LIGHT COMMERCIAL · UP TO 10 TONS · ALL-ELECTRIC OR DUAL-FUEL · GROUND-READY

Heat through frost.
All-electric or dual-fuel.

Three reasons, in order: a heat exchanger designed for no defrost stops, one controller, and ground-ready.

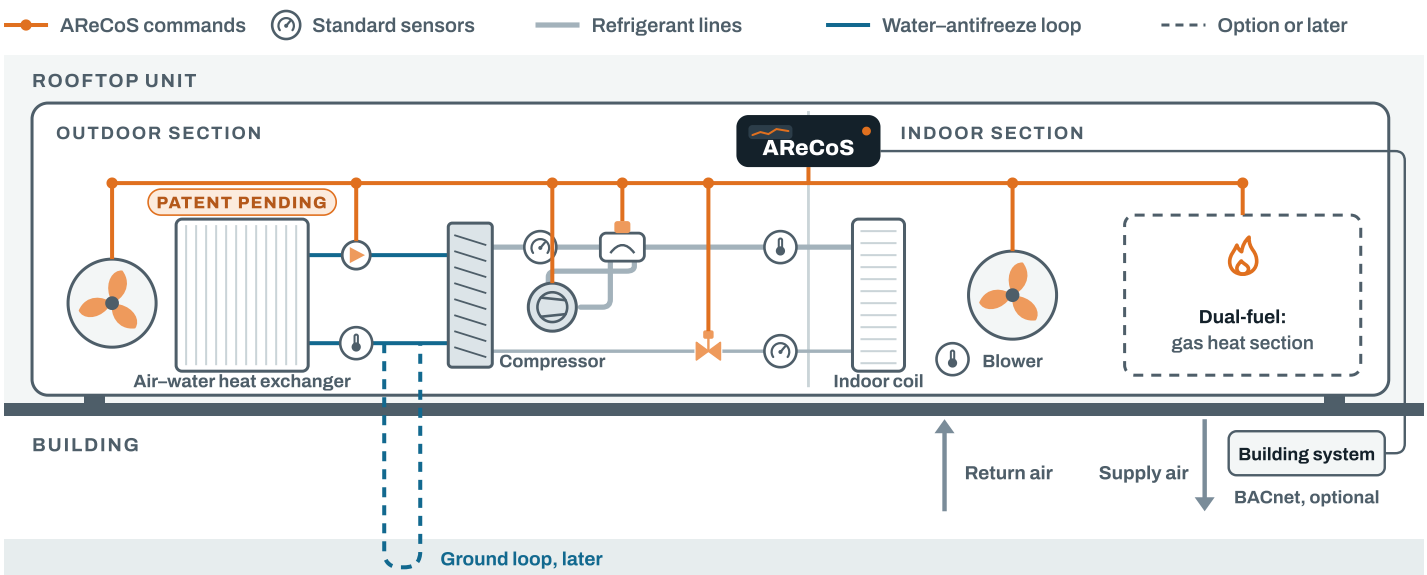
U.S. Patent 12,768,557
controller, granted Oct. 20, 2026

Air–water heat exchanger
patent pending, U.S. provisional 63/989,941

Hardware test published
US 2024/0295337 A1, FIGS. 4–7

Prototype design ratings
updated during certification

Controller hardware test, on a cooling bench.



TARGET · AT 0 °F
100%
of 47 °F rated heating capacity

TARGET · –15 °F
≥ 70%
of 47 °F rated heating capacity

MODELED · COOLING
22.1
IEER · EER 13.4

MODELED · 17 °F
2.57
COP · 3.72 at 47 °F

10-ton unit. Design targets and prototype design estimates, to be updated during certification.

1 · New electromechanical frost removal

Designed to keep frost thin and clear it while heating: no reverse-cycle defrost stops in normal operation; fallback defrost if it faults.

2 · The controller

Designed to pick the cheaper heat, heat pump or gas, hour by hour, and set the whole unit for the least electricity.

3 · Ground-ready

A ground loop is designed to connect straight to the outdoor heat exchanger. Sized for the whole winter, a loop needs no gas; gas or electric backup stays for safety.

Specification (as designed)

- **Electrical:** 208–230 V and 460 V three-phase, 575 V optional.
- **Designed for** UL 60335-2-40 listing, AHRI 340/360 ratings and ASHRAE 90.1.
- **Refrigerant:** R-454B (A2L), with leak detection and mitigation.
- **Cooling and backup:** designed to keep cooling to 115 °F; heating backup sized to the gap, 10, 15 or 20 kW.

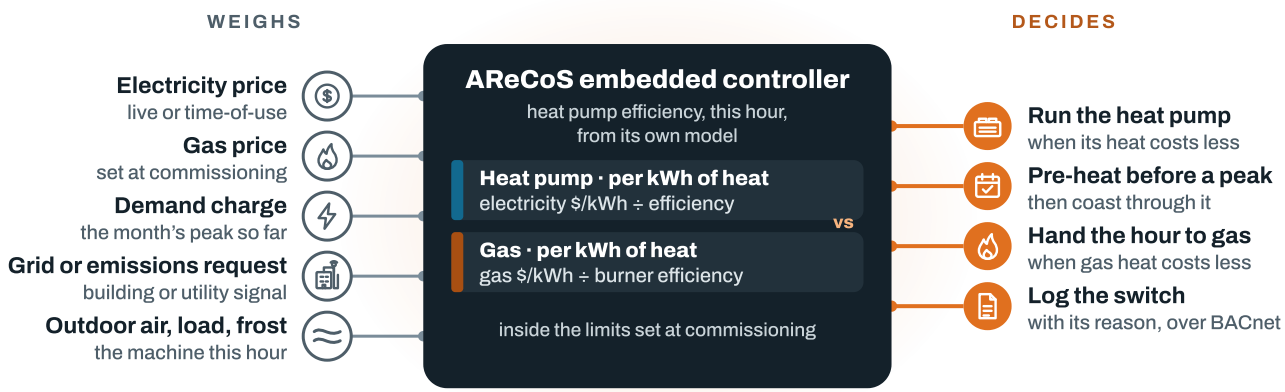
Why a heat pump, if the gas stays?

