

Turf-Tec Digital Moisture Sensor



From the inventors of one of the first moisture sensors available to the turfgrass industry comes the new Turf-Tec Digital Moisture Sensor.

The Turf-Tec Digital Moisture Sensor has been developed to determine soil moisture in the soil profile. The unit has an adjustable foot which allows you to determine moisture at the one inch, two inch, three inch or four inch depth without changing probes. This will insure you can determine the soil moisture above, below and in the turfgrass rootzone for maximum water savings and plant health.





Simply slide the adjustable foot to the desired depth, insert the Turf-Tec Digital Moisture Sensor into the soil and press the "Read" button near the digital display. The read out is

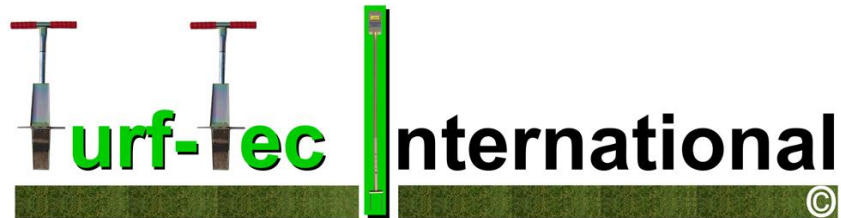
a percentage of soil moisture that is held within the air space in the soil.



This state of the art unit is designed to work in all soil types and salinity ranges. The probes are also easily replaceable. The Turf-Tec Digital Moisture Sensor uses a newly designed electrical conductivity sensing circuit that gives quick and reliable readings of soil moisture. With years of science behind the sensing results, there is no easier way to test for soil moisture.

MS6-W - Turf-Tec Digital Moisture Sensor

<p>Replacement parts:</p>	
<p>MS6-P001- Turf-Tec Digital Moisture Sensor probes (Set 2)</p>	



Turf-Tec Digital Moisture Sensor - MS6-W



1. Screw in probes- Be sure probes are very tight but do not over tighten.
2. Wet area on green with irrigation water and extend probes to 1 inch level.
3. Insert probes 3-4 times in soil to clean them before use each day.
4. Insert into wet area on green at 1 inch level.
5. Press read button.
6. If reading over 100% - Adjust meter internally until reading is at 100% to compensate for salts and minerals in soil. (See Instruction Manual, page 5)

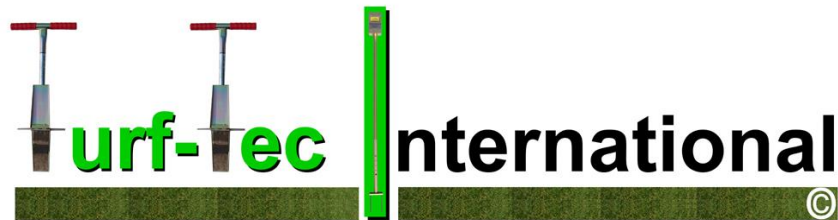
Readings

0-25% Dry

25-75% ***Ideal***

75% - 100% Wet

(Over 100% - adjustment must be made to unit)



Turf-Tec Digital Moisture Sensor Instructions

Specifications



Construction: Plated Steel and Anodized Aluminum
 Dimensions: 39 Inches tall (Assembled)
 Read out: Meter reads 0 - 199% scale
 Probes: Replaceable set of probes*
 Battery: One - 9 Volt Battery

Operating Instructions

- (1) Remove unit from box and attach spikes. Note there are two different color spikes, one **Blue** and one **Black**. You must attach one of each color to the Meter foot in order for the unit to work correctly*.
- (2) Next push adjustment button in with thumb and slide foot to desired depth, (Each hole is in one inch increments) and button will lock into place.
- (3) Push power button to the "On" position by pressing in.
- (4) Press the red "Read" button to zero out the meter.
- (5) Insert probes slowly into turf. If resistance is met, DO NOT

FORCE, either move to a new location or make a hole for the probe with a suitable tool.

- (6) Press the "Read" Button.
- (7) Read the digital read out and record the reading.
- (8) Take several different readings to get an average idea of moisture content at each level in the soil.
- (9) Note – Pressing read each time the probe is out of the soil will zero out the readings.
- (10) After finished taking readings, be sure to turn unit off to conserve battery life.
- (11) If digital read out is faded, install a new 9 volt battery.



