

Operators Manual

MT-PRO

Grain Moisture Tester

Farmscan Part No. 2166



Introduction

THANK YOU for purchasing an AgraTronix product.

READ THIS MANUAL carefully to learn how to operate and service your equipment correctly. Failure to do so could result in personal injury or equipment damage.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of this equipment and should remain with the unit when you sell it.

RECORD SERIAL NUMBERS in the warranty section located on page 20-1. Accurately record all the numbers. Your dealer needs these numbers when you need service or parts. If this manual is kept with the equipment, also file the serial numbers in a secure place away from the unit.

WARRANTY is provided through AgraTronix for customers who operate and maintain their equipment as described in this manual. The warranty is explained in the warranty section located on page 20-1.

This warranty provides you the assurance that AgraTronix will back its products where defects appear within the warranty period. In some circumstances, AgraTronix provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused or modified to change specifications, the warranty will become void and field improvements may be denied.

Sold / Serviced / 12m Return to base Warranty

FARMSCAN PTY LTD

ABN 76 632 674 545

Unit 4, 27 Mordaunt Circuit, Canning Vale WA 6155

Sales: (08) 6102 3200 Support: 0480 018 282

www.farmscan.com.au

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Contents

	Page
Operation	
Operating Conditions	05-1
Operational Messages	05-1
Moisture Limit Guidelines	05-2
Operating Procedure - Preheating	05-3
Operating Procedure – Normal Operation	05-4
Average Test Results	05-5
Select a New Grain Scale or Function	05-6
Select a Different Language	05-6
Calibration Modes	05-7
Select a Different Calibration Mode	05-8
Calibration Consideration / Limits	05-8
Adjust Calibration – Simple Option	05-10
Adjust Calibration – Advanced Option	05-11
Clear Calibration – Simple Option	05-12
Clear Calibration – Advanced Option	05-12
Display Temperature in the Cell	05-13
Turn on Backlight and Turn off Tester	05-13
Troubleshooting	10-1
Service	
Check Battery Power Levels and Replace Batteries	15-1
Clean the Tester	15-1
Warranty	
Warranty	20-1
Record Serial Numbers	20-1
Manufacturer' Contact Information	
Manufacturer's Contact Information	25-1
Accessories	25-1

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Operation

OPERATING CONDITIONS

Test cell and grain **MUST** be free of any condensation or surface moisture. Moisture on grain or in test cell will cause high readings. Very hot or cool grain will pick up moisture when it warms or cools. The pressure cap of the tester can squeeze moisture from high moisture grains, such as corn, into the bottom of the test cell.

Because grains are irregularly shaped and may not always pack the same way in the test cell, minor variations in readings may occur. To enhance accuracy, always take three (3) successive readings of the total sample being tested and average the results. Empty and refill the tester with new grain from the sample between each test.

The tester is most accurate when grain and tester are between 60°F (16°C) and 90°F (32°C). The unit will, however, operate at temperatures between 33°F (1°C) and 120°F (49°C). For best results, grain temperature should not be below 40°F (4°C) or above 110°F (43°C). If the grain temperature is 20°F (11°C) more or less than the temperature of the unit, preheat the tester per instructions on page 05-3. Condensation on the grain or test cell is best avoided by having the tester and grain at about the sample temperature.

The environment to which a grain sample is exposed can appreciably change its moisture content. Exposed to the open air, grain can gain or lose 1% to 2% indicated moisture in only a few minutes. 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 re-closable bag or jar.

OPERATIONAL MESSAGES

Symbol	Definition
SYSTEM BATTERY LOW	System battery needs replacing
MOISTURE BELOW LIMIT	Moisture is below limit
MOISTURE ABOVE LIMIT	Moisture is above limit
ERROR (---)	Electronic Failure

NOTE: Contact Manufacturer if an ERROR message occurs.

Operation

MOISTURE LIMIT GUIDELINES - DISPLAY READING

(Specifications and design subject to change without notice.)

