SIGMA SKY R7

30÷650 kW

General
Non-reversible chillers and heat pumps with low GWP refrigerant with scroll compressors and plate heat exchangers. Also available in inverter version for a specific capacity range. Extended range, versatile applications.

Configurations
Chiller: chiller with ON / OFF compressors

Hi: chiller with inverter compressor

OH: non-reversible heat pump

Hi OH: Non-reversible heat pump with inverter compressor

HPW: reversible heat pump on water side

Hi HPW: reversible heat pump on water side with inverter driven compressor

/XLN: Super low-noise unit

/DS: execution featuring a desuperheater

/DC: execution with recovery condenser

Strengths
- Conforming with Ecodesign Reg. 2281, tier 2
- High efficiency inverter version available
- Low GWP refrigerant: unit filled with R32
- New design: compact footprint for options with built-in hydraulic module
- Buffer tank (option)
- BlueThink advanced control with integrated web server. Multilogic function and Blueye® supervision system. (options)
- Flowzer: inverter driven pumps (options)

BlueBox by Swegon

SIGMA SKY R7

Sigma Sky R7 is a wide range of high efficiency reversible chillers and non reversible heat pumps, with hermetic scroll compressors and water source, suitable for both comfort and process applications.

In order to meet any and all requirements and to achieve the most challenging efficiency levels, Sigma Sky was designed to also include an inverter compressor and to come in a dedicated unit set-up for heating only and cooling only.

If compared to its predecessor Tetris W Rev, the furnishing elements of the Sigma Sky configuration are designed to be more compact and to maximise the reduction of the machine footprint, especially in configurations including the built-in hydraulic module.

REFRIGERANT

The models from the Sigma Sky series are available with refrigerant R32.

Acronym "R7" indicates the need to use refrigerant R32 and it shows that the refrigerant has a GWP level below 700.

Refrigerant R32 (GWP=677*)

The refrigerant consists in pure gas.

R32 is classified as a Group 1 fluid under PED.

It is also classified as A2L under the ASHRAE Standard 34, i.e.

- non-toxic;
- mildly flammable.

(*) GWP (AR5), pursuant to IPCC V, evaluated over a span of 100 years.

STRUCTURE

The structure consists of a load-bearing frame made of epoxy polyester powder coated steel sheet, coloured with RAL 7035.

All screws and bolts are stainless steel.

Although they intended for installation in machinery rooms, the units from the Sigma Sky series are always enclosed within dedicated panels, which prevent access to the elements around the unit in all circumstances and contribute to correct reading by the refrigerant leak detection sensor (installed on the machine as standard) during unit operation. The panels serve as covering and protective elements and they are fully made with sheet metal coated with epoxy-polyester powder, colour RAL 7035 .

COMPRESSORS

Sigma SKY R7 - Sigma SKY R7 OH R7 - Sigma SKY HPW R7

The compressors are hermetic orbiting scroll scrolls connected in tandem, in one or two circuits. The two-circuit size 57.5 is made with a tandem and a trio while the size 65.6 is made with two pairs of compressors connected in a trio. They are provided with thermal overload protection by internal Klixon® or external Kriwan© module (depending on the model) and with oil equalization line. All the compressors are fitted as standard with crankcase heater.

The compressors are enclosed in a dedicated technical compartment, which can be accessed by removing the panelling to allow maintenance operations to be carried out even with units running.

Sigma SKY Hi R7 - Sigma SKY Hi OH R7

Depending on the model, there are the following compressor configurations:

models with just one compressor (x.1) use a single modulating compressor

models with two compressors (x.2) use one modulating compressor connected in tandem with one ON/OFF compressor

The modulating compressors are hermetic scroll compressors with permanent-magnet brushless motor and are fitted with oil level sight glass.

The speed of the modulating compressor is varied, depending on the total heat load, roughly between 30 and 105 rps. 30rps and 105rps of its nominal capacity, which is referred to a speed of approx. 95 rps..

The speed of rotation of the compressor is variable in the range 1.800÷6.300 rpm.

The modulating compressors are controlled through DC inverter. This also has the following functions:

- management of acceleration and deceleration ramps
- management of the operating envelope of the modulating compressor
- management of the alarms and safety devices of the modulating compressor

The use of a modulating compressor allows the total inrush current to be reduced because it is always started with an acceleration ramp. In models with two compressors the ON/OFF compressors always get started with the modulating compressor operating at low speed so as to minimise the inrush current of the unit.

The ON/OFF compressors are hermetic orbiting spiral scroll compressors and are fitted with oil level sight glass.

For units with two compressors, there is also an oil equalization line.

USER-SIDE HEAT EXCHANGER

The exchanger is a braze-welded stainless steel plate heat exchanger, insulated with a shroud of closed-cell insulating material.

Models with 2 refrigerant circuits are fitted with dual circuit heat exchanger and therefore with a single pair of hydraulic connections. This has allowed us to:

- maximize the EER and COP levels
- reduce the amount of refrigerant used in the unit
- make the unit lighter and more compact
- make its maintenance easier.

The heat exchanger is fitted with a temperature probe for protection against frost and a differential pressure switch for water flow control. .

A paddle flow switch is available as option for water flow control (supplied together with the unit).

SOURCE-SIDE HEAT EXCHANGER

The exchanger is a braze-welded stainless steel plate heat exchanger, insulated with a shroud of closed-cell insulating material.

Models with 2 refrigerant circuits are fitted with dual circuit heat exchanger and therefore with a single pair of hydraulic connections. .

REFRIGERANT CIRCUIT

Sigma SKY R7 - Sigma SKY R7 OH R7 - Sigma SKY HPW R7

Each refrigerant circuit of the basic unit (cooling only) comprises:

- valve on the liquid line
- charging valves
- liquid sight glass
- Weld-on filter drier
- electronically-controlled thermostatic expansion valve
- pressure transducers for reading the high and low pressure values and relevant evaporating and condensing temperatures
- User-side differential pressure switch
- high pressure switch

The units are fitted with an electronic expansion valve which helps the machine achieve stability more quickly and provides for better superheating control if compared to a mechanical expansion valve, thus maximising the use of the evaporator in all load conditions.

The evaporator and the compressor suction pipes are always isolated with an extruded closed-cell expanded elastomer. In OH and HPW versions the elastomer isolation above is also applied to the delivery pipes in the compressor and to the condenser.

Sigma SKY Hi R7 - Sigma SKY Hi OH R7

Each refrigerant circuit of the basic unit (cooling only) comprises:

- valve on the liquid line
- charging valves
- liquid sight glass
- Weld-on filter drier
- electronically-controlled thermostatic expansion valve
- pressure transducers for reading the high and low pressure values and relevant evaporating and condensing temperatures
- User-side differential pressure switch
- high pressure switch

The evaporator and the compressor suction pipes are always isolated with an extruded closed-cell expanded elastomer. In OH version the elastomer isolation above is also applied to the delivery pipes in the compressor and to the condenser.

ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanized sheet-iron box.

The electrical control panel of the basic unit comprises:

- main disconnect switch
- automatic circuit breakers for compressors with fixed calibration
- fuses to protect the auxiliary circuits
- thermal magnetic circuit breakers for the pumps (if present)
- contactors for compressors and pumps (if present)
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts for compressors and pumps (if present)
- microprocessor controller with display accessible from the outside
- Warning lights used to warn about voltage being supplied to the leak test circuit, a malfunction of the refrigerant leak sensor, and a refrigerant leak alarm.

All the electrical cables inside the panel are numbered and the terminal board dedicated to the customer's connections is colored orange so that it can be quickly identified in the panel.

All cables are supplied with PG elements (cable glands) to increase the safety of the unit and at the same time to reduce the possibility of refrigerant spilling into the electrical panel should refrigerant leak.

Power supply: 400/3~/50.

CONTROL BLUETHINK

The unit is supplied as standard with an advanced controller (applies to all versions).

Main controller functions advanced

The control allows the following functions:

- water temperature adjustment, with control of the water entering the user-side heat exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the log of all machine inputs, outputs and states
- automatic rotation of compressor starting sequence
- recording of the alarm log
- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page
- digital input for general ON/OFF
- digital input for Summer/Winter selection

For further details on available functions and on displayed information, you can refer to the specific documentation of the control.

By default, the serial connections present as standard are enabled only for reading from BMS. Enabling of writing from BMS is to be requested when ordering.

Main functions of the webserver (only for units with advanced control)

As standard, the Bluethink controller integrates a webserver with a preloaded web page that is accessed via password.

The web page allows the following functions to be carried out (some of these are available only for users with advanced level rights):

- display of the main functions of the unit such as unit serial n°, size, refrigerant
- display of the general status of the machine: water inlet and outlet temperatures, external air temperature, mode (chiller or heat pump), evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, pumps, expansion valves
- display in real time of the graphs of the main quantities
- display of the graphs of logged quantities
- display of alarm log
- management of users on several levels
- remote ON/OFF
- remote set point change
- remote time band change
- remote summer winter mode selection

Human-Machine Interface

The control has a graphic display that allows the following information to be displayed:

- water inlet and outlet temperature
- set temperature and differential set points
- description of alarms
- hour meter of operation and number of start-ups of the unit, the compressors and the pumps (if present)
- high and low pressure values, and relevant condensing and evaporating temperatures
- external air temperature
- superheating at compressor suction.

CONTROLS AND SAFETY DEVICES

All the units are fitted with the following control and safety components:

- high pressure switch with manual reset
- high pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller
- high pressure safety valve conveyed outside the unit
- antifreeze probe at outlet of each evaporator
- compressor overtemperature protection
- water differential pressure switch
- Refrigerant leak detector calibrated for R32

TESTING

All the units are factory-tested and supplied complete with oil and refrigerant.

