LINDBERG/BLUE M

Constant Temperature Waterbaths

Models: WB1110 WB1120 WB1130 WB1140

Installation and Operation Manual

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1 Introduction

Lindberg/Blue M Constant Temperature Waterbaths are capable of automatically controlling temperature within close tolerances.

1.1 Features and Benefits

- Digital instrumentation for precise temperature setpoint and display
- Microprocessor automatically optimizes control parameters during waterbath operation.
- Main power ON/OFF switch on control panel.
- Type 304 polished stainless steel bath provides long life and low maintenance.
- Independent Overtemperature Limit Switch interrupts power to heater, manually reset.
- All standard Lindberg/Blue M Constant Temperature waterbaths are shipped electrically complete and ready for operation.

1.2 Specifications

Table 1. Lindberg/Blue M Waterbaths

Model	Dimensions in. (cm)		Temperature Range[a]	Approximate Capacity gallons (liters)	Maximum Heater Watts	Voltage
	Tank Size L x W x D	Overall L x W x H				
Constant Temperature						
WB1110A-1 WB1110WLFA-1	12 x 7.5 x 7.5 (30 x 19 x 19)	18 x 14 x 12.5 (46 x 36 x 32)	5°C above ambient to 100°C	2.9(11.0)	800	A-1 are 120 VAC 60 Hz only single phase
WB1120A-1 WB1120WLFA-1	18 x 12 x 7.5 (46 x 30 x 19)	28 x 14 x 13 (71 x 36 x 32)		7.0(26.5)	1400	
WB1130A-1 WB1130WLFA-1	20 x 18 x 9.5 (51 x 45 x 24)	30 x 20.3 x 14.5 (77 x 51.5 x 37)		14.8(56.0)	2400	
WB1140A-1 WB1140WLFA-1	36 x 18 x 9.5 (91 x 45 x 19)	48 x 20.3 x 14.5 (117 x 51.5 x 37)		2.6.6(100.7)	2400	
WB1110C-1 WB1110K-1 WB1110WLFC-1 WB1110WLFK-1	12 x 7.5 x 7.5 (30 x 19 x 19)	18 x 14 x 12.5 (46 x 36 x 32)		2.9(11.0)	800	208/240[b] VAC 50/60 Hz single phase
WB1120C-1 WB1120K-1 WB1120WLFC-1 WB1120WLFK-1	18 x 12 x 7.5 (46 x 30 x 19)	28 x 14 x 13 (71 x 36 x 32)		7.0(26.5)	1400	
WB1130C-1 WB1130K-1 WB1130WLFC-1 WB1130WLFK-1	20 x 18 x 9.5 (51 x 45 x 24)	30 x 20.3 x 14.5 (77 x 51.5 x 37)		14.8(56.0)	2400	
WB1140C-1 WB1140K-1 WB1140WLFC-1 WB1140WLFK-1	36 x 18 x 9.5 (91 x 45 x 19)	48 x 20.3 x 14.5 (117 x 51.5 x 37)		2.6.6(100.7)	2400	

a. Waterbaths will operate up to 100°C at sea level. Refer to the boiling point graph in the back of this manual.
Operation above +60°C (+104°F) requires a dust cover or gable cover.
To maintain temperature stability, a stainless steel gable cover is recommended for operation above 75°C. See Section 3.4 on page 3.

b. A 25% reduction in heater power results from operation at 208V.

2 Safety Considerations

WARNING! Do not modify or change system components. Replacement parts must be O.E.M. exact replacement equipment. Modification or use of the equipment in a manner other than expressly intended may cause death or serious injury. This includes use of user-supplied components and materials not specifically designed for the waterbath. Reconfiguring the controller may cause death or serious injury.

Lindberg/Blue M shall not be liable for any damages, including incidental and/or consequential damages, regardless of the legal theory asserted, including negligence and/or strict liability.

Before using, user shall determine the suitability and integrity of the product for the intended use and that the unit has not been altered in any way. User assumes all risk and liability whatsoever therewith.

WARNING! This unit is not intended for use in processing hazardous work loads. Fatal injuries and property damage can result from processing combustible volatile fluids or materials which emit explosive vapors.

CAUTION! Connect the waterbath to the correct power source. Incorrect voltage can result in severe damage to the waterbath.

CAUTION! Do not connect the neutral side of the 120 volt line to unit for grounding purposes.

In cases where the above information and local electrical codes conflict, consult your local authority. Do not connect the unit to overloaded power lines. Lower voltage to the unit will decease power to the heating element.

CAUTION! Before turning on the main switch and to prevent possible heating element damage, fill bath with distilled or demineralized water. Check bath periodically to make certain water has not evaporated to an unsafe level. The bath should have no less than 5 inches of water. The use of ordinary tap water will cause the formation of mineral deposits which will impair performance of the bath without proper maintenance.

CAUTION! This product contains fiberglass wool or other refractories which can result in the following:

- May be irritating to skin, eyes, and respiratory tract.
- May be harmful if inhaled.
- Possible cancer hazard based on tests with laboratory animals. Animal studies to date are inconclusive. No human exposure studies with this product have been reported.

WARNING! Before maintaining this equipment, read the applicable Warning Sheet at the back of this manual.

WARNING! When installing, maintaining, or removing the refractory insulation, the following precautions will minimize airborne dust and fiber:

- Keep personnel not involved in the installation out of the area.
- Use a good vacuum to clean area and equipment. Do **not** use compressed air.
- Use NIOSH high efficiency respirator (3M #8710 or equivalent).
- Wear long sleeve clothing, gloves, hat, and eye protection to minimize skin and eye contact. Do not wear contact lenses.
- Thoroughly wash self after work is complete.
- Launder work clothing separate from other clothes and thoroughly clean laundering equipment after use. If clothing contains a large amount of dust and/or fiber, dispose of rather than cleaning.
- Promptly place used fiberglass parts and dust in plastic bags and dispose of properly.

