Guardian 5000
Instruction Manual

Version History

Date	Version	Description
2024/8/22	A	• New Release

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1. Introduction

This manual contains installation, operation and maintenance instructions for OHAUS Guardian™ 5000 hotplate-stirrer. Please read the manual completely before using.

Applicable Products

This instruction manual is applicable to the following products:

- e-G52ST07C
- e-G52HP07C
- e-G52HS07C
- e-G52HS10C
- e-G52HSRDA

1.1. Safety Information

Definition of Signal Warnings and Symbols

WARNING	For a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	For a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data, or minor or medium injuries if not avoided.
Attention	For important information about the product. May lead to equipment damage if not avoided.
Note	For useful information about the product.

Warning Symbols

Caution

Explosion Hazard

Electrical shock

Caution, hot surface

Protective Conductor Terminal

Alternating Current

Safety Precautions

WARNING! The protection provided by the unit may be impaired if used with accessories not provided or recommended by the manufacturer, or used in a manner not specified by the manufacturer.

- Always operate unit on a level surface for best performance and maximum safety.
- DO NOT lift unit by the top plate.
- Disconnect unit from the power supply prior to maintenance and servicing.
- Spills should be removed promptly, after the unit has cooled down.
- Alkalis spills, hydrofluoric acid or phosphoric acid spills may damage the unit and lead to thermal failure.

- DO NOT immerse the unit for cleaning.
- DO NOT operate the unit at high temperatures without a vessel/sample on the top plate.
- DO NOT operate the unit if it shows signs of electrical or mechanical damage.
- Protective earthing of the equipment is achieved via connection of the provided power cord to a compatible grounded power outlet.

CAUTION! To avoid electrical shock, completely cut off power to the unit by disconnecting the power cord from the unit or unplugging from the wall outlet.

WARNING! unit is not explosion proof. Use caution when unit is on or when heating volatile materials.
WARNING! DO NOT use the unit in explosive atmospheres or with materials that could cause a hazardous environment from processing. Keep in mind the material blink point relative to the target temperature that has been set.

CAUTION! The top plate can reach up-to 550°C, DO NOT touch the heated surface. Use caution at all times. Keep the unit away from explosive vapors and clear of papers, drapery and other flammable materials. Keep the power cord away from the heater plate.

CAUTION! Beware of the following risks when heating:

- flammable materials
- low boiling point combustible substances
- glass breakage as a result of mechanical shaking power
- incorrect container size
- too much medium
- unsafe condition of container

Earth Ground - Protective Conductor Terminal

Alternating Current

1.2. Intended Use

This instrument is intended for use in laboratories, pharmacies, schools, businesses and light industry. It must only be used for processing materials as described in these operating instructions. Any other type of use and operation beyond the limits of technical specifications, without written consent from OHAUS, is considered as not intended.

This instrument complies with current industry standards and the recognized safety regulations; however, it can constitute a hazard in use.

If the instrument is not used according to these operating instructions, the intended protection provided by the instrument may be impaired.

2. Installation

2.1. Unpacking

Check that there's no damage occurred during shipment. Notify the carrier for the damages found at the time of unpacking.

Packing list:

- Hotplate-Stirrer / Hotplate / Stirrer Unit
- Power Cord
- Stir Bar (Not applicable for e-G52HP07C)

2.2. Selecting the location

Select a location that meets the following requirement to position the instrument:

- the location must be sturdy, flat and level.
- away from explosive vapors
- the surface on which the instrument is placed can withstand the typical heat produced by the instrument
- avoid locations that is difficult to disconnect the power cord during use.

2.3. Connecting Power

The instrument is supplied with a 3-conductor grounded power cord. It should be plugged into a matching standard grounded outlet.

If the cord supplied does not meet your needs, please use an approved power cord that has ratings equal or exceeding those of the originally provided cord and that complies with the local/national regulations of the country in which the equipment is to be used.

Attention:
Replacement of the plug must be made by a qualified electrician.

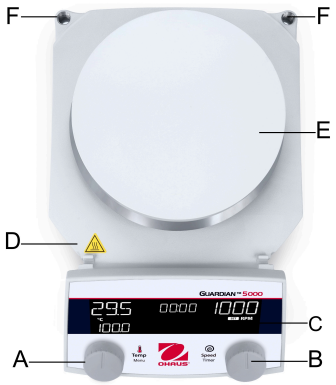
2.4. Switch On / Off

After the power is connected, the instrument will be ready for switch on. Flip the **Standby Switch** to switch On or Off the instrument.

3. Product Overview

This chapter gives a product overview of its construction, interface, control panel and display.

