Operation, Maintenance, & Replacement Plan

Attachment 1

Agri Drain Smart Drainage System
Operator's Manual

Agri Drain
Smart Drainage System®
www.agridrain.com

Operator's Manual

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RSG1651 P-S

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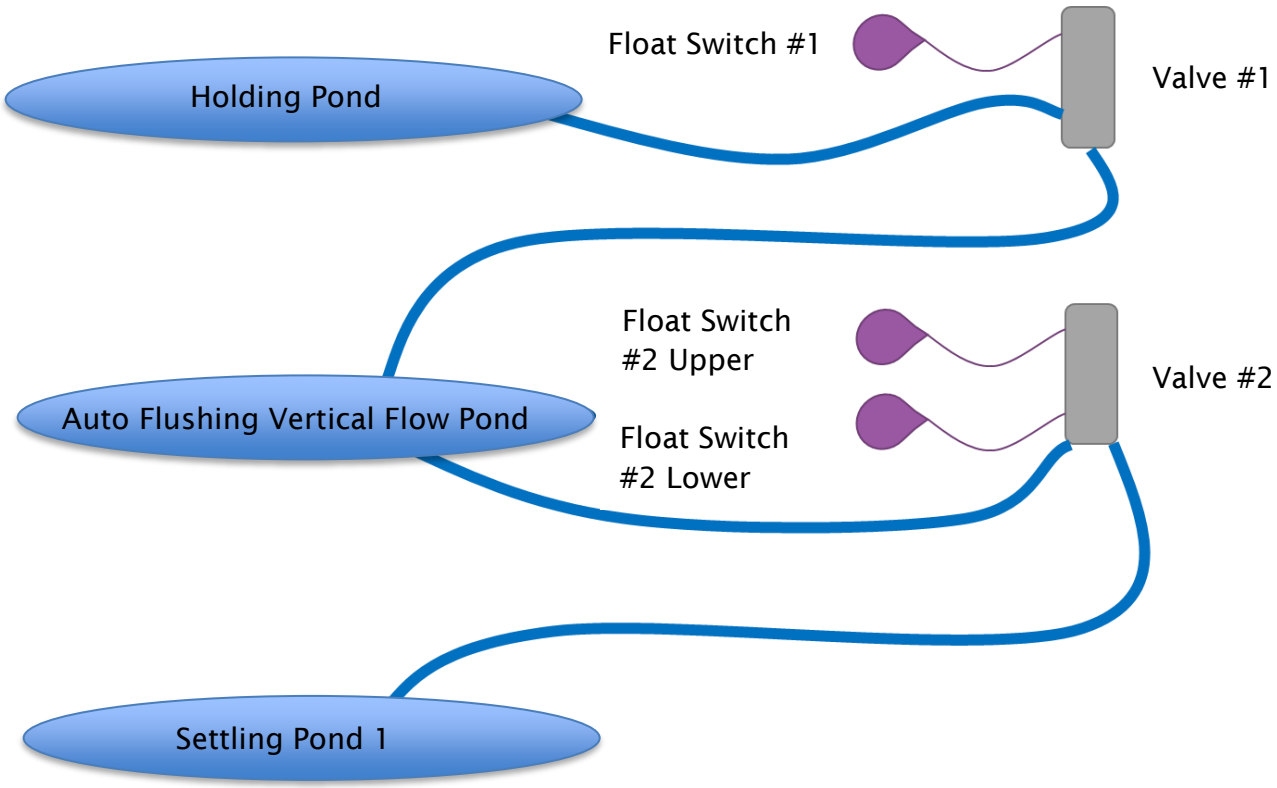
1. System Diagram



2. System Operation

The operation of the system is intended to move water collected in the Holding Pond to the Auto-Flushing Vertical Flow Pond #1 (AFVFP1) for treatment. The system holds the water in the AFVFP1 for a user specified period of time and then the system releases the treated water from the AFVFP1 to Settling Pond 1 (SP1).

