Contents

 Warning: The instrument can not provide the designed protection for operators who do not follow the right procedures and requirements given by the manufacturer.

 Warning: All solutions must be handled with care according to the lab's safety regulation. Please make a reference to the related material safety data sheet. Wear the lab-gown, goggle and rubber gloves all the time. Be care of hot reagents.

 Warning: Be aware of the risk of electric shock. Only the trained professionals are permitted to open the face panel or back cover.

 Notes: Please make sure that the water, electricity and gas sources of the instrument are turned off after the experiment is completed.（Please operate according to the actual situation!）

I. Introduction

1. Application

Hanon SH220F Graphite Digester, adopted with global advanced technology,is characterized by its fast digestion, high efficiency and accuracy, It can achieve linear or curve heating raise type both. And it also can store 10 methods,the the heating gradients are up to 5. PID temperature controlling is more stable and accuracy. It is applied to agriculture, forestry, environmental protection, chemical industry, food industry, pharmaceutical industry, biochemistry as well as higher education institutions and scientific research departments for sample digestion prior to sample chemical analysis of soil, food, forage, plants, seeds and ores. It is more applicable to combined use with Hanon Kjeldahl Apparatus. It made of high quality and purity graphite by casting and processing, this instrument is featured by its advantages, including resistance acid and alkali, good thermal conductivity, low temperature difference between holes, large heating area for test tube and quick heating up. These advantages assist sample digestion.

2. Principle

The desired output temperature can be determined by controlling the infrared heating tube in the graphite block via PID temperature controlling program, which is corresponding to the inputted value of temperature.

3. Features

(1) Continuously adjustable temperature in the furnace, constant temperature under control, ease of operation.

(2) Linear or Curve heating raise

(3) Simultaneous digestion of 20 samples improves working efficiency considerably.

(4) Low average temperature difference, ideal uniformity of sample digestion, high efficiency of thermal conductivity.

(5) Designed for corrosion resistance, strong acid and alkali resistance of the complete machine surface.

(6) The complete machine is provided with a series of protection against overvoltage, overcurrent and overheating.

(7) Uniform heating all over the sample prevents heat loss to the greatest extent possible.

(8) Treated with special antioxidation process, service life of the graphite block is extended and temperature difference between holes in the furnace gets lower.

(9) Real time man-machine interaction, output is cut off at the end of experiment.

II. Main specifications

1. Technical specifications

(1) Temperature control range: Room temperature +5℃～450℃；

(2) Temperature control accuracy: ±1℃；

(3) Digestive duct: 300 mL（full charge H_2O 20℃）；

(4) Positions: 20 positions；

(5) Thermal insulation material: environmentally friendly fiber and unique air duct insulation technology.

(6) Power supply: 220 VAC±10% 50Hz；

(7) Rating power: 3.6 KW；

(8) Boundary dimension: 515mm×421mm×211mm；

(9) Net weight: 25 kg；

(10) Range of time setting: 00（hr.）:00（mins.）—23（hr.）:59(mins.)

2.Working condition:

(1) To be placed where ventilation condition is favorable, such as fume cupboard;

(2) Input voltage：AC 220V ±10% 50Hz；

Air switch, leakage protection switch and reliable ground wire shall be equipped.

Attention:

1. Do not touch the platform when the heating operation is going on.
2. Do not splash liquid inside the instrument.
3. Do not cover the instrument when the heating operation is going on.
4. Do not leave the instrument unattended when the heater is in operation.
5. Keep the inflammable, explosive or temperature-sensitive reagents away from the heater.
6. Using the instrument in the unsafe environment is strictly prohibited.