3 Installation

3.1 Unpacking

Carefully unpack and inspect the unit and all accessories for damage. If you find any damage, keep the packing materials and immediately report the damage to the carrier. We will assist you with your claim, if requested. **Do not return goods to Lindberg/Blue M without written authorization.** ***When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.***

Do not exceed the electrical and temperature ratings printed on the dataplate of the waterbath.

CAUTION! Improper operation of the waterbath could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within design limits noted on the dataplate.

3.2 Location

All standard Lindberg/Blue M Constant Temperature Waterbaths are shipped electrically complete. Positioning and connecting proper electrical service are the only requirements for placing the bath into operation.

To maximize its capabilities, do not locate in an area where the bath will be subjected to extremely wide ambient temperature variations: near outside windows, entrances, building heating and/or air conditioning vents, etc.

3.3 Wiring

WARNING! Improper operation of the waterbath could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within design limits noted on the dataplate.

CAUTION! Connect the waterbath to the correct power source. Incorrect voltage can result in severe damage to the waterbath.

WARNING! **Do not** connect the neutral side of the 120 volt line to the unit for grounding purposes. Do not connect the waterbath to overloaded power lines.

For detailed wiring information, refer to the wiring diagrams at the end of this manual.

3.3.1 120 VAC Operation

The WB1110A, WB1120A, WB1130A, and WB1140A models (including models with WLF{water level feeder} suffix) operate on 120 VAC, 50/60 Hz, single phase. Each waterbath includes a 120 VAC grounded plug and cord set.

Check the dataplate on the bath's left side to verify the current and voltage requirements. Fuse protection should not exceed 125% of the bath's rating.

Make sure the electrical outlet is grounded. A grounding connection is very important to permit proper functioning of the digital instrumentation supplied in the control system. Consult the National Electrical Code and applicable local codes for proper grounding technique to reduce EMI and RFI for electronic gear.

Remove all packing materials from inside the bath.

3.3.2 240 VAC Operation

The WB1110C, WB1120C, WB1130C, and WB1140C models (including models with WLF{water level feeder} suffix) operate on 208/240 VAC, 50/60 Hz, single phase. Each waterbath includes a 240 VAC grounded plug and cord set. The units are completely prewired and ready for operation.

Check the dataplate on the bath's left side to verify the current and voltage requirements. Fuse protection should not exceed 125% of the bath's rating.

Make sure the electrical outlet is grounded. A grounding connection is very important to permit proper functioning of the digital instrumentation supplied in the control system. Consult the National Electrical Code and applicable local codes for proper grounding technique to reduce EMI and RFI for electronic gear.

Remove all packing materials from inside the bath.

3.3.3 208 VAC Operation

A bath wired for 240 VAC operation can also operate on 208 VAC. However recovery times will be longer.

3.4 Optional Covers

Covers are optional accessories available with all models and sizes.

There are three types of covers:

1. A flat stainless steel dust cover

2. A semi-transparent Lexan gable cover

3. A stainless steel gable cover

For operation above 60°C, you should always use a cover to maintain temperature stability. For operation above 75°C you should use option 3, the stainless steel gable cover.

All covers fit directly on top of the unit. Refer to the replacement parts tables (Section 10 on page 13) to determine which covers are available for your model.

4 Start Up

CAUTION! Do not use liquids other than distilled or demineralized water. Never load any corrosive or flammable material into the bath. Bath must be operated with water. Failure to load bath with 5 inches of water will shorten the life of the heater.

CAUTION! To prevent burns, avoid contact with water and/or workload when temperature exceeds 40°C (104°F).

To start up the waterbath, complete the following steps:

1. Make sure that the drain valve is closed.
2. Check the water level. Allow at least 5 inches of water as a minimum. Check for any leaks below.
3. Turn on main power switch. Upon power initialization, all LED's and displays will momentarily be illuminated. Upon completion of the controller's initial diagnostics, the pump will start and the heating element is enabled. Within several seconds, the upper display will show the current sensor temperature.
4. Verify operation of the circulation pump by observing the agitation pattern in the water. If the pump fails, turn off the main power switch for 5 to 10 seconds and then turn back on. This step may need to be repeated a few times in order to prime the pump.

4.1 Setting the Temperature

The Temperature Controller senses the process temperature of the bath and supplies the heat necessary to achieve the desired setpoint. Refer to Figure 1.

Refer to Table 2 on page 5 for a list of LED displays and keypad functions.

CAUTION! Do not adjust the setpoint high limit setting above 105°C (221°F).

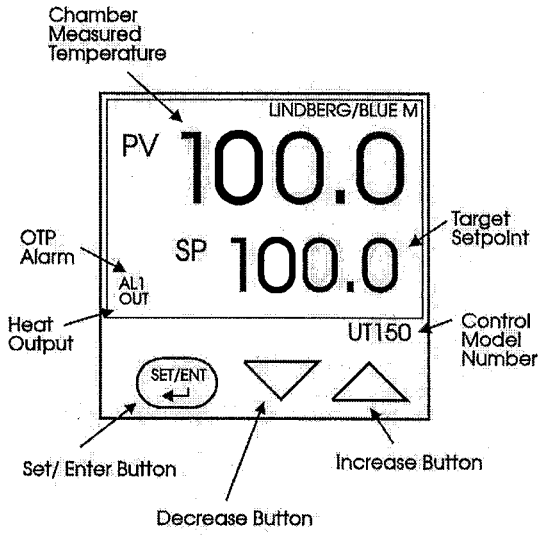

Figure 1. Controller Panel

To set the temperature to the desired setpoint, complete the following steps:

1. Select the alarm setpoint (following instructions in Section 4.2).
2. Press △ or ▽ until the desired setpoint is indicated on the bottom line of the display.
3. Press and release **SET/ENT** to register the new setpoint.
4. If the unit fails to heat up to setpoint, use an insulated tool to press the overtemperature reset mechanism on the left side at the rear of the unit. It is a lever accessed through a small hole beside the switch mount holes. If the unit still fails to operate, call Service.