Grains	Moisture Range Low Limit	Moisture Range High Limit
Alfalfa	6.0%	24.0%
Barley	7.0%	25.0%
Beet	8.0%	20.0%
Buckwheat	6.0%	23.0%
Canary	8.0%	23.0%
Clover: Purple	6.0%	20.0%
Clover: White	6.0%	20.0%
Corn: high moisture	15.0%	40.0%
Corn: low moisture	6.0%	22.0%
Dactyl	7.0%	22.0%
Fescue	6.0%	22.0%
Flax (Linseed)	5.0%	17.0%
Lentils	7.0%	18.0%
Millet	6.0%	21.0%
Mustard	5.0%	21.0%
Navy Beans	8.0%	20.0%
Oats	6.0%	23.0%
Peanuts: Spanish	6.0%	15.0%
Peas: FODDER	7.0%	20.0%
Peas: Green	8.0%	21.0%
Peas: Yellow	8.0%	21.0%
Phleum	6.0%	24.0%
Popcorn: White	6.0%	24.0%
Popcorn: Yellow	6.0%	25.0%
Rapeseed (canola)	7.0%	15.0%
Rice: Long	8.0%	22.0%
Rice: Medium	8.0%	22.0%
Rye	7.0%	26.0%
Rye Grass	9.0%	20.0%
Safflower	6.0%	28.0%
Sorghum (milo)	9.0%	21.0%
Soybeans	8.0%	25.0%
Sunflower: Stripe	7.5%	22.0%
Triticale	6.0%	23.0%
Wheat: Durum	8.0%	20.0%
Wheat: hard red spring	7.0%	21.0%
Wheat: hard red winter	7.0%	21.0%
Wheat: soft red winter	8.0%	22.0%
Wheat: white	7.0%	22.0%

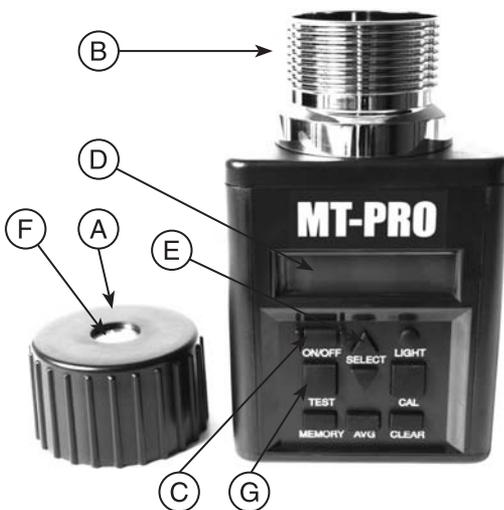
Operation

OPERATING PROCEDURE – PREHEATING

IMPORTANT: If the temperature of the grain sample is 20°F (11°C) more or less than the temperature of the unit, preheat the tester and test as follows:

PREHEATING PROCEDURE

1. Remove cap (A) and inspect test cell (B) to be sure that it is clean and empty.
2. Press ON-OFF button (C) to turn on tester. The display (D) will show ALWAYS AVERAGE 3 TESTS for approximately 7 seconds, then will show ALFALFA (initial operation) or the name of the last grain tested.
3. When the grain to be tested has been selected using the SELECT arrows (E), fill the test cell (B) even to the top of the cell with sample to be tested.
4. Replace cap loosely. **DO NOT TIGHTEN.**
5. After 30 seconds, empty test cell and immediately refill with fresh grain.
6. Replace cap (A) and tighten until pressure-indicator screw (F) is flush with the top of cap (A). (Use “finger-flush” test as illustrated)
7. Immediately press TEST button (G). The words TESTING will be displayed for about 10 seconds, while the tester compensates for temperature. The moisture % and temperature will then be displayed for about 10 seconds.

