

Wireless Solar Powered DC Valve Controllers

User guide

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Section 1: Introduction

The Wireless Solar Powered DC-valve Controllers (WSPDVC) is a system specially designed for use in automating for irrigation and monitoring small farms. Congratulations for selecting this product because you made a great step toward automating and monitoring your farm. In this guide you will find all the required data for initializing the system as well as troubleshooting any future issues.

1.1 About this guide

This user guide is intended for new users and expert users as well, all the required instructions for installing and operating the system as well as trouble shooting is well documented in the following Four Sections.

Section in this user guide include:

- Section 1: Introduction
- Section 2: Installation procedure
- Section 3: Operating the system
- Section 4: Trouble shooting

1.2 General Safety Precautions

This system includes parts that should be connected to the main power, also it has batteries that should be recycled properly, please take five minutes to carefully read the following rules, even if you already know of this rule take it seriously and follow the given information.

- You should avoid any physical contact with any energized part of the system.
- Treat all electrical devices as if they are alive or energized.
- Disconnect the power source before servicing or repairing electrical equipment.
- Only use tools and equipment with non-conductive handles when working on electrical devices.
- Properly recycle the battery when changing and dispose of the replaced battery properly.

1.3 What is included in this package?

This system comes with all required ready components to rapidly start the installation in your farm.

- **Watering unit**

This unit is ready to use and needs no configuration

- **Main node**

This unit is preprogrammed and ready to use after you fill the WIFI network credentials.

1.4 Where to Find More Information

You can visit our website <https://web.engr.oregonstate.edu/~rottek/usersguide.php> to get the soft copy of the user guide.

Section 2: Installation of the system

In this chapter you will find the easy installation procedure. Before getting started with installation, a general overview for the system parts should take place.

2.1 System parts overview

2.1.1 Watering node

This node has the ability to control remotely the solenoid valve to start or stop watering, also this node is solar powered and no need for any external power other than the battery supply, this system can run continuously for three days without sunlight, this node will be connected to the main node wirelessly without the need for laying down any cables, and also there is no need for any configuration for the radio communication.

2.1.2 Main node

This node is responsible for the connection between your farm valves and your Wi-Fi network, also this unit is easy to install and can be placed anywhere where there is Wi-Fi coverage and has a wall outlet.

2.2 System installation

2.2.1 Installation of watering node

- Unpack the unit and observe the three included parts (solar cell, water valve, controller box).
- Open the controller box to reach the connection terminal.

- Start with the valve by connecting its two wires to the controller box using a screwdriver on the terminal labeled (vl+, vl-).
- Connect the solar cell to the dedicated terminals labeled (pv+, pv-).
- Close the controller box and make sure it's well secured by the included screws.
- Turn on the controller box (you should see the LED as an indication).
- Use the valve on/off button to test the valve, you can observe the valve when it's going on or off.
- If anything goes wrong or if the valve didn't work properly, please refer to the trouble shooting section.

Cautions:

- Make sure that the maximum distance between any node and the main node is 300 feet or less to avoid data loss
- Make sure that the solar cell is under direct sunlight without any shades as much as possible. Also, the solar panel should be facing south since it has been directly to the sun light.

2.2.2 Installation of main node

Unpack the main controller package and observe the following parts:

- Main controller box
- Power adapter

- SD card
- Open website
- Make sure that the WIFI is turned on
- Attach the SD card to the holder labeled (SD)
- Connect the power for the main controller
- Select the device and fill in your WIFI credentials

Section 3: Operating the System

In this chapter we will go through a step-by-step procedure to start up the system,

Note:

If you didn't read the installation chapter please, read it first then come back.

3.1 Local operation

This mode is used when there is no internet connection to the main node where the user cannot send or receive data from the website, user will not lose control because he can control the valves manually from the node unit using the manual button, and also in case of power loss on the farm this mode still available since the valve nodes operates on batteries and can operate for 3 days without being recharged.

- Notice the button on the watering node with the valve label.
- You can flip it once to turn on the valve or un-flip it again to turn off the valve.

3.2 Remote operation

In this mode the user can control irrigation from the website, also the user can send instant commands to open or close any valve and finally the user can schedule the watering procedure using this mode.

- Schedule control: to set the ON time and/or OFF time depending on the time.
- You can also open the website from any laptop or desktop using any available internet explorer.
- Navigate through the website TABS to:
 - Schedule control: to set the ON time and/or OFF time depending on the time.
 - Connect to the same network to make sure that everything is working.
 - History: you can view the operation history from this tab, or you can download the history as CSV (comma separated values).

3.3 Retrieve history

All of the operations are stored in two places to make sure that your data is safe, all of the operations with the corresponding time stamp are stored on the website as well as on the.

- Using the website to open the history chart, you can view/download all the operations.

- Using the website (after logging in to your account), navigate to the history tab and download the CSV.
- Remove the SD card from the main controller and use any laptop or desktop to read the data (Text file).

Section 4: Trouble shooting

4.1 Watering node troubleshooting

4.1.1 Valve doesn't work locally

If you try to press manually valve on/off and it doesn't work, you should make sure that the battery is charged by placing the system under the sunlight to be charged.

4.1.2 Valve doesn't work remotely

Reduce the distance between the watering unit and the main controller to make sure that radio signal is received. Review history to make sure command was sent. Double check RF power in the code and double check everything is well connected.

4.1.3 System not charging

Make sure the connection between the solar cell and the watering unit is correct and check the connection polarity.

4.2 Main controller

4.2.1 Not connected to the WIFI

Please make sure that your WIFI network is available at the location of the system and make sure that you entered the right credentials on the application, and that the controller is plugged in.

References and File Links

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