TF420LIGHT & WEATHER FASTNESS TESTER

INSTRUCTION MANUAL

SAFETY INSTRUCTIONS

Due to the potential hazards associated with any electrical instrument it is important that the user is familiar with the instructions covering the capabilities, and theoperation of the instrument. The user should ensure that all reasonable safety precautions are followed and if any doubt should seek professional advice before proceeding.

The instrument is designed for use by suitably trained, competent personnel in a controlled working environment and is intended for use as a LIGHT& Weather FASTNESS TESTER only.

TESTEX cannot be held responsible for any unauthorized modifications to this unit.

WARNING

This unit contains hazardous live voltages. Under no circumstance should the user try to prevent or restrict the movement of parts or gain access to the internal circuitry, either personally or with the aid of foreign bodies.

All ventilation slots must be kept clear.

PROVISION FOR LIFTING AND CARRYING

When unpacking or moving this unit extreme care is required, owing to its physical construction and weight.

It is recommended that accepted lifting and carrying procedures are employed and that personnel wear the appropriate protective equipment e.g. safety shoes.

If the unit is to be move an appreciable distance/height it is recommended that it is moved via a suitable vehicle e.g. a fork lift truck.

OPERATING ENVIRONMENT

This unit is intended to be used in a residential, commercial and light industrial environment as laid down in BSEN 50081-1 and BSEN 50082-1.

The following list gives examples of locations in which the instrument might be located; workshops, laboratories and service centers. Locating which are considered to be commercial or light industrial.

CLIMATIC ENVIRONMENT

The unit is intended to operate within the following conditions

1) Temp 20-23deg Celsius
2) Humidity 50-65% RH
3) Altitude <2000m above sea level.

ELECTRICAL INFORMATION

This unit complies with BSEN 61010-1safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

INSTALLATION CATEGORY AND POLLUTION DEGREE

Installation category III
Pollution Degree 2

ELECTRICAL / AIR SUPPLY

Voltage: ☐110V; ☐127V; ☐220V; ☐230V; ☐240V; ☐380V; ☐415V; ☐ V
Frequency: ☐50Hz; ☐60Hz
Phase sequence: ☐1 Phase; ☐3 Phase;
Air pressure : ☐0.4-0.6Mpa
use distilled water

WARNING LABELS

Number	Symbole	Publication	Description
1		IEC 417, No. 5031	Direct current
2		IEC 417, No. 5032	Alternating current
3		IEC 417, No. 5033	Both direct and alternating current
4		IEC 617-2, No. 02–02–06	Three–phase alternating current
5		IEC 417, No. 5017	Earth (ground) TERMINAL
6		IEC 417, No. 5019	PROTECTIVE CONDUCTOR TERMINAL
7		IEC 417, No. 5020	Frame or chassis TERMINAL
8		IEC 417, No. 5021	Equipotentiality
9		IEC 417, No. 5007	On (Supply)
10		IEC 417, No. 5008	Off (Supply)
11		IEC 417, No. 5172	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION (equivalent to Class II of IEC 536 –see annex H)
12 (see note)	 Background colour – yellow; symbol and outline – black	ISO 3864, No. B.3.6	Caution, risk of electric shock
13	Symbol under consideration		Easily–touched higher temperature parts
14 (see note)	 Background colour – yellow; symbol and outline – black	ISO 3864, No. B.3.1	Caution (refer to accompanying documents)

Section 1 Introduction

1.1 The TF420

Light & Weather Fastness Tester , to determine color fastness to light, weather and light aging of various colored textiles and other materials by simulating both light and dark cycles and nature weather conditions by specimen holders and rack sprays and long-arc-xenon lamp equipped.

Meets but is not limited to the following standards

ISO 105 B02
GB/T 8427
AATCC 16.3

1.2 Main features of the instrument:

1.2.12.5kw long arc xenon lamp was adopted to simulate the solar spectrum;
1.2.2 With more than 95% high transmittance filter combination, the same irradiated light requires low power consumption and more energy saving and environmental protection.
1.2.3 Digital setting of irradiance, real-time monitoring, automatic closed-loop adjustment, control band (optional 340nm, 420nm, 300-400nm and 300-800nm band);
1.2.4 Detection and wireless transmission using optical energy conversion technology to provide energy without the need for additional power.
1.2.5 blackboard thermometer (BPT), standard thermometer blackboard (BST), irradiation and detection of samples in the same location (isometric) real reflect the status of the sample tested, the measured data adopts radio frequency technology synchronous transmission;
1.2.6 Industrial temperature control (refrigeration) system, multi-stage ultrasonic humidifying intelligent control system, rapid adjustment of temperature and humidity in the test chamber to ensure accurate and stable test temperature and humidity;
1.2.7Various operation modes (shower, alternating, rotation and rotation) can simulate the real climate;
1.2.8 all the sample holder to achieve timing respectively, can be different sample by the experiment, the convenient test monitoring, reduce the operation cost, operation time and timing can be power-off protection, respectively, to prevent accidental power;
1.2.9 And 10.4-inch large color touch screen, reduce the fault of the thin film panel, and various test monitoring mode (animation, digital, curve), easy to control, clear and clear;
1.2.10. The installation of all four fluorine materials for the processing of optical filter components shall be installed.
1.2.11. A test can be run for 1000 hours continuously.

1.3 instrument technical performance:

Test warehouse temperature control	25 ~ 50 ℃, the resolution is 0.1 ℃.
Humidity control of test chamber	10 ~ 90% RH, resolution 0.1% RH.
Test time control	0min ~ 9999: 59min; The precision of + / - 1 min.
Irradiance control range	0.80 ~ 2.01W/m² @ 420nm; Accuracy 0.03W/m² @ 420nm; Digital setting, automatic compensation.
Light source	A. xenon arc lamp rated power 2.5kw.
	B. Colour temperature 5500K ~ 6500K.
Sample	
A. Rotary speed of sample frame	2-7 rpm
B. Size and number of sample size	145 mm x 45 mm sample clip 16 (ISO/GB) 145 mm x 70 mm sample clip 8 (AATCC)
C. Each sample clip is timed	Less than or equal to 1000h.
D. Sample thickness	no more than 8mm.
Black standard thermometer	40 ~ 85 ℃, the resolution of 0.1 ℃.
Power supply	AC220V plus or minus 5%, 50Hz, power 8.0 KW
Contour size	1000x 550 x 1570 mm(L * W * H)
weight	180KG

1.4 equipment installation environment and requirements

1.4.1 Space requirements

The height of the instrument is 160cm, so the installation must be installed on the ground. The four corners are required to withstand 200Kg, and the ground is flat. Minimum space length is 2 meters, width 1.8 meters, height 2.2 meters.

1.4.2 Environmental requirements

Ambient temperature requirements between 10 ℃ to 32 ℃, high temperature instrument heat affect the cooling effect, can't work normally, so the space requires a minimum of 1.5 P air conditioning.

1.4.3 Power supply requirements

The instrument uses a power supply of high power, so it needs to be used with sufficient power, and the incoming line must be more than 6mm² copper wires. The incoming line has 40A air switch, single phase three-wire system. The geodetic line shall not be connected with the zero line, the earth line of the instrument shall be connected to the shell, and the earth line shall be connected with the zero line to interfere with the instrument, which may endanger the operator's safety.

1.4.4 Water inlet requirements

If the instrument does the weather, the instrument must have three levels of water or pure water. If you don't have to do the rain, you can tap water for water and use only wet water. Pay attention to drainage needs to have floor drain, the discharge height must not exceed the installation floor 10cm, and otherwise the water will be filled in the normal drainage instrument.

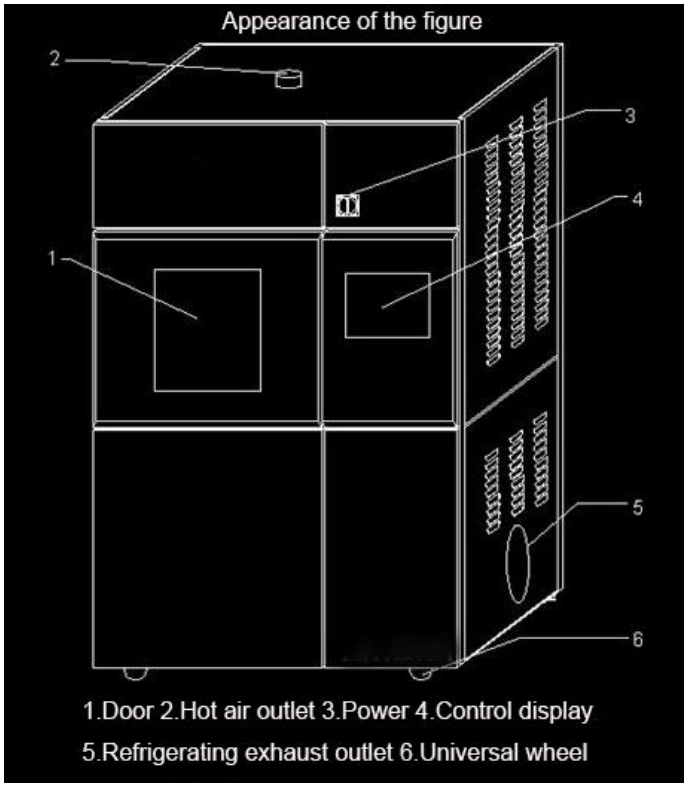
The Best water is the distilled water.

