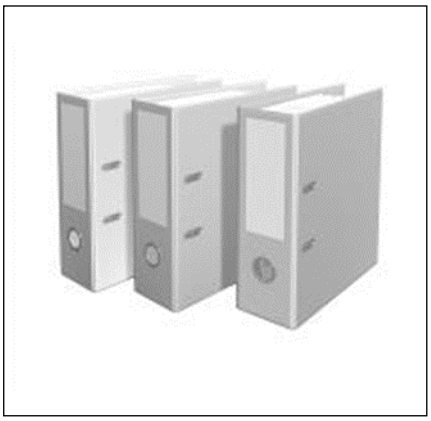
PLANNER MANUAL
Commercial Heat Pump

AEROTOP L



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General information

Features and benefits

AEROTOP L is the new air cooled heat pump, equipped with Full DC Inverter technology and R-32 refrigerant, for outdoor installation. It is available from 20 kW up to 55 kW and is the most effective and valuable solution both in terms of capital investment and running costs.

Energy Efficiency
Class A Eurovent at full load in heating and in cooling.
SCOP up to 4,30, which reaches the A++ class according to EU Regulation 811/2013 (ErP) with low water temperature (LWT 35°C).
SEER up to 4,64 which makes it extremely competitive even com-pared to the cooling only units.
Capacity modulation from 30% to 100%.

Functionality
- Management and production of domestic hot water up to 55 °C
- Climate compensation with outdoor temperature
- Double set-point adjustable
- Additional heating source management

- SILENT mode:
- speed reduction of compressors and fans
- three levels of silence: standard mode, silenced, super silen-ced

Application Versatility
All the main system components are integrated in the unit, assu-ring the best reliability and an easy installation:
- Hydronic assembly with 1 inverter pump

Wide operating range
Outdoor air temperature max / min
heating mode < 30 °C / > -14 °C
domestic hot water mode < 43 °C / > 14 °C
cooling mode < 48 °C / > -10 °C

Flow water temperature max /min
heating mode < 54 °C / > 15 °C
domestic hot water mode < 54 °C / > 15 °C
cooling mode < 20 °C / > 0 °C

Modular design
AEROTOP M has been designed for modularity. It is possible to connect up to 16 units in a local network, reaching a maximum capacity of 960 kW. The combinations can also take place with different capacity units. The modular system, obtained by combining several modules, preserves the strengths of the single module, but multiplies the advantages:
- Increased system efficiency
- Higher reliability
- Simplified handling and installation
- Quick and easy maintenance
- Scalability

Technology
The technical solutions adopted place AEROTOP M on top of its category
- DC inverter technology on compressors and fans
- Electronic expansion valve
- Flow switch
- Hydrophilic battery

Tax credit
Due to its high efficiency, AEROTOP M may be eligible for heat pump subsidies in Your Country

General information

Standard unit technical specifications

Compressor Range 54–61kW
Inverter controlled rotary-type hermetic compressor equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. It is installed on anti-vibration mounts and it is equipped with oil charge. The compressor is wrapped in a sound-absorbing hood, that reduces its sound emissions and it thermally insulates it. A crankcase heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.
Compressors are connected in tandem on a single refrigerating circuit with a dedicated system for the oil recovery

Range 65–88 kW
Direct expansion heat exchanger
Scroll hermetic compressor with steam injection controlled by inverter, complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. It is installed on anti-vibration mounts and it is equipped with oil charge. The compressor is wrapped in a sound-absorbing hood, that reduces its sound emissions and it thermally insulates it.
A crankcase heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.
Compressors are connected in tandem on a single refrigerating circuit with a dedicated system for the oil recovery .

Structure
Supporting structure realized with steel with zinc-magnesium superficial traitment painted with polyester powder RAL 9001, that ensures excellent mechanical features and high long-term resilience against corrosion.

Paneling
External RAL 9001 painted zinc-magnesium sheet metal panelling that ensures superior resistance to corrosion for outdoor installation and eliminates the need for periodic painting.
Each panel can be easily removed to allow full access to internal components.

Internal exchanger
- Direct expansion heat exchanger, brazed AISI 316 stainless steel plates, in pack without seals using copper as the brazing material, with low refrigerant charge and large exchange surface.
- The exchanger comes complete with:
- external thermal insulation no-condensation, thickness 17 mm, in expanded polypropylene (EPP)
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.
- flow switch
- anti-ice probe

External exchanger
c coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar.
Fins are made from aluminum with hydrophic treatment that allows the correct evacuation of condensing water and optimizes defrosting.
Fins have a special corrugated surface and they are appropriately distanced to ensure the maximum heat exchange efficiency. n.

Fan
Helical fans with 4 profiled blades made of reinfoced plastic, directly coupled to the DC brushless motor with electronic control, IP 54 execution.
Fans are located in aerodynamically shaped structures to increase efficiency and minimize noise level, equipped with accident prevention steel guards.

Refrigeration circuit
- Refrigeration circuit with: Direct expansion heat exchanger
- filter dryer
- liquid receiver
- pressure transducer (high/low)
- refrigerant temperature probe
- electronic expansion valves
- non return valve4-way reverse-cycle valve
- high pressure safety pressure switch
- low pressure safety pressure switch
- low pressure safety valve
- return liquid separator
- oil separator

Refrigeration circuit
- cooling system of the of the electrical control panel using undercooled liquid

Only for range 65–88 kW:
- economizer exchanger

Electrical panel
- main door lock isolator switch
- phase monitor
- auxiliary components protection fuse
- compressor protection fuse
- fan motor thermal protections
- interface terminal with graphic display
- intuitive graphical interface retro lighted
- display of operating status
- Unit On/Off and overload reset
- manual changing of the operating mode (hot or cold)
- management of the operating parameters
- daily, weekly programmer of temperature set-point and unit on/off
- self-diagnosis system with immediate display of the fault code
- compressor overload protection and timer
- relay for remote cumulative fault signal
- potential-free contact for remote on-off control
- potential-free contact for summer / winter change
- potential-free contacts for compressor status
- serial port with modbus port (RS485) for remote communication

Test
Unit subjected to factory-tested in specific steps and test pressure of the piping of the refrigerant circuit (with nitrogen and hydrogen), before shipping them

General information

Refrigerant information

Refrigerant Information
This product contains fluorinated greenhouse gases covered by the Kyoto protocol. Do not discharge gas into air.
Refrigerant type: R32

Characteristics of R32 refrigerant:
- minimum environmental impact thanks to the low Global Warming Potential GWP
- low flammability, class A2L according to ISO 817
- low combustion speed
- low toxicity

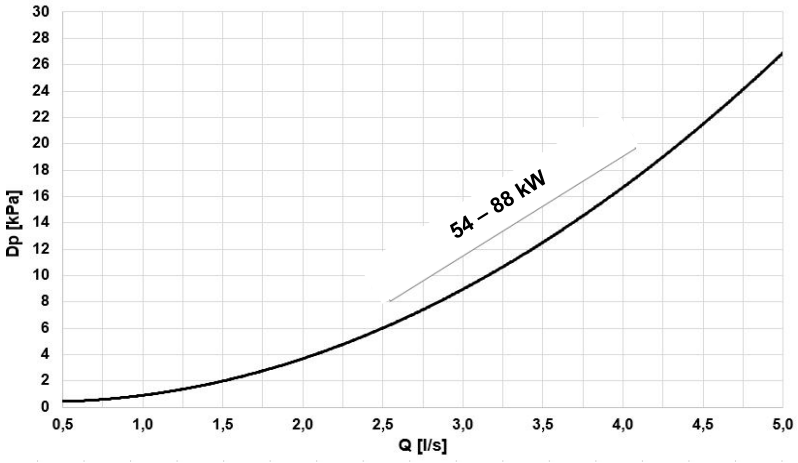
The refrigerant quantity is indicated on the unit plate
Quantity factory-loaded refrigerant and equivalent CO2 tons:

AEROTOP L	Refrigerant (Kg)	Equivalent CO^2 tons
54, 61k	15	10
65, 79, 88	21	14

Physical characteristics of the R32 refrigerant	
Safety class (ISO	A2L
GWP	675
LFL Low flammability limit	0,307 Kg/m^3 @ 60°C
BV Burning velocity	6,7 cm/s
Boiling point	-52 °C
GWP	675 100 yr ITH
GWP	677 ARS 100 yr ITH
Self-ignition temperature	648 °C

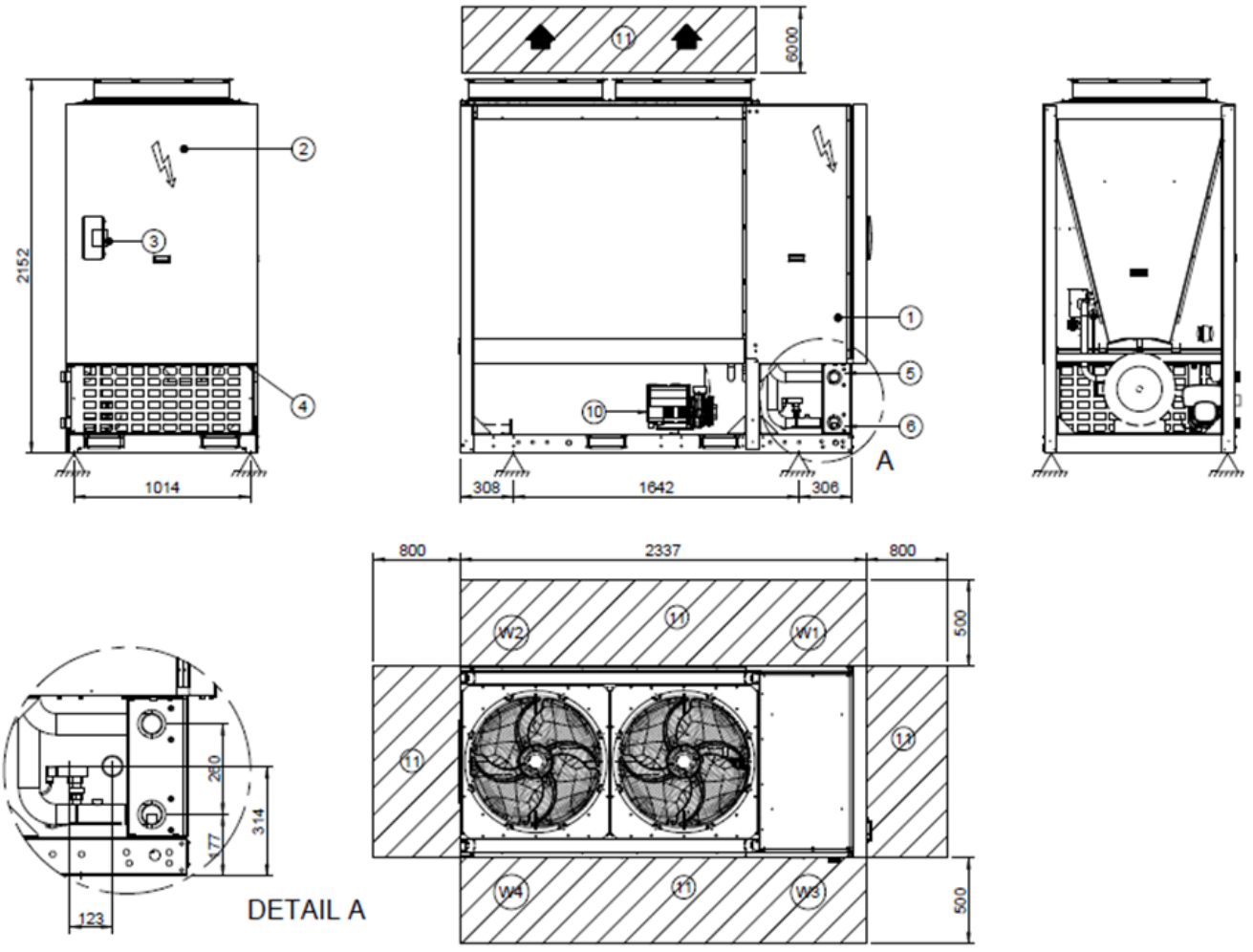
General information

Built-in options

Scope delivery	Description
User side hydronic group with 1 inverter pump	Hydronic unit made of a centrifugal electric pump, adjusted by way of inverter, body and propeller made in AISI 304 steel. The electric pump is equipped with three-phase electric motor with IP55 protection and complete with heat formed insulating casing. The water connection are 2” Victaulic.
Copper / aluminium condenser coil	Coils with copper pipes and aluminium fins. Resist bi-metallic corrosion and allow for application in coastal areas. Attention! Cooling capacity variation -2.7% Variation in compressor power input +4.2% Operating range reduction -2.1°C
Finned coil protection grill	The grilles protect the external coil from accidental contact with objects or persons. Ideal for installation in places where persons can pass from, such as car parks, terraces, etc
Steel mesh strainer on the water side	The device stops the exchanger from being clogged by any impurities which are in the hydraulic circuit. The mechanical steel mesh strainer must be placed on the water input line. It can be easily dismantled for periodical maintenance and clean-ing Filter fittings are Victaulic type by 2”. Steel mesh strainer pressure drops  Q = Admissible water flow rate [l/s] DP = Water side pressure drops [kPa]
Anti-vibration mount support	The rubber antivibration mounts are attached in special housing on the support frame and serve to smooth the vibrations produced by the unit thus reducing the noise transmitted to the support structure.

Technical data

Dimensions drawings
AEROTOP-L 54 - 61 kW



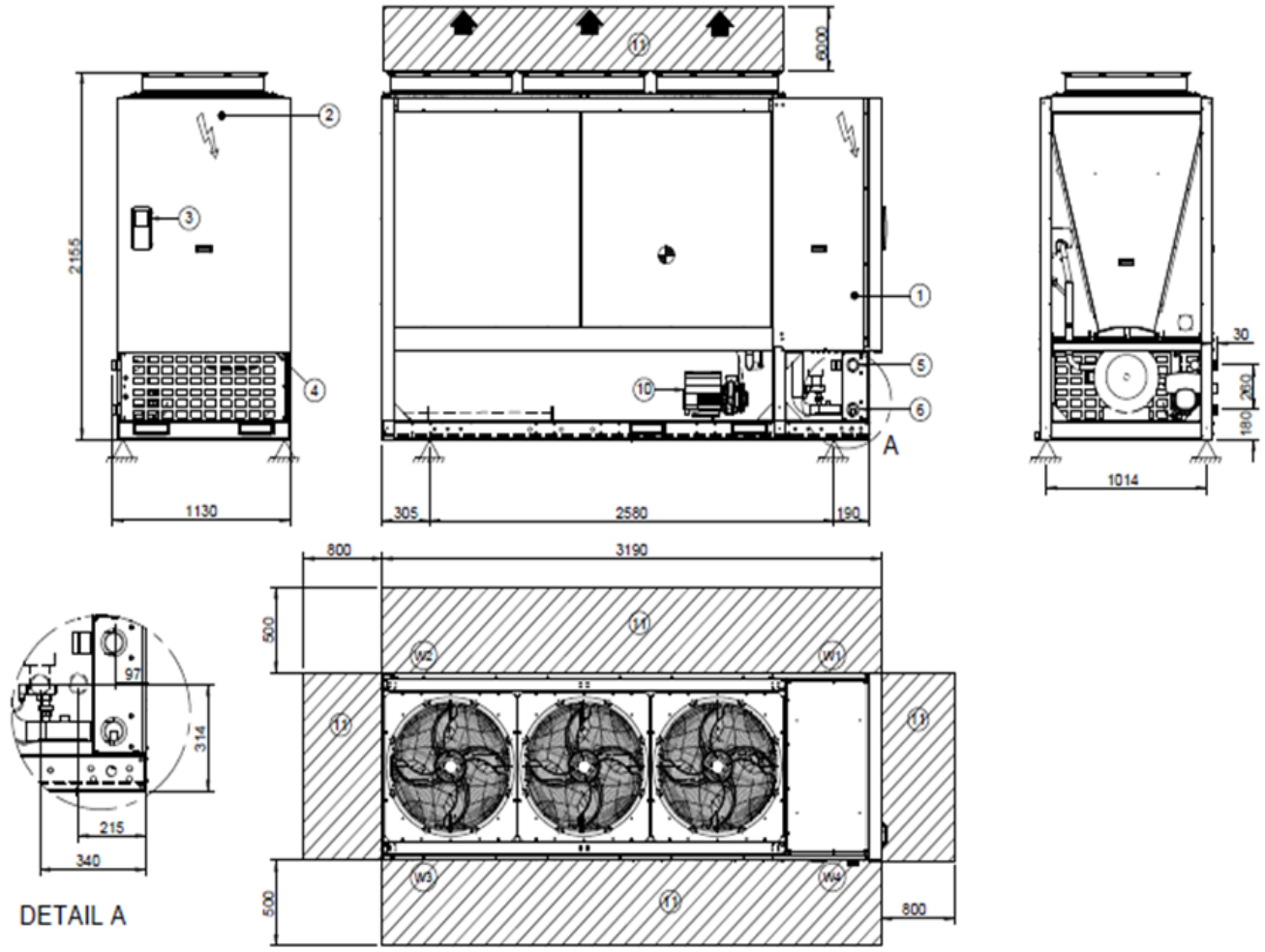
1. Compressor compartment
2. Electrical panel
3. Control keypad
4. Power input
5. Water return 2" Victaulic
6. Water flow 2" Victaulic
7. Pump
8. Functional spaces

In modular configuration the water input and output are 4" Victaulic.

AEROTOP L		54	61
Lenght	mm	2337	2337
Depth	mm	1130	1130
Height	mm	2152	2152
Operating weight	kg	580	580
Shipping weight	kg	590	590

Technical data

Dimensions drawings
AEROTOP-L 65 - 88 kW



1. Compressor compartment
2. Electrical panel
3. Control keypad
4. Power input
5. Water return 2” Victaulic
6. Water flow 2” Victaulic
7. Pump
8. Functional spaces

In modular configuration the water input and output are 4” Victaulic.

