

Seedburo® Model 1200A Automatic Moisture Meter User Manual



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1 UNPACKING

Before shipment, your new **Seedburo® Model 1200A Automatic Moisture Meter** has been thoroughly tested and found free of defects. Upon unpacking the unit, please inspect for any visual damage before continuing. If any damage or missing part is noticed, please retain the packing material and contact the office from which the unit was purchased.

Before powering up the unit, please remove the overload shipping rod on the back of the meter. The shipping rod should be saved and reinstalled when transporting or shipping the unit back to factory for service.

The warranty will be voided on all meters received at Motomco without the overload rod installed. This shipping overload rod is used to prevent damage to the load cell and its mechanism.

The **Model 1200A** is shipped with the power cord and a plastic tray.

The **Model 1200A** should be installed and maintained in a level position in a location where the ambient temperature will be between 60°F and 85°F.

***** WARNING *****

PLEASE KEEP Moisture Meter CLEAN TO ASSURE OPTIMAL OPERATION.

SAMPLES SHOULD BE PLACED INTO DUMP CELL SLOWLY UNTIL IT REACHES 100%.

DO NOT “DUMP” LARGE AMOUNT OF SAMPLE INTO MOISTURE METER, AS IT CAN DAMAGE THE SCALE. THE SCALE IS VERY SENTIVE (HIGH PRECISION) AND IT CAN BE DAMAGED IF HEAVY LOADS ARE PLACED ON IT SUDDENDLY.

** Please see page 14 for additional information.*

2 GENERAL INFORMATION

The **Seedburo® Model 1200A Automatic Moisture Meter** is a fully automatic, electronic instrument designed for the determination of moisture in cereal crops and in a wide variety of other products.

The official Grain Standards of the United States specifies that the percentage of moisture shall be ascertained by:

- (a) the use of the air-oven method, or
- (b) any device and method which gives equivalent results.

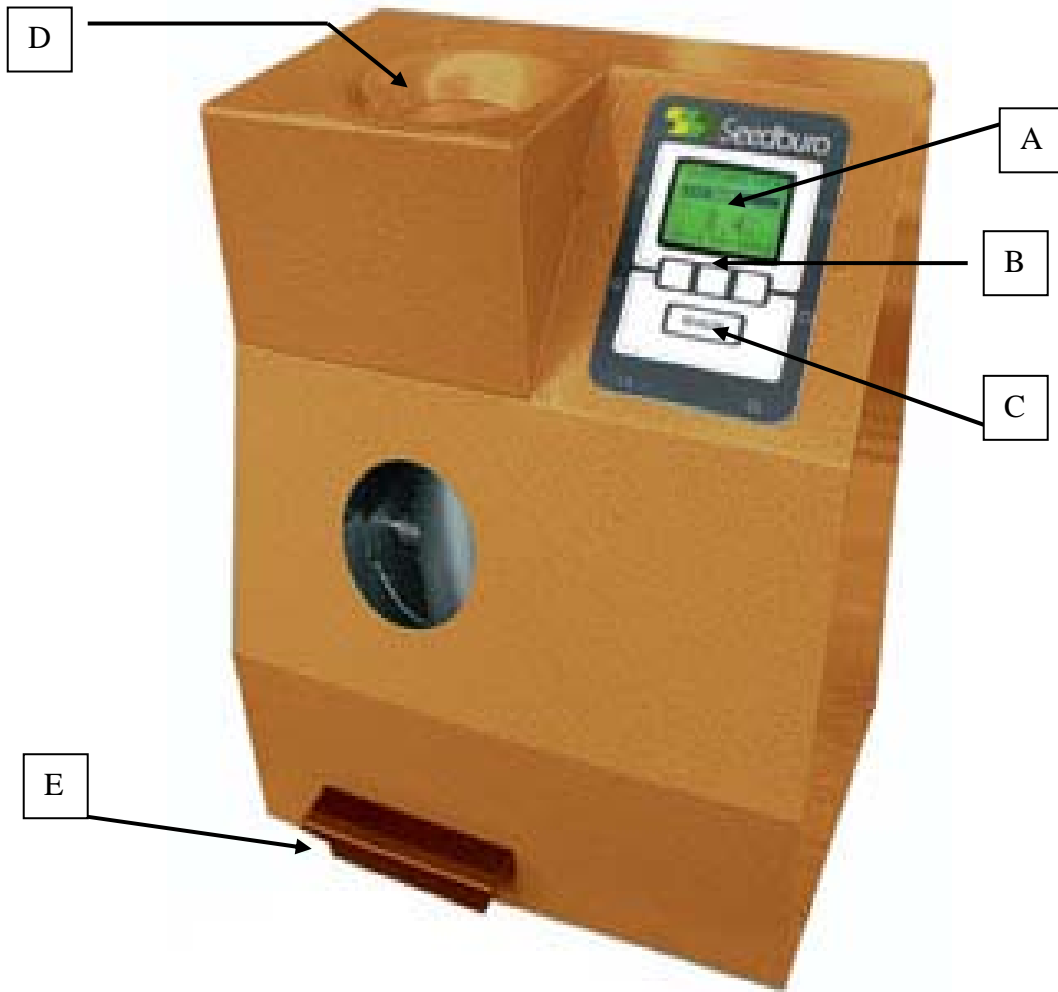
The **Seedburo® Model 1200A Automatic Moisture Meter** is outstanding in providing this equivalency quickly and accurately. The instrument determines the quantity of moisture in the grain sample by evaluating changes in its electrical characteristics due to the presence of moisture. Using internally stored calibration data, this change is automatically displayed as percent moisture.

