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***Dept. of Environmental
Conservation***

ICH-G1HD-9X9M

Environmental Chamber

Product Manual

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1. Important Notes

- NOTE 1:** Pictures within this manual may vary due to product improvement.
- NOTE 2:** The Fuji controller setup parameters vary from chamber to chamber due to the AUTO-TUNE feature. To avoid unnecessary trouble and the expense of being charged for a possible customer service visit, with the exception of the set values (SV), do not attempt to change any parameters without first taking note of all stored values.
- NOTE 3:** Through alarms, each Fuji Microcontroller has the ability to act as a component fail safe and protect your chamber from further damage in the event the process value (PV) excessively deviates for some unforeseen reason. For your convenience, Darwin Chambers pre-sets these alarms with a 15-minute delay to allow an adequate amount of time for the PV to recover in the event of a power outage/door opening.
- NOTE 4:** Alarm set values and delay times are listed as per the Darwin Chambers standard configuration. During chamber installation alarm values may vary as a result of factory authorized personnel optimizing the chamber operation to suit the customer's need.
- NOTE 5:** The system utilizes a chilled glycol loop to condition the chamber. To ensure proper chamber operation, it is important to periodically check the system's glycol levels.

2. Warranty

Darwin Chambers Co. will warranty goods of its manufacture in accordance with details as stated in the original quotation. The original quotation is defined as that which the original purchase order refers to.

Darwin Chambers warrants goods of its manufacture as being free of defective materials and faulty workmanship for 24 months, all labor for 12 months, 36 months for the compressor(s), and 10 years on the walk-in panels after delivery as long as the units have been used within the guidelines of the manufacturer's recommendations. Darwin Chambers will repair or replace, without charge, any items under warranty found to be defective by an agent or duly authorized representative of Darwin Chambers Co. Certain parts may need to be returned to the factory for repair. Service to chambers is to only be conducted by a qualified technician and/or as specifically directed by Darwin Chambers Company. Factory service/repair is preferable.

Consignee must inspect shipped package(s) thoroughly upon delivery for damage of any kind – any and all damage must be noted on bill of lading. Damage claims are to be made against shipping company unless otherwise directed by Darwin Chambers Co. Failure to inspect shipment(s) will result in loss of claim from shipper and Darwin Chambers Co.

Disclaimer: Darwin Chambers Co. only warrants that the parts and assemblies manufactured by it will be as specified and free from defects in materials and workmanship. Darwin Chambers Co makes no other warranties or representations of any kind whatsoever, expressed or implied, except that of title and all implied warranties including any warranty of merchantability and fitness for a particular purpose is hereby disclaimed.

The information we supply is believed to be accurate and reliable as of this printing. However, Darwin Chambers shall not be liable for any incidental damages, consequential damages, special damages, other damages, costs or expenses excepting only the cost or expense of repair or replacement as described above. Products must be installed and maintained in accordance with Darwin Chambers instructions. There is no warranty against damage to the product resulting from misuse or failure to comply with directions provided. Users are responsible for the suitability of the products to their application.

3. Symbol Definitions



CAUTION

Appears next to required safety related information in the manual.



WARNING

PERSONAL INJURY WARNING: *Meaning risk of electrical shock.*

This symbol warns the user of a potential shock hazard where HAZARDOUS LIVE voltages that could result in serious injury or death can occur.

TECH TIP

Technical advice and special instructions are given wherever this symbol is found.

NOTE

This symbol denotes special advice.

4. Key Definitions

Alarms – Set parameters designed to alert the user of testing deviation that performs a timed component shut down to protect the environmental chamber from potential damage.

Absolute Alarms – A type of alarm that is dependent upon a fixed value or limit, that when reached/crossed indicates the process is out of tolerance by an audible/visual indicator.

Deviation Alarms – A type of alarm that has a set limit/range which automatically adjusts at a fixed value from a variable (Set Value) that when reached/crossed indicates the process is out of tolerance by an audible/visual indicator.

Deionized Water (DI) – Also known as demineralized water, is water that has had its mineral ions removed, such as cations from sodium, calcium, iron, copper and anions such as chloride and bromide.

Conductivity – A measure of the ionic activity of a solution in term of its capacity to transmit current.

Parts Per Million (PPM) – The number of parts by weight of a substance per million parts of water.

Polyvinyl Chloride (PVC) – A white, water-insoluble, thermoplastic resin, derived by the polymerization of vinyl chloride; used chiefly for thin coatings, insulation, and piping.

Process Value (PV) – The current / actual condition within the environmental chamber.

Relative Humidity (RH) – The amount of water vapor in the air, expressed as a percentage of the maximum amount that the air could hold at the given temperature; the ratio of the actual water vapor pressure to the saturation vapor pressure.

Reverse Osmosis (R.O.) – The process by which pure water is produced as a result of forcing waste or saline water through a semi permeable membrane.

Set Value (SV) – The user-determined set point of the environmental chamber.

Total Dissolved Solids (TDS) – An expression used to describe the combined content of all inorganic and organic substances contained in a liquid (which are present in a molecular, ionized, or micro-granular suspended form).