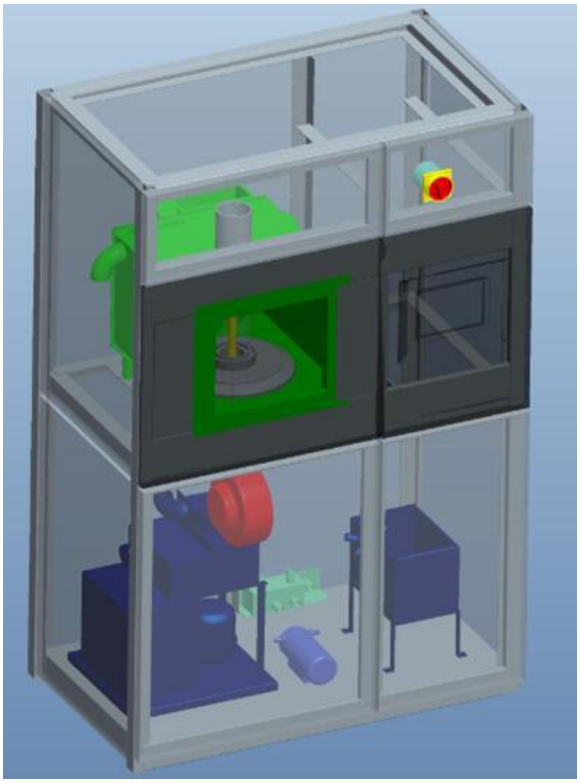
1.4.5 Air requirements

The instrument needs to be kept in a dry room with little dust and little electromagnetic interference. Because the instrument USES the air-cooled xenon lamp to run, use fan to cool, if the air micro - layer multi - lamp tube service life will be reduced.

Section 2 Instrument structure and principle

2.1 Product structure diagram



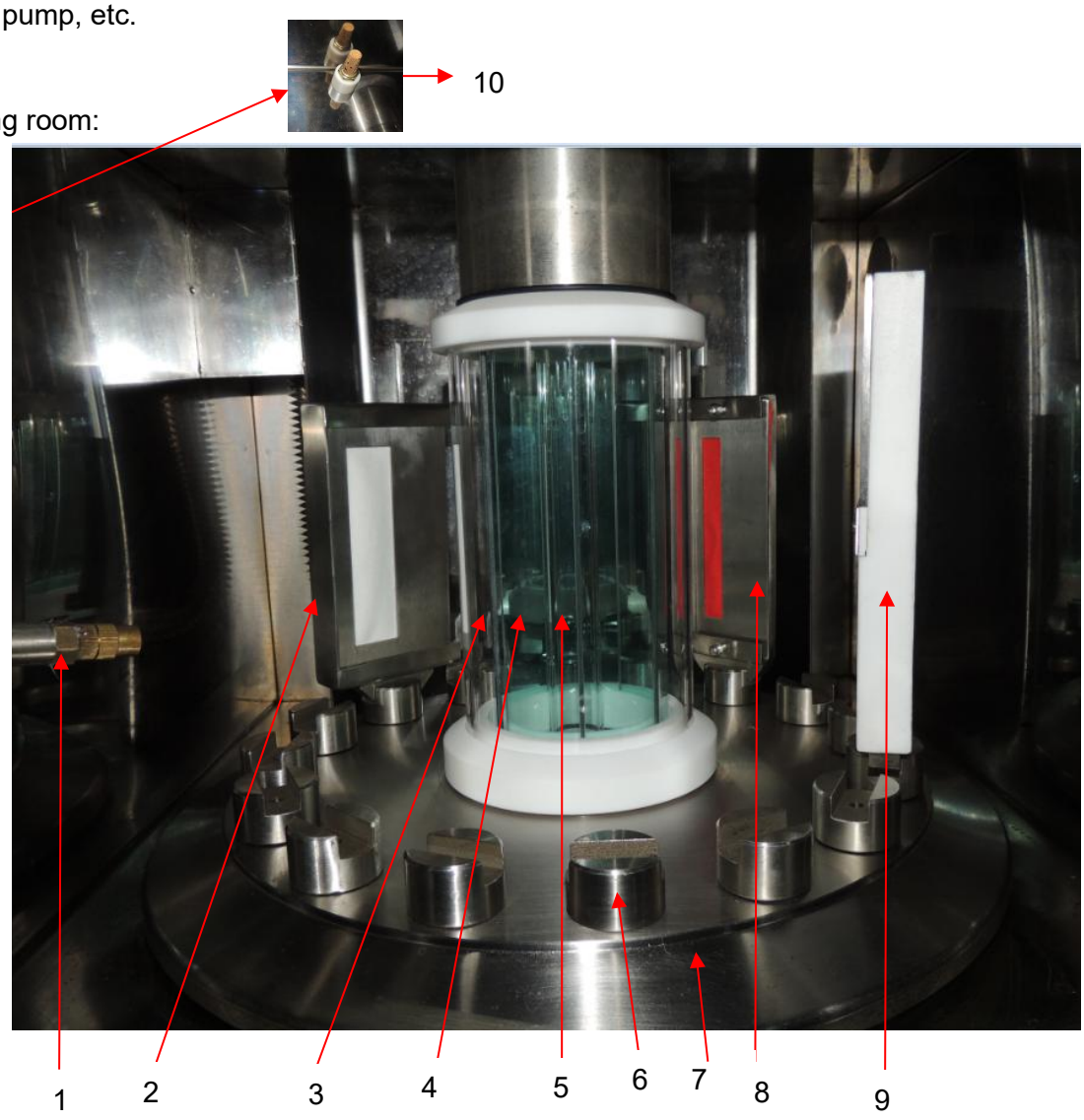


2.2 components

The main components of the instrument include: xenon lamp, filter cartridge, filter, xenon lamp power supply, PP cotton water through filter element, blue wool standard and solar cell etc.

Other components: the refrigeration system, xenon lamp cooling systems, display control panel, instrument and computer main board, power board, driver board, the board irradiation meter, test clips, test turntable system, test chamber, equipment storage tank, circulating water pump, etc.

Testing room:



1. Spraynozzle6.Fix sample holder

2.Sampleholder (AATCC)7.Sample frame

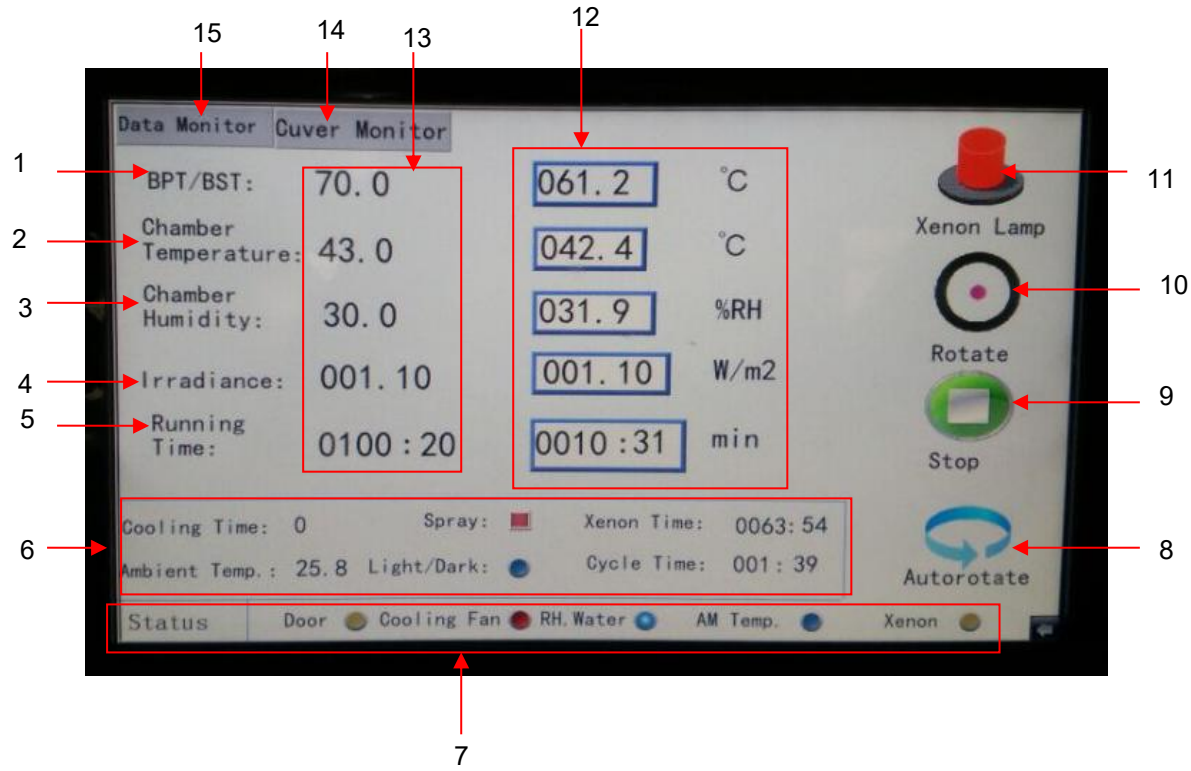
3.Quartz glass tube8.Sampleholder (ISO/GB)

