Sapien™ 2Wire Controller Troubleshooting Guide

Introduction

This document identifies some of the typical field faults reported during support calls for the Sapien 2Wire controller series. Each identified field fault lists possible root causes and methods to troubleshoot.

Typical 2Wire Field Faults

1. The Sapien display is blank,
2. The Sapien's display appears to be upside down or doesn't make any sense,
3. Several stations in numerical order will not operate manually or from a programmed start.
4. The Sapien is indicating a station fault "Failed to Come On". What does this mean?
5. Random stations have been reported to come on outside a scheduled start time,
6. The Sapien is used with a pump start, but the pump will not actuate when stations are operated from the "Manual" menu.
7. The Sapien terminal block indicates inputs for a flow sensor and or other sensor, but there doesn't appear to be any programming functions for these?
8. Is the Sapien compatible with a normally open type rain sensor and if so, what is the expected behavior?
9. The Sapien terminal block has a label called "Programmer". How does this work?
10. The Sapien terminal block has a label for "Remote Control". Is this compatible w/ my Rain Bird, Hunter or Irritrol hand-held remote?

1 The Sapien Display is Blank

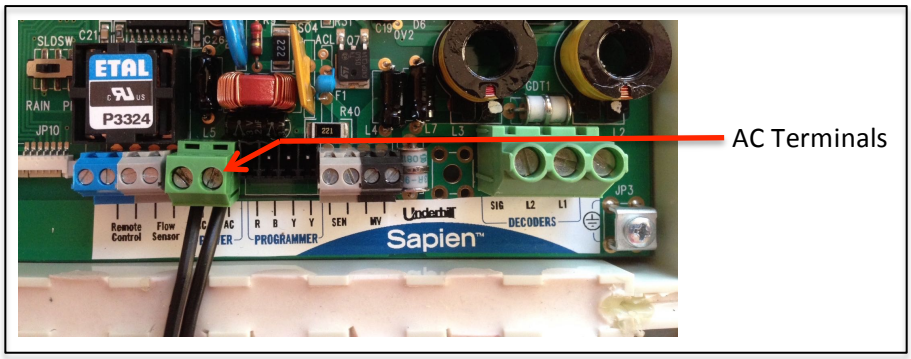
No characters are visible on the display in any of the menus.

Possible Root Causes

1) The AC power to the Sapien is disconnected or a breaker has been tripped.
2) The Sapien's transformer is damaged and has failed,
3) The ribbon cable between the display printed circuit board (PCB) and the output printed circuit board has become disconnected.
4) A component has been damaged on one of the Sapien's PCB's.

Troubleshooting

1) Using a multi-meter, set to AC volts, verify if +/- 28 volts can be measured across the AC terminals on the Sapien. If no voltage can be measured, then measure source of power to the transformer. This should be a minimum of 115 Volts AC. If the transformer is plugged into a GFIC receptacle, reset the outlet and measure for AC volts again. See Figure 2-1.



Sapien AC Terminals
Figure 2-1

If AC volts cannot be measured, then locate the subpanel and verify if the breaker has been tripped. Reset the breaker and confirm AC volts in the reverse order.

2) If the volts AC can be measured on the primary side (plug-side) of the transformer, but no voltage can be measured on the Sapien's AC terminal blocks, then replace the transformer p/n TW-75VA-115 or TW-75VA-230V.
3) Verify if the ribbon cable shown in Figure 2-2 is firmly connected to both PCB's. If disconnected, contact Underhill Technical Support (949) 427-6448.

Ribbon Cable Between PCB's
Figure 2-2

4) Open the interior case of the Sapien. If there is a strong odor of burnt electronics or observed scorched marks around one or more components than the Sapien will require replacement.

2 *The Sapien's display appears to be upside down or doesn't make any sense*

Some of the characters on the display appear to be upside down, or are illegible.

Possible Causes

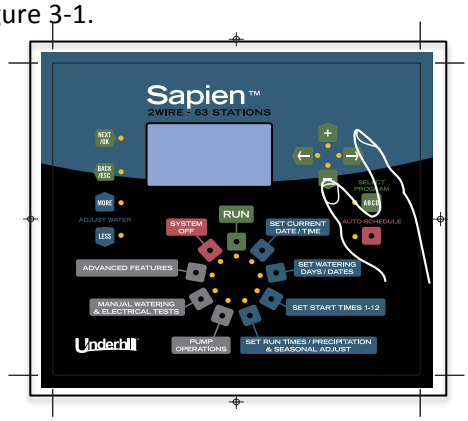
1) The Sapien may have been subjected to an electrical surge from the AC side or through the 2Wire path from a lighting ground strike. The net result is the EEPROM needs to be reset as one possible remedy

Troubleshooting

1) Verify the Sapien has a ground wire to a ground rod, ground plate or cold-water pipe depending on its location. If not present, connect a #14 AWG wire to the GND terminal, a Philips-head fastener located to the right of the L1/L2 terminals.
2) Reset the EEPROM.

