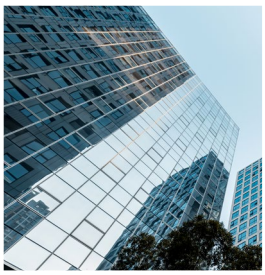
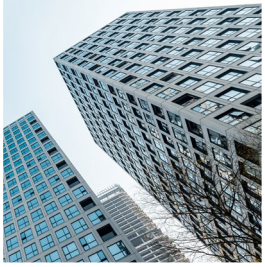
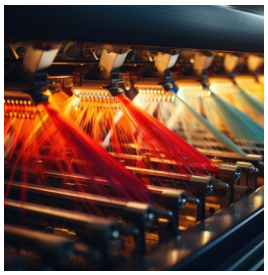
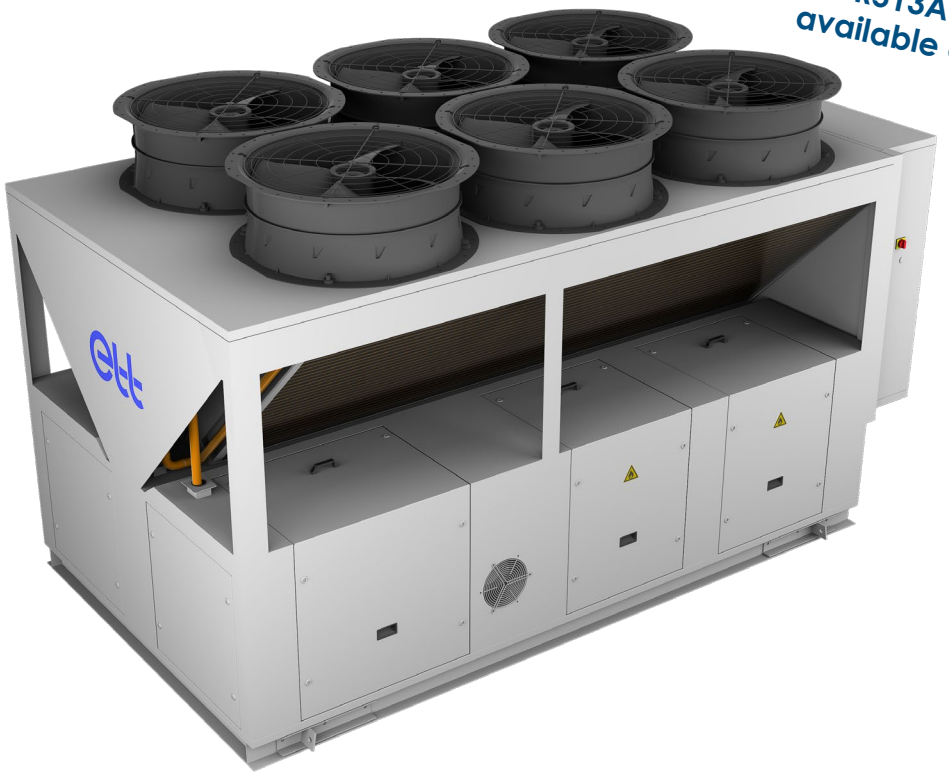
CLIMATIC
ENVIRONMENT
SOLUTIONS
AND EQUIPMENT


NEROMAX

R513A version
available on request



R290

Reversible air-to-water heat pump – packaged unit

www.ett-hvac.com

MADE IN FRANCE

CONTENTS

General description

The **ETT** packaged unit is delivered ready to operate. Its full aluminium structure (frame and casing), ensures an excellent corrosion protection (20-year anti- corrosion guarantee).

Aluminium facilitates the REFURBISHMENT of machines for a second life, unlike a steel structure.

Environmental impact:

The Ultima Green Line range is eco-friendly and uses the R290, a natural refrigerant with low environmental impact:

- ✓ Zero ozone depletion (ODP)
- ✓ Global Warming Potential (GWP) of 0.02
- ✓ Does not generate any PFAS (forever chemicals)

Our technical choices have a major impact on the environment

•DECARBONATION:

ETT is committed to an ambitious approach to reducing greenhouse gas emissions:

- ▪ Reducing the energy consumption of our machines
- ▪ Fluid refrigerants with low GWP
- ▪ Energy monitoring & AI
- ▪ Adiabatic cooling
- ▪ Development of machine retrofits

•ALUMINIUM : PERFORMANCE AND DURABILITY!

- ▪ Lightweight: 3 times lighter than steel
- ▪ Corrosion resistant and long lifespan
- ▪ Thermal performance
- ▪ 100% recyclable indefinitely
- ▪ Facilitates the refurbishment of our machines

• ECO-DESIGN:

Our technologies are designed with sustainability in mind, reducing their environmental impact throughout their life cycle.

• LOW-POLLUTION MANUFACTURING PROCESS:

- ▪ Selective sorting: 80% recovery rate
- ▪ No paint or solvents

• END OF MACHINE LIFE:

In compliance with regulations, ETT is a member of the Ecologic eco-organisation for the end-of-life processing of

EcoLogic

ich are 98% recyclable.

• ETT CERTIFICATIONS

- ▪ **CSR assessment**: ECOVADIS Gold Medal for our CSR approach

- ▪ **ISO 14001 & ISO 9001 certification** : our Quality and Environmental Management System

- ▪ **Certificate of competence for handling refrigerants**
- ▪ **Membership of the UN Global Compact**
- ▪ **Qualiopi certification** for our training centre

Qualiopi processus certifié
RÉPUBLIQUE FRANÇAISE
La certification qualité a été délivrée au titre de la catégorie d'action suivante : Actions de formation

As a positive-impact company, ETT contributes to a more sustainable world through its decarbonising products and services.

In addition, each unit is delivered with a certificate of conformity to EU standards and complies with the following standards:

- Machinery Directive 2006/42/EC - Operator's safety
- Low Voltage Directive (LVD) 2014/35/EU - Electricity
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Regulation (EU) 2016/426 – Gas appliances
- Standard NF EN 60204 -1- Electrical appliances
- Standard EN 378-2 : 2017 – Safety and environmental requirements
- PED Directive 2014/68/EU (in accordance with Articles 2.10, 2.11, 3.4, 5a and 5d of Annex 1) - Pressure equipment
- EcoDesign regulations ErP UE 2281/2016

20-year guarantee against corrosion frame - casing

ENERGY SAVING

ENVIRONMENTAL ATTITUDE

SERVICE LINK

Risk analysis

It is up to the building operator to carry out a risk analysis in line with local regulations concerning the installation of machines containing propane.

In Europe, Directive 1999/92/EC applies, requiring employers to carry out an assessment of explosion risks, define ATEX zones and draw up a document detailing the prevention and protection measures put in place to protect workers. This risk assessment is to be provided at the time of commissioning.

Safety and intervention zone

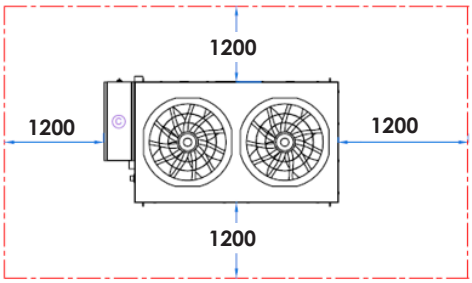
Since propane is heavier than air, it is important to avoid any areas where gas could accumulate near the machine in the event of a leak.

Therefore, for flat roofs, special attention must be paid to the positioning of the machines in relation to openings (such as Skydomes) and roof parapets.

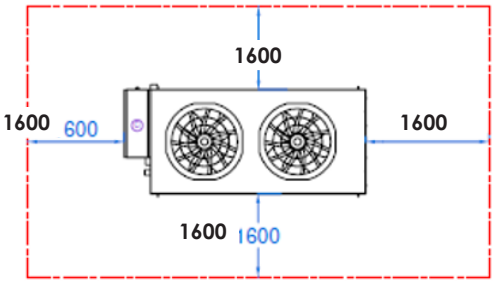
Likewise, it is necessary to ensure the absence of air intakes, wall openings, drainage channels, and low points near the machine.

For each machine size, a safety zone must be maintained (indicated by the shaded area in the diagrams below), and this zone must be free of any external rooftop equipment.

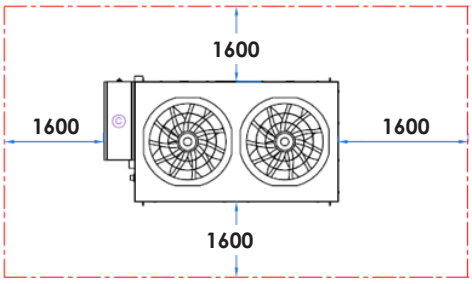
SAFETY AND INTERVENTION ZONE DEPENDING ON THE TYPE OF MACHINE



NEROMAX 50



NEROMAX 60 to 80



NEROMAX 135 to 155

Special case of work on the refrigeration circuit:

In this case, the technician must maintain a **5-meter** safety distance **all around** the machine (not shown in the diagrams).

During the intervention, it is essential to secure this expanded zone by preventing any ignition sources and checking that there is no possibility of gas leakage into the building (by closing openings and air intakes, in particular). If it is not possible to seal these openings, an analysis must be carried out to implement preventive measures such as a deflector or a safety system must be installed.

This analysis must be carried out as soon as the machine is installed.

Innovation for environment

Commercial, industrial, tertiary and accommodation buildings are **major consumers of energy** and therefore have a **significant impact on CO^2 emissions** .
ETT's Research and Development department has designed an innovative **high-power, high-temperature air-to-water heat pump solution with very low noise levels**.

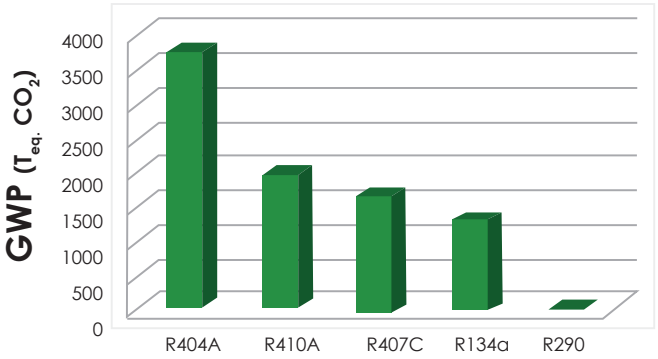
The NEROMAX range has been designed to:

- **produce hot water**: at 63°C down to -2°C ext., at 55°C down to -13°C ext. or at 45°C down to -20°C ext.
- **chilled water production** at +7°C up to 45°C ext.
- **reducing energy consumption** by using EC propeller fans and staged compressors (up to 4 stages to improve seasonal efficiency).

Environmental impact:

NEROMAX is an eco-responsible heat pump that uses propane (R290), a natural refrigerant with a low environmental impact:

- ✓ **Zero ozonedepletion** (ODP = 0)
- ✓ Global Warming Potential **F-Gas 2027 compliant** (GWP = 0.02)
- ✓ **No PFAS** (synthetic chemical compounds) that could persist in the environment.



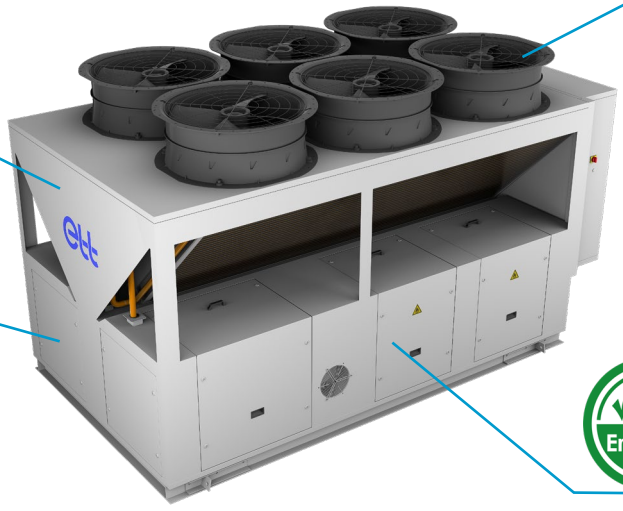
F-GAS READY 2027

NO PFAS

Optimised seasonal efficiency

SCOP

Variable speed EC propeller fan (diam 910)



Compressors
Scroll Up to 4 control power stages

Solution ErP 2021

A solution for decarbonation

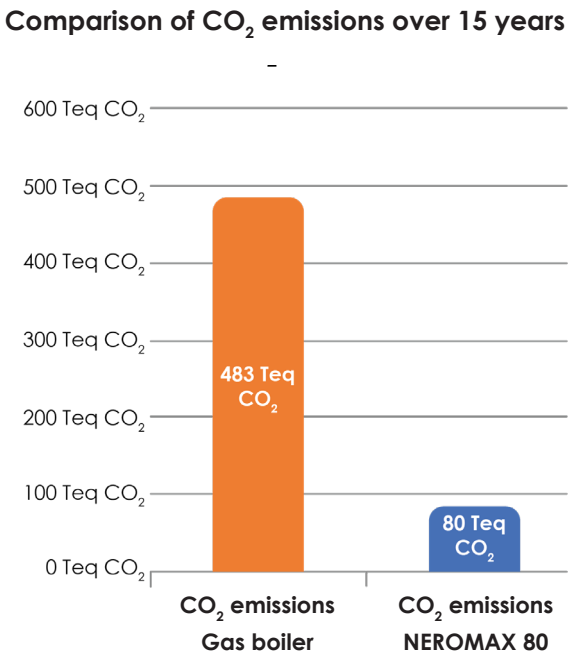
The Neromax range is one of the solutions available for **decarbonising heat production**.

Regulations:

In May 2022, the European Commission presented the REPowerEU plan. Its aim is to **double** the **deployment of heat pumps** in the European Union **by 2030** in order to reduce dependence on fossil fuels by giving priority to renewable energies.

Performance:

Compared with annual heat production using a natural gas boiler, the NEROMAX range **reduces CO_2 emissions by 83% over 15 years (1)**.



(1) Operating assumption based on meteorological data for France (Lille) with 0.10 kg CO_2 /kWh for electricity production and 0.23 kg CO_2 / kWh for natural gas production for a NEROMAX with a nominal output of 80 kW.