5. Introduction

The ICH-G1HD-9X9M environmental chamber has been developed with affordability, accuracy, and consistent performance in mind to meet your testing and budgeting needs. The ICH-G1HD-9X9M model utilizes effective control of temperature by using a mechanical refrigeration system with a hot-gas bypass, a chilled glycol loop, electric resistance heat, ultrasonic humidification, and a regenerative desiccant dehumidification system..

While the ICH-G1HD-9X9M model will suit most needs through the purchase of additional options, functionality may be added to your chamber, to allow greater flexibility within your testing environment. For more information, please visit www.DarwinChambers.com or email our sales team at parts@darwinchambers.com.

6. Requirements

6.1. Electrical (Per Component)

For component electrical specs please refer to the folder titled Spec Sheets and Component Manuals on the CDROM.

In the event of a malfunction or breakdown, do not attempt to perform repairs without first contacting a factory representative. Failure to do so may void your warranty. System repairs should never be performed without the assistance of a qualified service personnel or a qualified electrician.

6.2. Ambient

For the best results, it is recommended that the chambers be maintained in a surrounding environment of $22.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$ and $\leq 50.0\%$ RH. To achieve the best performance from your chamber, it is important to keep the unit in an area that is air-conditioned during the summer months. The reason for this is mainly due to high ambient dew points, which may introduce more humidity into the chamber than the standard chamber can remove during the normal course of operation.

6.3. Operating Range

The chamber is designed to operate at 20.0°C to 23.0°C and 30.0 to 40.0%.

NOTE: *Chamber Operation outside of Darwin Chambers specified operating range may result in damage to the unit, may void the chamber warranty, and should be avoided*

6.4. Interior Operating Space

Proper product and shelf placement is essential to the flow of air and directly affects the chamber uniformity. Darwin Chambers recommends that all product remains at a minimum of two inches from each side of the chamber walls and six inches away from the bottom of the evaporator of the chamber.

6.5. Estimated Refrigerant Charge

The estimated refrigerant charge on the condensing unit is 15 oz. of R134a.

7. Humidifier Requirements (When Enabled)

7.1. Electrical



(US Models & Overseas Models)

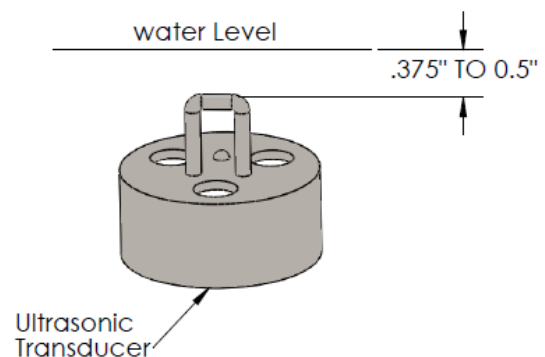
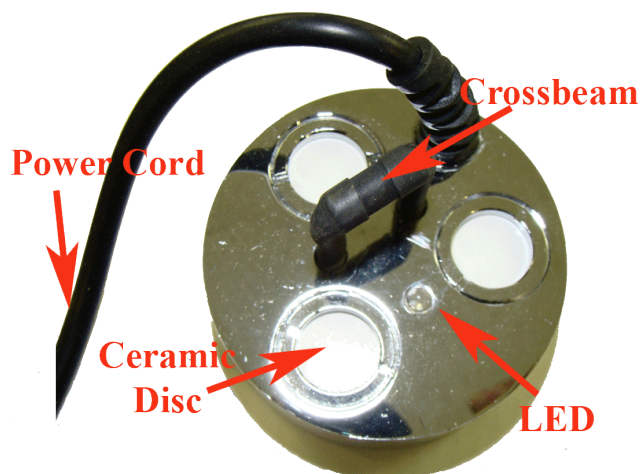
24 Volt AC Single Phase 50/60 Hz
2.6 Amps per Mister

7.2. Water Quality

The ultrasonic humidifier requires the use of a water supply that can meet the following water specifications: A conductivity of 0.06 μ S - 5 μ S (Micro Siemens), TDS (Total Dissolved Solids) of less than 20 PPM (Parts per Million), and 1-10 PSI (Pounds per Square Inch) of supply water pressure. The conductivity requirements are necessary to ensure that the humidifier's ultrasonic transducer's conductivity sensor can adequately detect the presence of water. Without the proper conductivity, the ultrasonic transducer may burn out and/or function improperly. Meeting the TDS requirements will ensure that sediment within the water supply will not accumulate within the humidifier or be dispersed throughout the chamber. The accumulation of sediment within the humidifier may result in humidifier deterioration and/or malfunction. Sediment being dispersed throughout the chamber could also result in corrosion, mechanical/electrical problems, and samples placed within the chamber being blanketed by the sediment. **PLEASE NOTE:** Darwin Chambers Co. recommends the use of an R.O. system or a Darwin Chambers Co. brand DI water filtration system to meet these specifications.

