# Control Consoles

Models: CC58114PC/CC58114PBC

Installation and Operation Manual

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1 Introduction

Lindberg/Blue M CC58114 series control consoles are complete temperature control systems containing a microprocessor-based digital temperature controller or programmer.

Each console is equipped with a solid state power module, power contactor (for OTP), panel mounted circuit breaker and polarized thermocouple jack(s).

"B" models also include Over Temperature Control (OTC) by an independent digital controller.

The consoles are designed to operate Lindberg/Blue M 1200°C laboratory box, tube and crucible furnaces.

2 Safety Considerations

WARNING! Do not modify or use equipment in a manner other than expressly intended. Modification of equipment other than that for which it is explicitly designed could cause severe injury or death. Any customer after-market retrofit violates the warranty of the equipment.

Do not reconfigure the controller(s). Any reconfiguration of the control instrument(s) could cause inaccurate readings, faulty instrumentation, and may cause the furnace to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not disconnect any safety features provided. Disconnection of the unit safety features could allow the furnace to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not use components or materials not specifically designed for this equipment. Failure to comply with this precaution could result in damage to equipment used or the unit and may create an overheat situation. Also, do not use anything other than OEM exact replacement equipment and parts. Not using OEM replacement parts could cause faulty instrumentation readings, inoperable equipment, or temperature overshoot. Both situations may cause personal injury or death, product, and property damage.

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. Misapplication may compromise the safety of the end user or the life of the product.

3 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.

4 Installation

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

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

4.1 Location

Keep line voltage variations to a minimum for best control accuracy. Do not locate unit in areas of wide ambient temperature variation, such as near vents or outdoor entrances. Allow at least three inches space all around the console, although more space may be required for ease of maintenance.

4.2 Power Wiring

"A" voltage control consoles are designed to operate on 110V or 120V 50/60Hz, "C" voltage consoles on a 208V or 240V 50/60Hz single phase power source. The customer is to provide a main power disconnect switch or circuit breaker and correctly sized power and ground wires according to local electrical codes. The wiring should correspond with those carrying similar loads built into the console.

CAUTION! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Always conform to the National Electrical Code and local codes. Utilize proper grounding techniques to reduce RFI and EMI for electronic gear. Do not connect unit to already overloaded power lines; lower voltage to unit will decrease power to the heating elements.

CAUTION! Connect the console to the proper power source. Failure to use the specified voltage can result in damage to the unit.

Information for sizing fuse, circuit breaker, or power lines appears on the control console dataplate. Fuse protection must never exceed 125% of console's current rating.

Wire rated at 50°C minimum is suggested to be used for the connections between the console and the power supply.
4.3 Power Wiring Procedure

⚠️ **WARNING!** Disconnect console from main power before attempting any maintenance

Remove both console side panels by undoing the appropriate screws. In the back panel, push out the two lower plastic hole plugs from inside the plastic bushing. If hard wiring is desired the bushings may be removed and the holes used to mount a standard 1/2” electrical conduit connector.

Insert the power and ground wires through one of the bushings. Connect the black wire to terminal L1, the white wire to terminal L2, and the green wire to the ground bar. The second bushing is used for the wiring to the furnace.

These control consoles can be used in conjunction with a large number of different furnaces. The internal connections must be made according to the wiring diagram relating to your particular furnace.

Check that all electrical connections are secure before replacing the console side panels.

4.4 Thermocouple Wiring Installation

Insert the thermocouple plug into the thermocouple jack on the console rear panel.

5 Initial Start-up

It is necessary to become familiar with the digital temperature controller(s) before attempting to operate the furnace for the first time. Examine the appropriate installation/operation instructions for the controller(s) that are included with the control console.

Refer to the separate furnace instruction manual for initial heat-up time and temperature recommendations.
6 UP150 Controller Operation

The furnace temperature controller is configured and tuned at the factory to function well for most applications. Occasionally, it may be advisable to configure the temperature controller differently to suit a particular working environment or process.

