

Picking the Right Meter for Troubleshooting Irrigation Control Electrical Problems

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Are your efforts to troubleshoot electrical problems made more confusing by the type of meter you use? Many people are unsuccessful in electrical troubleshooting because they have the wrong meter or do not know how to use the one they have. In this article I will address how to pick the right meter for the job.

To set the stage let's agree on what we are talking about when we say electrical troubleshooting. For the purpose of this article, I am talking about troubleshooting basic controller operation, field wires and solenoids. I am not talking about sophisticated controller diagnostics, two wire systems or repairing central control communication cable. We will be discussing basic troubleshooting needs. As a side note, as we look at meters I am not recommending brands as much as I am going to be recommending features; there are many different brands that will have the features you need.

The top photo at the right is a picture of some of the most common types of meters that people may see in a store.

These range from \$20 to \$600. Some of these will graph out your readings; others just give you an "idiot light." Let's look at them individually.

First we have the analog meter, pictured below, that perhaps many of you have seen or used or maybe you currently



own and use.

Notice the arrows that are pointing to the two holes? This is the first problem with this meter. Depending on which reading I want to do, I have to remember to move the meter leads to the correct hole. Few people remember to do that every time, and then we get bizarre readings that make no sense. The next problem is the meter display itself. You may not want to admit it publicly, but you really don't know what the needle is telling you, do you? Few people can interpret the scales and readings on this type of meter. We just look for the needle to move and then we say something like "Whoa! Yea we got power!" or maybe "uh oh, we got a problem here!" Lastly we have the range setting dial. You have to make sure that this is set to the correct range or you will blow up the meter or get an incorrect reading. Again, few people remember to change the range for the current reading they are doing.

So it is safe to say that you don't want to get this type of meter. Let's look at some digital meters.

At the right is a big fancy meter. Now this is a meter that brings out the testosterone in an irrigation tech! This is a meter



that says "I know what the heck I am doing!"

Do not succumb to the temptation to buy the biggest, fanciest, fattest meter in the display case. Do not give into meter

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The Right Meter –

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envy!

This is a hand held oscilloscope, it costs about \$600 and 90% of its features will never be needed on your standard troubleshooting jobs. Most techs that have meters like this never use any but the most basic features. Some are not sure they are using it correctly. The manuals for these are about an inch thick!

Below is another digital meter.



Now this is a nice little meter. It has the features we need. Those features are: AC Voltage and Resistance (ohms). Yes, believe it or not, those two readings will diagnose 95% of all the problems you will run into in troubleshooting your basic irri-



gation electrical problems. In over 20 years of diagnosing systems I have used those two readings more than anything else. The good thing about digital meters is that you can't cheat. You can't just look for a needle to jump and say, "yea, it works!" You are forced to look at and interpret the reading.

The arrow shows that the leads are permanently attached, which eliminates the need to try to figure out which hole to stick them in. It is auto ranging, so I do not have to move a dial or rotate a switch to make sure I am at the correct range for the reading I am doing. The only problem with this one is durability. It is not designed to bounce around in the back of a pick-up in the rain.

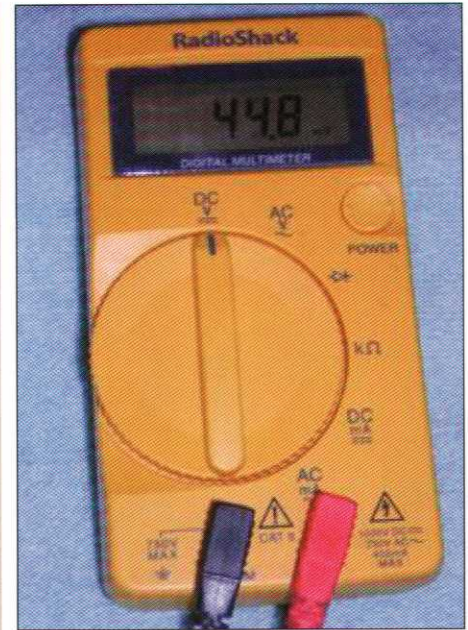
The meter, pictured below at the left, is not a bad choice. It is auto ranging if you select that feature. There is only one extra hole for the leads so that limits mistakes. The readings are limited to just a few, which is good because it is simple to use. It costs about \$45 and is fairly durable.

The yellow meter, pictured above right, is even better. Again it is digital and auto ranging. The leads are detachable but there are only two holes, so that helps. The features are limited which keeps

things simple. It is fairly durable. The only drawback is tough to really see. The fuse is difficult to get to, and when the fuse blows it only cuts out the amp reading (which you will rarely use) which is why you won't know it is blown. Other than that it is a good choice for a meter. This one costs about \$35 The trick is to keep it simple. Do not buy a big, fat expensive meter just because you can. It will only complicate your troubleshooting.

Finally let's look at a "non-meter."

This is not a meter but a diagnostic tool. It will activate a valve and give you a light display if a valve is "good" or "bad." While this is very simple to use, it will not give you the information that you can get from a digital meter. By interpreting the readings from a digital meter you can tell if the problem is a broken wire, short bad splice, etc. With this unit you don't really know what the problem is, just that you have a problem. It is good in the hands of "non technicians" but for in-depth diagnosis you need a real meter. Even if you do not use the "idiot lights" it is good to have a valve activator in your tool box. There are many variations of these tools available.



To sum things up, you need to get a meter that is durable, digital and does at least AC voltage and resistance (ohms). Attached leads are nice, and you want to look for auto

ranging as well. Buy extra fuses for the meter at the time of purchase. Also buy lead adapters that convert the needle ends to alligator clips too. Beyond that, try to limit the bells and whistles.

I know that some technicians will argue that more sophisticated tools are sometimes needed, maybe, but that is for advanced repairs occurring maybe 2% of the time. For most of us the above type of meter will be all we ever need.

Once you have a good, easy-to-use meter, you are in much better shape to properly diagnose your wiring problems. In the next article we will address how to take your meter and use it to troubleshoot field wiring problems.

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