MOISTURE**MATCH**™

A next generation grain tester

A next generation moisture tester incorporating new and unique technology. Finally, a portable tester that will more accurately match and track with the commercial elevator testers. Designed for the future with computer interface and upgrade capability.

Warranty

The Farmex™ Model GMT2 – MoistureMatch Grain Moisture Tester is guaranteed to be free from defects in materials and workmanship for one year from date of retail purchase. This warranty does not cover the batteries or damage resulting from misuse, neglect, accident or improper installation or maintenance. This warranty does not apply to any product which has been repaired or altered outside the factory.

The foregoing warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and any other obligation or liability in connection with its product and will not be liable for consequential damages.

Customer Support

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http://www.agratronix.com

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TESTER COMPONENTS

Identify the following components:
1. Fill Cup
2. Moisture Tester
3. Cap
4. Batteries
5. Port Door
6. Battery Door

DEFAULT MANUFACTURER SETTINGS

The tester has various options that have different settings. These options and the "default" settings are listed below:

Grain List – All grains are activated
Commercial Tester – Industry Standard
Language – English

Refer to the operation guidelines for further information regarding settings.

Packaging
The MoistureMatch comes with a protective plastic film cover over the display window. Remove the protective cover and discard.

BATTERY CONNECTION

The tester is supplied with two standard 9V alkaline batteries. The system battery provides power for all electronics and the backlight battery powers the LCD display backlight.

Inside the battery compartment, the base has a raised image that shows the polarity of the batteries. Line up the battery positive (+) and negative (–) terminals to the raised image. Make sure the batteries are completely seated.

Place the battery door over the battery compartment and snap into place.

MAIN SELECTION BUTTONS

UP/DOWN Arrows
Toggle between various options such as YES and NO. Either button will perform the same toggle function.

Scroll through a list of options. One example is grain selection. Use the UP or DOWN arrows to scroll through all the different grains.

ENTER

The ENTER button will acknowledge the selection you make. (Example: when selecting grain, scroll through grain choices with the UP/DOWN arrows to make your grain choice and press ENTER to accept the selection).

ENTER will take you through the steps of a procedure by going to the next step.

ENTER can also return you to the previous display.

MENU

Automatically shows the various menu options (Batteries, Commercial Tester, Diagnostics, Grain, Language, Software Version).

CANCEL

CANCEL will return back to the initial display and not make any changes.

SELECTING THE MENU OPTION

When the tester displays the GRAIN screen, press the MENU button.

The tester will display the MENU screen with six options. Use the UP/DOWN arrows to scroll to the option required and press the ENTER button.

```
BATTERY
COMMERCIAL TESTER
DIAGNOSTICS
GRAIN
LANGUAGE
SOFTWARE VERSION
```
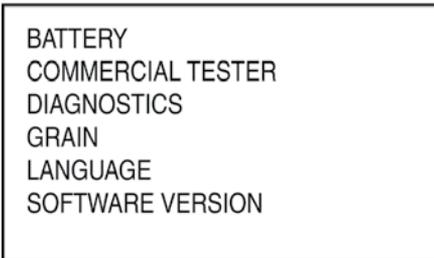
SELECTING THE BATTERY OPTION

Selecting the BATTERY option will display a screen that indicates the power remaining in the SYSTEM battery and the LIGHT battery.

SELECTING THE LANGUAGE OPTION

Selecting the LANGUAGE option screen displays the available languages.

```
ENGLISH
FRENCH
GERMAN
ITALIAN
SPANISH
SWEDISH
```

Use the UP/DOWN arrows to select the language of your choice.

The number of languages available depends on the Software Version that you have. Press the ENTER button and return to the Main display.

Press the ENTER button to save the language selected or press cancel to exit the Language option.

SELECTING THE COMMERCIAL TESTER OPTION

Selecting the commercial tester option will display the list of commercial grain elevator testers to which this unit has been calibrated. Use the UP/DOWN arrows to scroll through the list.

```
DJ GAC 2000 SERIES
MOTOMCO 919
MOTOMCO 919E
LABTRONICS
INDUSTRY STANDARD
```
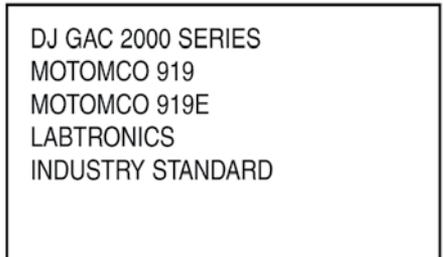
After scrolling to the desired commercial grain elevator, press the ENTER button to set this selection.