3.1. Product Structure



#	Controls	Functions
A	**Left Knob**[1]	Control temperature and Menu (and Timer for e-G52HP07C)
B	**Right Knob**[2]	Control speed and Timer (and Menu for e-G52ST07C)
C	**Display Screen**	Show operation status, parameters and menu settings
D	**Caution, Hot Surface Mark**	Hot surface warning
E	**Top Heating Plate**	Heat medium
F	**Accessory Rod Mounting Hole x 2**	Mount rod holders
G	**Standby Switch**	Switch ON / Off the instrument

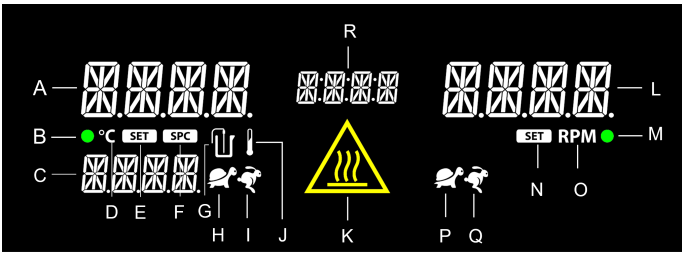
Note:

- 1 Not applicable to e-G52ST07C
- 2 Not applicable to e-G52HP07C

3.2. Interface

#	Description
H	**External Temperature Probe Port**
I	**RS232 Port**
J	**Power Entry Module**

3.3. Display



	Heating Display		General Display		Stirring Display
A	**Real-Time Temperature Display**	R	**Timer Display**	L	**Stirring Speed Display**
B	**Heating Indicator**			M	**Stirring Indicator**
C	**Set Temperature Display**			N	**Set Speed Icon**
D	**˚C Icon**			O	**Speed Unit - RPM Icon**
E	**Set Temperature Icon**			P	**Soft Acceleration Rate Icon**

	Heating Display	General Display		Stirring Display
F	**Single Point Calibration Icon**		Q	**Fast Acceleration Rate Icon**
G	**External Probe Connection Icon**			
H	**Soft Heating Rate Icon**			
I	**Fast Heating Rate Icon**			
J	**Set Temperature Limit Icon (SmartHeat™)**			
K	**Hot Top Indicator Icon**			

Attention:
The **Hot Top Indicator Icon** will illuminate when the top plate temperature is >= 40°C.
This icon will continuous to light up when the instrument is switched Off.

Attention: RUN DRY
The Run Dry alarm will be displayed and heating will be shut off, if a probe-controlled heating is running when probe tip not immersed in the heating medium, or sample level goes down due to evaporation.
Turn off the standby switch to clear the alarm.

Note:
RUN DRY protection is by default Disable.
To enable the function, enter Menu > SYS > RUN DRY > EN

4. Operations

This section covers topics and instructions of the instrument operation.

The topics would include:

Topics
Heating *(on page 7)*
Stirring *(on page 10)*
Timer Control *(on page 12)*
Single Point Calibration (SPC) *(on page 13)*

4.1. Heating

This section covers topics, including heating operation tips and instructions for heating operation. Proper heating operation is crucial in laboratory settings, where precise temperature control is essential for accurate experimentation.

Topic
Heating Operation Tips *(on page 7)*
Heating Operations *(on page 8)*

4.1.1. Heating Operation Tips

Measure the Sample Temperature

The temperature display on the unit represents the estimated top plate temperature, not the sample temperature. The vessel contents being heated may be at a lower temperature depending on the size and thermal conductivity of the vessel. It may be beneficial to monitor the temperature of the vessel contents and adjust the setpoint temperature accordingly.

When external probe is in use, the temperature display on the unit represents the sample temperature measured by the probe.

For precise sample temperature control, we recommend to use the Ohaus External Temperature Probe.

For details of working with Ohaus External Temperature Probe to measure sample temperature, please refer to Measure the Sample Temperature with Ohaus External Temperature Probe *(on page 9)*

Heating Overshoot

The unit may overshoot the temperature up to 10°C before stabilizing at the setpoint. The two methods to minimize overshoot are:

- Metal containers minimize overshoot.

Caution! When heating metal containers on a ceramic top plate, it is recommended to use the lowest temperature setting possible to limit thermal stress to the ceramic top plate.

- If a glass vessel is used, start with a temperature setpoint 5 to 10°C below the desired temperature. When the temperature stabilizes at this lower setting, increase the heater to the final temperature. Overshoot is then reduced to about 1°C.

