Wind Controls

Owner's Manual

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Contents

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Description

There are three configurations for Wind Controls. They are as follows:

Off Only (available for all product lines)
The unit will shut off when a preset wind speed is exceeded. Once the wind speed drops below this set point the unit will turn on again.

Reduction Only (available for Giant Fountain ONLY)
The unit's spray pattern will be reduced when a preset wind speed is exceeded via a valve mounted on the unit. Once the wind speed drops below this set point the unit's spray pattern will return to full size.

Off and Reduction Combination (available for Giant Fountain ONLY)
This is a combination of the two configurations described above. There are two wind speed settings that first reduce the unit's spray pattern and than shut the unit off. The reduction wind speed must set lower than the off wind speed for this configuration to function properly.

Wind Controls consist of four main components: an anemometer, a PC Board (one for Off Only and Reduction Only, and two for Off and Reduction Combination), a delay-on-break relay (one for Off Only and Reduction Only, and two for Off and Reduction Combination), and a valve (for spray pattern reduction). The anemometer sends a signal to the PC Board which is used to determine wind speed. This measured wind speed is compared to the preset wind speed. The preset wind speed is fully programmable via four sets of dip switches which can be reconfigured in the field without the need for tools (SEE the Dip Switch Settings Table). If the measured wind speed exceeds the preset wind speed, the relay will be actuated. A delay-on-break relay is used to maintain the actuated state for a predetermined amount of time in order to prevent damage to the unit's motor. Otterbine recommends setting the delay-on-break relay for 15 minutes minimum.

Specifications

Operating Power	105-127 VAC 60Hz, 4VA or 220-240 VAC 50Hz, 4VA
Input Device	3 Cup Anemometer with 60ft of cable
Display	Light Emitting Diode (LED) - indicates relay actuated and anemometer signal
Controls	Field programmable via Dip Switches
Accuracy	Electronics +/- 0.005%
Outputs	Double Pole Double Throw Delay-On-Break Relay
Ambient Temperature	32^{O} F(0^{O} C) to 158^{O} F(70^{O} C) Standard -40^{O} F(-40^{O} C) to 158^{O} F(70^{O} C) Extended

Installation

Anemometer - Figure 1

The anemometer should be mounted at the point at which it is desired to sample the wind speed. Typically, it is located as high as feasible and well clear of obstructions.

It may be mounted on an existing structure, a mast or a tower. It is desirable to mount it so that the supporting structure will not influence the wind characteristics in its immediate vicinity. If it is mounted above a rooftop or similar building structure, it should be high enough so that the wind deflected off the structure will not affect it, typically 5 to 10 feet or more.

The anemometer must be attached to a rigid structure that doesn't sway or vibrate. Trees are not suitable for anemometer mounting. The rapidly rotating cups of the anemometer develop a centrifugal moment which resists the movement of the supporting structure. This quickly destroys the internal bearings and results in erratic output signals.

If the aluminum mast is to be mounted on a metallic structure, consideration must be given to galvanic corrosion which occurs between dissimilar metals. This consideration is especially important in locations exposed to salt spray and air. Attachment to galvanized steel and aluminum using stainless steel hose clamps is acceptable. For other combinations of metals recommended procedure is to electrically insulate the aluminum mast from the metallic structure.

Secure the anemometer cable to the supporting structure at intervals of four feet or less. Allowing the cable to vibrate in the wind may result in a broken cable.

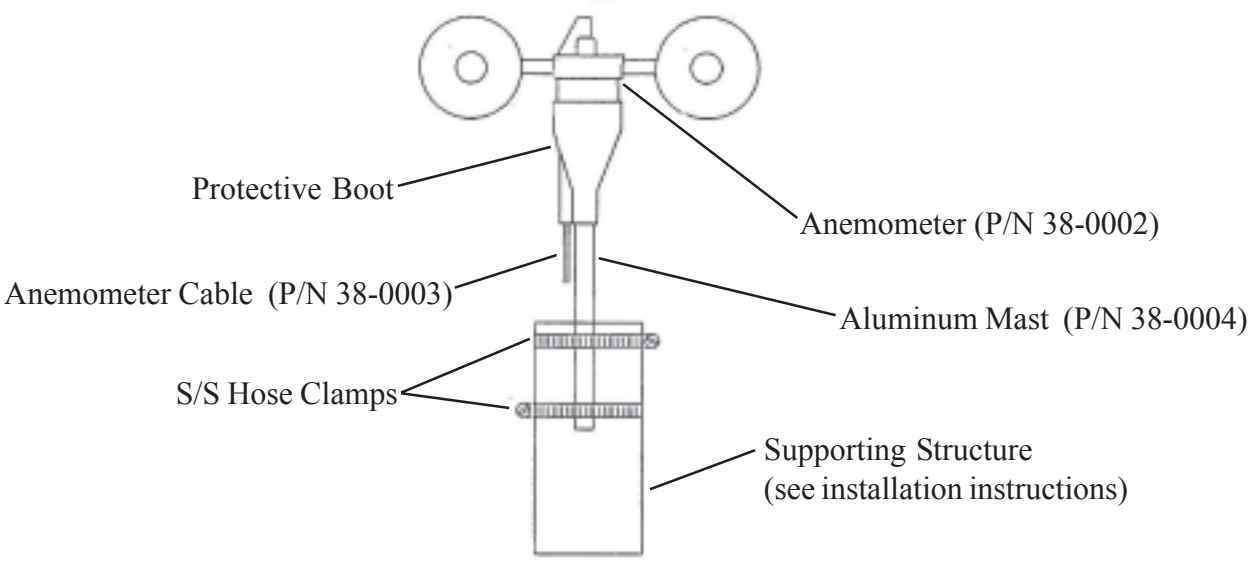


Figure 1

Installation - continued

Control Panel

The Control Panel should be mounted so it is not in direct sunlight and next to or as close as possible to the unit panel.

NOTE: All electrical work is to be done by a Qualified Licensed Electrician. This will ensure that all electrical work conforms with local, state and national electrical codes.

1. Connect the anemometer cable to the Signal Excite Terminal Block on the PC Board (See Figure 3). Polarity is not important. The anemometer comes standard with 60 feet of cable. If more than 60 feet is needed, simply splice additional wire to it for the desired length (18awg wire MIN). Splice must be water tight.

2. For Off Controls. The Unit Panel and the Wind Controls Panel must be interconnected for the Off Controls to function properly (See Figure 2, Details "A" & "B"). The interconnection wires must be 16awg minimum and polarity is not important.

3. For Reduction Controls. Connect the 16/2 cable from the Wind Controls Reduction Valve to the terminal block in the Wind Controls Panel (See Figure 2, Detail "B"). Polarity is not important.

