



Instruction Manual

Halogen Moisture Analyzer

USS-VM00001-220G to USS-VM00005-220G

USS-VM00006 to USS-VM00010



220 g: 40-230 °C | 62 g: 40-200 °C

350 W Halogen Heating | 110 V AC, 60 Hz, US Plug

Read this manual before installation and use.
Keep it with the instrument for reference.

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About this instrument

The U.S. Solid halogen moisture analyzer combines a weighing system with a halogen heater. It records the initial sample mass, monitors mass loss during drying, and calculates moisture and solids results from the measured masses.

This manual covers the 10 models on page 15. Models USS-VM00001-220G to USS-VM00005-220G have a 220 g capacity and 40-230 °C range. Models USS-VM00006 to USS-VM00010 have a 62 g capacity and 40-200 °C range. Check the instrument label before use.

Results depend on the sample and the selected drying method. Mass lost on heating may include volatile substances other than water. Do not interpret a loss-on-drying result as a water-specific measurement without validating the method for the sample.

Safety Precautions

Electrical safety

WARNING: Electric shock or fire can result from an incorrect supply, damaged wiring, or liquid entering the instrument.

Use the specified 110 V AC, 60 Hz supply and the supplied grounded US power cord. Confirm that the instrument rating label matches the supply before connecting it. Never remove or bypass the protective ground.

Keep the power plug accessible. Route the cord so that it cannot be pulled, pinched, or tripped over. Do not operate with a damaged cord or plug.

Keep liquids out of the housing, connectors, and weighing mechanism. Do not use the instrument in wet or unstable locations.

Switch off and unplug the instrument before cleaning, moving it, or connecting accessories. If there is smoke, an unusual odor, or abnormal heating, stop use and disconnect power when it is safe to do so. Contact U.S. Solid.

Do not open the housing, modify wiring, or attempt internal repairs. Service must be performed by qualified personnel authorized by U.S. Solid.

Heat and fire safety

WARNING: The heater, chamber, sample pan, and sample can cause burns during and after a test.

Keep at least 1 m (39.4 in) of clear space above the instrument. Leave surrounding ventilation openings unobstructed. Do not place objects on the heater cover.

Keep combustible materials away from the instrument. Do not touch the halogen lamp or hot chamber parts. Use suitable handling tools and heat protection when removing a hot pan.

Allow the instrument and accessories to cool before cleaning or covering them. Never place a dust cover over a warm instrument.

Only trained users familiar with the sample hazards may operate the analyzer. Wear suitable eye protection, protective clothing, and gloves.

Sample Selection and Preparation

Assess the sample before heating

Do not test explosive samples or samples that may undergo an uncontrolled dangerous reaction. Do not assume that a lower set temperature makes a flammable or solvent-containing sample safe.

Samples that may release toxic or corrosive vapors require a documented assessment and suitable extraction before any test. If safe use cannot be established, do not test the material. Ask U.S. Solid for guidance on equipment suitability.

Select a temperature and endpoint appropriate to the sample. Excessive temperature can cause decomposition, oxidation, or scorching and change the reported result. A higher temperature does not necessarily produce a better measurement.

Choose an appropriate sample amount

Choose the sample amount through method validation. Use enough material to obtain a representative result while maintaining a thin, even layer. Low-moisture samples or models with coarser weighing readability may require a larger sample.

The total load, including accessories placed on the weighing system, must remain within the instrument capacity. Taring does not increase capacity. Do not press down on the pan or drop material onto it.

Prepare and handle consistently

1. Take a representative portion of the material. Mix or reduce particle size only where appropriate for the sample and method; avoid losing moisture during preparation.
2. Use a clean, dry pan. Spread the sample evenly in a thin layer and avoid piles or contact with the chamber.
3. Keep loose powder out of the center opening and the weighing mechanism. Handle samples promptly to limit changes caused by ambient humidity.
4. For repeat tests, keep sample preparation, sample amount, initial chamber conditions, heating program, and endpoint consistent.

