



Instruction Manual

USS-HMA1X Moisture Analyzer



Table of Contents

| | |
|---|----|
| Introduction | 2 |
| 1.1 About Moisture Analyzer | 2 |
| Safety Precautions | 3 |
| 2.1 Definition of Warning Symbols | 3 |
| 2.2 Warnings | 3 |
| 2.3 Cautions | 5 |
| Design and Function | 6 |
| 3.1 Components | 6 |
| 3.2 Control Panel | 8 |
| Installation and Adjustment | 10 |
| 4.1 Scope of Delivery | 10 |
| 4.2 Selecting the Location | 11 |
| 4.3 Installing Parts | 12 |
| 4.4 Leveling the Moisture Analyzer | 13 |
| 4.5 Connect to Power | 15 |
| Calibration | 16 |
| 5.1 Single-Point Calibration | 16 |
| 5.2 Multi-Point Calibration | 17 |
| 5.3 Internal Calibration | 18 |
| Measurement | 19 |
| 6.1 Log-in Password | 19 |
| 6.2 Procedure | 19 |
| 6.3 Drying Mode | 22 |
| 6.4 Ending Mode setting | 23 |
| Setting | 24 |
| 7.1 System | 24 |
| 7.2 Printer | 25 |
| 7.3 Report | 25 |
| Maintenance | 26 |
| 8.1 Cleaning | 26 |
| 8.1.1 Cleaning the sample chamber | 26 |
| 8.1.2 Cleaning the heating unit | 27 |
| 8.1.3 Cleaning the display panel and keyboard | 27 |
| 8.2 Disposal | 27 |
| Troubleshooting | 28 |
| Technical Data | 30 |

Introduction

Thank you for choosing the U.S. Solid USS-HMA1X Moisture Analyzer.

The USS-HMA1X moisture analyzer is precise and reliable. It provides a high level of operating convenience and response sensitivity to facilitate determination of the moisture content of your samples. U.S. Solid's dedicated customer service staff are available to answer any inquiries regarding applications and accessories.

To make full use of the functions and performance of the U.S. Solid USS-HMA1X moisture analyzer, please read the manual completely and follow the usage instructions before installation and operation.

1.1 About Moisture Analyzer







Moisture analyzers work according to the thermogravimetric principle. Moisture is determined by the direct weight lost by the sample due to heating from an intense halogen light.

The U.S. Solid USS-HMA1X Halogen Moisture Analyzer determines the initial weight of the sample. The sample is quickly heated by the internal halogen dryer unit causing the moisture to vaporize. During the drying operation, the instrument continuously determines the weight of the sample and displays the loss of moisture. Upon drying completion, the moisture content or the dry solids content of the sample is displayed.

Safety Precautions

U.S. Solid Moisture Analyzer qualifies as state-of-the-art technology and complies with all recognized safety rules. Improper use or handling, however, can result in damage and/or injury. Follow the precautions below to ensure safe and trouble-free operation of your moisture analyzer.

2.1 Definition of Warning Symbols

| | | | |
|---|------------------|---|---------------------------------|
|  | Electrical shock |  | Inflammable/explosive substance |
|  | Hot surface |  | Toxic substance |
|  | Acid / Corrosion |  | General hazard |

2.2 Warnings



- The Analyzer has a 3-pin power socket equipped with a ground terminal. To prevent electric shock and to maintain stability in operation of the analyzer, be sure to ground the analyzer.

- Avoid allowing the analyzer to get wet. It is not a water-resistant structure. Any leakage of liquid into the analyzer may cause damage to the analyzer or an electric shock to the user.



- Use a power source (voltage, frequency, outlet type) adapted to the specification of the analyzer. If excessive voltage is used, the analyzer may overheat and be damaged or cause a fire.

- Do not measure samples that could cause a dangerous chemical reaction or create an explosion or poisonous gas, when the sample is dried.

- Keep flammables away from the analyzer. Parts of the analyzer become very hot. Materials placed near it might catch fire.



- Do not touch the heater cover, the halogen lamp, glass-housing, pan handle, sample pan or sample without adequate protection, burns or scalding may result.

- Parts of the analyzer are very hot when a measurement finishes. For operation, use the specified grips of the heater cover and pan handle.

Use the standard accessory tools.



- Toxic gases produced during the drying process of substances containing toxic or corrosive ingredients may cause irritation (eyes, skin, breathing), illness or death. Such substances may be dried only in a fume cupboard.



- For substances that produce corrosive vapors when heated (e.g. acids), work with small amounts of samples as the vapor may condense on cooler housing parts and cause corrosion.

