XNNOV

AIR-TO-WATER HEAT PUMPS

Electrify heating and cooling with one low-GWP plant.

Commercial & institutional air-source heat pumps | 35 to 330 tons



10	A2L A1	AI	[-10 °F]
models, 35–330 T	low-GWP refrigerants	predictive plant control	min. heating ambient

GWLess Series Designed for cold climates Built for decarbonization

One plant for heating, cooling and hot water

The XNNOV air-to-water heat pump (AWHP) range replaces the boiler-plus-chiller plant with a single all-electric system. Each unit extracts heat from outdoor air and delivers hot water for space heating in winter, then reverses to supply chilled water in summer — from one footprint, one refrigerant circuit design and one control platform.

Built on XNNOV's GWLess low-GWP platform — R-454B (A2L) for reversible heating and cooling plants, R-515B (A1) for high-temperature heat pump boilers up to 190 °F — and an AI-driven control layer, the range covers 35 to 330 nominal tons in ten sizes, so a single product family serves everything from a mid-rise residential building to a hospital campus.

Applications

- Multifamily and mixed-use residential
- Schools, colleges and universities
- Hospitals and long-term care
- Offices, retail and hospitality
- Industrial and process heating/cooling
- Boiler/chiller retrofits and hybrid plants

Plant configurations

- Heating-only or reversible heating/cooling
- Modular multi-unit plants with N+1 redundancy
- Hybrid: AWHP base load with existing boilers for peak
- Simultaneous heating/cooling (heat recovery)

Why a hydronic heat pump plant

- Zero on-site combustion: no flue, gas service or combustion air
- Water distributes energy — no refrigerant piping inside the building
- Reuses existing hydronic terminals in retrofit projects
- Buffer storage enables load shifting and utility peak management
- Single-source equipment, controls and commissioning support

PERFORMANCE BRIEFLY

22.4	3.57	8.0	[-10 °F]
IPLV, Btu/W·h	**COPh**	**COPshc**	**min. heating ambient**
AHRI 550/590-part load	47 °F air / 110 °F LWT	simultaneous heat + cool	no add-on kit