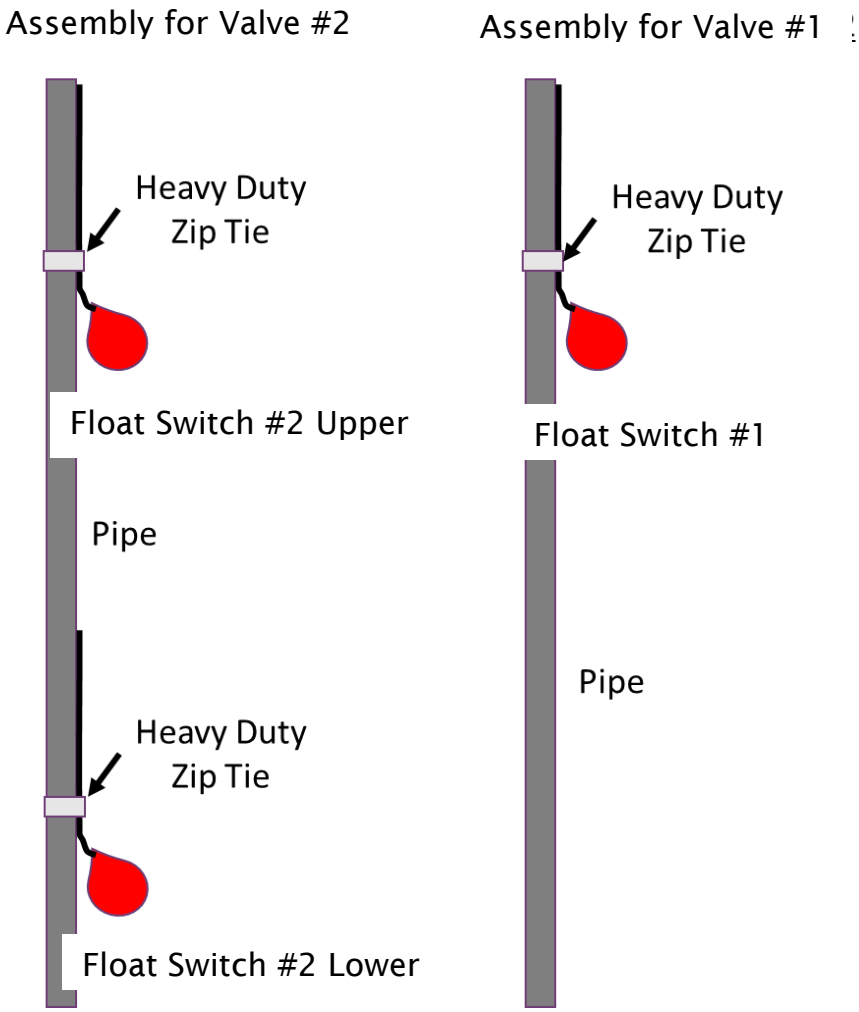
Float switches are used to indicate the water level in both the Holding Pond and AFVFP1. When adequate water has accumulated in the Holding Pond, Float Switch #1 indicates this to the controller. Valve #1 is opened while Valve #2 remains closed, thus filling the AFVFP1. Once the AFVFP1 is filled as indicated by Float Switch #2 Upper, Valve #1 closes and the treatment timer starts. When the treatment timer completes, Valve #2 opens to release the treated water into SP1.

Section II. Float Switch Installation

1. Float switch and pipe assembly

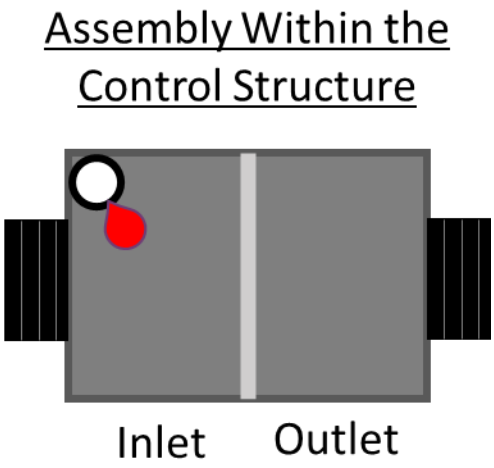
The float switches can be assembled to a section of pipe and the controlled water level can be adjusted by sliding the float switches along the length of the pipe. *(Note Float Switch #1 is attached directly to the Agri Drain structure.)*

Using heavy duty zip ties attach the cord of the float switch to the pipe as shown in the diagrams below. Be sure to leave 3-4 inches of cord between the zip tie and the float switch to allow the switch to float up and down. Additionally, leave enough cord on Float Switch #2 upper and #2 lower to allow the removal of the pipe from the stilling well.



2. Float Assembly Installation

Install Float #1 in the Holding Pond control structure ensuring that the floats is able to maintain their full range of motion in order to ensure proper operation. *(Note that Float Switches #2 Upper & Lower are installed in stilling well installed in AFVFP1.)*



Section III. M91-2-R1 Controller Operation

The Unitronics M91-2-R1 Controller makes it possible to control external equipment.

The keypad interface buttons ◀ and ▶ can be used to navigate between controller menu screens. The numbered keypad buttons can also be used to modify system parameters.

1. Menu Screens

1.1 Hold Time

The default Hold Time is 12:00 hours.

C: Displays the current Hold Time setting in hh:mm format (in the picture, the current Hold Time is 1 minute.)

E: When the cursor is blinking, allows you to enter an alternative Hold Time using the hh:mm format

The entry cursor can be activated by pressing the < ↵ > button, and the numeric keypad can be used to enter the time in **hh:mm** format.

Once a new Hold Time has been entered, press the < ↵ > button to store it.

1.2 Force State:

This screen can be used to manually set the control state.

There are 5 states available:

State Number	Description
0 (Default State)	Command Valve 1 and Valve 2 closed. Wait for Float Switch 1 to be high and Float Switchs 2 upper and 2 lower to be low
100	Open Valve 1 and wait for Float Switch 2 upper and 2 lower to be high. Start the Fault 030 timer.
200	Close Valve 1. Start the Treatment Pond Hold timer and wait for it to complete
300	Open Valve 2 and wait for Float Switch 2 lower to be low. Start the Fault 010 timer.
400	Command Valve 2 closed and wait 1 minute

The entry cursor can be activated by pressing the <↵> button, and the numeric keypad can be used to enter the desired system state in the **nnn** format.

