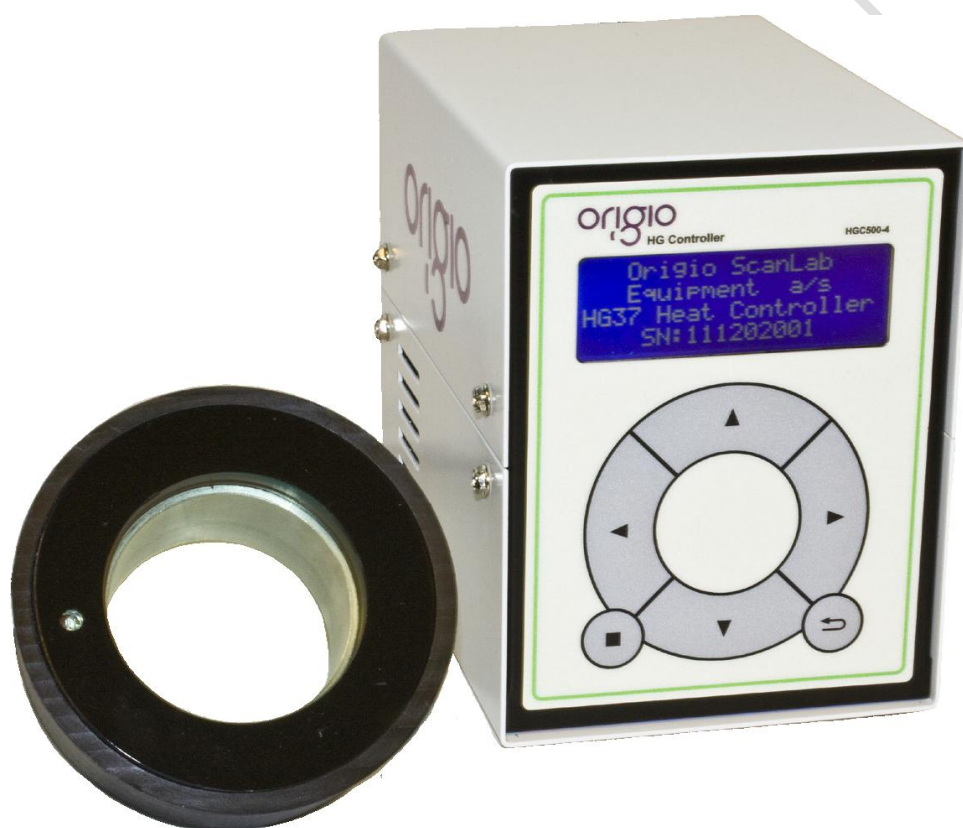


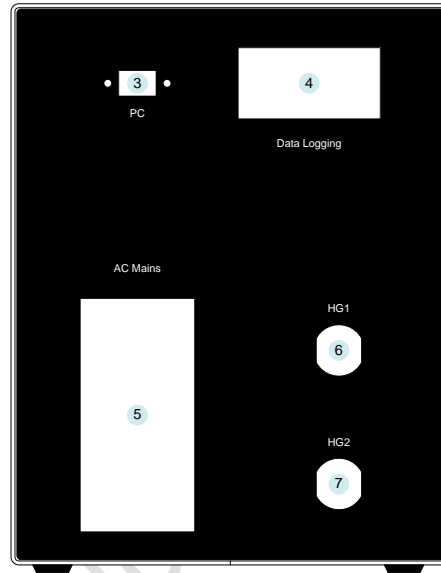
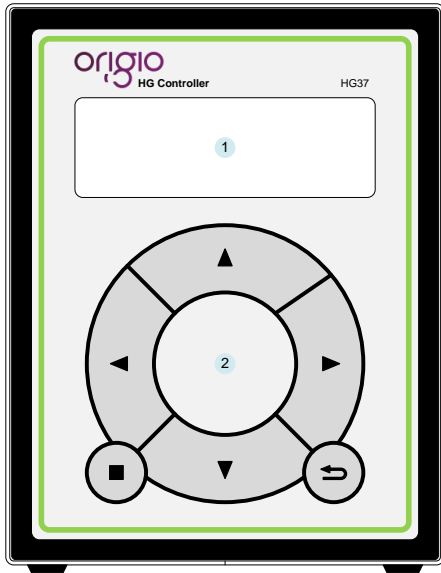
# Origio HG37 Heated Glass Stage Users Manual

Revision 2.00, Firmware Version 2.05, Hardware Version 2.01

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## Origio HG37 Component Description

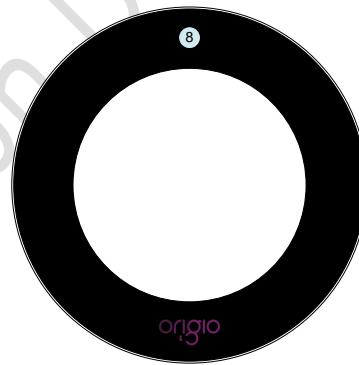


### Keypad

- ▲ - Arrow Left
- ◀ - Arrow Right
- ▶ - Arrow Up
- ▼ - Arrow Down
- ⊞ - Enter
- ⊞ - Escape