Table 2. UT150 Parameter Functions

Parameter Code	Factory Set Value	Description
Operating parameters (access by holding the SET/ENT key)		
A1	50.0	Alarm setpoint (ºC; 122ºF)
CtL	Pid	Control mode
At	oFF	Auto tuning
P	4.0	Proportional band (ºC; ºF=7.2)
I	180	Integral time
d	30	Derivative time
Ct	1	Heat cycle time
FL	2	Sensor filter
bS	0.0	PV bias (offset)
LoC	0	Key lock
Setup parameters (access by setting LoC=-1)		
In	17	Input type (J thermocouple in ºC; ºF=47)
SPH	100	High setpoint limit ºC; ºF=212
SPL	0.0	Low setpoint limit ºC; ºF=32
Upr	oFF	Up ramp rate (degrees C or F / minute)
dnr	oFF	Down ramp rate (degrees C or F / minute)
AL 1	9	Alarm 1 type
AL 2	oFF	Alarm 2 type
HY 1	0.5	Alarm 1 hysteresis (ºF=1)
HY 2	0.0	Alarm 2 hysteresis
SC	on	Super Control
dr	0	Direct/reverse action

Table 3. Pushbutton Keypad

Button	Function
SET/ENT	Pressing and holding the SET/ENT for three seconds advances the display to the Operation Parameters Menu. While in the Operation Parameters Menu, use SET/ENT to move from one parameter to the next, and to register changes you have made in setpoint and parameter values. Holding SET/ENT for three seconds exits either the Operation or Setup Parameters menu.
△	Use the Up Arrow button to increase the temperature setpoint display and to change parameter values in the Operation and Setup Parameter menus. Whenever you change the value of a setpoint or parameter, the decimal point flashes to remind you to register the changed value with SET/ENT.
▽	Use the Down Arrow button to decrease the temperature setpoint display and to change parameter values in the Operation and Setup Parameter menus. Whenever you change the value of a setpoint or parameter, the decimal point flashes to remind you to register the changed value with SET/ENT.

Refer to Section 5.2 on page 6 for procedures to change to degrees Fahrenheit, or refer to the controller manual.

4.2 Setting the Overtemperature Alarm

To set the alarm on the temperature controller (typically 5°C above the desired main temperature setpoint), complete the following steps:

The high limit alarm system with the temperature controller disables the heater output. To set the alarm on the temperature controller (typically 5°C above the desired main temperature setpoint), complete the following steps:

1. Press and hold **SET/ENT** for 3 seconds, until **A1** is displayed on the upper line.
2. Press △ or ▽ until the desired overtemperature limit setpoint shows on the bottom line of the display.
3. Press **SET/ENT** to register the new overtemperature alarm setpoint.
4. Press and hold **SET/ENT** for 3 seconds to return to the normal display.

5 Operation

The waterbath temperature controller is configured and tuned at the factory to function well for most applications. Occasionally, the user may want to configure the temperature controller differently to suit their own working environment or process.

Note: *Before attempting to reconfigure the controller, it is strongly recommended that the user reads this chapter and the controller manual. Reconfiguring the controller can change the unit characteristics and design parameters, at best hampering performance and at worst making the equipment dangerous to use.*

This chapter provides brief instructions on how to perform some configuration changes such as changing the temperature display units. Detailed instruction on configuring the temperature controller are found in the controller manufacturer's manual.

5.1 Changing the Setpoint

To change the temperature setpoint, complete the following steps:

1. Press △ or ▽ until the desired setpoint is indicated on the bottom line of the display.
2. Press **SET/ENT** to register the new setpoint.

Note: *If the bath temperature is not changing in response to a setpoint, use an insulated tool to press the overtemperature reset mechanism on the left side at the rear of the unit. It is a green lever accessed through a small hole beside the switch mount holes. The Overtemperature Limit Switch is an independent temperature control switch, factory set for 105°C maximum. If tripped, it disconnects power to the heater and there is no audible or visual indicator. This switch must be manually reset.*

5.2 Changing Between Celsius and Fahrenheit

The controller is factory-set to operate with degrees Celsius. To change the display modes and parameter settings to the Fahrenheit scale, you will need to change the Input Type parameter **In** and also the values of various scale-dependent parameters. If during this procedure the buttons are inactive for more than two minutes, the controller will return to the standard display.

To change from Celsius to Fahrenheit:

1. With the controller operating, access the Operating Parameters menu by pressing and holding **SET/ENT** for 3 seconds.
2. Press and release **SET/ENT** repeatedly until the upper display reads LoC.
3. Press ▽ until the displayed value of LoC is -1; then press **SET/ENT** to access the Setup Parameters menu (refer to Table 2 on page 5).
4. The first setup parameter displayed is Input Type (In). Press to change its value from 17 to 47. After making this adjustment (and all following parameter adjustments) be sure to press and release **SET/ENT** again to register the change.
5. Press and release **SET/ENT** to advance to the SPH parameter and change its value to 212.
6. Press and release **SET/ENT** to advance to the SPL parameter and change its value to 32.
7. Press and release **SET/ENT** to advance to the HY1 parameter and change its value to 1.
8. Press and hold **SET/ENT** for 3 seconds to exit the Setup Parameters Menu.
9. Press and hold **SET/ENT** for 3 seconds to enter the Operating Parameters Menu and display the A1 parameter.
10. Use the △ button to set the A1 parameter to the desired overtemperature limit in °F.
11. Press and release **SET/ENT** to advance to the P parameter and change its value to 7.2.
12. Press and hold **SET/ENT** for 3 seconds to exit the Operating Parameters Menu.
13. The new temperature units are now effective. Follow the instructions in Section 5.2 to reset the temperature setpoint in °F.
14. Apply the °F label over the °C label on the control panel.