2.1 FEATURES

The **Seedburo® Model 1200A Automatic Moisture Meter** is equipped with the following features:

1. Full featured backlit graphic LCD display
2. No key pressing is required for measurement.
3. Three multifunction keys for easy operation and setup.
4. Correct sample size and sample temperature determination.
5. RS-232 serial port for external printer or computer connection.
6. Power Supply 110V AC or universal voltage (from 90VAC to 260V AC)
7. Meets NIST Handbook 44 Specifications.
8. Single or Averaged Measurements for improved accuracy.
9. Automatic grain dump after measurement.

3 TECHNICAL REFERENCE



3.1 MAIN COMPONENTS

The **Seedburo® Model 1200A** consists of the following components:

MAIN HOUSING

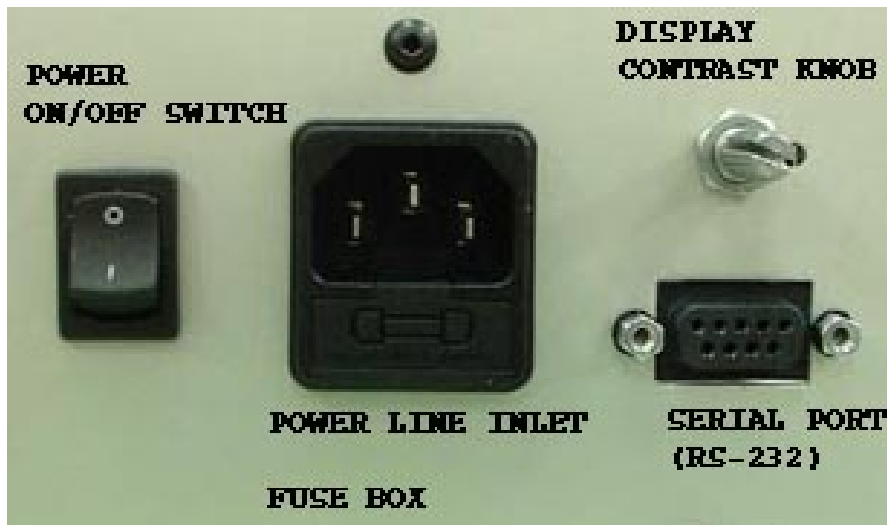
The electronic circuitry of the **Seedburo® Model 1200A Automatic Moisture Meter** is totally encased in a rigid aluminum housing with components carefully designed to withstand the rigors of normal field usage. The power-on switch is located in the back of the instrument. The display is located in the right side front panel (Part A in figure). The sample loading opening (Part D

in figure) is located on the top panel next to the display. The bottom left panel has a tray (Part E in figure) for disposing of the sample.

