



Shanghai Sunny Hengping Scientific Instrument Co.,Ltd

Instruction Manual

Moisture Analyzer

 NO. xxxxxxxx
 xxxxxxxx-xx

The Enterprise Standard: Q31/0112000217C010-2016-01

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ESH series of Electronic
Moisture Analyzer

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1 Introduction

What is Halogen Moisture Analyzer

Based on the theory of Thermo-Gravimetric Analysis, moisture analyzer could measure certain subject's moisture content: measure sample's weight at first, and then desiccate the sample through internal heating system, this instrument could continuously measure and display sample weight during desiccation.

The most important part in practical use is the heating ratio, compared with traditional infrared heating and oven-heating, halogen heating could reach maximum heating power in minimum time, which highly improves actual working efficiency due to the reduced heating time.

Precautions

Please abide by certain precautionary measures as follows in order to use moisture analyzer safely:



- This instrument is suitable for measuring sample's moisture content, any mishandlings/ inappropriate handlings during process could lead to damages of people, instrument itself as well as other facilities.
- Unplug power connector during cleaning.
- When processing, make sure there are enough space around, at least one meter's available right above.
- Should be handled by those who had a profound knowledge about the performance of to-be-tested-samples as well as instrument itself, or those who had been trained or taught to familiar how to use/ process.
- Please prepare related protective equipments, like safety glasses, gloves, garments and masks, etc.
- Do not change any internal assembling parts randomly.
- After-sale service should be provided by professionals authorized Sunny Hengping.



- This instrument applies three-pin plug, including grounding wire. Do not connect GND grounding directly when instrument if power-off.
- Make sure that it would not cause any potential dangers or barriers when connecting the power.
- Do not use this instrument in the environment of dangerous, humid and unstable areas.



- During heating process, be more cautious when you want to move sample. It might cause burn because of the high temperature (sample, heating units) around by.

Some samples need to be more cautious:



- Carefully analyze potential dangers or consequences if the sample itself is hazardous, so highly suggest that this instrument be preserved by professionals.
 - Fire/ explosion: samples which are flammable or explosive should be handled in dry and low-temperature areas.
 - Toxic/ flammable: samples which are toxic or flammable should be handled in fume hoods.
 - Corrosion: samples which are corrosive would release corrosive gases during heating, so when necessary, suggest to take a few samples and process in fume hoods.
-
- Attention: Any damages caused by violation of requirements above, and some other mishandlings, customers should take full responsibility.

Disclaimer

ESH series Moisture Analyzer reserve some analysis date in the scheduled system, customers could choose randomly, but need to ascertain the accuracy of these date yourself. Sunny Hengping takes no responsibility about the usage of this date.

Diagram Guideline

Diagram clarification vividly shows what's function and control buttons look like.



Picture on the left side shows current status, which is Application interface.



Solid black triangle mark: represent the motion that already touched the button.



Blank black triangle mark: represent the display's current status.



This mark instructs danger, might cause damage to person and dysfunction of the instrument.

2 Installation



Before installation, the instrument must be power-off.

Disassemble

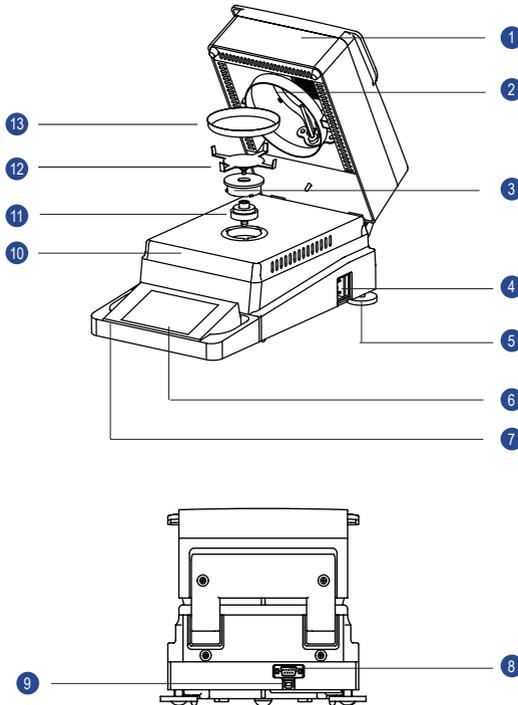
- ▶ Unpack the package and take all the accessories out carefully.
- ▶ Damage check-out firstly, if there are any, after unpacking.
- ▷ Contact local distributor or after-sale service centers of Sunny Hengping.
- ▷ Properly preserve outer package and assembling attached for future transportation usage. Unplug power cable during transportation.

Packing List

- | | | | |
|-------------------------|----|--|-----|
| • ESH moisture analyzer | ×1 | • Bearing block for sample pan bracket | ×1 |
| • Power cable | ×1 | • Sample pan bracket | ×1 |
| • Accessory box | ×1 | • Sample pan | ×30 |
| | | • Weighing for calibration (besides internal calibration type ESH) | ×1 |
| | | • Instruction manual (qualification certificate, warranty) | ×1 |
| | | • Cleaning brush | ×1 |
| | | • Aluminum pan (optional) | |
| | | • Tweezer for sample pan (optional) | |

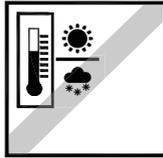
Identification of ESH Moisture Analyzer components

Make sure that you could identify each component before using this instrument



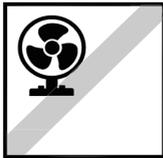
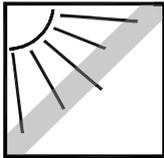
Number	component	Number	component
1	heating cover	8	RS 232 interface
2	halogen heating lamp	9	USB interface (optional)
3	buckle	10	Working stand panel
4	220V fuse socket	11	Bearing block for sample pan bracket
5	Adjustment controller	12	Sample pan bracelet
6	Display	13	Sample pan
7	Protective cover		

Choose proper location



Proper location is the key point for high accuracy moisture analyzer, if you want to receive counterpart accurate result.

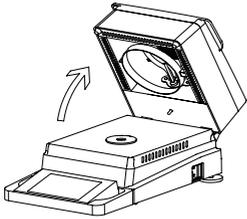
To make sure:



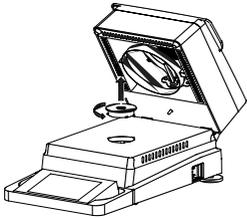
- Horizontal, firm, stable and vibration-less working stand
- Avoid direct exposure to sun
- Avoid severe temperature fluctuation
- Avoid cross-ventilation

Optimal location: wind-free corner/ stable desk, keep far away from door, window, radiator and air-condition air outlet.

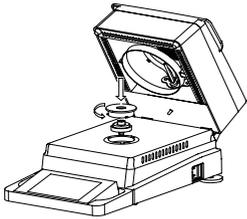
Installation of sample pan bracket



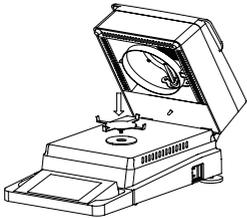
► Open heating cover



► Switch buckle and take it down



► Install bearing block and buckle, switch buckle to the right position



► Place sample pan bracket

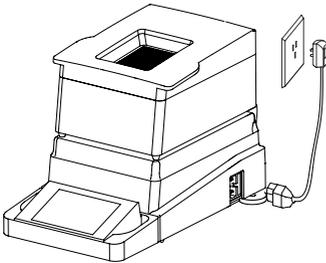
Power connect



Check if the instrument's working voltage is compatible with local supply voltage.



Voltage differences might cause dysfunction and damages to the instrument.



Make sure the power socket has grounding

3 Process overview

Open/ Close (stand by)

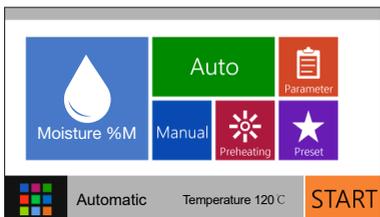
This instrument needs at least 60mins pre-heating to adapt the fluctuation of the environment. If the instrument was placed in the cooler area, then it would need hours' pre-heating to make sure the stability.