Correlating Readings

Remember that each soil is unique and reading for one type soil will be different from another type soil. The best way to find out your soil moisture readings is to take a Moisture Sensor reading at field capacity; this will tell you what the "Wet" readings are in your particular soil type. This is accomplished by saturating the soil with your irrigation water and taking a reading. This will give you the "High" reading. If numbers are above 100% see the calibration section. You should also measure moisture in a dry area and this will give you your "Low" threshold. By watering until the soil reached the middle of these two numbers will give you the best turfgrass health.

Correlating Readings continued

1. Readings on the scale are in percentages. 0% - 25% indicate low moisture. In this range, plant roots have difficulty absorbing moisture. Therefore, this must be considered a danger condition.
2. 25% - 75% indicate medium moisture or the ideal range.
3. 75% - 100% indicate a wet soil, which denotes too much water. Readings over 100% are possible and most likely indicate the presence of salts or minerals in the soil. See "*Adjustment of Readings - Calibration*" Section.
4. Normally, after irrigation or rain, the read out will indicate wet or saturated soil. This condition will change in about an hour, when dealing with normally draining soils, to the 25 - 75% range.
5. To calibrate the readings on your area - Run your irrigation cycle for as long as you usually run during dry conditions. (If you do not have irrigation, test the area right after a soaking rain of at least one half inch.) One hour after irrigation or rainfall, take soil moisture readings at the 1", 2" 3" and 4 Inch level. Record these readings.
6. These numbers are your baseline reading of your soil at field capacity. "Field capacity" means that the soil is holding all of the water it can after the gravitational water has drained from the top four inches of the soil profile.
7. After field capacity readings have been recorded for each area with unique soils, you can use this range as your "Wet" moisture readings. You will never want to irrigate above these numbers as the soil will be saturated and turfgrass health will decline.

Soils and Readings

A soil in good tilth consists of 50% solids, 25% air spaces and 25% water. Rain or irrigation water will temporarily fill all of the voids in the soil. Depending on the porosity of the soil or its capacity to hold water, good soils will drain in about an hour. This gravitational water and will move down into the soil profile. Normally, it will take about an hour for this gravitational water to move down after it is applied to turfgrass areas.

As the turfgrass plant uses the water held in the soil, which is at "field capacity", air begins to fill the voids occupied by the water, allowing the root system to take in oxygen. As water is used up in the "field capacity" range, it can be noted on the meter over time.

Learning to use your Turf-Tec Digital Moisture Sensor as a guide to irrigation practices will greatly reduce the guesswork in developing and managing quality turfgrass areas.

Different soils and their moisture readings

The Turf-Tec Digital Moisture Sensor tells the amount of water in the air space that is in the soil. A one to two year old USGA sand based golf green or sand based athletic field that is saturated will show a very small amount of moisture because of the air space in the soil and its ability to drain the water quickly at field capacity. An area constructed from clay, soil, silt or other native materials will show a much higher reading when saturated.

The main objective in using this tool is to be sure you calculate your field capacity for all areas of unlike construction. On Golf Courses, Greens, Tees and Fairways will require three different ranges for wet, good and dry readings. Athletic field may have different soil characteristics if wear areas have been re-built or re-seeded with different soil types. Once these areas on your property are noted, they will not change much over time unless a total renovation or re-construction is undertaken.

Golf Courses, Tournaments and Sporting Events

The main thing to look for before tournament play or events is not to need an actual percentage reading of say 30% but to look for consistency. If all the greens have the same percentage of soil moisture and they all have the same reading on the Turf-Tec Penetrometer, they will all respond to the ball impact the same way. If all sports field areas are also consistent, they will have the same footing and ball bounce. The key to playability is consistency from green to green or area to area on an athletic field with the relationship of soil moisture and compaction.

Adjustment of Readings - Calibration

The Turf-Tec Digital Moisture Sensor comes pre-calibrated from the factory to read 100% if the probe tips are placed into moist water types. If you adjust the readings, Turf-Tec will re-calibrate your unit to factory settings if required, however the shipping charges will not be covered under the one year warranty period.

To adjust the readings, follow the below procedure.

