OPERATING MANUAL

EchoTherm™
DIGITAL, ELECTRONIC CHILLING/HEATING DRY BATH
MODEL IC22 & IC22XT
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I. INTRODUCTION

Congratulations on your purchase of an *EchoTherm* 2-Position, Digital Electronic Chilling/Heating Dry Bath Model IC22 or IC22XT. Please read the instructions carefully to insure that you receive the maximum benefit from it. Also, be sure to fill out and return the enclosed warranty registration card.

II. WARRANTY

Torrey Pines Scientific warrants this product to be free from defects in material and workmanship for a period of one year from the date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse within the one year period, please return---freight prepaid---and correction of the defect will be made without charge.

Out of warranty products will be repaired on a charge basis.

III. RETURN OF ITEMS

Authorization must be obtained from our Customer Service Department before returning items for any reason. When applying for authorization, please include data regarding the reason the items are to be returned. For your protection, items must be **carefully packaged** to prevent damage in shipment and **insured** against possible damage or loss. Torrey Pines Scientific will not be responsible for damage resulting from careless or insufficient packing. A 15% restocking charge will be made on all unauthorized returns.

Note: Torrey Pines Scientific reserves the right to make improvements in design, construction, and appearance without notice.

IV. LABELS

There are various labels on the body of this unit. Listed below are the labels and their meanings.

This symbol means “ATTENTION. The INSTRUCTION MANUAL IS TO BE CONSULTED FOR FURTHER INFORMATION.”

This symbol means “WARNING, HOT SURFACE.”

V. CAUTIONS

CHILLER/HEATER PLATE SURFACE

The IC22 & IC22XT are capable of chilling and heating the plate surfaces from -10°C to 100°C (IC22) or -20ºC to 100ºC (IC22XT). The upper temperature of 100°C (212°F) can burn the skin if touched. **Use extreme caution.** Never leave your unit accessible to others when hot. Never touch the plate surfaces unless you are sure they are cold.

ELECTRICAL

The IC22 & IC22XT cooling/heating module runs off 12 VDC (+/- 10%), 50/60Hz. These units are supplied with a universal power supply that takes 100VAC to 260VAC, 50/60Hz and converts that to 12 volts DC for the instrument. The unit is supplied with an AC input cord for the power supply for the country of use. Be certain to use a line cord with the same rating and of the same type as the one supplied by the manufacturer. Use the normal precaution one would use with any electrical appliance.

ENVIRONMENTAL CONDITIONS

The IC22 & IC22XT are intended for indoor use. Ambient temperatures for the lab should not exceed the range of 15ºC to 22ºC for proper performance of the instrument. Temperatures from 5ºC to 40ºC will not affect the structure of the unit. Maximum relative humidity of 80% for temperatures up to 31ºC decreasing to 50% for relative humidity at 40ºC should not be exceeded.

VI. GENERAL DESCRIPTION

The Torrey Pines Scientific Models IC22 & IC22XT have a pair of Peltier driven chilling/heating plates. The units have only two moving parts, the DC fans that cool the unit. Everything else is solid state and should last years without problem. All functions of the unit are accessible from the front panel via the membrane switch and accompanying digital display.

HEATER/CHILLER PLATES

The plate surfaces are a very flat aluminum designed for good contact with any flat surfaced item placed on them. The plate sizes are 2.875" (7.3 cm) x 4.375" (11.1 cm). They are designed in this size to accommodate 96-well assay plates and aluminum blocks supplied by Torrey Pines Scientific. They chill and heat quickly without a load on them. Zero degrees centigrade can be attained in a couple of minutes. Thirty-seven degrees centigrade can be attained even quicker. The temperature of the plates is sensed by platinum RTD's mounted under each plate. The computer in the unit compares the plate temperatures with the target temperatures and instructs the Peltier modules to heat or chill the plates as required.

TIMERS

The IC22 & IC22XT have a count down timer for each plate that reads in days, hours, minutes, and seconds all at once. Each can be set separately to a maximum of 30 days. The timers are displayed, when in use, alternately with the SET POINT and PLATE TEMP. Each timer has a user settable AUTO-OFF as well. This works to turn the individual chiller/heater target temperature off when the timer counts to zero.

