

INDOSAW

PROJECT REPORT ON A DIGITAL MOISTURE TESTING MACHINE (WITH BLUE TOOTH)



ABSTRACT

Moisture content is one of the most important factors in the maintenance of quality as well as purchase of food grains. It is a must to know the moisture content of seed and grain lots just after harvest or before storage as an aid to seed trade. For these reasons, food grains and seeds are called upon to test for moisture and Digital Moisture Testing Machines provide such information.

Prepared By:- Aarav Prakash, The Doon School
Indosaw, Ambala Cantonment

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1. INDESPENSIBLE

If the moisture content goes above certain critical levels, there is a danger of undesirable development taking place due to physiological processes within the grains resulting in deterioration of quality or even total damage. For these reasons, food grains and seeds are called upon to test for moisture and Digital Moisture Testing Machines provide such information.

2. INSTANTANEOUS AND QUICK MEASUREMENT

It takes less than a minute to complete a test and find out the percent moisture content in a given sample.

3. WIDE RANGE OF PERCENT MOISTURE CONTENT

INDOSAW Digital Moisture Testing Machine measures the moisture percentage from 3.5%-40%.

4. MATHEMATICAL CHARTS AND CONVERSION TABLES

INDOSAW Digital Moisture Testing Machine gives percentage moisture content directly on LED display unit. No mathematical chart or conversion table is needed.

5. NO SEPARATE TEMPERATURE TESTS

For **INDOSAW** Digital Moisture Testing Machine there is no need to take the temperature readings separately. The machine automatically senses the temperature and displays it on an LCD screen.

6. ACCURACY AND CONSISTENCY OF RESULTS

INDOSAW Digital Moisture Testing Machines are based upon a very sound proven theory. The conductivity of the specified specimen, homogeneously pressed to predetermined thickness in order to bring the material to uniform state and minimise packing errors, is recorded on specially designed Ohm-meter. It is for this reason that all **INDOSAW** Digital Moisture Testing Machines give the same results for a single sample. Also the results of all **INDOSAW** Digital Moisture Testing Machines are always consistent, accurate, reliable and reproducible.

7. RUGGED CONSTRUCTION

INDOSAW Digital Moisture Testing Machines are of rugged construction on to which is fixed a complete electronic unit. The compression unit consists of Bevel Gear Mechanism, which is constructed out of the choicest grade of steel. It is very well protected within the body and needs no attention throughout the life of the instrument.

8. PORTABLE

INDOSAW Digital Moisture Testing Machines are portable as they are provided with a convenient handle for carrying the instrument from place to place.

9. EASY TO OPERATE

INDOSAW Digital Moisture Testing Machines are simple to operate, without requiring a high degree of skill or special training on the part of the user.

INDOSAW DIGITAL MOISTURE TESTING MACHINE

Digital Moisture Testing Machine has been designed for quick and accurate determination of percent moisture content of wide range of granular substances such as Paddy, Rice and Wheat etc.

PRINCIPLE

Grains/ Seeds are conductive to electricity, due to moisture contained in them, electrical conductivity also varies with temperature. These properties of the grains have been put into practical use in this moisture testing machine. A temperature sensor along with microprocessor circuitry automatically compensates for these variations and displays moisture percentage. For uniformly, accurate and reliability of the results, the material under test is compressed in order to nullify the porosity effect of grains/seeds.

CONSTRUCTION

Digital Moisture Testing Machine is a self contained and portable instrument. The mechanical part consists of a compression unit to compress the sample to a predetermined thickness. The thickness setting is very easily read on a vertical/circular scales. The material under test is taken in a test cup and is compressed to predetermined thickness. Press the push type switch till the reading comes on the display. No temperature reading and no correlator dial are required. Computerized version of intelligent Digital Testing Machine automatically compensates for the temperature corrections and automatically makes necessary computation for the crop. The code number can be selected from the thickness chart. It can be set on the intelligent Digital Moisture Testing Machine using up/down keys.

