Carrier

Reversible Air-to-Water Heat Pumps/Chillers

AQUASNAP PLUS Reversible

INVERTER Technology

Quality Management Systems

Puron the environmentally sound refrigerant

30AW

Nominal heating capacity 4-15 kW
Nominal cooling capacity 3-16 kW

The new reversible AquaSnap PLUS air-to-water heat pumps/chillers with built-in inverter technology were designed for residential and light commercial applications. They offer excellent energy efficiency values, exceptionally quiet operation and meet the most stringent operating temperature demands.

The units integrate the latest technological innovations: ozone-friendly refrigerant R410A, DC inverter twin-rotary compressors, low-noise fan and microprocessor control.

With exceptional energy efficiency values the inverter mini-chillers qualify for local tax reductions and incentive plans in all EU countries.

The 30AW units were specifically designed for ease-of-installation and service and underline Carrier's reputation for highest product quality and reliability.

For added flexibility the AquaSnap PLUS units are available with or without an integrated hydronic module, to suit the installation.

The AquaSnap PLUS heat pump systems can be used with a wide choice of Carrier terminal fan coil units - cassettes, low, medium and high-pressure satellite units, console units, underceiling units and high-wall units.

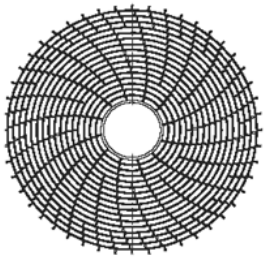
Features

- Wide operating range in both heating and cooling mode offering high performance in a wide temperature range.
- DC inverter twin-rotary compressors with Pulse Amplitude Modulation (PAM) and Pulse Width Modulation (PWM) for enhanced reliability, low energy consumption and smooth vibration-free operation under all operating conditions.
- Variable-speed fans with an innovative patented fan blade shape ensure improved air distribution at exceptionally low noise levels
- Pre-set or customised selection of the appropriate climate curve for stable output capacity to match the heat load.
- Output to link and integrate the unit with existing heat sources or a back-up heating source (single or dual-energy approach) for increased savings and optimum comfort all year round.
- Connection and control of an external dehumidifer through the Comfort™ Series programmable thermostat 33AW-CS1 to monitor and regulate the relative humidity.
- Input and output connections to the three-way valve for connection to a domestic hot-water buffer-tank. Provides increased flexibility for any application.
- Leaving water temperature up to 60°C for radiator and domestic hot water applications.
- Plug-and-play control for failsafe serviceability.
- Alarm input to force the unit off for increased safety, and matching with external control systems or safety devices.
- Output to operate an additional water pump for increased installation flexibility.

Advanced technology

- Electronic system management: several sensors placed in key positions in the refrigerant circuit electronically detect the operational system status. Two micro-controllers receive the input from the sensors, manages them using advanced control algorithms and optimises the refrigerant flow and the functioning of all core components - the compressor, fan motors and the pulse modulation valve.
- The pulse modulation valve, a bi-flow electronic expansion device, optimises the refrigerant amount in the circuit and the superheat, preventing refrigerant migration back into the compressor. This device further enhances high system performance and reliability.
- The air management system, consisting of the propeller fan, orifice and air discharge grille guarantees minimised noise levels.

New patented fan blade shape and grille profile with low pressure drop



Advanced performance

- The AquaSnap PLUS heat pump systems have an extremely high energy efficiency ratio in both cooling and heating mode, ensuring significant energy savings. Large, efficient coils and optimised circuiting ensure that all combinations meet the European tax rebate efficiency targets. Efficiency at part load conditions (seasonal energy efficiency) reaches the highest level in the industry.
- Year-round comfort - the advanced technology used in the new AquaSnap PLUS heat pump condensing units provides optimised comfort levels for the end users, both in terms of water temperature control and quietness. The desired temperature is quickly reached and effectively maintained without fluctuations. The 30AW offers optimised individual comfort levels - both in winter and in summer.
- Wide temperature operating range: AquaSnap PLUS heat pumps can operate efficiently in extreme temperature conditions. To suit the requirements of IT applications, the new AquaSnap PLUS can work at low-ambient conditions in cooling mode (down to 0°C and up to 46°C outside temperature). For end user comfort the units also operate down to -20°C outdoor temperature in heating mode, and in the summer season they produce hot water up to 60°C at up to 30°C outside temperature for domestic hot water applications.

Environmental care

- Ozone-friendly R410A refrigerant
- Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
- High-density refrigerant, therefore less refrigerant required
- Very efficient - gives an increased energy efficiency ratio (EER)
- The components of AquaSnap PLUS heat pump systems are free of any hazardous substances.
- The new packaging ensures high protection during transport and handling and is 100% recyclable.

Fast and simple installation and service

- Easy access to all internal components: simply undo three screws to remove the complete front panel to access the refrigerant piping connections, control box and electrical connections, as well as the compressor and other key parts.
- Advanced circuit design and component selection has resulted in a compact unit with an exceptionally small footprint that is easy to transport even through narrow doors.
- Reduced operating weight and a handle on the unit panels to facilitate transport.
- No additional buffer tank required, simplyfing and speeding up the installation process
- 3 bar pressure relief valve as standard
- Two or three-litre internal expansion tank
- High-temperature refrigerant protection
- Water flow switch to ensure that the circuits contain enough water to operate correctly.
- Various power cable outlet options: pre-punched holes in the cabinet panels permit cable exit on the side, front or rear.
- Dealer service tool connection kit includes the software and connections to monitor the operating parameters from a personal computer, giving an easy-to-read display with visual graphs and statistics indicators.
- All 30AW units are equipped with 1 inch gas MPT water connections.
- Option for an integrated hydronic module reduces space requirements and simplifies the installation. Only the power and the water supply and return piping need to be connected.

- Condensate drain piping connection to the unit includes a leak-proof pipe rubber joint.
- Specially shaped anchorage feet ensure correct and safe unit fixing to the foundation.
- The Comfort™ Series programmable thermostat periodically runs system checks to monitor and assess the unit operating parameters (standard parameters for the H version (AC) are 45°C LWT in heating and 7°C LWT in cooling, and for the X version (CHF) 35°C LWT in heating and 15°C LWT in cooling,). If a problem occurs, troubleshooting fault codes and messages help the service technician to identify the fault.

Detachable GMC board

DC inverter twin-rotary compressor

- Advanced technology providing maximum energy-efficiency with high capacity available at peak conditions and optimised efficiency at low and mid compressor speeds. The AquaSnap PLUS heat pump DC inverter uses Intelligent Power Drive Unit (IPDU) hybrid inverter technology, combining two electronic management logics: Pulse Amplitude Modulation (PAM) and Pulse Width Modulation (PWM) for optimised compressor operation in all conditions, minimised temperature fluctuations, and providing perfect individual comfort control with significantly reduced energy consumption:
  - PAM: pulse amplitude modulation of the direct current controls the compressor at maximum load conditions (start-up and peak load), increasing the voltage at fixed frequency. The compressor works at high speed to rapidly achieve the desired temperature.
  - PWM: pulse width modulation of the direct current controls the compressor at partial load conditions, adjusting the frequency at fixed voltage. The compressor speed is fine-tuned and the system provides high-level comfort (no temperature fluctuations) at exceptionally efficient working conditions.

- Compressor frequency is increased continuously up to the maximum level. This ensures that there are no current draw peaks in the start-up phase and safe connection to a single-phase power supply even in large-capacity systems. The maximum operating current of AquaSnap PLUS systems is below 7.2 A (systems up to 6 kW) and below 23 A for larger systems (12 kW). Inverter ramp-up speed makes soft starts unnecessary and ensures immediate maximum power.
- The two rotary compression cylinders, offset from each other by 180°, and the DC brushless motor with the shaft in perfect balance ensure reduced vibration and noise, even at very low operating speeds. This results in an extremely wide range between minimum and maximum capacity with continuous operation, guaranteeing that the system is always optimised and provides maximum comfort at exceptionally high efficiency levels.
- Twin-rotary cylinders, low vibrations and low load to the shaft ensure highest compressor reliability and a long trouble-free operating life.
- All DC brushless twin-rotary compressors are equipped with crankcase heaters as standard.
- A double compressor shield for acoustic insulation further reduces noise levels.

Double compressor shield

Superior reliability

- Exceptional endurance tests
  - Third-party testing and certification - all performances are certified by Eurovent and unit safety is certified by IMQ.
  - All units are tested at various stages on the production line for circuit leakage, electrical compliance, water and refrigerant pressures.
  - End-of-line test of all unit operating parameters.
  - Corrosion resistance test.
  - Accelerated ageing test on critical components and complete assembled units, simulating thousands of hours of continuous operation
  - Packaging crash test to ensure that the units are adequately protected against accidental shocks.
  - Extensive field and site testing.

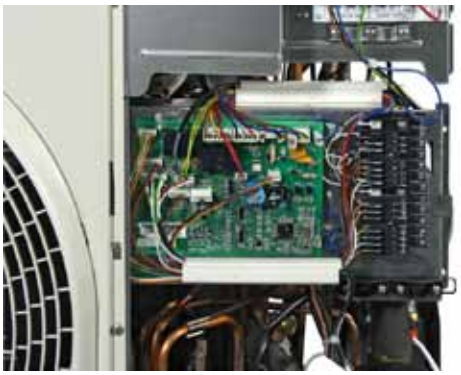
Corrosion-resistant casing

Economical operation

- Increased energy efficiency at part load
  - The exceptionally high energy efficiency of the AquaSnap PLUS heat pumps is the result of a long qualification and optimisation process.
  - Use of ambient air as primary source of energy in domestic heating applications significantly reduces the overall energy consumption and minimises CO_2 emissions.
  - Night mode operation at reduced compressor speed, resulting in low-noise operation and a significant reduction in energy consumption.
  - Easy-to-set and economical silent mode, reducing the compressor speed.
  - R410A refrigerant is easier to use than other refrigerant blends.

GMC board

- The new GMC controller was specifically developed for the AquaSnap PLUS inverter heat pumps, and incorporates new control algorithms. It features customised or pre-defined climate curves, domestic hot water control, a night-time noise reduction function, a defrost/alarm output signal, an external heat source, a pump block prevention function, freeze protection and compressor operation management.



