

## Installation, Operation and Maintenance Instructions

Controller Manual

132 Controller

# 132 Controller

## Contents

This manual is for guidance on the use of the Carbolite Gero product specified on the front cover. This manual should be read thoroughly before unpacking and using the furnace or oven. The model details and serial number are shown on the back of this manual. Use the product for the purpose for which it is intended.

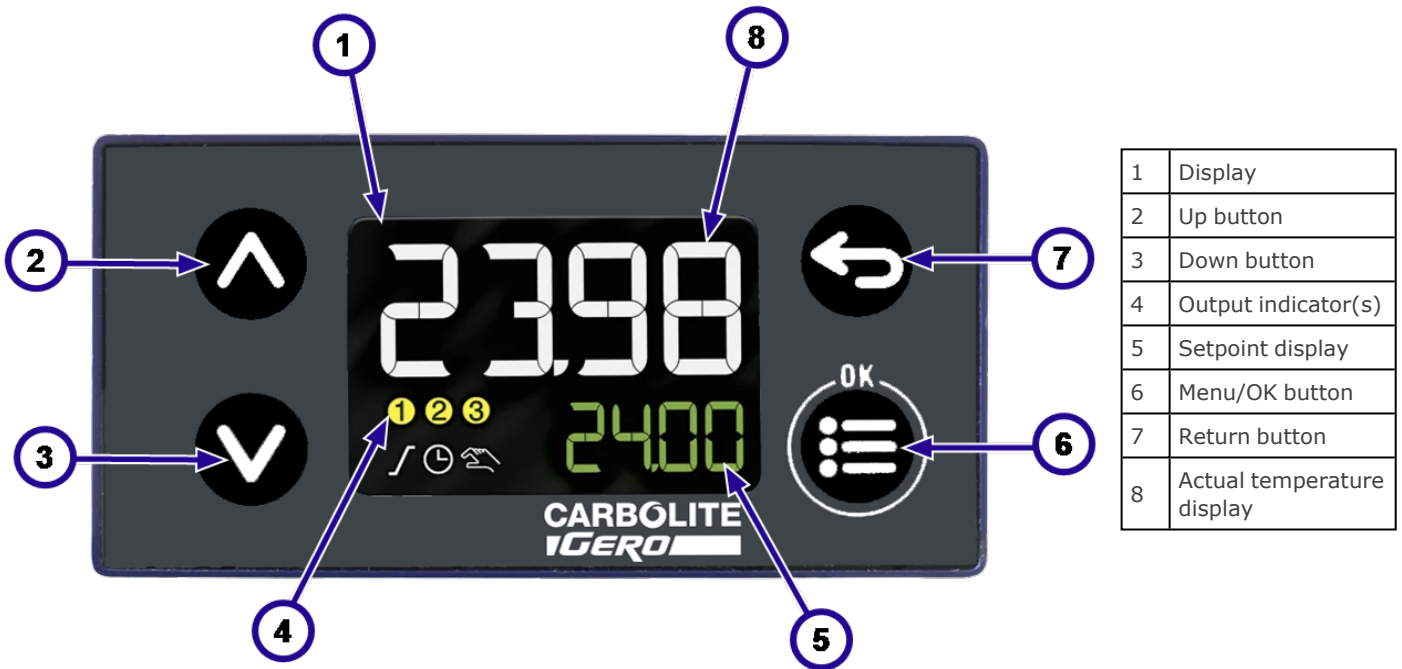
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## 1.0 Introduction

The 132 is a simple temperature controller that uses PID (Proportional Integral Derivative) algorithms to adjust the heating power and control the temperature within the product.

Users navigate through the controller by pressing the four buttons positioned at either side of the display.