5.3 Setting the Ramp to Setpoint Rate

The Ramp Rate feature allows the chamber to be heated or cooled at any rate slower than the maximum capability of the unit. To fine tune ramp rates, you may need to test using loads with similar mass and thermal properties to loads you intend to use in waterbath applications.

To set the ramp to setpoint time, complete the following steps. If during this procedure the buttons are inactive for more than two minutes, the controller will return to the standard display.

1. With the controller operating, press and hold **SET/ENT** for 3 seconds to enter the Operating Parameters menu.
2. Press and release **SET/ENT** until the LoC parameter is on the upper display.
3. Press the down arrow button to show '-1', and press **SET/ENT** once to enter the Setup Parameters menu.
4. Press and release **SET/ENT** until the Upr parameter is on the upper display.
5. Press the arrow buttons to select the new Up Ramp Rate value, in °C per minute or °F per minute, or 'oFF'. Press and release **SET/ENT** to register the value change.
6. Press and release **SET/ENT** until the dnr parameter is on the upper display.
7. Press the arrow buttons to select the new Down Ramp Rate value, in °C per minute or °F per minute, or 'oFF'. Press and release **SET/ENT** to register the value change.
8. Press and hold **SET/ENT** for three seconds to exit the Setup Parameters menu.
9. The new Ramp Rates are now effective.
10. Follow the instructions in Section 5.1 to reset the temperature setpoint.

Note: *After each temperature setpoint change the respective ramp rate will be effective. The ramp rate begins when the SET/ENT button is pressed after the target setpoint is selected. The setpoint display on the controller will show the changing setpoint at the selected ramp rate.*

To view the target setpoint during the ramp rate, press and release an arrow button. The lower display will show the setpoint next to the selected target setpoint. Return to the ramping setpoint display by pressing and releasing the other arrow button.

5.4 Auto Tuning the Controller

Factory settings are provided for general purposes, but your process can be enhanced through the auto tune feature. For a given process temperature and product load, auto tuning maximizes the performance of the chamber by operating with the quickest response and minimal temperature overshoot.

To auto tune the controller.

1. Load the chamber with materials that have the same mass and thermal characteristics as a typical product load.
2. Operate the chamber to the process temperature.
3. Press and hold **SET/ENT** for 3 seconds to display the A1 parameter of the Operating Parameter menu.
4. Press and release **SET/ENT** to show the At parameter.
5. Press and release the arrow buttons to show on in the lower display.
6. Press **SET/ENT** once to enter the auto tune mode and exit the Operating Parameters menu.

The controller will cycle three times through a heating and cooling pattern, measuring the characteristics of the load and chamber temperature controls. During the auto tuning, At will alternately flash with the measured temperature (PV) to indicate that the auto tuning is in progress. The length of time for the auto tune varies with the load, chamber size and temperature selected.

The auto tune is completed when the regular display of the measured temperature is shown. The chamber should now operate to the process temperature with the given product load, with the quickest response and minimal temperature overshoot.

If the process temperature or load changes significantly, another auto tune session may be necessary to optimize the chamber performance.

6 Communication Option

The Communication Option enables digital communication between the UT150 controller and a PC. It is a factory-installed temperature controller and cable assembly using an RS-485 connection through a DB9 cable.

This option is supplied with the necessary cable and diagnostic software to set up and check the connections between the unit and the PC. Follow the steps below to make the cable connections and to check the data transfer. If you have purchased the 'SpecView Plus Communication Software' with the copy protection key, refer to the SpecView instructions in parallel with this setup outline.

6.1 Cable Installation

1. To install the 25-foot external cable, disconnect the electrical power from both the unit and PC.
2. Connect the cable end with a black housing to the 9-pin port on the rear of the Lindberg/Blue M unit.
3. Connect the other cable end with the RS-232/485 Converter to the COM 1 Port (or other COM port of your choice) on the rear of the PC.
4. If you have purchased the SpecView Plus Communication Software with the copy protection key, install this key on your parallel port. It may be necessary to locate the key between a cable and the parallel port.
5. Apply electrical power to the unit and the PC.

6.2 UT150 Communications Setup Parameters

Table 4 shows the default values for UT150 Communications Setup Parameters. To access these parameters:

1. Hold the **SET/ENT** button for three seconds to display the Operating Parameters. Press and release the **SET/ENT** button to display the 'LoC' parameter. Press the down arrow to show '-1' in the lower display and press **SET/ENT** to acknowledge and enter the Setup Parameters menu.
2. Press and release the **SET/ENT** button to access the six parameters specific to the communications option.

Table 4. UT150 Communications Parameters

Parameter Code	Factory Set Value	Description
Communications Setup Parameters		
PSL	0	Protocol selection
Adr	1	Controller address
bPs	9600	Baud rate
Pr 1	EVN	Parity (even)
StP	1	Stop bit
dLn	8	Data length

