

Case Study

A Multi-Tenant 600,000 Square Foot Commercial Office Building in Jersey City, NJ.



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Overview:

Variable Frequency Drives (VFD's) are computer and power supply. Excessive heat will cause premature VFD failure.



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Causes of Excessive Heat Include

- Fan Failure
- Clogged Vents
- Loose Terminal Connections

Identification of Problem

Delta T Alerts were installed on both units (Figure 1). The site's Chief Engineer tested and recorded temperatures at two VFD's labeled P-4 and P-5.



Figure 1 Delta T Alerts installed on VFD's P-4 and P-5.

Operating & Temperature Data

After the Delta T Alerts were installed, temperature data was collected under normal operating conditions (Table 1). Additionally, a thermographic and visual image was collected of the external VFD to document the cover panel temperature measurements (Figure 2 and Table 2).

VFD #	Operating Hertz	Room Ambient Temperature	Internal VFD Temperature Recorded by Delta T Alert
P-4	45	77°F	97°F
P-5	45	77°F	95°F

Table 1 Temperatures collected under normal operating conditions.

Temperatures	Operating Hertz	Minimum	Maximum
Rec. #1	79°F	75°F	83°F – Exhaust Vent

Table 2 Cover panel temperatures collected under normal operating conditions.

Case Study

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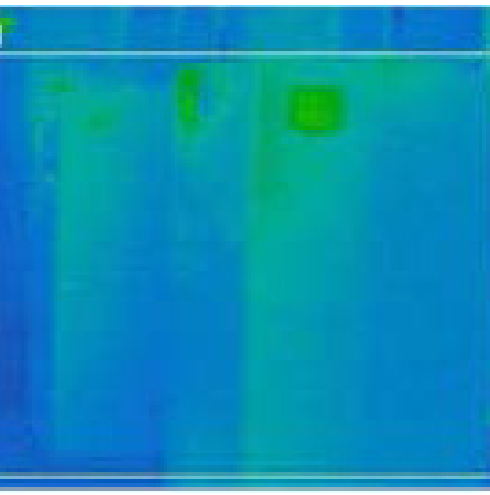


Figure 2 Thermographic and visual image documenting normal operation of VFD.

Fan Removal & Temperature Data Results

The Chief Engineer removed the fan from P-5 VFD (Figure 3) and took thermal readings of both VFD's after 30 minutes of operation at 45 Hertz (Figure 4 and Table 3) concluding that fan failure results in an overheated VFD resulting in premature VFD failure.

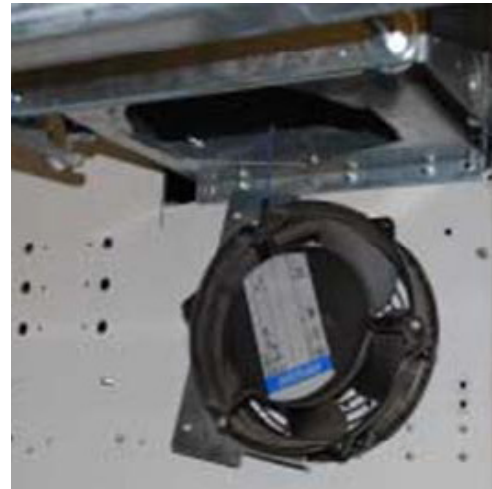
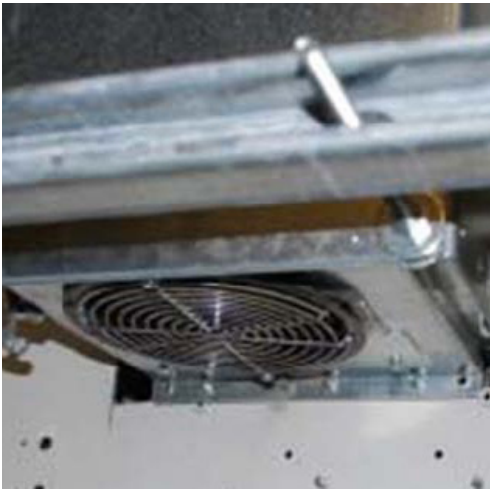


Figure 3 Documenting the disconnection and fan removal from VFD unit P-5.

Case Study

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Figure 4 Thermographic and visual image documenting increased heat of VFD P-5 after fan removal.

VFD #	Operating Hertz	Room Ambient Temperature	Internal VFD Temperature Recorded by Delta T Alert
P-4	45	77°F	97°F
P-5	45	77°F	117°F

Table 3 Temperatures collected with VFD P-5's fan removed.

Benefits & Conclusion

- Delta T Alert monitoring system can be used as a proactive tool to reduce expensive repairs and/or replacement of Variable Frequency Drives.
- Delta T Alert records three readings per day, 365 days per year versus one infrared snapshot once per year.
- Delta T Alert's prevent downtime or possible catastrophic failure.

Use of IRISS family Electrical Maintenance Safety Devices (EMSDs) such as infrared windows, ultrasound ports, voltage detection ports and online monitoring, allow energized electrical maintenance tasks to safely and efficiently be completed while switchgear enclosure remains closed.

To learn more about infrared windows, Electrical Preventive Maintenance, NFPA standards or electrical thermography please visit www.iriss.com.



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