7.3. Water Level

When the humidifier's reservoir has been filled, there should be no more than approximately one and one half (1-1/2") inches of tap water above the ceramic discs of the ultrasonic transducer. **NOTE:** *If the water level exceeds the one and one half (1-1/2") inch level, the transducers capacity to produce humidity will be greatly diminished. In addition, water MUST cover the crossbeam (conductivity sensor) of the ultrasonic transducer by a minimum of 1/4 inches otherwise the transducer will stop generating humidity automatically.*



8. CHAMBER OPERATION – Control Panel

8.1. Powering the Chamber or Components On and Off

To turn the chamber on and off the control panel needs to be opened. To open the control panel, first locate the screw on the right hand center portion of the panel. Next, remove the screw by turning it counter clockwise until it has been completely backed out of the panel. Then, open the panel by pulling it. To turn the chamber or components on/off, simply locate the fuse block(s) located within the control panel on the top right hand side and then open the block(s) of the component(s) that require removal of power. To remove complete power from the control panel open each available fused block.



NOTE: Some components may not be circuited through the control panel. To remove complete power from the chamber the individual disconnects of the additional components will have to be located and then have power removed.

8.2. Changing the Set Value (SV)

Press the up or down arrow to change the set value. When changing the set value (SV), ensure that the high alarm (AL1) and a low alarm (AL2) values have been increased. Increasing the alarms allows the chamber to reach the set value without the possibility of the chamber going into alarm condition. Please refer to the section “Changing Alarm Parameters” for more information.

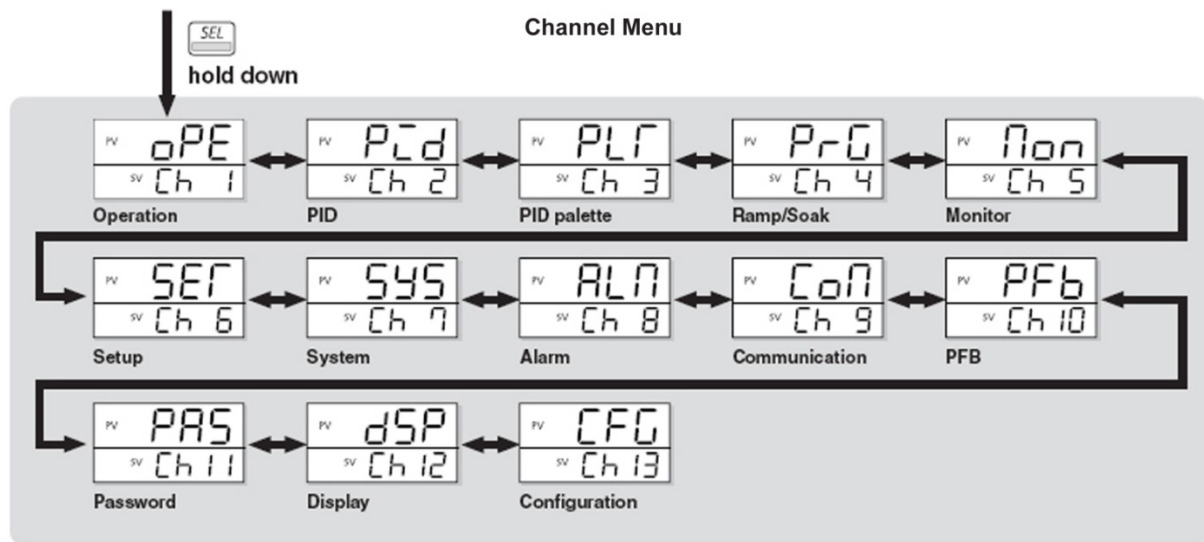


This diagram is intended as a quick reference to the controller's functionality. Some functions are dependent upon the chamber type, the controller type, and which options have been purchased.

8.3. Navigating the Menu

The Fuji PXG4 Micro Controller offers a large range of customizable settings that have been preprogrammed from the factory to best suit the chambers intended operation. In order to adjust any parameters the user is required to navigate the controller's menu. To enter the controller's menu, press and hold the "SEL" (Select) key until Channel 1 (Ch1) appears on the lower, green SV screen. There are 13 possible channels within the PXG4's menus. Navigating from channel to channel simply requires pressing the up and down arrows on the controllers face. To enter the desired channel press the "SEL" key when the appropriate channel is displayed. To change a setting, first press the "SEL" key and the current value displayed on the PV screen (upper red screen) will begin to flash. Using the arrow keys, the parameters can be adjusted. To confirm a parameter simply press the "SEL" key one more time. To return to the main menu of channels, hold down "SEL" until the current channel is displayed on the SV screen. To exit the menu, press the A/M key.

NOTE: *There are 13 channels within the standard PXG4, several of the channels and parameters that are not utilized and have been masked to expedite the menu navigation process. It is not recommended to alter any preprogrammed parameters without first documenting the current parameter and/or adjusting any parameter not discussed within this user manual. For any parameter information not available within this product manual, please refer to the Fuji PXG4 User Manual.*



8.4. Controller Parameter Settings

The factory preset controller parameter values are typically sent with the owner's documentation. However, if this information is missing, or if it has been lost or misplaced, please contact Darwin Chambers Company at 877-7-TEMP-RH or email technicalsupport@darwinchambers.com.

8.5. To AUTO-TUNE Controller

Auto-tuning allows the controller to calculate the optimum level of control required to maintain the desired setting value (SV). This feature will not fix a chamber with a problem — it only fine-tunes an already controlling chamber. Do this if the SV or some other important variable (load, outside temperature, etc.) is changed and the control is less than desirable.