PACKAGING

The unit is made and shipped on a wooden pallet that allows the unit to be handled using a forklift truck.

The unit is wrapped in transparent polyethylene stretch film.

SAFETY DEVICE CHAIN

The unit is conceived and designed for installations inside machinery rooms, as classified in standard EN 378-1. The machinery room shall comply with the requirements laid down in standard EN 378-3. The unit is finally manufactured in compliance with standard EN 378-2, sect. 6.2.14, which specifies and safeguards every element for design compliance.

More specifically, in compliance with the requirements laid down in standard EN 378-2, sect. 6.2.14, the units of the Sigma Sky R7 range shall include the following:

- detailed study to prevent the occurrence of flammability conditions in the technical room;where possible, use of weld-on components to prevent potential leakage;isolation of the electrical panel aboard from the technical room in order to prevent all migration of refrigerant coming from the refrigerant circuit, which is a potential cause of flame ignition;safety valves routed to the outside of the unit;additional draining holes on the base of the frame in order to prevent the refrigerant concentration from achieving the LFL value (Low Flammability Limit) in the event of leakage;a refrigerant leak detector installed as standard, specifically calibrated for R32 refrigerant, and designed to continue to read in the event of leakage, provided that the leak is confined inside the panelled machine. It gets activated when 10% of the LFL value is achieved.

The two scenarios below may occur in the event of a refrigerant leak.

Scenario 1 - Refrigerant leak inside the unit

- The alarm relay in the sensor opens and, in so doing, it cuts off power to the unit, excepting the leak detector which continues to operate and to read the leakage status in the room.A (red) LED light goes on outside the electrical panel to warn about the leak. NOTE: provision is made for a potential-free contact to trigger the alarm.

Scenario 2 – Refrigerant leak outside the unit and inside the machinery room (or another indoor place where the unit is installed) Please note that:

- the installer is the sole person responsible for assessing the risk of flammability and for classifying the danger zone in the place of installation, as required by standard EN 378-3 and/or national and local regulations.The installer is the sole person responsible for establishing the safety measures required in the machinery room, including the installation of fans, refrigerant leak detectors, etc.The installer is the sole person responsible for switching the unit off using the potential-free contact before the leak reaches the unit and its electrical panel.

If the refrigerant leak detector is malfunctioning, the following situations may occur:

- the malfunction relay in the sensor opens and, in so doing, it cuts off power to the unit, excepting the leak detector which continues to operate and to read the leakage status in the room;a (yellow) LED light goes on outside the electrical panel to warn about the leak. NOTE: provision is made for a potential-free contact to trigger the alarm.

Where a black-out occurs, none of the elements in the unit are powered.

For the purpose of this document, a black-out is to be considered as a temporary and short-lasting condition. When power is restored, the sequence for the activation of all the elements, including the safety elements, gets restarted. The sensor performs its restart cycle (approx. 120 seconds), during which the circuit breaker is prevented from closing. At the end of this cycle, an additional min. span of time elapses (set in the timer) before the sensor can read correctly. If no leak or malfunction is identified at the end of this extra time, the circuit breaker closes and the unit can get restarted, according to the time set in the controller. Conditions of power missing for a long time (e.g. for extraordinary maintenance at the place of unit installation), which may last for several days also, are not be considered as a temporary black-out and they have to be treated as black-out conditions. In this case, when the unit is restarted, it is good practice to carry out a preventive inspection of the unit and a check for leaks.

VERSIONS

In the basic version, the unit is a high efficiency liquid chiller, but includes various types of set-up as an option to meet the requirements of all types of application.

R7: chiller

The standard Sigma Sky R7 unit is a non-reversible chiller for cooling only

OH R7: heat pump (heating only)

The OH unit is a non-reversible heat pump.

HPW R7: heat pump with hydronic-side reversal

The HPW unit is a heat pump that includes cycle reversal on the hydronic side of the system via special 3-way or 4-way reversing valves outside the unit (not supplied).

In addition to what is present in the basic version, the HPW set-up includes an OK signal in the terminal board for controlling the group of external reversing valves (not supplied).

Hi R7: inverter chiller

Unit with inverted-modulated compressor (cooling only)

Hi HPW R7: inverter driven reversible heat pump on water side

The Hi HPW unit is an inverter driven heat pump that includes cycle reversal on the hydronic side of the system via special 3-way or 4-way reversing valves outside the unit (not supplied).

In addition to what is present in the basic version, the HPW set-up includes an OK signal in the terminal board for controlling the group of external reversing valves (not supplied).

Hi OH R7: inverter non-reversible heat pump

Unit with inverted-modulated compressor (heating only)

OPTIONS

/DC: unit with total recovery condenser

In addition to the set-up of a chiller only unit, /DC units include:

- a heat recovery condenser for recovering 100% of the condensation heat; The exchanger is a brazed plate heat exchanger
- temperature probe at the inlet of the heat recovery heat exchanger
- a liquid receiver for each refrigerant circuit

This set-up is not available for OH and HPW units.

/DS: unit with partial heat recovery

/DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coil. The exchanger is a braze-welded plate heat exchanger. For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

The installation of the desuperheater circuit pump is the responsibility of the customer.

The unit does not control external pumps and/or sensors on the desuperheater circuit.

The desuperheater can be used during operation in cooling mode. However, it can also be used in heating mode on condition that the following measures are taken:

- a valve (either 2- or 3-way) must be installed on the desuperheater water circuit;
- the valve must be monitored using a temperature control system;
- the valve must be operated to regulate the temperature of the input water into the desuperheater = IWTds.

First, enter the unit heating setpoint, which corresponds to the temperature of water delivered to the heating unit=LWTu_Heating. Then set the condition below:

- IWTds > LWTu_Heating + 10 [K]

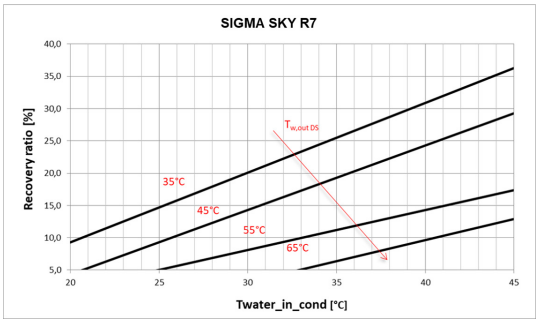
The valve, the control systems and their installation, setup operations, etc. are the responsibility of the client. If heat recovery is not required during operation in heat pump mode, or where the above requirements are not met, the water circuit of the desuperheater must be shut off. Desuperheater operation in heat pump mode reduces the heating capacity transferred from the unit to the user's hydronic circuit.

Below is an example graph where, as the condenser inlet temperature changes (Twater_in_cond) and as the temperature of the water leaving the heat recovery heat exchanger changes, (Tw,out DS), the percentage of recovered heat is shown as an indication (Recovery ratio).

Condensation heat recovery is a function of size, version and operating conditions.

The percentage of recovered heat is calculated as the ratio between recovered heat flow to the desuperheater and the heat flow to the condenser under nominal conditions, therefore evaporator inlet-outlet water temperature 12-7°C.

In the following graph, a constant temperature delta of 5°C between water inlet and outlet at the heat recovery heat exchanger has been considered.



/XLN: super low noise unit

Units in XLN set-up are fully panelled with sheet metal panels coated with epoxy-polyester powder, colour RAL 7035. RAL 7035 and lined with matting made of sound absorbing and soundproofing material.

Compressors are provided with a cover jacket consisting of: 13 mm noise-absorbing material made with self-extinguishing polyester fibre on the compressor side - density 30 Kg/m³ -, soundproof rubber sheet - density 6 kg/m³ -, placed in-between the polyester layers, and an additional 5 mm layer of noise-absorbing material made with self-extinguishing polyester fibre on the sheath side - density 30 kg/m³. Max. total thickness: 20 mm

HYDRAULIC MODULES

All the units can be equipped with hydraulic module in various combinations on the user side, on the source side and in combination with the total heat recovery heat exchanger.

Hydraulic modules with one pump have:

- one pump
- a gate valve on the delivery side of the pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- an expansion vessel

In the version with 2 pumps, these are always with one on standby while the other is working. Switching over between the pumps is automatic and is done by time (to balance the hours of operation of each one) or in the event of failure.

Hydraulic modules with tank also have:

- a gate valve at the inlet of the pump or the suction manifold
- a tank with drain valve and air valve

Hydraulic module combinations

The hydraulic circuit inside the unit is completely insulated with closed cell insulation material.

The technical choices made for the Sigma Sky range are such that:

- the selection of one pump (pump on source side) is not allowed;
- the number of pumps on the user side and on the source side is the same.

Refer to the table of configurations that are not possible to check for availability of specific set-ups.

The hydraulic module on the user side can have the following configurations:

- /1P: hydraulic module with one pump
- /1PS: hydraulic module with one pump and buffer tank
- /2P: hydraulic module with two pumps
- /2PS: hydraulic module with two pumps and buffer tank

All the above-mentioned modules have pumps with standard discharge head.

The following are also available:

modules /1PM, /1PMS, /2PM and /2PMS that have pumps with increased available discharge head

modules /1Pr, 1Prs/, /2Pr, and /2PrS with suitable pumps, having a reduced available head.

The pumps above can be combined with the following options on the source side:

- /1S: hydraulic module with one pump/2S: hydraulic module with two pumps

The source side pumps are normally switched off and they are switched on a few seconds before the start of first compressor.

When reaching the set point, a few seconds after switching off the last compressor, the source side pumps are switched off again.

For the various set-ups refer to the table showing the versions that are not available.