ADVANCED FEATURES OF INDOSAW DIGITAL MOISTURE METER CAT NO. 6010 WITH BLUE TOOTH

- ▶ **Calibration & Error Correction** : Provision to check the calibration as and when desired as per 5.3 clause of IS: 8824 - 1978 (Part-1). Correction of deviation from factory set reading against standard reference & temperature. Calibration can be done in a very user friendly way by selecting a code & pressing a button.
- ▶ **Auto Calibration** : Automatic using simple key operation. (Without opening the equipment or using a screw driver). When reading in a moisture meter gets disturbed with a passage of time there is a provision of checking this and correcting this to factory Settings.
- ▶ **Averaging** : Customer can have averaging of number of readings of moisture percentage through a key.
- ▶ **Recall Facility** : Last reading Recall facility.
- ▶ **Curve Programming & New Commodity Calibration** : INDOSAW moisture meter has a facility to calibrate new commodities with reference to customer's own standard method or re-program old existing one.
- ▶ **Hot keys** : Three Hot Keys for any three crops which are programmable.
- ▶ **Data Logging** : It has facility to record data, which includes Moisture percentage, Temperature, Commodity name, Commodity code along with Date & Time.
- ▶ **Data Storage** : It has memory of 200 readings.

WHAT IS AUTO CALIBRATION?

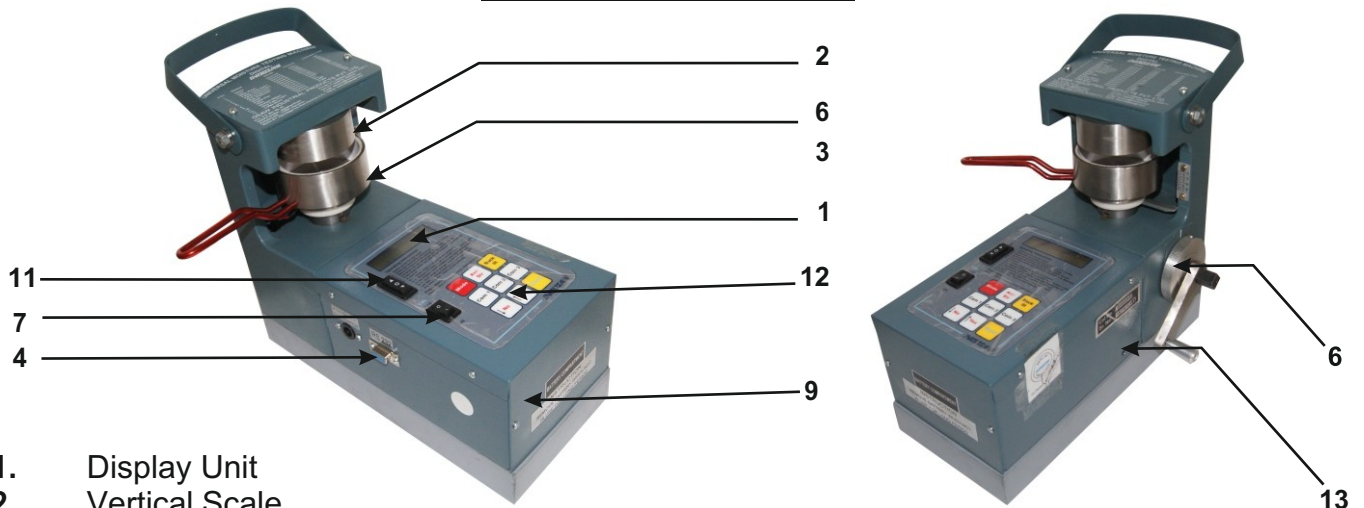
There are few factory settings i.e. range 1 and range 2 that are required to measure the moisture percentage of any commodity. These are the internal electronics setting. Over a period of time, the values of resistances and capacitances change due to seasonal and aging effect. Hence the value of range 1 and range 2 changes. So calibration is required after one year.

In auto calibration you don't have to open the box for recalibration. By simple key operation, you can check the calibration of the moisture meter. If it is not correct then you can easily recalibrate it to the factory setting by a simple key operation.

