Operating Instructions
Temperature Controller
type 91e

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

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1 DESCRIPTION

1.1 Early Versions of 91e Controller
The early version of the 91/91e was fitted between 1990 and early 1995. It did not have a ramp-to-setpoint feature, but in other respects is similar to the later version described below.

1.2 Later Versions of 91e Controller
The later version of model 91e was brought into use in early 1995. It is a digital instrument with PID control algorithms, made by Eurotherm. It is supplied as an integrated part of the control section of the furnace.

The 91e features:
- Easy use as a simple temperature controller, where on setting the required temperature the controller immediately attempts to reach and maintain it.
- A ramp-to-setpoint feature, which may be used to limit the heating (or cooling).

Model 91eHL also contains a “power limit” feature, enabling it to be used on furnaces that require a maximum setting to the supplied power.

The controller does not contain a real-time calendar, and is not subject to century-end date problems.

2 OPERATING INSTRUCTIONS

2.1 Controls
Most Carbolite products are fitted with an “Instrument Switch” which cuts off power to the controller and other parts of the control circuit. See the instruction manual for the furnace for the overall operating instructions.

To operate the 91e there must be power to the furnace, and the Instrument switch must be on. If a time switch is included in the furnace circuit, this must be in an On period.
2.2 **The 91e – Operation**

When switched on, the controller lights up, goes through a short test routine, and then displays the measured temperature and starts to control. The output light glows or flashes as heating occurs.

The upper display shows the actual temperature measured in the furnace.

The lower display shows the "set point" or desired temperature.

One touch anywhere on the front panel lights up the three push buttons.

The Up and Down buttons allow the set point to be adjusted.

One touch of the Scroll button displays the units of temperature F or C.

A second touch of the Scroll button brings up the tune Parameter. Self tuning of the PID terms can be initiated with Up or disabled with Down. Normally the factory set tuning will be satisfactory and retuning will not be necessary, but if the control action is not satisfactory with your combination of load and temperature then you may wish to try retuning. Please call our service department if you need advice.

A third depression of the Scroll button reveals the alarm set point AL.SP, which can be adjusted with the Up and Down buttons. The alarm has no function when the 91 is being used as a normal controller.

The output light OP indicates the state of the controller's output signal to the solid state relay (which in turn switches the power to the heating elements).

Early versions: there is no ramp-to-setpoint feature; this is indicated by there being no SP.rr parameter as described in the next paragraph. Please do not use the Secret Key unless you need to discover whether the SP.rr parameter is present (and, if so, to set it).

Later versions: the ramp-to-setpoint feature may be used for controlled slow heating. To access this feature, press the Scroll button until AL.SP appears. Press the Secret key. Press Scroll until SP.rr appears. Alter the parameter value using Up and Down buttons - the possible values are OFF and 0.1 to 50°C/min. Press Secret key again to return to display of measured value. DO NOT alter any other parameters without first consulting Carbolite.

3 **Power Limit Adjustment (91EHL)**

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.

With the controller powered up, press the Scroll key until the display shows AL.SP.

Press the Secret Key as shown in the controller drawing.

Press the Scroll key until the display shows H.PL. (10 presses; the H.PL parameter follows the H.ct parameter.)

Press the Up or Down key to select a new value of Heat Power Limit, between 0% and 100%.

Either allow the display to "time out" or press the Secret Key to return to operator mode.

Take care not to alter any other control parameters.
For preventive maintenance, repair and calibration of all Furnace and Oven products, please contact:

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