

# APPLICATION GUIDE

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**AIR COOLED LIQUID CHILLER AND HEAT PUMP**

**eCOMFORT**

**20 - 190 kW**

**eCOMFORT-AGU-1705-E**



[www.lennoxemea.com](http://www.lennoxemea.com)

**LENNOX**



# eCOMFORT

## APPLICATION GUIDE

Ref : eCOMFORT-AGU-1705-E

### 1. GENERAL

Model number description	2
Range presentation	2
Technical description	5
Options and accessories	8

### 2. GENERAL DATA

General data	14
Fan data	30
Water pressure drops	34
Hydraulic equipment	
Hydraulic sketches	35
Water pump data	36
Glycol solution unit	38
Water volume	38
Minimum water flow through the evaporator	40
edrive : variable water flow rate	40
Partial heat recovery	44
Acoustic data	45
Operating limits	48

### 3. ELECTRICAL DATA

Electrical tables	49
-------------------	----

### 4. DIMENSIONAL DATA

Dimensional data	48
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Our company's products comply with European standards.

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The manufacturing of eComfort units answers to ISO9001 and ISO 14001 control quality systems.

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## MODEL NUMBER DESCRIPTION

**EXAMPLE**

GA C 020 S M 1 M

GA	Type of eCOMFORT unit
C	<b>C</b> = Cool-only unit <b>H</b> = Heat pump unit
020	Approximate power in kW.
S	<b>S</b> = Single circuit <b>D</b> = Double circuit
M	Refrigerant R410 A
1	Revision number
M	400V/3/50Hz

The eCOMFORT range is perfect for air conditioning applications in tertiary and commercial buildings such as offices, hotels, shops and restaurants as well as for cooling processes in, for example, industrial, medical, food, winemaking and data center environments.

**STRAIGHTFORWARD INSTALLATION:**

Installation and commissioning are **fast and easy** since the following are integrated in the unit:

- complete hydraulic module with low- or high-pressure single or twin pump, comprising all the equipment necessary: pump(s), expansion tank with pressure gage and safety valve, pressure taps, water filter with sieve, air bleed and water flow controller.
- large-capacity buffer tank (100 to 400 liters of water depending on the size of the unit), providing sizable energy storage and a buffer effect of approximately 2.7 liters/kW on average across the entire range.
- immersion heating rods, medium- or high-power modulating auxiliary electric heating elements incorporated directly in a buffer tank inside the unit.

Only electric and hydraulic connections are required for the eCOMFORT unit.

Furthermore, the eCOMFORT range is **compact and discreet** for perfect architectural integration. **Low profile**, the unit as standard does not exceed 1.5 to 1.7 m and all the cooling and hydraulic components are concealed within the unit.

**LOWER ENERGY BILLS**

The eCOMFORT water chillers and heat pumps have been optimized **so you needn't worry about your energy bill**.

- In thermal comfort applications, 80% of the operating times are between:
  - 2 and 10°C outside air in heating mode and
  - 17 and 26°C in cooling mode.
 The eCOMFORT units have been optimized primarily for these partial load operating conditions. The eCOMFORT range therefore offers **seasonal energy efficiencies (SEER & SCOP) that exceed the European ecodesign requirements for 2021** (cooling mode) and **2017** (heating mode).



These seasonal energy efficiencies refer to the ratio between the annual requirements of buildings in cooling or heating and the annual electricity consumption. The high seasonal energy efficiencies of the eCOMFORT range help **reduce your energy bill by 12% to 15% on average** compared to a traditional unit and, therefore, facilitate a rapid return on investment.

- The scenario is similar in industrial cooling applications, where 90% of the operating times are between -2°C and 25°C outside air. The eCOMFORT units, in conjunction with variable air flow control (optional), ensure the **best SEPR seasonal energy efficiencies, which exceed the European requirements for 2021** regarding high-temperature process cooling (7°C outlet water temperature) and **for 2018** regarding medium-temperature process cooling (-8°C outlet water temperature).



- **eDrive**: the eCOMFORT range can be equipped with an optional variable speed pump (single or twin mounted in tandem). In a hydraulic system, the pump is one of the main points of energy consumption. The cost associated with pumping can represent 20% of the total cost of owning a unit. Savings on energy consumption are made in particular at partial load and during periods of downtime, **75% pumping energy can therefore be saved.**

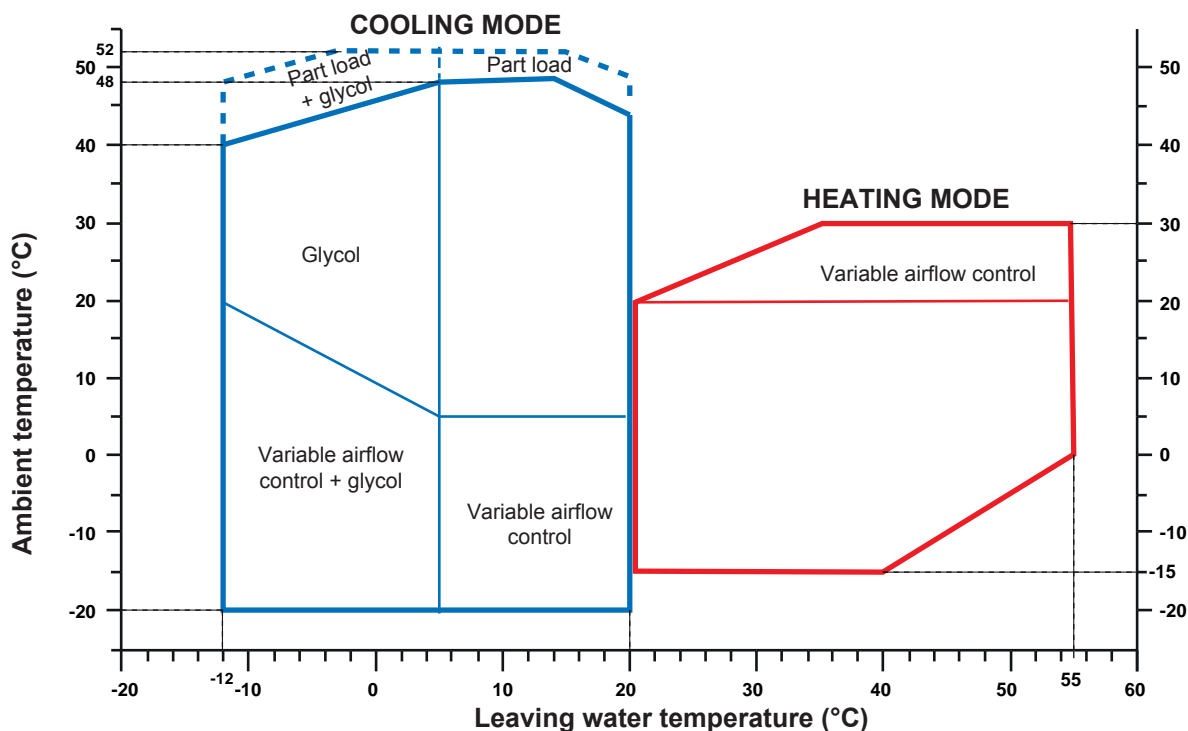


- The desuperheater allows **free production of hot water for sanitary purposes or hot industrial process water up to 70°C** by recovering from **20% to 25% of the rejected heat.**

### USER COMFORT THROUGHOUT THE YEAR

With extended operating ranges, the eCOMFORT range has been designed to guarantee thermal comfort throughout the year.

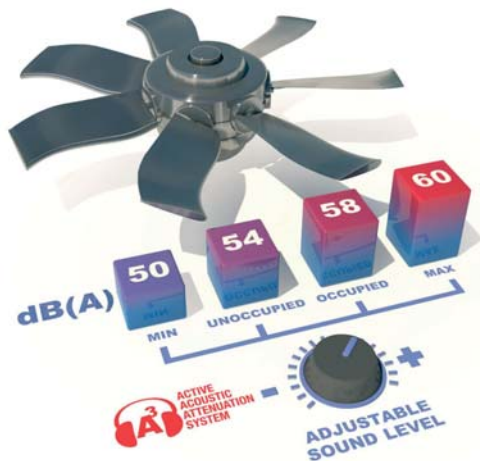
- In heating mode, the eCOMFORT range produces hot water at 45°C up to an outdoor temperature of -10°C: thermal comfort is maintained throughout the winter. Furthermore, the unit works in extreme cold, right down to -15°C, and the heating rods ensure **thermal comfort is always maintained and guaranteed.** Medium- or high-power modulating auxiliary electric heating elements are incorporated in a buffer tank inside the unit.
- In cooling mode, the unit works at full load from -20°C to 48°C ambient air. In addition, it can work at partial load up to ambiances reaching 52°C. For industrial applications, the outlet water temperature can go as low as -12°C.
- The eCOMFORT units offer **precise control of the outlet water temperature** in cooling and heating modes thanks to multistage scroll compressors in conjunction with an electronic expansion valve and a large-capacity buffer tank. In addition, this water tank ensures sizable energy storage. Its buffer effect eliminates the constraints of high variable load systems and the inconvenience associated with the defrost phases for heat pumps.



## ACOUSTIC COMFORT

The eCOMFORT range has **three different noise levels, meeting all external constraints.**

- The eCOMFORT units offer **quiet operation as standard** thanks to:
  - the use of optimized components with small, silent compressors and high-performance propeller fans with profiled blades, producing a significant reduction in the noise level.
  - a compact design with compressors, pumps and fans inside a closed box.
- This range also offers a second effective noise level with integration of the optional, high-performance acoustic cover, **which can halve the noise of the unit (-3 dBA).**
- Furthermore, the eCOMFORT range has **an intelligent noise attenuation system** called the **Active Acoustic Attenuation System**. Combined with the optional variable air flow controller (EC fan), this system automatically adjusts the air flow to remain within the daytime and nighttime noise level constraints (programmable) while guaranteeing thermal comfort within the building.



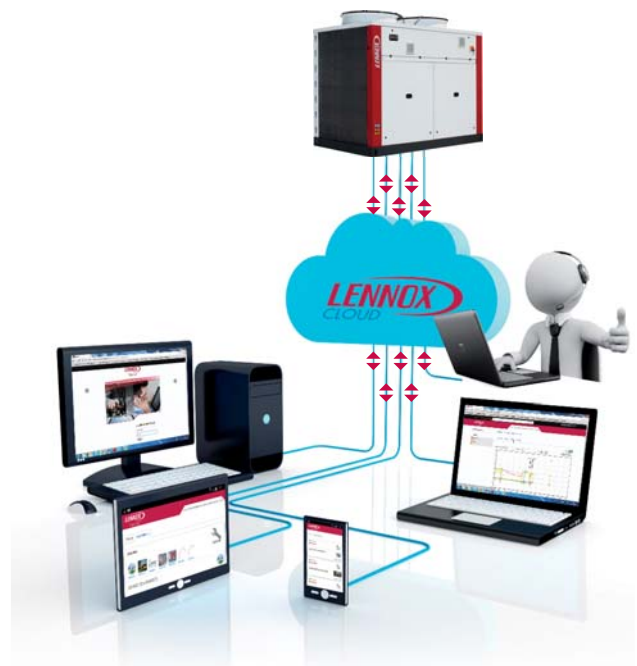
## CONNECTIVITY FOR COMFORT AND PERFORMANCE

- Connectivity for comfort: **LennoxHydrocontrol** is a user-friendly interface for local supervision of the entire hydraulic system. **It guarantees constant comfort throughout the year and saves energy** thanks to:
  - zoning of the building,
  - time programming by zone,
  - precise control of setpoints by zone,



- Connectivity for performance: **LennoxCloud** facilitates remote monitoring of the unit, making it possible to achieve **significant energy savings while avoiding performance drifts** throughout the unit's life cycle. The eCOMFORT units can be remotely controlled, adjusted and diagnosed :
  - through online verification of all unit data trends,
  - through optimization of unit operation by analyzing this data,
  - by facilitating maintenance thanks to alarm and alert reports.

Also, LennoxCloud is a single system able to supervise several units located on different installations.



## CONSTRUCTION OF THE UNIT, CASING AND BASE FRAME

The eCOMFORT range complies with the standards and directives of the European Community.

All the eCOMFORT units are designed and manufactured according to an ISO 9001 quality and ISO 14001 environmental management system.

The casing and the base frame are in painted or pre-lacquered galvanized steel, guaranteeing **high corrosion resistance**. The casing is white in color (RAL 9003) with red uprights (RAL3003) and the base frame is gray (RAL7021).

The design is **modern, compact and discreet**. The cooling components, fans and the entire hydraulic module are concealed for perfect architectural integration.

As standard, the **height of the unit is much reduced** (1.5 to 1.7 m) for discreet installation on a roof or on the ground without the need for a peripheral screen.

## COMPRESSORS



The units are equipped with **multi-scroll compressors, mounted in tandem or trio**, to provide the best seasonal efficiencies (ESEER, SEER, SCOP and SEPR).

The Compliance® scroll compressors are of **simple and robust design**, thus increasing their reliability and service life thanks to:

- axial and radial play, which allows the compressor to tolerate the liquid slugging,
- motor winding cooled by the gas intake,
- electronic control of the compressor discharge temperature,
- a device to protect the motor against overcurrent and overheating, based on size,
- a non-return valve on the discharge,
- an oil equalization sight glass,
- mounting on an independent base frame insulated by anti-vibration pads.

## WATER HEAT EXCHANGER

The evaporator on the eCOMFORT unit is of the latest generation of heat exchangers made from stainless steel plates with copper brazing.

These exchangers **improve the seasonal efficiencies and reduce internal pressure drops**.

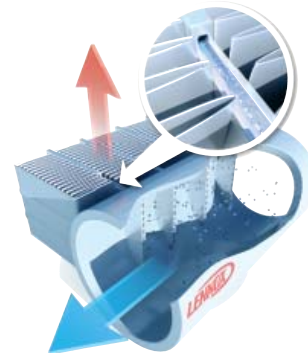
The are thermally insulated and frost-protected:

- either through the use of glycol,
- or through activation of the pump managed by the control system,
- or through optional electric tracing.

## AIR HEAT EXCHANGER

As standard, the eCOMFORT water chillers are equipped with all-aluminum microchannel condenser coils which provide:

- a **significant improvement in efficiency**,
- a **60% reduction** in the amount of refrigerant required,
- **better corrosion resistance**, especially in moderate urban or coastal environments.



The eCOMFORT heat pumps are themselves equipped with traditional condenser coils made from copper tubing and aluminum fins.

All the coils can given an optional anti-corrosion treatment for resistance against highly aggressive environments.

## FANS

As standard, the unit is equipped with latest-generation, high-performance propeller fans with profiled blades. The aerodynamic shape of the blades is optimized, **reducing the noise level considerably** while significantly increasing the efficiency compared to conventional blades.

As an option, these high-performance propeller fans can be equipped with EC (electronic commutation) technology, allowing the variable air flow rate to be controlled.



All the electric fan motors are class F and are protected against overheating by internal thermal protection as well as IP55 protection.

## REFRIGERATION CIRCUIT

The eCOMFORT range has 1 to 2 independent refrigeration circuits using R410A refrigerant.

Each refrigeration circuit includes:

- the required amount of refrigerant, which is 60% less thanks to the use of R410A refrigerant and microchannel heat exchangers (only on the cool-only version),
- a dehydration filter with filter cartridge,
- an electronic expansion valve
- temperature and pressure sensors,
- a high-pressure pressure safety switch,
- a fluid reservoir, a cycle reversing valve and a liquid/vapor exchanger (heat pump version only).



Each sealed refrigeration circuit is nitrogen-brazed and fitted by certified operators.

Before evacuation and refilling with refrigerant, each refrigeration circuit undergoes a pressure tightness test using a nitrogen/hydrogen mixture and a leak detection procedure. All the units are then subjected to full electrical and functional tests and trials to ensure and guarantee they are perfectly sealed and functioning properly before dispatch.

## ELECTRICAL CABINET

- Electrical cabinet, components and cabling compliant with the EN 60204-1 standard.
- 400 V three-phase power supply, 50 Hz, + earth without neutral.
- Power cable inlet is in the lower part of the cabinet.
- IP54 tightness class.
- Electric components are of an international brand to facilitate maintenance and ensure fast replacement.
- Main on/off switch mounted on the front.
- Customer display accessible on the front.
- 400/24 V transformer for control circuit power supply.
- Electrical cables numbered to facilitate maintenance and diagnostic operations.
- Frequency converters (VFD) for controlling the pump with enhanced ventilation (optional eDrive).

## REGULATION



The eCOMFORT range is equipped with the latest generation eCLIMATIC controller.

The eCLIMATIC control system is designed to offer the best seasonal energy efficiencies throughout the unit's service life while ensuring reliable operation, with user-friendly interfaces.

This control system offers numerous possibilities. The main functions are as follows:

- 7 programmable time periods a day, 7 days a week, making it possible to manage the energy savings and the noise level according to the environmental constraints and the constraints on usage of the premises. There are 4 operating modes to choose from,
- Dynamic management of the setpoints: water logic based on outdoor temperature. This control system automatically adjusts the outlet water temperature setpoint based on the cooling (floating LP) or heating requirement and the outdoor temperature,
- Controlling the variable-speed pumps with maintenance of constant delta P, constant delta T or fixed speed/dead zone control, guaranteeing a reduction in the annual energy consumption related to pumping,
- Control of the bypass valve (if this option is chosen) in constant delta P regulation,
- Intelligent management of the noise level by controlling the variable air flow of the fans,
- Management of compressor and pump run-time balancing and automatic changeover in the event of a pump fault (if twin pump option is chosen),
- Dynamic, intelligent and independent defrost system for each circuit, limiting the number and duration of defrost cycles in winter to ensure high seasonal energy performance (SCOP) in heating mode,
- Automatic unloading of a compressor in case of excessive condensation pressure, allowing the machine to operate even when outside air temperature is high, (operation up to 52°C ambiance in partial load),
- Control and protection of all operating ranges,
- Management and regulation of several master/slave units (cascade, takeover),
- Automatic summer/winter changeover.



The eCLIMATIC control system offers an interface on the front, the “DC Advanced” display, equipped with a graphic screen providing access to the main user parameters:

- Reading the variables: temperatures of ambient air, water and refrigerant,
- Reading the refrigerant pressures,
- Reading and programming the operating times and modes,
- Reading and programming the water temperature setpoints,
- Reading and programming the noise level setpoints,
- Alarm history.



**STANDARDS: OVERVIEW**

The unit is manufactured in compliance with the European standards and directives:

- Pressure equipment, 2014/68/EU,
- Machinery Directive 2006/42/EC,
- Low voltage, 2014/35/EU,
- Electromagnetic compatibility, 2014/30/EU,
- Environment and safety, EN 378-2,
- Use of certain hazardous substances (ROHS), 2011/65/EU,
- Energy-related products: ecodesign, 2009/125/EC,
- WEEE, 2012/19/EU.

**COMMUNICATION**

The eCLIMATIC control system is equipped as standard with a GTC port enabling remote control via a communication bus. Depending on the desired communication protocol, the eCLIMATIC control system can be equipped with an optional ModBUS®, LonWorks® or BacNET® communication card.

The control system allows remote control of the unit as standard via programmable dry contacts (2 inputs/1 output). These dry contacts are by default:

- One input: on/off,
- Another configurable input (e.g. summer/winter changeover),
- An output for alarm reports or information.

OPTIONS	
<b>LNCJ</b>	Low noise : Acoustic compressor jacket
<b>SEAS</b>	Variable air flow control with standard EC fans
<b>HIFP</b>	Variable air flow control with high pressure EC fans
<b>ACTR</b>	LenGuard anti-corrosion condenser coil treatment
<b>CPGR</b>	Coils protection : metallic grille
<b>LLWT</b>	Low leaving water temperature down to -12°C
<b>PHRF</b>	Hot sanitary water supply : desuperheater
<b>RLKD</b>	Refrigerant leak detection
<b>SPLP</b>	Hydraulic module with low-pressure single pump
<b>DPLP</b>	Hydraulic module with low-pressure twin pump
<b>SPEL</b>	Hydraulic module with eDrive low-pressure single pump
<b>DPEL</b>	Hydraulic module with eDrive low-pressure twin pump
<b>SPHP</b>	Hydraulic module with high-pressure single pump
<b>DPHP</b>	Hydraulic module with high-pressure twin pump
<b>SPEH</b>	Hydraulic module with eDrive high-pressure single pump
<b>DPEH</b>	Hydraulic module with eDrive high-pressure twin pump
<b>BYVC</b>	Bypass Valve for delta P control with eDrive pump (supplied loose)
<b>WTNG</b>	Water tank
<b>WTHS</b>	Water tank electrical heater Standard
<b>WTHH</b>	Water tank electrical heater High
<b>EWFS</b>	Electronic flow switch
<b>WFIF</b>	Water filter (supplied loose)
<b>KGRL</b>	Flange connection (supplied loose)
<b>APEP</b>	Antifreeze protection on exchangers and pipings down to -20°C
<b>APPP</b>	Antifreeze protection on exchangers, pump(s) piping down to -20°C
<b>APPW</b>	Antifreeze protection on exchangers, pump(s) piping and water tank down to -20°C
<b>ECLO</b>	LonWorks® interface FTT10
<b>BNET</b>	BACnet® interface MSTP
<b>MBUS</b>	ModBus interface RS485
<b>MBIP</b>	ModBus and BACnet® interface TCP/IP
<b>DM60</b>	Remote advanced display (supplied loose)
<b>DS60</b>	Service display (supplied loose)
<b>DCBO</b>	Remote control : customer drive contact input/output
<b>ELME</b>	Electric energy meter
<b>PHCT</b>	Phase reversal protection
<b>POWF</b>	Power factor correction
<b>SOFT</b>	Soft starter
<b>EBFM1</b>	Electrical box upgrade ventilation : 1 fan
<b>EBFM2</b>	Electrical box upgrade ventilation : 2 fans
<b>ALWA</b>	Aluminum wires adaptor (supplied loose)
<b>AVUB</b>	Anti-vibration mounts rubber type (supplied loose)
<b>SLCR</b>	Wooden crate for long distance

**ACOUSTIC OPTION**

**Low noise level option (code LNCJ)**

For noise-sensitive environments and areas, the compressors are equipped with a high-performance acoustic cover allowing **the noise level to be reduced without any reduction in performance.**

**OPTIONS FOR FAN AND EXTERNAL COILS**

**Variable air flow control by EC fan**

Variable air flow control by EC fan offers the following advantages:

- **Year-round operation** down to -20 °C outdoor temperature in cooling mode.
- **Year-round operation** up to 30 °C outdoor temperature in heating mode (heat pump).
- **A further increase in energy savings** through improved seasonal efficiencies (floating HP).
- **Intelligent noise attenuation management**, programmable night and day, combined with acoustic covers.
- **Available static pressure** up to 210/250 Pa for encased and indoor applications (fan curves on page 30).

Option code	Type	Available static pressure
<b>Standard</b>	Standard AC fan	70 to 90 Pa
<b>SEAS</b>	Standard EC fan	90 to 140 Pa
<b>HIFP</b>	High-pressure EC fan	210 to 250 Pa

**Floating high pressure in cool mode**

LENNOX optimizes the performance of its eCOMFORT units in cool mode by using EC fans (optional), allowing maximum savings to be achieved. We determine an optimal correlation between the condensation temperature and the outside air temperature, which allows us to obtain the lowest possible consumption for the compressors/condenser fan motors

**Anti-corrosion protection: LENGUARD (code ACTR)**

For installations in potentially aggressive environments such as coastal or industrial areas, LENNOX offers the option of non-toxic, water-based anti-corrosion protection treatment for condensers, validated over 10,000 hours of salt spray testing (ASTM B117 standard)

**Metal coil protection grills (code CPGR)**

Black metal grills are used to protect the coils from impact during transport of the unit and for protection against bad weather. They also protect the users from sustaining cuts.

**OPTIONS FOR REFRIGERATION CIRCUIT**

**Low water temperature operation down to -12°C (code LLWT)**

This option is necessary to increase the cooling operating range between +5°C and -12°C outlet water for industrial processes or ice storage.

**Desuperheater: hot water for sanitary purposes (code PHRF)**

On eCOMFORT units from 90 to 185 kW, a plate heat exchanger on each refrigeration circuit enables production of hot water up to 70°C. **Heat recovery is greater than 20%** of the rejected heat depending on the temperatures required.

**Refrigerant leak detection (code RLKD)**

Refrigerant leak detection prevents performance and efficiency degradation as well as unwanted downtime and **extends maintenance intervals** in terms of leak checking.

Refrigerant leak detection allows the customer to check, via the temperature and pressure sensors in the refrigeration circuit, whether the amount of refrigerant varies during the life cycle of the unit.

Via the eClimatic controller, these sensors provide the customer with information about the status of the refrigeration circuit.

## HYDRAULIC OPTIONS:

### Hydraulic module:

The hydraulic module is integrated in the eCOMFORT unit. It is composed of one or two pumps and all the hydraulic equipment required for **fast commissioning** on-site:

- single pump or twin pumps,
- vane-type water flow controller,
- expansion tank,
- pressure gage,
- drain valve,
- water temperature sensor,
- safety valve,
- air bleed,
- pressure tap,
- water pressure sensor with eDrive option.



Numerous hydraulic modules are available depending on the type of pump and static pressure requirement:

Option code	Type of pump	Available static pressure up to
SPLP	One single pump	130 kPa
DPLP	Two single pumps	
SPEL	One single pump with a speed variator (eDrive)	50 to 130 kPa
DPEL	Two single pumps with a speed variator (eDrive)	
SPHP	One single pump	200 kPa
DPHP	Two single pumps	
SPEH	One single pump with a speed variator (eDrive)	130 to 200 kPa
DPEH	Two single pumps with a speed variator (eDrive)	

The twin pumps are two independent single pumps and are mounted in tandem in normal/emergency operation.

The hydraulic modules with speed variator (eDrive) adapt to requirements from 50 to 200 kPa. Numerous control modes are available, **enabling significant savings on installation and energy consumption** as well as rapid returns on investment. Please refer to the corresponding chapter on variable water flow (page 36).