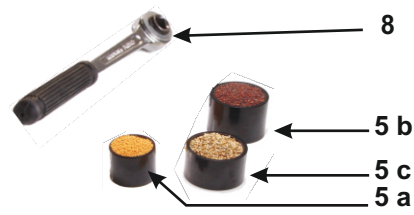
Why PT-100 Temperature sensor?

Platinum resistance temperature sensor. The term PT-100 comprises of two parts PT and 100. The sensor consists of Platinum wire whose resistance is 100 Ohm at 0° C. Its resistance changes 0.4 Ohm as the temperature changes to 1° C. It has a linear relationship with temperature. It requires no power to change its resistance. PT-100 sensor continuously senses the ambient temperature when the moisture meter is off and according to the temperature its resistance changes. Since the resistance is directly calibrated to the temperature, we get the actual temperature when we turn ON the moisture meter.

PARTS IDENTIFICATION



- 1. Display Unit
- 2. Vertical Scale
- 3. Circular Scale
- 4. Printer port
- 5.(a) Volume Cup A
- 5.(b) Volume Cup B
- 5.(c) Volume Cup C
- 6. Test Cup
- 7. Press Key
- 8. Ratchet Handle
- 9. Battery Compartment
- 10. Cover Plate
- 11. AC Adaptor 9V DC
- 12. Key Pad
- 13. Blue Tooth



WORKING WITH ADAPTER OR DRY CELLS

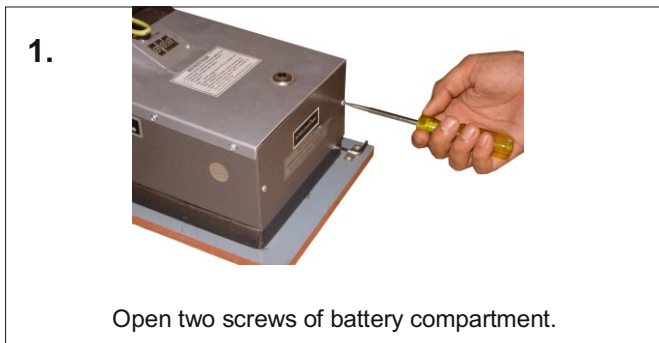


Open the box.



Power connection of adapter to main socket & phono socket.

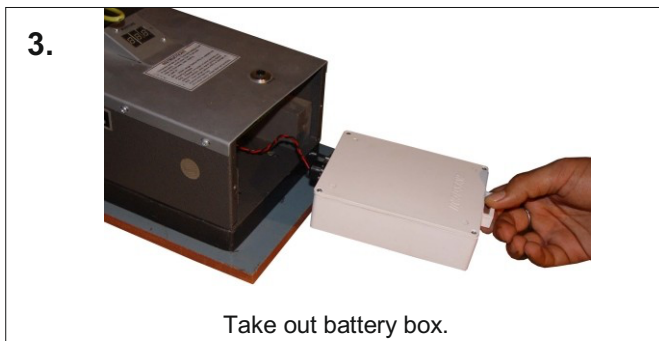
FITMENT OF DRY CELLS IN THE BATTERY COMPARTMENT



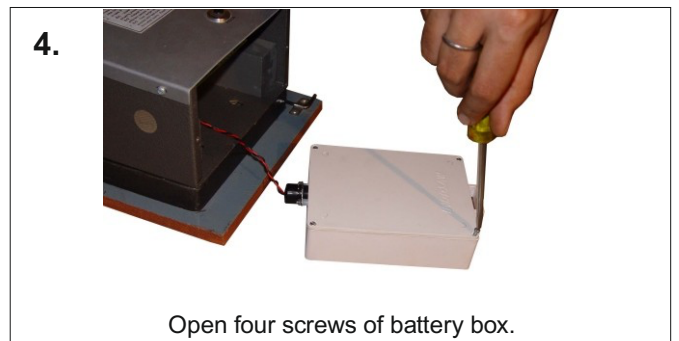
Open two screws of battery compartment.