3.2 POWER CONNECTION

Before applying power to unit, please verify that the voltage used corresponds to the name plate voltage on the back of the instrument

The power cord is connected in the AC power inlet located in the back panel, where the fuse holder is also present.



THE ROUND PIN ON THE LINE CORD IS CONNECTED TO THE **Seedburo® Model 1200A Automatic Moisture Meter**. IF AN ADAPTER WITH A GROUNDING WIRE IS USED, MAKE SURE THAT THE GROUNDING WIRE IS CONNECTED TO A GOOD EARTH GROUND, OTHERWISE A SHOCK HAZARD MAY OCCUR! DO NOT USE A 3-PIN TO 2-PIN ADAPTER.

IF THE UNIT IS NOT GROUNDED PROPERLY, THE WARRANTY IS VOID.

3.3 DISPLAY & KEY PAD

All information, from moisture percent to error messages, is clearly displayed on the 128x64 pixels graphic LCD screen (Part a in figure page 4).

Three MULTI-FUNCTION KEYS are located below the display (Part b in figure page 4). Their function changes in the operation of the **Seedburo® Model 1200A**, and is continuously displayed on the last line of the graphical display.

The MEASURE key (Part c in figure page 4) is located beneath the three multi-function keys.

3.4 SERIAL COMMUNICATION

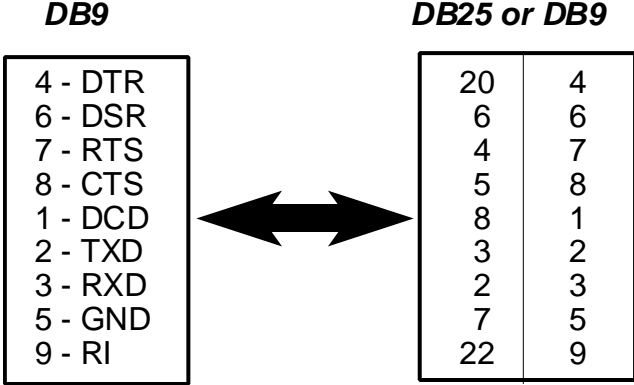
An input/output Serial Port (Standard 9DB Pin RS-232) is located on the back panel of the unit (figure on page 5). It can be used to connect the **Seedburo® Model 1200A** to a RS-232 compatible printer or to the serial port of a computer.

The electrical signal assignment for the RS-232 9 pin connector is given below.

Pin	Label	Signal
1	DCD	+ RLSD
2	TXD	Transmit Data
3	RXD	Receive Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

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The electrical wiring diagram for the 9 pin to a 25 or 9 pin connector is given on the next page.



The **Seedburo® Model 1200A** can be configured for 300, 1200, 2400,4800 or 9600 baud serial communications with 1 stop bit, 8 data bits and no parity.

If the print option on the unit is activated, the unit will send the following information through the communication: unit serial number, program and calibration version, user identification, date and time of the measurement, sample number and product name and percent moisture. The sample number is automatically incremented for each measurement and is reset to zero at power-on.

A typical printed ticket is shown in the figure below.

Seedburo® Model 1200A S/N: XXXX
 Cal. C2.99
 Ver. USA00 User: MOT
 Time: 07/15/2001 18:22
 Sample Number: 5
 Sample: CORN TO 21%
 (8 TO 21 % MOIST)
 MOISTURE: 11.08%

4 OPERATION

4.1 SAMPLE COLLECTION

The moisture content in various portions of a lot or parcel of grain to be tested may vary considerably.

In order for the sample to be representative, grain should be removed from different sections of the lot and thoroughly mixed. For the most accurate results, a grain probe should be used and the sub-samples mixed and divided in a Boerner divider.

If such equipment is not available, an equivalent procedure should be devised and followed. The importance of accurate sampling cannot be over stressed. This is true no matter what method of moisture determination is used. In addition, the size of the sample to be tested should be as large as possible in order to average out small variations. This is accomplished in the **Seedburo® Model 1200A Automatic Moisture Meter** by the use of 3½” test cell which, for most types of commodities, can contain sizes up to 300 grams.

