SE-AH SERIES

SE-AH-50U

Air source commercial heat pump for bulk sanitary hot water up to 60 °C. R410A scroll circuit, three-phase, rated down to 5 °C ambient.

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HEATING CAPACITY
50 kW
At T1 · A20 °C / W50 °C

PEAK COP
4.15
At T1 · A20 °C / W50 °C

MAX WATER TEMP
60 °C
Rated outlet 55 °C

HOT WATER OUTPUT
1450 LPH
At T1 · A20 °C / W50 °C

Performance

Rated output at each test condition

T1 A20 °C / W50 °C		T2 A15 °C / W50 °C		T3 A10 °C / W50 °C	
Heating capacity	50 kW	Heating capacity	33.4 kW	Heating capacity	29.2 kW
Power input	12.1 kW	Power input	9 kW	Power input	4.4 kW
COP	4.15	COP	3.7	COP	3.3
Hot water output	1450 LPH	Hot water output	820 LPH	Hot water output	630 LPH

Technical specifications

SE-AH-50U

ELECTRICAL SUPPLY		
Power supply	—	**380~415 V / 50 Hz / 3 Ph**
Rated input power	kW	**12.1**
Rated current	A	**23.1**
Required MCB	—	**80 A × 4 pole**
Required cable	—	**4 core × 10 sq.mm copper cable + earthing**
REFRIGERATION CIRCUIT		
Compressor	—	**Scroll (Copeland / Panasonic)**
Number of compressors	Nos	**2**
Refrigerant	—	**R410A**
Heat exchanger (condenser)	—	**Tube-in-shell / Brazed plate heat exchanger**
Evaporator	—	**Blue finned evaporator coil**
Throttling device	—	**Electronic expansion valve**
Fan quantity	Nos	**2**

WATER CIRCUIT		
Rated water temperature	°C	**55**
Maximum water temperature	°C	**60**
Water flow	m³/hr	**8.7**
Water pipe size	inch	**R1-1/2**
UNIT & ACOUSTICS		
Dimensions (L × W × H)	mm	**1450 × 890 × 1110**
Net weight	kg	**365**
Noise at 1 metre	dB(A)	**≤ 67**

TEST CONDITIONS

T1 — Ambient 20/15 °C (DB/WB), E.T. 10 °C, C.T. 55 °C
T2 — Ambient 15/10 °C (DB/WB), E.T. 5 °C, C.T. 55 °C
T3 — Ambient 10/7 °C (DB/WB), E.T. 0 °C, C.T. 55 °C
T4 — Ambient 5/3 °C (DB/WB), E.T. −5 °C, C.T. 55 °C

INSTALLATION REQUIREMENT

Dedicated **80 A × 4 pole** MCB required at the unit.
Supply cable **4 core × 10 sq.mm** copper, with separate earthing.
Maintain water flow of **8.7 m³/hr** through the unit.

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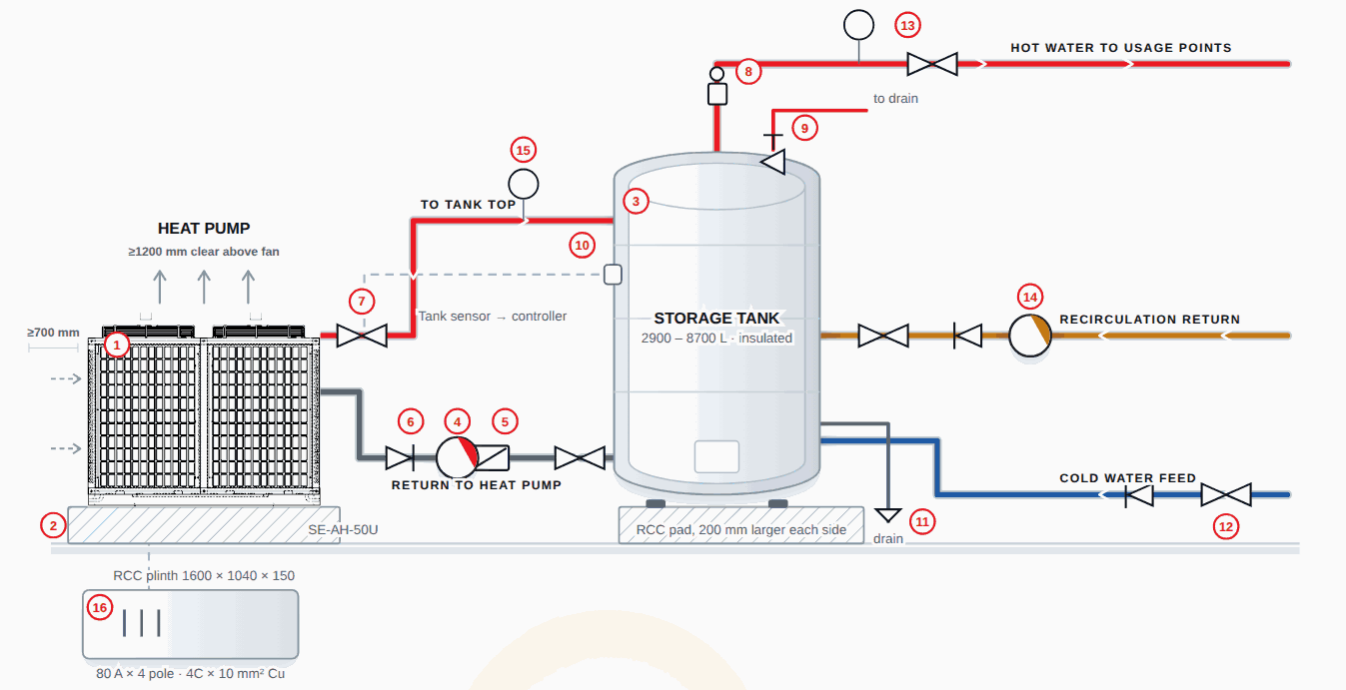
Site installation schematic