4. Connect the input power to the terminal block and earth ground to the ground lug.
For 60Hz Sites input power is 120V 1Ph
For 50Hz Sites input power is 220V 1Ph

Reduction Valve (Giant Fountain Units Only)

The Spray Pattern Reduction Valve is factory installed on the unit (See Figures 4 &5). There are two valve sizes: 1-1/2" for 7.5, 10, & 15HP units and 2" for 25HP units. The valve is normally closed. The valve opens when it receives a 24V signal from the Control Panel thereby reducing the spray pattern. The mount the spray pattern is reduced is adjustable in the field by setting the valve throttle as desired. Verify that the reduction valve cable (16/2 SJOW, P/N 34-0011) is properly strain relieved.

Typical Panel Layout

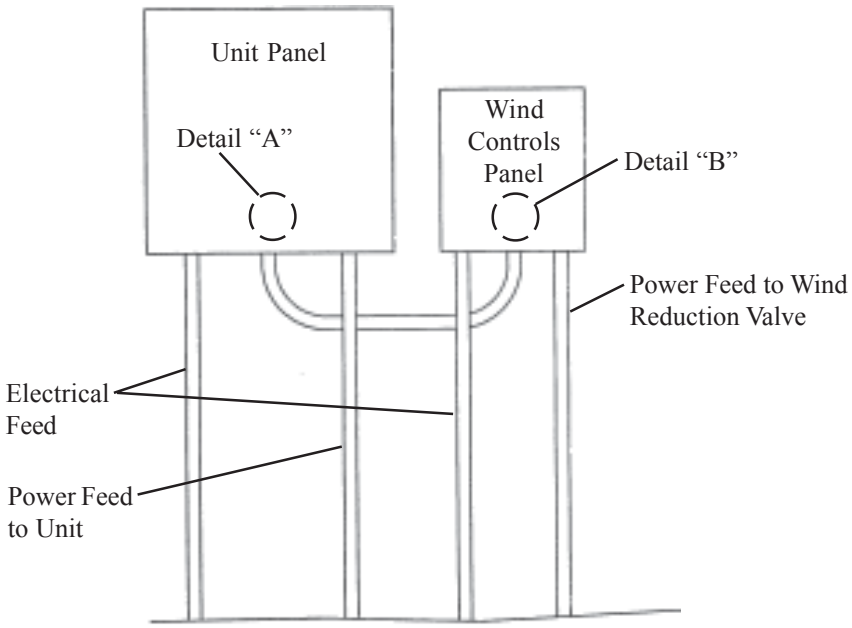
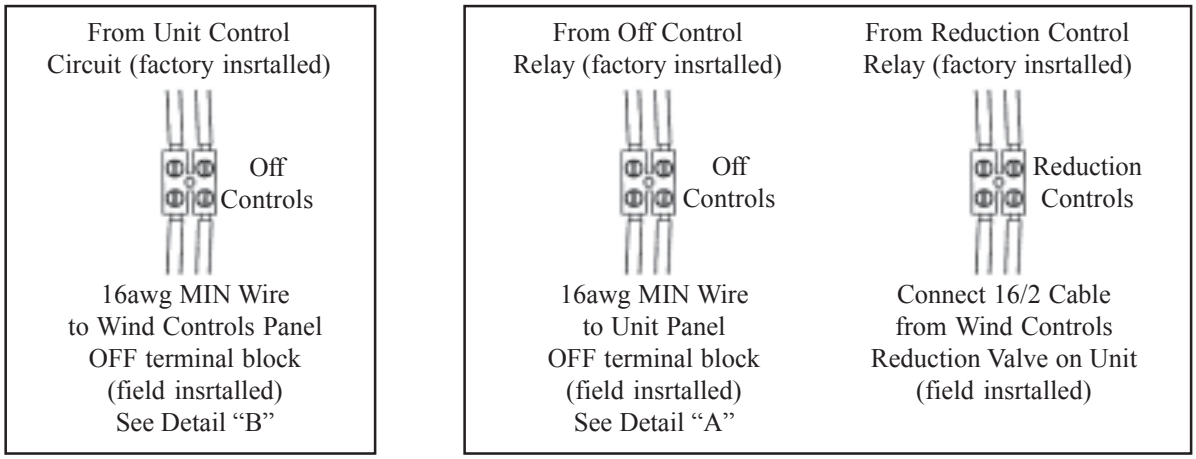


Figure 2



Detail "A"

Detail "B"

Wind Controls PC Board (P/N 38-0001)