► After connect the power, enter the boot screen interface.

▷ Self-check process

Attention: the halogen light would flash several times during self-check process



▷ Enter measuring interface



► Press MENU button on the bottom left to switch to the stand-by status



▷ Enter "Application" interface



▶ Press “Power” button on the bottom right, to switch to stand-by status.



▷ Enter stand-by status.

▶ During this status, touch random place on the display to exit stand-by status.

Application Menu

Through application menu, customer can choose moisture measurement, weight measurement, counting, percentage and unit conversion and many other applications.



► Customer can choose the “App” icon on the lower left corner during any application if customers want to enter the application interface.

▷ Display the application interface.



- ① Applications selectable area: moisture measurement, weight measurement, counting, percentage and unit conversion.
- ② Standby: switch the moisture meter into standby mode.
- ③ Function selectable: application, setting and calibration.

Application lists in moisture measurement



Moisture Measurement

Start default applications.

This app is to measure the sample's moisture, dry weight, wet weight and other applications.



Weighing

Used to determine the weight of the sample.



Counting

Used to determine quantity of samples with similar weight.



Percentage

Used to determine the percentage between to-be-measured sample and reference sample.



Conversion

Custom conversion ratio to be used, read weight directly after multiplied by this ratio.

Choose Applications

In the app interface, shows different measurements that are available.



▶ Press and start the application (e.g. Weighing)



▷ come to the weighing working interface.

▶ Choose "Applications" icon, users are able to get back to the application list interface and re-choose the related applications.

Calibration



▷ Pictures on the left is the calibration interface.

Moisture analyzer provides calibration and options as follows

- External calibration: this feature you need to use the external calibration counterweights for moisture meter calibration.
Attention: please pay attention to the common difference of standard weights.
- Internal calibration; this function needs internal weight to calibrate.
Attention: only can be achieved by ESH series moisture analyzers with internal calibration function.
- Horizontal calibration: horizontal adjustment.



Before using this instrument, weight calibration must be done in locations where moisture analyzer will be placed. External and internal calibration selectable.

- Do calibration every time after moisture analyzer is started.
- Do calibration every time after adjusting the balance
- Do calibration every time when ambient conditions are changed.
- Do calibration every time when moisture meter is placed/ moved to a new place.

Horizontal Calibration



▶ Press menu button in any application.

▷ Display application interface.



▶ Choose calibration to enter calibration interface.

▷ Display calibration function menu interface.

▶ Choose horizontal calibration.



▷ Display horizontal calibration interface.

▶ Twirl the leveling feet left or right according to the placement of electronic bubble, until it stands on the right middle.



▶ Press “ back” icon, revert back to calibration interface.



Balance need to be re-adjusted when instrument is moved.

External Calibration

▶ Clean weighing pan



▶ Press menu button on left bottom in any application.



▷ Display the application interface.

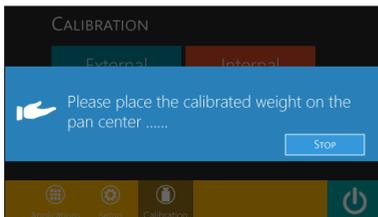


▶ Select calibration.

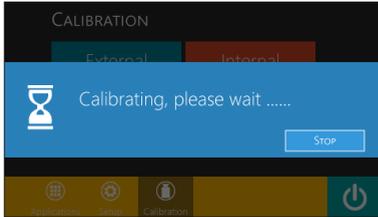


▷ enter calibration interface .

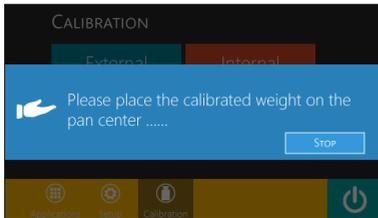
▶ Select external calibration.



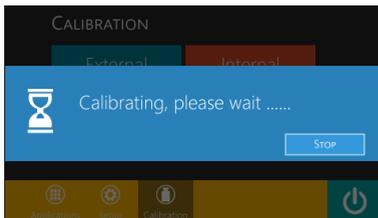
▷ remind users to place standard weight on the middle of the pan.



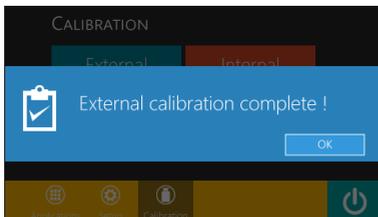
► When the standard weight is placed on the pan, moisture calibrate automatically. Attention: the weight should be the same as indicated.



► Remove the weight according to indication.



▷ When the weight is removed from pan, moisture analyzer starts zero point calibration automatically.



▷ Press "OK" to finish calibration.



During calibration, press "stop" to terminate the calibration process.

Internal calibration (only available with ESH moisture analyzers with internal calibration function)

▶ Clean weighing pan.



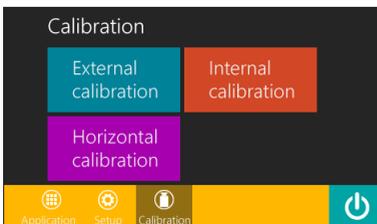
▷ Press menu button on the left bottom in any application.



▷ Display the application interface.

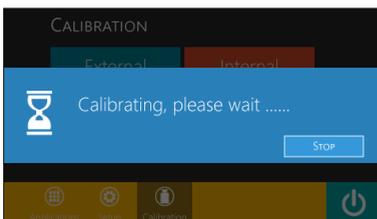


▶ Select calibration.

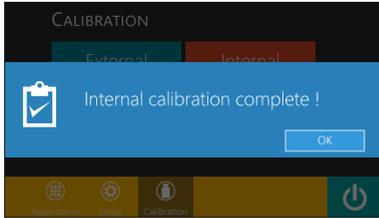


▷ Enter calibration interface.

▶ Select internal calibration.



▷ At this time, moisture meter is under calibration, please wait.



▷ Press “OK” to finish calibration.



Internal calibrating is only available with ESH moisture analyzers with internal calibration function.

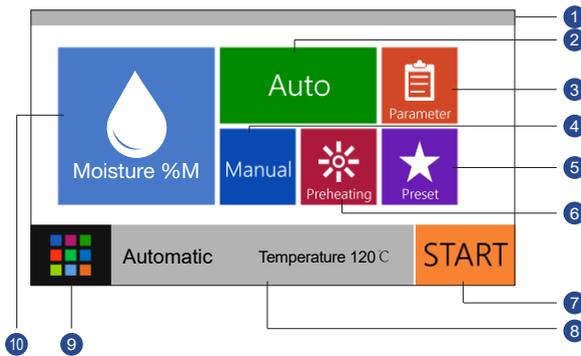
4 Moisture measurement



Please do not use any sharpen tool (ex. Ball pan) to click the touch screen in case of doing damage the instrument.

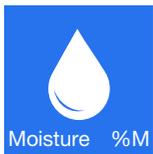
- Laboratory gloves are available in operation.

Major interface of moisture measurement



- ① Processing time displaying column.
- ② Automatic measurement mode.
- ③ Customized specification.
- ④ Manual measurement mode.
- ⑤ Default measurement mode selection.
- ⑥ Preheating mode.
- ⑦ Start button for moisture measurement.
- ⑧ Current measurement and specification display column.
- ⑨ Menu button.
- ⑩ Button of moisture measurement result for selecting.

Moisture Analyzer function interface



Moisture measuring mode: provide different measuring modes for option, like dry weight and humidity, etc.



Custom parameter: could setup measuring parameters, and save as custom date for future use.



Preliminary measuring method: there are some preliminary measuring methods for optional.



Auto measuring mode: the instrument could process automatically according to the setup.

