

## **INSTALLER and INSPECTOR QUICK-REFERENCE:**

**2025 NRCA-MCH-12-A**

### **Fault Detection and Diagnostics (FDD) for Packaged Direct-Expansion Units**

#### **Purpose and Scope of the Test**

The purpose of this test is to verify proper fault detection and reporting for automated fault detection and diagnostics systems for packaged DX units. Automated Fault Detection and Diagnostic (FDD) systems ensure proper equipment operation by identifying and diagnosing common equipment problems such as temperature sensor faults, low airflow, or faulty economizer operation.

FDD systems help to maintain equipment efficiency closer to rated conditions over the life of the equipment.

#### **Test trigger**

**Newly Constructed and Additions/Alterations:** Applies to any FDD system installed on a packaged direct expansion (DX) unit.

FDD systems are required on newly installed air handlers with a mechanical cooling capacity greater than 33,000 Btu/hr and an installed air economizer.

#### **Relevant Energy Code References and Required Compliance Documents**

Title 24, Part 6 of the California Building Standards Code, Building Energy Efficiency Standards (Energy Code) sections 120.2(i), 120.5(a)11, 160.3(a)2H, 160.3(d)1K, Nonresidential Appendix NA7.5.11, Design Document NRCC-MCH-E, NRCC-PRF-E, LMCC-MCH-E, LMCC-PRF-E. Coordinate this test with:

- NRCA-MCH-02-A Outdoor Air.
- NRCA-MCH-05-A Air Economizer Controls.

#### **Who Can Perform the Test**

This test must be performed by an acceptance test technician certified by a CEC-approved Acceptance Test Technician Certification Provider, using compliance document NRCA-MCH-12-A.

#### **Required Tools**

FDD tests for packaged DX units require no additional instrumentation for testing, since control algorithms are embedded in FDD hardware installed on the HVAC unit.

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#### Estimated Time to Complete Test

**Construction Inspection:** 0.5 hour.

**Functional testing:** 1 to 2 hour.

FDD systems have the capability to report alarms to a remote server; accessible via a Web interface. It may be helpful to have two people conducting the test – one to perform testing on the unit and a second to verify reporting of the alarm to the remote interface.

#### Potential Issues and Cautions

Compared to the pressure sensors, the temperature sensors can have a longer response time to reach a steady-state condition. Therefore, the FDD algorithms may have trouble working properly during transitional states – for example, when the fan or compressor first turns on. The tester should be aware of the potential for false alarms.

#### Inspection Enforcement

Verify the inspector is in receipt of one NRCA-MCH-12-A for EACH system that must demonstrate compliance. All NRCA forms for Mechanical Systems must have a water mark logo from a certified Mechanical ATTCP Provider.

#### Required:

Verify that the installed FDD has been certified to the Energy Commission (CEC) and is listed on the CEC website (<https://www.energy.ca.gov/rules-and-regulations/building-energy-efficiency/manufacturer-certification-building-equipment/economizer-fdd>).

#### Acceptance Criteria

- The FDD system is able to detect a disconnected outside air temperature sensor and report the fault.
- The FDD system is able to detect excess outside air and report the fault.
- The FDD system is able to detect a stuck outdoor air economizer damper and report the fault.