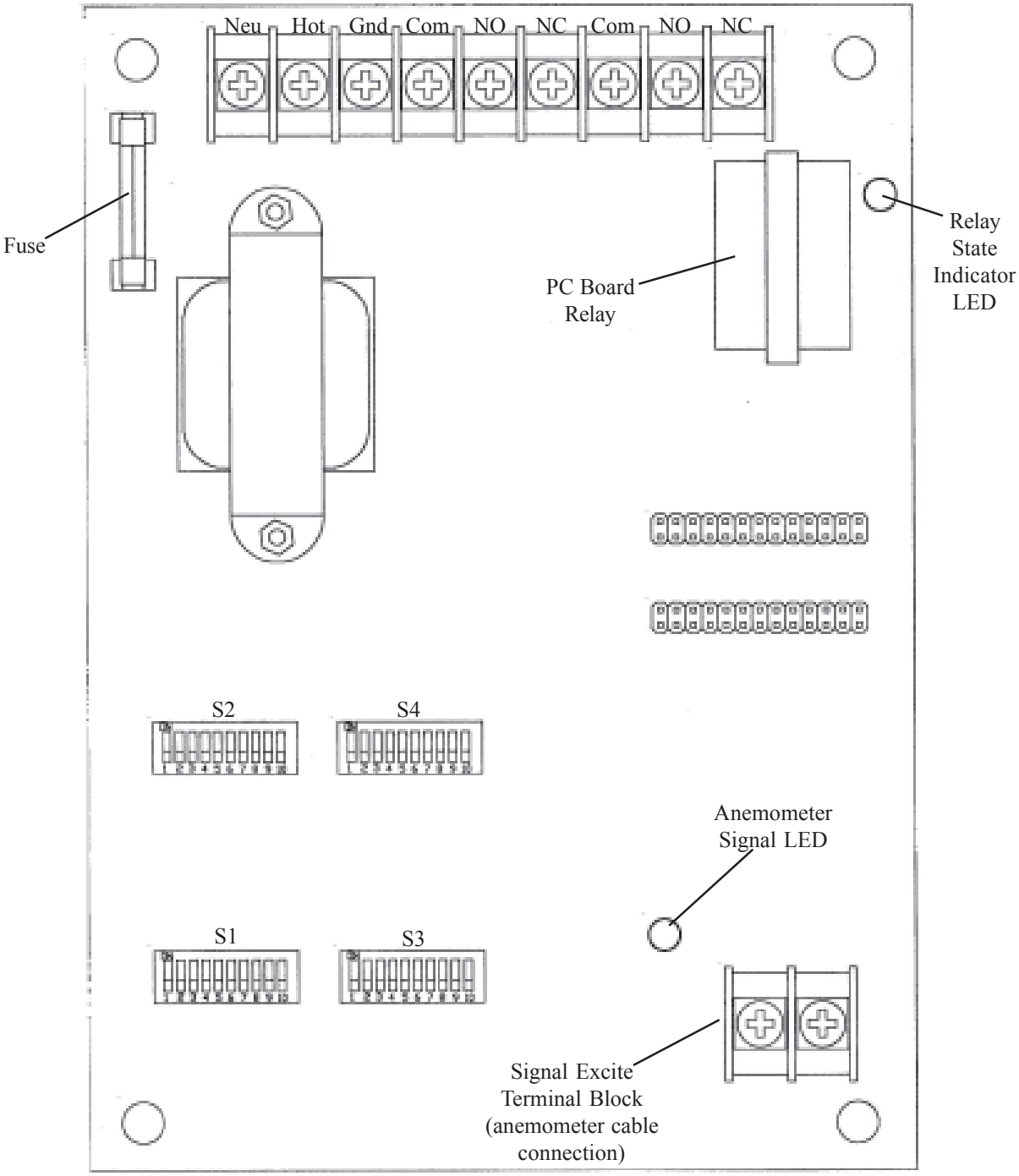


Figure 3

Wind Speed Dip Switches Preset at the Factory as follows:

for 60Hz Models: OFF = 15 MPH, REDUCTION = 7 MPH
for 50Hz Models: OFF = 7 m/sec, REDUCTION = 5 m/sec