How the unit connects to the tank, pumps and piping on site



Hot water · Return to heat pump · Cold water feed · Recirculation return · Electrical & control

1. Heat pump unit
2. RCC foundation with anti-vibration pads
3. Insulated storage tank
4. Primary circulation pump
5. Y-strainer
6. Non-return valve
7. Isolation valve (typical)
8. Automatic air vent
9. Safety / pressure-relief valve
10. Tank sensor to heat pump controller
11. Drain valve
12. Cold water feed
13. Hot water to usage points
14. Recirculation (return-line) pump
15. Thermometer
16. Power supply / MCB panel

Indicative hookup only. Static head, draw pattern and local code may call for additional components — confirm the final scheme with Sunniva before ordering.

Selection & site preparation

Recommended sizing derived from this model's rated data

SYSTEM SIZING	
Storage tank volume	**2900 – 8700 L**
Tank sizing rule	**Hot water output × 2 to 6** LPH measured at 20 °C ambient. Indicative range — stay inside it so the tank is neither undersized nor oversized.
Primary circulation pump	**9.5 m³/hr @ 10 – 12 m head**
Recirculation (return) pump	**1 – 1.3 m³/hr @ 6 – 8 m head**
Primary pipe size	**40 mm (R1-1/2) to 10 m run; 50 mm beyond**
Line insulation	**25 mm closed-cell, every line above 45 °C**

CIVIL & ELECTRICAL	
Unit footprint & dry weight	**1450 × 890 mm · 365 kg**
Heat pump plinth	**1600 × 1040 × 150 mm RCC, M20**
Plinth level	**100 mm above finished floor, ± 3 mm/m**
Tank pad (2900 L)	**150 mm RCC, 200 mm larger each side** ≈ 3335 kg filled
Clearances	**700 mm air-on · 1200 mm above fan · 800 mm service side**
Electrical	**80 A × 4 pole MCB · 4 core × 10 sq.mm copper cable + earthing**

Installation steps

Follow in order; commission before start-up

1. Cast the RCC plinth **1600 × 1040 × 150 mm** in M20 concrete, 100 mm above finished floor. Let it cure and check it is level within 3 mm per metre.
2. Set the unit down on anti-vibration pads. Keep **700 mm clear** at the finned coil faces and **1200 mm above the fan** — the unit must breathe or capacity drops.
3. Place the tank on its own level pad, as close to the heat pump as the site allows. Short pipes lose less heat.
4. Pipe **tank bottom → isolation valve → Y-strainer → primary pump → heat pump inlet**, in that order. Fit the non-return valve after the pump.
5. Pipe the **heat pump outlet → tank top inlet**. Fit an isolation valve at each end so the unit can be serviced without draining the tank.
6. Fit the **automatic air vent** and the **safety valve** on the tank top. Pipe the safety valve discharge to an open drain — never cap it.
7. Bring the **cold water feed** into the tank bottom through an isolation valve and a non-return valve.
8. Fit the tank sensor into the tank pocket and run its cable back to the heat pump controller. Do not run it alongside the power cable.
9. Insulate every hot line with **25 mm closed-cell** insulation, pump body included.
10. Power the unit from a dedicated **80 A × 4 pole** MCB using 4 core × 10 sq.mm copper cable + earthing.
11. Fill and vent the system fully. Confirm the flow switch stops the unit when the pump is off, then start.