Installation and Supplied Items

Unpack and inspect

Inspect the instrument and accessories for shipping damage. Keep the original packaging for transport or service. If an item is damaged or missing, contact U.S. Solid before use.

Item	Quantity
Moisture analyzer	1 unit
Aluminum sample pans, 90 mm	50
Stainless steel sample pans, 90 mm	4
Fiberglass sheets (complimentary)	10 sheets
Calibration weights; masses by model listed below	1 of each
Fabric gloves	2 pairs
USB drive with electronic manual and instructional videos	1
Grounded US power cord	1
Factory inspection certificate	1
Certificate of conformity, warranty card, and instruction manual	1 of each
Sample pan support	1
Draft shield	1

62 g models: 50 g and 100 g. 220 g models: 100 g and 200 g.

Use only the prompted mass within capacity; see page 7 before calibration.

Choose the location

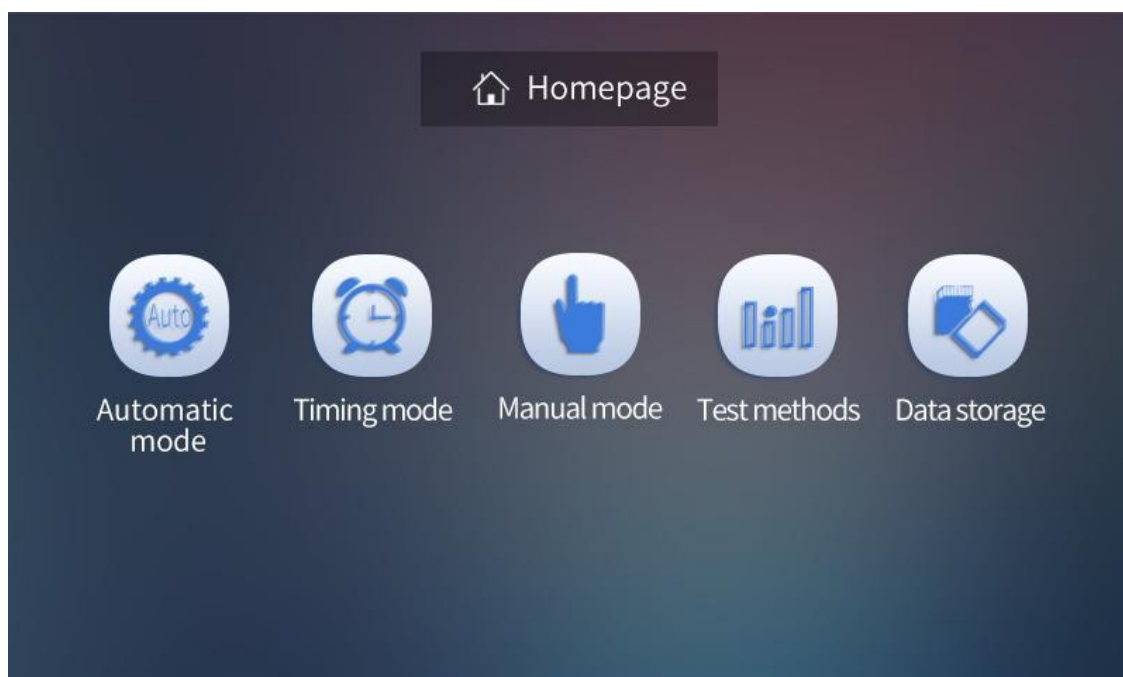
Use a clean, dry indoor work area at 1-38 °C, ideally 18-25 °C, with a firm, level bench. Avoid drafts, direct sunlight, vibration, magnetic fields, and nearby heat sources. Maintain the overhead clearance described on page 3. Allow a cold instrument to reach room temperature before connection; if condensation is possible, leave it unplugged for at least 2 hours and until dry.

