

DS-360 Digestion System

FCC ID: WTTSISPDS-360

INSTRUCTION MANUAL

China National Analytical Center, GuangZhou

GuangDong Institute of Analysis

NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and**
- (2) this device must accept any interference received, including interference that may cause undesired operation.**

To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with minimum distance 20cm between the radiator and your body. Use only the supplied antenna without any modification.

Foreword

Thank you for purchasing of DS-360 Graphite Digestion System, this instrument is used for sample preparation in department of inorganic analysis, according to EPA method. Because sample preparation has some dangers, the operator should has professional knowledge and read this entire manual carefully before operating instrument.

NOTICE:

1. Safety: Different kinds of acid like hydrochloride, nitric acid, hydrofluoric will be used for sample preparation. Most of acid are volatile and harmful to health, so operating instrument in ventilated environment is recommend, various corresponding protective measures must be taken. When use digestion reagent contained HClO_4 , quantity of HClO_4 and digestion temperature must be controlled carefully, then operation security could be guaranteed, otherwise fire and explosion hazards could be created
2. Operation: Operating instrument in the environment which is specified in this manual. When the instrument is not in use, unplug the plug. When clean the dirt on the surface of graphite block, wiping with soft cloth, don't use organic solvent as possible and don't destroy the coat on the surface.
3. Storage: The instrument is not in use for a long time, store in the environment which is specified in this manual.

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1. Application and Feature

DS-360 graphite digestion system is a constant temperature equipment used for all kinds of samples preparation by heating, controlled by microprocessor. Built in Bluetooth interface, operator can control it from a long distance by PDA. Any rebuilding measures like boring needn't to be applied to the fume hood of lab. This instrument has the characteristics of simple structure, high reliability and performances, easy operation. Multiple anticorrosion design ensure it can adapt to all kinds of wicked environment. It can be widely used in analysis of biology, chemistry, environment protection and other area of industry.

Bluetooth modular parameters of the Digestion System:

Number of Channels: 79 Channels

Channel Separation: 1 MHz

Type of Modulation: FHSS (Frequency Hopping Spread Spectrum)

Dwell time: The Dwell time in hybrid mode is approximately 2.6 ms (in a 12.8s period)

Antenna Type: Integral

Power Supply: DC 3.3V

2. Instrument Structure, Specification, Installation

The standard package of product include two cases, one is instrument case, the other is accessory case. Packing list in each case.

2. 1 Schematic Diagram of Instrument Structure

Outside View:



Figure 2.1: Outside View

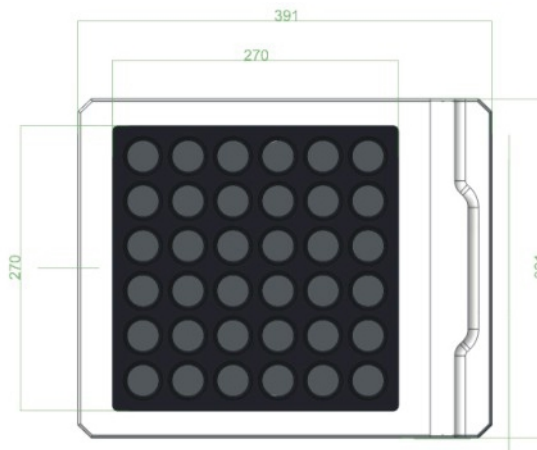


Figure 2.2: Top View

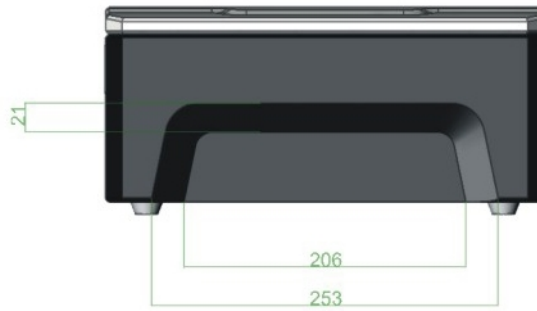


Figure 2.3: Side View

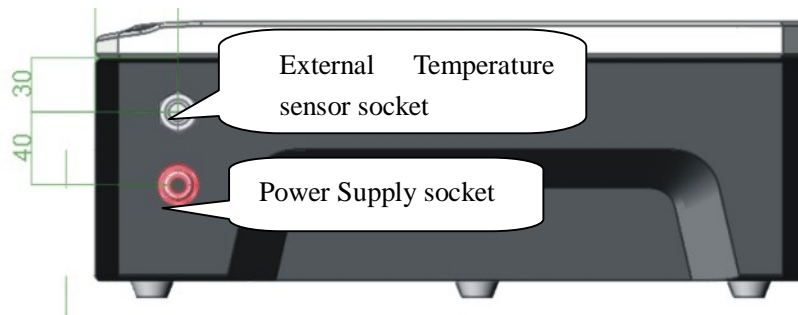


Figure 2.4: Rear View

Dimensions: 391mm×321mm×116mm

Weight: 20Kg

2. 2 Operating Condition Requirements:

- 2.2.1 The instrument need to placed in the good ventilated environment, operating instrument in a fume hood is recommend, avoid the instrument to strong shock at the same time. Do not expose the instrument to strong magnetic fields.
- 2.2.2 Power requirement: 110V/60Hz±10% , good connection to Protective Earth.
- 2.2.3 Operating temperature: $-10^{\circ}\text{C} - +70^{\circ}\text{C}$; air relative

humidity: < 90%.

2.2.4 Storage temperature: -20°C — $+85^{\circ}\text{C}$; relative humidity: <90%.

2.3 Installation

The instrument is correctly connected, according to structure diagram, then power on.

3. Instrument Main Specifications, Feature

3.1 Main Specifications

- l Power input: 1500W
- l Numbers of digestion hole : 36
- l Temperature control range: ambient temperature— 210°C
- l Temperature control accuracy: $\pm 0.2^{\circ}\text{C}$
- l Temperature difference of hole: $\pm 1.5^{\circ}\text{C}$
- l Controlling temperature time: 0—24 hours
- l Heating block: Teflon plating graphite block

3.2 Feature

- l Heating module is made of graphite block, temperature control accuracy is $\pm 0.2^{\circ}\text{C}$.
- l Good temperature uniformity, temperature difference of hole is $\pm 1.5^{\circ}\text{C}$, ensure good digestion consistency.
- l Teflon (PTFE) coat prevent graphite block from eroding by strong corrosive substance and ensure its long service life. The anticorrosion design of whole structure ensure it can adapt to all kinds of wicked environment.
- l Corrosion resistance reduce sample contamination.
- l Digestion time can be adjusted, depending on sample type and digestion method.

-
- l Ten heating step can be edited, rising time and stable time can be set in each heating step. For the sample difficult to digest, heating step is set flexibly and made to a method database, maintained conveniently.
 - l Temperature control range is between room temperature to 210 °C , built in overheating protector. Internal temperature measurement mode or external temperature measurement mode can be selected, temperature control accuracy is well.
 - l According to EPA method 200.2, 200.7, 200.8, 200.9, 245.1, 365.1 and 3050B.
 - l Calibrated Class “A” digestion tube, the sample digested can be diluted to a volume immediately without transferring.
 - l Networking function, eight instruments can be controlled by PDA at the same time.

NOTE: Testing method refer to enterprise standard.

4. Instrument Use

4.1 Use

- l Connect to the instrument and turn on, according to figure 4. Then run software on PDA
- l Instrument Indicator: “Power” lamp is power supply indicator, “Hot” lamp is heating indicator “1、2、3” lamp is running step indicator. Three lamps will light at the same time when the running step numbers is more than three.
- l For treat a great deal samples conveniently. After place digestion tube in racket (optional), put them into digestion hole all together. The sample should be put in the middle digestion hole as possible is recommend. When there are many samples, place averagely for the best results. .

5. Software Operation

The Digestion System is connected to the PDA via Bluetooth communication during normal operation, the operation and data acquisition of the Digestion System is implemented by the PDA. The PDA is used as a user terminal equipment, the following is the software operating description.

5.1 PDA Software operation

5.1.1 System Requirements:

- 1 PDA with built-in Bluetooth
- 2 Windows CE4.2 or above

5.1.2 Install Guide

Connect PDA to PC, copy SISP Digestion System. Cab to PDA, click SISP Digestion System. Cab in explorer to install software.



Figure 5.1

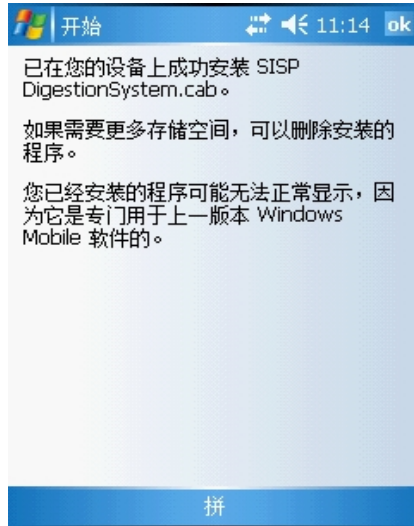


Figure 5.2

Program running



Figure 5.3

Select "start" -> "program"