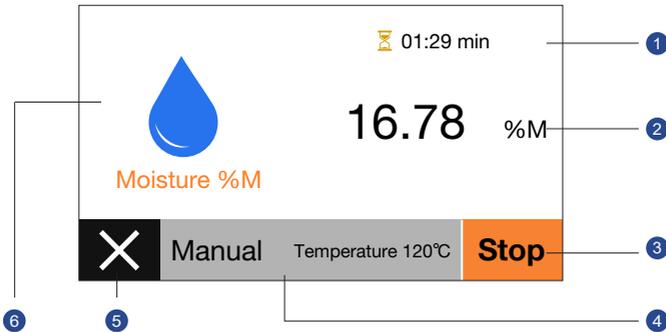


Manual measuring mode: process manually.



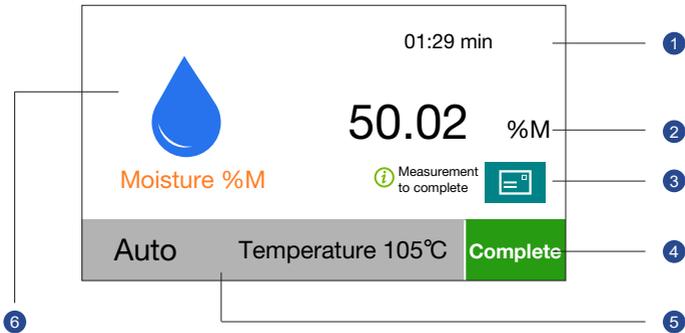
Pre-heating mode: when ask for high accuracy measuring result, this function could pre-heat sample pan and heating cell, etc. to anhydrate residue and some other volatile substance.

Moisture Analyzer working interface



- 1 Measuring time (RT)
- 2 Measuring result (RT)
- 3 Finish current sample measuring and revert back to finished interface (manual mode).
- 4 Current measuring mode and parameter.
- 5 Cancel/ stop current sample measuring and revert back to main interface.
- 6 Display of measuring result.

Moisture Analyzer finished interface

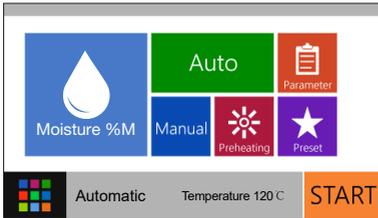


- 1 Overall measuring time.
- 2 Measuring result.
- 3 Measuring report button.
- 4 End current sample measuring and revert back to main interface.
- 5 Measuring mode and parameter.
- 6 Display of measuring result.

Moisture measuring preparation

Auto-finish mode

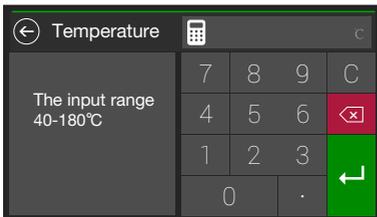
The instrument could estimate automatically during this mode, and auto-finish measuring when it reaches to constant weight (which means in internal time/ unit time, sample's weight loss is less than a certain parameter). This certain parameter is factory default, and cannot amend.



▷ Main interface.



▶ Choose auto measuring mode.



▷ Desiccation temperature setup interface.

Attention: temperature setting should be in valid range (40-180 120°C).

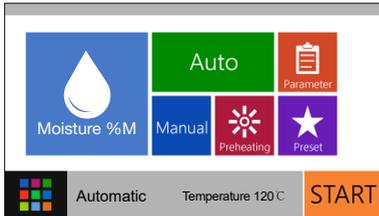


▶ e.g. desiccation temp. 120°C , press number “120”, then press “confirm”, revert back to measuring interface.

▶ Press “Start” button to start samples measuring.

Manual measuring mode

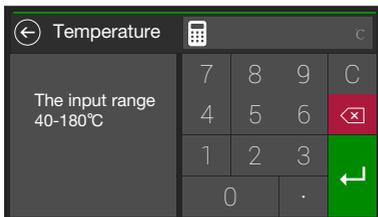
The process of measuring only stops when you press “stop” button during this measuring mode.



▷ Main interface.



▶ Choose manual measuring mode.



▷ Desiccation temperature setup interface.

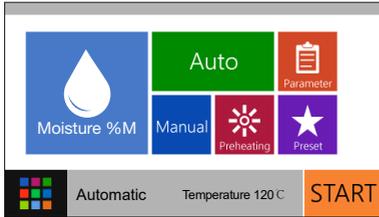
Attention: temperature setting should be in valid range (40-180 120°C).



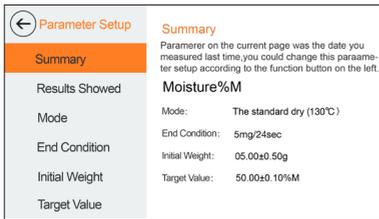
▶ e.g. desiccation temp. 120°C , press number “120”, then press “confirm”, revert back to measuring interface.

▶ Press “Start” button to start samples measuring .

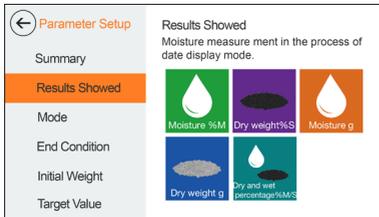
Parameter



- ▷ Moisture analyzer main interface.
- ▶ Choose parameter setup.



- ▷ Shows parameter setup guideline.
- ▷ Parameter on the right side was the date you measured last time, you could change this parameter setup according to the function button on the left.



- ▶ Measuring mode options
- ▷ Several options you could choose (moisture content %M, dry weight %S, etc.)



- ▷ Represent that object has been chosen.



Moisture percent content — moisture's percent content in measured sample

$$\text{Moisture \%M} = \frac{\text{initial weight} - \text{end weight}}{\text{initial weight}} \times 100\%$$

Moisture %M



Solid's percent content — solid's percent content in measured sample

$$\text{Dry weight \%S} = \frac{\text{end weight}}{\text{initial weight}} \times 100\%$$

Dry weight %S



Moisture content — moisture content in over sample weight

Moisture content g = initial weight - end weight

Moisture g



Solid's content — solid's content in over sample weight

Dry weight g = end weight

Dry weight g

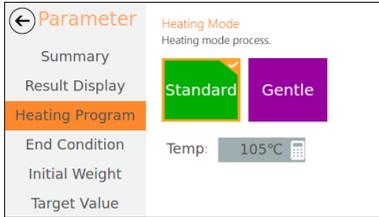


Dry and wet percentage — moisture and solid's percentage

$$\text{Dry and wet percentage \%M/S} = \frac{\text{initial weight} - \text{end weight}}{\text{end weight}} \times 100\%$$

Dry and wet percentage

%M/S



- ▶ Choose heating mode.
- ▷ Heating mode process.



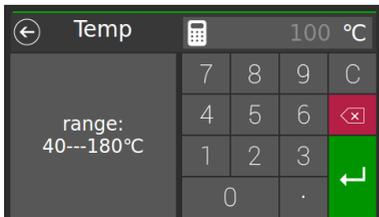
- ▷ This heating mode, could reach target temperature quickly.



- ▷ This heating mode, temperature increase gradually from initial desiccation to end desiccation.



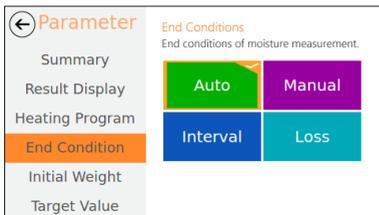
- ▶ Click temperature display button and setup desiccation temperature.



- ▶ Input desiccation temperature within allowed temperature range.



- ▶ Press “confirm” button, and revert back to heating mode interface.



- ▶ Choose finish/end conditions.
- ▷ Several options (auto, manual, timing, and weight loss).

Auto

▶ Auto-stop mode: refer to details specified in chapter auto measuring mode.

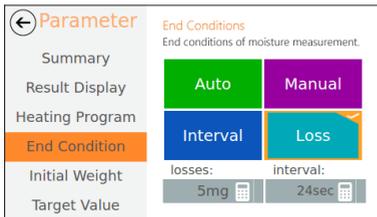
Manual

▶ Manual-stop mode: refer to details specified in chapter manual measuring mode.