User interfaces

- The AquaSnap PLUS can use the following user interfaces:
  - the 33AW-CS1 Comfort™ Series programmable thermostat with easy-to-read LCD screen. It provides enhanced control capability for maximised performance, reliability and indoor comfort and has extended programming features such as weekly scheduling and dehumidifier/humidifier signals. The sleek contemporary design blends in with any room decor.
  - the AquaSnap PLUS 33AW-RC1 remote controller
  - dry contacts

Comfort™ Series programmable thermostat 33AW-CS1

Remote controller 33AW-RC1

Type key

30AW H 006 H B

- **Software release**
- **Unit options**
  - H - With hydronic kit
  - X - Without hydronic kit
- **Nominal size**
  - 004 - nominal size 4 kW
  - 006 - nominal size 6 kW
  - 008 - nominal size 8 kW
  - 012 - nominal size 12 kW
  - 015 - nominal size 15 kW
- H - Standard version
- Air-to-water heat pump
- Liquid chilling packages/ heat pumps

Options and accessories

Options	Description	Advantages	Use
Additional outdoor sensor	Additional outdoor sensor 33AW-RAS01	Better reading of outdoor air temperature	30AW 004-015
Remote controller	33AW-RC1 remote controller	On/off, heating/cooling and ECO mode	30AW 004-015
Programmable thermostat	33AW-CS1 Comfort™ series programmable thermostat	Extensive control features like weekly scheduling	30AW 004-015

Physical data

30AW		004	006	008	012	015
Data at Eurovent LCP/A/CHF conditions*						
Nominal heating capacity	kW	4.1	5.8	7.2	11.9	14.5
Power input	kW	1.01	1.37	1.82	3.01	3.57
COP	kW/kW	4.05	4.24	3.95	3.94	4.06
Eurovent class, heating		A	A	B	B	A
Nominal cooling capacity	kW	4.9	7.0	7.8	13.5	16
Power input	kW	1.21	1.92	1.98	3.68	4.20
EER	kW/kW	4.05	3.66	3.95	3.67	3.81
Eurovent class, cooling		A	B	A	B	A
Data at Eurovent LCP/A/AC conditions**						
Nominal heating capacity	kW	3.9	5.8	7.4	12.9	14
Power input	kW	1.22	1.90	2.32	4.26	4.36
COP	kW/kW	3.2	3.06	3.18	3.03	3.21
Eurovent class, heating		A	B	B	B	A
Nominal cooling capacity	kW	3.3	4.7	5.8	10.2	13
Power input	kW	1.13	1.60	1.97	3.46	4.47
EER	kW/kW	2.91	2.95	2.95	2.96	2.91
ESEER part-load performance	kW/kW	4.5	4.6	4.4	4.3	4.4
Eurovent class, cooling		B	B	B	B	B
Nominal heating capacity, radiator applications***	kW	4.1	5.6	6.7	11.5	11.7
Power input	kW	1.51	2.16	2.49	4.58	4.18
COP	kW/kW	2.71	2.58	2.30	2.51	2.80
Operating weight	kg					
Unit without hydronic module		56	58	68	99	124
Unit with hydronic module		59	61	71	105	130
Refrigerant		R-410A	R-410A	R-410A	R-410A	R-410A
Compressor		DC twin-rotary				
Expansion valve		PMV	PMV	PMV	PMV	PMV
Hydronic circuit						
Net water volume	l	0.8	0.8	1.0	2.3	2.3
Expansion tank volume	l	2	2	2	3	3
Maximum water-side operating pressure	kPa	300	300	300	300	300
Water pressure drop, X version (CHF)	kPa	16	9.5	14.5	26.0	33
Available static pressure, H version (AC)	kPa	47	43	40	45	30
Water connections, inlet/outlet (MPT gas)	in	1	1	1	1	1
Fans		Propeller fans				
Quantity/diameter	mm	1/495	1/495	1/495	2/495	2/495
Number of blades		3	3	3	3	3
Sound levels						
Sound power level, heating****	dB(A)	62	62	64	67	68
Sound power level, cooling†	dB(A)	64	64	65	68	69
Sound pressure level, heating****	dB(A)	42	42	44	47	48
Sound pressure level, cooling†	dB(A)	44	44	45	48	49

The water heat exchanger fouling factor is 0 (m^2 K)/W for all conditions.

* Standard Eurovent LCP/A/CHF conditions in heating mode: water heat exchanger entering/leaving water temperature 30°C/35°C, outside air temperature 7°C db/6°C wb.
Standard Eurovent LCP/A/CHF conditions in cooling mode: water heat exchanger entering/leaving water temperature 23°C/18°C, outside air temperature 35°C.
** Standard Eurovent LCP/A/AC conditions in heating mode: water heat exchanger entering/leaving water temperature 40°C/45°C, outside air temperature 7°C db/6°C wb.
Standard Eurovent LCP/A/AC conditions in cooling mode: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
*** Conditions in heating mode: entering/leaving water temperature 55°C/a, outside air temperature 7°C db/6°C wb. Performances are in accordance with EN 14511.
**** Based on the following conditions: entering/leaving water temperature 35°C/30°C, outside air temperature 7°C.
† Based on the following conditions: entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.

Note: The sound pressure level is measured in a hemisperic field at 4 m distance from the unit.

Electrical data

30AW		004	006	008	012	015
Power supply	V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Voltage range	V	198-264	198-264	198-264	198-264	198-264
Full load current	A	7.2	11	14	23	20
Fuse rating	A	10	16	16	25	25
Main power cable section	mm^2	2.5	2.5	2.5	2.5	2.5

Sound power levels Lw

Cooling mode

30AW		Octave bands, Hz							Sound power levels	
		125	250	500	1000	2000	4000	8000		
004	dB	61	68	62	56	51	47	41	dB(A)	64
006	dB	61	68	63	56	53	50	46	dB(A)	64
008	dB	66	62	63	59	56	55	51	dB(A)	65
012	dB	70	65	67	62	58	57	50	dB(A)	68
015	dB	70	68	66	64	61	58	53	dB(A)	69

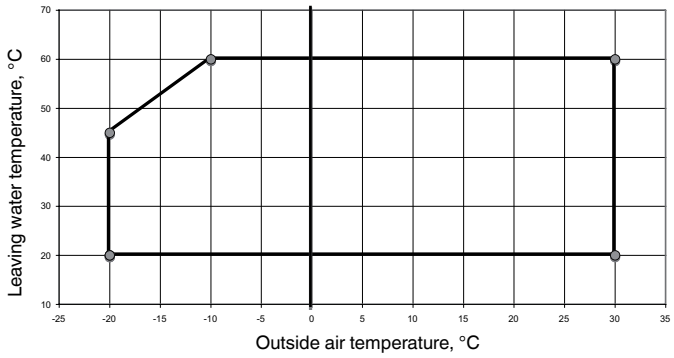
Heating mode

30AW		Octave bands, Hz							Sound power levels	
		125	250	500	1000	2000	4000	8000		
004	dB	67	62	61	56	50	47	43	dB(A)	62
006	dB	62	64	62	55	50	48	43	dB(A)	62
008	dB	66	65	63	57	54	52	45	dB(A)	64
012	dB	70	66	66	61	57	54	46	dB(A)	67
015	dB	72	68	67	63	59	56	50	dB(A)	68

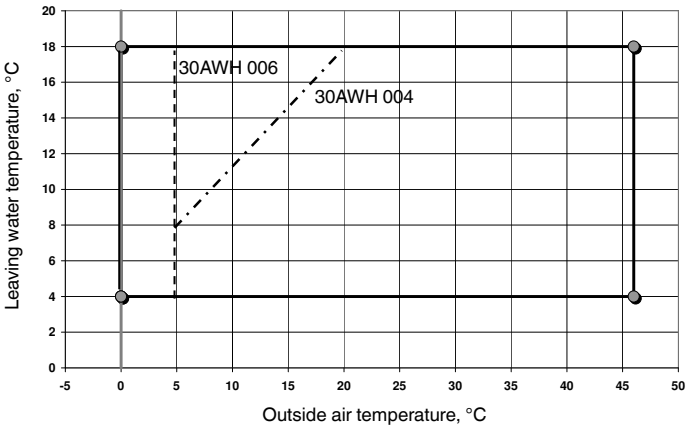
Operating limits

	Cooling mode	Heating mode
Maximum outside temperature	46°C	30°C
Maximum leaving water temperature	18°C	60°C
Minimum outside temperature	0°C (30AWH 004 + 006: 5°C)	-20°C
Minimum leaving water temperature	4°C	20°C

Operating range, heating mode

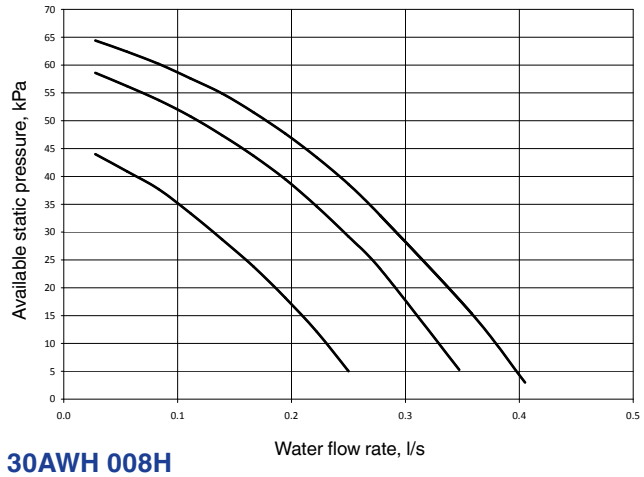


Operating range, cooling mode

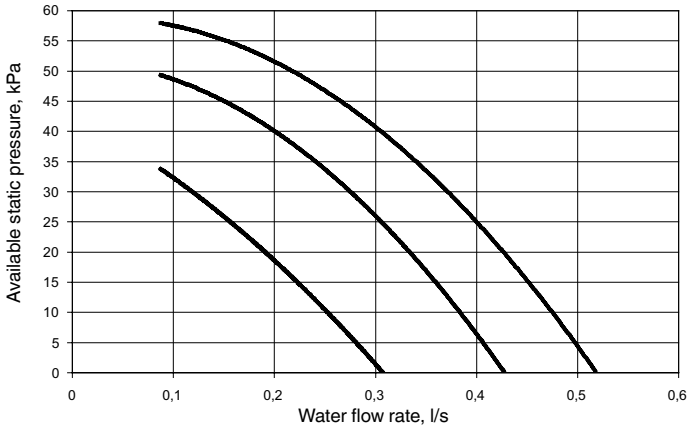


Available static pressure (units with hydronic module)

