TrolMaster WCS-3 Water Content Sensor 3 User Manual

Contents

TrolMaster WCS-3 Water Content Sensor 3

OVERVIEW

The TrolMaster WCS-3 Water Content Sensor 3 is specifically designed to measure the moisture level (in percentage) of the growing medium. The WCS-3 can be used with the TrolMaster Aqua-X (NFS-1), Aqua-X Plus (NFS-3), Aqua-X Pro (NFS-2), Hydro-X Pro (HCS-2), and Tent-X (TCS-1) control systems. Each WCS-3 sensor is a 3-prong Volumetric Water Content (VWC) sensor. To use the WCS-3, you will insert the 3-prong sensor into the growing media such as coir, soil or rock wool to be measured. You can connect multiple Medium Moisture Sensors to a single controller. Up to 50 WCS-3 can be connected to the NFS-2 and HCS-2 controllers, 20 on the NFS-3, 8 on the NFS-1 controller, and 1 on the TCS-1 controller.

Note: The TCS-1 can only have a single WCS-3 connected. Each WCS-3 features a built-in LCD on one side of the sensor that becomes "live" and can be viewed when the sensor is shaken or disturbed. The display will show the current VW% reading right on the sensor. The WCS-3 reading is also shown on the main TrolMaster controller. When using TrolMaster's free TM+ Pro app, you can even see the moisture level of the growing medium measured by the WCS-3 "LIVE" on your smartphone. Plus you can view historical data graphs on the app and also receive notifications if the WCS-3 reading exceeds your highest or lowest alarm settings.

FEATURES

- Ultra-slim simplicity design
- Tap-to-wake LCD Display
- Crop-steering irrigation compatible
- Designed for Daisy-chain multiple sensors
- Real-time measuring of water content
- Alarm and mobile notification when setpoint exceeded

PRINCIPAL OF OPERATION

Accurate VWC / moisture level measurements of the growing medium are critically important to maximize a crop's potential. Until recently that simple task has proven to be expensive and rather difficult to accomplish. The WCS-3 was engineered with two main goals. Provide a quality VWC sensor, and do it at a reasonable cost to the consumer. To accomplish those goals the WCS-3 uses the newest technology to read moisture levels within various types of grow media accurately. By keeping the cost low, we hope to encourage more growers to benefit from the ability to monitor their growth medium 24-7.

WCS-3 VERSUS OTHER VWC SENSORS

There are many choices and types of VWC sensors available today. Most VWC sensors like the WCS-3 use several stainless steel spikes inserted into the grow medium to measure the moisture level. Measuring moisture level is complicated by multiple factors including the grow medium type, salt (nutrients) content of the water within the grow medium and of course, the amount of water being held within the grow medium.

All of these factors can affect the electrical conductivity (EC) of the growing medium which can affect the moisture level readings. To account for those differences, TrolMaster has come up with a simple and effective way for the WCS-3 to be calibrated by the user to provide accurate results regardless of the type of grow medium or nutrients being used.

CONNECTING THE WCS-3 TO THE TROLMASTER CONTROLLER
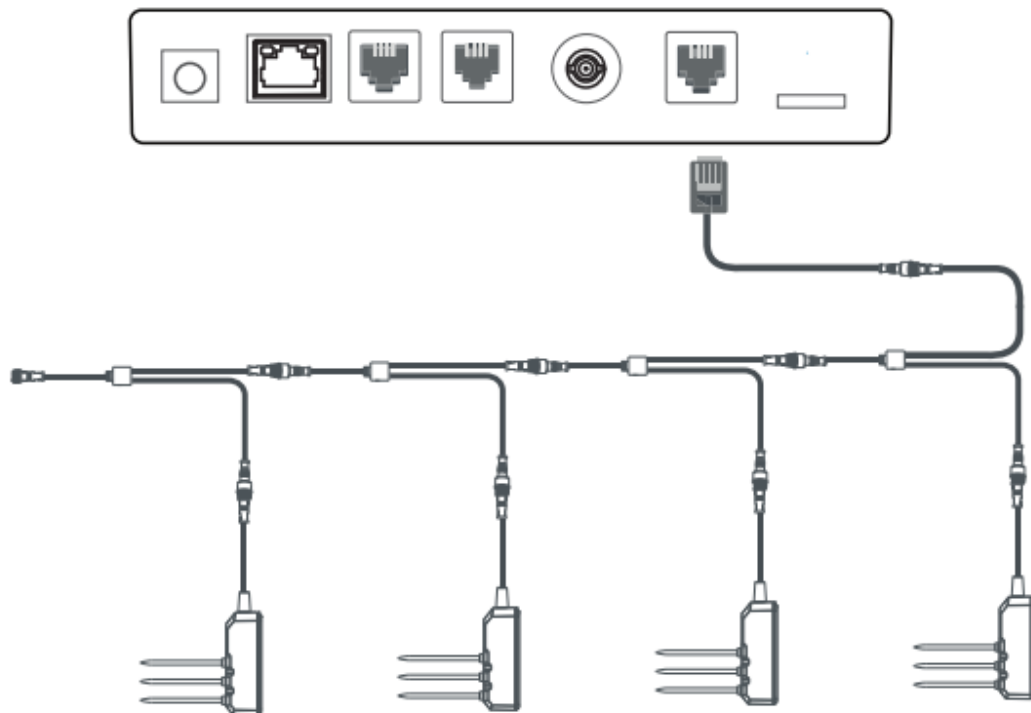
When connecting multiple WCS-3 to the TrolMaster controller, it is recommended to use one or more of the SPH-1 splitter hubs to power and connect the WCS-3 sensors. The SPH-1 has 8 separate RJ12 connection ports and each SPH-1 can power up to 20 WCS-3 sensors. Up to 5 WCS-3 can be connected to a single RJ12 port on the SPH-1. The SPH-1 then connects to the appropriate RJ12 port on the TrolMaster controller to integrate all of the connected WCS-3.

