

## Onsite, onscreen DMM trending fixes problems at a food processor

### Application Note



### Testing Functions Case Study

Shane Horn is a maintenance technician at a food processing plant in Canada. The plant is a large one, and ships all over the world. It's also very flexible, and can change over and produce many different products and package sizes in varying size runs.

As one could expect, the facility uses a lot of equipment—pumps, mixers, valving equipment and vacuum pumps on the process side, robotic package loaders on the finishing side, followed by carton machines, automatic case packers and conveyor systems.

The plant employs between 100 and 110 people, eight of whom maintain all the equipment, with two technicians per shift, says Horn. "We have a pipefitter/welder on days, as well as a full-time day technician."

Like most of the maintenance people, Shane is skilled in two trades. He started with the company as a millwright and then went through a four-year company apprenticeship program and became a licensed electrician.

With multiple skills, the maintenance people do multiple jobs. "We could be on a robot one minute, do PLC programming the next, and going to the processing side and fixing a pump that's leaking, and troubleshooting a vacuum pump or an automatic finishing valve," says Horn. "We do our own machining, too," he adds.

Horn uses a variety of Fluke equipment in his work, including a 199C Color ScopeMeter® test tool with the ac/dc current clamp and a Ti20 Thermal Imager, but the one instrument he uses most is a 289 True-rms Industrial Logging Multimeter with

**Tools:** Fluke 289 Digital Multimeter, Fluke 199C Color ScopeMeter®, Fluke Ti20 Thermal Imager

**Operator:** Shane Horn is a maintenance technician at a food processing plant in Canada

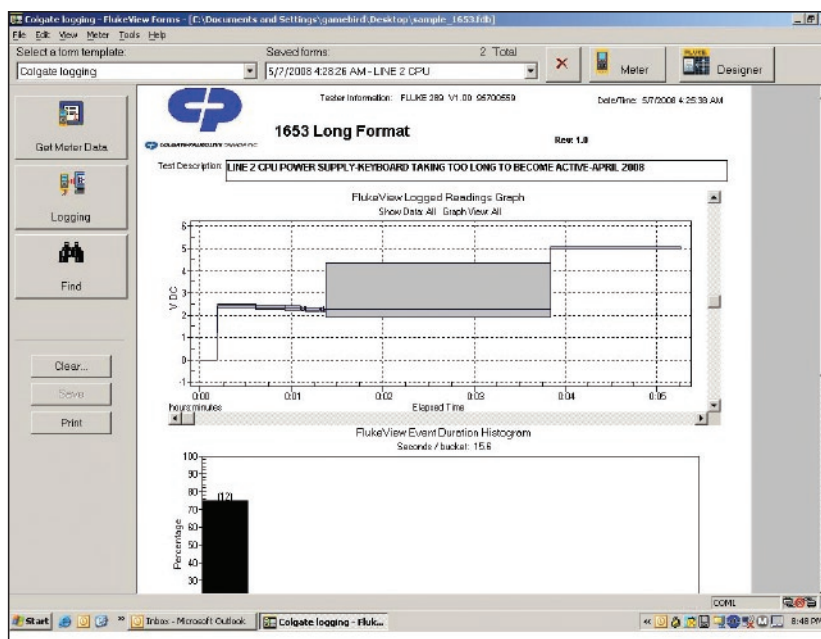
**Measurements:** TrendCapture on-screen logging, power supply monitoring, intermittents