CAUTION! Before reconfiguring the controller, read this chapter carefully. Reconfiguring the controller can change the unit characteristics and design parameters, which can hamper performance and make the equipment dangerous to use.

6.1 UP150 Controller Overview

This version (V 54) of the UP150 controller features the dual operation modes of Single Setpoint and Programming. Each mode has distinct operations and uses.

Single Setpoint Mode allows the user to select a single target temperature setpoint in the controller. The controller will then operate the heating equipment until this setpoint value is achieved.

Programming Mode allows the user to enter a series of setpoint and time values. The controller will follow these sequences of instructions to energize the heating equipment until the entire sequence is complete.

The Temperature Controller senses the chamber air temperature of the furnace (the PV, or process value) and supplies the heat necessary to achieve the desired setpoint. The controller includes an LED display and a pushbutton keypad. Refer to Table 2 and Table 3 for lists of displayed parameters and keypad functions.

Table 2. UP150 Parameter Functions

<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Factory Set Value</th>
<th>Description</th>
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<tr>
<td>Mode</td>
<td>RST</td>
<td>Model Selection</td>
</tr>
<tr>
<td>HoLd</td>
<td>OFF</td>
<td>Program Hold (RUN mode)</td>
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<tr>
<td>AdV</td>
<td>OFF</td>
<td>Segment Advance (RUN mode)</td>
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<tr>
<td>CTL</td>
<td>Pid</td>
<td>Control mode</td>
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<tr>
<td>At</td>
<td>oFF</td>
<td>Auto tuning (RUN mode)</td>
</tr>
<tr>
<td>P</td>
<td>26</td>
<td>Proportional band (°C)</td>
</tr>
<tr>
<td>I</td>
<td>73</td>
<td>Integral time</td>
</tr>
<tr>
<td>d</td>
<td>18</td>
<td>Derivative time</td>
</tr>
<tr>
<td>Ct</td>
<td>1</td>
<td>Heat cycle time</td>
</tr>
<tr>
<td>Fl</td>
<td>OFF</td>
<td>Sensor filter</td>
</tr>
<tr>
<td>BS</td>
<td>0.0</td>
<td>PV bias (offset)</td>
</tr>
<tr>
<td>Loc</td>
<td>0</td>
<td>Key lock</td>
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Table 3. Pushbutton Keypad

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
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<tr>
<td>SET/ENT</td>
<td>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.</td>
</tr>
<tr>
<td>▲</td>
<td>Use the Up Arrow button to increase the temperature setpoint display and to change parameter values in the Operation and Setup Parameter menus. Whatever you change the value of a setpoint or parameter, the decimal point flashes to remind you to register the changed value with SET/ENT. While in operating mode, pressing this button stops (resets) program operation.</td>
</tr>
<tr>
<td>▼</td>
<td>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. While in operating mode, pressing this button starts (runs) a program.</td>
</tr>
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</table>
6.2 Single Setpoint Operation

The following sections describe how to operate the controller in single setpoint (local) mode. Use this mode when you only need to run the furnace with a specific setpoint and do not require a programmed sequence of steps.

6.2.1 Setting High Temperature Alarm Setpoint:

1. Press and HOLD for three seconds the ‘SET/ENT’ button to display “modE rES”.
2. Press and release the ‘SET/ENT’ button to display “PrG 0”.
3. Press the ‘UP/RESET’ button to show the lower display value of “11”.
4. Press and release the ‘SET/ENT’ button to select this new value and advance to the “SSP 25” display.
5. Press and release the ‘SET/ENT’ button until the High Temperature Alarm Setpoint value is displayed as “A1”.
6. Select an alarm setpoint 10°C above the target setpoint to be selected.
7. Press and release the ‘SET/ENT’ button to place this new value in the controller memory.
8. Press and HOLD for three seconds the ‘SET/ENT’ button to exit this menu.

