

GreenLight-RedLight™

99 SITES and 81 PROFILES per SITE

HAND READER

**RED MEANS NO WATER REQUIRED
AT THE MEASURED DEPTH**

GREEN MEANS START WATERING NOW

**“ANOTHER NEW DAY HAS
DAWNED ON IRRIGATION
MANAGEMENT”™**

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GreenLight-RedLight

The Calibration for the **GreenLight-RedLight** is based on the Full Point or Field Capacity being automatically set at 100% when you do the calibration. This is the maximum amount of water that the soil will hold against gravity.

With most soils the Refill Point or the end of the Readily Available Water in the majority of soils is approximately 60%. When the soil moisture goes below this limit the plants cannot easily extract the moisture from the soil. Clays have less available water because of the large percentage of extremely fine particles in the soil.

	<u>SAND</u>	<u>LIGHT SANDY LOAM</u>	<u>SANDY LOAM</u>	<u>LOAM</u>	<u>CLAY LOAM</u>	<u>CLAY</u>
<u>FC</u>	<u>12</u>	<u>18</u>	<u>27</u>	<u>32</u>	<u>42</u>	<u>45</u>
<u>Refill</u>	<u>7</u>	<u>11</u>	<u>16</u>	<u>19</u>	<u>30</u>	<u>36</u>
<u>RAW</u>	<u>5mm</u>	<u>7mm</u>	<u>11mm</u>	<u>13mm</u>	<u>12mm</u>	<u>9mm</u>
<u>Full %</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>
<u>Refill %</u>	<u>58%</u>	<u>60%</u>	<u>59%</u>	<u>59%</u>	<u>69%</u>	<u>79%</u>
<u>% RAW</u>	<u>42%</u>	<u>40%</u>	<u>41%</u>	<u>41%</u>	<u>31%</u>	<u>21%</u>

The major advantage in using percentage calibration is that you do not have to do a soil analysis to get accurate results, because the percentage calibration removes the requirement for detailed soil testing over the total profile depth. When the soil is at Full Point the calibration is set automatically to 100%. If after the calibration you find that the soil was not exactly at Field Capacity the calibration can be edited on your computer and transferred back to the Hand Reader. The calibration for the Odyssey recorder can also be adjusted. Ask for the GreenLight-RedLight PC software and data cable from Dataflow Systems if you do not already have them.



If the access tube installation is a new site then the easiest way to install the access tube is to saturate the soil before installation. This is very important in clay soils. Dry clay can be very hard and also sticky. This will make the access tube installation very difficult. However if the clay soil has been saturated then the installation of the access tube will be easy because clay when it is wet is very slippery.

One simple way to achieve this is to either, place a piece of PVC pipe on the point where the access tube is going to be installed or form a soil dam around the site. Then fill the soil dam or container with water. The water must be allowed to drain away before you refill the container. The dam or PVC pipe must be filled a number of times to ensure that the soil is wet all the way down to the depth that the access tube is to be installed.

After the installation the soil must be left until the moisture content has ceased moving and is at Field Capacity. The table gives a guide as to how long it will take for the water in the soil to become stable and suitable for calibration.

	SAND	LIGHT SANDY LOAM	SANDY LOAM	LOAM	CLAY LOAM	CLAY
STABILISE TIME	1 to 2 hours	2 to 4 hours	3 to 6 hours	8 to 12 hours	24 hours	24 to 48 hours

If the access tube is an existing Micro-Gopher access tube then the soil must also be brought up to Field Capacity before the calibration is carried out. To achieve this the soil must be watered with enough water to bring the entire profile depth up to Field Capacity.

INSTALLATION OF THE ACCESS TUBE

It is essential that the access tube is driven in straight. If the tube bends, the moisture sensing staff will not fit down the tube.

Once the soil has been saturated with water, even in heavy clay loam soils the access tube can be driven into the soil with a hammer. A black nylon driving plug is included in the kit. In light sandy loams the access tube can be driven in very easily. It only takes approximately 40 seconds to drive the standard access tube into the soil. Place a mark on the PVC access tube, 10cm from the top, before you start to drive the tube into the soil. This is the depth that the access tube has to be driven into the soil. Alternatively, a steel or wooden spike (15 to 20mm diameter) can be punched into the soil and then pulled back out before driving in the access tube. Take care not to increase the hole diameter when withdrawing the spike.