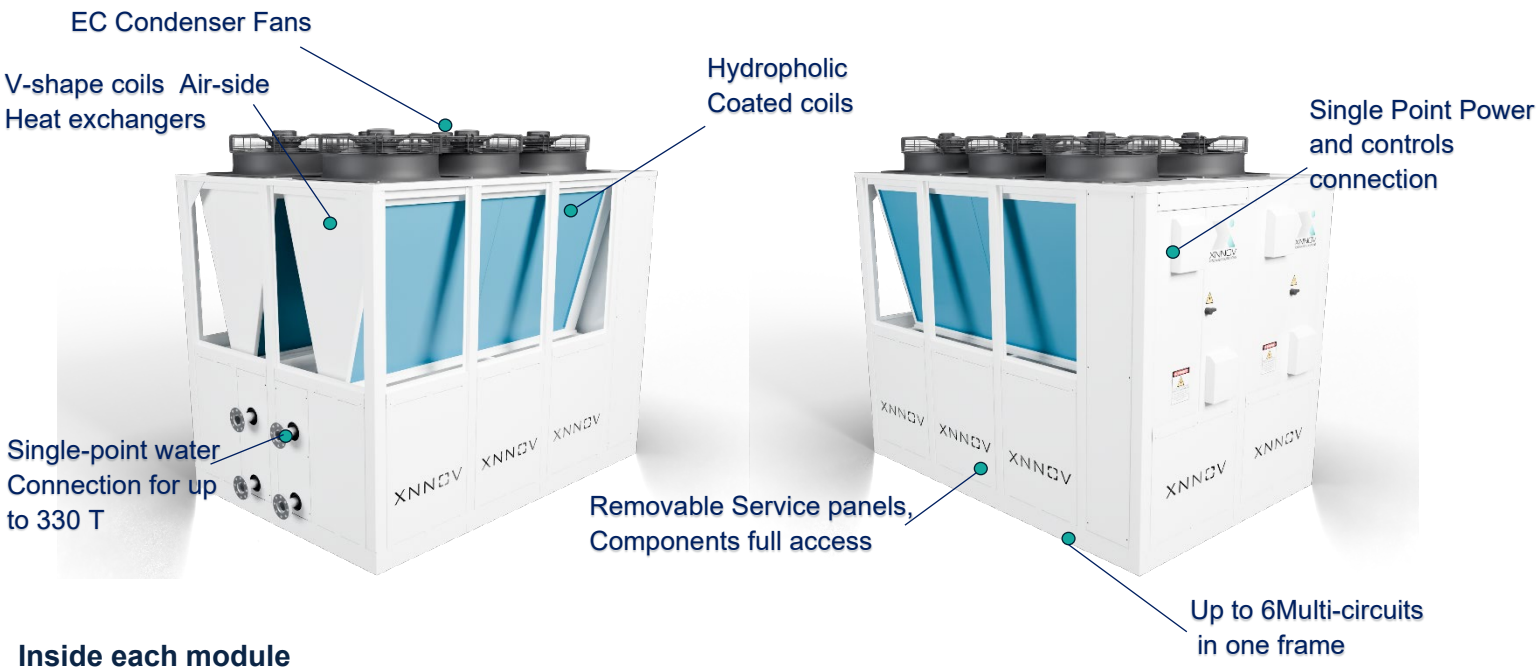


Tandem-module frame [35T-72T-105T-144T]



Trio-module frame [55T-110T-165T-220T-175T-330T]

Engineered inside



Inside each module

Variable-speed EVI compressor

Variable speed modulates capacity continuously to follow the load instead of cycling in fixed steps. Vapor injection (EVI) cools compression and increases refrigerant flow in cold weather, so heating capacity and water temperature hold up at low ambient.

EC variable-speed fans

High-efficiency motors modulate airflow with head pressure, cutting fan energy and sound at part load and low ambient.

Brazed-plate water heat exchanger

Compact, low-refrigerant-charge design with low water-side pressure drop, allowing smaller pumps.

Multi-circuit modules

Independent refrigerant circuits keep the full coil surface active at part load and provide built-in redundancy.

Demand-based defrost

Defrost is triggered by measured frost build-up, not a timer, and staggered across modules so the plant keeps delivering heat.

A2L leak detection

Factory refrigerant sensors, cabinet ventilation and controller alarms meet UL/CSA 60335-2-40 mitigation requirements.

V-shape coils

The V arrangement packs a large coil face into a narrow module, so modules assemble side by side in one frame, and multi-unit plants need less roof or pad area. Air is drawn through the full coil face and discharged vertically by the fans, keeping airflow uniform and limiting recirculation between adjacent modules.

Single-point water and power connection

Factory supply/return headers and one main power feed serve every module in the frame. Fewer site connections cut installation time and cost and simplify coordination between mechanical and electrical trades.

Two-pipe (reversible)

- Heating or cooling on a shared loop
- Seasonal changeover by controller or BAS
- Lowest first cost for two-pipe buildings

Four-pipe (heat recovery)

- Independent hot and chilled water loops
- Simultaneous heating and cooling from recovered energy

COPshc = (cooling + heating capacity) ÷ electrical input

Six reasons to choose XNNOV AWHP

Built for owners and engineers who need to electrify without compromising comfort, redundancy or operating cost.

1 Meet decarbonization rules

Municipal and provincial building-emission targets and gas restrictions increasingly exclude fossil heating in new and major-retrofit projects. An all-electric AWHP plant removes on-site combustion emissions and positions the building for tightening performance standards.

2 Perform in cold climates

Rated and controlled for northern winters, with capacity and COP published down to low ambient conditions — not only at mild rating points — so designers can size for the real design day and minimize backup heat.

3 Heat and cool from one plant

Reversible operation delivers hot water in winter and chilled water in summer. One asset replaces two, cutting capital cost, mechanical-room space, maintenance contracts and spare-parts inventory.

