Model 935
Moisture Tester

OPERATION MANUAL

REVISION 0, JUNE 2016

Model 935 Moisture Tester

SERIAL NUMBER

At Shore Measuring Systems, "*we SERVICE what we sell*". To help us better serve your operation and service needs, record the serial number of your tester in the space provided below so this information is readily available when you need to contact us.

Serial Number:

REGISTRATION CARD

When you receive your equipment, please complete and return the registration card below. Shore Measuring Systems maintains a file of all Model 935 Moisture Testers sold based on their serial numbers. With your help, your moisture tester will be recognized by the buyer's name and location.

Registration Card

Model 935 Moisture Tester

Serial Number: _____

Buyer's Name: _____

Address: _____

City: _____ State: _____

Zip Code: _____

Telephone Number: _____

Date of Purchase: ___/___/___

Model 935 Moisture Tester

QUICK-START GUIDE

NOTE: *These steps are a general guide to quickly begin testing when first receiving the tester. Some grains may require steps other than those presented, however the touchscreen prompts will guide you through the moisture test regardless of the grain being tested.*

1. Unpack the tester and place the base of the tester on a flat, level and stable surface.
2. Place the Grain Cell in the tester so that the green dots and connectors at the base of the cell and the tester are aligned.
3. Connect the power cable between the tester and a suitable power source, and move the power switch to the 'ON' position.

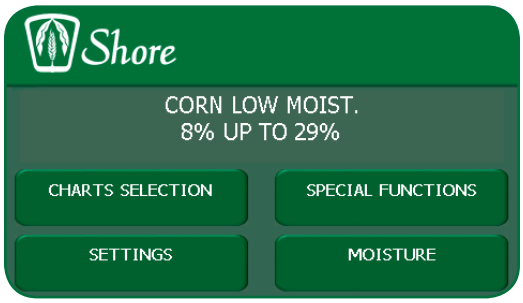
NOTE: *The power receptacle and the power switch are located at the back of the tester housing.*

4. When prompted, place the Dump Cell (clear plastic cylinder) in the top of the Grain Cell so that the two cylinders form a straight line.

NOTE: *The Dump Cell should fit easily into the Grain Cell.*

5. Press the green start button (✓) and allow the self-test to begin.
6. When prompted, remove the Dump Cell.
7. Press the green continue button and allow the self-test to continue.

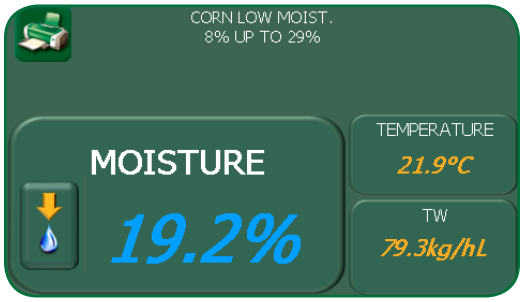
8. Begin a moisture test with the displayed chart or press MENU to select a different chart, perform Foreign Material or Damaged Kernel tests or modify the tester settings:
   - To begin a moisture test with the displayed chart, proceed with Step 9.



- To select a different chart, press CHARTS SELECTION. Refer to Page 11.
- To perform Foreign Material or Damaged Kernel tests, press SPECIAL FUNCTIONS. Refer to Page 12.
- To modify the tester settings, press SETTINGS. Refer to Page 13.
- To return to the previous screen, press MOISTURE.

9. Ensure that the butterfly valve is in the locked-closed position by turning the Dump Cell upside down, pressing and releasing the metal button on the side of the cell and returning the cell to the upright position.
10. Place the Dump Cell in the center of a container that is suitable for catching grain overflow.
11. Overfill the Dump Cell on the side with the 'FILL THIS SIDE' label and use the leveling stick to level the grain in the Dump Cell.
12. Place the Dump Cell securely in the Grain Cell, and press the metal button on the side of the Dump Cell to deposit the sample into the Grain Cell.
13. Remove the Dump Cell from the Grain Cell when prompted.
14. Allow the test to run, and wait for the moisture, temperature, and test weight readings to display on the screen.