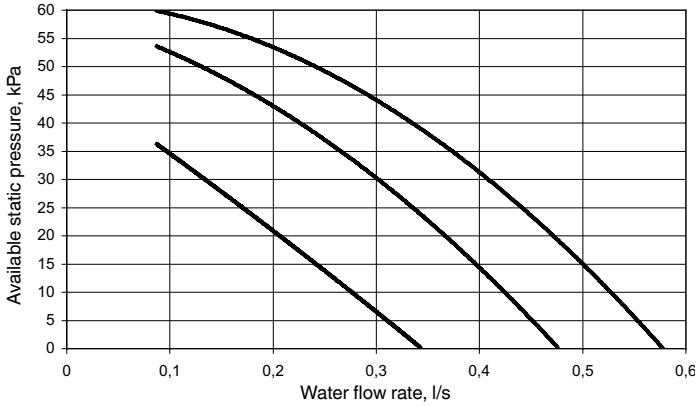
30AWH 004H



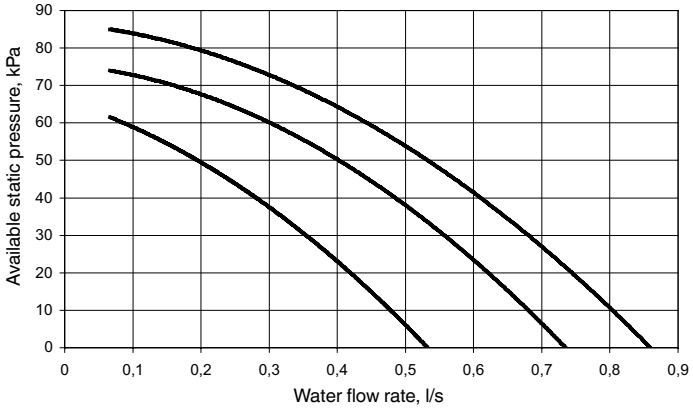
30AWH 006H



30AWH 008H

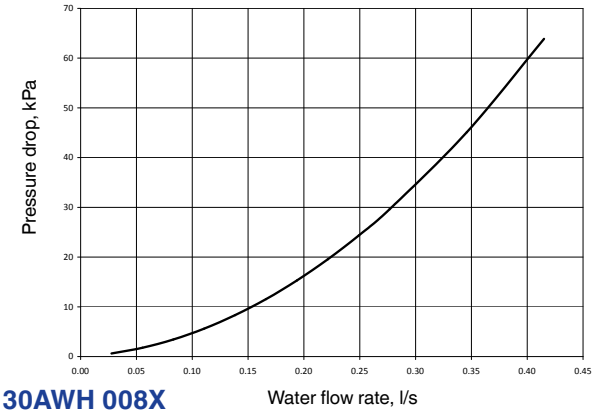


30AWH 012H + 015H



Pressure drop curves (units without hydronic module)

30AWH 004X



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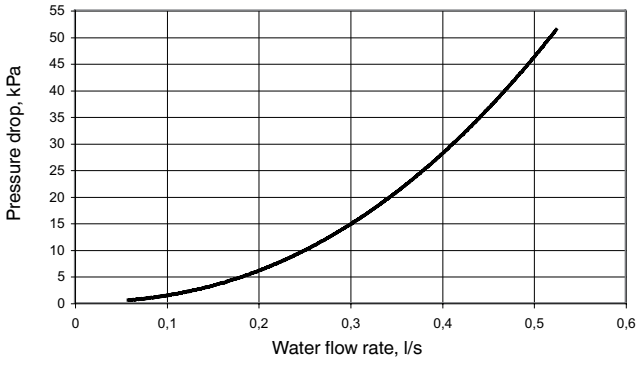
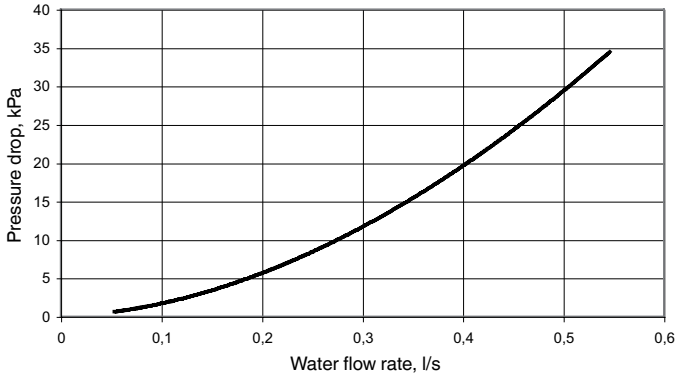
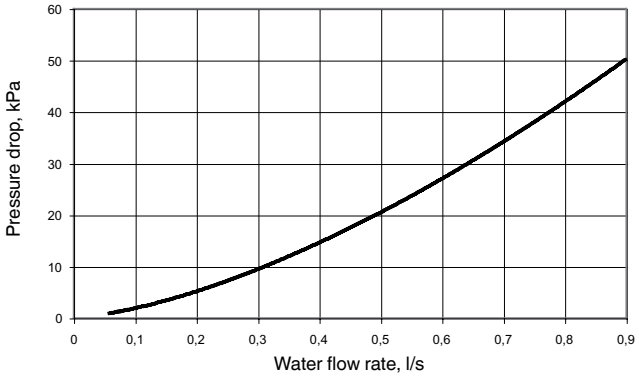