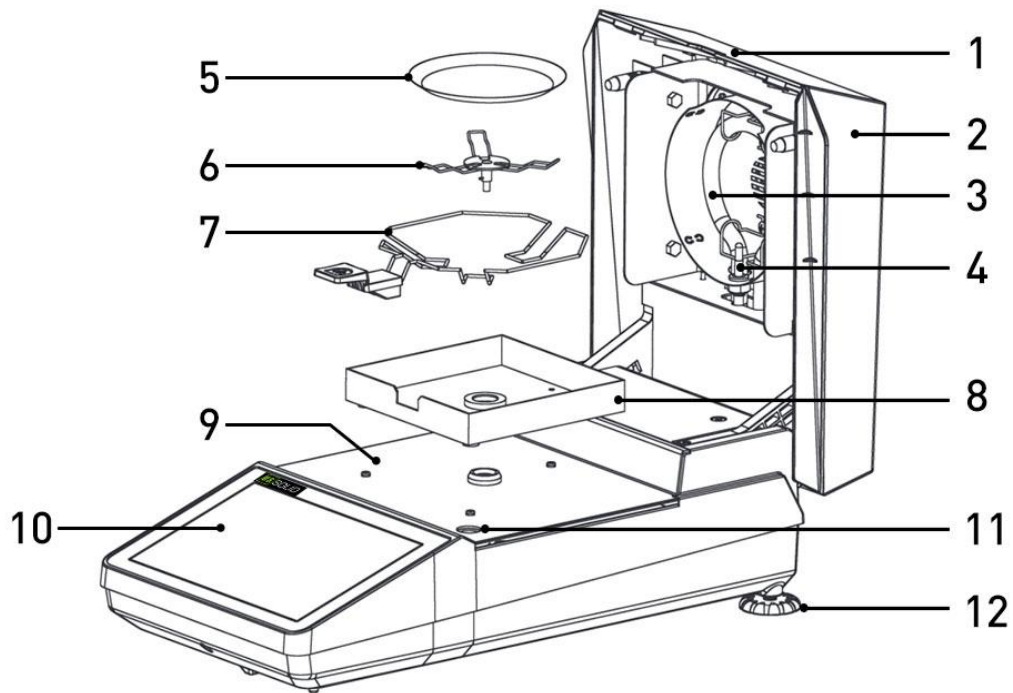
2.3 Cautions



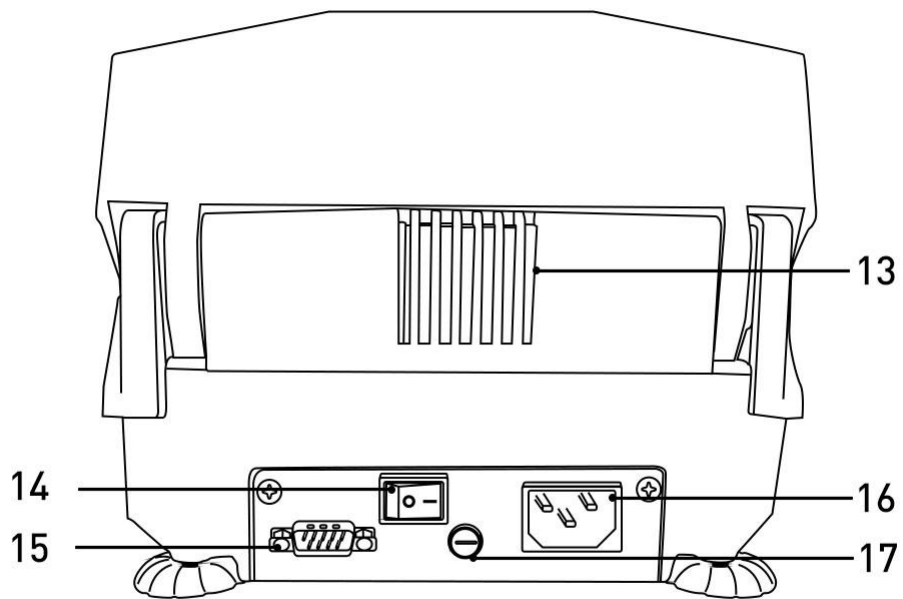
- Operate the Analyzer on a stable, rigid and flat table.
- Handle the moisture analyzer carefully. It is a precision device, subjecting it to impact may result in a malfunction.
- Ensure sufficient free space around the Analyzer as a safety zone. Allow at least 1 meter of free space above the Analyzer. Do not place anything on top of the heater cover.
- Use appropriate personal safety equipment, such as safety glasses, gloves and protective clothing.
- If an abnormal situation occurs (for example, a burning odor is smelt), remove the power cable immediately.
- When the device will not be used for a long period of time, turn the power off and disconnect the power cable.
- The Analyzer must be operated only by trained individuals who are familiar with the properties of the samples being tested and with the equipment operation.
- Do not disassemble, remodel or repair this product or accessories.