    Press the PRINT button to print the results, if necessary.



15. Lift the Grain Cell out of the tester and pour out the sample.
16. Test another sample or print prior results:
    - To test another sample, place the Grain Cell back onto the tester as described in Step 2, and repeat Steps 9 through 15.
    - To print any or all of the last twenty test results, place the Grain Cell back onto the tester as described in Step 2 and press the HISTORY button. Refer to "Test History" on Page 16.

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Shore

Model 935 Moisture Tester

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CARE AND MAINTENANCE

GENERAL INFORMATION

Product Overview

The Model 935 Moisture Tester is a bench-top instrument used to determine the moisture content that is retained in grains and other agricultural products.

- Moisture in the grain sample is determined by evaluating changes in the dielectric properties of the sample caused by the presence of moisture. Using calibration charts, these changes are automatically interpreted as a percentage of moisture.
- A touchscreen panel provides simple navigational and process icons. Results are quick and accurate, tests are simple to perform and can be customized to fit the product sampled and the user's needs.

Product Features

- The measurement principle is based on the dielectric properties of the grain.
- The range of moisture and temperature for each selected chart is displayed.
- An advanced system of weight and temperature readout is used, eliminating the need for an external thermometer and scale.
- A preset mass is not required.
- Weight and temperature measurements are automatic and are performed prior to the display of the moisture percentage.
- For grains of the same type, multiple tests can be performed without changing settings.
- Operation is easy and results are displayed clearly on a touchscreen display.
- The last twenty results are saved and all results can be printed.
- Universal voltage capability is provided (100 to 240 VAC).
- Calibration charts are available for a wide range of grain types.
- Meets requirements set forth by Handbook 44 (HB44) of the National Institute of Standards and Technology (NIST).
- Single measurements can be taken, or an average of three readings can be calculated for greater precision.

Commodities

The Model 935 Moisture Tester is designed to perform moisture tests for the following commodities:

Alfalfa, Meal

Barley, Rolled 2% up to 20.1%
Barley, Six-Rowed
Barley, Two-Rowed

Beans, Baby Lima
Beans, Black
Beans, Black Eye
Beans, Canary
Beans, Cranb & Thor Lima
Beans, Cranberry High Moisture
Beans, Dark Red Kidney
Beans, Garbanzo
Beans, Great Northern
Beans, Kidney High Moisture
Beans, Large Lima
Beans, Lentils
Beans, Light Red Kidney
Beans, Mung
Beans, Pea (Navy)
Beans, Pink
Beans, Pinto
Beans, Red Ball
Beans, Small Red
Beans, Small White
Beans, Yellow Eye

Buckwheat

Cabbage Col Seed, Chart CC-5

Canola
Canola Meal
Canola Meal, Over 20%

Coffee, Green Beans
Coffee, Parchment

Corn, Broken with Foreign Material
Corn, Cob Ground
Corn, Gluten
Corn, Goya Big
Corn, High Moisture
Corn, Low Moisture
Corn, Meal
Corn, Rolled Flake

Crambe, Seed

Cranberry, High Moisture

Cucumber Seeds, Pointset-Ashley
Cucumber, Beta Alfa CBA-1
Cucumber, C-F1-74

Distillers Dried, Grain

Dried Brewers, Grain

Fescue, Chart KY31

Flaxseed
Flaxseed, Western

Lespedza Seeds, Chart LS-1

Mash & Pellets, M-P Tentative

Millet

Mustard, Brown
Mustard, Oriental
Mustard, Yellow

Oats
Oats, Low Density

Peanut, Meal
Peanuts, Runner
Peanuts, Runner High Moisture
Peanuts, Spanish
Peanuts, Spanish High Moisture
Peanuts, Virginia

Peas, Austrian Winter
Peas, Wrinkled Dry

Pellets Dairy, Poultry Stock
Pellets, Milk Flo Mash
Pellets, Milk Flo Whole
Pellets, Paper Kitty Litter