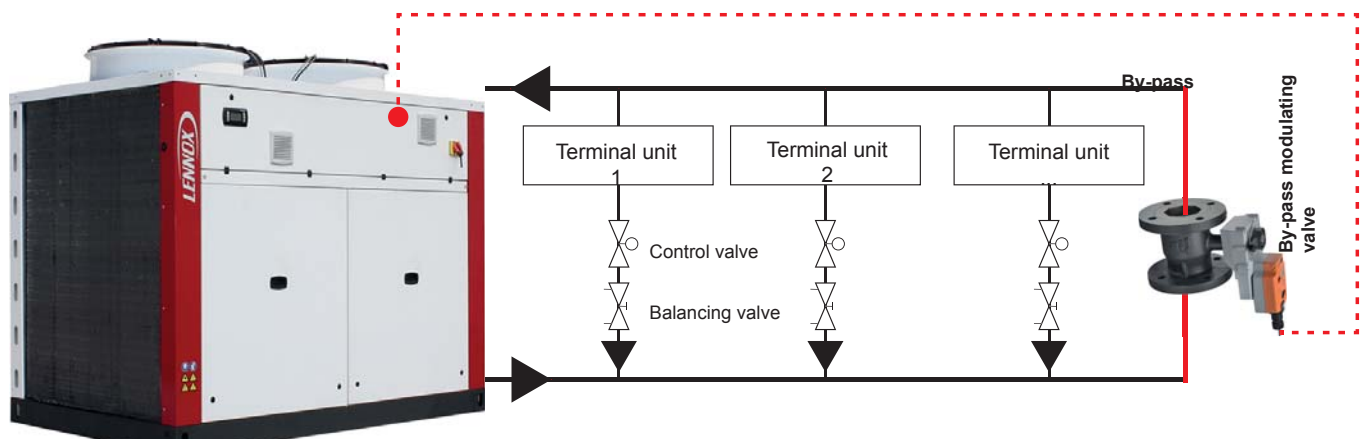
### Bypass valve for $\Delta P$ control with variable speed pump (eDrive) (code BYVC)

The bypass valve controlled by the unit is essential on variable water flow systems regulated in constant  $\Delta P$  and with terminals equipped with 2-way valves.

This configuration ensures the best energy savings on the installation and the energy costs of operating the pump.

Please refer to the corresponding chapter on variable water flow (page 42)

The bypass valve is supplied not mounted on the unit.



**HYDRAULIC OPTIONS (cont.) :**

**Buffer tank (code WTNG)**

The buffer tank is an essential option in the case of a water loop of low volume or with fast variable thermal load.

This tank is placed on the water return and **ensures sizable energy storage as well as a buffer effect** with:

- precision and stability in the outlet water temperature,
- inertia on water return, avoiding untimely operation and thus short cycles unacceptable for the compressors = reliability,
- elimination of the discomfort associated with the defrost cycles on the heat pumps.

The water chillers (GAC type) benefit from a large-volume buffer tank:

Size	Volume (liters)
020S → 045S <b>20 → 45 kW</b>	100
055S → 125S <b>55 → 125 kW</b>	175
110D → 125D <b>110 → 125 kW</b>	250
140D → 185D <b>140 → 185 kW</b>	400

The heat pumps (GAH type) benefit from a large-volume buffer tank:

Size	Volume (liters)
020S → 045S <b>20 → 45 kW</b>	100
055S → 080S <b>55 → 80 kW</b>	175
090S → 125D <b>90 → 125 kW</b>	250
140D → 185D <b>140 → 185 kW</b>	400

**Modulating electric heating elements (on heat pump only):**

In extreme cold, auxiliary modulating electric heating elements **ensure thermal comfort is maintained**. They are integrated in the unit, directly in the buffer tank.

High-power auxiliary modulating electric heating elements are also available **to guarantee and secure thermal comfort** should a thermodynamic circuit fail.

Power of electric heating elements:

Option code	Type	Size of unit			
		020S → 045S	055S → 080S	090S → 125D	140D → 185D
<b>WTHS</b>	Standard electrical power	9 kW	18 kW	27 kW	36 kW
<b>WTHH</b>	Higher electrical power	12 kW	24 kW	36 kW	48 kW

**Water filter (code WFIF)**

A Y filter with stainless steel sieve (filtration diameter: 1 mm) is available:

- to screw on sizes 020S to 045S (from 20 to 45 kW),
- with PN16 flange on sizes 055S to 185D (from 55 to 185kW).  
In this case, flange connections are included for mounting the filter on the unit.

This protection must be mounted on the customer's supply piping in order to protect the evaporator from all possible impurities. The filter is supplied not mounted on the unit.

**Flange connection: (code KGRL)**

Two connection sleeves with Victaulic groove on one side and flange on the opposite side are available.

The connections are supplied not mounted on the unit.

**Frost protection (code APEP, APPP or APPW)**

On water chillers and heat pumps, if the water is not glycolated, frost protection down to -20 °C outdoor temperature is available:

- electric tracing of plate exchanger and pipes,
- electric heating elements included in the buffer tank.

Electric power of frost-protection heating elements in tank:

	Size of unit			
	020S → 045S	055S → 080S	090S → 125D	140D → 185D
Electrical power	2.25 kW	6 kW	9 kW	12 kW

**CONTROL AND COMMUNICATION**

**LonWorks FTT10 communication interface (code ECLO)**

This card is a LonWorks interface, required for any connection between a GTC system with Lon protocol. No other equipment is required to establish LonWorks® dialog. One card per machine is required.

The list of variables can be found in the eClimatic controller manual.

**BACnet MSTP communication interface (code BNET)**

This card is a communication interface that uses the BACnet® protocol and enables communication with a BACnet MSTP system. This card is essential for any connection between the unit and a LennoxHydrocontrol system.

The list of variables can be found in the eClimatic manual

**Modbus RS485 communication interface (code MBUS)**

This card is a communication interface that uses the Modbus protocol and enables communication with a Modbus RS485 system.  
The list of variables can be found in the eClimatic manual.

**Modbus or BACnet TCP/IP communication interface (code EWFS)**

This card is a communication interface that uses the Modbus/BACnet TCP/IP protocol and enables communication with an IP network.  
The list of variables can be found in the eClimatic manual.

**Remote display (code DM60)**



The optional “DM Multi” remote display has the same design and the same advanced functions as the “DC Advanced” display on the front. It offers the following additional functions:

- remote connection up to 500 m,
- wall mounting,
- ability to manage up to 8 units with a single display, the units must be connected to the master/slave bus.

**Service display (code DS60)**



The “DS Service” service display, specifically for the experts, allows the technical service or maintenance personnel to adjust, read and modify all parameters of the unit.

**Remote control: additional client inputs/outputs (code DCBO)**



An expansion card is available with 10 universal inputs (NTC, 4/20mA, TOR dry contact) and 6 additional logic outputs. Each input/output can be parameterized to **allow remote control of the installation.**

**ELECTRIC OPTIONS**

**Electrical energy meter (code ELME)**



Current transformers (TI) are placed on the customer’s power supply cables.

They convert the main current into a secondary current (0 to 5 A) sent to an energy meter.

The energy meter communicates the following values to the eClimatic system:

- active power at the time t in kW,
- power factor (cos phi),
- total active energy meter in kWh.

These values are displayed on the energy meter and forwarded to the display on the front as well as the remote and service displays. They can be forwarded to a GTC via Modbus or BACnet (RS485 or TCP/IP) or LonWorks communication and made available on our LennoxCloud remote monitoring system.

**Phase protection (code PHCT)**



The phase controller is recommended when the power supply is unreliable or unstable, or when using an emergency generator. It **protects the components of the unit** against overvoltage, undervoltage or phase failure (phase reversal or loss).

**Power factor correction (code POWF)**

On eCOMFORT units from 90 to 185 kW, power factor correction improves the electrical efficiency of the unit. The module compensates the phase angle (Cos Phi) between the voltage and the current by using capacitors and thus **helps reduce electrical energy consumption**.

**Compressor soft start (code SOFT)**

With compressor soft start, the starter reduces the stresses on the installation:

- **Reduction of installation cost** by reducing the size of the upstream transformer,
- Reduction of loads in electrical distribution, current spikes down to -40% and drops in voltages related to engine start-ups,
- **Reduction of machine operating costs** by reducing the mechanical stresses,
- Automatic adaptation to network frequency,
- Protection against transient or permanent underload and overcurrent.



**Enhanced ventilation of the electrical cabinet: 1 fan (code EBFM1)**

A **system for cooling the electrical cabinet** is available as an option for specific climates and applications.

This option is obligatory on units from 20 to 80 kW:

- for operation above 48°C outside air,
- with the eDrive option: variable-speed pump(s).

This option is obligatory on units from 90 to 185 kW with the eDrive option (variable speed pump(s)).

**Enhanced ventilation of the electrical cabinet: 2 fans (code EBFM2)**

On units from 90 to 185 kW, a **double system for cooling** the electrical cabinet is available as an option for specific climates and applications.

This option is obligatory on units from 90 to 185 kW for operation above 48°C outside air.

**Adapter for power supply with aluminum cables (code ALWA)**

A special adapter kit is available for connecting the unit with aluminum cables.

This kit is supplied not mounted on the unit.

**Anti-vibration mounts (code AVUB)**

These rubber anti-vibration mounts reduce the transmission of vibrations to the ground and the noise level in general. They are fixed underneath the unit at the points specified in the installation manual. They are supplied not mounted.

**Protection for long-distance transport (code SLCR)**

The entire unit can be packaged in a slatted crate for protection during very long distance transport by truck or container .

**COOLING ONLY UNIT**
**B BOX**

eCOMFORT	GAC	020S	025S	030S	035S	040S	045S
<b>Cooling mode</b>							
Cooling capacity <sup>(1)</sup>	kW	20	25	32	37	40	46
Total absorbed power <sup>(1)</sup>		6,0	7,8	10,8	12,0	13,1	15,6
EER <sup>(1)</sup>		3,36	3,14	2,93	3,07	3,06	2,91
Eurovent energy class <sup>(1)</sup>		A	A	B	B	B	B
ESEER <sup>(2)</sup>		4,42	4,50	4,21	4,25	4,21	4,15
SEPR - Average temperature -8°C <sup>(3)</sup>		3,33	3,53	3,54	3,64	3,44	3,46
<b>Refrigeration circuit</b>							
Number of circuits		1					
Refrigerant charge	kg	4,0	4,2	4,4	4,6	4,8	5,2
Type of expansion valve		Electronic expansion valve					
<b>Compressors</b>							
<b>Multi stage Scroll compressors</b>							
Number of compressors		2					
Type		Tandem					
Capacity steps		0-50-100 %					
Rotation speed	RPM	2900					
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Oil charge	kg	2 x 1,24	2 x 1,77			2 x 2,51	
<b>Condenser</b>							
<b>Microchannel, aluminium tubes and fins</b>							
Number of condensers		1					
<b>Condenser fan</b>							
<b>Axial fan</b>							
Number of condenser fans		1					
Nominal airflow rate	m <sup>3</sup> /h	9676	10056	14342			
Rotation speed	RPM	912	916	684			
<b>Evaporator</b>							
<b>Brazed plate heat exchanger</b>							
Number of evaporators		1					
Nominal water flow rate	m <sup>3</sup> /h	3,47	4,24	5,47	6,36	6,92	7,85
Nominal pressure drop	kPa	17	25	27	36	30	39
Water volume	l	4,0	4,6			5,2	
Hydraulic service pressure without hydraulic module	kPa	1000					

(1) EUROVENT certified data, in accordance with standard EN14511 :  
 Water inlet / outlet temperature = 12 °C / 7 °C  
 Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825



## COOLING ONLY UNIT

## B BOX

eCOMFORT	GAC	020S	025S	030S	035S	040S	045S
<b>Hydraulic module (option)</b>							
Type of pump Low or high pressure pump	Stainless steel centrifugal single or twin pump mounted in parallel						
Expansion vessel volume	l	18					
Hydraulic service pressure with pump(s)	kPa	350					
Insulated water tank	l	100					
Hydraulic service pressure with pump(s) and water tank	kPa	350					
<b>Hydraulic connections</b>							
Type of standard connection	Threaded male						
Type of optional connection	Non available						
Inlet / Outlet connection diameters	1"1/2						
Inlet / Outlet external diameters	mm	48,3					
<b>Electrical data</b>							
Power supply	400V / 3 / 50Hz + E						
Maximum power	kW	9	12	15	17	18	21
Maximum running current	A	17	22	31	32	35	39
Starting current		52	63	91	118	119	148
Short circuit unit capacity	kA	10					
Power factor	0,84						
<b>Dimensions</b>							
Length	mm	1320					
Width		1125					
Height		1540					
Height with EC fan(s) (SEAS* or HIFP*)		1790					
Operating weight	kg	312	319	342	366	371	386
<b>Acoustic</b>							
Global sound power level Standard unit"	dB(A)	74,0	75,6	75,6	76,4	79,2	78,4
Global sound power level Low noise unit with acoustic jacket		71,7	73,2	73,2	74,5	76,8	76,1
Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)		70,0	72,0	72,0	72,0	75,5	74,6

\*SEAS Variable airflow control with standard EC fans

\*HIFP Variable airflow control with high pressure EC fans

**COOLING ONLY UNIT**
**C BOX**

eCOMFORT	GAC	055S	060S	070S	080S
<b>Cooling mode</b>					
Cooling capacity <sup>(1)</sup>	kW	55	61	70	83
Total absorbed power <sup>(1)</sup>		17,3	19,5	22,3	25,9
EER <sup>(1)</sup>		3,17	3,14	3,12	3,19
Eurovent energy class <sup>(1)</sup>		A	A	A	A
ESEER <sup>(2)</sup>		4,43	4,25	4,33	4,28
SEPR - Average temperature -8°C <sup>(3)</sup>		3,73	3,63	3,65	3,58
<b>Refrigeration circuit</b>					
Number of circuits		1			
Refrigerant charge	kg	7,0	8,0	8,5	10,0
Type of expansion valve		Electronic expansion valve			
<b>Compressors</b>					
<b>Multi stage Scroll compressors</b>					
Number of compressors		2			
Type					
Capacity steps		0-50-100 %			
Rotation speed	RPM	2900			
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF			
Oil charge	kg	2 x 3,25		2 x 3,38	
<b>Condenser</b>					
<b>Microchannel, aluminium tubes and fins</b>					
Number of condensers		2			
<b>Condenser fan</b>					
<b>Axial fan</b>					
Number of condenser fans		1	2	2	2
Nominal airflow rate	m <sup>3</sup> /h	19352	20111	20111	28685
Rotation speed	RPM	912	916	916	684
<b>Evaporator</b>					
<b>Brazed plate heat exchanger</b>					
Number of evaporators		1			
Nominal water flow rate	m <sup>3</sup> /h	9,45	10,56	11,99	14,26
Nominal pressure drop	kPa	33	40	18	24
Water volume	l	6,0	6,0	10,2	10,2
Hydraulic service pressure without hydraulic module	kPa	1000			

(1) EUROVENT certified data, in accordance with standard EN14511 :  
 Water inlet / outlet temperature = 12 °C / 7 °C  
 Outdoor air temperature = 35 °C.

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

## COOLING ONLY UNIT

## C BOX

eCOMFORT	GAC	055S	060S	070S	080S
<b>Hydraulic module (option)</b>					
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel			
Expansion vessel volume	l	35			
Hydraulic service pressure with pump(s)	kPa	350			
Insulated water tank	l	175			
Hydraulic service pressure with pump(s) and water tank	kPa	350			
<b>Hydraulic connections</b>					
Type of standard connection		Victaulic or Welded			
Type of optional connection		Flange			
Inlet / Outlet connection diameters		2"			
Inlet / Outlet external diameters	mm	60,3			
<b>Electrical data</b>					
Power supply		400V / 3 / 50Hz + E			
Maximum power	kW	25	28	30	36
Maximum running current	A	46	55	64	72
Starting current		142	164	173	212
Short circuit unit capacity	kA	10			
Power factor		0,84			
<b>Dimensions</b>					
Length	mm	2250			
Width		1320			
Height		1540			
Height with EC fan(s) (SEAS* or HIFP*)		1790			
Operating weight	kg	602	627	657	706
<b>Acoustic</b>					
Global sound power level Standard unit"	dB(A)	80,9	81,8	82,5	83,8
Global sound power level Low noise unit with acoustic jacket		78,2	79,1	79,8	81,2
Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)		77,5	78,5	79,3	80,3

<b>*SEAS</b>	Variable airflow control with standard EC fans
<b>*HIFP</b>	Variable airflow control with high pressure EC fans

**COOLING ONLY UNIT**

		C+ BOX			D BOX	
		090S	110S	125S	110D	125D
eCOMFORT	GAC					
<b>Cooling mode</b>						
Cooling capacity <sup>(1)</sup>	kW	91	107	122	106	123
Total absorbed power <sup>(1)</sup>		30,1	32,8	39,7	36,4	40,6
EER <sup>(1)</sup>		3,04	3,25	3,08	2,90	3,04
Eurovent energy class <sup>(1)</sup>		B	A	B	B	B
ESEER <sup>(2)</sup>		4,31	4,00	4,00	4,33	4,00
SEPR - Average temperature -8°C <sup>(3)</sup>		3,56	3,33	3,38	3,78	3,39
<b>Refrigeration circuit</b>						
Number of circuits		1	1	1	2	2
Refrigerant charge	kg	12,5	13,5	14,0	13,0	13,6
Type of expansion valve		Electronic expansion valve				
<b>Compressors</b>						
<b>Multi stage Scroll compressors</b>						
Number of compressors		3			2+2	
Type		Trio			Tandem / Tandem	
Capacity steps		0-33-66-100 %			0-25-50-75-100 %	
Rotation speed	RPM	2900				
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil charge	kg	3 x 3,25		3 x 3,38	4 x 3,25	
<b>Condenser</b>						
<b>Microchannel, aluminium tubes and fins</b>						
Number of condensers		2				
<b>Condenser fan</b>						
<b>Axial fan</b>						
Number of condenser fans		2				
Nominal airflow rate	m <sup>3</sup> /h	30675	42482	42482	30675	42482
Rotation speed	RPM	688	916	916	688 / 688	916 / 916
<b>Evaporator</b>						
<b>Brazed plate heat exchanger</b>						
Number of evaporators		1				
Nominal water flow rate	m <sup>3</sup> /h	15,75	18,40	21,10	18,21	21,25
Nominal pressure drop	kPa	29	25	32	42	56
Water volume	l	11,3	14,1	14,1	13,0	13,0
Hydraulic service pressure without hydraulic module	kPa	1000				

(1) EUROVENT certified data, in accordance with standard EN14511 :  
 Water inlet / outlet temperature = 12 °C / 7 °C  
 Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

## COOLING ONLY UNIT

## C+ BOX

## D BOX

eCOMFORT	GAC	090S	110S	125S	110D	125D
<b>Hydraulic module (option)</b>						
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel				
Expansion vessel volume	l	35			35	
Hydraulic service pressure with pump(s)	kPa	350			350	
Insulated water tank	l	175			250	
Hydraulic service pressure with pump(s) and water tank	kPa	350			350	
<b>Hydraulic connections</b>						
Type of standard connection		Victaulic or Welded				
Type of optional connection		Flange				
Inlet / Outlet connection diameters		2" 1/2				
Inlet / Outlet external diameters	mm	76,1				
<b>Electrical data</b>						
Power supply		400V / 3 / 50Hz + E				
Maximum power	kW	41	48	55	49	57
Maximum running current	A	79	101	110	92	114
Starting current		172	210	250	188	223
Short circuit unit capacity	kA	10				
Power factor		0,84				
<b>Dimensions</b>						
Length	mm	2250			2250	
Width		1320			1740	
Height		1815			1815	
Height with EC fan(s) (SEAS* or HIFP*)		2065			2065	
Operating weight	kg	876	892	892	989	1000
<b>Acoustic</b>						
Global sound power level Standard unit"	dB(A)	83,5	85,6	86,3	84,0	85,8
Global sound power level Low noise unit with acoustic jacket		81,0	83,6	84,2	81,4	83,9
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		80,0	81,1	82,1	80,5	81,5

\*SEAS Variable airflow control with standard EC fans

\*HIFP Variable airflow control with high pressure EC fans

**COOLING ONLY UNIT**
**E BOX**

eCOMFORT	GAC	140D	160D	185D
<b>Cooling mode</b>				
Cooling capacity <sup>(1)</sup>	kW	139	162	185
Total absorbed power <sup>(1)</sup>		44,7	52,3	60,0
EER <sup>(1)</sup>		3,10	3,10	3,08
Eurovent energy class <sup>(1)</sup>		A	A	B
ESEER <sup>(2)</sup>		4,13	4,19	4,03
SEPR - Average temperature -8°C <sup>(3)</sup>		3,49	3,54	3,39
<b>Refrigeration circuit</b>				
Number of circuits		2		
Refrigerant charge	kg	16,0	16,6	16,8
Type of expansion valve		Electronic expansion valve		
<b>Compressors</b>				
<b>Multi stage Scroll compressors</b>				
Number of compressors		2+2		3+2
Type		Tandem / Tandem		Trio / Tandem
Capacity steps		0-25-50-75-100 %		0-20-40-60-80-100 %
Rotation speed	RPM	2900		
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF		
Oil charge	kg	4 x 3,25	4 x 3,38	3 x 3,25 + 2 x 3,38
<b>Condenser</b>				
<b>Microchannel, aluminium tubes and fins</b>				
Number of condensers		4		
<b>Condenser fan</b>				
<b>Axial fan</b>				
Number of condenser fans		2	4	4
Nominal airflow rate	m <sup>3</sup> /h	43725	56441	67360
Rotation speed	RPM	919 / 919	683 / 683	912 / 679
<b>Evaporator</b>				
<b>Brazed plate heat exchanger</b>				
Number of evaporators		1		
Nominal water flow rate	m <sup>3</sup> /h	23,94	27,94	31,91
Nominal pressure drop	kPa	46	61	58
Water volume	l	24,3	24,3	27,1
Hydraulic service pressure without hydraulic module	kPa	1000		

(1) EUROVENT certified data, in accordance with standard EN14511 :  
 Water inlet / outlet temperature = 12 °C / 7 °C  
 Outdoor air temperature = 35 °C.

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

## COOLING ONLY UNIT

## E BOX

eCOMFORT	GAC	140D	160D	185D
<b>Hydraulic module (option)</b>				
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel		
Expansion vessel volume	l	50		
Hydraulic service pressure with pump(s)	kPa	350		
Insulated water tank	l	400		
Hydraulic service pressure with pump(s) and water tank	kPa	350		
<b>Hydraulic connections</b>				
Type of standard connection		Victaulic or Welded		
Type of optional connection		Flange		
Inlet / Outlet connection diameters		3"		
Inlet / Outlet external diameters	mm	88,9		
<b>Electrical data</b>				
Power supply		400V / 3 / 50Hz + E		
Maximum power	kW	62	71	83
Maximum running current	A	132	145	173
Starting current		241	285	313
Short circuit unit capacity	kA	10		
Power factor		0,84		
<b>Dimensions</b>				
Length	mm	2650		
Width		2250		
Height		1815		
Height with EC fan(s) (SEAS* or HIFP*)		2065		
Operating weight	kg	1401	1508	1575
<b>Acoustic</b>				
Global sound power level Standard unit"	dB(A)	86,4	86,8	87,7
Global sound power level Low noise unit with acoustic jacket		84,3	84,2	85,6
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		82,3	83,3	83,7

<b>*SEAS</b>	Variable airflow control with standard EC fans
<b>*HIFP</b>	Variable airflow control with high pressure EC fans

**HEAT PUMP UNIT**
**B BOX**

eCOMFORT	GAH	020S	025S	030S	035S	040S	045S
Cooling capacity <sup>(1)</sup>	kW	20	24	31	36	39	45
Total absorbed power <sup>(1)</sup>		6,0	8,0	11,2	12,4	13,5	16,2
EER <sup>(1)</sup>		3,31	3,05	2,77	2,94	2,92	2,76
Eurovent energy class <sup>(1)</sup>		A	B	C	B	B	C
ESEER <sup>(2)</sup>		4,45	4,41	4,11	4,16	4,17	4,05
SEPR <sup>(3)</sup> Average temperature -8°C		3,39	3,52	3,51	3,62	3,46	3,44
<b>Heating mode</b>							
Net heating capacity	kW	19,8	24,5	31,9	36,7	39,2	44,6
Total Absorbed power		6,6	8,2	10,6	12,2	13,1	14,9
COP		3,00	3,00	3,00	3,00	3,00	3,00
Eurovent energy class (full load)		B	B	B	B	B	B
Seasonal energy efficiency : $\eta_{s,h}$ <sup>(5)</sup>		135	128	126	126	126	126
Seasonal energy efficiency : SCOP <sup>(4)</sup>		3,45	3,28	3,22	3,22	3,22	3,22
Seasonal energy efficiency class <sup>(5)</sup>		<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>
<b>Refrigeration circuit</b>							
Number of circuits		1					
Refrigerant charge	kg	7,4	7,6	8,8	9,2	9,4	9,6
Type of expansion valve		Electronic expansion valve					
<b>Compressors</b>							
<b>Multi stage Scroll compressors</b>							
Number of compressors		2					
Type		Tandem					
Capacity steps		0-50-100 %					
Rotation speed	RPM	2900					
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF					
Oil charge	kg	2 x 1,24	2 x 1,77			2 x 2,51	
<b>Condenser</b>							
<b>Microchannel, aluminium tubes and fins</b>							
Number of condensers		1					
<b>Condenser fan</b>							
<b>Axial fan</b>							
Number of condenser fans		1					
Nominal airflow rate	m <sup>3</sup> /h	9625	9625	10060	14182	14182	14182
Rotation speed	RPM	911	911	916	683	683	683

(1) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 12 °C / 7 °C  
Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(4) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 40°C / 45 °C  
Outdoor air temperature = 7 °C.

