

# Thermo Scientific NESLAB RPC

Thermo Scientific Manual P/N U00756 Rev. 12/22/05

## Installation Operation

Visit our Web site at:

**<http://www.thermofisher.com/tc>**

Product Service Information, Applications  
Notes, MSDS Forms, e-mail.

Voice Info: (800) 258-0830



## **Thermo Fisher Scientific**

25 Nimble Hill Road  
Newington, NH 03801  
Tel : (800) 258-0830 or  
(603) 436-9444  
Fax : (603) 436-8411  
[www.thermofisher.com/tc](http://www.thermofisher.com/tc)

## **Sales, Service, and Customer Support**

25 Nimble Hill Road  
Newington, NH 03801  
Tel: (800) 258-0830  
Sales: 8:00 am to 5:00 pm  
Service and Support: 8:00 am to 6:00 pm  
Monday through Friday (Eastern Time)  
Fax: (603) 436-8411  
[service.tc.us@thermofisher.com](mailto:service.tc.us@thermofisher.com)

Dieselstrasse 4  
D-76227 Karlsruhe, Germany  
Tel : +49 (0) 721 4094 444  
Fax : +49 (0) 721 4094 300  
[info.tc.de@thermofisher.com](mailto:info.tc.de@thermofisher.com)

Building 6, No. 27  
Xin Jinqiao Rd., Shanghai 201206  
Tel : +86(21) 68654588  
Fax : +86(21) 64457830  
[info.china@thermofisher.com](mailto:info.china@thermofisher.com)

## **Statement of Copyright**

Copyright © 2007 Thermo Fisher Scientific. All rights reserved.

This manual is copyrighted by Thermo Fisher Scientific.

Users are forbidden to reproduce, republish, redistribute, or resell any materials from this manual in either machine-readable form or any other form.

# Table of Contents

## Preface

Compliance .....	2
After-sale Support.....	2
Unpacking .....	2
Out of Box Failure .....	3
Supplied Accessories .....	3
Warranty .....	3
Feedback .....	3

## Safety

.....	4
-------	---

## Overview

.....	5
-------	---

## Operation

START UP .....	7
SETPOINT .....	10
MENU .....	11
MAIN .....	11
ALARMS .....	12
OFFSET .....	14
TIMER .....	15
SETUP .....	16
PROGRAM .....	17
CHART .....	25
HELP .....	26

## Troubleshooting

Error Displays .....	27
HTC Fault .....	29
External Sensor Error .....	30
Checklist .....	31
Service Assistance .....	31

## Wall Bracket Dimensions

.....	32
-------	----

## Appendix Bath Computer Setup Loop

.....	33
-------	----

## WARRANTY

## Preface

### Compliance

Products tested and found to be in compliance with the requirements defined in the EMC standards defined by 89/336/EEC as well as Low Voltage Directive (LVD) 73/23/EEC can be identified by the CE Mark on the rear of the unit. The testing has demonstrated compliance with the following directives:

LVD, 73/23/EEC                      Complies with IEC/EN61010-1

EMC, 89/336/EEC                    IEC/EN61326-1

For any additional information, refer to the Declaration of Conformity that shipped with the unit.

### WEEE/RoHS

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the symbol shown at the right.



Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them.

Further information on Thermo Scientific's compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at: [www.thermo.com/WEEERoHS](http://www.thermo.com/WEEERoHS)

### After-sale Support

Thermo Fisher Scientific is committed to customer service both during and after the sale. If you have questions concerning operation, contact our Sales Department. If your bath fails to operate properly, or if you have questions concerning spare parts or Service Contracts, contact our Service Department.

Before calling, *please* obtain the following information:

- bath BOM number \_\_\_\_\_

- bath serial number \_\_\_\_\_

- bath software version \_\_\_\_\_

- voltage of power source \_\_\_\_\_

The BOM and serial number label are located on the label rear of the RPC. See page 26 for instructions on how to display the software version.

## **Unpacking**

Retain all cartons and packing material until the RPC is operated and found to be in good condition. If the RPC shows external or internal damage contact the transportation company and file a damage claim. Under ICC regulations, this is your responsibility.

## **Out of Box Failure**

An Out of Box Failure is defined as any product that fails to operate in conformance with sellers published specifications at initial power up. The unit must be installed in accordance with manufacturer's recommended operating conditions within 30 days of shipment from the seller.

Any Temperature Control product meeting the definition of an Out of Box Failure must be packed and shipped back in the original packaging to Thermo Scientific for replacement with a new unit; Seller to pay the cost of shipping. Customer must receive a Return Material Authorization (RMA) from Thermo Scientific prior to shipping the unit.

## **Supplied Accessories**

The following items are shipped with the RPC:

- 12VDC Power Supply
- Power Cord (60Hz RPCs only)
- RS-485 Cable
- RS-232 Gender Changer
- RPC Wall Bracket

## **Warranty**

Baths have a warranty against defective parts and workmanship for 24 months from date of shipment. See back page for more details.

## **Feedback**

We appreciate any feedback you can give us on this manual. Please e-mail us at [neslabmanuals@thermofisher.com](mailto:neslabmanuals@thermofisher.com). Be sure to include the manual part number and the revision date listed on the front cover.

## **Safety**

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your bath. If you have any questions concerning the operation of your bath or the information in this manual, contact our Sales Department.

**Do not shake or jolt the RPC, the LCD panel is very fragile. If the LCD panel breaks, avoid touching the liquid crystal. If the liquid crystal does come into contact with your skin or clothing wash it off immediately with soap and water.**

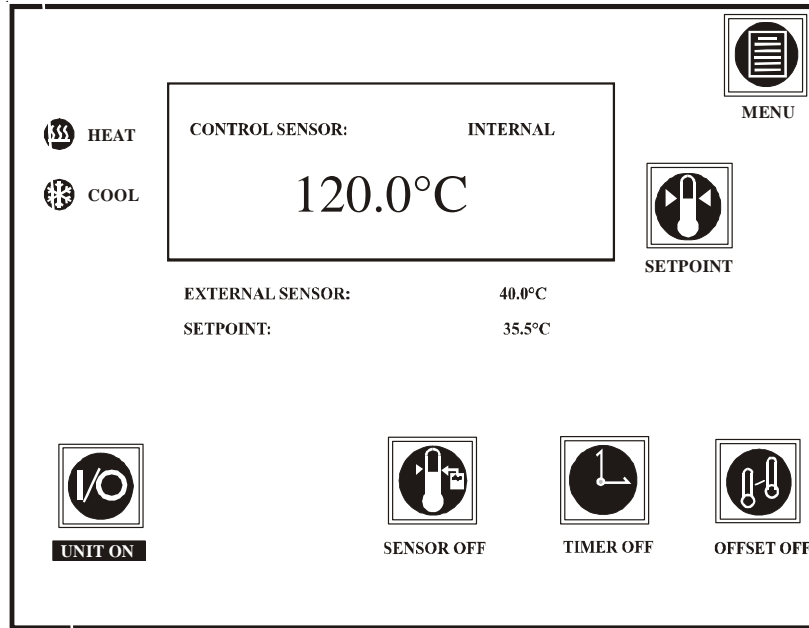
**Avoid static electricity — it can damage the bath.**

**When cleaning the bath use a soft cloth soaked with a cleaning naphtha solvent. Do not use ketonic or aromatic solvents. A dry cloth can easily scratch the LCD panel.**

**Store the bath in a dark area where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $77^{\circ}\text{F} \pm 9^{\circ}\text{F}$ ), and the relative humidity is below 65%.**

**Do not place the RPC near organic solvents or corrosive gases.**

# Overview



Typical RPC Main Display (Bath On)



**UNIT ON**

Press to start/stop the bath.  
See page 8.



**SENSOR OFF**

Press to enable/disable  
external sensor.



**SETPOINT**

Press to edit the bath's  
setpoint. See page 10.



**TIMER OFF**

Press to enable/disable  
the timer function. See  
page 15.



**MENU**

Press to select the menu  
of available displays. See  
page 11.



**OFFSET OFF**

Press to enable/disable the  
temperature offset mode.  
See page 14.