Interval

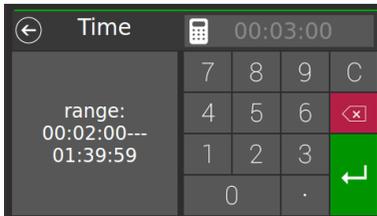
▶ Timing mode: the instrument stops measuring when reach to targeted timing set.

▶ Timing-set interface.



00:03:00

▶ Click to set-up time.



▶ End time setup.

▶ Input end time (hour : minute : second).

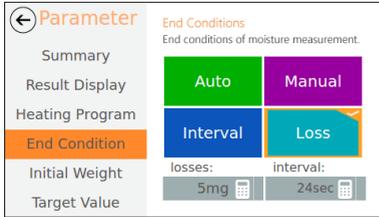


▶ Press "confirm" to set-up desiccation time, and revert back to finish/ end condition interface.

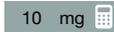
Loss

▶ The instrument automatically analyzes and finishes sample measuring according to the custom weight loss. Weight loss: loss of average weight per unit time.

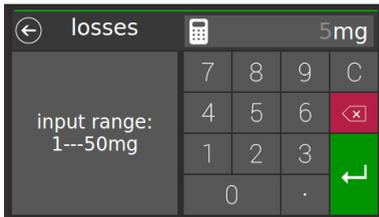
This mode could also referred as auto-end mode.



▷ Weight loss interface.

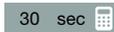


▶ Choose parameter of weight loss.

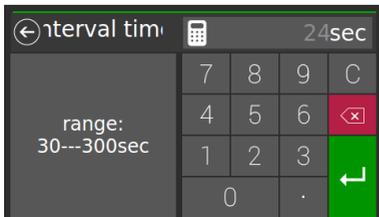


▷ Weight loss setup.

▶ Input weight loss parameter (1-50mg) and press “confirm” button.

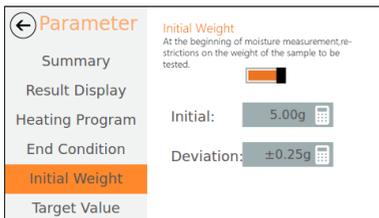


▶ Choose interval time.



▷ Interval time setup.

▶ Input interval time (30-300 seconds) and press “confirm” button.



▶ Choose initial weight.

▷ Initial weight parameter setup interface.

Initial weight: process multiple measuring with same sample, the measuring result would more accurate when initial weight is the same



▷ On/ off function button for initial weight.



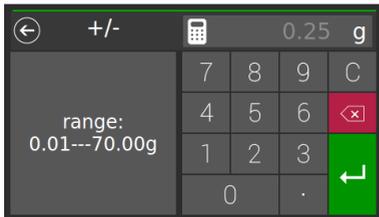
▶ Click initial weight display button.



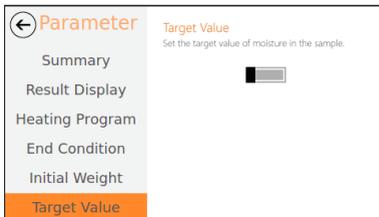
- ▷ Display initial weight setting.
- ▶ Input initial weight, press confirm and revert back to initial weight setting interface.
- Select "deviation" to set up the initial weight deviations.



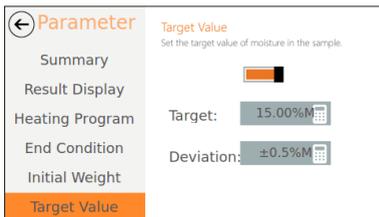
- ▶ Select "deviation" to set up the initial weight deviations.
- ▷ Display the initial weight "deviation" setting interface.
- ▶ Input deviation, press confirm and revert back to initial weight setting interface .



- ▶ Select initial weight function "off".



- ▷ Make sure there is no initial weight in parameter settings.



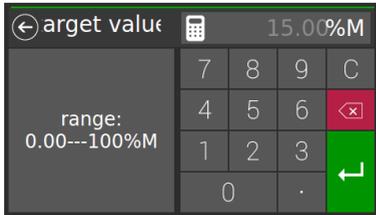
- ▶ Select "target value".
- ▷ Enter "target value" setting interface. Target value means to-be-tested sample is certain and the weight of which is equivalent.



- ▷ Means the function of target value is on.



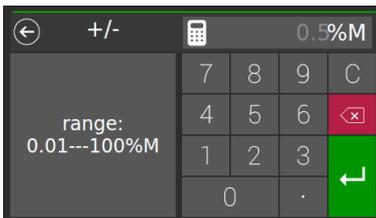
- ▶ Press the target value button.



▷ Input target value.



▷ Select deviation of target value.

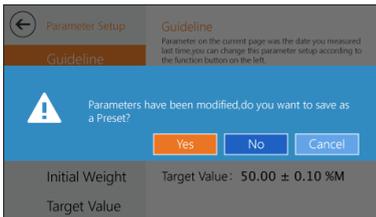


▷ Enter deviation setting interface.

▶ Input deviation range.



▷ Turn off the function of selecting target value.



▷ Save parameter settings.

▶ Select "yes", and the data will be saved.

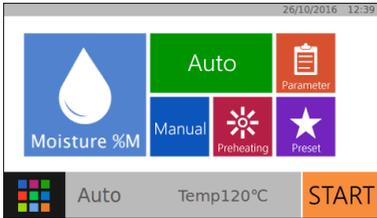
▶ Select "no", the measuring method and data will not be saved and only be treated as the current measurement. Revert back to measuring main interface.

★ Preset		Cancel	Save
flour	#1	Custom1#5	
rice	#2		
tea leaf	#3	Result display:Moisture%M	
Custom1	#4	Standard drying(105°C)	
Custom2	#5	End:losses(5mg/24sec)	
Custom3	#6	Initial weight:5.00±0.25g	
		Target value:	

▶ After selecting storage location, press save and the data will be saved in the memory storage so that it can be used again in the future.

Pre-settings

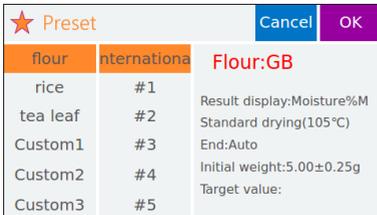
This function is to use measuring data that were saved and measured before. In which, flour#1, rice#1, tea leaf#1 are pre-setted, they cannot be changed, only for reference.



▷ moisture measuring interface.



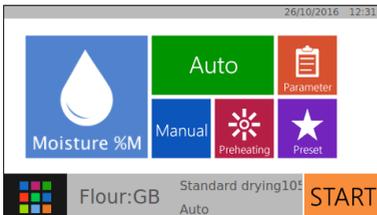
▶ Click pre-setting button.



▷ Enter pre-setting mode interface.

▶ e.g.: Select flour and national standard.

▶ Press confirm.



▷ Revert back to main interface.

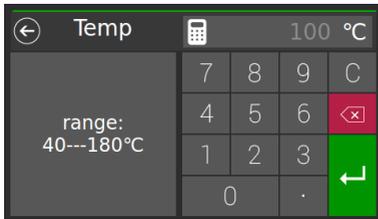
START

▶ Press start to launch the measurement process with flour national standard.

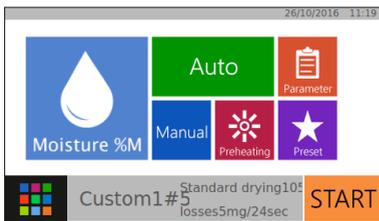
Pre-heating



- ▶ Press pre-heating button on moisture measuring main interface.



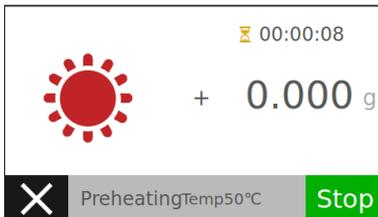
- ▷ Enter pre-heating setting interface.
- ▶ input temperature range from 40-180, press confirm .



- ▷ Revert back to moisture measuring main interface .



- ▶ Press start button, enter pre-heating mode.