Fit the weighing accessories

1. With the instrument unplugged and cool, place the draft shield in the sample chamber and align the center opening.
2. Insert the sample pan support into the center mounting position without forcing it. Place the sample pan on the support. The pan must not touch the shield or chamber.
3. Adjust the leveling feet until the bubble is centered. Recheck leveling whenever the instrument is moved.
4. Connect the power cord to the instrument and then to the grounded outlet. Power on and allow at least 30 minutes of warm-up before calibration or measurement.

Touchscreen and Controls

Use the touchscreen to choose a measuring mode, set up a test method, and view stored data. Tap with a fingertip; do not use sharp objects on the display.



Main menu reference

Control or menu	Purpose
Automatic mode	Run a test using the automatic stopping criterion.
Timing mode	Run a test for a selected duration.
Manual mode	Run a test that the operator must stop.
Test methods	Create, select, and recall measurement settings.
Data storage	Save and review completed test records.
SET	Access available instrument settings and weight calibration.
Tare	Zero the displayed load with the empty pan in place.
Start and stop	Begin a measurement or stop the current measurement.

The screen shown is a menu reference. Available functions depend on the installed interface. All models listed on page 15 support a drying curve, user management, permissions, and custom sample identifiers. Do not change protected service settings.

Weight Calibration

Calibrate the weighing system before first use, after relocation, and whenever a check indicates that adjustment is needed. The instrument must be level, warmed up, and free from drafts and vibration.

External weight calibration

1. Ensure that the pan and support are correctly installed, clean, dry, and cool. Remove all sample material.
2. Open the settings or calibration menu and select weight calibration.
3. Follow the displayed prompt for the required calibration mass. Use the specified weight and handle it with tweezers or suitable gloves.
4. Place the weight gently at the center of the pan and wait for the completion or removal prompt. Do not touch the instrument during the reading.
5. Remove the weight when instructed. Confirm that the empty pan reading returns to zero. Repeat the procedure if the instrument requests it or the check is unsatisfactory.

CAUTION: Never place a 100 g calibration weight on a 62 g instrument. Use only a calibration mass accepted by the specific model and within its capacity. Do not choose a calibration weight solely because it appears in a general accessory list.

220 g models include 100 g and 200 g weights, 1 of each. Use them separately as prompted; do not load both together. Follow the displayed calibration mass. If the required weight is unavailable or exceeds capacity, cancel and contact U.S. Solid.

Temperature and multipoint calibration

Temperature calibration uses a separate compatible temperature calibrator. Open SET, then Temperature Calibration, and follow the procedure supplied with that calibrator. Do not substitute a sample temperature reading for a calibration reference. Contact U.S. Solid before multipoint weighing calibration or if the required reference equipment or procedure is unavailable.

The startup check is not a substitute for external weight calibration. This manual does not specify an internal calibration function.

Making a Measurement

Read the safety and sample preparation sections before testing. Use a method appropriate to the material; do not use a generic high-temperature setting for every sample.

1. Verify the full model number and capacity. Confirm that the instrument is correctly assembled, level, and connected to the specified supply.
2. Allow at least 30 minutes of powered warm-up. Check or calibrate the weighing system as needed.
3. Select a method, heating program, temperature, and stopping mode. Set 40-200 °C for 62 g models or 40-230 °C for 220 g models. See page 15 for model identification.
4. If timed mode is selected, enter the required test duration. Review all settings before loading the sample.
5. Place a clean, dry, empty pan on the support. Ensure that it is seated freely and does not contact other parts.
6. Tare the empty pan. Wait for a stable zero reading.
7. Add the prepared sample evenly across the pan. Use the sample amount specified by your validated method and do not exceed the instrument capacity.
8. Close the heater cover and start the measurement. Do not move or disturb the analyzer during the test.
9. Observe the displayed sample weight, temperature, time, and available result values. The drying trend curve shows how the measurement changes over time.
10. Allow automatic or timed mode to reach its endpoint. In manual mode, remain with the instrument and stop heating at the required endpoint.
11. Record or save the completed result. If required, send data to a compatible connected printer or back up stored records to a USB drive.
12. Wait until it is safe to handle the pan. Remove the sample using suitable tools, clean any spilled material after cooling, and prepare the chamber for the next test.