### Front/Back Panel

1. Display
2. Keypad
3. USB
4. USB Data Logging
5. AC Mains
6. Heated Glass 1 (HG1)
7. Heated Glass 2 (HG2)
8. Tri-State LED



Voltage	Frequency	Cable Terminator Type
200/240VAC	50Hz	IEC 3 PIN
120VAC	60Hz	IEC Class 1 3 PIN
200/240VAC	60Hz	IEC 3 PIN

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## 1. GENERAL INFORMATION

This manual contains information that is subject to copyright. All rights reserved. This manual should not be photocopied, otherwise copied or distributed, completely or in part, without the approval of ORIGIO Equipment.

This equipment conforms to the CE Low Voltage Directive.

There are **no user** serviceable parts in either the controller or Glass heater module and any service problems must be referred to Origio Equipment.

The controller unit must not be operated outside of the Sterile Workstation or in an environment that will bring it into contact with liquids.

The unit is designed to be powered from a mains electricity supply and it **must** be earthed via the incoming mains lead.

## 2. IMPORTANT INFORMATION

### 2.1. Safety Information

Before use the heated glass module must be connected to the controller supplied on a level surface designed to accommodate the heated glass.

No heated systems or hot containers must be placed on the glass surface when the controller is in operation.

The Control unit must be located on a level secure surface or in a custom made enclosure that is ventilated.

If the glass shows any signs of damage it must be disabled and disconnected from the controller.

### 2.2. Operational Characteristics

The heated glass will warm to Set Point temperature (SP) and is controlled by a proportional-integral-derivative controller (PID controller) with a generic control loop feedback mechanism (i.e. temperature sensor) and an auto tuning mechanism to acclimatize the glass heating to the operating environment within the power limitations of the controller. Manual tuning of the heating is also possible but must only be carried out by a qualified Origio technician.

Placing extremely hot or cold items on the glass should be avoided during normal operation. This includes touching the glass with your hands especially when performing the auto tuning and auto calibration operations.

There is a Tri-state LED fitted under the surface of the glass this will display the glass temperature status giving a clear indication if the surface temperature is within boundaries.

The controller case will get warm during operation and this is normal.

The operational characteristics of the glass heating system works by rotating the heat cycle in the glass surface keeping an even temperature without hot spots.

## 3. PRODUCT OVERVIEW

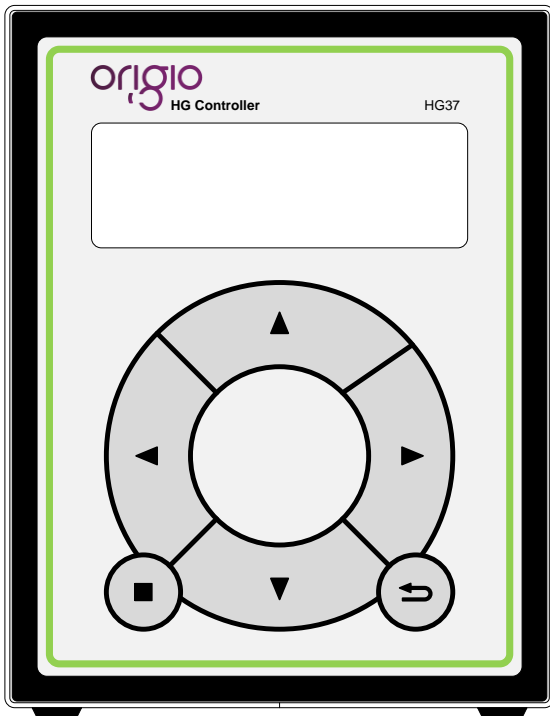
### 3.1. Product Hardware Description

The HG37 System consists of a control unit, the heated glass module and the interconnecting cable.

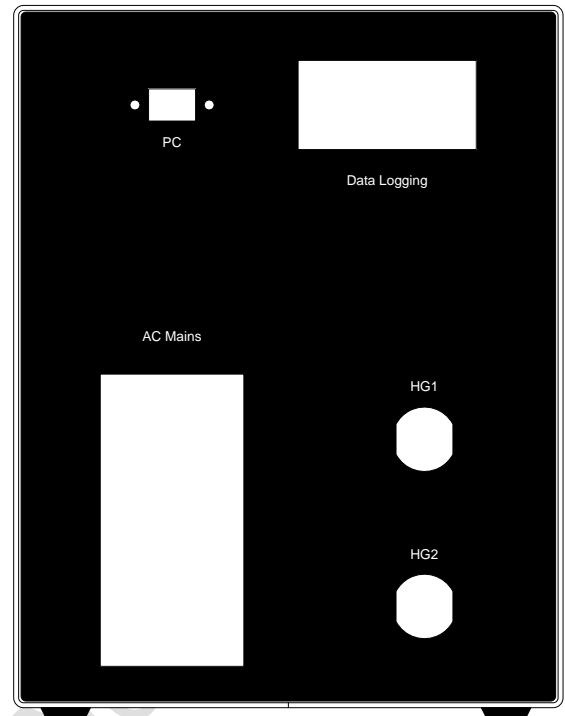
The control unit has a keypad mounted on the front to allow for user settings and data access.