4.Infrared and up filter9.Black scale thermometer (BST)

5.Long arc xenon lamp 10.Humidity sensor

Main components introduce and use functions:

Control display screen:



1. BPT/BST:display chamber's blackboard temperature

2.Chamber temperature: display chamber's temperature

3.Chamber humidity: display chamber's humidity

4.Irradiance:display chamber's irradiance

5.Running time: display the machine's running time

6.Testing chamber's state: display the machine's chamber state

7.Machine 's state: display machine's state

8.Autorotate: click it to set auto rotate

9.Stop: click it stop test and exit testing screen

10.Rotate: click it to make the sample frame rotate

11. Xenon lamp: click it the xenon lamp ON/OFF

12. Chamber's actual state parameter: display the chamber's state

13. Chamber's standard setting parameter: display the standard setting parameter

14. Cuver monitor: click it to turn to the cuver display screen

15. Data monitor: click it to turn to the testing screen

Testing chamber's state

Cooling time: it is display the xenon lamp cooling time, when the lamp is off, it need to wait 120s that can open lamp again.

Spray: hint the spray nozzle whether run: red (off), green (on)

Xenon time: display how much time the xenon lamp have run

Ambient temp: display the machine be use on what temperature's environment

Light/Dark: hint the chamber light or dark (flicker is light, red is dark)

Cycle time: display how much time will cycle a time.

Machine 's state

Door: hint the testing chamber's door open or close

Cooling fan: hint the cooling fan ON or OFF

RH.Water: hint the water tank whether have enough water

AM temp: the machine be used on what temperature's environment

2.2.1 Light source:

The rated power is 2.5KW air cooled long arc xenon lamp; Color temperature: 5500K ~ 6500K.

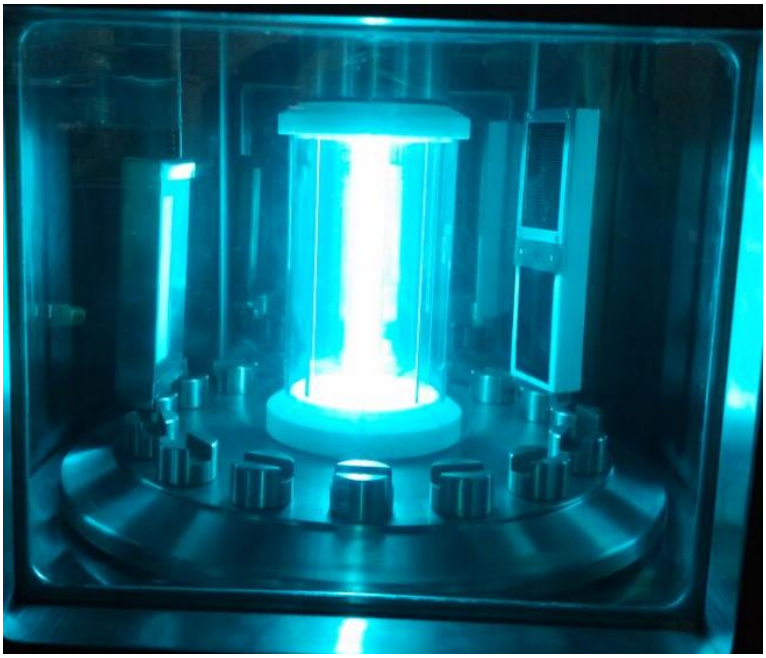
2.2.2 Filter components:

2.2.2.1 Filter components are composed of filters and filters. The transmittance of the filter is at least 90% between 380nm and 750nm, while the transmittance between 310 and 320nm should be 0.

infrared and UV filter

2.2.3 Sample frame:

The sample frame is rotated around the light source at a speed of 5r/min to ensure that the sample is uniformly irradiated.



2.2.4 Test chamber:

2.2.4.1 Temperature and humidity:

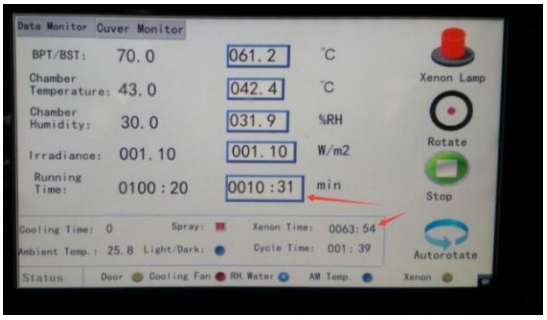
The temperature and relative humidity in the test chamber are controlled by the microcomputer and automatically adjusted according to the parameters set.

2.2.4.2Get wet in the rain:

The shower system of the product consists of water pump, solenoid valve and spray nozzle. The water from the pump is sent out through the solenoid valve to the spray nozzle to complete the rain work. The duration and duration of the rain can be set according to the test requirements on the instrument control panel.

2.2.5 Timing device:

Record the accumulated working time of the xenon arc lamp and the time of each test. When the xenon lamp is lit to work, the timer is timed simultaneously while the xenon lamp is out, the timer also stops timing.



In addition, the instrument has the function of timing each sample, ranging from 1min to 1000h. To facilitate the beginning or termination of each sample at any time.

2.2.6 Test time loss protection function

The instrument is working in a sudden power failure or normal shutdown during the test. It has the function of parameter memory, and can continue to experiment on the original parameter basis after starting up again.

2.2.7 Insurance device

2.2.7.1 To enable the xenon arc lamp to work properly, xenon arc lamp is activated on the circuit to interlock with cooling fan. The xenon arc lamp cannot be activated when the fan does not work (the cooling fan icon flickers on the display screen).

2.2.7.2 On the upper left of the glass door in the test chamber, there is a protective switch, open the glass door, and the xenon arc lamp is automatically extinguished. The door opens warning interface on the color screen.

2.2.7.3 The instrument has current protection when the current is large, the current protection of heating refrigeration is at 25A, and the lamp current protection is at 32A.

2.3 Principle of instrument testing:

Its working principle is: the simulation and strengthen the effects of color to be measured natural conditions, provide the necessary testing optical radiation, temperature, humidity, get wet in the rain, such as conditions, testing will be tested in the warehouse and then sample compared with the standard color blue wool, evaluation of sample (weather) in light fastness.

Section 3 Test operation and method

3.1 preparations before starting the instrument

3.1.1 the instrument shall be installed on a stationary ground before starting up, and adjust the ground feet as shown, turning the red gear parts. Raise the two feet in front of you, so that the instrument is slightly back to the rear view from 5-10 degrees.

Feet

Power knob switch(ON)

Air switch

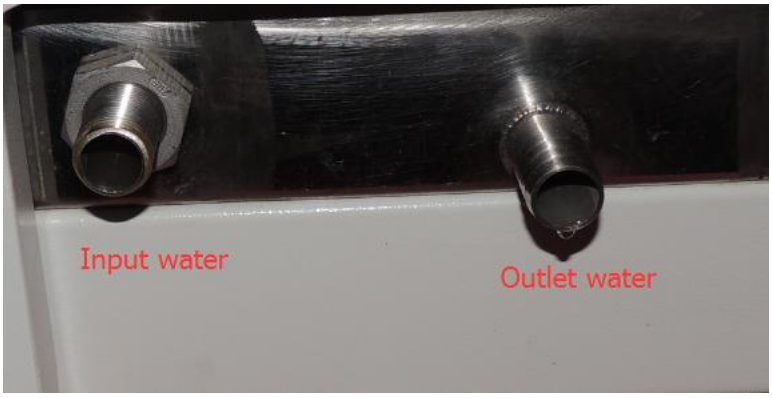
3.1.2 power switch, when the instrument is switched off, the knob indicates the state of "0", and the knob will be rotated to "1" to indicate the current state.