After the last test

Switch off the instrument when it is no longer needed. Disconnect power for extended storage. Allow all heated parts to cool before fitting a dust cover or packing the instrument.

Heating and Stopping Modes

Heating programs

Standard heating: Use for routine samples where the selected method calls for direct heating to the set temperature.

Gentle heating: Use a gradual heating approach for heat-sensitive samples that may scorch or change under rapid heating. Validate the program for the material.

Rapid heating: Intended for suitable samples with higher moisture content. Do not assume an overshoot temperature or duration; use only the behavior specified by the installed program.

Step heating: Apply a staged drying approach where the sample method requires it. Use the available stage controls on the instrument; the number of stages and their limits must match the installed configuration.

Heating program names may appear as Standard, Soft or Gentle, Fast or Rapid, and Step. Select the corresponding function on the installed interface.

Stopping modes

Automatic: The analyzer stops when the programmed stability criterion is satisfied. An automatic endpoint does not prove that all water has been removed from every sample. Validate the criterion for the intended measurement.

Timed: The analyzer stops after the selected duration. The duration setting range is 1–99 minutes, adjustable in 1 second increments.

Manual: The operator stops the measurement. Do not leave the analyzer unattended in this mode; heating must be stopped by the operator.

Set the temperature and duration

1. Tap the temperature field and enter a setting within the model range: 40-200 °C for 62 g models; 40-230 °C for 220 g models. Confirm the value; the setting increment is 0.1 °C.
2. For timed mode, enter the drying duration and confirm. Review the heating program before tapping Start. For manual mode, tap Stop when the required endpoint is reached.

Select the endpoint together with the temperature and sample preparation method. A short test can end before adequate drying; excessive heating can alter the sample and distort the result.

Result Interpretation

Understand the result

Initial sample mass is the net mass after the empty pan has been tared. Dry sample mass is the mass remaining at the selected endpoint. Mass loss is the difference between these values.

Result	Meaning
Moisture content	Mass lost divided by initial sample mass, expressed as a percentage.
Solids content	Dry sample mass divided by initial sample mass, expressed as a percentage.
Dry basis mass loss	Mass lost divided by dry sample mass, expressed as a percentage.
Wet to dry ratio	Initial sample mass divided by dry sample mass; check the displayed unit or scaling.
Time and temperature	Test duration and displayed drying temperature.
Drying trend curve	Live progress view available on all listed models.

Dry-basis calculations require a nonzero dry sample mass. Display readability is the displayed increment, not a guarantee of measurement accuracy or repeatability.

Compare results consistently

Use the same sample preparation, initial chamber conditions, temperature, heating program, and endpoint when comparing batches. The current chamber temperature is shown at the upper right of the measurement interface. Allow comparable starting conditions before repeat tests.

Moisture and solids values describe a mass ratio. They do not identify individual volatile components. Validate a method against an appropriate reference method when the application requires water-specific results.

Methods and Data Management

Store and review tests

1. At the end of a test, use the save function to retain the completed record under its record number.
2. Open Data storage to find and review an earlier record. Check the sample identity and method before comparing results.
3. The instrument can store up to 2004 completed records. When storage is full, the oldest record may be replaced by a new saved record. Retain important results separately before relying on instrument memory.

Saved methods and date settings

Up to 96 custom test methods can be stored for recurring measurements. Review the heating program, temperature, endpoint, and sample amount each time a method is recalled.

1. Open Test methods, enter the required heating program, temperature, and stopping mode, and save the method with an identifiable name or number.
2. Recall the saved method before loading the sample and verify each setting. Method memory and result storage are separate functions.
3. Open SET and select the clock or date/time control. Enter the current date and time and confirm before creating records.

USB backup

Insert a compatible USB-C flash drive into the port labeled USB Data Import/Export. Use record export to back up results in HTML format, up to 2000 records per export. Wait for completion before removal and verify the saved files. For imports, use only supported data and the on-screen import function.