The HG37 control unit is capable of controlling two heated glass modules.

The heated glass module is located in the surface of the sterile workstation with the interconnecting cable mounted under the station.



Control Unit Front



Control Unit Back

- 2 x Heated Glass module connectors HG1 (upper socket) and HG2.
- 1 x Mains input via IEC lead (fused) and main power switch.
- 1 x USB socket for data logging.
- 1 x Mini USB socket for maintenance

### 3.2. Product Operation description

The HG37 will power up by operating the on/off switch on the rear of the unit and as the controller powers up the first LCD screen will show Origio name and the controller model number and name. The second LCD screen will show Model Number, Serial Number, Hardware Version and Software Version. The third LCD screen will show Date, Time and Serial Number. The final LCD screen, which is the normal operation system status screen, shows PV (present value) temperature, SP temperature and status for HG1 and HG2.

The SP (Set Point) or operating temperature must be set before the glass module will begin to heat this will be set during manufacture to 37.00°C, however if there is the need to perform this it is described later.

Before normal operation can begin the controllers heating system must be tuned to the environment it is operating in and calibrated. This must be done for both HG1 and HG2 separately.

The glass modules will begin to warm up automatically. The LED on the glass will display a particular colour depending upon the temperature of the glass explained below.

There is an LED built into the glass surface displaying one of three colours depending upon the temperature/Operating state. The sequence and colour representation is as follows:

- Red = Temperature too high or in Program mode
- Blue = In Heating Mode
- Green = Temperature is ok and within tolerance

Once the glass has stabilised and the LED is constant Green the glass is ready to use however ensure all other surfaces are up to operating temperature before commencing working on the glass. Check the actual temperature on the HG37 controller display for the accurate glass temperature.

### 3.3. Product Performance Description

The Glass module is designed to provide and maintain a constant 37.00°C over the central 60mm Ø glass area to within +/- 0.01°C at a maximum ambient temperature of 36°C once calibrated and the sensor has a reaction time of 100 milliseconds.

The heat source is regulated by a microprocessor and employing a unique method of controlling the heat signature to ensure zero hotspots and an even temperature across the surface.

The temperature accuracy (maintained by the sensor) is +/- 0.01°C

The light transmission through the coated glass over the 400-1000 nm range is 90% to 95%.

### 3.4. Definition of Use

A heated glass surface to maintain a temperature of 37°C over an area of 0.2827 cm<sup>2</sup> to keep Petri dishes with liquid contents not exceeding 40°C and not being below 34°C.

### 3.5. Functions and Terminology Descriptions

#### 3.5.1. Describing the Present Value (PV)

The Present Value is the current temperature.

#### 3.5.2. Describing the Set Point (SP)

The set point (SP) is the temperature at which you wish the surface to be maintained (desired temperature).

#### 3.5.3. Describing the Auto Tuning (AT)

The auto tuner enables the controller to automatically tune its PID algorithm gain constants Kp, Ki, Kd and the heat cycle loop delay. These constants are reasoned by the number of temperature peaks, peak type, history of peaks, difference (error) between PV and SP, sample time, and adjusting the output power to the glass stage to achieve SP with minimal overshoot and oscillation.

The heat cycle delay is calculated by increasing it 1ms at a time when the previous temperature is larger than or equal to PV and max temperature reached is subsequently less than or equal to PV. This process is continued until PV is 0.20°C from SP. At this point the auto tuner starts to calculate the Kp, Ki and Kd values for the PID algorithm used by the HG37.

#### 3.5.4. Describing the Calibration Factor (CF)

The calibration factor is the value used by the internal processor to compensate for the actual temperature on the middle of the glass and the temperature read by the sensor on the outer rim of the glass.

#### 3.5.5. Describing the Auto Calibration (CL)

The auto calibration function automatically calculates the calibration factor with the use of a specially built calibration probe and the second glass heating channel. Both HG1 and HG2 have to be calibrated separately.

#### 3.5.6. Calibration Time

This is the user defined time period used by the controller to complete the auto calibration process; the recommended and therefore default value is 40 minutes to allow for safe temperature saturation of the glass, although in reality SP is achieved within 10/20 minutes.

#### 3.5.7. Alarm

The alarm sound can be enabled or disabled.

If enabled, after power up the alarm is temporarily disabled until it reaches set point (SP) for the first time and is indicated by the symbol "->" after the present value (PV) temperature for HG1 and HG2.

## 4. USER SETUP

### 4.1. Start up

Switch on the power to the controller as the boot sequence will begin.