ALARMS

These units have an audible alarm that sounds for one minute when the timer counts down to zero. Touching the UP ARROW will turn the alarm off during this first minute. However, if the alarm sounds for the entire minute, it will shut off the sound automatically. When the alarm first sounds, the timer will start to count up. This lets the user know how much time has passed since the first timer sounded.

DATA LOGGER

The units are supplied with a built-in data logger for each plate. The data loggers can be made to collect up to 8110 data points in intervals of 1/second, 1/minute, one every 5 minutes. See the instructions later for use.

VII. FRONT AND REAR PANEL CONTROLS

FRONT PANEL

The front panel of the IC22 & IC22XT shown above has a tactile touch membrane keyboard with audible feedback. The keyboard is used to set all operating parameters. The display is a two-line alphanumeric LCD with backlighting. When the unit is turned on, the display will light and show the SET POINT and PLATE TEMP which is the actual temperature of the plate surface for each plate surface. There are two LED's on the front panel. One a power on indicator, the other, the BUFFER, flashes when the data logger is collecting data and is on solid when the data logger is full and needs to be dumped.

REAR PANEL

The rear panel shown above has the on/off power switch at the left, the universal power supply input next to that, and the RS232 I/O port on the right.

VIII. SET UP PARAMETERS

SET UP PARAMETERS

1. Ambient operating temperature range is from 5°C to 40°C.

2. Maximum altitude of operation should not exceed 2000 meters.

3. Maximum ambient operating relative humidity should not exceed 80% at 31°C decreasing linearly to 50% relative humidity at 40°C.

SET UP INSTRUCTIONS

1. Place the unit on a level, dry bench or surface.

2. Plug the power supply into a properly grounded, 3-wire outlet of proper voltage. Plug the power supply input into the back of the instrument.

3. Place the sample on the plate surface.

4. Turn the unit on by the switch on the rear of the chilling/heating module. The unit display will light and the power LED will illuminate.

5. Set target temperature and timer, if wanted, according to the instructions that follow.

Note: Do not use this equipment in any manner not specified by the manufacturer.

ENVIRONMENTAL INFORMATION

1. This unit is for installation category II.

2. This unit is rated pollution degree 2.

IX. DISPLAY AND KEYBOARD DESCRIPTIONS.

DISPLAY

The display is a two-row alphanumeric LCD with backlighting for easy viewing. It is used to set all the parameters of the IC22 & IC22XT. When used with the keyboard, it can be made to set temperatures, to set timers, to set the data loggers, and to calibrate the plates against a local standard.

KEYBOARD

The keyboard consists of an UP ARROW and a DOWN ARROW. When the keys are touched, an audible beep will occur. The user will note that the keys also have a tactile feedback to them when they are depressed. Use of these arrows will be described in the next chapter.

X. SETTING TEMPERATURE, TIMER AND DATA LOGGER

SETTING TEMPERATURE

The IC22 & IC22XT have 2 plates that are set individually to any temperature from -10ºC (IC22) or -20ºC (IC22XT) to 100ºC. When the unit is turned on the display will show two rows of temperature information with a “B” beside the top row, and with an “F” beside the bottom row with an arrow pointing to one of the rows. The arrow denotes the row of temperature information corresponding to the plate that active with the keypad. To set the front plate (F) or the back plate (B), the arrow to the left of the display has to point to the plate being set. To move the arrow from one plate to the other simply depress both the UP and DOWN arrows at the same time. The arrow in the display will toggle from one to the other row of temperature information.

To set a temperature, select the plate to set by moving the arrow on the display to point to either the front or back plate. Then press the UP or DOWN ARROW until SP (set point) is at the value desired. That plate will then go to that temperature. The display for that plate will read SP and the value set as the target and T and the value of the actual plate temperature. “T” and the value next to it now will move toward the set point temperature.

There are a couple of points to remember. Although the plates can be set to -10°C for the IC22, it only can go 30°C below room temperature. The IC22XT can be set to -20ºC, but it can only go to 40ºC below ambient. What that means is that the unit may not reach -10°C (IC22) or -20ºC (IC22XT) if the ambient temperature is 25°C. Also, the power available to heat and chill each individual plate and samples on it is 50 watts. There are some larger loads like the larger sample blocks that will not go as far hot or cold as wanted, or, if they do, it will take longer than the unloaded plate will take to reach the same temperature. For best results, use the covers available as accessories. The part number for the cover is 720-0009.

