Operating Instructions
Temperature Controllers

808 Controller
808P Programmer
818P Programmer
and 92 overtemperature controller

This manual collects together the separate instruction sheets formerly issued for the above controllers.

<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>section</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

See also the main manual for the furnace or other product to which the controller is fitted.
1. **808 CONTROLLER**

- The upper display shows the actual temperature measured inside the furnace.
- The lower display shows the "setpoint" or desired furnace temperature.
- Press the "Up" or "Down" button to adjust the setpoint.
- The output light indicates the state of the controller's output signal to the solid state relay (which in turn switches the power to the heating elements).
- The above is all you need to know to start using the controller. What comes next is optional.
- The controller has a "ramp to setpoint" feature which allows you to limit the rate of warm-up - either to avoid thermal shock damage to the furnace or contents - or to control the rate of cool down.
- Try changing the setpoint. You will notice that the "ramping indicator" glows for a few moments. Touch the parameter button briefly while the ramping indicator is glowing. The indicator flashes and the lower digital display will momentarily display the instantaneous value of the ramping setpoint.
- In most cases the controller is factory set so that the setpoint is ramped at the maximum rate of 99.99°C per minute. If desired you can slow this to a minimum of 0.01°C per minute (0.6°C per hour) as follows:
- Push the parameter button. The lower display will shown a letter "C" (confirming a Celsius scale is in use) then the upper display will change to show SPrr (Set Point Ramp Rate) and the lower display will show the selected ramp rate. Adjust this value using the "Up" and "Down" buttons. (Note this value applies equally on heating and cooling).
- If you are not able to alter the setpoint ramp rate in this way then it is probable that the rate has been locked at the factory in order to protect the furnace from thermal-shock damage. This is quite common on furnaces with ceramic work tubes. Contact Carbolite’s service division for further advice on this.
2. **808P PROGRAMMER**

*For drawing, see 808 opposite.*

1. The 808P has three operating modes:-
   - **Idle** mode - in which it behaves as an ordinary controller. Alter the setpoint (desired temperature) simply by using the Up and Down buttons.
   - **Run** mode - in which it is running a time/temperature program of up to four segments (2 ramps and 2 dwells).
   - **Hold** mode - which is a temporary pause in the execution of the program. This can be engaged manually, or automatically by the holdback facility if the furnace deviates too far from program.

2. The 808P normally displays both the actual temperature measured inside the furnace and the present setpoint or desired temperature. This setpoint is held constant in Idle and Hold modes, but varies according to the program in run mode.

3. Press the Parameter button. On the left of the lower display a letter C or F confirms the units of temperature. The right hand side of the display will be blank if the 808P is in Idle, or will show which program segment is in use (r1, d1, r2 or d2) if it is in run or Hold mode.

4. Press the parameter button again to display the program status **Prog** (Idle, run or Hold). You may change this using the Up or Down buttons. Select Idle to allow program adjustment.

5. Press the parameter button again to display the Idle mode setpoint **SP**. Press Up or Down to change this value. Note that this parameter is part of the normal display during Idle mode, and can be altered then or now with the same effect.

6. **Lc** (loop count) is the next parameter to be displayed. Raise or lower this value to set the number of repetitions of your program. Note that if L2 is higher than L1 (see below), then at the end of d2 the program will ramp down to L1 at rate r1 as the first stage in the next execution of the program.

7. **r1** represents the rate of change of temperature in °/minute for ramp 1.

8. **L1** represents the first temperature Level that you wish to ramp towards.

9. **d1** is the length of time in minutes that you wish the furnace to maintain the L1 temperature (the dwell at level 1).

10. **r2**, **L2** and **d2** have similar functions for the second set of segments.

11. **Hb** allows you to make the programmer pause (Holdback) and to wait for the furnace to catch up with the program, if the temperature deviates from the program by more the set amount. Hb should be set to about 10° to ensure that dwell times are not begun until the furnace has reached the programmed temperature level. Hb is factory set to 2000°, and will have no effect unless reduced to a lower value.