ORIGIO Equipment

HG37V24B  
Heated Glass Stage

MN: HG37V24B  
SN: 201304270154  
HV: 2.01  
SV: 2.05

Date : 11-4-13  
Time : 08:42:18

SN : 201304270154

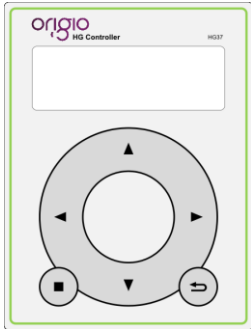
HG1 PV : 0.00 °C                      -> NC  
HG1 SP : 37.00 °C  
HG2 PV : 0.00 °C                      -> NC  
HG1 SP : 37.00 °C

### 4.2. Menu Access via the Keypad

**Important:** Do not use any sharp items on the keypad including pens or pencils.

On the front of the controller keypad press the following exact sequence:





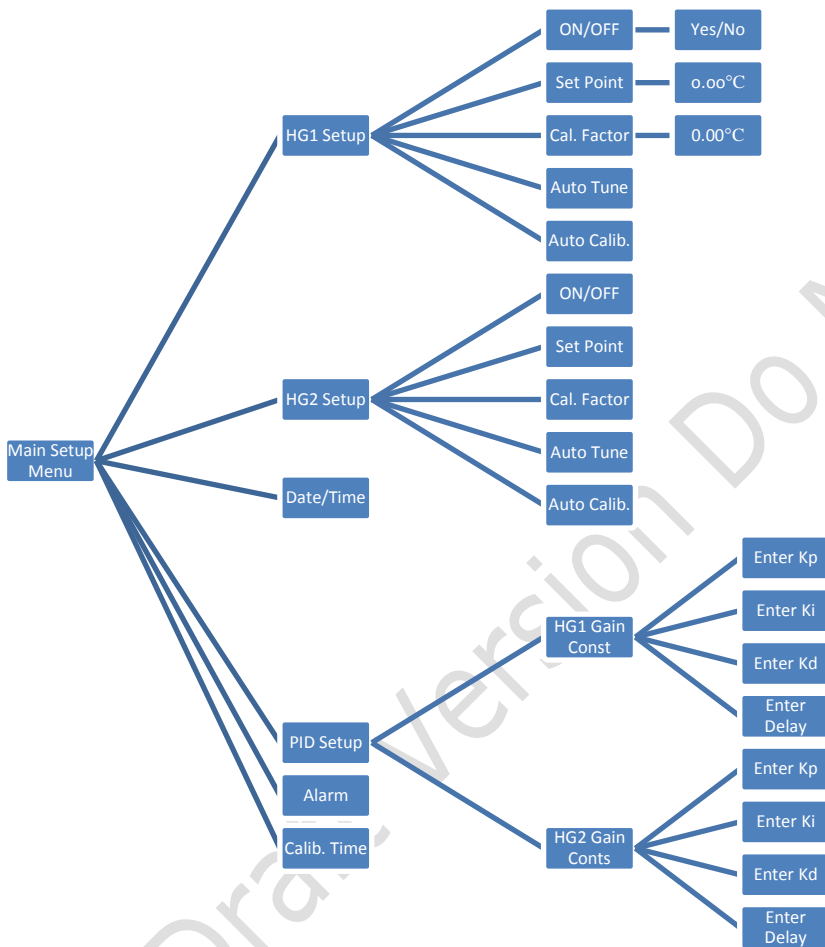
[Enter][Enter] shown on the keypad as

◻ = Enter (activate menu/accept selection)

⏪ = Escape (exit menu/return to previous menu item)

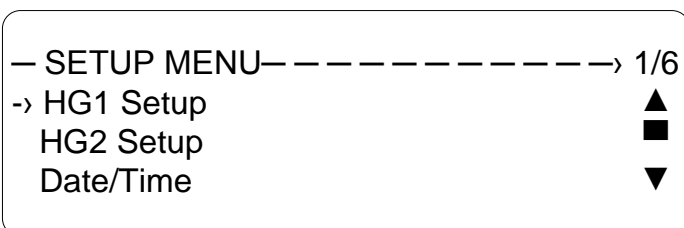
The key sequence must be entered within 1 second of each key press.

### 4.3. Menu Structure



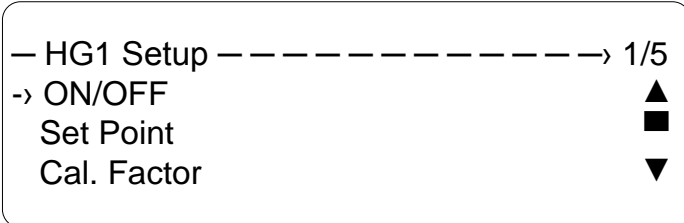
### 4.4. Enable/Disable HG1 and or HG2

Activate programming mode by pressing ◻ [Enter] ◻ [Enter] (x2) within the allowed time frame. This will take you into the setup menu below.



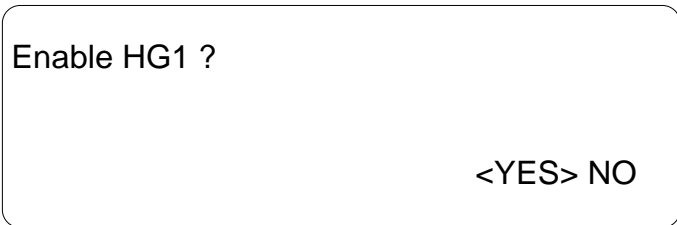
**Note:** that the LED on the glass is now RED indicating that the heating process has been suspended. Use ▲ [UP] ▼ [DOWN] arrow keys to select the desired glass to be setup i.e. "HG1 Setup".