Pepper, Seed
Pepper, Seed Green Jalapeno-Cayenne

Pine Nuts

Popcorn, White
Popcorn, Yellow

Pumpkin Seed, Hulled Seeds

Radish Seeds, Chart RS-1

Red Altaswede, Clover 201262

Rice, Brown Long Grain
Rice, Brown Long Grain Parboiled
Rice, Brown Medium Grain
Rice, Brown Short Grain
Rice, Milled 2nd Head Parboiled
Rice, Milled Brewers & Screens
Rice, Milled Brewers Parboiled
Rice, Milled CAL2 CAL Second Head
Rice, Milled Long Grain
Rice, Milled Long Grain Parboiled
Rice, Milled Medium Grain
Rice, Milled Medium Grain Coated
Rice, Milled Medium Grain Parboiled
Rice, Milled Short Grain
Rice, Rough Calrose High Moisture
Rice, Rough Long Grain
Rice, Rough Long Grain Parboiled
Rice, Rough Long High Moisture
Rice, Rough Medium Grain
Rice, Rough Medium High Moisture
Rice, Rough Medium Low Moisture
Rice, Rough Short High Moisture
Rice, Rough Short Low Moisture

Rye

Sesame Seeds, SS-1

Sorghum, High Moisture
Sorghum, Low Test Weight
Sorghum, Milo

Soybean, Meal
Soybeans
Soybeans, Ground Hull Mill Feed
Soybeans, Immature
Soybeans, Over 20%

Squash, SQ-1-73

Sunflower Seed
Sunflower Seed, 7% Up To 25%
Sunflower Seed, Confectionery
Sunflower Seed, High Moisture
Sunflower Seed, Hulled
Sunflower Seed, Low Moisture

Timothy Seed, TM-1 Tentative

Tomato, Filon TF-1-73

Triticale

Wheat, Durum
Wheat, Hard Red Spring
Wheat, Hard Red Winter
Wheat, Hard White
Wheat, Middlings W MD 01
Wheat, Soft Red Winter
Wheat, Soft Red Winter High Moisture
Wheat, Soft White
Wheat, Soft White High Moisture

Main Components

Dump Cell

The grain sample is placed in the Dump Cell. The Dump Cell is a clear, plastic cylinder that is equipped with a manually-operated butterfly valve. This design ensures that the sample is always uniformly deposited into the Grain Cell.

Scale

The correct amount of grain that is required for each grain type is measured by the scale when the grain sample is placed in the Dump Cell. This advanced weighing system is used to obtain the most accurate moisture measurements.

NOTE: *The built-in scale is active at all times.*

Grain Cell

Moisture content is measured in the Grain Cell. The Grain Cell is a metal cylinder that is equipped with a temperature sensor. When the grain is deposited into the Grain Cell, the temperature sensor is automatically activated.

To provide maximum precision, the Grain Cell is designed to evenly disperse the sample. The patented cell-post system compensates for differences in volume, weight and those caused by uneven grain release.

Tester Housing

The tester housing is designed to withstand the rigors of field use. The electronic circuits are isolated from the interior of the cabinet.

The power switch, communication ports, power receptacle and printer output are located at the rear of the housing.

Touchscreen Display

The LCD touchscreen display is located at the front of the housing and has a screen resolution of 480x272 pixels. All user functions and measurement results are available on the touchscreen display.

Power

Power Specifications:

- 100 to 240 VAC
- 50/60 Hz, 1.5 A

Touchscreen Legend

Icon	Description
	Scroll
	Confirm selection / entry
	Start / Select
	Cancel / Deselect
	Return to previous screen
	Continue
	Access the Main Menu
	Access the History screen
	Access the Identification (ID) screen
	Print
	Save
	Save to USB drive
	Restricted access

Testing Guidelines

The Model 935 Moisture Tester was designed to provide moisture readings quickly and accurately for various types of grain. For the tester to perform as designed, familiarize yourself with the following general guidelines:

- The sample should be as clean as possible (free of foreign material).
- The grain should be removed from various sections of a batch and mixed prior to performing a moisture test. This is necessary because the moisture retained in a large amount of grain can vary considerably.