Operating principles

NEROMAX is a thermodynamic system for producing hot or chilled water

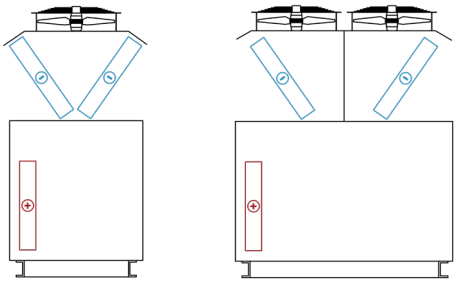
This new ETT unit is designed to meet all the thermal needs of a building:

> Heating
> Cooling
> Domestic hot water (DHW) via a primary network

The unit operates as a heat pump:

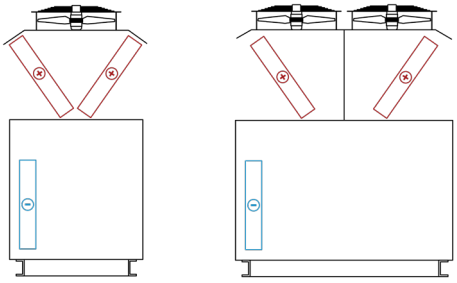
>Treated fluid: chilled and hot water networks
>Rejection: outside air
> System: 2 pipes

Hot water Mode:



Hot water mode: maintains the temperature of the hot water networks using the thermodynamic system.

Cooling mode:



Cooling mode: maintains the temperature of the chilled water network using the thermodynamic system.

COMPACT version

The NEROMAX machine is available in a "**COMPACT** " version for projects requiring shorter machine lengths.
Please note that the Hydraulic and Extra Low Noise options are not available on " **COMPACT** " versions.

Main components of the NEROMAX

Propeller fans Ø910 communicating, variable speed drive, bionic blade design, "EC" electronically commutated motor, optimum efficiency
Very low noise level

Low noise level

Frame and casing assembly aluminium AG3
20-year anti-corrosion guarantee

20-year guarantee against corrosion frame - casing

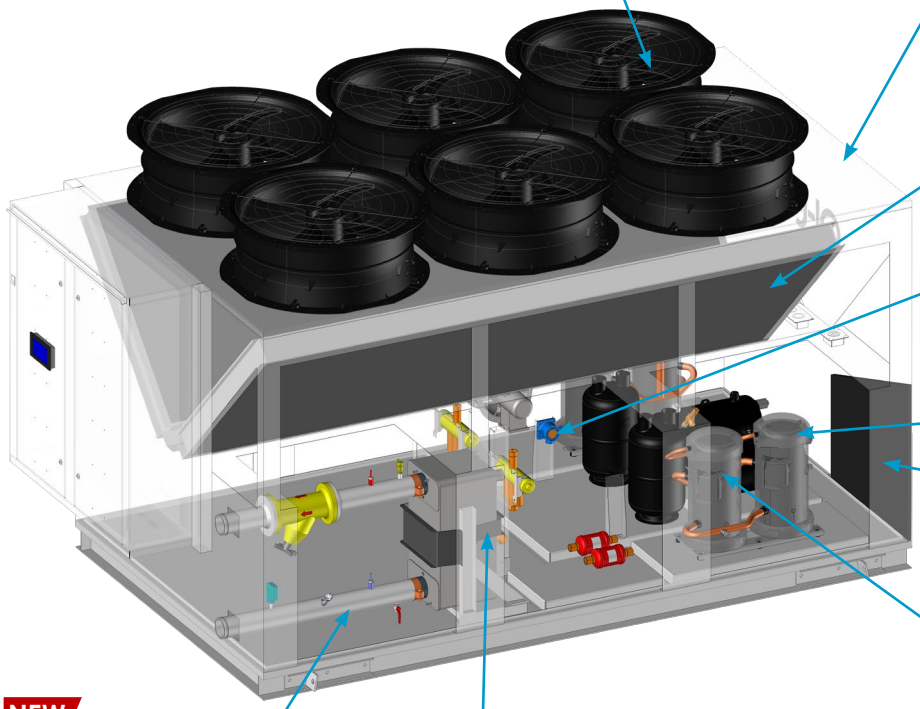
NEW
Copper/aluminium coil with 7mm tube (reduced weight and refrigerant charge)

Propane gas detector and safety chain with ATEX extractor

Ex

Sound jacket on compressors

Sound insulation and cover of the technical compartment

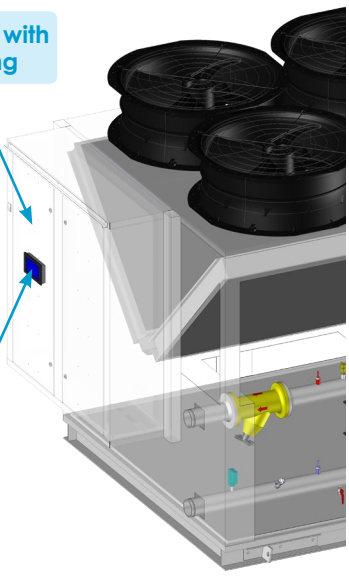


NEW
High temperature Scroll compressor up to 4 control stages on 2 circuits

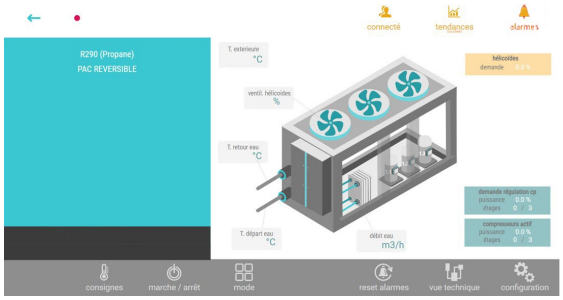
NEW
Checking the minimum water flow using a **calorimetric** flowmeter

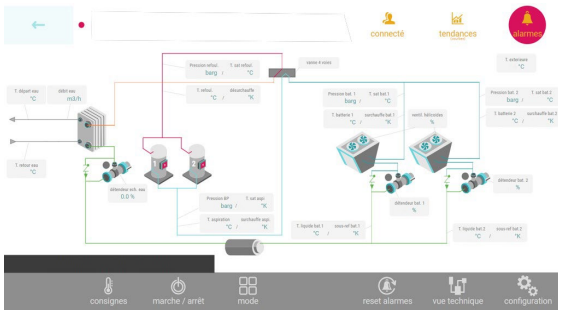
DUAL hot and chilled water plate heat exchangers
Optimised part-load performance

Electrical cabinet with IP54 protection rating



Example of PLC touch screen pages:



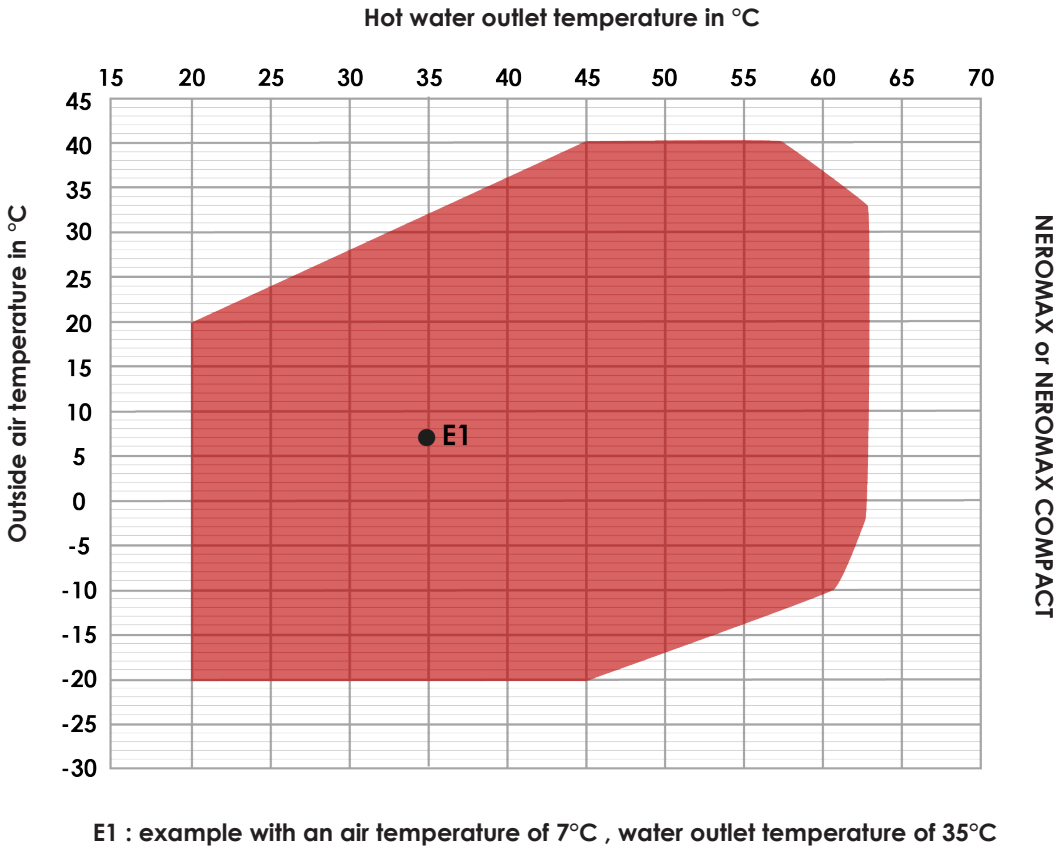


New Generation PLC
Communication between machines and transfer of technical data to an external server for optimum monitoring with **myETTvision**

NEW
7'' touch screen housing a latest-generation PLC for easy machine parameter setting (setpoint management , summer/ winter weather compensation, occupancy management and time scheduling, machine cascade management, load shedding for auxiliaries, propeller "low noise" mode, pump control, fault and alarm reporting)

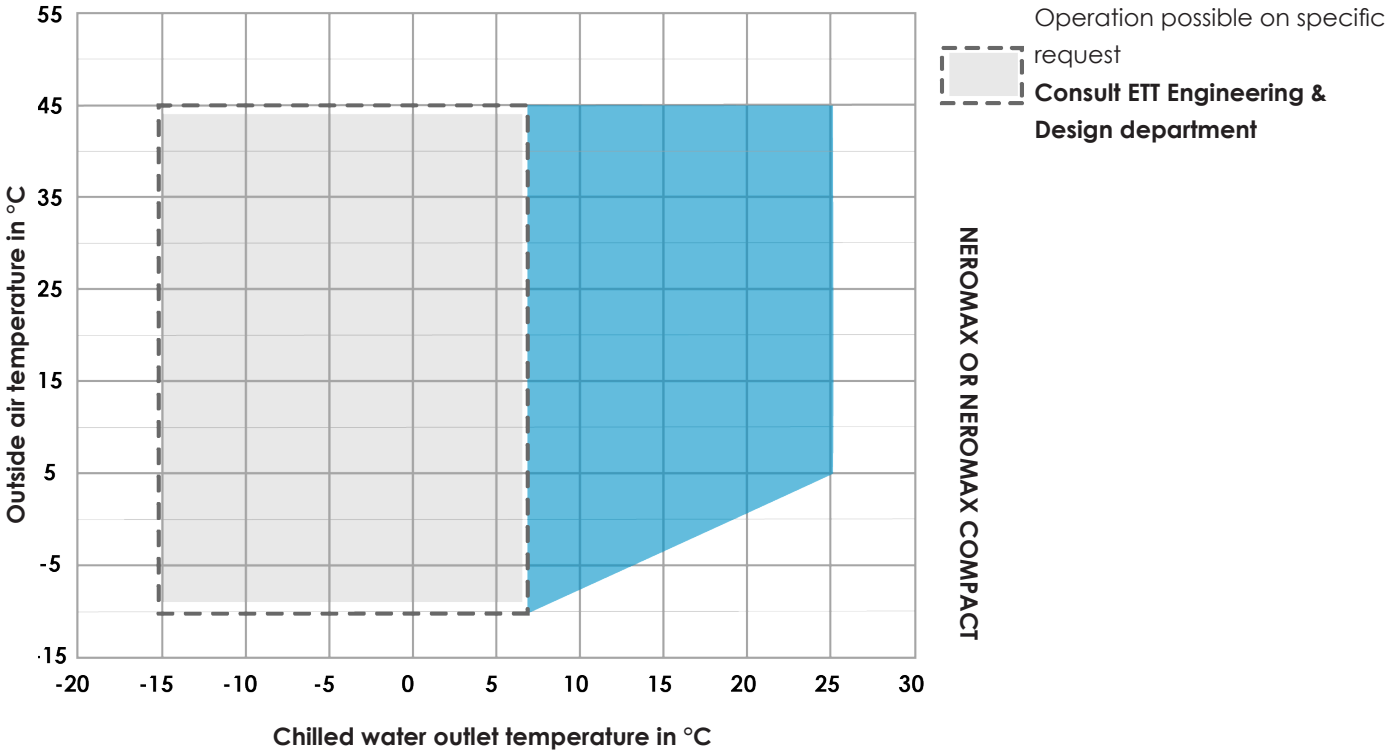
Operating ranges

HOT WATER MODE



E1 : example with an air temperature of 7°C , water outlet temperature of 35°C

CHILLED WATER MODE



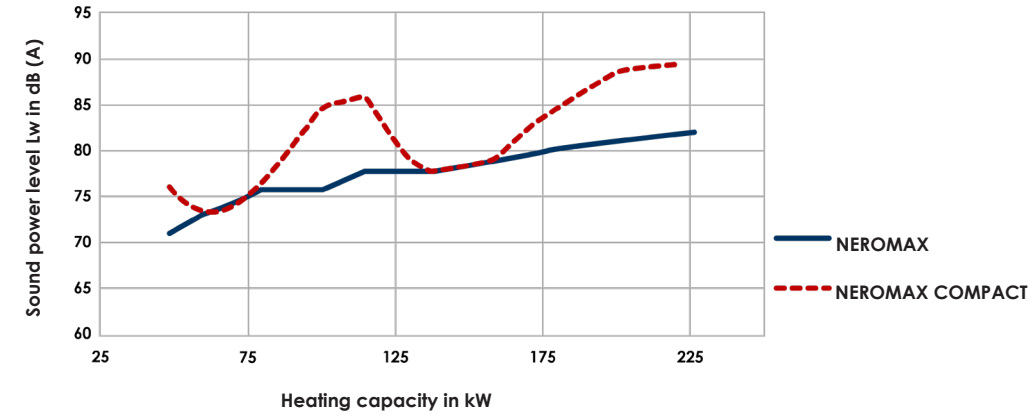
NEROMAX is particularly suitable for supplying tempered water loops.

Premium sound deadening

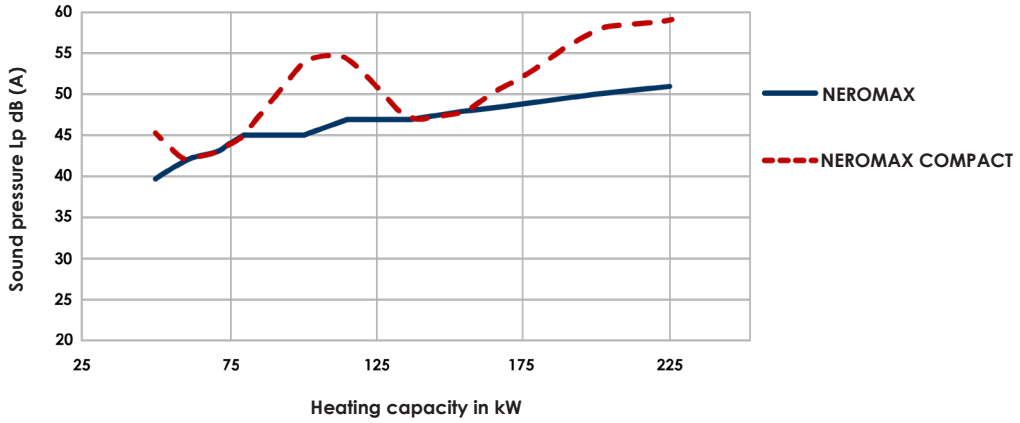
To reduce noise levels as much as possible, all NEROMAX machines are fitted with soundproofing for the technical compartment and with jackets on the compressors. This combination reduces the acoustic power of the units more than 12 dB(A).

