

FRANKLIN AID



Franklin Electric



Franklin Application/Installation Data (AID) ... For The Professional Driller-Installer

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CORRECT METERS MAKE LIFE EASIER

From a surgeon to a carpenter to a computer programmer, we all have “tools of the trade” that make the job at hand easier to accomplish. It’s certainly no different for the pump technician, especially when the pump owner is standing in the doorway with an expectant look on his or her face. Having the correct tool not only reduces frustration and concern, but gets the job done quickly and competently.

Being electrical in nature and design, motors require the use of a variety of meters to correctly diagnose what the problem is (and, maybe more importantly, what the problem isn’t). Here’s a recap of meters that Franklin Electric recommends pump technicians keep close at hand, and what those meters can reveal. Upcoming issues of Franklin AID will go into greater detail about specific test procedures.

VOLTMETER - Whether using a multimeter or a single-purpose voltmeter, you are looking for the same measurement: the amount of voltage being delivered to the electrical system.



WARNING! USE COMMON SENSE Out of necessity, the system must be powered up when checking for voltage. Stay alert and be aware of shock hazards at all times.

Single Phase - Measure across L1 and L2 to determine the supply voltage. The supply voltage must be $\pm 10\%$ of the voltage rating on the motor nameplate. Measure while the motor is running or attempting to start to get a true reading of the voltage seen by the motor while it is under a load.

Low or high voltage will cause high amps, which can trip an overload and prevent the motor from starting. Both conditions can also cause the motor to overheat and possibly damage the windings.

ELECTRICAL GROUND CAUTION Although an electrical ground is not required for the operation of the motor, ground circuits should be installed as a safety measure per all local, state, and national code requirements.

Three Phase - Three measurements are required for 3-phase systems: L1 to L2, L1 to L3, L2 to L3. Again, measure while the motor is running or attempting to start. Voltage should be the same on each pair of line leads. Low or high voltage will result in the same conditions as the 1-phase system.

Measuring Voltage To Ground - Although a ground connection is required for safety and code requirements, it is not required for the motor to operate. So, taking a voltage measurement to ground will not provide any significant information. One exception is that if you are not seeing any voltage line to line, then measuring line to ground can verify that there is voltage in the system.

AMMETER - Most ammeters in use today are the clamp-on type, which are certainly the easiest to use. Multimeters that require the measurement of amps through the use of probes are not recommended. In using your clamp-on ammeter make sure the jaws are closed, and that the conductor you are measuring is close to the center of the jaws and at a right angle to the jaws.



That’s where the truest reading will be seen.

Measuring amperage is a quick way to ensure that the motor is getting voltage. If you can read amperage, that means voltage must be present.

High amperage, which can result in the tripping of the motor protector, can be caused by ground fault or increased friction (drag) on the motor shaft. Low amperage can be attributed to low water in the well, or obstructions in the flow of water through the hydraulic system.

OHMMETER - Whether you use a digital or an analog (needle-type) ohmmeter, you are measuring the resistance of the conductor, or connection, to the electricity flowing through it. Resistance is measured in ohms. Two measurements (winding resistance and insulation resistance) can tell the pump technician if a motor is in good condition.

Note: Always take resistance readings with the system power off. Otherwise, your meter could be damaged.

Winding Resistance: Measure from motor lead to motor lead whether the motor is 1-phase or 3-phase. Consult the Franklin AIM Manual for the correct resistance values. Winding resistance measures the integrity of the winding. A reading lower than the range specified in the AIM Manual indicates a short

somewhere in the circuit. A reading higher than the specified range indicates an open condition in the circuit. Either extreme indicates a serious motor or cable problem.

POWER CABLES INCREASE WINDING RESISTANCE READINGS Consult the Franklin AIM Manual to determine how much resistance to allow for power supply cables.

Insulation Resistance: Whether the motor is 1-phase or 3-phase, measure from any motor lead to ground. It is important that the ground be the system ground or a true earth ground such as water in the well. Consult the AIM Manual to interpret your findings and to determine whether or not a ground fault (short to ground) might be present. Ground faults result in high amperage that could trip a motor protector or damage a winding.

Control Box Components: Ohmmeters can also be used to test components in 1-phase control boxes. The AIM Manual outlines correct test procedures and desired results.

CAPACITANCE METERS - Testing capacitors with an ohmmeter reveals if the capacitor is bad. What an ohmmeter will not show you is a weak capacitor. That's where a capacitance meter comes in handy. It will indicate the exact level of capacitance (measured in microfarads) that the capacitor can hold. Weak start capacitors can result in longer starting periods which can cause nuisance tripping of the overload or possible damage to the start winding. Weak run capacitors can result in increased amperage in the run winding which in turn could decrease the life of the motor.

SUMMARY - Used correctly, electrical meters are a technician's best friend and demonstrate competent

professionalism to your customer. Not only that, having the right meter for the right test gives you confidence about what a particular problem might or might not be and reduces your time on site. They are an investment well made.

FOR A FREE COPY OF THE FRANKLIN AIM MANUAL, CONTACT THE TOLL FREE SERVICE HOTLINE AT 800-348-2420 OR DOWNLOAD A COPY AT www.franklin-electric.com.



Getting to Know Your Field Service Team: Rick Hicklin



Rick brings a wide variety of experience in the water systems industry to Franklin Electric's Field Service organization. Working both for pump manufacturers and in distribution, Rick had already accumulated more than 20 years experience when he joined Franklin 3 years ago. His knowledge and experience encompasses not only submersible motors, but the entire scope of water systems products.

Rick is responsible for Field Service in the West Region. This region includes Washington, Oregon, California, Nevada, and Arizona, not to mention Alaska and British Columbia. It means a lot of time on the road and on airplanes for Rick, but he thoroughly enjoys his position. He says, "We have a great industry, and there are so many good people that work in it. Working with them and helping everyone do a better job is very satisfying to me."

Rick and his wife Carol are both native Californians and reside in Sacramento. In his free time, Rick enjoys a good game of golf and following thoroughbred horse racing.

To gain the benefit of Rick's extensive water systems experience, contact him at 260/827-5122 or via email at rhicklin@fele.com.

TOLL-FREE HELP FROM A FRIEND

Phone Franklin's toll-free SERVICE HOTLINE for answers to your installation questions on submersible pump motors. When you call, a Franklin expert will offer assistance in troubleshooting submersible systems and provide immediate answers to your motor application questions.

Franklin Electric SERVICE HOTLINE 800-348-2420 FAX 260-827-5102
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