/PIE: Arrangement for outdoor installation

- The electrical control panel is made in a painted galvanized sheet-iron box with IP54 protection rating.
- The structure of the unit is made of galvanized sheet-iron coated with polyester powder in
- The base frame is insulated with polyethylene foam.
- Water tightness is achieved by seals around the perimeter of the panels.

DESCRIPTION OF ACCESSORIES

Refrigerant circuit accessories

VM2 **Condensation control with 2-way modulating valve**

The accessory includes the supply of a 2-way modulating valve complete with servo control to be installed on the source-side hydraulic circuit (installation by the customer). The servo control is controlled via a 0-10V signal from the control depending on the condensing pressure.

This accessory is to be used in applications where it is beneficial, when possible, to reduce the total flow rate of water coming from the source (for example, when well water is used). When the unit reaches the setpoint, the valve will be forced to close.

Accessory supplied loose.

VM3 **Condensation control with 3-way modulating valve**

The accessory includes the supply of a 3-way modulating valve complete with servo control to be installed on the source-side hydraulic circuit (installation by the customer). The servo control is controlled via a 0-10V signal from the control depending on the condensing pressure.

This accessory is to be used in applications where it is beneficial, when possible, to reduce the flow rate of water sent to the source-side heat exchanger (for example, when water from a loop is used). When the unit reaches the set point, the valve will be forced to total recirculation.

Accessory supplied loose.

DVS **Double safety valve**

With this accessory, instead of each individual safety valve per circuit, there is a "candelabrum" with two safety valves and a diverter valve for choosing the valve in operation. This allows the safety valves to be replaced without having to drain the machine and without having to stop it.

SCU **Cumulative 0-10V signal for condensation control**

This accessory requires a 0-10V output in the terminal board to carry out condensation control through a device outside the machine (2-way valve, 3-way valve, inverter-controlled pump). The signal is linked to the condensing pressure.

The signal is cumulative and therefore the accessory is suitable for combination on units in which there is a single condensation control device located on the common branch of the source.

Incompatible with condensation control with modulating valve.

MAFR **Pressure gauges**

The operating pressures of each circuit of the unit can be displayed on the control by accessing the relevant screens. Also, the machine can be fitted with pressure gauges (two for each circuit) installed in a clearly visible position. These allow reading in real time of the working pressures of the refrigerant gas on the low pressure side and on the high pressure side of each refrigerant circuit.

RUB **Compressor suction and delivery valves**

The valves situated on the delivery side and on the suction side of the compressors allow the compressor to be isolated from the rest of the refrigerant circuit, so making the maintenance operations quicker and less invasive

BK **Brine Kit**

This accessory is compulsory if a water temperature set point lower than +3°C is used (if the unit is provided with double set point or variable set point, the lower set point is considered).

The accessory consists of increased insulation and suitable sizing and calibration of some components.

The inlet and outlet temperatures of the user-side exchanger must be given on ordering to allow correct setting of the alarm parameters and verification of the sizing of the expansion valve.

The cooling set point can then be changed by the customer in an interval that, compared to the set point given on ordering, ranges from -1K up to the maximum temperature allowed by the above-stated operating limits.

The unit will be optimized to work at the set point temperature given on ordering. For different set points, the cooling capacity provided and the level of efficiency of the machine could decrease and move away from these conditions.

BC **Capacitive backup battery for electronic expansion valve**

When the compressors stop, the controller always closes the electronic expansion valve to prevent dangerous refrigerant migration. The presence of the backup battery ensures that the electronic valve is kept in closed position even when there is no power supply

This option uses a condenser as energy storage, and not an ordinary coil. In this way, it is not affected by the memory effect of normal coils and the need for maintenance is avoided.

Applies to units with advanced controller.

EILT **Extra insulation for low temperatures**

The accessory consists of increased insulation on the compressor intake and appropriate sizing and calibration of some components. The thermostated insulation is placed on the base and on the sides of the compressor intake. The insulation has a thickness of 15 mm and prevents the formation of condensation on the surface of the compressor suction which could be damaged in the event of ice formation.

The accessory is to be considered mandatory for water production lower than or equal to -8 ° C.

The EILT accessory includes the Brine Kit and is incompatible with the XLN version due to the space occupied by the thickness of the insulation.

IPS **Condensation control with source-side pump inverter**

In order to keep the condensing temperature above the minimum allowed, the control of the unit modulates the flow rate of water to the heat exchanger through the inverter that drives the source-side pump.

If the unit is in HP set-up, when it is working in heat pump mode, the pump always operates at maximum speed to guarantee the maximum flow rate of water to the source-side heat exchanger.

The accessory can be applied only to units provided with integrated source-side hydraulic module.

HWT **High outlet water temperature**

This accessory is mandatory for certain operating conditions in which the condensing or evaporating temperatures are above a certain threshold.

Please refer to the "Operating Limits" section.

Hydraulic circuit accessories

Some accessories may be incompatible with each other even if not expressly indicated.

COL Water manifolds for DS

This accessory provides a pair of manifolds for connection of the partial heat recovery heat exchangers. The installation of the manifolds outside the machine is to be carried out by the customer.

Accessory supplied loose.

FLUS Flow switch (instead of the water differential pressure switch)

As an alternative to the differential pressure switch (standard flow sensor), it is possible to request the paddle flow switch as accessory. This detects when there is no water flow to the user-side exchanger and sends a signal to the control of the unit that will stop the compressors to prevent damage to the exchangers.

The flow switch is supplied loose (installation by the customer) and replaces the water differential pressure switch (standard).

V3 Three-way valve for domestic hot water management

(for OH units)

This is a three-way on-off valve, complete with servo control. The unit controller can manage two separate hydraulic circuits through this valve: one for comfort and one for domestic hot water production.

The valve and the servo control are for indoor installation and they require the ambient temperature not to drop below -10°C.

Accessory supplied loose. Installation by the customer.

V3MC 3-way modulating valve on hot circuit

(for OH units)

The accessory involves the supply of a 3-way modulating valve to be inserted on the hot circuit in order to check that the temperature of the water entering the exchanger is always higher than the minimum allowed.

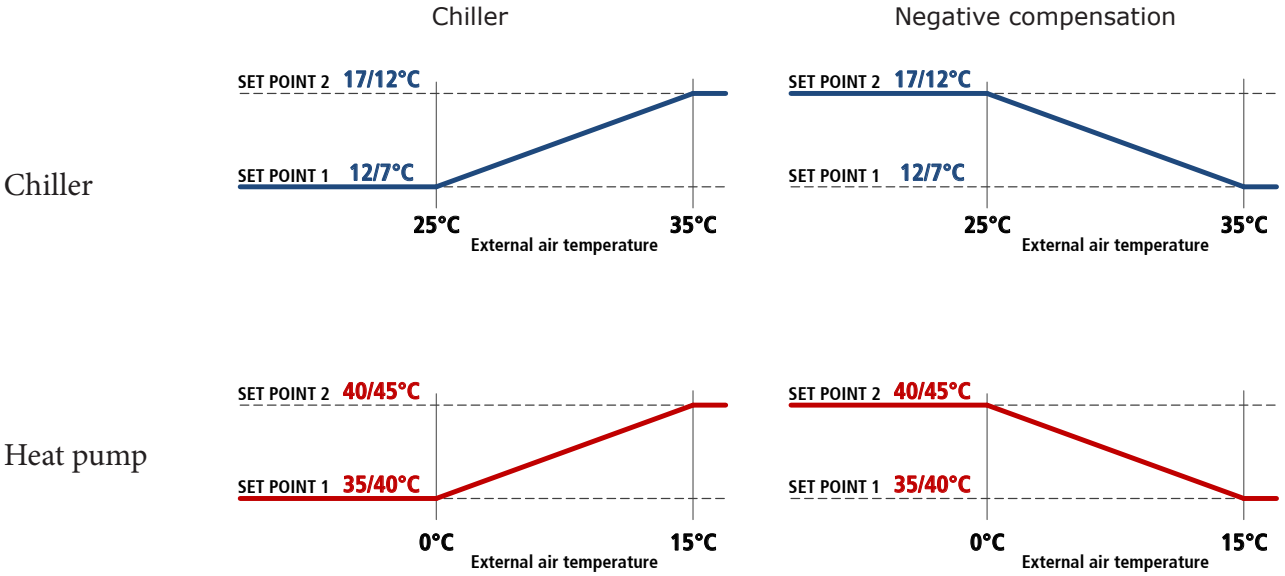
Electrical accessories

Some accessories may be incompatible with each other even if not expressly indicated.

CSP **Set point compensation depending on external air temperature**

For units fitted with this accessory, the set point of the unit is set so that it can vary between two values, a maximum and a minimum, depending on the external air temperature. The compensation ramp and the maximum and minimum values of the set point can be changed by the user.

Unless otherwise specified in the order, the controller will be set to implement a positive compensation logic according to the temperatures shown in the following diagrams:



IA **Automatic circuit breakers**

With this accessory, automatic circuit breakers are installed instead of fuses for the protection of auxiliary loads. Also, the same accessory uses automatic circuit breakers with adjustable thermal overload protection to protect the compressors.

LIID **Limitation of the current absorbed by digital input**

When this accessory is requested, a digital input is prepared in the terminal board to activate the forced capacity reduction of the unit to a set fixed level.

This accessory is useful when there is a need to necessarily limit the power absorbed by the unit as regards particular conditions.

We point out that, in some conditions (for example, during defrosting, oil return cycles or hourly compressor rotation procedures), the controller could force the unit to operate at full capacity for limited periods of time.

R1PU **Relay for management of 1 external user-side pump**

This accessory can be requested for units without user-side pumps and allows a pump outside the machine to be controlled.