6.3 Software Installation

1. Load the SpecView software onto the PC hard drive, using the disks provided.
2. Run the software. (If you have purchased the SpecView Plus Communication Software with the copy protection key, skip step 3.)
3. If you do not have a copy protection key, a 'SpecView' window opens with the message, "Problem with Dongle: 'Dongle' (Copy Protection Key) not detected on parallel port." Click the OK button to acknowledge the message. Without the copy protection key, this diagnostic/sampler software has a 20-minute time limit on each run. If the message 'demo version of SpecView has stopped communicating - values are frozen' appears before the communication diagnostics are finished, close the software and reopen it for another 20-minute segment.
4. When the 'Configurations Found..' window opens, click on the "Test Comms for New Config." Button.
5. The 'Input Required..' window then opens. Enter a new Config. Name (up to 8 characters with no spaces) or accept the 'DEFAULT' name. Click OK.
6. The 'Ports and Protocol' window opens next. On the 'COM1:' line (if the COM1 port is the serial port used to connect to the controller) select the pulldown menu from Protocol column. Highlight "*Yokogawa 100" or "100 Series" for controller model UT150.
7. Select the pulldown menu from the Baud Rate column. Highlight "9600". Click on the 'Start Scan' button.
8. The SpecView program scans all 99 possible controller addresses and places a representative 'instrument view' of the temperature controller on the PC screen for each controller found connected to the PC. The factory-set addresses are 1, 2, 3, etc., depending on the number of controllers with communications in a single waterbath. Additional units with communications will require the controller's address to be changed. See Section 6.8 on page 9 for detailed instructions on configuring multiple controllers.
9. After the instrument scan is completed, a SpecView window appears with the message, "All channels scanned. Press OK to continue, or cancel to rescan". Press OK if all of the connected controllers are properly displayed. If no controls are displayed, check the "troubleshooting" section at the end of this setup.
10. To begin communication between the PC and the controller, click on the 'Enter Runtime' button (an icon of a running figurine). This action will ask for a file name to save this display: use the given default or select another.
11. The "SpecView" window will be displayed, showing the current PV (process variable) and SP (set point). If the SpecView display of the controller shows X's, the communications connection or power to the control may have been interrupted.
12. On some controllers, the decimal point position has been changed from the Yokogawa factory default. This will make the SpecView display differ from the controller. If this is the case, follow the instructions in Section 6.7 on page 9.

6.4 Communications Test

When you have established a working communications link between the controller and PC, you should check the link by varying the target set point function:

1. Click on the arrows of the controller(s) shown in the SpecView window. This will open a keypad window where the set point can be changed.
2. Select a temperature set point a few degrees from the current temperature and press the 'send' button. Verify that the controller display shows the setpoint change.
3. Select the original temperature set point through the keypad on the controller and observe the change on the PC display.
4. The controller parameters may be viewed through SpecView by clicking on the 'PAR' button. A window opens that lists the controller parameters. Each parameter can be changed by selecting it and clicking on the 'Alter' button. Select the 'Close' button. Make no changes at this time.

This concludes the initial software diagnostics.

6.5 Ordering SpecView

If this software program is what you need as a tool to organize and operate the digital communication on Lindberg/Blue M equipment, contact Lindberg/Blue M sales, SpecView directly at sales@specview.com, or on their Internet site at www.specview.com, and request "SpecView Plus".

6.6 Troubleshooting

If your connection is not working properly, check the following conditions:

A. Verify complete and tight cable connections between the Lindberg/Blue M unit and the PC.

B. Verify that power has been supplied to the unit and temperature controller before starting the software program.

C. Verify the configuration values in the controller, listed in the Table 4 on page 8.

D. Verify the values in the 'Ports & Protocols' window (see step 6 in Section 6.3).

6.7 Decimal Point Adjustment

If the decimal point on the PC display of the controller does not match the controller display, you can make an adjustment to correct this:

1. From the Configuration Mode (available through the 'file' drop down while in the Runtime Mode), select the 'Variables List' icon, represented by a page with lines on it.
2. Select the controller model number and select 'Properties' button. The 'Add/Rename Instrument' box appears.
3. In the Address window, highlight the middle digit (usually a 1), and change to '0' (zero).
4. Click the 'Rename Only' button. Close the 'Variables' box (click on 'X' in corner of smaller box).
5. Select the 'Enter Runtime' icon to see the results of the change.

6.8 Addresses for Multiple Controllers

When more than one controller has the same communication address, alternative addresses need to be set up in the individual controllers. Addresses 1 through 99 can be selected on the same communication link to each PC COM port.

1. Determine a unique address for each temperature controller equipped with the communications option.
2. On the UT150 controller, access the Operating Parameters menu by pressing and holding **SET/ENT** for 3 seconds.
3. Press and release **SET/ENT** repeatedly until the upper display reads LoC.
4. Press ▽ until the displayed value of LoC is -1; then press **SET/ENT** to access the Setup Parameters menu .
5. Press and release the **SET/ENT** button to access the six parameters specific to the communications option. Compare the displayed values to those in Table 4 on page 8. Make adjustments as needed.
6. Press and hold **SET/ENT** for 3 seconds to exit the Setup Parameters Menu.

7 Electric Water Leveler

If "WLF" is part of your model number, your model is equipped with an electric water leveler. This device is designed to automatically replenish the bath's water after evaporation or cleaning.

7.1 Theory of Operation

A 3" diameter reservoir is installed in the rear component section of the waterbath. The reservoir is connected to the main bath tank with a tank fitting and flexible tube. The water in the small reservoir will seek the same level as the main bath tank.

A float switch in the small reservoir senses the water level. When the water level is below the switch setting, a solenoid valve is energized, supplying water to the waterbath. An overflow tube in the small reservoir helps prevent the bath from overfilling in the unlikely event that the solenoid valve fails to fully close.

A second float switch in the reservoir is used for protection against low water level. When the water supply has been shut off, the pump and heater will be disabled when the water level reaches the low switch setting.

7.2 Connecting the Leveler

To connect the leveler:

1. Connect the water supply to the 1/4" compression bulkhead fitting. Viewed from the front, this fitting is located on the back right-hand side. The water supply line should be a copper or stainless steel tube with a 1/4" outside diameter. The recommended water supply pressure is between 5 psig and 60 psig.
2. Connect a 1/2" inside diameter tube to the overflow fitting and run it to an open drain. This fitting is located below the leveler supply fitting on the back side of the waterbath.

7.3 Operating the Leveler

Once the water supply and drain connections are in place with no leaks, you can turn on the main switch. The waterbath should start filling with water immediately.

It is important to put product in the waterbath before turning it on; also to turn off the waterbath before you remove product. By following these procedures, you can avoid overflows due to placing large loads in an already full bath.

7.4 Adjusting the Water Level

The normal operating water level is controlled by the height of the small reservoir, which is held in place by a 3" diameter stainless steel hose clamp.

