

# 10 essential Fluke tools for data center maintenance

Many data centers take steps toward proactive maintenance using condition monitoring, which takes data collected as indicators of equipment performance. There is no tolerance for downtime. Keeping customer data available and protected at all times while maintaining stable operating conditions is not a simple task. You are going to want accurate, battle-tested measurement tools that extend uptime for as long as possible.

Data center managers and technicians need a broad set of tools to keep facilities operating at their maximum efficacy without disrupting efficiency. These tools can span multiple applications and functions including indoor air quality (IAQ) and heating, ventilation and air conditioning (HVAC), electrical diagnostics, thermal imaging, battery testing, power quality and vibration testing. The following 10 Fluke tools can benefit maintenance managers tasked with keeping their data center facilities up and running.



# 376 FC True-rms AC/DC Clamp Meter with iFlex®

Clamp meters help verify the presence of load current, ac/dc voltage and continuity. Electricians can use the Fluke 376 FC in tight cable compartments to measure current, up to 999.9 A. The 376 FC works well when measuring generator inrush, electrical motor inspection, and panel board measurements. This tool captures intermittent faults and frees you up to complete other pressing tasks while the clamp meter logs measurements. Its integrated variable frequency drive (VFD) low pass filter enables you to take accurate motor drive measurements as well. The bendable iFlex current probe expands the 376 FC's measurement range to 2500 A AC, which is helpful for accessing large conductors in tight spaces. After a brief set up, the tool wirelessly transmits measurement data to your smartphone using the Fluke Connect<sup>®</sup> app.



# **Ti400 Series Infrared Cameras**

A reliable thermal imaging camera can help you safely capture differences in apparent surface temperature measurements that could indicate an imminent threat to operations. The Fluke Professional Series of infrared cameras—particularly the Ti400, Ti450, and Ti480—can be put to great use in a data center environment. Engineers and technicians can inspect raceways, electrical panels, uninterruptible power supply (UPS), transformers, transfer switches, standby generators, HVAC systems, server racks and power distribution units (PDU) to locate hot and cold spots and differences in temperature, or Delta T. In addition to its HVAC applications, an infrared camera such as The Ti400 helps diagnose overload or imbalance in circuits, fuses or fuse clips, and electrical panels.

#### **975 AirMeter**

The Fluke 975 AirMeter measures electrically energized objects, and can diagnosis and repair HVAC systems. As servers generate substantial heat, it's important to monitor air temperature, relative humidity, and airflow in data centers. Used in combination with an infrared camera—to visually check general cooling efficiency and server heat generation—the 975 AirMeter helps an analyst determine where the data center needs more cooling or if airflow is being restricted. Its air monitoring capabilities can be used for superheat and sub-cooling contact measurements, maintaining air ducts, and flame sensors.

#### **Fluke CV Series Infrared Windows**

Fluke infrared windows are installed on the outside of electrical panel doors, allowing users of a thermal imager to conduct inspections at a data center without opening the panel cover. This reduces both exposure to switch gear and risk of arc flash. With a very simple installation process, Fluke IR windows make for much faster and more comfortable inspections, as PPE is often not required, all while increasing the safety of your people.

### **805 FC Vibration Meter**

The 805 FC allows data center commissioning engineers and HVAC technicians to determine the status of blower motors and compressors. They can screen rotating machines for mechanical faults—bearing status, imbalance, looseness, and misalignment. In addition, technicians can use the 805 FC to assist in correcting the misalignment that often afflicts motors and pumps. This rugged vibration screening tool provides trending of vibration levels in addition to health status and repair recommendations, and uses Fluke Connect to wirelessly communicate measurements and action items to your smartphone.







# **500 Series Battery Analyzers**

A battery analyzer is critical for maintaining a data center's critical power supply or UPS. Using the Fluke 500 Battery Analyzer, you can toggle between meter mode (for quick troubleshooting, 999 records with timestamps) and sequence modes (for testing multiple power systems and battery strings). Any electrical or UPS technician can set up a profile for generating reports and data management prior to testing various batteries. The measurement data and battery profile information is stored and archived with the management software and can be used to compare results, switch results between conductance and resistance readings, and perform trend analysis. With a Fluke 500 Battery Analyzer you can measure battery internal resistance, voltage and discharge volts, perform ripple voltage tests, intercell strap resistance, and with management software, configure up to 100 profiles and 100 profile templates. Each profile stores up to 450 batteries with timestamps. Either the device or the software determines battery health on a simple Pass/Warning/ Fail indicator system.

