FLUKE®

How to take readings from across the room

Application Note

The Fluke 233 has the features you'd expect from a modern multimeter, plus one more: a detachable head that enables you to take readings from across the room. This article takes a look at the 233 and its capabilities from an electronics technician's perspective.

If your work takes you away from the bench regularly, chances are that sometimes you have to deal with workspaces that are too cramped (or too dark, dirty, dangerous, or inaccessible) to get a measurement easily. Or you need two people to make a measurement when only one is available. Or the circuit you're working on is one place, but the outputs or controls are in another. It's in situations like these that the Fluke 233 digital multimeter with the removable display really shines. Being able to connect the leads, remove the display from the base unit, and walk across the room to operate controls, remove protective coverings, or just get out of the way in a hazardous environment, all the while watching real-time readings, can sometimes make the difference between getting the work done quickly and easily and not being able to get it done at all. (And by the way, the backlit display of the 233 really does shine in poorly lit workspaces.)

Even when equipment is sitting on a well-lit bench in the shop or lab, sometimes it's hard to get the typical multimeter in the right location for easy reading. Being able to remove the display and set it where you want (or stick it where you want—it has a magnetic back) frees you to focus on the measurement and not the meter.

When you pop the removable head back on the base, the 233 looks like and works like any other Fluke multimeter. It can make any of the electrical measurement tasks that you would expect—voltage, current, resistance, continuity, diodes, capacitance, frequency, and temperature—with the added convenience of being able to take those readings from the other side of the room.

The Fluke 233 with its removable magnetic display module and optional magnetic strap.

The 233's removable display module can be placed where it is easily seen.

How does it work?

The base and display module of the Fluke 233 communicate over a 2.4 GHz ISM-band radio link when the display module is separated from the base. The range with a clear line of site is about 33 feet (10 meters). Although the range is reduced when barriers are introduced, the short wavelength of the 2.4 GHz carrier allows communication between the base and display when guards and other equipment are in the way—and often even from within closed equipment cabinets. (When the display module is docked to the meter base, the two modules communicate over an internal infrared link.) The meter base is powered by three AA batteries and the display module by two AA batteries. Battery life is about 400 hours.

What's in the box?

The Fluke 233 includes test leads with removable alligator clips and a type-K thermocouple probe for temperature measurements from -40 °C to 400 °C (-40 °F to 750 °F). Also included are a 14-page printed Getting Started Manual, a 54-page Users Manual on DVD, and five AA batteries.

Specs and tradeoffs

The Fluke 233 can perform all of the functions you would expect from a general-purpose digital multimeter, but with the added benefit of a removable display. This section discusses some of the specifications of the 233 and how they compare to other multimeters. For a detailed list of specifications, see the sidebar *Fluke 233 True-rms Digital Multimeter Specifications.*

Battery life and weight

Battery life for the Fluke 233 is about 400 hours, which is comparable to many other Fluke multimeters. However, because it uses five AA batteries to power the base, the display module, and the data link that connects them when they are separated, the 233 weighs more: 600 g (21 oz) versus about 400 g (14 oz) for other, similar Fluke multimeters.

The Fluke 233 includes probes with alligator clips and a thermocouple temperature probe.

Resolution

The Fluke 233 is a 3½-digit multimeter with an enhanced-resolution, 6,000-count analog-to-digital converter that can give you the same resolution as a 4½-digit multimeter for measurements up to 600 volts, for example. (For more information about digits, counts, and resolution, see ABCs of DMMs at Fluke.com.)

Accuracy

The Fluke 233 has true-rms ac voltage and current measurement with the 0.25 percent basic dc accuracy of a general-purpose multimeter.

Safety

Safety is the one area where you don't want tradeoffs. The 233 has a safety rating of CAT IV 600 V, CAT III 1,000 V, which means that its input circuitry has been designed to withstand voltage transients commonly found in high-energy circuits without harming the user. This rating equals or exceeds the high safety ratings of other Fluke multimeters.

When the measured voltage exceeds 30 V, a red LED on the base unit of the 233 lights up to warn that there is a hazardous voltage at the meter input.

A safety feature offered by the 233 and no other is the ability simply to get out of harm's way. Whether you're facing common hazards like moving machinery and high voltages or more unusual challenges like radioactivity, being able to take a reading with "the danger at a distance" can make taking the measurement both safer and easier.

For information about the Fluke 233 True-rms Remote Display Digital Multimeter features and price, visit the Fluke 233 web pages at *www.fluke.com/233*.

The new Fluke 381 Clamp Meter also has a detachable display and the same remote reading capability as the Fluke 233, and it includes the new iFlex™ flexible current probe. You can learn more about the Fluke 381 at *www.fluke.com/381*.

For assistance in figuring out which multimeter is best for your needs, *www.fluke.com/dmm*.

Fluke 233 True-rms Digital Multimeter Specifications

Accuracy specifications		
DC voltage	Range: 0.1 mV to 1000 V	Accuracy: 0.25 % + 2
AC voltage	Range: 0.1 mV to 1000 V	Accuracy: 1.0 % + 3
DC current	Range: 1 mA to 10 A	Accuracy: 1.0 % + 3
AC current	Range: 1 mA to 10 A	Accuracy: 1.5 % + 3
Resistance	Range: 0.1 Ω to 40 MΩ	
Counts	6000	
Capacitance	Range: 1 nF to 9999 µF	Resolution: nF
Frequency	Range: 5 Hz to 5 kHz	Resolution: 0.01 Hz
Temperature	40 °C to +400 °C	
Power	AA batteries: Three for main body; two for display	
Battery life	400 hours	
Wireless frequency	2.4 GHz ISM Band 10 meter range	
Safety rating	CAT IV 600 V , CAT III 1000 V	
General specifications		
Basic features	AC true-rms: Yes	Ranging: Auto/Manual
Display	Backlight: Yes	
Data storage	Min/Max/Avg: Yes	
Other features	Battery type: AA alkaline	Removable display: Yes
Warranty and protection		
Safety rating	CAT IV 600 V/CAT III 1000 V	
External protection	Rubber overmold	
Warranty	Three-years	
Size (H x W x L)	5.3 cm x 9.3 cm x 19.3 cm (2.08 in x 3.6 in x 7.6 in)	
Weight	604 g (1.3 lb)	

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