6.2.2 Accessing Local Mode

1. Press and hold for three seconds the ‘SET/ENT’ button to display “modE rES”.
2. Press and release the ‘UP’ button twice to select the display “modE LCL”.
3. Press and release the ‘SET/ENT’ button once to select Local Mode. This selection causes the red indicator to illuminate beside “L” on the control panel (refer to Figure 1).
4. Use the ‘UP’ and ‘DOWN’ buttons to select the desired operating temperature setpoint.
5. Press and release the ‘SET/ENT’ button once to register the setpoint value.
6. The display will then show measured temperature in the upper display, the present temperature setpoint in the lower display.
7. This display and the buttons will remain active as long power continues to the control module. Power interruptions will cause the controller to enter reset or standby mode in which no actions are made to operate the heating equipment.

You may use the arrow buttons to adjust the setpoint (lower) value to be adjusted in this display mode. The ‘SET/ENT’ button will register setpoint value changes, until these values are changed again.

6.2.3 Exiting Local Mode

To exit Single Setpoint or Local Mode and turn off the energy to the heaters:

1. Press and hold for three seconds the ‘SET/ENT’ button to display “modE LCL”.
2. Press and release the ‘DOWN’ button twice to select the display “modE rES”.
3. Press and release the ‘SET/ENT’ button once to select the Reset Mode.
   This selection causes the red indicator to extinguish beside the display label “L” that had indicated the Local Mode.
4. This will change the display showing the measured temperature in the upper display, with the lower display showing the Start Set Point (SSP) temperature setpoint of the program.

6.3 Programming Operation: Entering a Program

This section describes how to enter a simple program that is designed to:

- direct the controller to ramp to a higher temperature;
- stabilize;
- ramp to a lower-temperature;
- end with an indefinite dwell.

If you intend to use the program features of the controller, it is advisable to go through all the steps in this sample program to familiarize yourself with the elements of programming mode.

Note: If the controller buttons are NOT pushed for 2 minutes, the controller will return to the regular operator mode/menu.

6.3.1 Entering Programming Mode

To access the programming menu:

1. Make sure the indicators beside “RUN” and “L” on the controller face are off. If either indicator is on, press and hold the ‘SET/ENT’ button until the display shows ‘modE’. Select ‘rES’ in the lower display with the ‘arrow’ buttons. Press and release the ‘SET/ENT’ button once.
2. Press the ‘SET/ENT’ button for 3 seconds to display “modE” in the upper display and “rES” (Reset) in the lower display.
3. Press and release ‘SET/ENT’ until “LoC” is displayed. Make sure the display below “LoC” is “0” (zero). If it is not “0”, use ‘DOWN ARROW’ to select “0” and press and release “SET/ENT” button to register the change to “0”.
4. Press and release the “SET/ENT” button until “PrG” is displayed.
5. At “PrG” display, press the ‘UP ARROW’ to make the lower display “1”.
6. Press and release the ‘SET/ENT’ button once to enter the programming menu.
6.3.2 Entering Program Parameters

The first display is the Start Set Point parameter, shown as “SSP” in the upper display. The value assigned to SSP is usually the current room temperature, 25°C.

On the next page is an illustration of the program profile and a table of the parameters entered.

Basic Ramp and Dwell Parameters:

1. Use the arrow buttons to select “25” in the lower display, then press and release the ‘SET/ENT’ button twice to enter this new value and to advance to the “StC” display.
   If the value for “SSP” is correct and does not need to be changed, press and release the ‘SET/ENT’ button once to advance to the “StC” display.

2. Next is the Start Code parameter, shown as “StC” in the upper display. The value assigned to StC is usually “0”. This will instruct the program to follow the Start Set Point. Press the SET/ENT button to advance to the next display.