### 1.1 Navigation



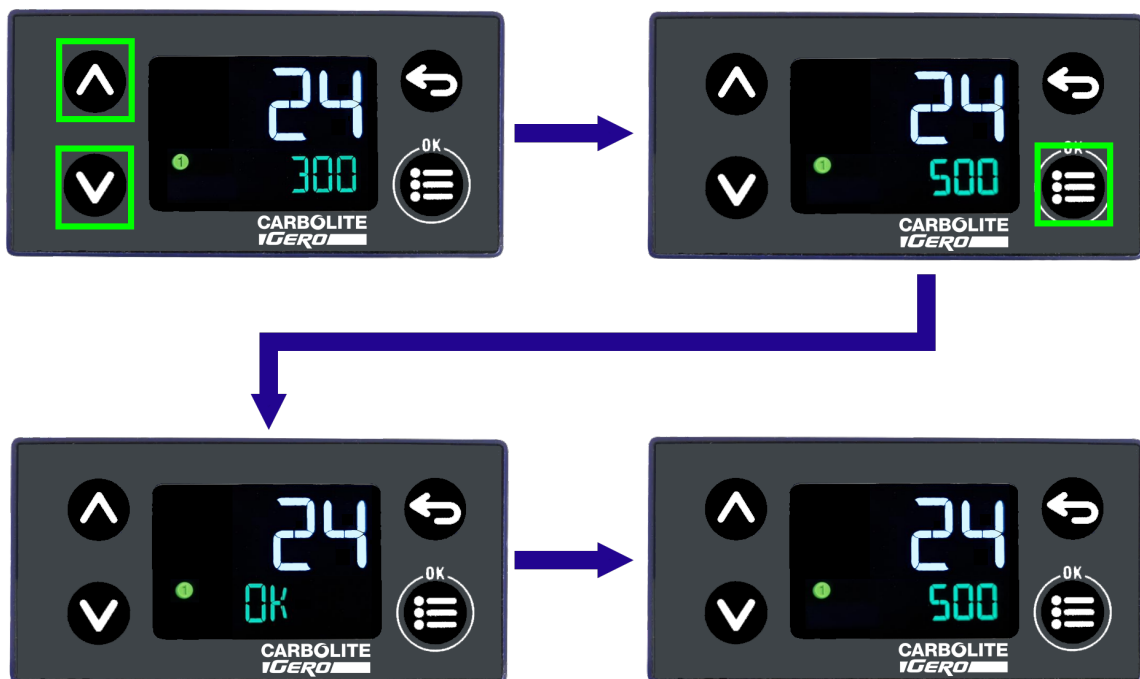
1	Display
2	Up button
3	Down button
4	Output indicator(s)
5	Setpoint display
6	Menu/OK button
7	Return button
8	Actual temperature display

## 2.0 Operation

### To change the setpoint:

1. Use the up and down buttons to adjust the setpoint to the desired temperature.
2. Press the Menu/OK button to accept the new value. **OK** will appear briefly on the lower half of the display.

The example pictured shows the setpoint being adjusted from 300°C to 500°C.



## 2.1 Setpoint Ramp Rate

By default, when a setpoint is entered, the controller will heat or cool at the fastest rate possible to achieve the setpoint temperature. Depending on the heat treatment process and the material being heated, it may be necessary to increase or decrease the temperature at a steady rate to reduce the risk of thermal shock damage.

