

## PW2000 Electronic Trouble Shooting Tool

### Basic Operating Concept

When using the PW2000 there is one basic principle should be understood to perform all the tests except the valve finding test. If electricity flowing through the PW2000's two long leads, it will make a loud whistling noise. For example, if you connect the long black lead to the negative side of a battery and the long red lead to the positive side of the battery, the PW2000 will make a whistling noise because there will be electricity flowing through it. When checking for DC current, the long red lead must always be connected to the + (positive side) of the current and the long black lead must be connected to the - (negative side) of the current. When checking for an AC current, the leads can be used in either current direction. This tutorial gives examples of some of the most useful tests that can be performed with the PW2000. For a more complete list of the test that the PW2000 can perform consult the User Instructions.

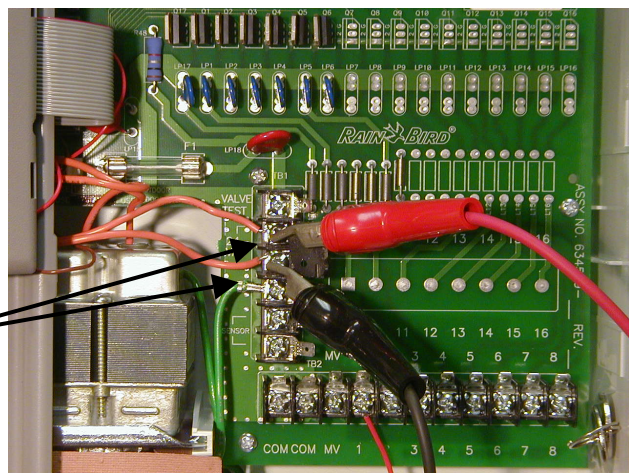


### Transformer Output Power Check

The purpose of this test is to see if there is power flowing from your transformer (which takes 110/220 VAC from the wall socket and reduces the voltage to 24 VAC) to your controller. If there is power you will get a whistling noise from the PW2000 when you connect it across the 24 VAC terminal.

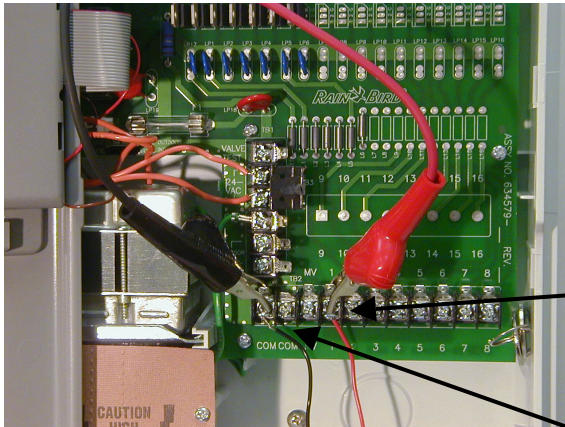
1. Connect one long lead to each of the output terminals of the controller's transformer (24 VAC terminal).
2. Listen for tone (loud tone – transformer OK).

24 VAC Terminals



## Output Station Check at Controller

The purpose of this test is to make sure that power is running through your controller to each station when that station is activated. The station terminal is where your solenoid valves and other system equipment are powered from.



1. Connect one long test lead to one of the common terminals on the controller and the other long lead to the terminal of the station to be tested.
2. Activate the station to be tested.
3. Listen for tone (loud tone – output station OK).

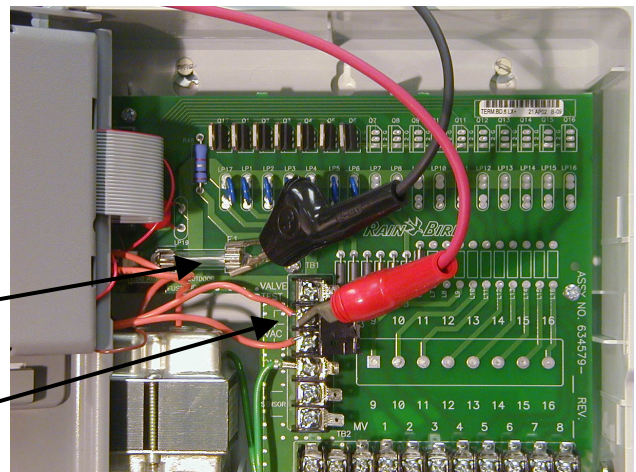
Station Terminal

Common Terminal

## Blown Fuse Test

The purpose of the fuse test is to confirm that your fuse is not blown or broken. If you do have a blown fuse your controller will not have power running to any of the stations. Since all controllers are different it is necessary to check both sides of the fuse to make sure power is flowing through it. If you only get a tone from one side then you have a blown fuse and must replace it. If you get no tone from either side then there is a problem other than the fuse (check the Transformer Power). If you get a tone from both sides then your fuse is good.

1. Connect one of the long leads to the output terminal of the controller transformer (24 VAC terminal).
2. Touch one side then touch the other side of the fuse with the other long lead.
3. Listen for tone (loud tone on both sides – fuse is good).