To adjust the placement of the reservoir:

1. Disconnect electrical power from the waterbath.
2. Remove the rear cover to gain access to the small reservoir.
3. Loosen the hose clamp and slide the reservoir higher or lower.
4. The waterbath is delivered with the reservoir placed close to the highest setting. If you want a much lower level, you may have to reposition the hose clamp in a lower slot on the reservoir holding bracket (four slots are provided). It may also be necessary to shorten the flexible tubes that connect the reservoir to the main bath tank and overflow.

8 Maintenance

CAUTION! Maintenance should only be performed by trained personnel.

WARNING! Disconnect waterbath from main power before attempting any maintenance to waterbath or its controls.

CAUTION! This product contains fiberglass wool or other refractories which can result in the following:

- May be irritating to skin, eyes, and respiratory tract.
- May be harmful if inhaled.
- Possible cancer hazard based on tests with laboratory animals. Animal studies to date are inconclusive. No human exposure studies with this product have been reported.

WARNING! Before maintaining this equipment, read the applicable Warning Sheet at the back of this manual.

WARNING! When installing, maintaining, or removing the refractory insulation, the following precautions will minimize airborne dust and fiber:

- Keep personnel not involved in the installation out of the area.
- Use a good vacuum to clean area and equipment. Do **not** use compressed air.
- Use NIOSH high efficiency respirator (3M #8710 or equivalent).
- Wear long sleeve clothing, gloves, hat, and eye protection to minimize skin and eye contact. Do not wear contact lenses.
- Thoroughly wash self after work is complete.
- Launder work clothing separate from other clothes and thoroughly clean laundering equipment after use. If clothing contains a large amount of dust and/or fiber, dispose of rather than cleaning.
- Promptly place used fiberglass parts and dust in plastic bags and dispose of properly.

CAUTION! Bath water may be hot. Empty the water using the drain valve on the rear of bath if water is greater than 40°C (104°F).

The filter screen should be cleaned at least once a week for optimal circulation and agitation. Remove the filter screen by gently prying it out. Use running water dislodge sediment from the screen and replace the screen in the drain fitting on the bottom of the tank.

For replacement parts specifications, refer to Table 6 on page 13. For wiring schematics, refer to Section 10.

8.1 Cleaning the Waterbath

The bath is constructed of Type 304 polished stainless steel chosen to provide long life and low maintenance. The bath should be drained and cleaned at least once a month. To clean the bath, complete the following steps:

WARNING! Turn off all power to the bath before cleaning. Never attempt to clean the bath with the power on. A serious shock hazard exits if the bath is powered during cleaning.

1. Disconnect power to the bath.
2. Empty water from bath using the drain valve located at the rear of the bath.
3. For normal periodic cleaning of the bath, use warm water which contains a small amount of mild soap, such as dishwashing detergent. Apply the soapy water with a sponge or soft cloth.
4. Use another cloth and clean water for rinsing. Thoroughly flush the bath with clean water while the drain valve is open.
5. Dry with a soft towel to prevent streaks.
6. If hard water deposits form, remove them in one of the following ways:
   - Use a high quality scouring compound such as "Bon Ami" that will not mar the surface. Prevent compound from entering the plumbing at the drain screen by minimizing the amount of cleaning compound used.
   - Use one of the commercially available stainless steel cleaning compounds. Use care to prevent the compound from entering plumbing.
   - Use a lime removing product, such as "Lime Away."
7. Thoroughly rinse bath with the drain valve open.

8.2 Oiling the Motor

Pump life can be maximized by keeping bath water clean, keeping the filter screen clear, and oiling the pump motor once every six months. Only the pump motors installed on 208-230 volt refrigerated waterbaths require oiling; all other pump motors have sealed bearings which do not need oiling. The pump motor name plate information will also reveal if oiling is required.

To oil the motor, complete the following steps:

WARNING! Turn off all power to the bath before oiling the motor. Never attempt to lubricate the pump with the power on. A serious shock hazard exists if the bath is powered during oiling.

1. Disconnect power to the bath.

WARNING! Always disconnect power to the bath before control compartment is opened.

2. Remove the top/rear cover of the bath.
3. Observe the arrows on the pump motor nameplate, which indicate the location to oil the upper and lower bearings.
4. Add only 4 or 5 drops of a high quality SAE 20 weight non-detergent oil in each bearing.
5. Mount and secure the top/rear cover to the back of the bath.

9 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

Table 5 is a guide to troubleshooting controller and waterbath problems.

Table 5. waterbath Troubleshooting

Problem	Probable Causes	Solution
Controller reads P.Er.	Abnormal parameter value	Check controller parameter settings and reset to proper values.
Controller reads b. o	Input burnout	Check the sensor wiring, replace sensor if necessary.
Controller reads ooo.	PV exceeds effective range	Check the input type and range settings and correct them.
Controller reads UUU.	PV is below effective range	Check the input type and range settings and correct them.
Controller reads Err	Probable hardware failure	Call Service for controller repair.
The controller displays do not illuminate.	The waterbath is not connected to the power supply.	Check waterbath connection to power source.
	Main switch is defective.	Replace power switch or controller.
	Fuse(s) blown.	Replace fuse(s) and verify power connections.
Temperature varies or fluctuates.	Improper loading.	Test the unit empty. If results are satisfactory, the waterbath was improperly loaded. Redistribute the load.
	Poor sensor connections.	Check connections. Clean and tighten.
	Contaminated sensor.	Replace sensor.
	Poor ventilation of base.	Clear the area around the base.
	Inlet and/or exhaust vents are open.	Close vents.
	Inadequate tuning values.	Auto-tune the controller.
	Insufficient stabilization time.	Allow load ample time to reach equilibrium.
	Intermittent failure of switch, controller, limit switch, or wiring.	Verify wiring connections.
Temperature Offset.	Controller degradation and/or sensor degradation.	Offset or bias the controller and/or replace the sensor.
Waterbath does not heat.	No power.	Check power source, fuses, breakers, and connections.
	Defective solid-state relay.	Replace solid-state relay.
	Tripped overtemperature control (see Section 4.1).	Reset the OTC system, following the instructions in Section 4.1.
	Defective sensor.	Replace sensor.
	Controller malfunction.	Verify controller parameters/replace controller.
	One or more heater coils are burned out (coil may be open, shorted, or shorted to ground).	Replace heater.
	Heater coils are improperly connected.	Verify power source with the appropriate schematic representation.
Slow heat up.	Low line voltage.	Install line of sufficient and proper voltage (isolate the waterbath from other electrical loads).
	Heavy load in waterbath.	Reduce load in chamber to allow sufficient circulation.
	Improper cover closure.	Adjust cover to close on all edges.
	Gasket deterioration.	Replace gasket.