12. **Run** your programme by using the parameter button to display the Prog parameter, and use the Up button to select **run**. The "R" LED will glow.

13. **Pause** the program by selecting Hold mode. The "R" LED will flash.

14. **Cancel** the program by selecting the Idle mode. The "R" LED goes off.

15. After a power failure the program will resume where it left off and complete any remaining part of the current program segment. Holdback will be automatically engaged if the furnace has cooled by more than the Hb setting.
3. **808 & 808P POWER LIMIT ADJUSTMENT**

This describes how to set the power limit, for example to compensate for ageing in silicon carbide elements. You are advised to consult Carbolite if you do not have instructions on how to decide upon the correct power limit.

1. Switch off the furnace instrument switch.
2. Unscrew the jacking screw to remove the controller from its sleeve.
3. Locate the spring-wire switch near the top of the right-hand printed circuit board, viewing the controller from the rear. Adjust this switch to close the circuit.
4. Replace the instrument into its sleeve and gently tighten the jacking screw.
5. Switch on the furnace instrument switch to allow the furnace to warm up to approximately 800°C or to such other power setting temperature as is specified by Carbolite.
6. Depress the PAR button until the display changes to show "Hi AL". Make another 14 depressions of the PAR button until the high power limit, "Hi PL", is displayed.
7. Use the arrowed "up" & "down" buttons to adjust the power limit.
8. Take care not to alter any other control parameters.
9. Switch off and reset the internal switch (see par. 3 above) to its open position.
4. **818P PROGRAMMER**

A. **TO HEAT UP AND HOLD ONE TEMPERATURE (Controller Mode)**
   
i. The upper display shows the actual (measured) furnace temperature.

   ii. The lower (secondary) display shows the set point (desired) furnace temperature. This is confirmed by the letters SP beside the lower display.

   iii. You can raise or lower the set point by holding depressed the Up or Down button.

B. **TO HEAT UP IN ACCORDANCE WITH A PRESET PROGRAMME.**

   i. The scroll button is concealed below the lower flap.

   **Short Scroll** - Depress the button once to show the set point (SP) on the lower (secondary) display. Depress it again to show the output power OP (the percentage of full power). Repeat if desired.

   **Main Scroll** - Hold the button down. The display will scroll once through the short scroll list, then pause at the first parameter of the main list: Pr1, the first ramp rate in degrees per minute. This value can be displayed and altered with the Up/Down buttons. Extreme values are "NONE" (i.e. omit segment) and "STEP" (i.e. infinite rate of rise). Press the scroll button again to display ramp level 1, PL1, in °C. A fourth scroll depression will display the dwell time at the previous level Pd1.

   ii. A program of up to 8 ramps and 8 dwells can be built up by using the above procedure, or you can cut short the program by setting a ramp or dwell segment to "End" by depressing the Down button.

   iii. After the program has been defined you can set the holdback value Hb which is the size of error between the programmed temperature and the measured temperature that will be tolerated before the program pauses to wait for the furnace to catch up. This feature is turned off by pressing the Down button.

   iv. Finally you can prescribe a number of repetitions of your program by setting the loop counter PLC to something other than 1.

   v. Start your program by pushing the run/hold button. The program starting temperature will be that measured inside the furnace. If the furnace is hotter than level 1, the 818P will invert the programmed ramp and programme the furnace down to the level 1 temperature.
The program can be paused by pushing the hold button, and resumed by a further depression.

Cancel the program by pushing both Up and Down buttons together.

The scroll button will initially allow the setpoint, power and "time" remaining in a current dwell period to be displayed. Further scroll button depressions allow all the program parameters to be inspected. However, they can only be altered while the program is in "hold".

At the end of the program the furnace will maintain the last "level" set point. Make your last level zero if you want the furnace to cool down at the end of your program.

The number of program loops remaining is displayed using the Up/Down buttons while the Lr mnemonic is displayed.

The operation of these models is the same as that of the 818P except for the following extra features accessed in the Main Scroll:

- "Pnr" is displayed before the first ramp rate, offering the opportunity to select a program number using the Up or Down buttons.
- "Cnt" is displayed after the other program parameters, offering the opportunity to "continue" by linking the present programme to the next one. Use the Up button for "Yes" and the Down button for "No".