The proper sample size is automatically determined by the instrument and no external scale is necessary.

4.2 POWER-UP

At Power-Up the **Seedburo®** logo is shown on the screen as well as the program version and calibration version. An initial selftest is performed to verify that all components are working.

Once the selftest is performed (no error messages) the instrument will change to the Size Control Screen. The last line of the screen shows the functions assigned to each key.

When you turn on the moisture meter, it will automatically display the last grain type used.

```

CANOLA
  SIZE CONTROL
  Place More

      0%

ABORT   SMPL
    
```

```

Canola
Corn > = 20%
Corn to 19.9%
Flaxseed & Solin
Lentils
Mustard Brown
NEXT INDIV. MENU
    
```

Pressing ABORT or SMPL will take you to the main sample list.
 Press NEXT to scroll-down the grain list, or INDIV. to choose grain.
 Press MENU to go to the SETUP Mode.

4.3 SETUP SCREEN MODE

The following setup of the unit can be performed:

- Date and time.
- User name.
- Communication port (serial port RS-232, and OFF).
- Speed (baud rate) of the RS-232.
- Average Mode YES/NO.

The NEXT key is utilized to move across the screen from one variable to the other, while the other two keys (UP and DOWN) are used to scroll through the possible values. The new settings are stored only when this mode is exited by pressing the MEASURE Key. In any other case, such as interruption of the settings caused by the powering down of the instrument, the previous settings will be retained. Please note that if the Average Mode is enabled (AVG MODE : YES) then the instrument will only display the average of three measurements as a moisture reading. Setup Screen

```

07/15/2002      18:22
USER: MOT
PRINT: RS-232
BAUD RATE: 9600
AVG MODE: NO

UP DOWN NEXT
    
```

4.4 SAMPLE SCREEN MODE

In this Mode the user can choose the sample type of the grain being tested. Besides the sample name, the moisture and temperature ranges are displayed. If the instrument is set for NON NTEP, the TEMP. RANGE will display NON NTEP (32° to 122°F).

The NEXT and PREV keys are used to scroll forward or backward in the list of possible sample types. This mode is exited by either pressing the MENU key which brings the unit back to the Menu mode, or by pressing the MEASURE Key which will start the measurement routine.

CORN TO 21% (8 TO 21% MOIST) MOISTURE RANGE: 9.8 TO 20.0 TEMP. RANGE: 40 F TO 99 F NEXT PREV MENU

4.5 SIZE CONTROL SCREEN MODE

In this mode the screen will ask the user to put MORE or LESS sample into the unit. The amount of sample present in the unit is represented as a percentage of the required amount. For example the value 75% indicates that three quarters of the required sample size has already been poured into the DUMP cell. The

ABORT key is used to exit this screen and move to the sample screen resetting both the load and test cells. The SMPL key is used to exit this screen and move to the sample screen without resetting the load and test cells.

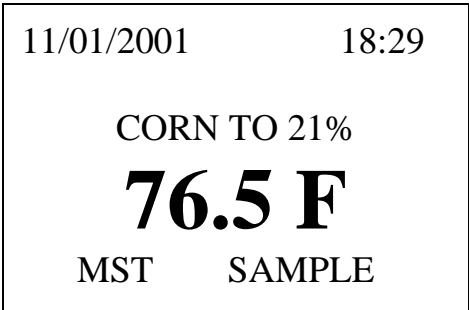
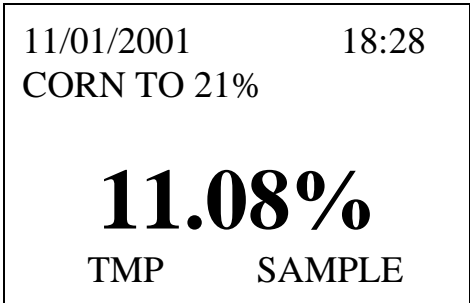
CORN TO 21% Size control Place MORE 75 % ABORT SMPL
--

The instrument continuously checks if the proper quantity of sample has been placed in the unit, and updates the screen with the proper message. The arrow below the empty square indicates the required sample size, and the filled squares represent the amount of grain present in the unit. Also NOTE that when the proper size is about to be reached, a new message is displayed in which the arrow is now at the middle of the screen and smaller amounts of grain sample are needed to increase the number of filled squares. The measurement can be aborted at any time by pressing the ABORT Key. The right amount of sample is advised by a double beep.