3.1.3 internal air switch, in order to reduce the voltage impact, the power supply is divided into two roads. All the way to control circuit, circuit capacity 25A, controlled air switch on the lower right side of the main control board. The other road is located on the switch of the power supply knob to control the current capacity of the xenon lamp 32A. The two switches must be in a closed state to work normally.

3.1.4 Water and drainage

Feed line can use Φ 6 trachea or instrument configuration hose, 4 teeth of ordinary water pipe.

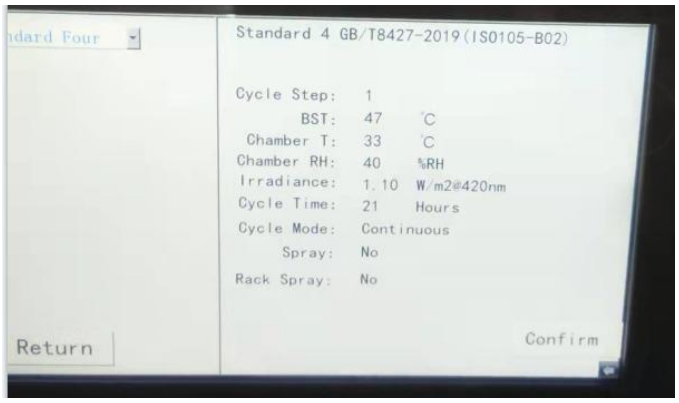
The maximum height of the drainpipe shall not be higher than 10cm, or the water in the instrument is stagnant.



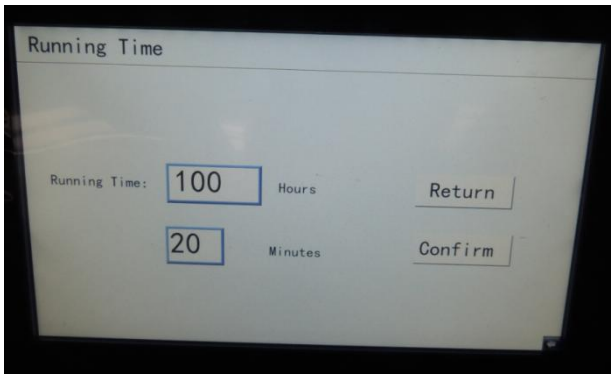
3.2 after the instrument is switched on

3.2.1 post-boot setting

The newly installed instrument is ready to turn on the machine, close the red knob, and the electric instrument will check for 20 seconds. The device will display the boot interface normally. After selecting the standard that you need to test, set the running time according to the color level of the customer.



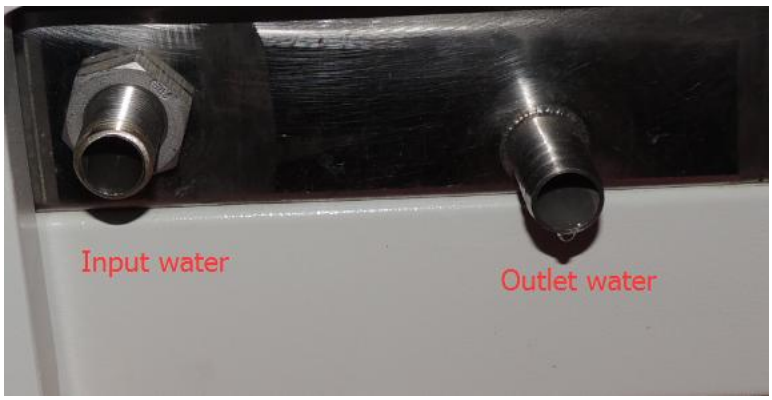
Testing standard

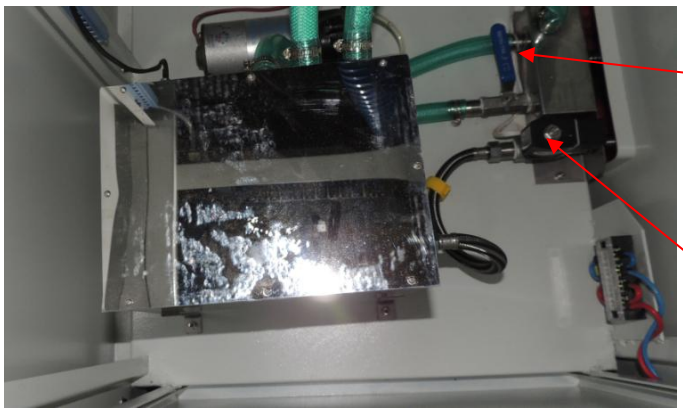


Running time

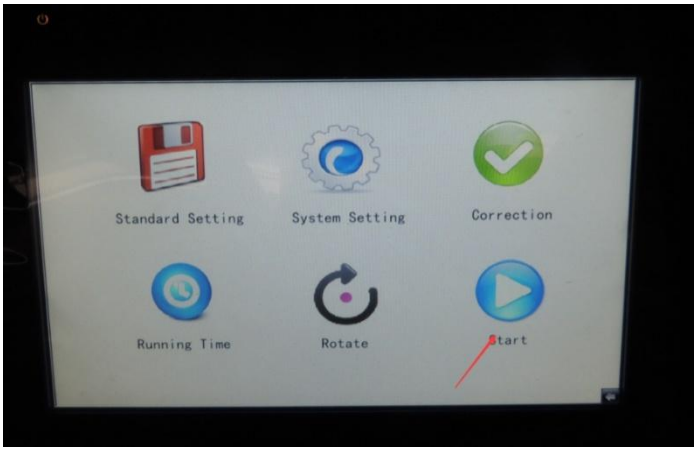
3.2.2 water inlet after startup

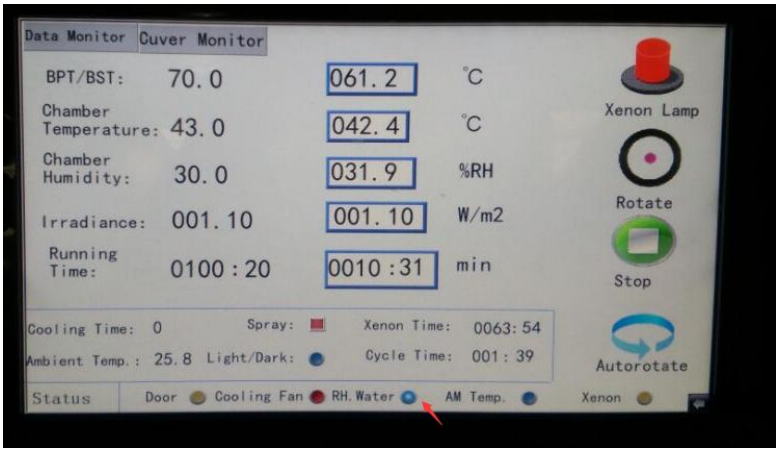
The water in the water tank inside the instrument when the instrument is out of the factory is empty. After the first startup, you need to fill in water, install input water pipe on input water hold, the water inlet valve will add water automatically after power. Set the parameters to start, and if the water is not full, the wet water lamp in the starting status bar is flashing. When the water is completed, the lamp will be automatically extinguished and the water inlet solenoid valve will be closed automatically.





Then click the ‘Start’





If the machine’s water tank have not enough water, the ‘RH. Water’ will flashing and the machine’s water inlet valve will auto work to add water. This water inlet valvewill auto stop work when the water enough and the ‘RH. Water ’ will stop flashing.

The outlet water valve need to manual close before add water or finish outlet water.

3.2.3 Self-calibrationinstrument(it is operation when you need to calibration)

The equipment has a blue wool standard of 1-8 grades. The first time the blue wool standard is put on the sample holder, the blue wool is the grade 4 colour difference of the grey sample card. Record the exposure time, which can be used to calibrate the exposure time.

it is operation when you need to calibration,the engineer have finished calibration before machine send form factory.

3.2.4 Instrument calibration time

After 500 hours of using the instrument, the exposure time of blue wool is calculated according to the method of 3.2.3.

3.3 evaluations of test results

According to the standard setting parameters, the exposure part of the sample was compared with the unexposed part after exposure time test. If the color difference is lower than grade 4, it is lower than the test grade. If the color difference is higher than 4, the test sample is higher than the test grade. For example, there is a test sample of blue wool grade iii, the instrument calibrated after the exposure time of 18 hours blue wool standard three levels of the color of the color of the color of the grade 4. After setting the standard parameters, set the running time for 18 hours. Half of the sample is exposed to the sample holder. Rotate the sample after the light, 18 hours later. Compared with the grey sample card, the sample size is higher than grade 4, and the color fastness of the sample is more than 3.