SELECTING THE GRAIN OPTION

Selecting the GRAIN option will display a list of up to four (4) grains at a time. Use the UP/DOWN arrows to scroll through the list. When the cursor points to a grain to be selected, it will indicate it is enabled: 1, or disabled: 0, status. Press the ENTER button to enable or disable that grain.

```
CANOLA                    1
CORN LOW MOISTURE         1
CORN HIGH MOISTURE        1
OATS                      1

8.0% – 26.0%        VER 1.0
```

All enabled grains will be displayed on the initial display when the tester is turned on. Those grains that are enabled can be selected by using the UP/DOWN arrows. Disabled grains can be enabled at any time by following the previous steps. After selecting grains, press the ENTER button to return to GRAIN screen.

Press the MENU button to return to the previous screen.

NOTE: There must be at least one grain enabled, so if the user disables all the grains, a message will be displayed prompting the user to enable at least one grain.

OPERATION

GENERAL INFORMATION

Matching Elevator Moisture

All other electronic grain moisture testers, portable or commercial, are calibrated to an industry standard like the ASAE Standard. Oven Drying, Microwave Drying or another standard is used for determining absolute moisture.

This tester takes a different approach. Calibration data was developed with respect to the most widely used commercial grain elevator testers in the North American market. The user can select a calibration curve that is based on the moisture readings of a commercial grain elevator moisture tester. The accepted industry practice is for farmers to sell their grain according to the readings given by their local grain elevator. So the test equipment that the grain elevator operator uses becomes the standard, not absolute moisture.

Unfortunately, the elevator tester measurements and absolute moisture may not be the same. Therefore, it is more important for the user to know what the elevator tester reads, rather than to know the absolute moisture. However, the Moisture-Match tester does have an absolute scale (Industry Standard) for reference.

Not only is it possible for different brands of commercial testers to give different results, it is also possible for the same brand and model commercial testers to produce different readings. The next feature described below allows the user to make fine tuning adjustments to track with the specific commercial tester that his local grain elevator uses.

Calibration to a Specific Commercial Tester (MoistureMATCH Technology)

Calibration adjustments are usually made by adding an offset to the entire calibration curve. This can cause problems because when a tester is adjusted at low moisture, it can throw off the calibration at high moisture and vice versa.

With the MoistureMATCH™ tester, when a calibration adjustment is entered, it impacts the moisture curve immediately surrounding the specific moisture that is being adjusted; the rest of the curve is not affected.

MOISTURE LIMIT GUIDELINES
(MAY CHANGE WITH DIFFERENT VERSIONS)