In addition, to achieve exceptional low noise levels in this power range, the NEROMAX range also features very low-noise 910mm propeller fans which operate at very low rotation speed even at full load [1].

Sound power level



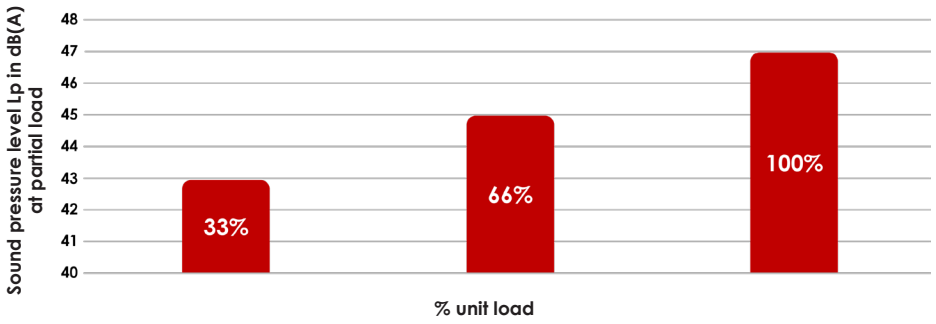
Sound pressure



Estimated pressure at 10m, with directivity factor = 1

Part load

Over a heating season, the heat pump operates 87% of the time at less than 66% of its capacity. The average noise level during the heating season is reduced by 2 to 4 dB(A) at partial load compared with the announced noise level at full load.



[1] *propeller fans not available on the NEROMAX COMPACT version*

Machine description

Aluminium frame and casing assembly:

- **Rigid, compact**, and lightweight packaged unit, perfectly weather-resistant, with a 20-year anti-corrosion guarantee on casing.
- **Vertical panels and aluminium roof**
- **Access via vertical panels.**
- A separate **technical compartment** that facilitates maintenance and control of the unit, enables measurements to be taken and settings to be fine-tuned during operation.
- **Electrical compartment with IP54 protection rating.**
- **Acoustic insulation of the technical compartment.**

Size 50 to 80

Size 135 to 155

Energy and thermodynamic assembly:

- **Refrigeration circuits**compliant with European directive on pressure equipment (PED 2014/68/EU).
- **R290** propane refrigerant.

R513A version available on request.

- **Direct-expansion brazed-plate**, heat exchangers. The exchanger for producing chilled water and hot water is combined with an electronic expansion valve.

- **Direct expansion outdoor exchanger**,made of copper tube aluminium fins with optional vinyl protection and aluminium frame, combined with an electronic expansion valve in "hot water production" mode.

External exchangers angled position and the separation by refrigeration circuit and by compressor ensure quick and efficient defrosting.

- **Compressor power stages**: power is adapted according to requirements. Operation in part load considerably reduces the number of defrost cycles and their duration.
- **Completely independent** refrigeration circuit: each refrigeration circuit has one or more independent EC propeller fans ventilating its exchanger.
- **1 x propane detector per machine:** securely stops the unit if propane is detected in the technical compartment (20% of the lower explosive limit- (LEL).
- **EC propeller fan**: I propeller fan(s) rotation speed is adjusted according to production in order to optimise energy consumption of the machines.
- **Anti-acid filter drier.**
- **HP and LP** pressure switches.
- **Switch over** valve.

Description of the control system

Electrical assembly:

■ **Electrical board** compliant with NF EN C 15-100 and NF EN 60204-01 standards including:

✔ An ETT PLC with 7" touch display **'.**

✔ A power switch with lockable external handle for full load cut-off. Connection using standard universal cable. Optional copper/aluminium connection boxes.

✔ A 400-230-24 volt transformer for regulation and control circuits.

✔ A fault summary with a dry contact on standby terminal.

✔ Numbered terminal blocks with disconnect terminals for remote controls and transfers.

✔ Internal wiring with numbered ferrules at both ends.

✔ A basic breaking capacity Ik3 of 10 kA.

✔ All components protected by circuit breakers.

✔ The LV distribution voltage rating is governed by the French interministerial Order of 24 December 2007. This sets the nominal voltage level at 230/400 V. It defines minimum and maximum admissible values at a user's delivery point (average value over 10 ml), corresponding to a range of -10 % / +10 % around the nominal values. It also defines the maximum allowable value of the voltage drop gradient: 2%. This corresponds to the additional voltage drop generated at a network point if 1 kW single-phase is added at that same point.

✔ A mushroom head emergency stop push button

Control assembly:

■ NTC-type temperature sensors whose accuracy and reliability have been tested and validated both in the factory and on site.

■ One or more PLCs developed specifically by ETT for this range of machines.

The microprocessor, the memory and the size of the PLCs are adapted to the chosen applications and options by integrating a program set-up in the factory. The PLC is housed in a plastic enclosure which guarantees a high level of mechanical protection and reduces the risk of electrostatic discharges.

The PLC has also the following functions:

✔ Start/Stop by remote contact

✔ On/off according to time schedule (2 time slots per day).

✔ Fault summary via dry contact for transfer to customer system.

✔ Heating and chilled water mode setpoints with weather compensation option

✔ Management of safety devices (frost protection thermostat, gas detector, HP pressure switch, etc.) and faults.

✔ Optimisation of compressors operating time.

✔ Analogue, economical management of alternate defrost cycles (flash-type) for each refrigerant circuit using frost detection and end of defrosting through analogue sensors, topping the ventilation of the exchanger concerned, drying the coil and starting a new heating cycle in the heat pump. External coils angled position helps blowing water away from the coil, ensuring efficient defrosting.

✔ Fault history in literal form (no code) with indication of time and outdoor temperature.

✔ Recording of machine, compressors and auxiliaries operating times.

Main options

Basic machine

Type	NEROMAX	NEROMAX COMPACT
Reversible mode	●	●
High temperature mode at 70°C		
AG3 aluminium casing	●	●
Casing layout	Layout A	
" Low NOISE " propeller fan	●	
"Low noise" technical compartment enclosure	●	●
"Low noise" acoustic compressor cover	●	●
Low-water pressure switch and drain valve	●	●
Heat exchanger frost protection thermostat	●	●
Calorimetric flowmeter	●	●
HP/LP pressure gauges R290	●	●
R290 safety chain (Built-in ATEX emergency detector and extractor)	●	●
Cu/Al coil	●	●
ETT progressive PLC with built-in 7" touch display	●	●
Single or double pump switch	●	●
Machine/compressors load shedding	●	●
Mushroom head emergency stop push button	●	●
Phase controller	●	●
Compressor crankcase heater	●	●
Defrost tracer	●	●
HP floating control (chilled water mode)	●	●
myETTvision remote communication platform	●	●

Additional options

Type	NEROMAX	NEROMAX COMPACT
Epoxy-coated coil fins	●	●
Heresite-coated coil	●	●
Electrofin-coated coil	●	●
Anti-corrosion options - Stainless steel screw and bolts - Stainless steel propeller fan grid	●	●
Refrigeration pipework coating	●	●
Hydraulic arrangement B	●	
Balancing valve	●	●
Filter strainer	●	(supplied separately)
Machine shut-off valve (s)	●	●
Customer flange connection	●	●
Expansion tank	●	
3 or 4 bar valve	●	
Single fixed-speed pump	●	
Double fixed-speed pump	●	
Buffer tank without auxiliary	●	
Buffer tank with 1 or 2-stage electric auxiliary depending on the size		
Defrost tracer	●	●
Electric meter	●	●
Al/Cu terminal blocks	●	●
BACNET IP licence	●	●
Soft starter compressor	Only on sizes 50; 60; 70; 80	
Master/slave machine cascade for up to 7 machines	●	●
Steel transport feet	●	●
Feet, aluminium 200, 400 mm	●	●

A version of the NEROMAX with R513A is available on request.

Technical features

NEROMAX 50

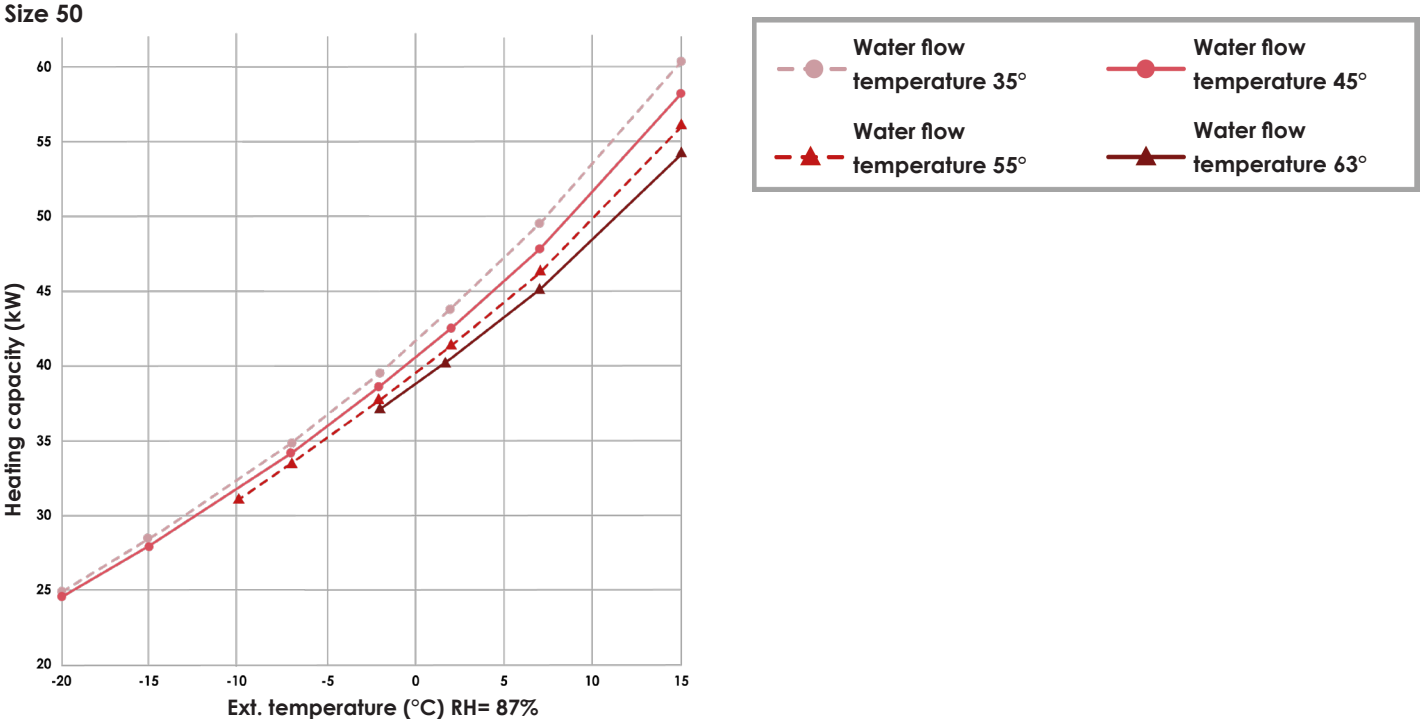
	DESIGNATION	Unit	50
PERFORMANCE	**CHILLED WATER PRODUCTION**		
	Cooling capacity(1)	kW	42.1
	Absorbed power (1)	kW	15.5
	EER (1)	kW/kW	2.71
	HOT WATER PRODUCTION		
	Heating capacity(2)	kW	49.1
	Absorbed power (2)	kW	11.9
	COP (2)	kW/kW	4.13
	Heating capacity - heating mode (3)	kW	37.1
	SCOP LT (4)	kW/kW	3.63
	η s, h LT (4)	%	142
	Energy efficiency class (SCOP LT)		A+
	SCOP MT (5)	kW/kW	2.96
	η s, h MT (5)	%	116
	Energy efficiency class (SCOP MT)		A+
HYDRAULICS	**WATER FLOW RATE**		
	Rated flow rate of a reversible unit (2)	m^3/h	7.8
	Rated flow rate on water loop at 20°C	m^3/h	11.8
	Exchanger pressure drop at maximum flow rate	mWC	2.5
VENTILATION	**AIR FLOW RATE**		
	Rated flow rate	m^3/h	17,000
	ACOUSTICS - LOW NOISE STANDARD		
	Acoustics power level Lw	dB(A)	71
	Sound pressure Lp (6)	dB(A)	40
GENERAL INFORMATION	**ELECTRICAL DATA**		
	Total installed electrical power	kW	24.4
	Total installed electrical current	A	46
	Starting current	A	171
	Starting current (Soft starter option)	A	113
	COMPRESSORS		
	Circuits / Quantity per circuit		1 / 2
	Type		Scroll
	DIMENSIONS		
	Length	mm	2,450
	Width	mm	1,450
	Height	mm	2,195
	WEIGHT		
	Unit without option / with water	kg	1,095

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

400 V- 50 Hz 3-phase power supply + earth without neutral

Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 50



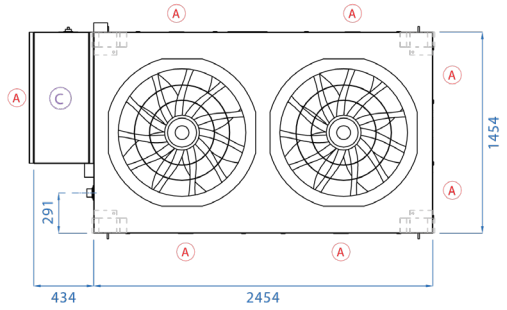
Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

Minimum COP depending on outside temperature

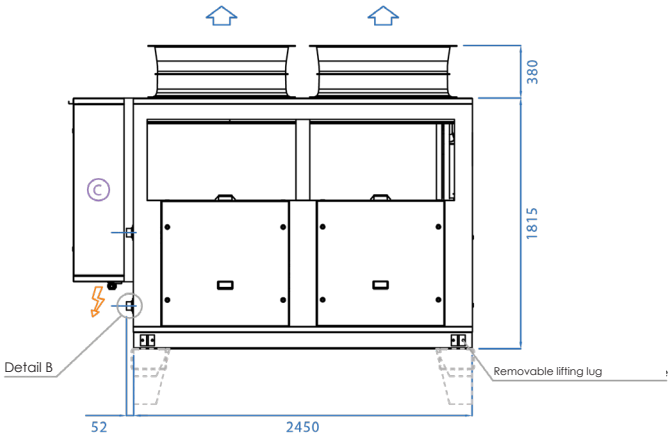
(Water flow temperature: +63°C)