(5) Following ecodesign regulation n°2013/813 on space heaters, in accordance with standard EN14825, average climate

(6) SCOP in accordance with standard EN14825, average climate



## HEAT PUMP UNIT

## B BOX

eCOMFORT	GAH	020S	025S	030S	035S	040S	045S
<b>Evaporator</b>		<b>Brazed plate heat exchanger</b>					
Number of evaporators		1					
Nominal water flow rate	m <sup>3</sup> /h	3,45	4,21	5,35	6,28	6,80	7,71
Nominal pressure drop	kPa	17	25	26	35	29	38
Water volume	l	4,0	4,0	4,6	4,6	5,2	5,2
Hydraulic service pressure without hydraulic module	kPa	1000					
<b>Hydraulic module (option)</b>							
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel					
Expansion vessel volume	l	18					
Hydraulic service pressure with pump(s)	kPa	350					
Insulated water tank	l	100					
Hydraulic service pressure with pump(s) and water tank	kPa	350					
<b>Hydraulic connections</b>							
Type of standard connection		Threaded male					
Type of optional connection		Non available					
Inlet / Outlet connection diameters		1"1/2					
Inlet / Outlet external diameters	mm	48,3					
<b>Electrical data</b>							
Power supply		400V / 3 / 50Hz + E					
Maximum power	kW	9	12	15	17	18	21
Maximum running current	A	17	22	31	32	35	39
Starting current		52	63	91	118	119	148
Short circuit unit capacity	kA	10					
Power factor		0,84					
<b>Dimensions</b>							
Length	mm	1320					
Width		1125					
Height		1540					
Height with EC fan(s) (SEAS* or HIFP*)		1790					
Operating weight	kg	335	341	370	394	400	421
<b>Acoustic</b>							
Global sound power level Standard unit"	dB(A)	74,0	75,6	75,6	76,4	79,2	78,4
Global sound power level Low noise unit with acoustic jacket		71,7	73,2	73,2	74,5	76,8	76,1
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		70,0	72,0	72,0	72,0	75,5	74,6

<b>*SEAS</b>	Variable airflow control with standard EC fans
<b>*HIFP</b>	Variable airflow control with high pressure EC fans

**HEAT PUMP UNIT**
**C BOX**

eCOMFORT	GAH	055S	060S	070S	080S
<b>Cooling mode</b>					
Cooling capacity <sup>(1)</sup>	kW	54	60	68	81
Total absorbed power <sup>(1)</sup>		17,9	20,1	23,1	26,7
EER <sup>(1)</sup>		3,02	2,99	2,96	3,05
Eurovent energy class <sup>(1)</sup>		B	B	B	B
ESEER <sup>(2)</sup>		4,35	4,15	4,30	4,25
SEPR <sup>(3)</sup> Average temperature -8°C		3,72	3,6	3,68	3,6
<b>Cooling mode</b>					
Net heating capacity	kW	53,6	61,3	67,6	79,3
Total Absorbed power		17,9	20,4	21,7	25,9
COP		3,00	3,01	3,11	3,06
Eurovent energy class (full load)		B	B	B	B
Seasonal energy efficiency : $\eta_{s,h}$ <sup>(5)</sup>		128	126	135	130
Seasonal energy efficiency : SCOP <sup>(4)</sup>		3,28	3,22	3,45	3,32
Seasonal energy efficiency class <sup>(5)</sup>		<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>
<b>Refrigeration circuit</b>					
Number of circuits		1			
Refrigerant charge	kg	14	18	18,4	19
Type of expansion valve		Electronic expansion valve			
<b>Compressors</b>					
<b>Multi stage Scroll compressors</b>					
Number of compressors		2			
Type		Tandem			
Capacity steps		0-50-100 %			
Rotation speed	RPM	2900			
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF			
Oil charge	kg	2 x 3,25		2 x 3,38	
<b>Condenser</b>					
<b>Microchannel, aluminium tubes and fins</b>					
Number of condensers		2			
<b>Condenser fan</b>					
<b>Axial fan</b>					
Number of condenser fans		1	2	2	2
Nominal airflow rate	m <sup>3</sup> /h	19251	20120	20120	28364
Rotation speed	RPM	911	916	916	683

(1) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 12 °C / 7 °C  
Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(4) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 40°C / 45 °C  
Outdoor air temperature = 7 °C.

(5) Following ecodesign regulation n°2013/813 on space heaters, in accordance with standard EN14825, average climate

(6) SCOP in accordance with standard EN14825, average climate

## HEAT PUMP UNIT

## C BOX

eCOMFORT	GAH	055S	060S	070S	080S
<b>Evaporator</b>		<b>Brazed plate heat exchanger</b>			
Number of evaporators		1			
Nominal water flow rate	m <sup>3</sup> /h	9,31	10,37	11,80	14,04
Nominal pressure drop	kPa	32	39	17	24
Water volume	l	6,0	6,0	10,2	10,2
Hydraulic service pressure without hydraulic module	kPa	1000			
<b>Hydraulic module (option)</b>					
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel			
Expansion vessel volume	l	35			
Hydraulic service pressure with pump(s)	kPa	350			
Insulated water tank	l	175			
Hydraulic service pressure with pump(s) and water tank	kPa	350			
<b>Hydraulic connections</b>					
Type of standard connection		Victaulic or Welded			
Type of optional connection		Flange			
Inlet / Outlet connection diameters		2"			
Inlet / Outlet external diameters	mm				
<b>Electrical data</b>					
Power supply		400V / 3 / 50Hz + E			
Maximum power	kW	25	28	30	36
Maximum running current	A	46	55	64	72
Starting current		142	164	173	212
Short circuit unit capacity	kA	10			
Power factor		0,84			
<b>Dimensions</b>					
Length	mm	2250			
Width		1320			
Height		1540			
Height with EC fan(s) (SEAS* or HIFP*)		1790			
Operating weight	kg	645	683	715	773
<b>Acoustic</b>					
Global sound power level Standard unit"	dB(A)	80,9	81,8	82,5	83,8
Global sound power level Low noise unit with acoustic jacket		78,2	79,1	79,8	81,2
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		77,5	78,5	79,3	80,3

\*SEAS Variable airflow control with standard EC fans

\*HIFP Variable airflow control with high pressure EC fans

**HEAT PUMP UNIT**
**D BOX**

eCOMFORT	GAH	090S	110S	125S	110D	125D
<b>Cooling mode</b>						
Cooling capacity <sup>(1)</sup>	kW	91	106	120	105	121
Total absorbed power <sup>(1)</sup>		30,4	33,5	40,8	37,4	41,8
EER <sup>(1)</sup>		2,98	3,15	2,95	2,80	2,90
Eurovent energy class <sup>(1)</sup>		B	A	B	C	B
ESEER <sup>(2)</sup>		4,37	4,00	4,00	4,42	4,00
SEPR <sup>(3)</sup> Average temperature -8°C		3,59	3,36	3,39	3,83	3,39
<b>Heating mode</b>						
Net heating capacity	kW	91,2	103,4	118,1	106,3	121,1
Total Absorbed power		30,3	34,1	39,3	34	40,2
COP		3,01	3,03	3,00	3,12	3,02
Eurovent energy class (full load)		B	B	B	B	B
Seasonal energy efficiency : $\eta_{s,h}$ <sup>(5)</sup>		147	133	131	143	127
Seasonal energy efficiency : SCOP <sup>(4)</sup>		3,75	3,4	3,35	3,65	3,25
Seasonal energy efficiency class <sup>(5)</sup>		<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>	<b>A+</b>
<b>Refrigeration circuit</b>						
Number of circuits		1	1	1	2	2
Refrigerant charge	kg	25	27	27,3	27,6	29
Type of expansion valve		Electronic expansion valve				
<b>Compressors</b>						
<b>Multi stage Scroll compressors</b>						
Number of compressors		3		2+2		
Type		Trio		Tandem / Tandem		
Capacity steps		0-33-66-100 %		0-25-50-75-100 %		
Rotation speed	RPM	2900				
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF				
Oil charge	kg	3 x 3,25		3 x 3,38	4 x 3,25	
<b>Condenser</b>						
<b>Microchannel, aluminium tubes and fins</b>						
Number of condensers		2				
<b>Condenser fan</b>						
<b>Axial fan</b>						
Number of condenser fans		2				
Nominal airflow rate	m <sup>3</sup> /h	30633	42200	42200	30633	42200
Rotation speed	RPM	688	915	915	688 / 688	915 / 915

(1) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 12 °C / 7 °C  
Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(4) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 40°C / 45 °C  
Outdoor air temperature = 7 °C.

(5) Following ecodesign regulation n°2013/813 on space heaters, in accordance with standard EN14825, average climate

(6) SCOP in accordance with standard EN14825, average climate

## HEAT PUMP UNIT

## D BOX

eCOMFORT	GAH	090S	110S	125S	110D	125D
<b>Evaporator</b>		<b>Brazed plate heat exchanger</b>				
Number of evaporators		<b>1</b>				
Nominal water flow rate	m <sup>3</sup> /h	15,61	18,21	20,77	18,06	20,87
Nominal pressure drop	kPa	29	25	31	41	54
Water volume	l	11,3	14,1	14,1	13,0	13,0
Hydraulic service pressure without hydraulic module	kPa	1000				
<b>Hydraulic module (option)</b>						
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel				
Expansion vessel volume	l	35			50	
Hydraulic service pressure with pump(s)	kPa	350			350	
Insulated water tank	l	250			250	
Hydraulic service pressure with pump(s) and water tank	kPa	350			350	
<b>Hydraulic connections</b>						
Type of standard connection		Victaulic or Welded				
Type of optional connection		Flange				
Inlet / Outlet connection diameters		2" 1/2				
Inlet / Outlet external diameters	mm	76,1				
<b>Electrical data</b>						
Power supply		400V / 3 / 50Hz + E				
Maximum power	kW	41	48	55	49	57
Maximum running current	A	79	101	110	92	114
Starting current		172	210	250	188	223
Short circuit unit capacity	kA	10				
Power factor		0,84				
<b>Dimensions</b>						
Length	mm	2250				
Width		1740				
Height		1815				
Height with EC fan(s) (SEAS* or HIFP*)		2065				
Operating weight	kg	927	995	995	1061	1073
<b>Acoustic</b>						
Global sound power level Standard unit"	dB(A)	83,5	85,6	86,3	84,0	85,8
Global sound power level Low noise unit with acoustic jacket		81,0	83,6	84,2	81,4	83,9
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		80,0	81,1	82,1	80,5	81,5

\*SEAS Variable airflow control with standard EC fans

\*HIFP Variable airflow control with high pressure EC fans

**HEAT PUMP UNIT**
**E BOX**

eCOMFORT	GAH	140D	160D	185D
<b>Cooling mode</b>				
Cooling capacity <sup>(1)</sup>	kW	137	159	181
Total absorbed power <sup>(1)</sup>		46,2	54,1	62,3
EER <sup>(1)</sup>		2,95	2,95	2,91
Eurovent energy class <sup>(1)</sup>		B	B	B
ESEER <sup>(2)</sup>		4,13	4,19	4,00
SEPR <sup>(3)</sup> Average temperature -8°C		3,48	3,53	3,39
<b>Heating mode</b>				
Net heating capacity	kW	135,8	157,2	174,5
Total Absorbed power		43,5	51,4	58,3
COP		3,12	3,06	3,00
Eurovent energy class (full load)		B	B	B
Seasonal energy efficiency : $\eta_{s,h}$ <sup>(5)</sup>		132	133	127
Seasonal energy efficiency : SCOP <sup>(4)</sup>		3,38	3,4	3,25
Seasonal energy efficiency class <sup>(5)</sup>				
<b>Refrigeration circuit</b>				
Number of circuits		2		
Refrigerant charge	kg	35	37	38
Type of expansion valve		Electronic expansion valve		
<b>Compressors</b>				
<b>Multi stage Scroll compressors</b>				
Number of compressors		2+2	2+2	3+2
Type		Tandem / Tandem		Trio / Tandem
Capacity steps		0-25-50-75-100 %		0-20-40-60-80-100 %
Rotation speed	RPM	2900		
Oil type		MOBIL EAL Arctic 22CC or ICI EMKARATE RL32CF		
Oil charge		4 x 3,25	4 x 3,38	3 x 3,25 + 2 x 3,38
<b>Condenser</b>				
<b>Microchannel, aluminium tubes and fins</b>				
Number of condensers		4		
<b>Condenser fan</b>				
<b>Axial fan</b>				
Number of condenser fans		2	4	4
Nominal airflow rate		43659	55668	66097
Rotation speed	RPM	919 / 919	682 / 682	911 / 678

(1) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 12 °C / 7 °C  
Outdoor air temperature = 35 °C.

(2) ESEER following Eurovent calculation method, in accordance with standard EN14511

(3) Following ecodesign regulation n° 2015/1095 on process cooling chillers, normalized leaving water temperature at -8°C, in accordance with standard EN14825

(4) EUROVENT certified data, in accordance with standard EN14511 :  
Water inlet / outlet temperature = 40°C / 45 °C  
Outdoor air temperature = 7 °C.

(5) Following ecodesign regulation n°2013/813 on space heaters, in accordance with standard EN14825, average climate

(6) SCOP in accordance with standard EN14825, average climate

## HEAT PUMP UNIT

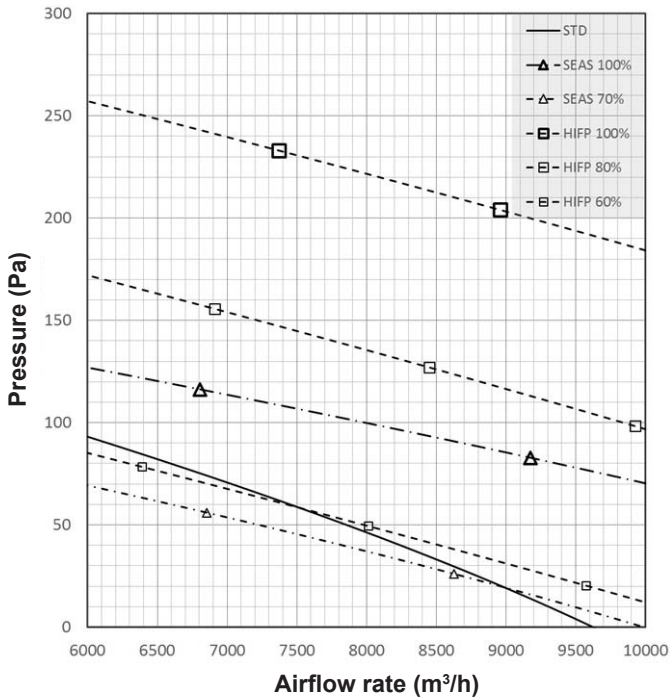
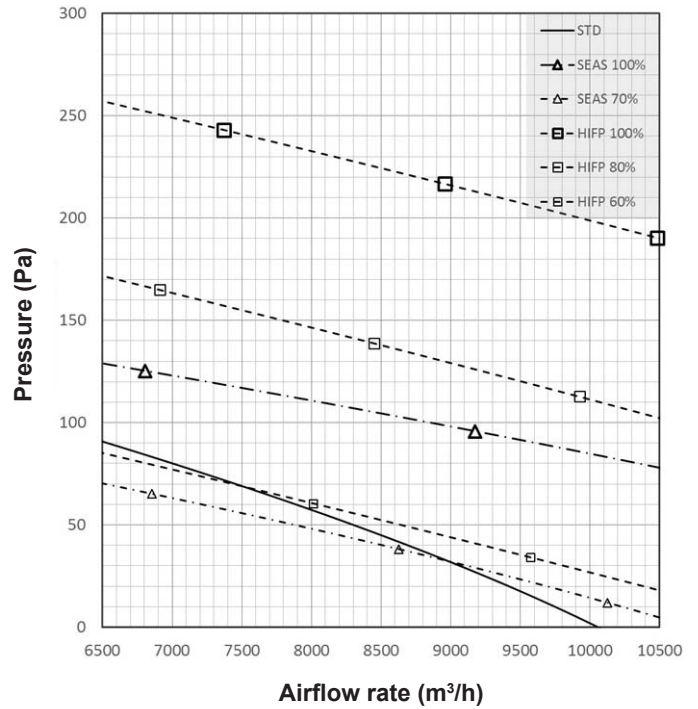
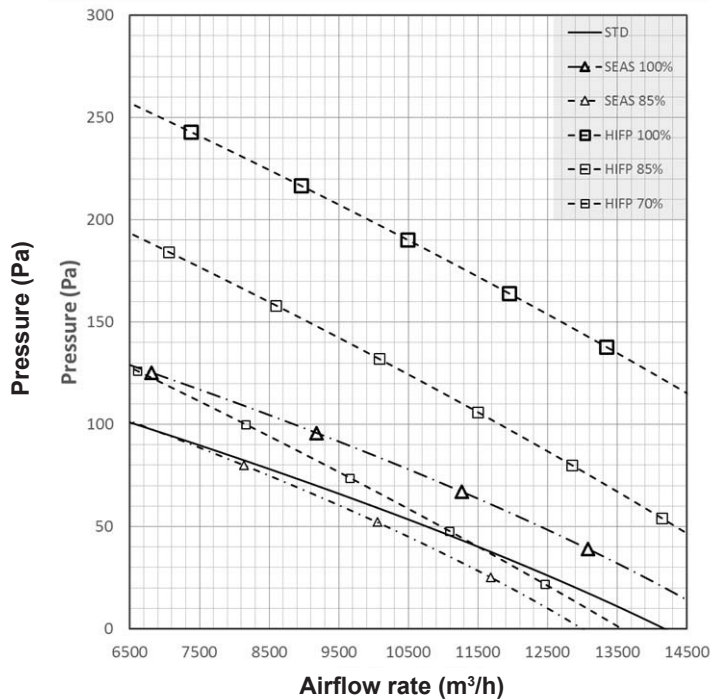
## E BOX

eCOMFORT		GAH	140D	160D	185D
<b>Evaporator</b>		<b>Brazed plate heat exchanger</b>			
Number of evaporators		1			
Nominal water flow rate	m <sup>3</sup> /h	23,54	27,48	31,29	
Nominal pressure drop	kPa	44	59	56	
Water volume	l	24,3	24,3	27,1	
Hydraulic service pressure without hydraulic module	kPa	1000			
<b>Hydraulic module (option)</b>					
Type of pump Low or high pressure pump		Stainless steel centrifugal single or twin pump mounted in parallel			
Expansion vessel volume	l	50			
Hydraulic service pressure with pump(s)	kPa	350			
Insulated water tank	l	400			
Hydraulic service pressure with pump(s) and water tank	kPa	350			
<b>Hydraulic connections</b>					
Type of standard connection		Victaulic or Welded			
Type of optional connection		Flange			
Inlet / Outlet connection diameters		3"			
Inlet / Outlet external diameters	mm	88,9			
<b>Electrical data</b>					
Power supply		400V / 3 / 50Hz + E			
Maximum power	kW	62	71	83	
Maximum running current	A	132	145	173	
Starting current		241	285	313	
Short circuit unit capacity	kA	10			
Power factor		0,84			
<b>Dimensions</b>					
Length	mm	2650			
Width		2250			
Height		1815			
Height with EC fan(s) (SEAS* or HIFP*)		2065			
Operating weight	kg	1483	1592	1663	
<b>Acoustic</b>					
Global sound power level Standard unit"	dB(A)	86,4	86,8	87,7	
Global sound power level Low noise unit with acoustic jacket		84,3	84,2	85,6	
"Min global sound power level Xtra low noise unit with acoustic jacket + EC fan (programme AAAS)"		82,3	83,3	83,7	

\*SEAS Variable airflow control with standard EC fans

\*HIFP Variable airflow control with high pressure EC fans

## FAN DATA

 GAH  
020S / 025S

 GAH  
030S

 GAH  
035S / 040S / 045S


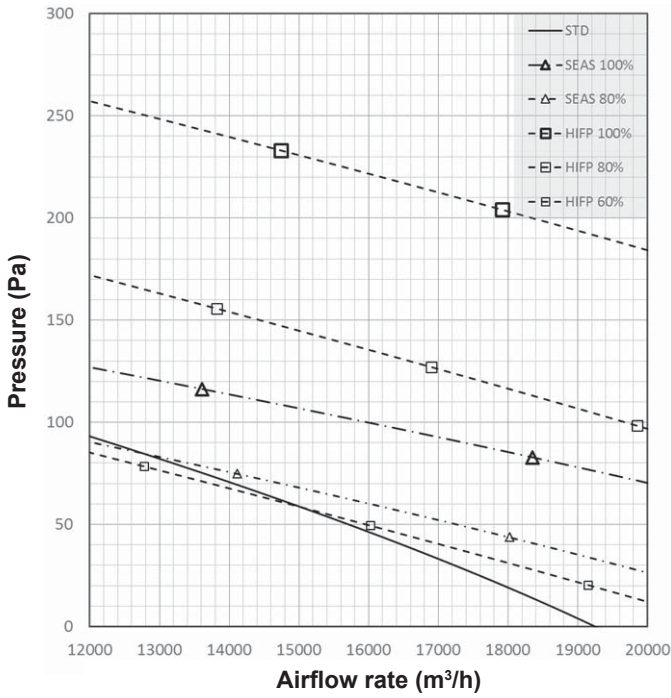
NOTE: For GAC units consider 3% more of airflow

<b>STD</b>	Standard unit
<b>SEAS</b>	Variable airflow control with standard EC fans
<b>HIFP</b>	Variable airflow control with high pressure EC fans

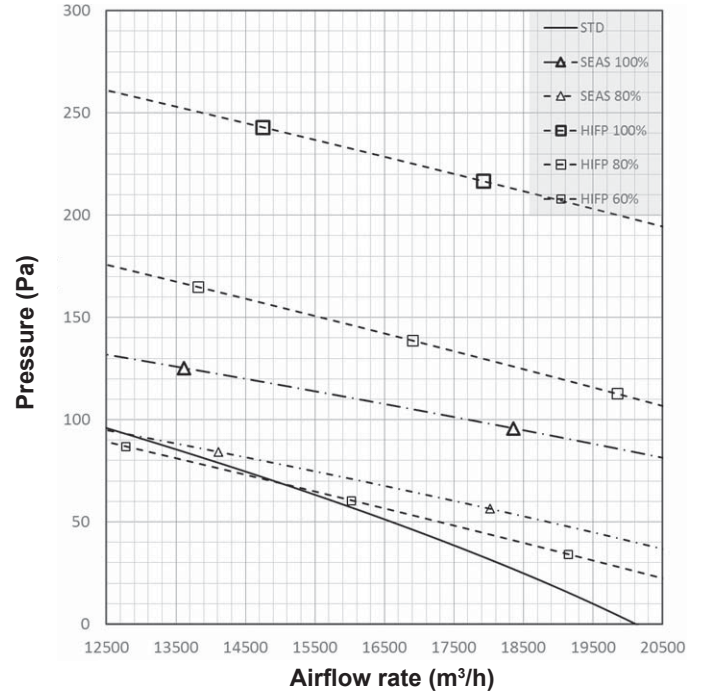


FAN DATA

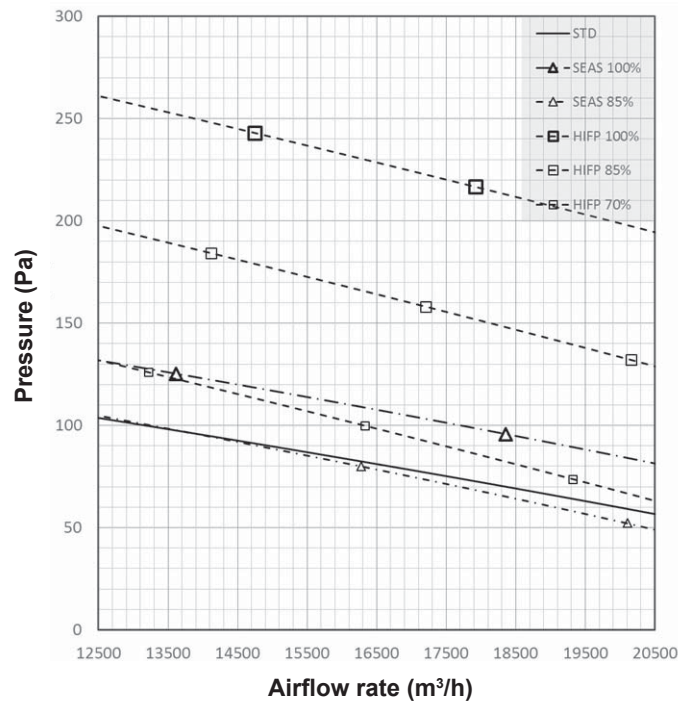
GAH  
055S



GAH  
060S / 070S



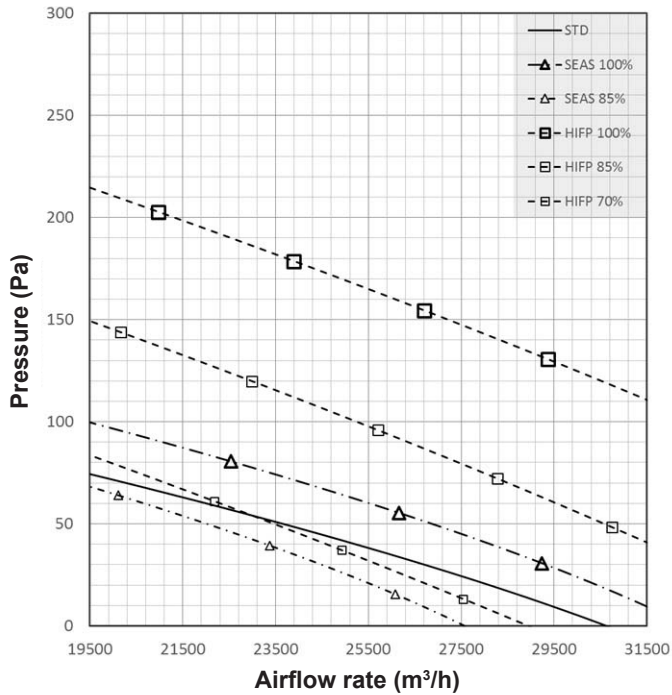
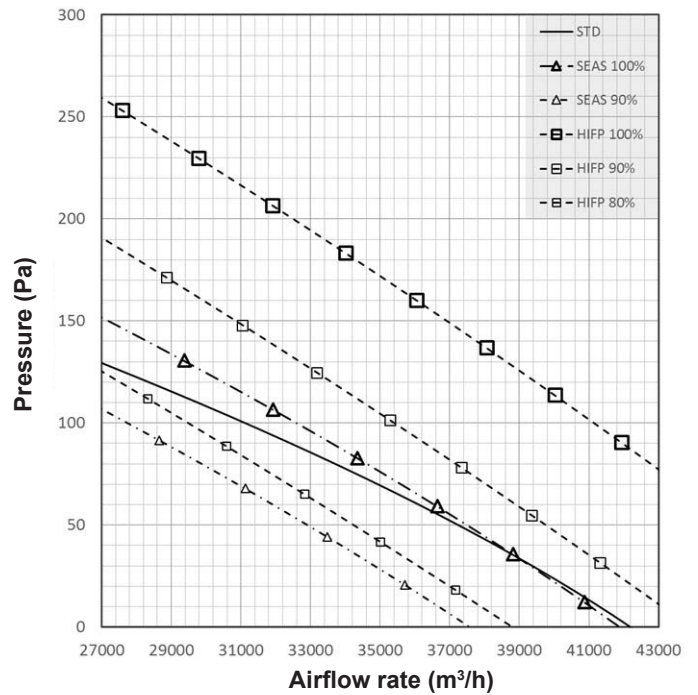
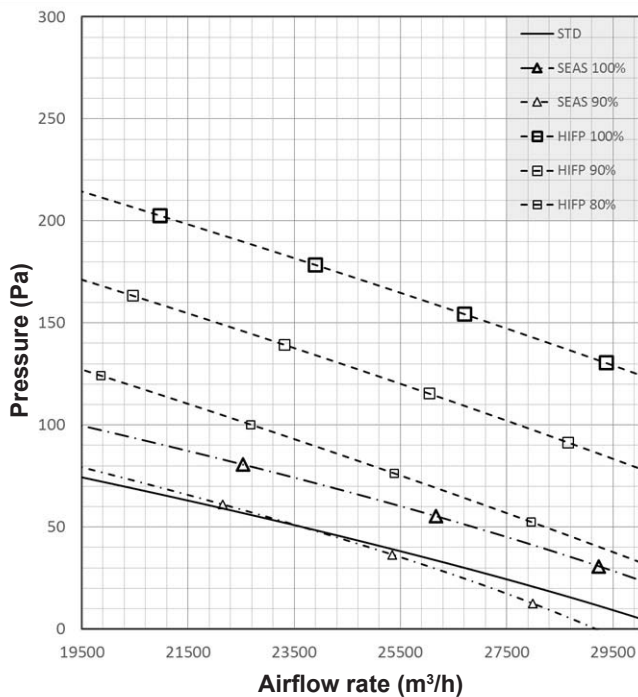
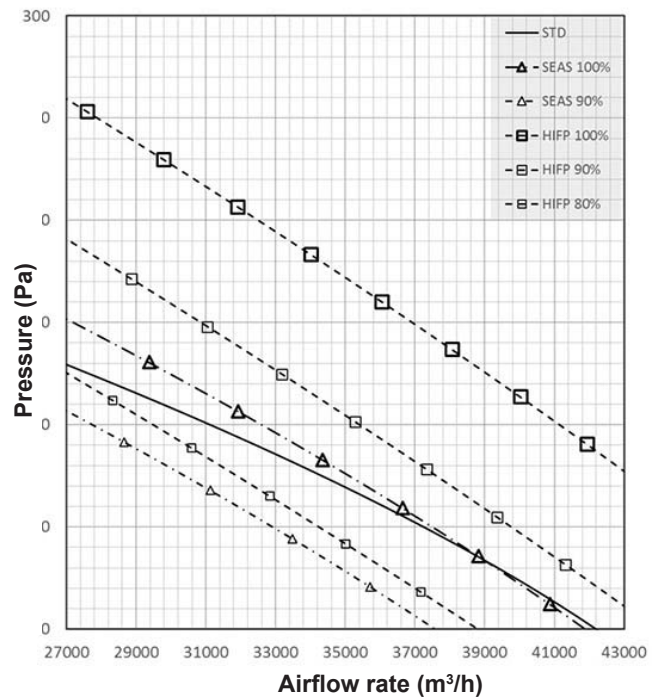
GAH  
080S