Section 4 Man-machine operation instructions

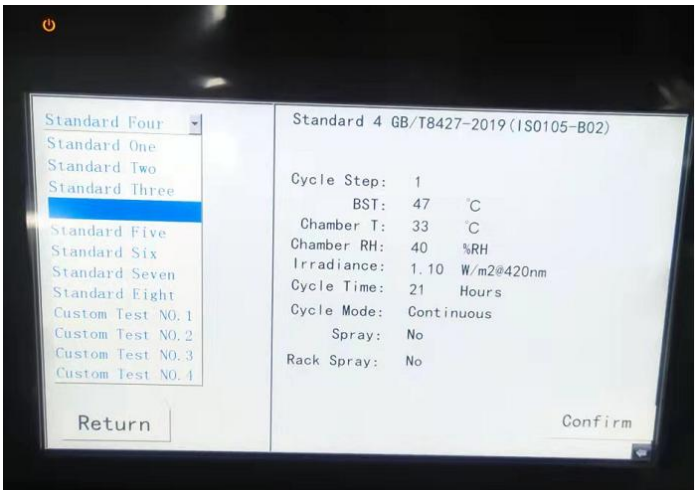
The control of this instrument is controlled by the touch screen, which can be programmed by the touch screen operation setting standard or the standard of the curing system, and monitor and control the operation of the system. Its operation is convenient and simple, its operation interface is as follows:

4.1 boot interface (as shown in the figure below) :

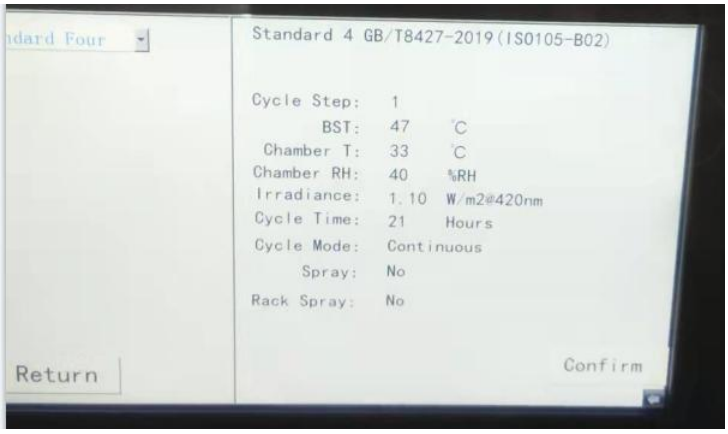
Displays the current time and date, and the system version. Click the main menu to enter the main interface.

4.2 click the icon to enter the corresponding function for setting and monitoring

Under the main menu interface, click the "standard Settings" icon and enter the "standard options" interface (see below).

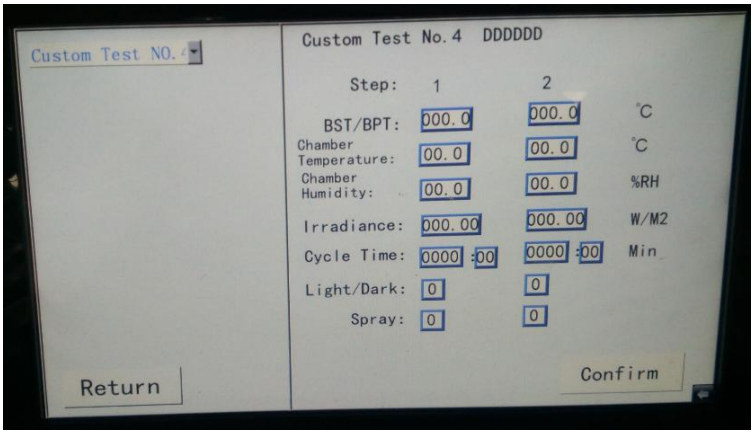


4.2.1 Under the standard option interface, click the drop-down button to conduct the test standard selection (the system given eight standard test options and four custom items), click the standard option. On the right display standard content, press "confirm" to select this standard parameter, selected test fixed standard item. If the custom can enter the test project parameter setting interface (as shown in the figure below):

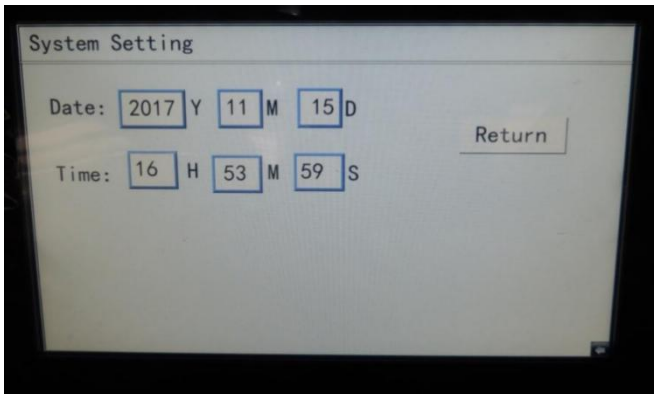


Test steps: the device test cycle steps 1, 2, chosen from three and four parameters is two steps, the runtime system automatically according to the set of steps 1 and 2 parameters.
Custom standard NO.: custom standard number can be set for the parameter programming standards.
The blackboard temperature(BST/BPT): set up the board temperature, set the board temperature according to standard requirements.
Chamber temperature: the temperature setting of the test storehouse.
Chamber humidity: exposure conditions need the relative humidity of the sample.
Irradiance: the exposure to the irradiance for the program.
Cycle time: the test of time setting according to the standard requirement.
Light/Dark: chamber lamp light or dark set
Spray: the program selected in the rain, when choosing the heavy rain can't choice and pattern.
Confirm: click it to confirm setting parameter.

4.2.2 same as 4.2.1, after selecting the custom project, you can set the test project parameter setting interface (as shown in the figure below).The parameter options in the contact interface, and select the parameters to be set, click the digital input; After setting the parameters, click "confirm" to save the return. Custom one and custom two can only be set to continuous work.

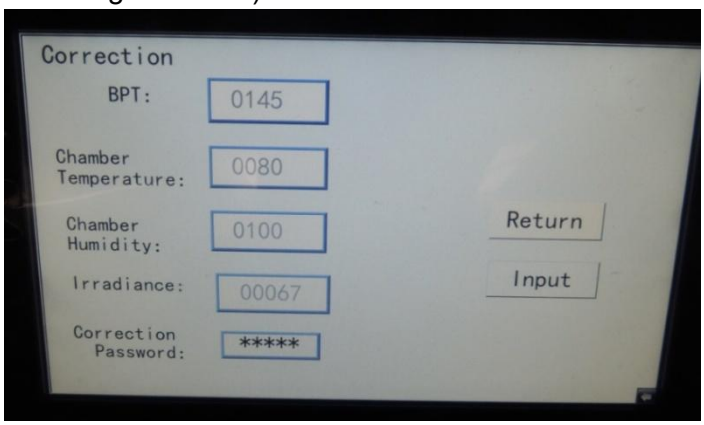


4.3 click the "system Settings" icon under the main menu interface to enter the "system Settings" interface (as shown below):



Date: instrument show dates for the current date, can be adjusted.
Time: instrument display time for the current time, can be adjusted.

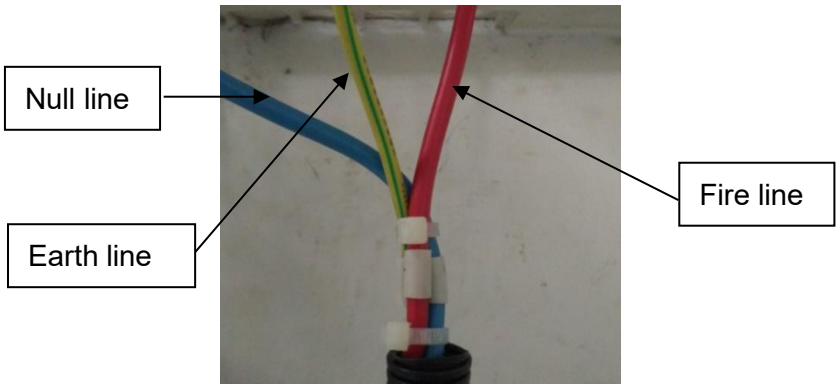
4.4 click the "Correction" icon under the main menu interface to enter the "system correction" interface (as shown in the figure below):



The interface debugging and calibration parameters for the equipment manufacturers, users do not need to set up.