III. Name of parts

1. Structure

(Fig.1)

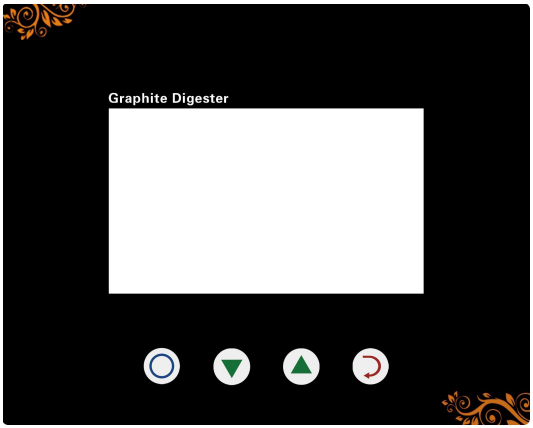
（1）Digestion platform （2）Control panel （3）Power switch

(Fig.2)

（4）Overload protector （5）Power line

IV. Operation

1. Control panel



(Fig.3)

Instruction of control panel

1. Display window

To display measured temperature or various prompts based on the state of the instrument.

2.【Return key】 

a. Return to heating set interface,

b. Press for 5 seconds until it turns to system set interface.

3.【Function key】 

Set values and alter timing mode.

4.【Shift key】 

Circular shift of the cursor to the right.

5.【Enter key】 

Press this key to confirm the work to be implemented or the operation involved.

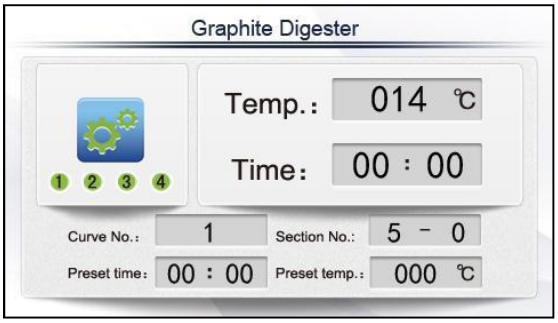
2. Operation

2.1 Dynamic booting interface

(Fig.4)

2.2 Heating set interface

2.2.1Curve heating interface



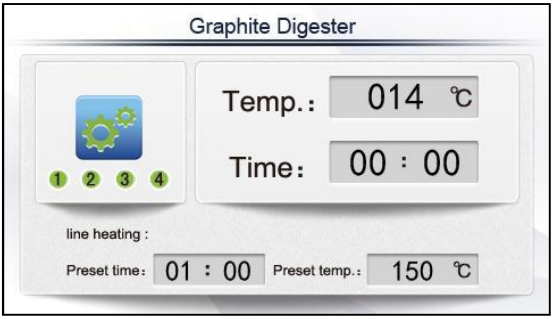
（Fig. 5）

Automatic default display of the heating set interface shall be entered after booting (Fig. 5).

Curve heating interface is automatic defaulted

In the interface Fig.5, The preset method is on the interface are same as last operation. You may directly enter the heating-on interface if no change is required. Or, click “function”key for new setting, or selecting.

2.2.2 Linear heating set interface

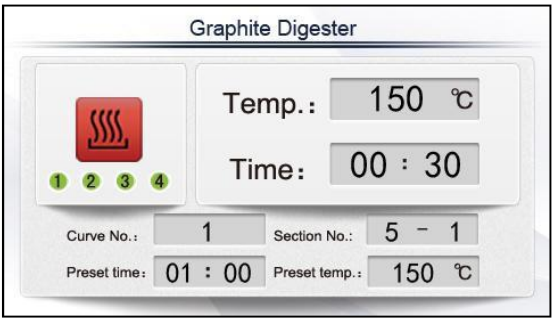


（Fig. 6）

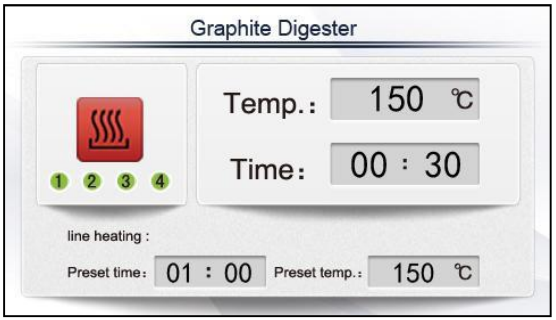
The preset time and temperature on this interface are both the values set in last operation. You may directly enter the heating-on interface if no change is required.

In case the preset time and temperature values are required to be changed, press shift key and function key for set. Press Enter key for heating-on interface.

