Instructions for the use of the
Airwell Trip Point Tester

An Airwell Pump control circuit relies on the electrical conductivity of the water that it pumps to cycle the controller. All water is not the same, salty water conducts electricity much more readily than fresh water. (Distilled or pure water conducts no electricity at all). So it is sometimes necessary to make the circuit more or less sensitive.
We make this adjustment by changing the Resistor Pack that is screwed onto the top of all Airwell circuits.
As standard, unless otherwise specified, all new agricultural controllers are dispatched with BLACK resistor packs and new industrial controllers with RED resistor packs, these are midway through the possible options.

1. **To use this Trip Point Tester** you will unplug the existing resistor pack from the top of the circuit and plug this unit in its place. You will notice that there is an indexing slot to prevent incorrect plug orientation.

2. Once the tester is connected, there is a switch on the end of the tester to turn it on.

3. When turned on you will notice that the tester defaults to the word BLACK on the display screen. This means that the tester is doing the job of a BLACK resistor pack.

4. You can use the UP and DOWN arrows to switch between different resistor pack colours to simulate changing the resistor packs themselves. The tester can do the job of all colour resistor packs. The colours are as follows.

Fresh	BLUE	0 – 600 ppm (150 k/ohms)
	GREEN	400 – 1000 ppm (100 k/ohms)
	BLACK	600 – 4000 ppm (47 k/ohms)
	VIOLET	1500 – 10000 ppm (22 k/ohms)
	RED	3000 – 20000 ppm (3.9 k/ohms)
	ORANGE	10000 – 50000 ppm (2.2 k/ohms)
Saline	YELLOW	30000 – 200000 ppm (1.2 k/ohms)

5. **The next purpose of this Tester** is to give a visual display of exactly what is happening down the bore, and how the Airwell control circuit is responding to this water contact with the probes in the pump. You will notice that there are two bar graphs, one marked **H** which denotes the high or top probe in the pump unit and the other bar graph marked **L** for the low or bottom probe in the pump. As the probes in the pump become wet the amount of resistance is indicated by how far the graph moves to the right of display. You might find for instance that the top (H) bar graph may be reading little and the bottom (L) bar graph may be fully to the right. This would indicate that the bottom probe is covered, but the water has not yet covered the top probe. (or a broken wire to the top probe)

6. **You will also notice that there is a TRIP POINT marked on the display screen**. This is the level of resistance that is required for the pump control circuit to trip. It will only trip to the pressure cycle if both the top and bottom probes are past the trip point. Once tripped to pressure state, both probes must go to the dry (left) side of the trip point before the controller is returned to the exhaust or pump filling state. You can watch the function of your pump on the Tester as it works from pressure to exhaust.

The nuts and bolts.

7. **Do you know for sure that your pump is full, but the pump is not cycling?** You would expect to see both bar graphs fully to the right. If for instance the top graph is past the trip point and the bottom graph has a low reading then it is likely that the wire to the bottom probe (white wire) is broken. This assumption is made because the pump cannot fill to the top without filling at the bottom first. If you are not getting a reading on either probe graph the EARTH wire (yellow wire) in the cable may not be contacting or broken. If you are getting a full reading on the bottom graph but little or nothing on the top graph, the wire to the top probe may be broken (brown wire). Alternatively you may need a fresher resistor pack if the water is known to be very fresh.

8. **Do you know that your pump vessel down the bore is empty?** You may know this because you have air passing right through the pump and up the water riser pipe. You would expect in this situation to see both bar graphs to the left or at least well under the trip point. If either graph is above the trip point then this will be preventing the controller from changing to the exhaust state. This can be an indication that a wire has shorted out or water has found its way into the probe or probe cable. The controller cannot tell the difference between water in the cable and water in the pump where it should be.

9. **Selection of the correct resistor pack.** It should be noted that if the water is anything like normal you will probably be right with a BLACK resistor pack. When the pump is known to be full (because you have turned the air off for instance), the bar graphs should just make it fully to the right. You can experiment with this by changing the colour setting on the tester and taking note how far to the right each setting gets the graphs.

10. **It is often a sign of something wrong if both graphs don't read about the same.** Because both probes are in the same water and connected to the same controller there is little reason for them to be much different. The one that is reading high is likely to be affected by water getting into the probe or cable. This can be the case even if the pump is still operating apparently normally. A sign of pending problems perhaps.

11. **Bad contamination or build-up of iron on the probes may show up as a slight signal even when the pump is empty.** This often does not matter. As long as the graphs fall far enough below the trip point to be reliable it will operate fine. You can compensate for this build-up on the probes by using a higher salinity resistor pack. (ie RED).

12. **Very long cable kit lengths may show up as a partial signal.** You may find with long cable kits the bar graphs may not fall completely back to the left when known to be dry. This is due to cable capacitance and has no bad effect.