Grain	Industry Standard	Dickey-John GAC2000	Motomoco 919	Motomoco 919E	Labtronics
Barley: 2 Row	8-22	8-26	8-20	8-20	8-22
Barley: 6 Row	8-22	8-26	8-20	8-20	8-22
Beans: Pinto	6-29	5.5-31	6-29	6-29	6-27
Buckwheat	4-26	3.5-25.5	4-26	4-26	5-27
Canary	6-27.5	6-27.5	6-27.5	6-27.5	6-27.5
Corn	8-40	10-40	8-40	8-40	9-38
Flax	3.5-21	3-21	3.5-21	3.5-21	3.5-21
Flax (Linseed)	5-16	5-16	4-14	N/A	6-16
Lentils	6.5-24	6.5-24	6.5-24	6.5-24	6.5-24
Millet	6-25.5	6-25	6-26	6-25.5	6-25.5
Mustard: Yellow	3.5-24	3.5-28	3.5-24	3.5-24	3.5-20
Oats	8-24	8-22	8-20	8-20	8.5-22.5
Peanuts: Spanish	6.5-17	5-20	5-20	5-20	5-20
Peas: Chick	6-27.5	6-27.5	6-27.5	6-27.5	6-27.5
Peas: Field	6-27.5	5.5-28.5	6-27.5	6-27.5	6-26
Peas: Green	6-25.5	6-26	6-25.5	6-25.5	6-25.5
Peas: Yellow	6-25.5	6-26	6-25.5	6-25.5	6-25.5
Rapeseed (Canola)	5-20	5-21	4.5-14	4.5-14	5-15
Rice: Long (Paddy)	8-24	8-26	N/A	8.5-25	N/A
Rice: Medium (Paddy)	8-28	8-28	N/A	9-25	N/A
Rice: Short (Paddy)	8-24	8-28	N/A	9-28	N/A
Rye	8-27	8-29	8-20	8-20	9-24
Safflower	3.5-23.5	3.5-22	3.5-23.5	3.5-23.5	3.5-25
Softwheat	5.5-25.5	5.5-24	5.5-25.5	5.5-25.5	5-27
Sorghum (Milo)	8-23	8-24	9.5-21	9.5-21	N/A
Soybeans	8-26	6-24	8-20	9.5-15	7-26
Sunflower: Oil	5-23	4-20	7-25	7-26	7-23
Sunflower: Stripe	6-22	5-17	11-28	N/A	7-23
Wheat: Durum	6.5-23.5	6-20	7-20	7-20	8-21
Wheat: Hrd Rd Spr	6.5-25	6-22	7-20	7-20	8.5-25
Wheat: Hrd Rd Wtr	8-25.5	8-20	8-20	8-20	8-20
Wheat: Sft Rd Wtr	8-25.5	8-22	7-20	7-20	9-25
Wheat: White	6.5-24	6-24	7-24	7-24	7-24

Note: If grain temperature is 40°F (4°C) or below, or 110°F (43°C) or above, and the grain moisture is near either the high or low limit of the unit (listed above), the tester is programmed to reduce its moisture limits. For example: Rather than the lower limit of 8% moisture it may only go down to 8.5% moisture due to the temperature effect. (Specifications and design subject to change without notice.)

With this feature, adjustments can be made independently at high or low moisture points. Adjustments can be made to multiple individual moistures over the entire moisture range.

This technology allows the user to "match" his commercial tester more precisely. Over time, if the grain elevator tester drifts or is reading differently for any reason, the portable grain tester can be calibrated to that specific grain elevator tester and will still "match" it.

EXAMPLE: The commercial grain elevator tester reads 13% moisture and the MoistureMATCH™ reads 12%. Use the calibration procedure to adjust the MoistureMATCH tester up to 13%. (As with all moisture testers, it is recommended you take the average of 3 readings).

Later, during harvest, you may have grain that tests 18% with the Moisture-MATCH™, and tests 17% with the commercial tester. Adjust the MoistureMATCH tester down to 17%, and this adjustment will not impact the adjustment at 13% described above.

Again, many moisture testers claim to be adjustable to match commercial testers, but they can only achieve this with a fixed offset that impacts the entire moisture range.

Automatic Compaction Detection

State-of-the-art technology automatically detects the amount of grain compaction in the test cell and allows a fixed compaction setting to be preset to establish a trip point at which a test can begin. The MoistureMATCH will automatically begin testing the sample compacted when the present compaction threshold is met.

OPERATIONAL MESSAGES

The following is a list of messages to the user and their definitions.

MESSAGE DESCRIPTION

TIME LIMIT EXPIRED – Since the tester has been filled with grain, the time limit has expired. Empty test cell and start over.

TEST CELL ERROR – Test cell needs to be cleaned out or emptied; could not calibrate test cell.

COMPACTION SENSOR ERROR – Compaction sensor cannot initiate.

REPLACE NOW – System battery needs to be replaced. If the battery goes to 0%, the battery icons will be displayed when the tester turns on.

MOISTURE BELOW LIMIT – Moisture is below low limit. Empty test cell for next test.

MOISTURE ABOVE LIMIT – Moisture is above high limit. Empty test cell for next test.

EMPTY TEST CELL – Test cell is not empty or is not clean.

OPERATING CONDITIONS

NOTE: This test cell must be empty before turning on the tester. The unit performs a self-calibration, similar to the commercial elevator testers, each time it is turned on.

