

• **Accurate interpretation.**

The operator must interpret measurements correctly. If he makes the measurement with the multimeter on the wrong range setting, for example, he could identify failing parts as good, or vice versa.

Consider this example. In the assembly and testing of a power adapter for a laptop computer, the operator must mount the transformer in a plastic housing, attach the main input lead to the primary side of the transformer, and connect rectifier diodes to the output side of the transformer.

As the power adapter is assembled, the operator must make, minimally, four critical tests:

- Measuring the impedance of the primary side windings of the transformer.
- Measuring the impedance of the secondary windings.
- Applying power to the transformer and measuring the output voltage and current with no load.
- Measuring the output voltage and current with the load attached to the transformer.

To top it off, the operator must repeat this process for every power adapter being assembled during his shift. Doing so requires almost robotic consistency. A Japanese lean-manufacturing principle known as Poke Yoke stresses minimizing waste and eliminating failures at each stage of production. That principle applies in any testing environment where a fault can replicate itself unless it is detected and eliminated at its source.

The Fluke 8808A—built for manufacturing

With the arrival of the new 8808A benchtop multimeter, Fluke has tackled the requirements of diverse manufacturing environments head-on.

The meter offers a dual-display, 5½-digit benchtop multimeter optimized for the manufacturing environment. The full-featured instrument handles all the standard measurements—volts, ohms, and amps—and it offers 0.01 % V dc accuracy. And while many meters offer dual volts/frequency readings, the 8808A displays volts and current side by side, a much harder engineering accomplishment.

While serving in a variety of ways in design and service, as well as manufacturing, the Fluke 8808A multimeter is distinguished by a range of functions that optimize it for the complexities of a diverse manufacturing environment:

- Simplified setup for multi-step test routines via front-panel “radio like” preset buttons.
- A Limit Compare mode with pass/fail indicators to eliminate misinterpretations from borderline readings.
- An integral dc leakage current test for measuring low “standby” or leakage currents.
- A “2x4-wire” function eases testing of complex surface-mount PCBs.

Setup keys for repetitive operations ensure consistency and repeatability

Setup keys on the Fluke 8808A take the familiar paradigm of preset-station buttons on a car radio and advance it by several levels of sophistication. Imagine that a single test on the production line entails several settings on the multimeter, including range setting and pressing of multiple buttons. Leaving these setup steps in the hands of a production line operator could be risky, especially if it involves repeating those steps for every

unit coming down the production line. (The operator typically has a work instruction sheet for this purpose, but that approach simply specifies a step-by-step procedure for the operator to follow; it doesn’t eliminate those steps.)

However, with the introduction of setups, a test engineer defines each procedure, programs it into the multimeter, and associates it with a setup button on the front panel of the multimeter. On the production line, the operator simply pushes one button to recall the setup.

Setup keys help to ensure consistency and repeatability of measurements throughout the manufacturing process, eliminating the major causes of error in fast-moving manufacturing operations.

Limit Compare mode eliminates errors in interpretation

What about the challenge of interpreting measurement results? Should that be left to a production line operator who is trained to follow processes but lacks understanding of the fundamentals behind them?

Take the example of measuring a 9 V power supply rail with a high-precision multimeter, in which a reading may show fluctuations in the last one or two digits due to variations in component characteristics or environmental conditions. The operator’s work instruction sheet may state that the battery voltage must fall between 9.001 V and 8.999. However, if the last digit is fluctuating—right on the “edge” of the specification—does the production line operator have the skill to specify whether the power supply has passed or failed?

Using the Limit Compare mode, the 8808A defines a reading as a “pass” or a “fail,” saving the operator from having to make a judgment call when faced with a borderline reading.