The heat pump is designed to carry the heat in every hour its heat costs less than gas; gas covers the hours it is cheaper, typically the price peaks and the coldest nights. In summer, the same unit is the air conditioner.

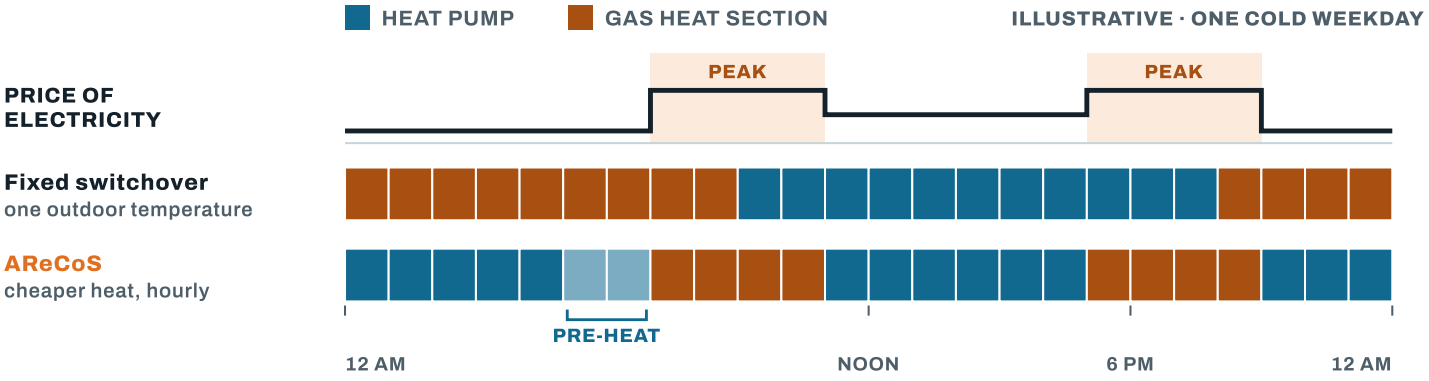
All-electric
Heat pump heating with optional electric resistance backup.

Dual-fuel
Heat pump heating with a gas heat section; the AReCoS controller manages fuel switching.

2 · The controller: the cheaper heat, each hour (design intent) · not one set temperature



One cold weekday (illustrative, not a measured result)



A fixed switchover burns gas through the cheapest power and runs the heat pump into the peak.

Holds the building's peak. Units on a roof are designed to share the switchover to hold the kW cap.

Prices the demand charge. Designed into the same decision, so a switch sets no new monthly peak.

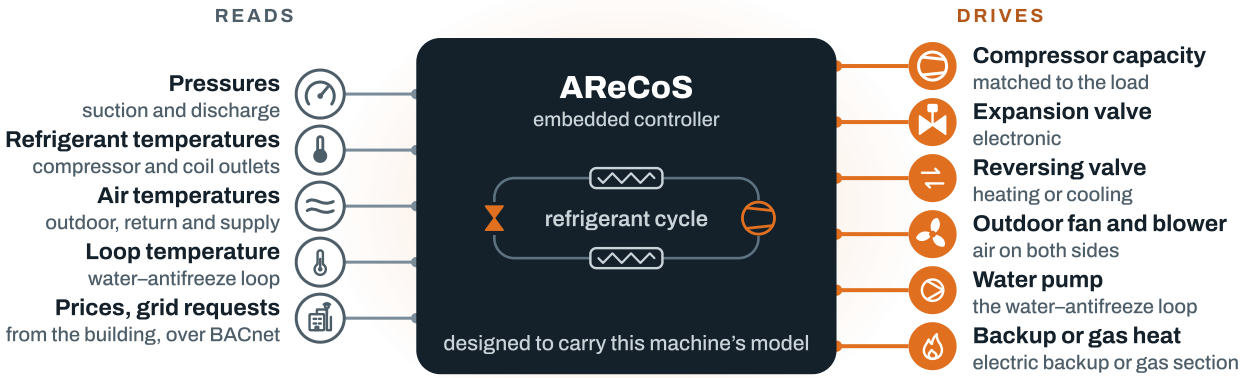
Controller: U.S. Patent 12,768,557, issued October 2026 · Air–water heat exchanger: patent pending, U.S. provisional application 63/989,941 · arecos.net · info@arecos.net · Rev 14

AReCoS

CONTROLLER · GRID · SERVICE · STATUS

One controller sets the whole unit.

Designed to set compressor, valves, fans and pump together for the least electricity. No cloud in the control path.



Designed to answer the grid

· design targets, within comfort limits · the controller decides how

TARGET · SHED
15%
of its power, on request

TARGET · CRITICAL
40%
shed

TARGET · SPARE POWER
+15%
added

TARGET · BUILDING
kW cap
held, winter and summer

Flags the likely cause before a visit

Designed to name the likely cause and where to look, in every mode.

Catches a slow leak

Designed to track refrigerant charge in heating and cooling.

Units agree among themselves

Designed to share the load over BACnet, with no supervisory system.

Prototype development: All-electric and dual-fuel configurations.

Initial pilots: All-electric and dual-fuel.

Commercial units: After the pilots and certification.

Reserve a place in the first units — free, no obligation, pilot costs planned to be mostly covered, under a written pilot agreement.

arecos.net/#reserve · info@arecos.net

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