Indicates the bath's  
heater status.

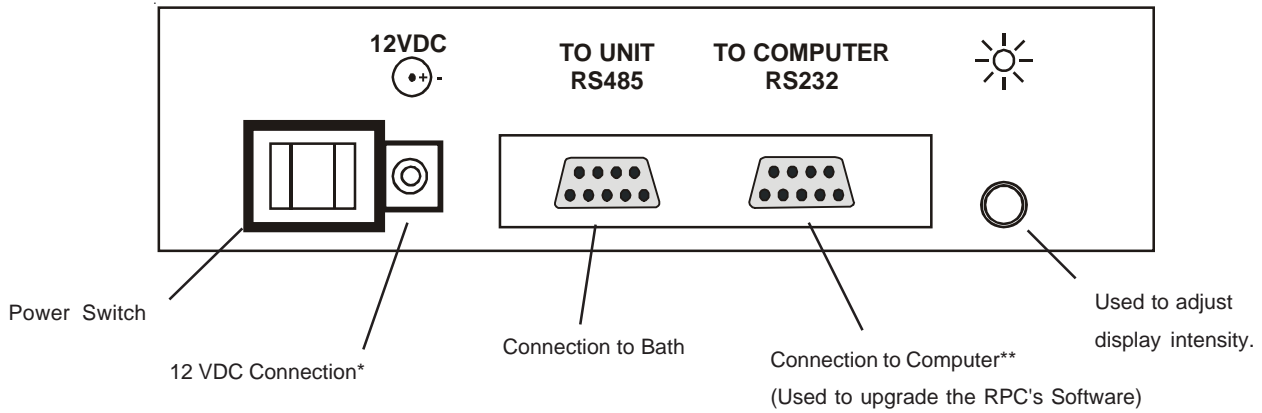


Indicates the bath's  
refrigeration system  
status.



Indicates an error  
condition. See page 27.

RPC Rear View



\*Only use the power transformer supplied with the RPC. Call our Service Department if you need a power supply (part number 083138).

\*\*Use the null modem gender changer supplied with the RPC. Call our Service Department if you need a gender changer (part number 083523).

**NOTE:** Power the RPC with an AC Adapter that is UL Listed with the following ratings:

- Class 2
- Input rated 100-240 VAC, 47-63 Hz, 0.4A
- Output rated 12VDC, 1.25A Max.

## Operation



### Start Up

Connect the supplied power transformer to your power source and to the 12 VDC connector on the rear of the RPC.


**NOTE:** Power the RPC with an AC Adapter that is UL Listed with the following ratings:

- Class 2
- Input rated 100-240 VAC, 47-63 Hz, 0.4A
- Output rated 12VDC, 1.25A Max.

Connect the supplied RS-485 cable from the RPC to the RS-485 connector located on the rear of the bath.

If external sensor operation is planned, ensure the external sensor is connected to the bath.

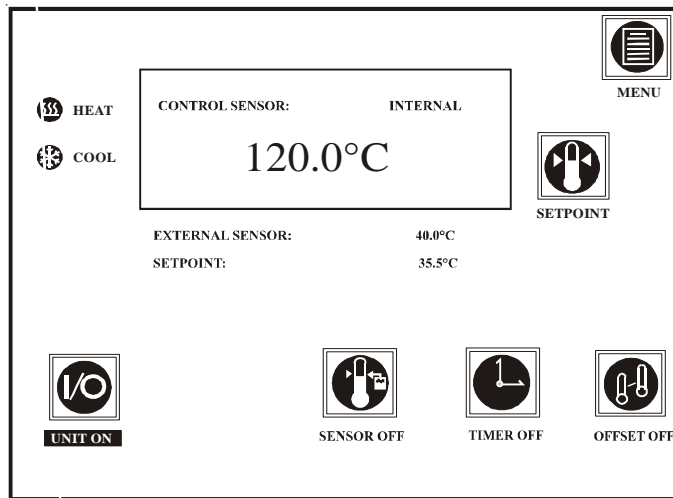
Turn on the bath and ensure it is configured for RS-485 operation, not RS-232. Use the bath's Computer Setup Loop described in the appendix.

Once RS-485 operation is verified, press the Computer button . The Computer LED should illuminate.



Digital Plus Controller


Turn on the RPC using the power switch on the rear of the RPC. The display will momentarily show Thermo and then the Main Display will appear.



Main Display



If the Main Display does not appear, or seems distorted, adjust the display intensity dial on the rear of the RPC.

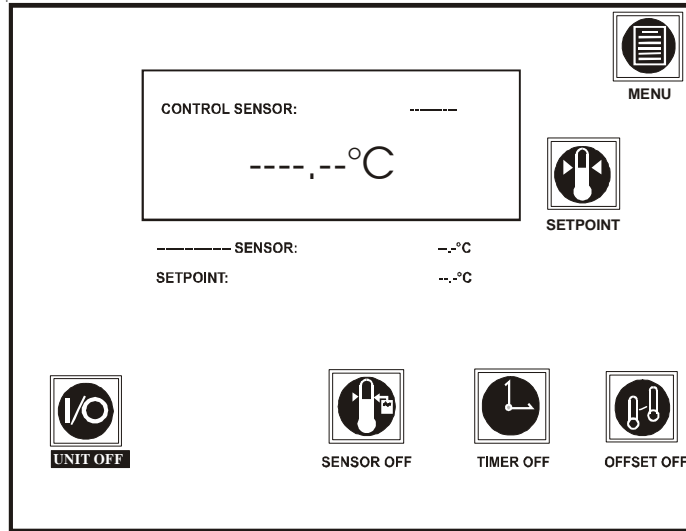
If the RPC displays BATH IS NOT CONNECTED check all connections, ensure the bath is configured for RS-485 operation, not RS-232, and that the Computer

LED  on the bath is flashing.




As the RPC retrieves all of the bath's settings (Heater Status, Setpoint, Temperature Limits, Timer Settings, etc.) the bath's Computer LED will flash and then the RPC will mirror the bath's status.

Although you can still monitor the bath's settings using the local controller, changes are only possible using the RPC (as long as serial communication is enabled).

Press the RPC's  button to stop the bath. You can also turn the bath off by pressing the bath's  but the bath will remain in the serial communication mode. To restart, send another start command.



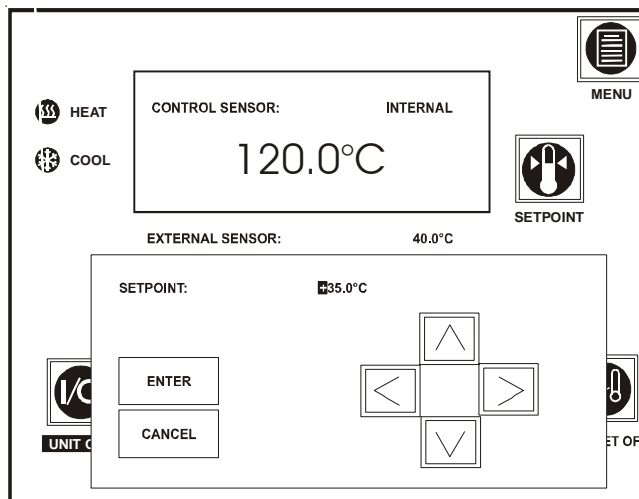
Main Display **BATH OFF**

**NOTE:** If the bath is shut down in the serial communication mode and if you need to start the bath using the local controller, simultaneously depress and hold both arrow keys on the bath for approximately 10 seconds. The display will then show the internal probe temperature, and the alarm will sound indicating control is transferred to the local controller. Press the  LED and turn off the LED and disable serial communications. Turn the controller off using . You can now start and operate the bath by depressing .



## Setpoint

Press the SETPOINT icon. The SETPOINT EDIT Window will appear.



SETPOINT EDIT Window

### Setpoint functions:

Use the left or right arrow button to highlight the desired character. Use the up and down arrow buttons to change the value.

Once the desired setpoint is displayed press ENTER. If an error was made press CANCEL to abort any changes. In either case the RPC returns to the Main Display.

When making a numerical change you can, if desired, speed up the change rate by holding the up or down arrow for two seconds.