3. The next parameter, “SP1”, is the first setpoint value that is desired in the chamber and is normally a ramp segment. Select this target temperature setpoint value with the arrow buttons then press and release the ‘SET/ENT’ button twice to enter this value and to advance to the “StM1” display. If the value for “SP1” is correct and will not be changed, press and release the ‘SET/ENT’ button once to advance to the “StM1” display.

4. The next parameter, “tM1”, represents the first time period for the unit to reach the target temperature setpoint selected in “SP1”. This selection can be a value ranging from 0.00 to 99.59, which represents hours and minutes. Select this time value with the arrow buttons and enter it by pressing and releasing the ‘SET/ENT’ button twice.

5. Press and release the ‘SET/ENT’ button to advance to the next display of “SP2”, this is normally the dwell segment. Select the same target setpoint temperature value as “SP1” with the arrow buttons. Press and release the ‘SET/ENT’ button twice to enter this value and to advance to the next display.

6. The next parameter, “tM2”, represents the second time period used to maintain or dwell at the target setpoint selected in “SP2”. This selection can be a value ranging from 0.00 to 99.59, which represents hours and minutes. Select this time value with the arrow buttons and enter it by pressing and releasing the ‘SET/ENT’ button twice.

7. Next, “SP3” is the third setpoint value desired in the chamber. Select this target temperature setpoint with the arrow buttons and press and release the ‘SET/ENT’ button twice to enter this value and to advance to the “tM3” display.
   If this value is correct and not changed, press and release the ‘SET/ENT’ button once to advance to the “tM3” display.

8. “tM3” represents the third time period for the unit to reach the target setpoint selected in “SP3”. This selection can be a value ranging from 0.00 to 99.59, which represents hours and minutes. Select this value with the arrow buttons and enter it by pressing and releasing the ‘SET/ENT’ button.

9. The next parameter, “SP4” is normally the dwell segment. Select the same target temperature as “SP3” with the arrow buttons, then press and release the ‘SET/ENT’ button twice to enter this new value and to advance to the next display.

Additional Program Parameters:

10. The next parameter displayed is “tM4”. Select a lower display value of “0FF” with the ‘arrow’ buttons, then press and release the ‘SET/ENT’ button twice to enter this value change and advance to the next display.

11. The next display shows “EV1” in the upper display. The lower value should always be “0” (zero). Press and release the ‘SET/ENT’ button once to go to the next display.

12. “AL1” should always have a lower value of “9”. Press and release the ‘SET/ENT’ button once to advance to the next display.

13. The next parameter, “A1”, is used to select the high temperature alarm trip setpoint. Use the ‘arrow’ buttons to select a value 10ºC (or 20ºF) HIGHER than the highest target setpoint to be used. Select the High Temperature Alarm value with the arrow buttons then press and release the ‘SET/ENT’ button twice to enter this new value and to advance to the “HY1” display. If the value for “A1” is correct and not changed, press and release the ‘SET/ENT’ button once to advance to the “HY1” display.

14. “HY1” is used to select the amount of temperature change below the high temperature alarm setpoint where the alarm relay will reset. This value is usually “1”. Select “1” with the arrow buttons and press the ‘SET/ENT’ button six times to enter the correct value and advance to the “JC” display. Or if the value is correct, press the ‘SET/ENT’ button five times to advance to the “JC” display.

15. For the parameter displayed as “JC”, select “1” with the arrow buttons, then press and release the ‘SET/ENT’ button twice to display “WTZ”. Selecting the value of “1” will cause the program to hold the setpoint at this last segment. A value of “0” would cause the program to reset and stop running the program and stop the power to the heaters. A value of “2” will cause the program to repeat ‘continuously’.

16. When the display shows “WTZ”, select a lower display value of “0FF” with the ‘arrow’ buttons. Press and HOLD the ‘SET/ENT’ button for 3 seconds to return to the Reset or standby display.