4 Cut energy and demand costs

Heating COP several times higher than electric resistance lowers energy use. Paired with buffer storage, the plant pre-heats or pre-cools ahead of utility peak events, supporting demand-response programs and reducing peak charges.

5 Future-proof refrigerant

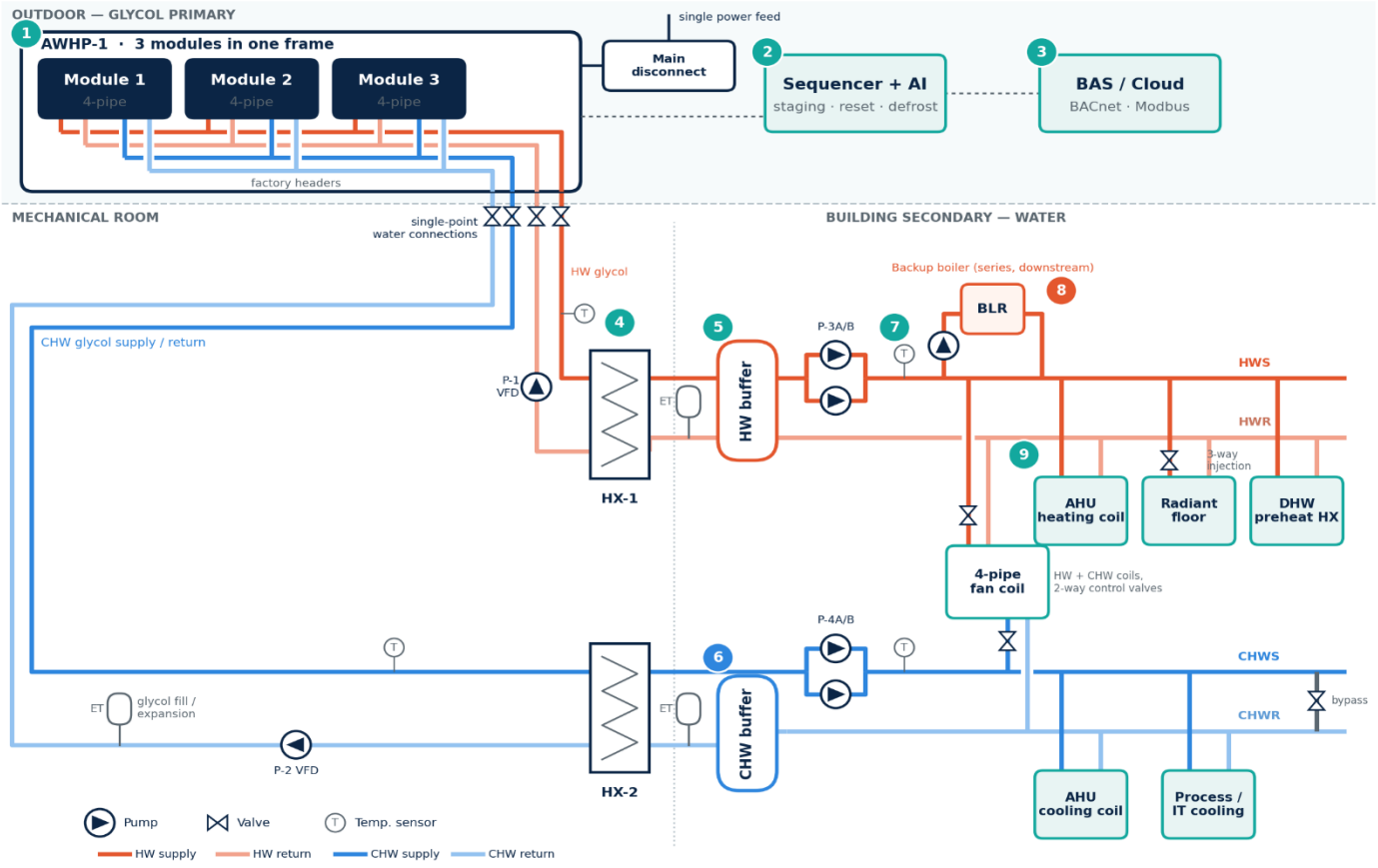
The GWLess platform uses A2L low-GWP refrigerant, aligned with the HFC phase-down under the U.S. AIM Act and Canada's HFC regulations, and designed to UL/CSA 60335-2-40 safety requirements.