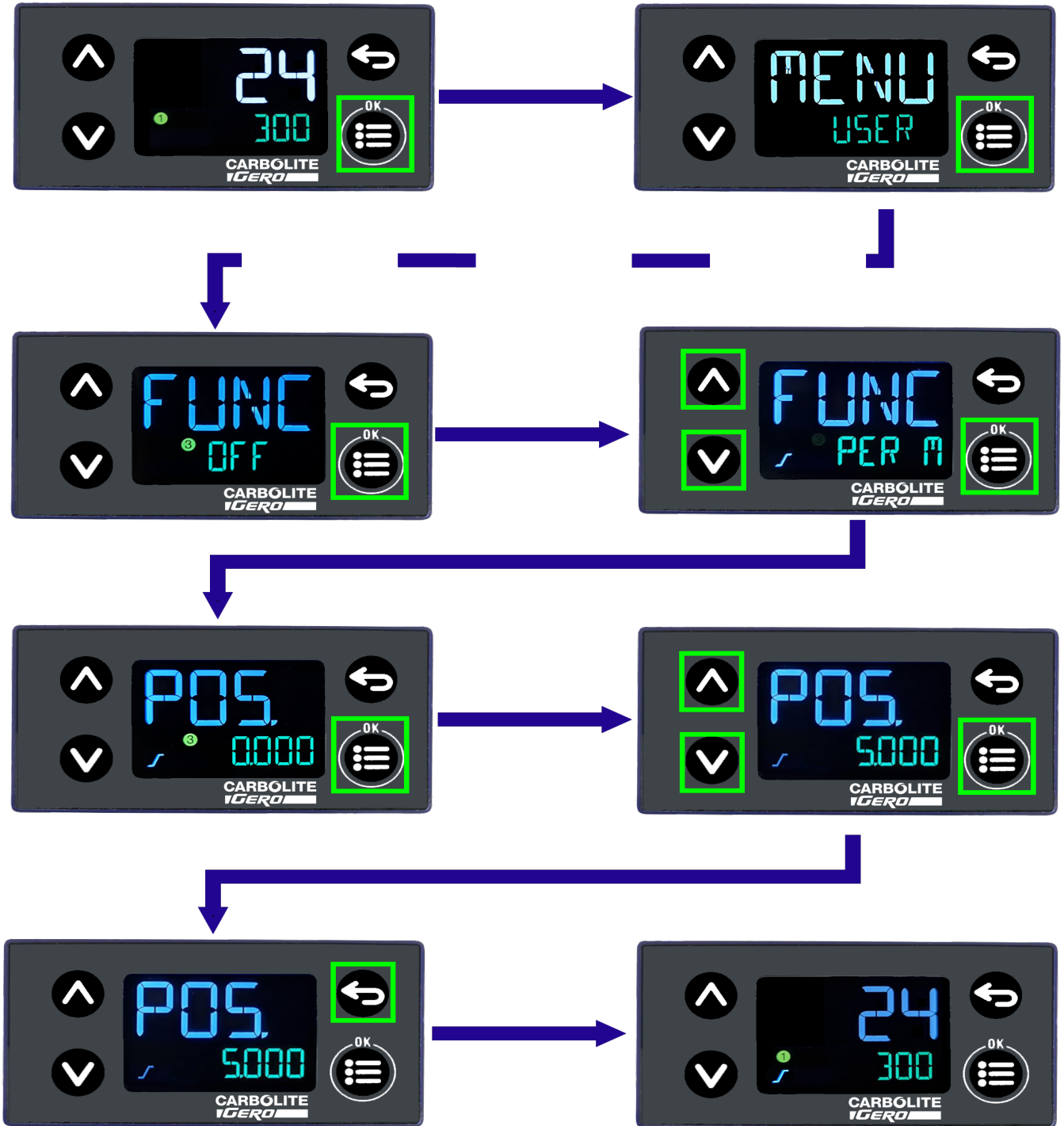
It is possible to configure the 132 controller to increase or decrease the temperature of product at a controlled rate by inputting a setpoint ramp rate.

### To set the setpoint ramp rate:

1. Press the Menu/OK button to access the controller menu. The scrolling text on the lower half of the display should show *USER LEVEL*.
2. Press the Menu/OK button to access further information.
3. Press the up and down arrow buttons to scroll through to *FUNCTION*.
4. Press the Menu/OK button, then use the up and down arrow buttons to scroll through the ramp rate style options:
  - *PER MINUTE*
  - *PER HOUR*
  - *PER DAY*
  - *OFF*
5. Press the Menu/OK button to select the ramp rate style. When a ramp rate style other than "OFF" is selected, a small ramp icon will appear on the display to notify the operator that a setpoint ramp rate is enabled.
6. Press the down arrow button until *POS . (POSITIVE GRADIENT)* appears on the display. This value controls the rate at which the temperature will increase.
7. Press the Menu/OK button to enable editing.
8. Use the up and down arrow keys to input the ramp rate, then press the Menu/OK button to confirm.
9. If it is necessary to set a ramp rate for cooling, then press the up and down arrow keys until *NEG . (NEGATIVE GRADIENT)* appears on the display. This value controls the rate at which the temperature will decrease.
10. Press the Menu/OK button to enable editing.
11. Use the up and down arrow keys to input the ramp rate, then press the Menu/OK button to confirm.
12. To return to the home display, press the return button to navigate back through the controller menus.