Figure 5.4

double click “DigestionSystem”

5.1.3 Interface Description

Main interface

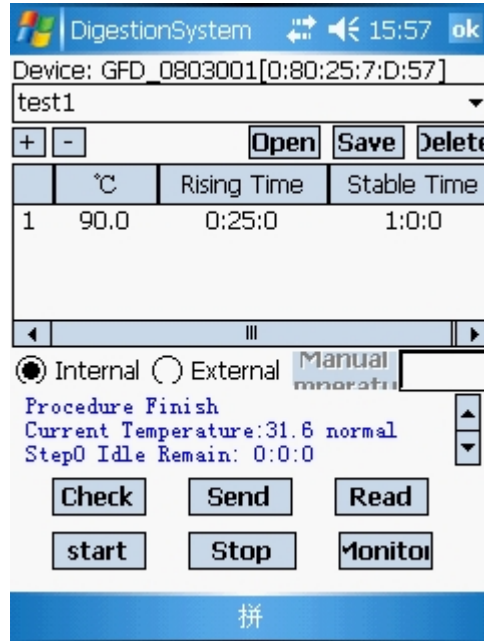


Figure 5.5

button function:

- Check** Check status of instrument.
- Send** Send settings of heating step to digestion instrument.
- Read** Read settings of heating step of instrument.
- start** Start digestion program on instrument.
- Stop** Stop digestion program on instrument.
- Monitor** Enter into monitor interface of digestion procedure.

Open Select one digestion program in database.

Save Save settings of current heating step into database.

Delete Delete digestion program in database

3 my-test ▾ digestion program list.

Monitor interface

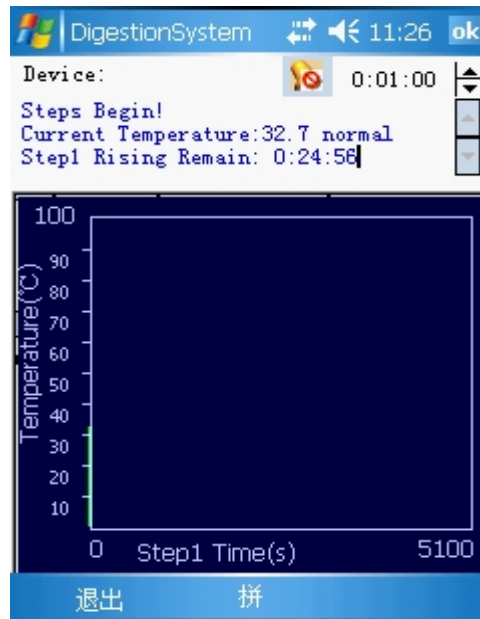


Figure 5.6

5.1.4 Searching Device

After digestion program running, program begin to search device.

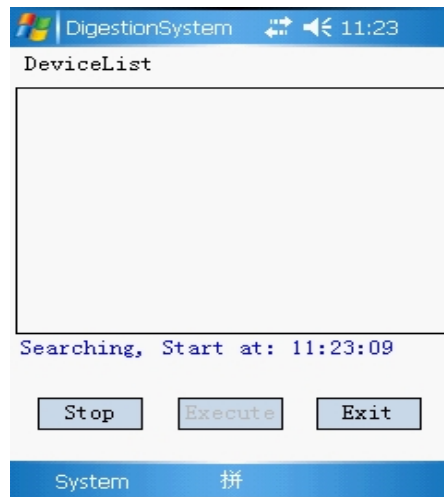


Figure 5.7

5.1.5 Connecting Device

Select a device (digestion instrument): When all instruments list, click “Stop”, select one instrument, click “Execute” to connect to instrument.



Figure 5.8

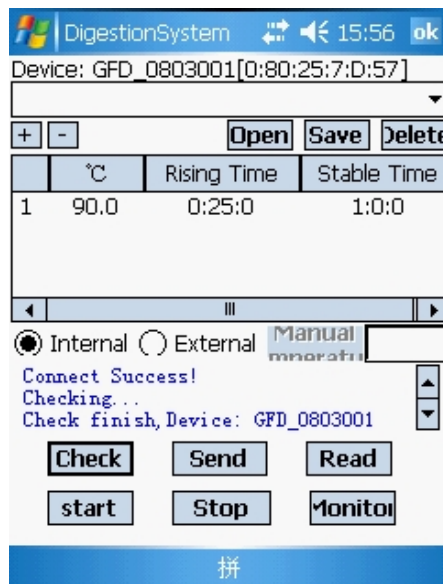


Figure 5.9

5.1.6 Setting Digestion Program

1 heating step modifying

Once enter into main interface, program will check status of instrument automatically, read settings of heating step. If settings of heating step to be modified, double click temperature, rising time, stable time on parameter bar, edit. Temperature value must be more than 50, can with a decimal point. If incorrectly edit, while execute instruction like send and save, which row and what parameter are wrong will show. Heating rate of the instrument usually is 3—5⁰C/min, so operator should calculate rising time, according to objective temperature. Rising time must be increased as sample increment.