4.1.2. Heating Operations

This section covers the following topics:

Topics
Start Heating *(on page 8)*
Adjust Temperature while Heater is On *(on page 8)*
Turn off the Heater *(on page 9)*
Measure the Sample Temperature with Ohaus External Temperature Probe *(on page 9)*
How to set Temperature Ramp Rate *(on page 9)*
Set a Heating Plate Temperature Limitation *(on page 10)*
Disable the Heating Function *(on page 10)*

4.1.2.1. Start Heating

1. Rotate the **Left Knob** to adjust the target temperature
2. Long press the **Left Knob** for 2 seconds to start heating.

When the heater is turned on:

- The **Heating Indicator** will be illuminated.
- Your will hear a beep sound (if the beeper is turned on).
- The **Heating Indicator** will blink when the temperature is ramping.
- The **Heating Indicator** will stop blinking when the temperature has reached the target.

4.1.2.2. Adjust Temperature while Heater is On

1. When the heater is on, rotate the **Left Knob** to adjust the temperature set-point.
2. Confirm the edit of temperature set-point
   - If Real-time Adjustment **RTA** is enabled (**EN**), temperature set-point is reset in real time. No other actions required to confirm the change.
   - If Real-time Adjustment **RTA** is disabled (**DIS**), after rotating the **Left Knob**, the **Set Temperature Display** will start to blink. Short press the **Left Knob** to confirm the edit.

4.1.2.3. Turn off the Heater

Long press the **Left Knob** and release the knob when you hear a beep sound, or release in 1.5 second.

When heating is stopped, the green light will fades.

4.1.2.4. Measure the Sample Temperature with Ohaus External Temperature Probe

1. Connect the external probe to the External RTD Probe Port on the rear side of the unit.
2. Adjust the temperature set-point, then long press the Left Knob to start.

Once the Ohaus External Temperature Probe is connected:

- The External **Probe Icon** on the screen will illuminate.
- The display will show the temperature of the sample measured by the external probe instead of the heating plate temperature.

Note:

The Hot top plate icon will still illuminate once the heater temperature reaches 40°C.

Attention: DO NOT plug or unplug the external temperature probe while the heater is on.

4.1.2.5. How to set Temperature Ramp Rate

1. Press and hold the **Left Knob** to enter the Menu.
2. Rotate the **Left Knob** to navigate to **TEMP RATE**.
3. Short press the **Left Knob**. The configuration sets of temperature ramp rate would start blink.
4. Select a desired option and short press **Left Knob** to confirm the setting. The options include:
   - **STD**
   - **FAST**
   - **SOFT**

   For details of temperature ramp options, please refer to SmartRate™ *(on page 16)*

4.1.2.6. Set a Heating Plate Temperature Limitation

1. Press and hold the **Left Knob** to enter the Menu.
2. Rotate the **Left Knob** to navigate to **TLIM**.
3. Short press the **Left Knob** to edit the temperature limitation. The digits will blink while editing.
4. Short press the **Left Knob** again to confirm the setting.

When the temperature limitation is adjusted:

- The temperature limitation icon will illuminate.
- The temperature limitation icon will blink when setting the temperature upto the limitation.

4.1.2.7. Disable the Heating Function

Heating function can be disabled for heating prohibited applications. Set Temperature Limitation (TLIM) to 0 to disable the heating function.

1. Press and hold the Left Knob to enter the Menu.
2. Rotate the knob to navigate to TLIM
3. Press the knob to edit the temperature limitation to "0". The digits will blink while editing.
4. Press the Left Knob again to confirm the setting.

When the heating function is disabled:

- The temperature limitation icon will illuminate.
- The temperature setting digits set would display 0.
- The heating function is always disabled even when the actual temperature is below Zero.
- When user attempts to start heating, both the temperature setting digits and the TLIM symbol will blink. And the timer won't work.

4.2. Stirring

This section covers topics, including stirring operation tips and instructions for stirring operation. Proper stirring operation is crucial in laboratory settings, where precise speed control is essential for accurate experimentation.

Topic
Stirring Operation Tips *(on page 10)*
Stirring Operation *(on page 11)*

4.2.1. Stirring Operation Tips

The stirrer increases speed at a steady rate until the set-point is reached. The stirrer may not be able to reach its setpoint for the following reasons:

- the stir bar may be too large.
- the liquid may be too viscous.
- the magnetic strength of the stir bar has reduced over time.

As the stirring speed will vary according to liquid viscosity, stir bar length, stir bar magnetic strength, and distance from top plate. Adjust one or all of these to achieve the desired stirring speed. For example: the closer the reaction vessel is to the top plate, the strong the magnetic connection between the unit and the stir bar.