Resetting the EEPROM will erase all existing controller programming information and will require reprogramming the Sapien with date, time, year, and all other programming data.

3) Unplug the transformer from its power source and wait 15 seconds. As you plug the transformer back in, press the right arrow and "-" or down arrow buttons simultaneously, see Figure 3-1.



Resetting the EEPROM
Figure 3-1

The Sapien will display the following message shown in Figure 3-2. Disconnect the transformer from its power source, wait 10 seconds and reconnect.

Sapien Restart Message
Figure 3-2

3 Several stations in numerical order will not operate manually or from a programmed start.

The Sapien displays "Fault" messages for several stations in numerical order. These stations will not operate from the controller either from a manual or programmed start.

Possible Root Causes

1) A portion of the 2Wire path above a specific station number has a failed wire splice or the 2Wire path is broken,
2) One or more solenoids have reached end of life,
3) One or more decoders have failed.

Troubleshooting

1) In this example, stations 1-8 operate, but stations 9-12 don't, but station 13 and above also function. It's possible that stations 9-12 have a separate 2Wire path off of the main wire run. Locate valve box #8 to determine if there is a 3-way wire splice leading out of the valve box. Observe the integrity of the wire splice and re-make if needed.

   If the wire splice is adequate, then look for any ground disturbance between this valve box and valve box #9. A new sign, fence post, gopher mound, fallen tree or a new utility trench can be indications of some form of site disruption. If valve box #9 is in close proximity to valve box 8, run a pair of wires on grade and splice into the 2Wire path in valve box 9. Determine if stations 9-12 will now operate. Locate the broken wire, repair or replace as needed.

2) Temporarily disconnect decoder #9 from the 2Wire path and bring it back to the Sapien controller. Temporarily disconnect the 2Wire path on terminals L1/L2 and connect the black and red wires of the decoder to this terminal. Using a known working solenoid attach the two yellow decoder wires to the solenoid. Operate station #9 manually from the controller. The solenoid should buzz, hum or click if the decoder is functioning properly.

3) While the decoder is disconnected from the 2Wire path, use a multi-meter and conduct an Ohm resistance test on the solenoid in valve box #9. If the Ohms resistance is measured above 65 Ohms, the solenoid may require replacement. Conduct the same test on the known working solenoid as a baseline value. Replace the solenoid(s) as needed.

   Repeat steps 2 and 3 until the field fault has been isolated and corrected.

4 The Sapien is indicating a station fault "Failed to Come On". What does this mean?

A "Fault" is posted in the RUN menu. Seelct the ADVANCED FEATURES menu and then using the "-" arrow button select "Station Failed Log". This submenu will display one or more stations with a field fault.

Possible Root Causes

1) A wire splice in a valve box for a specific station is faulty or drawing too much current
2) A solenoid is failing or has reached end-of-life
3) A decoder has failed.

Troubleshooting

1) The same troubleshooting methods outlined in #3 on the preceding page can be applied to this same field observation.

5 Random stations have been reported to come on outside a scheduled start time

The property owner has reported one or more stations coming on in the middle of the day when no irrigation is programmed to be operating. Generally speaking it may be the same valve operating but at different times.

Possible Root Causes

1) The Sapien has been disrupted by a lighting strike
2) There is a mid-day start time on one of the programs
3) A decoder has failed.

Troubleshooting

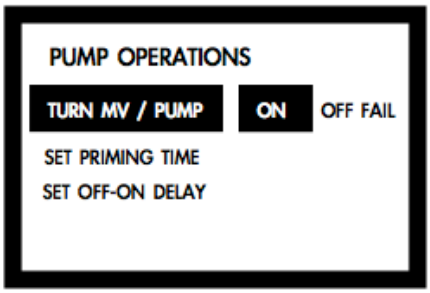
1) Observe the Sapien controller in the RUN menu. Operate one or more stations manually to confirm expected operation.
2) Select "SET START TIMES 1-12" menu button. Select "Set Program Starts" submenu and then press the "NEXT/OK" button. The controller will display all of the start times for Programs A, B, C & D. Press the "Select Program" button to edit any un-needed start times.
3) If there are no mid-day start times, then locate the valve box with the station that operates randomly. Temporarily disconnect the decoder from the 2Wire path. Once disconnected, conduct an Ohms resistance test on the solenoid of the corresponding station. If the Ohms value is 65 Ohms and higher, then consider replacing the solenoid.