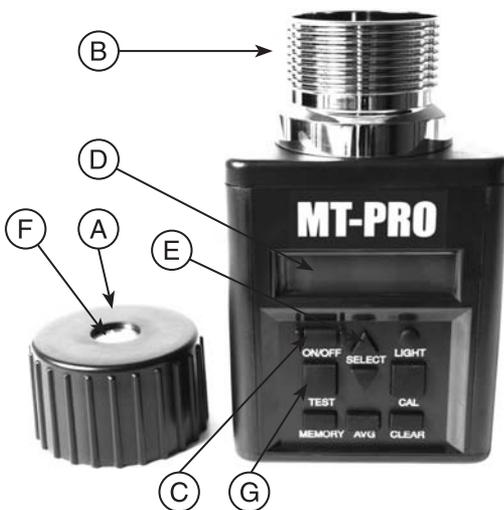


- A - Cap
- B - Test Cell
- C - ON-OFF Button
- D - Display
- E - Select Arrows
- F - Pressure-Indicator Screw
- G - Test Button

Operation

OPERATING PROCEDURE – NORMAL OPERATION

1. Remove cap (A) and inspect test cell (B) to be sure that it is clean and empty.
2. Press ON-OFF button (C) to turn on tester. The display (D) will show ALWAYS AVERAGE 3 TESTS for approximately 7 seconds, then will show ALFALFA (initial operation) or the name of the last grain tested.
3. When the grain to be tested has been selected using the SELECT arrows (E), fill the test cell (B) even to the top of the cell with sample to be tested.
4. (For Initial Test Only) Before tightening pressure cap, turn on tester and allow tester to warm up for 30 seconds before attempting first test.
5. Replace cap (A) and tighten until pressure-indicator screw (F) is flush with the top of cap (A). (Use Finger-flush test as illustrated.)
6. Immediately press TEST button (G). The words TESTING will be displayed for about 10 seconds, while the tester compensates for temperature. The moisture % and temperature will then be displayed for about 10 seconds.
7. The tester will then return to displaying the name of the last grain tested. Empty the test cell and refill with a fresh sample and test again.
NOTE: Take at least three readings of new grain from the sample collected and average the results.



- A - Cap
- B - Test Cell
- C - ON-OFF Button
- D - Display
- E - Select Arrows
- F - Pressure-Indicator Screw
- G - Test Button

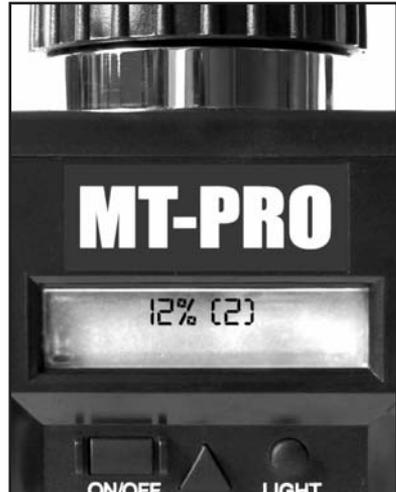
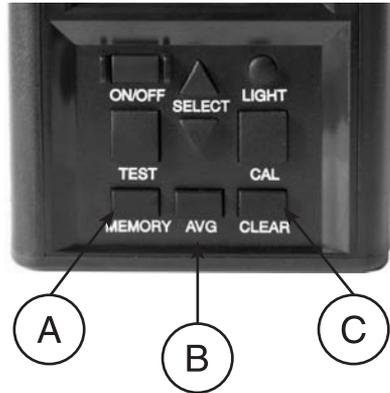
Operation

AVERAGE TEST RESULTS

1. When testing grain, the test result is displayed for about ten seconds. During the period that the test moisture % and temperature is displayed, press the MEMORY button (A). The tester will acknowledge that it has entered the reading into memory, by displaying the current average and then the number of stored readings. Up to 20 readings can be stored into memory. If the maximum number of readings has been reached, the tester will not allow any more readings to be stored.

NOTE: Averaging is stored for one grain only. When a test for a new grain is performed, existing averaging data for the previous grain is erased when the new grain's averaging data is taken. Averaging data is retained even if batteries are removed.

2. Press the AVG button (B) to display the average of all results entered for the grain being tested.
3. To clear the averaging, press the AVG button. The current average will be displayed. Then press the CLEAR button (C) and the tester will then display 0.0% (0). This indicates that the averaging has been cleared.



Operation

SELECT A NEW GRAIN SCALE OR FUNCTION

1. At start up, the tester will display, ALWAYS AVERAGE 3 TESTS for approximately 7 seconds, then will display the name of the last grain tested, such as CORN.
2. To select a new grain scale, press either the up or down arrow on the SELECT button (A) to index forward or backward through the grain (function) menu. The grains are listed in alphabetical order followed by other tester functions.
NOTE: To use other functions included with the tester, push SELECT button (A) up or down to get desired function. Push TEST button (B) to perform that function.



