



# TRIGGERS for 2013 Title 24, Part 6 Nonresidential HVAC Controls – 1

Space Conditioning Equipment <sup>A</sup>	Mandatory Measures							Prescriptive Requirements			
	Zone Thermostat <sup>B</sup> §120.2(a), (b) Setback Capable <sup>L</sup>	DCV <sup>C</sup> §120.1(c)	Shutoff and Reset <sup>D</sup> §120.2(e)	Ventilation Dampers <sup>E</sup> §120.2(f) Automatic close upon fan shutdown <sup>M</sup>	Isolation Devices <sup>F</sup> §120.2(g)	Demand Shedding <sup>G</sup> §120.2(h)	Economizer FDD <sup>H</sup> §120.2(i) §140.4(e)	Zone Control <sup>I</sup> §140.4(d)	Supply Temperature Reset <sup>U</sup> §140.4(f)	Economizer <sup>E, W</sup> §140.4(e)1, 2, 3, 4, 5	Variable Flow Control <sup>K</sup> §140.4(k)6 §140.4(m)
Package Terminal Air Conditioner <sup>S, T</sup>	YES <sup>N</sup>	YES	YES <sup>V</sup>	YES	no	YES	YES	YES	YES	YES	YES <sup>J</sup>
Unitary Air Conditioners and Condensing Units <sup>N</sup>	YES	YES	YES <sup>V</sup>	no	no	no	YES	no	no	YES	no
Unitary Heat Pumps <sup>Q</sup>	YES	YES	YES <sup>V</sup>	YES	no	no	YES	no	no	YES	no
Applied Heat Pumps <sup>Q</sup>	YES	YES	YES <sup>V</sup>	YES	YES	YES	YES	YES	no	YES	YES <sup>J</sup>
Variable Refrigerant Flow (VRF) <sup>P</sup>	YES	YES	YES <sup>V</sup>	YES <sup>O</sup>	YES	YES	YES	YES	no	YES	YES
Forced Air Furnace	YES	YES	YES <sup>V</sup>	YES <sup>R</sup>	no	YES	YES	no	no	YES	no
Unit Heater	YES	no	YES <sup>V</sup>	no	no	no	no	no	no	no	no

<sup>A</sup> Central Energy Management Control System (EMCS) should be installed at building site for optimal equipment operation and coordination.

<sup>B</sup> Feedback received from zones through EMCS. Load required based on number of satisfied zones.

<sup>C</sup> Demand Control Ventilation. See §120.1(c) 3, 4, &5 for additional CO<sub>2</sub> concentration setpoint information and sensor location requirements.

<sup>D</sup> Must include automatic restart to maintain setback temperatures as necessary.

<sup>E</sup> Only applies to new air-cooled unitary direct-expansion systems with 54,000 Btu/h capacity or greater. See §120.2(i) for greater detail.

<sup>F</sup> For systems serving multiple zones totaling more than 25,000 sq. ft..

<sup>G</sup> Include settings capable of disabling, manually controlling, or automatically operating equipment.

<sup>H</sup> Fault detection and diagnostics (FDD) systems are commonly available for packaged HVAC units, and can be integrated directly by the manufacturer. These are required for all systems with cooling capacity of 54 kBtu/h (4 ½ tons) or greater. Controls include economizer checks and refrigerant diagnostics. The systems can report failures or suboptimal conditions that impact efficiency. Required acceptance tests for these systems may be found Reference Appendix NA7, 7.5.11.”

<sup>I</sup> Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.



