T&M BUYER'S GUIDE

Electricians invest a substantial amount of money into the tools they use every day on the job site, so it's important that they do their research and buy tools that are specifically appropriate to their line of work.

There's good natured discourse involving any tool purchase, with tried and true favourites among seasoned professionals, and newcomers touting the benefits of newly released features.

However, there are guidelines that should be followed and information to consider prior to making a purchase, especially in the world of Test & Measurement equipment.

UNDERSTANDING FUNCTION

It's important to comprehensively understand how a meter functions: not only in general, but in the context you'll be using yours. Since meters can be simple diagnostic tools that accurately quantify voltage, amperage, and continuity, they're used by almost every electrician in almost every setting.

When combined with the specialised knowledge these electricians possess, they can help test, install, and repair electrical components of various capabilities and complexities. Meters can easily determine if faults exist, verify proper circuit functionality, and can actively assist in keeping infrastructure up and running. Most importantly, they help prevent unsafe conditions, not only for the customer, but for the electrician working on the circuit.

BEFORE MAKING A PURCHASE

Each potential buyer must consider their work environment as being the biggest factor in making a purchase – not only now, but in the future. Since these tools can be expensive, they should be considered an investment and treated as such. Buying a tool that is "future-proof" for your career path is critical.

If you're a residential electrician, you may pick something completely different than an electrician who plans on working on high current outdoor industrial applications. Each role may require a different tool. Remember: you get what you pay for, but you can make your money go a long way if you know what you need.

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CATEGORY RATING & JOB SETTING

Meter capability spans four categories. Each category is progressively more capable, but also impacts the cost. Higher protection ratings are necessary for specific types of work environments. Any meter rated at a specific Category can be used in that Category or lower rated environment but cannot be used safely in a higher rated environment. For instance, a CAT III meter may be used in a CAT II environment, but should not be used in a CAT IV environment, even if the voltage to be measured is within its nominal range. Test instruments are rated on their ability to withstand a voltage spike, which is applied through a specified level of resistance. This applied voltage spike increases with each CAT rating.

CAT I

These meters are useful for small electronics work, battery testing, and continuity adjustments in low current applications.

CAT II

Useful in single phase situations up to 240 Volts, for small appliance, socket, plug in, and long branch applications within the home or office.

CAT III

Capable of three phase distribution, including single phase commercial high amperage lighting. Includes distribution devices, feeders, industrial plant circuits, and high current appliance circuitry in service areas.

CAT IV

The highest rating, which can be used in outdoor applications of utility power, meters, distribution, overhead line, and overcurrent protection modules. Three phase at utility connection, any outdoor conductors. Outside and service entrance, service drop from pole to building, run between meter and panel.

Electricians will opt for the highest category of protection given the environment they will be working in. Most modern meters are dual rated CAT III 1000 V CAT IV 600 V for example. This can provide good protection in your investment. Also, the meter must have the appropriate CAT rating AND voltage rating for the intended use.

METER TYPES

The capacity at which a meter can measure and the way they go about it may be different, but their function is straightforward. There are situations in which probes are necessary, and actual physical conduction is needed in line of a circuit to take a measurement. However, many measurements are made without breaking the circuit, which is the benefit of a clamp on meter or fork meter, which measure the electromagnetic field around the conductor to make a reading, making them far more useful and much safer in many applications. Many clamp and fork meters also include probes as well for situations where direct conduction is needed.

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Some broad categories of meters you'll see on the market:

Multimeter

These meters are used for everything from small electronics applications to battery testing and continuity assessments. They often provide a higher degree of range, resolution and functionality than clamp meters.

Fork Meter

A two-pronged "fork" fits around the conductor and takes a current measurement without interfering or breaking the circuit. Particularly useful in lower current (100 to 200 amps) cramped or limited access situations.

Clamp Meter

A retractable clamp fits around the conductor that is being measured allowing isolation from other conductors. More suited to applications in which conductor isolation is necessary, and for higher current applications.