User permissions and sample identification

User management and permission settings are available through SET. Use an authorized account for restricted adjustments. Assign a sample identifier before saving results so that records can be traced to the material tested. Contact U.S. Solid if access settings need to be restored.

Only install instrument firmware supplied or approved by U.S. Solid. Obtain the update procedure before using the USB firmware-update function.

Serial Data Connection

The RS-232C interface provides a connection to compatible external equipment. Use a correctly wired cable and matching communication settings. A connector alone does not establish compatibility with every computer or printer.

Reference communication settings

Parameter	Setting
Interface	RS-232C
Communication	Asynchronous
Baud rate	2400 / 4800 / 9600 / 19200 baud
Data bits	8
Parity	None
Stop bits	1
Output encoding	ASCII

The operating-manual reference setting is 9600 baud with 8 data bits, no parity, and 1 stop bit (8N1). Match the selected baud rate on both devices. Use RS-232 equipment; do not connect to a different electrical interface merely because the connector fits.

Connection pin reference

Instrument 9-pin connector	Function	Computer 9-pin connection
Pin 2	RXD input	Pin 3
Pin 3	TXD output	Pin 2
Pin 5	Signal ground	Pin 5

1. Turn off both devices before making the connection.
2. Verify the cable wiring and the external device interface. Connect the serial cable without forcing the connectors.
3. Set both devices to compatible communication parameters and switch them on.
4. Send a test record and verify that the received or printed values match the instrument display.

For a printer, follow the printer instructions and confirm compatibility before purchase or connection. If output is unreadable, check the serial settings and cable before repeating the test. Contact U.S. Solid if the issue remains.

Cleaning and Maintenance

WARNING: Switch off, unplug, and allow the instrument and sample chamber to cool completely before cleaning.

Clean the removable parts

1. Remove the sample pan and the removable support and draft-shield parts without forcing the weighing mechanism.
2. Remove loose sample residue. Keep powder and liquid away from the center opening and internal weighing components.
3. Clean removable parts with a soft, lint-free cloth lightly dampened with water or a mild detergent solution. Do not immerse the instrument.
4. Dry the parts thoroughly and reinstall them in the correct order. Verify that the pan moves freely without contacting the shield or chamber.

Clean the housing and touchscreen

Wipe with a soft, slightly damp, lint-free cloth. Do not spray liquid directly onto the instrument. Do not use abrasive cleaners, corrosive chemicals, or organic solvents. Do not press the screen with sharp objects.

Heating chamber and sensor

Inspect for residue only after the chamber has cooled and power is disconnected. Avoid bending the temperature sensor, touching electrical connections, or stressing the lamp. If contamination cannot be removed without dismantling or force, stop and contact U.S. Solid for service instructions.

Routine care and storage

Keep the instrument clean and dry. Protect it from vibration, impacts, strong magnetic fields, and prolonged exposure to dust or humidity. Do not drop objects onto the sample pan or press down on the weighing system.

Recheck leveling after moving the analyzer and check weighing performance before use. Keep the original packing material and protect removable parts separately when transporting the instrument.

Disposal

Dispose of samples, consumables, and electrical equipment according to the requirements applicable to the materials and location. Do not discharge hazardous sample residues into ordinary waste streams.

Glass heater shield (electromagnetic models)

USS-VM00004-220G, USS-VM00005-220G, USS-VM00009 and USS-VM00010 have a glass panel between the lamp and sample area. Inspect only when cool and unplugged. Do not apply force or remove the panel; contact U.S. Solid if it is cracked or damaged.

Troubleshooting

Stop testing before making adjustments. Disconnect power and allow cooling before handling the chamber or connections. For smoke, damaged wiring, or repeated failures, stop use and contact U.S. Solid.