Wind Controls Reduction Valves

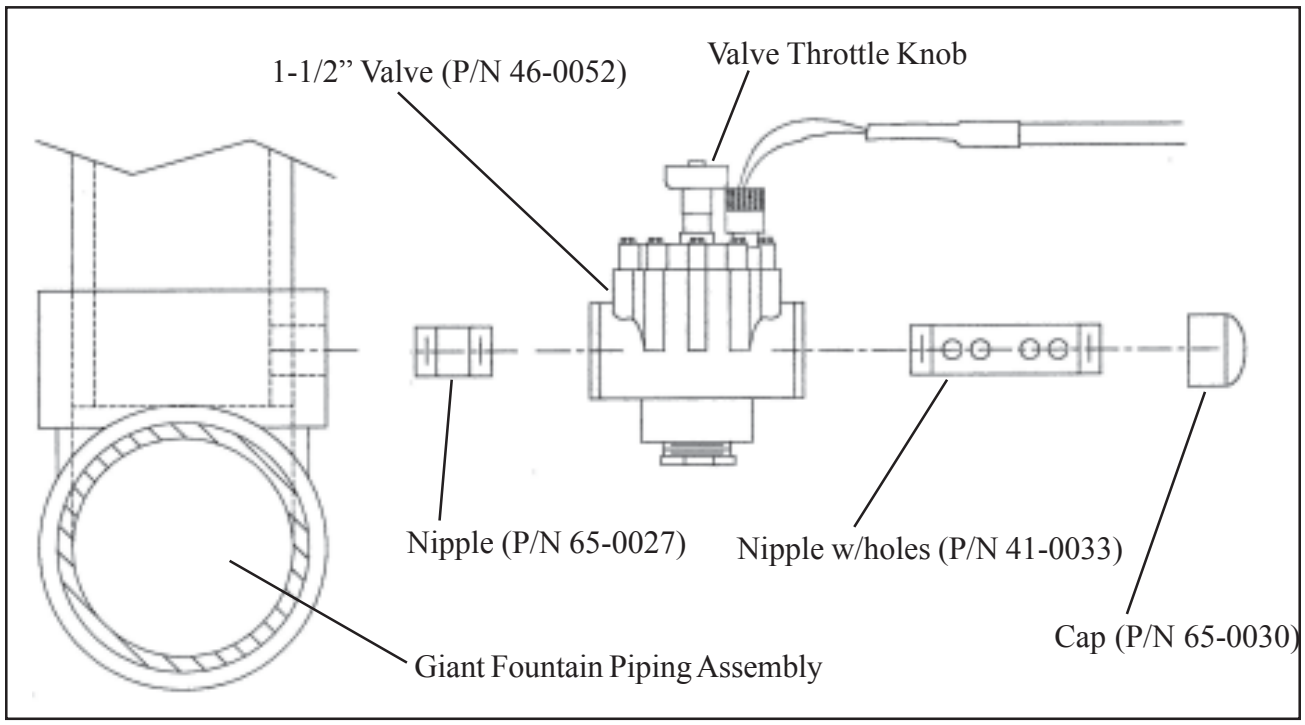


Figure 4

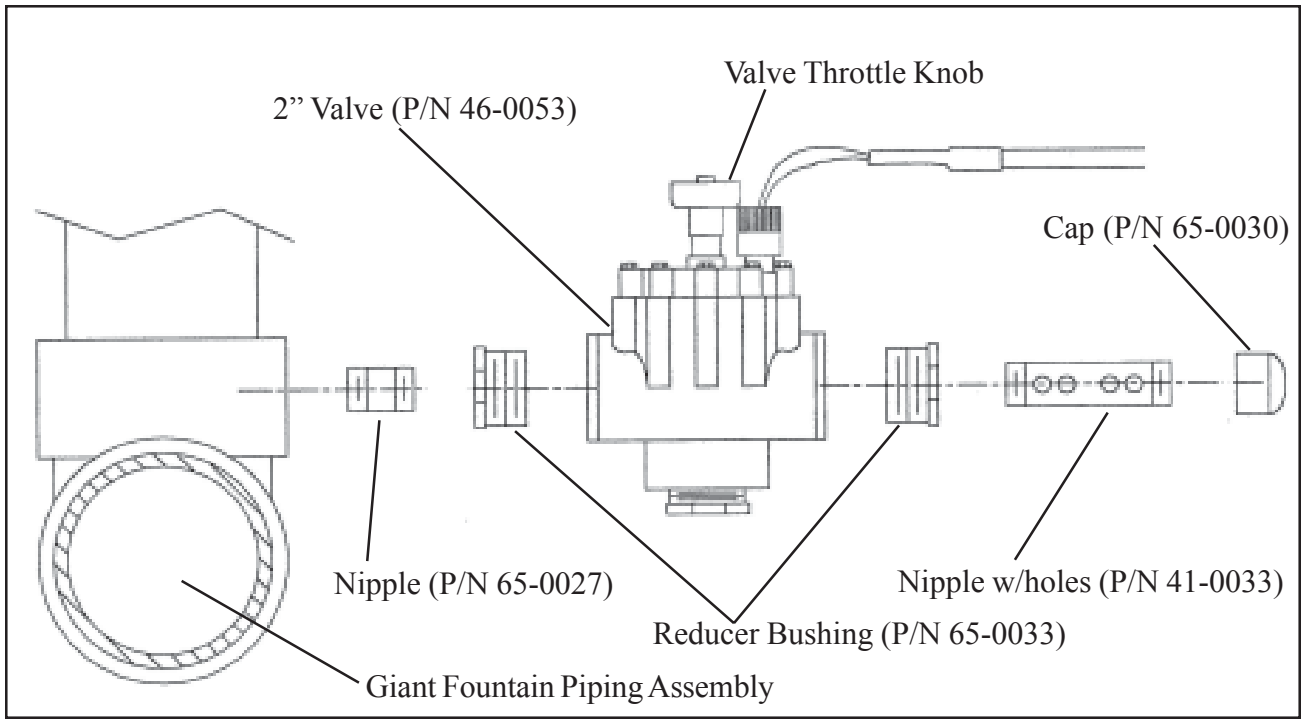


Figure 5

Troubleshooting

Anemometer

The anemometer signal LED (See Figure 3) will be flashing on the PC Board when it is picking up a signal from the anemometer.

If an open circuit occurs in the cable between the anemometer and the control panel, the PC Board may pick up stray electrical signals. Most likely it will pick up 50 or 60Hz, the electric utility power frequency. This is quickly determined as described in the following.

The anemometer at rest should exhibit a resistance of 400 to 600 ohms. This can be tested from the control end of the cable. Disconnect power to the control panel and remove the cable from the PC Board. Place the leads from an ohm meter across the wires of the cable. A fluctuating resistance will be indicated if the anemometer turns during the test.

A resistance greater than 1000 ohms indicates an open circuit (break in the cable). Repair or replace the anemometer cable.

A resistance less than 100 ohms indicates a short circuit (wires of the cable are touching). Repair or replace the anemometer cable.

If an ohm meter is unavailable, connect the anemometer to the PC Board with a short length of cable. If the problem is remedied, the trouble is in the cable.

Control Panel

Check fuses are not blown. Replace if necessary.

When the PC Board senses a wind speed greater than the set wind speed the Relay State Indicator LED (See Figure 3) will be ON. If this is not the case, the PC Board Relay (See Figure 3) or the PC Board will need to be replaced.

Once the PC Board Relay is energized, the delay-on-break relay will in turn be energized. It will remain energized for the length of time as determined by the time adjustment knob. In other words, even if the wind speed drops below the set wind speed the delay-on-break relay will remain energized until the time delay is over. If this is not the case, check the following.

For Off Controls, the contacts are normally closed. Verify the contacts are closed when the delay-on-break relay is not energized and open when it is. Replace the delay-on-break relay if necessary.

For Reduction Controls, the contacts are normally open. Verify the contacts are open when the delay-on-break relay is not energized and closed when it is. Once the contacts close, voltage is applied to the primary side of the transformer which then sends 24V to the reduction valve on the unit. Replace the delay-on-break relay and/or the transformer if necessary.

Maintenance

The anemometer and anemometer cable should be inspected annually for evidence of damage by ice, sand, etc.

The Reduction Valve and cable should be inspected annually for damage.

The Control Panel should be inspected annually for damage. Any dirt or dust on the PC Board(s) should be removed since it could effect their function.

Icing

Under some conditions operation of the anemometer will be degraded by the presence of ice. This most often occurs as the result of freezing rain. The condition quickly clears when sunshine heats the anemometer, causing the ice to melt. The condition may persist for hours or days in the absence of bright sunshine. No permanent damage is done to the anemometer.

Wind Speed Dip Switch Settings (MPH - miles per hour)
1 = ON, 0 = OFF

MPH	Switch	1	2	3	4	5	6	7	8
3	S1	1	0	1	1	0	1	0	0
	S2	0	1	1	1	0	0	0	1
	S3	0	0	0	1	0	0	0	1
	S4	1	1	0	1	0	1	0	1
4	S1	0	1	0	0	0	1	0	0
	S2	1	1	0	1	0	1	0	0
	S3	0	0	1	0	0	0	1	0
	S4	0	1	1	0	1	0	1	0
5	S1	1	1	0	1	1	0	0	0
	S2	1	0	1	0	1	0	1	0
	S3	1	0	1	1	0	1	0	0
	S4	0	1	1	1	0	0	0	1
6	S1	0	1	1	0	1	0	0	0
	S2	1	1	1	0	0	0	1	1
	S3	0	1	0	0	0	1	0	0
	S4	1	1	0	1	0	1	0	0
7	S1	1	1	0	0	1	0	0	0
	S2	0	1	1	0	0	0	0	1
	S3	1	1	0	1	1	0	0	0
	S4	1	0	1	0	1	0	1	0
8	S1	1	0	0	0	1	0	0	0
	S2	1	0	1	0	1	0	0	0
	S3	0	1	1	0	1	0	0	0
	S4	1	1	1	0	0	0	1	1
9	S1	1	1	1	1	0	0	0	0
	S2	1	1	1	1	0	1	0	0
	S3	1	1	0	0	1	0	0	0
	S4	0	1	1	0	0	0	0	1
10	S1	1	0	1	1	0	0	0	0
	S2	1	1	0	1	0	1	0	1
	S3	1	0	0	0	1	0	0	0
	S4	1	0	1	0	1	0	0	0
11	S1	0	0	1	1	0	0	0	0
	S2	1	0	1	1	0	1	1	0
	S3	1	1	1	1	0	0	0	0
	S4	1	1	1	1	0	1	0	0
12	S1	1	1	0	1	0	0	0	0
	S2	0	0	1	0	0	1	1	0
	S3	1	0	1	1	0	0	0	0
	S4	1	1	0	1	0	1	0	1

MPH	Switch	1	2	3	4	5	6	7	8
13	S1	0	1	0	1	0	0	0	0
	S2	1	1	0	0	0	0	0	1
	S3	0	0	1	1	0	0	0	0
	S4	1	0	1	1	0	1	1	0
14	S1	1	0	0	1	0	0	0	0
	S2	1	1	0	0	0	0	1	1
	S3	1	1	0	1	0	0	0	0
	S4	0	0	1	0	0	1	1	0
15	S1	1	0	0	1	0	0	0	0
	S2	0	0	1	1	1	0	0	0
	S3	0	1	0	1	0	0	0	0
	S4	1	1	0	0	0	0	0	1
16	S1	0	0	0	1	0	0	0	0
	S2	1	1	0	1	0	0	0	1
	S3	1	0	0	1	0	0	0	0
	S4	1	1	0	0	0	0	1	1
17	S1	0	0	0	1	0	0	0	0
	S2	0	1	0	1	0	0	0	0
	S3	1	0	0	1	0	0	0	0
	S4	0	0	1	1	1	0	0	0
18	S1	1	1	1	0	0	0	0	0
	S2	0	0	0	1	1	0	0	1
	S3	0	0	0	1	0	0	0	0
	S4	1	1	0	1	0	0	0	1
19	S1	1	1	1	0	0	0	0	0
	S2	1	0	0	0	1	1	0	0
	S3	0	0	0	1	0	0	0	0
	S4	0	1	0	1	0	0	0	0
20	S1	0	1	1	0	0	0	0	0
	S2	1	0	1	0	1	0	1	1
	S3	1	1	1	0	0	0	0	0
	S4	0	0	0	1	1	0	0	1
21	S1	0	1	1	0	0	0	0	0
	S2	0	1	0	0	0	0	0	1
	S3	1	1	1	0	0	0	0	0
	S4	1	0	0	0	1	1	0	0
22	S1	0	1	1	0	0	0	0	0
	S2	0	1	1	0	1	1	0	0
	S3	0	1	1	0	0	0	0	0
	S4	1	0	1	0	1	0	1	1