4.2.2. Stirring Operation

This section covers the following topics:

Topics
Start Stirring *(on page 11)*
Adjust Speed while the Stirrer is On *(on page 11)*
Turn off Stirrer *(on page 12)*
How to set Stirring Ramp Rate *(on page 12)*

4.2.2.1. Start Stirring

1. Rotate the **Right Knob** to adjust the target speed
2. Long press the **Right Knob** for 1.5 seconds to start stirring.

When the stirrer is turned on:

- The **Stirring Indicator** will be illuminated.
- The unit will beep if the beeper is turned on.
- The **Stirring Indicator** will blink when the speed is ramping.
- The **Stirring Speed Display** will show the current speed and the target speed in a repeating cycle.
- The **Stirring Indicator** will stop blinking when the speed has reached the target.

4.2.2.2. Adjust Speed while the Stirrer is On

1. When the stirrer is on, rotate the **Right Knob** to adjust the speed set-point.
2. Confirm the edit of speed set-point
   - If Real-time Adjustment **RTA** is enabled (**EN**), speed set-point is reset in real time. No other actions required to confirm the change.
   - If Real-time Adjustment **RTA** is disabled (**DIS**), after rotating the **Right Knob**, the **Stirring Speed Display** will start to blink. Short press the **Right Knob**to confirm the adjustment.

Note:
For more details about RTA, please refer to Syetem - SYS *(on page 17)*.

4.2.2.3. Turn off Stirrer

Long press the **Right Knob** and release the knob when you hear a beep sound, or release in 1.5 second.

When stirring is stopped, the green light will fades.

4.2.2.4. How to set Stirring Ramp Rate

Navigation: **Menu** > **RPM RATE**

1. Press and hold the knob to enter the Menu.
2. Rotate the knob to navigate to **RPM RATE**.
3. Short press the knob. The configuration sets of temperature ramp rate would start blink.
4. Select a desired option and short press knob to confirm the setting. The options include:
   - **STD**
   - **FAST**
   - **SOFT**

   For details of speed ramp options, please refer to SmartRate™ *(on page 17)*

4.3. Timer Control

By default the Timer will be set to 00:00 and count upwards when the heating or stirring functions are turned on.

User can also set a Count-down Timer to specify a time for heating or stirring the samples. Once the set time is reached, the device will automatically switch off, ensuring that the samples are not overheated or over-stirred.

This section covers the following topics:

Topics
Set a Timer *(on page 12)*
Reset the Timer *(on page 12)*
Timer Starting Criterion *(on page 13)*

4.3.1. Set a Timer

To set a timer:

1. Short press the knob to enter timer configuration.

   The screen will display "HH:MM", and then minutes setting will start to blink.
2. Rotate the knob to set the "minutes" of timer. Then short press the knob to confirm.
3. Rotate the knob to set the "hours" of timer. Then short press the knob to confirm.

The timer is now adjusted. The screen will display the value of the timer.

4.3.2. Reset the Timer

To reset the timer

1. Short press the knob to enter timer configuration.
2. Press and hold the knob for 2-3 seconds, until the timer is reset to 00:00.

4.3.3. Timer Starting Criterion

Start the Timer as soon as Heating or Stirring is On

Set the Timer Start Setting (TMDE) to STD to start Timer when heating or stirring is switched on.

1. Press and hold the **Left Knob** to enter Menu.
2. Rotate the **Left Knob** and navigate to **SYS** > **TMDE**.
3. Select **STD**.

The Timer will start as soon as heating or stirring is switched on.

Start the Timer as soon as Heating Reached the Target Temperature

Set the Timer Start Setting (TMDE) to Temperature Dependent Mode (TEMP) to start Timer when reaching the target heating temperature.

1. Press and hold the **Left Knob** to enter Menu.
2. Rotate the **Left Knob** and navigate to **SYS** > **TMDE**.
3. Select **TEMP**.

The Timer will start when reaching the target heating temperature.

4.4. Single Point Calibration (SPC)

Proper temperature calibration is crucial for reliable experimental results and safety in laboratory settings. This section includes step-by-step calibration procedures.

> **Note:**
> Single Point Calibration (SPC) is not applicable to e-G52ST07C.

To perform the Single Point Calibration:

1. Navigate to **Menu** > **SPC** > **NEW**, then short press the **Left Knob** to enter.
2. Rotate the **Left Knob** to adjust SPC point.
3. Press and hold the **Left Knob** to start calibration.
   The unit will heat to the set temperature. The SPC icon **SPC Icon** will blink while calibration is running.

   > **Note:**
   > To abort calibration, turn off the unit by flipping the standby switch.