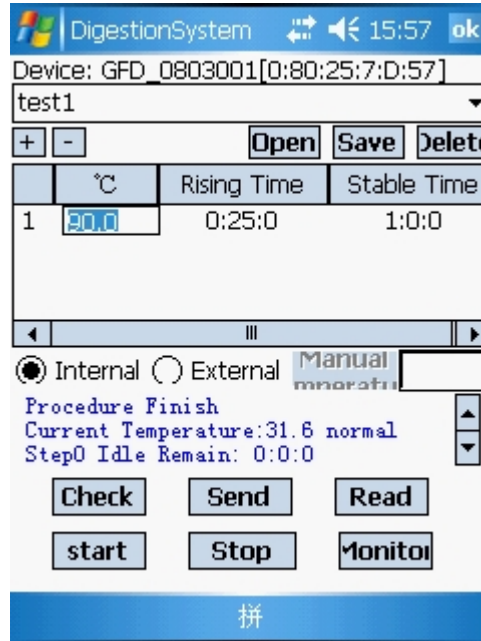


Figure 5.10

- 2 Add heating step: click
- 3 Subtract heating step: click
- 4 load from database: click

select one of them. Click “Open”.
- 5 Save to database : After settings of heating step is modified, if want to save into the database. click to edit new database or select existing database, click “save” to save or overlay.
- 6 Delete: click select one of them. Click “Delete”.

5.1.7 Sending Program

Click “Send”, sending out the editing program. If this program is right, it will be sent to the instrument after verified by software.

5.1.8 Running Program

Click “start”, running the digestion program of selected instrument. When instrument perform normally, temperature curve show in the monitor screen. Click “Monitor”, enter into monitor interface. Current working states of instrument and count down display at the top of drawing region.

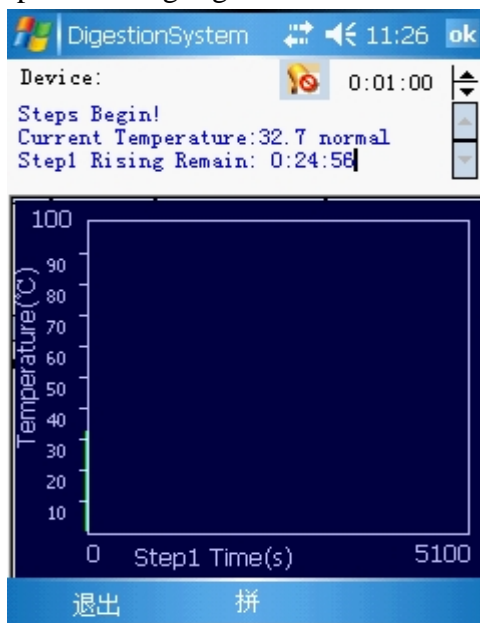


Figure 5.11

When digestion program start normally, “Start” and “Send” button are not enabled until digestion is end. When heating to a stable temperature or heating step finished, PDA make an indicated sound to remind operator.

5.1.9 Ending Program

Click “Stop”, stop digestion program of selected instrument.

6. Maintenance and Troubleshooting

6.1 Maintenance

- | The instrument need to be placed in the good ventilated environment, operating instrument in a fume hood is recommend. Avoid the instrument to strong shock is necessary for maintenance.
- | While cleaning the instrument, wipe up the dirt on graphite block with soft cloth carefully. Don't use water and organic solvent as possible, coat on the surface can not be destroyed.
- | When the instrument is not in use, turn off power supply.
- | When outer temperature sensor is not in use, its jack should be sealed with rubber plug.

6.2 Troubleshooting

- | The distance from the digestion instrument to PDA should be less than 10m. If communication exception generate, PDA must close to the instrument as possible.
- | “HOT” lamp go out while heating, stop heating and turn off power supply immediately, please contact the store that you purchased the product from.
- | If temperature anomaly while heating, stop heating and turn off power supply immediately, please contact the store that you purchased the product from.
- | Thank you for using this instrument and our service, if you have any question, please call: (86) 020-8762272
- | Choose us, that you choose the optimization and improvement of experimental process.