NOTE: For GAC units consider 3% more of airflow

<b>STD</b>	Standard unit
<b>SEAS</b>	Variable airflow control with standard EC fans
<b>HIFP</b>	Variable airflow control with high pressure EC fans

## FAN DATA

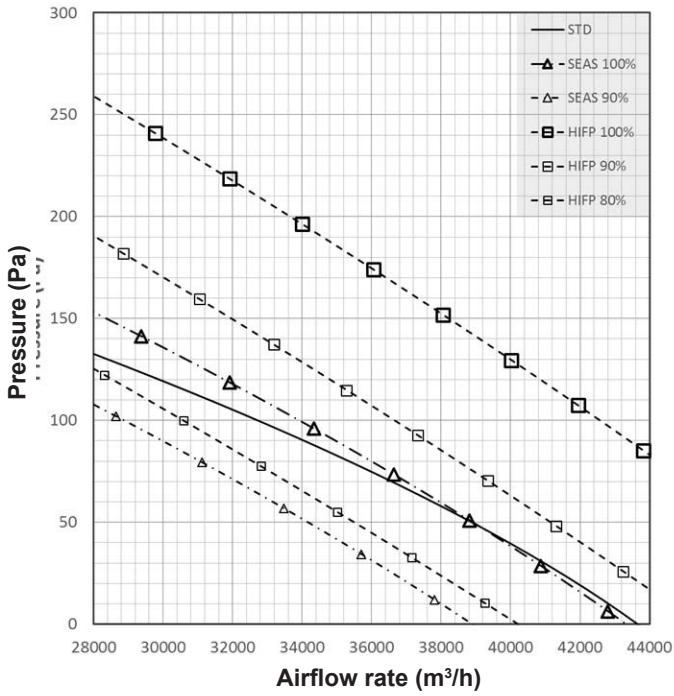
 GAH  
090S

 GAH  
110S / 125S

 GAH  
110D

 GAH  
112S


NOTE: For GAC units consider 3% more of airflow

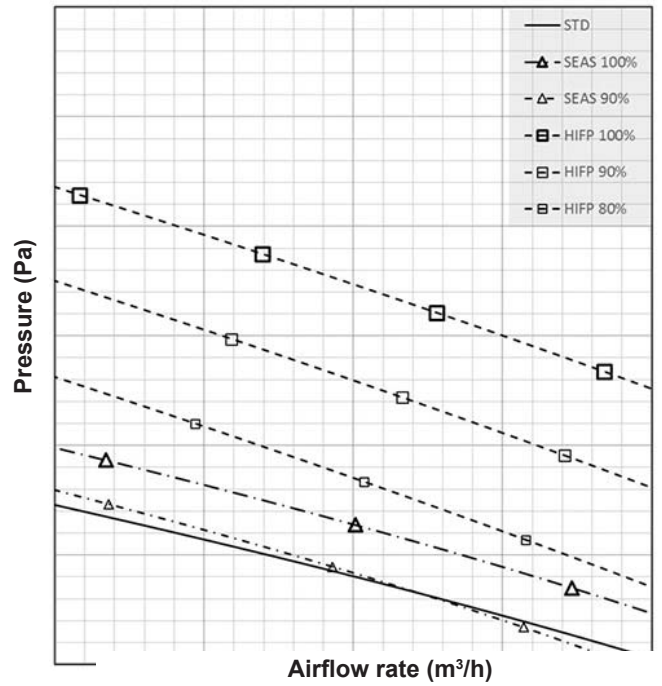
<b>STD</b>	Standard unit
<b>SEAS</b>	Variable airflow control with standard EC fans
<b>HIFP</b>	Variable airflow control with high pressure EC fans

FAN DATA

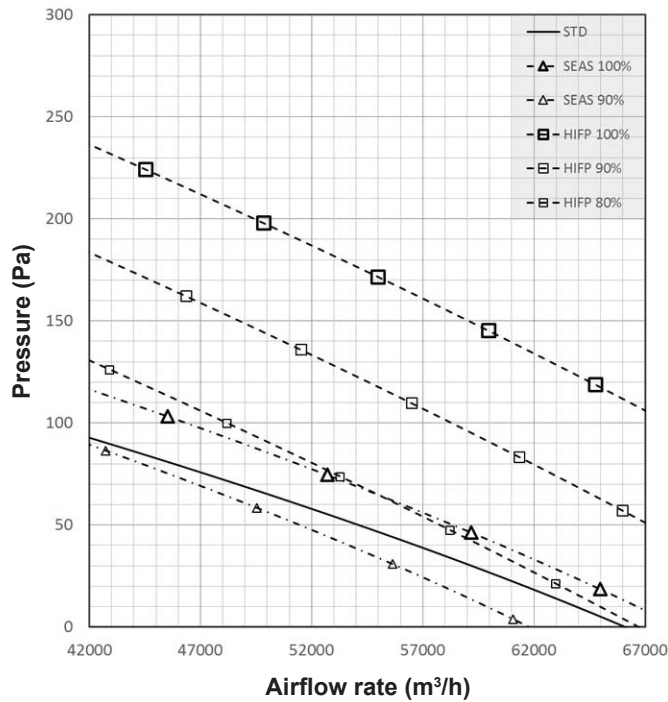
GAH  
140D



GAH  
160D



GAH  
185D



NOTE: For GAC units consider 3% more of airflow

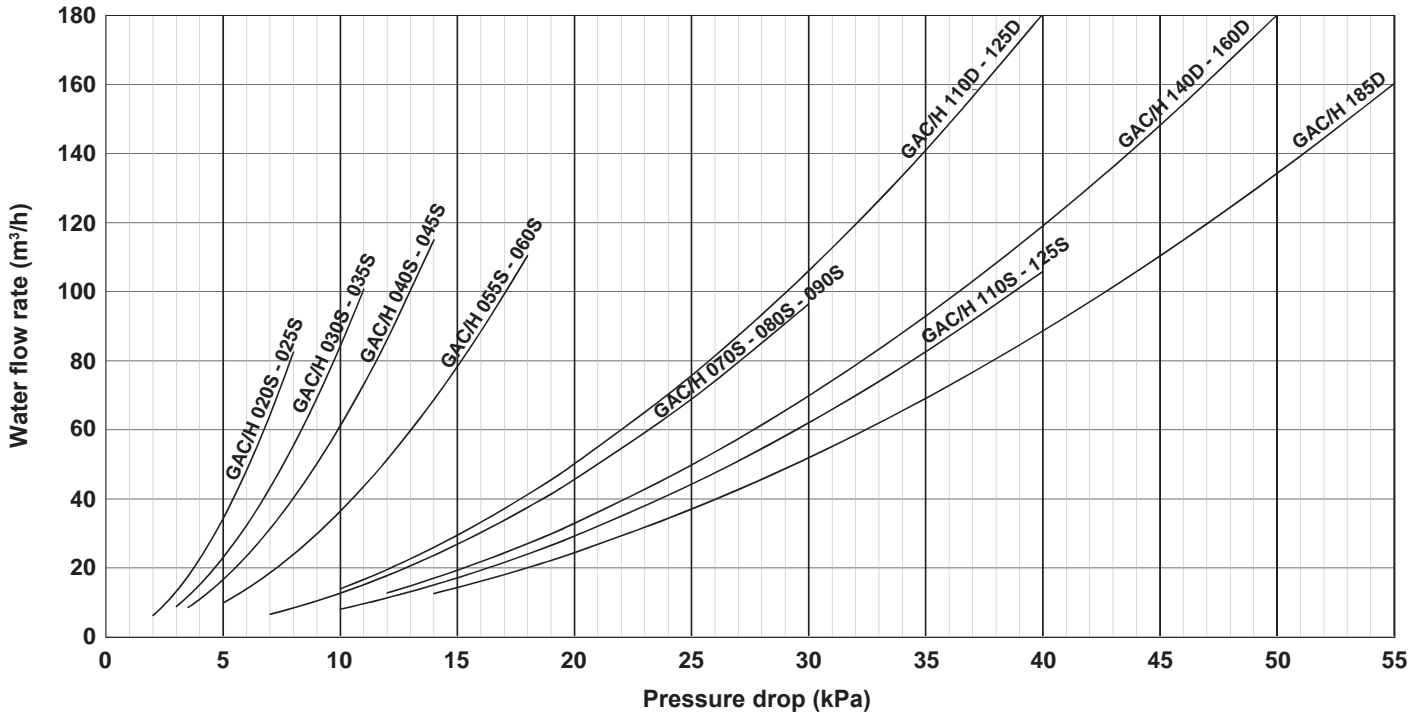
<b>STD</b>	Standard unit
<b>SEAS</b>	Variable airflow control with standard EC fans
<b>HIFP</b>	Variable airflow control with high pressure EC fans



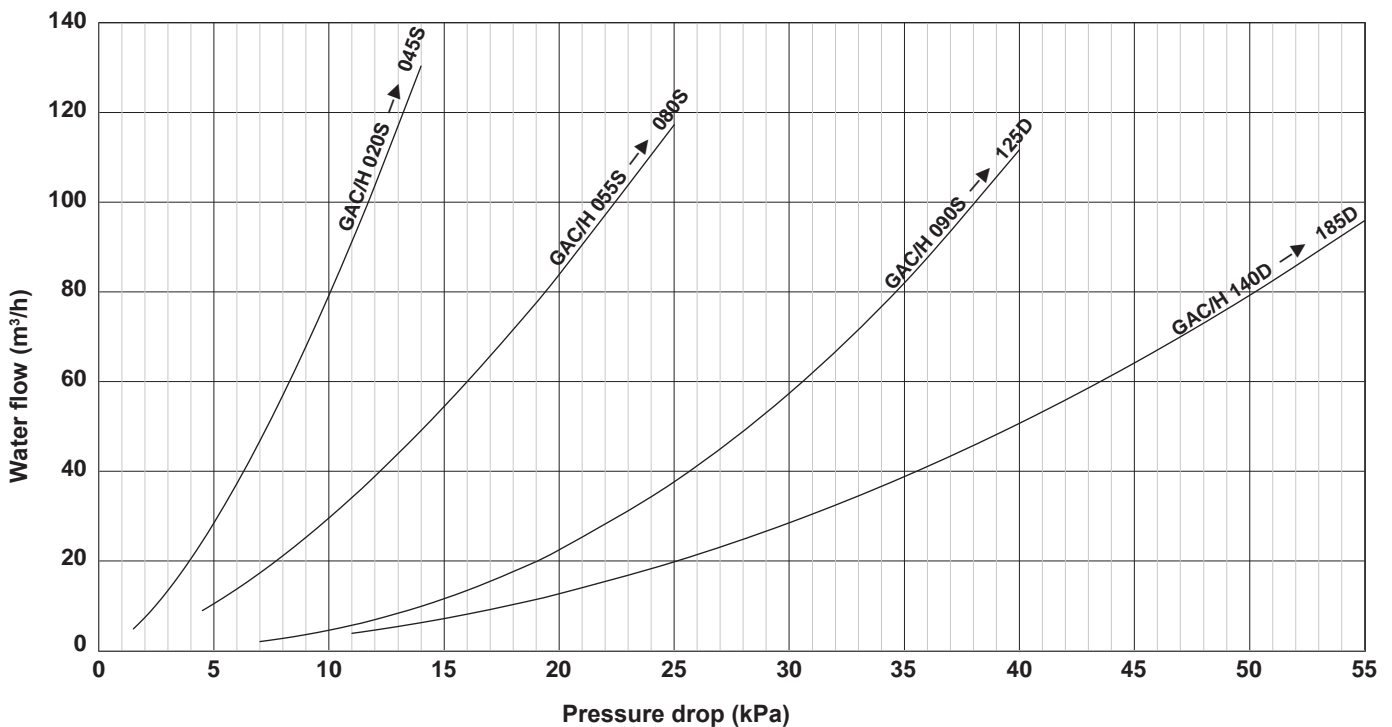
### INSTALLATION ADVICE

The units MUST be fitted with a water filter at the inlet to the unit (trapping any particles with a diameter greater than 1 mm.)

## Pressure drop of the unit without water filter

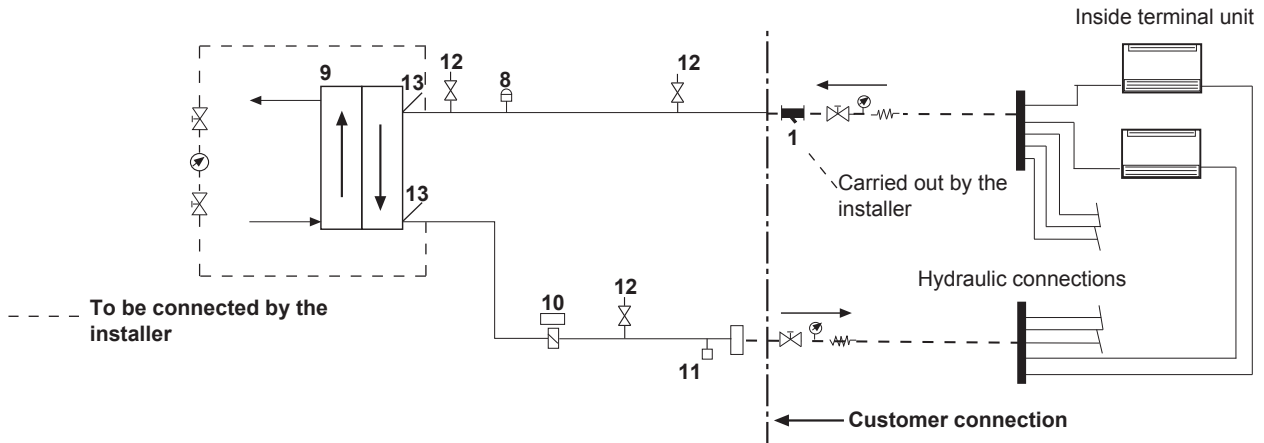


## Pressure drop for option water filter

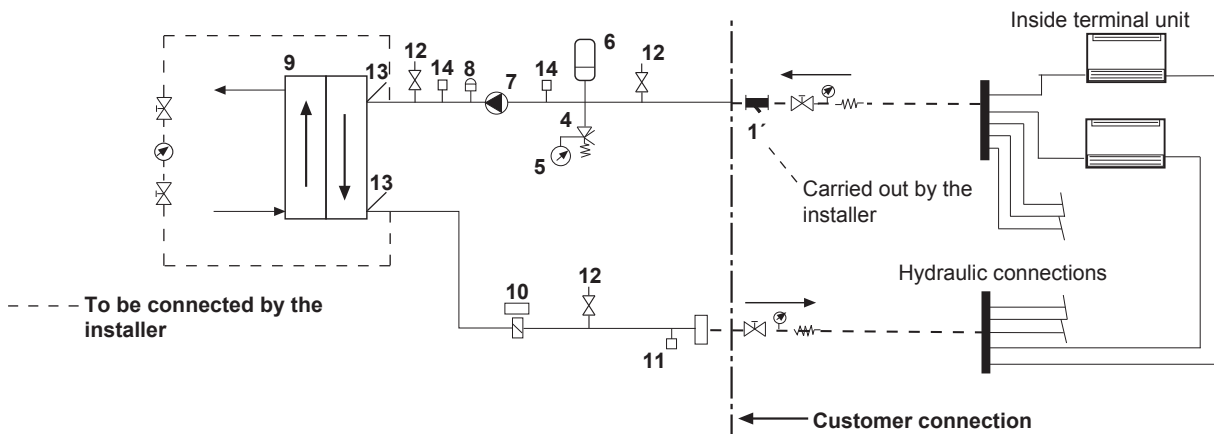


Filter included as standard.

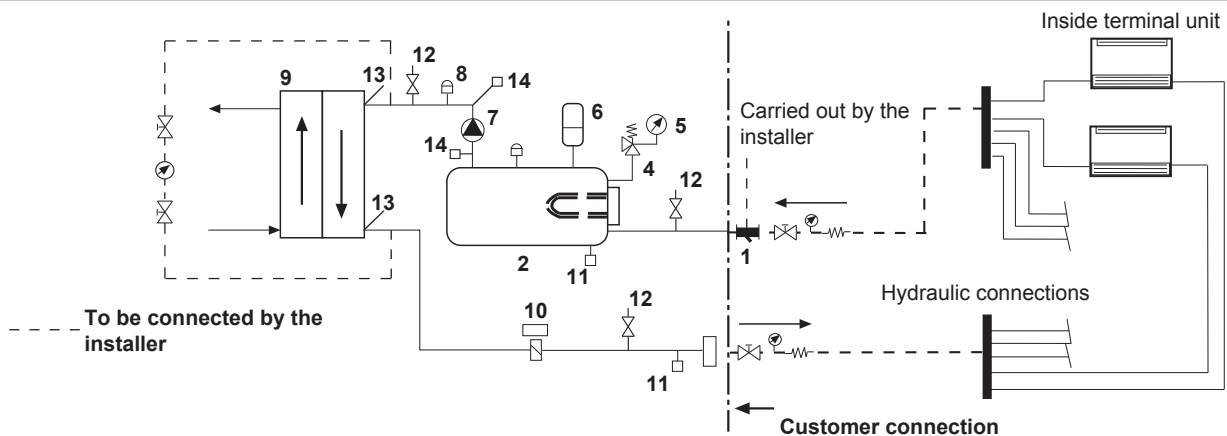
**STANDARD UNIT**



**UNIT WITH WATER PUMP OPTION**



**UNIT WITH WATER TANK OPTION**



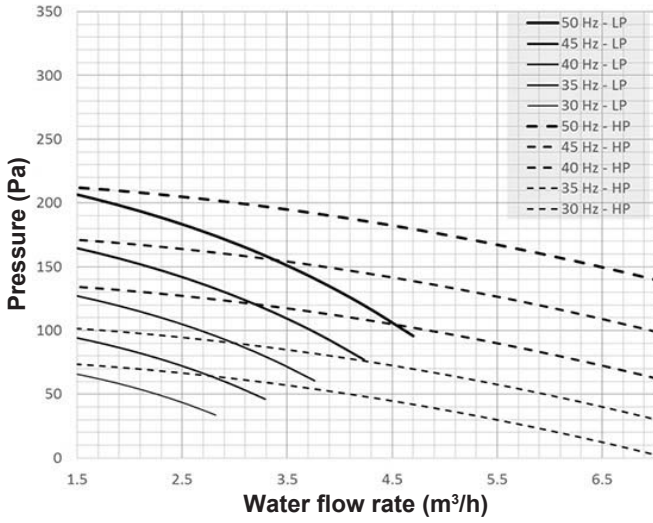
**COMPONENTS:**

STANDARD VERSION		UNIT WITH WATER PUMP OPTION		UNIT WITH WATER TANK OPTION	
8, 9, 10, 11, 12, 13		4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
1	Water filter (additional option, supplied loose)	6	Expansion vessel	11	Drain valve
2	Water tank	7	Water pump	12	Pressure tap
3	Water tank heater	8	Air purge valve	13	Water temperature sensor
4	Safety valve	9	Plate exchanger	14	Pressure transducer (when variable water flow option is selected)
5	Pressure gauge	10	Flow switch		

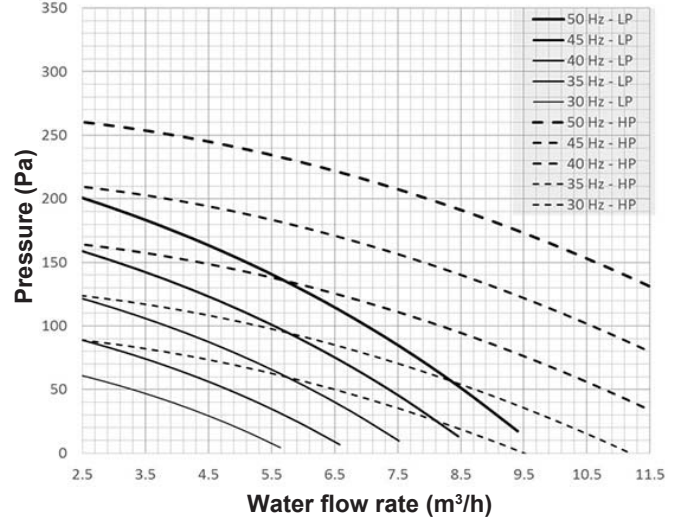
The use of a water filter in the circuit upstream of the heat exchanger is mandatory. These filters must remove all particles with a diameter greater than 1 mm, and must be positioned within 1 meter of the inlet of the exchanger. They may be supplied as an option by the manufacturer.