TECH TIP If an Auto-tune is required, it should be performed after the process value (PV) has stabilized at the desired set value (SV). For chambers that have two Fuji PXG4 controllers (one for temperature and one for humidity), the temperature controller must be Auto-tuned first. Then allow both the temperature and %RH to stabilize before performing an Auto-tune on the chambers humidity controller.

To enter the Auto-tune mode, press and hold SEL key until the controller displays the first channel, Ch1. Press SEL one more time to enter Ch1 (Channel 1). Once inside channel 1, scroll if necessary with the up and down arrow keys until the Auto-tune function (AT) is visible on the PV screen. Press SEL once and off will start to flash on the SV screen. To change the value from off to on, simply press the up arrow key. Then press SEL once to activate the Auto-tune (AT) mode. Once the Auto-tune mode is activated, "on" will stop flashing and a green indicator light (on the lower-right corner of the controller) will begin to flash. This indicates the controller is now in the Auto-tune mode. When the green indicator light stops flashing, the Auto-tune process will then be completed. To exit the menu, simply press the A/M key and the front screen will then be displayed.

NOTE: Do not open the door(s) or make any changes while the unit is Auto-tuning. Auto-tuning will take anywhere from 5 minutes to 20 minutes—there will be a light flashing in the lower right hand corner of the controller during this process.

8.6. Locking the Control

Scroll to LOC in the first menu. To change any settings enter a 0. To "lock" all settings including the SV, change the parameter to a "1." To lock all settings except the SV set the parameter to a value of "2."



8.7. Changing Alarm Parameters

The controller has a high alarm (AL1) and a low alarm (AL2). For ease of use, these alarms are preset from the factory with deviation alarms that are set at $\pm 2.0^{\circ}\text{C}$ and $\pm 5.0\%\text{RH}$. The alarms are triggered when the PV reaches $\pm 2.0^{\circ}\text{C}$ and $\pm 5.0\%\text{RH}$ from the chamber's set value(s) (SV). If it is preferred that these alarms are absolute(s), they can be changed via adjusting the values D01T and D02T in Ch7 to the values of 1 and 2

respectively. To access these alarms, go into Ch1 as described above. Scroll down through the menu until you see “AL1” or “AL2”. Press “SEL” once and then use the up/down buttons to change the alarm setting value. Press “SEL” again to confirm the new parameter.

EXAMPLE: A temperature controller with deviation alarms set at $\pm 2.0^{\circ}\text{C}$ is programmed to control at 25.0°C . In this configuration, AL1 would be equivalent to $25.0^{\circ}\text{C} + 2.0^{\circ}\text{C}$ (or 27.0°C). AL2 would equal $25.0^{\circ}\text{C} - 2.0^{\circ}\text{C}$ (or 23.0°C). With these alarms, if the temperature reaches 27.0°C then AL1 will go into alarm. If the process value reaches 23.0°C , AL2 will go into alarm.

AL1 and AL2 both have a delay of 15 minutes. When the process value reaches the set limits dictated by the alarm and the delay time has elapsed, an alarm condition is triggered and an audible will begin to sound. This delay allows access to the chamber without the alarm going off every time the chamber deviates from the controlling set value. The delay times (DLY1 and DLY2) can be changed, please see page 9 in the PXG4 User Manual for further details.

An alarm condition triggered by the temperature controller will disable chamber components. A high alarm will disable the chamber's heater, hot-gas bypass, and chamber lighting. A low alarm will disable the chamber's refrigeration. A high humidity alarm will disable the chamber's humidification system. A low humidity alarm will disable the optional dehumidification system.

When changing the set value, it is necessary to increase (or widen) the alarms. This will allow the chamber ample time to reach its set value. Once the set value is achieved, it is strongly recommended to tighten/lower the alarm values. Tightening the alarm allows chamber to provide an adequate warning when an excessive deviation in the process value occurs. This protects both the chamber and the product placed within the chamber.

Please NOTE: *All specified alarm parameters are based upon the typical factory configuration. Actual alarm set values may vary depending upon the application and customer specified chamber set values. Specific values are intended only to illustrate chamber functionality. Actual factory alarm parameters should not be altered without first documenting the parameters.*

8.8. Adjusting the Alarm Delay Time

To change the alarm delay time, press and hold down the SEL button for 3 seconds until Ch1 appears on the display. Press the down arrow key until Ch8 is displayed. Press SEL to enter Ch8 and then use the down arrow key to reach DLY1. When DLY1 appears press the SEL key one time (until the displayed value begins to flash). Using the up/down arrow keys, adjust the DLY1 time to 15 minutes or another desired setting. Press the SEL key to confirm the setting. Using the same procedure, adjust the DLY2 time to the desired setting.



8.9. Alarm Condition

Once the high and low alarms have been set and the process value has passed the set alarm values the D01 or D02 lights will start to flash on the controller(s). If the chamber does not come back within the alarm limits before the delay time fully elapse the unit will then enter alarm condition.