Design and Function

3.1 Components

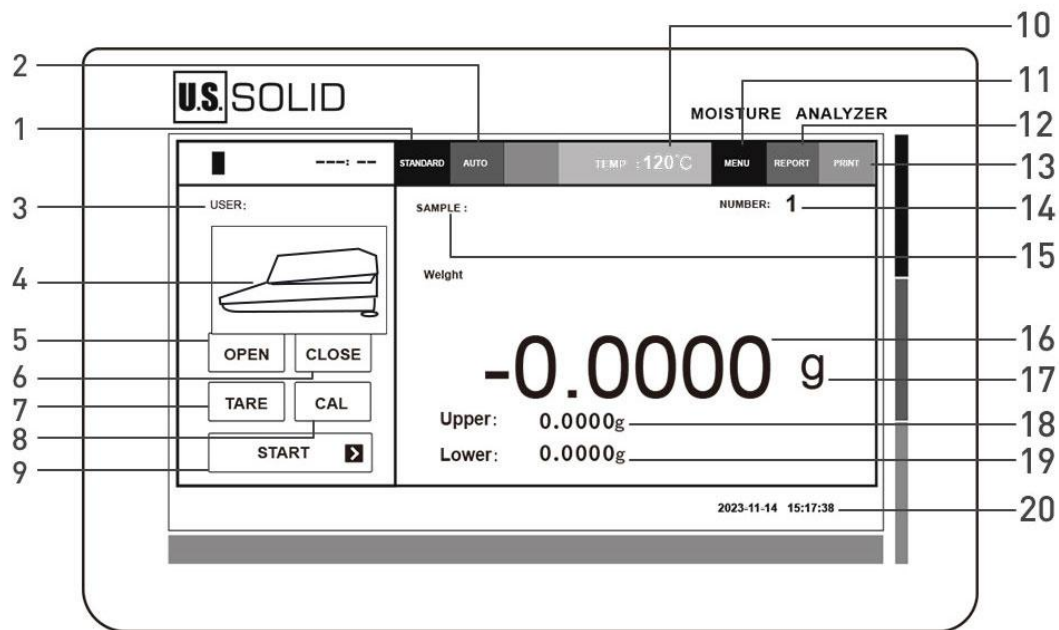


- | | |
|--------------------------|----------------------------|
| 1: Observation Window | 7: Sample Pan Handle |
| 2: Heater Cover | 8: Draft Shield |
| 3: Heater (Halogen Lamp) | 9: Stainless Steel Bracket |
| 4: Temperature Sensor | 10: Control Panel |
| 5: Sample Pan | 11: Level Bubble |
| 6: Sample Pan Holder | 12: Leveling Foot |



- 13: Fan Outlet
- 14: Switch
- 15: RS-232 Connector
- 16: Power Inlet
- 17: Fuse Holder

3.2 Control Panel



| No. | Description |
|-----|---|
| 1 | Test mode selection |
| 2 | Ending mode selection |
| 3 | User name setting |
| 4 | Indicates the opening and closing state of heater cover |
| 5 | Open the heater cover |
| 6 | Close the heater cover |
| 7 | Tare the weighing value |
| 8 | Calibration options |
| 9 | Start measuring |
| 10 | Temperature setting |
| 11 | Menu interface |

| | |
|----|------------------------------|
| 12 | Measuring report |
| 13 | Print the measurement report |
| 14 | Pre-set program number |
| 15 | Name of sample |
| 16 | Measurement result value |
| 17 | Measurement result unit |
| 18 | Upper limit weight |
| 19 | Lower limit weight |
| 20 | Date and time |

Installation and Adjustment

4.1 Scope of Delivery

Unpack and check the completeness of the delivery. The following accessories are parts of the standard equipment for your new U.S. Solid USS-HMA1X Moisture Analyzer:

- 1 Moisture Analyzer Main Body
- 50 Aluminum Sample Pans
- 1 Sample Pan Holder
- 1 Sample Pan Handle
- 1 Draft Shield
- 1 Power Adapter
- 1 100g Calibration Weight
- 1 Instruction Manual
- 1 Quality Certification

Unpacking and checking the instrument for transport damage.

Immediately inform U.S. Solid customer service if you have any complaints or parts are missing.

Keep all all of the packaging. This packaging guarantees the best possible protection for the transport of your instrument when transporting.

4.2 Selecting the Location

Measurement performance of your moisture analyzer depends largely on the surrounding environments.