2. The unit will then measure the sample temperature and, before dumping, it will check again the size of the sample and if it has changed, the display will show the proper message. The instrument will perform the measurement only when the temperature of the sample has stabilized and the correct size of the sample is present in the unit. All this might seem excessive, but it is necessary to assure the high accuracy of the **Seedburo® Model 1200A Automatic Moisture Meter** in the moisture readings.

If the measurement procedure is performed as described in this manual, measurement is obtained in less than 20 sec. After the measurement is complete the sample will be automatically dumped in the plastic tray.

3. The measurement is performed and the Moisture Value or an Error Message is displayed. By pressing the TMP Key the display toggles between the Moisture and the Sample Temperature readings.



The ON/OFF LINE toggle key is used to temporally disable the sample number count and the ticket print-out. “ON LN is the default mode (sample number count and printout is enabled), while “OFFLN” mode disables the increase of sample number count and the print-out for the successfully completed measurement. The “ON LN” mode is then automatically reset.

If the average mode is enabled (AVG Mode: YES) then the instrument will display as follows:

01/15/2001	17:45
CORN TO 21%	
Averaged meas.	
1 out of 3	
SAMPLE	

To speed up the operation of the **Seedburo® Model 1200A** between two successive readings on the same sample, the sample removed from the LOAD cell can be directly placed into the unit and the measuring process automatically initiates. In this case, the correct size is already present in the cell. This procedure can also be used to perform statistical measurements on the sample.

To insure the accuracy of results, the instrument performs calibration if any of the following conditions are satisfied:

1. During self-test at power-on.
2. Every 15 minutes counted from the last calibration.
3. If the equipment temperature has changed more than 2° C since last calibration.

5 MAINTENANCE

The **Seedburo® Model 1200A Automatic Moisture Meter** is a high precision moisture meter, and care should be taken in maintaining the instrument.

5.1 FACTORY SERVICE

Before shipment, all **Seedburo® Model 1200A Automatic Moisture Meters** are calibrated against the factory Primary Standard. This Standard is maintained in continuing agreement with the Master Standard held by the Grain Division of the United States Department of Agriculture.

To assure continuing accuracy, meters in commercial usage should be returned to the factory or any authorized dealer periodically for replacement of any worn part, since any replacement requires recalibration against the Primary Standard. This factory or authorized dealer service should be scheduled during your “off” season, when the meter can be most conveniently spared from your operation.

Frequency of service will depend necessarily on the amount and type of usage and it is recommended that any meter be returned for service not later than the end of its first three years of field usage.

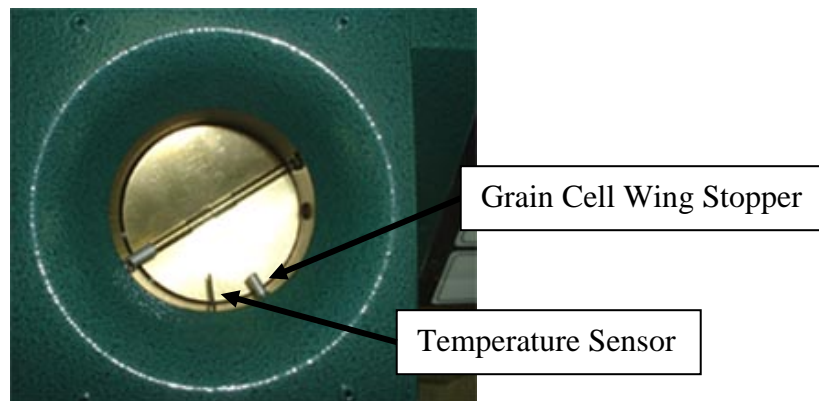
For service, the unit should be sent freight prepaid to **Seedburo Equipment Company, 1022 West Jackson Blvd, Chicago, IL 60607**; or to the authorized dealer near you. Where available, United Parcel Service is the preferred method of transportation.