Fuse

24 VAC terminal

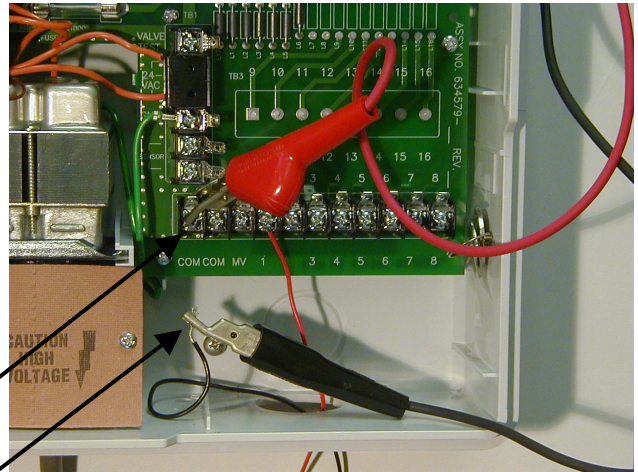
## Broken Wire Test

The purpose of the broken wire test is to see if one of the power wires running to a valve or other piece of equipment is broken. Electricity can only flow in a complete circuit, therefore if one of the wires is broken there will be no electricity flowing through that circuit. The way to check for a broken wire is to connect the PW2000 in series to a particular circuit, if the circuit is not broken it will make a whistling noise. There are two power wires connecting each piece of equipment, the station wire and the common wire. Since the common wire is connected to all your valves it is used in all the individual circuits for each valve. If the common wire is broken, all your circuits will fail the broken wire test. However, if one of the circuits pass the test, then any other circuit that fails has a broken station wire.

1. Disconnect the common wire at the controller.
2. Connect one of the long leads to one of the common terminals of the controller and the other long lead to the common wire going to the valves.
3. Activate each station one by one.
4. Listen for tone (no tone on one station – broken power wire, bad connection or open solenoid for that station; no tone on all stations – broken common wire).

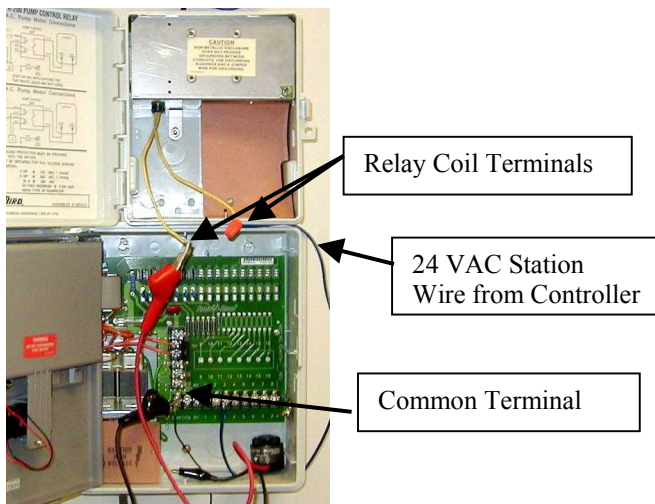
Common Terminal

Common Wire



## Relay Coil Test

The purpose of the relay test is to make sure that your relay is working properly and has power flowing through it. You must check both relay coil terminals to ensure that if there is a problem that it is your relay and not something in the power circuit (broken wire, bad station, etc.). To do this, first check the relay coil terminal that the station wire is connected to, if there is power going to the relay the PW2000 will close the circuit and make a whistling noise. If not, then you have a problem with your circuit before the relay. Next check the other relay coil terminal, if the relay is good you will hear a whistling noise from the PW2000.



1. Connect one of the station wires from the controller to one of the relay coil terminals; activate station.
2. Connect one of the long leads to one of the common terminals of the controller.
3. Connect the other long lead to both relay coil terminals, one at a time.
4. Listen for tone (loud tone from both – relay coil good).

## Valve Finding Test

The purpose of the valve finding test is to find irrigation valves that are operated by 24 VAC solenoids. This is the only test that uses the short black lead of the PW2000. This test works by placing the PW2000 **in series** with the solenoid to be tested, the PW2000 then cycles the solenoid very quickly. The quick cycle causes the valve to “chatter” and allows you to locate your valve by following the noise. Another use for this test is if you are not sure which valve is connected to which station. You could activate a station with a valve connected to it and place the PW2000 in series between the common terminal and the common wire. Whichever solenoid is “chattering” is the solenoid that is connected to that station. The valve finding test does not work if more than one solenoid is connected to the station being tested.

1. Turn off the water source to the valves.
2. Relieve the water pressure from the system if needed.
3. Disconnect the common wire going to the valves from the controller common terminal.
4. Connect the black short lead to the controller common terminal.
5. Connect the black long lead to the common wire going to the valves.
6. Activate the output of the valve to locate.
7. Locate the valve by the loud chattering of the solenoid.