Press ◻ [ENTER] to confirm selection, the following screen will appear.



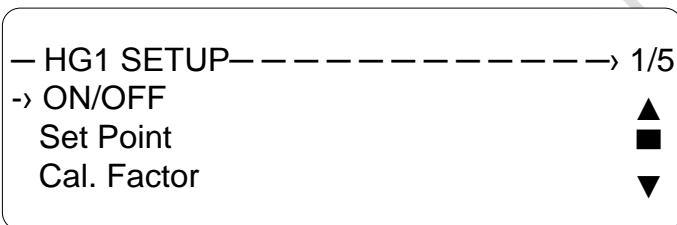
Use ▲ [UP] ▼ [DOWN] arrow keys to select "ON/OFF".

Press ◻ [ENTER] to select item, the following screen will appear.



Use ◀ [LEFT] ▶ [RIGHT] arrow keys to select between "YES" and "NO" to enable or disable HG1 and press ◻ [ENTER] to confirm selection.

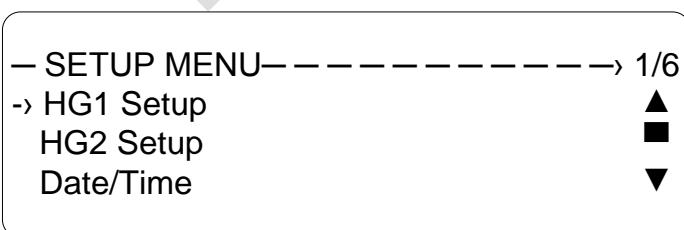
After confirmation the following screen will appear.



Follow the same procedure to enable or disable HG2.

## 4.5. Set Point (SP)

Activate programming mode by pressing ◻ [Enter] ◻ [Enter] within the allowed time frame. This will take you into the setup menu below.



Use ▲ [UP] ▼ [DOWN] arrow keys to select between "HG1 Setup" and "HG2 Setup".

Press ◻ [ENTER] to select desired setup glass, the following screen will appear.

```

- HG1 SETUP-----> 2/5
  ON/OFF
-> Set Point      ▲
  Cal. Factor     ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select "Set Point".

Press ◻ [ENTER] to confirm selection, the following screen will appear.

```

Enter SP Value :
(20.00 to 50.00 °C)
    
```

00.00

Use ◀ [LEFT] ▶ [RIGHT] arrow keys to select the digit to edit.

**Note:** that the cursor will highlight the selected digit.

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the value (0...9).

Once the required Set Point value has been entered press ◻ [ENTER] to confirm selection, the following screen will appear.

```

Your choice was :
    
```

37.00 °C

Press ◻ [ENTER] to confirm value, and to exit this section and the following screen will appear.

```

- HG1 SETUP-----> 2/5
  ON/OFF
-> Set Point      ▲
  Cal. Factor     ▼
    
```

## 4.6. Calibration Factor (CF)

Activate programming mode by pressing ◻ [Enter] ◻ [Enter] within the allowed time frame. This will take you into the setup menu below.

```
— SETUP MENU— -----> 1/6
-> HG1 Setup      ▲
    HG2 Setup      ■
    Date/Time      ▼
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select between "HG1 Setup" and "HG2 Setup".

Press ◻ [ENTER] to select desired setup glass, the following screen will appear.

```
— HG1 SETUP— -----> 1/5
ON/OFF           ▲
Set Point        ■
-> Cal. Factor    ▼
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select "Cal. Factor".

Press ◻ [ENTER] to confirm selection, the following screen will appear.

```
Enter CF Value :
(20.00 to 50.00 °C)

      00.00
```

Use ◀ [LEFT] ▶ [RIGHT] arrow keys to select the digit to edit.

**Note:** that the cursor will highlight the selected digit and if auto calibration was used it will show a value which is the difference in temperature on the middle of the glass and the temperature read by the sensor on the outer rim of the glass.

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the value.

Once the required Calibration Factor value has been entered press ◻ [ENTER] to confirm selection, the following screen will appear.

```
Your choice was :

      02.21 °C
```

Press ◻ [ENTER] to confirm value, the following screen will appear.

```

- HG1 SETUP-----> 1/3
  ON/OFF           ▲
  Set Point        ■
  -> Cal. Factor    ▼
    
```

## 4.7. Auto Tuning (AT)

Activate programming mode by pressing  [Enter]  [Enter] within the allowed time frame. This will take you into the setup menu below.

```

- SETUP MENU-----> 1/6
-> HG1 Setup       ▲
  HG2 Setup        ■
  Date/Time        ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select between "HG1 Setup" and "HG2 Setup".