R2PU **Relay for management of 2 external user-side pumps**

This accessory can be requested for units without user-side pumps and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.

The two pumps are controlled by two separate relays.

RE1S **Relay for management of 1 external source-side pump**

This accessory can be requested for units without source-side pumps and allows a pump outside the machine to be controlled.

RE2S **Relay for management of 2 external source-side pumps**

This accessory can be requested for units without source-side pumps and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.

The two pumps are controlled by two separate relays.

R1PR **Relay for management of 1 external heat recovery-side pump**

This accessory can be requested for units without heat recovery pumps (for DC units) and allows a pump outside the machine to be controlled.

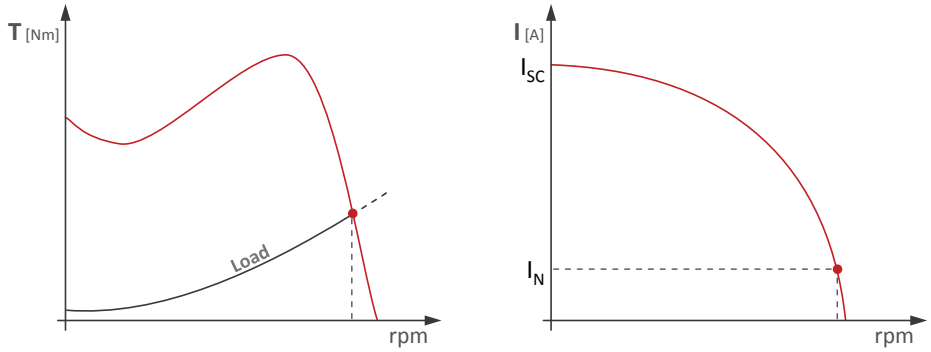
R2PR **Relay for management of 2 external heat recovery-side pumps**

This accessory can be requested for units without heat recovery pumps (for DC units) and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.

The two pumps are controlled by two separate relays.

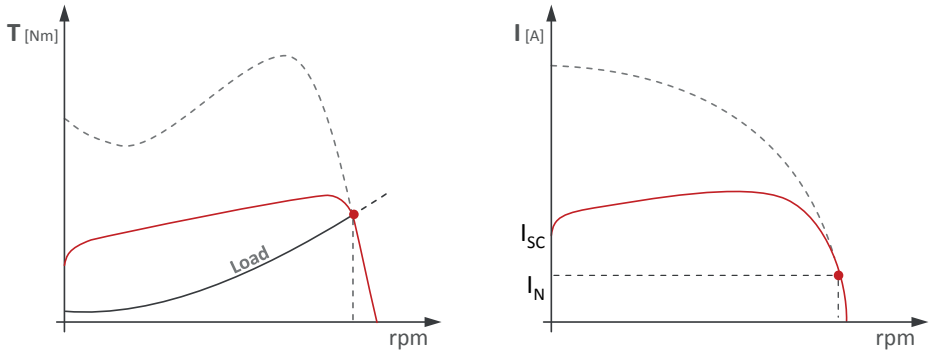
SOFT **Electronic soft-starter**

The scroll compressors have DOL (Direct On Line) starting and their torque (T) and current (I) characteristics are shown in the following diagrams:



For an individual compressor, the normal starting current ISC will be 4-5 times its rated current IN.

If the unit is equipped with the electronic soft-starter accessory, the starting of each compressor is done with an acceleration ramp that allows the effective value (rms value) of the inrush current of the individual compressor to be lowered.



RIF **Power factor correction to cosφ ≥ 0.95**

With this accessory, an electrical control panel (IP54 protection rating), containing power factor correction capacitors to make the cosφ of the unit greater than or equal to 0.95, is supplied with the unit. The capacitors should be connected (by the customer) to the electrical control panel of the unit in the specially prepared terminal board.

Besides reducing the absorbed reactive power, the use of this accessory also allows the maximum absorbed current to be lowered.

RMMT **Maximum and minimum voltage relay**

This accessory constantly monitors the voltage value and the unit's power supply phase sequence. If the supply voltage does not fall within the set parameters or there is a phase reversal, an alarm is generated that stops the machine to prevent damage to its main parts

ENM **Energy meter**

The accessory allows the main electrical quantities (including voltage, current, power) to be read on the three phases, via current transformer.

This accessory communicates with the BlueThink controller to supervise the monitored data. The values measured are then made available through the unit display and the web server.

GFC FC/NG management

This option is available only for the basic model (chiller).

The option includes configuration of the BlueThink controller of the unit, in order to carry out the free-cooling mode, without using glycol.

The option also includes integration in the machine of: free-cooling pump relay, consent for external dry cooler, system return probe and dry-cooler inlet and outlet probes.

The components required for making the system, and also the hydraulic and electrical connections to the unit, are to be provided by the customer.

More specifically, the system will consist of:

- a water-water heat exchanger that carries out the separation between the source side (glycol) and the user side (non-glycol).
- a 3-way modulating valve that feeds the free cooling circuit and carries out condensation control when the unit is working in mixed chiller/free cooling mode.
- a source-side pump

COTW Outgoing water temperature control

With this accessory, outgoing instead of incoming water temperature control is used.

SETD Double set point from digital input

The accessory allows you to preset two different operating set points and manage the change from one to the other through a digital signal.

The set point temperatures must be specified when ordering. For optimization of the unit, reference will be made to the lower set point in chiller mode and the higher set point in heat pump mode.

Unless otherwise specified in the order, the controller will be set at the factory with the following temperatures:

- in chiller mode, set point 1 to 7°C and set point 2 to 12°C
- in heat pump mode (only for HP units) set point 1 to 45°C and set point 2 to 40°C

For operating conditions other than standard, unless otherwise specified in the order for the second set point, the controller will be set at the factory:

- by adding 5°C to the main cooling set point
- by subtracting 5°C from the main heating set point

If necessary this value will however be limited to remain within the operating limits of the unit.

SETV Variable set point with remote signal

The accessory allows the set point to be varied continuously between two preset values, a maximum and a minimum, depending on an external signal that can be of the 0-1V, 0-10V or 4-20mA type.

The set point temperatures and the type of signal to use for the adjustment must be specified when ordering. For optimization of the unit, reference will be made to the lower set point in chiller mode and the higher set point in heat pump mode.

Unless otherwise specified in the order, the controller will be set at the factory with 0-10V analogue input and with the following temperatures:

- in chiller mode, 0V will correspond to a set point of 7°C and 10V will correspond to a set point of 12°C
- in heat pump mode (only for HP units), 0V will correspond to a set point of 45°C and 10V will correspond to a set point of 40°C

For operating conditions other than standard, unless otherwise specified in the order for the variable set point, the controller will be set at the factory:

- by adding 5°C (10V) to the main cooling set point (0V)
- by subtracting 5°C (10V) from the main heating set point (0V)

If necessary this value will however be limited to remain within the operating limits of the unit.

TERM Remote-controlled user terminal panel

This accessory allows the terminal normally situated on the machine to be replicated on a support situated at a distance. It is particularly suitable when the unit is placed in an area that is not easily accessible.

The accessory is supplied loose and is to be installed by the customer at a maximum distance of 120m from the unit. We advise using a cable of the following type: "TECO O.R. FE 2x2xAWG24 SN/ST/PUR".

For this accessory, there is a dedicated serial port.

SFU **User-side remote-controlled operating probe**

With this accessory, the operating probe is to be placed on a tank outside the machine. When the set point temperature is reached in the tank, the unit also stops the pumps to guarantee the maximum energy saving.

The circulation of water in the tank to the system is to be provided by the customer.

The accessory is available only for units with built-in user-side hydraulic module or with the "Relay for management of 1/2 external user-side pumps" accessory.

CSU **Enabling for integration heater on user side**

The accessory enables management of a heat source outside the unit which is supplementary to the user circuit.

The necessary OK signals for controlling a maximum of four capacity steps are included in the electrical control panel. Activation of the steps takes place depending on the distance from the set heat pump set point.

CSS **Enabling for integration heater on tap water side**

The accessory enables management of a heat source outside the unit which is supplementary to the domestic hot water circuit.

ENML **Energy meter with current limiter**

The accessory allows the main electrical quantities (including voltage, current, power) to be read on the three phases, via current transformer.

This accessory communicates with the BlueThink controller to supervise the monitored data. The values measured are then made available through the unit display and the web server.

This accessory is designed to limit the maximum current the unit can absorb. The controller instantly checks the absorption levels and, where necessary, it applies a forced capacity reduction that keeps the absorbed current value below the stored threshold.

ENT **Energy trend**

This function estimates the energy consumption and the cooling and heating production of the unit. The efficiency of the unit is calculated ("EER" for cooling operation or "COP" for heating operation).

Data are calculated in real time according to the working conditions of the unit (evaporation and condensing pressure, external air temperature).

Data are also displayed in the unit user interface in a dedicated "Energy Trend" mask.

Following data are also recorded in the logs in the controllers memory:

- "EnergyTrendHours" contains records of the values of energy absorbed and produced for each hour
- "EnergyTrendHistory" contains records of the values of energy absorbed and produced for each day

The "logs" can then be downloaded via a USB pendrive or from the WEB pages.

The function returns values within the operating envelope of the machine. No data will be recorded outside the operating envelope.The data is stored as an hourly average for 12 months of operation. After 12 months the control overwrites the first data.If hourly resolution is required, the data must be downloaded at least once a year. The control also stores daily average data. This is stored for the life of the unit.In case of microprocessor board failure, data, if not previously downloaded and saved, will be lost.

AS Automatic management of domestic hot water

(for OH units)

This function enables the unit to control the temperature inside a domestic hot water storage tank and to manage a 3-way valve outside the unit (available as an accessory).