SELECT A DIFFERENT LANGUAGE

1. At start up, the tester will always display the name of the last grain tested in the current language selected. (English is the default language from the factory.)
2. To select a new language, press either the up or down arrow on the SELECT button (A) to index forward or backward through the grain (function) menu until the word LANGUAGE is displayed.
3. When LANGUAGE is displayed, press TEST button (B). The current language selected will be displayed. Press either the up or down arrow on the SELECT button (A) to index forward or backward through the grain language menu until your choice of language is displayed. The seven (7) languages (as displayed) are: ENGLISH, SPANISH, GERMAN, FRENCH, ITALIAN, SWEDISH and PORTUGUESE.
4. Press TEST button (B) again to return to the main grain menu, which will now be displayed in the new language.

Operation

CALIBRATION MODES

This tester includes two different Calibration Modes. Please read the description below to determine which calibration mode you wish to use.

- 1. Simple Calibration Mode:** In Simple Calibration Mode if you apply an offset to a given grain the tester will simply apply that offset to the displayed moisture regardless of the moisture content or range. This means there is just a single offset that will be applied to the grain. The calibration offset can also be adjusted at any time without having to take a valid test. **This is the default mode for the tester. Example:** You have tested two grain samples, one at 10%, and the other at 20%. You have retested the 20% grain and apply a 2% offset. If you now retest the two samples the new results are as follows:

<u>Original</u>	<u>Moisture display with user offset applied</u>
20%	22%
10%	12%

- 2. Advanced Calibration Mode:** In Advanced Calibration Mode you must first take a valid test before you can adjust the offset for the tested grain. Once a test is taken and the offset is made, the adjustment will only be applied to the moisture range of the grain just tested. So if you are making large adjustments at higher moisture levels, the offset that you apply will not affect the lower moisture of the same grain. This means that multiple tests can be taken for a grain at different moisture ranges and different offset can be applied to each of the ranges. **Example:** You have tested two grain samples, one at 10%, and the other at 20%. You have retested the 20% grain and apply a 2% offset. If you now retest the two samples the new results are as follows:

<u>Original</u>	<u>Moisture display with user offset applied</u>
20%	22%
10%	10%

NOTE: Regardless of the mode selected (Simple or Advanced) each grain can still be individually adjusted.

Operation

SELECT A DIFFERENT CALIBRATION MODE

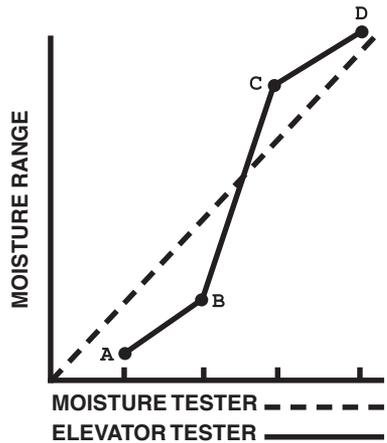
1. Calibration mode 'SIMPLE' is the default mode from the factory.
 2. To select a new calibration mode, press either the up or down arrow on the SELECT button (A) to index forward or backward through the grain (function) menu until the phrase CALIBRATION MODE is displayed.
 3. When CALIBRATION MODE is displayed, press TEST button (B). The current calibration mode selected will be displayed. Press either the up or down arrow on the SELECT button (A) to index forward or backward through the calibration mode menu until your choice of calibration mode is displayed. The only 2 mode options are SIMPLE and ADVANCED.
 4. Press TEST button (B) WAIT will be displayed, and then you will be returned to the Calibration Mode menu.
 5. If you do not want to change calibration mode simply press the CLEAR button and you will be returned to the Calibration Mode menu.
- NOTE: CHANGING CALIBRATION MODES WILL ERASE ALL USER CALIBRATION SETTINGS.**



CALIBRATION CONSIDERATION / LIMITS

Typically the moisture tester will be consistent with most elevator testers over a broad range of moisture levels. However, there are some things to consider when thinking about your moisture tester calibration.