The first character has an adjustment range of either + or -.

Characters to the left of the decimal point have an adjustment range 0 to 2.

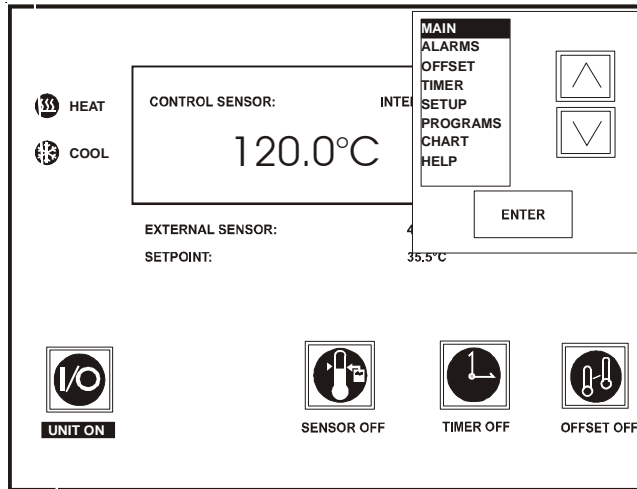
Characters to the right of the decimal point have an adjustment range of 0 to 9.

The setpoint is restricted to the range of the bath. Also, it cannot be lower than 0.01° above the low-temperature alarm limit, or higher than 0.01° below the high-temperature alarm limit.



## MENU

Press the MENU icon. The MENU Window will appear.

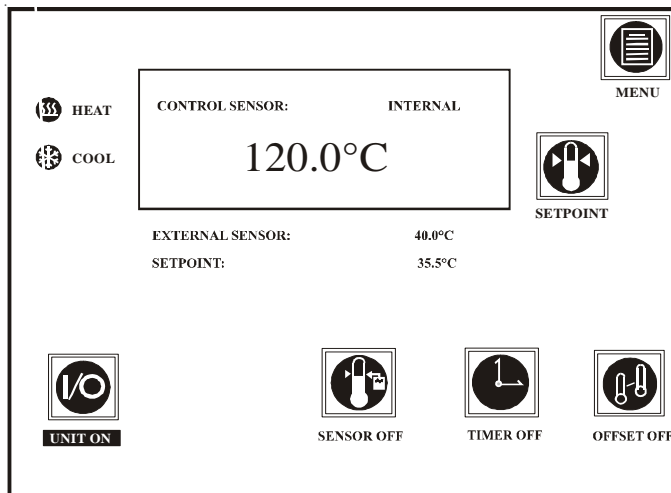


MENU Window

The MENU Window shows the list of other available windows. Use the up and down arrow buttons to highlight the desired window. Once highlighted, press ENTER.

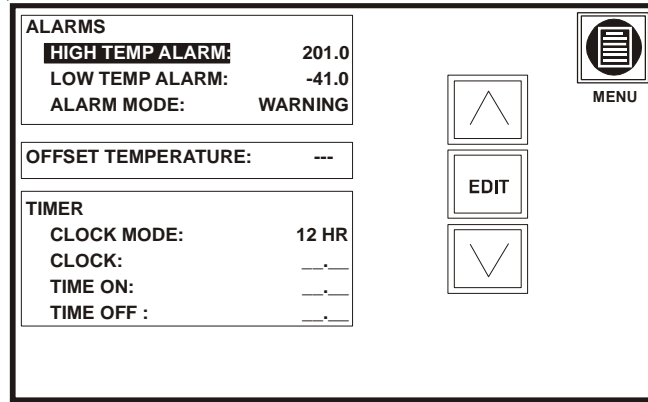
**NOTE:** CHART is displayed only when a program is running. With the bath off only MAIN, SETUP, PROGRAM, and HELP are displayed and available to edit.

Selecting **MAIN** returns the RPC to the Main Display.



Main Display

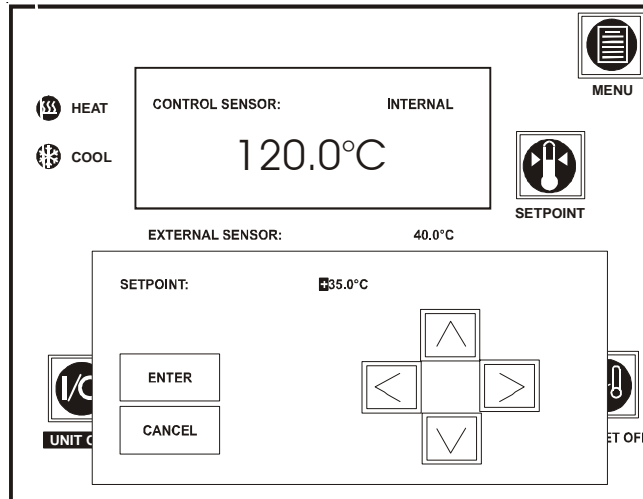
Selecting **ALARMS** opens the following window:



ALARMS OFFSET TIMER Window

If changes are needed, use the arrows to highlight the desired feature. Once highlighted, press EDIT. If no changes are needed press the MENU icon to return to the MENU Window.

Choosing either **HIGH TEMP ALARM** or **LOW TEMP ALARM** opens a display similar to the one used to adjust the setpoint.



TEMP ALARM EDIT Window

### Temperature Alarm functions:

Even though the Main Display's values are dashed out if the RPC is not connected to the bath, you can still edit the Alarm values.

Use the left or right arrow button to highlight the desired character. Use the up and down arrow buttons to change the value. When making a numerical change you can, if desired, speed up the change rate by holding the up or down arrow for two seconds.

The first character has an adjustment range of either + or -.

Characters to the left of the decimal point have an adjustment range 0 to 2.

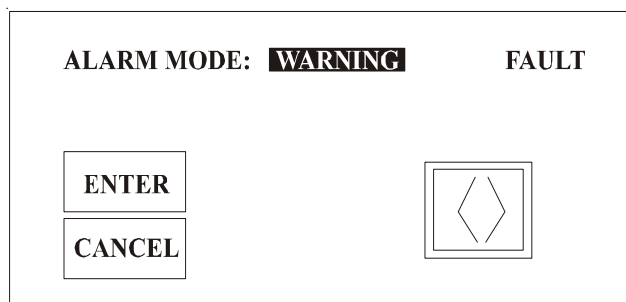
Characters to the right of the decimal point have an adjustment range of 0 to 9.

The Low Temp Alarm setpoint is restricted to no closer than  $-0.1^{\circ}\text{C}/-0.01^{\circ}\text{C}$  of the setpoint. Also, it can not be set more than  $2^{\circ}$  below the low-end temperature range of the bath.

The High Temp Alarm setpoint is restricted to no closer than  $+0.1^{\circ}\text{C}/+0.01^{\circ}\text{C}$  of the setpoint. Also, it can not be set more than  $2^{\circ}$  above the high-end temperature range of the bath.

Once the desired setpoint is displayed press ENTER. If an error was made press CANCEL to abort any changes. In either case the RPC returns to the ALARMS OFFSET TIMER Window.

With **ALARM MODE** highlighted, pressing EDIT brings up:



ALARM MODE EDIT Window

To make a change use the arrow button to have an alarm function as a **WARNING** (bath continues to run with an alarm), or to function as a **FAULT** (bath shuts down with an alarm).

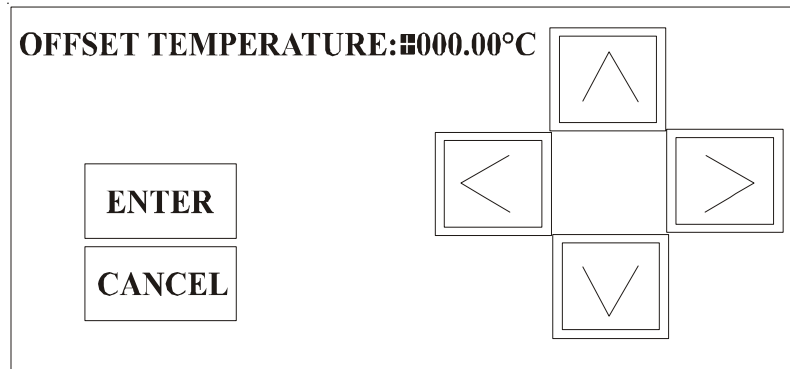
Selecting either ENTER or CANCEL returns you to the ALARMS OFFSET TIMER Window.