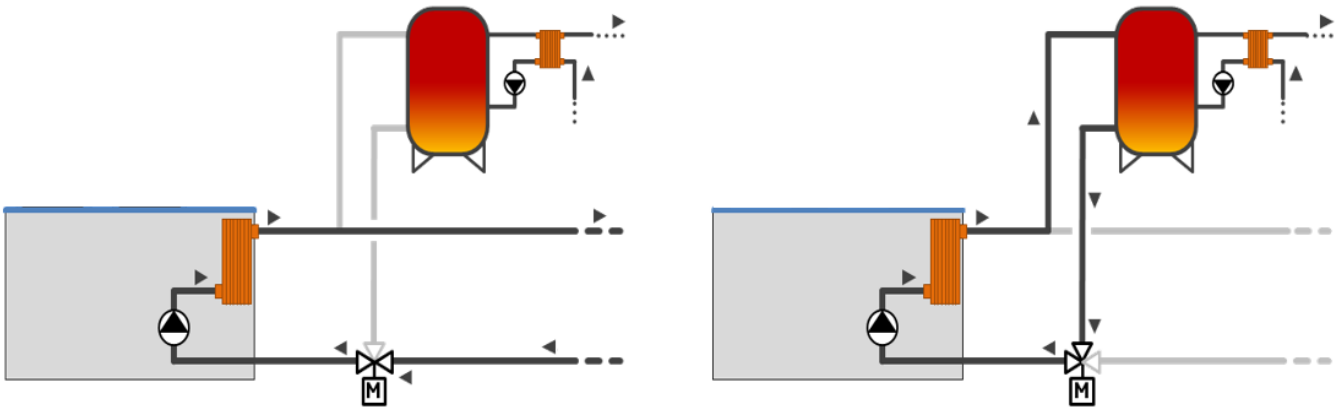
The water temperature in the domestic hot water tank is controlled through a dedicated probe situated in the tank.

Normally, the heat pump operates on the system to meet the comfort requirements of the building, but when the water temperature in the domestic hot water tank falls below a set threshold, the controller switches to domestic hot water production.

If the unit is operating as heat pump for heating, the 3-way valve will be switched and the set point changed.

Once the temperature in the domestic hot water tank has reached the set value, the unit automatically returns to producing water for the heating or air conditioning system.

Domestic hot water production is always given priority.



This accessory provides for the presence in the electrical panel of two digital inputs for disabling, respectively, the production of domestic hot water and the production of water for the heating system.

When the unit is working in "domestic hot water only" mode, the pump is normally off and is switched on only for the time required to meet the demand for domestic hot water production.

When this accessory is fitted, the machine must have control of pump operation. This means that either the unit is equipped with one of the hydronic modules available in the catalogue (therefore with at least one pump installed on it) or the relay for external pump management must be requested as accessory.

The probe to be placed in the sanitary tank is supplied with a 12m long cable. The probe is used to measure the water temperature in the hottest part of the tank, so it must be positioned in a specially prepared pocket and secured using heat conducting paste. Installation by the customer.

In case of management with variable water flow, the installation must necessarily be made with the derivation towards the domestic hot water tank upstream of any bypass valve or channel.

SV3 Signal for 3-way modulating valve

(for OH units)

In the electrical control panel, a 0-10V output is preset to be used to control a 3-way modulating valve inserted on the hot circuit.

If the temperature of the water entering the hot exchanger is too low (for example, after the machine has been stopped for an extended period), through this signal, the controller of the unit will control the valve so as to recirculate part of the flow rate at the outlet and ensure that the unit always works within the operating limits.

The 3-way modulating valve is not included in this accessory, but can be requested as further accessory.

Network accessories

BEET Blueye® via Ethernet

Blueye® is a supervision platform that enables remote monitoring of one or more units in the same system interconnected through a network with Modbus protocol.

This accessory features the Blueye device, as already installed and wired in the unit.

The critical variables to be monitored over time are identified for each connected device. These variables are sampled and saved to the cloud so that they are accessible at all times through a web portal or a mobile APP (available for Android and iOS).

The following options can be selected for connection to the internet:

- a LAN (Ethernet) connection - available in the system;
- a connection to a mobile network - at least 3G. The data SIM card is not included.

Three different types of contracts can be signed.

Blueye® Cloud Basic:

- to monitor a max. of 20 variables in total over max. 5 units/peripherals;
- to set a min. sampling frequency of 60 seconds.

Blueye® Cloud Advanced:

- to monitor a max. of 200 variables in total over max. 10 units/peripherals;
- to set a min. sampling frequency of 5 seconds.

Blueye® Connect:

- To monitor up to 10 units/peripherals.

Subscribing to any of the **Blueye® Cloud** enables:

- viewing the history of the monitored variables, in the form of both numerical values and graphs;
- downloading the history of variables in CSV format;
- the creation of automatic reports;
- setting notifications (via APP or mail) with settable thresholds for each variable;
- switching the unit ON/OFF remotely;;
- changing the set point remotely;
- selection of SUMMER/WINTER mode remotely (for reversible units only).

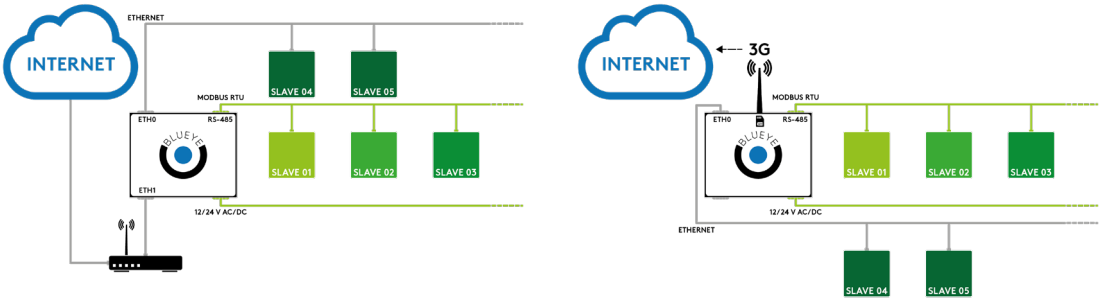
The subscription to the **Blueye® Connect** service offers the advantages below:

- a safe connection (tunnelling) between the user and the remote unit through the Blueye® portal;
- full access to the remote controller;
- real time monitoring;
- software upgrading.

Blueye® via Ethernet is only available for units supplied with an advanced controller and does not include any type of service. This service must be purchased separately based on the number of units/devices to be connected and the number of variables to be monitored. In order to connect multiple units to **Blueye® device, the network switch is required (this accessory is sold separately).**

Units can also be connected to the Blueye device through the RS485 network featuring a Modbus RTU protocol (for this option, refer to BERS accessory).

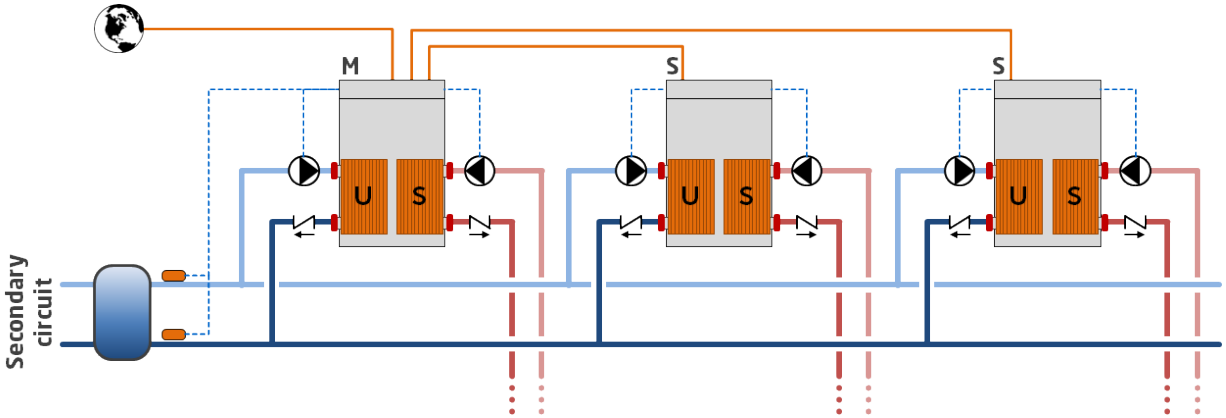
For further details, refer to the specific Blueye® documentation.



FMx Multilogic Function

The Multilogic function allows management of up to 32 units equipped with advanced Bluethink controller and connected in hydraulic parallel with each other.

Multilogic systems only operate with the "Ipro" advanced controller and if the connected units have the same software version. A Multilogic network cannot operate with different software versions/releases.



On the basis of the information recorded by the temperature probes installed on the delivery and return manifolds of the system, with the master unit, a capacity request is generated that is distributed among the units connected in the Multilogic network according to settable priority and optimization logics.

If communication between the units fails or if the master is off-line, the slave units can continue to work according to the set thermoregulation parameters.

The connected units can be different from each other, in terms of capacity and set-up, provided the following rules are complied with:

- if there are both chiller units and heat pumps in the Multilogic network, the Master unit must obligatorily be one of the HP units
- if there are both free cooling and non free-cooling units in the Multilogic network, the Master unit must obligatorily be one of the free-cooling units.