4. Once the unit has reached the calibration temperature, the **SPC Icon** and the calibration temperature will blink.
5. Rotate the **Left Knob** to input the temperature measured by a secondary temperature measurement device. Then short press the **Left Knob** to confirm.

Note:
If external probe is connected, use a reference temperature measurement device to measure the temperature of heated sample at the location of the external probe.

6. The unit will begin to regulate temperature with compensated error. When this is complete, you can:
   - **SAVE** - Retain calibration and back to the **Menu**.
   - **ADJ** - Return to step 5 to fine tuning the calibration.
   - **RJCT** - Cancel the single point calibration and return to the initial calibration menu.

5. Menu

5.1. Enter or Exit the Menu

Enter the Menu

Note:
Heating and Stirring need to be turned off to enter the Menu.

1. Press and hold the knob until Menu **Menu** is displayed.
   Menu would be displayed for 2 seconds, and then the first sub-menu will be displayed for configuration.
2. Rotate the knob to select sub-menu. Press the knob to enter the sub-menu.
3. Configure the settings
4. Press the knob to confirm the adjustment, and back to the Menu.

Exit the Menu

1. If in the sub-menu, rotate the knob to **BACK**, then press the knob to back to the Menu.
2. From the Menu, rotate the knob to Exit **EXIT**, then press the knob.

5.2. Menu Map

Menu	Sub-Menu	Refer to
TEMP RATE	• **STD** • **FAST** • **SOFT**	SmartRate™ - TEMP RATE *(on page 16)*
TLIM	Max °C - 0 °C adjustable	SmartHeat™ - TLIM *(on page 16)*
SPC	• **NEW** • **CLR**	Single Point Calibration - SPC *(on page 17)*
RPM RATE	• **STD** • **FAST** • **SOFT**	SmartRate™ - RPM RATE *(on page 17)*

Menu	Sub-Menu	Refer to
SYS	• Beeper **BEEP** • Timer Start Setting **TMDE** • Power Recovery **PWRR** • Reset **RSET** • Real-time Adjustment **RTA** • Run Dry Protection **RUN DRY** • System Version **V** 1.01[1] **Note:** 1 Example display of system version	Syetem - SYS *(on page 17)*

5.3. SmartRate™ - TEMP RATE

SmartRate™ "TEMP RATE" allows the user to change the increasing rate of temperature.

Mode	Icon
SOFT (Turtle Icon): Gentle heating rate to reduce temperature overshoot. Temperature ramping up time is longer than the Standard mode.	
FAST (Rabbit Icon) : Fast heating rate to shorten the temperature ramping up time. Temperature overshot will be larger than the Standard mode.	
STD (no icon displayed): Standard heating rate.	-

5.4. SmartHeat™ - TLIM

SmartHeat™ allows users to limit the maximum temperature of the heating plate for safety concerns regarding sample blink-point. Heating function can be disabled by setting the SmartHeat™ limit value at 0 ˚C. For details, please refer to SmartHeat™ *(on page 16)* Temperature Limit Icon will be displayed when a temperature limit is activated.	

5.5. Single Point Calibration - SPC

Menu Options	Definition
NEW	Set a new SPC point. Storage of SPC points: • Top Plate: 3 • External Probe: 3
CLR	Clear SPC point

Note:
For calibration procedures, please refer to Single Point Calibration (SPC) *(on page 13)*.

5.6. SmartRate™ - RPM RATE

SmartRate™ "RPM RATE" allows the user to change the accelerating rate of stirring.

Mode	Icon
SOFT (Turtle Icon): Gentle acceleration compare to the standard mode.	
FAST (Rabbit Icon) : Faster acceleration compare to the standard mode.	
STD (no icon displayed): Standard acceleration rate	-

5.7. Syetem - SYS

SYS Sub-menu	Definition	Options
BEEP	Set to enable or disable beeper.	• Enable **EN** (default) • Disable **DIS**
TMDE	Timer Start Setting controls the initiation of the timer in count or countdown situations	• STD **STD** (default): timer start when heating or stirring is on • Temperature dependent **TEMP**: the timer will start once the heater temperature or probe temperature reaches the set temperature in count or countdown situations
PWRR	If power has been disconnected, Power Recovery allows the unit to automatically start heater and stirrer functions again when power is returned.	• Enable **ON** • Disable **OFF** (default)

SYS Sub-menu	Definition	Options
RSET	Restore the instrument to factory settings.	• **YES** (long press the knob to confirm selection) • **NO**
RTA	Enable RTA (Real-time Adjustment), temperature and stirring speed will be adjusted in real-time. Disable RTA, the classic Guardian adjustment mode will be activated automatically.	• Enable **ENEN** (default) • Disable **DIS**
RUN DRY	Enable or disable RUN DRY protection.	• Enable **EN** • Disable **DIS** (default)
V 1.01[1]	Display of the current system version	--

Note:

1 Example display of system version

6. RS232

RS-232 serial port provides two-way communications for data logging and unit control by means of a PC and a suitable application program.