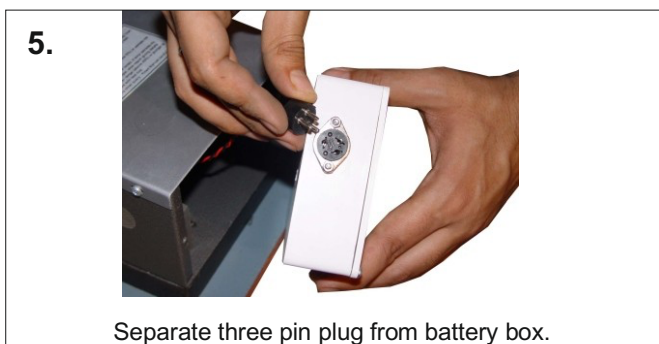
Battery box is seen.



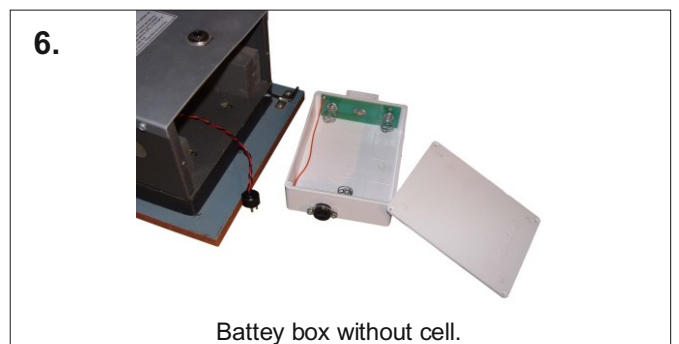
Take out battery box.



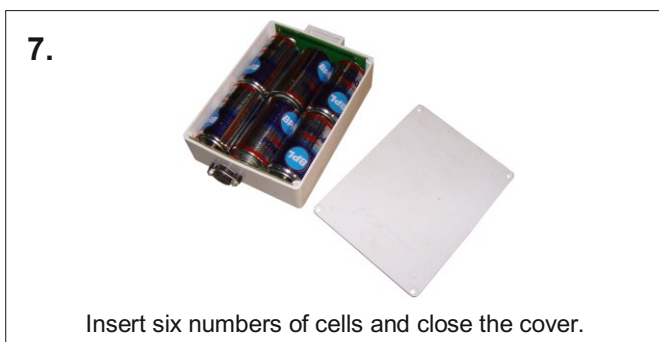
Open four screws of battery box.



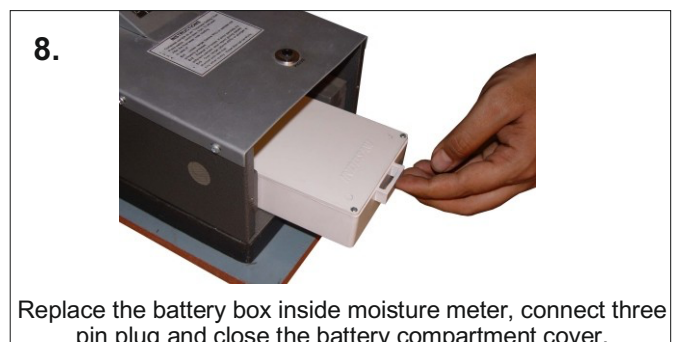
Separate three pin plug from battery box.



Battery box without cell.



Insert six numbers of cells and close the cover.



Replace the battery box inside moisture meter, connect three pin plug and close the battery compartment cover.