6 AI-optimized operation

XNNOV's control layer learns building load and weather patterns to stage units, reset supply temperatures and schedule defrost, keeping the plant at its highest-efficiency operating point while flagging faults before they cause downtime.

A complete system maximizes performance

Heat pump efficiency is decided as much by the plant design as by the unit. XNNOV supplies the heat pumps, controls and system guidance as one package, so the design runs at the lowest practical supply temperature and the highest seasonal COP.



1 AWHP — 3 modules in one frame

4-pipe modules on factory headers: one supply/return pair per loop and one power feed for the whole unit.

2 Sequencer + AI controller

Stages modules on each loop, balances heating and cooling demand, resets supply temperatures, and staggers defrost.

3 BAS/cloud connectivity

BACnet and Modbus integration for status, alarms, set points, trending and remote diagnostics.

4 Glycol/water HX (HX-1, HX-2)

Glycol stays in the outdoor primary loops; the building loops run on water, avoiding glycol in terminals and DHW.

5 HW buffer — supply side

Stabilizes supply temperature through defrost and low load. Size for ≥ 8 gal per heating ton, or per XNNOV IOM.

6 CHW buffer — return side

Damps return-temperature swings and prevents short cycling. Size for ≥ 3 minutes of chilled-water flow.

7 Secondary pumps (duty/standby)

Variable-speed pumps serve each building loop; an end-of-loop bypass protects minimum flow.

8 Backup boiler — series, downstream

Trims supply temperature on design days and defrost; heat pumps always take the return water first.

9 Building loads

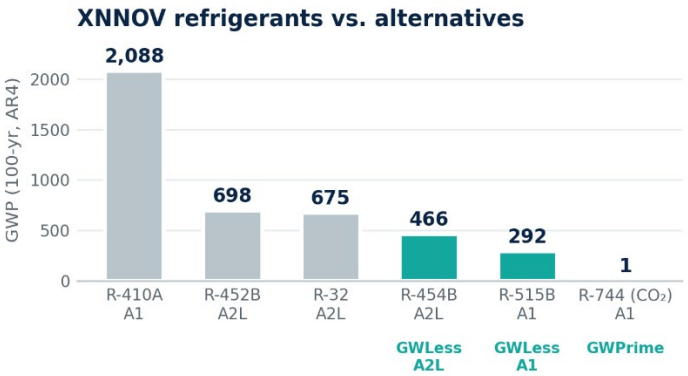
4-pipe fan coils on both loops; AHU coils; radiant floor through 3-way injection; DHW preheat; process cooling.

Simplified P&ID, typical 4-pipe arrangement. Buffer volumes are minimum rules of thumb; final configuration depends on site conditions, load profile and

The right refrigerant for the application

No single refrigerant is optimal everywhere, so XNNOV builds on three. GWLess A2L (R-454B) runs the reversible air-to-water heat pump range. GWLess A1 (R-515B) runs the high-temperature heat pump boilers that replace fossil boilers at up to 190 °F. GWPrime (CO_2) is reserved for dedicated domestic hot water.

	GWLess A2L	GWLess A1	*GWPrime*
Refrigerant	R-454B	R-515B	R-744 (CO_2)
ASHRAE 34 class	A2L — Lightly flammable	A1 — non-flammable	A1 — non-flammable
GWP (AR4)	466	292	1
XNNOV products	Reversible air-to-water heat pumps	Air- and water-source heat pump boilers	High-temperature DHW heat pumps
Leaving water	Up to 137 °F heating; 36–123 °F cooling	Up to 190 °F	Very high, single-pass DHW
Safety standard	UL / CSA 60335-2-40; ASHRAE 15 / CSA B52	UL / CSA 60335-2-40; ASHRAE 15 / CSA B52	UL / CSA 60335-2-40; ASHRAE 15 / CSA B52 Transcritical high-pressure design