NEROMAX 50		
Ext. temperature/ RH	**-2°C/ 87%**	**+7°C / 87%**
COP	1.93	2.42

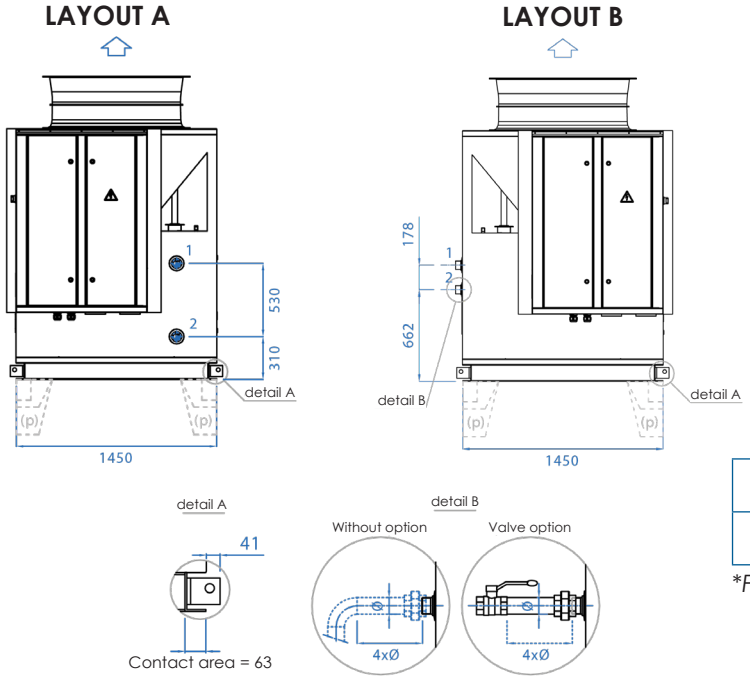
Top view:



Side view:



Front view:



LAYOUT A: Left-hand electrical board

LAYOUT B: Right-hand electrical board, side hydraulic outlets

Threaded connection * DN50	1	2
NEROMAX reversible version	IN	OUT

**Flange option on request*

- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	2,450	1,450	2,195

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

Technical features

NEROMAX 60-80

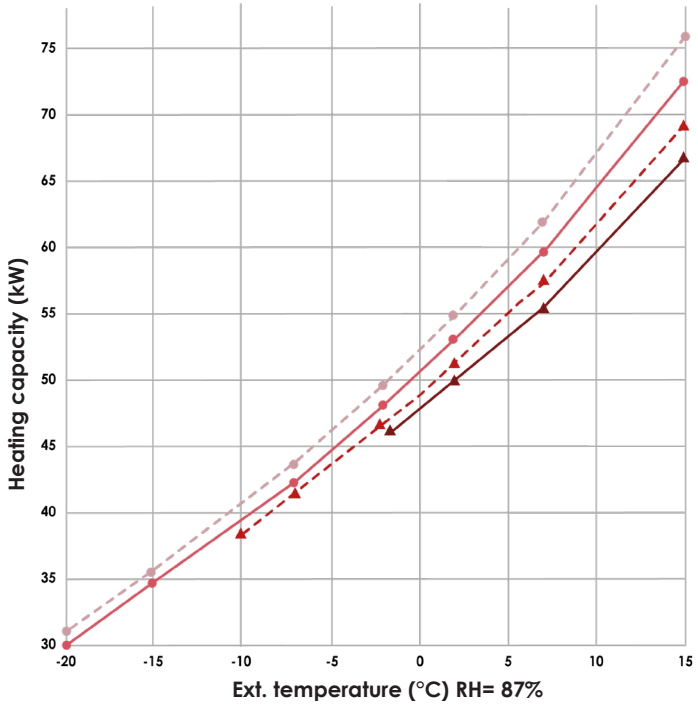
	DESIGNATION	Unit	60	70	80
PERFORMANCE	**CHILLED WATER PRODUCTION**				
	Cooling capacity[1]	**kW**	55.1	63.2	69.2
	Absorbed power [1]	**kW**	17.7	21.9	25.9
	EER [1]	**kW/kW**	3.11	2.89	2.68
	HOT WATER PRODUCTION				
	Heating capacity[2]	**kW**	61.2	71.2	80.1
	Absorbed power [2]	**kW**	13.8	16.5	19.2
	COP [2]	**kW/kW**	4.43	4.32	4.17
	Heating capacity - heating mode [3]	**kW**	45.5	53.4	60.1
	SCOP LT [4]	**kW/kW**	3.57	3.61	3.62
	η s, h LT [4]	**%**	140	141%	142
	Energy efficiency class (SCOP LT)		A+	A+	A+
	SCOP MT [5]	**kW/kW**	2.93	3.00	3.02
	η s, h MT [5]	**%**	114	117%	118
	Energy efficiency class (SCOP MT)		A+	A+	A+
HYDRAULICS	**WATER FLOW RATE**				
	Rated flow rate of a reversible unit [2]	**m^3/h**	9.4	10.8	12.3
	Rated flow rate on water loop at 20°C	**m^3/h**	14.6	16.9	19.0
	Exchanger pressure drop at maximum flow rate	**mWC**	1.6	2.1	2.5
VENTILATION	**AIR FLOW RATE**				
	Rated flow rate	**m^3/h**	24,500	25,500	26,500
	ACOUSTICS - LOW NOISE STANDARD				
	Acoustics power level Lw	**dB(A)**	73	74	76
	Sound pressure Lp [6]	**dB(A)**	42	43	45
GENERAL INFORMATION	**ELECTRICAL DATA**				
	Total installed electrical power	**kW**	29.4	35.2	39.8
	Total installed electrical current	**A**	52	66	72
	Starting current	**A**	174	181	223
	Starting current (Soft starter option)	**A**	116	123	149
	COMPRESSORS				
	Circuits / Quantity per circuit		1 / 2	1 / 2	1 / 2
	Type		Scroll	Scroll	Scroll
	DIMENSIONS				
	Length	**mm**	3,000	3,000	3,000
	Width	**mm**	1,450	1,450	1,450
	Height	**mm**	2,195	2,195	2,195
	WEIGHT				
	Unit without option / with water	**kg**	1,450	1,450	1,450

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

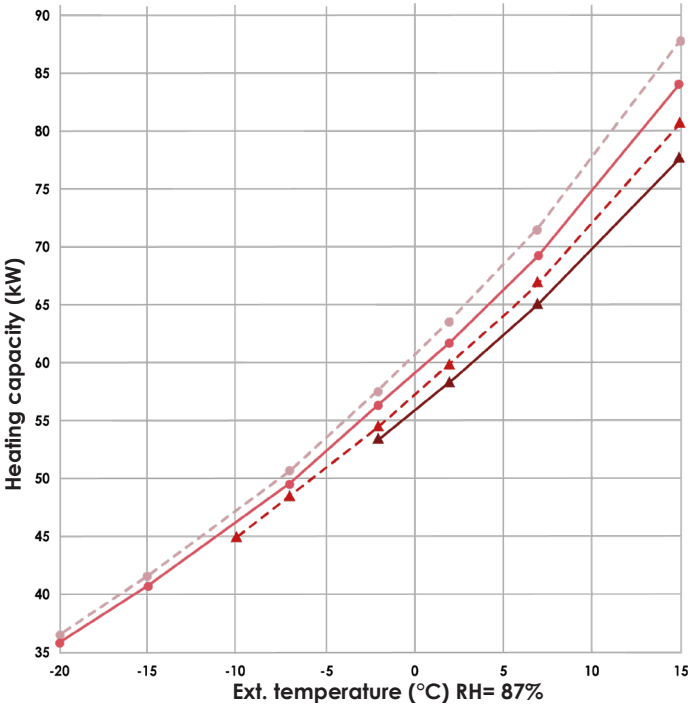
400 V- 50 Hz 3-phase power supply + earth without neutral

Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 60



Size 70



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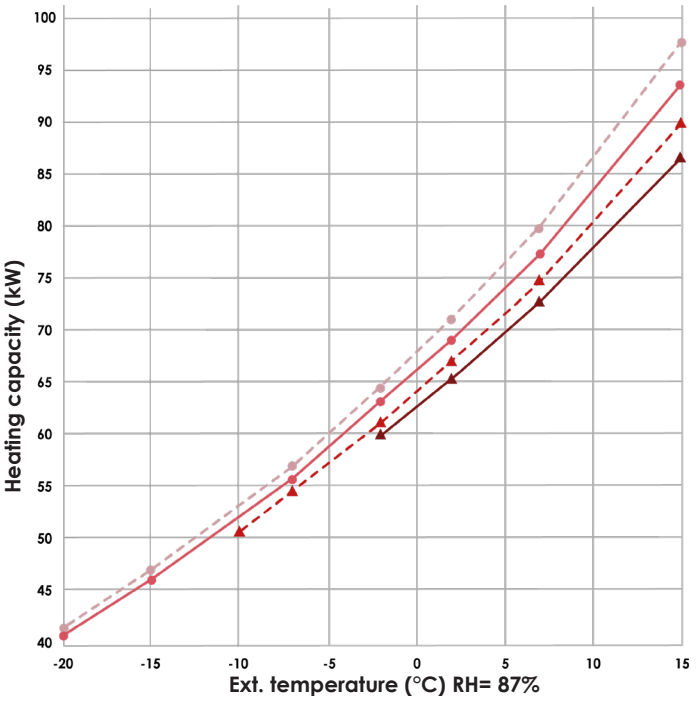
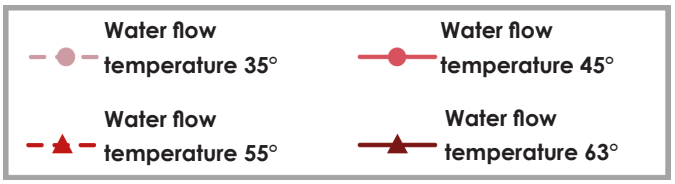




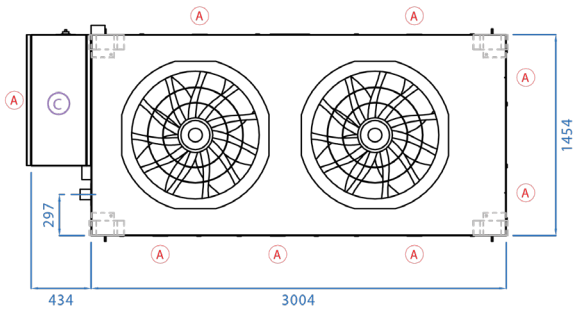
Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

Minimum COP depending on outside temperature
(Water flow temperature: +63°C)

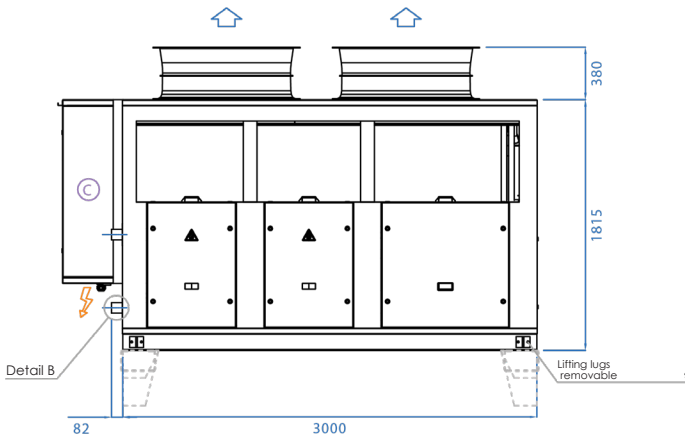
NEROMAX 60-70-80		
Ext. temperature/ RH	**-2°C / 87%**	**+7°C / 87%**
COP NEROMAX 60	2.00	2.55
COP NEROMAX 70	2.00	2.50
COP NEROMAX 80	2.01	2.46

Dimensions and connections

Top view:

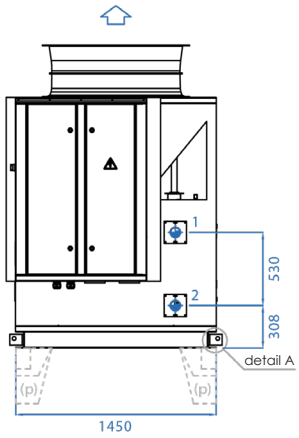


Side view:

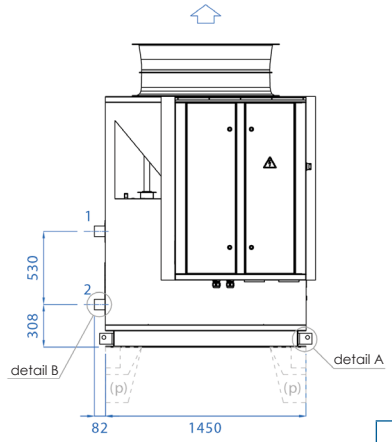


Front view:

LAYOUT A

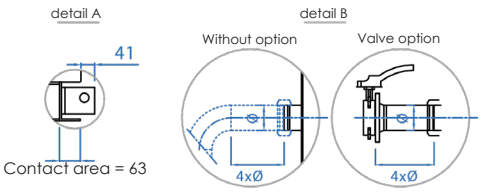


LAYOUT B



LAYOUT A: Left-hand electrical board

LAYOUT B: Right-hand electrical board, side hydraulic outlets



"Victaulic connection" * DN65	1	2
NEROMAX reversible version	IN	OUT

**Flange option on request*

- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	3,000	1,450	2,195

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

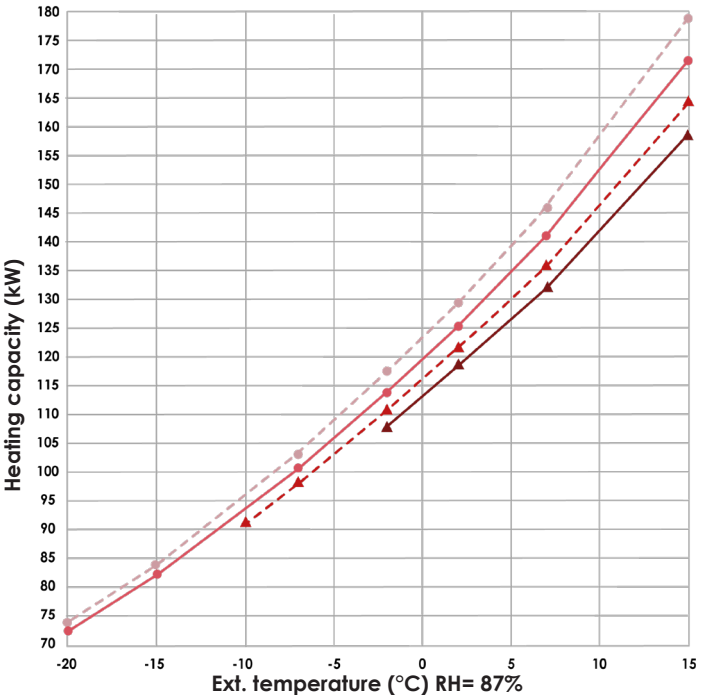
	DESIGNATION	Unit	135	155
PERFORMANCE	**CHILLED WATER PRODUCTION**			
	Cooling capacity(1)	kW	125.1	139
	Absorbed power (1)	kW	44.0	51.9
	EER (1)	kW/kW	2.84	2.68
	HOT WATER PRODUCTION			
	Heating capacity(2)	kW	145	162.9
	Absorbed power (2)	kW	32.4	39.4
	COP (2)	kW/kW	4.48	4.13
	Heating capacity - heating mode (3)	kW	105.4	121.4
	SCOP LT (4)	kW/kW	3.85	3.87
	η s, h LT (4)	%	151%	152%
	Energy efficiency class (SCOP LT)		A++	A++
	SCOP MT (5)	kW/kW	3.20	3.21
	η s, h MT (5)	%	125%	126%
	Energy efficiency class (SCOP MT)		A++	A++
HYDRAULICS	**WATER FLOW RATE**			
	Rated flow rate of a reversible unit (2)	m³/h	21.9	24.6
	Rated flow rate on water loop at 20°C	m³/h	35.1	39.2
	Exchanger pressure drop at maximum flow rate	mWC	2.2	2.7
VENTILATION	**AIR FLOW RATE**			
	Rated flow rate	m³/h	51,000	53,000
	ACOUSTICS - LOW NOISE STANDARD			
	Acoustics power level Lw	dB(A)	78	79
	Sound pressure Lp (6)	dB(A)	47	48
GENERAL INFORMATION	**ELECTRICAL DATA**			
	Total installed electrical power	kW	70.3	79.5
	Total installed electrical current	A	133	145
	Starting current	A	248	296
	Starting current (Soft starter option)	A	N/A	N/A
	COMPRESSORS			
	Circuits / Quantity per circuit		2 / 2	2 / 2
	Type		Scroll	Scroll
	DIMENSIONS			
	Length	mm	3,300	3,300
	Width	mm	2,200	2,200
	Height	mm	2,500	2,500
	WEIGHT			
	Unit without option / with water	kg	2,518	2,518

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

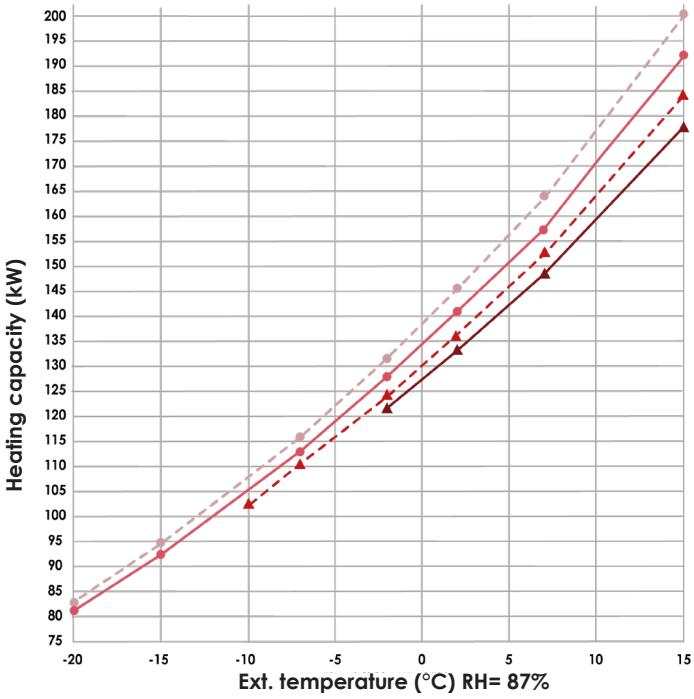
400 V- 50 Hz 3-phase power supply + earth without neutral

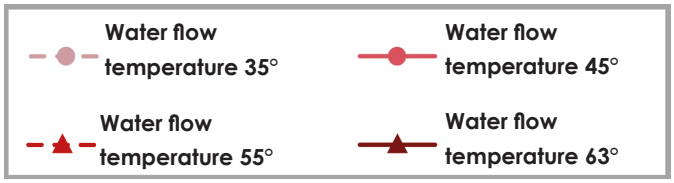
Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 135



Size 155





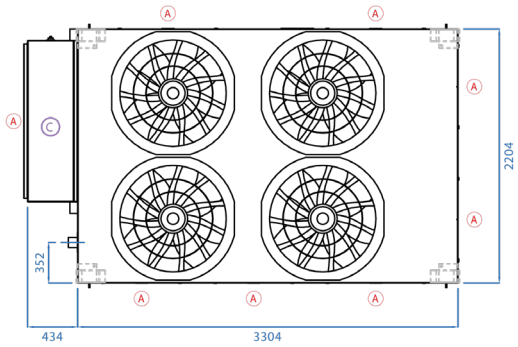
Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

Minimum COP depending on outside temperature

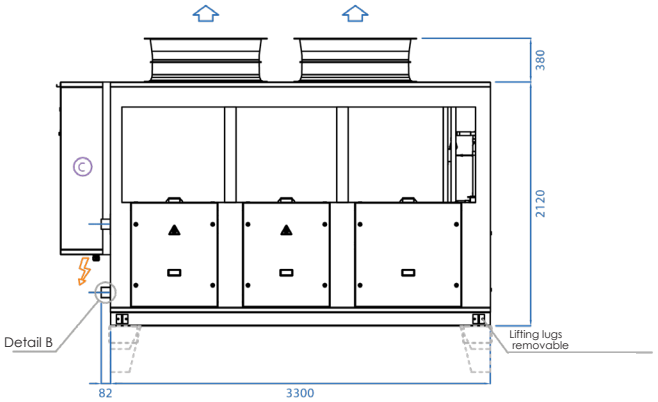
(Water flow temperature: +63°C)

NEROMAX 135 - 155		
Ext. temperature/ RH	**-2°C / 87%**	**+7°C / 87%**
COP NEROMAX 135	2.02	2.56
COP NEROMAX 155	2.05	2.53

Top view:

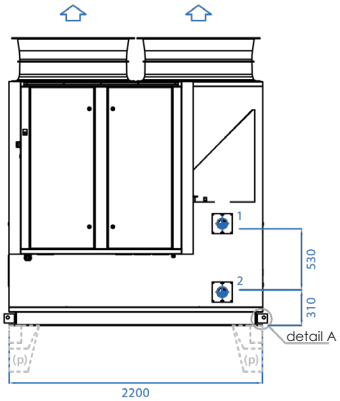


Side view:

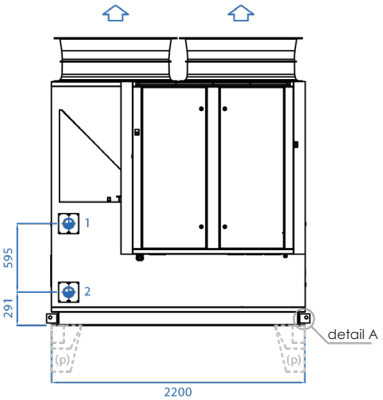


Front view:

LAYOUT A

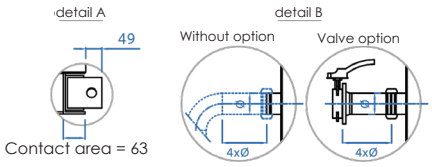


LAYOUT B



LAYOUT A: Left-hand electrical board

LAYOUT B: Right-hand electrical board



"Victaulic connection" * DN80	1	2
NEROMAX reversible version	IN	OUT

**Flange option on request*

- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	3,300	2,200	2,500

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

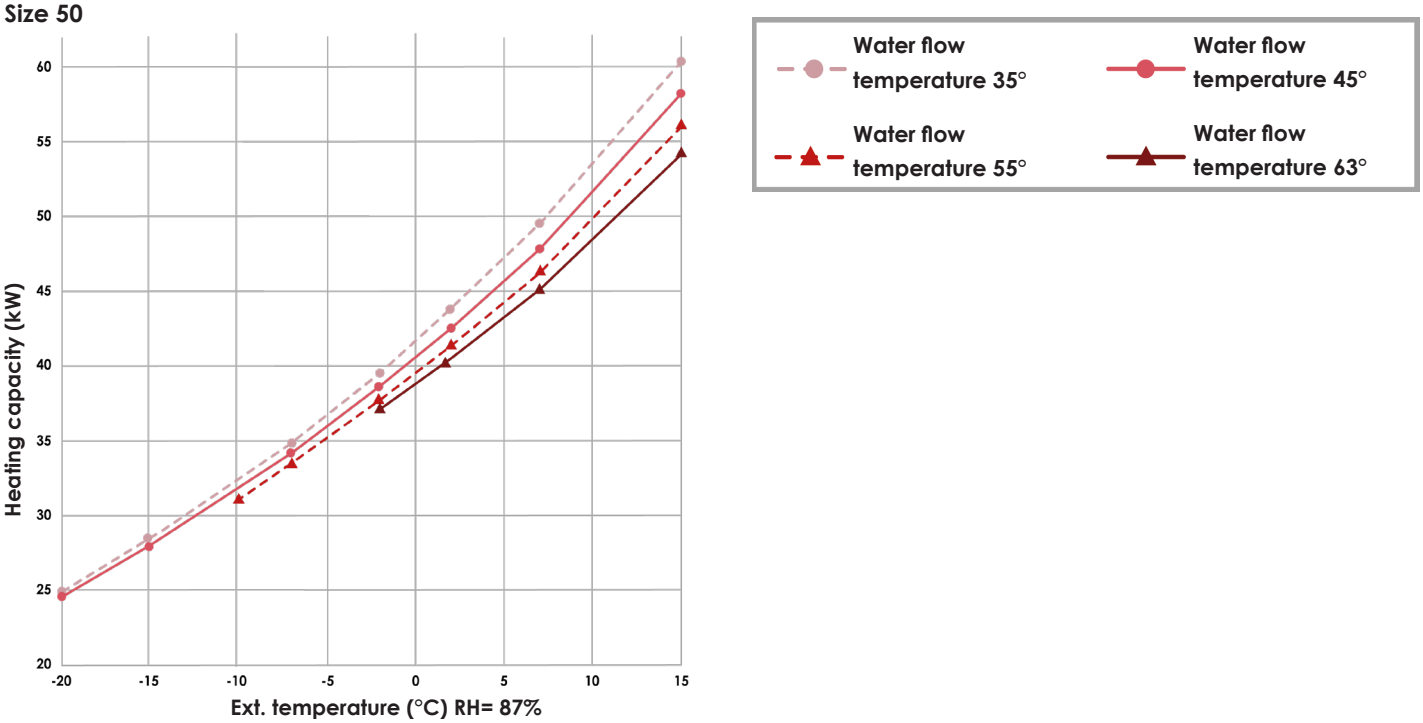
	DESIGNATION	Unit	50
PERFORMANCE	**CHILLED WATER PRODUCTION**		
	Cooling capacity(1)	kW	42.1
	Absorbed power (1)	kW	15.9
	EER (1)	kW/kW	2.65
	HOT WATER PRODUCTION		
	Heating capacity(2)	kW	49.1
	Absorbed power (2)	kW	17.1
	COP (2)	kW	2.87
	Heating capacity - heating mode (3)	kW	37.1
	SCOP LT (4)	kW/kW	3.54
	η s, h LT (4)	%	138
	Energy efficiency class (SCOP LT)		A+
	SCOP MT (5)	kW/kW	2.89
	η s, h MT (5)	%	113
	Energy efficiency class (SCOP MT)		A+
HYDRAULICS	**WATER FLOW RATE**		
	Fixed rated flow rate for reversible unit (2)	m^3/h	7.8
	Fixed rated flow rate on water loop at 20°C	m^3/h	11.8
	Exchanger pressure drop at maximum flow rate	mWC	2.5
VENTILATION	**AIR FLOW RATE**		
	Rated flow rate	m^3/h	17,000
	ACOUSTICS - LOW NOISE STANDARD		
	Acoustics power level Lw	dB(A)	76
	Sound pressure Lp (6)	dB(A)	45
GENERAL INFORMATION	**ELECTRICAL DATA**		
	Total installed electrical power	kW	25.0
	Total installed electrical current	A	46
	Starting current	A	171
	Starting current (Soft starter option)	A	113
	COMPRESSORS		
	Circuits / Quantity per circuit		1 / 2
	Type		Scroll
	DIMENSIONS		
	Length	mm	2,150
	Width	mm	1,450
	Height	mm	2,195
	WEIGHT		
	Unit without option / with water	kg	1,029

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

400 V- 50 Hz 3-phase power supply + earth without neutral

Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 50



Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

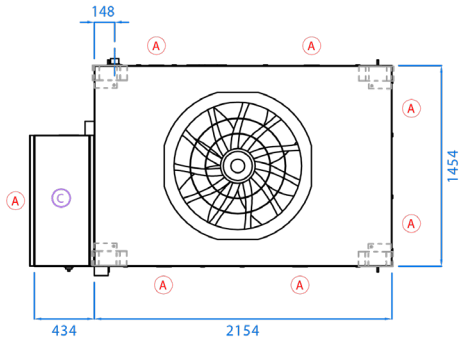
Minimum COP depending on outside temperature

(Water flow temperature: +63°C)

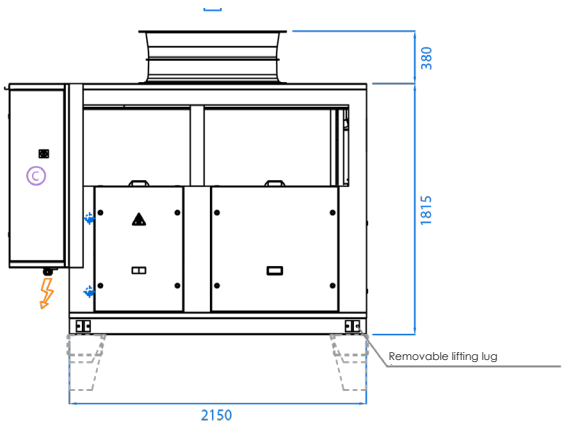
NEROMAX COMPACT 50		
Ext. temperature/ RH	**-2°C / 87%**	**+7°C / 87%**
COP	1.93	2.42

"COMPACT" TYPE VERSION (incompatible with hydraulic option)

