



**QAQC LAB**

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MRDA8

# OPERATING INSTRUCTIONS



## MRDA8 DIGITAL INSTRUMENT

The MRDA8 offers flexibility and adaptability for almost any moisture testing requirement. This instrument uses digital microcomputer circuitry to provide fast, accurate and reliable non-destructive moisture measurement for many products. The MRDA8 may be used for comparative testing without calibration or to determine the percentage of moisture with calibration. The MRDA8 will hold 100 different calibration curves. These curves are stored in permanent memory in tables 00 through 99. A fully discharged battery will not cause data in the tables to be lost.

The four sensitivity settings provide a range of moisture testing ability. Built-in calibration standards insure that the instrument is accurate at all times. The dome-shaped electrode buttons are stainless steel for longer life and they are individually spring loaded to conform to irregular or rough surfaces. They provide an electrical penetration into the sample to a depth of one inch. Single unit design provides greater strength, lighter weight, and easier handling. The rechargeable NI-CAD battery virtually eliminates battery replacement.

## DESCRIPTION OF INSTRUMENT

The MRDA8 is comprised of a digital display, an ON/OFF toggle switch, touch pad switches, a Moisture Range switch, a Standard switch and the built-in electrode. Provided with the instrument are a carrying case, universal wall charger and operating manual. The plastic handle contains a spring-loaded switch bar. The instrument may be turned **ON** by either the **ON/OFF** toggle switch or by depressing the switch bar in the handle.

## HOW TO MAKE A CALIBRATION CURVE

An alternate method for entering the calibration value is to place the instrument on the product and press the **ENT** key. This will automatically obtain the calibration value and display it. Press the **ENT** key again to enter the value. This automatic feature can be used to enter the calibration signal for all six calibration points. The display must be in the calibration mode (+), as described later in this section.

This automatic feature will work only if you have not previously pressed the arrow keys in the calibration mode.

For many users, this is the preferred method of calibration. It is quicker and easier, because samples do not have to be read separately, the results written down, and the data entered. It is done automatically.

A calibration curve can be created by taking readings on prepared samples which cover the desired moisture range. These same samples are then tested by oven drying or other standard method for determining moisture percentage. The MRDA8 calibration table can hold up to six (6) moisture points. The MRDA8 measures the moisture in a volume of material 3" diameter and 1" thick.

We recommend that several samples of approximately 4" x 4" are used for a proper calibration.

The various samples should be exposed to different humidity or wetted and dried until they reach the desired moistures. Sufficient time should be allowed for them to stabilize at this condition.

## **SELECT SAMPLES**

The quickest CALIBRATION CURVE can be determined by taking the instrument readings on just the very wettest and the very driest samples. Press the electrode of the instrument firmly against the sample of the material.

Be sure that all of the electrode buttons are in contact with the sample, and that the rim around the electrode can be felt to bottom against the sample. Rock the instrument slightly to obtain the highest steady reading.

These samples must have the same physical characteristics (shape, thickness, etc.) as the production material. Remember that the Radio Frequency energy from the Model DA-8 penetrates through the product, therefore it is very important to have enough material under the electrode for consistent and accurate readings. It is recommended that a low dielectric material (such as a Styrofoam block at least 2" thick) be used as a spacer between the product and the surface under the product. Never take moisture readings on top of metal tables or other conductive materials.

## **MODEL DA-8 CALIBRATION**

The Model DA-8 displays the actual moisture content of the material being measured based on the calibration performed and stored in the instrument. The Model DA-8 can store 100 different calibrations.

These calibrations are stored in the product calibration tables, which are available as table 00 through 99.

### **Always program from driest to wettest in ascending order!**

The instrument can be turned on by either the **ON/OFF** switch or by depressing the switch bar on the handle.

The **MOISTURE RANGE** switch provides four sensitivity settings. Position #4 has the highest sensitivity, #1 the lowest.