30AWH 008X

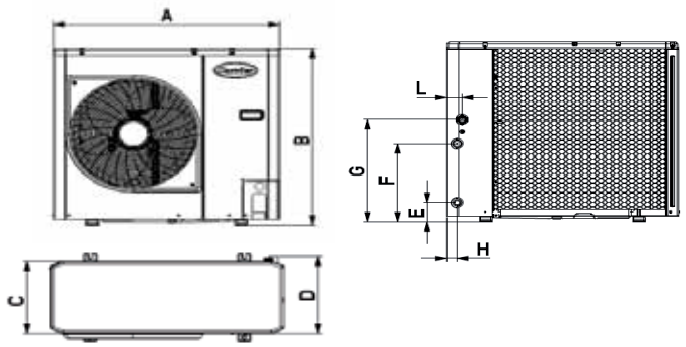


30AWH 012X + 015X

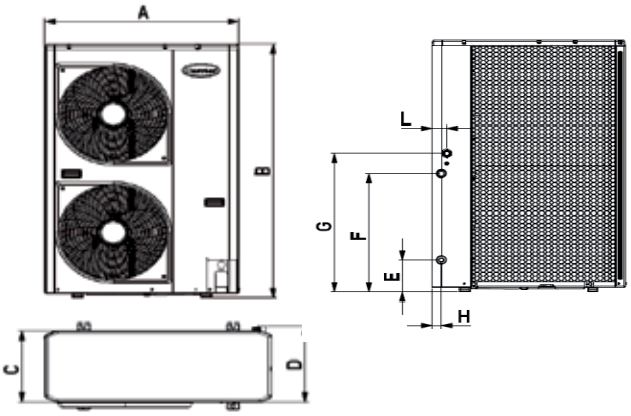


Dimensions, mm

30AW 004-008

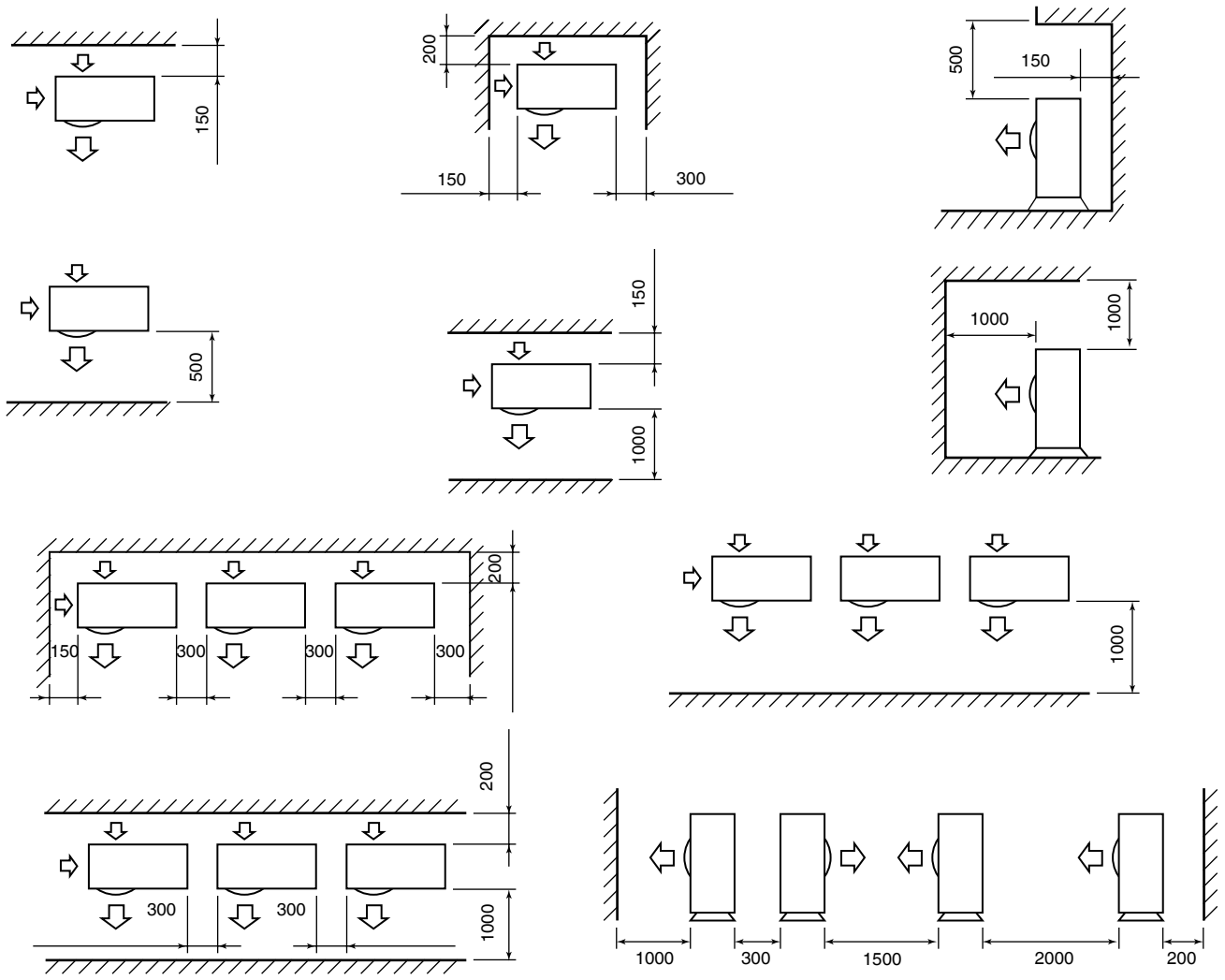


30AW 012-015



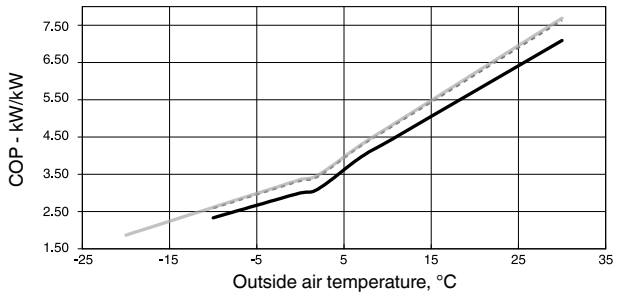
30AW	A	B	C	D	E	F	G	H	L
004	908	821	326	350	87	356	466	40	60
006	908	821	326	350	87	356	466	40	60
008	908	821	326	350	87	356	466	40	60
012	908	1363	326	350	174	640	750	44	69
015	908	1363	326	350	174	640	750	44	69

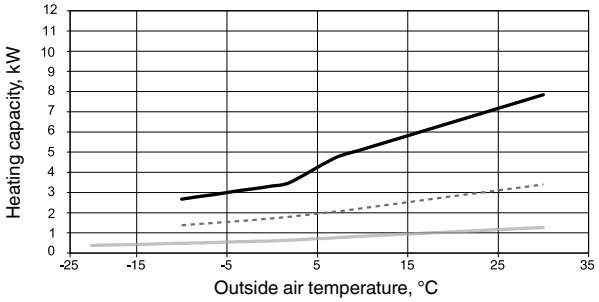
Clearances, mm



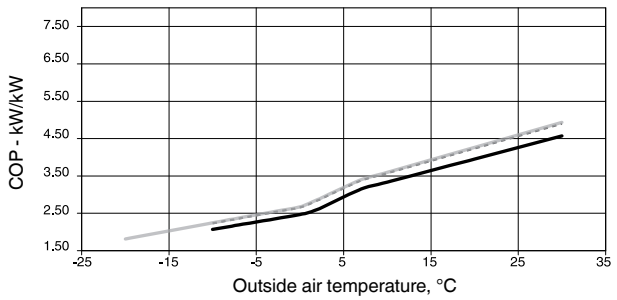
Heating capacities, 30AWH 004

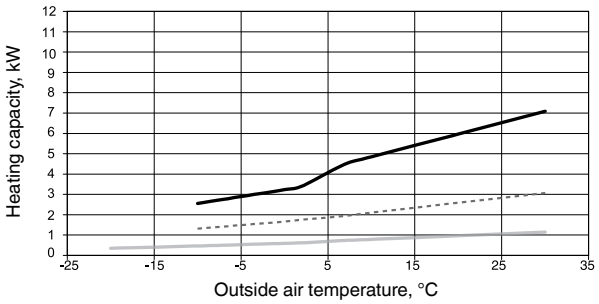
30-35°C



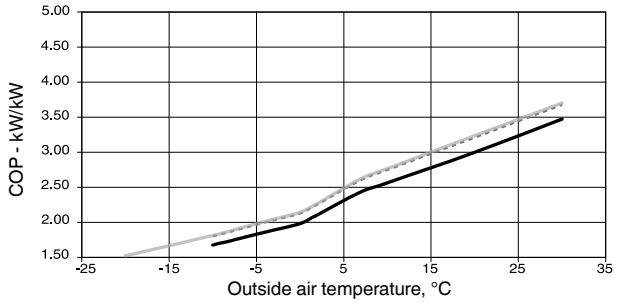


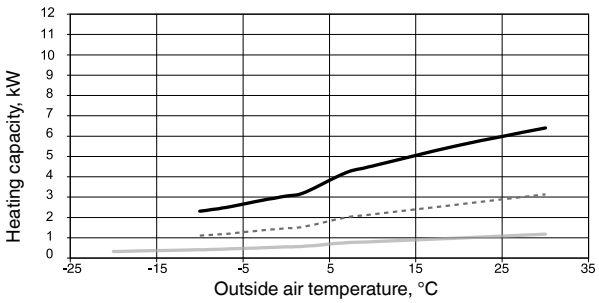
40-45°C



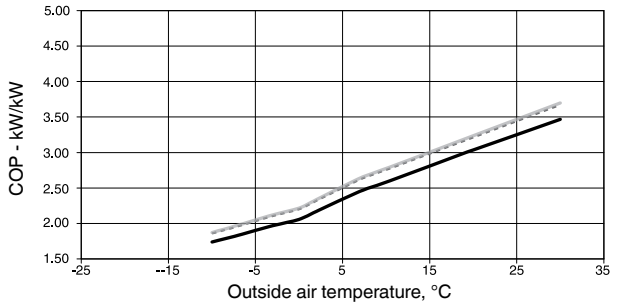


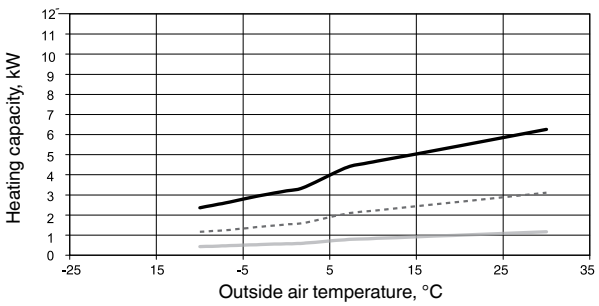
50-55°C





55-60°C





Maximum
Medium
Minimum

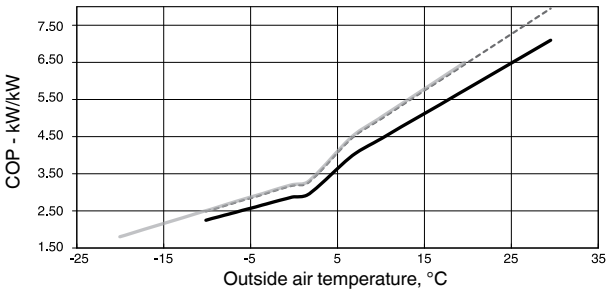
Maximum
Medium
Minimum

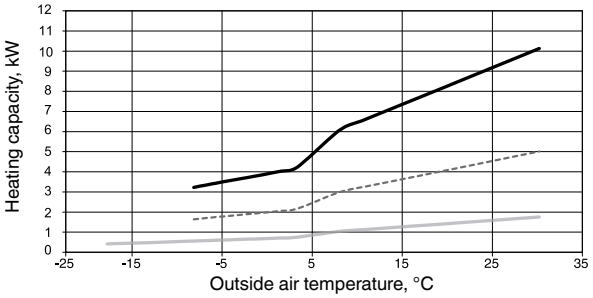
Application data:
Standard units, refrigerant: R410A
Water heat exchanger temperature rise: 5 K (10 K for LWT = 60°C)