Setup

- Interface connections chosen in accordance with EIA standard RS-232
- Device Connector: RS-232 DB9 Female
- Recommended Cables:
  - DB9 M/M Straight Through Serial Cable
  - USB-A to RS-232 DB9 Straight Through Serial Adapter Cable
- Transmission Procedure
  - Asynchronous character transmission in start-stop mode
- Transmission Type
  - Full Duplex
- Character Format
  - Start Bit(s): 1
  - Character Bits: 8
  - Parity Bit(s): None
  - Stop Bit(s): 1
- Transmission Speed (Baud Rate): 9600
- Data Flow Control: Xon/Xoff
- Syntax
  - Instructions and parameters separated by space (0x20)
  - CR LF termination (0x0D, 0x0A)
  - Max length: 80 characters
- '<command> A' returned if the command is recognized; ‘L’ returned otherwise.

User Commands

RS232 User Commands	
ID <XXXX>	Set ID [1-9999] returns ID value [1-9999] if <XXXX> is blank
MODEL	Returns equipment model ID, e.g. e-G52HS07C
SERIAL	Returns production serial number
VERSION	Returns software revision

RS232 User Commands	
MODE	returns value: 0: Idle 1: Heating, Plate Controlled 2: Heating, Probe Controlled 3: Stirring 4: Heating (Plate) & Stirring 5: Heating (Probe) & Stirring 99: error
START_HEAT	Start heat function and timer
STOP_HEAT	Stop the heat function, reset timer if stir is not active
START_STIR	Start stir function and timer
STOP_STIR	Stop the stir function, reset timer if heat is not active
TARGET_TEMPERATURE <XXXX>	Set the target temperature value Returns the target temperature value if <XXXX> is blank
TARGET_SPEED <XXXX>	Set the target speed value Returns the target speed value if <XXXX> is blank
MEASURED_TEMPERATURE	Returns measured temperature value Returns both plate and probe values if in probe mode
MEASURED_SPEED	Returns measured speed value
TIMER	Returns current timer value
TIMER <HH>:<MM>:<SS>	Timer Mode = Count Down; Run end @ timer = HH:MM:SS
TIMER_RESET	**Mode = Idle:** Reset timer to 00:00:00 (count up) **Mode = running (1-5):** Reset timer to set value; timer continues counting from reset value.
LOCK	Lock user interface
UNLOCK	Unlock user interface
PARAM XXXX	XXXX = 0: Single parameter dump 0 < XXXX < 9999: Parameter dump every XXXX seconds. <TIMER [hh:mm:ss]>, <ID>, <MODE>, <TARGET TEMP>, <MEASURED TEMP>, <TARGET SPEED>, <MEASURED SPEED>, <ERROR CODE>,

7. Accessories

Item No.	Description
30973654	Probe PT100(A) -40~400C 25cm SS316/304
30500590	Probe PT1000(A) -40~400C 20cm SS316/304
30500592	Probe PT1000(A) -40~400C 25cm SS316/304
30973655	Probe PT1000(A) -40~400C 25cm Hastelloy
30500591	Probe PT1000(A) -40~200C 20cm PTFE
30500593	Probe PT1000(A) -40~200C 25cm PTFE
30304101	Interface Kit, RS232-USB
30304102	Interface Kit, RS232-Ethernet
30973298	Probe Holder Kit-1
30400145[1]	Ultra Flex Support Kit
30400146	Support Rod And Clamp Kit
30400147	Spinbar 2.5 cm PTFE
30400148	Spinbar 3.8 cm PTFE
30400149	Spinbar 7 cm PTFE
30400150	Spinbar 10 cm with Pivot Ring PTFE
30726783[2]	Spinbar with a Pivot 3.8 cm PTFE
30500598	Stir Bar Retriever
30392195	Clamp, Holder, CLC-CLMPHA
30500597	Vessel Clamp
30392314	Clamp, Specialty, Column, CLS-COLMNSS
30392315	Clamp, Specialty, Column, CLS-COLMNSM
30392316	Clamp, Specialty, Column, CLS-COLMNSL
30392317	Clamp, Specialty, Column, CLS-COLMNSX
30392318	Clamp, Specialty, Nester, CLS-NESTXS
30910731	Splash Shield for e-G52XX07C
30910732	Splash Shield for e-G52HS10C
30910733	Splash Shield for e-G52HSRDA
30910734	Silicone Cover for e-G52HSRDA
30500570	Base Plate 135 mm
30500571	Handles for Base Plate
30500572	Sectional Block 12 mm Vials
30500573	Sectional Block 15 mm vials
30500574	Sectional Block 17 mm Vials
30500575	Sectional Block 21 mm Vials
30500576	Sectional Block 28 mm Vials
30500577	Sectional Block 12 mm Test Tubes