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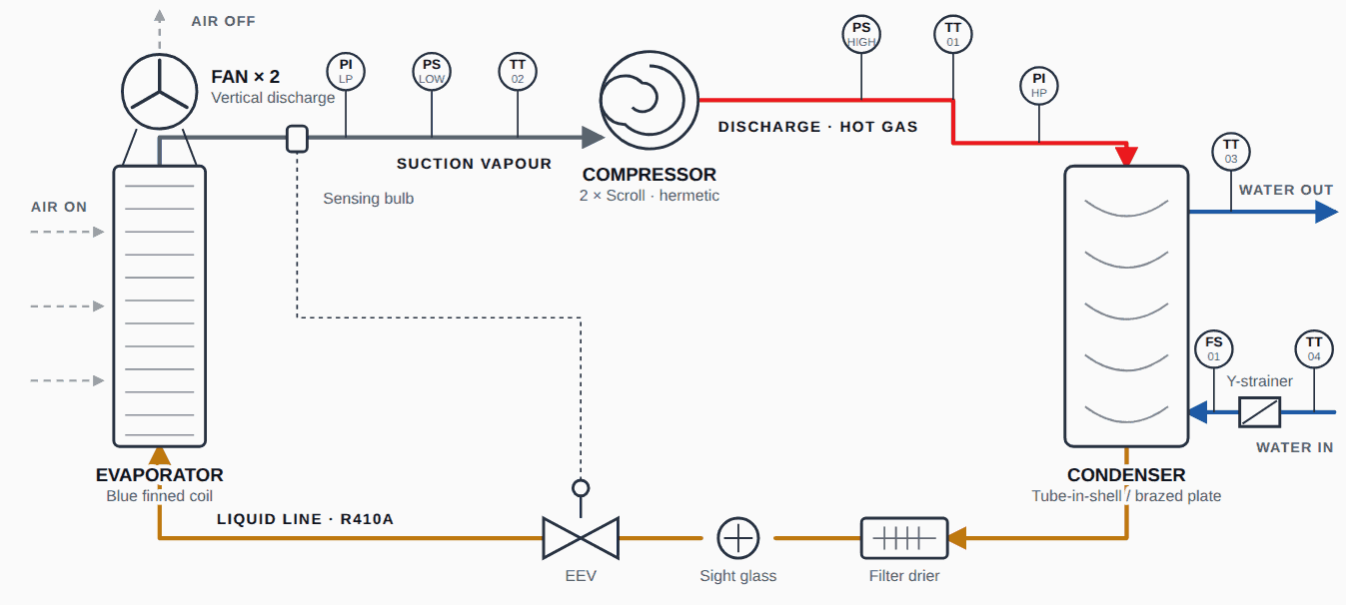
Process & instrumentation diagram

Refrigeration circuit, instrumentation and water connections



Schematic representation of the standard circuit — not to scale. Component arrangement may vary with build option.

Instrument schedule

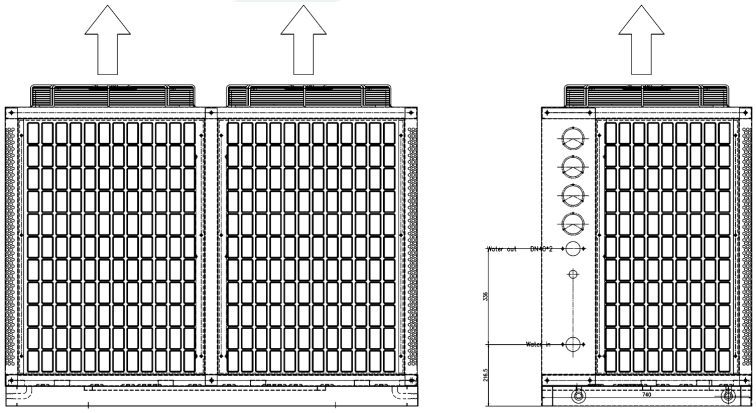
Tags as marked on the diagram above

TAG	DEVICE	FUNCTION
TT 01	**Compressor discharge temperature**	Discharge superheat & high-temperature cut-out
TT 02	**Compressor suction temperature**	Suction superheat monitoring
TT 03	**Water outlet temperature**	Set-point control
TT 04	**Water inlet temperature**	Return water sensing, ΔT calculation
PS HIGH	**High-pressure switch**	Discharge over-pressure cut-out

TAG	DEVICE	FUNCTION
PS LOW	**Low-pressure switch**	Loss-of-charge / low-suction cut-out
PI HP	**High-side pressure gauge**	Discharge pressure indication
PI LP	**Low-side pressure gauge**	Suction pressure indication
FS 01	**Water flow switch**	Interlock — no-flow lockout

Cabinet reference drawing

Typical general arrangement — this model's own dimensions alongside



DIMENSIONS (L × W × H)
1450 × 890 × 1110 mm

NET WEIGHT
365 kg

Reference arrangement only — Twin-compressor cabinet, vertical discharge. Dimensions printed on the drawing are indicative; the figures above and in the specification table are the ones that apply to this model.