NOTE: Graph 1 provided is for illustration purposes only and does not reflect actual test data.



GRAPH 1:
Moisture Tester - Elevator Tester
Comparison

Operation

CALIBRATION CONSIDERATION / LIMITS (CON'T)

- 1. Tester Differences:** Your moisture tester unit may not match a given elevator tester. None of the testers exactly match the actual weighted moisture of any given grain. There is no national standard for elevator testers. The difference between moisture testers and various USDA approved elevator testers is not a constant value. A correction at one moisture level may not be valid for a different moisture level. Graph 1 illustrates how the moisture tester might compare to an elevator tester over a broad range of moisture levels. The moisture tester and most elevator testers (shown in graph by solid line) will closely match those of the moisture tester (shown by dashed line) for that range, as illustrated. However, as we get away from mid-range into the high and low moisture levels, differences between elevator tester and moisture tester not only become greater, but may switch from a moisture tester reading higher than elevator tester to a reading lower than the elevator tester. For example, in Graph 1, the area between B and C represents the mid-range moisture. Moisture tester readings match elevator tester readings in this area with an accuracy of plus or minus 0.5 percent. The area between A and B represents the low moisture range. Moisture tester readings differ more from elevator tester readings, and are LOWER than elevator tester readings. The area between C and D represents the high moisture range. Moisture tester readings again differ more from elevator tester readings than they did at mid-range moisture, but now the readings are HIGHER than elevator tester readings.
- 2. Calibration Requirements:** Graph 1 illustrates that moisture tester readings closely match elevator tester readings for mid-range moisture levels. (Graph is for illustration purposes only and does not reflect actual test data.) Calibration changes required for grain in this moisture range will be small, if any. However, if grain is very dry (Low Moisture Range) or very wet (High Moisture Range), it may be necessary to calibrate your moisture tester unit against the elevator tester using a sample of your grain in both testers. Record the calibration correction required. It will be valid for all testing in that moisture range for that grain.

Operation

ADJUST CALIBRATION – SIMPLE OPTION

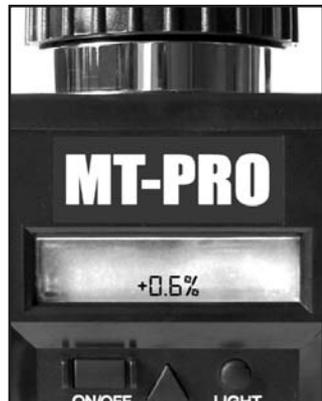
IMPORTANT: Always obtain three (3) test results from the grain elevator for the sample being compared. Average these three (3) results. Compare this average with the average of three (3) tests by the moisture tester before making any adjustments.

1. Each grain scale can be individually adjusted up to 5.0% by increments of 0.1% to more closely match the results of an elevator tester.
2. First select the grain to be adjusted.
3. Press CAL Button (A), tester will now display the current offset applied to the grain.
4. Press the Up Arrow (B) to raise the adjustment amount or press the Down Arrow (C) to lower. The tester will add or subtract up to 5.0% by increments of 0.1% to the calibration offset.
5. After the adjustment amount has been selected, press the CAL Button (A) to return to grain tester mode.



NOTE: Adjustment can NOT be made to factory calibration to produce moisture readings in a tester that shows “BELOW LIMIT” or “ABOVE LIMIT” readings.

IMPORTANT: When using the SIMPLE calibration offset option, the tester will apply calibration offset to selected grain regardless of moisture range.



Operation

ADJUST CALIBRATION – ADVANCED OPTION

IMPORTANT: Always obtain three (3) test results from the grain elevator for the sample being compared. Average these three (3) results. Compare this average with the average of three (3) tests by the moisture tester.

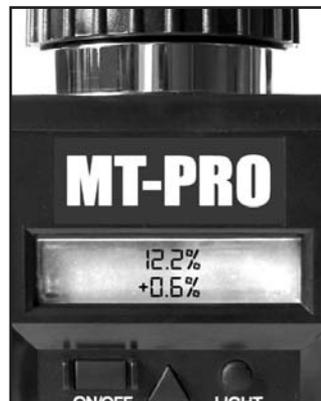
1. Each grain scale can be individually adjusted up to 5.0% by increments of 0.1% to more closely match the results of an elevator tester.
2. First select the grain to be adjusted.
3. Test the grain selected, using the sample you wish to adjust to. Once valid moisture appears, press the CAL button (A).