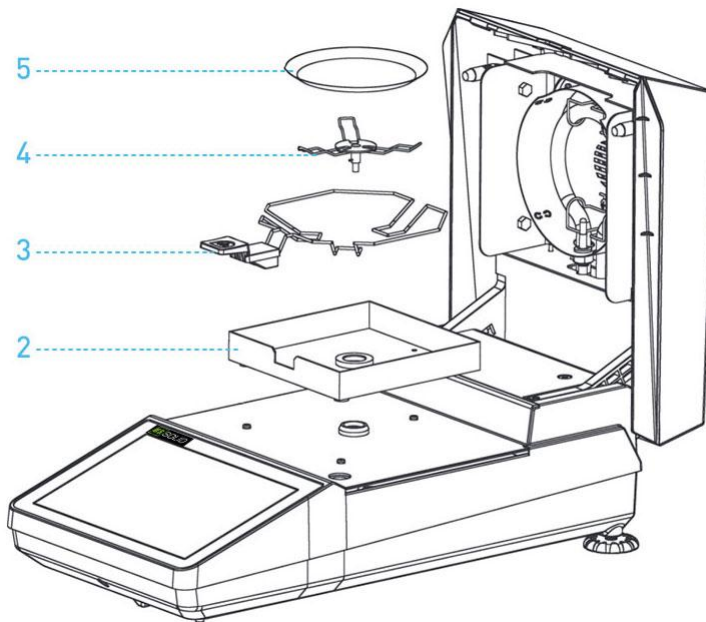
Follow these guidelines to make sure the proper environmental conditions are met:

- Operate the instrument only indoors.
- Make sure that all parts of the instrument reach room temperature (5°C-30°C) before switching it on. Make sure that the relative humidity is between 20% and 80% and that non-condensing conditions are met.
- The power plug must be easily accessible.
- Select a firm, horizontal location that is free from vibrations as possible.
- Avoid direct sunlight.
- No excessive temperature fluctuations.
- Surroundings should be as free from dust as possible.
- Sufficient clearance around the instrument to allow warm air to dissipate.
- Sufficient distance from heat-sensitive materials in the vicinity of the instrument.

4.3 Installing Parts

Procedure:

1. Lift the cover straight up



2. Install the draft shield

Place the draft shield into the sample chamber. Align it with the hole.

3. Install the sample pan holder

Place the pan holder on the axis of the moisture analyzer main unit.

Align the pan holder with the draft shield, and insert them onto the bottom.

4. Place the sample pan handle

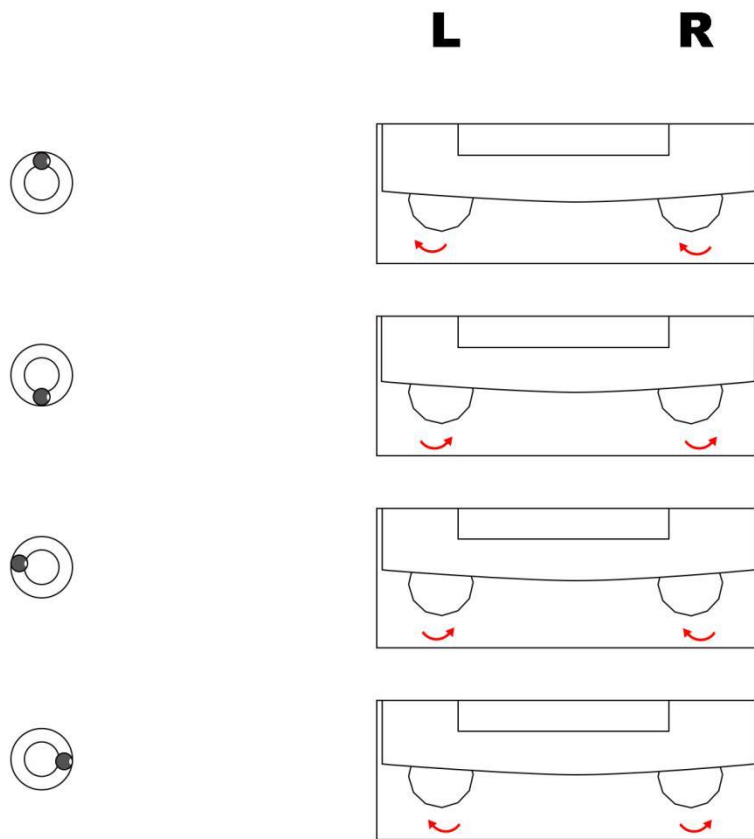
5. Place a sample pan

Place a sample pan on the pan holder so that the brim of the holder can secure the sample pan.

4.4 Leveling the Moisture Analyzer

Accurate horizontal positioning is a necessary condition for repeatable measurements and exact results. To compensate for small irregularities or tilts at this location, the instrument needs to be leveled.

Adjust the leveling feet of the Moisture Analyzer until the air bubble in the indicator is centered. The level indicator is located under the cover towards the rear of the Moisture Analyzer.



| Position of air bubble | Adjustment method |
|------------------------|---|
| up | Turn both feet clockwise |
| down | Turn both feet counterclockwise |
| Left | Turn left foot counterclockwise, right foot clockwise |
| Right | Turn left foot clockwise, right foot counterclockwise |

4.5 Connect to Power

Warning:

- To prevent electric shock, be sure to use the 3-pin power cord with equipment grounding connector.
- Check to make sure the voltage indicated on the moisture analyzer data label matches the local line voltage. If it does not match, do not connect the moisture analyzer to the power source.