AEROTOP L		65	79	88
Lenght	mm	3190	3190	3190
Depth	mm	1130	1130	1130
Height	mm	2155	2155	2155
Operating weight	kg	780	780	780
Shipping weight	kg	796	796	796

Technical data

Performances

AEROTOP L	Note		054	061	065	079	088
Cooling performances (EN14511:2018)	5	kW	53,3	58,9	72	77,7	85
A35 / W18	3	kW	62,4	72,3	85,1	89,2	107
Electrical absorption (EN14511:2018)		kW	18,1	20,3	22,9	25,1	29,2
EER (EN14511:2018)	4		2,95	2,9	3,15	3,1	2,91
SEER	6		4,57	4,51	4,64	4,62	4,5
Heating performances (EN14511:2018)	2	kW	53	66	79,3	84,7	91
A-7 / W35		kW	39	48	55	60	66
A2 / W35		kW	50	59	71	77	84
Electrical absorption (EN14511:2018)		kW	16,5	20,8	23,8	25,7	28
COP (EN14511:2018)	1		**3,21**	**3,17**	**3,33**	**3,29**	**3,25**
Number of compressors			2				
Cooling cyrcles			1				
Type of compressor			ROTARY INVERTER		SCROLL INVERTER		
Standard power supply			400/3/50+N				
Maximum inrush current		I max.	46	46	60,2	60,2	60,2
Sound pressure level		dB(A)	65	65	66	67	67
SCOP - W35	6		**4,04**	**4,03**	**4,08**	**4,07**	**4,06**
min. Buffer dimensioning		L	1000		1500		
Suggested piping dimensions							
Cooling		DN	80	100	100	125	125
Heating		DN	65	65	80	80	80
Standard Water flow rate							
Cooling dT 3K		l/s	4,00	5,79	6,81	7,14	8,57
Heating dT 7K		l/s	3,05	3,20	4,27	4,60	4,80
Standard Air flow rate		m^3/h	24800	24800	37200	37200	37200
Length		mm	2337	2337	3190	3190	3190
Width		mm	1130	1130	1130	1130	1130
Height		mm	2152	2152	2155	2155	2155
Minimum free space side		mm	800				
Minimum free space front/back		mm	500				
Minimum free space above		mm	3000				
Weight		kg	580	580	780	780	780
ErP Energy efficiency - W35	7		**A++**	**A++**	**A++**	**-A++**	
Article number			3725697	3725698	3725699	3725700	3725701

Technical data

Performances

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions)

Contains fluorinated greenhouse gases (GWP 675)

1. COP (EN 14511:2013) Heating performance coefficient. Ratio between delivered heating capacity and power input in compliance with EN 14511:2013.
2. Entering/leaving water temperature user side 40/45 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)
3. Entering/leaving water temperature user side 23/18 °C, Entering external exchanger air temperature 35 °C
4. EER (EN 14511:2013) cooling performance coefficient. Ratio between delivered cooling capacity and power input in compliance with EN 14511:2013
5. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35°C
6. Data referred to unit operation with inverter frequency optimized for this application.
7. Data calculated according to the EN 14825:2016 Regulation

Technical data

Construction

AEROTOP L		54	61	65	79	88
Compressor						
Compressor type		ROTARY INVERTER		SCROLL INVERTER		
Refrigerant		R32				
N° compressor	Nr	2	2	2	2	2
Oil charge	l	5	5	6	6	6
Refrigerant charge	kg	15,0	15,0	21,0	21,0	21,0
N° circuits	Nr	1	1	1	1	1
User side exchanger						
Type of internal exchanger 1		BPHE				
Water content	l	5,7	5,7	7,8	7,8	7,8
External Section Fans						
Fans type		BRUSHLESS DC MOTOR				
N° fans	Nr	2	2	3	3	3
Standard air-flow	m^3/h	24800	24800	37200	37200	37200
Installed unit power	kW	0,9	0,9	0,9	0,9	0,9
Water circuit						
Maximum water side pressure	Mpa	1	1	1	1	1
Minimum circuit water volume in heating 2	l	400	400	620	620	620
Minimum circuit water volume in cooling 3	l	150	150	200	200	200
Total internal water volume	l	5,9	5,9	8,0	8,0	8,0
Power supply						
Standard power supply		400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

1. BPHE = plate exchanger
2. Entering/leaving water temperature user side 25/30 °C, external exchanger entering air 2°C (U.R. = 85%) - Minimum water volume that does not consider the volume of water inside the unit.
3. Entering/leaving water temperature user side 15/10 °C, external exchanger entering air 25°C (U.R. = 85%) - Minimum water volume that does not consider the volume of water inside the unit.

Technical data

Electrical data

Supply voltage 400/3/50+N

AEROTOP L		54	61	65	79	88
F.L.A. - Full load current at max admissible conditions						
F.L.A. - Total	A	38,5	38,5	59,7	59,7	59,7
F.L.I. - Full load power input at max admissible conditions						
F.L.I. - Total	kW	25,6	25,6	40,1	40,1	40,1
M.I.C. - Maximum inrush current						
M.I.C. - Total	A	46,0	46,0	60,2	60,2	60,2

Power supply 400/3/50 (+ NEUTRAL) +/- 10%. Maximum Phase Unbalance: 2%.
For non standard voltage please contact ELCO technical office

Wiring cross sections and fuse protection

AEROTOP L	Remote ON - OFF External power supply			
	Power supply	Switch manual	fuses	Wiring (Lmax = 20 mt)
54 - 61	380-415V 3N~ 50Hz	100A	63A	25mm^2 X 5
65 - 88	380-415V 3N~ 50Hz	100A	80A	25mm^2 X 5

Deviating connection lengths and electrical fuses must be calculated according to the country-specific regulations.

EVU-Lock
Special tariffs with reduced electricity prices are available from many energy supply companies (EVU) for the operation of heat pumps. In return, the utility company is allowed to shut down the heat pump at certain times and the building cannot be reheated by the heat pump for this period. Coverage is then usually provided by a buffer storage tank. In solidly built houses, especially in connection with underfloor heating, blocking periods can be bridged by the storage mass. A buffer tank or second heat generator is then not required. If a second heat generator (bivalent parallel operation) is available, the blocking time can be neglected for the dimensioning of the heat pump.

There are some country-specific differences for blocking periods:
Tariffs in Germany are regulated according to the Federal Tariff Ordinance (Federal tariff regulation heat pumps) on Heat Pumps. Shutdown can occur up to 3 times per day for two hours each. Shutdown can be time-controlled, demand-controlled (balancing of load peaks) or not at all. A distinction is made between hard and soft shutdown. In the case of hard shutdown, the main power supply (compressor current) is interrupted. Alternatively, many utilities offer shutdown via a ripple control signal. Additional electric heating inserts mounted outside the heat pump (e.g. in the storage tank) may continue to be operated up to a maximum output of 2kW.

In practice, the following surcharge factors have proven effective, since never all rooms are heated and the standard outside temperature is rarely reached.

Sum of blocking times per day [h]	Factor for additional heating power
2	1,05
4	1,1
6	1,15

Technical data

Sound levels

Standard mode

AEROTOP L	Sound power level								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
54	62	67	68	72	79	72	64	52	64	82
61	68	79	76	73	76	67	59	52	65	82
65	65	66	69	73	80	73	65	51	62	81
79	59	67	69	72	80	73	65	51	65	84
88	87	77	76	76	79	68	60	53	67	85

Silenced Mode

AEROTOP L	Sound power level								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
54	54	57	62	67	66	64	57	46	56	74
61	73	65	70	69	65	62	55	49	56	74
65	66	57	60	68	67	65	56	43	58	76
79	61	55	59	67	66	63	55	41	58	76
88	86	67	69	70	63	58	54	47	58	76

Sound levels refer to units with maximum test conditions. For maximum capacity supplied in silent mode, a correction factor of 0,90 shall be used.

Super Silenced Mode

AEROTOP L	Sound power level								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
54	48	51	57	62	58	61	56	44	52	70
61	68	64	70	64	59	62	54	48	53	71
65	69	58	59	66	62	59	51	40	53	71
79	61	49	56	64	61	59	52	39	53	71
88	86	63	58	68	60	56	54	48	55	73

Sound levels refer to units with maximum test conditions. For maximum capacity supplied in super silent mode, a correction factor of 0,85 shall be used.

Silenced mode or Super Silenced mode can be set from the user interface terminal

Sound levels refer to units with nominal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)

Data referred to the following conditions in heating:
- internal exchanger water = 30/35°C
- ambient temperature 7/6 °C

Data referred to the following conditions in cooling:
- internal exchanger water = 12/7°C
- ambient temperature 35°C

Technical data

Sound levels
Performance correction factors

At maximum conditions data

AEROTOP L	Sound power level								Sound pressurelevel	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
54	55	65	67	72	77	70	61	50	67	83
61	55	65	67	72	77	70	61	50	67	83
65	57	67	69	73	79	72	64	51	69	85
79	57	67	69	73	79	72	64	51	69	85
88	57	67	69	73	79	72	64	51	69	85

Sound levels refer to units with maximum test conditions. The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field. Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)

Performance correction factors- Silenced Mode

AEROTOP L		54	61	65	79	88
Cooling capacity factor	Nr	0,930	0,930	0,930	0,930	0,930
Total power input factor	Nr	1,000	1,000	1,000	1,000	1,000
EER factor	Nr	0,930	0,930	0,930	0,930	0,930
Heating capacity factor	Nr	0,950	0,950	0,950	0,950	0,950
Total power input factor	Nr	0,950	0,950	0,950	0,950	0,950
COP factor	Nr	1,000	1,000	1,000	1,000	1,000

Performance correction factors - Super Silenced Mode

AEROTOP L		54	61	65	79	88
Cooling capacity factor	Nr	0,880	0,880	0,880	0,880	0,880
Total power input factor	Nr	1,020	1,020	1,020	1,020	1,020
EER factor	Nr	0,860	0,860	0,860	0,860	0,860
Heating capacity factor	Nr	0,900	0,900	0,900	0,900	0,900
Total power input factor	Nr	0,900	0,900	0,900	0,900	0,900
COP factor	Nr	1,000	1,000	1,000	1,000	1,000

Fouling and glycol use correction factors, overload and control device

Correction factors for Glycol use

% ethylene glycol by weight		0%	10%	20%	30%	40%	50%
Freezing point	°C	0	-4	-9	-16	-23	-37
Correction factor for unit cooling capacity	Nr	1	0,984	0,973	0,965	0,96	0,95
Correction factor for flow rate	Nr	1	1,019	1,051	1,092	1,145	1,2
Correction factor for system pressure drop	Nr	1	1,118	1,268	1,482	1,791	2,1

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

Fouling correction factors

	Internal exchanger	
m²K/W	F1	FK1
0,44x10(-4)	-	-
0,88x10(-4)	0,96	0,99
1,76x10(-4)	0,93	0,98

The cooling performance values provided in the tables are based on the external exchanger having clean plates (fouling factor 1). For different fouling factor values, multiply the performance by the coefficients shown in the table.
F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor

Overload and control device calibrations

Refrigerant side		Open	Close	Value
High pressure safety switch	kPa	4200	3200	-
Low pressure safety switch	kPa	50	130	-
Low pressure safety valve	kPa	-	-	3000
Compressor discharge high temperature safety thermostat	C°	115	75	-
Water side				
Antifreeze protection	C°	4	20	-
High pressure safety valve	kPa	-	-	600*

The value entered refers to units supplied with a hydronic group installed on board

Operating ranges heating cooling

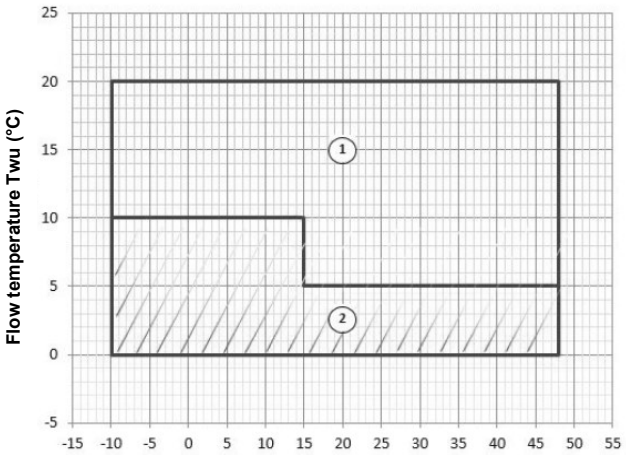
Operating Limits
The diagrams on the left show the operating limits of the AEROTOP L heat pumps. The temperature difference at the condenser must fall between 5°C and 8°C.
In order to prevent a reduction of the operating limits:

- The minimum flow values referred to the condenser must not be exceeded towards the minimum to ensure correct performance and trouble-free operation.
- The pipes must be kept as short as possible to reduce loss of head, and their insulation must be according national standards to minimize heat losses. Incorrectly sized pipes can cause faults and breakdowns, resulting in damages to the heat pump in addition to a drop in performance.

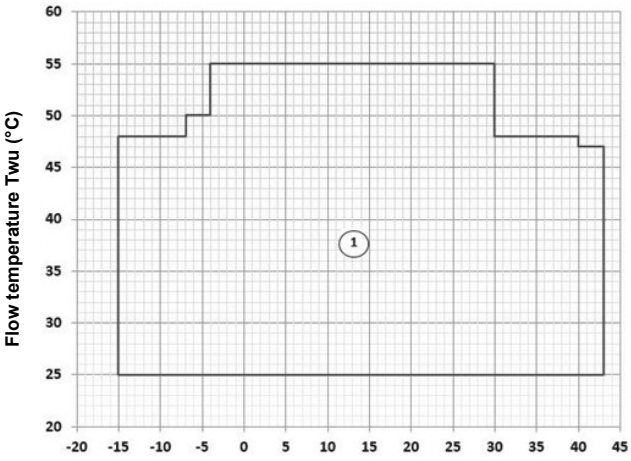
Twu [°C] = Leaving exchanger water temperature
Tae [°C] = External exchanger return air temperature

1 Normal operating range
2 Operating range where the use of ethylene glycol is mandatory in relation to the temperature of the water at the flow of the user side exchanger.

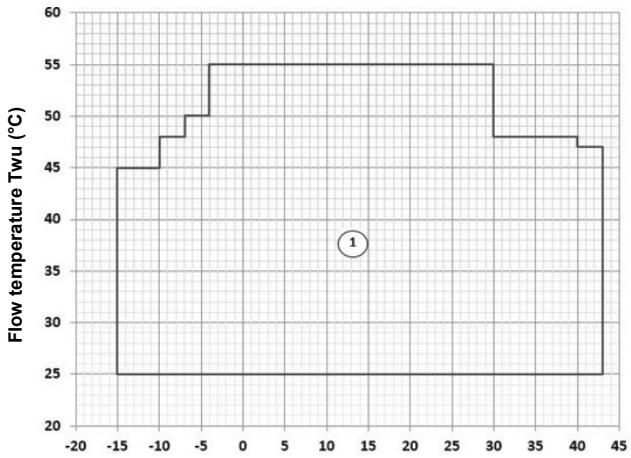
Operating range - Cooling AEROTOP L 54 - 88kW



Operating range - Heating - AEROTOP L 54 - 61kW



Operating range - Heating - AEROTOP L 65 - 88kW



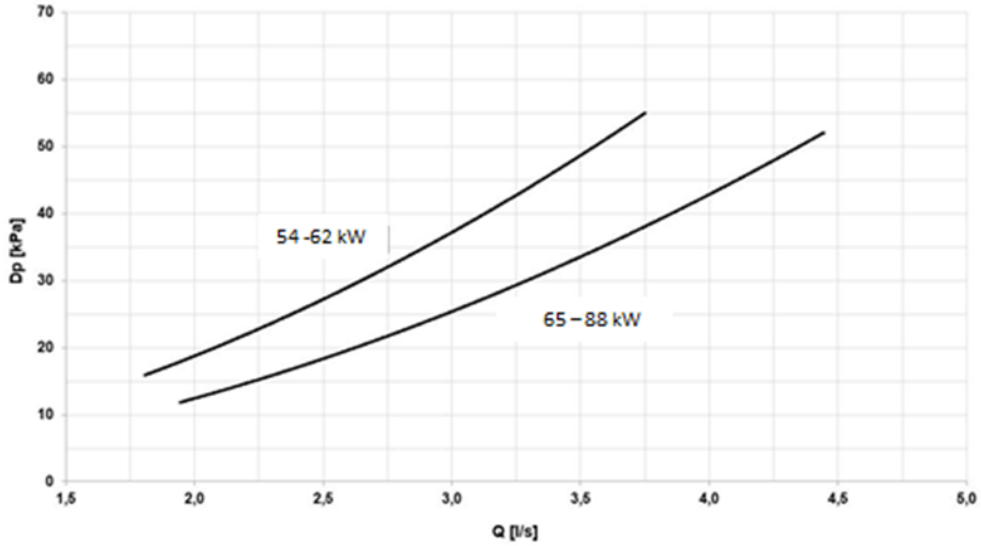
Technical data

Internal exchanger pressure drop and admissible water flow rates

Internal exchancer pressure drop

Standard unit without hydronic assembly on the user side, but equipped with components as listed on the key of the enclosed plumbing circuit diagram.
It is possible to control an external pump by an on/off or 0-10V signal.
Water fittings are Victaulic type by 2”.

Internal exchanger pressure drop curves



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

Q = Water flow rate[l/s]
DP = Pressure drops [kPa]

The water flow rate must be calculated with the following formula

Q [l/s] = kWf / (4,186 x DT)

kWf = Cooling capacity in kW
DT = Temperature difference between entering / leaving water

To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is provided by ELCO as accessory

Admissible water flow rates

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation

AEROTOP L		54	61	65	79	88
Minimum flow	l/s	1,9	1,9	2,9	2,9	2,9
Maximum flow-rate	l/s	6,4	6,4	6,4	6,4	6,4

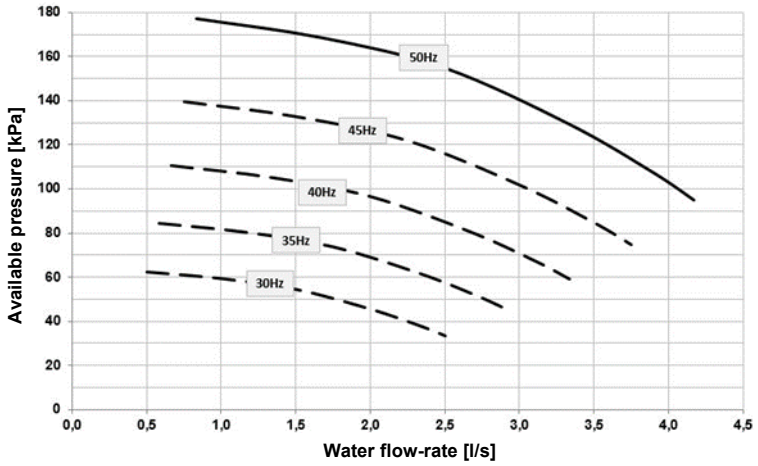
Hydronic assembly

Unit with 1 Inverter pump

This configuration provides for one inverter-controlled electric centrifugal pump with body and impeller in AISI 304 steel and components listed in the key of the included water diagram. The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.
During the installation phase it is possible to choose the most suitable head curve for system requirements by setting the inverter frequency. The pump will always work at fixed flow.

Water fittings are Victaulic type by 2

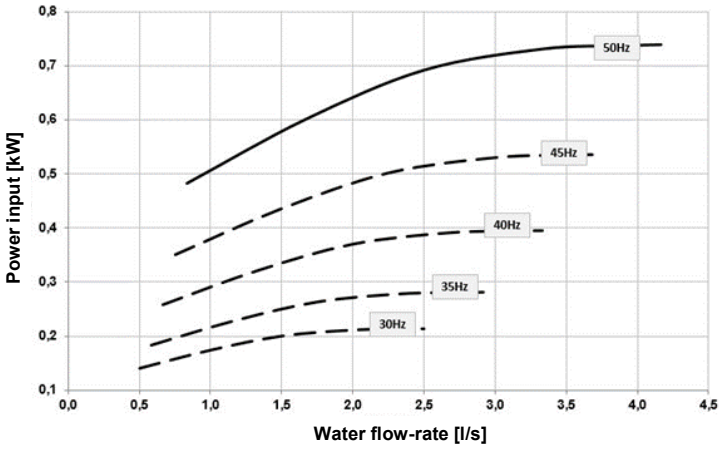
Pump available pressure AEROTOP L 54 – 61 kW



Caution: in order to obtain useful head values, the head represented in these diagrams must be lowered by:

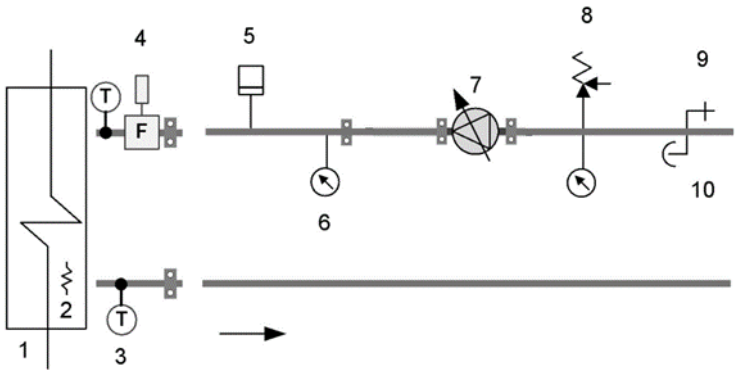
- Condenser pressure drops
- IFWX - Steel mesh strainer on the water side" accessory (where present).