### Example:

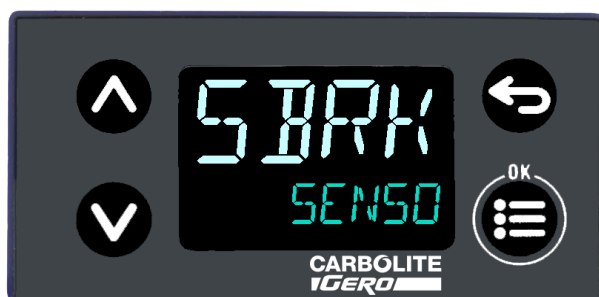
If the *FUNCTION* parameter is set to *PER MINUTE*, and the *POSITIVE GRADIENT* is set to *5 .000*, then the temperature will increase at 5°C per minute until it reaches the setpoint temperature.



## 2.2 Sensor Break

If the thermocouple breaks or becomes disconnected, then the controller will register a sensor break, and cut power to the heating elements.

The display will show *SBRK* and a scrolling *SENSOR BREAK* message.

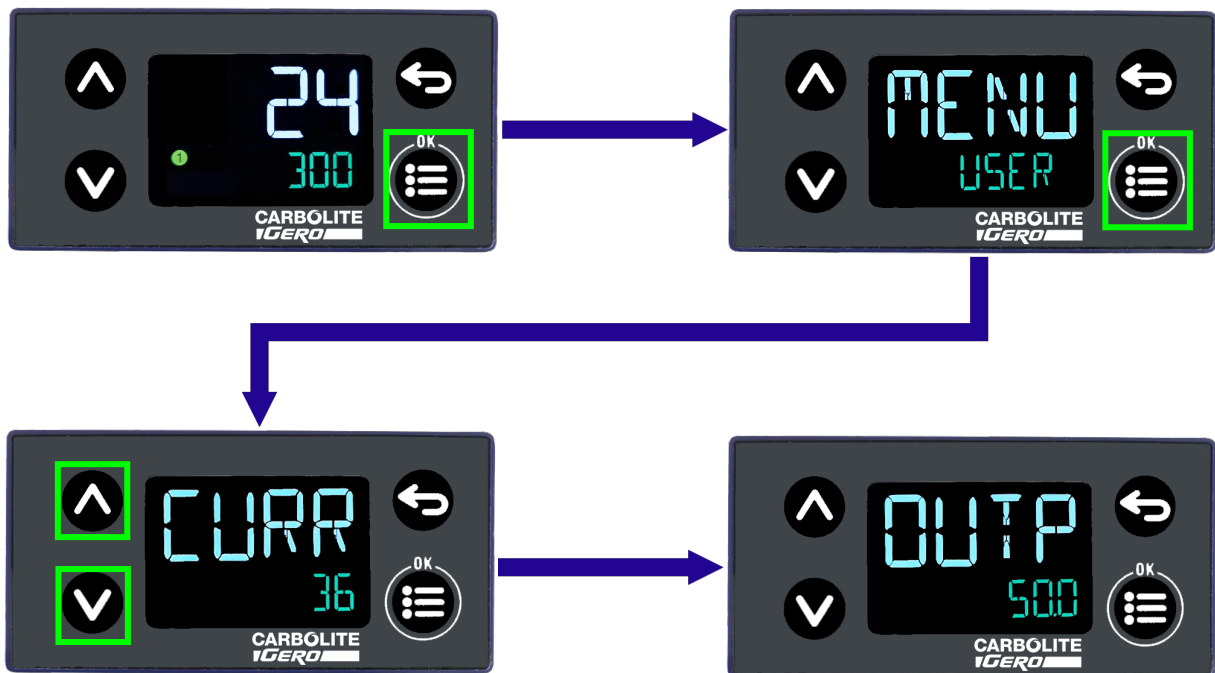


## 2.3 Working Output Power

During heating, the 132 controller displays the working output power of the product as a percentage value. It is referred to as *OUTPUT LEVEL DISPLAY*.

### To view the working output power:

1. Press the Menu/OK button to access the controller menu. The scrolling text on the lower half of the display should show *USER LEVEL*.
2. Press the Menu/OK button to access further information.
3. Press the up and down arrow buttons to scroll through and view the following information:
  - *CURRENT SETPOINT* (desired temperature)
  - *MEASURED VALUE* (actual temperature)
  - *OUTPUT LEVEL DISPLAY* (working output power)
4. To return to the home display, press the return button to navigate back through the controller menus.



