

**INSTALLER and INSPECTOR QUICK-REFERENCE:  
2022 NRCA-MCH-03-A  
Constant Volume, Single-Zone, Unitary (Packaged and Split)  
Air Conditioner and Heat Pumps Systems**

**Purpose and Scope of the Test**

This test verifies the components of a constant volume, single-zone, unitary air conditioner, and heat pump system function correctly, including: thermostat installation and programming, supply fan, heating, cooling, and damper operation.

**Test trigger**

Newly Constructed and Additions/Alterations: Applies only to new constant-volume, single-zone, and unitary units with direct expansion (DX) cooling. These units may be cooling only or heating and cooling.  
Exceptions: Systems serving healthcare facilities.

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

Title 24, Part 6 of the California Building Code, Building Energy Efficiency Standards (Energy Code) sections 110.12(a), 120.2(a), 120.2(b), 120.5(a)2, 141.0(a), 141.0(b)2C, 141.0(b)3, 160.3(a), 180.2(b) and NA7.5.2.  
Testing of the economizer, outdoor air ventilation, and demand-controlled ventilation are located in the following sections of the Reference Appendices:

- NA7.5.1.2 Constant Volume System Outdoor Air Acceptance.
- NA7.5.4 Air Economizer Controls and Exhaust Air Heat Recovery (if applicable).
- NA7.5.5 Demand Control Ventilation (DCV) Systems (if applicable).

**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-03-A.

**Required Tools**

No tools are required to perform this test, however under certain ambient conditions, a temperature probe may be helpful to determine whether heating or cooling is actively taking place. An amp meter may also be helpful in determining the status of the fans in situations where the airflow is difficult to observe.

**Estimated Time to Complete Test**

- Construction inspection: 0.5 to 1 hours, depending on familiarity with thermostat programming
- Functional testing: 1 to 2 hours

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**Potential Issues and Cautions**

- Ensure that the supply fan runs continuously in occupied mode and cycles appropriately in unoccupied mode. Cycling refers to the supply fan running only when heating or cooling is enabled.
- When testing the manual override, adjust the length of the override period to minimize test time. Be sure to reset the override period back to the correct length of time.
- Tip: Overall test time may be reduced (especially for rooftop HVAC units controlled by thermostats) if two people perform the test – one to manipulate the thermostat while someone else verifies operation at the packaged unit.
- The Energy Code does not mandate the actual differential between occupied and unoccupied setpoints, only that the system must be adjustable down to 55°F for heating and up to 85°F for cooling and that the thermostat can be set for a 5°F dead band.
- Setback control is only required for climates where the winter median of extremes is less than or equal to 32°F.
- Setup control is only required for climates where the 0.5 percent summer design dry-bulb temperature is greater than or equal to 100°F.

**Inspection Enforcement**

Verify the inspector is in receipt of one NRCA-MCH-03-A for EACH air conditioner and heat pump system constructed or modified.

**Optional Equipment Check:**

Verify that the acceptance test technician has access to the following equipment:

- Temperature meter.
- Amp meter.

**Acceptance Criteria**

The following are verified through inspection:

- Verify that the control system is certified as OpenADR 2.0a or 2.0b compatible.
- Thermostat is located within the space conditioning zone that is served by the respective HVAC system.
- Thermostat meets the temperature adjustment and dead band requirements of section 120.2(b).
- Occupied, unoccupied, and holiday schedules have been programmed per the schedule of the facility.
- Preoccupancy purge has been programmed to meet the requirements of section 120.1(d)2.

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**Acceptance Criteria (cont.)**

The following modes of operation function correctly:

- Occupied heating mode operation: The supply fan operates continuously, all heating stages operate, cooling is not enabled, and the outdoor air damper is at minimum position.
- Occupied operation with no heating or cooling load: The supply fan operates continuously, heating or cooling is not enabled, and the outdoor air damper is at minimum position.
- Occupied cooling mode operation: The supply fan operates continuously, all cooling stages operate, heating is not enabled, and outside damper is at minimum position.
- Unoccupied operation with no heating or cooling load: The supply fan shuts off, heating or cooling is not enabled, and the outdoor air damper is fully closed.
- Unoccupied operation with heating load: The supply fan cycles ON, heating is enabled, cooling is not enabled, and the outdoor air damper is either closed or at minimum position.
- Unoccupied cooling mode operation: The supply fan cycles ON, cooling is enabled, heating is not enabled, and the outdoor air damper is at minimum position.
- Manual override mode: Verify that the system reverts to occupied mode, the supply fan turns ON for duration of override, heating or cooling is enabled as necessary, and the outdoor air damper opens to minimum position.
- Manual override mode: Verify that the system reverts to unoccupied mode when manual override time period expires.

Follow the **Construction Inspection** and **Functional Testing** instruction on the NRCA-MCH-03-A.