10 Replacement Parts

Table 5. Replacement Parts: Waterbath Model 1110

Waterbath Model	WB1110A-1 WB1110WLFA-1	WB1110K-1 WB1110WLFK-1	WB1110C-1 WB1110WLFC-1
Control Relay	302819H02	302819H03	302819H03
Fuse, Main Power	E04J-10 (10 Amp)	E04J-5 (5 Amp)	E04J-5 (5 Amp)
Fuse, Instrument Power (1Amp)	E04J-1	E04J-1	E04J-1
Heater	38941H01	38941H05	38941H05
Main Temperature Control	303115H03	303115H03	303115H03
Thermostat, Overtemperature	118319	118319	118319
Circulation Pump	118039	118041	118041
Line Cord	48951H15	430366H01	48951H03
RTD	118010	118010	118010
Solid State Relay	102460	102460	102460
Switch, Main Power	118007TA	118006	118006
Solenoid Valve	38777H01	38777H02	38777H02
Float Switch	E16F-1	E16F-1	E16F-1
Tube, Neoprene	38825H01	38825H01	38825H01
Clamp, Nylon Hose	38845H01	38845H01	38845H01
Drain Valve	M16-D51	M16-D51	M16-D51
Filter Screen	38867G01	38867G01	38867G01
Shelf, Wire Rod	C-5565-Q	C-5565-Q	C-5565-Q
Dust Cover	118081	118081	118081
Lexan Gable Cover	118107	118107	118107
Stainless Steel Gable Cover	38576G01	38576G01	38576G01
Concentric Ring Cover	118091	118091	118091
Wiring Diagrams	304173 I04 304173 I06	304173 I01 304173 I02	304173 I01 304173 I02

10 Replacement Parts

Table 5. Replacement Parts: Waterbath Model 1120

Waterbath Model	WB1120A-1 WB1120WLFA-1	WB1120K-1 WB1120WLFK-1	WB1120C-1 WB1120WLFC-1
Control Relay	302819H02	302819H03	302819H03
Fuse, Main Power	E04J-15 (15 Amp)	E04J-10 (10 Amp)	E04J-10 (10 Amp)
Fuse, Instrument Power (1Amp)	E04J-1	E04J-1	E04J-1
Heater	38941H02	38941H06	38941H06
Main Temperature Control	303115H03	303115H03	303115H03
Thermostat, Overtemperature	118319	118319	118319
Circulation Pump	118039	118041	118041
Line Cord	48951H15	430366H01	48951H03
RTD	118010	118010	118010
Solid State Relay	102460	102460	102460
Switch, Main Power	118007TA	118006	118006
Solenoid Valve	38777H01	38777H02	38777H02
Float Switch	E16F-1	E16F-1	E16F-1
Tube, Neoprene	38825H01	38825H01	38825H01
Clamp, Nylon Hose	38845H01	38845H01	38845H01
Drain Valve	M16-D51	M16-D51	M16-D51
Filter Screen	38867G01	38867G01	38867G01
Shelf, Wire Rod	C-5566-Q	C-5566-Q	C-5566-Q
Dust Cover	118082	118082	118082
Lexan Gable Cover	118108	118108	118108
Stainless Steel Gable Cover	38576G02	38576G02	38576G02
Concentric Ring Cover	118092	118092	118092
Wiring Diagrams	304173 I04 304173 I06	304173 I01 304173 I02	304173 I01 304173 I02

10 Replacement Parts

Table 5. Replacement Parts: Waterbath Models 1130

Waterbath Model	WB1130A-1 WB1130WLFA-1	WB1130K-1 WB1130WLFK-1	WB1130C-1 WB1130WLFC-1
Control Relay	302819H02	302819H03	302819H03
Fuse, Main Power	E04J-25 (25 Amp)	E04J-15 (15 Amp)	E04J-15 (15 Amp)
Fuse, Instrument Power (1Amp)	E04J-1	E04J-1	E04J-1
Heater	38941H04	38941H03	38941H03
Main Temperature Control	303115H03	303115H03	303115H03
Thermostat, Overtemperature	118319	118319	118319
Circulation Pump	118039	118041	118041
Line Cord	48951H07	430366H02	48951H03
RTD	118010	118010	118010
Solid State Relay	102460	102460	102460
Switch, Main Power	118007TA	118006	118006
Solenoid Valve	38777H01	38777H02	38777H02
Float Switch	E16F-1	E16F-1	E16F-1
Tube, Neoprene	38825H01	38825H01	38825H01
Clamp, Nylon Hose	38845H01	38845H01	38845H01
Drain Valve	309118H01	309118H01	309118H01
Filter Screen	38867G01	38867G01	38867G01
Shelf, Wire Rod	C-5567-Q	C-5567-Q	C-5567-Q
Dust Cover	118083	118083	118083
Lexan Gable Cover	118109	118109	118109
Stainless Steel Gable Cover	38576G03	38576G03	38576G03
Concentric Ring Cover	118093	118093	118093
Wiring Diagrams	304173 I03 304173 I05	304173 I01 304173 I02	304173 I01 304173 I02