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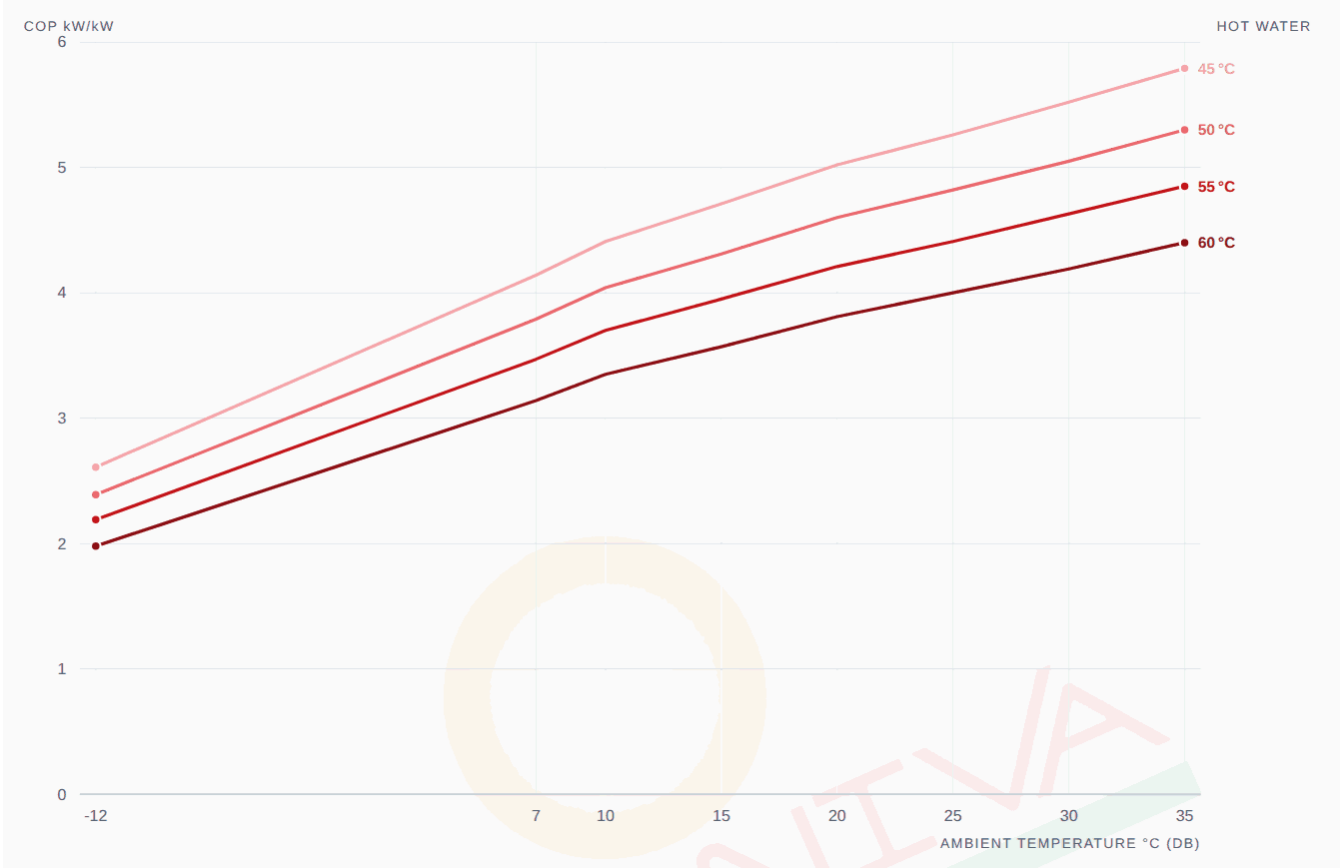
COP characteristic

Full performance map across the operating envelope

COP · heating duty

COP against ambient temperature, one curve per hot-water outlet temperature



COP · HOT WATER ↓ / AMBIENT °C →	-12	7	10	15	20	25	30	35
45 °C	2.61	4.14	4.41	4.71	5.02	5.26	5.52	5.79
50 °C	2.39	3.79	4.04	4.31	4.60	4.82	5.05	5.30
55 °C	2.19	3.47	3.70	3.95	4.21	4.41	4.63	4.85
60 °C	1.98	3.14	3.35	3.57	3.81	4.00	4.19	4.40

HOW TO READ THIS

Performance map for the R410A circuit. Rated figures at the certified test conditions are on page 1.