The test cell and grain MUST be free of any condensation or surface moisture. Moisture on grain or moisture on the test cell walls will cause high readings. Very hot or cool grain will pick up moisture when it warms or cools.

Because grains are irregularly shaped, especially corn, and will not always pack the same way in the test cell, minor variations in readings may occur. This is the reason commercial tester grain elevators may give different moisture results for the same sample tested several times. To enhance accuracy, always take three (3) successive readings of the total sample being tested. Empty and refill the tester with new grain from the sample between each test.

The tester is most accurate when the grain and tester are between 60°F (16°C) and 90°F (32°C). The unit will, however, operate at temperatures between 32°F (0°C) and 113°F (45°C). For best results, grain temperatures should not be below 40°F (4°C) or above 110°F (43°C).

Condensation on the grain or test cell is best avoided by having the tester and grain at about the same temperature. The environment that a grain sample is exposed to can significantly change its moisture content. Exposed to the open air, grain can gain or lose 1% to 2% indicated moisture in a short period of time. If a sample is to be held for even a short time before being tested, it should be placed into a tightly closed, air-tight container, such as a zip-lock bag or jar.

MOISTURE TEST

The fill cup must be removed from the test cell. The cap can be on or off while the tester performs self-calibration.

Inspect the test cell and make sure it is empty and clean.

1. Press and release the ON/OFF button to turn on the tester. The display window will briefly display a logo while the tester performs a real-time power up self-

CORN
LOW MOISTURE

FILL TEST CELL
TIGHTEN CAP
STOP AT BEEP

calibration, similar to that performed by commercial testers. The resulting display is the "main display."

2. Use the UP/DOWN arrows to scroll to the grain that is to be tested.

NOTE: Options shown on a display can be selected by pressing the UP/DOWN arrows.

NOTE: Generally the two lower lines in the display screen will indicate instructions to the user.

NOTE: When the test procedure is initiated, the test must be completed when fifty (50) seconds or the test session will end and the tester will beep and display an operational message "TIME LIMIT EXPIRED."

The test procedure is initiated when the tester detects grain entering the test cell. A message displaying "TEST INITIATED" will appear on the display.

The user must move on to the following steps and complete the test or press CANCEL to back out of the test.

If the test is cancelled, the test cell must be emptied. When the test cell is emptied, the tester will return to the grain display and is ready for another test.

3. Scoop up grain with the fill cup; pour into the test cell; repeat until the grain is at the top rim of the test cell (top of the threaded portion of the tester). Thread the cap onto the tester until it beeps or "TESTING" is displayed.

   NOTE: Some grains, such as fescue and high moisture corn, will require pre-compaction. Fill the test cell and compact, using the bottom of the fill cup. Continue to add grain until the compaction is great enough to initiate a test.

When the compaction threshold is met, the tester will beep and display TESTING. If you are in a noisy environment and can't hear the beep, watch the display until the message "TESTING" is displayed.

After the moisture is determined, the display will read out the results of the test. The last six test results will be displayed as well as a running average for those tests. At this point, you can prepare to take another test or clear all or some of the displayed moistures.
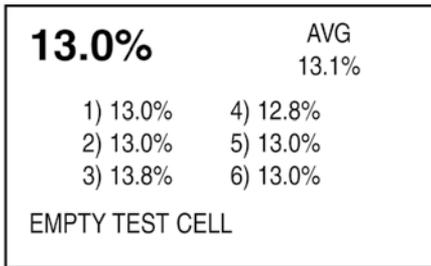
5. If additional tests are required, press ENTER, remove the cap, and completely empty the test cell. Press ENTER and the tester will return to the GRAIN display, ready to begin a new test.

IMPORTANT: A NEW SAMPLE MUST BE USED FOR EACH TEST. THE TESTER AUTOMATICALLY DETERMINES IF THE TEST CELL HAS BEEN EMPTIED. IT WILL NOT PERFORM A NEW TEST UNTIL THE CURRENTLY TESTED GRAIN HAS BEEN EMPTIED FROM THE TEST CELL.