Once the desired state has been entered, press the <↵> button to store it.

1.3 Fault Codes:

If any faults are present, they will be displayed on the Fault Codes Screen:

The various faults are described in the table below:

Fault Code	Condition	Check
010	Treatment Pond empty timeout (default 24 hours, can be user specified)	Check that valve 2 is open and unobstructed
020	Float Switch 2 upper is high, Float Switch 2 lower is low, for period >5 minutes (or user specified alternative)	Check that both float switches are not stuck or faulty
030	Treatment Pond fill timeout (default 24 hours, can be user specified)	Ensure Valve 2 is closed, and Valve 1 is open. Check that float switches 2 upper and 2 lower are not stuck or faulty

a) Fault 010 Config:

C: Displays the current timeout for fault 010. The default timeout is 24:00 hours before a fault is indicated on the Faults screen

E: Displays the user entered timeout for fault 020. Press the < ↵ > button to enable entry of the value (indicated by the flashing cursor) and the < ↵ > button again to accept the entry.

b) Fault 020 Config:

C: Displays the current timeout for fault 020. The default timeout is 00:05 minutes before a fault is indicated on the Faults screen

E: Displays the user entered timeout for fault 020. Press the < ↵ > button to enable entry of the value (indicated by the flashing cursor) and the < ↵ > button again to accept the entry.

c) Fault 030 Config:

C: Displays the current timeout for fault 030. The default timeout is 24:00 hours before a fault is indicated on the Faults screen

E: Displays the user entered timeout for fault 030. Press the < ↵ > button to enable entry of the value (indicated by the flashing cursor) and the < ↵ > button again to accept the entry.

WARNING!

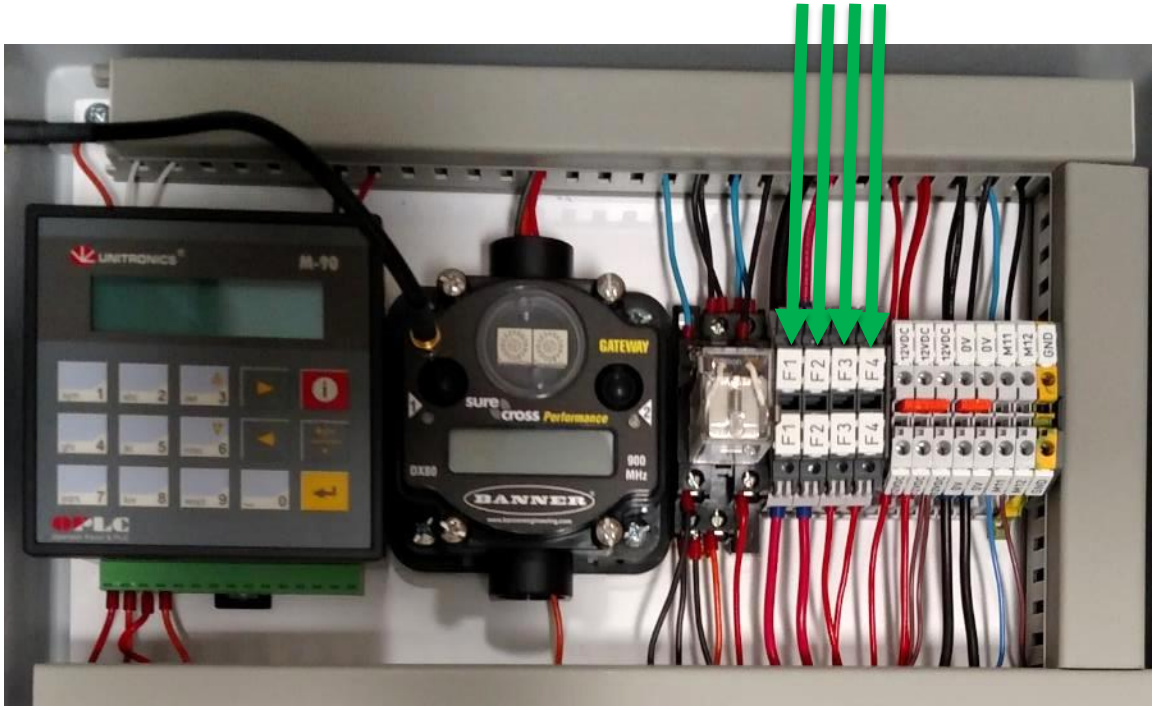
TO AVOID DAMAGE TO HARDWARE

Install fuses AFTER connecting antenna, solar panel, pressure transducer, and battery. If replacing hardware, disconnect fuses prior.

Fuse location shown below for both Primary and Secondary units.

RSG1651- Primary

F1, F3: 5A, 250 V 5x20mm
F2: 10A, 250 V 5x20mm
F4: 1 A, 250 V 5x20mm



RSG 1651 – Secondary

F1, F3: 5A, 250 Volts 5x20mm
F2: 10A, 250 Volts 5x20mm
F4: 1 A, 250 Volts 5x20mm