Pump absorption AEROTOP L 54 – 61 KW



Heat Pump Integral Components

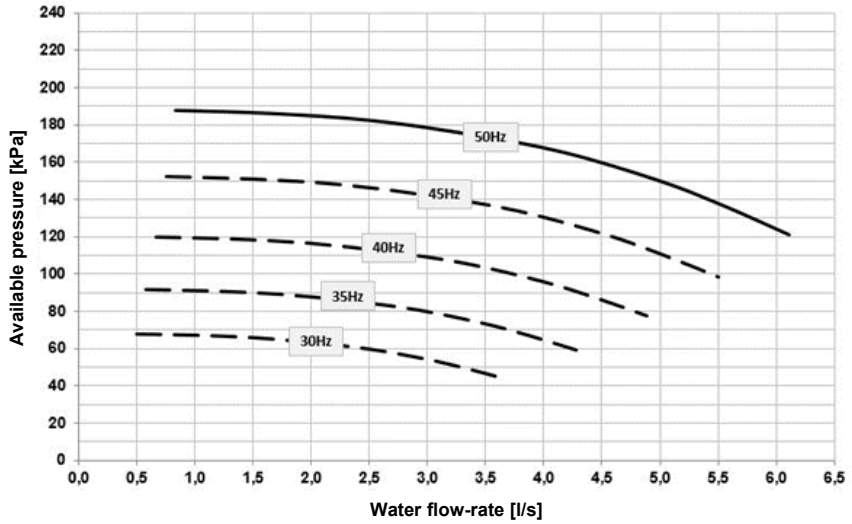
1. Heat pump exchanger
2. Antifreeze heater
3. Water temperature probe
4. Flow Switch
5. System load safety pressure switch
6. Pressure gauge
7. Inverter pump
8. Safety valve
9. Discharge
10. Vent



Hydronic assembly

Unit with 1 Inverter pump

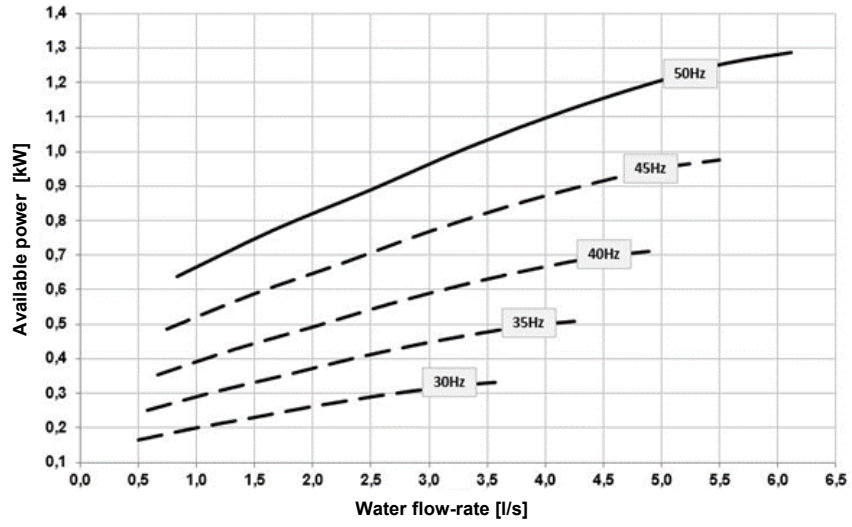
Pump available pressure AEROTOP L 65 – 88 kW



Caution: in order to obtain useful head values, the head represented in these diagrams must be lowered by:

- Condenser pressure drops
- IFWX - Steel mesh strainer on the water side" accessory (where present).

Pump available power AEROTOP L 65 – 88 kW



Electrical data

AEROTOP L		54	61	65	79	88
F.L.A. (Full load current)	A	1,90	1,90	2,50	2,50	2,50
F.L.I. (Full load power input)	kW	0,75	0,75	1,1	1,1	1,1

Performances in heating

AEROTOP L 54

To	Tae (°C) DB/WB	Heating capacity EN14511								COP EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
25	-10/-11.1	38,1	34,7	30,9	26,2	22,2	17,8	13,7	12,6	3,37	3,20	3,12	3,02	2,93	2,82	2,67	2,51
	-7/-8	41,1	37,8	34,0	29,1	24,8	20,0	15,5	14,4	3,60	3,45	3,40	3,32	3,23	3,13	3,01	2,86
	2/1.1	51,9	48,6	44,3	38,7	33,5	27,3	21,1	19,6	4,45	4,35	4,35	4,32	4,26	4,15	3,97	3,89
	7/6	58,7	55,3	50,6	44,3	38,4	31,4	24,4	22,6	4,98	4,91	4,94	4,94	4,88	4,78	4,58	4,51
	10/8.2	63,1	59,5	54,5	47,9	41,5	34,0	26,3	24,4	5,32	5,27	5,32	5,34	5,29	5,18	4,98	4,89
	18/14	75,0	71,1	65,4	57,5	50,0	40,8	31,5	29,2	6,25	6,27	6,39	6,48	6,48	6,39	6,16	6,07
30	-10/-11.1	37,1	33,8	30,1	25,6	21,7	17,3	13,3	12,3	3,07	2,92	2,85	2,76	2,67	2,57	2,45	2,29
	-7/-8	40,2	37,0	33,2	28,5	24,3	19,5	15,1	14,0	3,28	3,15	3,10	3,03	2,95	2,85	2,73	2,59
	2/1.1	51,1	47,9	43,6	38,0	32,8	26,6	20,5	19,0	4,02	3,94	3,94	3,92	3,86	3,75	3,57	3,50
	7/6	58,0	54,5	49,8	43,6	37,7	30,7	23,6	21,9	4,49	4,43	4,46	4,46	4,41	4,30	4,10	4,03
	10/8.2	62,3	58,7	53,7	47,0	40,7	33,1	25,5	23,6	4,78	4,74	4,78	4,80	4,76	4,65	4,44	4,36
	18/14	74,1	70,1	64,4	56,5	49,0	39,8	30,5	28,3	5,59	5,60	5,71	5,79	5,78	5,69	5,45	5,35
35	-10/-11.1	36,2	33,0	29,4	25,0	21,2	17,0	13,0	12,0	2,80	2,67	2,61	2,53	2,45	2,35	2,22	2,02
	-7/-8	39,4	36,3	32,5	27,9	23,7	19,1	14,7	13,6	2,99	2,87	2,83	2,77	2,69	2,59	2,47	2,29
	2/1.1	50,4	47,1	42,9	37,3	32,1	26,0	19,9	18,5	3,65	3,57	3,58	3,55	3,50	3,39	3,21	3,09
	7/6	54,4	51,3	49,0	42,8	36,9	30,0	22,9	21,2	4,07	4,00	4,02	4,02	3,98	3,87	3,66	3,57
	10/8.2	61,4	57,8	52,8	46,2	39,8	32,3	24,8	22,9	4,31	4,26	4,31	4,32	4,28	4,17	3,95	3,86
	18/14	73,1	69,1	63,3	55,5	47,9	38,8	29,5	27,3	5,00	5,01	5,11	5,17	5,16	5,05	4,80	4,70
40	-10/-11.1	35,4	32,3	28,8	24,6	20,8	16,5	12,8	11,8	2,56	2,44	2,39	2,32	2,25	2,12	2,01	1,91
	-7/-8	38,6	35,6	32,0	27,4	23,3	18,8	14,4	13,4	2,73	2,63	2,59	2,54	2,47	2,37	2,24	2,14
	2/1.1	49,7	46,4	42,2	36,7	31,5	25,4	19,4	17,9	3,32	3,25	3,25	3,23	3,18	3,06	2,88	2,80
	7/6	56,4	52,9	48,2	42,0	36,2	29,2	22,2	20,5	3,67	3,62	3,65	3,64	3,59	3,48	3,26	3,18
	10/8.2	60,6	57,0	52,0	45,3	39,0	31,5	24,0	22,1	3,89	3,85	3,89	3,90	3,85	3,73	3,50	3,42
	18/14	72,1	68,0	62,2	54,4	46,8	37,7	28,5	26,3	4,50	4,50	4,58	4,63	4,60	4,48	4,21	4,11
45	-10/-11.1	34,7	31,8	28,4	24,2	20,6	16,4	12,6	11,7	2,34	2,24	2,19	2,14	2,07	1,93	1,83	1,75
	-7/-8	38,0	35,0	31,5	27,0	23,0	18,5	14,2	13,2	2,50	2,41	2,38	2,33	2,26	2,17	2,04	1,95
	2/1.1	49,0	45,8	41,5	36,1	30,9	24,9	18,9	17,4	3,01	2,95	2,96	2,94	2,88	2,76	2,57	2,50
	7/6	53,3	50,6	47,5	41,3	35,4	28,5	21,5	19,9	3,21	3,19	3,20	3,17	3,14	3,08	2,89	2,82
	10/8.2	59,8	56,1	51,1	44,5	38,2	30,7	23,2	21,3	3,51	3,48	3,51	3,51	3,46	3,33	3,09	3,01
	18/14	71,0	66,9	61,0	53,2	45,6	36,6	27,4	25,2	4,03	4,03	4,10	4,13	4,09	3,96	3,68	3,57
50	-10/-11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7/-8	37,4	34,5	31,1	26,7	22,8	18,3	14,0	13,1	2,29	2,21	2,18	2,14	2,08	1,99	1,87	1,75
	2/1.1	48,3	45,1	40,9	35,5	30,4	24,3	18,4	17,0	2,74	2,69	2,69	2,67	2,61	2,50	2,33	2,22
	7/6	54,8	51,3	46,7	40,5	34,7	27,8	20,9	19,2	3,01	2,97	2,99	2,97	2,92	2,80	2,57	2,48
	10/8.2	58,8	55,2	50,2	43,6	37,3	29,9	22,3	20,5	3,17	3,14	3,17	3,16	3,11	2,98	2,73	2,65
	18/14	69,7	65,6	59,7	51,9	44,4	35,4	26,3	24,0	3,61	3,61	3,67	3,69	3,64	3,50	3,21	3,10
55	2/1.1	47,6	44,5	40,3	34,9	29,9	23,9	18,0	16,5	2,50	2,45	2,45	2,43	2,37	2,26	2,02	2,00
	7/6	54,0	50,5	45,8	39,7	33,9	27,1	20,2	18,6	2,72	2,69	2,70	2,69	2,63	2,50	2,26	2,23
	10/8.2	57,9	54,2	49,2	42,6	36,4	29,0	21,5	19,8	2,86	2,83	2,86	2,85	2,79	2,65	2,40	2,36
	18/14	68,3	64,1	58,3	50,5	43,1	34,1	25,1	23,0	3,23	3,23	3,27	3,29	3,23	3,08	2,78	2,73

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Heating capacity and COP calculated according to EN 14511:2018
ATTENTION: The data of the heat capacity and COP include defrosting

Performances in cooling

AEROTOP L 54

To	Tae	Cooling capacity EN14511								EER EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
5	10	62,8	56,0	49,8	44,7	39,5	33,1	27,2	25,3	5,95	6,04	6,23	6,32	6,39	6,45	6,48	6,51
	15	60,2	53,7	47,7	42,8	37,8	31,6	25,8	24,0	5,12	5,20	5,37	5,45	5,50	5,54	5,53	5,55
	25	55,0	49,1	43,6	39,1	34,4	28,5	23,0	21,3	3,88	3,94	4,08	4,15	4,18	4,17	4,12	4,12
	35	49,7	44,3	39,4	35,2	30,8	25,3	20,2	18,6	2,95	3,00	3,09	3,14	3,14	3,10	2,99	2,97
	45	44,1	39,4	34,9	31,2	27,1	22,0	17,3	15,7	2,23	2,27	2,33	2,35	2,33	2,25	2,19	2,07
7	10	66,9	59,7	53,1	47,7	42,2	35,3	28,9	26,9	6,28	6,40	6,63	6,77	6,83	6,91	6,94	7,00
	15	64,2	57,3	51,0	45,8	40,4	33,6	27,4	25,5	5,40	5,50	5,70	5,82	5,88	5,92	5,91	5,94
	25	58,8	52,5	46,7	41,8	36,8	30,4	24,5	22,7	4,08	4,17	4,32	4,41	4,44	4,44	4,38	4,38
	35	53,1	47,5	42,2	37,7	33,0	27,0	21,5	19,8	2,95	3,16	3,27	3,33	3,34	3,29	3,16	3,15
	45	47,3	42,3	37,5	33,4	29,0	23,5	18,3	16,7	2,35	2,39	2,47	2,49	2,47	2,38	2,22	2,19
10	10	73,1	65,3	58,1	52,2	46,1	38,5	31,4	29,2	6,69	6,85	7,15	7,32	7,41	7,50	7,53	7,58
	15	70,4	62,9	56,0	50,3	44,3	36,8	30,0	27,8	5,82	5,96	6,22	6,37	6,47	6,53	6,53	6,60
	25	64,6	57,8	51,4	46,0	40,4	33,4	26,9	24,8	4,40	4,51	4,70	4,81	4,86	4,88	4,80	4,82
	35	58,5	52,3	46,5	41,5	36,3	29,7	23,5	21,6	3,34	3,42	3,55	3,62	3,63	3,59	3,45	3,44
	45	52,1	46,6	41,3	36,8	32,0	25,8	20,0	18,2	2,53	2,58	2,67	2,70	2,68	2,59	2,40	2,37
15	10	84,2	75,4	67,1	60,3	53,1	44,2	35,9	33,3	7,50	7,78	8,23	8,51	8,72	8,89	9,00	9,09
	15	81,3	72,7	64,7	58,1	51,1	42,4	34,3	31,7	6,53	6,76	7,14	7,38	7,55	7,69	7,72	7,81
	25	74,9	67,0	59,5	53,3	46,8	38,5	30,8	28,4	4,95	5,10	5,36	5,53	5,63	5,67	5,60	5,64
	35	67,9	60,8	54,0	48,2	42,0	34,2	27,0	24,8	3,75	3,86	4,03	4,13	4,16	4,13	3,97	3,96
	45	60,6	54,2	48,0	42,7	37,0	29,7	22,8	20,8	2,84	2,91	3,02	3,07	3,06	2,95	2,74	2,69
18	10	91,2	81,7	72,7	65,3	57,5	47,7	38,6	36,2	7,98	8,35	8,92	9,30	9,58	9,87	10,0	10,1
	15	88,1	78,9	70,2	62,9	55,3	45,8	36,9	34,6	6,96	7,26	7,72	8,03	8,27	8,49	8,59	8,58
	25	81,3	72,7	64,6	57,8	50,7	41,6	33,2	31,0	5,28	5,48	5,78	5,99	6,12	6,20	6,15	6,09
	35	73,8	62,4	58,6	52,3	45,6	37,0	29,1	27,0	4,00	4,14	4,34	4,46	4,51	4,47	4,31	4,23
	45	65,8	58,9	52,1	46,3	40,1	32,1	24,6	22,8	3,03	3,11	3,25	3,30	3,29	3,18	2,95	2,94
20	10	95,9	85,9	76,5	68,7	60,4	50,1	40,5	38,0	8,31	8,74	9,39	9,84	10,2	10,6	10,8	10,9
	15	92,7	83,0	73,9	66,2	58,2	48,1	38,7	36,2	7,25	7,59	8,12	8,50	8,78	9,06	9,21	9,22
	25	85,6	76,6	68,0	60,9	53,3	43,7	34,8	32,5	5,50	5,73	6,07	6,30	6,46	6,57	6,54	6,49
	35	77,7	69,5	61,7	55,0	47,9	38,9	30,5	28,3	4,17	4,32	4,55	4,68	4,75	4,73	4,57	4,48
	45	69,3	62,0	54,9	48,7	42,1	33,7	25,8	23,9	3,16	3,25	3,40	3,46	3,45	3,35	3,11	3,10

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Cooling capacity and EER calculated according to EN 14511:2018

Performances in heating

AEROTOP L 61

To	Tae (°C) DB/WB	Heating capacity EN14511								COP EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
25	-10/-11.1	47,5	41,9	38,0	33,8	29,3	24,5	19,4	15,0	3,55	3,39	3,26	3,18	3,10	2,98	2,85	2,71
	-7/-8	50,1	44,8	41,1	36,9	32,3	27,3	21,8	17,1	3,71	3,59	3,49	3,44	3,38	3,28	3,16	3,05
	2/1.1	61,1	55,8	52,1	47,6	42,4	36,5	29,5	23,3	4,38	4,35	4,33	4,35	4,35	4,30	4,19	4,04
	7/6	68,2	62,8	59,0	54,2	48,5	41,9	34,0	26,9	4,81	4,84	4,85	4,92	4,96	4,92	4,82	4,67
	10/8.2	72,8	67,3	63,4	58,4	52,3	45,2	36,7	29,1	5,09	5,14	5,19	5,28	5,34	5,32	5,22	5,06
	18/14	85,7	79,7	75,4	69,8	62,8	54,4	44,2	34,8	5,81	5,97	6,11	6,30	6,45	6,48	6,42	6,26
30	-10/-11.1	46,1	40,8	37,0	32,9	28,5	23,9	18,9	14,6	3,22	3,08	2,97	2,90	2,83	2,73	2,60	2,46
	-7/-8	48,9	43,8	40,1	36,1	31,6	26,7	21,2	16,6	3,36	3,26	3,17	3,14	3,09	2,99	2,88	2,77
	2/1.1	60,2	55,0	51,3	46,9	41,7	35,8	28,9	22,7	3,95	3,93	3,91	3,94	3,95	3,89	3,79	3,65
	7/6	67,4	62,0	58,2	53,4	47,7	41,1	33,2	26,2	4,33	4,35	4,37	4,44	4,47	4,44	4,34	4,19
	10/8.2	72,1	66,5	62,5	57,5	51,5	44,4	35,9	28,3	4,57	4,62	4,67	4,75	4,81	4,79	4,69	4,53
	18/14	84,9	78,8	74,5	68,8	61,8	53,4	43,2	33,9	5,19	5,34	5,47	5,63	5,77	5,79	5,72	5,55
35	-10/-11.1	44,9	39,7	36,1	32,2	27,9	23,4	18,5	14,3	2,93	2,81	2,71	2,65	2,59	2,49	2,38	2,24
	-7/-8	47,9	42,9	39,3	35,4	30,9	26,1	20,8	16,2	3,05	2,97	2,90	2,86	2,82	2,74	2,63	2,52
	2/1.1	59,4	54,2	50,5	46,1	41,0	35,1	28,2	22,1	3,57	3,56	3,55	3,57	3,58	3,53	3,43	3,28
	7/6	66,7	61,3	57,4	52,6	46,9	40,3	32,5	25,4	3,90	4,00	4,01	4,03	4,04	4,01	3,91	3,75
	10/8.2	71,3	65,7	61,7	56,7	50,6	43,6	35,1	27,5	4,11	4,16	4,20	4,28	4,33	4,31	4,21	4,04
	18/14	84,1	77,9	73,5	67,8	60,7	52,3	42,1	32,9	4,65	4,78	4,89	5,04	5,15	5,17	5,09	4,91
40	-10/-11.1	43,7	38,8	35,3	31,5	27,4	23,0	18,2	14,1	2,66	2,56	2,48	2,43	2,37	2,29	2,19	2,06
	-7/-8	46,9	42,1	38,6	34,8	30,4	25,7	20,4	15,9	2,78	2,71	2,65	2,62	2,58	2,51	2,40	2,30
	2/1.1	58,6	53,5	49,8	45,4	40,3	34,5	27,7	21,5	3,25	3,24	3,23	3,25	3,26	3,21	3,11	2,95
	7/6	65,9	60,5	56,6	51,9	46,2	39,6	31,8	24,7	3,54	3,56	3,58	3,63	3,66	3,63	3,52	3,35
	10/8.2	70,5	64,9	60,9	55,8	49,8	42,7	34,3	26,7	3,71	3,76	3,79	3,87	3,91	3,89	3,78	3,60
	18/14	83,2	76,9	72,5	66,7	59,6	51,3	41,1	31,8	4,19	4,30	4,39	4,52	4,62	4,63	4,53	4,33
45	-10/-11.1	42,6	38,0	34,6	30,9	26,9	22,7	18,0	13,9	2,42	2,34	2,27	2,23	2,18	2,11	2,01	1,89
	-7/-8	45,9	41,3	38,0	34,2	29,9	25,3	20,1	15,7	2,53	2,47	2,42	2,40	2,37	2,30	2,20	2,09
	2/1.1	57,8	52,7	49,1	44,8	39,7	33,9	27,1	21,0	2,94	2,94	2,93	2,96	2,96	2,92	2,81	2,65
	7/6	66,7	59,7	55,8	51,1	45,4	38,8	31,1	24,0	3,21	3,23	3,25	3,28	3,31	3,27	3,16	2,99
	10/8.2	69,7	64,0	60,0	54,9	48,9	41,9	33,5	25,9	3,35	3,39	3,42	3,49	3,53	3,50	3,38	3,20
	18/14	82,1	75,8	71,3	65,5	58,4	50,1	39,9	30,7	3,75	3,85	3,94	4,05	4,13	4,12	4,01	3,80
50	-10/-11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7/-8	45,1	40,6	37,4	33,7	29,6	25,0	19,9	15,5	2,31	2,26	2,22	2,20	2,18	2,12	2,02	1,92
	2/1.1	57,0	52,0	48,4	44,1	39,1	33,4	26,5	20,5	2,67	2,67	2,67	2,69	2,70	2,65	2,54	2,39
	7/6	64,2	58,8	55,0	50,3	44,6	38,1	30,3	23,3	2,89	2,91	2,93	2,97	3,00	2,95	2,84	2,66
	10/8.2	68,7	63,1	59,0	54,0	48,0	41,0	32,6	25,0	3,02	3,06	3,09	3,15	3,18	3,15	3,03	2,84
	18/14	80,9	74,5	70,0	64,2	57,1	48,8	38,7	29,5	3,36	3,45	3,52	3,62	3,69	3,68	3,56	3,33
55	2/1.1	56,2	51,3	47,7	43,5	38,5	32,8	26,0	20,0	2,43	2,43	2,43	2,45	2,46	2,41	2,30	2,13
	7/6	63,3	58,0	54,1	49,4	43,8	37,3	29,6	22,6	2,61	2,63	2,65	2,69	2,71	2,67	2,55	2,37
	10/8.2	67,7	62,1	58,0	53,0	47,0	40,1	31,7	24,2	2,72	2,76	2,79	2,84	2,87	2,83	2,71	2,51
	18/14	79,4	73,1	68,5	62,8	55,7	47,5	37,4	28,3	3,00	3,08	3,15	3,24	3,30	3,27	3,14	2,91