**WATER FLOW AND AVAILABLE STATIC PRESSURE OF WATER PUMP**

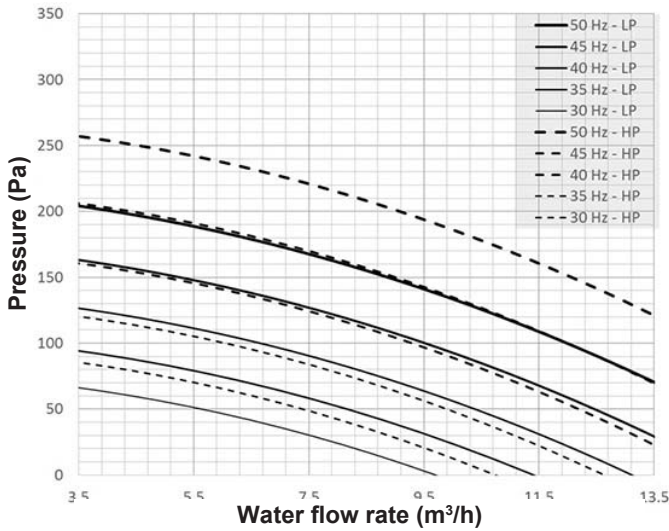
GAC/GAH  
020S - 025S



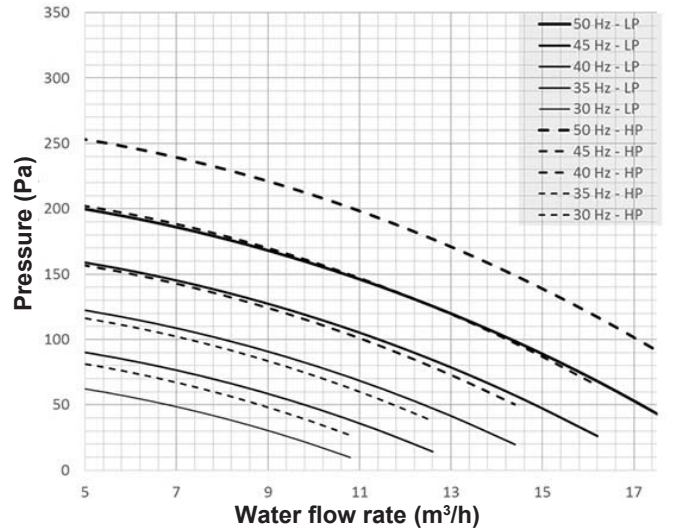
GAC/GAH  
030S - 035S



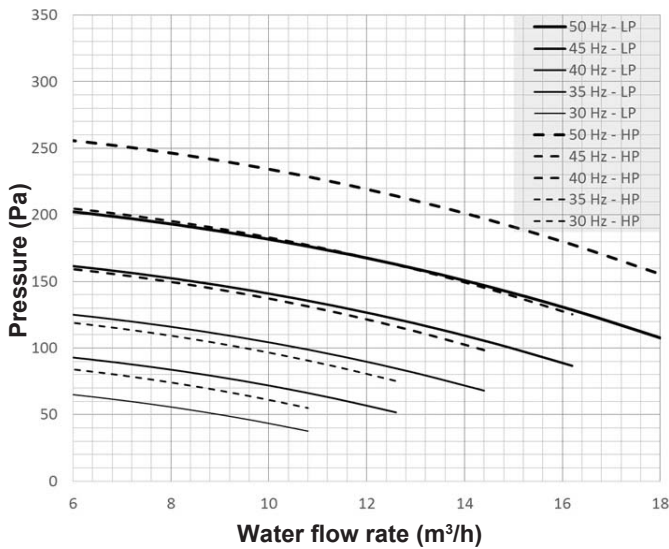
GAC/GAH  
040S - 045S



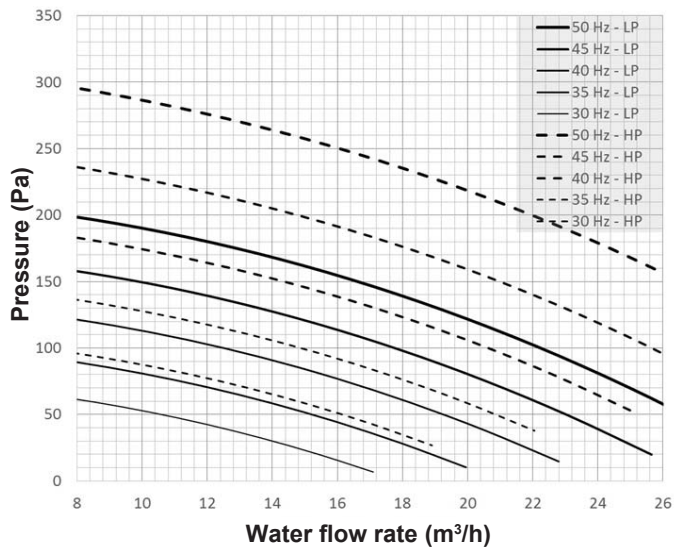
GAC/GAH  
055S - 060S



GAC/GAH  
070S / 080S



GAC/GAH  
090S

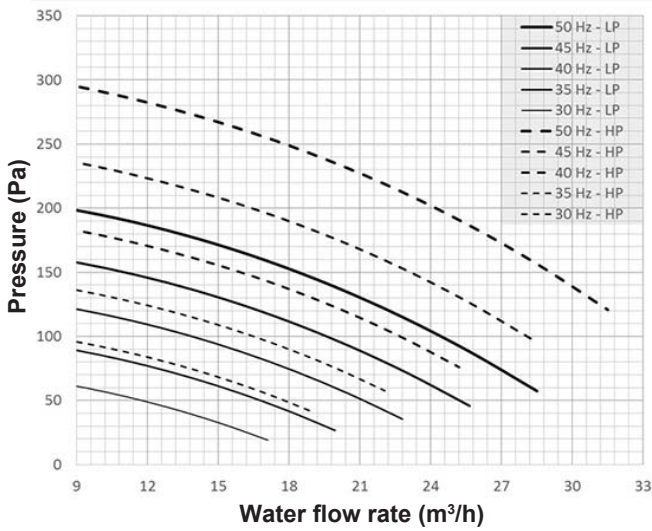


LP Low pressure

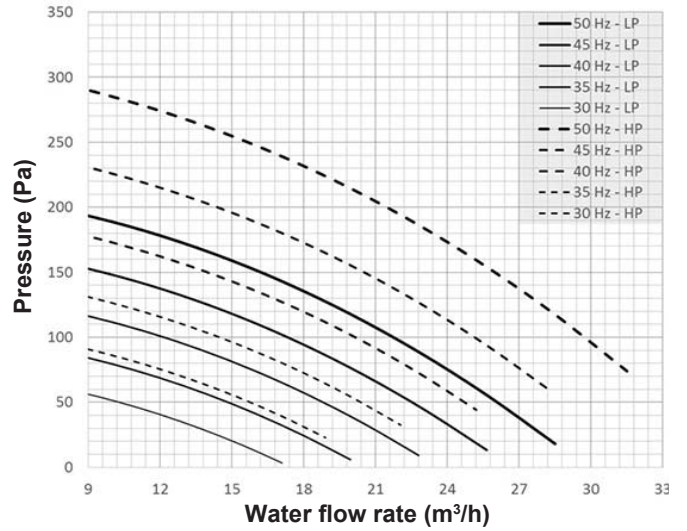
HP High pressure

**WATER FLOW AND AVAILABLE STATIC PRESSURE OF WATER PUMP**

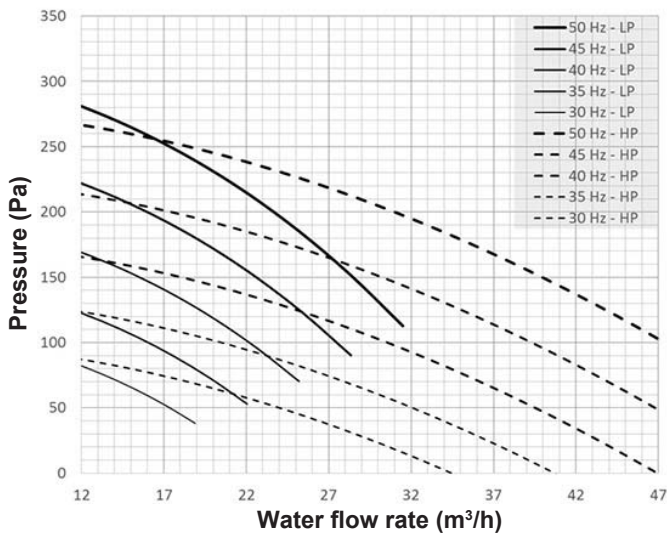
GAC/GAH  
110S / 125S



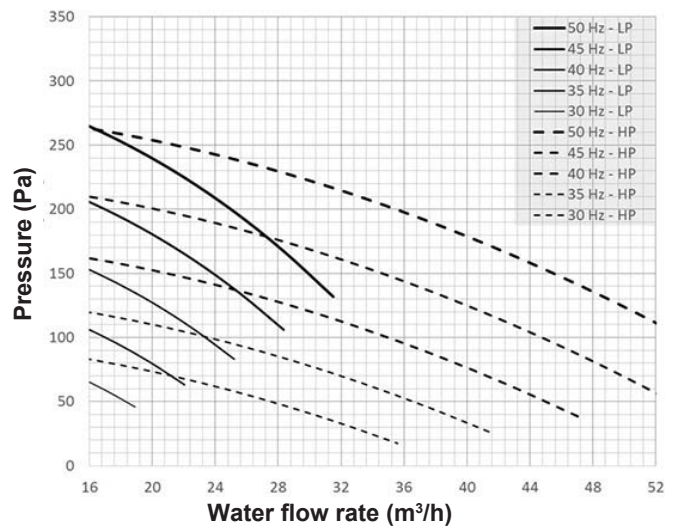
GAC/GAH  
110D / 125D



GAC/GAH  
140D / 160D



GAC/GAH  
185D



**LP** Low pressure

**HP** High pressure

## GLYCOL SOLUTION UNIT



If the outside temperature where the system is to be installed or the water outlet temperature is likely to drop below 5°C, it is very important to use glycol anti-freeze.

The amount of anti-freeze required will vary depending on the minimum ambient temperature or the water outlet temperature. When the percentage of glycol increases the standard pump flow decreases, the pressure drop increases and the cooling and thermal capacities drop. As a result the minimum flow must be multiplied by the coefficient shown in the table:

	Minimum ambient temperature or water outlet temperature			
	+ 5 °C → 0 °C	0 °C → - 5 °C	-5°C → - 10 °C	- 10 °C → - 15 °C
Ethylene glycol %	10%	20%	30%	35%
Pressure drop	1,05	1,10	1,15	1,18
Water flow	1,02	1,05	1,08	1,10
Power input	0,997	0,996	0,995	0,994
Capacities Cooling mode	0,995	0,985	0,975	0,965
Capacities Heating mode	0,994	0,993	0,99	0,987

**Example :** 10 % glycol  
 Pressure drop : 210 x 1,05  
 Minimum flow : 12,38 m<sup>3</sup>/h x 1,02  
 System capacity x 0,99

## WATER VOLUME

### MINIMUM WATER VOLUME IN THE INSTALLATION

Thanks to an intelligent algorithm and short cycle protection of compressors, eCOMFORT can operate with low volumes of water. The water volume of the installation (piping + exchangers) must be capable of storing the energy supplied by the chilled water cooler or the heat pump during the minimum operating time. When this volume is insufficient, a buffer tank must be installed.

The minimum capacity in liters of water of the whole installation is then expressed by the following formula :

$$\text{Minimum water loop volume (litre)} = \frac{\text{Minimum capacity stage (kW)} \times \text{Minimum operating time (s)} \times 1000}{\text{Water density (1000 kg/m}^3\text{)} \times \text{Water specific heat (4,18 kJ/Kg.}^\circ\text{C)} \times \text{Acceptable temperature deviation (}^\circ\text{C)}}$$

This formula may be simplified that way :

$$\text{Minimum water loop volume (litre)} = 28,7 \times \frac{\text{Minimum capacity stage (kW)}}{\text{Acceptable temperature deviation (}^\circ\text{C)}}$$



Size	Nominal cooling capacity	Minimum capacity stage	Minimum water loop of the installation (litres)			GAC Water volume with tank option	GAH Water volume with tank option
	kW	%	(acceptable deviation = 6°C)	(acceptable deviation =4°C)	(acceptable deviation =2°C)	Litres	Litres
020S	20	50%	48	72	144	104	104
025S	25	50%	59	88	177	104	104
030S	32	50%	76	114	228	105	105
035S	37	50%	88	132	265	105	105
040S	42	50%	100	151	301	105	105
045S	46	50%	109	163	327	105	105
055S	55	50%	131	197	393	181	181
60S	61	50%	146	220	439	181	181
70S	70	50%	166	249	499	185	185
80S	83	50%	198	297	594	185	185
90S	91	33%	144	216	432	186	261
110S	107	33%	168	253	505	189	264
125S	122	33%	193	290	579	189	264
110D	106	25%	126	189	379	263	263
125D	123	25%	147	221	442	263	263
140D	139	25%	166	249	498	424	424
160D	162	25%	194	291	581	424	424
185D	185	20%	177	266	531	427	427

Note: In cases where the unit operates with a low volume of water with an air handling unit or if the unit is used for industrial processes, the buffer tank is essential (see the section on hydraulic options). For heat pump applications, we also recommend using a buffer tank to maintain a stable temperature during defrost cycles. In addition, the eCOMFORT unit equipped with modulating immersion heaters in the balloon guarantees and secures the thermal..

**MAXIMUM WATER VOLUME IN THE INSTALLATION**

The units with hydraulic module include a expansion vessel. The table below details the maximum water volume in the system.

If the water volume in the system is greater than that detailed in the table. it will be necessary to add additional expansion vessel(s). The system design must allow for water expansion and contraction.

MODELS	020S ► 045S	055S ► 125D	140D ► 185D
Volume of the expansion vessel (liters)	18	35	50
Refrigerant	Maximum water volume in liters		
WATER	775	1500	2145
WATER + 10% glycol	560	1150	1640
WATER + 20% glycol	490	950	1430
WATER + 30% glycol	420	860	1240
WATER + 35% glycol	310	650	950

## MINIMUM WATER FLOW THROUGH THE EVAPORATOR

In case of installation with fixed speed pump, to prevent from freezing risk, the flow rate through the evaporator must be higher than the minimum flow given in the table below.

In case of variable primary flow, the pump speed must be controlled through the eCLIMATIC control. Additionally, the hydraulic system must be properly designed and balanced to ensure a right water flow distribution through the chiller evaporator and the terminal units. This is especially important when the system is designed with fan coils equipped with two-way valves. When the two-way valves are closing in response to building load change, it is important that the system is designed to ensure a minimum evaporator flow that is always minimum 60% of the chiller's design flow rate. This can be done with a bypass from chilled water supply to chilled water return opened via a signal from a flow meter.

Additionally, some terminals can be fitted with three way control valves in order to ensure the flow will not drop below the minimum value at any load condition as indicated in the table below.

Size	Water flow rate (m <sup>3</sup> /h)						Water content (liter)		
	Minimum		Nominal		Maximum		Unit with buffer tank	Buffer tank	
	GAC	GAH	GAC	GAH	GAC	GAH		GAC	GAH
020S	1.7	1.7	3.5	3.4	5.8	5.7	4.0	100	100
025S	2.1	2.1	4.2	4.2	7.0	7.0	4.0	100	100
030S	2.7	2.7	5.5	5.3	9.1	8.9	4.6	100	100
035S	3.2	3.1	6.4	6.3	10.6	10.4	4.6	100	100
040S	3.5	3.4	6.9	6.8	11.5	11.3	5.2	100	100
045S	3.9	3.9	7.8	7.7	13.0	12.8	5.2	100	100
055S	4.7	4.7	9.4	9.3	15.7	15.5	6.0	175	175
060S	5.3	5.2	10.5	10.3	17.5	17.2	6.0	175	175
070S	6.0	5.9	12.0	11.8	19.9	19.6	10.2	175	175
080S	7.1	7.0	14.2	14.0	23.7	23.3	10.2	175	175
090S	7.9	7.8	15.7	15.6	26.1	25.9	11.3	175	250
110S	9.2	9.1	18.4	18.2	30.6	30.2	14.1	175	250
125S	10.5	10.4	21.0	20.7	35.0	34.5	14.1	175	250
110D	9.1	9.0	18.2	18.0	30.2	30.0	13.0	250	250
125D	10.6	10.4	21.2	20.8	35.3	34.7	13.0	250	250
140D	11.9	11.7	23.9	23.5	39.7	39.1	24.3	400	400
160D	13.9	13.7	27.9	27.4	46.4	45.6	24.3	400	400
185D	15.9	15.6	31.8	31.2	53.0	52.0	27.1	400	400

## eDrive TECHNOLOGY, THE RIGHT CHOICE TO SAVE 75% OF PUMP ENERGY COSTS.

LENNOX offers the eDrive, a variable speed drive pump option (with single or double pump) which modulates the water flow through the evaporator and reduces energy costs. This option is available on chillers and heat pumps from 20 to 1000 kW.

In a water system, one major contributor to annual energy consumption is the pump motor. Pumping energy cost can represent 20% of the total cost of owning a chiller. This ratio can be even higher for a heat-pump.

**eDrive™ variable speed driven pump is contributing to continuous Lennox efforts to save energy while exploring possibilities to reduce installation cost.**

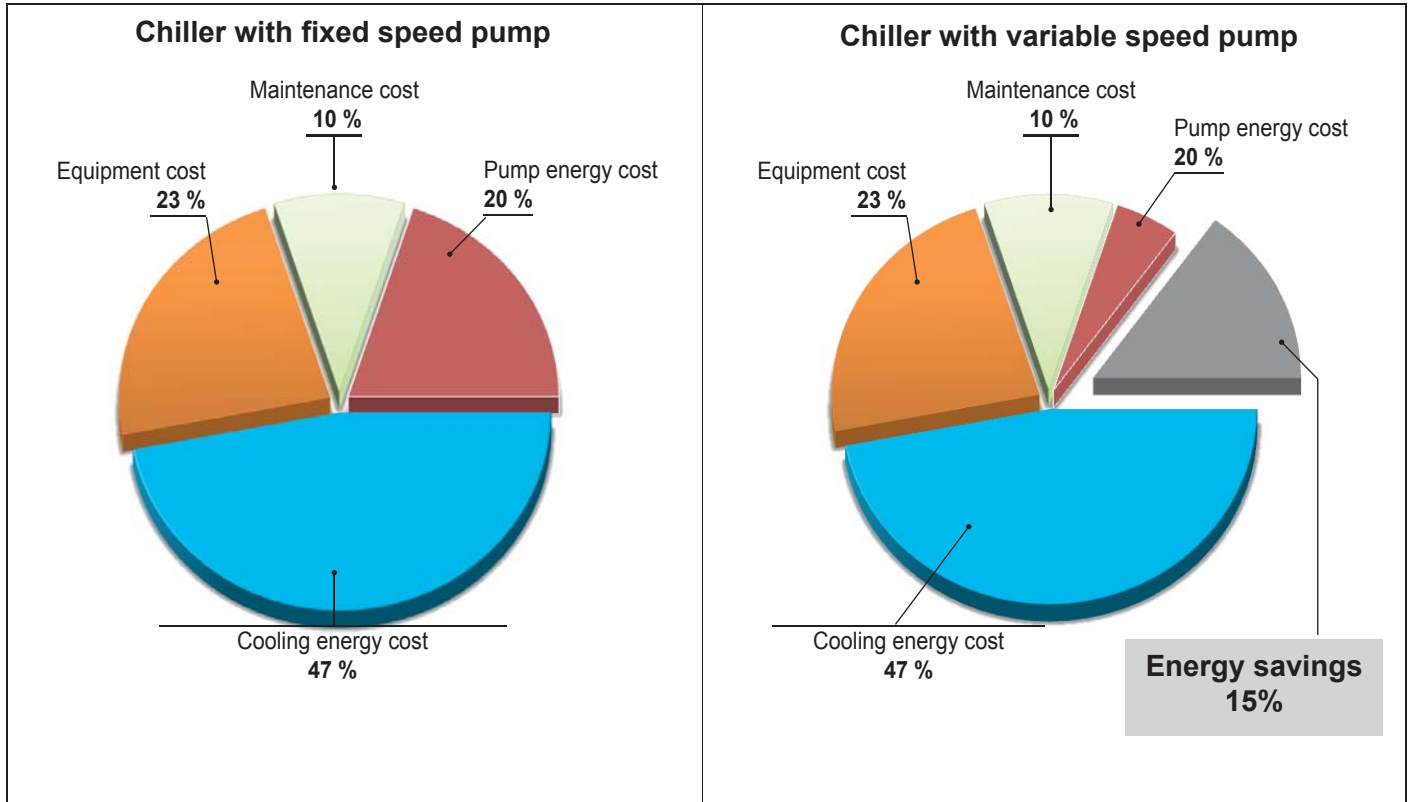
eDrive™ variable speed driven pump benefits:

- Cost savings on the energy consumption especially at part-load conditions and during off period.  
75% of this energy could be saved !
- Cost savings on the initial system cost. Fewer pumps and piping connections than primary–secondary systems, terminal units equipped with two-way control valves instead of three-way valves, elimination of water flow set valve.
- Flexibility and accuracy in the pump operation control (smooth start and stop, gradual change of speed, accuracy and stability of control)
- Reduction of the repeated stress on the pump and piping resulting in longer equipment life time (elimination of the «hammer blow» in pipes).
- Elimination of the start-up current thanks to variable frequency drive that controls a gradual pump motor supply.

Designing a variable primary flow chilled water plant that performs reliably at all load conditions requires careful attention to chiller design. Thanks to the newest generation of chiller controllers and intensive testing, eCOMFORT can reliably maintain the desired chilled water temperature with a flow range from 60% to 100% that gives up to 75% annual energy savings.

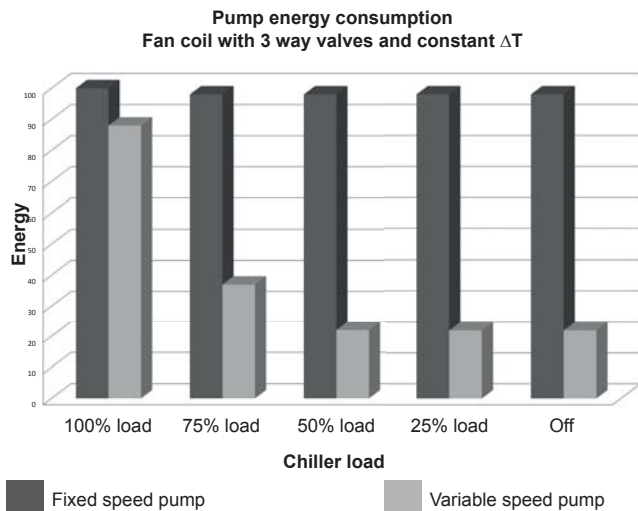
LENNOX eDrive™ Technology modulates the Water Flow especially in Part-Load Conditions through a Specific Algorithm and a Variable Frequency Driver.

Typical cost split in a chiller through 15-year lifespan



**eDrive™ VARIABLE WATER FLOW SAVES YOUR MONEY IN THE ENERGY COST**

- Through the elimination of the energy normally lost in the water flow control valve during unit full-load operation (Variable water flow = perfect pump curve adjustment to the required nominal water flow and delta P)
- Through pump rotation speed reduction during unit part-load operation.
- Thanks to pump running at minimum speed during Chiller “off” period (night, unoccupied)

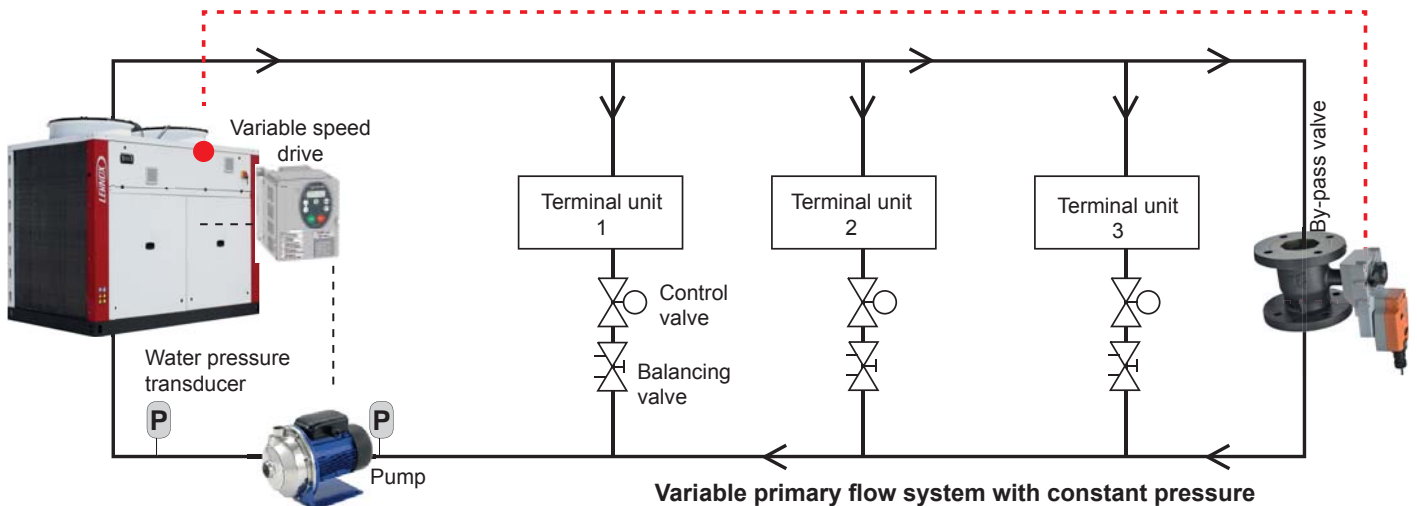


**PUMP AFFINITY LAWS**

“The power required for pumps varies as the cube of the flow rate.”

20% water flow reduction = 50% energy reduction.  
40% water flow reduction = 80% energy reduction.

## eDrive VARIABLE WATER FLOW MAY SAVE MONEY IN THE SYSTEM DESIGN COST



A variable primary flow design uses fewer components than primary–secondary systems as the pumps of the secondary distribution loop and the mixing tank are eliminated.

When compared with constant primary flow systems, terminal units can be equipped with two-way control valves instead of three-way valves often used in constant volume systems. Using two-way valves instead of three-way valves on fan coils represent a budget reduction that pays for the variable frequency driver cost. On top of that, the water flow set valve is eliminated as the pump adjustment to real installation needs can be done electronically. These factors may reduce the initial cost of the chilled water system.

## eDrive VARIABLE WATER FLOW BY LENNOX

### 3 control modes available :

#### **Constant speed / Dead zone**

- Interest to set the right installation design flow (avoid setting valve).

#### **Constant Delta P (setting to declare the required working pressure)**

- Easy to install and operate with 2 way valves installation.

#### **Constant Delta T (Setting to declare the required delta T)**

- Need a good installation with well balanced circuits to ensure good flow distribution when the flow is reduced.
- Installation with terminal units fitted with 3-way valves.

### Operation for each mode:

- Constant speed / dead zone : eDrive pilots the pump to the water flow desired when the compressors are in operation. When the compressors are stopped (dead zone), control will automatically reduce the speed of the pump to the minimum water flow. This minimum flow is also adjustable within minimum 30Hz (60% flow).
- Constant delta P : the eDrive™ regulation is managing the pump to maintain the required delta P in order to keep constant the customer available static pressure. When the terminals control valves close in response to decreased building loads, the pump controller slows the pump speed to maintain the target delta P. In this mode the pump does not detect terminal capacity reduction (fan speed staging).
- Constant Delta T : the eDrive™ regulation is managing the pump to maintain the required Delta T. When the Delta T is increasing in response to the number of compressors running, the pump controller increases the speed of the pump. Conversely, when the compressors are stopping in response to decreased building loads, the pump controller slows the pump speed to maintain the target Delta T.

### Safety parameters:

- If the evaporating pressure reaches the low limit (risk of evaporator frosting), the flow is increased.
- If the outlet evaporator temperature reaches the low limit, the flow is set to the maximum.
- When the pump speed varies and the flow switch trips, the flow is automatically increased.
- During defrost procedure (HP), the flow is set to the maximum.
- Pump motor supply range from 30 Hz minimum to 50Hz maximum. Minimum pump motor frequency set at 30 Hz. Below this value, risk of pump motor failure due to overheating.
- For safe operation of the chiller, the unit is protected by the flow switch.

- Minimum and maximum admissible water flow per unit size: with constant delta T, the flow may vary from 60% to 100% of the selected pump nominal flow.
- Maximum change in flow rate through the evaporator: a 10% per minute change in flow rate is admissible in most of air conditioning applications.

**Installation instructions to respect in case of variable primary flow:**

- The hydraulic system will have to be properly designed and balanced to ensure a right water flow distribution through the chiller evaporator and the terminal units.
- The hydraulic system will have to be properly designed to respect minimum and maximum water flow through each chiller following the values given by the manufacturer.

Case of constant Delta P mode :

- In case of system designed with terminal units equipped with 2 way valves, the hydraulic system will need to have a bypass flow to ensure a minimum water flow through the chiller evaporator.  
By-pass method :
  - Bypass adequate water flow can be achieved with a slow modulating opening as soon as the water flow rate is near the minimum. When the water flow rises according to predefined setting, this valve closes. This bypass modulating valve provided by LENNOX as an option is controlled by our eClimatic control. The bypass should be positioned at the beginning of the installation near the unit and allows significant energy savings and cost as opposed to a location at the end of the system.
  - An alternative is to install some 3-way valves at different points of the terminal units. This approach allows constant minimum flow in the chiller or heat pump and ensures a cheaper system.
- The minimum water flow through the chiller evaporator will need to respect a minimum value that is 60% of the nominal chiller water flow.
- The flow bypass from chilled water supply to chilled water return can be done with a motorized bypass valve opened via a signal from a flow meter.
- For safe operation some terminals can be equipped with three way control valves in order to ensure the flow will not drop below the minimum value at any load condition.
- The water flow must not vary by more than 10% per minute.
- Check the control valve authority in low load periods, especially in case of long pipe hydraulic systems.

**OPERATING WEIGHT OF ADDITIONAL OPTION (KG)**

Hydraulic module...	020S	025S	030S	035S	040S	045S	055S	060S	070S	080S
With low-pressure single pump	15	15	17	17	21	21	26	26	26	26
With low-pressure twin pump	29	29	33	33	43	43	53	53	53	53
With high-pressure single pump	21	21	23	23	23	23	28	28	28	28
With high-pressure twin pump	43	43	46	46	46	46	56	56	56	56
With eDrive low-pressure single pump	17	17	19	19	23	23	28	28	28	28
With eDrive low-pressure twin pump	23	23	25	25	25	25	30	30	30	30
With eDrive high-pressure single pump	31	31	35	35	45	45	55	55	55	55
With eDrive high-pressure twin pump	45	45	48	48	48	48	58	58	58	58
Water tank	145	145	145	145	145	145	295	295	295	295

Hydraulic module...	090S	110S	125S	110D	125D	140D	160D	185D
With low-pressure single pump	28	28	28	28	28	36	36	36
With low-pressure twin pump	55	55	55	55	55	72	72	72
With high-pressure single pump	31	31	31	31	31	57	57	57
With high-pressure twin pump	62	62	62	62	62	114	114	114
With eDrive low-pressure single pump	30	30	30	30	30	39	39	39
With eDrive low-pressure twin pump	34	34	34	34	34	60	60	60
With eDrive high-pressure single pump	57	57	57	57	57	75	75	75
With eDrive high-pressure twin pump	65	65	65	65	65	117	117	117
Water tank	360	360	360	360	360	580	580	580

### DESUPERHEATER : PARTIAL HEAT RECOVERY

On eCOMFORT units from 90 to 185 kW, an additional plate heat exchanger (water / refrigerant) on each circuit allows a 20 to 25% recovery of the heat rejected. This heat exchanger is sized to recover heat for the production of free hot water up to 70 °C.