Connect a power cable:

- a. Insert the female end of the power cord into the power inlet located at the rear of the main unit.
- b. Plug the male end of the power cord into the outlet.

Note:

To obtain accurate results, the moisture analyzer must be warmed up for at least 30 minutes each time it is connected to an AC power source or after a power outage of more than 30 minutes.

Only after this length of time will the analyzer reach the required operating temperature.

Calibration

Weight calibration is the correction of the difference between the measured value displayed and the true weight (mass) of a sample, or the reduction of the difference to a level within specified permissible error limits.

5.1 Single-Point Calibration

Utilize the included 100g weight with the machine.

Procedure:

1. Tap "CAL" located on the left, or alternatively, tap "MENU" in the upper right corner, followed by "CAL" .
2. To start the single-point calibration, tap "SINGLE-POINT". The screen will then display "Please wait".
3. When the prompt "Please put on the weight" appears, position the calibration weight on the sample pan. The message "Please wait" will be displayed again.
4. Once the screen shows "Please remove the weight", remove the calibration weight.
5. Upon completion of these steps, the machine will automatically finish the calibration process and return to the home screen.

5.2 Multi-Point Calibration

For the multi-point calibration, a set of weights comprising of 100 g, 50g, and 20 g is needed.

Procedure:

1. Tap “CAL” located on the left, or alternatively, tap "MENU" in the upper right corner, followed by “CAL”;
2. Initiate the multi-point calibration by tapping “MULTI-POINT”.
3. When the prompt “Please put on the weight 100.0000g” appears, place the 100g calibration weight on the sample pan. The message “Please wait” will be displayed.
4. Once the screen shows “Please remove the weight”, remove the 100g calibration weight.
5. Upon seeing the prompt “Please put on the weight 50.0000g”, place the 50g weight on the pan, after which “Please wait” will be displayed again.
6. When the message “Please remove the weight” appears again, take off the 50g weight.
7. Following the same pattern, when “Please put on the weight 20.0000g” is displayed, place the 20g weight on the pan. The “Please wait” message will be shown.

8. Remove the 20g weight when prompted with "Please remove the weight".
9. After all these steps, the machine will automatically finalize the multi-point calibration procedure and return to the home screen.

5.3 Internal Calibration

The feature of internal calibration, which facilitates automated calibration of the machine, is exclusively available in the USS-HMA00014 model. For more detailed information, please check the "TECHNICAL DATA" section.

Procedure:

1. Select "CAL" located on the left side. Alternatively, click "MENU" situated at the top right corner, then choose "CAL".
2. Start the internal calibration process by tapping on "INTERNAL CAL".

The machine will then perform the calibration automatically.

Measurement

6.1 Log-in Password

The default password upon initial setup is "1994".

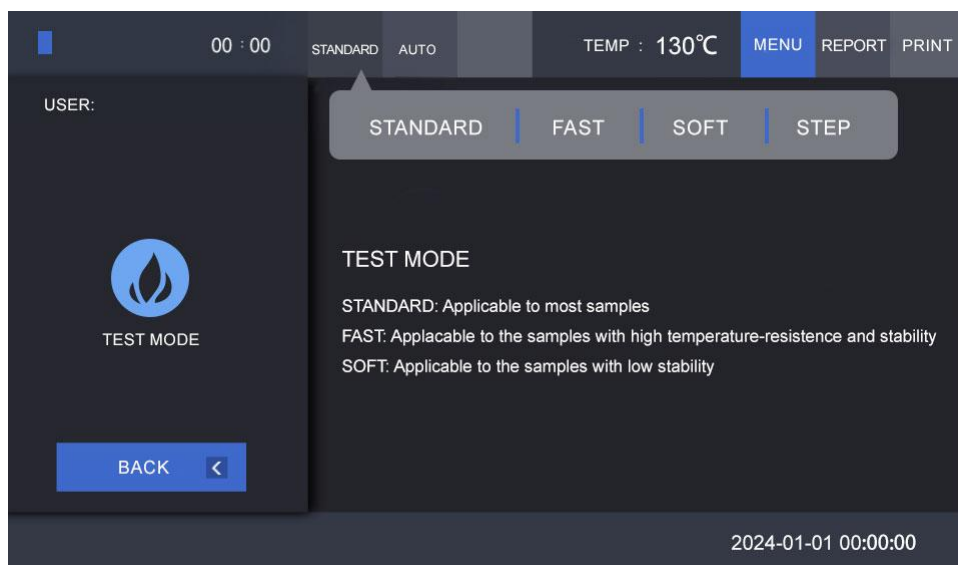
To personalize the password for both admin and operators, kindly follow these steps:

1. Head to the "Menu" section
2. Proceed to "System"
3. Select "Admin" and choose either "Operator" or "Admin"
4. Tap the empty field and input your desired password (ensure it is a four-digit number)
5. Lastly, tap "Confirm" to finalize your new password. Your login password is now successfully set

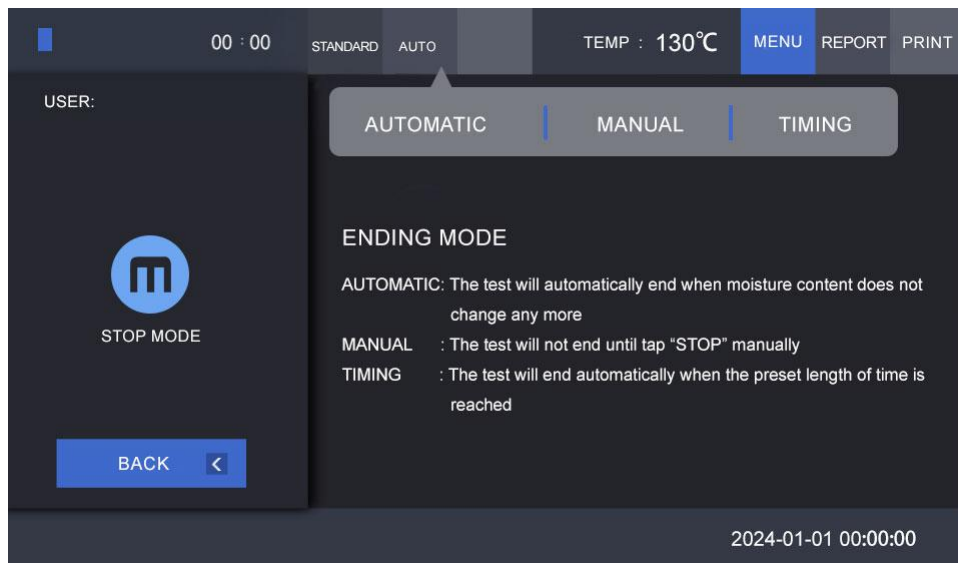
6.2 Procedure

1. Power on the moisture analyzer by flipping the switch located on the machine's rear side.

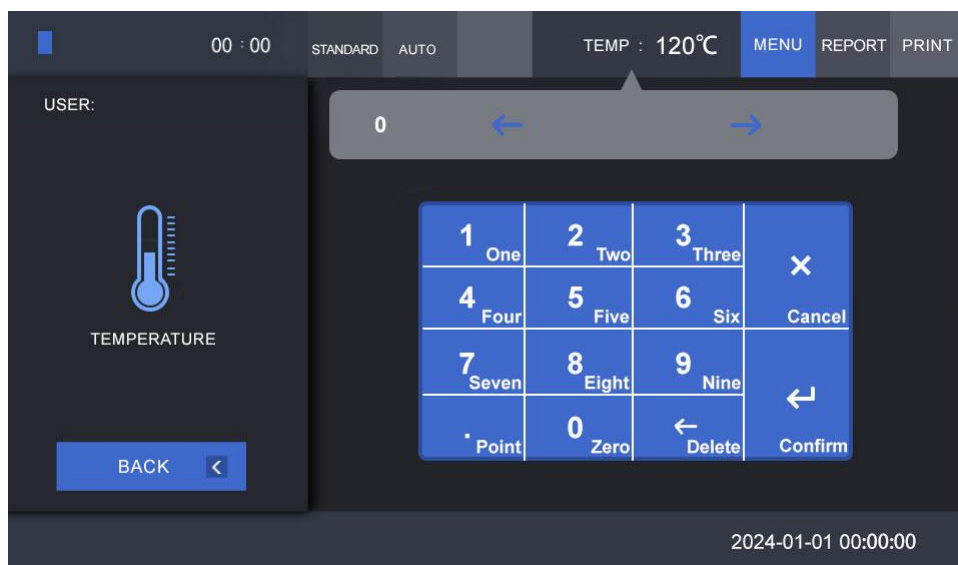
2. Tap on the blank field and input the default password “1994” to access the home interface (Please go to MENU-SYSTEM-ADMIN to set the password for admin and operators).
3. Either tap “OPEN” on the home screen or manually lift the cover, depending on the opening method of your particular model (refer to “TECHNICAL DATA” for specifics).
4. Place the sample, which needs to be measured, onto the sample pan.
5. Either tap “CLOSE” or manually shut the cover, based on your model's specifications.
6. Select the drying mode by tapping “Standard” located at the upper part of the screen (refer to section 6.2 for additional details).



7. Choose the ending mode by tapping “Auto” located at the upper part of the screen (refer to section 6.3 for further information)



8. Set the heating temperature by tapping “TEMP”, then tap “BACK” to return to the home screen



9. Start the measurement process by tapping “START”.

10. The display will show the moisture percentage, remaining sample weight, and the dynamic curve. To view the percentage of weight loss and the percentage of dried contents, simply tap on "Conversion".