10 Replacement Parts

Table 5. Replacement Parts: Waterbath Models 1140

Waterbath Model	WB1140A-1 WB1140WLFA-1	WB1140K-1 WB1140WLFK-1	WB1140C-1 WB1140WLFC-1
Control Relay	302819H02	302819H03	302819H03
Fuse, Main Power	E04J-25 (25 Amp)	E04J-15 (15 Amp)	E04J-15 (15 Amp)
Fuse, Instrument Power (1Amp)	E04J-1	E04J-1	E04J-1
Heater	38941H04	38941H03	38941H03
Main Temperature Control	303115H03	303115H03	303115H03
Thermostat, Overtemperature	118319	118319	118319
Circulation Pump	118039	118041	118041
Line Cord	48951H07	430366H02	48951H03
RTD	118010	118010	118010
Solid State Relay	102460	102460	102460
Switch, Main Power	118007TA	1180006	118006
Solenoid Valve	38777H01	38777H02	38777H02
Float Switch	E16F-1	E16F-1	E16F-1
Tube, Neoprene	38825H01	38825H01	38825H01
Clamp, Nylon Hose	38845H01	38845H01	38845H01
Drain Valve	309118H01	309118H01	309118H01
Filter Screen	38867G01	38867G01	38867G01
Shelf, Wire Rod	C-5568-Q	C-5568-Q	C-5568-Q
Dust Cover	118084	118084	118084
Lexan Gable Cover	118110	118110	118110
Stainless Steel Gable Cover	38576G04	38576G04	38576G04
Concentric Ring Cover	118094	118094	118094
Wiring Diagrams	304173 I03 304173 I05	304173 I01 304173 I02	304173 I01 304173 I02

11 Boiling Point Table

Table 7. Effect of Altitude on Boiling Point and PSIA

Altitude (ft)	Altitude (meters)	Boiling Point (ºF)	Boiling Point (ºC)	Atmospheres	PSIA
0	0	212	100	1.000	14.70
1000	305	210	99	0.965	14.19
2000	610	208	98	0.931	13.69
3000	915	206	97	0.899	13.21
4000	1220	205	96	0.867	12.74
5000	1524	203	95	0.836	12.28
6000	1829	201	94	0.806	11.84
7000	2134	200	93	0.777	11.41
8000	2439	198	92	0.748	11.00
9000	2744	196	91	0.721	10.60
10000	3049	195	91	0.694	10.20

12 Warranty

12.1 Domestic Warranty (United States and Canada)

Lindberg/Blue M warrants this product to the owner for a period of twelve (12) months from date of shipment by Lindberg/Blue M. Under this warranty Lindberg/Blue M through its authorized Dealer or service organizations, will repair or at its option replace any part found to contain a manufacturing defect in material or workmanship, without charge to the owner, for a period of ninety (90) days, the labor, and a period of one (1) year, the parts, necessary to remedy any such defect. All components used in the manufacture of this product are covered by this warranty excluding heating elements and thermocouples.

This warranty is limited to products purchased and installed in the United States and Canada. It does not apply to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided. This warranty shall not apply to equipment or parts which have been subjected to negligence, accident, or damage by circumstances beyond Lindberg/Blue M's control or improper operation, application, maintenance, or storage.

To obtain prompt warranty service, contact the nearest Lindberg/Blue M authorized service center or Dealer. A listing of these companies will be provided upon request. Lindberg/Blue M's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Lindberg/Blue M's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

12.2 International Warranty (excluding Canada) 12 Months Parts Warranty

Lindberg/Blue M warrants this product to the original owner for a period of twelve (12) months from the date of shipment from the Lindberg/Blue M factory. Thermocouples and heating elements are excluded from this warranty. If any part is found to contain a manufacturing defect in material or workmanship Lindberg/Blue M will, at its option, repair or replace the part. Lindberg/Blue M assumes no responsibility for any labor expenses for service, removal, or reinstallation required to repair or replace the part, or for incidental repairs, and such costs are the responsibility of the Owner and his Dealer.

The warranty does not apply to damage caused by accidents, misuse, fire, flood, Acts of God or any other events beyond Lindberg/Blue M's control or to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided by Lindberg/Blue M. To obtain prompt warranty service, simply contact the Dealer from whom you purchased the product or the nearest Dealer handling Lindberg/Blue M products. Lindberg/Blue M's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that its sole remedy and Lindberg/Blue M's sole liability with respect to defective parts or any other claim shall be as set forth in this warranty, and any claims for incidental, consequential or other damages are expressly excluded.

WEEE Compliance

Great Britain



WEEE Compliance. This products is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96EC. It is marked with the following symbol. Thermo Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this products should be disposed of or recycling 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**

Deutschland



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Italia



Conformità WEEE. Questo prodotto deve rispondere alla direttiva dell'Unione Europea 2002/96EC in merito ai Rifiuti degli Apparecchi Elettrici ed Elettronici (WEEE). È marcato col seguente simbolo. Thermo Scientific ha stipulato contratti con una o diverse società di riciclaggio/smaltimento in ognuno degli Stati Membri Europei. Questo prodotto verrà smaltito o riciclato tramite queste medesime. Ulteriori informazioni sulla conformità di Thermo Scientific con queste Direttive, l'elenco delle ditte di riciclaggio nel Vostro paese e informazioni sui prodotti Thermo Scientific che possono essere utili alla rilevazione di sostanze soggette alla Direttiva RoHS sono disponibili sul sito **www.thermo.com/WEEERoHS**

France



Conformité WEEE. Ce produit doit être conforme à la directive européenne (2002/96EC) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est merqué par le symbole suivant. Thermo Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Davantage d'informations sur la conformité de Thermo Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Scientific qui peuvent aider le détection des substances sujettes à la directive RoHS sont disponibles sur **www.thermo.com/WEEERoHS**

Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (Lindberg/Blue M or specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

Lindberg/Blue M SALES DIVISION

Phone:	828/658-2827 800/657-0770
FAX:	800/873-2952

LABORATORY PARTS and SERVICE

Phone:	828/658-2891 800/438-4851
FAX:	828/658-2576

TECHNICAL SUPPORT

Phone:	800/438-4851

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