This concludes the steps required to enter a typical ramp-and-dwell program. On the next page is an illustration of the program profile and a table of the parameters entered.
6.3.3 Running a Program

To run a program such as the one outlined above, press and hold the ‘DOWN/RUN’ button making the ‘RUN’ indicator illuminate. At the end of this program the ‘HLD’ (hold) indicator is illuminated to indicate this program is in the indefinite dwell at the last target temperature. This hold indicator is caused by the “Jx” selection of “1”, while the “Jx” selections of “0” or “2” will not illuminate the “HLD” (hold) indicator.

6.3.4 Ending a Program

To end a program while in the ‘RUN’ or ‘HLD’ (hold) mode, press and hold the ‘UP/RESET’ button to turn off the current program and extinguish the ‘RUN’ or ‘HLD’ indicator.

Turning off the unit’s power will also stop the program. When power is restored, the controller is in the Reset or standby mode with no power to the heaters.

Note: The programmer/controller will not operate the unit’s heaters (to change or maintain a temperature) unless there is a program running or a single setpoint value is selected in the Local Mode.

6.3.5 Changing a Program

To make changes ONLY to the target temperature and segment length times for simple program operation, follow these steps:

1. Make sure the indicators beside “RUN” and “L” on the controller face are off. If either indicator is on, press and hold the ‘SET/ENT’ button until the display shows ‘modE’. Select “ESE” in the lower display with the ‘arrow’ buttons. Press and release the ‘SET/ENT’ button once.
2. Press the ‘SET/ENT’ button for 3 seconds to display “modE” in the upper display and “ESE” in the lower display. Press and release ‘SET/ENT’ repeatedly to display “LoC”. Make sure the value below “LoC” is “0” (zero). If it is not “0”, use “DOWN” arrow to select “0” and press and release “SET/ENT” button to register the change to “0”.
3. Press and release the ‘SET/ENT’ button once to show “PrGr” on the upper display.
4. Press the ‘UP’ arrow to make the lower value “1”.
5. Press and release ‘SET/ENT’ button twice to display “Sp!”.
   Using the arrow buttons to revise the target setpoint.
6. Press and release ‘SET/ENT’ button twice to display “tm!1”.
   Using the arrow buttons to revise the segment time length needed to get to the target setpoint “Sp!”.
7. Press and release ‘SET/ENT’ button to display other setpoints and segment time lengths. Use the arrow buttons to change the temperature setpoints and time lengths. Press and release the ‘SET/ENT’ button to register any new values.
8. Press and HOLD the ‘SET/ENT’ button for 3 seconds to exit the program menu and return to the reset or standby display.

6.4 Auto Tuning the UP150 Controller

Auto tuning maximizes the performance of the chamber at a selected temperature with the product load’s characteristics, by operating with the quickest response and minimal temperature overshoot.

Factory settings are for general purposes, but your process can be enhanced through the auto tune feature. To obtain this maximum performance, follow these steps to auto tune the controller.

1. Load the chamber with materials that have the same mass and thermal characteristics as an actual product load.
2. Operate the chamber to the process temperature.
3. Start the Auto Tune: Press and hold the ‘SET/ENT’ button for three seconds to display the “modE” parameter of the Operating Parameter menu.
4. Press and release the ‘SET/ENT’ button five times to advance to the “At” parameter.
5. Press and release the ‘UP’ arrow button to show “on” in the lower display.
6. Press the ‘SET/ENT’ button once to enter the auto tune mode and exit the Operating Parameters menu.
7. 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) display 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.
8. The auto tune is completed when the regular display of the measured temperature is shown without the “At” value flashing. The chamber should now operate to the process temperature with the given product load, with the quickest response and minimal temperature overshoot.
9. If the process temperature or load changes significantly, another auto tune session may be necessary to optimize the chamber performance.

To interrupt the auto tune before it is completed, simply turn off the power to the controller and unit. When the power is restored the auto tune will not be operating.
6.5 Temperature Offset Procedure

The purpose of this procedure is to create an offset in the displayed temperature measurement for the Yokogawa model UP150 temperature controller.