The instrument must be carefully packed to protect against in-transit damage. **It is recommended that the box and inserts used in the original shipment from the factory be retained for future use.**

5.2 ROUTINE CARE AND MAINTENANCE

In order to ensure optimal operation of the moisture meter, it must be kept clean at all times.

- A) It is recommended that the unit be blown with compressed air as often as possible. The grain contains a considerable amount of fines, and during the busy season it is recommended to air blow the unit at least once a day; the more often the better it is for the moisture meter's ideal operation. Compressed air can be blown into the inner side of the unit thru the holes in the front and back of the moisture meter.
- B) The dump cell can be cleaned by blowing compressed air into the opening on top of the moisture meter. The same cleaning frequency as above is recommended. Please make sure that no damage is done to the temperature sensor while cleaning. (See figure below).



- C) The grain cell can be cleaned by manually tilting the cup forward. This can be done by first turning off the unit, then insert your hand through the round hole in front of the unit, and gently tilting it forward. The grain cell will reset automatically when you turn on the unit.



6 TROUBLESHOOTING

6.1 ERROR MESSAGES

The Seedburo® Model 1200A Automatic Moisture Meter has error codes incorporated into its program. These error messages are used to warn the operator of malfunctions of the equipment and/or procedural errors committed by the operator. In the case of an error, please note the error number and check the following table of error messages, which also lists the possible cause and a suggested corrective action for each error.

If no corrective action can be taken or fails to alleviate the problem, please call Motomco, Ins. with the error number, and the sequence of operations performed to obtain such error.

The errors can be divided into two types:

1. Equipment errors and
2. Procedural errors.

In general the equipment errors result in the inoperational status of the unit, while procedural errors can be easily fixed.

After an error has occurred, please verify your steps, and correct them according to the instructions set in this manual.

A typical *Error Message Screen* is shown here.

01/15/2001	06:22
USER: XXX	
CORN TO 21%	
** ERROR #27: **	
Temp. Diff.	
Out of Range	
SETUP	SAMPLE

6.2 ERROR LIST

Error #	Message	Possible Cause	Corrective Action	
1	RCT data corrupt SET time + date	Real time clock values are corrupted.	The date and time are reset to original values. Reset values in the SETUP MODE.	
2	Corrupt data for chart #XX	Calibration data for moisture measurement are corrupted.	Call SEEDBURO. for service.	
3-4	Instr. Temp. out of range: xx.xC/F	Instrument temperature is out of operating range.	Wait for instrument to reach temperature range.	
5-8	Hardware error	Internal hardware problem.	Call SEEDBURO. for service.	
9-10	Sample Temp. out of range: xx.xC/F	Sample temperature is out of operating range.	Wait for sample to reach temperature range.	
11-13	Hardware error	Internal hardware problem.	Call SEEDBURO. for service.	
14-17	Hardware error	Improper measuring procedure.	Verify that correct sample type is selected. Repeat measurement.	
18-25	Size control error	Internal Hardware error.	Call SEEDBURO for service.	
22	Size control HW. error: NEG			
23	Size control HW. error: RAM			
24	Size control HW. error: ROM			
25	Size control HW. error: PRG			
26	Size control not stable			Make sure that the instrument is not touched during the measurement. Repeat measurement.
27	Temp. diff. out of range			Temperature difference between instrument and grain is greater than required.
28	Instrument temp. out of range	Instrument temperature is out of operating range.	Wait for instrument to reach temperature range.	
29	Moisture out of range!	Moisture reading is outside calibrated values	Perform measurement following steps as described in the manual.	
30	Moisture out of limits			
31	Temp. sensor malfunction	Temp. sensor malfunction	Call SEEDBURO for service	
32-38	Software error	Software error. Memory may be corrupted.	Call SEEDBURO for service.	
39	Config. Error	Invalid calibration data. Instrument is not properly calibrated.		
40-45	Eqpt. T. Sensor cal. data error!	Problem with temperature sensor		
48-49	Dump or size control failure	Problem with the load cell dump activation	Tap the meter near the sample loading opening.	
52	Grain dump error	The grain cell has a problem to unload	Turn off and on the meter.	
53-54	Dump error	Refer to 48-49		

If error persists, call SEEDBURO for service at (312) 738-3700.

