular application in another application that has not been approved by Preservaech Inc.
- 6) Fire, water damage, theft, war, riot, hostility, acts of God such as hurricanes, floods etc,
- 7) Service calls resulting in customer education.

WARRANTY SERVICE

Proof of purchase date will be required for warranty claims; so, please retain bills of sale. In the event warranty service is required, present a facsimile of the cover of this document to our AUTHORIZED SERVICE DEPOT. Please contact our head office for service instructions.