GWP values: IPCC AR4 100-year, as used in U.S. EPA and Canadian HFC regulations; R-515B per Honeywell Solstice N15 data sheet. Safety classes per ASHRAE Standard 34

Designed for A2L safety

- Designed and listed to UL 60335-2-40 / CSA C22.2 No. 60335-2-40
- Outdoor-installed units keep the refrigerant circuit outside occupied space
- Factory refrigerant leak detection and mitigation controls
- Hydronic distribution: only water or glycol enters the building

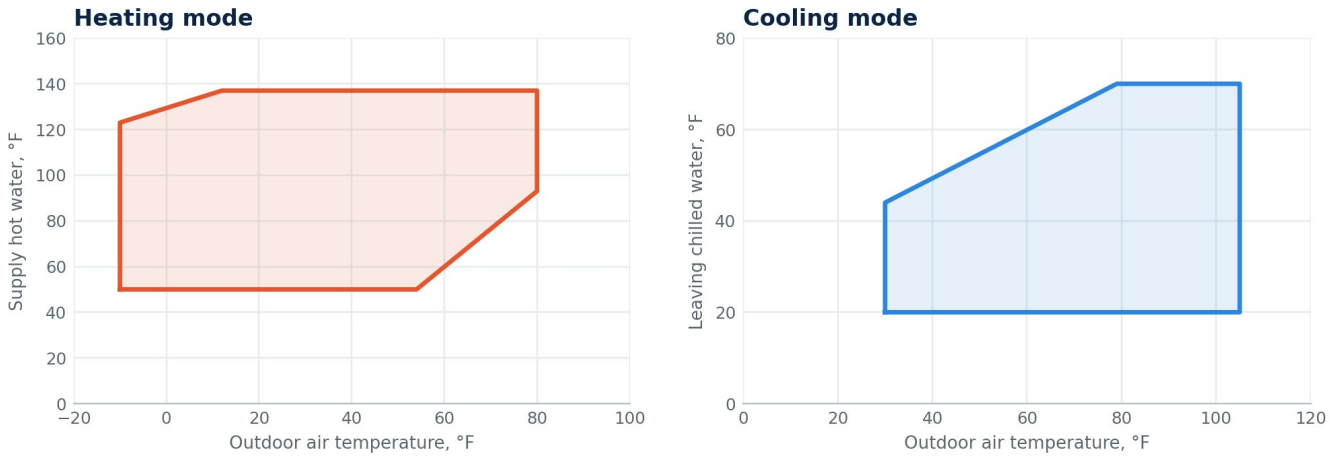
Regulation-ready

The low-GWP refrigerant supports compliance with the HFC phase-down under the U.S. AIM Act and Canada's Ozone-depleting Substances and Halocarbon Alternatives Regulations, avoiding the stranded-asset risk of legacy high-GWP equipment.

Wide operating envelope, no add-on kits

An air-to-water heat pump is only as useful as its output on the coldest day. The XNNOV range is designed to hold capacity and supply temperature across a wide envelope, so designers size on the real design day rather than a mild rating point.

	Ambient air	Leaving water
Heating	–10 to 80 °F	50 to 140 °F
Cooling	20 to 95 °F	20 to 70 °F
Simultaneous (4-pipe)	—	Hot [50] – [140] °F / chilled [20] – [70] °F



Operating limits for GWLess A2L (R-454B) units. Selections near envelope edges should be confirmed in the XNNOV selection software.

Built for uptime

- Modular plant: remaining modules keep running during service
- Staggered defrost across modules — no loss of plant heat output
- Compressor run-time balancing extends component life
- Capacity added incrementally as a building is phased in
- Accelerated life and factory run testing
- Forklift-ready modules for tight rooftop and retrofit sites
- Canadian parts stock and service network
- Tiered low-sound packages for noise-sensitive sites

Intelligent controls, powered by AI

Every XNNOV AWHP ships with a unit controller and connects to the XNNOV plant sequencer. The AI layer turns the plant from a set of machines into one optimized system.