A. WARRANTY

Included with the factory shipment of each **Seedburo® Model 1200A Automatic Moisture Meter** is a warranty and registration card. For your convenient reference, the full language of the warranty is reproduced below.

Seedburo warrants each new instrument sold by it to be free from defects in material and workmanship in normal use and service. Its obligation under this warranty being limited to repairing or, at its option, replacing at its factory any part or parts thereof which shall, within ninety days after delivery of such instrument to the original user, be returned to Seedburo, with transportation charges prepaid and which examination shall disclose to Seedburo satisfaction to have been thus defective.

This warranty shall not apply to any instrument which has been repaired or altered outside of the manufacturer's factory in any way so as, in the judgment of the manufacturer, to affect the instrument's stability or reliability, or which has been subject to misuse, neglect or accident, or which has had the serial number altered, effaced or removed. Nor shall this warranty apply to any instrument which has been connected otherwise than in accordance with the instructions furnished by the manufacturer.

This warranty is in lieu of any other warranty, express or implied, including any warranty of merchantability or of fitness for a particular purpose. Seedburo neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with the sale of this instrument.

Warranty

Seedburo Equipment Co. warrants each new instrument sold by it to be free from defects in material and workmanship in normal use and service, its obligation under this warranty being limited to repairing or at its option, replacing at its factory any part or parts thereof which shall, within ninety days after delivery of such instrument to the original user, be returned to Seedburo, with transportation charges prepaid and which examination shall disclose to Seedburo satisfaction to have been thus defective.

This warranty shall not apply to any instrument which has been repaired or altered outside of the manufacturer's factory in any way so as, in the judgment of the manufacturer, to affect the instrument's stability or reliability, or which has been subject to misuse, neglect or accident, or which has had the serial number altered, effaced or removed. Nor shall this warranty apply to any instrument which has been connected otherwise than in accordance with the instructions furnished by the manufacturer.

IN NO EVENT SHALL SEEDBURO BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES AND ITS LIABILITY UNDER THE WARRANTY SHALL BE LIMITED SOLELY TO THE REPAIR OR REPLACEMENT OF PARTS AS STATED.

B. REGISTRATION

On your receipt of a new meter, please fill in and mail the registration card promptly. The factory maintains a file record, by serial number, of all **Seedburo® Model 1200A Automatic Moisture Meters** produced. With your cooperation in mailing the registration card, the serial number of your **Seedburo® Model 1200A Automatic Moisture Meter** will be fully identified as to owner and location.

Instrument Serial No. _____

Date registration Card Mailed _____

Warranty

This warranty is in lieu of any other warranty, express or implied, including any warranty of merchantability or of fitness for a particular purpose. Seedburo Equipment Co. neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with the sale of this instrument.

IN NO EVENT SHALL SEEDBURO EQUIPMENT COMPANY BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES AND ITS LIABILITY UNDER THE WARRANTY SHALL BE LIMITED SOLELY TO THE REPAIR OR REPLACEMENT OF PARTS AS STATED ABOVE.

SEEDBURO EQUIPMENT COMPANY

2293 S Mt Prospect Rd, Des Plaines, IL 60018 Ph #312-738-3700

Please remove this page and mail to:

Seedburo Equipment Company
2293 S Mt Prospect Rd
Des Plaines IL 60018

REGISTRATION CARD

Seedburo® Model 1200A Automatic Moisture Meter

SERIAL No. _____

Name of Purchaser _____

Street Address _____

City or Town _____

Date of Purchase _____

Seller's Name and Location _____

Your Phone No. _____

(Please fill in and mail this registration card within five days after your receipt of the Instrument.

Thank you.)

Seedburo Equipment Company