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Heating capacity and COP calculated according to EN 14511:2018
ATTENTION: The data of the heat capacity and COP include defrostings

Performances in cooling

AEROTOP L 61

To	Tae	Cooling capacity EN14511								EER EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
5	10	69,7	61,5	54,6	48,5	42,6	36,4	29,7	25,3	5,61	5,84	6,08	6,26	6,36	6,42	6,46	6,51
	15	66,8	59,0	52,4	46,5	40,8	34,7	28,2	24,0	4,82	5,02	5,23	5,39	5,48	5,53	5,53	5,55
	25	61,0	53,9	47,9	42,5	37,2	31,5	25,3	21,3	3,65	3,81	3,97	4,10	4,16	4,18	4,14	4,12
	35	55,0	48,7	43,3	38,3	33,4	28,1	22,3	18,6	2,77	2,89	3,02	3,11	3,15	3,13	3,04	2,97
	45	48,8	43,2	38,4	34,0	29,5	24,6	19,2	15,7	2,10	2,19	2,28	2,34	2,35	2,30	2,17	2,07
7	10	74,2	65,5	58,3	51,8	45,4	38,8	31,6	26,9	5,89	6,17	6,45	6,66	6,80	6,88	6,93	7,00
	15	71,2	62,9	55,9	49,7	43,5	37,0	30,0	25,5	5,06	5,30	5,55	5,73	5,85	5,90	5,91	5,94
	25	65,2	57,6	51,2	45,5	39,8	33,6	27,0	22,7	3,83	4,01	4,20	4,34	4,43	4,45	4,41	4,38
	35	58,8	52,1	46,3	41,1	35,8	30,1	23,8	19,8	2,90	3,05	3,19	3,29	3,34	3,32	3,22	3,15
	45	52,3	46,3	41,2	36,5	31,6	26,3	20,5	16,7	2,21	2,31	2,41	2,47	2,49	2,44	2,30	2,19
10	10	81,0	71,6	63,7	56,7	49,7	42,3	34,4	29,2	6,23	6,57	6,92	7,19	7,36	7,47	7,51	7,58
	15	78,0	69,0	61,4	54,6	47,8	40,6	32,9	27,8	5,42	5,71	6,02	6,26	6,42	6,50	6,54	6,60
	25	71,7	63,4	56,4	50,1	43,7	37,0	29,6	24,8	4,12	4,32	4,55	4,73	4,84	4,88	4,84	4,82
	35	64,8	57,4	51,1	45,3	39,4	33,1	26,1	21,6	3,12	3,28	3,45	3,57	3,63	3,62	3,52	3,44
	45	57,6	51,1	45,5	40,2	34,8	28,9	22,4	18,2	2,37	2,49	2,61	2,68	2,70	2,65	2,49	2,37
15	10	93,2	82,6	73,6	65,5	57,4	48,7	39,4	33,3	6,91	7,37	7,88	8,30	8,61	8,80	8,93	9,09
	15	90,0	79,7	71,0	63,1	55,2	46,8	37,7	31,7	6,03	6,42	6,85	7,20	7,46	7,63	7,71	7,81
	25	82,9	73,5	65,3	58,0	50,6	42,7	34,0	28,4	4,58	4,87	5,16	5,40	5,57	5,65	5,63	5,64
	35	75,1	66,6	59,3	52,6	45,7	38,2	30,0	24,8	3,48	3,68	3,90	4,06	4,15	4,16	4,04	3,96
	45	66,9	59,4	52,8	46,7	40,4	33,4	25,7	20,8	2,65	2,79	2,94	3,04	3,07	3,02	2,84	2,69
18	10	101	89,5	79,7	70,9	62,1	52,7	42,5	36,2	7,29	7,86	8,48	9,01	9,44	9,72	9,94	10,1
	15	97,4	86,4	77,0	68,4	59,8	50,7	40,7	34,6	6,38	6,85	7,36	7,80	8,15	8,38	8,54	8,58
	25	89,8	79,7	71,0	63,0	54,9	46,2	36,7	31,0	4,87	5,19	5,56	5,83	6,05	6,16	6,17	6,09
	35	81,5	72,3	64,4	57,0	49,6	41,4	32,4	27,0	3,70	3,93	4,18	4,37	4,49	4,51	4,40	4,23
	45	72,7	64,5	57,4	50,7	43,8	36,1	27,7	22,8	2,82	2,98	3,15	3,26	3,31	3,25	3,06	2,94
20	10	106	94,1	83,9	74,6	65,3	55,3	44,5	38,0	7,55	8,18	8,89	9,51	10,0	10,4	10,7	10,9
	15	102	90,9	81,0	72,0	63,0	53,2	42,7	36,2	6,61	7,13	7,71	8,22	8,62	8,92	9,15	9,22
	25	94,6	83,9	74,7	66,3	57,8	48,6	38,6	32,5	5,06	5,41	5,81	6,13	6,38	6,53	6,56	6,49
	35	85,8	76,2	67,8	60,1	52,2	43,5	34,1	28,3	3,85	4,10	4,37	4,58	4,72	4,75	4,64	4,48
	45	76,6	68,0	60,5	53,4	46,1	38,0	29,1	23,9	2,93	3,11	3,29	3,42	3,47	3,42	3,22	3,10

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Cooling capacity and EER calculated according to EN 14511:2018

Performances in heating

AEROTOP L 65

To	Tae (°C) DB/WB	Heating capacity EN14511								COP EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	min%	40%	100%	90%	80%	70%	60%	50%	min%	40%
25	-10/-11.1	48,8	44,4	43,5	40,3	35,8	31,3	26,5	22,3	3,02	3,20	3,24	3,26	3,24	3,27	3,47	3,54
	-7/-8	54,4	49,0	47,9	44,2	39,2	34,1	28,7	23,9	3,35	3,55	3,60	3,62	3,59	3,60	3,81	3,86
	2/1.1	70,9	62,8	61,1	56,1	49,2	42,4	35,3	28,9	4,31	4,56	4,62	4,63	4,57	4,56	4,76	4,69
	7/6	80,0	70,6	68,7	63,0	55,2	47,4	39,3	32,0	4,83	5,11	5,19	5,20	5,12	5,09	5,31	5,20
	10/8.2	85,2	75,5	73,4	67,4	58,9	50,6	41,8	34,1	5,12	5,45	5,54	5,55	5,46	5,43	5,66	5,62
	18/14	100,1	88,7	86,3	79,2	69,3	59,4	49,0	39,8	5,88	6,36	6,48	6,53	6,47	6,46	6,75	6,61
30	-10/-11.1	49,4	44,2	43,1	39,8	35,2	30,6	25,7	21,5	2,77	2,95	3,00	3,02	3,00	3,02	3,20	3,25
	-7/-8	54,8	48,6	47,3	43,6	38,3	33,2	27,7	23,0	3,06	3,27	3,32	3,34	3,31	3,32	3,50	3,54
	2/1.1	70,7	61,9	60,1	55,0	48,0	41,2	34,0	27,6	3,92	4,17	4,24	4,26	4,20	4,18	4,36	4,28
	7/6	79,7	69,6	67,5	61,7	53,8	46,0	37,8	30,6	4,37	4,67	4,75	4,76	4,69	4,67	4,86	4,74
	10/8.2	84,7	74,3	72,1	65,9	57,4	49,0	40,3	32,6	4,62	4,96	5,06	5,08	5,01	4,98	5,18	5,12
	18/14	99,3	87,2	84,6	77,5	67,5	57,6	47,2	38,0	5,31	5,78	5,91	5,97	5,93	5,93	6,19	6,12
35	-10/-11.1	50,1	44,1	42,9	39,4	34,7	30,0	25,0	20,8	2,53	2,69	2,74	2,75	2,73	2,74	2,88	2,91
	-7/-8	55,2	48,4	47,0	43,1	37,7	32,4	26,9	22,2	2,80	2,98	3,03	3,04	3,01	3,00	3,15	3,15
	2/1.1	70,7	61,2	59,2	54,1	47,0	40,1	32,9	26,5	3,55	3,78	3,84	3,85	3,79	3,76	3,91	3,80
	7/6	79,3	68,6	65,3	60,6	52,6	44,7	36,6	29,4	3,96	4,22	4,29	4,31	4,24	4,20	4,35	4,21
	10/8.2	84,3	73,2	70,9	64,7	56,1	47,7	38,9	31,3	4,16	4,48	4,57	4,59	4,52	4,48	4,64	4,55
	18/14	98,6	85,9	83,2	76,0	66,0	56,0	45,7	36,6	4,76	5,21	5,33	5,39	5,34	5,33	5,54	5,45
40	-10/-11.1	50,8	44,2	42,8	39,2	34,3	29,5	24,5	20,2	2,32	2,45	2,49	2,49	2,46	2,45	2,56	2,56
	-7/-8	55,7	48,3	46,7	42,7	37,2	31,8	26,3	21,5	2,56	2,70	2,74	2,75	2,70	2,68	2,79	2,77
	2/1.1	70,7	60,7	58,6	53,4	46,2	39,2	32,1	25,6	3,23	3,41	3,46	3,46	3,39	3,35	3,45	3,31
	7/6	79,2	67,9	65,6	59,7	51,6	43,7	35,6	28,4	3,58	3,80	3,86	3,86	3,79	3,73	3,84	3,68
	10/8.2	83,9	72,4	70,0	63,7	55,1	46,6	37,9	30,2	3,77	4,03	4,10	4,12	4,03	3,98	4,09	3,98
	18/14	98,0	84,9	82,1	74,9	64,8	54,8	44,5	35,4	4,30	4,68	4,79	4,84	4,78	4,75	4,90	4,78
45	-10/-11.1	51,6	44,4	42,8	39,1	34,0	29,1	24,1	19,7	2,12	2,22	2,24	2,24	2,19	2,17	2,25	2,22
	-7/-8	56,4	48,3	46,6	42,5	36,8	31,4	25,8	21,0	2,33	2,44	2,47	2,46	2,41	2,37	2,44	2,40
	2/1.1	70,8	60,3	58,1	52,8	45,6	38,6	31,4	24,9	2,92	3,05	3,09	3,09	3,01	2,95	3,01	2,86
	7/6	79,1	67,4	64,9	59,0	50,8	42,9	34,8	27,6	3,33	3,39	3,44	3,44	3,35	3,28	3,35	3,17
	10/8.2	83,6	71,7	69,3	63,0	54,2	45,7	37,0	29,4	3,39	3,60	3,66	3,66	3,57	3,50	3,57	3,44
	18/14	97,4	84,0	81,2	73,9	63,8	53,8	43,5	34,4	3,84	4,17	4,26	4,29	4,22	4,17	4,28	4,13
50	-10/-11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7/-8	56,8	48,3	46,6	42,4	36,6	31,1	25,5	20,6	2,12	2,19	2,21	2,20	2,13	2,08	2,13	2,07
	2/1.1	70,8	60,0	57,8	52,5	45,2	38,1	30,9	24,4	2,64	2,73	2,76	2,74	2,65	2,58	2,62	2,47
	7/6	78,8	67,0	64,5	58,5	50,3	42,4	34,3	27,1	2,90	3,03	3,06	3,05	2,95	2,88	2,91	2,74
	10/8.2	83,4	71,3	68,7	62,4	53,7	45,2	36,4	28,8	3,04	3,20	3,25	3,24	3,15	3,07	3,11	2,92
	18/14	96,7	83,3	80,5	73,2	63,1	53,2	42,9	33,8	3,43	3,70	3,78	3,80	3,72	3,65	3,72	3,56
55	2/1.1	70,8	59,9	57,6	52,3	44,9	37,9	30,3	23,8	2,38	2,44	2,45	2,43	2,34	2,27	2,23	2,09
	7/6	78,6	66,7	64,2	58,3	50,0	42,1	33,9	26,8	2,59	2,69	2,72	2,70	2,60	2,52	2,53	2,36
	10/8.2	82,9	70,9	68,4	62,1	53,3	44,8	36,1	28,5	2,71	2,84	2,88	2,87	2,77	2,69	2,70	2,52
	18/14	92,5	82,1	79,9	72,8	62,7	52,8	42,5	33,4	3,13	3,30	3,34	3,35	3,27	3,19	3,24	3,07

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Heating capacity and COP calculated according to EN 14511:2018
ATTENTION: The data of the heat capacity and COP include defrostings

Performances in cooling

AEROTOP L 65

To	Tae	Cooling capacity EN14511								EER EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
5	10	82,5	75,3	65,6	56,8	47,8	38,9	32,9	28,4	5,65	5,73	5,87	5,94	5,96	5,92	5,84	5,79
	15	79,8	72,7	63,3	54,6	45,9	37,2	31,3	26,9	4,97	5,06	5,22	5,31	5,36	5,36	5,31	5,28
	25	74,3	67,6	58,6	50,4	41,9	33,6	28,0	23,9	3,93	4,03	4,18	4,28	4,36	4,39	4,37	4,36
	35	68,7	62,4	53,9	46,0	38,0	30,0	24,8	20,9	3,02	3,08	3,19	3,25	3,27	3,25	3,19	3,15
	45	62,9	57,0	49,0	41,6	34,0	26,4	21,5	18,0	2,27	2,30	2,35	2,36	2,33	2,25	2,28	2,40
7	10	87,3	79,6	69,4	59,9	50,4	41,0	34,6	29,8	5,89	6,00	6,16	6,25	6,29	6,25	6,17	6,12
	15	84,4	76,9	66,9	57,7	48,4	39,1	32,9	28,3	5,20	5,31	5,48	5,58	5,65	5,65	5,60	5,56
	25	78,8	71,7	62,1	53,3	44,3	35,4	29,5	25,2	4,12	4,22	4,39	4,51	4,59	4,63	4,60	4,59
	35	72,4	66,2	57,2	48,8	40,2	31,7	26,2	22,1	3,15	3,24	3,35	3,42	3,46	3,43	3,36	3,32
	45	66,9	60,7	52,2	44,3	36,2	28,1	22,8	19,0	2,40	2,43	2,49	2,50	2,48	2,38	2,41	2,53
10	10	94,5	86,2	75,1	64,9	54,5	44,2	37,3	32,1	6,11	6,24	6,42	6,52	6,54	6,46	6,36	6,63
	15	91,7	83,6	72,6	62,6	52,4	42,3	35,5	30,4	5,54	5,68	5,89	6,03	6,11	6,12	6,07	6,03
	25	85,8	78,0	67,6	57,9	48,1	38,4	31,9	27,1	4,40	4,53	4,73	4,87	4,97	5,01	4,98	4,96
	35	79,6	72,3	62,4	53,2	43,9	34,5	28,4	23,9	3,41	3,49	3,63	3,71	3,75	3,73	3,65	3,60
	45	73,4	66,6	57,3	48,6	39,7	30,8	24,9	20,7	2,60	2,64	2,71	2,73	2,70	2,61	2,63	2,75
15	10	108	98,4	85,7	73,9	62,0	50,1	42,1	36,2	6,75	6,96	7,26	7,43	7,53	7,49	7,38	7,70
	15	105	95,6	83,0	71,5	59,7	48,0	40,2	34,4	6,14	6,36	6,66	6,87	7,02	7,07	7,02	6,99
	25	98,7	89,6	77,6	66,5	55,1	43,8	36,3	30,8	4,97	5,11	5,37	5,56	5,71	5,78	5,76	5,75
	35	92,0	83,6	72,1	61,5	50,6	39,7	32,6	27,4	3,86	3,98	4,15	4,27	4,33	4,32	4,25	4,19
	45	85,4	77,6	66,8	56,7	46,3	35,8	28,9	24,0	2,98	3,05	3,14	3,18	3,16	3,06	3,09	3,23
18	10	116	106	92,6	79,9	66,9	54,0	41,5	38,9	7,18	7,45	7,84	8,10	8,25	8,26	8,07	8,54
	15	113	103	89,9	77,3	64,5	51,8	39,4	37,0	6,55	6,81	7,21	7,49	7,69	7,80	7,72	7,74
	25	107	97,4	84,3	72,1	59,8	47,4	35,4	33,3	5,31	5,52	5,83	6,07	6,26	6,38	6,36	6,37
	35	98,2	89,2	78,7	67,1	55,1	43,2	31,7	29,8	4,15	4,18	4,36	4,46	4,52	4,63	4,55	4,53
	45	93,6	85,0	73,2	62,1	50,7	39,3	27,9	26,2	3,26	3,34	3,45	3,50	3,50	3,40	3,45	3,59
20	10	123	112	97,5	84,1	70,4	56,8	43,5	40,8	7,49	7,81	8,28	8,59	8,81	8,86	8,68	9,20
	15	120	109	94,7	81,5	67,9	54,5	41,4	38,9	6,85	7,16	7,61	7,95	8,22	8,36	8,32	8,34
	25	113	103	89,0	76,2	63,1	50,0	37,3	35,1	5,59	5,83	6,19	6,46	6,70	6,85	6,85	6,86
	35	106	96,6	83,4	71,0	58,4	45,8	33,5	31,5	4,43	4,60	4,83	5,00	5,11	5,13	4,99	5,00
	45	99,4	90,3	77,8	66,1	54,0	41,8	29,6	27,9	3,47	3,56	3,69	3,76	3,76	3,66	3,72	3,88

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Cooling capacity and EER calculated according to EN 14511:2018