Conversion: m/sec = MPH x 0.44704

Wind Speed Dip Switch Settings (MPH - miles per hour)
1 = ON, 0 = OFF

MPH	Switch	1	2	3	4	5	6	7	8
23	S1	1	0	1	0	0	0	0	0
	S2	1	0	0	0	1	1	1	1
	S3	0	1	1	0	0	0	0	0
	S4	0	1	0	0	0	0	0	1
24	S1	1	0	1	0	0	0	0	0
	S2	0	1	0	0	1	1	0	1
	S3	0	1	1	0	0	0	0	0
	S4	0	1	1	0	1	1	0	0
25	S1	1	0	1	0	0	0	0	0
	S2	1	1	1	0	1	1	1	0
	S3	1	0	1	0	0	0	0	0
	S4	1	0	0	0	1	1	1	1
26	S1	1	0	1	0	0	0	0	0
	S2	0	1	0	0	0	0	1	0
	S3	1	0	1	0	0	0	0	0
	S4	0	1	0	0	1	1	0	1
27	S1	1	0	1	0	0	0	0	0
	S2	0	0	0	0	1	0	0	0
	S3	1	0	1	0	0	0	0	0
	S4	1	1	1	0	1	1	1	0
28	S1	0	0	1	0	0	0	0	0
	S2	0	1	0	0	0	1	1	1
	S3	1	0	1	0	0	0	0	0
	S4	0	1	0	0	0	0	1	0
29	S1	0	0	1	0	0	0	0	0
	S2	0	1	1	0	1	1	0	1
	S3	1	0	1	0	0	0	0	0
	S4	0	0	0	0	1	0	0	0
30	S1	0	0	1	0	0	0	0	0
	S2	0	1	1	1	0	0	0	1
	S3	0	0	1	0	0	0	0	0
	S4	0	1	0	0	0	1	1	1
31	S1	0	0	1	0	0	0	0	0
	S2	1	0	0	1	0	1	1	0
	S3	0	0	1	0	0	0	0	0
	S4	0	1	1	0	1	1	0	1
32	S1	0	0	1	0	0	0	0	0
	S2	1	0	1	0	0	0	1	0
	S3	0	0	1	0	0	0	0	0
	S4	0	1	1	1	0	0	0	1

MPH	Switch	1	2	3	4	5	6	7	8
33	S1	0	0	1	0	0	0	0	0
	S2	0	0	1	0	0	1	0	0
	S3	0	0	1	0	0	0	0	0
	S4	1	0	0	1	0	1	1	0
34	S1	0	0	1	0	0	0	0	0
	S2	1	0	1	0	0	0	0	0
	S3	0	0	1	0	0	0	0	0
	S4	1	0	1	0	0	0	1	0
35	S1	1	1	0	0	0	0	0	0
	S2	0	0	0	1	0	1	1	1
	S3	0	0	1	0	0	0	0	0
	S4	0	0	1	0	0	1	0	0
36	S1	1	1	0	0	0	0	0	0
	S2	0	0	1	1	0	0	1	1
	S3	0	0	1	0	0	0	0	0
	S4	1	0	1	0	0	0	0	0
37	S1	1	1	0	0	0	0	0	0
	S2	0	1	0	0	1	1	0	1
	S3	1	1	0	0	0	0	0	0
	S4	0	0	0	1	0	1	1	1
38	S1	1	1	0	0	0	0	0	0
	S2	1	0	0	1	1	0	0	1
	S3	1	1	0	0	0	0	0	0
	S4	0	0	1	1	0	0	1	1
39	S1	1	1	0	0	0	0	0	0
	S2	1	0	0	0	0	0	0	1
	S3	1	1	0	0	0	0	0	0
	S4	0	1	0	0	1	1	0	1
40	S1	1	1	0	0	0	0	0	0
	S2	1	1	0	1	0	1	1	0
	S3	1	1	0	0	0	0	0	0
	S4	1	0	0	1	1	0	0	1
41	S1	1	1	0	0	0	0	0	0
	S2	1	0	1	0	1	0	1	0
	S3	1	1	0	0	0	0	0	0
	S4	1	0	0	0	0	0	0	1
42	S1	1	1	0	0	0	0	0	0
	S2	1	0	0	0	0	0	1	0
	S3	1	1	0	0	0	0	0	0
	S4	1	1	0	1	0	1	1	0

Conversion: m/sec = MPH x 0.44704

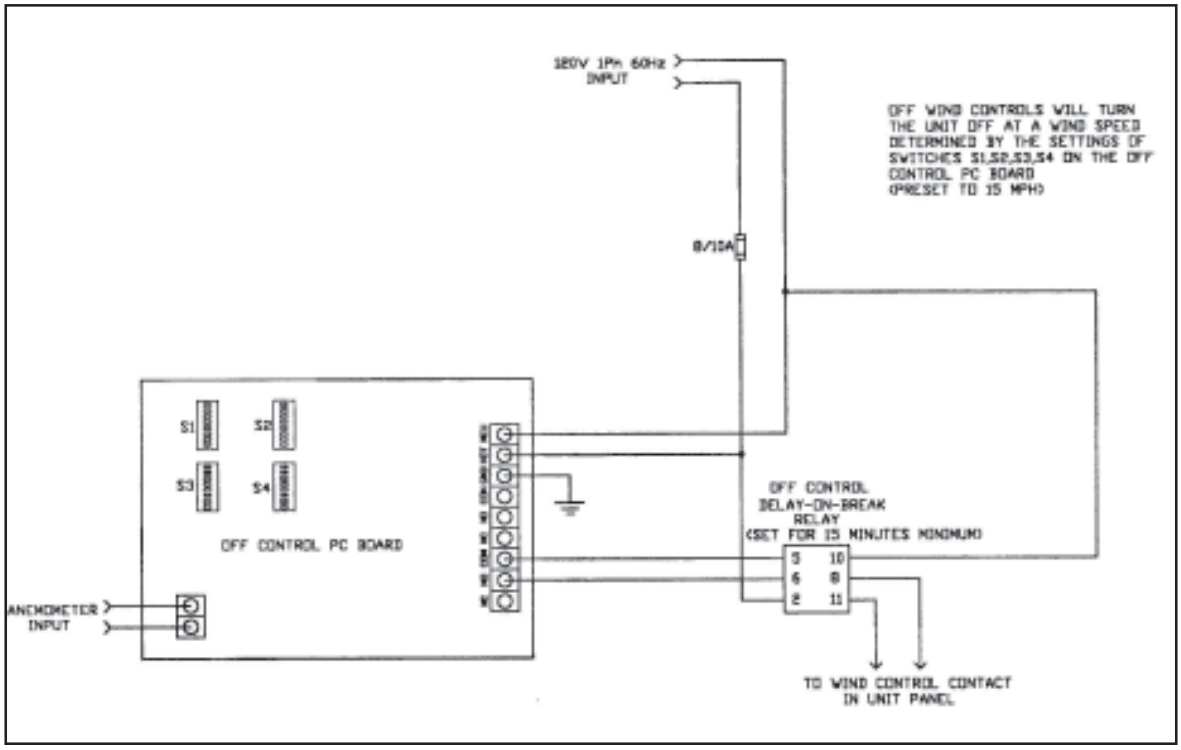
Wind Speed Dip Switch Settings (m/sec - meters per second)
1 = ON, 0 = OFF