SPECIFICATIONS OF DIGITAL DATA LOGGING MOISTURE METER WITH BLUE TOOTH**SPECIFICATIONS****SPECIFICATIONS:**

Commodity calibration	: Food Grains, Pulses, Oil seeds, & Vegetables seeds etc.
Range	: 3.5 to 40%
Consistency	: ± 0.2 %
Principle of measurement	: Resistance
Temperature Compensation	: Automatic with PT-100 temperature sensor.
Error Conditions	: Under Range, Over Range etc.
Display	: 2 x16 character alphanumeric LCD display
Low Battery Indication	: Displayed on LCD display, No display of moisture percentage in case of low battery.
RS 232 Port	: It has the facility to print Moisture percentage, Temperature, Commodity name, Date and Time through printer. Recorded data can be transferred to a PC.
Blue Tooth	: This facility helps to transfer the data from moisture meter to a PC or mobile having the blue tooth facility, without using any cable.
Calibration check & Error Correction	: Provision to check the calibration as and when desired Correction of deviation from factory reading against standard reference & temperature calibration can be done in a very user friendly way.
Auto calibration	: Automatic on LCD using a simple key operation.(Without opening the equipment or using a screwdriver). When reading in a moisture meter gets disturbed with a passage of time there is a provision of checking this and correcting this to factory settings.
Hot keys	: Hot Keys for three crops which are programmable.
Keypad	: Membrane type keypad.
Averaging	: Customer can have averaging of number of readings of moisture percentage through a key.
Recall Facility	: Last reading Recall facility. Curve Programming/New
commodity Calibration	: It has facility to calibrate new commodity with reference to customer's own standard method
Data Logging	: It has facility to record data, which includes Moisture percentage, Temperature, Commodity name, commodity code along with Date & Time.
Data storage capacity	: It has memory of 200 readings.
Power	: 9V DC Adaptor for AC mains or 6 (R-20 type) dry cells.
Size (L x B x H in cm)	: 30x18x27 cm (approx.)
Weight	: 12kg (approx)

COMPACT UNIVERSAL DIGITAL DATA LOGGING MOISTURE METER



3. Select volume of sample as displayed. Take a representative sample in volume cup A ,B or C or by weight as specified and transfer it into the test cup.
4. Compress the sample as per the displayed pressure.
5. Press READ switch and wait till moisture % displayed.

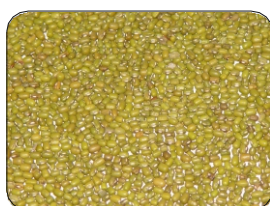
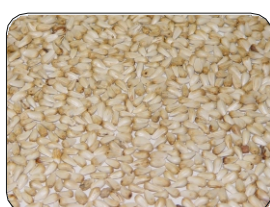
OPERATING INSTRUCTIONS

1. Switch on the ON/OFF switch.
2. Select commodity by pressing UP/DOWN arrow keys, it is displayed on display unit.

The moisture content of seeds is one of the most important factors influencing their viability in storage. It is desirable to know the moisture content of a seed lot just after harvest or before storage as an aid to seed trade. The rate of deterioration of seeds in storage increases as seed moisture content increases. One percent decrease in moisture content nearly doubles the storage potential to seed.

The role of moisture contents in the life of a seed is as follows:

Seed Moisture Content	Effect on Seed
35- 80%	Moisture content of developing seed, seed not mature enough for enough harvest.
18- 40%	Seed Physiological mature, respiratory rate high susceptible to field deterioration-heating occurs if seed is stored without adequate ventilation. Moulds and insects very active. Seed susceptible to mechanical damage during harvesting and handling.
13-18%	Respiratory rate still high can get heating at higher level. Moulds and insects can be damaging seed resistant to mechanical damage.
10-13%	Seeds store reasonably well for 6 to 18 months in open storage in temperate climates, very little insect activity, seed very susceptible to mechanical damage.
08-10%	Seed sufficiently dry for 1 to 3 years in open storage in temperate climates; very little insect activity; seed very susceptible to mechanical damage.
04-08%	Safe moisture content for sealed storage.
00-04%	Extreme desiccation can be damaging of seed. Hard seededness develops in some kinds of Seeds.



Paying for moisture ?Stop It.

Foodgrains, Oil Seeds, Pulses, Vegetable Seeds, Coffee, Suji, Maida, contain moisture, which beyond permissible limit is to your disadvantage. Not only you pay for excessive moisture but also invite moulds and pests to destroy your commodity. Digital Moisture Testing Machine helps you pay what is a must. Nothing more.

Gives moisture percentage results directly and accurate. It's computerized & portable. Takes hardly a minute to find moisture content.

It's **INDOSAW**.....

It's dependable.