NOTE: *To protect the chamber and the product placed within, alarms are designed to disable chamber components. AL1 (D01), the high alarm, will typically disable the heater, hot-gas bypass, and lights if the temperature controller is in alarm. If the %RH controller is in high alarm the humidifier will be disabled. AL2 (D02), the low alarm, disables the refrigeration system on the temperature controller or the optional dehumidification system if it is a %RH alarm. If the alarm condition is not cleared, the chamber may not be able to return to specification or function as designed.*

Several key indicators will signal an alarm condition. The first of these indicators will be an audible siren. If the alarm was acknowledged by pressing the Alarm Acknowledge Button on the control panel, this audible will attenuate and may not easily be noticed depending upon the ambient noise levels. Another key indicator of your chamber being in alarm is the Alarm Acknowledge button illuminating. In addition, the most important method that can be utilized to determine the alarm condition is by looking for a solid red LED next to the D01 and D02 lights on the controller(s). The D01 and D02 lights indicate whether the chamber is in a high or low alarm condition. If the D01 light is solid red, your chamber is in high alarm. If the D02 light is illuminated with a solid red LED, your chamber is in low alarm.

8.10. Alarm Indicator

For your convenience, the ICH-G1HD-9X9M chamber has an alarm indicator (Alarm Acknowledge button). During an alarm condition, the button will illuminate to indicate that there is an alarm. If an alarm condition occurs, please see section 8.11 "Resetting an Alarm Condition."



8.11. Resetting an Alarm Condition

An alarm condition can occur from a variety of circumstances. For instance, if your chamber's set value is 25.0°C with high and low alarms ($\pm 2.0^\circ\text{C}$) set at 27.0°C and 23.0°C respectively, and with a prolonged door opening the process value falls to 22.3°C the chamber will go into alarm condition once the preset delays have expired (DLY1 and DLY2). The chamber is setup in such a manner that when an alarm is triggered the associated component will be disabled until the process value (P.V.) returns back into the alarm limits. When an alarm condition occurs, the system will sound an audible and may not return to normal operation until the alarm has been reset. To reset an alarm condition, use the following steps.

Resetting a Alarm Condition

- 1) Identify the Alarm – The temperature controller has five lights at the top that indicate which controller outputs are active. The lights; C1, C2, D01, and D02, and D03, are small LED's that will illuminate when chamber outputs and/or alarms are active. D01 and D02 are the lights to signify active alarms. Light number D01 is active during a high alarm. D02 activates when the chamber is in low alarm. The C2 indicator is not utilized while the D03 indicator signifies an active AL3 parameter (utilized for switching optional process controls on/off). To identify the active alarm, look at the D01 and D02 indicators for a solid red dot to identify the alarm. Depending on the illuminated light, take note of which alarm is being triggered.
- 2) Clear the alarm – Once the controller and respective active alarm has been identified, the user will need to enter into the controller parameter level to clear the alarm. To do this, "HOLD down" the SEL key until Ch1 is displayed on the controller. Once Ch1 is visible, "HOLD down" the SEL key for approximately one second and then press the down key to scroll until the active alarm is displayed on the screen. The controller will display AL1 or AL2. Once the parameter that is associated with the active alarm light (D01 or D02) is visible, press the SEL key one more time until the current parameter begins to flash. To clear the alarm, the parameter will need to be adjusted to above the process value if it is a high alarm and below the process value if it is a low alarm. After the value has been adjusted, press the SEL key again to confirm the value. If the value was accepted it would stop flashing, it will display the new parameter, and the audible alarm will cease. Once the parameter has been set, press the A/M key to exit the menu. If the actions were successful, the Alarm Acknowledge light on the control panel will turn off.
- 3) Depress the alarm acknowledge button – If the alarm acknowledge/silence was pressed to attenuate the audible, it is strongly recommended that the button be depressed so that if an alarm condition occurs again, there will be a non-attenuated audible warning.
- 4) Returning the alarms – After the chamber begins to operate normally, it is strongly encouraged to re-enter the controller that has been in alarm condition and set the alarms back to their previous settings.

NOTE: *If the alarm condition reoccurs, and the cause is unforeseen, there could be a problem with one of the system's components. This should not be ignored, contact the Service Department at Darwin Chamber at 1-877-7-TEMP-RH (1-877-783-6774) or email at; technicalsupport@darwinchambers.com.*

8.12. Compressor Button

This button is designed to apply power to the chambers refrigeration system. By default, this button should be pressed in. To deactivate the refrigeration system, depress the Compressor button.



NOTE: *If the chamber is operating at $<5.0^{\circ}\text{C}$ above the ambient or below ambient condition, and if the Compressor button is not pressed, the system will not maintain set value.*

9. Humidity Operation (Optional)

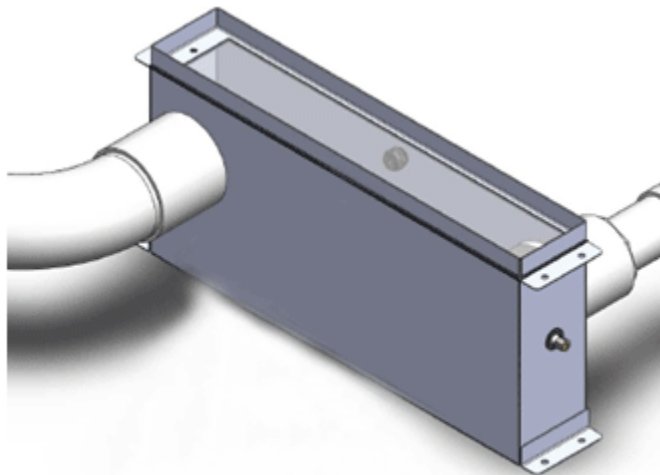
Darwin Chambers Co. achieves precise humidity control through the use of the Fuji PXG4 Micro Controller coupled with the Rotronic HygroClip 2. Together, the PXG4 and HygroClip 2 simultaneously measures the %RH within the chamber and calculates the humidifier output that is required to ensure accurate, consistent, and stable control of the chamber's humidity.