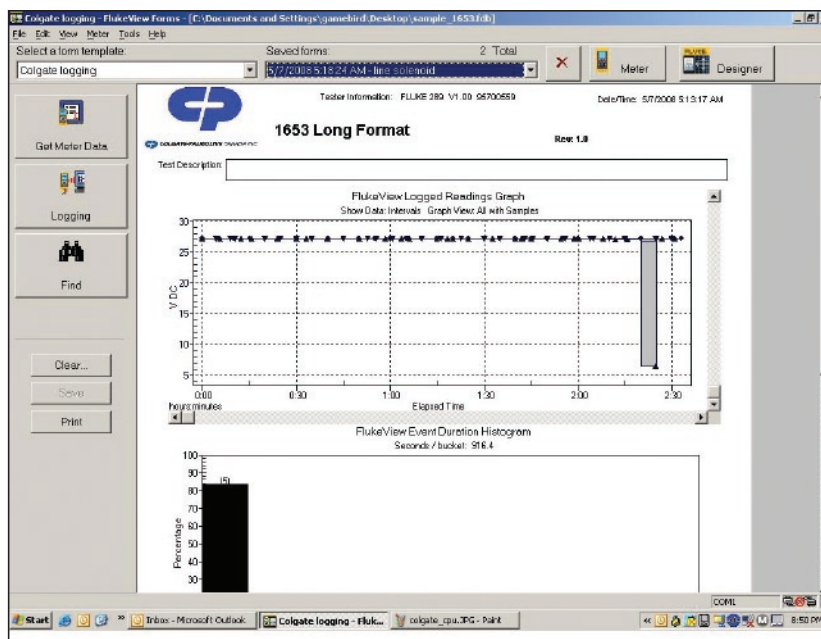
TrendCapture. What prompted the purchase of the 289, he explains, was the need to trend data. “Before I used to have my clamp-on for current,” he says, “but it didn’t have that recording function that I needed.” With his busy schedule, he explains, “It’s hard to stand around and test a circuit for hours on end.” The hardest to troubleshoot, he adds, are intermittent problems, but now he can hook the 289 to the circuit he’s troubleshooting and let it run while he’s working somewhere else. If something happens he can stop the record function, graph the data right on his DMM screen with Trend-Capture, and figure it out on the spot.

### What’s with those solenoid valves?

The TrendCapture onscreen logging function was especially useful when one of the package filling machines began to give trouble. The machine’s main air supply is controlled by two solenoid valves that are powered by the machine’s E-stop circuit. If the E-stop button is pushed, the machine goes to a zero-energy state: the electric power shuts down and the solenoid valves de-energize; one isolates the incoming air and the other dumps all residual air pressure. The problem was, while the filler was running, the main air would suddenly release and shut off the machine, then in a split second re-energize. “We traced the circuit and monitored the E-stop relays and all associated contactors,” Horn explains. “Coming up with nothing obvious, we started tightening all screw terminals and replacing contactors and even replaced the actual solenoids. The problem still existed.”



Identifying a power supply spike to a solenoid valve.



Diagnosing CPU power-up delays.

That's when he decided to try the TrendCapture function. He put the meter in the enclosure and started monitoring the contactor action, but found nothing. He then went further into the circuit and monitored the 24 V dc power feeding the line side of the contact. The next time the machine went down "I came right over, stopped my record function and went back to find out what had happened." Onscreen he saw a "spike"-like dip in the 24 V from one of the dc power supplies. The supply's cooling fan had gone bad, and when it overheated its output would drop, shutting off the air to the machine.

Once he had found the problem, Horn changed out the power supply, and the machine went back to full operation. "Having the 289 was like having another electrician working on shift with me," he says. "I was able to perform other tasks while the 289 was monitoring the circuit. I was in two places at the same time."

### **Solving another power supply problem**

The maintenance department also ordered the FlukeView® Forms software for his computer, and Horn put it to use right away. He plugged the data cable into the 289 and downloaded all of the logging information he had gathered from the solenoid problem, as well as a new CPU problem. "Our operator interface screen at power up would take a long time to become active," he explains. "I connected my 289 to the 5 V dc power supply and powered up the system. The meter captured the power supply struggling to reach 5 V dc. The first two to three minutes the power supply was only putting out 2 V dc to 3 V dc then instantly jumped up to 5 V dc and the HMI is then active. After this discovery we replaced the power supply and everything's great."

### **A graveyard shift-proof meter**

Horn has found the built-in protective features on the 289 useful, especially when they keep him from making mistakes. A few weeks ago, while working the graveyard shift, he was troubleshooting a dc motor that drives a heat shrink oven, and wanted to measure the current the armature was pulling. He went to hook the meter in series with the armature, he says, but neglected to connect the meter leads to the proper terminals on the meter. This is a classic error, but the 289 immediately gave him a warning message. "Before you even hook it up it gives you this warning, leads are connected improperly," he says. "It's a nice graveyard shift-proof meter, or for newer tradesmen, as well." And it's not affected by working nights.

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