  For even more accurate results, Shore recommends the use of a grain divider to mix the collected sub-samples. If you do not have this equipment, a similar process should be used to ensure that a correct sample is available and an accurate percentage is calculated.

- A large amount of grain should be used for the measurement of the sample. This is necessary to obtain an accurate average with a minimum of variations.

  This tester has a 3.5 in (8.9 cm) cell with a capacity of 10.5 oz (300 g), depending on the density, and the sample size is determined automatically without the need for an external scale.
- The temperature standards set forth by the NIST should be adhered to. These standards were set to ensure consistency across moisture measurements.
  - Ambient temperature: 50 °F to 86 °F (10 °C to 30 °C).
  - Ideal temperature of the grain sample: 40 °F to 104 °F (4.4 °C to 40 °C).

NOTE: *This tester can accept samples with a temperature up to 160 °F (71.1 °C).*

- The difference in temperature between the grain sample and the tester should not exceed 18 °F (10 °C) when performing a moisture test.

Notes

- Averaging:
  - If averaging is set to ‘YES’, the test result will display only after the third reading.
  - If averaging is set to ‘OVER 20%’, the test result will display only after the third reading if the moisture content of the initial sample is greater than 20%.
- If the tester detects a discrepancy between the ranges of temperature and moisture of the selected product and of the product being analyzed, test results will not be displayed.
- If the tester indicates that the sample volume exceeds 100% capacity, remove grain manually until that level reaches 100%.

- If you need to change any tester setting, press the MENU button and access the applicable screen.
- If you need to save a measurement remotely, insert a USB flash drive into the back of the tester housing prior to starting a moisture test. The results will be saved in a text-document format, which will include the date and the time of the test.

Unpacking

When unpacking your tester, confirm that the following components were provided:

- Model 935 Moisture Tester
- Power cord
- Dump cell
- Grain cell
- Leveling stick
- Operation manual

The Model 935 Moisture Tester was carefully inspected to be free of defects. Inspect all components for damage that may have occurred during shipment.

If any components are damaged or were not provided, place the tester and its components in the original box and contact Shore Measuring Systems:

Shore Measuring Systems
1301 Crystal Avenue
Kansas City, Missouri 64126

Phone: (816)968-6150
Toll-Free: (800) 837-0863
Email: sales@shoremeasuring.com

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OPERATION

Startup

When the tester is turned on, the self-test/calibration will start automatically for the next moisture test. This self-test requires minimal manual intervention, and the tester will then be ready to perform a moisture test with the last selected chart without further adjustment of settings.

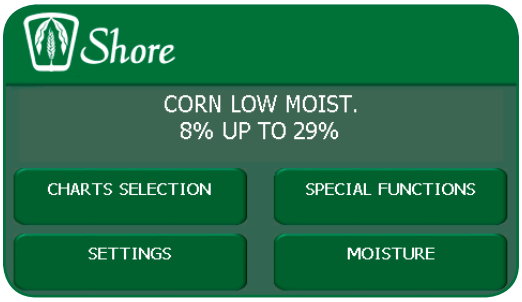
- To complete the self-test, follow the touchscreen prompts.
- To initiate a self-test at any time, use the power switch to the turn the tester off and back on.
- To perform a moisture test with the last selected chart (which is displayed on the touchscreen when the self-test is complete), follow the touchscreen prompts.

- To select a different chart, perform a Foreign Material or Damaged Kernel test or change the moisture settings, press the MENU button. Refer to “Main Menu” on Page 10.
- To review or print any or all of the last twenty tests, press the HISTORY button. Refer to “Test History” on Page 16.
- To specify the License Plate and/or the Batch/Lot on the printout for the next moisture test(s), press the IDENTIFICATION button. Refer to “Tester ID” on Page 16.

Main Menu

The main menu is accessible after the self-test has completed, charts have been selected, settings have been changed or a moisture test or special test is performed. Press MENU to access the main menu.