Performances in heating

AEROTOP L 79

To	Tae (°C) DB/WB	Heating capacity EN14511								COP EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
25	-10/-11.1	54,1	50,5	47,8	44,6	41,0	36,5	31,2	24,9	3,05	3,11	3,17	3,23	3,26	3,24	3,29	3,51
	-7/-8	60,0	56,0	52,8	49,2	45,0	40,0	33,9	26,8	3,37	3,45	3,52	3,59	3,62	3,59	3,63	3,85
	2/1.1	77,6	72,1	67,8	62,8	57,2	50,4	42,3	32,9	4,32	4,42	4,52	4,60	4,64	4,58	4,59	4,79
	7/6	87,3	81,1	76,4	70,7	64,3	56,5	47,2	36,5	4,81	4,95	5,07	5,17	5,21	5,13	5,13	5,33
	10/8.2	93,5	86,7	81,6	75,6	68,7	60,3	50,3	38,9	5,13	5,27	5,40	5,51	5,56	5,47	5,47	5,68
	18/14	109	101,7	95,8	88,8	80,8	71,0	59,2	45,5	5,90	6,10	6,28	6,44	6,53	6,48	6,51	6,78
30	-10/-11.1	54,5	50,7	47,7	44,3	40,5	35,9	30,4	24,1	2,79	2,86	2,92	2,98	3,02	3,00	3,04	3,23
	-7/-8	60,2	55,9	52,5	48,7	44,4	39,2	33,0	25,9	3,08	3,16	3,24	3,30	3,34	3,31	3,35	3,53
	2/1.1	77,2	71,4	67,0	61,9	56,1	49,2	41,0	31,6	3,91	4,03	4,13	4,22	4,26	4,20	4,21	4,38
	7/6	86,5	80,2	75,3	69,5	62,9	55,1	45,7	35,1	4,36	4,49	4,62	4,72	4,77	4,70	4,70	4,87
	10/8.2	92,5	85,7	80,4	74,3	67,2	58,8	48,8	37,3	4,63	4,77	4,91	5,03	5,08	5,02	5,02	5,19
	18/14	108	100,3	94,3	87,2	79,0	69,2	57,3	43,7	5,31	5,51	5,70	5,87	5,97	5,93	5,97	6,20
35	-10/-11.1	55,0	50,9	47,7	44,2	40,2	35,4	29,8	23,4	2,54	2,61	2,67	2,72	2,76	2,73	2,76	2,91
	-7/-8	60,4	55,9	52,4	48,4	43,9	38,6	32,3	25,1	2,80	2,88	2,95	3,01	3,04	3,01	3,03	3,17
	2/1.1	76,8	70,9	66,3	61,1	55,2	48,2	39,9	30,6	3,54	3,64	3,74	3,82	3,86	3,80	3,79	3,91
	7/6	85,9	79,4	74,4	68,5	61,8	53,9	44,5	33,9	3,98	4,17	4,23	4,27	4,31	4,25	4,23	4,35
	10/8.2	91,7	84,7	79,3	73,2	66,0	57,5	47,4	36,0	4,16	4,30	4,43	4,54	4,59	4,53	4,51	4,64
	18/14	107	99,2	93,0	85,8	77,6	67,7	55,8	42,2	4,81	4,97	5,13	5,29	5,39	5,35	5,37	5,55
40	-10/-11.1	55,6	51,2	47,9	44,1	40,0	35,1	29,4	22,9	2,32	2,37	2,43	2,48	2,50	2,46	2,47	2,57
	-7/-8	60,8	56,0	52,3	48,2	43,5	38,1	31,7	24,5	2,55	2,61	2,68	2,73	2,75	2,71	2,70	2,80
	2/1.1	76,6	70,5	65,8	60,5	54,5	47,4	39,1	29,7	3,20	3,29	3,38	3,44	3,47	3,40	3,37	3,45
	7/6	85,5	78,8	73,7	67,7	61,0	52,9	43,5	32,9	3,54	3,65	3,76	3,84	3,87	3,80	3,76	3,83
	10/8.2	91,1	84,0	78,5	72,3	65,1	56,5	46,4	34,9	3,75	3,87	3,99	4,08	4,12	4,05	4,01	4,08
	18/14	106	98,1	91,9	84,7	76,4	66,4	54,6	41,0	4,28	4,45	4,61	4,75	4,84	4,79	4,78	4,89
45	-10/-11.1	56,2	51,6	48,1	44,2	39,9	34,9	29,0	22,4	2,10	2,15	2,20	2,24	2,25	2,20	2,18	2,25
	-7/-8	61,2	56,2	52,4	48,1	43,3	37,8	31,3	24,0	2,31	2,36	2,42	2,46	2,47	2,41	2,39	2,44
	2/1.1	76,5	70,2	65,4	60,0	53,9	46,8	38,4	29,0	2,88	2,95	3,03	3,08	3,09	3,02	2,97	3,00
	7/6	85,0	78,3	73,1	67,1	60,3	52,2	42,7	32,1	3,29	3,34	3,39	3,43	3,45	3,36	3,31	3,33
	10/8.2	90,6	83,4	77,9	71,5	64,3	55,7	45,5	34,1	3,35	3,46	3,56	3,64	3,67	3,58	3,53	3,55
	18/14	105	97,2	91,0	83,8	75,5	65,5	53,6	40,1	3,82	3,97	4,11	4,23	4,30	4,24	4,20	4,26
50	-10/-11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7/-8	61,6	56,5	52,5	48,1	43,2	37,6	31,0	23,6	2,09	2,13	2,18	2,21	2,21	2,14	2,10	2,12
	2/1.1	76,4	70,1	65,2	59,7	53,6	46,4	37,9	28,2	2,58	2,65	2,71	2,75	2,75	2,67	2,60	2,54
	7/6	84,7	77,9	72,7	66,6	59,8	51,7	42,2	31,5	2,84	2,92	3,00	3,05	3,06	2,97	2,90	2,88
	10/8.2	90,1	82,9	77,3	70,9	63,8	55,1	45,0	33,5	2,99	3,08	3,17	3,23	3,25	3,16	3,09	3,08
	18/14	105	96,5	90,3	83,1	74,8	64,8	52,9	39,4	3,39	3,52	3,65	3,75	3,80	3,73	3,68	3,69
55	2/1.1	77,3	70,4	65,1	59,6	53,4	45,6	37,7	27,4	2,34	2,38	2,42	2,45	2,44	2,33	2,28	2,16
	7/6	85,6	78,1	72,4	66,4	59,5	50,8	41,9	31,0	2,57	2,62	2,67	2,71	2,71	2,59	2,54	2,44
	10/8.2	90,6	82,9	76,9	70,6	63,4	54,1	44,6	33,2	2,73	2,78	2,82	2,87	2,88	2,75	2,70	2,67
	18/14	104	95,6	89,0	82,5	74,3	63,6	52,5	39,0	3,14	3,20	3,26	3,32	3,35	3,24	3,22	3,20

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Heating capacity and COP calculated according to EN 14511:2018
ATTENTION: The data of the heat capacity and COP include defrostings

Performances in cooling

AEROTOP L 79

To	Tae	Cooling capacity EN14511								EER EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	30%	100%	90%	80%	70%	60%	50%	40%	30%
5	10	88,7	80,9	72,5	62,5	52,3	43,1	33,2	29,2	5,57	5,64	5,77	5,89	5,95	5,94	5,85	5,81
	15	85,8	78,2	70,0	60,3	50,3	41,3	31,5	27,7	4,89	4,98	5,11	5,24	5,34	5,36	5,32	5,29
	25	80,0	72,8	65,0	55,8	46,2	37,6	28,2	24,7	3,85	3,94	4,07	4,21	4,33	4,38	4,38	4,36
	35	74,0	67,2	59,9	51,1	42,0	33,8	24,8	21,6	2,96	3,02	3,11	3,21	3,27	3,27	3,19	3,16
	45	67,7	61,5	54,7	46,4	37,8	30,0	21,5	18,6	2,24	2,27	2,32	2,36	2,35	2,30	2,35	2,38
7	10	93,8	85,5	76,6	66,1	55,2	45,5	34,9	30,7	5,80	5,90	6,04	6,20	6,27	6,27	6,16	6,13
	15	90,8	82,7	74,0	63,7	53,1	43,5	33,1	29,1	5,10	5,21	5,35	5,52	5,62	5,65	5,60	5,57
	25	84,8	77,1	68,9	59,0	48,8	39,7	29,6	25,9	4,03	4,13	4,27	4,43	4,56	4,61	4,61	4,59
	35	78,4	71,4	63,6	54,3	44,5	35,8	26,2	22,8	3,10	3,17	3,27	3,38	3,45	3,45	3,36	3,33
	45	72,1	65,5	58,2	49,4	40,2	32,0	22,8	19,7	2,36	2,40	2,45	2,50	2,50	2,44	2,49	2,51
10	10	102	92,6	83,0	71,5	59,7	49,1	37,5	33,0	6,00	6,12	6,29	6,46	6,54	6,51	6,36	6,30
	15	98,6	89,8	80,4	69,1	57,5	47,1	35,7	31,3	5,42	5,55	5,74	5,93	6,08	6,12	6,07	6,04
	25	92,3	84,0	75,0	64,2	53,0	43,0	32,0	28,0	4,30	4,42	4,59	4,77	4,92	5,00	4,99	4,97
	35	85,7	77,9	69,5	59,2	48,6	39,0	28,4	24,7	3,33	3,42	3,53	3,65	3,74	3,75	3,65	3,61
	45	79,0	71,8	63,9	54,3	44,2	35,0	24,8	21,4	2,55	2,60	2,66	2,72	2,73	2,66	2,71	2,73
15	10	116	106	94,7	81,6	68,0	55,8	42,4	37,2	6,57	6,78	7,05	7,32	7,49	7,52	7,38	7,31
	15	113	103	91,9	79,0	65,6	53,6	40,4	35,4	5,97	6,18	6,44	6,73	6,96	7,06	7,03	7,00
	25	106	96,5	86,2	73,7	60,8	49,2	36,4	31,8	4,80	4,97	5,18	5,43	5,64	5,76	5,78	5,76
	35	99,0	90,1	80,3	68,4	56,1	44,9	32,6	28,3	3,77	3,88	4,03	4,19	4,31	4,34	4,25	4,20
	45	91,9	83,6	74,5	63,3	51,5	40,8	28,8	24,8	2,92	2,99	3,08	3,15	3,18	3,12	3,18	3,20
18	10	125	114	102	88,2	73,4	60,1	45,6	39,0	6,95	7,23	7,56	7,93	8,18	8,28	8,16	8,06
	15	122	111	99,5	85,5	70,9	57,9	43,5	37,1	6,34	6,60	6,93	7,30	7,60	7,76	7,77	7,72
	25	115	105	93,6	80,1	66,0	53,3	39,4	33,4	5,14	5,35	5,61	5,91	6,17	6,33	6,38	6,35
	35	108	95,1	87,6	74,7	61,1	49,0	35,5	29,8	4,02	4,10	4,29	4,46	4,65	4,78	4,70	4,62
	45	101	91,6	81,6	69,4	56,5	44,8	31,6	26,2	3,19	3,27	3,37	3,47	3,51	3,46	3,54	3,44
20	10	132	120	108	92,8	77,2	63,2	47,9	41,0	7,23	7,56	7,94	8,38	8,71	8,86	8,78	8,67
	15	128	117	105	90,1	74,7	60,9	45,7	39,0	6,61	6,92	7,29	7,72	8,09	8,30	8,36	8,31
	25	121	111	98,9	84,6	69,7	56,3	41,5	35,1	5,40	5,63	5,93	6,28	6,58	6,78	6,87	6,84
	35	114	104	92,8	79,1	64,8	51,8	37,5	31,5	4,30	4,46	4,66	4,89	5,06	5,13	5,06	4,98
	45	107	97,3	86,8	73,8	60,1	47,6	33,6	27,9	3,39	3,49	3,60	3,72	3,77	3,72	3,82	3,71

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Cooling capacity and EER calculated according to EN 14511:2018

Performances in heating

AEROTOP L 88

To	Tae (°C) DB/WB	Heating capacity EN14511								COP EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	min%	100%	90%	80%	70%	60%	50%	40%	min%
25	-10/-11.1	58,6	54,2	50,2	46,8	43,2	38,5	32,8	26,7	3,01	3,07	3,14	3,20	3,25	3,27	3,19	3,46
	-7/-8	65,1	60,1	55,6	51,7	47,6	42,3	35,8	28,8	3,33	3,40	3,48	3,55	3,61	3,62	3,52	3,79
	2/1.1	84,4	77,7	71,6	66,3	60,7	53,4	44,7	35,5	4,24	4,34	4,47	4,56	4,63	4,63	4,46	4,75
	7/6	95,0	87,4	80,6	74,6	68,2	60,0	50,0	39,5	4,72	4,85	5,00	5,11	5,20	5,19	4,99	5,29
	10/8.2	102	93,5	86,2	79,7	73,0	64,1	53,3	42,0	5,02	5,16	5,32	5,44	5,55	5,54	5,33	5,64
	18/14	119	110	101	93,7	85,8	75,4	62,7	49,3	5,77	5,96	6,17	6,35	6,50	6,54	6,33	6,73
30	-10/-11.1	59,2	54,5	50,3	46,7	42,9	38,0	32,1	25,9	2,74	2,81	2,89	2,95	3,00	3,02	2,94	3,19
	-7/-8	65,4	60,2	55,5	51,3	47,0	41,5	34,9	27,9	3,03	3,11	3,19	3,26	3,33	3,34	3,25	3,49
	2/1.1	84,0	77,1	70,9	65,4	59,6	52,3	43,4	34,2	3,83	3,94	4,07	4,16	4,25	4,25	4,09	4,35
	7/6	94,2	86,6	79,6	73,5	67,0	58,6	48,5	38,0	4,26	4,39	4,54	4,66	4,75	4,76	4,58	4,84
	10/8.2	101	92,5	85,0	78,5	71,6	62,6	51,7	40,5	4,52	4,66	4,83	4,95	5,07	5,08	4,88	5,16
	18/14	118	108	99,7	92,2	84,1	73,7	60,9	47,5	5,18	5,37	5,59	5,77	5,93	5,99	5,80	6,17
35	-10/-11.1	59,9	55,0	50,5	46,6	42,6	37,6	31,5	25,2	2,49	2,56	2,63	2,69	2,74	2,75	2,67	2,87
	-7/-8	65,9	60,4	55,4	51,1	46,6	41,0	34,2	27,1	2,75	2,82	2,91	2,97	3,03	3,04	2,94	3,14
	2/1.1	83,7	76,7	70,3	64,7	58,8	51,3	42,4	33,1	3,46	3,56	3,68	3,77	3,85	3,85	3,69	3,90
	7/6	93,7	87,7	78,8	72,6	66,0	57,5	47,3	36,8	3,98	4,15	4,26	4,37	4,40	4,40	4,23	4,36
	10/8.2	99,9	91,6	84,1	77,4	70,4	61,3	50,4	39,1	4,06	4,19	4,35	4,47	4,58	4,58	4,39	4,62
	18/14	118	108	98,4	90,8	82,7	72,2	59,3	45,9	4,79	4,90	5,02	5,19	5,35	5,40	5,23	5,52
40	-10/-11.1	60,6	55,5	50,8	46,7	42,5	37,3	31,0	24,6	2,27	2,33	2,40	2,45	2,49	2,49	2,40	2,55
	-7/-8	66,3	60,7	55,5	51,0	46,4	40,5	33,6	26,5	2,50	2,56	2,64	2,70	2,74	2,74	2,63	2,78
	2/1.1	83,6	76,4	69,9	64,2	58,1	50,5	41,5	32,3	3,13	3,22	3,33	3,40	3,46	3,45	3,29	3,44
	7/6	93,3	85,3	78,1	71,9	65,1	56,5	46,3	35,8	3,45	3,56	3,69	3,79	3,86	3,85	3,67	3,83
	10/8.2	99,3	90,9	83,3	76,6	69,5	60,3	49,3	38,1	3,65	3,77	3,92	4,02	4,11	4,10	3,91	4,08
	18/14	116	106	97,4	89,8	81,6	71,0	58,1	44,7	4,16	4,32	4,51	4,67	4,81	4,84	4,66	4,88
45	-10/-11.1	61,5	56,0	51,1	46,9	42,5	37,1	30,7	24,2	2,06	2,12	2,17	2,21	2,25	2,23	2,13	2,24
	-7/-8	66,9	61,0	55,7	51,0	46,2	40,2	33,2	26,0	2,26	2,32	2,39	2,43	2,47	2,45	2,33	2,43
	2/1.1	83,5	76,2	69,6	63,8	57,7	50,0	40,8	31,6	2,81	2,89	2,99	3,05	3,10	3,07	2,90	3,00
	7/6	91,2	84,9	77,6	71,3	64,5	55,8	45,5	35,0	3,25	3,29	3,34	3,39	3,45	3,42	3,23	3,34
	10/8.2	98,7	90,3	82,7	75,9	68,8	59,5	48,5	37,2	3,26	3,37	3,50	3,59	3,66	3,64	3,44	3,56
	18/14	115	105	96,5	88,8	80,6	70,0	57,1	43,8	3,70	3,85	4,02	4,16	4,27	4,29	4,10	4,26
50	-10/-11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7/-8	67,5	61,4	55,9	51,1	46,2	40,1	32,9	25,6	2,05	2,10	2,15	2,19	2,21	2,18	2,05	2,12
	2/1.1	83,5	76,1	69,4	63,5	57,3	49,6	40,4	31,1	2,52	2,59	2,68	2,73	2,76	2,72	2,55	2,61
	7/6	92,6	84,5	77,2	70,8	64,0	55,3	45,0	34,4	2,77	2,85	2,95	3,02	3,06	3,02	2,84	2,90
	10/8.2	98,2	89,8	82,2	75,4	68,2	59,0	47,9	36,6	2,91	3,01	3,12	3,20	3,25	3,22	3,02	3,10
	18/14	114	104	95,7	88,1	79,9	69,3	56,4	43,1	3,28	3,41	3,57	3,69	3,79	3,79	3,60	3,71
55	2/1.1	83,4	76,0	69,3	63,4	57,2	49,4	40,1	30,5	2,26	2,32	2,39	2,43	2,46	2,41	2,24	2,22
	7/6	92,6	84,4	76,9	70,5	63,7	55,0	44,7	34,1	2,53	2,58	2,63	2,69	2,72	2,67	2,49	2,52
	10/8.2	98,7	89,7	81,5	75,0	67,8	58,6	47,6	36,3	2,70	2,74	2,78	2,84	2,88	2,84	2,65	2,69
	18/14	116	104	93,7	86,8	79,4	68,8	56,0	42,7	3,16	3,18	3,20	3,29	3,34	3,33	3,15	3,22

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Heating capacity and COP calculated according to EN 14511:2018
ATTENTION: The data of the heat capacity and COP include defrostings