### 3.0 Autotuning

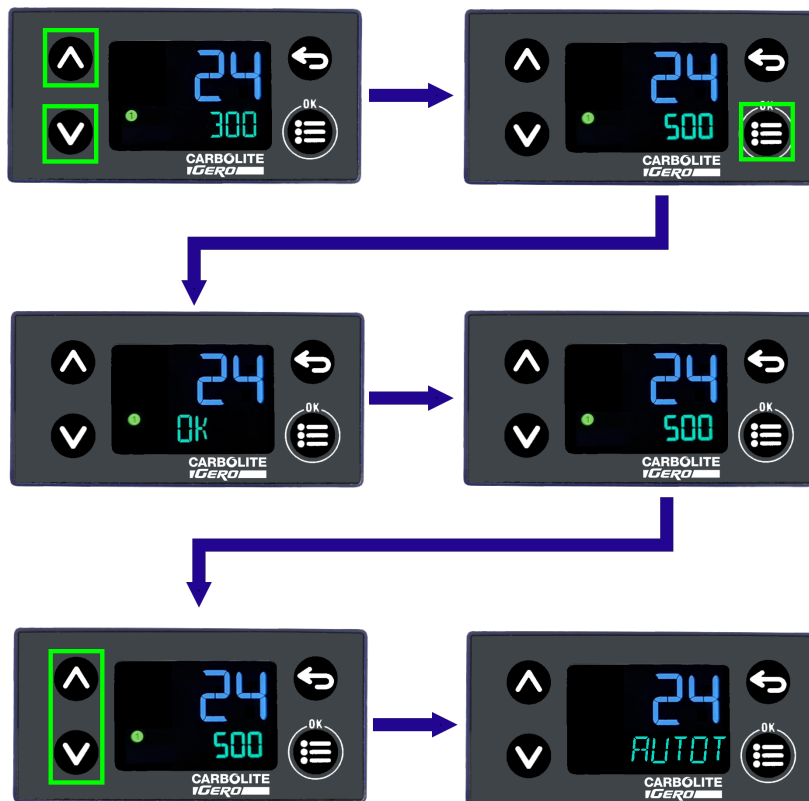
All Carbolite Gero products are preconfigured for optimum performance when used within their normal expected operating temperature range.

Depending on the intended application, it may be necessary for the product to be used outside of this normal range, in which case some tuning may be required in order to optimise the PID controls within the temperature controller e.g. if a high temperature product is to be used at a significantly lower temperature than it was originally designed for, or if a particularly heavy sample/load is to be heated.

#### To autotune the 132:

1. Enter the setpoint temperature that you wish to autotune the controller to e.g. 500°C.
2. From the home display, press and hold both the up and down arrow buttons (more than 5 seconds) until *AUTOTUNING ACTIVE* appears.
3. When the autotuning process is complete, the controller will return to the default home display.

**Note:** To cancel the autotuning process, press and hold both the up and down arrow buttons until the controller returns to the default home display.







ProductLabel

The products covered in this manual are only a small part of the wide range of ovens, chamber furnaces and tube furnaces manufactured by Carbolite Gero for laboratory and industrial use. For further details of our standard or custom built products please contact us at the address below, or ask your nearest stockist.

For preventive maintenance, repair and calibration of all furnace and oven products, please contact:

**Carbolite Gero Service**

Telephone: + 44 (0) 1433 624242

Fax: +44 (0) 1433 624243

Email: [ServiceUK@carbolite-gero.com](mailto:ServiceUK@carbolite-gero.com)

**Carbolite Gero Ltd,**

Parsons Lane, Hope, Hope Valley,  
S33 6RB, England.

Telephone: + 44 (0) 1433 620011

Fax: + 44 (0) 1433 621198

Email: [Info@carbolite-gero.com](mailto:Info@carbolite-gero.com)

[www.carbolite-gero.com](http://www.carbolite-gero.com)

**CARBOLITE**  
**GERO** 30-3000°C

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