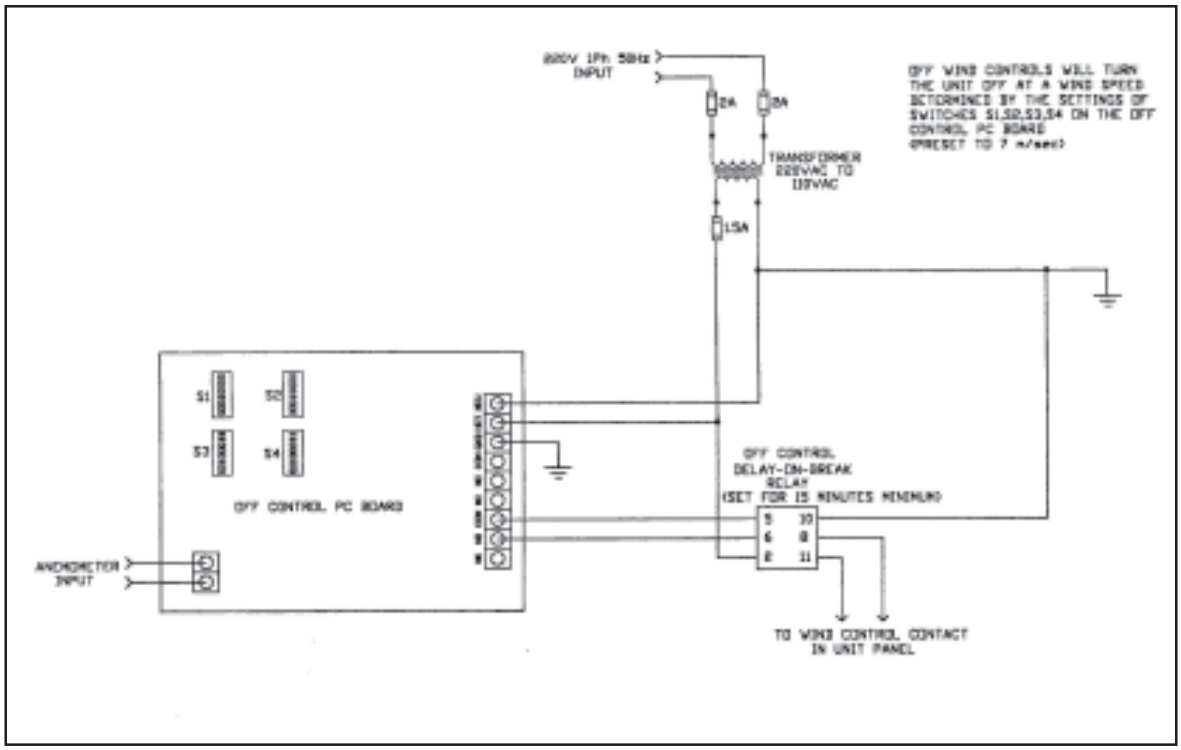
m/sec	Switch	1	2	3	4	5	6	7	8
2	S1	0	1	1	1	1	0	0	0
	S2	0	0	1	1	0	0	0	1
	S3	1	0	1	1	1	1	0	0
	S4	1	1	1	0	1	0	0	0
3	S1	0	0	1	0	1	0	0	0
	S2	1	0	1	1	1	0	1	0
	S3	0	1	1	1	1	0	0	0
	S4	0	0	1	1	0	0	0	1
4	S1	1	1	1	1	0	0	0	0
	S2	0	1	1	0	0	0	1	0
	S3	0	0	1	0	1	0	0	0
	S4	1	0	1	1	1	0	1	0
5	S1	0	0	1	1	0	0	0	0
	S2	0	0	0	1	1	1	0	0
	S3	1	1	1	1	0	0	0	0
	S4	0	1	1	0	0	0	1	0
6	S1	0	1	0	1	0	0	0	0
	S2	1	1	1	1	0	1	0	0
	S3	0	0	1	1	0	0	0	0
	S4	0	0	0	1	1	1	0	0
7	S1	0	0	0	1	0	0	0	0
	S2	0	1	0	1	1	1	0	1
	S3	0	1	0	1	0	0	0	0
	S4	1	1	1	1	0	1	0	0
8	S1	1	1	1	0	0	0	0	0
	S2	1	1	0	0	0	1	0	1
	S3	0	0	0	1	0	0	0	0
	S4	0	1	0	1	1	1	0	1
9	S1	0	1	1	0	0	0	0	0
	S2	0	1	0	1	0	0	1	1
	S3	1	1	1	0	0	0	0	0
	S4	1	1	0	0	0	1	0	1
10	S1	0	1	1	0	0	0	0	0
	S2	0	0	1	1	1	0	0	0
	S3	0	1	1	0	0	0	0	0
	S4	0	1	0	1	0	0	1	1
11	S1	1	0	1	0	0	0	0	0
	S2	0	1	1	1	0	0	0	1
	S3	0	1	1	0	0	0	0	0
	S4	0	0	1	1	1	0	0	0