9.1. Changing the humidity/%RH

The operation of the Fuji PXG4 humidity controller is identical to that of the Fuji PXG4 temperature controller discussed in the Chamber Operation section of the user manual. To change the set value of the humidity controller, simply press the Up/Down keys on the controller until the set value (SV) on the bottom screen reaches the desired setting. Once the SV has been set, allow the chamber's process value (PV) to reach the SV and stabilize before performing any testing.

9.2. Humidification Process

After the initial humidifier setup and the temperature has stabilized at set value, adjust the humidity controller to its desired set value and then let the humidity stabilize. During normal operation, the %RH transmitter will send a signal to the Fuji controller. When more %RH is required, the Fuji Microcontroller will request more humidity as the PV begins to dip below the SV. As the Fuji request more output from the humidifier, the C1 light on the top left of the humidity controller will illuminate green in color. Simultaneously the ultrasonic transducers within the humidifier will trigger, lighting a red LED, and producing mist to be supplied into the chamber.



9.3. Humidity Alarms

The Fuji PXG4 humidity controller utilizes three different alarms. The PXG4 humidity controller has a high alarm (AL1), a low alarm (AL2), and an alarm that is used to activate/deactivate the optional dehumidification (AL3). These alarms are very similar to the alarms found on the Fuji PXG4 temperature controller. However, the humidity controller has its AL1 and AL2 alarms set at $\pm 5.0\%$ RH (instead of $\pm 2.0^\circ\text{C}$ as it is in the temperature controller).

EXAMPLE: A humidity controller with deviation alarms set at $\pm 5.0\%$ is set to control at 60.0% RH. In this configuration, AL1 would be equivalent to $60.0\% + 5.0\%$ or 65.0% RH. AL2 would equal $60.0\% - 5.0\%$ or 55.0% RH.

55.0% RH. With the alarms set at these values, AL1 will go into alarm if the humidity level reaches 65.0% RH. If the humidity level goes below 55.0% RH, AL2 will go into alarm.

9.4. Special Humidifier Considerations

- It is crucial to have water quality that falls within Darwin Chambers water quality specifications. Poor water quality is the leading cause of a humidifier failing to operate correctly.
- Upon initial start-up, you should NOT continue using tap water. Over time, atomized tap water may leave behind an assortment of mineral deposits that cling to walls of humidifier, that accumulate onto floor of the humidifier, and mineral deposits that ultimately cover the ultrasonic ceramic discs and the conductivity sensor (crossbeam); leading possibly to future humidification complications.
- After the initial start-up and for day-to-day operations you should use either Distilled, Reverse Osmosis (R.O.), or water from a Darwin Chambers brand DI water filtration system (10 psi max preferred), until the next cleaning or replacement of ultrasonic discs upon which tap water will be required for start up.

10. Dehumidification

Dehumidification is typically achieved through the use of a third switching alarm (AL3L and AL3H) within the humidity controller. By default on the %RH controller, the AL3 parameters are utilized to send 24 Volts AC to the dryer terminations on the chamber. If a chamber has been factory configured for the optional MG90 or a similar dehumidifier, then the AL3 parameters are utilized to create continuity through the dryer terminations. Typically, AL3 on the humidity controller is set as a high deviation low absolute alarm. These parameters are displayed as AL3L and AL3H. AL3L is preset from the factory at 0.0% RH and AL3H is set at 1.0%RH. With these pre-programmed settings, AL3L will never trigger unless the chamber reaches 0.0% RH. AL3L will only trigger when the process value reaches or falls below the parameter set value. AL3H triggers when the humidity reaches or exceeds 1.0% RH greater than the set value.

EXAMPLE: If a chamber has been controlling at 40.0°C and 75.0% RH and is then set to control at 40.0°C and 60.0% RH, the AL3H (D03) would be triggered due to the humidity being greater than 1.0% higher than the set value (SV). Once triggered the chamber will apply dehumidification until the PV falls within 1.0% of the SV.

To change the factory preset alarms, go to AL3L in Ch1 (Channel 1) and set the value to the desired setting (0.0% RH is the factory preset). Then using the down arrow button, scroll through Ch1 until the controller displays AL3H. Set AL3H to the desired setting (1.0% is the factory preset).

NOTE: *It is acceptable on compressed air dehumidification systems to decrease the value of AL3H to 0.5 for tighter control. On heated regenerative dehumidification systems AL3H should not be adjusted without first contacting technical support. Adjusting AL3H in such a scenario may result in damage to the dehumidification system and erratic chamber behavior.*

11. Preventive Maintenance

11.1. Cleaning

The Darwin Chambers Company suggests that the use of vinegar, club soda, or a mild germicidal soap with water should be used for basic routine cleaning. Finally, use isopropyl alcohol for the sterilization of your chamber.