Press  [ENTER] to select desired setup glass, the following screen will appear.

```

- HG1 SETUP-----> 2/5
  Set Point        ▲
  Cal. Factor      ■
  -> Auto Tune     ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select "Auto Tune".

**Note:** before selecting auto tuning make sure calibration factor value is set to 0.00°C else incorrect tuning will take place.

Press  [ENTER] to confirm selection, the following screen will appear.

```

HG1 PV : 28.20 °C      -> AT
HG1 SP : 37.00 °C
HG2 PV : 0.00 °C      -> NC
HG1 SP : 37.00 °C
    
```

The "AT" symbol indicates that auto tuning has commenced to deduce the required heat cycle delay and the PID gain constants  $K_p$ ,  $K_i$  and  $K_d$ . On completion of the auto tuning process, "AT" auto tuning in progress indicator will clear, if a USB key was inserted prior to starting auto tuning a data log can be obtained for temperature and a report for the auto tuning showing the calculated gain constants and heat cycle delay.

If auto tuning is activated without enabling the appropriate glass the following message is displayed.

Glass Not Enabled !

Press any key to return to menu.

**Note:** Both HG1 and HG2 have to be tuned separately. If both glasses are enabled the glass not being tuned is temporarily disabled and enabled after the tuning is complete. Before commencing the auto tuning process all environmental variables must be at normal operating state as the calculated gain constants vary depending on environmental variables. Moreover it is extremely important that the calibration factor is set to 0.00°C before commencing the auto tuning process.

Both HG1 and HG2 have to be tuned separately. If both glasses are enabled prior to starting the auto tuning process, the glass not being tuned is temporarily disabled during the process and enabled once complete.

### 4.8. Calibration Time

Activate programming mode by pressing [Enter] [Enter] within the allowed time frame. This will take you into the setup menu below.

```

-- SETUP MENU-- -----> 1/6
-> HG1 Setup      ▲
  HG2 Setup      ■
  Date/Time      ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select "Calib. Time".

```

-- SETUP MENU-- -----> 6/6
  PID Setup      ▲
  Alarm          ■
-> Calib. Time  ▼
    
```

Press [ENTER] to select "Calib" Time", the following screen will appear.

```

Enter Calib. Time :
(Minutes)
                40
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to increment and decrement "Calibration Time".

Press [ENTER] to confirm the new entry and exit to "Setup Menu", the following screen will appear.

```

-- SETUP MENU-- -----> 6/6
  PID Setup          ▲
  Alarm              ■
-> Calib. Time      ▼
    
```

The calibration time value only applies to the auto calibration process. The recommended default value is 40 minutes if starting from ambient temperature.

## 4.9. Auto Calibration (CL)

Activate programming mode by pressing  [Enter]  [Enter] within the allowed time frame. This will take you into the setup menu below.

```

-- SETUP MENU-- -----> 1/6
-> HG1 Setup        ▲
  HG2 Setup         ■
  Date/Time         ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select between "HG1 Setup" and "HG2 Setup".

Press  [ENTER] to select desired setup glass, the following screen will appear.

```

-- HG1 SETUP-- -----> 2/5
  Cal. Factor       ▲
  Auto Tune         ■
-> Auto Calib.     ▼
    
```

Use ▲ [UP] ▼ [DOWN] arrow keys to select "Auto Calibrate".

Press  [ENTER] to confirm selection, the following screen will appear.

```

HG1 PV : 28.20 °C      -> CL
HG1 SP : 37.00 °C
HG2 PV : 0.00 °C      -> NC
HG1 SP : 37.00 °C
    
```

The "CL" symbol indicates that auto calibration has commenced to deduce the required calibration factor. On completion of the auto calibration process, "CL" auto calibration in progress indicator will clear and the controller will revert to normal operation.

**Note:** The alarm must be disabled during the auto calibration process.

If auto calibration is selected without enabling the appropriate glass the following message is displayed.





Date :

15

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Date" value (1 to 31).

Press ◻ [ENTER] to confirm selection, the following screen will appear.

Month :

4

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Month" value (1 to 12).

Press ◻ [ENTER] to confirm selection, the following screen will appear.

Year :

13

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Year" value (11 to 99).

Press ◻ [ENTER] to confirm selection, the following screen will appear.

Hour :

21

Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Hour" value (0 to 24).

Press ◻ [ENTER] to confirm selection, the following screen will appear.

Min :

58

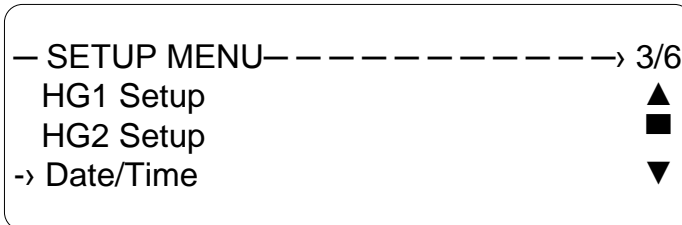
Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Minutes" value (0 to 59).

Press ◻ [ENTER] to confirm selection, the following screen will appear.