Performances in accordance with EN 14511

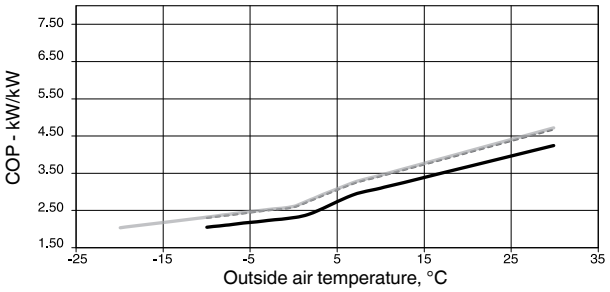
Heating capacities, 30AWH 006

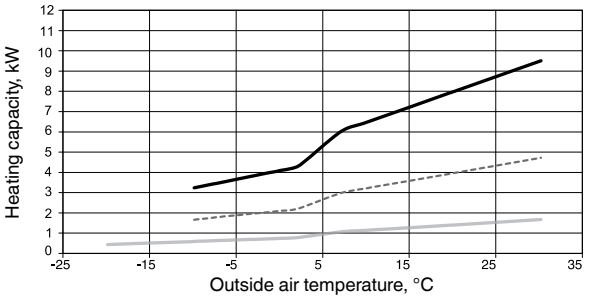
30-35°C



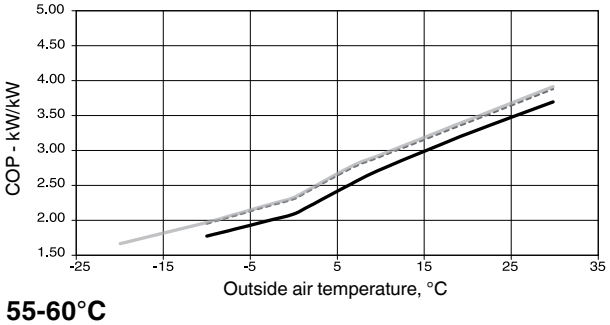


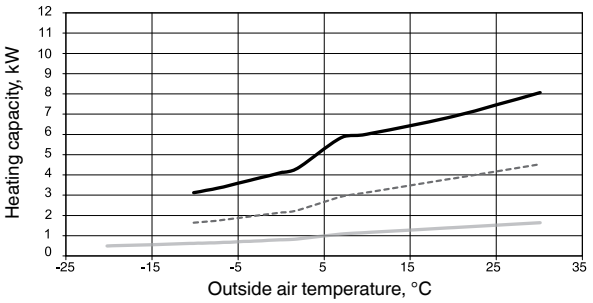
40-45°C



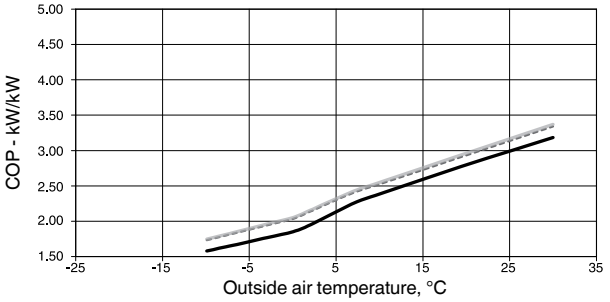


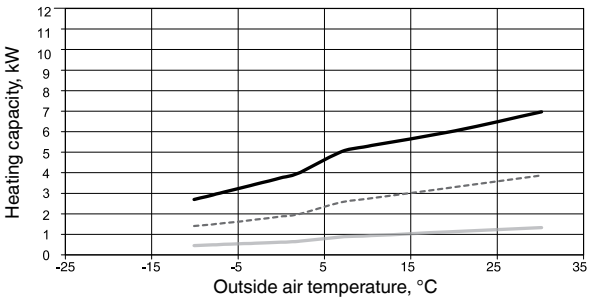
50-55°C





55-60°C





Maximum
Medium
Minimum

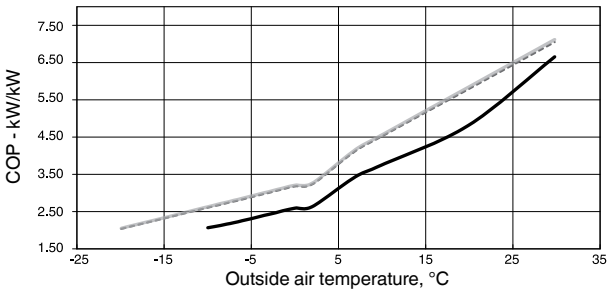
Maximum
Medium
Minimum

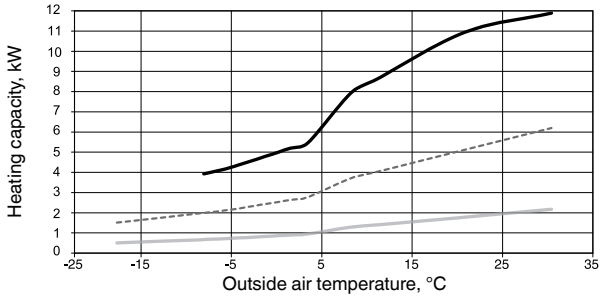
Application data:
Standard units, refrigerant: R410A
Water heat exchanger temperature rise: 5 K (10 K for LWT = 60°C)

Performances in accordance with EN 14511

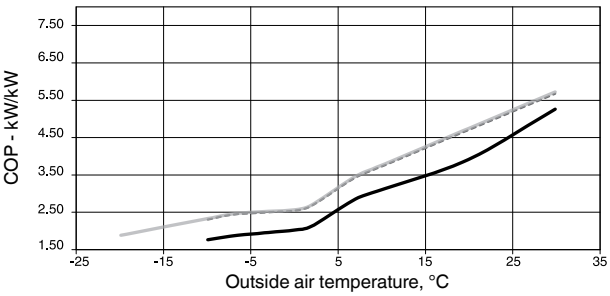
Heating capacities, 30AWH 008

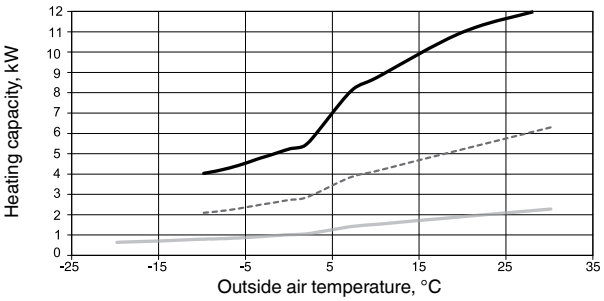
30-35°C



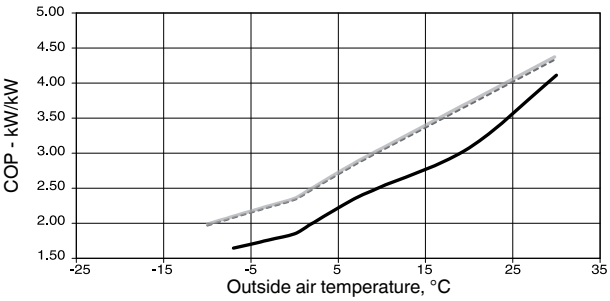


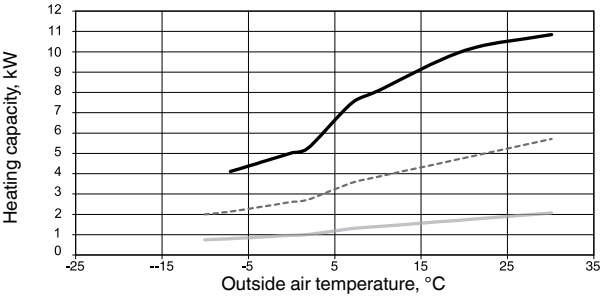
40-45°C



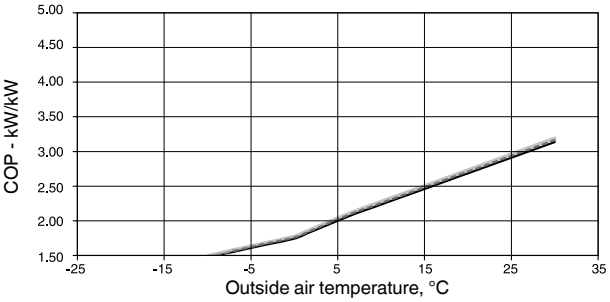


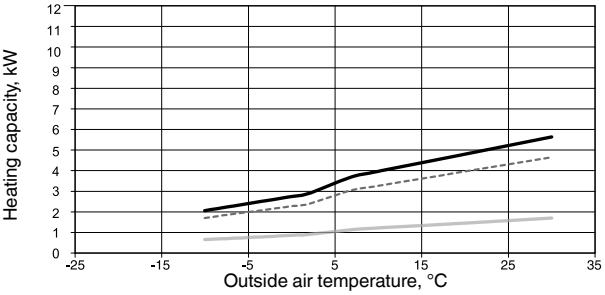
50-55°C





55-60°C





Maximum
Medium
Minimum

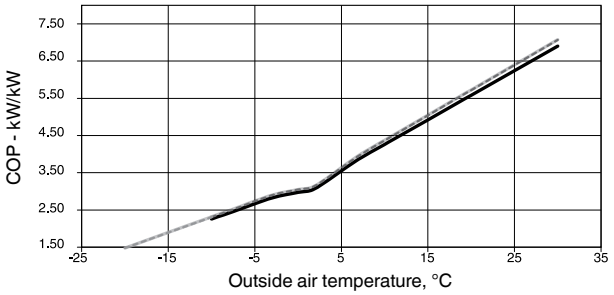
Maximum
Medium
Minimum

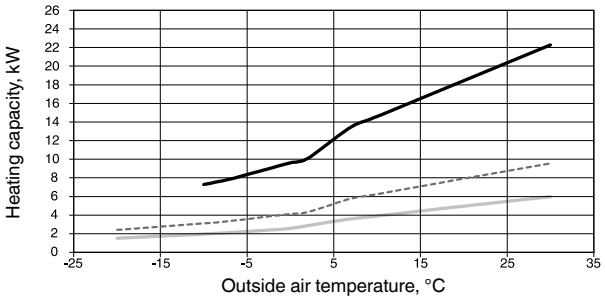
Application data:
Standard units, refrigerant: R410A
Water heat exchanger temperature rise: 5 K (10 K for LWT = 60°C)