Selecting Cnt Yes at the end of program 3 will cause program 4 to run. Selecting Cnt Yes at the end of program 4 (818P4) or program 15 (818P15) will cause program 1 to run. Each program will complete the set number of loops before proceeding to the next one.

The 818P is an extremely flexible unit; this guide gives you the minimum information needed to use the 818P. Full details of what it can do are available on request (if available).

### 818P POWER LIMIT ADJUSTMENT

This describes how to set the power limit, for example to compensate for ageing in silicon carbide elements. You are advised to consult Carbolite if you do not have instructions on how to decide upon the correct power limit.

1. Switch off the furnace instrument switch.
2. Unscrew the jacking screw to remove the controller from its sleeve.
3. Locate the blue (security or 'SW6') link switch on the central printed circuit board (labelled "security"). Adjust this switch to close the circuit.
4. Replace the instrument into its sleeve and gently tighten the jacking screw.
5. Switch on the furnace Instrument switch. The upper display will show the measured value and the lower display controller setpoint.
6. Press and hold the parameter scroll button until the lower display indicates "SP1".
7. Step press (quick press and release) the scroll button to index through the parameters (see data sheet) until the power limit parameter "HL" is displayed.
8. Press the Up or Down button to increase or decrease the preset element power limit.
9. Take care not to alter any other parameters.
10. Repeat steps 1 and 2.
11. Open the security link switch.
12. Replace the instrument into its sleeve and gently tighten the jacking screw.
**Eurotherm 92**

### 1.1 **To set the overtemperature alarm temperature (AL1)**

<table>
<thead>
<tr>
<th>Action</th>
<th>display</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. press the Scroll key once</td>
<td>°C</td>
</tr>
<tr>
<td>ii. press the Secret key once</td>
<td>ConF</td>
</tr>
<tr>
<td>iii. press the Scroll key once</td>
<td>AL1</td>
</tr>
<tr>
<td>iv. press the Up arrow once</td>
<td>Set Temperature</td>
</tr>
<tr>
<td>v. press Up or Down arrows to adjust to Set Temperature</td>
<td>the desired alarm value</td>
</tr>
<tr>
<td>vi. leave the instrument for 10 seconds</td>
<td>Actual Temperature</td>
</tr>
</tbody>
</table>

The alarm temperature will remain set if the furnace is switched off.

### 1.2 **Overtemperature condition**

If the alarm condition is activated, the AL1 indicator will flash, and the furnace elements will be switched off, and will stay off.

### 1.3 **To clear the alarm condition**

<table>
<thead>
<tr>
<th>Action</th>
<th>display</th>
<th>AL1 indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. press the Scroll key twice</td>
<td>Act.temp.</td>
<td>flashing</td>
</tr>
<tr>
<td>ii. press and hold the Up arrow for 5 seconds</td>
<td>AL1</td>
<td>flashing</td>
</tr>
<tr>
<td>iii. release and press Up arrow again</td>
<td>CLr</td>
<td>flashing</td>
</tr>
<tr>
<td></td>
<td>Alarm set</td>
<td>stops flashing</td>
</tr>
<tr>
<td></td>
<td>temperature</td>
<td></td>
</tr>
</tbody>
</table>

After the above procedure, when or if the actual temperature falls below the alarm set temperature the AL1 indicator will switch off and the overtemperature relay will operate to allow the furnace elements to come on again.

### 1.4 **Alternative Configuration**

It is possible for the 92 overtemperature controller to be configured such that the furnace elements come on again automatically after an overtemperature condition, once the temperature has dropped below the alarm setting. This may be referred to as or non-latching mode.

Carbolite can configure the controller this way by prior agreement. For retrospective reconfiguration, please contact Carbolite's service division for advice.

**92 OVERTEMPERATURE CONTROLLER**

Only applicable if 92 overtemperature control fitted.
For preventive maintenance, repair and calibration of all Furnace and Oven products, please contact:

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