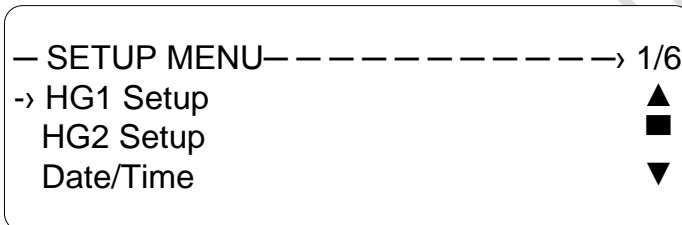
Use ▲ [UP] ▼ [DOWN] arrow keys to increment or decrement the "Seconds" value (0 to 59).

Press ◻ [ENTER] to confirm selection, the following screen will appear.

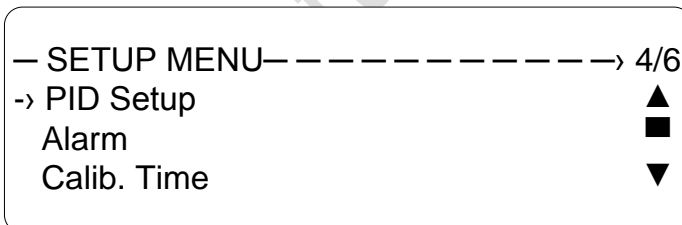


## 4.11. PID Setup

Activate programming mode by pressing ◻ [Enter] ◻ [Enter] within the allowed time frame. This will take you into the setup menu below.



Use ▲ [UP] ▼ [DOWN] arrow keys to locate "PID Setup".



Press ◻ [ENTER] to confirm selection, the following screen will appear.





continued until PV is 0.20°C from SP. At this point the auto tuner starts to calculate the Kp, Ki and Kd values for the PID algorithm used by the HG37.

Before initiating the auto tuning process it is imperative that calibration factor is set to 0.00°C, ambient temperature remains relatively constant, at normal operational state, and any other changeable environmental variables also remains constant during the process.

On completion of the tuning process, "AT" auto tuning in progress indicator will clear and normal operation will commence. However it is advised that before active use, the system is rebooted and the temperature log obtained to determine if correct tuning has taken place.

It is not possible for the controller to state success or failure of tuning due to its single generic feedback loop and dependency on environmental variables beyond its control.

Therefore it is imperative that a visual and or temperature data log check is carried out after completion of tuning. If the correct tuning constants have been deduced, temperature peak on reaching SP should be minimal. If the temperature peak is 1.00°C above SP then auto tuning has not been successful and auto tuning must be carried out again.

An acceptable value for the temperature peak must not exceed  $SP + 0.30^{\circ}\text{C}$  to  $0.50^{\circ}\text{C}$  and there must not be any oscillation in settling down to SP temperature.

It is also possible to manually tune the gain constants and the heat cycle loop delay however this is not recommended and must be carried out by an Origio certified technician.

Both HG1 and HG2 have to be tuned separately.

## 5.4. Calibration (setting up CF value)

It is important that, a). The room ambient temperature is stable and not above SP and b). The workstation surface has been allowed to saturate to a stable temperature.

It is also important that you do not turn off and on the HG37 during this procedure and the CF value is set at 0.00°C.

The glass can be automatically or manually calibrated, these procedures are described below.

### 5.4.1. Auto Calibration

The auto calibration function automatically calculates the calibration factor with the use of a specially built calibration probe and the second glass heating channel. Both HG1 and HG2 have to be calibrated separately.

The alarm function must be disabled and both heating channels enabled. The calibration time must be set to allow for temperature saturation of the glass. Recommended value is 40 minutes and the calibration factor set to 0.00°C

The symbol "CL" indicates auto calibration in progress and will clear on completion.

A conductance fluid must be used between the calibration puck (accuracy 0.01°C) and glass to guarantee optimal performance.

### 5.4.2. Manual Calibration Procedure 1 Glass Stage without Petri Dish

It is recommended that a memory stick is inserted into the USB socket and utilise the data logging facility to record the temperatures of the HG37. It is under normal use for quality control.

This setup and calibration procedure must first be performed without any Petri dishes or other objects on the heated glass stage.

Another important point is that the workstation is in its normal operational state, this is very important as it will affect the resulting exercise and render the setup ineffective.

After first switch on perform the following:

- Initially check Set point temperature is the desired value (37°C).

- Ensure Calibration factor is set at 0.00°C.
- Allow the unit to run and wait until the PV temperature stabilises approximately 40 minutes before taking any measurements.

Once the stabilised temperature has been achieved take a temperature reading at the centre of the glass and compare this temperature with the indicated temperature on the display of the HG37. The difference in both of these temperatures must then be entered into the HG37 as the Calibration factor and the unit allowed to reach a stabilised temperature and the indicated temperature should settle out to between  $SP - 0.02^{\circ}C$  &  $SP + 0.02^{\circ}C$ . Re test the glass centre temperature and ensure it as close as possible with the set point temperature. You may see slight fluctuations but the stable temperature will be whatever is displayed if there is a slight difference between the glass centre and displayed temperature you can adjust the calibration factor accordingly either up or down to achieve the correct temperature in the centre of the glass.