Performances in accordance with EN 14511

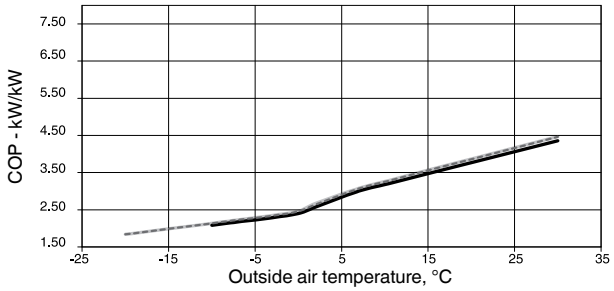
Heating capacities, 30AWH 012

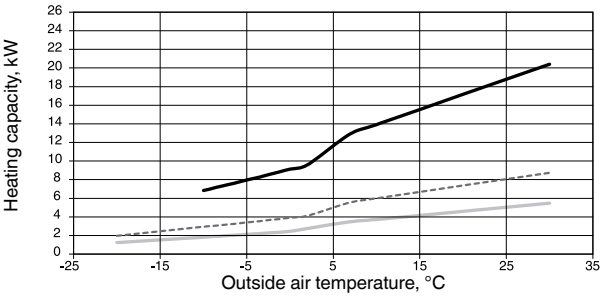
30-35°C



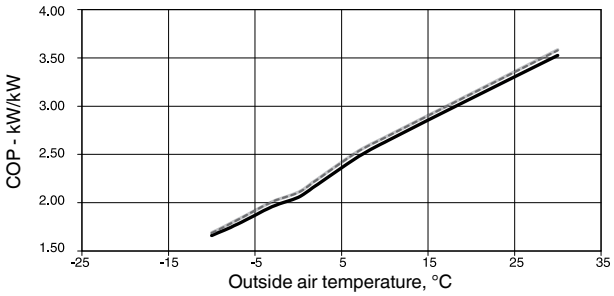


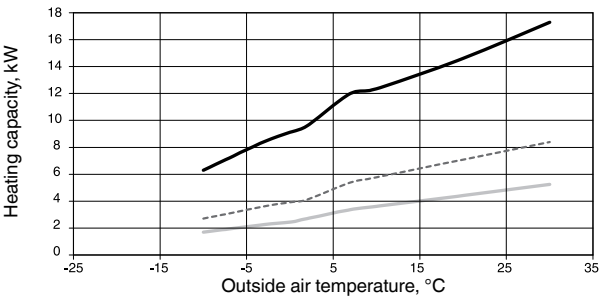
40-45°C



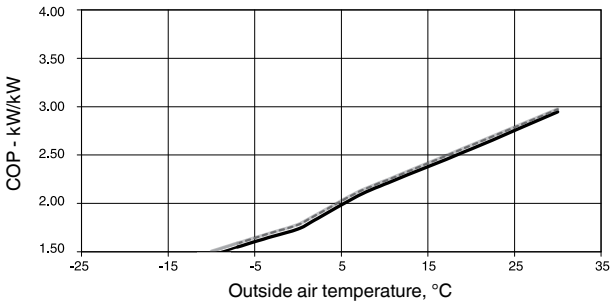


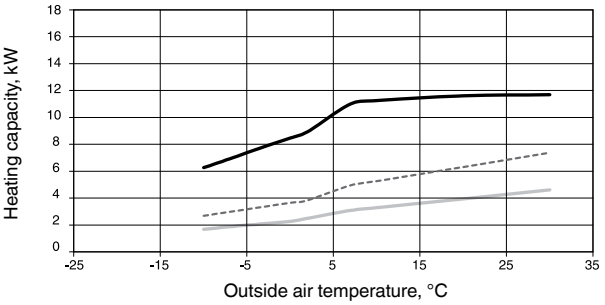
50-55°C





55-60°C



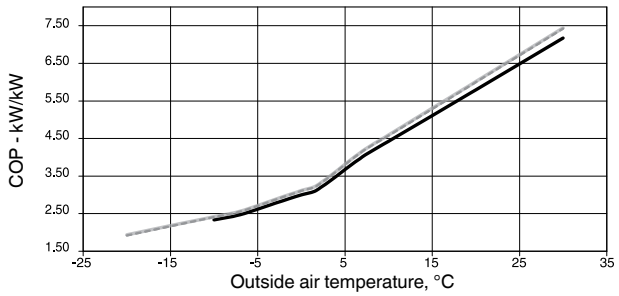


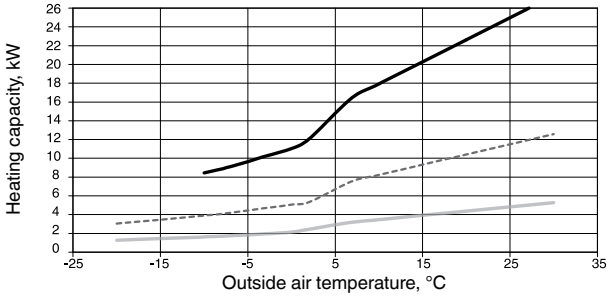
Application data:
Standard units, refrigerant: R410A
Water heat exchanger temperature rise: 5 K (10 K for LWT = 60°C)

Performances in accordance with EN 14511

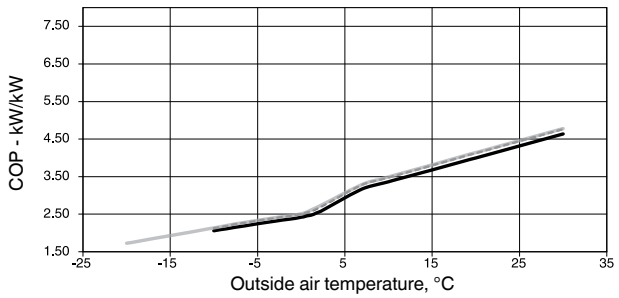
Heating capacities, 30AWH 015

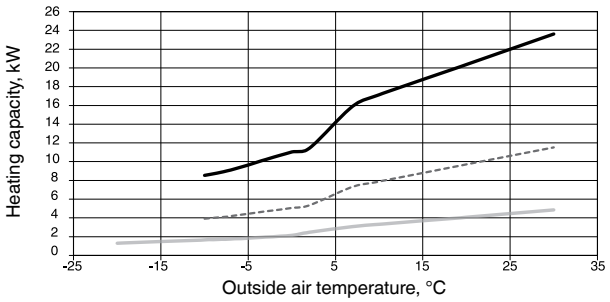
30-35°C



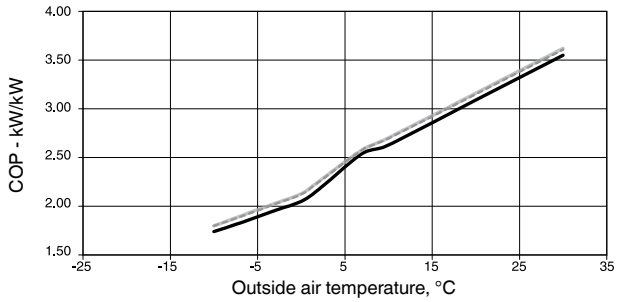


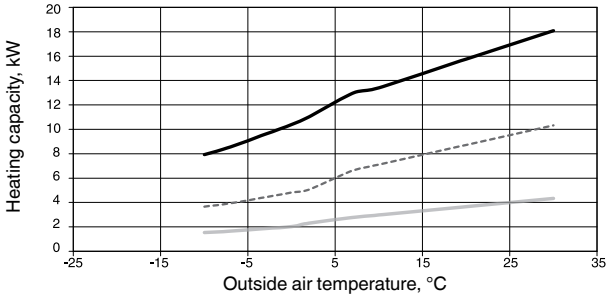
40-45°C



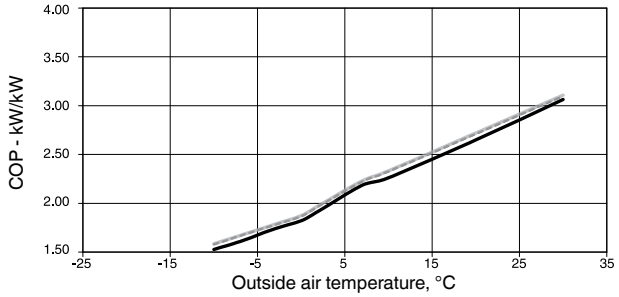


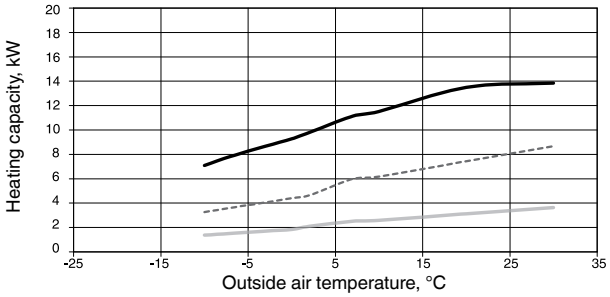
50-55°C





55-60°C





Maximum
Medium
Minimum

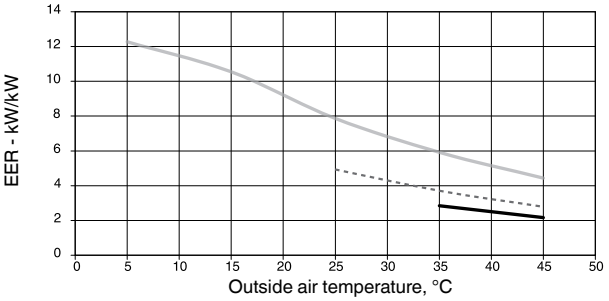
Maximum
Medium
Minimum

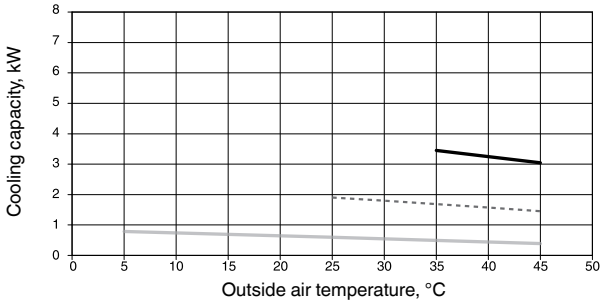
Application data:
Standard units, refrigerant: R410A
Water heat exchanger temperature rise: 5 K (10 K for LWT = 60°C)