Typical applications for heat recovery are installations with high demand for hot water :

- for domestic use, such as hospitals and hotels
- for industrial use.

This option is available on both cooling only and heat pump versions. Heat recovery can only be applied when the unit is operating (either in cooling or in heating mode).

GAC With desuperheater option		GAC 090S	GAC 110S	GAC 125S	GAC 110D	GAC 125D	GAC 140D	GAC 160D	GAC 185D
Cooling capacity	kW	91,3	106,7	122,3	105,6	123,2	138,8	162	185
Heat recovery capacity		21,7	20,9	28	28,4	29,1	33,1	39,3	40,5
Water flow rate	m <sup>3</sup> /h	1,87	1,8	2,42	2,45	2,51	2,85	3,39	3,49
Exchanger pressure drop	kPa	2,7	2	3,4	1,7	1,8	1,6	2,3	2,1
Water volume	dm <sup>3</sup>	1,296	1,566	1,566	2,052	2,052	2,592	2,592	2,862
Connection diameters Inlet / outlet		1" / 1"		1" 1/4 / 1" 1/4					

**Conditions :**

**Unit :**

Water inlet / outlet temperature = 12 °C / 7 °C  
 Outdoor air temperature = 35 °C (glycol 0%)

**Desuperheater :**

Water inlet / outlet temperature = 50 °C / 60 °C

GAH With desuperheater option		GAH 090S	GAH 110S	GAH 125S	GAH 110D	GAH 125D	GAH 140D	GAH 160D	GAH 185D
Cooling capacity	kW	90,5	105,6	120,4	104,7	121	136,5	159,3	181,4
Heating capacity without recovery mode		91,2	103,4	118,1	106,3	121,1	135,8	157,2	174,5
Heating capacity in recovery mode		68,9	79	88,4	81,3	92,1	104,2	118,3	129,5
Heat recovery capacity		22,3	24,4	29,7	25	29	31,6	38,9	45
Water flow rate	m <sup>3</sup> /h	1,92	2,11	2,56	2,16	2,5	2,73	3,35	3,88
Exchanger pressure drop	kPa	2,9	2,6	3,8	2,8	1,8	1,5	2,2	2,5
Water volume	dm <sup>3</sup>	1,296	1,566	1,566	1,566	2,052	2,592	2,592	2,862
Connection diameters Inlet / outlet		1" / 1"		1" 1/4 / 1" 1/4					

**Conditions :**

**Unit :**

Water inlet / outlet temperature = 40 °C / 45 °C  
 Outdoor air temperature = 7 °C (glycol 0%)

**Desuperheater :**

Water inlet / outlet temperature = 50 °C / 60 °C

### DESUPERHEATER : OPERATING LIMITS

Maximum outlet water temperature	°C	25
Minimum outlet water temperature		70
Minimum difference water inlet / outlet		3
Maximum difference water inlet / outlet		15

If the water inlet temperature is lower than 25°C, a three-way valve is required.

## SOUND POWER LEVEL

## STANDARD UNITS - FULL LOAD OPERATION

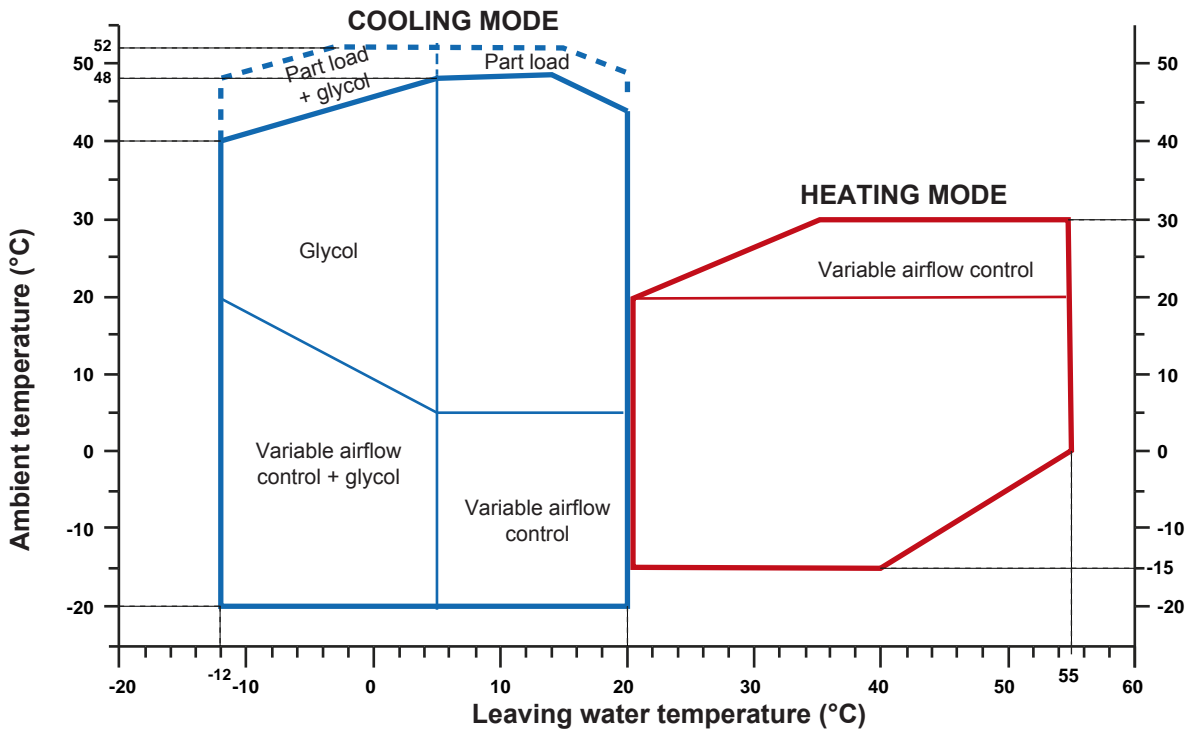
GAC GAH	Spectrum per octave band dB(A)								Global sound power Lw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
020S	72,2	63,0	61,4	63,0	67,6	68,4	67,9	61,0	74,0
025S	72,2	63,0	61,6	64,5	68,2	69,1	69,7	69,0	75,6
030S	72,2	63,0	61,5	62,3	65,7	69,5	69,6	70,4	75,6
035S	77,6	71,1	66,0	67,3	67,0	70,1	70,4	70,1	76,4
040S	77,6	71,1	66,0	67,8	69,0	73,9	73,5	71,3	79,2
045S	77,6	71,1	66,2	70,7	72,5	73,3	70,1	67,9	78,4
055S	75,2	66,0	64,5	65,9	69,4	75,1	75,7	74,2	80,9
060S	75,2	66,0	64,7	66,2	69,9	75,8	77,1	75,2	81,8
070S	75,2	66,0	64,8	66,4	70,2	76,3	78,1	76,0	82,5
080S	80,6	74,1	69,2	70,7	72,0	78,5	78,4	76,4	83,8
090S	80,6	74,1	69,1	70,5	72,4	76,5	78,4	78,1	83,5
110S	88,6	78,7	76,2	77,2	76,2	79,0	80,1	77,9	85,6
125S	88,6	78,7	76,2	77,3	76,3	80,7	80,5	78,2	86,3
110D	80,6	74,1	69,1	70,7	72,9	78,2	78,7	77,2	84,0
125D	88,6	78,7	76,1	77,2	76,4	79,5	80,4	78,3	85,8
140D	88,6	78,7	76,2	77,2	76,5	79,9	81,3	79,1	86,4
160D	83,6	77,1	72,2	73,7	75,0	81,5	81,4	79,4	86,8
185D	89,2	80,0	77,0	78,1	77,6	81,8	82,4	80,2	87,7

## SOUND POWER LEVEL

## LOW NOISE UNITS WITH ACOUSTIC JACKET (LNCJ) - FULL LOAD OPERATION -

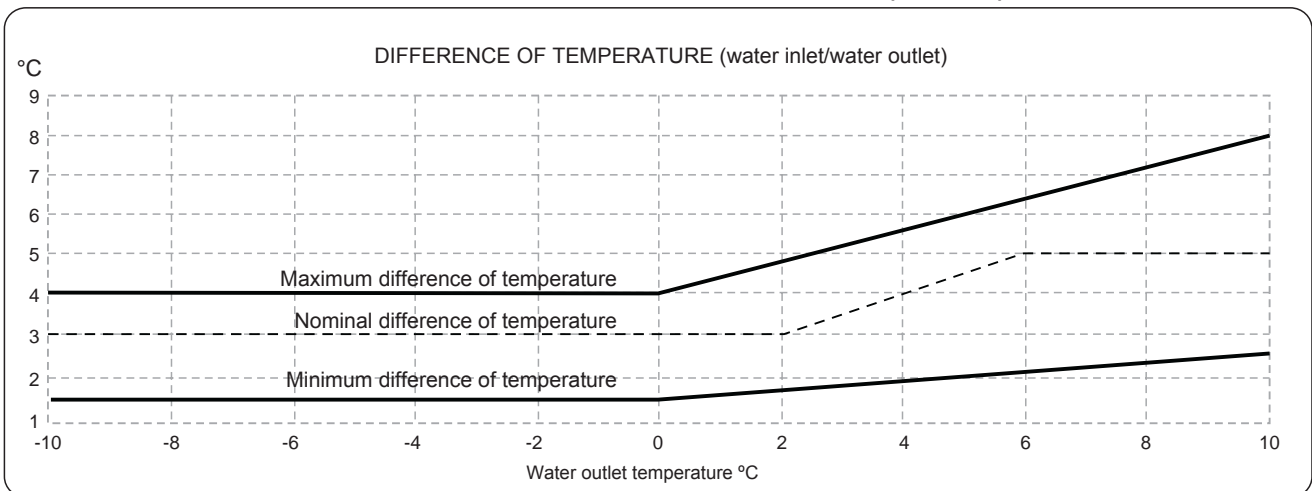
GAC GAH	Spectrum per octave band dB(A)								Global sound power Lw dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
020S	72,2	63,0	61,4	62,4	65,5	66,1	65,3	58,8	71,7
025S	72,2	63,0	61,5	63,3	66,0	66,7	67,0	66,1	73,2
030S	72,2	63,0	61,4	62,0	64,1	67,0	66,9	67,5	73,2
035S	77,6	71,1	65,9	67,1	66,4	68,1	67,8	67,3	74,5
040S	77,6	71,1	66,0	67,4	67,7	71,4	70,7	68,4	76,8
045S	77,6	71,1	66,1	69,2	70,3	70,8	67,6	65,2	76,1
055S	75,2	66,0	64,4	65,3	67,6	72,5	72,9	71,3	78,2
060S	75,2	66,0	64,5	65,5	67,9	73,1	74,2	72,2	79,1
070S	75,2	66,0	64,6	65,6	68,2	73,5	75,2	73,0	79,8
080S	80,6	74,1	69,0	70,3	70,7	75,9	75,6	73,4	81,2
090S	80,6	74,1	69,0	70,2	70,9	74,0	75,6	75,2	81,0
110S	88,6	78,7	76,1	77,1	75,5	76,9	77,5	75,1	83,6
125S	88,6	78,7	76,1	77,1	75,6	78,3	77,9	75,5	84,2
110D	80,6	74,1	69,0	70,3	71,3	75,5	75,9	74,2	81,4
125D	88,6	78,7	76,1	77,1	75,6	77,4	77,8	75,6	83,9
140D	88,6	78,7	76,1	77,1	75,7	77,7	78,6	76,3	84,3
160D	83,6	77,1	72,0	73,3	73,7	78,9	78,6	76,4	84,2
185D	89,2	80,0	76,9	77,9	76,8	79,4	79,7	77,3	85,6

Global sound power level measured in compliance with ISO standard 3744 and according Eurovent standards.



	GAC/GAH Cooling mode		GAH Heating mode	
	minimum	maximum	minimum	maximum
<b>Water outlet temperature</b>				
Standard	5°C	20°C	20°C	55°C
With low leaving water temperature option (LLWT) + antifreeze option	-12°C	20°C	NA	NA
Inlet/outlet temperature difference	3°C	10°C	3°C	10°C
<b>Air temperature</b>				
Standard	5°C	48°C	-15°C	20°C
With variable airflow control option (standard EC fan (SEAS) or high pressure EC fans (HIPF))	-20°C	48°C	-15°C	30°C

### UNITS WITH LOW WATER TEMPERATURE KIT (OPTION)



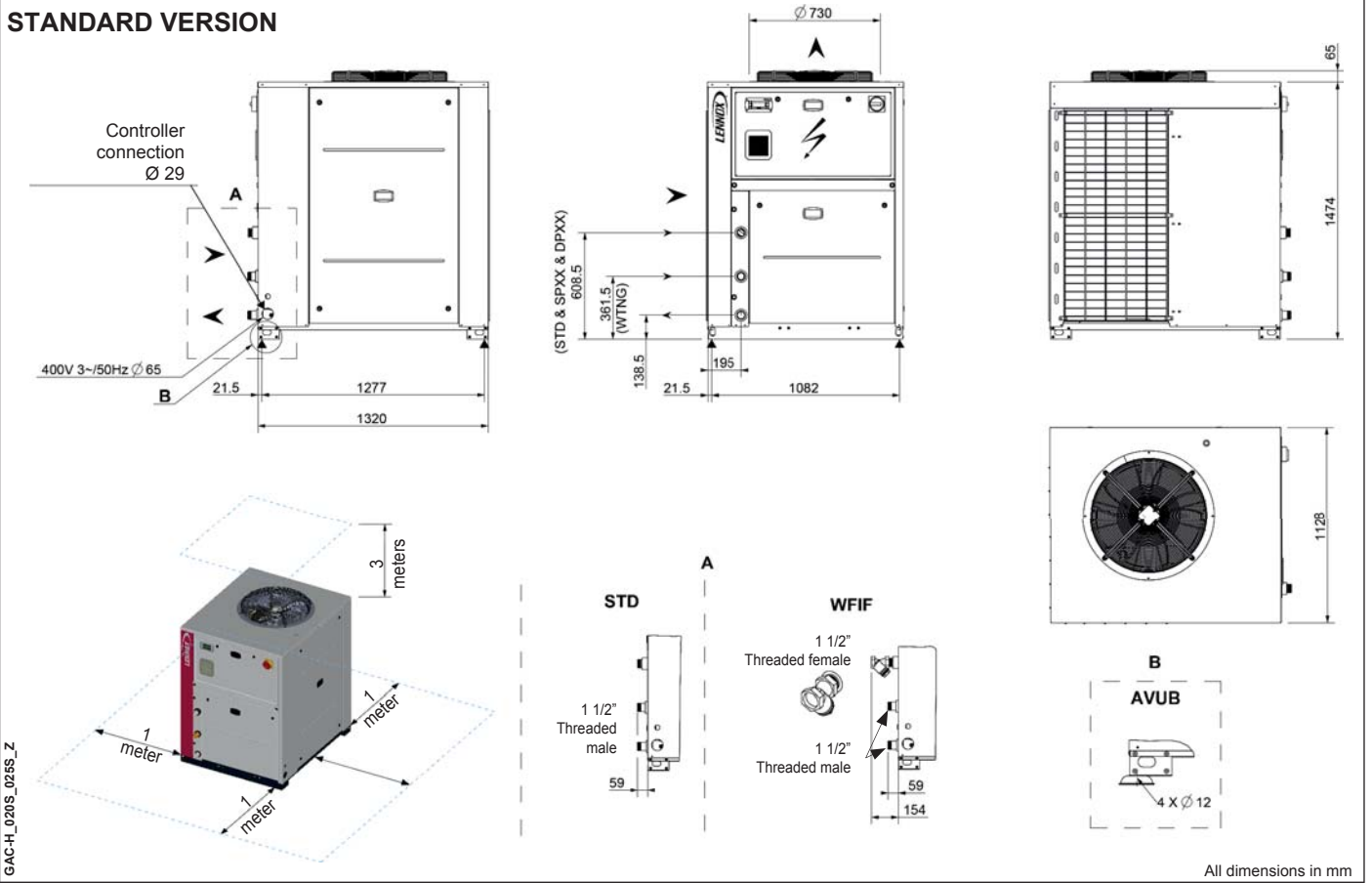


eCOMFORT		020S	025S	030S	035S	040S	045S	055S	060S	070S	080S
Maximum power	KW	9,4	11,8	15,1	17,4	18,0	20,7	24,6	27,5	30,4	35,6
Maximum current	A	17,2	21,8	31,2	32,2	34,6	38,6	46,4	55,4	64,4	72,4
<b>Locked rotor current</b>											
Starting current	A	52,2	63	91,2	118,2	119,4	148,4	142,4	164,4	173,4	212,4
Starting current with softstarter		35	42,4	61,2	77,8	79,0	97,2	95,2	108,4	117,4	142,8
<b>EC FAN (SEAS)</b>											
Additional power	KW	0,2	0,2	0,2	-0,1	-0,1	-0,1	0,5	0,5	0,5	-0,1
Additional current	A	0,2	0,2	0,2	-0,8	-0,8	-0,8	0,4	0,4	0,4	-1,6
<b>EC FAN - HIGH PRESSURE (HIPF)</b>											
Additional power	KW	1,1	1,1	1,1	0,8	0,8	0,8	2,2	2,2	2,2	1,6
Additional current	A	1,5	1,5	1,5	0,5	0,5	0,5	3	3	3	0,1
<b>Low pressure water pump</b>											
Additional power	KW	0,6	0,6	0,8	0,8	1,1	1,1	1,1	1,1	1,1	1,1
Additional current	A	1,5	1,5	1,7	1,7	2,5	2,5	2,5	2,5	2,5	2,5
<b>High pressure water pump</b>											
Additional power	KW	1,1	1,1	1,1	0,8	0,8	0,8	2,2	2,2	2,2	1,6
Additional current	A	2,5	2,5	3,3	3,3	3,3	3,3	3,3	3,3	3,3	3,3
<b>Antifreeze electrical heater</b>											
Additional power	KW	2,3	2,3	2,3	2,3	2,3	2,3	6	6	6	6
Additional current	A	3,3	3,3	3,3	3,3	3,3	3,3	8,7	8,7	8,7	8,7
<b>Modulating electrical heater - Standard capacity (GAH only)</b>											
Additional power	KW	9	9	9	9	9	9	18	18	18	18
Additional current	A	13	13	13	13	13	13	26	26	26	26
<b>Modulating electrical heater - High capacity (GAH only)</b>											
Additional power	KW	12	12	12	12	12	12	24	24	24	24
Additional current	A	17,3	17,3	17,3	17,3	17,3	17,3	34,7	34,7	34,7	34,7

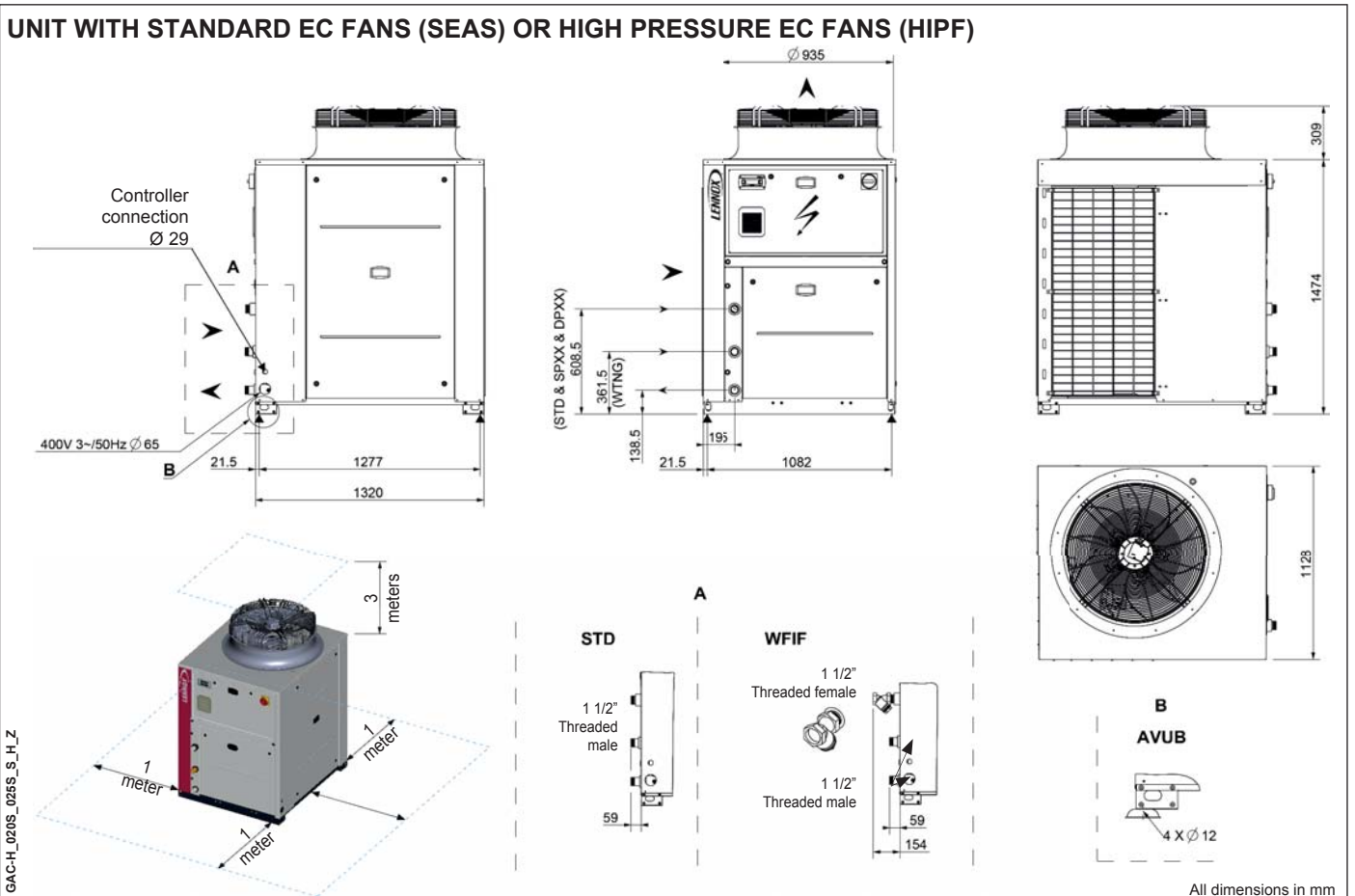
eCOMFORT		090S	110S	125S	110D	125D	140D	160D	185D
Maximum power	KW	40,8	47,7	54,6	48,6	56,5	62,3	71,2	83,3
Maximum current	A	79,4	100,8	109,8	92,4	113,8	131,8	144,9	173,2
<b>Locked rotor current</b>									
Starting current	A	172,4	209,8	249,8	188,4	222,8	240,8	284,9	313,2
Starting current with softstarter		125,2	153,8	180,2	141,2	166,8	184,8	215,3	243,6
<b>EC FAN (SEAS)</b>									
Additional power	KW	-0,1	-0,5	-0,5	-0,1	-0,5	-0,5	-0,2	-0,6
Additional current	A	-1,6	-2,4	-2,4	-1,6	-2,4	-2,4	-3,3	-4,0
<b>EC FAN - HIGH PRESSURE (HIPF)</b>									
Additional power	KW	1,6	2,1	2,1	1,6	2,1	2,1	3,2	3,7
Additional current	A	0,1	1,2	1,2	0,1	1,2	1,2	1,9	2,2
<b>Low pressure water pump</b>									
Additional power	KW	1,5	1,5	1,5	1,5	1,5	3	3	3
Additional current	A	3,3	3,3	3,3	3,3	3,3	6,5	6,5	6,5
<b>High pressure water pump</b>									
Additional power	KW	1,6	2,1	2,1	1,6	2,1	2,1	3,2	3,7
Additional current	A	6,5	6,5	6,5	6,5	6,5	7,6	7,6	7,6
<b>Antifreeze electrical heater</b>									
Additional power	KW	9	9	9	9	9	12	12	12
Additional current	A	13	13	13	13	13	17,3	17,3	17,3
<b>Modulating electrical heater - Standard capacity (GAH only)</b>									
Additional power	KW	27	27	27	27	27	36	36	36
Additional current	A	39	39	39	39	39	52	52	52
<b>Modulating electrical heater - High capacity (GAH only)</b>									
Additional power	KW	36	36	36	36	36	48	48	48
Additional current	A	52	52	52	52	52	69,4	69,4	69,4

GAC/GAH 020S-025S

STANDARD VERSION



UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)