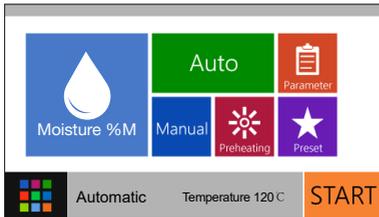
- ▷ under Pre-heating.



- ▶ Press “stop” button, to stop pre-heating, Revert back to moisture measuring main interface .

Moisture measuring process

Start



- ▶ When measuring method is confirmed, press start and launch moisture measuring process.

Preparation



- ▶ Open the upper heating cover.



- ▶ Put pan on the bracket and close the cover.



- ▶ Wait until the reading is stable.

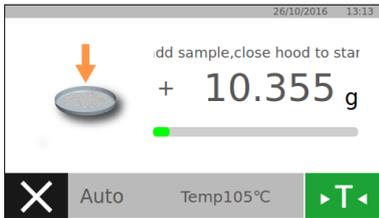


- ▶ Open upper cover again.

Add the sample to be tested

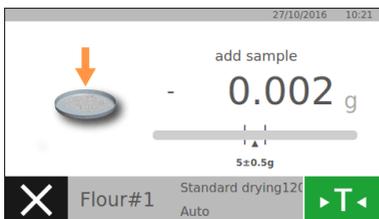


- ▷ indicate to put sample on the pan.
- ▶ put sample on the pan.



system require that sample weight should more than 0.2g, if not:

- ▷ the instrument indicates to put more sample on the pan close the cover.



if you have initial weight setting, there will be weight leverage on the display, which turns blue if sample id not enough:

- ▷ indicate to put more samples.



weight leverage would be red if sample is too much:

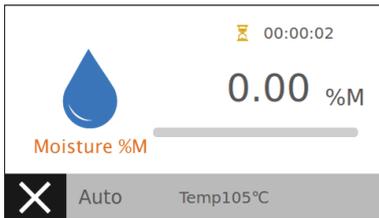
- ▷ indicate to reduce part of the sample.



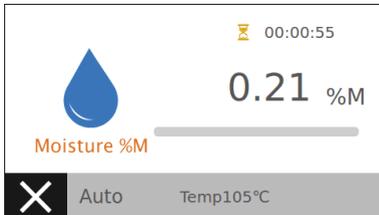
weight leverage turns into green, if sample weight is just enough:

- ▷ Indicate to close the cover.

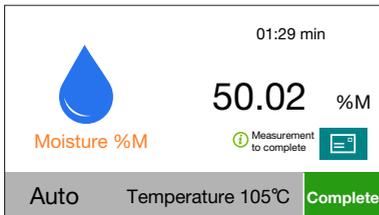
Measurement analysis



- ▷ Under measuring process
Attention: halogen lamp will turn on. After reaching pre-seted temperature, halogen will flash slowly
This interface means customers haven't use target value function.

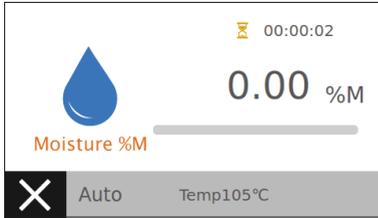


- ▷ This interface means that customers are using target value function .

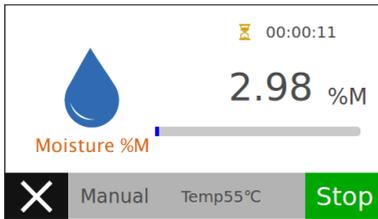


- ▷ Measurement complete.

End measuring



▷ When select auto or weight loss off mode, moisture analyzer will automatically stop the measurement and revert back to complete moisture measuring interface.



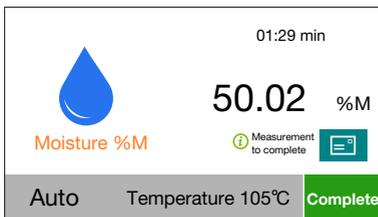
▷ When select manual mode, press stop button on the right bottom, moisture analyzer will stop the measurement and revert back to complete moisture measuring interface .



▷ When select timing mode, moisture analyzer will stop the measurement and revert back to complete moisture measuring interface when reach to pre-setting time.



▷ Press" cancel" button to cancel current measuring and revert back to moisture measuring main interface.

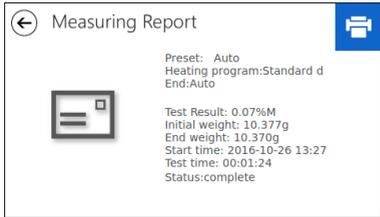


▷ Complete moisture measuring interface.

Attention: the instrument will stop measuring and enter end measuring interface if you open the cover during process.



▶ Press this button to review measuring report.



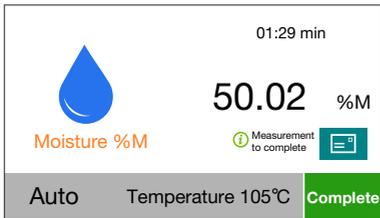
▷ Show measuring report content.



▶ Press this button to print the measuring report.



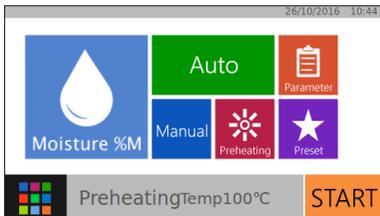
▶ Attention: only available when connect to serial port printer



▷ complete moisture measuring interface.



▶ Press complete button on the right bottom to revert back to main interface.



▷ preparation for next sample measuring.

5 Applications

Attention: should only be used within weighing capacity (refer to technical parameters)

Weighing Application



▶ Press menu in any application.



▶ enter application interface.



▶ Press weighing.



▶ Enter weighing interface .

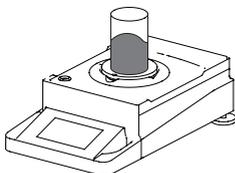


Zero
▶ Empty weighing pan.
▶ Choose ▶0◀ to zero moisture analyzer.



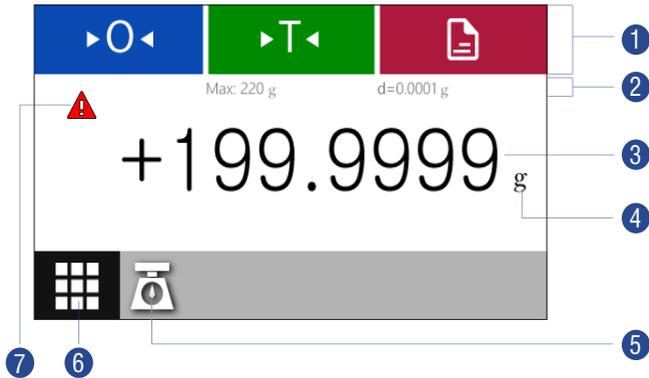
Tare

- ▷ If you measuring sample with container, firstly put this container on the pan bracket
- ▶ Choose ▶T◀ " to tare, and reading would be back to zero.
Container's weight would be deducted from overall weight.
Overall weight tare range



- ▶ Put sample on the pan.
- ▷ Record reading only when numbers on the reading display is stable and weighing unit turns to solid black.

This application's available only when sample weight is within weighing capacity.



- ① Toolbar, shows us buttons which are applicable. including zero ►O◀, tare ►T◀, and print 🖨️.
- ② Max: maximum weighing capacity; d: accuracy.
- ③ Current reading.
- ④ Weighing unit (click to enter unit setup, weighing mode only).
- ⑤ Shows current application.
- ⑥ Menu: click to enter application menu.
- ⑦ Error alarm, click to review details.

Weighing unit conversion

Purpose: weighing unit configuration and accuracy of the reading



► Switch to other weighing unit, please click unit button (like “g”) on weighing interface.



▷ Then enter weighing unit interface.
 ► Click unit that you need, like (gram, carat, kilogram, etc.)



▷ Revert back to weighing interface once you choose specific weighing unit.
 The instrument would keep the same setup unless you change once again.