Per-unit control enclosures on the service side



Plant overview with AI advisor

Plant sequencing

- Coordinates up to 6 units, including mixed capacities
- Staging based on real thermal demand, not fixed steps
- Automatic lead/lag rotation by run hours
- Tank stratification sensing for storage-based strategies
- N+1 redundancy with automatic failover

Energy optimization

- Outdoor-reset and load-based supply temperature reset
- Predictive pre-heat/pre-cool ahead of utility peak events
- Demand-limiting to cap building peak kW
- Optimized, demand-based defrost scheduling

Connectivity

- BACnet (IP / MS/TP) and Modbus (RTU / TCP)
- Remote monitoring: status, alarms, set points, operating modes
- Trending and performance logging for M&V and commissioning
- Alarm notification by email or text; bilingual EN/FR HMI

Predictive maintenance

- Continuous fault detection and diagnostics (FDD)
- Early warning on coil fouling, low charge and pump issues
- Measured COP and energy reporting per circuit and per unit

Model range and specifications

Ten sizes from 35 to 330 nominal tons. Units combine in parallel for larger plants and redundancy.

Model	AWHP-035	AWHP-055	AWHP-072	AWHP-105	AWHP-110
Nominal tons	35	55	72	105	110
MBH	432	660	864	1,260	1,320
kW	127	193	253	359	387
Heating [1]					
Capacity @ 47 °F / 110 °F LWT, MBH	416	657	832	1,248	1,313
COP @ 47 °F	3.40	3.57	3.40	3.40	3.57
Capacity @ 17 °F / 110 °F LWT, MBH	286	430	573	859	859
COP @ 17 °F	2.41	2.41	2.41	2.41	2.41
Capacity @ –4 °F, MBH	198	297	396	594	594
Water flow, gpm	83	131	166	250	263
Cooling [2]					
Capacity @ 95 °F / 44 °F LWT, tons	31.1	47.3	62.7	93.0	96.3
EER, Btu/W·h	10.5	10.6	10.6	10.5	10.8
IPLV, Btu/W·h	23.5	22.0	23.6	23.4	22.3
Simultaneous heat/cool [3] (4-pipe)					
Heating MBH / cooling tons	464 / 29.8	711 / 45.9	938 / 60.4	1,388 / 89.0	1,439 / 93.2
COPshc	7.71	7.88	7.80	7.69	7.98
Refrigerant & sound					
Refrigerant/charge, lb	R-454B	R-454B	R-454B	R-454B	R-454B
Compressors/circuits	2 / 1	3 / 1	4 / 2	6 / 3	6 / 2
Fans/airflow, cfm	2 / 26,000	3 / 39,000	4 / 52,000	6 / 78,000	6 / 78,000
Sound power, dB(A) std	80.4	82.2	83.4	85.2	85.2
Electrical					
Voltage	460/575-3-60	460/575-3-60	460/575-3-60	460/575-3-60	460/575-3-60
MCA / MOP / RLA, A – 480V	74 / 100 / 60	108 / 125 / 90	141 / 150 / 119	208 / 225 / 179	208 / 225 / 179
MCA / MOP / RLA, A – 575V	62 / 80 / 50	90 / 110 / 75	118 / 125 / 100	173 / 175 / 149	173 / 175 / 149
Dimensions					
L × W × H, in					
Water connections					
Ship/operating weight, lb					

Model range and specifications (continued)