- <sup>J</sup> Variable Frequency Drive necessary to operate supply fan speed control at the unit.
- <sup>K</sup> Air-side applications referred to in respective code language. Central EMCS necessary for remote system operation and ability to oversee all space-conditioning equipment and pumping needs.
- <sup>L</sup> Heating and Cooling Setpoint dead band of  $\pm 5^{\circ}\text{F}$  should be implemented on all temperature setpoints. Applies only to equipment with heating AND cooling capability. Setback zone temperature setpoint to  $55^{\circ}\text{F}$  or lower for heating and  $85^{\circ}\text{F}$  or higher for cooling.
- <sup>M</sup> Exemptions for; gravity dampers, combustion air paths, 24 hour operation, or local law jurisdiction.
- <sup>N</sup> Stand-alone single room window units are exempt (See §110.2(c)).
- <sup>O</sup> Damper to reduce ventilation to zero during unoccupied periods.
- <sup>P</sup> Assuming system has ventilation capacity at the terminal device.
- <sup>Q</sup> Air or water source configuration.
- <sup>R</sup> Reference to combustion air requirements.
- <sup>S</sup> Configurations vary between availability of central plant in design or reliance on self-contained heating and cooling.
- <sup>T</sup> Special application requirements for Hotels, High-rise Residential, and Perimeter Zoning. Setback capable terminal devices should be used except where zone is not on EMCS. In that case, capability of four programmable control periods per 24 hours is required (§110.2(c)).
- <sup>U</sup> A reset strategy defined and applied to the supply air stream of the unit or terminal device.
- <sup>V</sup> Must include automatic time switch OR occ. sensor OR 4-hour timer. 7-day programmable local control exemption.
- <sup>W</sup> Exemptions apply where: (1) outside air conditions are undesirable, (2) high-rise residential, (3) adverse effects of other systems, like dehumidification, (4) high cooling efficiency systems [Table 140.1-A] (5) computer rooms served per §140.9(a).





# Acceptance Tests

Form and Measure Matrix	Zone T-Stats	DCV	Shutoff and Reset	Ventilation Dampers	Isolation Devices	Demand Shedding	Econ. FDD	Zone Control	Supply Temp. Reset	Variable Flow Control
2013-NRCA-MCH-02-A Ventilation Systems	no	YES	no	YES	no	no	YES	no	no	no
2013-NRCA-MCH-03-A Constant Volume, Single-zone, Unitary A/C and HP	YES	YES	YES	YES	YES	YES	YES	YES	no	no
2013-NRCA-MCH-05-A Air Economizer Controls	no	YES	no	YES	no	no	YES	no	no	no
2013-NRCA-MCH-06-A Demand Control Ventilation	no	YES	no	no	no	no	no	no	no	no
2013-NRCA-MCH-07-A Supply Fan VFD	no	YES	no	YES	no	no	YES	no	no	YES
2013-NRCA-MCH-08-A Valve Leakage	no	no	no	no	YES	no	no	no	no	no
2013-NRCA-MCH-11-A Automatic Demand Shed	no	no	YES	no	no	YES	no	YES	no	no
2013-NRCA-MCH-12-F Fault Detection and Diagnostic for DX Systems	no	no	no	no	no	no	YES	no	no	no
2013-NRCA-MCH-13-F Fault Detection and Diagnostic for AHUs	no	no	no	no	no	no	YES	no	YES	no
2013-NRCA-MCH-16-F Supply Air Temp Reset	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2013-NRCA-MCH-18-F Energy Management Control System	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES





# TRIGGERS for 2013 Title 24, Part 6 Nonresidential HVAC Controls - 2

Space Conditioning Equipment <sup>A</sup>	Mandatory Measures							Prescriptive Requirements		
	Zone Thermostat <sup>B</sup> §120.2(a), (b) Setback Capable <sup>L</sup>	DCV <sup>C</sup> §120.1(c)	Shutoff and Reset <sup>D</sup> §120.2(e)	Ventilation Dampers <sup>E</sup> §120.2(f) Automatic close upon fan shutdown <sup>M</sup>	Isolation Devices <sup>F</sup> §120.2(g)	Demand Shedding <sup>G</sup> §120.2(h)	Economizer FDD <sup>H</sup> §120.2(i) §140.4(e)	Zone Control <sup>I</sup> §140.4(d)	Supply Temperature Reset §140.4(f)	Variable Flow Control <sup>K</sup> §140.4(k)6 §140.4(m)
<b>Boiler</b>	no	no	<b>YES</b>	<b>YES</b> <sup>N</sup>	<b>YES</b>	<b>YES</b>	no	<b>YES</b>	<b>YES</b> <sup>J</sup>	<b>YES</b>
<b>Air-cooled Chiller</b>	no	no	<b>YES</b>	<b>YES</b> <sup>O</sup>	<b>YES</b>	<b>YES</b>	no	<b>YES</b>	<b>YES</b> <sup>P</sup>	<b>YES</b>
<b>Water-cooled Chiller</b>	no	no	<b>YES</b>	<b>YES</b> <sup>O</sup>	<b>YES</b>	<b>YES</b>	no	<b>YES</b>	<b>YES</b> <sup>P</sup>	<b>YES</b>