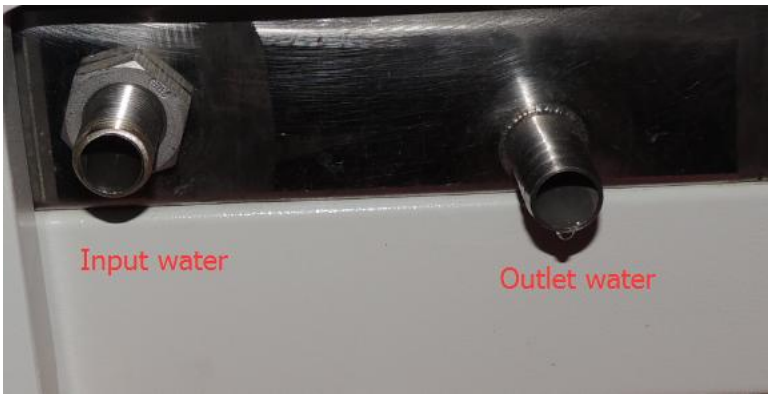
Section 5 Operation tester

1. Connect the machine ‘s power line:



220V (the machine power line can not use the plug)

2. Connected the water pipe on the input water and outlet water hold which behind machine. The water must use the distilled water.

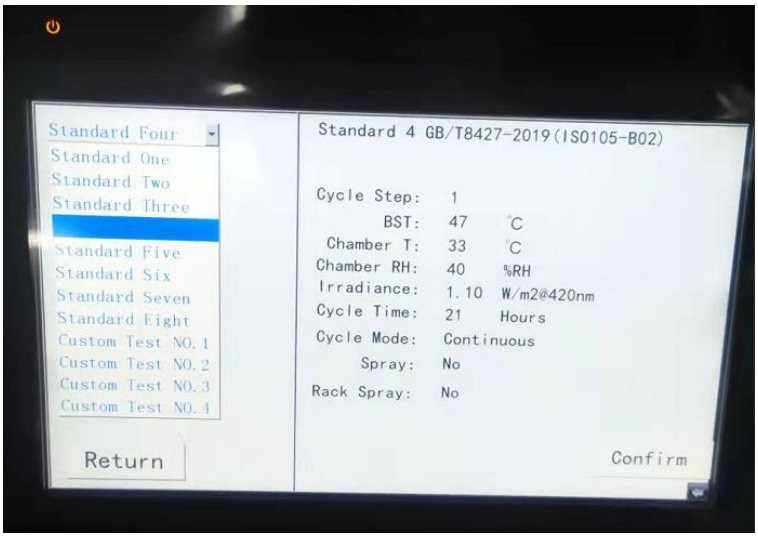


3. Open the machine power switch:

4. Then wait 20 second that enter main screen,click Menu:

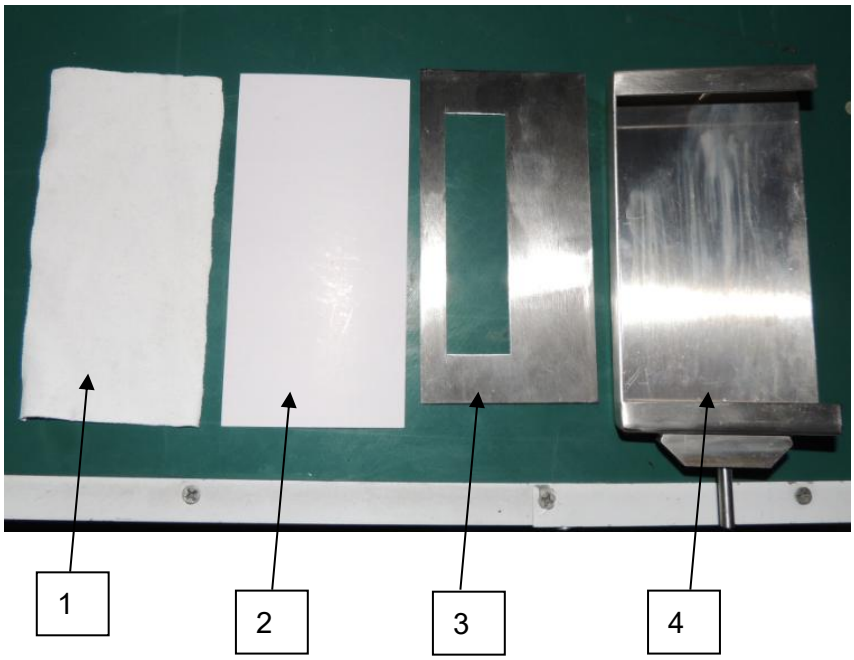
5. Click standard setting

6. Select the testing standard:



7. Then open the testing chamber's door to install the blackboard thermometer:

8. Install the sample:



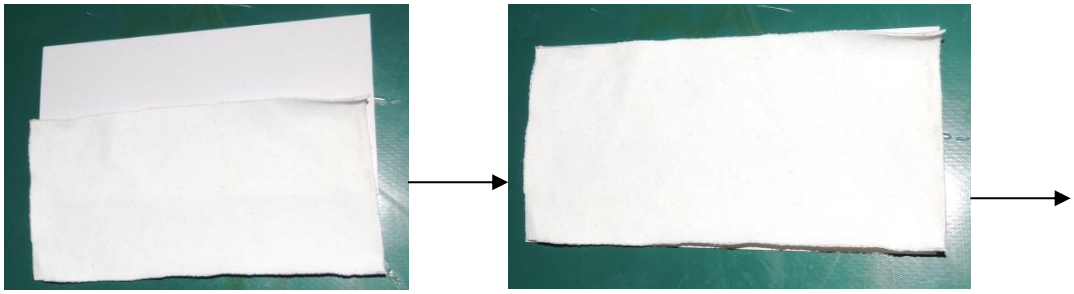
1.Sample (145 x 70 mm)

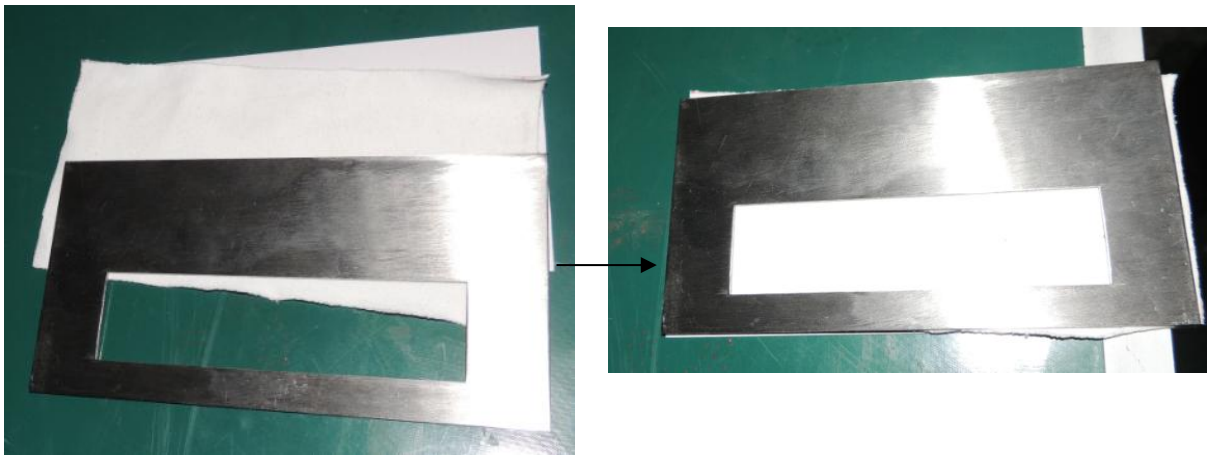
2. Sample plate

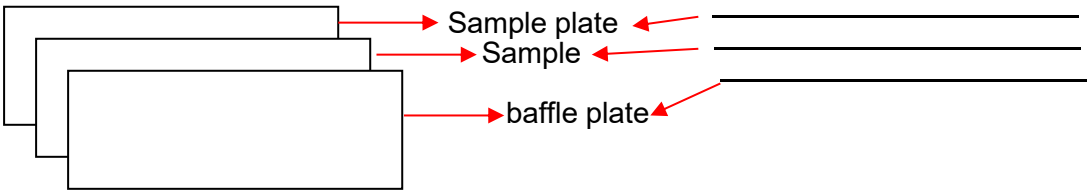
3.Baffle plate

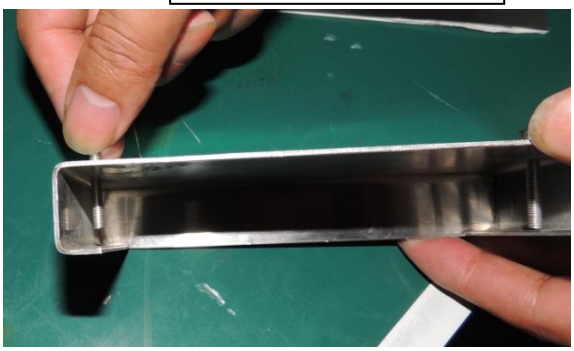
4.Sample holder

Sample plate, sample, and baffle plate stacked together:

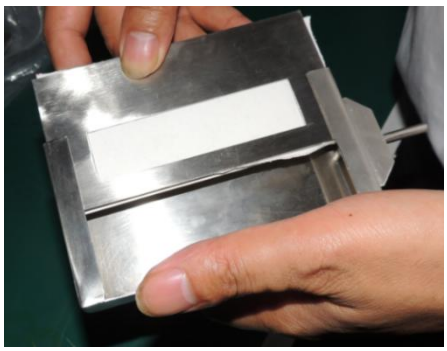






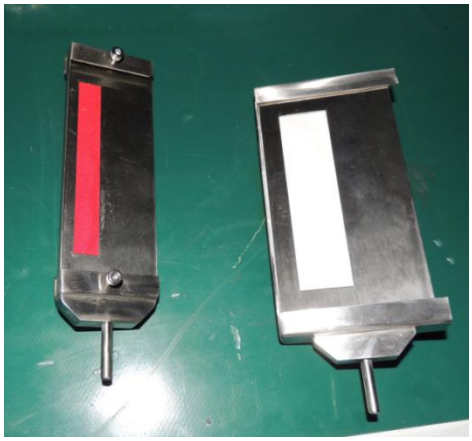


Loose sample holder’s screws a little.



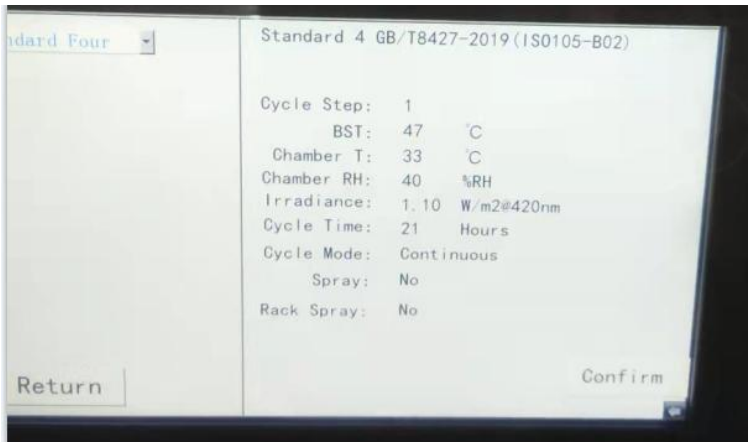
Install the stacked plate

Lock sample holder’s screws to fix it

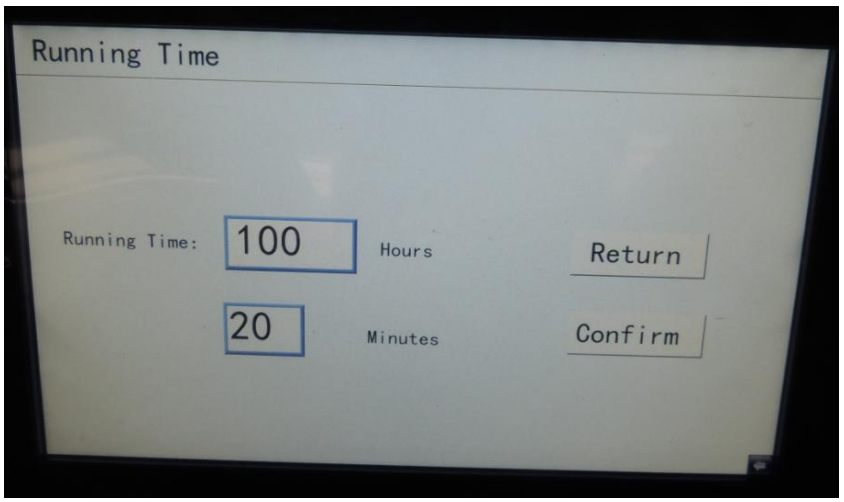


9. Install sample on testing chamber:

10. Select testing standard:



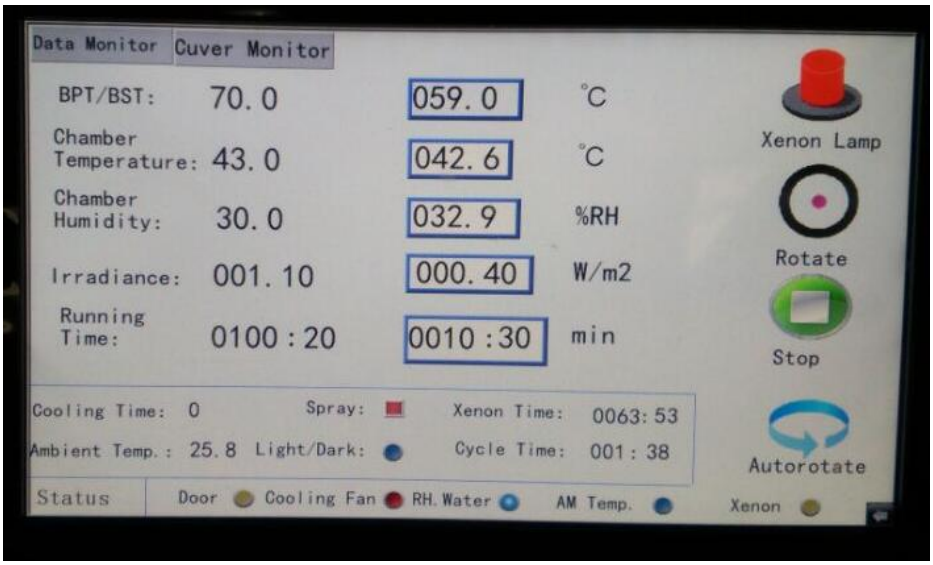
11. Set testing time:



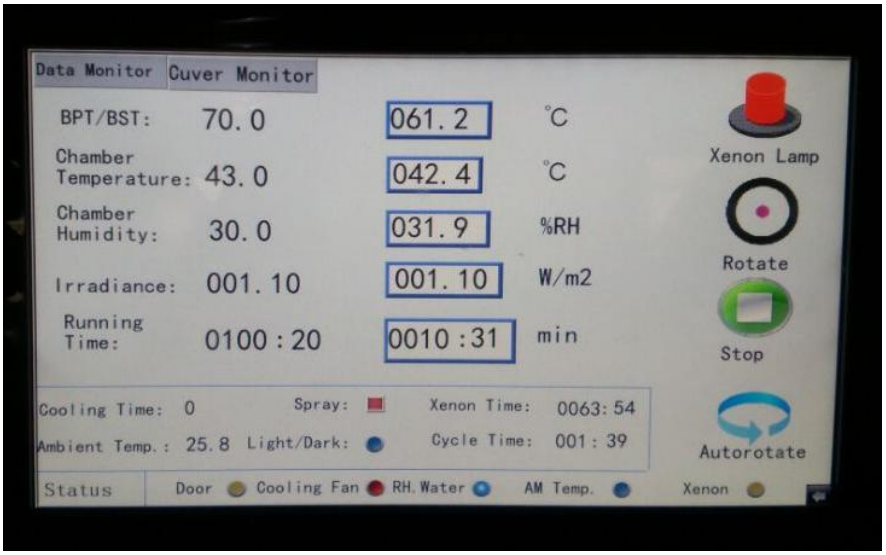
12. Then click ‘Start’ to enter testing screen:

13. Click the ‘Rotate’ to open the make sample frame run

14. Click the ‘Xenon Lamp’ to open the xenon lamp to begin testing:



15. Wait some minutes, the machine chambers state will get to standard’s setting parameter



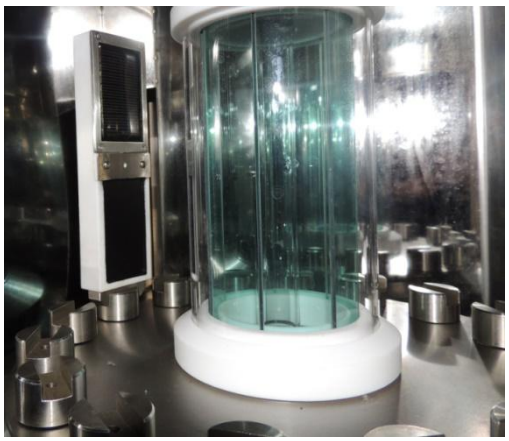
16. The machine will auto stop when the machine run to the setting time.