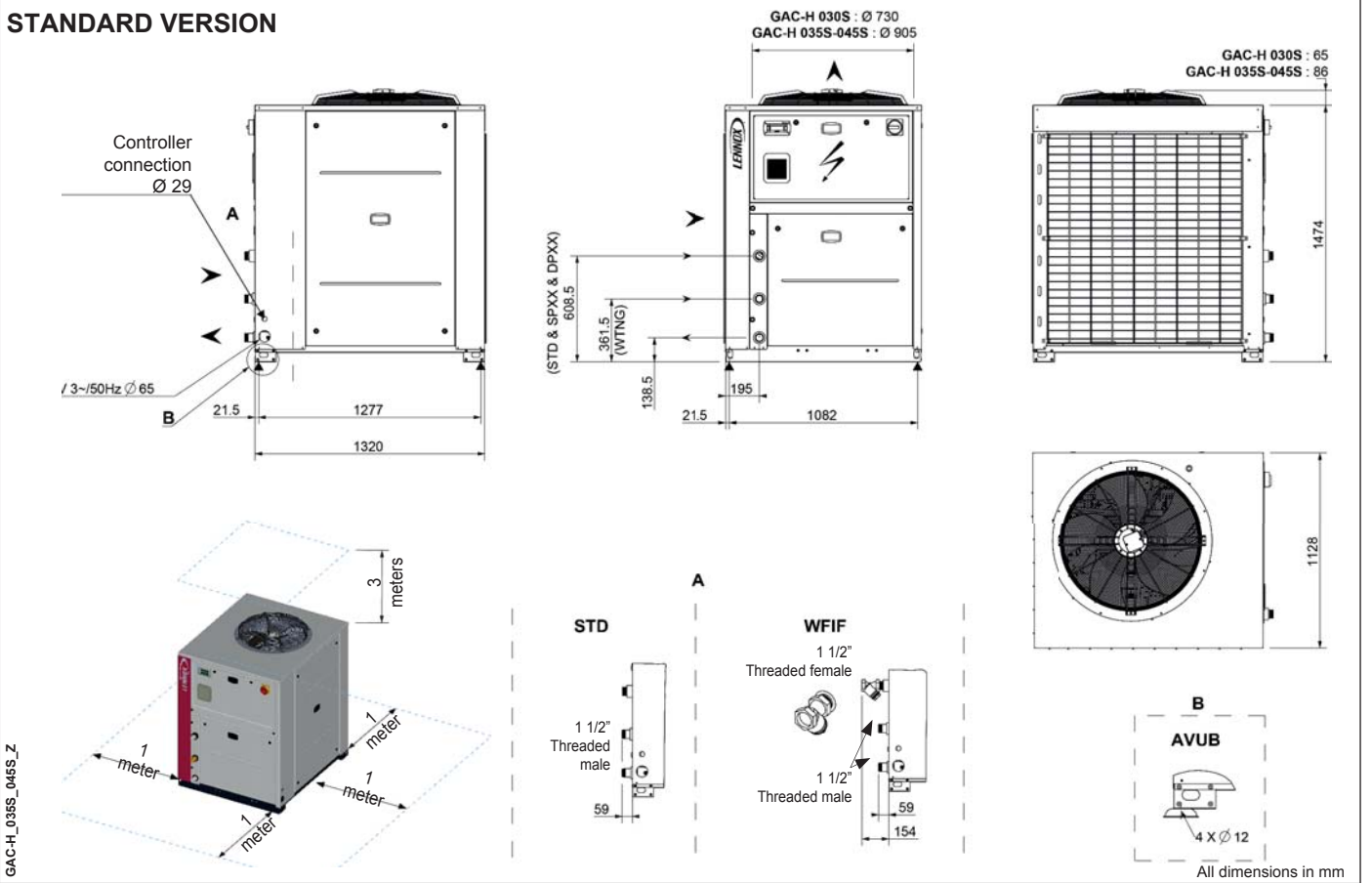


<b>SPXX</b>	Hydraulic module with single pump
<b>DPXX</b>	Hydraulic module with twin pump
<b>AVUB</b>	Rubber anti-vibration mounts

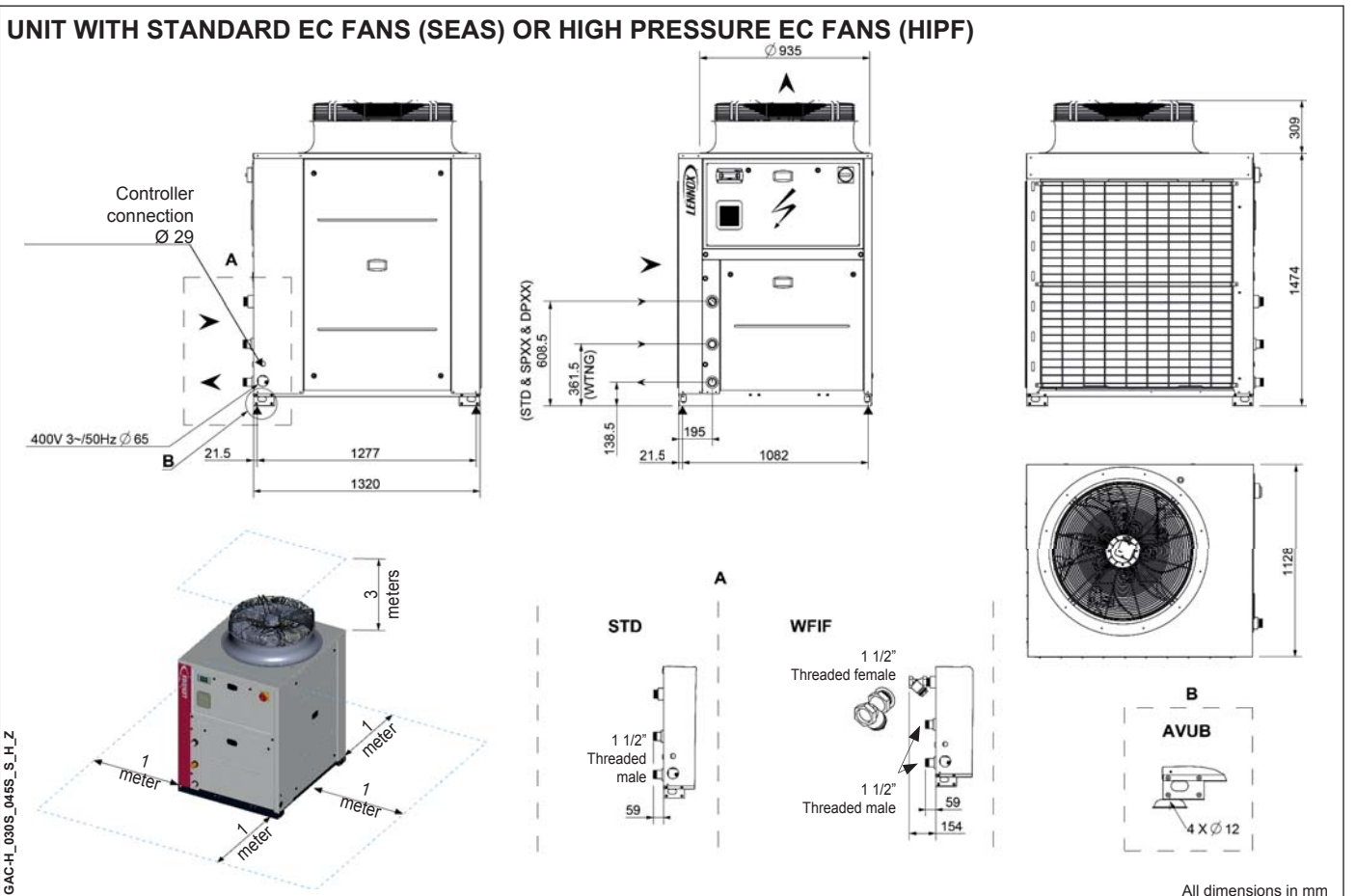
<b>WTNG</b>	Water tank
<b>WFIF</b>	Water filter (supplied loose)

GAC/GAH 030S-035S-040S-045S

STANDARD VERSION



UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)

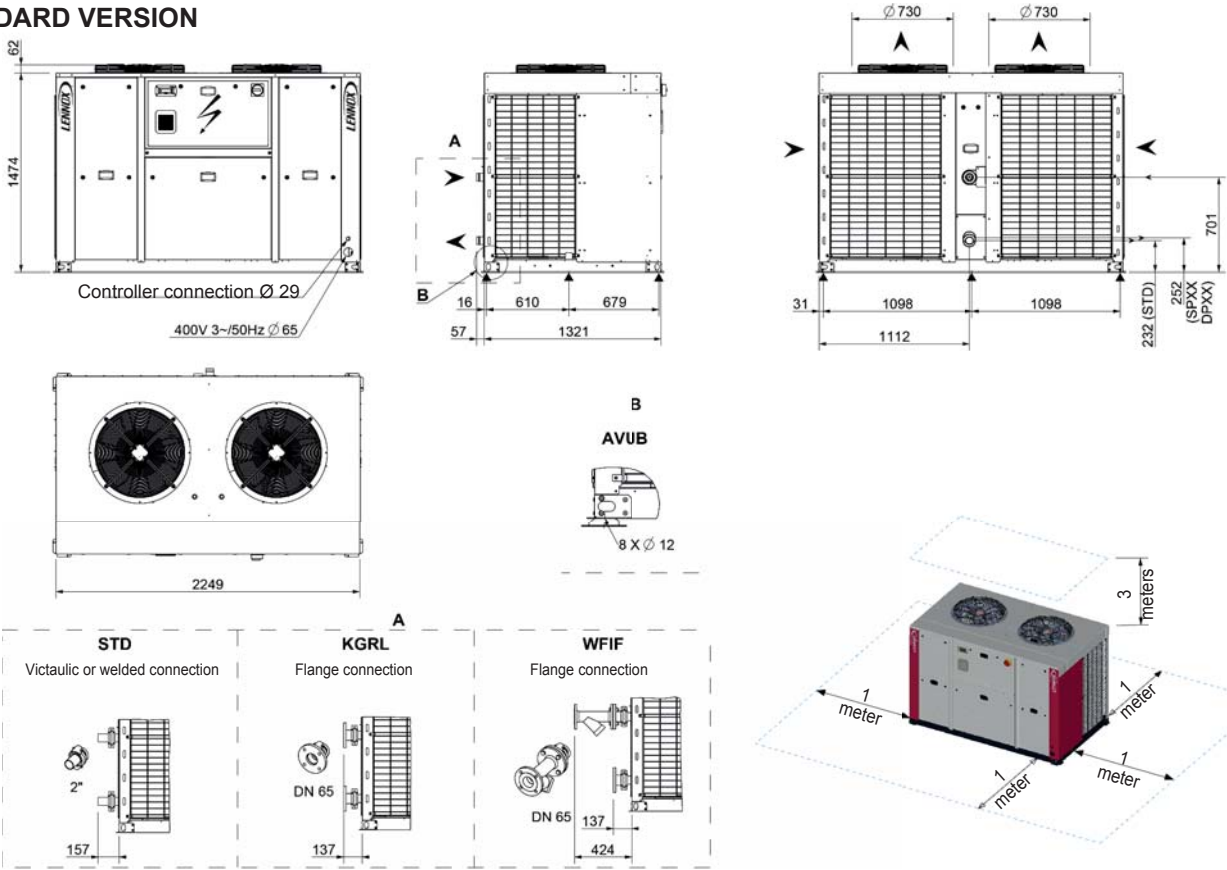


<b>SPXX</b>	Hydraulic module with single pump
<b>DPXX</b>	Hydraulic module with twin pump
<b>AVUB</b>	Rubber anti-vibration mounts

<b>WTNG</b>	Water tank
<b>WFIF</b>	Water filter (supplied loose)

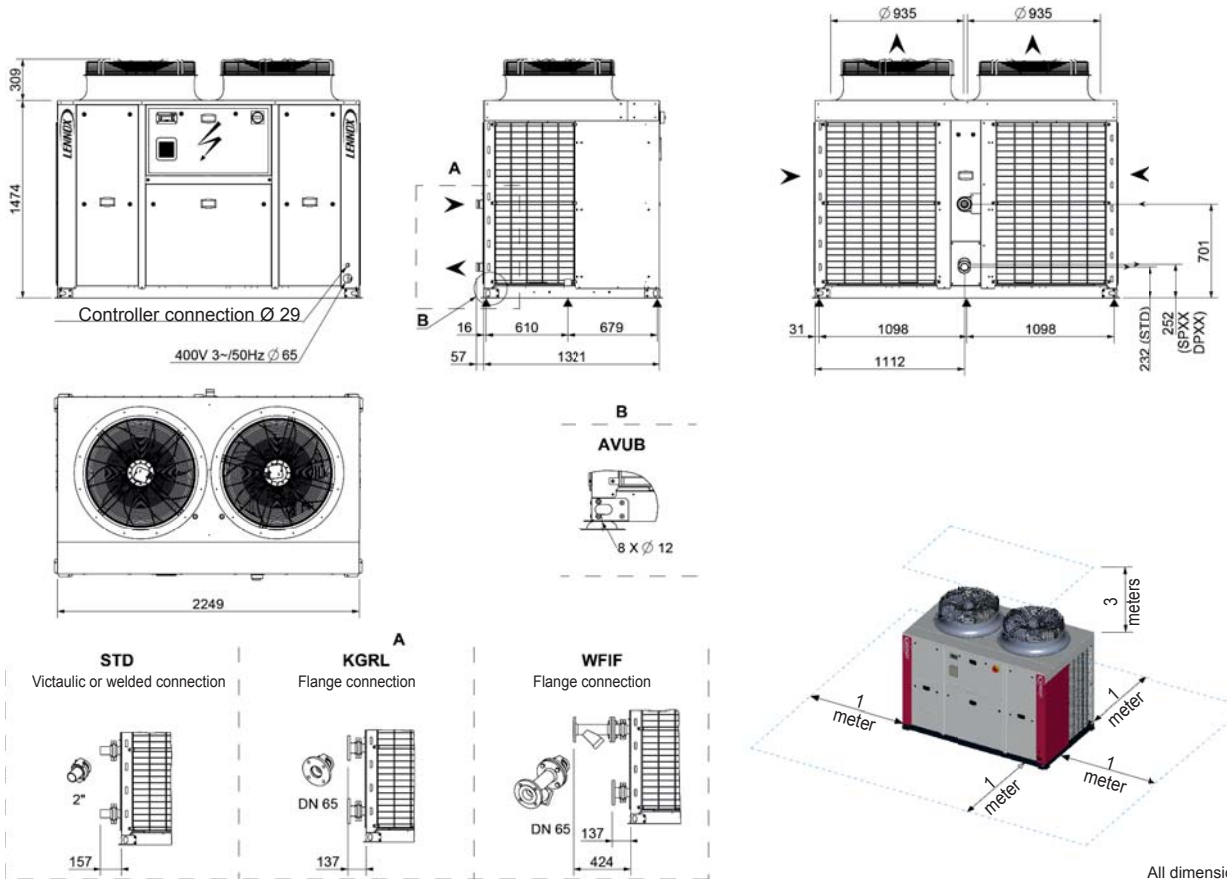
GAC/GAH 055S

STANDARD VERSION



GAC-H\_055S\_Z

UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)



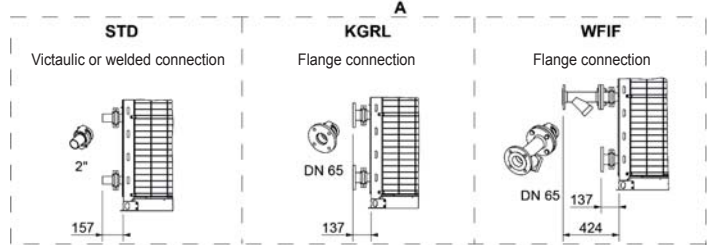
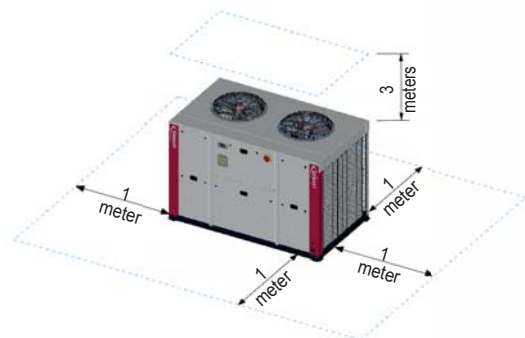
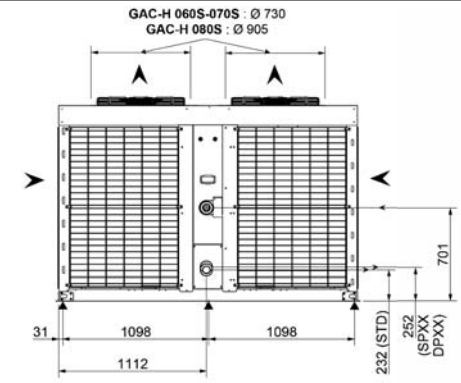
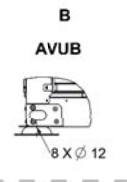
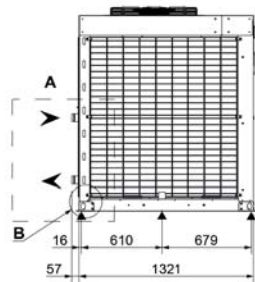
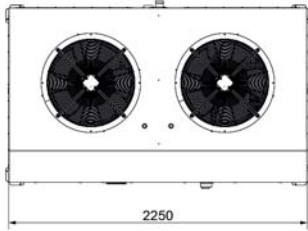
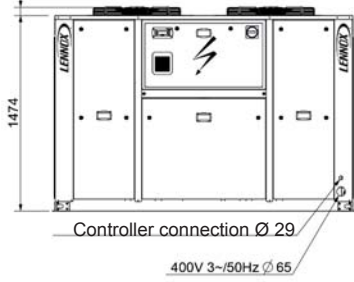
GAC-H\_055S\_S\_H\_Z

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)
<b>AVUB</b>	Rubber anti-vibration mounts		

GAC/GAH 060S-070S-080S

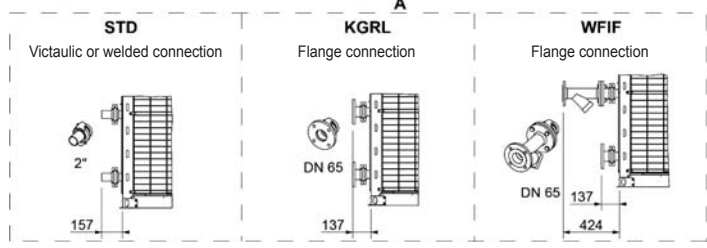
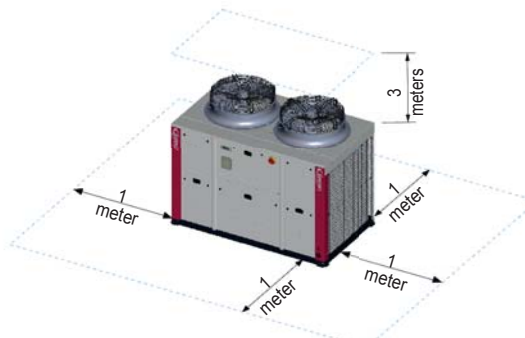
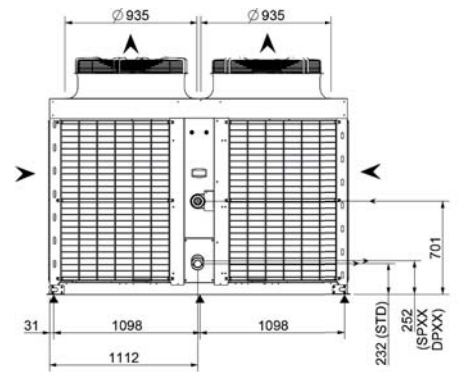
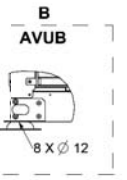
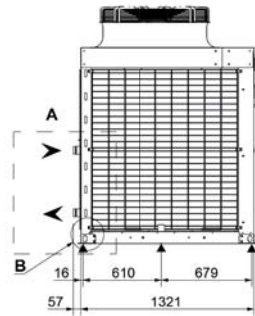
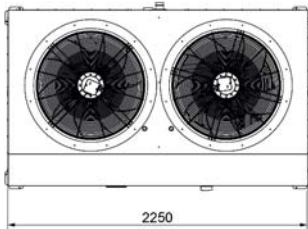
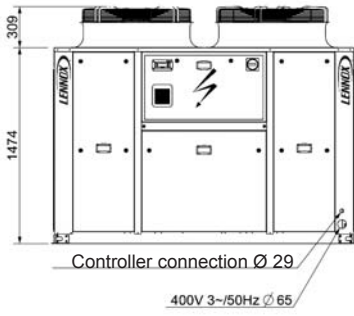
**STANDARD VERSION**

GAC-H 060S-070S : 62  
GAC-H 080S : 93



All dimensions in mm

**UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)**

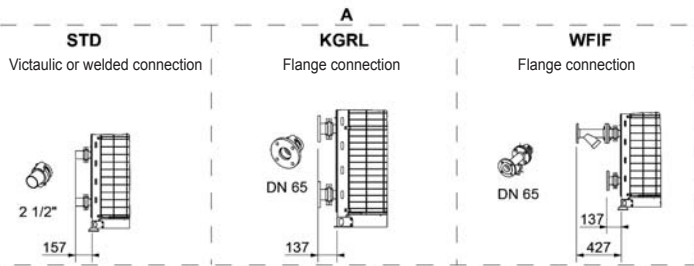
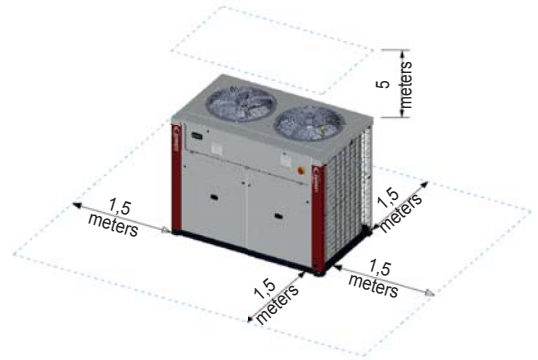
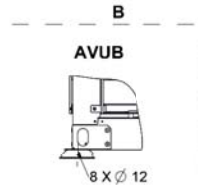
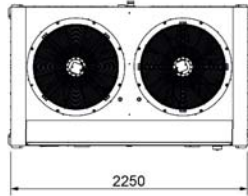
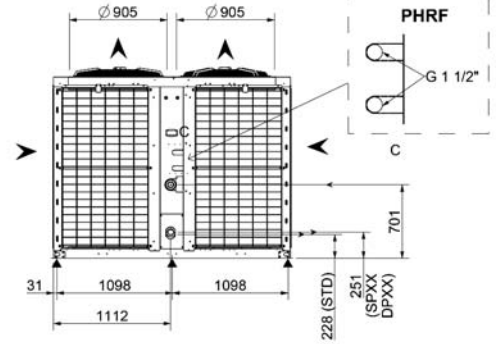
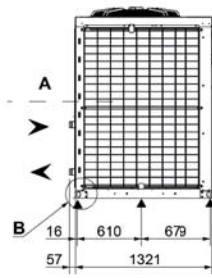
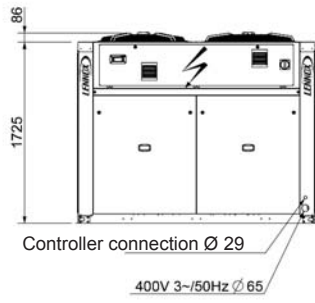


All dimensions in mm

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)
<b>AVUB</b>	Rubber anti-vibration mounts		

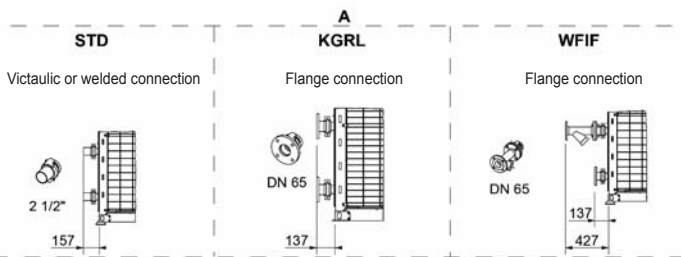
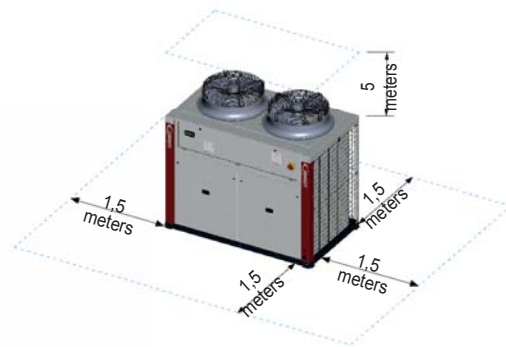
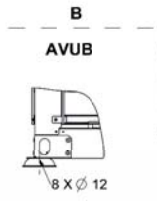
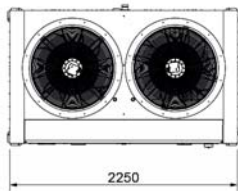
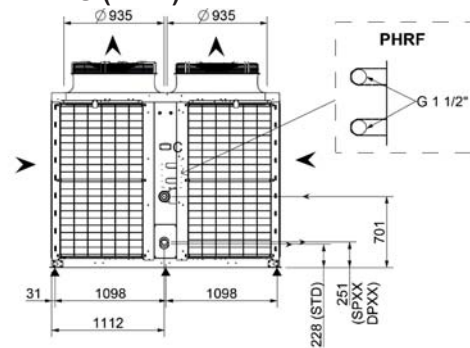
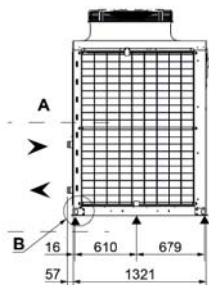
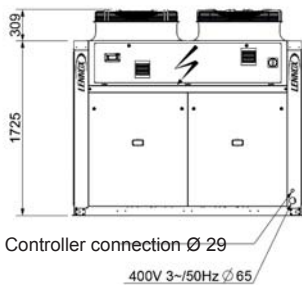
GAC/GAH 090S-110S-125S

STANDARD VERSION



All dimensions in mm

UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)

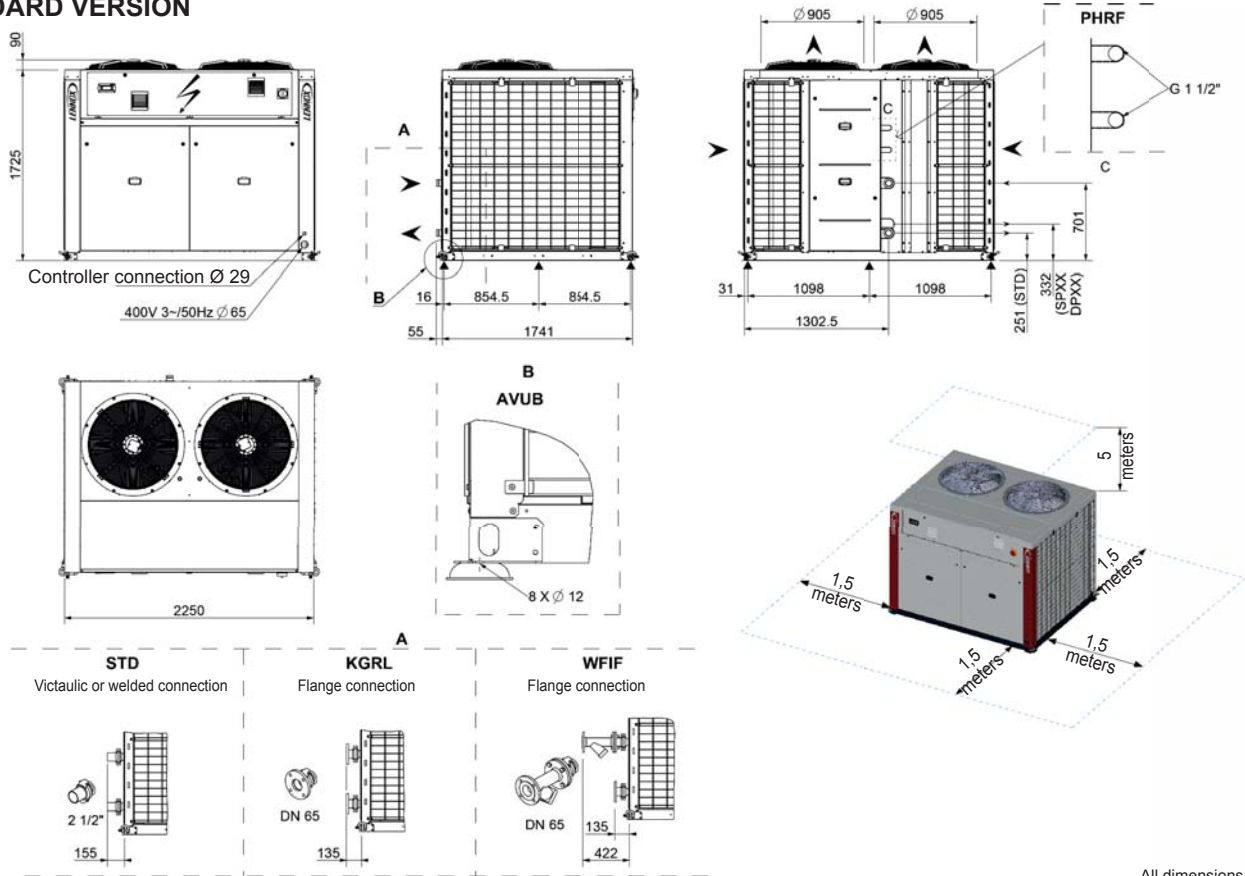


All dimensions in mm

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)
<b>AVUB</b>	Rubber anti-vibration mounts	<b>PHRF</b>	Domestic hot water supply : desuperheater