Where a figure on this map differs from the rated point on page 1, **the map governs** — it is measured across the full operating envelope, while the rated point is a single certified test condition.

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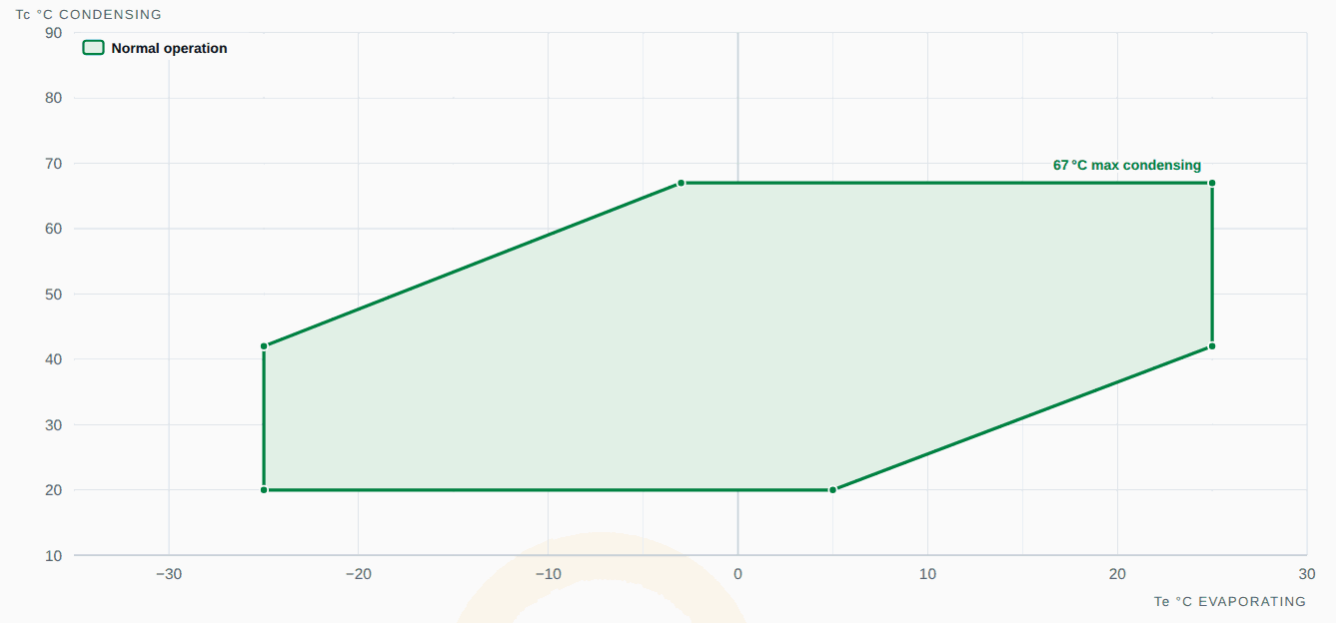
Operating envelope

The compressor's permitted window, in refrigeration terms

Operating envelope · R410A circuit

Condensing against evaporating temperature — the compressor's permitted operating window



ENVELOPE LIMITS	
Evaporating temperature Te	**−25 °C to 25 °C**
Condensing temperature Tc	**20 °C to 67 °C**
Peak condensing	**67 °C** highest hot-water temperature the circuit can reach
Transient operation	**Not applicable** the envelope above is the continuous operating window

READING THE ENVELOPE

Te (evaporating) follows the source the unit draws heat from — the colder the air or source water, the lower Te sits.

Tc (condensing) follows the water leaving the unit — asking for 80 °C hot water puts Tc near the top of the envelope.

A duty is valid only **inside the shaded area**. A cold source combined with very hot water pushes the point towards the top-left, which is exactly where the envelope closes in — that corner is the real limit on winter performance.

Representative envelope for the R410A circuit, redrawn from Panasonic compressor data (**Operating envelop.xlsx**, sheet "R410a"). Envelope limits are broadly similar across compressor makes, so treat this as a representation of the circuit's operating window. Where a duty sits close to a boundary, confirm against the compressor fitted to the unit before finalising the design.

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