The **OUT** position in the **STANDARD** switch is for moisture testing. The **IN** position is used for checking the standard value on the instrument based on full scale loading. The value will depend on the calibration table being used. In table 00, switching the **STANDARD** to the **IN** position will give a reading of 5.0 which corresponds to 50 counts.

The Model DA-8 comes with a factory pre-set calibration in table 00.

This factory set calibration is a 1 to 1 correlation between the calibration signal and moisture and can be used to determine which sensitivity setting is to be used for the material to be tested. The decimal point is fixed when reading moisture. **In the calibration process the decimal is a pointer and not an actual decimal value.**

By moving the pointer to the left of a display digit with the → key you can change the value of that digit by using the ↑ key.

- ◆ Hold instrument away from any material while doing the self-check. Turn the instrument **ON** by using either the **ON/OFF** toggle switch or by depressing the switch bar in the handle of the instrument.
- ◆ On power-up the Model DA-8 performs a self-diagnostics and battery check in addition to auto-zeroing.
- ◆ The display should read 0.0
  - NOTE:** The display may read a different value if the instrument has already been calibrated or if a different table has been **LOADED** and used.
- ◆ Press the **FCT** key once, the display will show **.LOX** where **X** is the calibration table being used.
- ◆ The **L** on the display indicates that a specific table is **LOADED**. To load a different table press the **→** and the **↑** keys to change to the desired table, then press the **ENT** key.

If the display shows **.L00** then the default factory set calibration has been loaded and is available.

This means that the 00 table has the following data:

Moisture of .1% = Calibration Signal of 001

Moisture of 10.0% = Calibration Signal of 100

(The above is correct only if the 00 table has not been changed.)

This is a two-point one to one correlation. .900 was entered on the third moisture point to make the instrument use two points for the calibration instead of the six (6) available points. If more than two points are entered and if all six points are not used, always enter .900 for the next available calibration signal.

- ◆ Once that you have established that the 00 table is being used, you can take quick readings on the material to be measured to determine which sensitivity setting to use. The Model DA-8 reads in the range of 0 to 25.5%.
- ◆ Start with the sensitivity setting on #4 (Highest sensitivity) and the **STANDARD** switch **OUT**.
- ◆ Turn the instrument **OFF** then **ON**, the display should read 0.0. Place the instrument on the driest product and note the reading.  
Place the instrument on the wettest product and note the reading.
- ◆ Check and note the spread between the readings. If the wettest sample reads 255 (255 is the saturation value) then go to sensitivity #3.
- ◆ Set the sensitivity on #3. Place the instrument on the driest product, note the reading. Place the instrument on the wettest product, note the reading. If the sample reads 255 then go to sensitivity #2. If the difference in signal spread is lower than the difference obtained with sensitivity #4 then stop and use #4 sensitivity. If you can't get the readings of the dry and the wet materials to be on scale, then continue the process by changing to the lower sensitivity settings.

**Example:** Using sensitivity setting #2

Dry Product 2% Calibration Signal = 4

Wet Product 6% Calibration Signal = 53

**NOTE:** The actual reading on the display will be 0.4 for the dry and 5.3 for the wet. But remember that the decimal is fixed and it is a pointer when calibrating. The actual reading is really 4 counts. If the display reads 1.4 then reading is 14 counts.

Once a sensitivity setting has been selected, then the instrument is ready for calibration. Use an available table to store the calibration. Do not use table 00 to program your calibration.

- ◆ Turn the unit **ON** and press the **FCT** key twice. The display should read **.POX** where **X** is the next table from the one being used. **P** indicates that we are to **PROGRAM** data to this table.
- ◆ Press the **→** twice, this will move the decimal pointer two locations. The display should read **PO.X**.
- ◆ Use the **↑** key to increment the value to the table that you are going to store the calibration.
- ◆ Press the **ENT** key. This will make the table available for storing the calibration data. The display will show 1.00 or a previously stored value. If no value was previously stored then 1.00 means first moisture point. We will now enter the moisture value for the dry product.
- ◆ As per the example above, enter the moisture value of 2 into the first moisture location. Press the **→** once to move the decimal pointer to the right. The display should read **0.NX**. Press the **↑** until the **N** value is 2.
- ◆ Press the **↑** once, the display should now read 02.0.
- ◆ Press the **ENT** key.
- ◆ The display should now have a **+** sign on the left side. This indicates that a Calibration Signal should be entered. It will correspond to the low moisture value.