The Multilogic function that can be requested with the unit can be:

- **FM0:** Multilogic function for Slave unit
- **FM2:** Multilogic function for Master unit for managing up to 2 Slaves
- **FM6:** Multilogic function for Master unit for managing up to 6 Slaves

If you need to connect more than 6 slaves (up to 31), you can ask for a quotation from our sales department.
For the slave units, the accessory includes:

- programming of the unit as slave of a system of machines in Multilogic network

For the master units, the accessory includes:

- programming of the unit as master of a system of machines in Multilogic network
- entering of the parameters necessary for connection with the individual slave units
- installation in the electrical control panel of a network switch to allow the units to be connected in a LAN network.
- the supply of 2 temperature probes to be positioned on the delivery and return manifold of the system (supplied separately with it, installation and wiring by the customer)

The connection between the master unit and the slave units made with a CAT cable. 5E/UTP (prepared by the customer) with RJ45 connectors. Maximum cable length 100m.

For further details, please refer to the controller manual.

The time slots can be set from the control depending on installation requirements.

When the unit is working in heat pump mode, in order to maximise the COP and to obtain the widest possible operating limits, the control of the unit forces the fans to the maximum speed also during the night time bands.

PBA BACnet protocol over IP (Ethernet)

The controller is set for use, in read and write mode, of the BACnet port on IP protocol.

By default, the programming gives read-only access to the control of the unit. Reading / writing access is activable on field with a service level.

R2PU Relay for management of 2 external user-side pumps

This accessory can be requested for units without user-side pumps and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.

The two pumps are controlled by two separate relays.

GLO Modbus Lonworks Gateway

With this accessory, a RS485/Lon gateway is installed inside the electrical control panel.

By default, the programming gives read-only access to the control of the unit. Reading / writing access is activable on field with a service level.

SMAR Smartlink function predisposition

This accessory makes it possible to connect the controller of the unit with the controller of a Swegon GOLD™ air handling unit via a simple serial cable, so allowing their operating logics to be merged into a single consciousness that pursues the maximum energy efficiency of the system. The RS485 serial interface is already included and dedicated to connection with Swegon units.

The option is incompatible with:

- double set point
- variable set point with remote signal
- summer/winter selection by digital input
- set point compensation depending on external air temperature
- multilogic
- all communication protocols.

SW4P Network switch with 4 ports

The accessory includes installation in DIN rail of a professional 4-port network switch.Requires Blueye via Ethernet.

SW8P Network switch with 8 ports

The accessory includes installation in DIN rail of a professional 8-port network switch.

Requires Blueye via Ethernet.

SMAP Setup of Smartlink+ functions

This option is used to connect the controller in the unit with the controller of a Swegon GOLD™ air handling unit via the Ethernet port TCP/IP, so allowing the operating logics of hydronic and ventilation systems to be merged into a single logic for the achievement of maximum energy efficiency and comfort. This option is only available for units featuring an advanced controller and it is compatible with Multilogic and Hyzer systems only if the machine is the Master.

The option is incompatible with:

- double set point
- variable set point with remote signal
- set point compensation depending on external air temperature
- all communication protocols.

PSN SNMP protocol

The accessory consists of a gateway that allows Ethernet connection to a SNMP manager supervision system.

The use of this accessory causes the RS485 serial port to be unavailable.

SERI RS485 serial connection with Modbus protocol

RS485 serial connection with Modbus protocol

PBL Predisposition for connection to BoosterLink

Predisposition for connection of the source unit to the BoosterLink manager, in combination with a user-side unit of the "temperature booster" type.

For further information on use, refer to the specific documentation.

Other accessories

Some accessories may be incompatible with each other even if not expressly indicated.

AG **Rubber anti-vibration mounts**

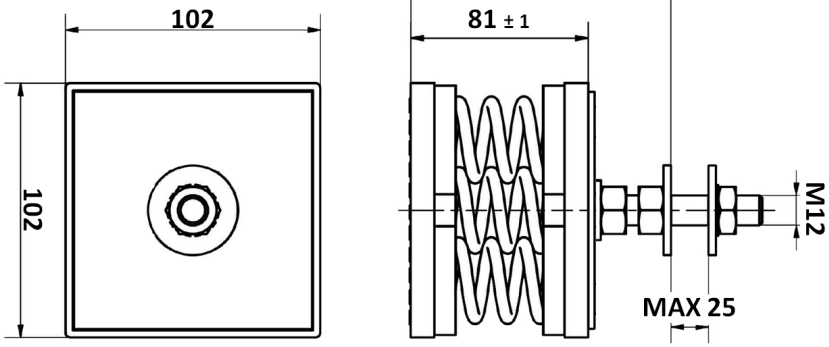
These allow you to reduce the vibrations transmitted from the unit to the surface it is standing on.

Accessory supplied loose.

AM **Spring anti-vibration mounts**

These allow you to reduce the vibrations transmitted from the unit to the surface it is standing on.

Accessory supplied loose.



KFW **Water filter kit**

To protect the elements of the hydraulic circuit (in particular, the exchangers), there are Y filters that can stop and settle the particles that are normally present in the water flow and would otherwise settle in the more delicate parts of the hydraulic circuit and damage its heat exchange capacity.

The kit involves the supply of a filter for each exchanger present in the machine.

Installation of the water filter is mandatory even when it is not supplied as an accessory.

Accessory supplied loose.

MIS **Separate hydraulic module**

For units that have an external hydraulic module, the pumps are supplied not electrically wired (in the factory they are still tested and wired, but then disconnected) in this way the customer who receives the machine at the installation site can easily disconnect the module from the unit main and facilitate the handling of the two in the installation phase. For further information, please contact the sales office

Flowzer options

Our range of Flowzer options offers flexible and scalable solutions to set the speed of pumps in the system with a view to optimising and reducing energy consumption.Different types of control modes are offered based on the system and application type:

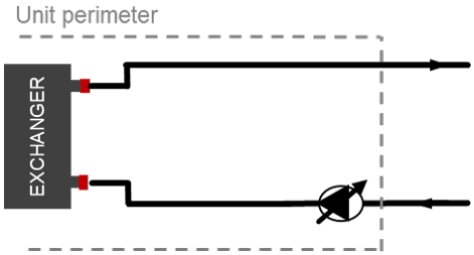
- FLOWZER VP - Inverter for manual pump adjustment
- FLOWZER VD - control of available pump discharge head for variable flow systems without monitoring the flow rate limits;
- FLOWZER VDE - flow rate control to keep the flow rate constant as the external working conditions of the system change;
- FLOWZER VDT - flow rate control with constant TD (difference between input and output temperature in the heat exchanger on the user side) in variable flow pumps, without monitoring the flow rate limits;
- FLOWZER VFPP - automatic management of variable flow rate in systems with one single primary circuit and a bypass valve;
- FLOWZER VPS - automatic management of variable flow rate, including balancing of flow rates between primary and secondary circuits;
- flowzer vps with TD-based control - automatic management of variable flow rate, including control with constant TD (difference between input and output temperature in the heat exchanger on the user side) in systems featuring both the primary and secondary circuits.

The tables below summarise the main system diagrams and show the application type and advantages/disadvantages offered by each solution. Each individual option is illustrated and explained individually in the next pages.

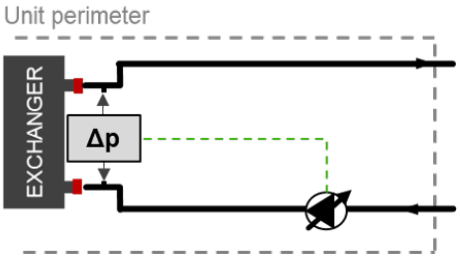
The hydraulic diagrams in this document are for exemplification purposes only and their main function is to help the reader understand the type of machines and devices the controller can manage.For a more technical evaluation of the system, please refer to the dedicated manual.

Constant flow system			
	Application	Advantages	Disadvantages
Flowzer VP	Ideal for constant flow systems The option is given to set two different speeds: one for heating and one for cooling mode or one for chiller and one for FC mode. This solution replaces the 2-way regulating valve.	- Increased efficiency: increased “REAL” EER of the unit installed, considering the power consumption of the pumps in real installation conditions and in real operating conditions. - Reduced installation times and costs: quick setup of water flow using the display.	This solution doesn't allow to save energy in the pump under part load conditions, due to the possibility to only set two frequency values in the inverter.
Flowzer VDE	Ideal for constant flow systems to keep the water flow to the heat exchanger constant under all conditions	- Plug&Play: provides for easy and flexible implementation as it is not supplied with options to be fitted therefore allows for quick commissioning.	This solution is less efficient as losses in the heat exchanger are kept constant under all conditions (including in cases when they may be reduced).