## **OFFSETTEMPERATURE**

This mode changes the temperature displayed on the bath a user defined amount. Use the arrow buttons to change the value. For example, if the bath is at +40°C and the desired offset is +5°C, change the display to +45°C.

**The "offsetted temperature" is used only for display. The value does not affect the bath's alarms or its temperature control.**

Choosing **OFFSETTEMPERATURE** opens:



OFFSET TEMPERATURE Edit Window

### **OFFSET functions:**

Even though the Main Display's values are dashed out if the RPC is not connected to the bath, you can still edit the offset value.

Use the left or right arrow button to highlight the desired character. Use the up and down arrow buttons to change the value. When making a numerical change you can, if desired, speed up the change rate by holding the up or down arrow for two seconds.

The first character has an adjustment range of either + or -.

Characters to the left of the decimal point have an adjustment range 0 to 2.

Characters to the right of the decimal point have an adjustment range of 0 to 9.

Once the desired temperature is displayed press ENTER. If an error was made press CANCEL to abort any changes. In either case the RPC returns to the ALARMS OFFSET TIMER Window.



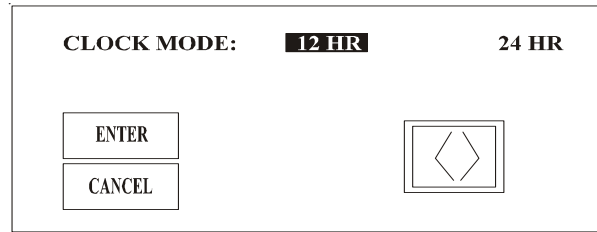
OFFSET OFF

The offset feature is enabled by pressing the OFFSET icon on the Main Display.

## TIMER

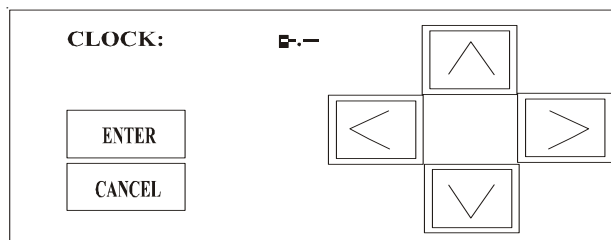
Highlight any TIMER features to edit it.

**CLOCK MODE** allows you to select either a 12 or 24 hour clock display.



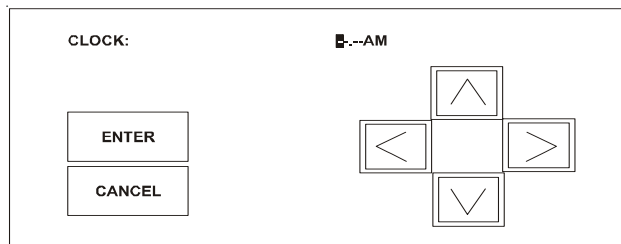
CLOCK MODE Window

**CLOCK** is used to set the desired time. **NOTE:** You must set all four digits.



CLOCK Window

**TIME ON** and **TIME OFF** are used to set the timer to automatically turn the bath on and off. **NOTE:** You must set all four digits.



TIME ON/TIME OFF Window

When displaying any of the four TIMER features, pressing either ENTER or CANCEL returns you to the ALARMS OFFSET TIMER Window.

### TIMER functions

Even though the Main Display's values are dashed out if the RPC is not connected to the bath, you can still edit the Timer values.

The RPC keeps time with the bath and uses the timer variables set in the bath. When CLOCK is selected the displayed time stops, *and remains stopped*. Be sure the desired time is displayed before you press ENTER. To accept the displayed clock time press ENTER. To cancel the new clock time and return to the original value press CANCEL.

If no TIME ON value is entered, the bath will not automatically turn on. If no TIME OFF value is entered, the bath will not automatically turn off.

The timer feature is enabled by pressing the TIMER icon on the Main Display.



TIMER OFF

## SETUP

Highlight **SETUP** on the MENU Window and press ENTER to view the SETUP Window.

The screenshot shows a rectangular window titled "SETUP". On the left side, there are two sections: "ADDRESS 01-100:" with a value of "01", "RESOLUTION:" with "0.1", and "FRC:" with "OFF". Below these is a section titled "PID" with sub-parameters: "P - COOL:" (0.6), "I - COOL:" (0.60), "D - COOL:" (0.00), "P - HEAT:" (0.6), "I - HEAT:" (0.60), and "D - HEAT:" (0.00). On the right side of the window, there are three vertically stacked buttons: an up arrow, a button labeled "EDIT", and a down arrow. In the top right corner of the window, there is a "MENU" icon consisting of a circle with a list symbol and the word "MENU" below it.

SETUP Window

If changes are needed press the arrow buttons to highlight the desired function and then press EDIT. EDIT Windows similar to the clock windows will appear. Pressing ENTER or CANCEL in the individual edit displays returns you back to the SETUP Window. Press the MENU icon to return to the MENU Window.

**ADDRESS 01 - 100:** allows you to select which bath will be controlled by the RPC. The range is 01 to 100. **NOTE:** The address number must match the address number set in the bath or else the bath will not communicate with the RPC.

**RESOLUTION:** allows you to select the temperature readout resolution, 0.1° or 0.01°.

**FULL RANGE COOLING:** allows you to enable/disable full range cooling. When it is on the refrigeration runs at all bath temperatures. With it off, refrigeration shuts down above 50°C (122°F)

PID allows you to edit the controller's Proportional-Integral-Derivative (PID) algorithm values. The COOL and HEAT ranges are P = 0.1 to 99.9, I = 0.00 to 9.99, D = 0.00 to 5.00.

**NOTE:** PID values should only be changed by a qualified technician. Incorrect PID values will hamper unit performance.

### SETUP parameters:

Even though the Main Display's values are dashed out if the RPC is not connected to the bath, you can still edit the Setup values.

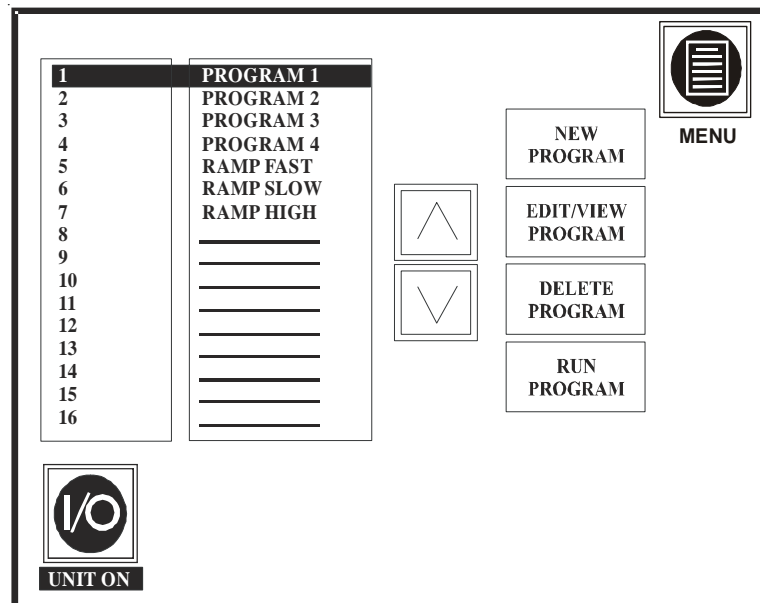
## PROGRAMS

The RPC can store up to 16 temperature programs, each having up to 16 program steps. You can run, view, edit, or delete one program at a time. The programs can cover the bath's full temperature operating range in 0.1° or 0.01° increments. Step times can vary from 0 to 6,500 minutes in 1 minute increments. Each program step can be set up to run as many as 9999 repetitions (LOOPS).

The RPC can store all 16 programs in its nonvolatile memory.