SETTING TIMER

There is a timer for each plate. Each can be set separately. Each timer is a count down timer that reads in days, hours, minutes, and seconds continuously. They can be set to 30 days maximum. When a timer counts down to zero, it will sound an audible alarm for one minute. When the alarm starts to sound, the unit will then count up so that the user may see how long it has been since the alarm timed out. The audible alarm can be turned off after it has sounded by depressing the UP or DOWN ARROW.

When either timer is set, the display will show the timer value in days, hours, minutes, and seconds and the SET POINT as SP and then the value as set, and the actual temperature as T and the actual plate temperature. The display will show these values for temperature and timer on one row of the display corresponding to the plate set by toggling that line of the display between the timer (for 5 seconds) and the temperature (for 2 seconds).

To set the timer be sure the arrow on the display is pointing to the plate to be set, then simultaneously **depress and hold both the UP and DOWN arrows for a couple of seconds.** The display will toggle into a mode where the other functions can be accessed. The list of other functions is:

EXIT
SET & START TIMER
START LOG
CALIBRATE
TIMER OPTIONS
LOG OPTIONS

(The timer will be covered here. More of the other functions will be covered later.)

Depress the DOWN arrow and the pointer arrow to the left of the list will move down the list. Pressing the UP arrow will move the pointer arrow back up the list. Note that only two items of the list can be displayed at any one time. The display will scroll through the list and display just two lines at once.

When the arrow is pointing to SET & START TIMER, press both the UP and DOWN arrows at the same time. The display will now show the timer in days, hrs, mins, secs. Pressing the DOWN arrow will cause the pointer to jump from seconds to minutes to hours to days in that order. This allows setting each as needed. Stopping the pointer where wanted and then pushing the UP arrow allows a value to be set. Pressing both UP and DOWN arrows together again will set the timer and change the display so that it now shows the timer and the temperature set point and plate temperature. The timer will start to count down at this point.

The other timer options under TIMER OPTIONS are AUTO-OFF and BEEP. These options should be set before setting a timer value. To reach TIMER OPTIONS scroll the pointer down the list until it points at TIMER OPTIONS. Next depress both the UP and DOWN arrows together. The display will now show AUTO-OFF: NO, and BEEP: YES. Note that the pointer arrow is still to the left. Pushing the DOWN arrow will cause the pointer to move down and then up again between the AUTO-OFF and BEEP functions. The UP arrow is then used to activate the AUTO-OFF (change the setting from no to yes) and the BEEP (change the setting from yes to no). Once the setting has been made, press the UP and DOWN arrows together and the unit will return the display to where the pointer is at EXIT. Depress the UP and DOWN arrows together and the display will return to the original screen. Play with this. You cannot hurt the unit, and you will become more familiar with the operation.

SETTING THE DATA LOGGER

The data logger collects values of actual plate temperature at intervals that can be set by the user. These data points, 8110 maximum for each plate, can be set to collect data points every second, every minute, or every five minutes as set by the user. As data points are collected, the BUFFER LED will flash, once for each data point collected. When the buffer is full, the BUFFER LED will stop flashing and be on constantly. The buffer can then be down loaded whenever wanted via the RS232 I/O port as per the instructions in that section of the manual.

To set the data logger, select the plate by moving the arrow on the display to the front or back plate, then depress both UP and DOWN arrows at the same time. The display will then show the menu of other functions with the arrow pointer to the left. Scroll down the selections by pressing the down arrow until LOG OPTIONS is indicated by the pointer. Depress both the UP and DOWN arrows at the same time and the display will say LOG ENTRY EVERY SECOND. Pressing the DOWN arrow again will change the display to LOG ENTRY EVERY MINUTE. Pressing the DOWN arrow again will change the display to say LOG ENTRY EVERY 5 MINUTES. Stop the display at the sampling interval desired then press both the UP and DOWN arrows at the same time. The display will now show the pointer arrow at EXIT. Push the DOWN arrow until the pointer arrow is at START LOG. Press the UP and DOWN arrows at the same time and the unit will start to collect data points and the BUFFER LED will start to flash. The display will return to reading the SET POINT and PLATE TEMP.