GAC 110D-125D

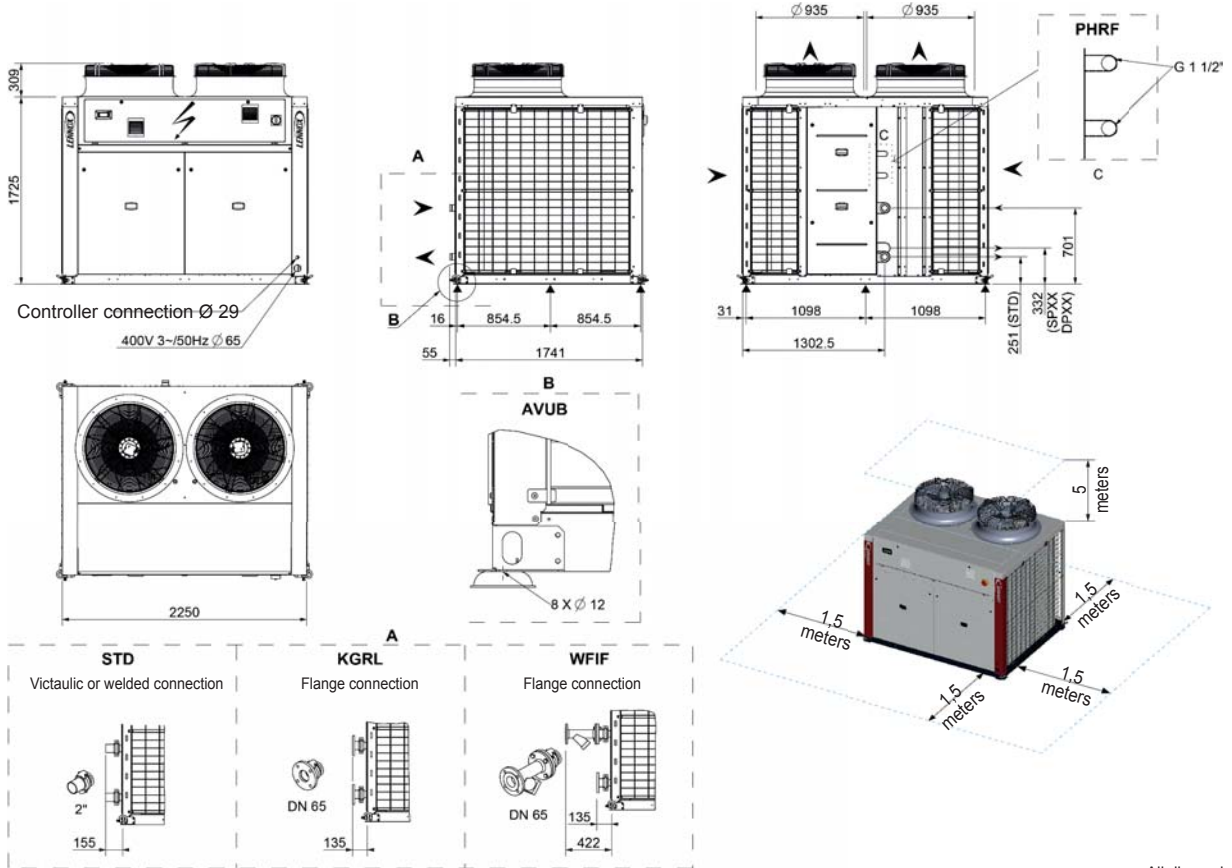
STANDARD VERSION



GAC\_110D\_125D\_Z

All dimensions in mm

UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)

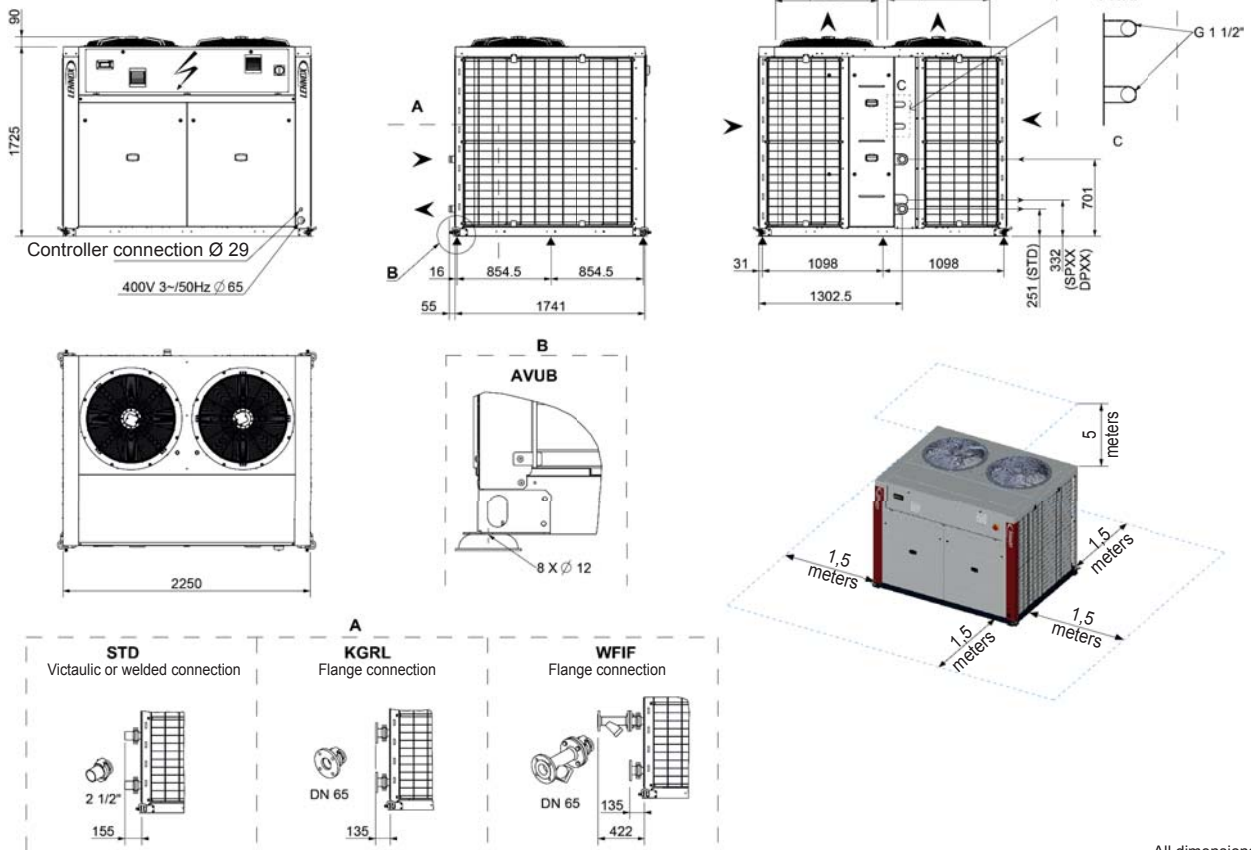


GAC\_110D\_125D\_S\_H\_Z

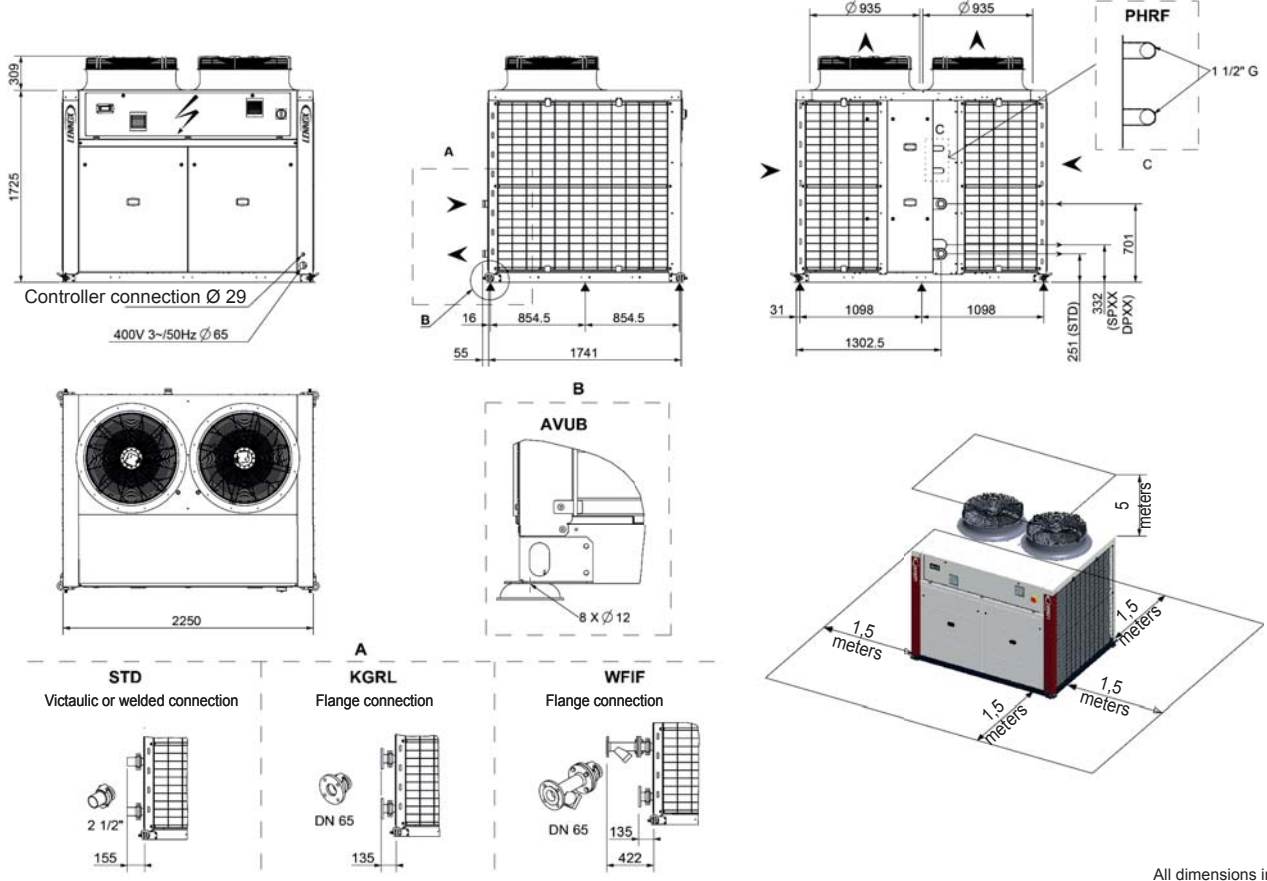
All dimensions in mm

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)
<b>AVUB</b>	Rubber anti-vibration mounts	<b>PHRF</b>	Domestic hot water supply : desuperheater

## GAH 090S-110S-125S-125D

**STANDARD VERSION**


All dimensions in mm

**UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)**


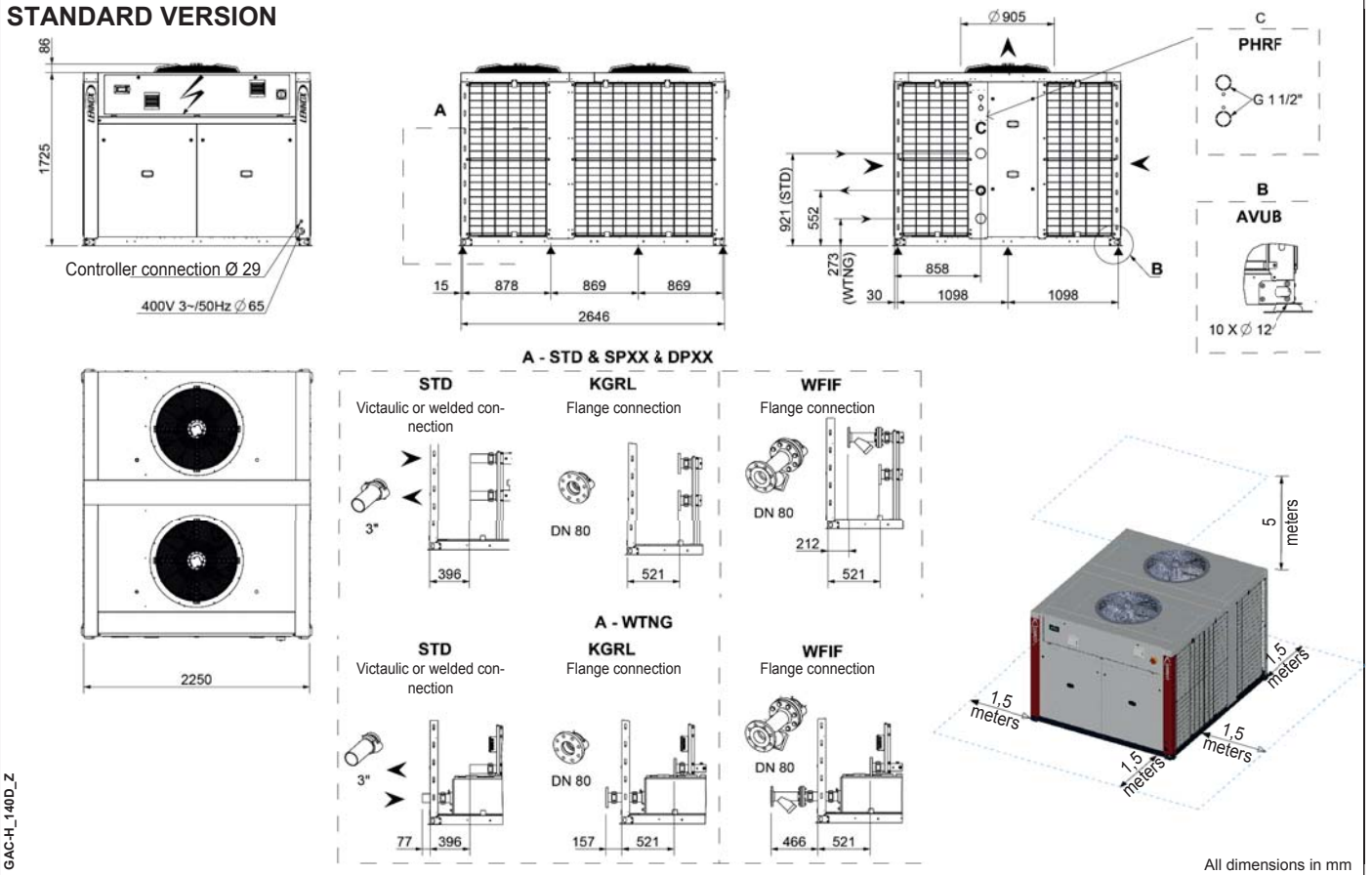
All dimensions in mm

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)
<b>AVUB</b>	Rubber anti-vibration mounts	<b>PHRF</b>	Domestic hot water supply : desuperheater

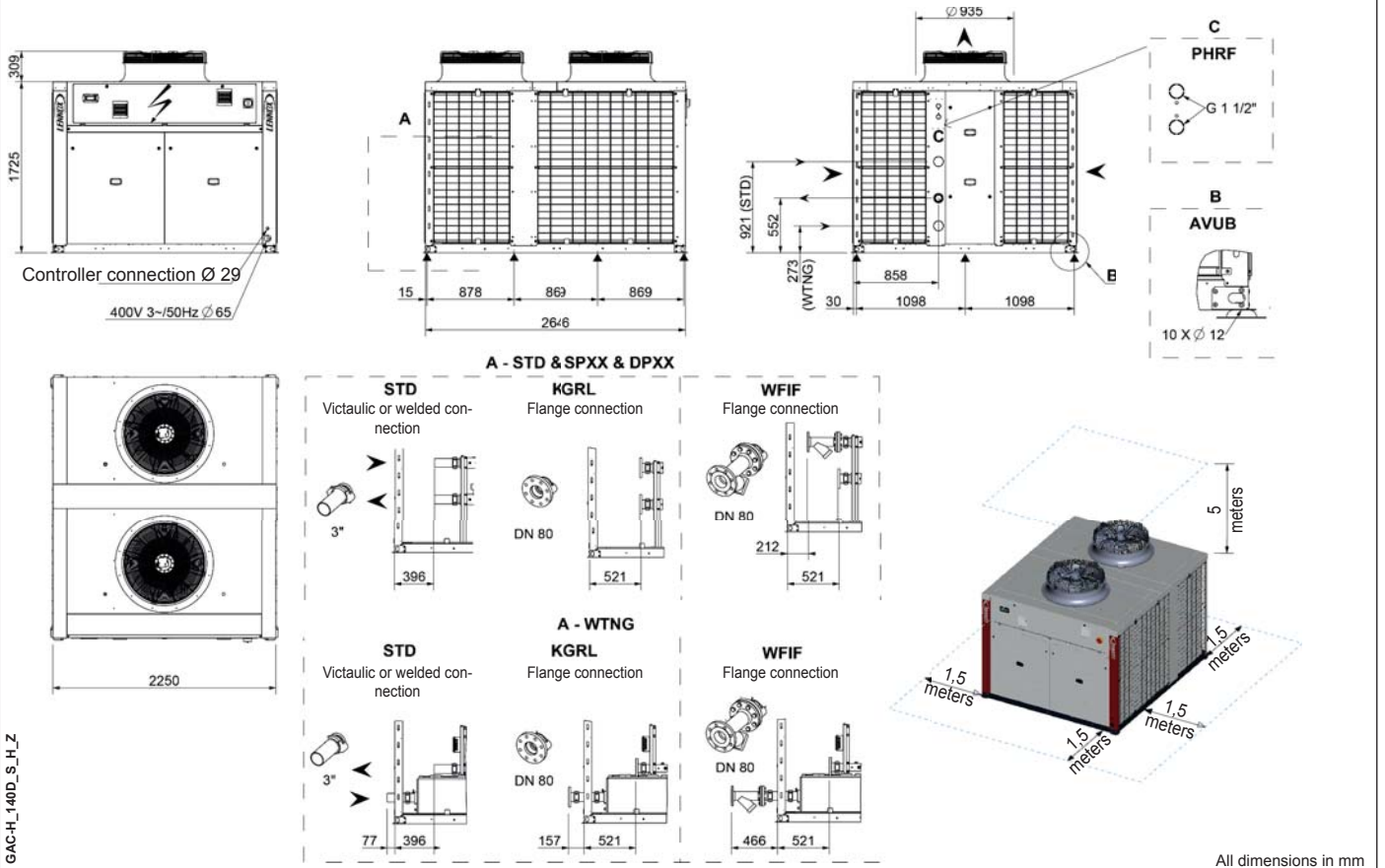


GAC/GAH 140D

STANDARD VERSION



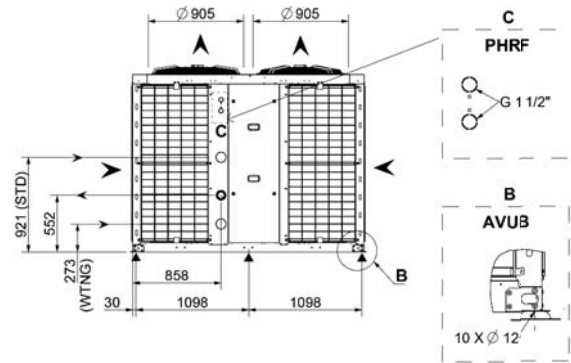
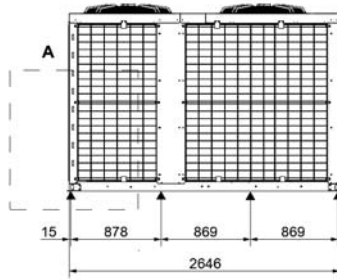
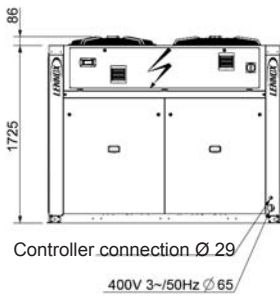
UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)



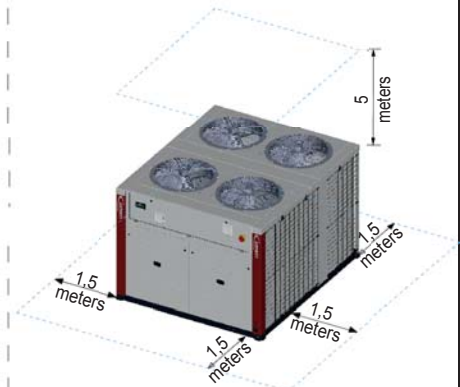
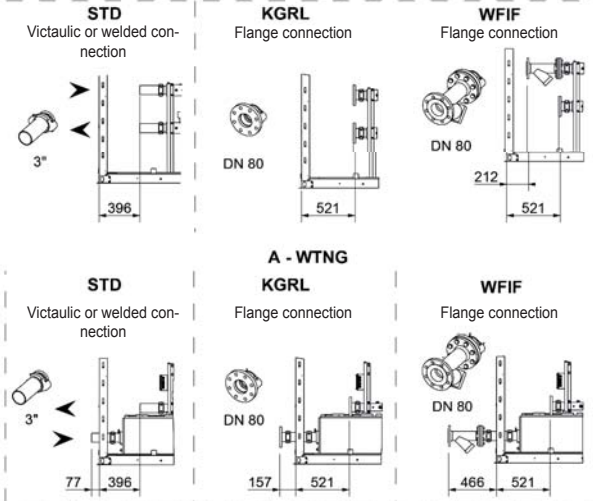
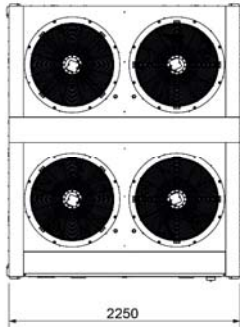
<b>SPXX</b> Hydraulic module with single pump	<b>KGRL</b> Flange connection	<b>WTNG</b> Water tank
<b>DPXX</b> Hydraulic module with twin pump	<b>WFIF</b> Water filter (supplied loose)	
<b>AVUB</b> Rubber anti-vibration mounts	<b>PHRF</b> Domestic hot water supply : desuperheater	

GAC/GAH 160D - 185D

**STANDARD VERSION**

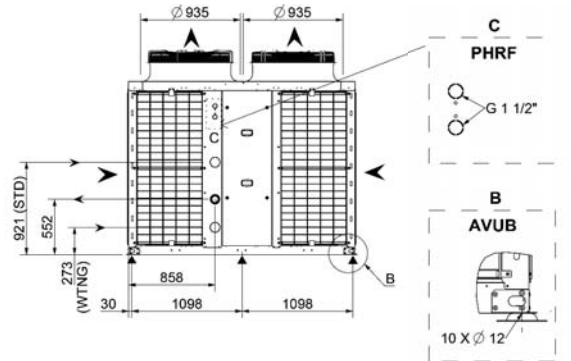
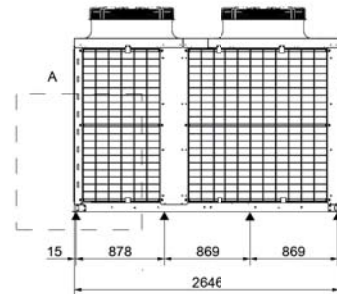
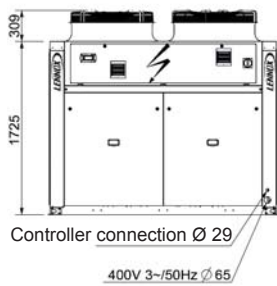


**A - STD & SPXX & DPXX**

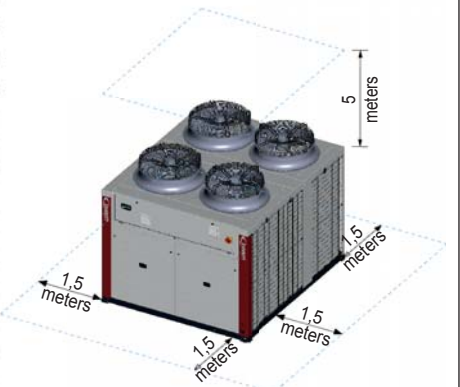
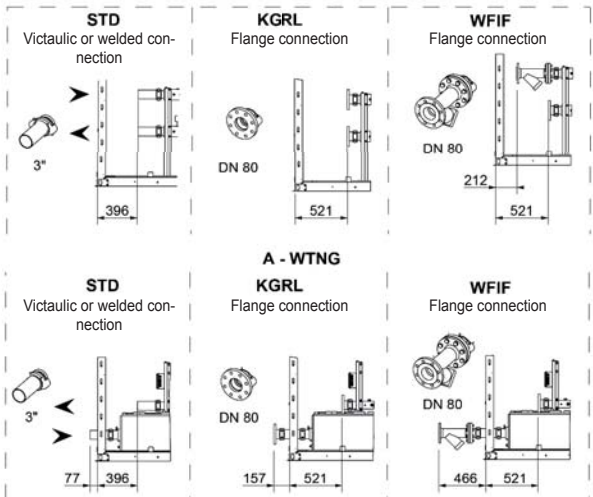
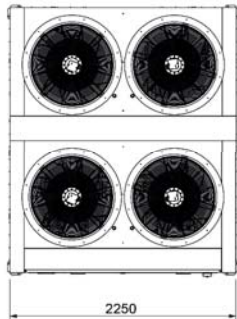


All dimensions in mm

**UNIT WITH STANDARD EC FANS (SEAS) OR HIGH PRESSURE EC FANS (HIPF)**



**A - STD & SPXX & DPXX**



All dimensions in mm

<b>SPXX</b>	Hydraulic module with single pump	<b>KGRL</b>	Flange connection	<b>WTNG</b>	Water tank
<b>DPXX</b>	Hydraulic module with twin pump	<b>WFIF</b>	Water filter (supplied loose)		
<b>AVUB</b>	Rubber anti-vibration mounts	<b>PHRF</b>	Domestic hot water supply : desuperheater		



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