6.3 Drying Mode

Standard Drying Mode

The default setting is the Standard Drying Mode, appropriate for a majority of samples. You can set the heating temperature in this mode.

During the test, the sample is heated to the set temperature and maintained at that level until the test automatically concludes.

Fast Drying Mode

The Fast Drying Mode is ideal for samples with high moisture content. In this mode, you can set a heating temperature. The initial temperature will surpass the set value, then decrease to the set temperature and remain there until the test automatically ends.

Soft Drying Mode

The Soft Drying Mode is designed for samples with low moisture content. The heater's rise to the set temperature takes a longer duration, providing a steady and slow temperature increase. You can manually set the duration for the temperature rise phase.

Step Drying Mode

The Step Drying Mode allows for step-by-step settings. For "STEP 1" and "STEP 2", you should set the temperature and time, with the mode set to "TIMING". For the final step, you can choose between the "AUTO" and "TIMING" modes.

6.4 Ending Mode setting

Automatic ending mode

In the Automatic Ending Mode, the test will cease automatically once a certain condition is met - specifically, when the change in moisture content is less than 2 mg within a 45-second period. This mode activates after 15 seconds of heating.

Manual ending mode

During the test phase, tapping “START/STOP” will manually terminate the test.

Timing ending mode

This mode requires a preset analysis time. Once the predetermined time duration has passed, the heating process will automatically stop.

Setting

7.1 System



Tap "Menu" followed by "System" to access the following settings:

TIME/DATE: Modify the current time and date.

STOP MODE: Define the mechanism of automatic ending mode. By default, the machine stops automatically when the weight loss is less than 2mg in 45 seconds.

SYSTEM SETTING: Set the capacity and precision.

INFORMATION SETTING: Enter necessary user information.

HUMIDITY CALIBRATION: Adjust the humidity settings.

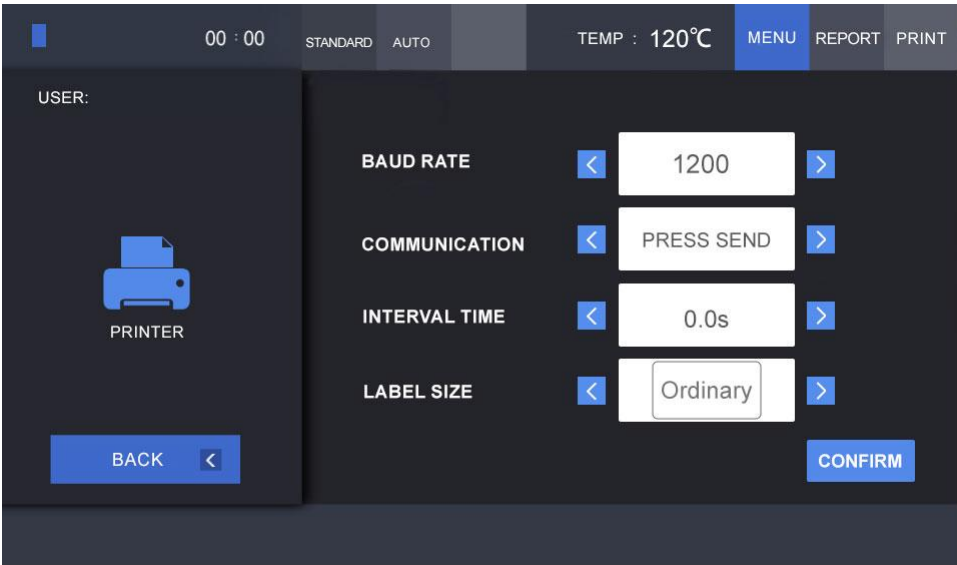
INTERNET: Input the Wi-Fi network and password details.

DATA BASE: Set up preset methods, including test mode, ending mode, and temperature.

ADMIN: Set the startup password for admin users and operators

7.2 Printer

Tap "Menu" followed by "Printer" to access the printer settings. This will allow you to configure the system to match your printer's specifications, enabling you to print the measurement results.



7.3 Report

To view individual test reports, simply tap "Menu", followed by "Report". This will display the detailed results of each test conducted.



Maintenance

- Turn off the power switch and remove power cord during maintenance.
- Cool down all parts of the analyzer before maintenance.