Performances in cooling

AEROTOP L 88

To	Tae	Cooling capacity EN14511								EER EN14511							
		Percentage of compressor load								Percentage of compressor load							
C°	C°	100%	90%	80%	70%	60%	50%	40%	30%	100%	90%	80%	70%	60%	50%	40%	30%
5	10	96,4	87,9	77,2	68,5	58,9	47,7	36,7	30,8	5,32	5,51	5,67	5,83	5,95	5,95	5,89	5,82
	15	93,2	85,0	74,6	66,1	56,7	45,7	35,0	29,2	4,66	4,84	5,00	5,18	5,32	5,36	5,34	5,30
	25	87,0	79,3	69,5	61,3	52,3	41,8	31,5	26,1	3,66	3,82	3,97	4,14	4,29	4,36	4,39	4,37
	35	80,4	73,3	64,1	56,4	47,8	37,9	28,0	22,9	2,81	2,93	3,04	3,16	3,25	3,27	3,23	3,17
	45	73,6	67,1	58,6	51,4	43,3	33,9	24,5	19,8	2,14	2,21	2,28	2,34	2,37	2,33	2,20	2,33
7	10	102	93,0	81,6	72,4	62,2	50,3	38,6	32,3	5,53	5,74	5,93	6,13	6,26	6,28	6,21	6,14
	15	98,6	90,0	79,0	69,9	59,9	48,3	36,8	30,7	4,85	5,05	5,24	5,44	5,59	5,65	5,63	5,58
	25	92,1	84,0	73,6	64,9	55,3	44,2	33,2	27,4	3,82	3,99	4,16	4,35	4,51	4,59	4,62	4,60
	35	85,3	77,8	68,0	59,9	50,7	40,1	29,6	24,2	2,91	3,07	3,20	3,33	3,43	3,45	3,40	3,34
	45	78,3	71,4	62,4	54,7	46,1	36,1	26,1	21,0	2,25	2,33	2,41	2,48	2,51	2,47	2,34	2,46
10	10	110	101	88,5	78,4	67,3	54,3	41,7	34,8	5,69	5,94	6,16	6,38	6,53	6,54	6,43	6,33
	15	107	97,7	85,8	75,9	65,0	52,2	39,8	33,1	5,13	5,37	5,59	5,83	6,03	6,11	6,10	6,05
	25	100	91,4	80,1	70,7	60,2	48,0	35,9	29,6	4,07	4,26	4,46	4,67	4,86	4,97	5,00	4,97
	35	93,1	84,9	74,3	65,4	55,4	43,7	32,2	26,2	3,16	3,30	3,44	3,59	3,71	3,75	3,70	3,63
	45	85,7	78,3	68,5	60,1	50,6	39,6	28,5	22,9	2,43	2,52	2,61	2,69	2,74	2,70	2,56	2,69
15	10	126	115	101	89,5	76,7	61,8	47,2	39,3	6,19	6,52	6,85	7,19	7,45	7,53	7,45	7,34
	15	122	112	98,1	86,8	74,2	59,5	45,1	37,4	5,61	5,92	6,25	6,58	6,87	7,02	7,06	7,01
	25	115	105	92,0	81,2	69,1	54,9	41,0	33,7	4,51	4,76	5,02	5,30	5,56	5,71	5,78	5,76
	35	107	98,1	85,9	75,6	64,0	50,5	37,0	30,1	3,55	3,73	3,92	4,11	4,27	4,33	4,29	4,22
	45	99,7	91,1	79,7	70,0	59,0	46,1	33,2	26,5	2,77	2,89	3,01	3,12	3,19	3,16	3,01	3,15
18	10	136	124	109	96,7	82,9	66,7	50,8	42,3	6,51	6,91	7,31	7,74	8,09	8,25	8,23	8,12
	15	132	121	106	93,9	80,3	64,3	48,6	40,3	5,93	6,30	6,68	7,10	7,47	7,69	7,78	7,75
	25	125	114	100	88,2	75,0	59,6	44,4	36,4	4,82	5,11	5,43	5,75	6,06	6,26	6,37	6,37
	35	117	107	93,7	82,4	69,8	55,0	40,3	32,7	3,83	4,04	4,26	4,48	4,68	4,77	4,75	4,67
	45	109	99,7	87,4	76,7	64,7	50,6	36,4	29,1	3,02	3,16	3,29	3,43	3,51	3,49	3,34	3,51
20	10	143	131	115	101,7	87,2	70,2	53,4	44,4	6,74	7,18	7,66	8,14	8,58	8,81	8,84	8,74
	15	139	127	112	99,0	84,6	67,8	51,2	42,4	6,17	6,57	7,01	7,49	7,93	8,21	8,36	8,34
	25	132	120	106	93,2	79,2	62,9	46,8	38,4	5,05	5,36	5,71	6,09	6,44	6,69	6,85	6,86
	35	124	113	99,2	87,3	73,9	58,2	42,6	34,6	4,04	4,27	4,51	4,77	4,99	5,11	5,10	5,03
	45	116	106	92,8	81,6	68,8	53,8	38,8	30,9	3,21	3,36	3,51	3,66	3,76	3,76	3,60	3,78

To [°C]= Leaving internal exchanger water temperature
Tae [°C]= External exchanger return air temperature
Performances in function of the return/flow water temperature differential = 5°C
Cooling capacity and EER calculated according to EN 14511:2018

Installation

General notes
Safety areas and functional distances

Positioning
Consider these elements during positioning:
- Technical spaces requested by the unit
- Electrical connections
- Water connections
- Functional clearances
- The optional vibration dampers influence the overall height

Functional clearances
Functional clearances have the purpose of:
- guaranteeing good unit operation
- allowing maintenance operations
- safeguarding authorised operators and exposed persons.
- respecting the functional clearances indicated

Positioning
Units are designed to be installed:
- Outdoors
- in permanent and flat position.
- Units may be installed on the ground or on the roof provided that sufficient ventilation is guaranteed.

If the unit is installed on a roof, the roof must be sturdy enough to withstand the weight of the unit and the weight of maintenance personnel.
Limit the transmission of vibrations:
- use anti-vibration devices or neoprene strips on the unit support points
- install flexible joints on the hydraulic connections
- The unit must be level

Pressure relief valve gas side
The installer is responsible for evaluating the opportunity of installing drain pipes in compliance with the local regulations in force (EN 378).
If ducted, the valves must be resized according to EN13136

Condensate
When a heat pump is in operation it produces a considerable amount of water due to the defrosting cycles of the external coil.
The condensate must be disposed of in order to avoid damaging people and things.

Installation criteria:
Customer approval
- position accessible safely
- technical spaces requested by the unit
- spaces for the air intake/exhaust
- max. distance allowed by the electrical connections
- install the unit raised from the ground
- verify unit weight and bearing point capacity
- verify that all bearing points are aligned and levelled
- condensate water draining
- consider the maximum possible snow level
- avoid places that can be subject to floods
- Protect the unit with a suitable fence in order to avoid access to unauthorised personnel (children, vandals, etc.)

A correct circulation of the air is mandatory to guarantee the good unit operating.
Avoid therefore:
- obstacles to the airflow
- ventilation difficulties
- leaves or other foreign bodies that can obstruct the air coil
- winds that hinder or favour airflow
- sources of heat or pollution close to the unit (chimneys, extractors etc..)
- Stratification (cold air that stagnates at the bottom)
- recirculation (expelled air that is sucked in again)
- positioning below ground level, near very high walls, underneath roofs or in corners, which can give rise to stratification or recirculation phenomena.
- Disregarding the previous indications may affect energy efficiency or lead to blocks due to HIGH PRESSURE (in summer) or LOW PRESSURE (in winter)..

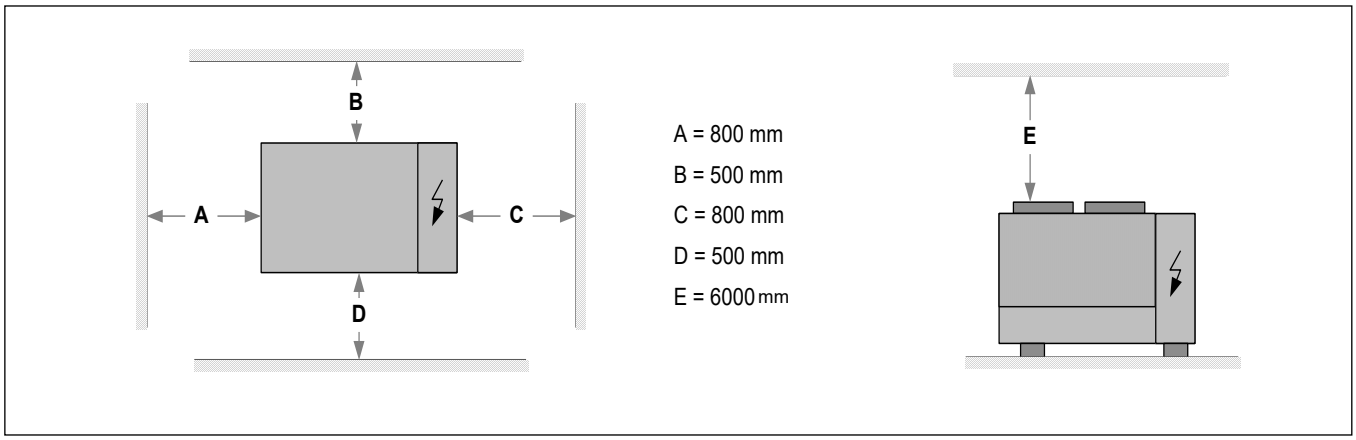
Structure for installation.
- Both steel and concrete bases may be suitable.
- The base must have a height of at least 300 mm from the ground so as to provide sufficient room to install hydraulic pipes and electrical connections.
- Verify that the base and bearing points are level.
- Envisage a drain for the condensation that may form on the heat exchanger when the unit functions as a heater.
  The drain must direct the condensation away from roads and pavements, especially in places where condensation might freeze.
- Make sure that the installation base is separate from the buildings, as the noise and vibrations may propagate.
- Fix the unit to the foundation using the installation holes on the base of the unit.

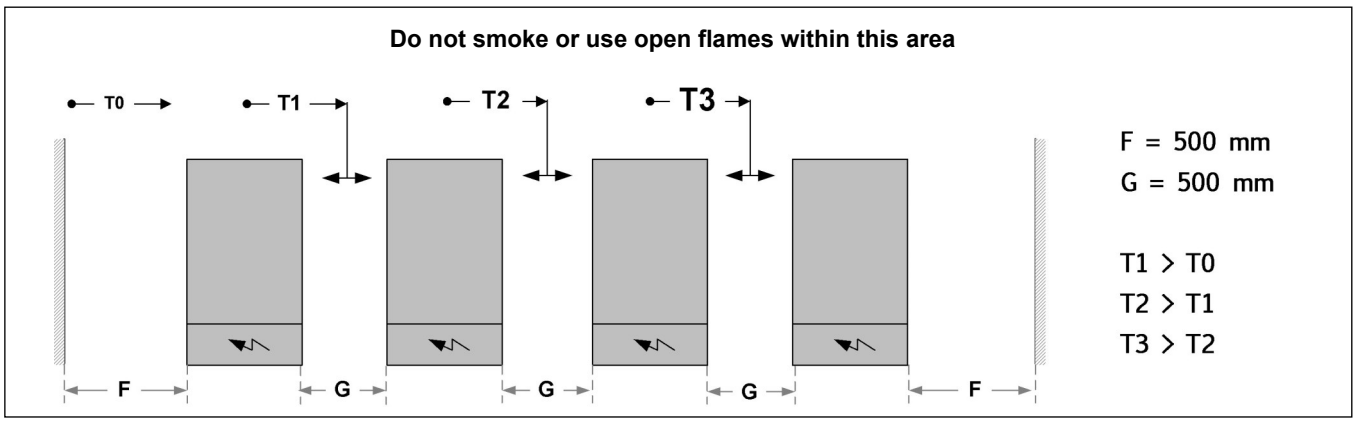
Prevent the accumulation of snow.
Batteries and fans must always be kept free from obstacles, accumulated leaves, snow, etc.
If the unit is installed where it might snow:
- do not install the unit under trees or roofs that may accumulate snow
- envisage a base of a suitable height for a possible accumulation of snow.
- arrange for a roof that can protect the fans from accumulations of snow.
- the roof must not cause short circuits between the air expelled from the fans and that suctioned by the batteries,.

Otherwise the accumulated snow will block the airflow and may cause problems to the equipment.

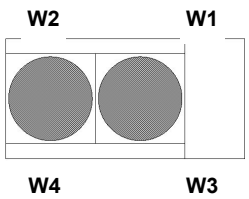
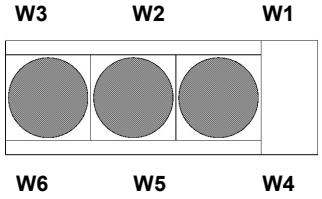
Installation

Setup





Anti-vibration mounts
Option

AEROTOP L	54 - 61		65 - 88	
support points				
Configuration	standard		standard	
KIT PE	PESM00003		PESM00005	
W1 (odice)	PAF 11 SPEC		PAF 9 SPEC	
W2	PAF 11 SPEC		PAF 22 SPEC	
W3	PAF 11 SPEC		PAF 4 SPEC	
W4	PAF 11 SPEC		PAF 9 SPEC	
W5	-		PAF 22 SPEC	
W6	-		PAF 4 SPEC	

Water quality

Water quality
Circulators function well exclusively with clean and high-quality tap water. The most frequent factors that can affect circulators and the system are oxygen, limescale, sludge, acidity level and other substances (including chlorides and minerals).
In addition to the quality of water, installation also plays an important role. The heating system must be airtight. Choose materials that are not sensitive to oxygen diffusion (risk of corrosion...).

Characteristics of the water
- compliant with local regulations
- Langelier Index (LI) between 0 and +0.4
- within the limits indicated in the chart
- Water quality must be checked by qualified personnel.

Hardness
If the water is hard, install a system suitable to preserve the unit from harmful deposits and limestone formation.
If necessary, install a water softener to reduce water hardness

Cleanliness
Before connecting the water to the unit, clean the system thoroughly with specific products effective to remove residues or impurities that may affect functioning. Existing systems must be free from sludge and contaminants and protected against build-ups.

New systems
In case of new installations, it is essential to wash the entire installation (with the circulator uninstalled) before commissioning the central installation. This removes residues of the installation process (welding, waste, joint products...) and preservatives (including mineral oil). The system must then be filled with clean high-quality tap water.

Existing systems
If a new boiler or heat pump is installed on an existing heating system, the system must be rinsed to avoid the presence of particles, sludge and waste. The system must be drained before installing the new unit. Dirt can be removed only with a suitable water flow. Each section must then be washed separately. Particular attention must also be paid to “blind spots” where a lot of dirt can accumulate due to the reduced water flow. The system must then be filled with clean high-quality tap water. If, after rinsing, the quality of the water is still unsuitable, a few measures must be taken to avoid problems. An option to remove pollutants is to install a filter. Various types of filters are available. A mesh filter is designed to catch large dirt particles. This filter is usually placed in the part with the larger flow. A tissue filter is designed to catch the finer particles.

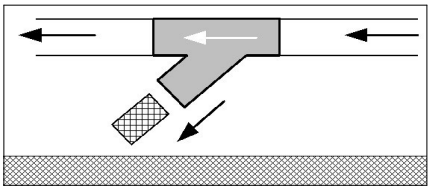
Exclusions
The warranty does not cover damage formed by limestone, deposits and impurities deriving from the water supply and/or by the malfunctioning of the system cleaning system.

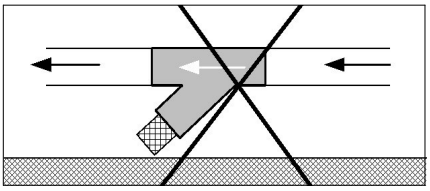
Risk of frost
- When the outside temperature gets close to 0°C, the water in the pipes and unit may freeze.
- Frost may determine irreversible damage to the unit.
- Frost damage is not covered by the warranty.

If the unit or hydraulic connections are subject to temperatures close to 0°C:
- mix water with glycol, or
- safeguard the pipes with heating cables placed under the insulation, or
- empty the system in cases of long non-use

Anti-freeze solutions
Consider that the use of anti-freeze solution determines an increase in a pressure drop.
Make sure that the glycol type utilized is inhibited (not corrosive) and compatible with the water circuit components.
Do not use different glycol mixture (i.e. ethylene with propylene).

Water filter
Use filter ≥ **30 mesh**
- It must be installed immediately in the water input of the unit, in a position that is easily accessible for cleaning.
- The filter should never be removed, doing so invalidates the warranty.





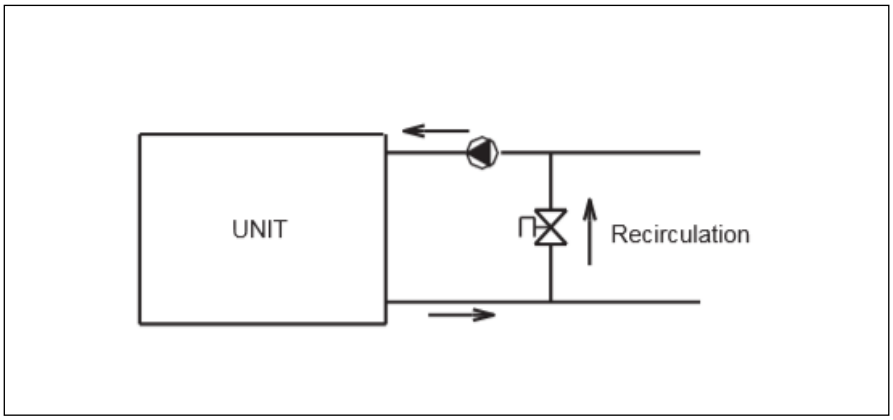
% ETHYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2	-3.9	-6.5	-8.9	-11.8	-15.6	-19.0	-23.4	-27.8	-32.7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-23.8	-29.4

Installation

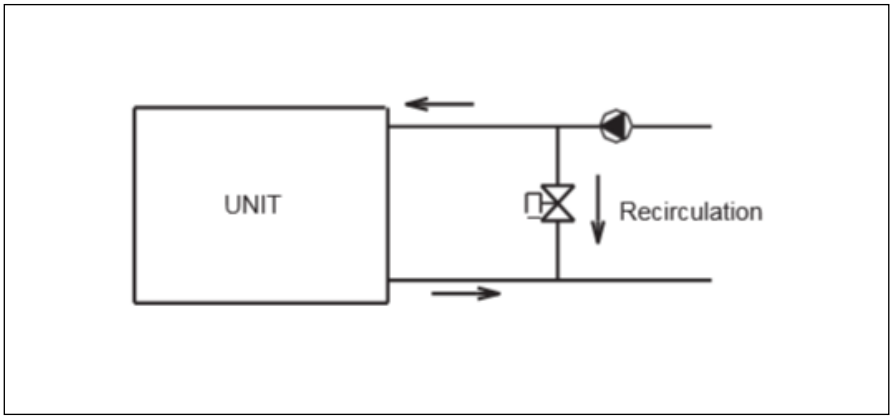
Water quality, Hydraulic connections

Water component for corrosion limit on Copper	
PH	7.5 ÷ 9.0
SO_4^{--}	< 100
HCO_3^- / SO_4^{--}	> 1
Total Hardness	8 ÷ 15 °f
Cl-	< 50 ppm
PO_4^{3-}	< 2.0 ppm
NH_3	< 0.5 ppm
Free Chlorine	< 0.5 ppm
Fe_3^+	< 0.5 ppm
Mn^{++}	< 0.05 ppm
CO_2	< 50 ppm
H_2S	< 50 ppb
Temperature	< 65 °C
Oxygen content	< 0.1 ppm
Sand	10 mg/L0.1 to 0.7mm max diameter
Ferrite hydroxide Fe3O4 (black)	Dose < 7.5 mg/L 50% of mass with diameter < 10 µm
Iron oxide Fe2O3 (red)	Dose < 7.5mg/L Diameter < 1 µm

Minimum capacity of the exchanger
The minimum water flow is indicated in the technical data.
If the system capacity is below the minimum flow, bypass the system as indicated in the diagram.

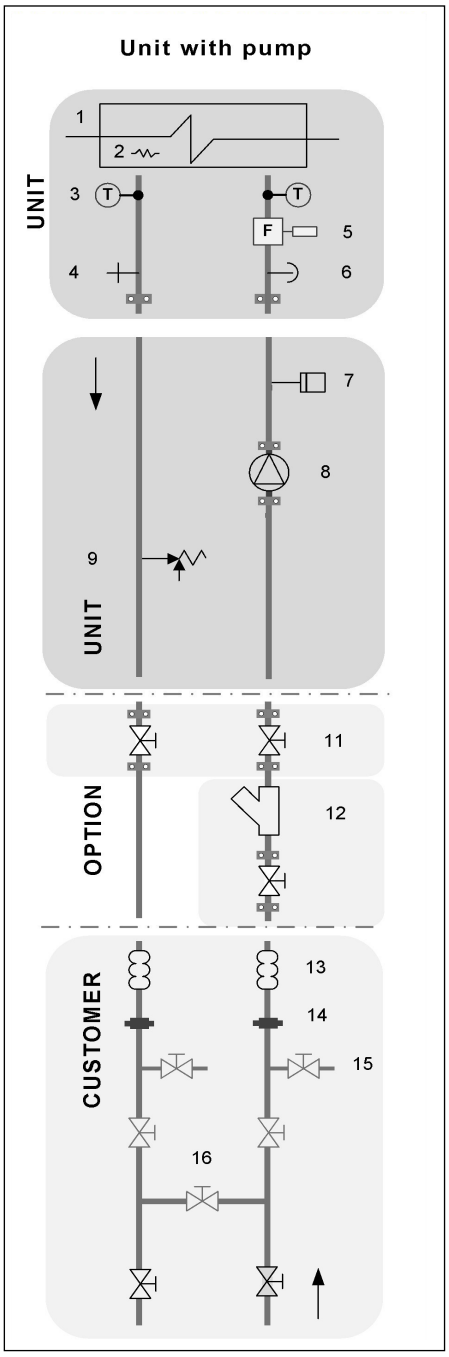


Maximum capacity of the exchanger
The maximum water flow is indicated in the technical data.
If the system capacity exceeds the minimum flow, bypass the system as indicated in the diagram.