To stop logging data points, depress the UP and DOWN arrows at the same time. The display will go to the other options screen. Scroll the pointer to STOP LOG. Then depress the UP and DOWN arrows together and the unit will stop collecting data points. The BUFFER LED will stop flashing and the display will return to reading SET POINT and PLATE TEMP again.

XI. TEMPERATURE CALIBRATION

The temperature calibration built into the unit is stable and will hold without drifting. However, our standards for temperature measurement may not be the same as the users. Therefore, the IC20 has been designed to be calibrated in the field by the user. Follow the easy instructions below if calibration is wanted or needed. **Note: The calibration is two-point for optimum accuracy. Therefore, if calibration is changed, it is best to clear the old calibration in memory. This is done by scrolling down through the options in the secondary functions to CLEAR CAL, and then hitting both the UP and DOWN arrows together. The unit is calibrated at the factory at 5ºC and 70ºC.**

To calibrate the unit at a temperature, select the plate to be calibrated by moving the arrow on the display to the plate desired. Then set the plate to go to that temperature. Give the unit time to equilibrate. Then press and hold the UP and DOWN arrows at the same time. The display will go to the other options screen with the pointer arrow to the left of EXIT. Scroll the pointer down using the DOWN arrow until the pointer is at CALIBRATE. Depress the UP and DOWN arrows at the same time and the display will read PLATE LO and PLATE HI. Depress both arrows on the temperature to be set, LO or HI. Depress the UP and DOWN arrows at the same time. The unit will show DISPLAYED and the temperature displayed, and MEASURED and the temperature measured. Now measure the plate temperature (or the block or other item that may be holding the samples to be controlled) using an electronic thermometer with a good surface temperature probe. **Note: This is a difficult temperature measurement to make accurately. If help is needed, contact the factory**. When the temperature measurement is made use the UP or DOWN arrow to make the MEASURED TEMPERATURE displayed read what the external meter measurement reads. Now press the UP and DOWN arrows at the same time and the display will return to normal. Repeat this for the HI temperature. The unit is now calibrated.

XII. RS232 INTERFACE

The RS232 is available through the 9-pin D-subminiature connector on the rear of the unit. Pins 2, 3 and 5 on the connector are used. It operates at 9600 baud, 1 stop bit, no parity. No handshake hardware or software is necessary. It will work well on a Windows terminal program per the settings in the chart on the following page. All communications settings and queries are done using ASCII characters with carriage return as the terminating character. When addressing the RS232 use all capital characters to address the rear plate and all lower case characters to address the front plate. **Note: To avoid possible EMI radiation, use a shielded cable.**

XIII. CLEANING, MAINTENANCE, AND CONSUMABLE PARTS

CLEANING

This unit is subject to splashes and spills during normal use. Also, condensation may occur when heating after chilling. Be sure to wipe up all spills and condensation with a soft cloth or paper towel as they occur. If a cleaning solution is necessary, use a mild soap or detergent solution and a soft cloth. Do not use solvents. They could damage the paint or display window on the unit. **Caution: Do not attempt to clean the plate surface when hot. Burns might occur.**

MAINTENANCE

There is no ongoing maintenance program needed with this unit other than the normal care and cleaning as instructed above, and a simple inspection done whenever the unit is to be used. This simple inspection should include:

1. Checking that the AC cord is not frayed or burned.

2. Checking that the unit is not dirty to a point where proper performance is impaired. This is especially important relative to the membrane switch and LCD window.

3. Being certain to store the unit properly when not in use. Store it in an area that will not have items placed on top of the unit, and cover the unit in a way that will keep dirt and other foreign bodies out.

Note: Outside electrical interference such as lightning might on occasion cause the unit to lock up or change target temperature without being instructed to do so. The unit should be reset if this happens. To reset the unit turn it off from the rear panel switch and turn it on again while holding the DOWN Arrow depressed.

SPARE PARTS AND CONSUMABLES

There are very few spare or consumable parts. A simple list is below.

Part Number	Description
730-0001	Power Cord, US
730-0006	Power Cord, German (European)
730-0008	Power Cord, UK
730-0004	Power Cord, Italian
730-0005	Power Cord, Australian

XIV. ADDITIONAL SYMBOLS

The following are additional symbols found on labels on the instrument

Symbol	Description
V	Voltage
~	Alternating Current
A	Current
Hz	Frequency
W	Power