Weighing unit conversion ratio

This tab contains conversion ratio between several common weighing units and gram unit.

Weighing unit	conversion ratio	display
Gram	1.0000000000	g
Carat	5.0000000000	ct

Counting application

Purpose: measuring materials with nearly the same weight. Firstly, measuring certain material's weight, and then measuring uncertain material's weight. You could read materials' quantity and weight per unit at the same time.

Minimize the possibility of counting errors.

- guarantee material's average weight of every parts.
- with more samples' quantity, comes with high accuracy.



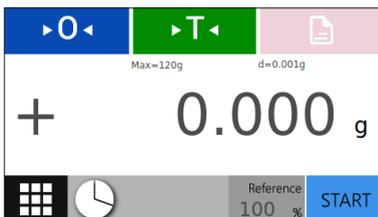
► Press Menu button in every status.



▷ Enter application interface.



► Choose counting button.



▷ Enter counting interface.
Preliminary quantity setup is 10pcs.



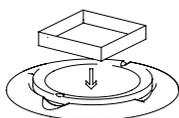
► Press quantity button if you want to change quantity.



- ▷ Enter quantity interface.
- ▶ Choose specific quantity (1, 5, 10, 20, 50, 100pcs for option)



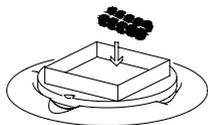
- ▶ Choose ▶ 0 ◀ to zero reading.



- ▶ Put container on the pan bracket.



- ▶ Press ▶ T ◀ to tare.



- ▶ Put certain quantity sample in the container.



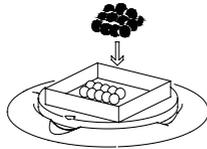
- ▷ Read samples' weight.



- ▶ Choose "start".



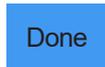
- ▷ Shows quantity that you already choose. Unit weight shows on the bottom of the display.



- ▶ Put uncertain material in the container.



- ▷ Count and read quantity.



- ▶ Select "Done".
- ▷ Application to count the initial interface.

Conversion

Weight multiply custom conversion ratio, if the ratio is less than 1, division is also applicable. The ratio will be saved in the system memorizer.

e.g. if you want to calculate the unit weight for A4 format paper, process as follows
—unit weight = paper weight/ surface area (like 80g/M2 or 70g/m2)
—surface area of one DIN A4 = $0.210 \times 0.297 = 0.06237 \text{m}^2$
—divide 0.06237, comes to 16.03335.
—setup conversion ratio to 16.03335 in the application system.



► Press menu button in any status.



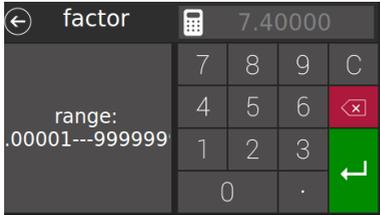
► Choose conversion in the application interface.



▷ Enter conversion interface.
Multiplier shows under conversion.

Factor
100.000

▷ Press conversion button if you want to change conversion ratio.



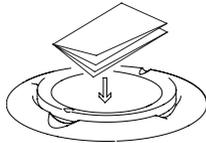
- ▷ Enter conversion ratio interface.
- ▶ Input specific ration.
- Press “finish” button and revert back to previous interface, or cancel input/ without input and revert back directly.



- ▶ Press >0< to zero reading if necessary.



- ▶ Click “start”.



- ▶ Put sample on the pan.



- ▷ Shows reading directly (Sample weight multiply ration that you set-up)
- If you have other samples, put them on the pan, system would automatically calculate weight through ration that you set-up.



- ▶ Select "end".
- ▷ The application back to the initial conversion interface.

Percent application

Purpose: ascertain the percentage or percent differences between sample and reference weight



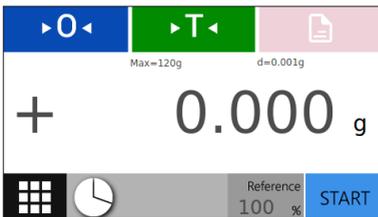
▷ Application interface.



▶ Press menu button in any status.



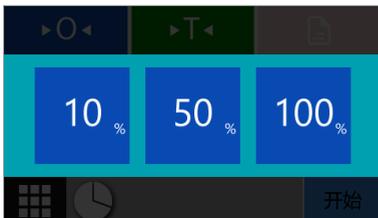
▶ Choose percentage.



▷ Enter percentage application interface.
Default percentage setting is 100%



▶ Press percentage button if you want to change.

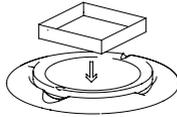


▷ Several percentages setting for optional
(10%, 50%, 100%).

▶ Click percentage that you choose.



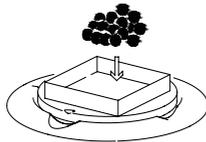
▶ Press **0** to zero reading.



▶ Put container on the pan bracket .



▶ Press **T** to tare.



▶ Put sample in the container.



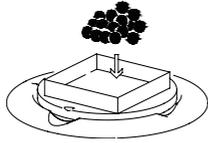
▷ Read sample's weight.



▶ Press "start".



▷ Reference percentage
Reference sample's weight shows on
the bottom of the display.



► Put to be measured sample in the container.



▷ Display the percentage based on reference sample.



► Press “End”
▷ Revert back to initial percentage interface.

6 Settings

application lists on setting menu

The function of settings cover all the basic settings, any changes based on these settings could be applied immediately.



Weighing settings

It is used to do some basic settings of the weighing function.



Print settings

It is used to set up the printing mode.



System settings

It is used to set up system parameters and default settings.



Instrument information

It shows basic information about moisture analyzer.

Enter setting menu and change settings



▶ Select menu button in any applications.



▷ Display application interface.

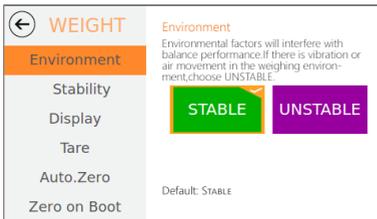


▶ Press setting button to enter setting interface.



▷ setting interface .

▶ Click required setting to enter setting menu (e.g.: weighing)



▶ Select one of the settings and change if you want.



▶ Status show chosen

▶ Select  Select to revert back. The changed settings will be launched at once, no need to restart the instrument.

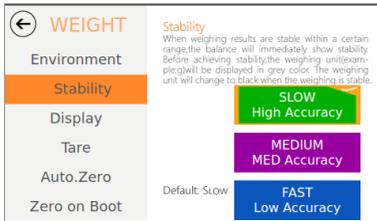
Weighing setup

It is used to set up some basic settings of weighing functions



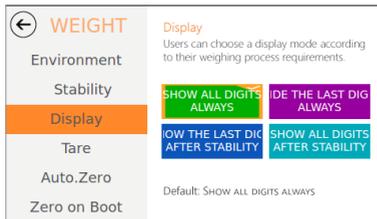
- Environment

Environmental factors will inevitably interfere and influence the weighing process/ If air or vibrations are affecting the weighing, select Unstable.



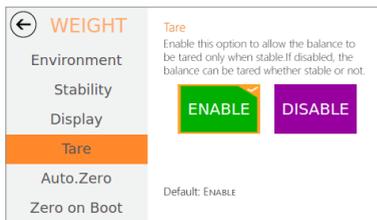
- Stability

When weighing is stable within a certain range, the weigh unit will change from gray to black. The tolerance can be set in the Stability menu.



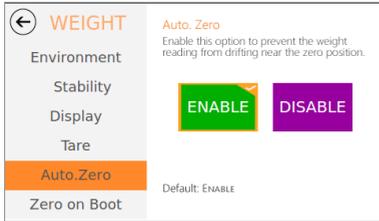
- Display

The weighing display can be changed to required reading accuracy.



-Tare

Use this menu to enable the tare function only when moisture analyzer is under stable status.