6. Press CLEAR to clear all or some of the previous test results.

   The user will be prompted to choose "CLEAR ALL" or "SELECT 1-6".

   Use the UP/DOWN arrows to select either option.

   If "CLEAR ALL" is selected, all readings, including the current reading, will be cleared.
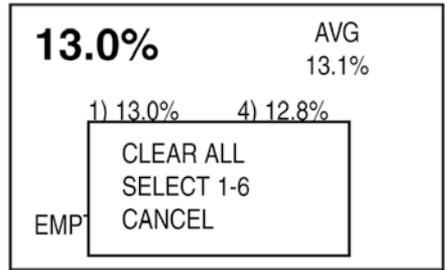
   If "SELECT 1-6" is selected, an arrow will appear next to the first reading. Use the UP/DOWN arrows to scroll to the reading that is to be cleared. Push the ENTER button to clear that reading.

7. Push the CANCEL button to exit the "CLEAR" reading option pop-up window.

   When a reading is cleared, any readings that follow the cleared reading will be shifted up one and a reading of zero will be loaded into the last (6th) position.
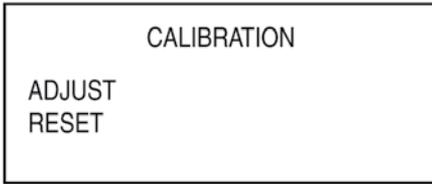
   After the test is complete, press the ENTER button to return to the grain display.

CALIBRATION ADJUSTMENT

Calibration has two options:
ADJUST – Adjust calibration
RESET – Reset to original manufacturer's calibration

```
            CALIBRATION

    ADJUST
    RESET
```

NOTE: Press and release the CANCEL button of any time to stop the calibration adjustment process.
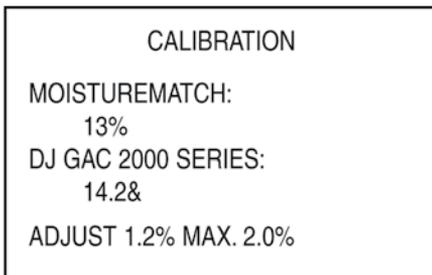
ADJUST
Enter the CALIBRATION menu by pressing the CAL button while the grain moisture is being displayed from a recent test.

NOTE: A calibration cannot be set that is beyond the limits for the selected grain.

Four (4) readings will be displayed:

1. The MoistureMATCH reading that was just taken.
2. The pre-selected commercial elevator tester will appear with any existing offset reading for that moisture point.
3. The existing adjusted value, if any, that shows the different between the commercial tester reading and the MoistureMATCH.
4. The maximum offset allowed at that moisture point. This is the largest offset that a user can enter.

```
            CALIBRATION

    MOISTUREMATCH:
        13%
    DJ GAC 2000 SERIES:
        14.2&
    ADJUST 1.2% MAX. 2.0%
```

Use the UP/DOWN arrow to enter the moisture reading of the commercial tester.

The adjusted value will change as you change the commercial tester reading.

After entering the adjusted commercial tester reading, push the ENTER button and the user will be prompted to display the calibration curve.

Select YES or NO and push ENTER.

Press ENTER to exit the Graph Display and return to the Main Display.
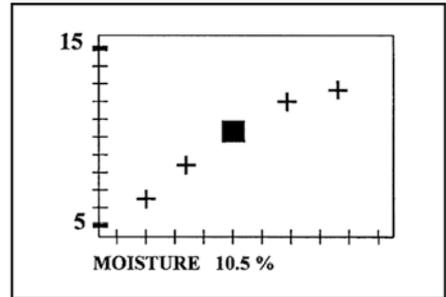
RESET
1. Enter the CALIBRATION menu by pressing the CAL button.

2. Use the UP/DOWN arrows to scroll to RESET and push the ENTER button.

3. The current grain and current commercial tester will be displayed. Use the UP/DOWN arrows to scroll to YES or NO to reset the calibration to the original manufacturer's calibration. All adjustments will be deleted.

```
            CALIBRATION

    RESET
       CORN HIGH MOISTURE
       MOTOMCO 919

    YES
    NO
```
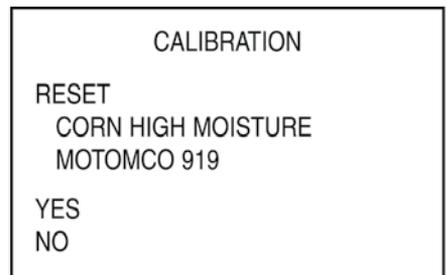
SELECTING THE DIAGNOSTICS OPTION

NOTE: Press and release the CANCEL button at any time to stop the Diagnostics.