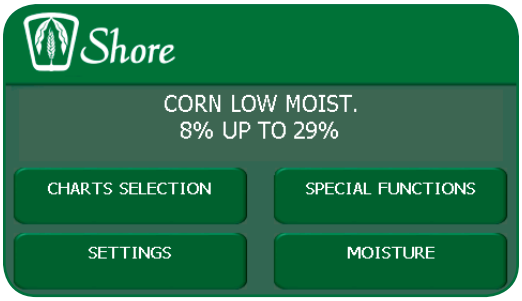
The main menu displays the grain type (chart) selected for analysis and provides access to main functions:



- Press CHARTS SELECTION to select the applicable chart for the grain to be tested. Refer to Page 11.
- Press SPECIAL FUNCTIONS to perform Foreign Material or Damaged Kernel tests. Refer to Page 12.
- Press SETTINGS to adjust tester settings such as time, language, units of measurement (UOM) and averaging, and to install charts other than those pre-installed by Shore. Refer to Page 13.
- Press MOISTURE to return to the previous screen and/or initiate the moisture test.

Charts Selection

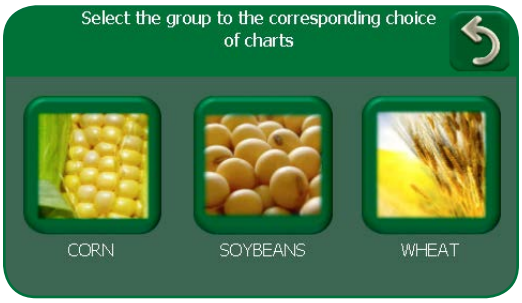
The charts selection screen is accessible from the main menu. Press CHARTS SELECTION to access the charts selection screen.



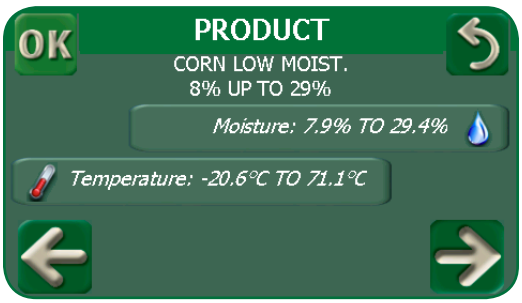
This screen allows selection of the installed chart that is applicable to the grain to be tested.

To select the applicable chart:

1. Press the button that is applicable to the grain to be tested.



2. Use the scroll buttons at the bottom of the screen to display the applicable chart.
3. Press OK.

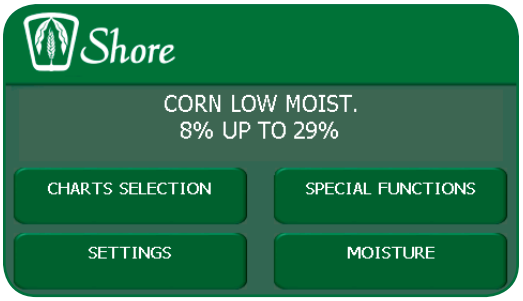


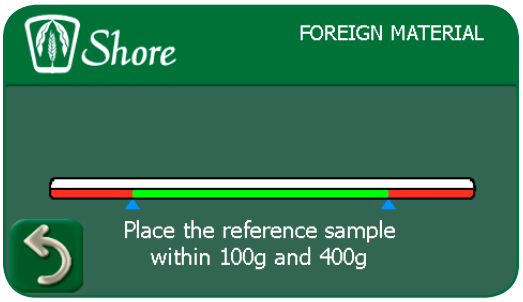
Special Functions

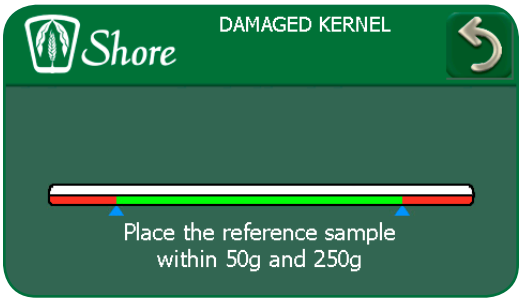
The special functions screen is accessible from the main menu. Press SPECIAL FUNCTIONS to access the special functions screen.