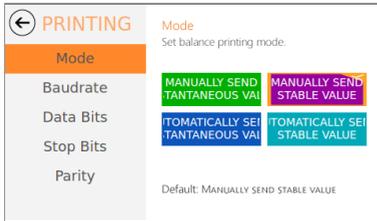
-Auto Zero
moisture analyzer will automatically eliminate the influences of drift near zero position, to achieve high accuracy.



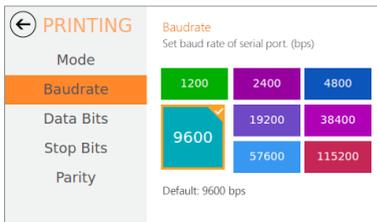
- Zero on Boot
auto zero when starting up.

Print setting

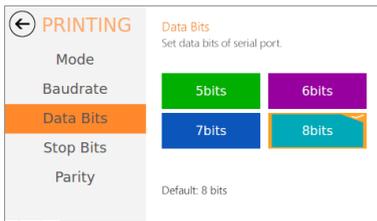
It is used to set up the moisture analyzer's printing mode.



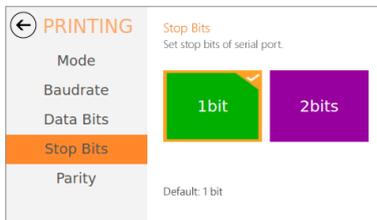
- Print mode.
output mode of print setting.



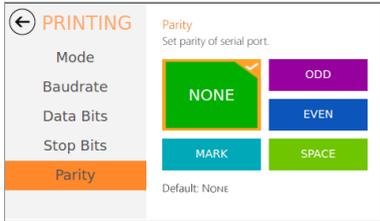
- Baud Rate
print baud rate setting.



- Date bits
data bits setting.



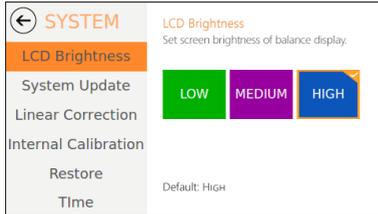
- Stop bits
stop bits setting.



- Parity bit setting.

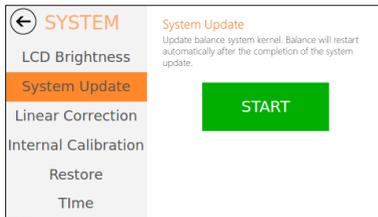
System Setup

It is used to set up system parameters and default setting.



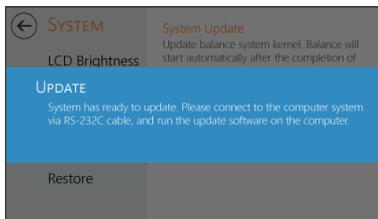
LCD display Brightness

- display Brightness setting.



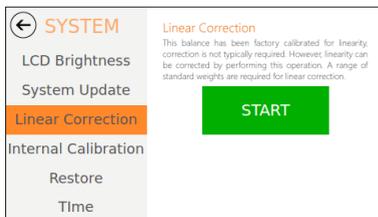
System Update

- Update system internal core, can not stop the process once started system restart after updating.



► Click “start” and blue windows will appear.

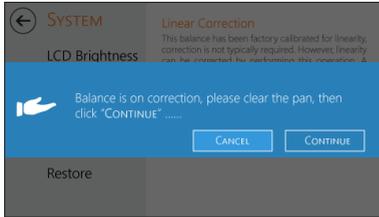
Now the system in updating, use standard RS-232C cable to connect PC, with accessory system in PC to update the software.



Linearity correction

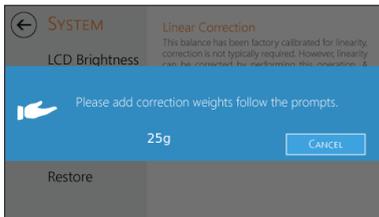
- In order to achieve high accuracy measuring result, moisture analyzer should set up linearity users don't need to revised again!

⚠ use standard weight to set up linearity .

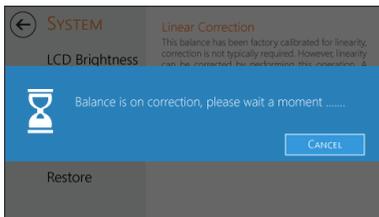


► After press “start” , a blue window will appear.

Moisture analyzer start to set up “linearity correction”, please empty weighing pan, click “continue”.....



► Put calibration weight according to indication, and click “continue”.

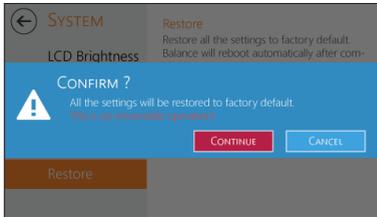


► Moisture analyzer is under “linearity correction”, please wait.



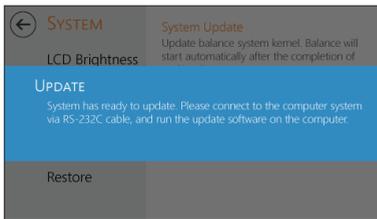
Default setting

- Reset all settings to defaulted status system will automatically restart the instrument after completion .

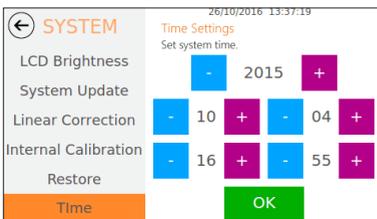


Press "restore", a blue window will appear.

- ▶ After adopting this function, all settings will be back to defaulted status. After restart, set up linearity in order to achieve high accuracy measuring result.
- ▶ Press "continue" and confirm default setting.



▶ The system is under default setting process.



Time settings

- set up the calendar according to the picture on left.



▶ Set up time, and press setting button to save current time setting.

Information about this instrument



- Shows this instrument's manufacturer information, product mode number, kernel version and Interface version.

7 Specifications

Product overview

Standard accessories of ESH series Moisture Analyzer are as follows

- power and voltage: AC 220V±10%; 50Hz±1Hz

Raw material

- base: die-casting aluminum alloy, paint
- upper cover: plastic (ABS/PC)
- heating cell: 304 stainless steel
- pan: aluminum alloy

Protective grade

- dust-proof, water-proof
- anti-pollution grade: II
- installation grade: II

Environment requirement for usage

Technical parameter is valid within conditions as follows

- temperature of working environment: ① 5 °C ~35 °C , temp. fluctuation is less than 5 °C /h. ② 5°C ~35°C , temp. fluctuation is less than 15°C /h
- relative humidity: ① 30%~70% ② 30%~75%

Process under environment without influences of vibration, airflow and magnetic

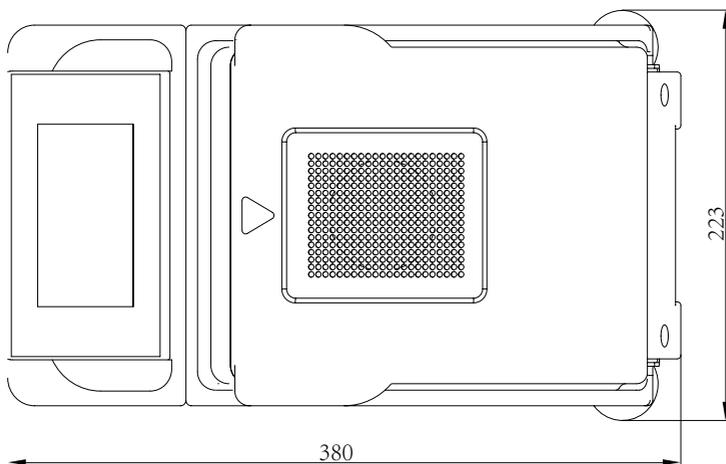
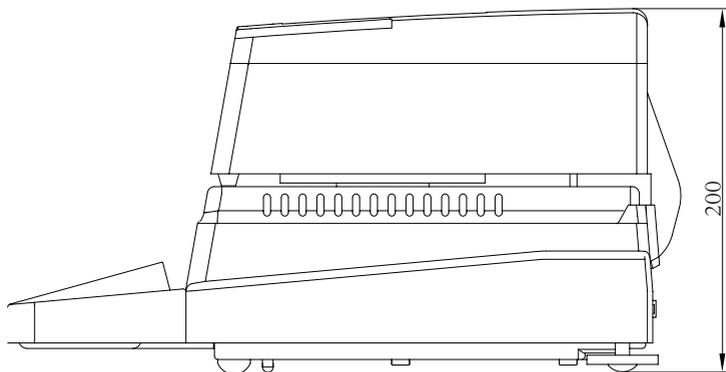
Pre-heating time should no less than 60 mins in stable environment, power source should have reliable grounding connection.