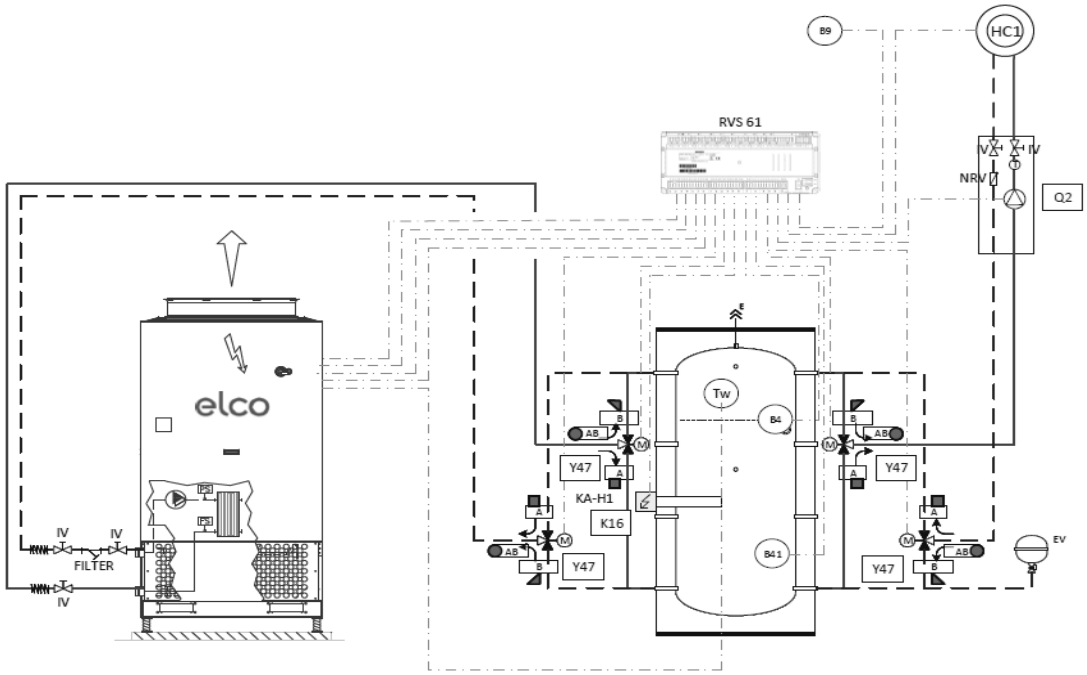
Installation

Hydraulic connections



1 heat pump exchanger
2 antifreeze heater
3 water temperature probe
4 drain
5 water flow switch
6 vent
7 system loading safety pressure switch
8 Pump
9 pressure relief valve
10 NA
11 shut-off valves
12 filter
13 flexible couplings
14 piping supports
15 exchanger chemical cleaning by-pass
16 system cleaning bypass

System solution
Heating cooling with 1 Zone direct



This schematic is for general guidance and is not to be considered a construction drawing.

Additional documents with hydraulic diagrams, circuit diagrams and parameter lists for controller settings are available for the following system examples. The illustrations do not claim to be complete. For practical implementation, the relevant technical rules apply..
Note: The standards can be obtained free of charge. The specified connection diagrams and parameters for controller setting simplify the installation and commissioning work.
For systems that deviate from the standards, an electrical diagram is required. This can be obtained from ELCO as a service.

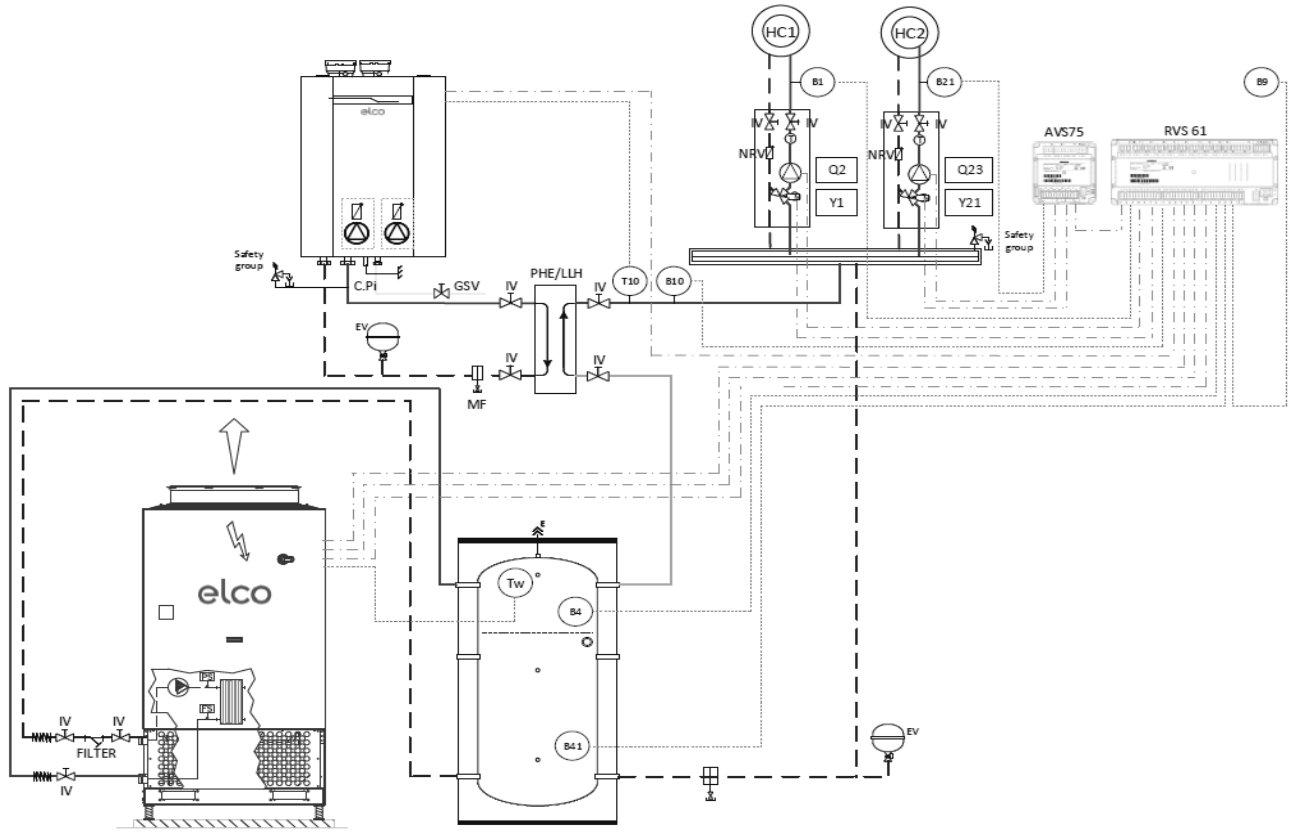
Legend:

-- --	Return
------	Flow
·····	Sensor cable
- · -	Pump / valve cable

TW	Buffer sensor
PS	Pressure switch
FS	Flow switch
B4	Buffer tank sensor top
B41	Buffer tank sensor bottom
B9	External air sensor
K16	Electric heating element
Y47	Buffer reversing valve
Q2	Secondary heating circuit HC1)
IV	Shut-off valve
NRV	Non-return valve
EV	Expansion valve

Installation

System solution
Bivalent system with 2 mixed zone



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Note: The standards can be obtained free of charge. The specified connection diagrams and parameters for controller setting simplify the installation and commissioning work.
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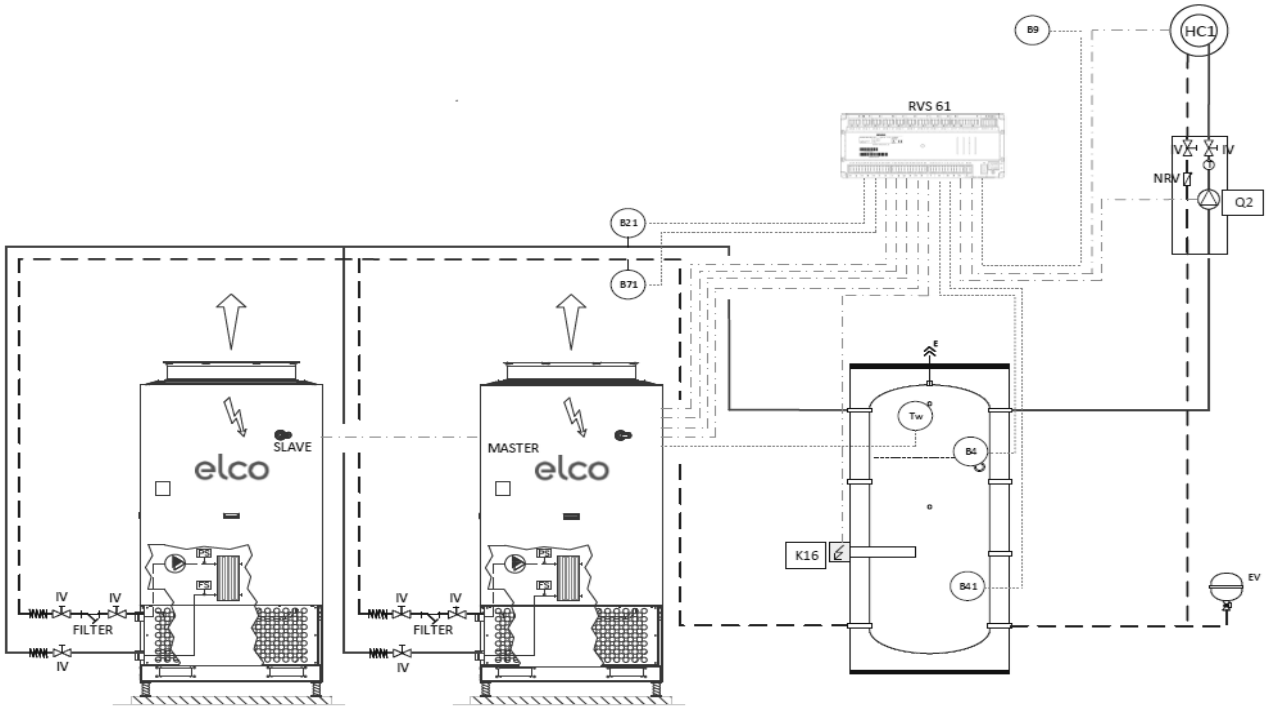
Legend:

-- --	Return
------	Flow
·····	Sensor cable
- · -	Pump / alve cable

TW	Buffer sensor
PS	Pressure switch
FS	Flow switch
B1	Flow sensor HC1
B21	Flow sensor HC2
B4	Buffer tank sensor top
B41	Buffer tank sensor bottom
B9	External air sensor
Q2	Secondary heating circuit HC1
Q23	Secondary heating circuit HC2
Y1	Mixing valve HC1
Y21	Mixing valve HC2
IV	Shut-off valve
NRV	Non-return valve
EV	Expansion valve
T10	Common flow sensor
C.Pi	Condensate pipe
GSV	Gas shut-off valve
MF	Sludge separator magnetic filter
LLH	Low Loss Header
PHE	Plate Heat Exchanger

Installation

System solution
Heating system cascade



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Additional documents with hydraulic diagrams, circuit diagrams and parameter lists for controller settings are available for the following system examples. The illustrations do not claim to be complete. For practical implementation, the relevant technical rules apply..
Note: The standards can be obtained free of charge. The specified connection diagrams and parameters for controller setting simplify the installation and commissioning work.
For systems that deviate from the standards, an electrical diagram is required. This can be obtained from ELCO as a service.

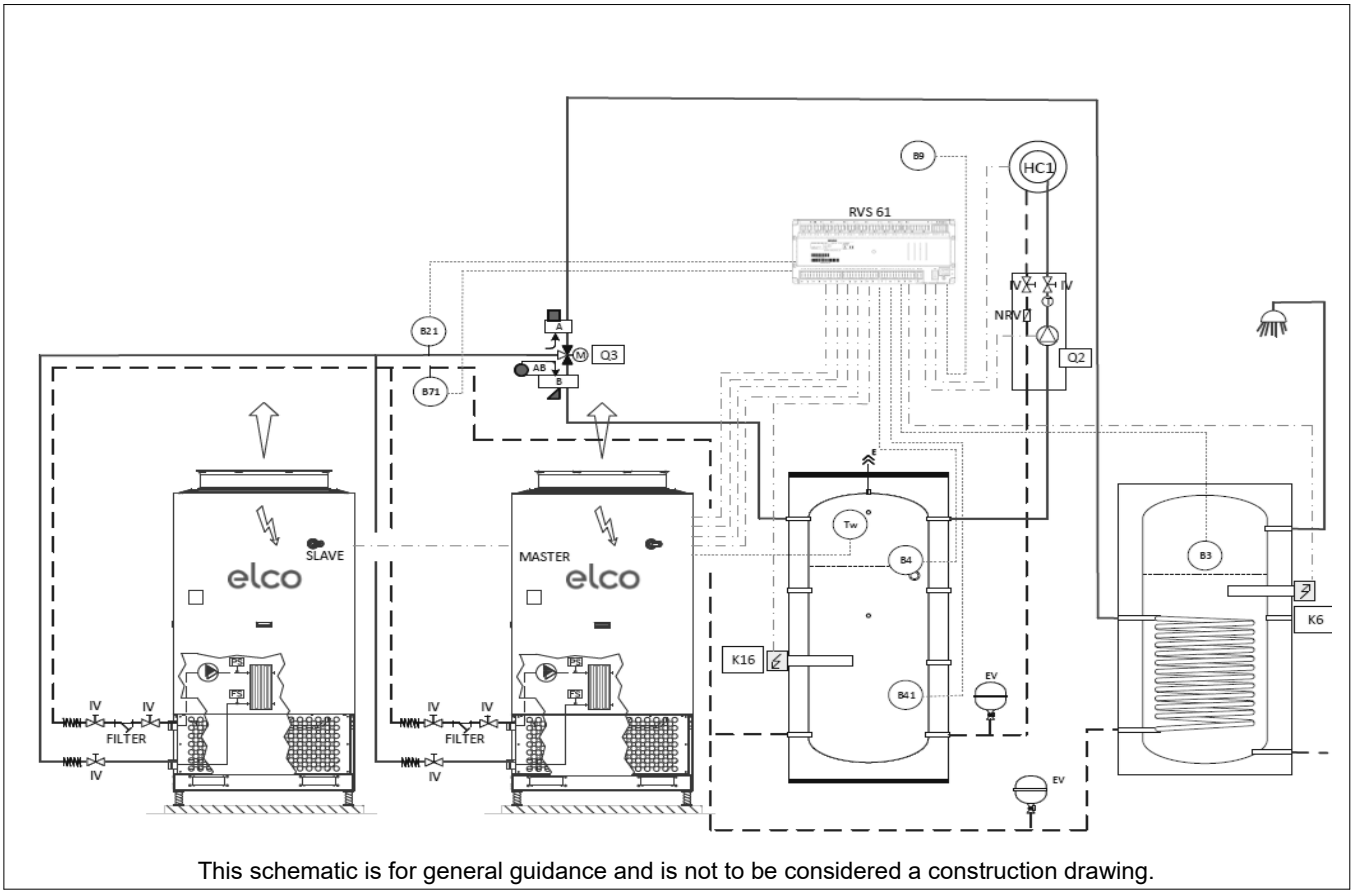
Legend:

-- --	Return
------	Flow
·····	Sensor cable
· -	Pump / valve cable

TW	Buffer sensor
PS	Pressure switch
FS	Flow switch
B4	Buffer tank sensor top
B41	Buffer tank sensor bottom
B9	External air sensor
B21	Flow sensor HC2
B71	HP Return sensor
K16	Electric heating element
Q2	Secondary heating circuit HC1
IV	Shut-off valve
NRV	Non-return valve
EV	Expansion valve

Installation

System solution
Cascade HHP with heating system and DHW with CYL



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B3	DHW Sensor top
K16	Electric heating element
K6	Electric heating element
Q2	Secondary heating circuit HC1
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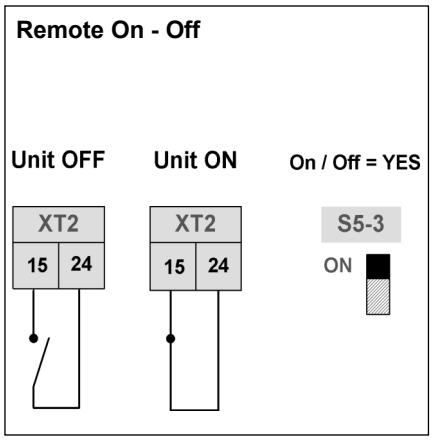
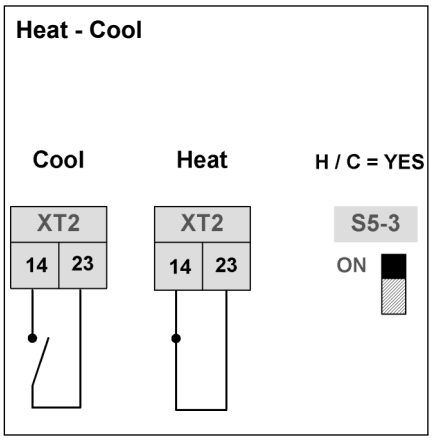
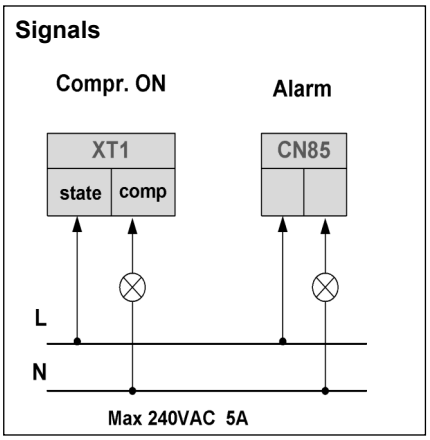
NRV	Non-return valve
EV	Expansion valve