m/sec	Switch	1	2	3	4	5	6	7	8
12	S1	1	0	1	0	0	0	0	0
	S2	1	1	1	0	1	0	0	0
	S3	1	0	1	0	0	0	0	0
	S4	0	1	1	1	0	0	0	1
13	S1	0	0	1	0	0	0	0	0
	S2	1	1	0	0	1	1	0	1
	S3	1	0	1	0	0	0	0	0
	S4	1	1	1	0	1	0	0	0
14	S1	0	0	1	0	0	0	0	0
	S2	1	0	1	1	1	0	1	0
	S3	0	0	1	0	0	0	0	0
	S4	1	1	0	0	1	1	0	1
15	S1	0	0	1	0	0	0	0	0
	S2	1	1	0	0	1	0	0	0
	S3	0	0	1	0	0	0	0	0
	S4	1	0	1	1	1	0	1	0
16	S1	1	1	0	0	0	0	0	0
	S2	1	0	0	0	1	0	1	1
	S3	0	0	1	0	0	0	0	0
	S4	1	1	0	0	1	0	0	0
17	S1	1	1	0	0	0	0	0	0
	S2	0	0	0	1	1	0	0	1
	S3	1	1	0	0	0	0	0	0
	S4	1	0	0	0	1	0	1	1
18	S1	1	1	0	0	0	0	0	0
	S2	1	0	1	0	0	1	1	0
	S3	1	1	0	0	0	0	0	0
	S4	0	0	0	1	1	0	0	1
19	S1	1	1	0	0	0	0	0	0
	S2	1	1	1	0	1	1	0	0
	S3	1	1	0	0	0	0	0	0
	S4	1	0	1	0	0	1	1	0
20	S1	1	1	0	0	0	0	0	0
	S2	0	1	1	1	0	0	0	0
	S3	1	1	0	0	0	0	0	0
	S4	1	1	1	0	1	1	0	0
21	S1	0	1	0	0	0	0	0	0
	S2	1	0	0	1	0	1	1	1
	S3	1	1	0	0	0	0	0	0
	S4	0	1	1	1	0	0	0	0