This screen allows Foreign Material and Damaged Kernel tests to be performed.

To perform a Foreign Material or Damaged Kernel test, press the appropriate button and follow the touchscreen prompts.

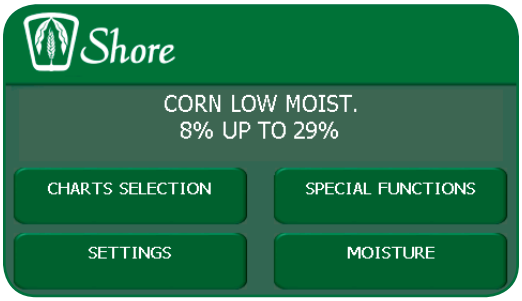






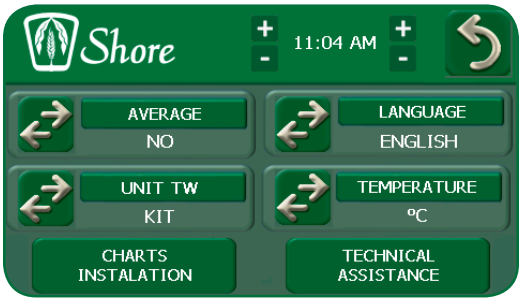
Settings

The settings screen is accessible from the main menu. Press SETTINGS to access the settings screen.



This screen allows adjustment of the time, tester language, UOM and averaging, and installation of charts other than those pre-installed by Shore.

NOTE: *The Technical Assistance screen is used by Shore to set up the tester prior to use.*



Time

- To adjust the hour, use the plus and minus buttons to the left of the time display.
- To adjust the minute, use the plus and minus buttons to the right of the time display.
- Press the return button to save the time setting.

Averaging

Use the scroll button to the left of the AVERAGE display to select the desired type of averaging, and then press the return button to save the setting:

- NO: Results are based on a single test of the sample.
- YES: Results are based on an average of three tests of the sample.
- OVER 20%: Test results that are over 20% moisture will be based on an average of three tests.

Test Weight UOM

Use the scroll button to the left of the UNIT TW display to select the desired test weight UOM/setting, and then press the return button to save the setting:

- lb/bu: Pound per bushel
- lb/A bu: Pound per bushel ‘Avery’
- lb/W bu: Pound per bushel ‘Winchester’
- KIT: Measurement of the test weight will occur after the moisture test. Refer to “Test Weight Measurement” on Page 15 to perform this test.

Language

Use the scroll button to the left of the LANGUAGE display to select the desired language, and then press the return button to save the setting.

Temperature Scale

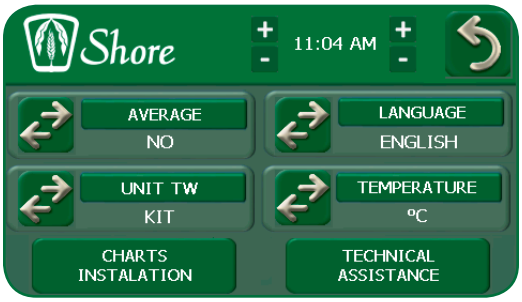
Use the scroll button to the left of the TEMPERATURE display to select between degrees Fahrenheit (°F) and degrees Celsius (°C), and then press the return button to save the setting.

Charts Installation

IMPORTANT: Charts are pre-installed by Shore based on the grains you will be testing. If you elect to install a different set of charts, those that were pre-installed will be deleted.