1. Operate the oven or furnace chamber to your normal stable temperature setpoint, with an independent temperature measurement device located in the center of the chamber. The controller will be 'running' the program or operating in the local mode to maintain the temperature.

2. Note any difference in the controller’s measured temperature (upper value) and the independent measurement. If a difference of greater than 1°C is noted proceed with the following steps.

3. Press and hold the “SET/ENT” button for 3 seconds to display "modE".

4. Verify the button lockout parameter will give access to make this display offset. Press and release the “SET/ENT” button twelve times to display “LoC”. The value 0 (zero) displayed will give full access and is necessary to make the display offset changes desired. If the value displayed is 1 or 2, use the “down arrow” button to make 0 (zero) and press and release the “SET/ENT” button to register this change.

5. Press and release the “SET/ENT” button twelve times to display “bS” and the current offset value.

6. Select the offset value with the arrow buttons that is needed to make this controller display correctly. For example, if the independent measurement is 553°C, the controller Temperature measurement display shows 550°C, and the current controller offset (bS) is –2, then make the controller display offset “+1” [(+3 needed offset) + (-2 current offset) = (+1 new offset)].

7. Press and release the “SET/ENT” button once to register this new offset value. Press and hold the “SET/ENT” button for 3 seconds to exit this controller menu.

8. Operate the controller to same temperature to stabilize the chamber to check for any further variations between controller and the independent measurement. Repeat steps 2 – 7 as necessary.

9. This completes the display offset procedure for the Yokogawa model UP150 temperature controller. If the button lockout parameter “LoC” was originally on a value of 1 or 2, repeat steps 3 & 4 to return to this original value.

6.6 Changing Temperature Scale Between °C and °F

To change the temperature scale in the UP150 controller to operate on °F instead of the factory setting of °C, or from °F to °C, follow these steps.

These changes will alter the controller input type and associated scale-dependent parameters, AND ERASE the stored program to default values. Please document the stored program in the controller BEFORE proceeding.

If during this procedure the buttons are inactive for more than two minutes, the controller will return to the standard display.

1. Make sure the indicators beside “RUN” and “L.” on the controller face are off. If they are on, press and hold the ‘UP/RESET’ button until the RUN or L indicators are off.

2. To access the Operating Parameters menu, press and HOLD the ‘SET/ENT’ button for at least 3 seconds to display “modE”.

3. Press and release the ‘SET/ENT’ button until the display shows “LoC” in the upper display. Make sure the value below “LoC” is “0” (zero). If it is not “0” use ‘down arrow’ to make “0” and press and release “SET/ENT” button to register change to “0”.

4. At “LoC” display, press the ‘down arrow’ to make the lower value “-1”.

5. Press and release the “SET/ENT” button to enter the Setup Parameters menu and show “In” on the upper display and a numerical value in the lower display.

6. See table below for the STANDARD values for this parameter and the others needed in the following steps.

7. Select the appropriate value for the “In” parameter. Press the ‘UP’ or ‘DOWN’ arrow buttons to make the lower display to the new value, then press and release the “SET/ENT” button TWICE to register the new value and advance to the next parameter.

8. “SPH” is the next parameter displayed. Select and enter the new value, then press and release the “SET/ENT” button TWICE.

9. “SPL” is the next parameter displayed. Select and enter the new value, then press and release the “SET/ENT” button ONCE.

10. Press and HOLD the “SET/ENT” button for at least 3 seconds to exit.

11. Press and HOLD the “SET/ENT” button for at least 3 seconds to enter the Operating Parameter menu and show "modE" in the upper display.

12. Press and release the ‘SET/ENT’ button until the upper display shows “P”. Select the value in the table and adjust the lower display accordingly. Press and release the ‘SET/ENT’ button TWICE.

13. “T” is the next parameter displayed. Select and enter the new value, then press and release the “SET/ENT” button TWICE.