Model	AWHP-144	AWHP-165	AWHP-220	AWHP-275	AWHP-330
Nominal capacity					
Nominal tons	144	165	220	275	330
MBH	1,728	1,980	2,640	3,300	3,960
kW	506	580	774	967	1161
Heating [1]					
Capacity @ 47 °F / 110 °F LWT, MBH	1,664	1,970	2,626	3,283	3,940
COP @ 47 °F	3.40	3.57	3.57	3.57	3.57
Capacity @ 17 °F / 110 °F LWT, MBH	1,146	1,289	1,719	2,149	2,578
COP @ 17 °F	2.41	2.41	2.41	2.41	2.41
Capacity @ –4 °F, MBH	792	891	1,188	1,485	1,783
Water flow, gpm	333	394	525	657	788
Cooling [2]					
Capacity @ 95 °F / 44 °F LWT, tons	125.4	142.0	192.7	236.6	289.0
EER, Btu/W·h	10.6	10.6	10.8	10.6	10.8
IPLV, Btu/W·h	23.6	22.1	22.4	22.2	22.4
Simultaneous heat/cool [3] (4-pipe)					
Heating MBH / cooling tons	1,876 / 120.8	2,132 / 137.7	2,878 / 186.4	3,553 / 229.4	4,317 / 279.6
COPshc	7.80	7.88	7.98	7.88	7.98
Refrigerant & sound					
Refrigerant/charge, lb	R-454B / —	R-454B / —	R-454B / —	R-454B / —	R-454B / —
Compressors/circuits	8 / 4	9 / 3	12 / 4	15 / 5	18 / 6
Fans/airflow, cfm	8 / 104,000	9 / 117,000	12 / 156,000	15 / 195,000	18 / 234,000
Sound power, dB(A) std	86.4 / —	87.0 / —	88.2 / —	89.2 / —	90.0 / —
Electrical					
Voltage	480-3-60 / 575-3-60	480-3-60 / 575-3-60	480-3-60 / 575-3-60	480-3-60 / 575-3-60	480-3-60 / 575-3-60
MCA / MOP / RLA, A – 480V	275 / 300 / 239	308 / 350 / 269	409 / 450 / 358	509 / 600 / 448	609 / 700 / 537
MCA / MOP / RLA, A – 575V	229 / 250 / 199	257 / 300 / 224	340 / 350 / 299	424 / 450 / 374	507 / 600 / 448
Dimensions					
L × W × H, in					
Water connections					
Ship/operating weight, lb					

[1] Heating ratings per AHRI 550/590 at the stated outdoor air and leaving water temperatures. Full performance tables at 110/120/140 °F LWT available in the selection software.

[2] Cooling ratings per AHRI 550/590: 95 °F ambient, 44 °F leaving / 54 °F entering chilled water. IPLV per AHRI 550/590.

[3] Simultaneous mode: 44 °F chilled LWT, 95/110 °F hot EWT/LWT. Sound power per AHRI 370.

Nominal tons are for size designation; MBH and kW are nominal conversions (1 ton = 12,000 Btu/h = 3.517 kW). Model designations are provisional. Highlighted fields are pending certified data.

Options, compliance and project support

Options and accessories

- Low-ambient / cold-climate package
- Heat recovery for simultaneous heating and cooling
- Low-noise package (compressor jackets, night fan mode)
- Coil coating for coastal or corrosive sites
- Integrated pump package
- Glycol isolation heat exchanger skid
- Seismic and wind restraint kit
- Single-point power connection
- Hydrophobic coated coils

Availability varies by model — confirm at selection.

Codes and standards

- AHRI 550/590 performance rating
- UL 60335-2-40 / CSA C22.2 No. 60335-2-40
- ASHRAE 15 and CSA B52 refrigeration safety
- ASHRAE 90.1 and NECB energy code support
- cETLus / cULus electrical listing

Certification status per model to be confirmed by XNNOV.

From feasibility to commissioning

XNNOV supports owners, engineers and contractors through every phase — one point of contact from first load calculation to a verified, operating plant.

Feasibility	Selection	Design support	Commissioning	Operations
Load profile, bin analysis, energy and GHG comparison	Unit sizing, plant configuration, hybrid strategy	Schematics, sequences of operation, submittals	Start-up, controls verification, operator training	Remote monitoring, M&V reporting, service



XNNOV

Revolutionizing heating and cooling for a sustainable future.

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RENEWABLE SOLUTIONS

XNNOV reserves the right to change product design, specifications and materials without notice. Performance data are subject to certification. Consult your XNNOV representative for current data and selections.