As per the example: The low Calibration Signal that corresponds to the dry product of 2% is 4.

- ◆ Enter the Calibration Signal as .004, press the **→** and press **↑** to make the display read +.004, then press the **ENT** key.
- ◆ The next value to enter is the second moisture point of the calibration.

As per the example: The second Moisture point is 6%.

- ◆ Enter this value by pressing the **→** and the **↑** until the display reads 06.0.
- ◆ Press the **ENT** key to enter the value. The display should now have a **+** on the left side to show that another Calibration Signal needs to be entered.

As per the example: The Calibration Signal for point two is 53.

- ◆ Press the **→** and the **↑** until the display reads **+.053** then press the **ENT** key to enter this value.
- ◆ The display should now show 3.00, this is the third point of the calibration table. Since we are only calibrating two points, we'll enter .900, which instructs the Model DA-8 that only two points are being used for the Calibration Table.

**NOTE:** The calibration signal or moisture content cannot exceed 255, the exception is entering 900. 900 indicates to the Model DA-8 that this is the last of the calibration points to be entered.

- ◆ Press **→** and the **↑** keys until the display reads .900, and press the **ENT** key to enter this value. This saves the data on this table, and readies the instrument to use this newly programmed calibration table.

**Always program from driest to wettest in ascending order!**

- ◆ The display should read a value; it may read 0.0 or any other value depending on the calibration.

You are now ready to measure moisture based on the calibration curve performed.

## TO READ MOISTURE:

If you turned the instrument **OFF**, then turn it **ON**. The last loaded or programmed table will be loaded when the unit is turned on.

If you want to verify what calibration table you are using then press the **FCT** key once. The display should read **.LAX** where **X** is the Calibration Table. If this is the calibration table that you are going to use, then press the **ENT** key to go back to the moisture measuring display. You can start to take moisture readings.

If a different table is to be used, press **FCT** then **→** and the **↑** until the table that you need is selected, then press the **ENT** key to load the table.

## RECHARGING THE BATTERY

The Model DA-8 is equipped with a rechargeable NI-CAD battery. A small connector plug is located on the back of the instrument just above the electrode. The power cord furnished with the instrument is connected between this plug and a 117 volt electrical outlet.

The Model DA-8 circuit is designed so that the instrument cannot be operated if the battery voltage falls too low. The Low Battery indicator on the display will come on as a warning to charge the battery. A few more tests can be made, after which the display will go **BLANK**. This is a sign that the battery should be recharged. Normal usage from a fully charged battery can run about a week. It is recommended that the battery be charged overnight about every two weeks. The battery cannot be damaged by overcharging, but it is not recommended that it be charged for more than 24 hours at any one time. If caught unexpectedly with a discharged battery, you can get a considerable number of tests after a charging period of just one hour.

## MAINTENANCE AND SERVICING

Keep metal parts of electrode clean at all times. Dirty contacts mean low readings. Use no solvents other than alcohol to clean the electrode.

Prolonged contact with moving samples will cause a heat build-up in the electrode sufficient to distort the plastic casting. If tests are necessary on moving materials, confine the tests to a series of short tests far enough apart to hold the heat down.

If the instrument cannot be reset to calibration accuracy and this cannot be corrected after battery recharging or replacement, then the instrument should be returned to the factory for servicing.

It is recommended that the instrument be returned to the factory once every 2 or 3 years for inspection.

## WARRANTY

The MRDA8 is under warranty for a period of six months from date of shipment against defective materials and workmanship. Any damage to the instrument due to accident, neglect, or misuse is not covered under this warranty.

