Operating Instructions

Eurotherm 810 Controller
Eurotherm 812 Programmer

See also the main manual for the furnace, oven or other product to which the controller is fitted.
1 **810 CONTROLLER**

The 810 usually displays the temperature measured inside the furnace.

Push either the “up” or “down” button for a moment and the 812 shows the “set” temperature that it is striving to achieve (note the flashing dot in the top left hand corner of the display). After a while it reverts to showing the measured temperature.

Keep the up or down button depressed, and, after a delay, the set temperature will change to what you want.

The scroll button allows you to inspect the PID terms which have been preset by Carbolite and should not be altered.
The 812 usually displays the temperature measured inside the furnace.

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The 812 is a controller and a programmer. Push the “run” button - it runs a program. Push the “up” and “down” buttons together - it becomes a controller.
3 **812 – Programming**

This is the basic temperature profile an 812 can produce.

The program parameters are displayed by pushing the “scroll” button which is behind the hinged lower panel.

Push the scroll button a few times - you will see the code letters (shown above) appear on the display: r1, L1, dl, r2, L2, d2. Touch an “up” or “down” button and you will see the value that relates to that part of the program. You can change these values by keeping the “up” or “down” button depressed.

“Le” controls the number of repeats of the program you want. Leave this at 1 to start with.

“AL” controls the alarm relay operation.

“Pb, ti, td, Hc, HL” are all PID control terms. They have been pre-set by Carbolite. Don’t alter them unless you are especially interested in their effect - and you have plenty of time to spend!

Press “Run” to start your program. The row of lights under the digital display shows which part of the program is active.

The 812 takes the actual furnace temperature as its starting point - so if it is hotter than “Level 1” when the “run” button is pressed it will control the furnace in a downward ramp at rate “r1” until level 1 is reached.

Press the “up” and “down” buttons together to stop the program.

At the end of the program the 812 will revert to its “Reset” mode (controller mode). Carbolite have added a link wire on the back of the unit to achieve this (between pins 16 and 17).
4  **812 – **INPUTS & OUTPUTS

4.1 Dwell times

It is possible to program the 812 with heating and cooling ramp rates which are too fast for the furnace to maintain. This has the result that the dwell period following such a ramp is artificially shortened, unless points 2, 3, and 4 below are observed.

4.2 Hold - remote

There is a “Hold” terminal (No. 11) on the back of the 812.

If this is connected to the common terminal (No. 12), it causes the program to stop, and the green “hold” light glows on the front panel. If this connection is removed, the program resumes. A switch can be put in this circuit to provide the operator with the means to stop, or “pause”, the program and resume at will.

4.3 Alarm

812 programmers supplied by Carbolite are equipped with a “deviation band Alarm” relay. This relay is energised and a light glows on the front panel if the furnace temperature “deviates” (high or low) from the program by more than a preset number of degrees.

4.4 Automatic Hold-back

If the “hold” circuit in item 2 is wired through the alarm relay contacts (i.e. link terminal 12 to 31 and terminal 32 to 11) then the program will pause whenever the alarm operates. This will allow the furnace to catch up. Set AL = 10 degrees as a first attempt.

4.5 Segment Outputs

There are five terminals on the back of the 812 - one for each program segment - that become active in turn as the program advances. They can be used to operate a relay (see item 8) or can be linked into the inputs on the 812.

4.6 Reset - remote

There is a reset terminal (No. 17) on the back of the 812. If this is connected to the common terminal (No. 12) then it has the same effect as pushing both “up” and “down” buttons together - the 812 stops the program and goes into “reset” mode.

4.7 Wait - automatic

By wiring any “segment” output to the “hold” input terminal through an external switch, the program can be made to pause at the beginning of any segment. This may be useful if manual intervention is needed in part of the program.
4.8 Switching external equipment

There is an “undedicated” relay in the 812 which can be operated by linking its control input (terminal No. 29) to any of the program segment outputs.

Alternatively, the alarm relay contacts can be used to switch external equipment. It is optional to replace the “band” alarm (see item 3) by one sensitive to only “high” errors, or only “low” errors.

4.9 Auto - Reset at “End”

The 812 normally stays at Level 2 indefinitely when the program reaches its “End” condition. To make the furnace cool down when “dwell 2” has elapsed, Carbolite link the “End” output (terminal No. 16) to the “reset” input (terminal No. 17). If the “reset mode” temperature is then adjusted to zero, the furnace will cool down and, in effect, switch off at the end of the program.

Note

a) This link between 16 and 17 can be removed if you wish.

b) If the “reset mode” temperature is set high, then the furnace will control at this temperature after the end of the program. This can be used as an extra dwell period - if natural heating/cooling between levels is acceptable.
5 **POWER LIMIT ADJUSTMENT**

Many Carbolite furnaces – particularly those fitted with Silicon Carbide elements, require a “power limit” setting to be made in the controller. This is preset by Carbolite for new elements and the customer voltage, but may need altering (see the main manual for details).

Switch off the furnace Instrument Switch.

Open the controller front door flap and unscrew the jacking screw in the lower right hand corner. Withdraw the instrument from its sleeve.

Viewing the instrument from the rear, on the right hand printed circuit board near the top corner is a small vertical switch. Put the switch into the “Up” position.

Replace the instrument into its sleeve and gently tighten the jacking screw.

Switch on the furnace Instrument Switch to allow the furnace to warm up to approximately 800°C or the power setting temperature if specified differently by Carbolite.

Fit a “clip-on” ammeter or equivalent to the element circuit.

Adjust the controller setpoint at least 100°C higher to ensure that the furnace is drawing full current power and not under controlled conditions. Note the ammeter reading.

Press the controller Parameter Scroll button several times at 1 second intervals until the letters appear on the screen. Wait a couple of seconds and note the reading.

Press either the “up” or the “down” button to adjust the power setting until the correct current setting for that furnace is achieved. Wait until the display changes to indicate the temperature.

Switch off the Instrument Switch, remove the controller as in explained above and switch “DOWN” the small switch in the rear of the instrument. Replace the instrument.

DO NOT adjust any of the other parameters as these are factory set and critical.
For preventive maintenance, repair and calibration of all Furnace and Oven products, please contact:

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