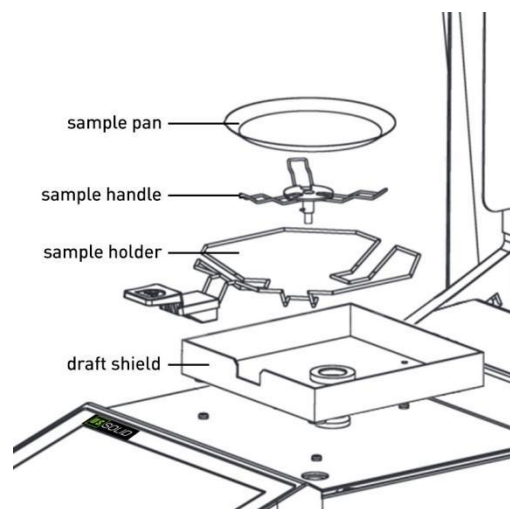
8.1 Cleaning

Make sure that no dust or liquid enters the moisture analyzer housing.

Do not use any aggressive cleaning agents (solvents, abrasive cleaning agents, etc.) or organic solvents to clean the analyzer.

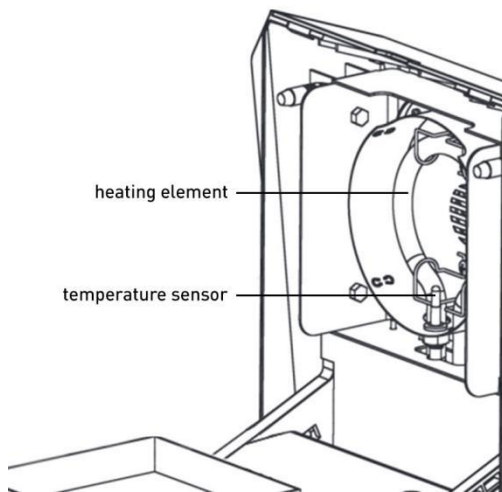
Clean the moisture analyzer using a piece of lint-free cloth which has been wet with a mild detergent (soap) only.

8.1.1 Cleaning the sample chamber



Remove sample pan, sample handle, sample holder and draft shield for cleaning. Ensure that no liquid seeps into the device. Dry with a dry soft cloth after cleaning.

8.1.2 Cleaning the heating unit



Disconnect the power by unplugging power cord from the outlet.

- Carefully remove any residue from the temperature sensor.
- Use a damp, lint-free cloth to clean the tubular heating element.

8.1.3 Cleaning the display panel and keyboard



Wipe the panel with a damp cloth. Do not use a chemical dust cloth, as it may damage the paint surface and display panel.

8.2 Disposal

Disposal of equipment and packaging must be carried out by the operator in accordance with relevant laws of the country or region in which the equipment is to be used.

Troubleshooting

Problem: Display remains off after switching on.

Possible causes:

- Power cord is not connected
- Power line fuse blown
- Power supply interrupted
- Instrument faulty

Problem: Display does not change when loading samples.

Possible causes: The sample pan/pan holder is not installed correctly.

Problem: Weight display is constantly changing or unstable.

Possible causes:

- The sample pan is in contact with the draft shield or heating chamber
- Air movement
- Test bench vibration
- Electromagnetic field interference

Problem: Drying does not start

Possible causes:

- Heating chamber open

- Power cord is not connected
- Power line fuse blown

Problem: Measurement takes too long.

Possible causes: Incorrect ending mode selected

Problem: Measurements are not repeatable.

Possible causes:

- The samples are not homogeneous.
- Drying time is too short.
- The temp selected is too high and the sample has been oxidized.
- The temperature sensor is contaminated or defective.
- The sample is not completely dry.

Fault code:

ERR1 The load is less than 1 gram.

ERR2 The temperature setting is less than 104°F

ERR3 The drying-time setting is less than 30 seconds

ERR4 Heater circuit board fault.

ERR5 The setting time is less than the specified time when in the soft drying mode.

ERR6 Temperature sensor fault.

Technical Data

| Model | USS- HMA11 | USS- HMA12 | USS- HMA13 | USS- HMA14 |
|----------------------|---|---------------|---------------|---------------|
| Capacity | 110 g | | | |
| Weight Readability | 0.001 g | | 0.0001 g | |
| Moisture Readability | 0.01 % | | 0.001 % | |
| Calibration | External | | | Internal |
| Heater Cover | Manual | Automatic | | |
| Heating Element | 450 W Halogen Lamp | | | |
| Operating Temp. | 40 °C - 200 °C （104 °F- 392 °F ） | | | |
| Ambient Temp. | 41 °F- 95 °F （5 °C - 35 °C ） | | | |
| Time setting range | 1 - 99 min | | | |
| Test mode | Standard, Fast, Soft, Step | | | |
| Ending mode | Automatic, Timing, Manual | | | |
| Displays of results | [%m] moisture content, [%] dry content, [g] residual weight in grams | | | |
| stabilization time | ≦ 3 s | | | |
| Pan size | Φ 100 mm | | | |
| Interface | RS-232 | | | |
| Power | 110V 60Hz AC | | | |
| Dimensions | 9.45*15.75*7.09 inches (240*400*180 mm) | | | |

Contact

Feel free to visit our website: www.ussolid.com

You can email us at service@ussolid.com