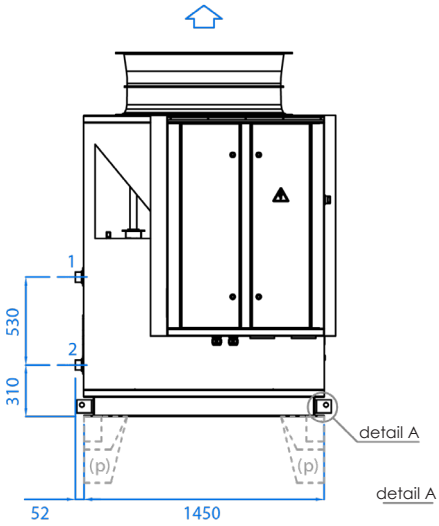
Top view:



Side view:

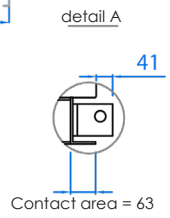


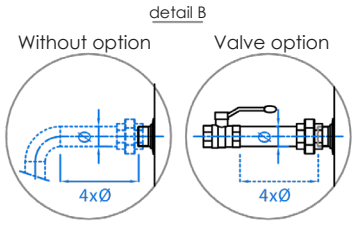
Front view:



Threaded connection* DN50	1	2
NEROMAX COMPACT reversible version	IN	OUT

**Flange option on request*





- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	2,150	1,450	2,195

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

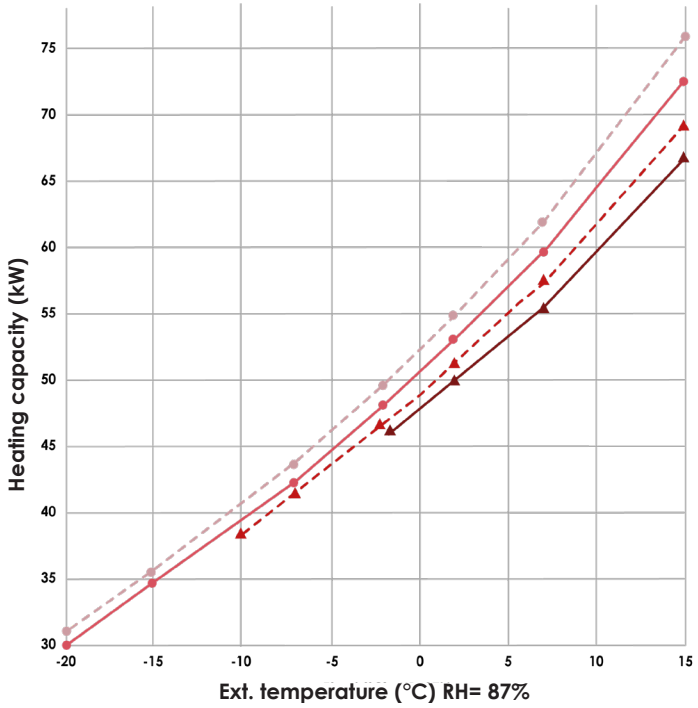
	DESIGNATION	Unit	60	70	80
PERFORMANCE	**CHILLED WATER PRODUCTION**				
	Cooling capacity(1)	kW	55.1	63.2	69.2
	Absorbed power (1)	kW	17.7	21.9	25.9
	EER (1)	kW/kW	3.11	2.89	2.68
	HOT WATER PRODUCTION				
	Heating capacity(2)	kW	61.2	71.2	80.1
	Absorbed power (2)	kW	13.8	16.5	19.2
	COP (2)	kW/kW	4.43	4.32	4.17
	Heating capacity - heating mode (3)	kW	45.5	53.4	60.1
	SCOP LT (4)	kW/kW	3.57	3.61	3.62
	η s, h LT (4)	%	140	141	142
	Energy efficiency class (SCOP LT)		A+	A+	A+
	SCOP MT (5)	kW/kW	2.93	3	3.02
	η s, h MT (5)	%	114	117	118
	Energy efficiency class (SCOP MT)		A+	A+	A+
HYDRAULICS	**WATER FLOW RATE**				
	Fixed rated flow rate for reversible unit (2)	m³/h	9.4	10.8	12.3
	Fixed rated flow rate on water loop at 20°C	m³/h	14.6	16.9	19.0
	Exchanger pressure drop at maximum flow rate	mWC	1.6	2.1	2.5
VENTILATION	**AIR FLOW RATE**				
	Rated flow rate	m³/h	24,500	25,500	26,500
	ACOUSTICS - LOW NOISE STANDARD				
	Acoustics power level Lw	dB(A)	73	74	76
	Sound pressure Lp (6)	dB(A)	42	43	45
GENERAL INFORMATION	**ELECTRICAL DATA**				
	Total installed electrical power	kW	29.4	35.2	39.8
	Total installed electrical current	A	52	66	72
	Starting current	A	174	181	223
	Starting current (Soft starter option)	A	116	123	149
	COMPRESSORS				
	Circuits / Quantity per circuit		1 / 2	1 / 2	1 / 2
	Type		Scroll	Scroll	Scroll
	DIMENSIONS				
	Length	mm	2,450	2,450	2,450
	Width	mm	1,450	1,450	1,450
	Height	mm	2,195	2,195	2,195
	WEIGHT				
	Unit without option / with water	kg	1,533	1,533	1,533

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

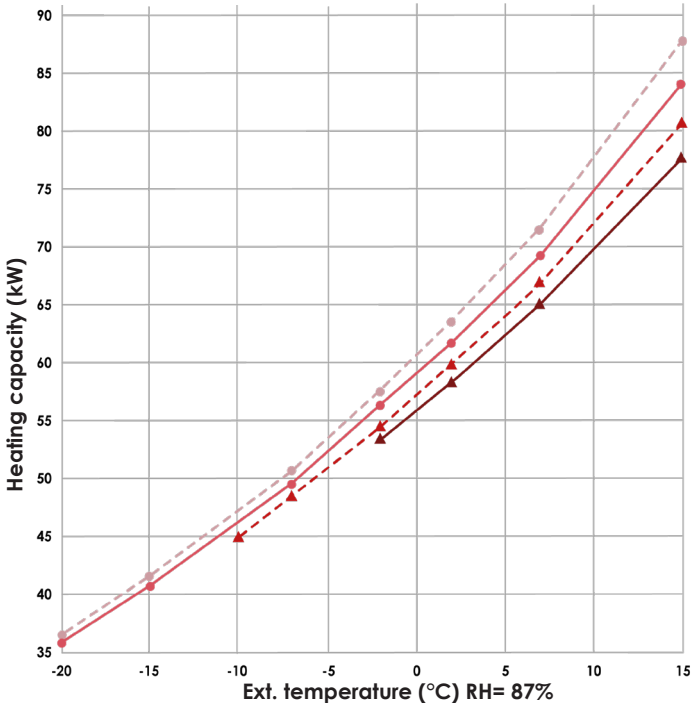
400 V- 50 Hz 3-phase power supply + earth without neutral

Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 60



Size 70



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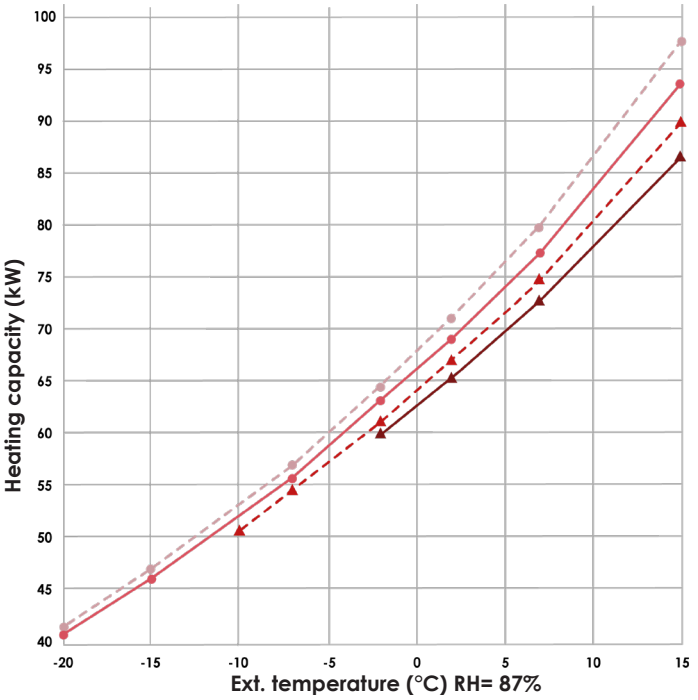
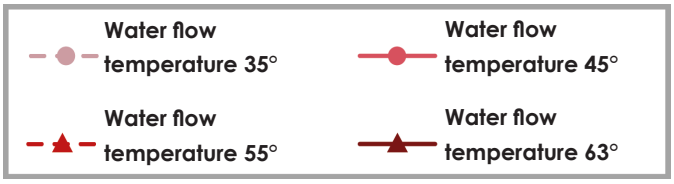




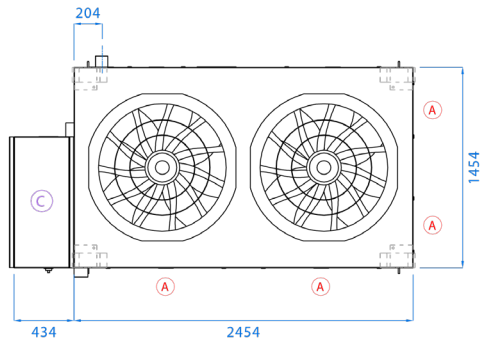
Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

Minimum COP depending on outside temperature
(Water flow temperature: +63°C)

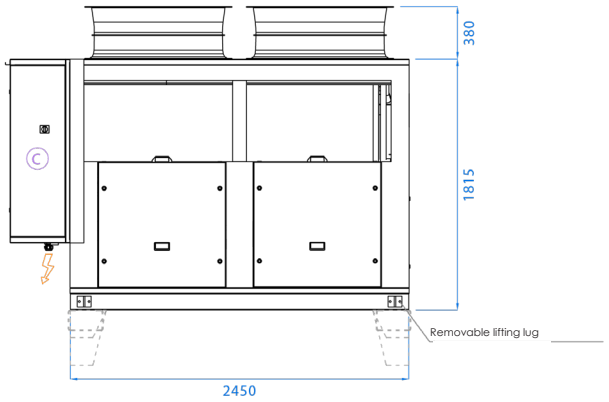
NEROMAX COMPACT 60-80		
Ext. temperature/ RH	**-2°C / 87%**	**+7°C / 87%**
COP NEROMAX COMPACT 60	2.00	2.55
COP NEROMAX COMPACT 70	2.00	2.50
COP NEROMAX COMPACT 80	2.01	2.46

"COMPACT" TYPE VERSION (incompatible with hydraulic option)

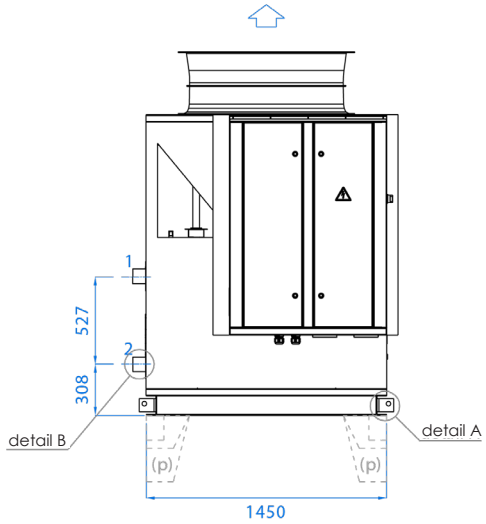
Top view:



Side view:

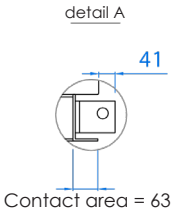


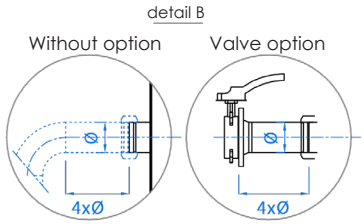
Front view:



"Victaulic"* DN65 - 60 to 80	1	2
NEROMAX COMPACT reversible version	IN	OUT

**Flange option on request*





- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	2,450	1,450	2,195

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

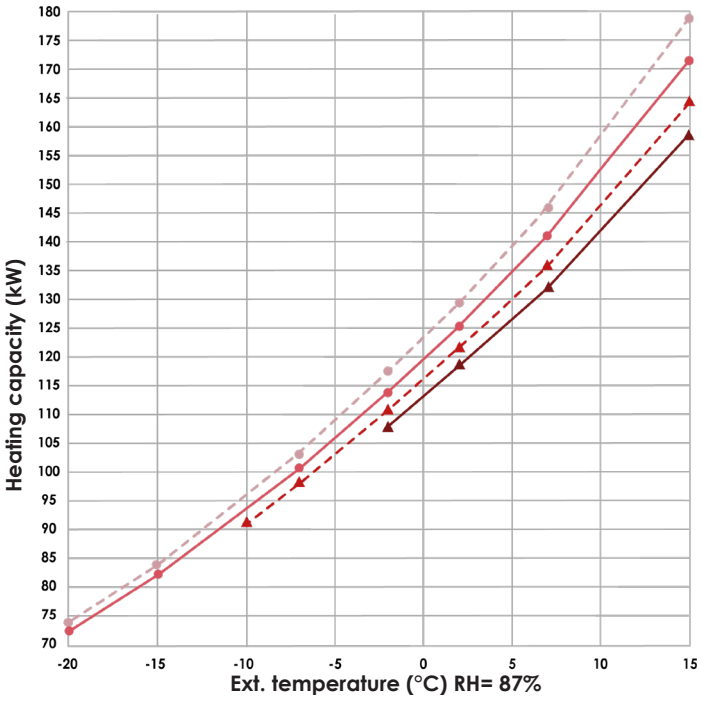
	DESIGNATION	Unit	135	155
PERFORMANCE	**CHILLED WATER PRODUCTION**			
	Cooling capacity(1)	kW	125.1	139
	Absorbed power (1)	kW	44.0	51.9
	EER (1)	kW/kW	2.84	2.68
	HOT WATER PRODUCTION			
	Heating capacity(2)	kW	145	162.9
	Absorbed power (2)	kW	32.4	39.4
	COP (2)	kW/kW	4.48	4.13
	Heating capacity - heating mode (3)	kW	105.4	121.4
	SCOP LT (4)	kW/kW	3.85	3.87
	η s, h LT (4)	%	151	152
	Energy efficiency class (SCOP LT)		A++	A++
	SCOP MT (5)	kW/kW	3.2	3.21
	η s, h MT (5)	%	125	126
	Energy efficiency class (SCOP MT)		A++	A++
HYDRAULICS	**WATER FLOW RATE**			
	Fixed rated flow rate for reversible unit (2)	m^3/h	21.9	24.6
	Fixed rated flow rate on water loop at 20°C	m^3/h	35.1	39.2
	Exchanger pressure drop at maximum flow rate	mWC	2.2	2.7
VENTILATION	**AIR FLOW RATE**			
	Rated flow rate	m^3/h	51,000	53,000
	ACOUSTICS - LOW NOISE STANDARD			
	Acoustics power level Lw	dB(A)	78	79
	Sound pressure Lp (6)	dB(A)	47	48
GENERAL INFORMATION	**ELECTRICAL DATA**			
	Total installed electrical power	kW	70.3	79.5
	Total installed electrical current	A	133	145
	Starting current	A	248	296
	Starting current (Soft starter option)	A	N/A	N/A
	COMPRESSORS			
	Circuits / Quantity per circuit		2 / 2	2 / 2
	Type		Scroll	Scroll
	DIMENSIONS			
	Length	mm	3,100	3,100
	Width	mm	2,200	2,200
	Height	mm	2,500	2,500
	WEIGHT			
	Unit without option / with water	kg	2,380	2,380