Technical Parameters

ESH series Moisture Analyzer

Model		ESH 35	ESH 31	ESH 41
Readability	g	0.005	0.001	0.0001
Verification Readability	g	0.05	0.01	0.001
Max. Capacity	g	120	120	120
Min. Capacity	mg	100	20	10
Moisture Content Readability	%	0.01	0.01	0.001
Moisture Measuring Range	%	0.1-100	0.1-100	0.01-100
Accuracy	0-50g	≤ ±25mg	≤ ±5mg	≤ ±0.5mg
Accuracy	50-120g	≤ ±50mg	≤ ±10mg	≤ ±1mg
Moisture Accuracy	%	±0.5	±0.5	±0.2
Repeatability	g	0.001	0.001	0.0001
Overload warning	g	120.45	120.09	120.009
Temperature Range		40°C ~180°C		
Operating Temperature Range	5°C ~35°C,	temperature fluctuation not more than 5°C /h		
Operating Humidity Range		40%~85%		
Power		AC:220V ± 10%; 50Hz± 1Hz		
Dimensions	mm	380X200X210 (L * W * H)		
Shipping Dimensions	mm	500X310X450 (L * W * H)		
Pan Size	mm	Φ90		
Net Weight	kg	5.8		
Gross Weight	kg	7.8		

Moisture Analyzer outline dimensions



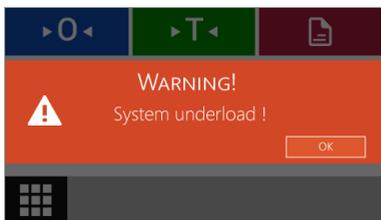
8 Troubleshooting

Solve common problems that occur during application

This chapter helps to solve some common problems that might come across during daily use. Please contact Sunny Hengping Instrument after-sale service center if you the problems you met cannot be solved.

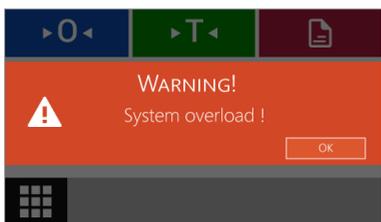
Malfunction warning and troubleshooting

Please contact local distributors or Sunny Hengping Instrument after sale service center if you the problems you met cannot be solved. Before sending the maintenance requests, you could also try solutions as follows:



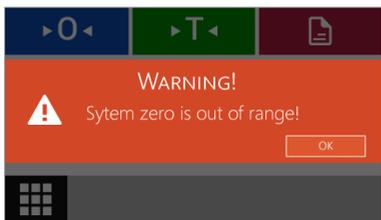
Under-load warning :

- the pan is not placed on the bracket.
- there might be some unknown subjects under the pan, check carefully.



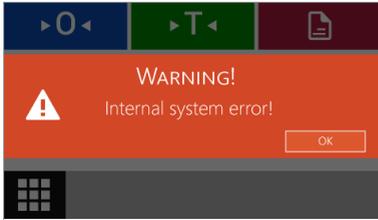
Over-load warning:

- the weight excess max. capacity on the pan, reducing weight accordingly.
- used to calibrate the instrument with weighing that is lighter than standard calibration weighing. In this situation, re-calibrate the instrument with standard weighing attached in the package.



Auto-zero malfunctions:

- the weight is out of the range when you need zero setting.
- the weight of initial zero setting is 20% larger than max. capacity, or regular zero setting, over 4%. Check if need to empty pan.



Contact after sale service if there are internal errors coming up.



Maintenance should only be handled by well trained technicians from Sunny Hengping Instrument. Do not repair the instrument with power on! Maintenance handled by green hand is invalid and customers should take the consequences or risks brought by, like false reading and system crash etc.

A Date Communication

Date Communication

- Date interface applied with standard nine-pin RS 232serial port, which makes it possible that ESH series moisture analyzer could connect with micro-computer and printer.

micro (9pin) ——— balance (9pin)
 2 (RxD) ——— 2 (TxD)
 3 (TxD) ——— 3 (RxD)
 5 (GND) ——— 5 (GND)

Serial baud rate 9600bps

- 10-digit bit format, with initial digit (0), 8 date bits (ASCII, low order digit in front), 1 digit stop bit (1)
- without odd and even number verification.
- continuously date output, do not need specific indication orders.

Output format of character string:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Sign	blank	reading								blank	unit	CR	LF		
±	┌	┌	1	9	9	.	9	9	9	9	┌	g	CR	LF	

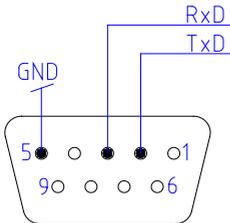
0: show as positive and negative sign

2~10: weight reading, align right

12~13 : Units

Display	output	
	13	14
g	g	
ct	c	†

Serial definition



Every ESH series Moisture Analyzers could connect peripheral equipments with RS-232C interface (like nine-pin serial printer and micro-computer).

Once connect with printer, could press  to output weighing result according to the print settings.

B Maintenance and Cleaning



Health risks might be caused by product pollution because of chemical sedimentation and microbiological residue. So daily maintenance and cleaning is key important, please abide by cleaning standards.

- ▶ Disconnect power: if necessary, disconnect power cable from the instrument.
 - make sure that no liquid or dust enters into inner part of the instrument.
 - do not disassemble the instrument.
 - do not use detergent which include solvent and abrading component, they could cause damage to the instrument.

- ▶ Please use soft and napless materials to clean the shell and the weighing pan, or use mild detergent in necessary. (suggest that clean weighing pan and working plate each time after measuring chemical products, though the instrument possess high quality material, still there are chances it might corrode the instrument and pan if corrosive material are sedimentated on the stainless steel surface for a long time)

- ▶ Use dry and soft material to wipe the instrument after cleaning.

C Warranty terms

We provide one year warranty for this product and responsible for free replacement and maintenance of accessories when dysfunction occurs. Conditions as follows would be excluded.

1. mis-operation;
2. maintain or refit by other company's ascendants;
3. dysfunctions caused by factors besides product itself;
4. process under severe and terrible environments, like high temp., humid and erosive gases around ;
5. natural disaster like fire and earthquake;
6. remove and transport after installation;
7. accessories like consumables;

D Product after-sale service

Dear customer:

Thanks for buying our products, in order to protect customers benefits, we are here to commit maintenance and after sale service.

①、 documents supports

1. valid business license and quality certification (copy files)
2. certificate of conformity available
3. conform to contract terms and after sale quality assurance
4. certified logo SOPTOP available. 

②、 Product warranty terms

	Product type	Model NO.	Policy	Service
1	ESH series	ESH35	One year warranty	Repair & redeliver within 7 days after sending products back
2	ESH series	ESH31	One year warranty	Repair & redeliver within 7 days after sending products back
3	ESH series	ESH41	One year warranty	Repair & redeliver within 7 days after sending products back
4	ESH series	ESH105	One year warranty	Repair & redeliver within 7 days after sending products back

1. provide one year warranty for main components, time valid from the purchase date
2. free debug and inspection
3. maintenances service procedure please inform in advance basic information and dysfunction, so we could obtain default data and profiles
4. conditions besides free maintenance
 - 1) products without our logo, or counterfeit products
 - 2) products or components exceed warranty time
 - 3) dysfunction and damage caused by mishandling without conform to instruction manual

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version: 1.0

Date: January 1st, 2016

Shanghai Sunny Hengping Scientific instrument Co., Ltd



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