14. “d” is the next parameter displayed. Select and enter the new value, then press and release the “SET/ENT” button ONCE.

15. Press and HOLD the ‘SET/ENT’ button for at least 3 seconds to exit.

16. Reenter or create a program using the new temperature scale.

The following table shows the corresponding parameter values for 1200°C box furnaces in °C and °F:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>SPH</td>
<td>1200</td>
<td>2192</td>
</tr>
<tr>
<td>SPL</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>P</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td>I</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>D</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

The P, I and D parameters may be altered through auto tuning.
7 Communication Option

The Communication Option (available on models with a 'COM' suffix) enables digital communication between the UP150 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.

7.1 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.

7.2 UP150 Communications Setup Parameters
Table 4 shows the default values for UP150 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.

Section 7.7 on page 9

<table>
<thead>
<tr>
<th>Parameter Code</th>
<th>Factory Set Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Setup Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSL</td>
<td>0</td>
<td>Protocol selection</td>
</tr>
<tr>
<td>Adr</td>
<td>1</td>
<td>Controller address</td>
</tr>
<tr>
<td>bPs</td>
<td>9600</td>
<td>Baud rate</td>
</tr>
<tr>
<td>Pr 1</td>
<td>EVEN</td>
<td>Parity (even)</td>
</tr>
<tr>
<td>StP</td>
<td>1</td>
<td>Stop bit</td>
</tr>
<tr>
<td>dLn</td>
<td>8</td>
<td>Data length</td>
</tr>
</tbody>
</table>

7.3 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 Green" for controller model UP150.
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 furnace. Additional units with communications will require the controller's address to be changed.
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 figure). 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 7.7 on page 9.
7.4 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.

7.5 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".

7.6 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 7.3).

7.7 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.

7.8 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 UP150 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.
8 Excess Temperature Option ("B" Models)

The Excess Temperature Option, when installed, provides an additional, independent temperature control system to help protect products from excess temperatures.

Read this section carefully before using this option.

8.1 Control Display

When the Excess Temperature Controller (the UT150L) is first turned on, it displays only the excess temperature setpoint in the bottom display. Press and release the SET/ENT button to show the duration time of the last excess temperature incident. (See Exceeded Temperature Duration Timer Section.)

Press and release the SET/ENT button once again to show the peak temperature measured for the last excess temperature incident.

Pressing and releasing the SET/ENT button once again shows the current temperature measured by the controller in the top display; this may differ slightly from the main temperature controller. The value shown in the bottom display is the current excess temperature setpoint.

Pressing and releasing the SET/ENT button again cycles back to the first display.

8.2 Excess Temperature Option Features

8.2.1 Exceeded Temperature Duration Timer

The Exceeded Temperature Duration Timer measures the time that the setpoint is exceeded (and power to the heaters interrupted) until the hysteresis value is reached as the chamber temperature cools. This time indicates when the chamber temperature exceeded the Excess Temperature setpoint.

8.2.2 Peak Exceeded Temperature

The Peak Exceeded Temperature is the highest temperature measured by the Excess Temperature Controller.

8.3 Operating Parameters

8.3.1 Excess Temperature Setpoint

The Excess Temperature setpoint is typically set about 10°C (18°F) above the operating temperature of the chamber, or to the maximum temperature the product or process could tolerate.

The Excess Temperature setpoint is selected by holding the SET/ENT button for three seconds to show 'SP' in the top display and the current setpoint in the bottom display. Adjust the setpoint with the arrow buttons and press the SET/ENT to register the new setpoint.

8.3.2 Hysteresis

Set the hysteresis ('HYS') of the Excess Temperature Controller to effectively use the Duration Timer feature. This value is usually 80% of the temperature difference between the Excess Temperature setpoint and the chamber operating temperature. For example, with an Excess Temperature setpoint of 1220°C and chamber operating temperature of 1180°C, set the hysteresis to 32°C.