11.2. Additional Preventive Maintenance

A thorough preventive maintenance routine should involve the removal of any sediment accumulation throughout the chamber and especially from the chamber's sensors. The removal of any dust accumulation on the chambers instrumentation and/or components should be performed to ensure that the chamber's instrumentation can effectively ventilate any heat buildup and to avoid unnecessary wear to the chambers individual components. Failure to maintain your stability chamber could result in mechanical difficulties and void the chambers warranty.

Due to the cost and complexity of your environmental chamber, it is strongly recommended that a professional service group should perform all additional preventive maintenance. For preventive maintenance, calibration, and validation services please call 1-877-7-TEMP-RH ext. 704 or email us at calsandvals@darwinchambers.com.

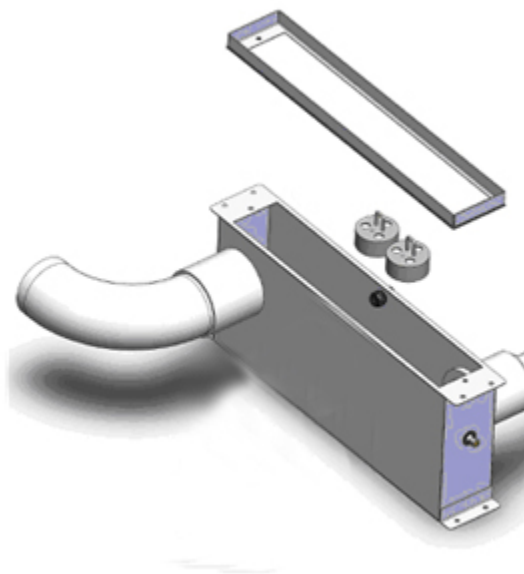
12. Humidifier Preventive Maintenance

The ultrasonic humidifier functions on the premise of ultrasonic vibrations atomizing water into a fine mist. As a direct result of the water atomization, particulates separated from the water supply during the atomizing process may then accumulate upon the humidifier's components. Overtime, without a routine cleaning regiment, the particulate accumulation may lead to diminished humidifier performance. Darwin Chambers recommends regular humidifier inspections on a 6-month interval to help ensure against excessive accumulations and general mister wear.

NOTE: *Necessary cleaning intervals and/or humidifier preventive maintenance required are solely dependent upon the humidifier's water supply water quality. All recommendations and generalizations are intended for consumer awareness and as a reminder to customers that proper preventive maintenance is required to uphold the chamber's warranty.*

12.1. Humidifier Cleaning Procedure

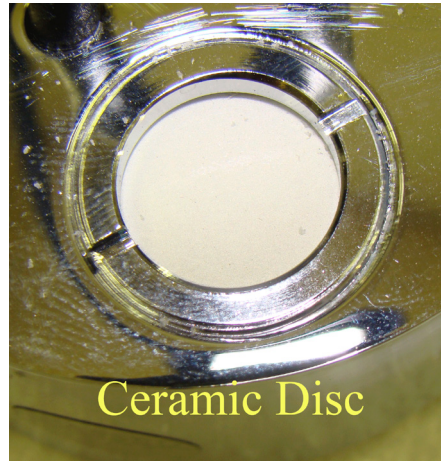
1. First power down the chamber and/or turn the %RH set value down to 0.0% RH and then disconnect/close the water to the humidifier.
2. Use a Phillips-head Screwdriver to remove the two ¼"-20, 1" round head machine screws from the humidifier's lid and then set screws and the lid to the side out of the way.



3. Vacuum the humidifier's tank out with a wet vacuum to remove any water.
4. Use a 50/50 vinegar and water solution to wipe down the interior cavity of the humidifier; ensuring that the mineral deposits are removed from the float valve, humidifier walls, humidifier floor, and the ceramic discs. The vinegar/water mix should help in the removal of the mineral deposits.

NOTE: *When cleaning the humidifier, do not use household or industrial cleaners containing abrasives of any kind on any part within or on any surface of humidifier. In addition, for routine cleansing, only use a soft cloth in water for the mist maker and individual parts.*

5. Gently clean the mister and its white ultrasonic ceramic discs with soft damp cloth or moist paper towel.



6. If applicable, replace the ultrasonic transducer's ceramic disc. It is recommended that the ceramic discs are replaced once a year to help ensure optimal humidifier performance.
7. Place the lid back onto the humidifier and utilize a Phillips-head screwdriver to secure the lid with the two ¼"-20, 1" round head machine screws.
8. Fill the humidifier to approximately 0.375 - 0.5" of tap water above the ultrasonic transducer's conductivity sensor. Then open the supply to the humidifier.
9. Power the chamber on and/or change the %RH set value to the desired %RH setting.

12.2. Maintenance and Replacement of Ceramic Disc

When to clean or replace ceramic disc(s)

1. If over a period of time or upon scheduled inspection a noticeable decrease in amount of mist may occur.
2. If humidifier should stop working altogether
3. Replace the ceramic disc at a minimum on a yearly interval.