If possible the unit is allowed to run for a period and a second check made. During normal operation the displayed temperature will be stable however there may well be slight fluctuations as the control system performs checks during the cycling of the heating system.

### 5.4.3. Manual Calibration Procedure 2 Petri Dish in Situ

Following the above it is possible to adjust for Petri dish anomalies by placing a Petri dish with medium on the centre of the glass, this dish must be at a stable temperature and the medium must be at SP if this is not the case do not perform this operation.

Ensure the HG37 Set Point is at the desired value this is very important.

Once the medium and the dish have stabilised take the centre temperature in the dish and compare to the indicated temperature. The difference in this temperature should be entered as the Calibration factor after this has been set allow the dish to remain on the glass and again re take the temperature in the centre of the Petri dish medium. If there is a difference in the displayed temperature adjust this in the calibration factor.

You can analyse the recorded temperature on the memory stick data logging facility and this can be emailed to Origio Equipment if requested so we may interpret any issues you are experiencing with the calibration and temperature management of your samples.

#### Notes:

- In normal operation it is important to allow the HG37 to warm for approximately 1 hour to saturate to a stable temperature before use.
- If you place any medium at a lower temperature than  $37^{\circ}C$  on the glass stage you will have to wait for stabilisation, once a colder object is placed on the glass the controller will attempt to correct this temperature to the set point temperature ( $37^{\circ}C$ ).
- If you turn the power off to the HG37 or there is a power disruption you must turn the unit back on and allow to stabilise for correct operation
- When taking temperature reading on the glass surface ensure your probe is a surface contact probe and is held in place on the surface and not affected by environmental variables such as air flow. Fixing the probe to the glass with adhesive tape is not recommended especially where there is an air flow as the flow will cool the probe.

## 5.5. The LED Warning System

There is a tri state LED embedded in the glass surface. This will display either Red/Blue/Green the table below explains the light system:

Red	Warning Temperature Too High or in Programming Mode
Blue	In warming phase
Green	Set Temperature Achieved and is in Tolerance

## 5.6. Data Logging & Collection

### 5.6.1. What is Data Logging

Data logging is the recording of the actual temperature of the glass surface at a particular moment in time and this is synchronised by the inbuilt clock. This data can be used to check a period of activity to ensure consistent temperature was maintained

### 5.6.2. Setting up Data logging

To record/store data on the HG37 a formatted USB memory device must be inserted into the USB socket on the rear of the control unit with a minimum capacity of 4GB. The controller will automatically export temperature readings to the USB port creating a file on the device for each day and storing a text data file within it. If the memory device fills the controller will continue to maintain all temperatures but the logging will temporarily cease. The USB memory device will need to be cleared regularly and we recommend at a minimum weekly period if a 4GB device is used and to be reinserted into the USB socket to continue recording. When the USB memory device is inserted into the socket the data light will show green.

Warning: Only insert data logging device after power up and the controller shows the status screen shown below.

```
HG1 PV : 0.00 °C      -> NC
HG1 SP : 37.00 °C
HG2 PV : 0.00 °C      -> NC
HG1 SP : 37.00 °C
```

### 5.6.3. Interpretation of Data

The data format will be a text list created and ordered by time & date with the mean temperature for each glass connected HG1 & HG2 (if connected) and recorded at that moment. They must be viewed in WordPad or Excel and each record is a CSV in a single line per event. An example of the data is shown below:

12012012, 1045,1,36.89 which is ddmmyyyy, hh:mm, HG glass no: temperature

## 5.7. Cleaning & Care of the Glass and control unit

### 5.7.1. Surface Cleaning

The Heated glass surface must not be cleaned with abrasives of any kind and no mineral containing substances, Cleaners used must be designed for Glass or an alcohol based cleaner.

### 5.7.2. Glass Care

Never apply pressure to the glass or sharp metallic edges on the surface of the glass. Hot items placed on the heated area will also be detected and will shut down the heating cycle.

### 5.7.3. Control Box

The control box can be cleaned with a soft cloth only no liquids of any kind and only when the unit is isolated from the mains supply. Do not use any sharp items on the keypad including pens or pencils.

## 6. TECHNICAL SPECIFICATION

- Power Input, 200/240Vac/120vac via an IEC lead
- Current consumption of control & heater circuit, 1.5mA full load
- Fuse 5A a/c
- Operating Temperature 37°C
- Calibration Method, Offset
- Warm up to quiescence = 1Hour
- Earthed chassis with 3 wire mains lead
- Type A USB socket for data export via standard memory device
- The temperature accuracy (maintained by the sensor) is +/- 0.1°C over 40°C range
- The coated glass has a thermal conductivity of 1.1 W/m.K
- The light transmission through the coated glass over the 400-1000 nm range is 70-88%

### WARNING:

#### PAT (Portable Appliance Testing).

If this is to be carried out the internal control circuit must be disconnected. Please seek assistance before carrying out this type of test.

### Conformity:

Unit Conforms to CE Low Voltage Directive 2006/95/EC

For Technical Support Please Contact:

Contact Numbers:	

For Sales Support Please Contact:

Contact Numbers:	