2.3 Heating running interface



(Fig.7)

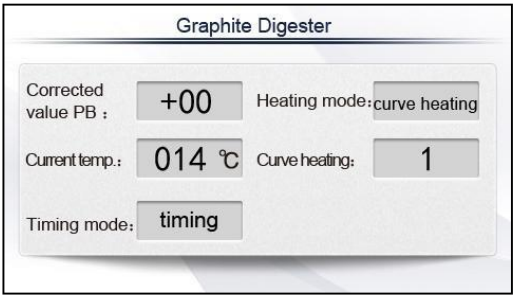


（Fig.8)

 Displays state of heating tube, if it abnormal:  .

When heating time is up, it displays “Time setting is up”, and the buzzer makes sound. Press Enter key for heating set interface, and the buzzer stops making sound.  Fault with the instrument appears, the temperature exceeds the set value over 30 degrees. An alarm is given, the instrument stops heating automatically and returns to the preset temperature.

2.4 System set interface



（Fig.9)

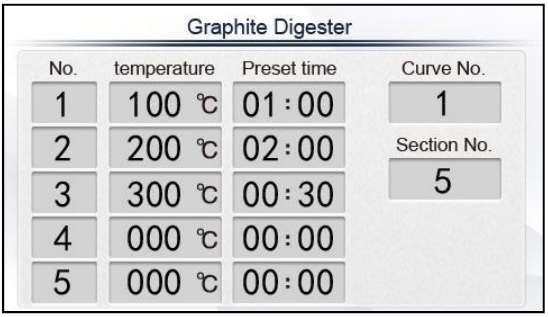
a、Long press Return key until it turns to system set interface.

b、Corrected value PB（-10—10）is the difference between the temperature measured by the system and the actual temperature of the digestion platform. Temperature may be set for correction. The first place is for +-, and the second and third places are for value.

c、Timing modes appear in two types: count up timing and count down timing. For count on timing, the time on the heating-on interface (Fig. 6) increases progressively from zero by minutes; for count down timing, the time on the heating-on interface (Fig. 6) decreases progressively by minutes from the setting time value.

d、Heating type including curve heating or linear heating

e、Serial number can be edited on curve heating set, selecting the serial number, click “OK” for visiting heating set interface, for setting the temperature point and time for different temp gradients. Click “back” for backing system set interface.



（Fig.10)

2.5 Hidden interface for timing point setting:

In connection with timing mode, you may long press Enter key for 5 seconds and go to either of the two interfaces. For one interface, timing starts immediately when the temperature begins rising; for the other one, timing starts when the temperatures goes up to the setting value. Press the Up Arrow key for setting. When the setting is over, press Shift key to return to the system set interface for the normal state.

3. Operation procedures

(1) Switch on the external power supply and turn on the power switch for the instrument;

(2) Set the required temperature and heating time period by the control panel and press Enter key;

(3) After completion of the experiment, switch off the power supply for the instrument and wait for cooling.

V. Common problems and trouble shooting

Faults	Causes	Solutions
No power for the complete machine	Burn of the fuse Internal fault	Replace with the spare fuse Claim for repair
Abnormal indication of the temperature	Sensor damaged Poor contact of the wire	Replacement is necessary Check the circuit
Indication of damage of the heating duct	Heating element damaged	Replacement of the accessory is needed

VI. Appendix

6.1 Declaration

This product has a 1 year warranty for the complete machine after the date of sale (subject to the invoice date), except for the following items:

1 Expiration of the warranty period;

2 Damages of the instrument arising from misuse;

3 Damages due to disassembly at discretion rather than under authorization of the manufacturer;

4 Damages of the instrument caused by improper transportation or storage.

6.2 Safety instructions

This section serves as safety instructions regarding use of the instrument in the user manual, including safety operation and warning of dangers in use.

Please read carefully the provisions as follows. In the event of negative effects arising from imprudent implementation of the following provisions, the customer shall take the responsibility.

6.3Operators shall follow the requirements strictly

This instrument will produce high temperature on the shell in operation and strongly corrosive liquid, such as strong acid applied in digestion may bring some danger. Thus the operation shall only be performed by the specialized personnel in the laboratory or the trained professionals. Training and operation shall be carried out seriously in accordance with this manual.