Performances in accordance with EN 14511

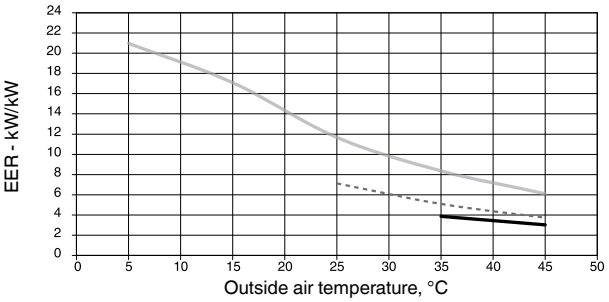
Cooling capacities, 30AWH 004

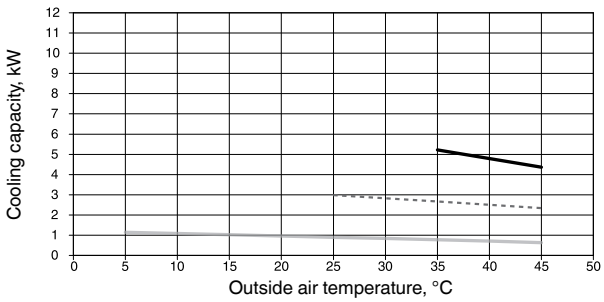
12-7°C





23-18°C



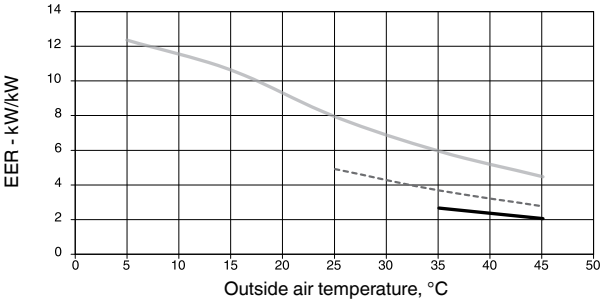


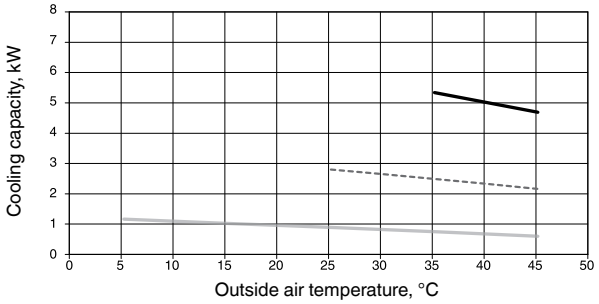
Maximum
Medium
Minimum

Maximum
Medium
Minimum

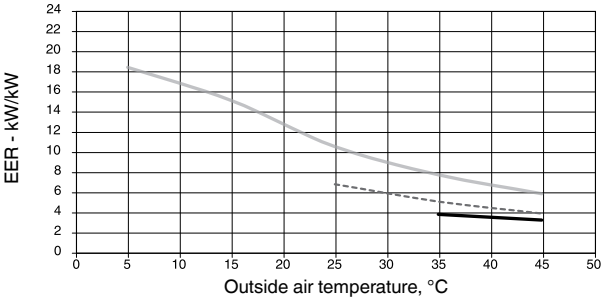
Cooling capacities, 30AWH 006

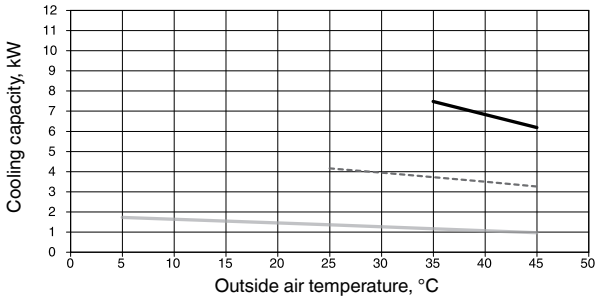
12-7°C





23-18°C





Maximum
Medium
Minimum

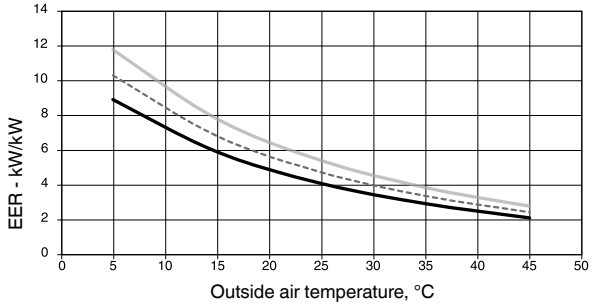
Maximum
Medium
Minimum

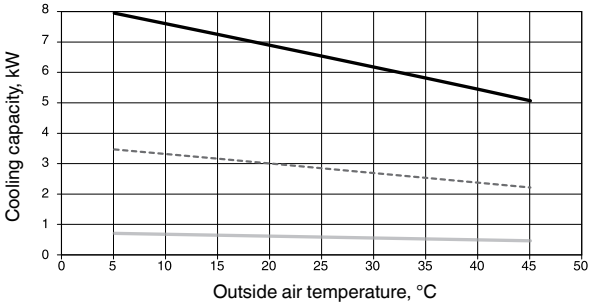
Application data:
Standard units, refrigerant: R410A
Evaporator temperature rise: 5 K
Evaporator fluid: chilled water

Performances in accordance with EN 14511

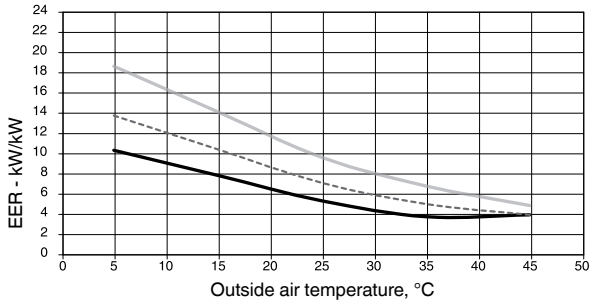
Cooling capacities, 30AWH 008

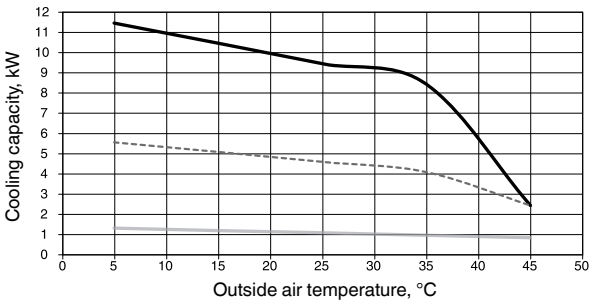
12-7°C





23-18°C



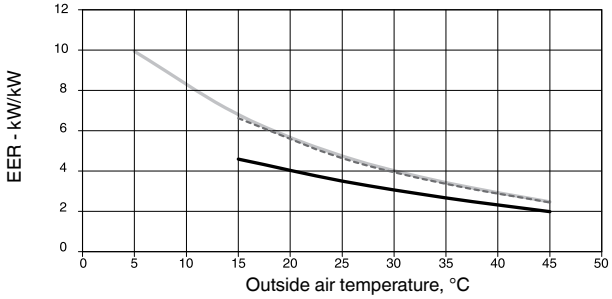


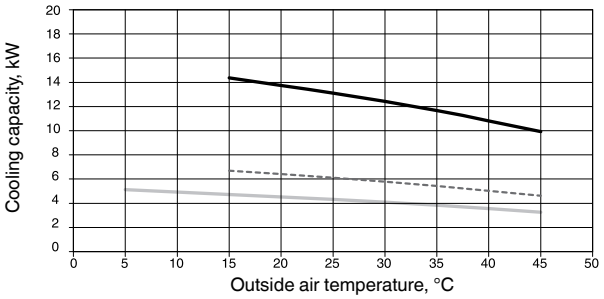
Maximum
Medium
Minimum

Maximum
Medium
Minimum

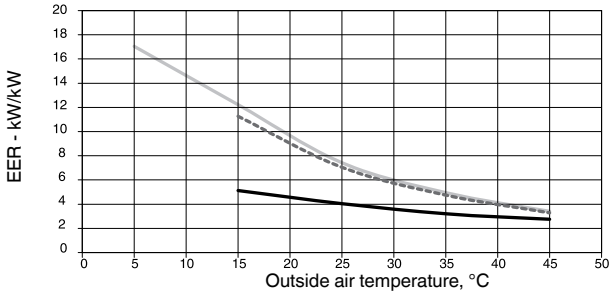
Cooling capacities, 30AWH 012

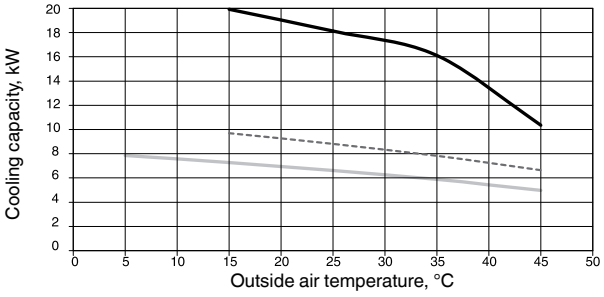
12-7°C





23-18°C





Maximum
Medium
Minimum

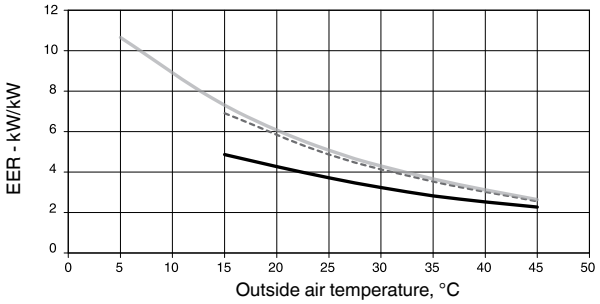
Maximum
Medium
Minimum

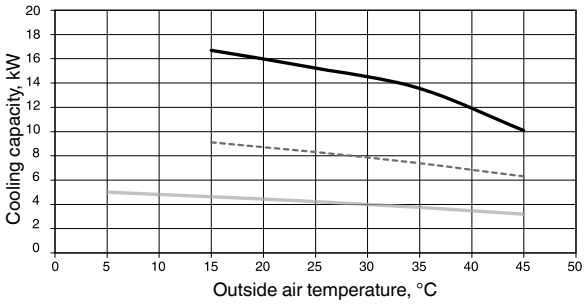
Application data:
Standard units, refrigerant: R410A
Evaporator temperature rise: 5 K
Evaporator fluid: chilled water

Performances in accordance with EN 14511

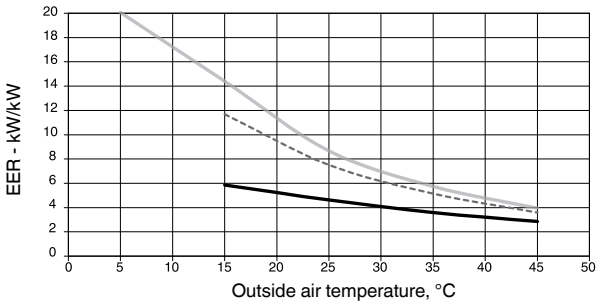
Cooling capacities, 30AWH 015

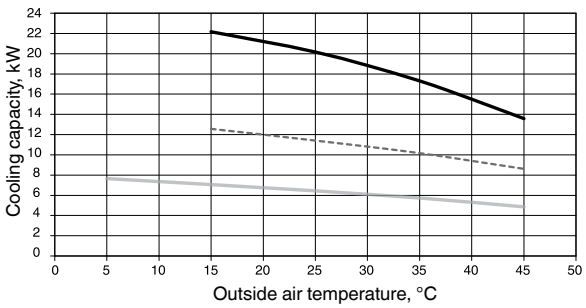
12-7°C





23-18°C





Maximum
Medium
Minimum

Maximum
Medium
Minimum

Application data:
Standard units, refrigerant: R410A
Evaporator temperature rise: 5 K
Evaporator fluid: chilled water