Problem	Possible cause	Action
Display remains off	Power disconnected; switch off; interrupted supply	Check the outlet, power cord, and switch. If the instrument remains off, contact support; do not open the housing.
Underload or zero underload	Pan support missing or not seated	Remove the sample and reinstall the pan support correctly. Check zero after warm-up.
Overload or zero overload	Excess load; material left on the pan	Remove excess load immediately. Check capacity and start with the empty pan.
Calibration rejected	Incorrect weight; extra material on pan	Clear the pan and follow the displayed mass prompt. Never exceed capacity.
Unstable weighing	Drafts; vibration; sample pan touching another part	Move away from airflow or vibration. Check leveling and that the pan is free from contact.
Incorrect weighing	Pan not tared; calibration needed	Tare the empty pan. Check performance with the correct weight and recalibrate if needed.
Touchscreen not responding	Temporary interference; supply or connection issue	If safe, turn the instrument off and restart it. Check the power connection. Contact support if the fault repeats.
Results vary between tests	Uneven sample; inconsistent preparation or drying conditions	Check sample uniformity, sample amount, temperature, endpoint, and starting chamber conditions.
No readable serial output	Cable or communication mismatch	Check pin wiring and matching baud rates on both devices. The reference format is 9600 baud, 8 data bits, no parity, 1 stop bit.

When requesting help, provide the full model number, serial number, symptom, displayed message, sample type, and test settings. No model-specific error-code list is included here.

Model Specifications

Match the full model number to the instrument label. Capacity includes the total load on the weighing system; taring does not increase capacity.

220 g models | 40-230 °C (104-446 °F)

Product model	Capacity	Weighing readability	Moisture readability
USS-VM00001-220G	220 g	0.01 g	0.01%
USS-VM00002-220G	220 g	0.005 g	0.01%
USS-VM00003-220G	220 g	0.002 g	0.01%
USS-VM00004-220G	220 g	0.001 g	0.01%
USS-VM00005-220G	220 g	0.0001 g	0.001%

62 g models | 40-200 °C (104-392 °F)

Product model	Capacity	Weighing readability	Moisture readability
USS-VM00006	62 g	0.01 g	0.01%
USS-VM00007	62 g	0.005 g	0.01%
USS-VM00008	62 g	0.002 g	0.01%
USS-VM00009	62 g	0.001 g	0.01%
USS-VM00010	62 g	0.0001 g	0.001%

Weighing sensor and glass heater shield

Models	Weighing sensor	Glass shield
USS-VM00001-220G to USS-VM00003-220G; USS-VM00006 to USS-VM00008	HBM strain gauge	Not fitted
USS-VM00004-220G and USS-VM00005-220G; USS-VM00009 and USS-VM00010	Electromagnetic force	Fitted

Weighing repeatability: standard deviation up to 3d, where d is the weighing readability above. Readability is a display increment, not measurement accuracy or moisture repeatability. Moisture and solids display ranges: 0-100%.

General Specifications and Support

Parameter	Value
Heating source	350 W halogen lamp
Temperature setting range	62 g models: 40-200 °C; 220 g models: 40-230 °C
Temperature resolution / setting step	0.1 °C / 0.1 °C
Temperature sensor / control	PT1000 / PID
Power supply	110 V AC, 60 Hz, grounded US plug
Maximum instrument input	500 W; distinct from lamp power
Display	5 in color touchscreen
Heating programs	Standard, gentle, rapid, step
Stopping modes	Automatic, timed, manual
Timed duration	1-99 min; 1 second setting increments
Method memory / result storage	96 custom methods / up to 2004 records
USB data port	USB-C data import/export; up to 2000 HTML records per export
Calibration	External weights; separate temperature calibrator
Sample pan / chamber height	90 mm diameter / 24.5 mm
Serial interface	RS-232; see page 12
Operating ambient temperature	1-38 °C; ideally 18-25 °C
Dimensions	23.4 x 35 x 20.5 cm

Temperature resolution and setting step do not specify temperature accuracy. Use the temperature limit for the exact model on page 15. Confirm the electrical rating on the instrument label before connection.

Contact U.S. Solid

Website: www.ussolid.com

Email: service@ussolid.com

For assistance, replacement accessories, or service, provide the full model number and serial number. Refer to the warranty terms supplied with your purchase for coverage.