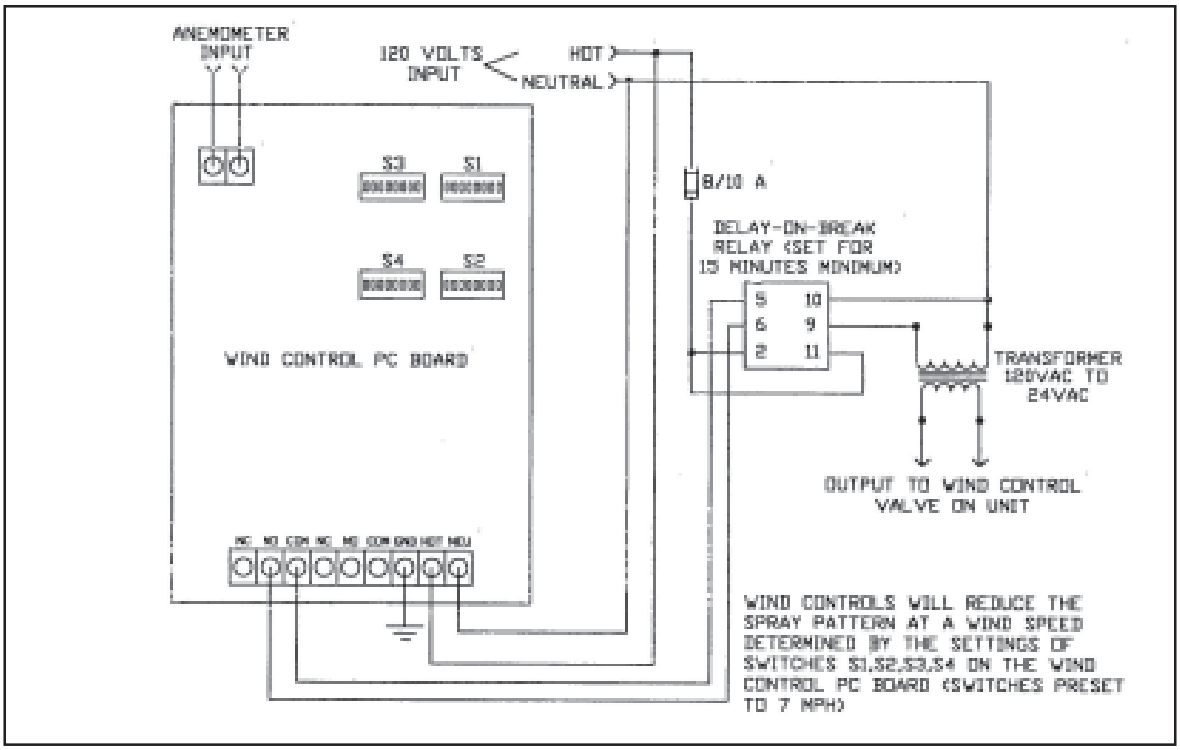
Conversion: MPH = m/sec x 2.2369

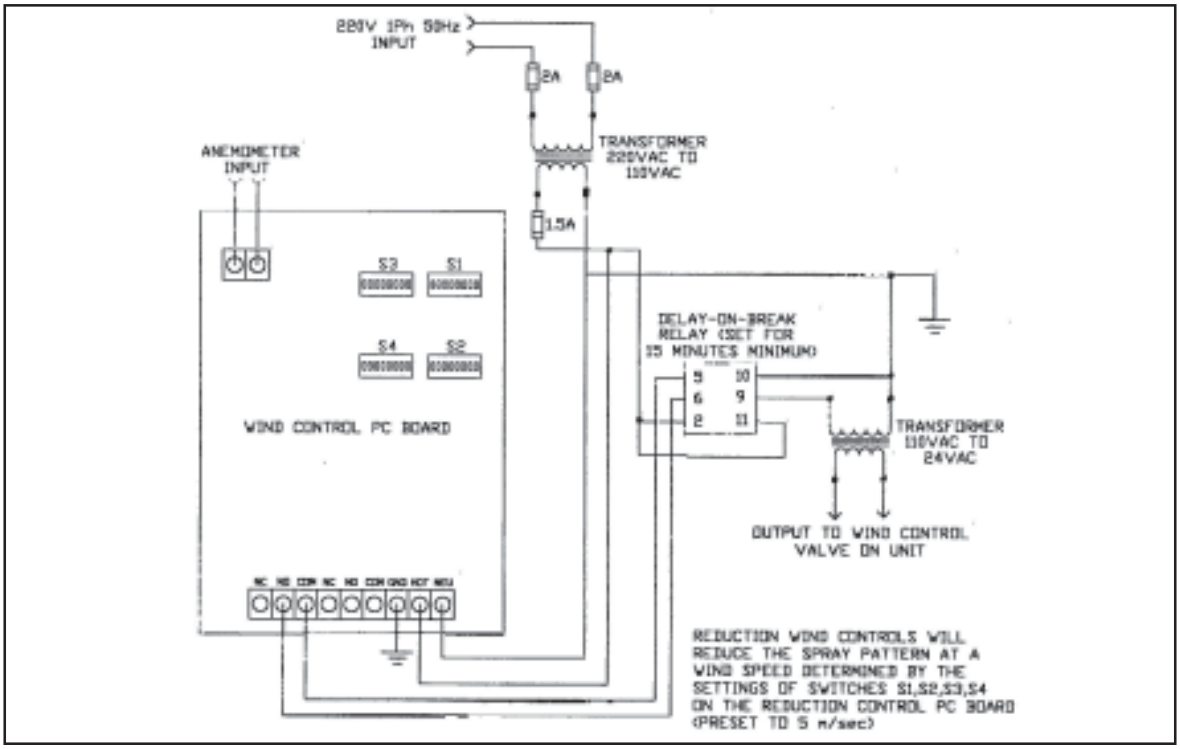
Schematics - OFF Only



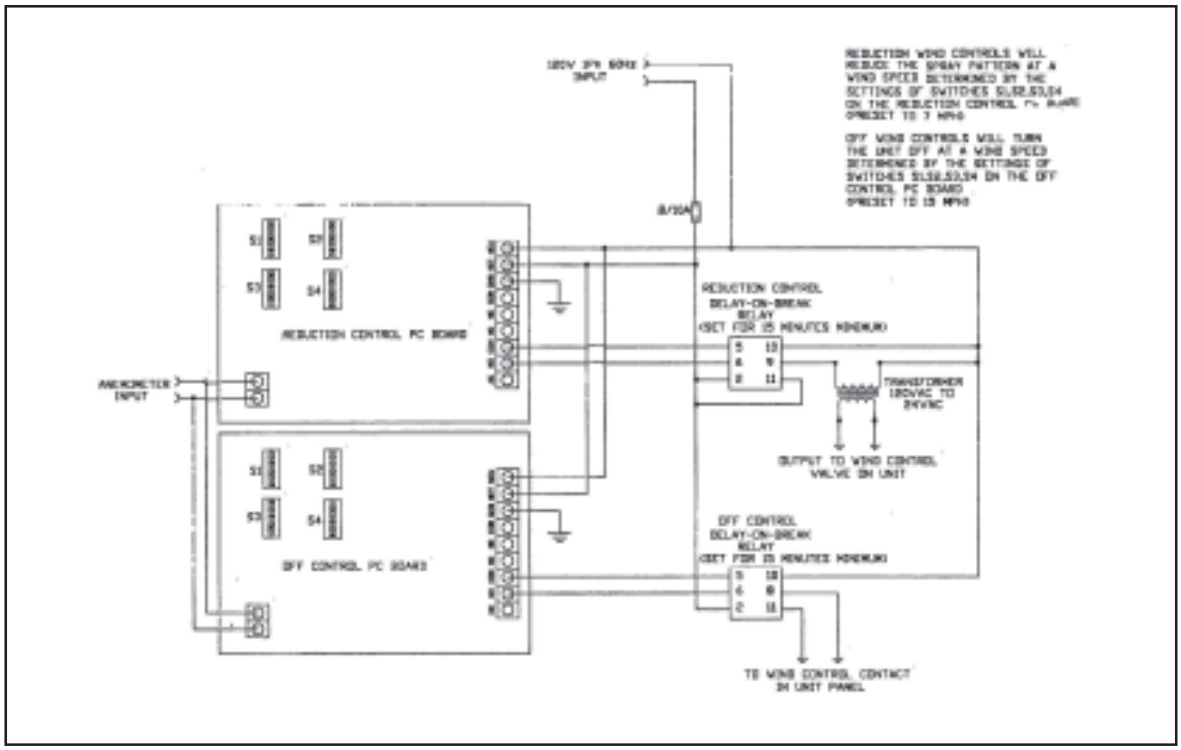


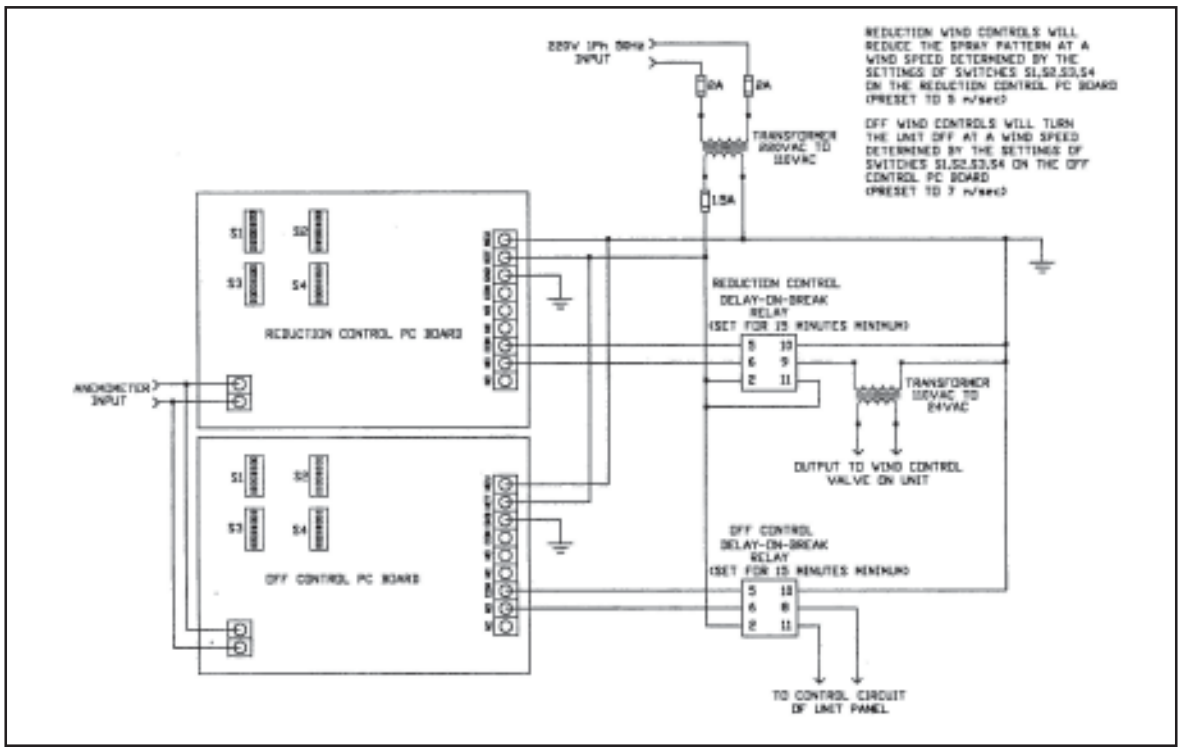
Schematics - REDUCTION Only





Schematics - OFF & REDUCTION Combination





WIND CONTROLS REFERENCE INFORMATION

TYPE (Circle One):

OFF ONLY REDUCTION ONLY OFF & REDUCTION

VOLTAGE (Circle One): 120V 1Ph 60Hz 220V 1Ph 50Hz

CONTROL PANEL SERIAL NUMBER: _____

UNIT SERIAL NUMBER: _____

Water Works With Otterbine!