

The electronic technician's Fluke 287 DMM

Application Note

Electronic devices, and the methods for designing and servicing them, are changing daily. Fluke tracks these changes closely, and when demand for a particular test method reaches critical mass, we develop a new DMM test feature to match.

The new Fluke 287 true-rms handheld multimeter has multiple features specifically designed for electronic technicians working in service applications as well as those involved in the design and development of new electronic products.

Display

Perhaps the biggest and most important feature offered on the new Fluke 287 DMM is its 1/4 VGA dot-matrix display.

Fluke developed this large screen in order to offer more flexibility in changing function displays and to provide more information at a glance. In the MIN MAX mode it's large enough to show the current reading, the Min, Max, and Avg readings along with their time stamps, elapsed time, and the start time and date for the recording session, simultaneously. No more toggling back and forth. This capability can be very useful in quickly tracking down interactions between sensitive electronics.

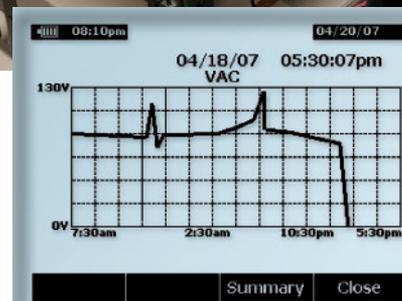
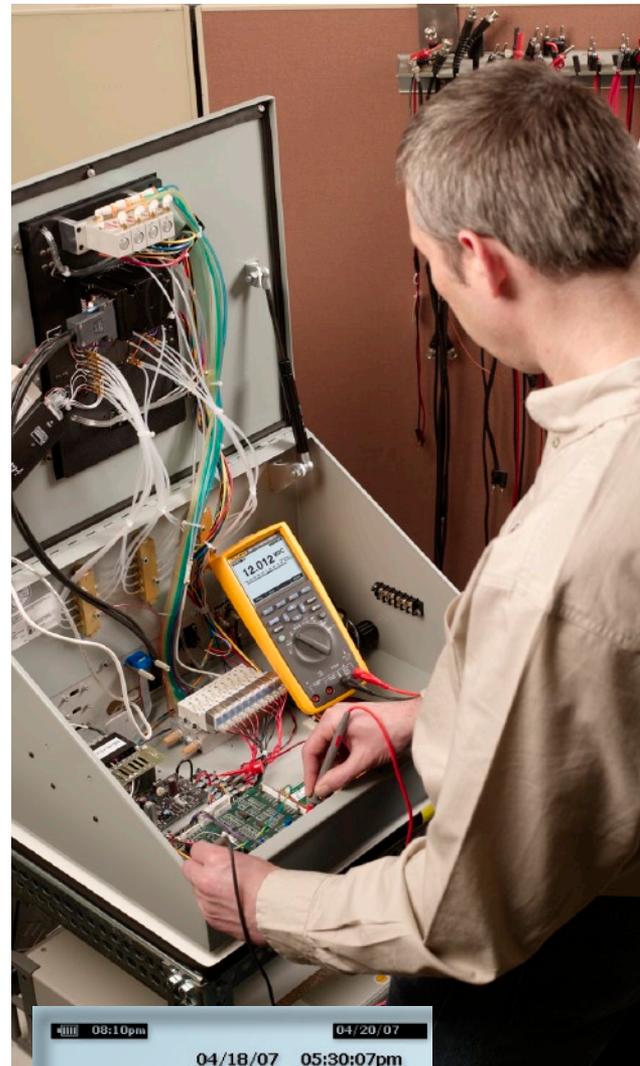
Then, there's the added capability this display brings to recording and logging. Here's an example of how one creative engineer tested the design of a new power inverter using a logging meter. He needed to record

the dc input voltage and current, the output ac voltage and current, and the temperature rise inside the inverter, while the input voltage and load were varied. The solution was to use five logging meters, download the results to FlukeView® Forms software, and graph it together in a single report.

Although the user was happy with his results, he still wanted more – the ability to see his results at the end of each test segment, without having to download to a computer each time. Well, the new Fluke 287 offers a feature called TrendCapture, a logging and graphing feature that was developed based on such user inputs.

TrendCapture appears as a strip chart-like display onscreen, with date and time information and a digital readout for whichever point on the graph you select with the cursor. The meter can also save multiple recording sessions before downloading, and it can record for over a week without a battery change.

And finally, this new screen has enough room to display how-to information about the meter's functions—just select the function and press the (i) info button. It's like having a built-in user manual.



Bandwidth

Other interesting features include the 100 kHz bandwidth of the Fluke 287 DMM, V ac and mV ac functions, and the ability to read voltage values expressed as dBV or dBm. This true-rms reading function is essential for evaluating the performance of servo loops and audio amplifiers.

And, since one of the uses for dB measurements is testing the frequency response of amplifiers, the Fluke 287 DMM designers included the ability to set up the instrument to simultaneously measure dBV or dBm and the frequency of the measurement in dual display mode. Add to this the ability to setup the dBm mode for a broad range of reference impedances and the 287 becomes the tool of choice for amplifier and audio transmission line performance testing.

Capacitance

Among the new features is capacitance that now reads up to 100 mF. With all of today's supercaps, and the large capacitors used in electronic motor drives and power inverters, this order of magnitude contribution to range is sure to be popular.

AC + DC true-rms voltage and current

Volts or amps readings can be made showing individual ac and dc values in a dual display, or the two values may be combined to display the true-rms signal present.

The dual display mode is useful for evaluating dc power supplies and any present ripple voltage. This mode also supports troubleshooting triac-based power controllers where both ac and dc values are present. AC+DC true-rms allows evaluation of the heating effect of the combined values. You can also revert to a standard dc measurement where you can then evaluate duty cycle and pulse widths of these complex waveforms in the dual display mode.

Temperature

The mV dc menu offers the ability to convert the meter to a thermometer in either degrees Fahrenheit or Celsius, based on the output of a K-type thermocouple. In this mode, the meter monitors the temperature of the input jacks to provide the reference value needed for accurate measurement. And, using the

recording function to log temperature over time means the test technician can evaluate electronic system cooling over a wide range of conditions for a day or more.

Basics

This new meter excels in the basics too, beginning with its 50,000 count resolution. Take for example, its 50 mV range where you can read voltages down to 1 μ V. Basic dc accuracy is 0.025 %, while basic true-rms ac readings are accurate to 0.3 %. And remember, ac measurements can be made over a broad frequency range—up to 100 kHz.

All in all, the new Fluke 287 is yet another example of how suggestions by busy technicians can be integrated into a powerful and still easy to use tool.

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