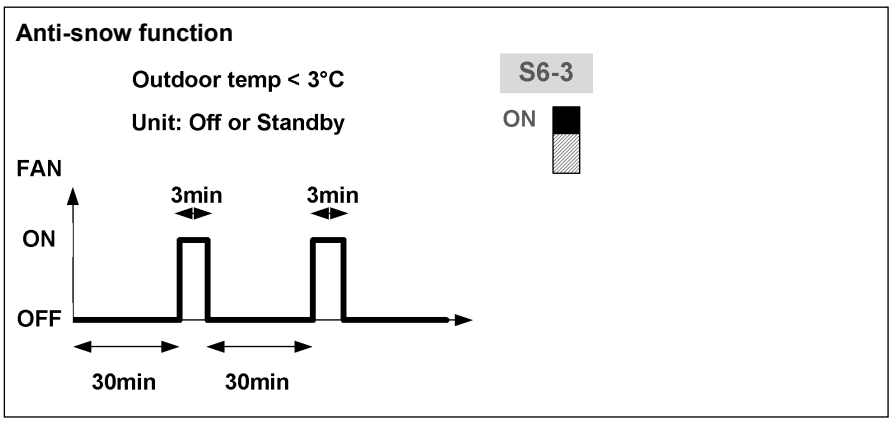
System configurations

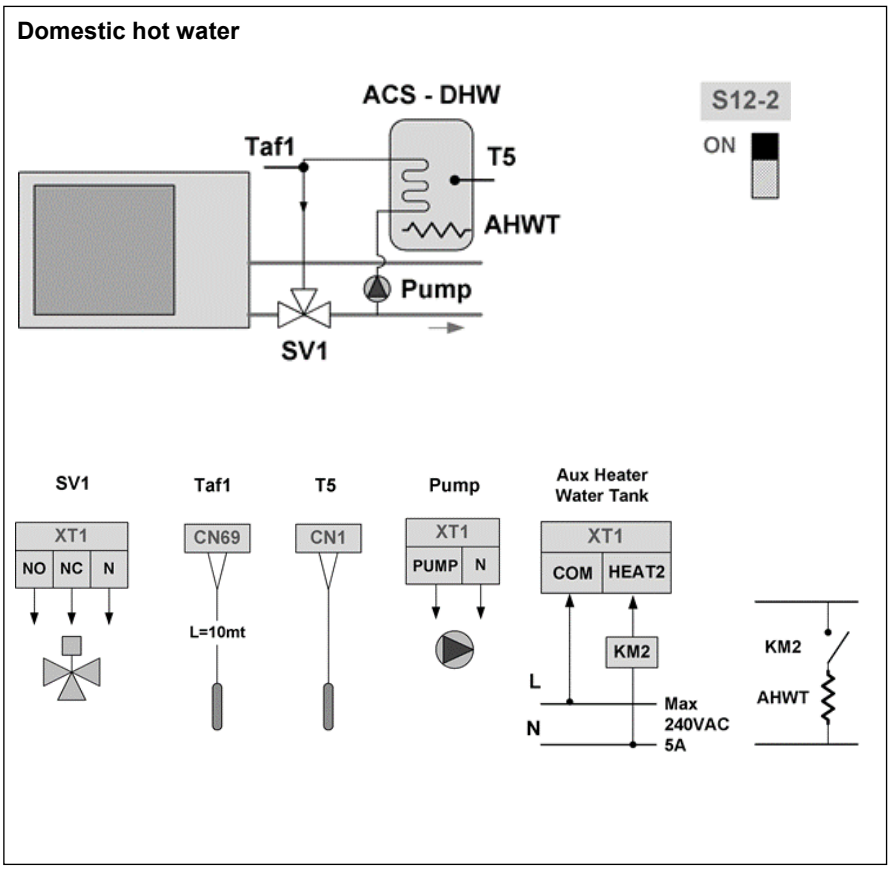
Electric connection

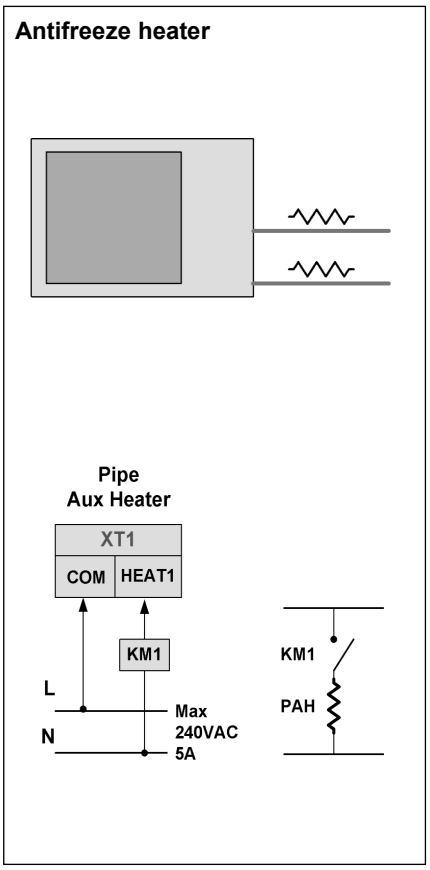












System configurations

Electric connection

Remote Interface Modul

The module has five digital inputs with optocouplers and an isolated BMS Modbus RTU port with variable baud rate.
The dip switch bank S1 is used to inform the MCU of the configuration parameters: BMS port baud rate, unit type, pump type, remote control activation, HMI Modbus port activation.
Termination of the BMS modbus port is available on dip switch bank S2.
Power supply for the unit is 7 to 17 V ac/dc.

Port Definition

HMI side:
CN1: A, B
power supply 7-17Vac/dc

CN2: E, E
HMI side GND connection

CN3: HMI Modbus RTU
port H2, H1 (H2 = +, H1 = -)

User side:
CN4: SA 4 ON/OFF
Voltage free digital input

CN5: SA 5 C/H
Voltage free digital input

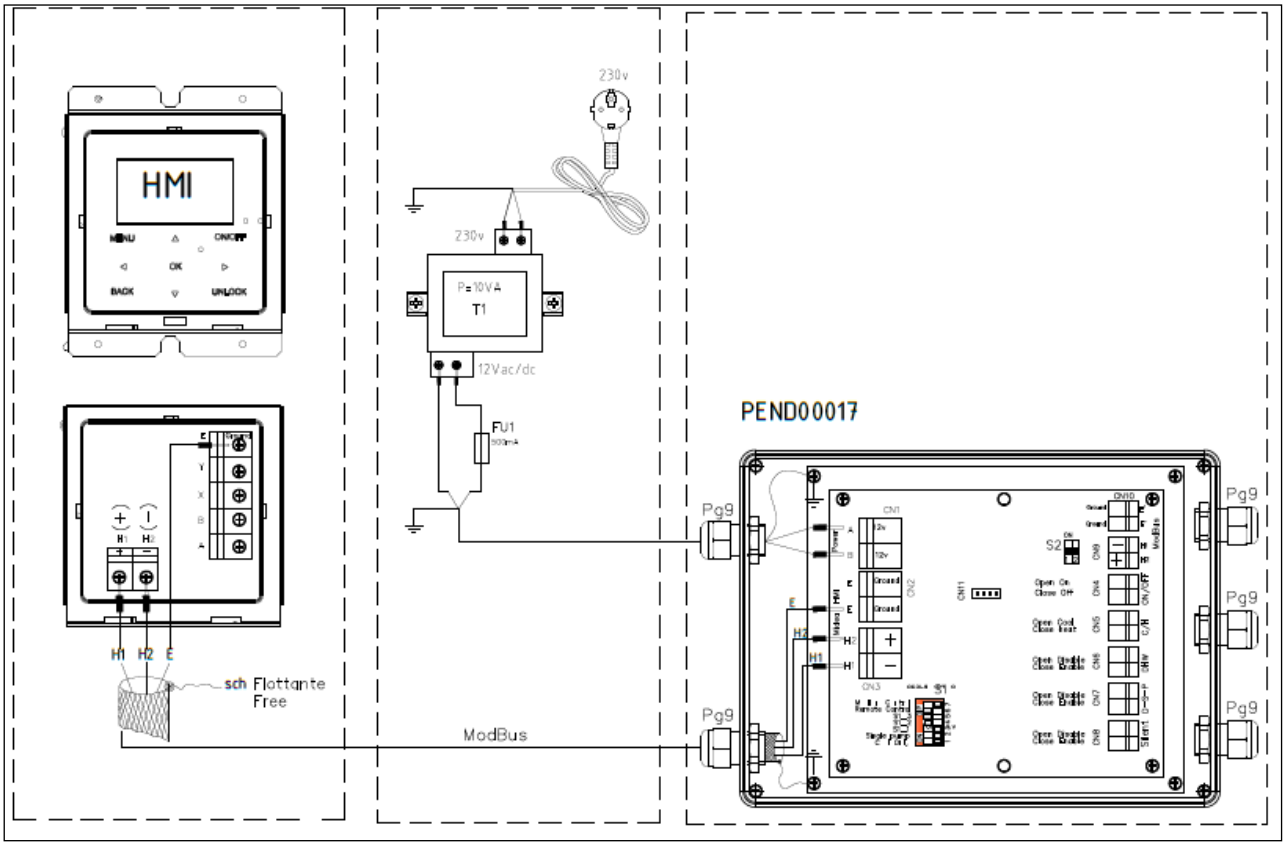
CN6: SA 6 DHW
Voltage free digital input

CN7: SA 7 D-P-S
Voltage free digital input

CN8: SA 8 Silent
Voltage free digital input

CN9: BMS port
Modbus RTU over RS485 (H2 +, H1 -)

CN10: E'E'
floating GND connection (customer side)



Digital inputs for potential-free contacts:
a. On/Off
b. Heat/cool mode
c. Domestic hot water
d. Double set-point;
e. Silent mode

Status LED of the digital input
Contact closed: LED on, contact open: LED off

Third party Modbus or BMS isolated communication interface
(communication speed selectable: from 1200bps to 115200bps) Parity NONE, word length 8, Stop Bit 1;1

Auto Modbus address acquisition
(shake hands function) from HMI; HMI and BMS Modbus ports are equipped with status LED for Rx Tx visual monitoring.
Wide range AC/DC power supply input compliance (From 7~17Vac/Vdc).

System configurations

Cascade management

Cascade management
It is possible to connect up to 16 units on a local network, reaching a maximum power of 1400 kW and up to 4 units connected hydraulically. The combinations can also occur with units with different power.
The modular system, obtained by combining multiple modules, preserves the strengths of the individual module, but it multiplies the advantages

Increasing system efficiency:

- the operation of multiple units connect in parallel increases total seasonal efficiency by 3%.

Greater reliability:

- The redundancy of cooling circuits and compressors guarantees full operation even in case of malfunction of a single module, that can be repaired while the system continues to be in operation.

Handling and simplified installation:

- the compact dimensions of an individual module make it easy to pass through doors and elevators. The V design of the coils makes it possible to reduce side clear space. The quick connections allow simple and quick installation.

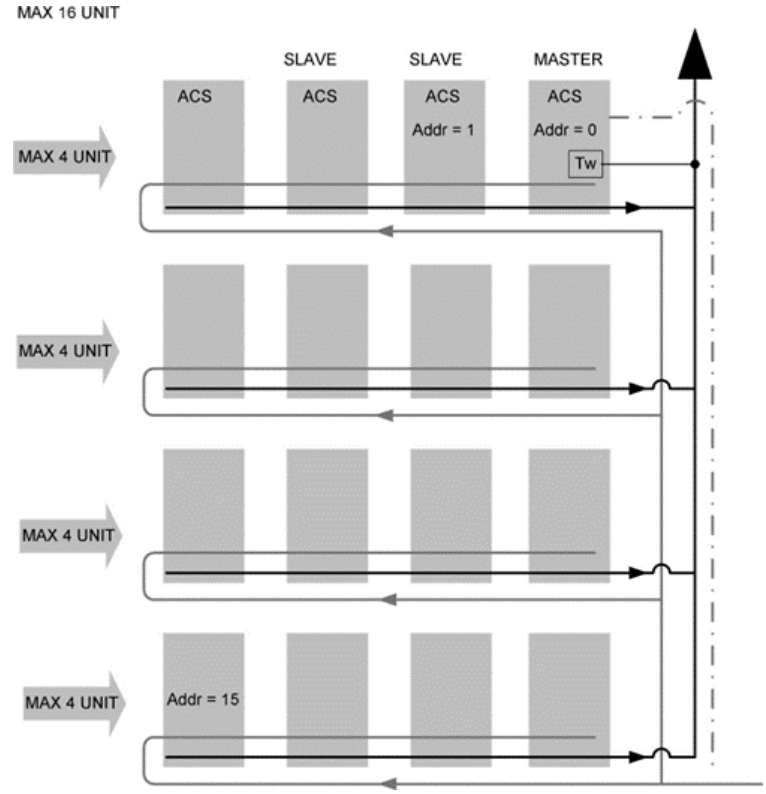
Easy and quick maintenance:

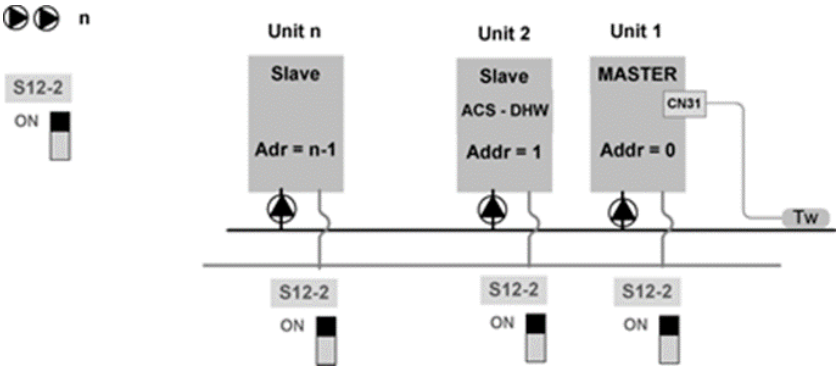
- all of the main components can be reached from the front guaranteeing on-line maintenance of a module, without blocking the adjacent modules. Every unit is equipped with cut-off and
- non return valve in order to isolate the individual unit in case of
- malfunction.

Scalability:

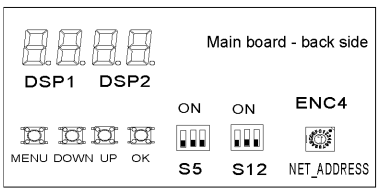
- it is possible to add additional modules, even subsequently, in order to satisfy system load requirements that may have changed

Modular system connection diagram - addressing





Unit addressing



UNIT	1 - MASTER	2 - Slave	3 - Slave	16 - Slave
Addr.	0	1	2	15
ENC4	0	1	2	F

System configurations

Modular configuration units

Modular system configuration

- Management of the entire system takes place through a unit defined as master. The master unit controller can be set up remotely at a maximum distance of up to 300 m.
- All units must be connected to each other using a shielded cable with three wires (3 x 0.75 mm2).
- Each module must be configured with the water connections for modular unit.
- Each module can be equipped with inertial system storage tank
- It's possible to have an external pumping group, sized for the entire capacity of the modular system (responsibility of the Customer). Pumping unit management will take place from the Master unit through a potential free contact and 0-10V signal.
- It is necessary to install a Y filter on the water input of the entire modular system (customer responsibility) with the following characteristics: MESH equal to 30 (0.5 mm)

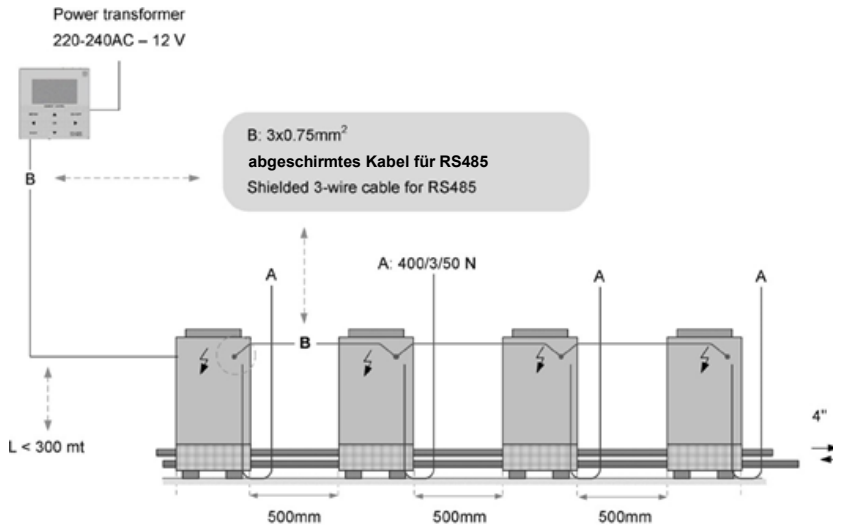
Every module is identified by a specific address.
Complete system management is carried out by the master unit, identified by the address 0.
Thermoregulation takes place on the supply temperature of the entire defined system (Tw)

If Tw >= set point + 10°C:
the regulation activates 50% of the resources in sequence based on the defined address. Once a time interval has passed (default: 240
seconds), if the load increases, further resources are activated, if the load decreases, the units are shutoff with the sequence (first start, first stop).

If Tw < set point + 10°C:
The adjustment on activates the master unit. Once a time interval has passed (default: 240 seconds), if the load increases, in sequence
further resources will activate based on the defined address, if the load decreases the master unit will shut-off.

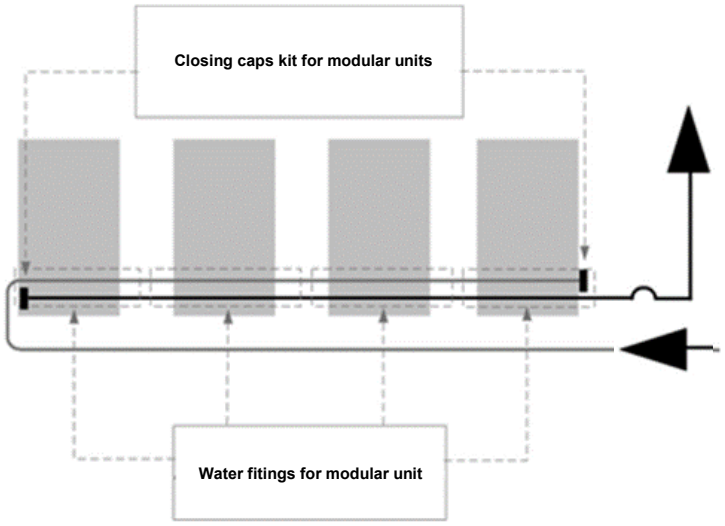
Modular system connection diagram

- Clearance values
- Power supply
- Connection



Options for modular system connection:

- Water fitting for modular unit
- Closing caps kit



Domestic hot water management in the modular system

Domestic hot water management in the modular system
Every module of the system can produce domestic hot water.

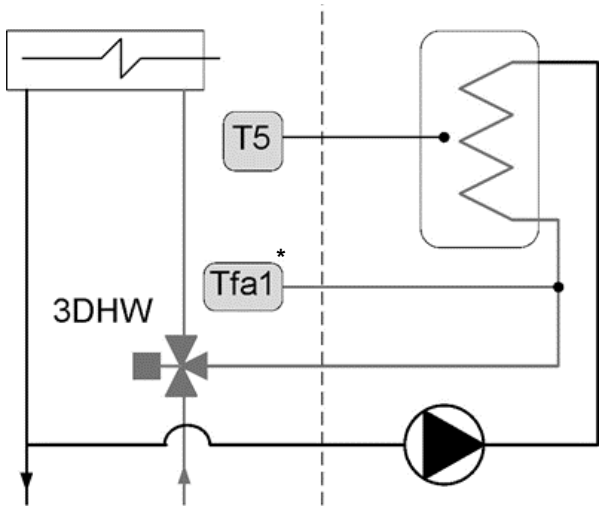
- It is necessary for each module dedicated to producing DHW to be equipped with 3-way valve installed as an accessory.
- Every module must have its own circulation pump and its own domestic hot water storage (responsibility of the Customer).
- The DHW pumping unit will be managed directly by the unit dedicated to DHW using a free contact.
- DHW production only takes place if the DHW storage temperature is above a minimum threshold (See diagram). The minimum temperature threshold varies based on the external temperature. In order to avoid that it falls under the minimum temperature, it is best to install a backup electric heater on the DHW storage
-

Domestic hot water management is of priority compared to the system.

If the system is satisfied (unit off):
When the temperature probe (T5), supplied by ELCO and positioned inside the storage calls for production of DHW, the unit dedicated to DHW activates, changing the set-point from set system to set DHW and diverts the water flow through the built-in 3-way valve. The unit will remain active until the DHW set -point has been satisfied, then it will shut-off.

If the system has a request (unit is on):
When the temperature probe (T5) sends a request for production of DHW, the unit dedicated to DHW, which is already active for the system stops, the cycle changes and if producing cooled water, the set-point changes from set system to set DHW and diverts the water flow through the built-in 3-way valve. The unit will remain active until the DHW set-point has been satisfied, then it will return to producing the system

Connection diagram for connecting the individual module for producing domestic hot water



* Accessory

to outdoor	t5 DhW storage	compressor	backup heater
24°C < t.o ≤ 30°C	< 15°C	OFF	ON
24°C < t.o ≤ 30°C	≥ 15°C	ON	OFF
t.o > 30°C	< 20°C	OFF	ON
t.o > 30°C	≥ 20°C	ON	OFF

Service:

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