1. **First, be sure probes are tight in the foot block. Low or sporadic readings will occur if probes are not tight. (Do not over tighten)**
2. Extend the probe tips out of foot to one inch level.
3. Wet an area that is representative of the area you will be testing (same soil type) with your irrigation water.
4. Insert the probes into the soil 2-3 times to clean them.
5. Insert the probes into the wet area and check the digital display. If the readings are over 100%, there is probably sodium or other minerals present in your irrigation water or soil. That value should be determined by sending in a water sample to a qualified lab or using an EC Meter.
6. Open the meter top by unscrewing the four screws in the face of the meter.
7. Place the probes again directly into the area of saturated soil.
8. Locate the calibration adjustment screw on the circuit board that is attached to the bottom of the meter box. (Photo below)



Photo - calibration adjustment screw

9. Insert a small screwdriver into the calibration adjustment screw and turn slightly until the reading on the digital display reads 100%.
10. Remove the probes from the soil and repeat the process a couple time to be sure the probes are clean and the reading is stable at 100%.
11. Reattach face securely with four screws.

Please note that if the readings are adjusted and rainfall occurs, the rain will often act as sodium flush and wet readings will read lower than 100% in the soil until the sodium or mineral levels reach the re-calibrated levels.

Probe wear and accuracy of readings

The Turf-Tec Digital Moisture Sensor comes with two probes that have a protective cover over the main portion of the probe with just the bottom one inch exposed to the soil. Once the unit is calibrated for your soil, if any areas of the protective coating are worn away or damaged, there will be more metal exposed to the soil, thus giving artificial higher readings. Care should be taken each day before readings are made to inspect the protective coatings on the probes and if this material is worn or damaged, new probes should be inserted in order to achieve accurate readings.

Readings over 100%

The Turf-Tec Digital Moisture Sensor will display readings over 100%, in fact the read out will go up to 199%. The reason for this is to alert the user that the unit should be calibrated so that the maximum reading shown is 100% on any area on your property that you are checking moisture on. For golf greens and sports fields, different construction techniques, age of areas, thatch build up and renovations account for variations in soil types and variations in organic matter content which changes moisture readings. This is especially true when you are checking a one-inch increment zone in the soil profile as compared to a composite moisture reading of the entire profile. By allowing moisture to be measured at one-inch increments allows you to localize moisture readings in the rootzone to produce the best environment for growing healthy turf.

If readings over 100% occur, follow the recalibration technique on page 5 until the highest number is 100% on the property you will be checking. Turfgrass areas with low organic matter now may read a lower range for that area when saturated so a repeat of step # 2-5 on page # 5 and record the "Saturated" and "Dry" readings for that turfgrass area. Once you become accustomed to the read-out range for that particular turfgrass area, watering to the midpoint of the "Saturated" and "Dry" numbers will allow the perfect balance of water and air to be in the rootzone, producing the best environment for growing turf.

LIMITED WARRANTY OF TURF-TEC INTERNATIONAL PRODUCTS

Turfgrass Products Corporation - dba - Turf-Tec International ("Seller") warrants to the final purchaser, that all Turf-Tec International tools will be free from defects in material or workmanship for a period of one year from date of purchase. SELLER'S SOLE OBLIGATION AND YOUR EXCLUSIVE REMEDY under this Limited Warranty and, to the extent permitted by law, any warranty or condition implied by law, shall be the repair or replacement of parts, without charge, which are defective in material or workmanship and which have not been misused, carelessly handled, or improperly repaired by persons other than Turf-Tec International. To make a claim under this Limited Warranty, you must return the complete tool, transportation prepaid, to Turf-Tec International after contacting Turf-Tec International and receiving a return authorization number. Please include a dated proof of purchase with your tool.

ANY IMPLIED WARRANTIES SHALL BE LIMITED IN DURATION TO ONE YEAR FROM DATE OF PURCHASE. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING BUT NOT LIMITED TO LIABILITY FOR LOSS OF PROFITS) ARISING FROM THE SALE OR USE OF THIS PRODUCT.

Hold Harmless Agreement

The seller shall protect, defend, indemnify and hold the purchaser and their respective assigns and their attorneys, accountants, employees, officers and directors harmless from and against all losses, costs, liabilities, claims, damages and expenses of every kind and character, as incurred, resulting from or relating to or arising out of the inaccuracy of results, injury of user, injury of sports participant, turfgrass loss, warranty, covenant or any agreement made by the seller in this agreement.