#### **435 Series II Power Quality and Energy Analyzer**

You need an easy to use tool for addressing potential issues with electrical power distribution problems. That's where Fluke 435-II Power Quality and Energy Analyzers enter your electrician's workflow. These logging tools can be used to conduct load studies on critical electrical equipment, catch harmonics issues, and monitor generator performance. The Fluke 435-II, for example, measures all three phases, and comes standard with automatic trending and logging functionality. Its PowerWave Data Capture is particularly useful for data center electricians. This feature keeps you informed of waveforms and half-cycle for characterizing electrical system dynamics.

#### 190-504/S 500 MHz ScopeMeter® Test Tool

ScopeMeter® Portable Oscilloscopes combine the performance of a bench oscilloscope with a multimeter and paperless recorder for installing, commissioning, and maintaining electronic equipment in the field. Fluke ScopeMeter test tools use a unique Connect-and-View<sup>™</sup> mode to automatically and continuously set up the oscilloscope, making them easy to use even on complex signals. The bandwidth of 190 Series II ScopeMeter is up to 500MHz, and the sampling rate is up to 5Gs/S.

1000V CAT III, 600 CAT IV, isolated channel and floating measurement enable this ScopeMeter to directly measure the power supply in the field. A 190 Series II can help a data center electrician or engineer inspect and verify the utility power input status, and the UPS output quality. The recorder feature of Fluke 190 II ScopeMeter can capture the UPS transfer/switching time to verify if the pause is within the loads' tolerance. This assures the UPS can function as a real critical uninterruptable power supply. Meanwhile, the 190 Series II can be used to troubleshoot motor drives in HVAC and precision AC systems, from power supply, to AC-DC, and DC-AC.









### **289 True-RMS Industrial Logging Multimeter**

Every humming data center facility deserves a digital multimeter. The widely trusted and durable Fluke 289 True-RMS Industrial Logging Multimeter arms technicians with a tool to eliminate ghost voltage with its low impedance voltage function. The Fluke 289 comes with a logging function for unattended monitoring of signals over time, and it stores up to 15,000 recorded events. Electricians can test transformers, electrical panels, and generators for voltage harmonics, as well as log intermittent faults and transient voltage (as fast as 250 µs) in electrical systems. As faults can cost data centers in lost data and dollars, you need the ability to quickly diagnose signal problems. Digital multimeters, such as the Fluke 289, are useful during the installation phase for VSD motors, as well as for subsequent troubleshooting. The 289 measures up to 10 A (20 A for 30 seconds) and is compatible with the Fluke Connect mobile app.

# **1623-2 GEO Earth Ground Tester**

Grounding design for electrical service and equipment in data centers is extremely important for keeping employees safe. The Fluke 1623-2 Earth Ground Tester can measure earth to ground loop resistances using a pair of clamps, meaning the earth ground rod does not need to be disconnected. It can be used to diagnose intermittent electrical problems related to poor earth grounding and test soil resistivity. The Fluke 1623-2 performs all four types of earth ground measurement, including: Stakeless Testing (using two clamps), Selective Testing (using one clamp and stakes), 3- and 4-Pole Fall-of-Potential (using stakes), and 4-Pole Soil Resistivity Testing (using stakes).

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#### Fluke Corporation

PO Box 9090, Everett, WA 98206 U.S.A.

Fluke Europe B.V. PO Box 1186, 5602 BD Eindhoven, The Netherlands

#### For more information call:

In the U.S.A. (800) 443-5853 or Fax (425) 446-5116 In Europe/M-East/Africa +31 (0) 40 2675 200 or Fax +31 (0) 40 2675 222 In Canada (800)-36-FLUKE or Fax (905) 890-6866 From other countries +1 (425) 446-5500 or Fax +1 (425) 446-5116 Web access: http://www.fluke.com

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