Performances in accordance with EN 14511

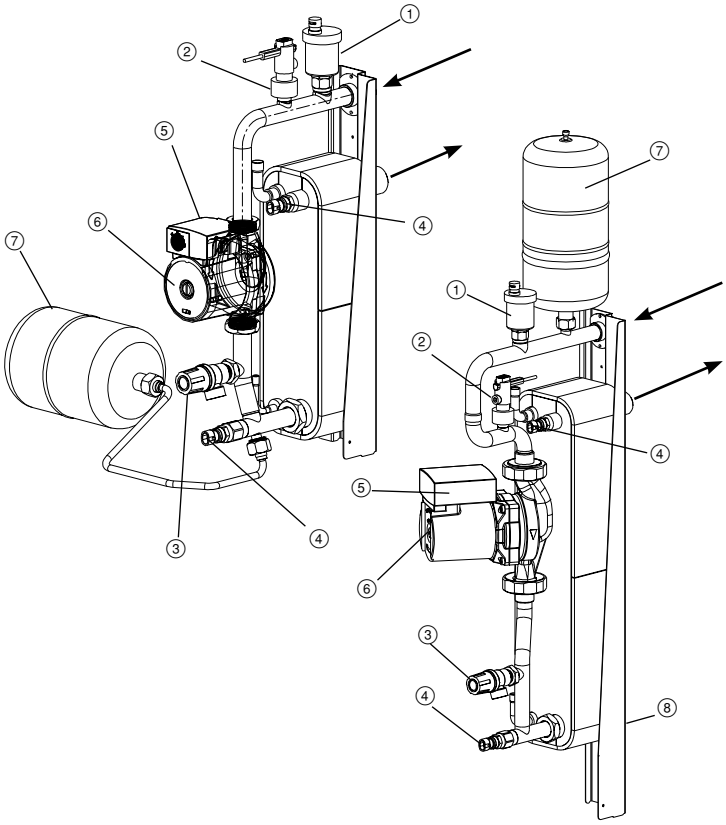
Hydronic module

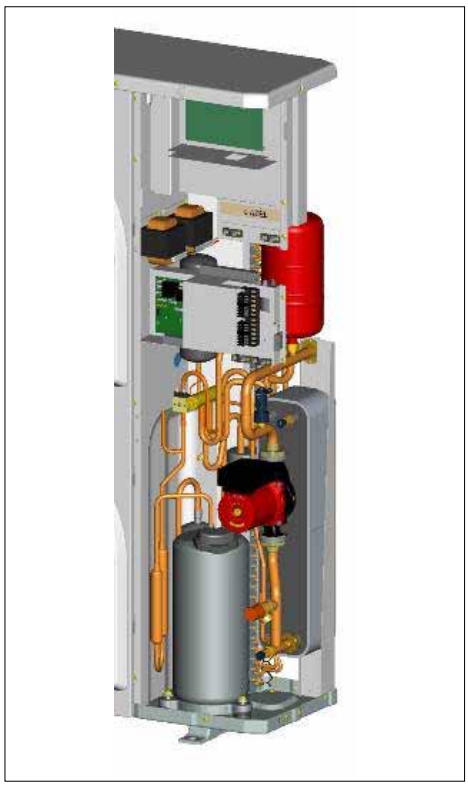
The hydronic module reduces the installation time. The unit is factory-equipped with the main hydronic components required for the installation: water pump, expansion tank, safety valve and pressure gauge.

The water heat exchanger and the hydronic module are protected against frost down to -10°C, using pump cycling. The hydronic module is integrated into the unit without increasing its dimensions and saves the space normally used for the water pump.

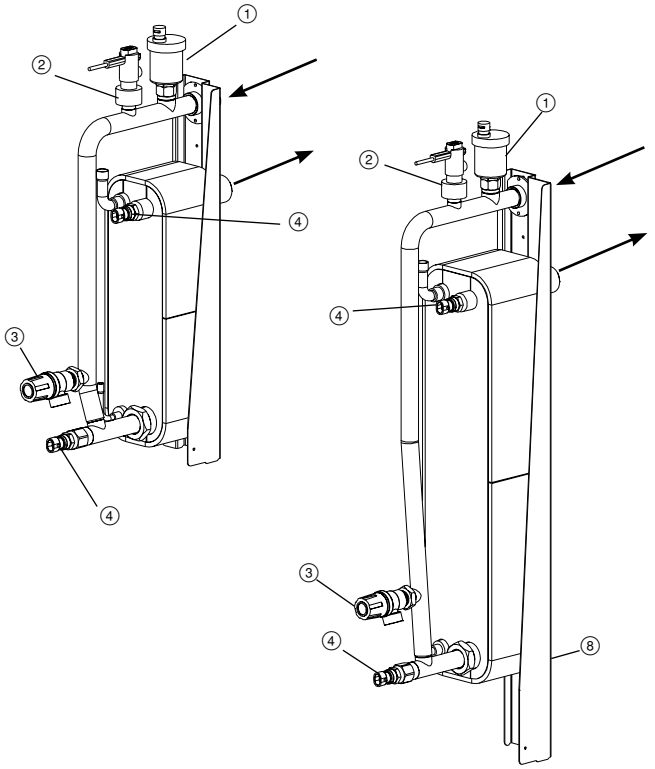
Hydronic components

30AWH - H models





30AWH - X models

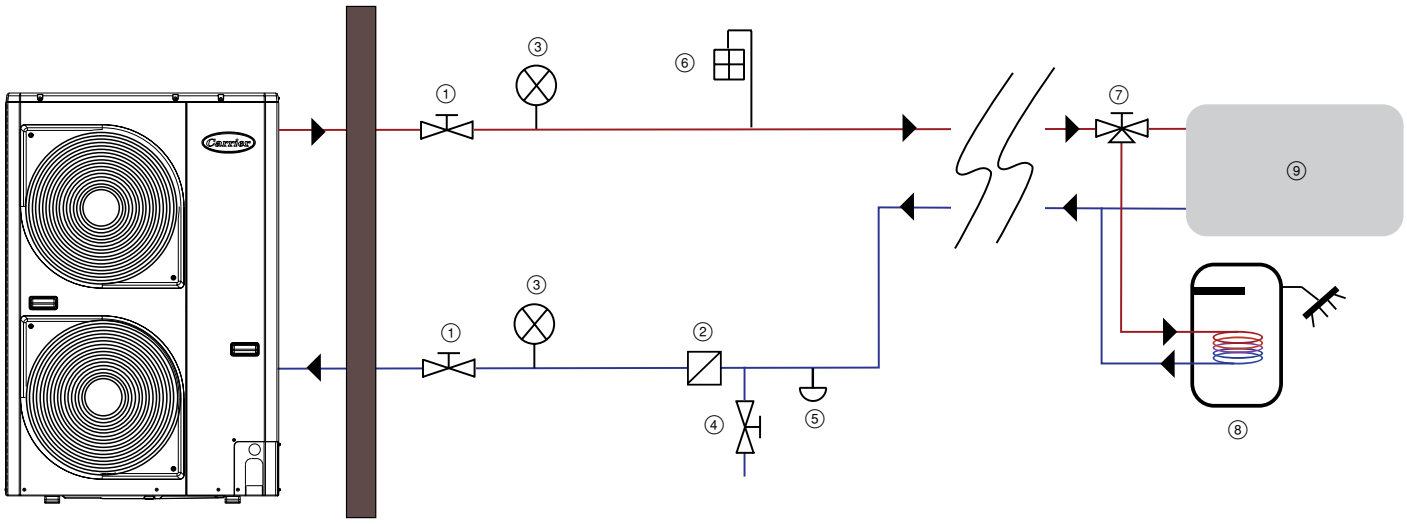


Legend

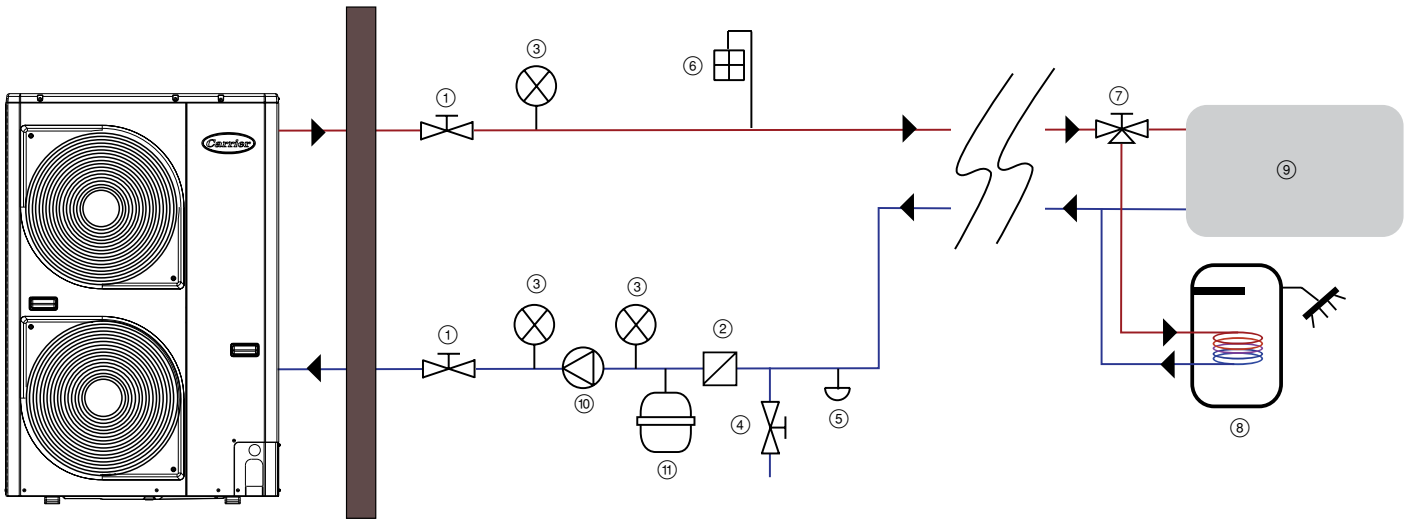
1 Automatic purge valve
2 Water flow switch
3 Pressure relief valve
4 Water temperature sensors
5 Water circulation pump
6 Plug to unblock the pump
7 Expansion tank
8 Water drain cap

Suggested hydronic circuit installation

30AWH - H models



30AWH - X models



Legend

1 Ball valve
2 Water filter (10 mesh/inch)
3 Pressure gauge
4 Charge valve
5 Drain valve (located at the lowest water circuit point)
6 Purge valve (located at the highest water circuit point)
7 Three-way valve
8 Domestic hot water tank
9 Terminals (fan coil units, underfloor heating, radiators
10 Water pump
11 Expansion tank

Carrier is participating in the Eurovent Certification Programme for liquid chilling packages. Products are as listed in the Eurovent Directory of Certified Products or on the Internet site www.eurovent-certification.com.

EUROVENT CERTIFIED PERFORMANCE

LLOYD'S REGISTER QUALITY ASSURANCE ISO 14001

Environmental Management Systems

Carrier

Order No.: 13469-20.03.2011. Supersedes order No.: 13469-20.01.2010.
Manufacturer reserves the right to change any product specifications without notice.

Manufactured by: Carrier SpA, Villasanta, Italy.
Printed in the Netherlands.