   Bring back the decoder removed from the valve box to the Sapien controller. Temporarily disconnect the 2Wire path and connect the decoder's red and black wires to the L1/L2 terminals. Using a known working solenoid, attach the two yellow decoder wires to the solenoid. Operate the corresponding station number manually from the controller. The solenoid should hum, buzz, or click. If it doesn't replace the decoder and program with the corresponding station number.

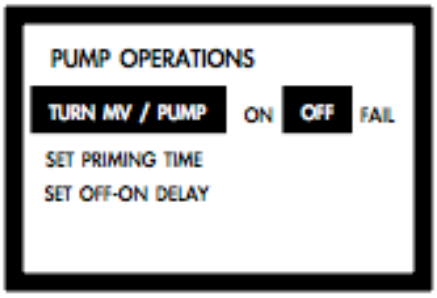
6 The Sapien is used with a pump start, but the pump will not actuate when stations are operated from the "Manual" menu

The Sapien's pump start operates in the following manner. When used with a scheduled start time the pump start turns off after the last station assigned to the program run time has elapsed. When a station is operated manually the pump will remain on indefinitely until the pump is specifically commanded "Off".

To turn the pump "Off", press the "PUMP OPERATIONS" menu button. The "On" command should be highlighted.



Press the right arrow button so "Off" is highlighted as shown below.



Press the "Next/Ok" button to save this change and the Pump start will turn off.

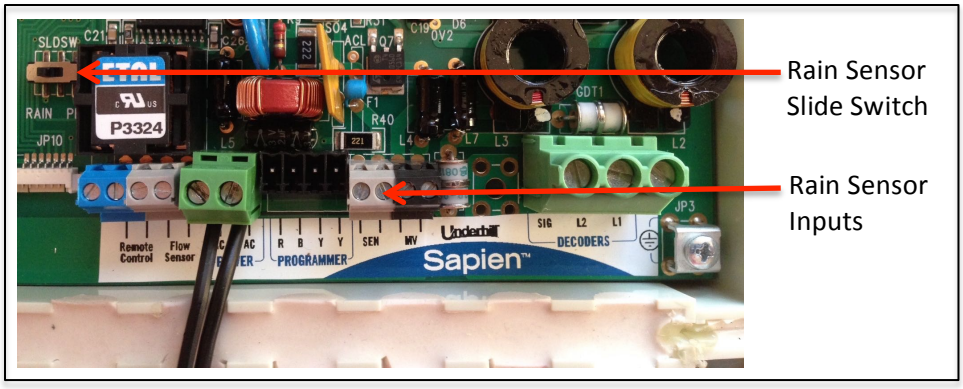
7 The Sapien terminal block indicates inputs for a flow sensor and or other sensor, but there doesn't appear to be any programming functions for these?

There is a terminal input for a flow sensor but the flow sensing software is not available for the current version of the Sapien. There are no current plans to update the software for this feature.

8 Is the Sapien compatible with a normally-open type rain sensor and if so, what is the expected behavior?

Yes, the Sapien is compatible with most normally-open type rain sensors. These types of sensors commonly have 4 inputs, 2 for 24 VAC to operate a receiver and 2 inputs connected to a controller's rain sensor input.

The Sapien's rain sensor inputs are shown in Figure 7-1. There is a slide switch on the far left-hand side of the terminal blocks. This must be in the "Rain" or left position for the rain sensor to operate.



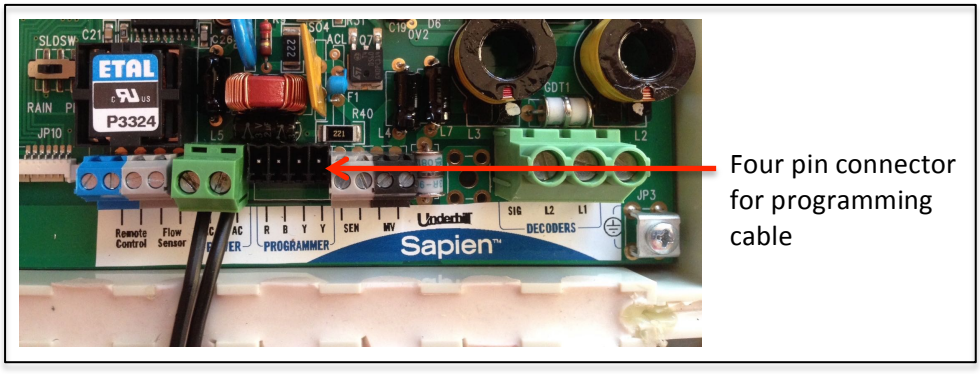
Sapien Rain Sensor Input
Figure 7-1

When connected properly, the rain sensor behavior is as follows:

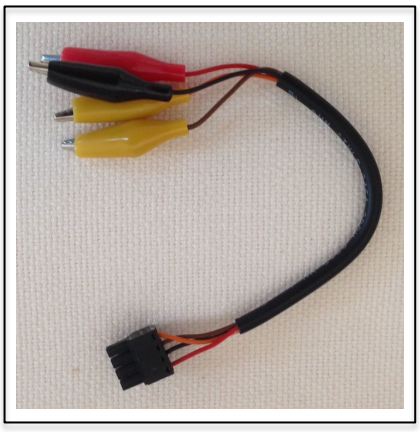
- In the presence of moisture, the rain sensor transmitter threshold value is exceeded and it sends an over-ride message to the rain sensor receiver.
- The rain sensor receiver accepts the message and over-rides the common wire until the rain sensor resets.
- If scheduled irrigation is occurring, the Sapien will allow the current station to finish its scheduled run time before suspending all other remaining stations.
- A rain sensor suspension can be over-ridden by selecting the "ADVANCED FEATURES" menu button. Then select the down or "-" button to select the "Sensor Bypass" sub-menu. Press the right or left arrow button to highlight "Bypass" to resume irrigation.
- To have the rain sensor resume automatic over-ride in a rain event, reset the selection to "Active".

9 The Sapien terminal block has a label called "Programmer". How does this work?

The Sapien has a four-pin connector, (see Figure 7-1) that mates to a small cable assembly that is shipped with every Sapien controller to program or test a decoder. The cable assembly is shown in Figure 8-1.



Programmer Four Pin Connector
Figure 7-1

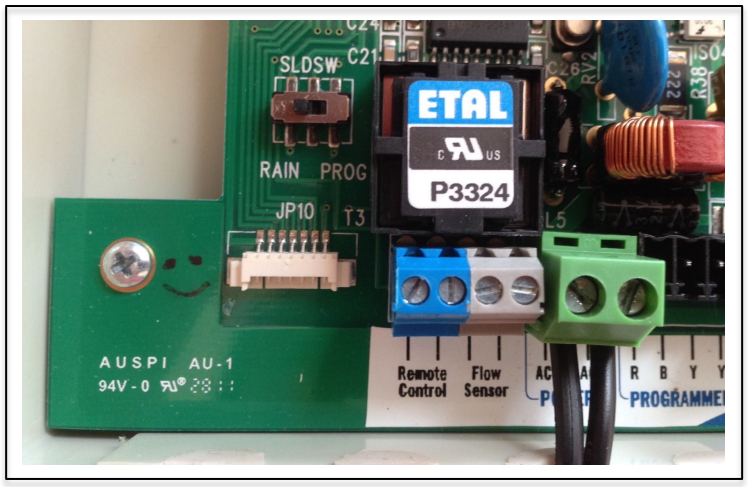


Programmer Cable Assembly
Figure 8-1

The connector is keyed to fit into the connector one-way only. The color-coding on the cable assembly should match the alphabetic references on the terminal block label.

To Program or Test a Decoder;

- Locate and move the slide switch shown in Figure 8-1 from “Rain” to “Prog” or the right-hand position. See Figure 8-2.
- Select the “OFF” menu button. Using the down or “-“ button select the “Programmer/Tester” submenu. Press the “NEXT/OK” button
- Press the left and right arrow buttons to select the corresponding station number.
- Press the “NEXT/OK” button to begin testing a decoder.
- The Sapien will begin to cycle thru stations 1-63 to complete the test or programming function.



Rain/ Prog Slide Switch
Figure 8-2

Remember to reset the slide switch back to the “Rain” position once testing or programming is completed.

The default station number for a brand new decoder is station 01.

10. ***The Sapien terminal block has a label for "Remote Control". Is this compatible w/ my Rain Bird, Hunter or Irritrol hand-held remote?***
    The terminal marked "Remote Control" is for a third party hand-held remote. The Sapien is not compatible with other competitive hand-held remotes listed above. To obtain a quote for a hand-held remote contact:

    Mark Keetch
    Metro Irrigation Supply Company
    Arlington, TX
    mark@metroirrigationsupply.com
    (817) 478-7131