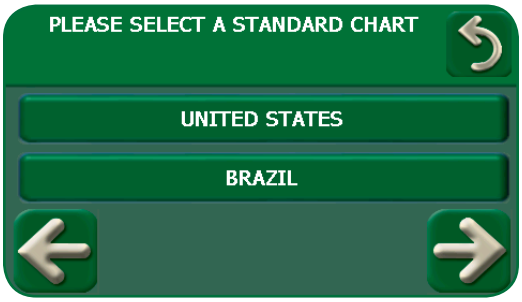
To delete the currently-installed charts and install a different set of charts:

1. Press CHARTS INSTALLATION.

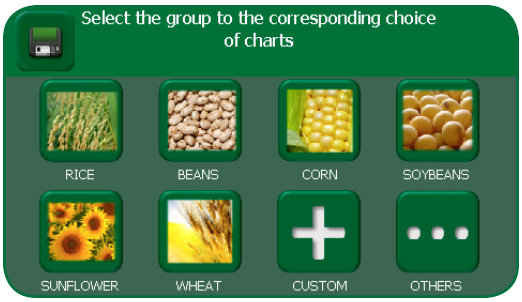


2. Use the scroll buttons at the bottom of the screen to display the desired set of charts.

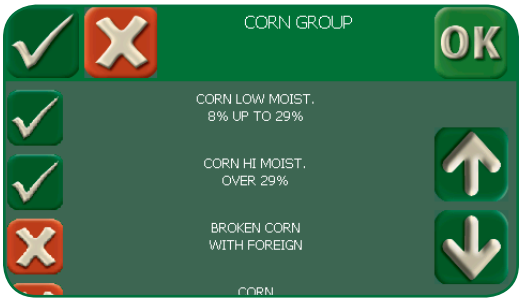
NOTE: *The countries specified in the chart names refer to the default chart settings and common commodities used.*



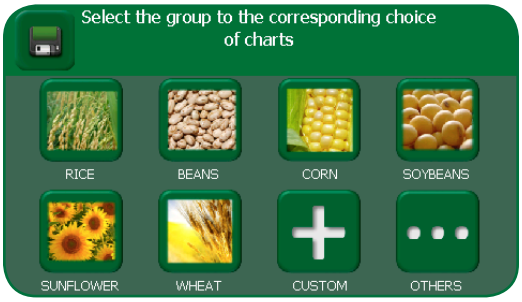
3. Press the chart name and press YES at the ATTENTION screen to confirm deletion of all the pre-selected charts.
4. Press the button that is applicable to the chart set desired.



5. Select the desired charts:
   - Press the green select button at the top of the screen to include all charts.
   - Press the red deselect button at the top of the screen to remove all charts.
   - Use the scroll buttons at the right side of the screen to display the available charts and press the red deselect or the green select button to the left of a chart to remove or include that chart.



6. Press OK.
7. Repeat Steps 4 through 6 for each chart set desired.
8. Press the SAVE button.



Test Weight Measurement

1. Obtain a pint cup and place the cup on a flat, level and stable surface.
2. Fill the pint cup with the tested grain.
3. With a z-shaped motion, level the grain in the pint cup with the leveling stick.
4. Dump the contents of the pint cup into the Grain Cell.
5. Allow the test to complete.

Error Message

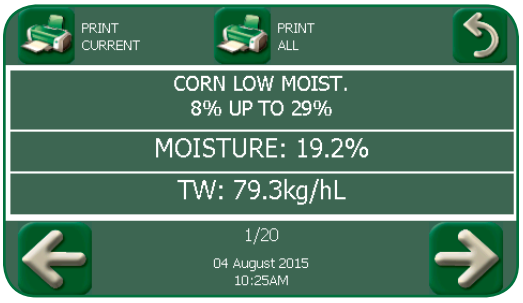
If the error message "**Dial out of limits**" displays during a test, dump the sample out of the Grain Cell, place the empty cell back into the tester correctly and follow the touchscreen prompts to restart the test.

Test History

Test history is accessible after the self-test has completed, charts have been selected, settings have been changed or a moisture test or special test is performed. Press the HISTORY button to access test history.

This screen displays the results of the last twenty tests performed, and allows any or all of these results to be printed.

- To print all the saved test results, press the ‘PRINT ALL’ button.
- To print a single saved test result:
  1. Use the scroll buttons at the bottom of the screen to display the result to be printed.
  2. Press the ‘PRINT CURRENT’ button.



Tester ID

Tester ID is accessible after the self-test has completed, charts have been selected, settings have been changed or a moisture test or special test is performed. Press the IDENTIFICATION button to access the tester ID screen.