Press the MENU button to enter the Options Window. Selecting the DIAGNOSTICS option will display the list of available diagnostics. Using the UP/DOWN arrows will scroll through the list.

```
TEST CELL
COMPACTION
GRAIN TEST
TEMPERATURE
BEEP
ESN
```

After scrolling to the desired Diagnostic, press the ENTER button to activate the selection.

SELECTING THE VERSION OPTION
Selecting the VERSION displays the software version and selected grain table and configuration version. A pop-up window will display temporarily, and then go away.

Press and release the CANCEL button to return to the grain display.

```
BATTERY
COMMERCIAL TESTER
DIAGNOSTICS

    SOFT VER 1.00
    CFG. VER 1.01
```

TROUBLESHOOTING

Symptom A: Unit does not power up or loses power occasionally (or backlighting does not operate.)

Solution 1: Press ON-OFF button for shorter time. Do NOT hold button down.

Solution 2: Check batteries for 7.5 volts or higher. Replace as necessary.

Solution 3: Remove battery access door from bottom of tester. Remove batteries and ensure polarity is correct. Reseat batteries.

Symptom B: Unit does not match the commercial elevator tester.

Solution 1: Verify that the desired grain and the correct commercial grain tester is selected.

Solution 2: The portable tester's moisture range has not been adjusted to the commercial elevator's tester properly. Check the calibration adjustment instructions and make fine-tune adjustments.

Solution 3: Temperature of the grain and unit may be more than 20°F (11°C) different.

Solution 4: The grain and/or test cell may have developed surface moisture from rapid changes in the grain sample's temperature. Allow grain and tester to stabilize near room temperature. Inspect for visible moisture on grain and inside the test cell. Dry the test cell with a soft cloth or blow dryer, if necessary. Retest grain.

Symptom C: Unit reads "MOISTURE BELOW LIMIT" or "MOISTURE ABOVE LIMIT."

Solution 1: Grain may be too wet or dry to test. Check moisture limit guidelines in Operating Instructions.

NOTE: Moisture limits are only guidelines.

Symptom D: Unit reads "TEST CELL ERROR".

Solution 1: Fill cup may still be inside the test cell. Remove it and try again.

Solution 2: Test cell still has grain in it. Remove all grain.

SERVICE

TO REPLACE BATTERIES
The tester is supplied with two 9 volt, alkaline batteries. The right battery (A) powers the backlight circuit. The left battery (B) powers the system.

At any time, select BATTERY from main menu to display the condition of both batteries.

The tester will properly operate, except backlighting, when there is no backlighting battery and if this battery is low.

NOTE: If the backlighting battery is fresh and the system battery needs replacing, the backlight battery can be used to operate the system, by moving it to the system battery location.

Remove the battery door and the old battery(s).

Insert new battery(s) and replace door.

TO CLEAN MOISTURE TESTER
Remove cap and wipe out inside of moisture tester cell with a dry paper towel.

ACCESSORIES

OPTIONAL CARRYING CASE
(P/N 20101)
The carrying case is constructed of padded vinyl to protect the tester. A zippered bottom, clear vinyl window and Velcro® sealing flap permit tester operation with tester in carrying case. Velcro is a registered trademark of VELCRO Industries.

OPTIONAL SOFTWARE
(P/N 20107)
This tester communicates to a PC through the RS232 serial port, like some commercial testers do. Software and grain table upgrades can be downloaded through the RS232 interface.

See the software documentation for downloading.

REPLACEMENT PARTS
Tester Cap Replacement:
        Order P/N 20103

Grain Scoop Replacement:
        Order P/N 20104

Battery Door Replacement:
        Order P/N 20105

Serial Port Door Replacement:
        Order P/N 20106