

The New Fluke 87V Digital Multimeter cuts through the clutter to accurately measure adjustable-speed motor drives

Technology
at Work



Until now, there hasn't been a multimeter on the market able to accurately measure adjustable-speed ac motor drives. Technicians had to use an oscilloscope, rely on the voltage and frequency readings calculated by the drive itself, or guess.

But a new Fluke digital multimeter (DMM), the 87V, incorporates a selectable low pass filter that delivers accurate drive output measurements with the push of a button. Now, troubleshooters don't have to guess whether the drive is operating correctly and delivering the correct voltage, current or frequency for a given control setting.

ASDs: Essential, but tough to measure

Adjustable-speed drives (ASDs) deliver big benefits for industry. They save energy, enable more precise process control and help motors and equipment last longer.

But the pulse width modulated (pwm) AC signals from ASDs contain electrical noise that 'blows the minds' of ordinary true-rms DMMs, producing wildly inaccurate readings.

The causes of this discrepancy are bandwidth and shielding. Many of today's true-rms digital multimeters have bandwidths out to 20 kHz or more. So they respond not only to the fundamental component, which is what the motor really responds to, but also to all of the high frequency components generated by the pwm drive. And if the DMM isn't shielded for high frequency noise, the drive controller's high noise levels make the measurement discrepancies even more extreme.

With the bandwidth and shielding issues combined, many true-rms meters will display readings as much as 20 to 30 % higher

than what the drive controller is indicating. These meters may read frequencies on the output side of the ASD in kilohertz: a thousand times higher than the frequency that matters to the motor.

In the past, this left the troubleshooter with few good choices.

"If they didn't have a scope, what they would have to do is take a look on the drive, and just hope that its voltage reading is correct," says Rockwell Automation's Rick Hoadley, Technical Program Manager, Allen-Bradley Engineered Drives. Because the ASD output voltage value is calculated, and not an actual reading, the technician could not rule out problems with the ASD itself. In addition, because a motor could be hundreds of feet distant, the voltage at the motor could be significantly different from the reading shown by the ASD.



**The Fluke 87V:
One-button solution**

The Fluke 87V, the latest in Fluke's popular line of industrial DMMs, solves such problems with a button-controlled filter that enables the 87V to precisely measure voltage and frequency on ASDs.*

"Those are two parameters which are critical for operating a motor properly," says Hoadley. "Because, for a motor to work right, it has to have the right volts-per-hertz ratio. If you're low in the volts-per-hertz, you're going to be low in the torque available out of the motor. And if you're high on the volts-per-hertz, that means you're very likely saturating the motor, and that could be a reason why the motor's running hot."

"Because the drives are always operating at different frequencies, you have to figure what the voltage should be, and how do I measure it properly?" Hoadley continues. "To have a meter to do a quick check to see what's going on really is important, especially in the field, for troubleshooting. The technician or engineer can take a quick look, calculate the ratio and say, 'all right, I'm basically where I should be for this motor.'"

In addition to its unique ability to accurately measure ASDs, the Fluke 87V boasts a new thermometer function and provides an important line of defense against workplace accidents. Rated for use in 600 V CAT (category) IV and 1000 V CAT III environments, the 87V is engineered to withstand voltage spikes of 8 kilovolts and reduce risks related to surges and spikes that can cause arc flashes.

*Patent pending

Thanks to its selectable low pass filter, the Fluke 87V DMM can accurately measure adjustable speed motor drives.

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