

DOCKETED	
Docket Number:	24-BSTD-03
Project Title:	2025 Energy Code Compliance Software, Manuals and Forms
TN #:	262795
Document Title:	Dual Fuel Heat Pump Thermostat Settings
Description:	Analysis reviewing common settings used for Dual Fuel Heat Pumps. This research will be used to inform settings specified in the Alternative Calculation Method Reference Manuals.
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MEMORANDUM

TO: 2025 Energy Code Compliance Software, Manuals and Forms (24-BSTD-03)
FROM: California Energy Commission
SUBJECT: Default Dual Fuel Heat Pump Thermostat Settings in the 2025 Energy Code Alternative Calculation Method Reference Manuals
DATE: April 25, 2025

Executive Summary

Building thermostat control settings in dual fuel heat pump systems play a crucial role in determining when the heat pump or gas furnace operates, significantly impacting seasonal gas and electricity consumption.

In dual fuel heat pump systems, the furnace and the heat pump typically cannot operate simultaneously because the heat pump coil is located downstream of the furnace and cannot reject heat to hot air exiting the furnace. Therefore, the heat pump must be locked out whenever the furnace is operating.

Multiple control methods exist in the various building thermostat models available on the market. The most common method is a control setting that locks out the heat pump and only operates the furnace below a certain outdoor temperature. This temperature is often referred to as the “changeover” or “balance point” temperature.

Generally, using a lower lockout temperature results in lower energy use because the heat pump operates more efficiently than supplemental furnace heating. However, using a lower lockout temperature in corresponding Energy Code compliance software may result in unachieved savings since users can override lockout temperatures.

As a result of this uncertainty, default lockout temperatures from thermostat manufacturers were used by the California Energy Commission (CEC) to help identify reasonable and conservative lockout temperatures for the 2025 Energy Code Alternative Calculation Method (ACM) Reference Manuals. The ACM Reference Manuals define the CEC-approved methods for demonstrating modeled compliance with California’s Energy Code (Title 24, Part 6). This memo provides further detail and some examples from several thermostat and heat pump manufacturers. The nomenclature and default settings vary between thermostat models.

AUXILIARY HEAT CONTROL DEFAULT VALUES

Manufacturer A:

ISU Number	Installer Setup Name	Settings	Default	Residential, Commercial or Both	Requires EIM	Notes
312	Outdoor Lockout Heat Pump	Off 5° F to 60° F (in 5° F increments)	Off (See Notes)	Both	No	ISU 312 Heat Pump Outdoor Lockout requires an outdoor sensor. Default is 40 F if ISU 201 Heating Equipment is Air to Air Heat Pump and ISU 218 Backup Heat Type is Gas/Oil.

This thermostat defaults to 40 °F changeover temperature when the system type is set to a dual fuel heat pump system.

A different thermostat model from the same manufacturer also defaults to a 40 °F changeover temperature.

Outdoor Lockout Heat Pump	Off	Off (See Notes)	Both	No	Default is 40 F if ISU 201 Heating Equipment is Air to Air Heat Pump and ISU 218 Backup Heat Type is Gas/Oil. Default is Off if ISU 201 Heating Equipment is Air to Air Heat Pump and ISU 218 Backup Heat Type is Electric. Default is Off if ISU 201 Heating Equipment is Geothermal or Geothermal Radiant.
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Manufacturer B:

1.5.10.7 Balance Point

This feature allows the user to set the outdoor temperature for which the dual fuel system changes between Heat Pump heating and Furnace heating

- Options: 5°F to 60°F
- **Default: 40°F**

This thermostat defaults to 40 °F changeover temperature for dual fuel systems.

Manufacturer C:

Heat Pump Restricted Mode Outdoor Temperature	"--" then 40	"--" = Disabled 10 to 70 Degrees F	43
	4.5	-12 to 21 Degrees C	

This thermostat defaults to 40 °F changeover temperature for dual fuel systems.

A different thermostat from the same manufacturer uses different nomenclature, but also defaults to locking out the compressor at 40 °F.

Lockouts*	Aux Heat	[No], Yes
	Aux Lockout ODT*	30 - 70 Deg [50 Deg]
	Comp Heat	[No], Yes
	Comp Lockout ODT*	5 - 70 Deg, 40 Deg

Manufacturer D:

Dualfuel	30	On, Off	Off
Dualfuel Changeover on Outdoor Temp	31	On, Off	Off
Dualfuel Balance Point	31	0 - 60 Degrees	35

This thermostat defaults to 35 °F changeover temperature for dual fuel systems.

Manufacturer E:

heat pump lockout temp	-20°F to 65°F in 5°F steps (-29°C to 16°C in 2.5°C steps)		15°F		Only displayed for systems with HP and heater kit. Is common lockout with aux heat source.
aux heat lockout temp	-10°F to 75°F in 5°F steps (-23°C to 22°C in 2.5°C steps)				Only displayed for systems with HP and heater kit. Doesn't apply to an aux heat source.
balance point	-10°F to 75°F in 5°F steps (-23°C to 22°C in 2.5°C steps)		50°F		Only displayed for dual-fuel systems (HP and gas furnace).
prioritize efficiency (or) prioritize comfort	(radio buttons)		50°F		Only displayed for dual-fuel systems (HP and gas furnace).

This thermostat defaults to 50 °F changeover temperature for dual fuel systems.

Manufacturer F:

5. Low Balance Point Default is **25°F**.
Adjustable range is -40°F to 48°F.
6. High Balance Point Default is **50°F**.
Adjustable range is -38°F to 75°F.

This thermostat uses a more complex control scheme that defaults to locking the heat pump out at 25 °F, locking the furnace out at 50 °F, and using other onboard control logic to determine which system to operate between 25 and 50 °F.

Conclusions

The nomenclature and default control settings for dual fuel systems vary between manufacturers and thermostat models. Default changeover settings for the products surveyed ranged from 35 °F to 50 °F, with one product using a more complex control scheme that defaults to allowing furnace operation at outdoor temperatures up to 50 °F.

The most common default setting among the products surveyed is 40 °F. As such, in the 2025 Energy Code ACM Reference Manuals staff requires that 2025 Energy Code compliance software use a thermostat lockout temperature of 40 °F for dual fuel heat pump systems.