This screen is used to specify the License Plate and the Batch/Lot on the printout for the next moisture test(s).

To specify the License Plate and/or the Batch/Lot:

1. Use the touchscreen keyboard to specify the License Plate.
   - If the Batch/Lot will not be specified, press EXIT.
   - If the Batch/Lot will be specified, press the scroll button at the bottom right of the screen and continue with Step 2.

2. Use the touchscreen keyboard to specify the Batch/Lot.
3. Press EXIT.

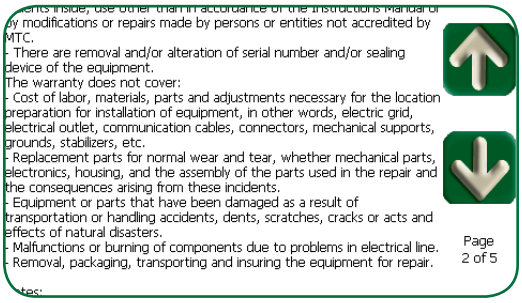
Resetting Procedures

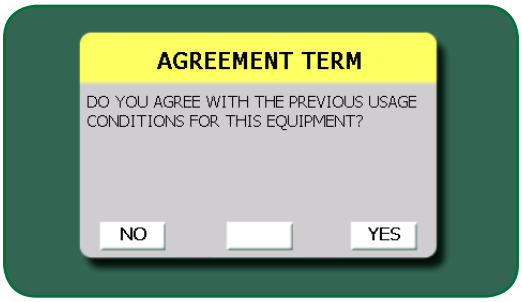
If the tester is reset, the language must be selected, the Terms of Use Agreement must be accepted and charts must be installed before a moisture test can be performed.

Perform these procedures when the tester is reset:

1. Use the scroll button to display the desired language and press OK.

2. Use the scroll buttons at the right of the screen to read the Terms of Use Agreement, and press YES to accept the agreement.





3. Refer to “Charts Installation” on Page 14 to install the desired charts.

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CARE AND MAINTENANCE

Care

- When handling the moisture tester, always support the bottom of the tester housing.
- Keep the moisture tester away from the elements.
- Avoid shock and strong impacts to the base of the Grain Cell, as this cell is connected to the scale.
- Ensure that the power cable is properly grounded to prevent damage to the tester.
- Do not allow liquids to contact the electrical components of the tester.
- Avoid the use of radios, telephones, and two-way radios near the tester; these devices can cause interference with the measurement process.
- The presence of foreign material on the interior or exterior of the Grain and Dump Cells will affect the accuracy of the moisture reading. For example, rice will deposit a thin layer of residue on the walls of the cells. Ensure that the interior and exterior surfaces of the cells are clean prior to each test.
- Use a cloth moistened with water to clean all tester components. The use of alcohol or other chemicals can damage internal tester components.

Maintenance

All Model 935 Moisture Testers are factory-calibrated with the manufacturer's Standard Tester.

For maintenance, send your tester complete in the original box, and with the power source; shipping costs must be paid by the owner. Contact Shore Measuring Systems using one of the methods listed on Page 7 to determine where to send the tester for maintenance.

Software Update

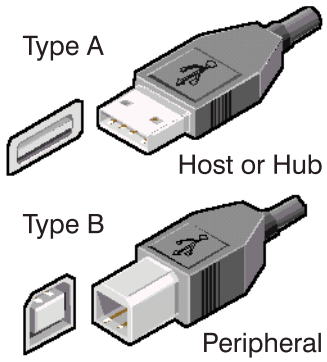
The Model 935 Moisture Tester is designed for software updates to be performed through a personal computer. Updates will be installed during periodic maintenance, however if your tester requires a software update at any other time, contact Shore's Service Center for more information.

Serial Communication

To allow serial communication between the tester and a computer, obtain a USB A/B type serial cable.

It will be necessary to install the version of driver ‘FT232’ onto your computer that is applicable to your operating system. This driver is available for download, free of charge, at:

http://www.ftdichip.com/Drivers/VCP.htm



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