Note: Connections to each controller model are shown below. Aqua-X, Aqua-X Plus & Aqua-X Pro: Connect an RJ12 cable to the "Water Detector"the port on the bottom of the back panel of the Controller.
Hydro-X Pro & Tent-X: If connecting to the Hydro-X Pro or the Tent-X, connect an RJ12 cable to the "Sensors" port on the bottom or back panel of the controller.

ADDRESSING THE WCS-3 SENSOR TO THE TROLMASTER CONTROLLER
Once you have connected the WCS-3 to the main controller, the sensor must be "addressed" to the controller. Addressing simply links the sensor to the controller so they can communicate. To address the sensor for the first time, with the sensor connected to the controller simply shake the sensor. An internal motion sensor detects the movement and will initiate the sensor addressing. When successfully addressed the controller will briefly display a message saying "New sensor has been added"

Note: You might now want to physically label each of the WCS-3 sensor heads you will be connecting to the

controller using the sensor number assigned by the controller when the sensors are addressed.

When connected to the TrolMaster controller, each WCS-3 sensor will communicate the measurements from that sensor to the controller. On the NFS-1 and TCS-1, all readings from the connected sensors will be averaged and displayed as the average of all sensors. When connected to the HCS-2, NFS-2, or NFS-3 controllers EACHsensorr reading will be shown on the controller.

Note: Remember that each WCS-3 sensor has its own built-in LED display that will show the current WC% reading from that particular sensor.

INSTALLATION AND INITIAL CALIBRATION OF THE WCS-3

Proper installation and initial calibration are CRITICALtoo extract the most accurate measurements from the WCS-3 sensor. When you are ready to install the sensor into the plant you will be monitoring, the first thing you will want to do is calibrate that sensor to that particular plant / grow medium. Calibration automatically adjusts the measurements coming from each sensor, to account for the type of grow medium and nutrients being used. If the sensor is not calibrated specifically to YOUR combination of grow medium and nutrients, the WCS-3 may not provide readings that are as accurate as possible. Once you complete this initial calibration it is best to leave the WCS-3 installed in the same plant and same position for the entire duration of the crop. Moving the sensor to a different plant or different position on the same plant will negatively affect the initial calibration you completed.

IMPORTANT!!! Before using the WCS-3 for the first time, you MUST calibrate the sensor to your grow medium and your feed water. To provide the most accurate readings possible, we conduct a 2-point calibration of 0% moisture (dry) and 100% moisture (fully saturated). Using those two baseline points, the WCS-3 sensor can then provide accurate measurements from 0-100%. You MUST prepare a sample of the growing medium you will be using to calibrate the WCS-3 sensor.

Note: It is possible to calibrate a sensor using a plant that is already growing in the container or cube.

1. Prepare the grow medium sample by fully saturating the grow medium, (top feed until runoff) using the same nutrient mixture that you will be feeding the plants with.

2. You will then want to wait about 5-7 minutes for excess water to drain from the bottom.

3. While waiting for the water to drain, you can start the calibration process by calibrating the WCS-3 sensor to read 0%. Simply allow the sensor to rest in "open air" to prepare to calibrate it.