<sup>A</sup> Central Energy Management Control System (EMCS) should be installed at building site for optimal equipment operation and coordination.

<sup>B</sup> Feedback received from zones through EMCS. Load required based on number of satisfied zones.

<sup>C</sup> Demand Control Ventilation. See §120.1(c) 3, 4, & 5 for additional CO2 concentration set point information and sensor location requirements.

<sup>D</sup> Must include automatic restart to maintain setback temperatures as necessary.

<sup>E</sup> Only applies to new air-cooled unitary direct-expansion systems with 54,000 Btu/h capacity or greater. See §120.2(i) for greater detail.

<sup>F</sup> For systems serving multiple zones totaling more than 25,000 sq. ft.

<sup>G</sup> Include settings capable of disabling, manually controlling, or automatically operating equipment.

<sup>H</sup> Fault detection and diagnostics (FDD) systems are commonly available for packaged HVAC units, and can be integrated directly by the manufacturer. These are required for all systems with cooling capacity of 54 kBtu/h (4 ½ tons) or greater. Controls include economizer checks and refrigerant diagnostics. The systems can report failures or suboptimal conditions that impact efficiency. Required acceptance tests for these systems may be found Reference Appendix NA7, 7.5.11.” Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.

<sup>I</sup> Simultaneous heat and cool prevention except for variable-air-volume and other system types listed in this section. Ambient conditions also provide lockout for seasonal operation only.

<sup>J</sup> Referred to as “Hot Water Supply Temperature Reset”.

<sup>K</sup> Includes reference to both water and air-side applications referred to in respective code language. Central EMCS necessary for remote system operation and ability to oversee all space-conditioning equipment and pumping needs.

<sup>L</sup> Heating and cooling set point dead band of ±5°F should be implemented on all temperature set points. Applies only to equipment with heating AND cooling capability. Setback zone temperature set point to 55°F or lower for heating and 85°F or higher for cooling.

<sup>M</sup> Exemptions for: gravity dampers, combustion air paths, 24 hour operation, or local law jurisdiction.

<sup>N</sup> Reference to combustion air requirements.

<sup>O</sup> Reference to mechanical room ventilation fan where chillers are located.

<sup>P</sup> Referred to as “Chilled Water Supply Temperature Reset”.





# Acceptance Tests

Form and Measure Matrix	Zone T-Stats	DCV	Shutoff and Reset	Ventilation Dampers	Isolation Devices	Demand Shedding	Econ. FDD	Zone Control	Supply Temp. Reset	Variable Flow Control
2013-NRCA-MCH-07-A Supply Fan VFD	no	YES	no	YES	no	no	YES	no	no	YES
2013-NRCA-MCH-08-A Valve Leakage	no	no	no	no	YES	no	no	no	no	no
2013-NRCA-MCH-09-F Supply Water Temperature Reset	no	no	no	no	no	no	no	no	YES	no
2013-NRCA-MCH-10-A Hydronic System Variable Flow	no	no	YES	no	YES	no	no	YES	no	no
2013-NRCA-MCH-11-A Automatic Demand Shed	no	no	YES	no	no	YES	no	YES	no	no
2013-NRCA-MCH-17-F Condenser Water Temperature Reset	no	no	no	no	no	no	no	no	YES	no
2013-NRCA-MCH-18-F Energy Management Control System	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