NOTE: Calibration of given grain cannot be performed unless a valid moisture test has been performed.

4. Once CAL button (A) is pressed, tester will now display the obtained moisture reading and the current offset applied to that moisture range.
5. Press the UP arrow (B) to raise the adjustment amount or press the DOWN arrow (C) to lower. The tester will add or subtract up to 5.0% by increments of 0.1% to the current moisture range.
6. After the adjustment amount has been selected, press the CAL button (A) to return to grain tester mode.

NOTE: Adjustment can NOT be made to factory calibration to produce moisture readings in a tester that shows “BELOW LIMIT” or “ABOVE LIMIT” readings.

IMPORTANT: This tester incorporates Multi-Point Calibration for each grain. Therefore, once a valid test is taken and an adjustment is made, the adjustment will only affect the moisture range of the sample tested.



Operation

CLEAR CALIBRATION – SIMPLE OPTION

1. Select grain to clear.
2. Press CAL button (A), tester will then display last calibration that was made.
3. Press CLEAR button (B).
4. Tester will then display 0.0% for both lines if the calibration has been cleared.

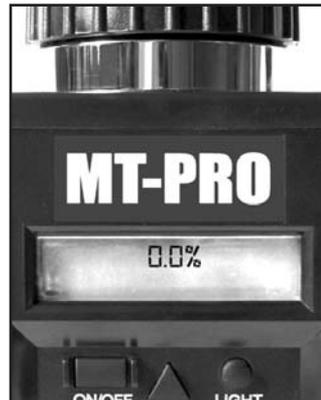
NOTE: If you press the CAL button and tester displays 0.0% on both lines, then no calibration has been made for this grain.



CLEAR CALIBRATION – ADVANCED OPTION

1. Select grain to clear.
2. Press CAL Button (A), tester will then display last calibration that was made.
3. Press CLEAR Button (B).
4. Tester will then display 0.0% for both lines if the calibration has been cleared.

NOTE: If you hit the CAL Button and tester displays 0.0% on both lines, then no calibration has been made for this grain.



Operation

DISPLAY TEMPERATURE IN THE CELL

1. To display the temperature in the cell, press either the up or down arrow on the SELECT button (A) to index forward or backward through the grain (function) menu until the word TEMPERATURE is displayed.
2. When TEMPERATURE is displayed, press TEST button (B). The current temperature in cell will be displayed in both F° and C°. Temperature will be displayed for a few seconds then will return to the main grain menu.

NOTE: If the tester and grain are different temperatures, the mass of the metal tester will quickly warm or cool the grain. Therefore, the temperature reading is the cell temperature, not necessarily the temperature of the grain before being put in the cell.



TURN ON BACKLIGHT AND TURN OFF TESTER

1. Press LIGHT button (A).
2. Press again to turn off backlight.

NOTE: The backlighting feature is designed to improve display visibility in low light conditions. In bright light conditions, the backlighting cannot be seen.

3. To turn off tester, press ON-OFF button (B). Tester will automatically turn itself off 2 minutes after the last button has been pushed.



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 0% or higher. Replace as necessary.

SOLUTION 3: Battery contacts may be making poor contact. Remove batteries and pull metal contacts up from bottom of compartment and above height of plastic knob using needle-nose pliers. See illustration below.

SYMPTOM B: Unit is inaccurate.

SOLUTION 1: Temperature of the grain and unit may be more than 20°F (11°C) different. Follow preheat procedure (See page 05-3).

SOLUTION 2: If grain is at an extreme temperature, let grain settle to reach room temperature. Retest grain.

SOLUTION 3: Grain and/or test cell may have developed surface moisture from rapid change in temperature of the grain sample. Allow grain and tester to stabilize near room temperature. Inspect for visible moisture on grain and inside test cell. Dry the test cell with a soft cloth or a blow dryer if necessary. Retest grain. (See page 05-4).

