

AUTOMATIC FAULT DETECTION AND DIAGNOSTICS (FDD) FOR AIR HANDLING UNITS AND ZONE TERMINAL UNITS ACCEPTANCE

CEC-MECH-13A (Revised 08/09)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		MECH-13A
NA7.5.12 Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance		(Page 1 of 6)
Project Name/Address:		
System Name or Identification/Tag:	System Location or Area Served:	
Enforcement Agency:	Permit Number:	
<i>Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.</i>	Enforcement Agency Use: Checked by/Date	

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:	Field Technician's Signature:	
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.
- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:		Phone:
Responsible Person's Name:	Responsible Person's Signature:	
License:	Date Signed:	Position With Company (Title):

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Intent:

Verify that the system detects common faults in air handling units and zone terminal units.

Construction Inspection

- 1 Instrumentation to perform test includes, but not limited to:
 - a. No instrumentation is required – changes are implemented at the building automation system control station.
- 2 Installation
 - a. The functional testing verifies proper installation of the controls for FDD for air handling units and zone terminal units. No additional installation checks are required.

A. Functional Testing for Air Handling Units	Results
Testing of each AHU with FDD controls shall include the following tests:	
Step 1: Sensor Drift/Failure	
a. Disconnect outside air temperature sensor from unit controller	Y / N
b. Verify that the FDD system reports a fault	Y / N
c. Connect OAT sensor to the unit controller	Y / N
d. Verify that FDD indicates normal system operation	Y / N
Step 2: Damper/Actuator Fault	
a. From the control system workstation, command the mixing box dampers to full open (100% outdoor air)	Y / N
b. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
c. Reconnect power to the actuator and command the mixing box dampers to full open	Y / N
d. Verify that the control system does not report a fault	Y / N
e. From the control system workstation, command the mixing box dampers to a full-closed position (0% outdoor air)	Y / N
f. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
g. Reconnect power to the actuator and command the dampers closed	Y / N
h. Verify that the control system does not report a fault during normal operation	Y / N
Step 3: Valve/actuator fault	
a. From the control system workstation, command the heating and cooling coil valves to full open or closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
Step 4: Inappropriate simultaneous heating, mechanical cooling, and/or economizing	
a. From the control system workstation, override the heating coil valve and verify that a fault is reported at the control workstation	Y / N
b. From the control system workstation, override the cooling coil valve and verify that a fault is reported at the control workstation	Y / N

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c. From the control system workstation, override the mixing box dampers and verify that a fault is reported at the control workstation	Y / N	

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B. Functional Testing for Zone Terminal Units	Results
Testing shall be performed on one of each type of terminal unit (VAV box) in the project. A minimum of 5% of the terminal boxes shall be tested.	
Step 1: Sensor drift/failure	
a. Disconnect the tubing to the differential pressure sensor of the VAV box	Y / N
b. Verify that control system detects and reports the fault	Y / N
c. Reconnect the sensor and verify proper sensor operation	Y / N
d. Verify that the control system does not report a fault	Y / N
Step 2: Damper/actuator fault	
If the Damper is stuck open:	
a. Command the damper to be fully open (room temperature above setpoint)	Y / N
b. Disconnect the actuator to the damper	Y / N
c. Adjust the cooling setpoint so that the room temperature is below the cooling setpoint to command the damper to the minimum position. Verify that the control system reports a fault	Y / N
d. Reconnect the actuator and restore to normal operation	Y / N
If the Damper is stuck Closed:	
a. Set the damper to the minimum position	Y / N
b. Disconnect the actuator to the damper	Y / N
c. Set the cooling setpoint below the room temperature to simulate a call for cooling. Verify that the control system reports a fault	Y / N
d. Reconnect the actuator and restore to normal operation	Y / N
Step 3: Valve/actuator fault (For systems with hydronic reheat)	
a. Command the reheat coil valve to (full) open	Y / N
b. Disconnect power to the actuator. Set the heating setpoint temperature to be lower than the current space temperature, to command the valve closed. Verify that the fault is reported at the control workstation	Y / N
c. Reconnect the actuator and restore normal operation	Y / N
Step 4: Feedback loop tuning fault (unstable airflow)	
a. Set the integral coefficient of the box controller to a value 50 times the current value. Lower the space cooling setpoint to simulate a call for cooling.	
b. The damper cycles continuously and airflow is unstable. Verify that the control system detects and reports the fault	Y / N
c. Reset the integral coefficient of the controller to the original value to restore normal operation	Y / N
Step 5: Disconnected inlet duct	

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a. From the control system workstation, command the damper to full closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N	

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C. Testing Results	PASS / FAIL
Test passes if all applicable answers are yes under Functional Testing Sections .	<input type="checkbox"/> <input type="checkbox"/>

D. PASS / FAIL Evaluation (check one):	
<input type="checkbox"/>	PASS: All Construction Inspection responses are complete and all Testing Results responses are "Pass"
<input type="checkbox"/>	FAIL: Any Construction Inspection responses are incomplete <i>OR</i> there is one or more "Fail" responses in Testing Results section. Provide explanation below. Use and attach additional pages if necessary.