FLOWZER VP

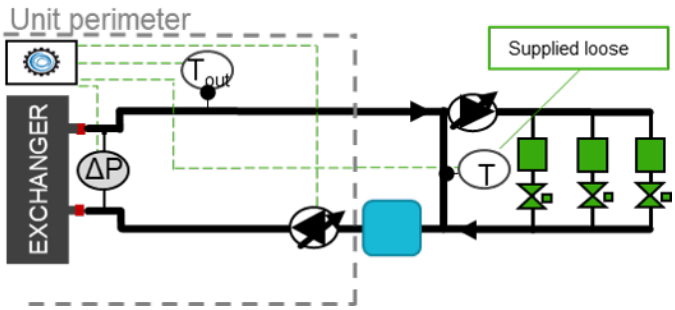


FLOWZER VDE

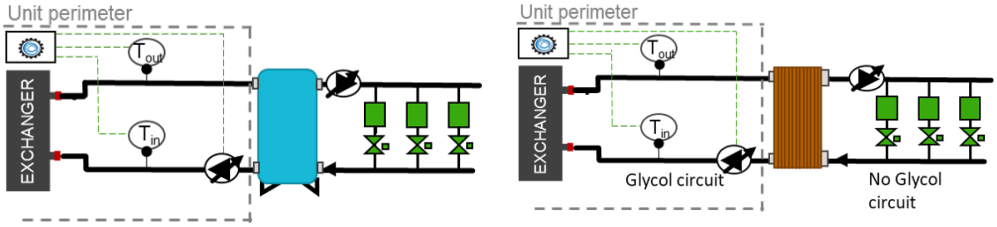


Variable flow system featuring primary and secondary circuits			
	Application	Advantages	Disadvantages
Flowzer VPS	Ideal for all systems featuring a primary and a secondary circuit divided by a hydraulic bypass branch	- Energy saving: the energy consumption during pumping operations can be cut down to 55% if compared with a traditional system - Enhanced comfort: correct balancing between primary and secondary loop	Only recommended in systems featuring a primary and a secondary circuit divided by a bypass pipe; not flexible for other applications
Flowzer VDT	Ideal for systems featuring similar users or users with similar operating conditions It is recommended in structured systems in which the client has third-party systems to control the min. and max. flow rate.	- Plug&Play: provides for easy and flexible implementation as it is not supplied with options to be fitted and for quick commissioning.	Risk of over- or underflow for some of the users in the secondary circuit if they have different operating conditions (same temperature difference) A control is required by third-party equipment to ensure compliance with the unit flow limits.
FLOWZER VPS with TD-based control	Ideal for systems featuring similar users or users with similar operating conditions Ideal for systems featuring a primary and a secondary circuits physically divided from the heat exchanger or a tank with multiple connections.	- Plug&Play: provides for easy and flexible implementation as it is not supplied with options to be fitted and for quick commissioning.	Risk of over- or underflow for some of the users in the secondary circuit if their temperature difference is not the same due to the existing operating conditions

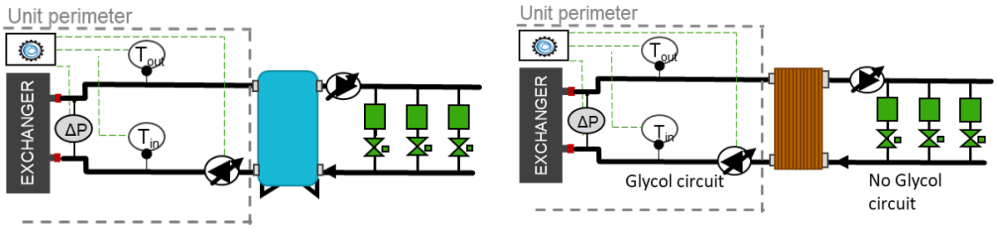
FLOWZER VPS



FLOWZER VDT

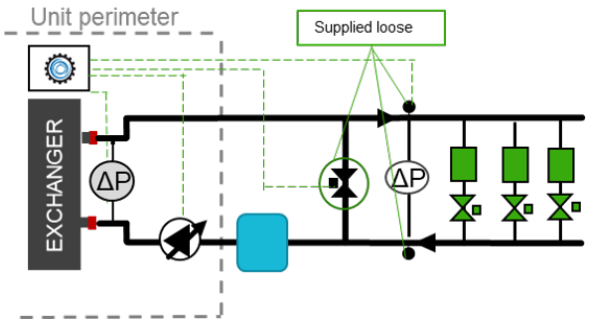


FLOWZER VPS with DT-based control

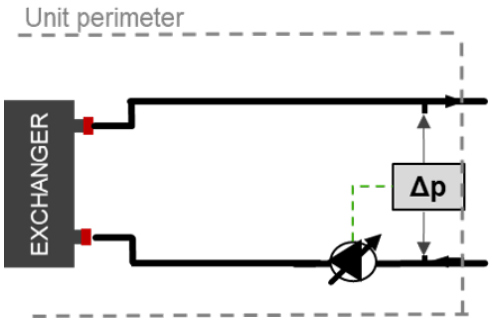


Variable flow system featuring primary circuit only			
	Application	Advantages	Disadvantages
Flowzer VFPP	Ideal for new systems intended to reduce installation costs	- Energy saving: the energy consumption during pumping operations can be cut down to 50% if compared with a traditional system Lower CAPEX thanks to reduced installation costs and smaller number of components (one pump less)	Requires some testing to correctly set the pressure available in the system and to correctly position the two transducers, based on the system layout and devices.
Flowzer VD	Ideal for systems fitted with changing users according to the season. Ideal for industrial processes, such as injection moulding, in order for each terminal to operate with the correct discharge head. It is recommended in structured systems in which the client has third-party systems to control the min. and max. flow rate.	- Plug&Play: provides for easy and flexible implementation as it is not supplied with options to be fitted therefore allows for quick commissioning.	A control is required by third-party equipment to ensure compliance with the unit flow limits.

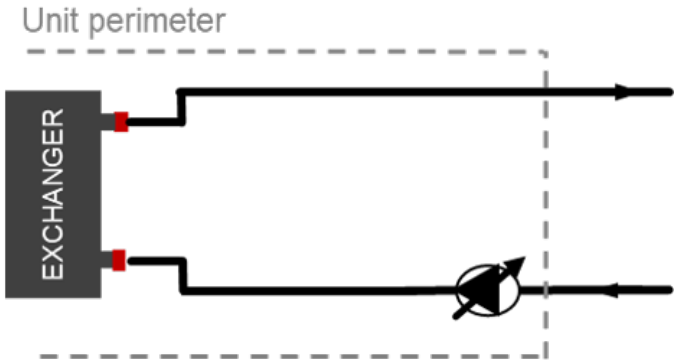
Flowzer VFPP



Flowzer VD



FVP FLOWZER VP - Inverter for manual pump adjustment



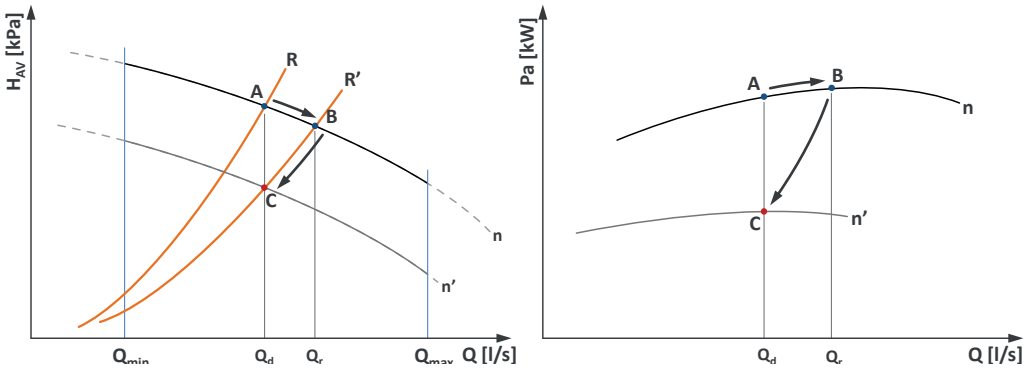
The accessory consists of inserting an inverter in the machine to manually adjust the speed of the pump (or pumps) in order to calibrate the pump flow rate on the head losses of the system.

This accessory is to be combined with one of the integrated hydraulic modules that can be selected for the unit.

Units equipped with integrated hydraulic module allow a certain level of available discharge head (point A) to be obtained under nominal flow rate conditions Qd.

But the actual head loss level of the system (e.g. characteristic curve R') normally causes the pump to find a different equilibrium point (point B), with a flow rate Qr higher than Qd.

In this condition, in addition to having a different flow from the nominal one (therefore also a different temperature jump), there is also a greater absorption of electric power from the pump itself.

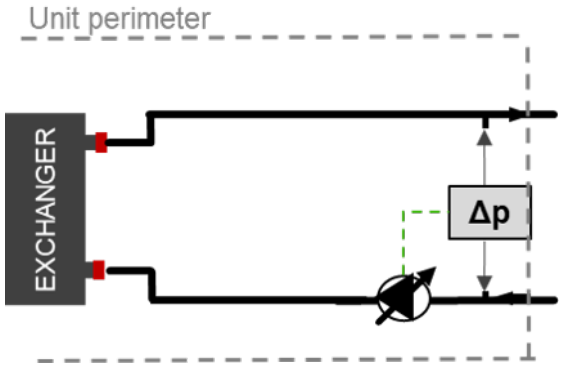


The use of the Flowzer allows the pump speed to be set manually (e.g. at speed n' instead of n) to obtain the design water flow rate and thermal gradient (point C). Once the adjustment procedure has been carried out, the pump will always work at a fixed flow rate.

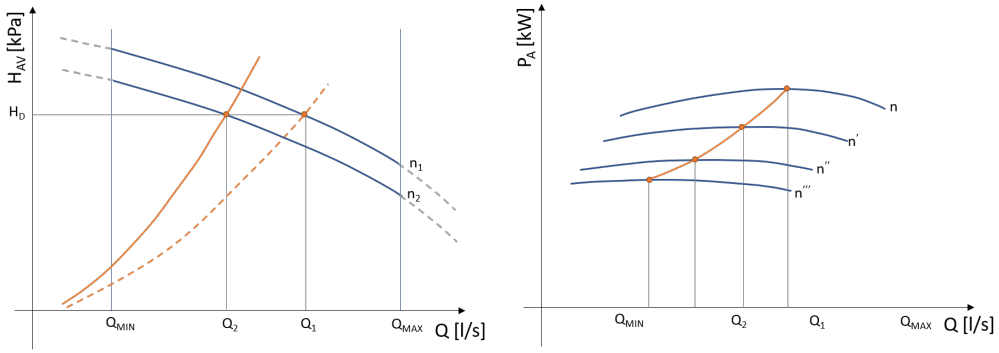
The adoption of the VP Flowzer allows to considerably reduce the electrical power consumption of the pump with a consequent energy saving. By way of example, a reduction in the flow rate of 10% leads to a reduction in power consumption of around 27%.