(1) Complies with EN 14511: chilled water return/flow temperature: 12/7°C, outside temperature 35°C
(2) Hot water return/flow temperature medium temperature: 30/35°C, outside temperature +7°C DB/ +6°C WB
(3) Hot water return/flow temperature: 58/63°C, outside temperature -2°C DB (RH 87%).
(4) SCOP LT 30/35°C in accordance with regulation (EU) no. 813/2013
(5) SCOP MT 47/55°C in accordance with regulation (EU) no. 813/2013
(6) Resulting sound pressure at 10m in free field

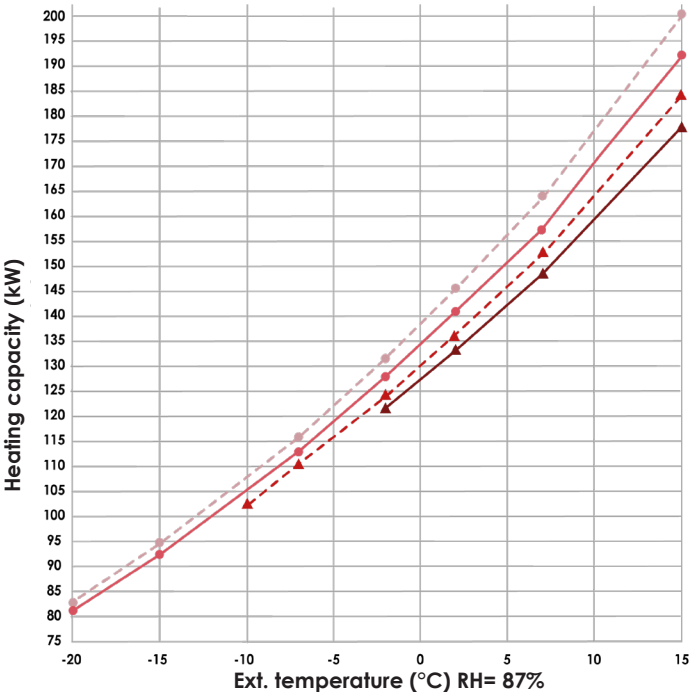
400 V- 50 Hz 3-phase power supply + earth without neutral

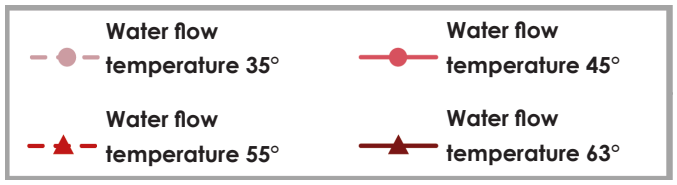
Note: Calculations based on the properties of air at atmospheric pressure, at sea level

Size 135



Size 155





Recommendation: for best regulation, select a fixed water flow rate for an inlet/outlet temperature differential of 5K or less. The maximum water flow rate should be set in the most critical case between chilled water production and hot water production in mid-season, when air temperatures are more favourable.

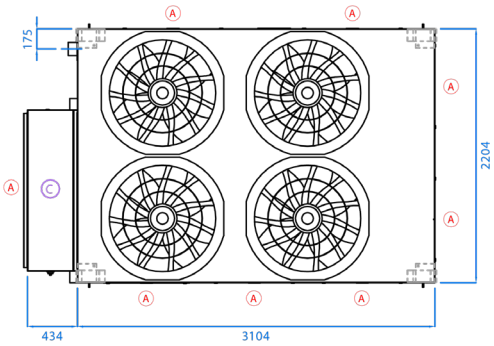
Minimum COP depending on outside temperature

(Water flow temperature: +63°C)

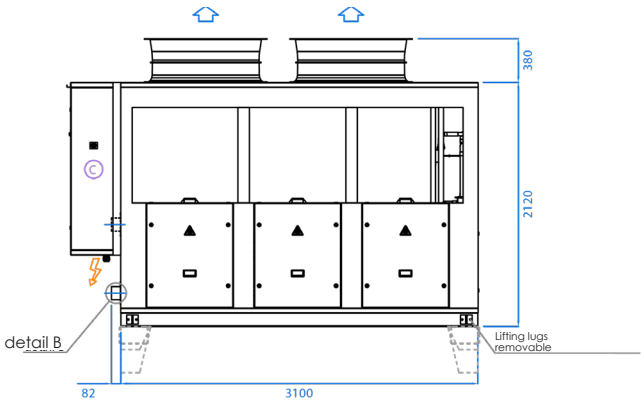
NEROMAX 135-155		
Ext. temperature/ RH	**-2°C / 87%**	**+7°C / 87%**
COP NEROMAX COMPACT 135	2.02	2.56
COP NEROMAX COMPACT 155	2.05	2.53

"COMPACT" TYPE VERSION (incompatible with hydraulic option)

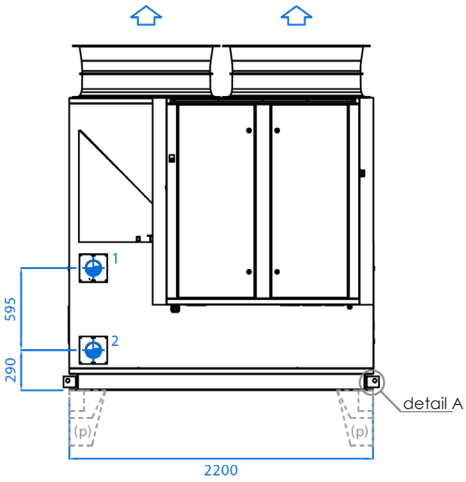
Top view:



Side view:

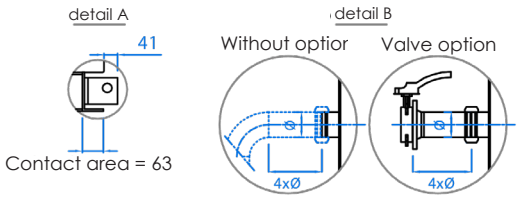


Front view:



"Victaulic"* DN80 - 135 to 155	1	2
NEROMAX COMPACT reversible version	IN	OUT

**Flange option on request*

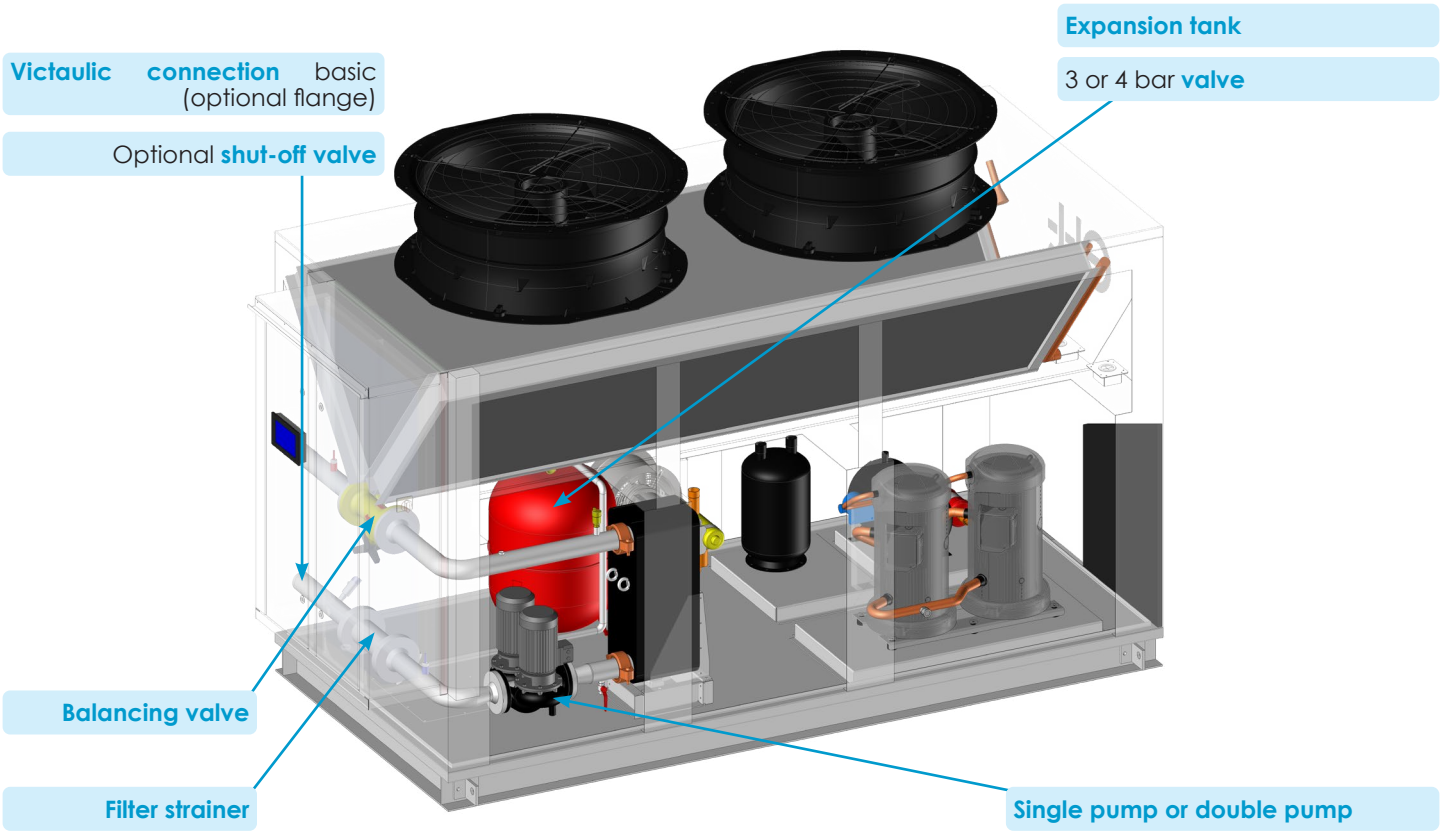


- Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Air direction

	Length	Width [1]	Height
Casing dimensions	3,100	2,200	2,500

A straight length of 4 x the pipe diameter is required to enable the control system to read the machine's water flow more clearly (see detail B).

Hydraulic options



Hydraulic options are not available on “compact” versions.

OPTIONAL: FILTER STRAINER 860 µm

A filter of at least 860 µm is required to ensure that the heat pump operates correctly and to guarantee the life of the exchanger. It can be offered integrated into the technical compartment as an option on the NEROMAX version.

		Unit	50	60	70	80	135	155
47/55 °C water regime	Pressure Drop	mWC	0.4	0.2	0.3	0.4	0.6	0.8
Water flow rate		m³/h	11.8	14.6	16.9	19	35.1	39.2
Weight		kg	5	7	7	7	10	10

OPTIONAL: EXPANSION TANK

	Unit	50	60	70	80	135	155
Expansion tank capacity	litres	50	75	75	75	100	100
Weight	kg	12	15	15	15	24	24

OPTIONAL: BALANCING VALVE

	Unit	50	60	70	80	135	155
Weight	kg	3	10	10	10	13	13

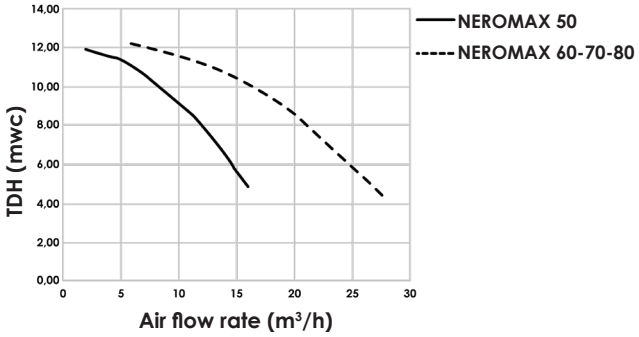
OPTIONAL: SHUT-OFF VALVES

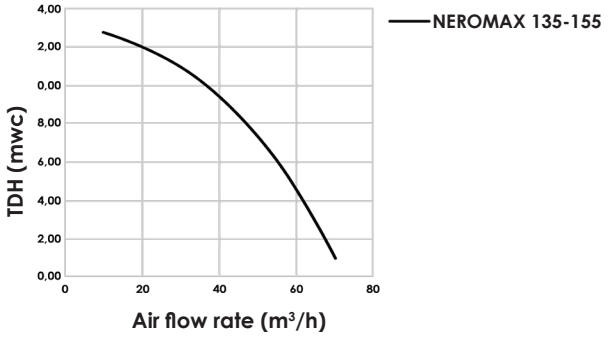
	Unit	50	60	70	80	135	155
Weight	kg	2.5	8	8	8	10	10

Hydraulic options

OPTIONAL: SINGLE PUMP

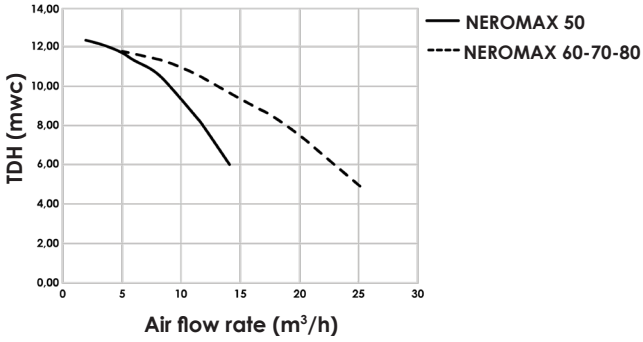
	Unit	50	60	70	80	135	155
Installed capacity	kW	0.75	1.5	1.5	1.5	3	3
Pump current	A	1.84	3.2	3.2	3.2	6.15	6.15
Weight	kg	25	52	52	52	70	70