Highlight **PROGRAMS** on the MENU Window and press ENTER to view the Program Window.

**NOTE:** Only programs previously loaded in the RPC's nonvolatile memory will appear in this window. By default, the first program is highlighted.



Program Window

To delete a program highlight it using the arrows and then press DELETE PROGRAM. A window will appear asking for confirmation. Select YES and the program name is replaced by an underline.

Press the MENU icon to select another display.

To view and/or edit the highlighted program press EDIT/VIEW PROGRAM. The Individual Program Window will appear. The display will indicate the program number and name and display up to ten steps of the program.

PROGRAM NO: 1				NAME: PROGRAM 1	
STEP	START TEMP	END TEMP	TIME (MIN)	# OF LOOPS	LOOP TO STEP
1	20.00	30.00	15		
2	30.00	80.00	35		
3	80.00	10.00	65		
4	10.00	20.00	105		
5	20.00	-15.00	25		
6	-15.00	-15.00	45		
7	-15.00	20.00	115		
8	20.00	30.00	25		

°C

UNIT ON

EDIT

ASSURED SOAK - OFF

RUN SAVE EXIT

Individual Program Window

To edit, highlight the parameter and press EDIT. An appropriate EDIT Window will open, for example:

START TEMP: 020.00°C

ENTER

CANCEL

Navigation buttons: Up, Down, Left, Right

START TEMP EDIT Window

Make any necessary change to the parameter and then press either ENTER to save the change or CANCEL to abort it. The RPC returns to the Individual Program Window. If necessary, continue highlighting parameters to edit them.

**NOTE:** Whenever the STEP number is highlighted the EDIT button will change to read DELETE. Use this feature to delete the highlighted step.

**Once all the changes are made press SAVE to save any changes to the program and return the controller to the Program Window, or press EXIT to abort any changes and return to the Program Window.**

**NOTE:** If you edit an existing program and save it, the older version is deleted.

PROGRAM NO: 1				NAME: PROGRAM 1	
STEP	START TEMP	END TEMP	TIME (MIN)	# OF LOOPS	LOOP TO STEP
1	20.00	30.00	15	3	1
2	30.00	80.00	35		
3	80.00	10.00	65		
4	10.00	20.00	105		
5	20.00	-15.00	25		
6	-15.00	-15.00	45		
7	-15.00	20.00	115		
8	20.00	30.00	25		

°C

I/O

UNIT ON

EDIT

ASSURED SOAK - ON

RUN SAVE EXIT

Individual Program Display

#### #OF LOOPS/LOOP TO STEP

This feature allows for automatic repetition of any number of steps. For example, after Step 4 set the # OF LOOPS to 3 and LOOP TO STEP to 1. Once the program initially reaches the end of Step 4, it will loop back to Step 1 (LOOP TO STEP) and run through Steps 1 through 4 again. In this instance the program will loop back three times. The entire sequence of steps will run a total of four times. After the fourth time the program will sequence to Step 5.

The maximum number of loops is 9999.

#### ASSURED SOAK

This option is enabled when you need to ensure the bath temperature will reach the next setpoint (regardless of time) before moving onto the next step.

**NOTE:** Assured soak is satisfied when the bath temperature is equal to or exceeds the setpoint.

To run a program from the Program Window, use the arrow buttons to highlight the desired program and then press RUN PROGRAM. To start a program from the Individual Program Window press RUN. In either case the Program Run Window will appear and the program will start. The display will flash PROGRAM RUNNING. As the program runs the completed steps (including any programmed loops) will have a check mark at the right-end of the step, and the current step will have an arrow at the right-end of the step. When the program is complete the display will flash PROGRAM FINISHED.

PROGRAM NO: 1 NAME PROGRAM 1

## PROGRAM RUNNING

STEP	START TEMP	END TEMP	TIME (MIN)	#OF LOOP	LOOP TO STEP	MENU STATUS
1	20.00	30.00	15			✓
2	30.00	80.00	35			←
3	80.00	10.00	65			
4	10.00	20.00	105			
5	20.00	-15.00	25			
6	-15.00	-15.00	45			
7	-15.00	20.00	115			
8	20.00	30.00	25			

°C

STEP INFO  
REMAINING TIME = 01:00

STEP  
ADVANCE

PAUSE

STOP

ASSURED  
SOAK - OFF

Program Running Display

To stop a program in progress press STOP. The buttons will change to read RUN and EXIT and the PROGRAM RUNNING banner will change to flash PROGRAM STOPPED. The RPC will maintain the current setpoint.

To pause a program in progress press PAUSE. The buttons will change to read RESUME and STOP. The PROGRAM RUNNING banner will change to flash PROGRAM PAUSED. The RPC will maintain the current setpoint.

Press RESUME to restart the program or EXIT to return to the Individual Program Display.

To skip the remaining time of the current program step press STEP ADVANCE. The RPC skips to the next step, regardless of any remaining loops or assured soak.

When a program is running, all other variables, except the timer, are view only.

**NOTE:** The RPC will stop the program and return to the Main Display if communications is lost.

### **RPC PROGRAM functions**

When making a selection holding the up or down arrow for two seconds will cause the selection to scroll and wrap around continuously at a ¼ second change rate.

The RPC does not have to be connected to the bath to build a program.

The program name can have up to 12 characters. Allowable characters are a space, 0 to 9, A to Z, !, &, +, -, ?, °.

Program steps require a START TEMP, END TEMP, and TIME. Optional entries are # OF LOOPS and LOOP TO STEP, skip them by pressing the ENTER or the down arrow key.

After the TIME or LOOP TO STEP parameter is entered, pressing the down arrow to add additional steps highlights the START TEMP parameter for the next step. The value displayed will automatically be the END TEMP from the previous step. If no additional steps are needed just press ENTER after the TIME or LOOP TO STEP parameter.

Nested Loops (programming a loop within a loop) are not allowed.

When running, stopping, or pausing a program, the words PROGRAM RUNNING, PROGRAM STOPPED, or PROGRAM PAUSED also flash on the Main Display. When the program is complete the display will flash PROGRAM FINISHED.

The RPC stays at the current setpoint when a program is stopped or paused. The RPC stays at the last setpoint when the program ends.

You can not edit a program once it's running. You have to STOP the program and then EXIT to the Individual Program Display.

Turning the bath off, or losing communication, terminates the program and returns the RPC to the Main Display. The controller will retain the current setpoint.

When the program is finished, the controller will retain the last setpoint.

When running a program the TIMER is the only variable available, all others are view only. The TIMER takes precedence over a program.

You must SAVE the program before you can RUN it.

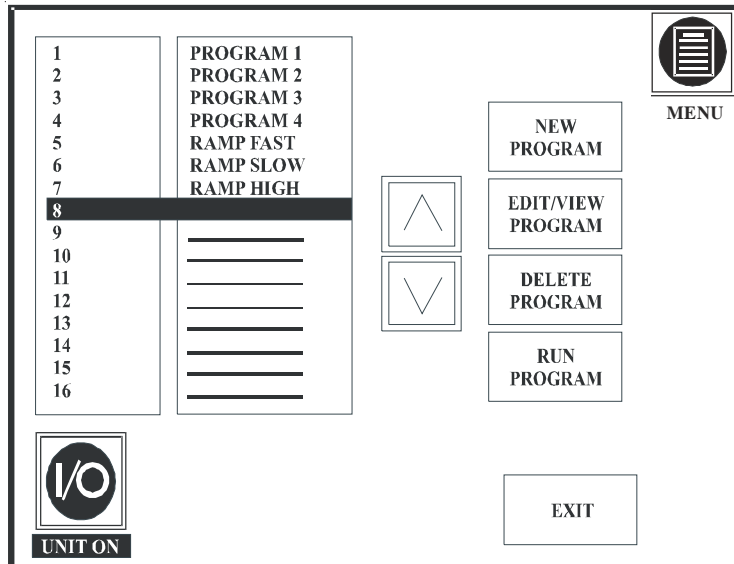
## NEW PROGRAM

Before you start, make a program definition. Define your program as a series of setpoints with a known period of time interval between each. Each interval is one step of the program. Pay careful attention to the first part of your program. What conditions must exist at the beginning of your process? For example, at the starting setpoint you may wish to program an initial period of constant temperature to allow for thermal stabilization.