Non-contact Voltage Tester

A speciality meter that is typically only useful in situations where only the presence of voltage is being sensed, to indicate the possibility that a circuit is energised or not.

These testers simply verify the existence of electricity in a particular circuit or conductor.

Non-contact voltage testers do so without any physical contact with the conductors and can be a complimentary tool. However, most instructors discourage this as being a primary tool. ALWAYS verify that a circuit is definitely de-energised with the contact method before touching conductors even if the NCVT does not indicate the presence of voltage.

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ADVANTAGES OF PICKING THE RIGHT METER

One of the most obvious benefits of choosing the correct meter is safety. In high current applications, a clamp or fork meter is clearly less risky to use than a multimeter that uses probes, as it is not necessary to break the circuit to take a current measurement. There is always a potential for an arc flash when interrupting a circuit, so using a meter that doesn't require a circuit interruption is not only ideal, but also much safer.

Clamp meters can be the easiest to use in situations in which an electrician may have to isolate a single conductor from an array of others. However, fork meters may be even more useful still in tight situations, where the prongs are able to fit around conductors without having to manipulate the clamp. Even though they tend to be bulkier, clamp meters also come in handy when you'd like to hang the meter from the conductor for a hands free reading. Some manufacturers offer a secondary display on the base of the meter to make those dark junction box readings easier.

FEATURES WORTH LOOKING FOR

When asked, seasoned professionals will all mention their favourite features in meters. When we had the opportunity to speak with industry pros, we got a variety of answers, including:

Battery Life

For obvious reasons, this is an important aspect of a meter. You don't want to be on a jobsite with a non-functional piece of equipment.

Alert/Tone Technology

An audible notification is crucial in certain environments that are dimly lit, or just from an ease-of-use perspective. Many meter manufacturers offer this feature. Often, it is possible to defeat the tone in noise sensitive areas such as hospitals.

Clear Digital Display with backlight

Being able to see your reading accurately in challenging workplaces is critical. Single or dual displays that are legible are extremely important regardless of where your job site may be.

Heavy Duty

Although meters are precision instruments, they must be tough and durable. Many manufacturers rate their meters to easily survive a 2-meter fall. Some offer a rubber overmould that helps with both insulation and drop protection, in addition to helping with grip and ergonomics.

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Certifications

Professionals typically buy their gear as a lifetime investment. Most of the reputable manufacturers certify their meters to be accurate and test them prior to leaving the factory, as well as providing some sort of warranty. Some even offer third-party certifications (such as a UL Listing) to ensure their accuracy, safety, and longevity.

One-handed Design

A good meter is ergonomically comfortable and can be used with one hand. Some meters allow both storage of the leads on the back and some will hold the extended probe or probes to simplify your work. This is useful in a variety of situations, whether you are a lineman, industrial, commercial, or residential electrician.

True RMS Rating

When a meter is accurate enough to read an entire sine wave and its potential variations, it can be rated as a TRMS capable meter. Basic RMS measurements are not entirely reliable because of potentially distorted AC voltage or current in electrical systems, which may affect the AC waveform. It's important to note that if you're pursuing a career as an electrician, you'll want a True RMS meter.

This is because the True RMS measurement (True Root Mean Square) uses more complex mathematical formulas that will ensure a reading that is much more accurate in real world applications. In addition to peak values of the sine wave, TRMS meters sample many times along each cycle as well, making them a more precise and safer tool to use.

WHAT THE PROS BUY

Most professional electricians don't bother using any meter in the field that is less than a CAT III. Many wouldn't even begin to consider a meter that doesn't hold a True RMS rating. A well appointed, TRMS-rated CAT III clamp or fork meter is useful in a broad range of environments (battery, small electronics, all residential work, service, agricultural, and light industrial). They are typically the easiest to manipulate and are safe and robust.

T&M PRODUCTS **SIGN UP** **T&M INFO** **CONTACT US**

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