If the soil is stoney the best method is to drill a bigger hole with a post hole auger. A 4 inch auger would be adequate for most small stoney soils. If the stones are bigger than this, you may need to use a 6 inch or 8 inch auger. Place the soil in separate clumps as you drill the hole, because the soil must be returned into the hole in the same order as it was dug out. After removing the stones the soil must be placed back into the hole and tamped down using a piece of wood. The soil should only be tamped down until the density is similar to that when it was being drilled. If there are a lot of stones, you may need to drill another hole to get some extra soil to make up the volume that the stones occupied. Once the soil is back in the hole it must be wet down as described above. Then the access tube can be driven in without any problems with the stones.

OPERATION OF THE HAND READER

The hand reader is powered by a 9 volt energiser battery. The power is turned on with a slider switch on the right-hand side of the housing. There are two sockets at the top of the reader box, the left one is for connection to the sensor. The right one is for connection to a computer. These are marked on the top label on the box.

INSTALLATION OF THE SENSOR STAFF IN THE ACCESS TUBE

Do not pull or carry the sensor staff by the connecting cable.

The sensor staff has a red plastic covering over the sensors. This avoids problems with moisture getting onto the metal sensors. Even though the material is reasonably tough, care must be taken in handling the sensor staff and also when it is being inserted into the access tube. Make sure that the staff is vertical when you insert it into the access tube. If the sensor staff is deliberately rubbed against the access tube top edge, not only may it damage the sensor covering, but it will also cause an air gap at the top of the access tube. When you pull it out of the access tube simply pull it out vertically.

Mishandling of the sensor staff resulting in damage will void the warranty.

Before using the sensor with the hand reader, the connector cable and cover must be installed. Loosen the grey cable gland on the connector housing, then plug the plug from the sensor staff into the socket in the connector housing. Make sure the plug clicks into the socket. Then screw the cover onto the thread at the top of the sensor staff. Re-tighten the cable gland. Plug the cable into the left socket on the reader and then carefully lower the sensor staff into the access tube.

If the plug is not correctly inserted into the socket, the sensors will not be able to be read and no values will appear on the display when trying to read the moisture level

When removing the hand reader connecting cable from the sensor staff, the plug must be pulled out of the socket by holding the plug body when you pull the plug from the socket. First, loosen the grey cable gland, then unscrew the connector housing, then unplug the connector.

If the plug is pulled out by pulling on the three wires then damage will be done to the sensors or the plug. If this happens then the resulting damage will void the warranty.

MENU 5 CALIBRATION OF NEW ACCESS TUBE

The top cap cover on each site should be numbered so that you know the site number when you record a profile. The hand reader will record 81 profiles from 99 different sites. This data is retained in memory and can be down loaded into a computer. A computer cable (optional) must be purchased from Dataflow Systems to do this.

The menu list on the housing can be scrolled using the INC or DEC key. When the menu item you want is displayed, press the RED ENTER key. To change the site displayed at the

bottom right hand corner after you have turned the power on, press the ENTER key and then scroll to the site by pressing the INC or DEC key. When the site you want is displayed, press the ENTER key. If the site is already calibrated, press the ENTER key to read the soil moisture percentage. If you are about to do a calibration, press the INC key three times until the CALIBRATE prompt is displayed. Then press the RED ENTER key. The program will automatically calibrate each sensor to indicate that the soil is at 100% The calibration and also the moisture read takes about 6 to 7 seconds. If you try to read soil moisture on a site that has not been calibrated the Hand Reader will not display a result, to reset the program turn the power off and then on.

When the calibration is complete the display will show 100% for all four sensors. Depress the ENTER key and the display will prompt you to SAVE THIS SCAN. Press the ENTER key and the total number of saved scans will be displayed. Press the ENTER key again and the display will go back to menu item 1. SELECT SITE If you do not want to save the soil moisture profile then press either the DEC or INC key to go to another menu item.

MENU 2 READ MOISTURE

After you change sites the display will prompt you to READ MOISTURE after you exit the site selection program. Press ENTER and the program will read the current soil moisture percentage. When the results are displayed you should look at the results being displayed and if the data for any reason does not look correct press the INC or DEC key to avoid saving the data. This may have been caused by the sensor staff may not have been inserted fully. If this is the reason, correct the staff position and do the reading again.

MENU 4 ERASE THIS SITE

If you want to re-calibrate a site then the site data must be erased first. Enter this item on the menu. The display will prompt you ARE YOU SURE !! If you want to erase the site, key ENTER, if not press either the INC or DEC key.

MENU 6 SCROLL DATA

This menu item allows you to scroll back through the soil moisture profiles that have been recorded. This allows you to look at the trend of the soil moisture movement. The DEC key takes you back to previous recorded profiles. If you want to come back to the last one, press the INC key until the last recorded profile is displayed. Once the last one is reached the program will not go any further. Likewise when you reach profile 1 by pressing the DEC key the program can not go beyond this. To exit the program depress the ENTER key.