FLUKE®

Make electrical measurements easy - with the right tools!

Application Note

With today's proliferation of electrical systems, a simple multimeter is no longer enough. The right tools will help electrical contractors to get the job done quickly, efficiently and safely.

Electrical systems in today's homes and commercial buildings are much more complex than just a few years ago. Where the most important load has traditionally been basic power and lighting circuits, all kinds of appliances, systems and networks have rapidly become established. A wide variety of domestic appliances, security and access control systems, personal computers and peripherals and many more mean more diversity and complexity for electricians and installers. Let alone the increasing trend towards 'smart buildings', with all the new technology that involves.

These developments are reflected in the corresponding growth in the cost and scale of electrical installations, which have increased to represent a significant proportion of the overall value of many new building projects. Where a simple, analog multimeter has in the past been enough to handle most tasks, today's electrical systems demand more sophisticated tools to get the job done quickly, efficiently and – above all – safely. But of course 'sophisticated' should not translate into difficult operation.

In the past the most frequently required value to be measured was voltage, for example to make quick checks for good connections or measure losses. Today a much wider range of parameters may need to be measured, for example accurate true rms voltages, variable-level signals, currents – including both steady-state values and inrush currents such as when motors or other devices are started-up – low-level signals in networks, or even parameters like frequencies, temperatures, rotational speeds and more.

Keeping safety in mind

All the time, the essential factor of safety has to be kept firmly in mind. As the leader in handheld electrical test tools, Fluke has a strong safety focus in all its products, and works actively towards industry-wide protection measures to help ensure safe working conditions. Fluke aggressively promotes its Electrical Safety Program, an educational campaign aimed at raising awareness of industrial electrical hazards and product standards.

One safety issue that's critical to electrical workers is transient overvoltages. As distribution systems and loads become more complex, the possibility of transient overvoltages increases. Motors, capacitors and power conversion equipment such as variable speed drives can be prime generators of voltage spikes. Lightning strikes on outdoor transmission lines also cause extremely hazardous high-energy transients. When taking measurements on electrical systems, these transients present invisible and largely unavoidable hazards. They occur regularly on low-voltage power circuits, and can reach peak values of many thousands of volts. This means voltages can be encountered that are far higher than simply the rated voltage of the network or circuit on which a measurement is being made. In these cases, the user's protection depends on the safety margin built into the meter being used. The voltage rating alone will not indicate how well that meter was designed to survive these high voltage transients.

Fluke electrical tools are tested by independent testing laboratories, and carry the corresponding approval marks such as UL, CSA, TUV and VDE. Particularly important is the EN61010 safety standard, which emphasizes protection against the increasing danger of high-voltage transients. Every Fluke meter is designed to meet this standard and is marked with a relevant category and voltage rating, in many cases the CAT III 1000 V overvoltage category which provides the required level of protection in domestic and commercial working environments.

Practical guidelines for purchasing

A few simple practical guidelines are worth applying every time when purchasing new multimeters and other test tools. It goes without saying that meters and test leads should always be made of durable, non-conductive materials. Double insulation is also essential to provide maximum protection against voltages present on live wires and conductors. Input jacks on meters should always be recessed to prevent the danger of accidentally touching live parts of the jack plugs. And for the same reason test leads should always have shrouded input connectors. Finally, test leads should have finger guards and non-slip surfaces, to give the user a secure grip without the danger of unintentionally coming into contact with live areas of either the lead itself or the component under test.

Wide choice of easy-to-use tools

Making the electrician's job simpler and more efficient, Fluke offers a wide choice of easy-to-use electrical test tools to handle. Probably the most common test of all is to check for the presence of a voltage, and the Fluke 1AC VoltAlert™ makes it easier than ever to do so. This compact tool fits in a shirt pocket, and all that's necessary is to touch the tip to a power terminal, conductor, outlet or cord, even without direct metal-to-metal contact. If it glows red you know there's voltage on the line.

The Fluke T3 voltage and continuity tester has LED voltage indicators that clearly show seven AC or DC voltage levels. Or if you need full multimeter functions in a compact, pocket-size tool, the Fluke 112 digital multimeter is specifically designed for use by electricians and contractors. It offers true rms AC voltage and current measurements, ensuring optimum accuracy of measurements on equipment that draws current in short pulses, as well as frequency and capacitance measurements. The model 112 also has a backlight for a clear readout even in dark spaces.

Meeting the increasing need for current measurements, the Fluke 322 clamp meter is compact and affordably priced, enabling every electrician to make quick, accurate measurements in tight spaces. Or with its new OpenJaw™ technology, the T5 voltage, continuity and current tester is a single, compact tool that allows currents up to 100A to be checked without opening the circuit.

There's more to today's electrical measurements than simply voltage and current, which is reflected in Fluke's wide range of special-purpose test tools. Good examples are the 61 and 65 infrared thermometers, for quick, safe, non-contact temperature measurements. These can be used for electrical fault location and diagnosis by identifying hot spots on electrical panels, connections, motors and systems. Infrared thermometers are the ideal tools for measuring surface temperatures of targets which

are rotating, electrically live, dangerously hot or in hard-to-reach locations. With their bright laser beam for easy object targeting, these thermometers cut measurement time down to almost zero by taking a temperature reading in less than one second. Best of all, one of these pocket-size infrared thermometers is available for less than € 130, so it can be an affordable part of every electrician's toolkit.

User-friendliness and durability are essential

Like all the Fluke electrical test tools, these models are all designed for easy, intuitive operation so electricians can concentrate on the job they are doing. No-one wants to carry a user manual when working on-site, so instruments should above all be easy to use. Key factors are a bright, easy-to-read display, and especially one with backlighting for working in dimly lit areas. Knobs and buttons should also be clear and easy-to-operate to ensure secure working in tough field conditions. And tools should be compact and lightweight, for easy use in cramped equipment cabinets and cable compartments.

Fluke professional test tools have earned a reputation over the years for their rugged construction, and most models are tested to withstand a 3 meter drop onto a hard surface. Which means they will last longer and continue to perform to specification, even after long periods of tough, everyday use.

Choose the accuracy you need

Of course it's important to be able to have confidence in your meter readings. Most measurements on electrical installations and circuits don't demand lab-grade accuracy levels, but it's important to be sure that the accuracy of a tool is properly matched to the measurement task to be done. Full information can be found in the product specifications, which will tell you what you need to know about the accuracy of your meter readings.

Accessories and service

Finally, it's worth giving some consideration to the value of tool accessories and spare parts. Accessories can often broaden the range of applications of a tool greatly, and in many cases make specific measurement tasks much easier. An extra set of test leads or alligator clips will extend the functionality of your meter. And the availability of spare fuses is important to allow tools to be put back into service without delay. Which is why it is recommended to buy tools from a trustworthy supplier who offers a wide range of add-ons and spares.

FLUKE®

Fluke. *Keeping your world up and running.*

Fluke Corporation
PO Box 9090, Everett, WA USA 98206

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands

For more information call:
In the U.S.A. (800) 443-5853 or
Fax (425) 446-5116
In Europe/M-East/Africa (31 40) 2 675 200 or
Fax (31 40) 2 675 222
In Canada (800)-36-FLUKE or
Fax (905) 890-6866
From other countries +1 (425) 446-5500 or
Fax +1 (425) 446-5116
Web access: http://www.fluke.com/

5/2003 10627-eng. Rev. 01