The hysteresis also controls the point when the 'exceeded' indicator is extinguished and the Excess Temperature Controller can be reset.

Exit the Operating Parameters by holding the SET/ENT button for three seconds.

8.4 Excess Temperature Controller Operation

After the Excess Temperature Setpoint and Hysteresis values are selected, the controller is ready for operation. The setpoint and hysteresis should be reviewed and adjusted if necessary, when the main controller setpoint is changed.

During an excess temperature incident, the 'EXCEEDED' and 'OUT' indicators are lit on the controller display area when the setpoint is tripped. The 'EXCEEDED' indicator will stay on while the temperature cools to the hysteresis amount, then turn off.

When the 'EXCEEDED' indicator is extinguished, the Excess Temperature Controller can be reset holding the 'up arrow/reset' button for one second when the normal operating display is showing the current measured temperature and the setpoint or just the setpoint.

The Exceeded Temperature Duration Timer and the peak Exceeded Temperature can be viewed either before or after the controller is reset. These are viewed on the controller display when the SET/ENT button is pressed and released, with the 'tln' or 'HI' in the top display. These values will be erased from the display and memory when the 'up arrow/reset' button is pressed during their respective displays (and the 'EXCEEDED' indicator is off).

Loss of power to the Excess Temperature Controller will not change the setpoint or hysteresis value. However, the last recorded Exceeded Temperature Duration Time and peak Exceeded Temperature will be lost.
9 Maintenance

CAUTION! Maintenance should only be performed by trained personnel. Disconnect console from main power before attempting any maintenance to console or its controls.

9.1 Temperature Controller Replacement

The temperature controller(s) plug into a sleeve mounted in the control console front panel.

CAUTION! The controller contains static-sensitive electronic devices. Do not touch the controller internal components.

9.1.1 Replacing the Controller

To remove the controller from the sleeve, ease the latching ears outward and pull the control out of the sleeve.

To remove the mounting sleeve from the front panel, complete the following steps:

1. Remove the control console side panels.
2. Disconnect the wires from the back of the sleeve, label the wires for reinstallation.
3. Using your fingers or a screwdriver, unhook the two retaining clips from the slots in the sides of the sleeve.
4. Slide the sleeve out of the front of the panel.

To reinstall the controller, reverse the above procedure.

9.2 Solid State Relay (SSR) Replacement

To replace the SSR(s), complete the following steps:

1. Remove the control console side panels. The SSR(s) are mounted on the inside surface of the back panel.
2. Disconnect the wires from the SSR, label the wires for reinstallation.
3. Undo the two screws holding the SSR to the rear panel and remove the SSR.

Note: Smear a thin layer of heat-sink paste under the new SSR before fitting.

To install the new SSR, reverse the above procedure.

10 Replacement Parts

All quantities are one each unless otherwise stated.

<table>
<thead>
<tr>
<th>Part description</th>
<th>Part number</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&quot;A&quot; voltage consoles</td>
<td>&quot;C&quot; voltage consoles</td>
</tr>
<tr>
<td>Solid state relay</td>
<td>7212-2210-00A</td>
<td>7212-2210-00A</td>
</tr>
<tr>
<td>Contactor</td>
<td>E02F-2-2</td>
<td>30008BH01</td>
</tr>
<tr>
<td>Heater fuse</td>
<td>32657-004</td>
<td>32657-004</td>
</tr>
<tr>
<td>Control fuse (2)</td>
<td>104828</td>
<td>104828</td>
</tr>
</tbody>
</table>
11 Wiring Diagram

Model CC58114 Series Control Consoles (with Programmable Controller)
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 at 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 product 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 product 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


Italia


France

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 silver 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.

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IF YOU NEED ASSISTANCE:

LINDBERG/BLUE M SALES DIVISION

Phone: 828/658-2711
       800/252-7100

FAX: 828/645-3368

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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