



# APPLICATION NOTE

January 2022 Rev B

## TIPS ON USING A MILLIAMP CLAMP-METER IN 2-WIRE

*Troubleshooting 2-wire irrigation control systems is faster when you use a sensitive clamp-meter that can reveal control cable faults without opening splices or cutting wires. The Armada Pro93, Pro95 and the Pro95i milliamp clamp-meters are all designed for this task. The Pro95i is the latest meter in this group. These meters are all capable because they measure milliamps, do it accurately utilizing True RMS technology, and do it conveniently through the clamp option.*



### **The Main Purpose of the Meter is to Find Milliamp Current Anomalies Like Short and Open Circuits**

Each 2-wire control system is different in size and the kind of decoders in use, which means normal current in the cable is different. Start out by estimating the “normal” current in the system you are working with. For example, use 0.5-0.7 mA for each Rain Bird-style decoder or 3.0-5.0 mA per Hunter-style decoder and multiply time the number of decoders in the system to get the total expected current in the system. If the total current in the system you are testing is half that number or twice that number you have an open splice or a short. Don't worry about the exact current reading which will vary with voltage on the cable.

### **Conditions for Testing**

The control cable must be powered up for the milliamp clamp-meter to work. This can be done several ways with that are better or worse for testing. Notes: Initial measurements should be made at the head of the cable, clamping around one wire, not both. The filter should be at 50/60 Hz or LPF for stability of readings.

**OK:** System operating with controller. This often produces milliamp readings that jump around because the controller is managing decoders and may even turn on a zone. You may still be able to find gross shorts and opens. In some Short situations the controller will remove power from the cable, so you need to connect current-limited external test power to the cable.

**BETTER:** System operating with controller in Short-finding Mode. This steadies out the milliamp readings, though controllers will still not power a dead short and you may be forced to apply a current-limited test power source.

**BEST:** Control cable disconnected and powered by an external source (e.g., current-limited 24 Vac source). This can be a 24v transformer (wall plug in) or the Armada Pro50 (mobile battery powered).

### **How to Set Up and Read the Meter**

Each model has some settings that you need to pay attention to. Once you get set up the meter to track the current flowing in control cable always use those settings.

Pro93 and Pro95: Set 'mA' on the dial, filter mode to 50/60 Hz (93) or LPF (95).

Use ohms instead of instead of Continuity ('beep') if measuring resistance.

Pro95i: Set 'mA' on the dial. Other settings are automatic.