Consider the bath's limitations when designing programs. Temperature or time parameters which exceed the performance capabilities of the bath will result in unsatisfactory operation. It is possible to create a program calling for very rapid changes in temperature. Although the bath may not be capable of producing such changes, it may be practical to program such steps as a way to cause the fastest *possible* temperature change.

If the bath's capabilities exceed the temperature or time parameters, the RPC controls the setpoint so that the temperature change takes place over the specified time interval.

To create a new program press NEW PROGRAM.



Program Window

PROGRAM NO: 8 NAME:					
STEP	START TEMP	END TEMP	TIME (MIN)	# OF LOOPS	LOOP TO STEP
1					

°C                 

UNIT ON                 

New Program Window

Create the program using the same procedure used to edit a program. Each step requires entering an END TEMP and a TIME. # OF LOOPS and LOOP TO STEP are optional parameters.

To save the program press SAVE. You can use the default name (in this case PROGRAM 8), or you can edit the name at this time. Once saved it will appear on the Program Window.

SAVE AS:      PROGRAM8

SAVE AS Window

You must SAVE the program before you can RUN it. To run the program press RUN. When a program starts it begins immediately at the initial program setpoint.

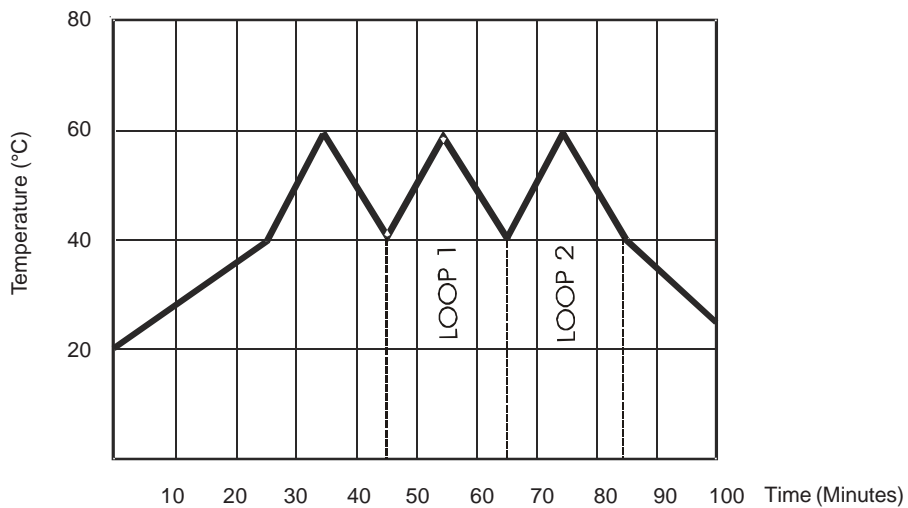
## Sample Program

PROGRAM NO: 1 NAME: SAMPLE

STEP	START TEMP	END TEMP	TIME (MIN)	#OF LOOPS	LOOP TO STEP
1	20.00	48.00	25		
2	48.00	60.00	9		
3	60.00	48.00	11	2	2
4	48.00	25.00	15		

°C

Sample Program



Sample Program Illustration

## CHART

The CHART display is only available if a program is running. Highlight CHART on the MENU Window and press ENTER to view a graphical presentation of the current step of a running program.

A typical display is shown below. The RPC determines how the step will be displayed. One solid stationary line is always displayed and represents the program step. Another scrolling line, with the dot on the end, travels across the screen and represents the bath's actual reservoir fluid temperature during the step.

**NOTE:** Since the step parameters, start temp - end temp - time, determine how an individual step is displayed, it is possible that the scrolling line may never appear for certain steps. For example, the step ramps from 25°C to 35°C in 5 minutes, but the reservoir fluid temperature is 5°C when the step starts. Since the bath is not even capable of reaching 25°C by the time the step is over the scrolling line will not appear.

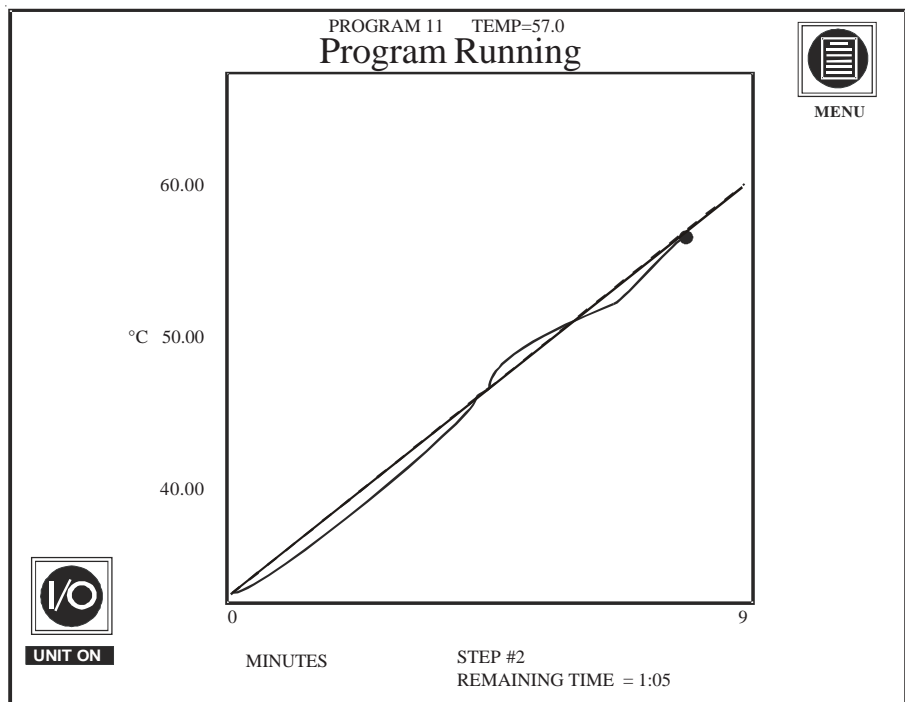
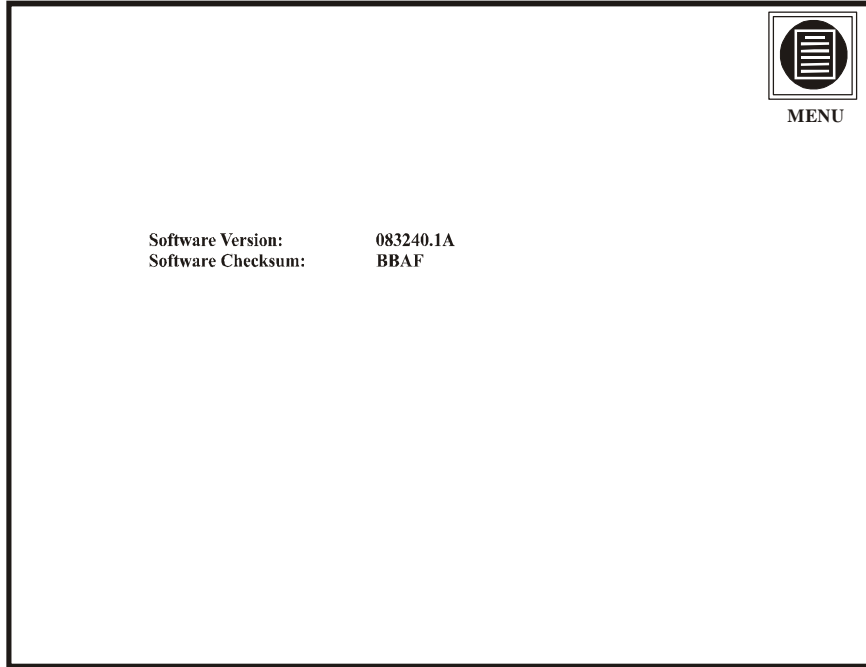


Chart Display

**HELP**

Select **HELP** to display the RPC's software version.