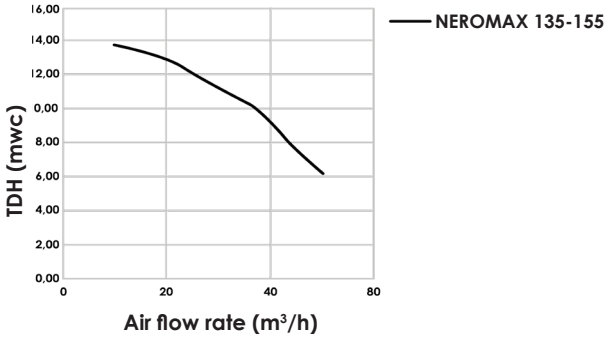




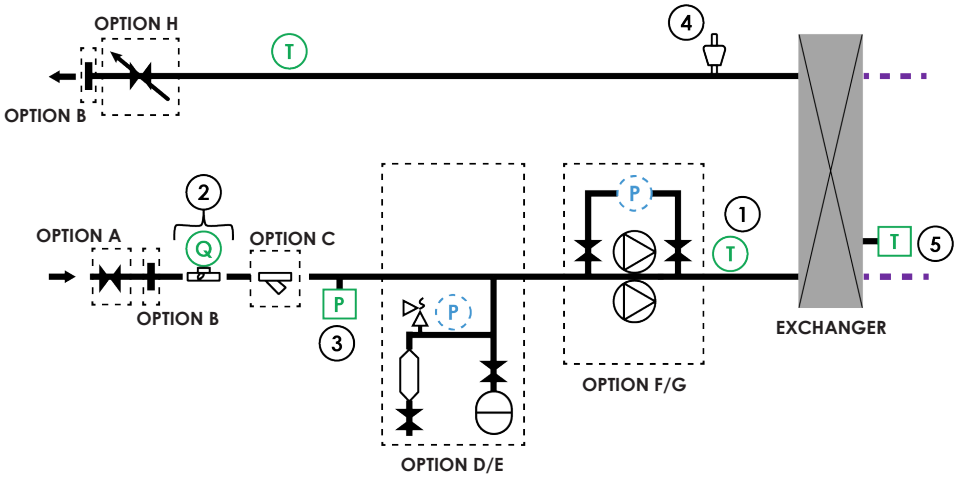
OPTIONAL: DOUBLE PUMP (SIMULTANEOUS OPERATION)

	Unit	50	60	70	80	135	155
Installed capacity	kW	1.1	1.5	1.5	1.5	3	3
Pump current	A	2.66	3.68	3.68	3.68	6.36	6.36
Weight	kg	41	43	43	43	67	67





Hydraulic drawing with options



STANDARD EQUIPMENT

1: Water inlet and outlet control sensors
2: Flow meter
3: Low water pressure switch
4: High level drain and low level drain
5: Frost protection thermostat

HYDRAULIC OPTIONS

A: Shut-off valve(s)
B: Flange connection
C: Filter strainer
D: Expansion tank
E: 3 or 4 bar valve(to be specified)
F/G: Single pump or double pumps
H: balancing valve

Hydraulic options

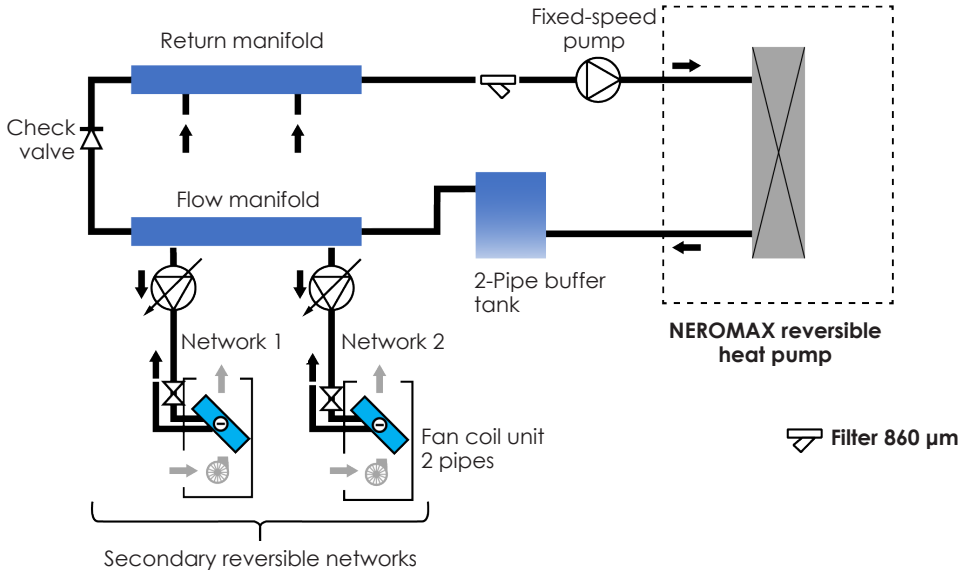
Hydraulic connection diameter

	Unit	50	60	70	80	135	155
DN		DN50	DN65	DN65	DN65	DN80	DN80
Standard connection		Threaded	Victaulic				
Connection (optional)		Flange					

Hydraulic drawing of installation

2-PIPE REVERSIBLE UNIT

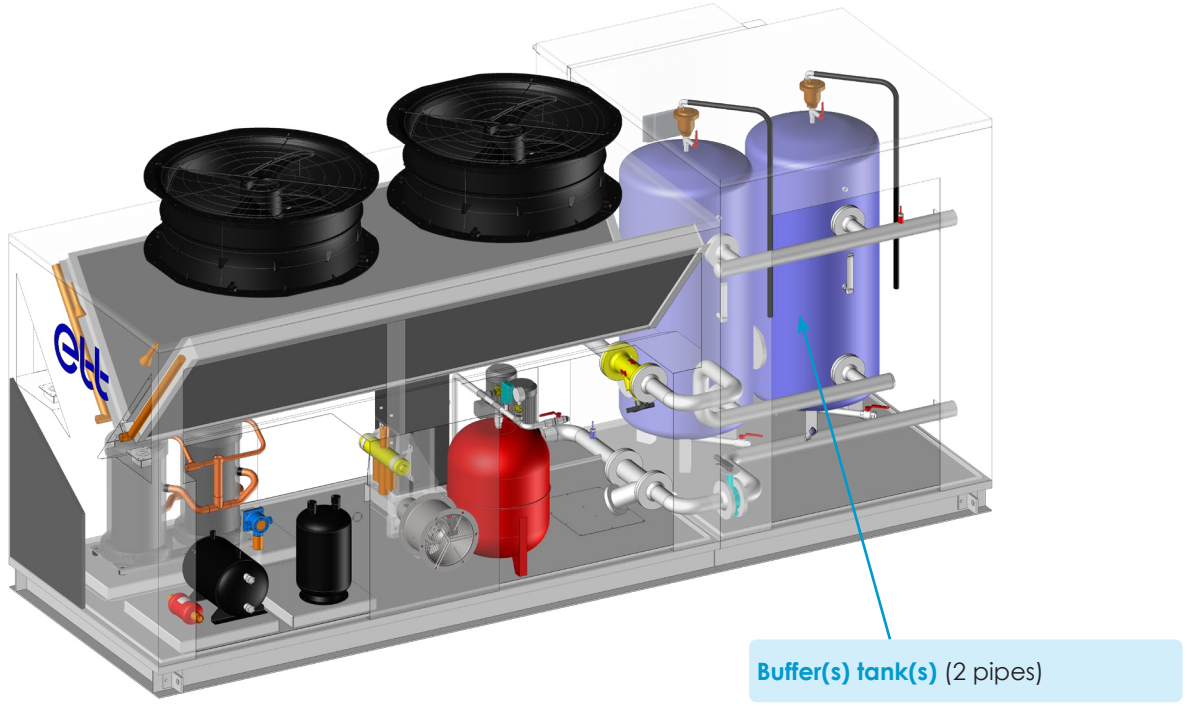
For reversible units, it is also recommended to operate at a fixed flow rate. It is essential to use a buffer tank with 2 connections to avoid poor temperature stratification in the buffer tank when switching from heating mode to chilled water mode. 4-pipe balloons are not recommended for these applications.

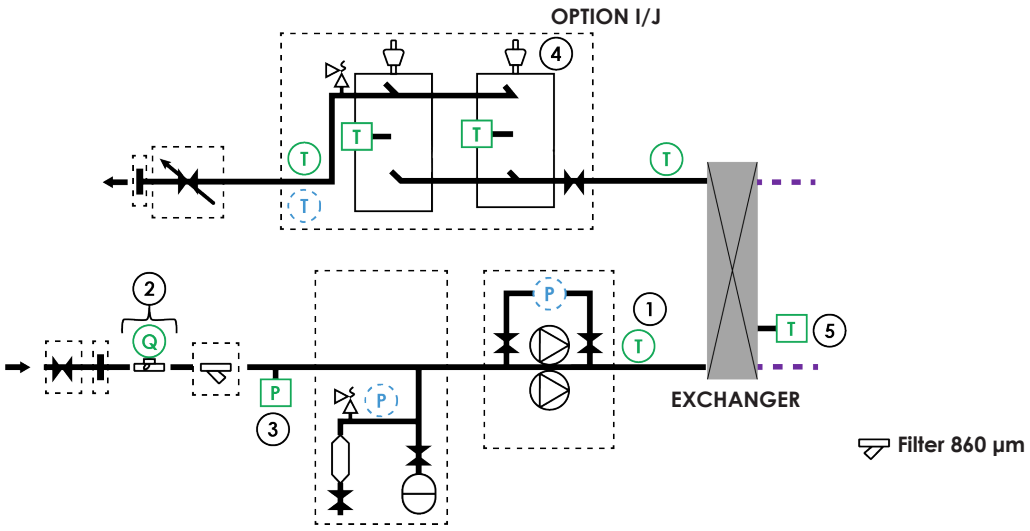


This type of installation can also be used on a regulated water loop for water/air emitters.

Hydraulic options are not available on “compact” versions.

Hydraulic options with buffer tank





Hydraulic options

I: Buffer tank

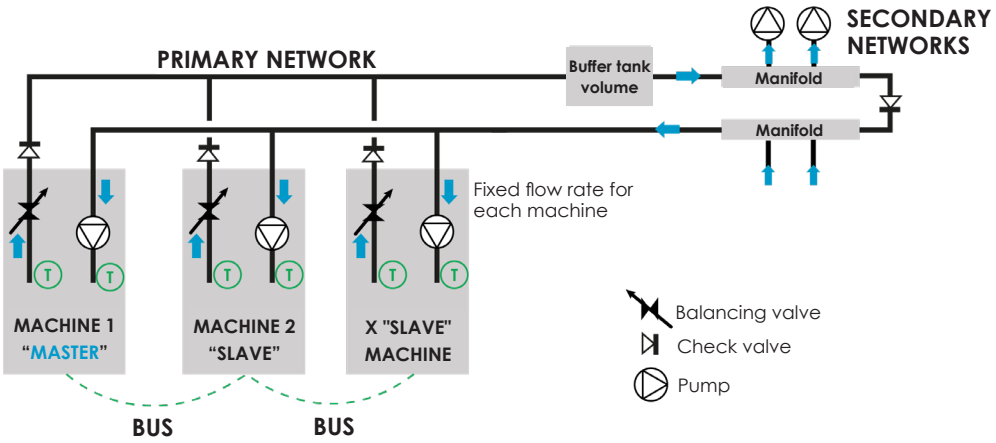
Optional: Buffer tank

	Unit	50	60	70	80	135	155
Buffer tank capacity	litres	300	600	600	600	900	900
Weight for optional empty tank	kg	446	893	893	893	1,260	1,260
Weight for 'optional filled tank'	kg	840	1,628	1,628	1,628	2,336	2,336

Optional: cascade management for up to 8 machines. The pumps are fixed-speed.

Option: Cascade process

Example 1: cascade of machines in reversible mode with **return temperature control.**



Note: Your sales contact will be happy to provide you with further information.

Sound spectrum

NEROMAX version

	FREQUENCY BAND Hz► / Propeller fan air flow rate (m^3/h)	63	125	250	500	1,000	2,000	4,000	8,000	Overall level Lw (dB(A))
50	17,000	52.0	53.0	58.0	67.0	63.0	63.0	61.0	58.0	71.0
60	24,500	54.0	57.0	63.0	69.0	66.0	66.0	65.0	60.0	73.0
70	25,500	54.0	58.0	64.0	70.0	67.0	66.0	65.0	61.0	74.0
80	26,500	54.0	59.0	65.0	71.0	69.0	68.0	67.0	63.0	76.0
135	51,000	57.0	62.0	67.0	73.0	71.0	70.0	69.0	64.0	78.0
155	53,000	58.0	63.0	69.0	75.0	73.0	71.0	70.0	66.0	79.0

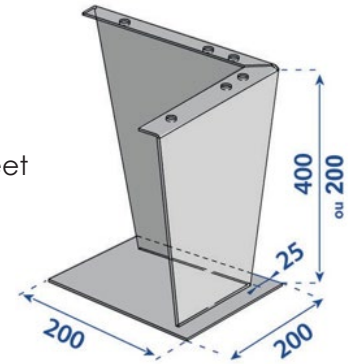
NEROMAX COMPACT version

	FREQUENCY BAND Hz► / Propeller fan air flow rate (m^3/h)	63	125	250	500	1,000	2,000	4,000	8,000	Overall level Lw (dB(A))
50	17,000	55.0	61.0	67.0	71.0	69.0	68.0	66.0	61.0	76.0
60	24,500	54.0	57.0	63.0	69.0	66.0	66.0	65.0	60.0	73.0
70	25,500	54.0	58.0	64.0	70.0	67.0	66.0	65.0	61.0	74.0
80	26,500	54.0	59.0	65.0	71.0	69.0	68.0	67.0	63.0	76.0
135	51,000	57.0	62.0	67.0	73.0	71.0	70.0	69.0	64.0	78.0
155	53,000	58.0	63.0	69.0	75.0	73.0	71.0	70.0	66.0	79.0

Data supplied in Hot Water Mode for a water regime of 47/55°C and an outside air temperature of +7°C DB / +6°C WB

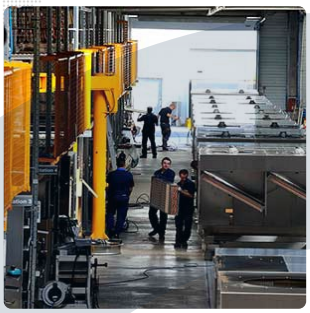
Accessories for installation: Feet

Fixed aluminium feet
Unit weight: 1 kg



Number of feet

	50	60	70	80	135	155
Without buffer tank option	4	4	4	4	6	6
With buffer tank option	6	6	6	6	8	8



Reference: MARK-BRO_60-EN_F

ETT - Route de Brest - BP26
29830 Ploudalmézeau - France
Tel: +33 2 98 48 14 22
Export Contact: +33 2 98 48 00 70
ETT Services: +33 2 98 48 02 22

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