Item No.	Description
30500578	Sectional Block 16 mm Test Tubes
30500579	Sectional Block 20 mm Test Tubes
30500580	Sectional Block 25 mm Test Tubes
30500581	Uni Block 12 mm Vials
30500582	Uni Block 15 mm vials
30500583	Uni Block 17 mm Vials
30500584	Uni Block 21 mm Vials
30500585	Uni Block 28 mm Vials
30500586	Uni Block 12 mm Test Tubes
30500587	Uni Block 16 mm Test Tubes
30500588	Uni Block 20 mm Test Tubes
30500589	Uni Block 25 mm Test Tubes
30392233[3]	Clamp, Specialty, Rod, CLS-RODS

Note:

- 1 30400145 needs a separate double clamp or hook clamp for securing on Guardian 5000
- 2 30726783 pack of 5 spinbars
- 3 30392233 is for use with the 30500570 Base Plate only
- Accessories are subjected to change.

8. Maintenance

Cleaning

WARNING: Electric Shock Hazard. Disconnect the equipment from the power supply before cleaning. Make sure that no liquid enters the interior of the instrument.

Attention: Do not use solvents, harsh chemicals, ammonia or abrasive cleaning agents.
The housing may be cleaned with a cloth dampened with a mild detergent if necessary.

Error Codes

Error Code	Description / Cause of Error	How to Fix
N/A	Unit fails to power on Missing or blown fuse	Not fixable by user, please contact OHAUS.
E1	Plate RTD Disconnected	Not fixable by user, please contact OHAUS.
E2	Plate RTD Error	Not fixable by user, please contact OHAUS.
E3	Stir Error	Flip the standby switch off and back on. If the problem persists, please contact OHAUS.
E4	Probe RTD Disconnected	Flip the standby switch off and back on. If the problem persists, please contact OHAUS.
E5	Probe RTD Error	• Flip the standby switch off, and remove the probe from the unit. Then, flip the standby switch on to return the normal operating mode. • If this does not solve the issue, replace the external probe or the main PCBA, and then try again. • If the problem persists, please contact OHAUS.
E7	User probe error. An External Probe is connected to the unit while heating is on.	Flip the standby switch off and back on. If the problem persists, please contact OHAUS.
E8	Plate over temperature	Not fixable by user, please contact OHAUS.
E9	Heating not working	Not fixable by user, please contact OHAUS.
E10	Triac Fault	Not fixable by user, please contact OHAUS.
AC Err	Mains frequency out of the range 40~55Hz (rating 50Hz) or 55~70Hz (rating 60Hz)	Regulate mains frequency within the range.

Technical Support Information

For technical issues, please speak to an Authorized Ohaus Service Agent. Please visit our website www.ohaus.com to find the Ohaus office nearest you.

9. Technical Data

9.1. Conditions

The technical data is valid under the following conditions:

Indoor Usee Only	
Altitude:	0 to 2000m
Operating temperature:	5 to 40˚C
Storage temperature:	-20 to 65˚C
Operating humidity:	20 to 80% relative humidity, non-condensing
Storage Humidity:	20 to 80% relative humidity, non-condensing
Electrical Supply:	100 - 120V ~, 1-15A, or 220 - 240V ~, 1-10A. (Depending on the models)
Voltage fluctuations:	Mains supply voltage fluctuations up to ±10% of the nominal voltage.
Overvoltage category (Installation category):	II
Pollution Degree:	2

9.2. Specifications

	Guardian 5000-2nd Generation				
Model No.	**e-G52HSRDA**	**e-G52HS10C**	**e-G52HS07C**	**e-G52HP07C**	**e-G52ST07C**
Function	Heating and Stirring			Heating	Stirring
Top Plate Size	Ø 5.3 in / 13.5 cm	10 x 10 in / 26 x 26 cm	7 x 7 in / 18 x 18 cm		
Top Plate Material	Ceramic Coated Aluminum	Ceramic			
Control	Digital				
Display	115 x 30 mm White Character LCD				
Timer	1 minute to 99 hours 59 minutes				
Temperature Range	Ambient + 5°C – 360°C	Ambient + 5°C – 500°C	Ambient + 5°C – 550°C		--
Set Temperature Increments	0.5°C				--
Temperature Readability	0.5°C				--
Temperature Stability[1]	+/-1% Plate, below 100°C +/-1°C +/-0.5% Probe, below 100°C +/-0.5°C				--
Temperature Calibration (SPC) Set Points	3 points for Plate 3 points for Probe				--
Probe Connection	PT100, PT1000 (Class A)				--