SOLUTION 4: If the tester displays SYSTEM BATTERY LOW, the test results may be inaccurate. Replace battery.

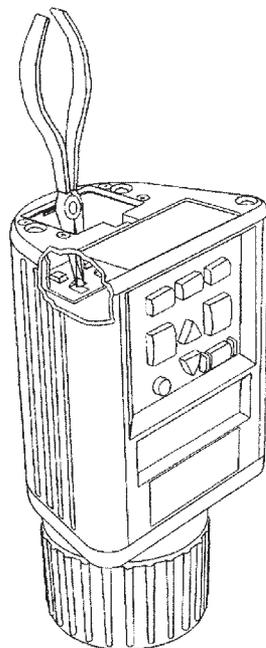
SOLUTION 5: Unit may need to be re-calibrated by factory. Return tester to your AgraTronix dealer for repair or replacement or call AgraTronix customer service at 1-800-821-9542 or Farmscan 0480 018 282.

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 on page 05-2 of Operating Instructions. NOTE: Limits shown on page 05-2 are only guidelines.

SYMPTOM D: Unit reads ERROR (---).

SOLUTION 1: Electronic failure. Return tester to your AgraTronix dealer for repair or replacement or call AgraTronix customer service at 1-800-821-9542 or Farmscan 0480 018 282.

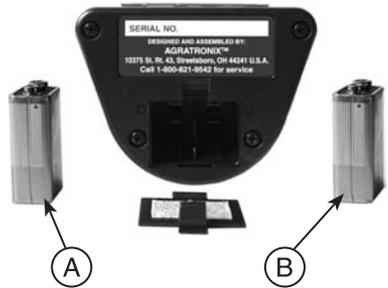


Service

CHECK BATTERY POWER LEVELS AND REPLACE BATTERIES

1. The tester is powered with two 9 volt alkaline batteries. The left battery (A) powers the backlight circuit. The right battery (B) powers the system.
2. The tester will flash a BATTERY LOW message if system battery needs replacing when unit is turned on. It will not say this for the backlight battery. In the event that the backlight battery is low, the backlight will not work.
3. At any time, select BATTERY from main menu (C) and press TEST (D) to display the percentage available for both batteries.
4. The tester system functions will operate if no backlight battery is installed or if it is low.
5. SYSTEM BATTERY LOW message will be presented when unit is turned ON and the battery is 10% or less usable.

NOTE: If the backlight 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.



- A - Light Battery
- B - System Battery
- C - Main Menu
- D - Test Button
- E - Select Button

CLEAN THE TESTER

1. Remove cap and wipe out inside of the tester with a dry paper towel.
NOTE: Grain may become lodged in threads of cap and should be removed with a small blade.

Warranty

WARRANTY

This product is guaranteed to be free from defects in materials and workmanship for two (2) years from date of retail purchase in USA or Canada and one (1) year overseas. This warranty does not cover the battery 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 an authorized factory repair facility.

The foregoing warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and any other type, whether expressed or implied. AgraTronix neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with its product and will not be liable for consequential damages.

RECORD SERIAL NUMBER

NOTE: The tester serial number is located on the bottom of the unit.

Write your model number, serial number and date of purchase in the space provided below. AgraTronix needs this information when ordering parts and when filing warranty claims.

Date of Purchase _____

Serial No. _____

Dealer _____

(To be filled in by purchaser)

Manufacturer's Contact Information

MANUFACTURER'S CONTACT INFORMATION



Toll-Free 1-800-821-9542
1-330-562-2222
FAX 1-330-562-7403
www.AgraTronix.com

10375 State Route 43
Streetsboro, OH 44241
USA

SOLD & SERVICED BY



FARMSCAN PTY LTD
ABN 76 632 674 545
Unit 4, 27 Mordaunt Circuit, Canning Vale WA 6155
Sales: (08) 6102 3200 Support: 0480 018 282
www.farmscan.com.au

ACCESSORIES

Carrying Case - Part No. 06053

The MT-PRO's carrying case is constructed of padded vinyl to protect the tester. A zipper bottom and Velcro® sealing flap permit operation with tester in carrying case.

Velcro is a registered trademark of VELCRO Industries.