Help Display

# Troubleshooting



## Error Displays

The RPC indicates a bath or RPC error using pop-up windows and by sounding an alarm. A pop-up window is displayed and the alarm sounds when the error first occurs. Pressing the OK button on the pop-up window extinguishes the window and mutes the alarm. (Should the error clear itself, the pop-up window extinguishes and the alarm mutes.)

If the error itself is still present, a blinking ERROR INDICATION will now appear at the top-left-hand corner of the RPC display. Pressing the indication displays a list of existing errors. The errors appear in the order they occurred.

The bath's reaction to warning/fault errors depend on how it is configured. If configured as a fault, the bath will shut down and the RPC pop-up window will display BATH OFF.

**NOTE:** The bath does not display RPC errors. The bath can not be used to clear RPC errors.

Error Display	Alarm
BATHISNOTCONNECTED	On
BATHISNOTON	3 Beeps
OFFSETISNOTDEFINED	3 Beeps
EXTERNALSENSORISNOTCONNECTED (When trying to enable)	3 Beeps
EXTERNALSENSORISSHORTED (When trying to enable)	3 Beeps
EXTERNALSENSORISNOTCONNECTED (When running as control sensor)	On
EXTERNALSENSORSHORTED (When running as control sensor)	On
CLOCKISNOTSET	3 Beeps
TIMEONORTIMEOFFISNOTSET	3 Beeps
INVALIDSETTING	None
INVALIDSETTING:SETPOINT VALUEABOVERANGEOFBATH	None

INVALIDSETTING:SETPOINT VALUEBELOWRANGEOFBATH	None
INVALIDSETTING:SETPOINTVALUE ABOVEHIGHTEMPALARMLIMIT	None
INVALIDSETTING:SETPOINTVALUE BELOWLOWTEMPALARMLIMIT	None
INVALIDSETTING:ALARMVALUE ABOVERANGEOFBATH	None
INVALIDSETTING:ALARMVALUE BELOWRANGEOFBATH	None
INVALIDSETTING:ALARMVALUE ABOVESETPOINT	None
INVALIDSETTING:ALARMVALUE BELOWSETPOINT	None
MAXIMUMVALUELIMIT EXCEEDED ???.	None
CONNECTIONTOBATHLOST	3 Beeps
PROGRAMHASNOTBEENSAVED	None
INVALIDLOOPINFORMATION	None
INVALIDSTEPINFORMATION	None
PROGRAMMEMORYISFULLDELETE APROGRAMANDTRYAGAIN	None
DELETEPROGRAM AREYOUSURE?	None
PROGRAMACTIVE NOCHANGESALLOWED	None
FUNCTIONORBUTTONNOTSUPPORTED	None

**Error functions:**

If the communications cable is removed when the bath is on, the RPC displays a communication error and returns to the Bath Off Main Display. The bath will continue using the last command. The error message can be cleared.

Trying to do a function that requires communication with the cable removed, or with communication disabled, displays a communication error. The error message can be cleared.

The RPC will return to the Main Display if you are running a program and communication is lost.

When an RPC error occurs, you can clear the pop up window and mute the alarm at the RPC only.

When a bath error occurs, you can mute the alarm at the RPC or at the bath.

When a bath fault error occurs, you can restart the bath at the RPC (when communication is established).

When a Bath Warning error appears as a pop-up window on the RPC, you can clear the pop up window and mute the alarm with the pop-up window OK button. If the error still exists the RPC will mute the alarm for any reoccurrences of that specific error until it is cleared and corrected, the error is added to the error list. The error list can be seen in a pop up window when the ERROR button is pushed. If the error goes away it will be removed from the list. **NOTE:** The alarm and the pop up window will also clear by themselves when the cause of the error is corrected.

When a Bath Fault error appears as a pop-up window, you can clear the pop up window and mute both the Bath and RPC alarms with the pop-up window OK button. Use the RPC I/O button to restart the bath after the error is cleared and corrected. **NOTE:** If another error happens to exist at the same time it will now appear.

## HTC Fault

If the bath's High Temperature Cutout (HTC) activates the RPC will display HTC and the alarms will sound. The bath will shut down and communication between the RPC and the bath is automatically disabled.

Once the cause of the HTC fault is identified and corrected, clear the HTC fault on the bath's controller. Clear the RPC HTC display by pressing OK.

Re-enable communications at the bath to use the RPC.

## **External Sensor Error**

### **Fault set on**

The bath will switch to its internal sensor and then shut down.

Both the bath and RPC sensor icon will flash.

Both the bath and RPC alarm will sound. Pressing OK on the RPC Error Display mutes the alarm.

The bath can be restarted using the RPC's I/O button.

### **Fault set off**

The bath will switch to its internal sensor and continue to run.

Both the bath and RPC sensor icon will flash.

Both the bath and RPC alarm will sound. Pressing OK on the RPC Error Display mutes the alarm.

If the error clears the bath will return to the external sensor.

With the error present, pressing the Sensor button disables the external sensor and clears the error.

### **Attempting to enable external sensor with fault present**

The bath will switch to its internal sensor and continue to run.

Both the bath's and RPC's sensor icon will flash three times. An error pop-up window will flash three times on the RPC.

Both the bath's and RPC's alarm will beep three times.

After the three cycles the error indications clear and the alarm mutes. Pressing OK will also clear the error indications and mute the alarm.

## Checklist

### No/poor RPC display

Check intensity dial on the top of the RPC.

### RPC will not start the bath

Check the RPC and bath for error messages.

Ensure power is supplied to the bath and that its circuit breaker is on.

Check all the cable connections between the bath and the RPC.

Check the bath's Serial Communication Mode status. The bath's Computer indicator should be flashing. If not, check the bath's Computer Setup Loop to verify RS-485 is enabled, see the instruction manual supplied with the bath. Be sure the address number set in the RPC matches the address number set in the bath.

Check reservoir. Bath will not start if fluid level is below the lower horizontal slit.

Make sure the voltage of the power source meets the specified voltage,  $\pm 10\%$ . Refer to the serial number label on the rear of the bath to identify the specific electrical requirements.

## Service Assistance

If, after following these troubleshooting steps, your bath fails to operate properly, contact our Service Department for assistance (see Preface, After-sale Support). Before calling, *please* obtain the following information:

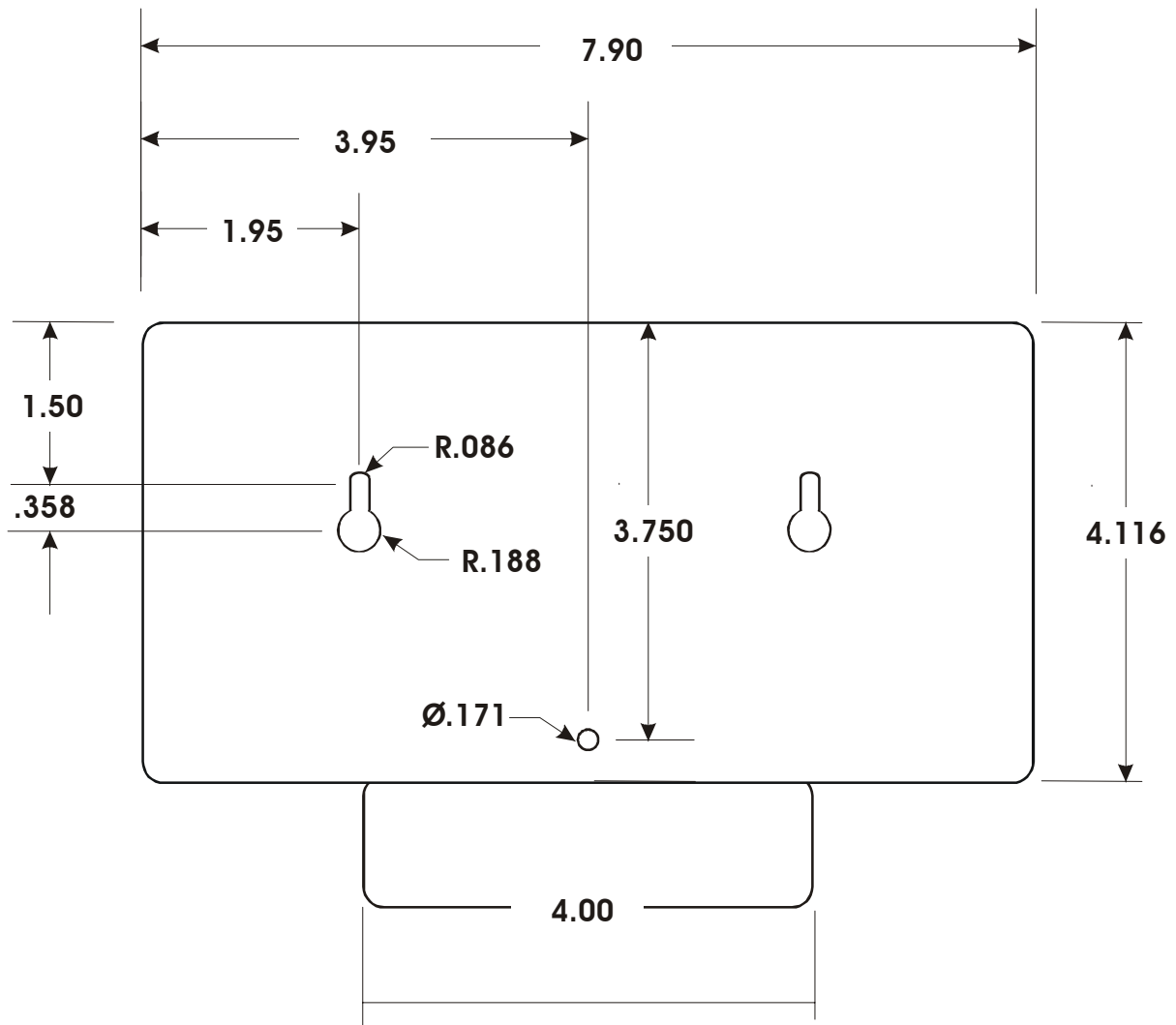
- *bath BOM number*

- *bath serial number*

- *software version*

- *voltage of power source*

# Wall Bracket Dimensions

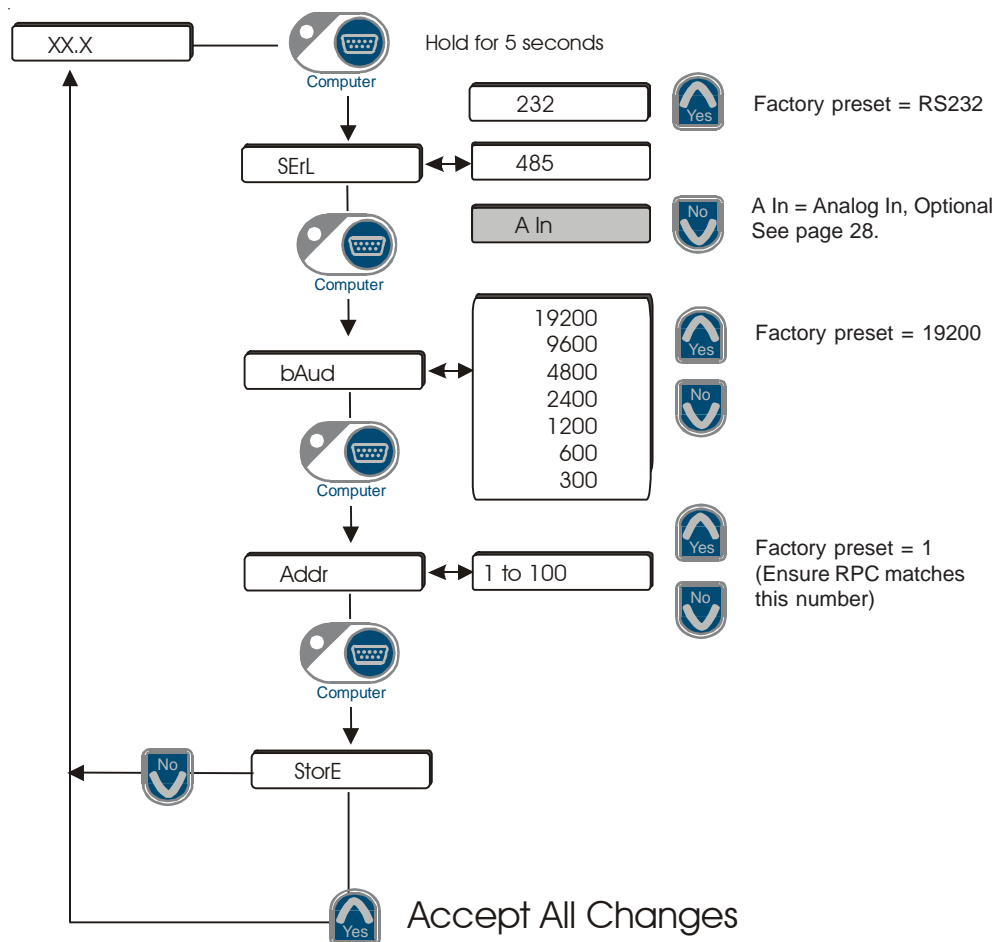


## Appendix - Bath Computer Setup Loop



The Computer Setup Loop is used to select the serial communications protocol and its parameters. With the bath on, press and hold the Computer button for five seconds. The controller will display **SErL**. Press the arrow buttons to toggle between **232** and **485**. Press the Computer button to advance you through the loop to adjust the remaining parameters. Press the arrow buttons to adjust any parameter. When **StorE** is displayed press YES to accept any new values, NO to abort them.

If the Computer button is not pressed for 60 seconds the function will time-out and the changes will not be saved. Pressing the Mute button will also exit the Computer Setup Loop and return you to the reservoir fluid temperature display.



## WARRANTY

Thermo Fisher Scientific warrants for 12 months from date of shipment any Thermo Scientific product according to the following terms.

Any part of the unit manufactured or supplied by Thermo Fisher and found in the reasonable judgment of Thermo Fisher to be defective in material or workmanship will be repaired at an authorized Thermo Scientific Product Repair Depot without charge for parts or labor. The unit, including any defective part must be returned to an authorized Thermo Scientific Product Repair Depot within the warranty period. The expense of returning the unit to the authorized Thermo Scientific Product Repair Depot for warranty service will be paid for by the buyer. Our responsibility in respect to warranty claims is limited to performing the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sales of any unit. With respect to units that qualify for field service repairs, Thermo Fisher Scientific's responsibility is limited to the component parts necessary for the repair and the labor that is required on site to perform the repair. Any travel labor or mileage charges are the financial responsibility of the buyer.

The buyer shall be responsible for any evaluation or warranty service call (including labor charges) if no defects are found with the Thermo Scientific product.

This warranty does not cover any unit that has been subject to misuse, neglect, or accident. This warranty does not apply to any damage to the unit that is the result of improper installation or maintenance, or to any unit that has been operated or maintained in any way contrary to the operating or maintenance instructions specified in this Instruction and Operation Manual. This warranty does not cover any unit that has been altered or modified so as to change its intended use.

In addition, this warranty does not extend to repairs made by the use of parts, accessories, or fluids which are either incompatible with the unit or adversely affect its operation, performance, or durability.

Thermo Fisher Scientific reserves the right to change or improve the design of any product without assuming any obligation to modify any unit previously manufactured.

THE FOREGOING EXPRESS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Thermo Fisher Scientific's OBLIGATION UNDER THIS WARRANTY IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE COMPONENT PARTS AND Thermo Fisher DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION.

Thermo Fisher ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO LOSS OR DAMAGE TO PROPERTY, LOSS OF PROFITS OR REVENUE, LOSS OF THE UNIT, LOSS OF TIME, OR INCONVENIENCE.

This warranty applies to units sold in the United States. Any units sold elsewhere are warranted by the affiliated marketing company of Thermo Fisher Scientific. This warranty and all matters arising pursuant to it shall be governed by the law of the State of New Hampshire, United States. All legal actions brought in relation hereto shall be filed in the appropriate state or federal courts in New Hampshire, unless waived by Thermo Fisher Scientific.