	Guardian 5000-2nd Generation				
Model No.	**e-G52HSRDA**	**e-G52HS10C**	**e-G52HS07C**	**e-G52HP07C**	**e-G52ST07C**
Probe Temperature Measurement Accuracy	±0.2°C + PT1000 (Class A) Tolerance[2]				--
Heating Power	600W at 120V 656W at 230V (600W at 220V)	1650W at 120V 2066W at 230V (2136W at 240V)	1582W at 120V (1050W at 110V) 1050W at 230V		--
SmartHeat™	User is able to adjust Set Temperature upper limit of the Top Plate, from 0°C to Rated Max Temperature				--
Speed Range	50 - 1800 rpm			--	50 - 1800 rpm
Speed Stability[1]	+/-2%			--	+/-2%
Stirring Capacity	20 L H2O	22 L H2O	20 L H2O	--	20 L H2O
SmartRate™	User is able to select the speed or temperature ramping rate				
Data Logging & Remote Control	built-in RS232 optional RS232-USB interface kit optional RS232-Ethernet interface kit				
IP Rating	IP32				
Housing	Painted Aluminum				
Dimensions (L x W x H)	259 x 175 x 108 mm 10.21 x 6.87 x 4.26 inch	402 x 287 x 118 mm 15.84 x 11.28 x 4.65 inch	329 x 221 x 116 mm 12.94 x 8.69 x 4.56 inch		
Working Environment	41°F – 104°F, 80%RH, non-condensing / 5°C – 40°C, 80%RH, non-condensing				
Net Weight	5.7 lb / 2.6 kg	14.8 lb / 6.7 kg	10.1 lb / 4.6 kg	8.6 lb / 3.9 kg	9.9 lb / 4.5 kg
Electrical (50/60Hz)	100-120V, 8A 220-240V, 4A	100-120V, 15A 220-240V, 10A	100-120V, 15A 220-240V, 7A		100-120V, 1A 220-240V, 1A

Note:

[1] Conditions permitting. Variations in temperature and speed measurement processes, vessel, ambient and sample will impact actual performance. To improve temperature accuracy of the system use the Single Point Calibration feature.

[2] PT1000 Class A Tolerance: ±(0.15°C + 0.002×T°C), T is Set Temperature

10. Compliance

Compliance to the following standards is indicated by the corresponding mark on the product.

Mark	Standard
CE	This product complies with the applicable harmonized standards of EU Directives 2011/65/EU (RoHS), 2014/30/EU (EMC) and 2014/35/EU (LVD) The EU Declaration of Conformity is available online at www.ohaus.com/ce.
UK CA	This product complies with the applicable statutory standards of the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, UK Electromagnetic Compatibility Regulations 2016 and Electrical Equipment (Safety) Regulations 2016. The UK Declaration of Conformity is available online at www.ohaus.com/uk-declarations.
	This product complies with the EU Directive 2012/19/EU (WEEE). Please dispose this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. For disposal instructions in Europe, refer to www.ohaus.com/weee.
	EN 61326-1
TÜV SÜD C US	CAN/CSA-C22.2 No. 61010-1, CAN/CSA-C22.2 No. 61010-2-010, CAN/CSA-C22.2 No. 61010-2-051
	UL 61010-1, UL 61010-2-010, UL 61010-2-051

ISED Canada Compliance Statement:

CAN ICES-003(A) / NMB-003(A)

ISO 9001 Registration

The management system governing the production of this product is ISO 9001 certified.

11. Limited Warranty

OHAUS products are warranted against defects in materials and workmanship from the date of delivery through the duration of the warranty period. During the warranty period OHAUS will repair, or, at its option, replace any component(s) that proves to be defective at no charge, provided that the product is returned, freight prepaid, to OHAUS.

This warranty does not apply if the product has been damaged by accident or misuse, exposed to radioactive or corrosive materials, has foreign material penetrating to the inside of the product, or as a result of service or modification by other than OHAUS. In lieu of a properly returned warranty registration card, the warranty period shall begin on the date of shipment to the authorized dealer. No other express or implied warranty is given by OHAUS Corporation. OHAUS Corporation shall not be liable for any consequential damages.

As warranty legislation differs from state to state and country to country, please contact OHAUS or your local OHAUS dealer for further details.