FLUKE®

Low power factor

Application Note

Power Quality **Case Study**

Measuring tools: Fluke 434 Power Quality Analyzer

Features: Low power factor

Problem Description:

Because power quality issues are difficult to pinpoint, clients often reach the wrong conclusions about their power issues. That often leads to expensive solutions that don't actually correct the underlying problem.

In one example, a facility hired a consultant to complete a site planning assessment survey for a proposed new server room. The server room was intended to minimize performance risks and reduce reliability problems.

Measurements taken

As always, the consultant started by collecting baseline readings. Connecting the Fluke 434 to the secondary side of the transformer, he checked the View Config screen (Fig. 1) diagram to verify proper connections. Switching to the phase view, (Fig. 2 & 3) the consultant checked polarity and voltage levels. The voltage and current phase arrows were too far apart for normal operations. Something was wrong with the power factor.

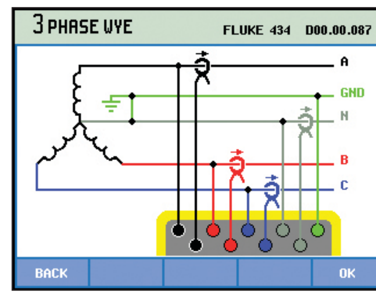

Fig. 1 View configuration screen

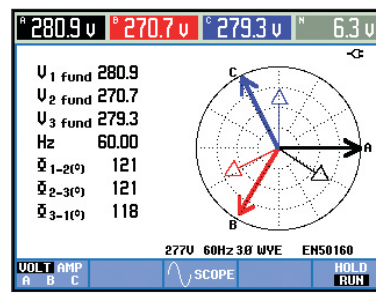

Fig. 2 Phase View-Volts

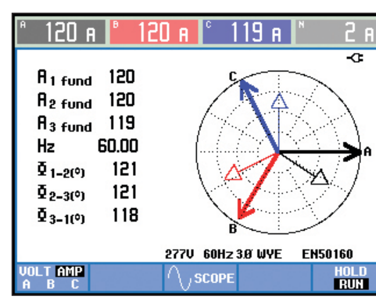

Fig. 3 Phase View-Amps

Selecting the Power & Energy function from the menu, he examined the power factor (PF) (Fig. 4) and displacement power factor (DPF) (Fig. 5).

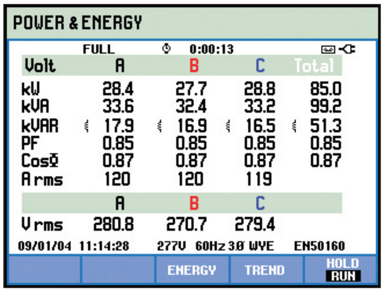

Fig. 4 Power factor

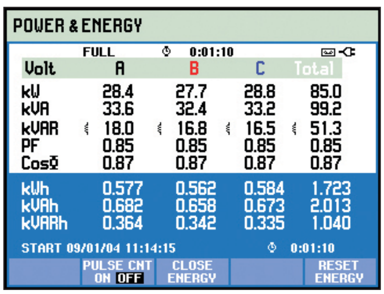

Fig. 5 Displacement power factor

Analysis

Power factor compares the real power (watts) required to the apparent power (Volts-Amps) being consumed. A completely efficient system would have a power factor of 1.0. However, in this facility, inductive loads including motors, transformers, and high-intensity lighting were consuming significant reactive nonworking power in addition to real power. That was causing a low power factor.

And since utilities start charging higher fees for power factors less than .95, this facility was getting higher power bills in addition to the voltage drops and overheating issues.

Conclusion:

Based on the information gathered with the Fluke 434, the consultant recommended a capacitor bank to correct the low power factor. By counteracting the reactive power of the inductive loads, the capacitors reduced the power factor discrepancy, increasing overall electrical system capacity and eliminating both the performance issues and the excess utility fees.

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Fluke Corporation
PO Box 9090, Everett, WA USA 98206

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 40) 2 675 200 or
Fax (31 40) 2 675 222
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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