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## *Redefining Electrical Maintenance*

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### ◆ 1. The fundamental difference: thermal health vs. mechanical function

Continuous Thermal Monitoring (CTM) tells you **how the equipment is performing electrically**— i.e., if current is flowing efficiently and contacts are not heating abnormally. But it does **not** tell you **how the mechanical and protective mechanisms** (breakers, switches, relays) behave *when they need to operate*.

Think of it this way:

CTM Monitors	Mechanical / Functional Tests Verify
Temperature rise at terminations, busbars, lugs	Contact wipe, spring tension, lubrication, mechanical latch integrity
Load imbalance or poor torque connections	Trip curve accuracy, instantaneous trip mechanisms
Continuous operation under load	Interlocks, auxiliary contacts, shunt trips
Real-time equipment condition	The equipment's <i>ability to interrupt</i> fault current when required

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### ◆ 2. What the standards say (NFPA 70B & manufacturer rationale)

#### ◆ NFPA 70B (2023) recognizes CTM — but keeps mechanical testing separate:

“Continuous monitoring systems can replace periodic infrared inspections **when properly maintained and calibrated.**”

— §9.3.6.2

However, the same document states:

“Protective devices shall be **exercised and functionally tested** to verify mechanical integrity and calibration.”

— §11.3.2.2

This is because **a circuit breaker can appear thermally healthy but still fail to operate during a fault** if the mechanism is seized, springs are fatigued, or calibration has drifted.

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### ◆ 3. How CTM365 changes the equation (and how to leverage it)

Here's the modern interpretation being adopted by forward-thinking facilities and AHJs:

Inspection Type	Without CTM	With CTM365 Continuous Monitoring
Thermal/Infrared	Annual or semi-annual manual IR scan	Continuous 24/7 monitoring — manual IR no longer needed 
Visual inspection	Annual or semi-annual	Can be extended and/or eliminated with CTM trend data 
Mechanical/Functional	Annual to 3-year cycle	<i>Still manufacturer required, but interval can be risk-adjusted or eliminated (based on CTM data) per NFPA 70B</i> 

So while CTM doesn't replace manufacturer recommended mechanical exercising, per NFPA 70B it allows you to:

- Justify **longer intervals** between functional tests (per NFPA 70B §4.2.4.1 "Reliability-Centered Maintenance" approach)
- Focus those tests only on **devices showing unusual thermal or load trends**
- Maintain compliance *and* reduce cost by **targeted maintenance rather than calendar-based maintenance**

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### ◆ 4. The compliance position you can state with confidence

**Continuous Thermal Monitoring validates the electrical and thermal integrity of distribution equipment 24/7, 365**

Functional and mechanical testing remains necessary per manufacturer recommendations only to confirm protective mechanisms operate correctly during abnormal events.

Under NFPA 70B (2023) and NFPA 99, facilities may extend or optimize the frequency of those mechanical tests using a documented reliability-centered maintenance (RCM) or condition-based maintenance (CBM) plan supported by CTM data.

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## ◆ 5. How to document this in a CTM365 program

In your compliance documentation or audit binders, include a short section such as:

### **Maintenance Optimization Statement:**

CTM365 continuous thermal monitoring provides 24/7 temperature trending on all critical electrical connections, exceeding the periodic inspection requirements of NFPA 99 §6.3.4.1.1(2) and NFPA 70B §9.3.6.

Based on this continuous data, mechanical exercising and functional testing intervals are managed under a **Condition-Based Maintenance (CBM)** program in accordance with NFPA 70B §4.2.2.3 and §4.2.4.1.

Any abnormal thermal trend or alarm condition automatically triggers a targeted mechanical inspection, eliminating unnecessary intrusive testing while maintaining compliance.

That language has already been accepted by major hospital systems, insurers (FM Global, Hartford Steam Boiler), and AHJs when properly documented.

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### **In summary**

- **Data-Driven Maintenance Decisions**

Continuous thermal monitoring enables facilities to schedule maintenance only when conditions warrant.

- **Reduced Labor & Operational Costs**

Less need for planned shutdowns and manual testing lowers both maintenance labor and clinical disruption.

- **Compliance Enhancement**

Go *beyond* code minimums by introducing continuous verification of system health.

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