4. Find and go to the Calibration page on the controller the WCS-3 sensors are connected to. You will select the sensor you want to calibrate and then select to calibrate the WC% "Zero" (0%) point.

5. Once you have selected and started the calibration, the process is almost instantaneous. When completed the sensor will read 0% moisture.

6. Next, you will insert the WCS-3 into the grow medium cube or container. The sensor should be positioned about ⅓ of the way up from the bottom of the container or cube. The TrolMaster name on the front of the WCS-3 should be upright and the cable should exit from the right side of the sensor. The three stainless steel probes should be in line horizontally.

   Note: If the WCS-3 is installed upside down, you will not be able to view the "hidden" LED display built-in to the top of the sensor.

7. Now you can complete the 100% calibration. Before starting, make sure you have allowed about 7 minutes since flushing the grow medium sample with nutrient water, and confirm there is no additional runoff coming from the bottom of the plant cube/container.

8. Go to the calibration page on the controller again, and after selecting the correct sensor to calibrate, select to calibrate the WC% to 100%.

9. Once you have selected and started the calibration, the process is almost instantaneous. When completed the sensor will read very close to 100% moisture.

   Note: Readings that range from 95-100% should be considered acceptable after calibration.

10. Once you have completed both the 0% and 100% calibration, the sensor is ready for use. If the sensor is moved or relocated to a different plant/container, the calibration should be redone to ensure the best accuracy.

ADDITIONAL INFORMATION AND TIPS
Below is some additional information and facts that will help us understand exactly what the WCS-3 can and cannot do. If you follow the installation and calibration process, your WCS-3 sensors will provide reliable and accurate measurements. Understanding the data the WCS-3 is providing is also important.

WHAT MAKES THE WCS-3 SENSOR SO SPECIAL?
The WCS-3 sensor was designed to read water content % from 0-100% whereas other VWC sensors provide readings from about 0-65%. The WCS-3 uses an absolute scale that says a reading of 100% = Completely saturated grow medium, and 0% = Completely DRY grow medium. The WCS-3 sensor can be calibrated to your specific growing medium which allows it to provide a simplified 0-100% Water Content measurement that is easy to understand.

Other VWC sensors do not use a 0-100% scale and they are NOT able to be calibrated to your specific grow medium. So other sensors force users to know what their specific grow medium water holding capacity is. Those other sensors would represent Full saturation at 65% in some grow mediums and 55% in others. The WCS-3 simplifies that so that no matter what grow medium you are using, you will always see the same 0-100 scale to indicate how saturated the grow medium is. On-board calibration of the WCS-3 sensors ensures that each user can confirm their sensors are calibrated and measure their specific grow medium correctly.

SENSOR CALIBRATION AND POSITIONING
Another factor affecting WCS-3 sensor readings is how the sensor is positioned and installed into the growing medium. The WCS-3 must be installed horizontally, towards the bottom of the container or cube about ¼ to 1/3 of the way up from the bottom of the container. The bottom is where the moisture and WC% will be the highest. When installing the WC sensors, ensure they are being consistently installed in the correct orientation, as well as in the same position relative to all other sensors being installed.

Once the initial calibration is completed, the sensor will not need to be recalibrated until the sensor is moved. Some people may try to move the sensors around from one plant to another during a crop. While it is possible to do that it is not recommended. By moving the sensor from plant to plant, the readings could be different because of density differences within the growing medium, irrigation differences between plants, and the position of the sensors. If the sensor does have to be relocated, it is advisable to re-calibrate the sensor.

PACKAGE CONTENTS

- 1 x Water Content Sensor 3
- 1 x 4ft M12 Cable
- 1 x M12 T-Splitter

SPECIFICATIONS

- Input Voltage: 12VDC
- Max Input Current: 0.1A
- Working Environments: Temperature: 32~122°F Humidity: ≤90%
- Water CContent-Range 0~100%
- Package Dimensions: 6.69″ (L) x 3.54″ (W) x 2.13″ (H) 170mm x 90mm x 54mm

WARNNING
DO NOT open or attempt to repair or disassemble the sensor as there are no user-serviceable parts inside.

Opening the sensor will void the warranty. The WCS-3 operates under natural ventilation conditions. For any issues or concerns with our products, DO NOT return them to the store. Please contact our tech support department at **support@trolmaster.com** or call **877-420-9876**.

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Documents / Resources

TrolMaster WCS-3 Water Content Sensor 3 [pdf] User Manual
WCS-3 Water Content Sensor 3, WCS-3, Water Content Sensor 3, Content Sensor 3, Sensor 3

References

- **User Manual**