17. Then open the testing chamber room to remove the sample to evaluation of sample (weather) in light fastness.

Section 6 Common failures and troubleshooting of instruments

6.1 When the lamp is lit, the blackboard temperature and irradiance jump, showing that it is 0 Normal boot couldn't display the irradiance, the new instrument to irradiation meter sample turntable;

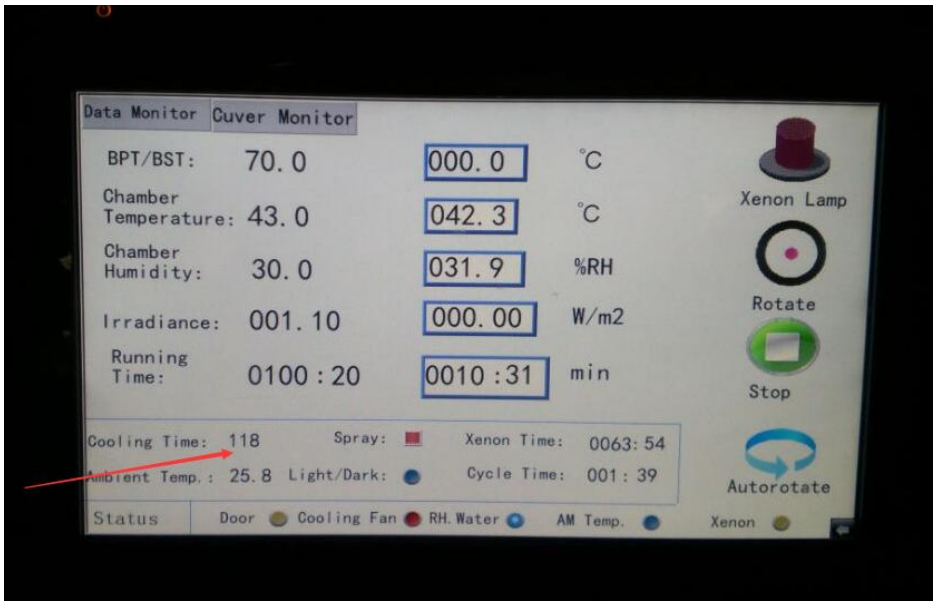
Irradiation meter put not on tubes;

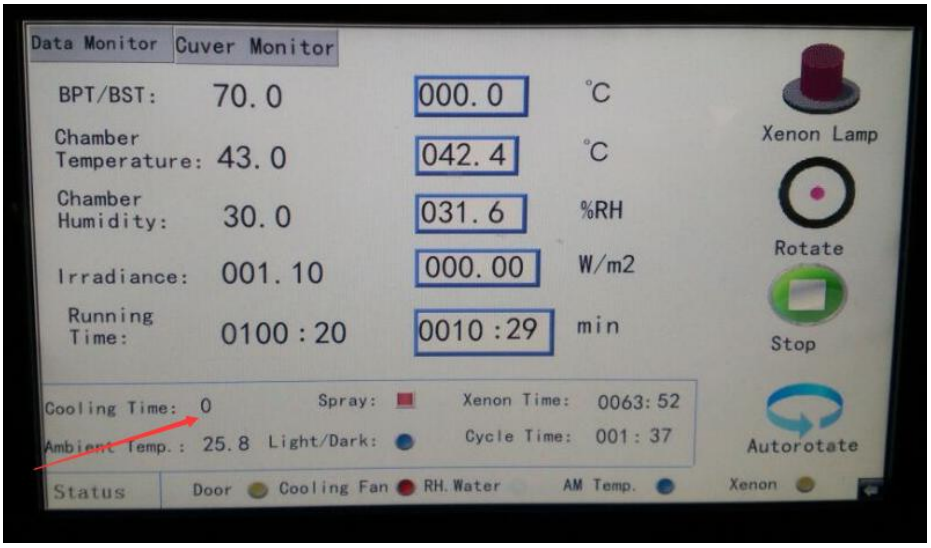


Instrument using a long time, irradiation meter blackboard solar cell aging change.

6.2 lamp tube will not be able to light the lamp after normal start-up:

Start normal, xenon lamp cooling time not to 0;





Door switch and xenon lamp, fan test warehouse door open or cooling fan does not turn.

6.3 the lamp has been lit and the icon has changed.

dadada voice, not light red knob after air switch trip;

Tube service life to replace the bulb.

6.4 The click of a light is a bit of a noise

Tube service life to replace the bulb.

Lamp in light is flashing, xenon lamp aging damage power supply.

6.5 The blackboard temperature cannot reach the set temperature and the irradiation is not reached

Xenon lamp and filter systems use a long time, change the filter system;

Irradiation meter solar cells to replace this problem

6.6 The newly installed equipment is leaking

Pipes placed too high, check for changes a drain

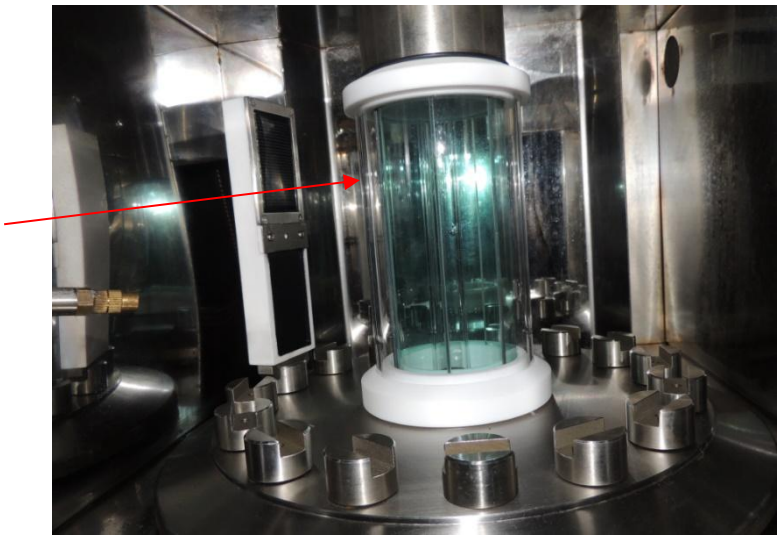
Do get wet in the rain test time is long, apparatus, leaning back.

6.7 touch screen location offset, touch is not accurate.

calibration touch screen, the method is: after the power to boot, fingers and hold, the display shows the top left corner shows the "ten", with a blunt small stick click on the "ten" such as pencil tip backwards, "ten" mobile location as before clicking. Until the screen shows "ten" hits, the touch screen automatically enters the working interface and the touch screen is corrected

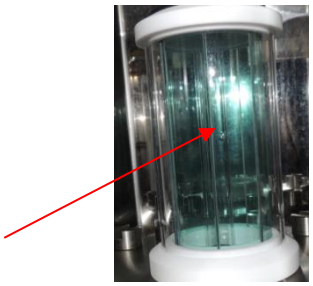
Section 7care and maintenance

7.1 after each test, the equipment should be cleaned and maintained. The test chamber should be cleaned with detergent.



7.2 Any trace left in the mirror is rubbed out with a very soft cloth. When the quartz glass tube is stained, it can be cleaned with 5% hydrochloric acid, and 20% citric acid is used in infrared and uv filter.

7.3 The dust in the air will affect the efficiency of the light tube on the glass, so it should be cleaned once after 3 ~ 4 weeks (depending on the time of the dust of the environment).



7.4 regularly clean air fans, preferably with compressed air or brush with soft brush.
7.5 to avoid the irradiance due to the aging of the device, when the xenon arc lamp works for 500 hours, calibrate the exposure time.
7.6 The equipment shall be equipped with an industrial refrigeration system which must be maintained by professional refrigeration equipment maintenance personnel or manufacturers.
7.7 to ensure the normal work of the machine check the water filter PP once a month. If too many impurities please replace. Clean the water when not in use, so as not to pollute the water circulation system. Please turn off the device to the power supply, open the right side of the door, you can see the ball valve rotation handle tank water through the drain outlet. Please turn back to the original position after finishing line, and use the water again next time.
7.8 solar panel description:
Solar panels can live up to ten years under normal conditions, but are used on TF420. The service life will be shortened by the proximity of the xenon lamp. If the surface of the solar panel turns yellow, new panels should be replaced, or the instrument won't work properly.
6.9 consumables replacement. Xenon lamp, filter and filter cartridge are normally used for 1500 hours (air cleaning and power supply in the environment). New accessories should be replaced.