Replacement Ceramic Kit packaged contents

1. This kit includes one key tool for the removal of the winding ring.
2. There should be three ceramic disc(s) included in the kit.



How to remove ceramic disc(s)

1. Insert key tool into winding ring. Turn counterclockwise.
2. Remove winding ring.
3. Remove ceramic disc.
4. Remove the clear soft plastic sealing washer and set aside for reuse.

How to install ceramic disc(s)

Note: *Install with ringside facing down. Install cleaned or replacement disc in the following order of prescribed steps.*

1. Dry completely inside the exposed cavity of the mister
2. Re-Insert sealing washer.
3. Install each ceramic disc with ringside facing down.
4. Position the winding ring.
5. Tighten clockwise with key tool.

13. Troubleshooting

<i>Problems</i>	<i>Possible Causes and Solutions</i>
The chamber's process value will not hold steady.	Temperature: For the best results, ensure that ambient conditions at the chamber's location are no more than $22.0^{\circ}\text{C} \pm 5.0^{\circ}\text{C}$. AUTO-TUNE the controllers. Inspect the door gasket for possible leaks. Ensure that the product inside is not impeding the chambers airflow. Inspect the condensing unit fan to determine if it is operational. Inspect the evaporator to ensure that the fans are functioning correctly. Inspect the chamber glycol level to determine if the system is low. Humidity: Ensure the chamber is not in a temperature or relative humidity alarm condition. Ensure that the temperature is steady. Inspect the evaporator to ensure that the fan is functioning correctly. Ensure the chamber door is completely closed and there is no damage to the door gasket. Inspect the humidifier's water level. The water level should be from 3/8" – 0.5." Check the water quality against the recommended water quality specifications to ensure the water is within specification. Observe the ultrasonic transducers to determine if they are producing mist and require servicing.
The chamber is not cooling.	Ensure that all alarms have been cleared. Inspect the door gasket for possible leaks. Ensure that the product inside is not impeding the chambers airflow. Inspect the evaporator fans to ensure they are operational. Inspect condenser unit fan to determine if operational. Inspect the chamber glycol level to determine if the system is low. Verify that the TACO cartridge circulator for the glycol loop is functioning through an amperage reading. Inspect the solenoid on the condensing unit. Carefully touch both sides of the copper piping. If the chamber will not cool and both sides of the solenoid feel the same temperature the hot-gas bypass solenoid maybe stuck open. In such an instance have an electrically trained technician disconnect the power to the solenoid to see if the temperature feels different. If it is verified that the solenoid is either energized when the

	temperature C1 indicator is not on or the valve is bleeding gasses through call technical support at 877-783-6774 Ext 2.
My chamber will not reach the set value.	Temperature: Ensure the chamber is not in an alarm condition. Inspect the chamber's door gasket for leaks. Inspect the condensing unit and ensure the refrigeration system's (condenser fan and compressor) is active and there is not excessive dirt/dust accumulation within the condenser(s). For the best results, ensure that ambient conditions at the chamber's location are no more than 22.0°C ± 5.0°C. Ensure that the product inside is not impeding the chambers airflow. Inspect the evaporator to ensure that the fan is operating correctly. Inspect the chamber glycol level to determine if the system is low. Verify that the TACO cartridge circulator for the glycol loop is functioning through an amperage reading. Humidity: Ensure the chamber is not in an alarm condition. Ensure that the temperature is steady. Inspect the evaporator to ensure that the fan is functioning correctly. Ensure the chamber door is completely closed and there is no damage to the door gasket. Inspect the humidifier's water level. The water level should be from 3/8" – 0.5." Check the water quality against the recommended water quality specifications to ensure the water is within specification. Observe the ultrasonic transducers to determine if they are producing mist and require servicing. If dehumidification is required ensure the D03 indicator on the controller is illuminated. If it is illuminated visually inspect the dehumidification system to determine if it is operational. If it is operational, make certain the exhaust is being released away from the system. Also, verify the filters have been cleaned.
Chamber does not have power.	Ensure the chamber is not in an alarm condition. Check the building's circuit breaker to see if it has been tripped. Check the breaker within the control panel to see if it has been tripped. Request the assistance of a qualified electrical technician.
The controls parameters have been adjusted and the cabinet does not operate properly.	Ensure that the supplied factory controller preset parameter values that shipped with the chamber documentation are still intact. If the parameter values were not documented, please contact a customer support rep at technicalsupport@darwinchambers.com.

14. Contact Information

14.1. Parts

For a copy of the most current Spare Parts List, please contact: parts@darwinchambers.com.

14.2. Contact Information

Darwin Chambers Company

2945 Washington Ave.

St. Louis MO 63103

Phone / Fax: 1-877-7-TEMP-RH

Alternate Phone: 314-534-3111

Email: sales@darwinchambers.com

14.3. World Wide Web

Visit The Darwin Chambers Company on the World Wide Web.

<http://www.Darwinchambers.com>

14.4. Technical Support

technicalsupport@darwinchambers.com

or call 1-877-7-TEMP-RH ext. 2

14.5. Calibrations and Validation

calsandvals@darwinchambers.com

1-877-7-TEMP-RH ext. 4