For the freecooling units the Flowzer VP is able to manage two different speeds of the pump automatically compensating the pressure drops of the water coil.

FVD **FLOWZER VD - control of available pump discharge head for variable flow systems without monitoring the flow rate limits;**



Flowzer VD requires two pressure transducers to be installed in the machine. Through these transducers, the inverter can gauge the actual pressure at the ends of the system and it can automatically adapt the pump speed to obtain a set available discharge head value. Flowzer VD must be combined with Flowzer VP. This accessory therefore allows a constant pressure system to be achieved.



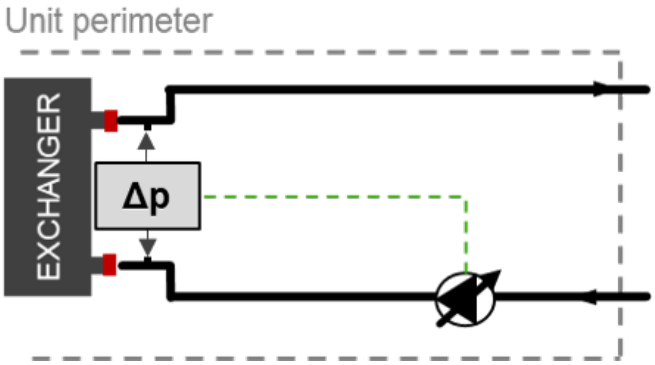
With the Flowzer VD, the customer can set, directly on the display, the available discharge head value (Hd) that the unit must maintain. As can be seen from the graph as the user request decreases, the resistant curve of the plant moves to the left, consequently the inverter reduces the speed of the pump in order to maintain the useful head necessary for the unit. With this system a significant reduction in electrical power is achieved. The customer will have to check that, in minimum flow rate conditions (that is, with the maximum number of user points closed), this is always higher than or equal to the minimum flow rate allowed by the unit.

This accessory is useful when the total head losses of the circuit are slightly variable or when they change depending on the seasons (for example, some user points are active only during summer operation and not during winter operation).

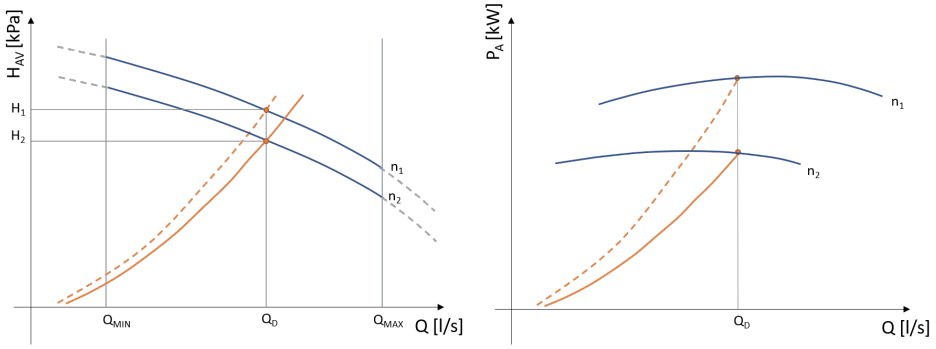
The use of this accessory also allows the pump speed to be adapted to possible fouling of the filter on the hydraulic circuit.

The option is not compatible with the Multilogic version. Please refer to the HYZER solutions for the compatibility between variable flow systems and multi-machine systems.

FVDE **FLOWZER VDE - flow rate control to keep the flow rate constant as the external working conditions of the system change;**

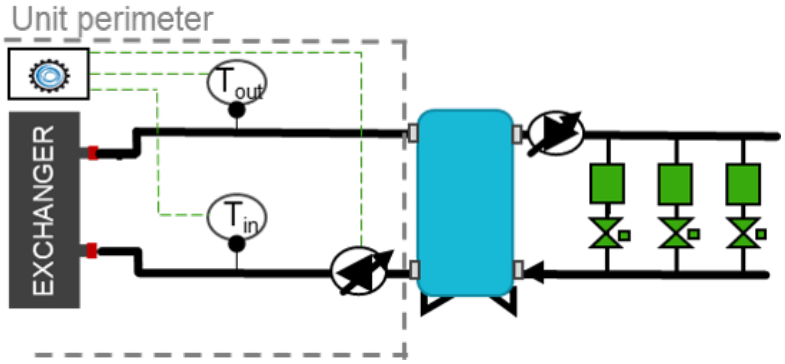


Flowzer VDE requires a differential pressure transducer to be installed in the machine. Through this transducer, the inverter can gauge the actual pressure at the ends of the heat exchanger installed in the machine and it can automatically adapt the pump speed for a constant flow value under all conditions. Flowzer VDE must be combined with Flowzer VP.



Flowzer VDE is used to automatically adjust the pump speed. As the graph shows, the inverter trips and increases the pump speed if a different condition occurs which would cause an undesired drop in the flow rate (e.g. operation of an external dry cooler). This is a more accurate solution than the VP option alone as it always provides for the water flow (Qd) required by the design conditions.

FVDT **FLOWZER VDT - flow rate control with constant TD (difference between input and output temperature in the heat exchanger on the user side) in variable flow pumps, without monitoring the flow rate limits;**



Flowzer VDT uses the temperature sensors installed at the inlet and outlet of the heat exchanger to automatically adjust the pump speed, thus keeping the T delta difference setpoint constant.

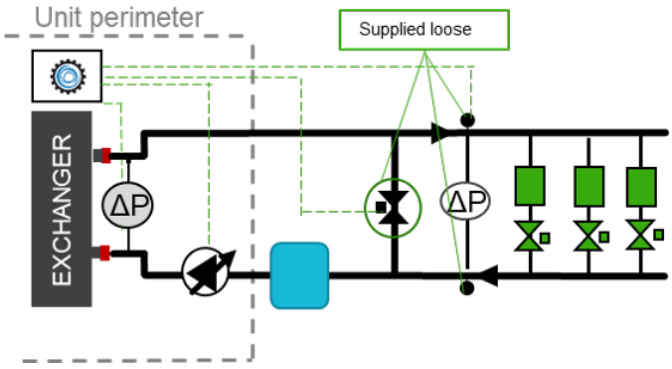
The option is not compatible with the Multilogic version. Please refer to the HYZER solutions for the compatibility between variable flow systems and multi-machine systems.

The unit must include the advanced Bluethink controller and just one heat exchanger on the user side.

With the Flowzer VDT, the customer can set, directly on the display, the available delta T value that the unit must maintain. The customer will have to check that, in minimum flow rate conditions (that is, with the maximum number of user points closed), this is always higher than or equal to the minimum flow rate allowed by the unit.

This option is specifically designed for systems in which the system users have similar operating conditions (same temperature difference).

FVF **FLOWZER VFPP - automatic management of variable flow rate in systems with one single primary circuit and a bypass valve;**



Bluethink solution for a variable flow rate system, consisting solely of a user-side primary circuit.
Flowzer VFPP includes:

- a pressure transducer installed at the ends of the user-side exchanger (Δpe)
- a dedicated control system, installed at the factory in the electrical control panel of the unit (Sc)
- a modulating bypass valve with servo-motor supplied separately with it (Vbp), supplied loose (installation by the customer)
- two system pressure transducers (Δpp) supplied separately (installation by the customer)

It is obligatory for the option to be combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit. The accessory is not compatible with Multilogic. Please contact our sales department for further details.
The unit must include the advanced Bluethink controller, just one heat exchanger on the user side and a minimum capacity step of 25% or less.
The option offers a complete default package to guarantee simple selection, purchasing and commissioning.
Flowzer VFPP has the advantage of:

- implementing an innovative design, which is alternative to the classic system based on fixed flow-rate primary circuit plus secondary circuit
- being ideal for new or entirely redesigned systems, especially for comfort applications
- having a variable flow system, with maximum energy saving
- simplifying the layout of the user circuit
- limiting the capex of the system
- performing a reliable check

The Flowzer VFPP system controller uses an advanced algorithm that enables prevention of unnecessary waste of energy and hunting by the inverter and the bypass valve.
The capex of the system is also reduced thanks to:

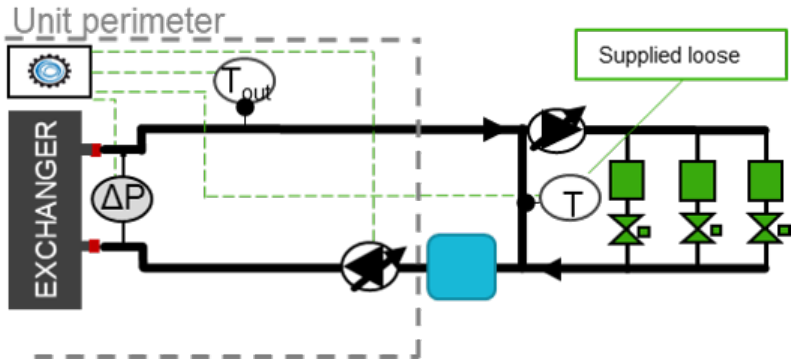
- single inverter + pumping module, integrated in the unit
- small internal footprint, due to the simplified layout

The operating principle can be summarized as follows:

- Flowzer VFPP carries out constant control of the discharge head
- the controller modulates the pump speed according to the signal detected by the system transducers Δpp
- as the demand from the system goes down, the pump speed will be reduced.
- the pump speed can be reduced until it reaches the minimum allowed flow rate on the heat exchanger of the unit
- this flow rate is indirectly monitored through the losses detected by the differential pressure transducer Δpe
- When the minimum allowed flow rate threshold is exceeded, the control system will open the bypass valve Vbp to recirculate the flow rate that is not required by the system, but is necessary to guarantee the minimum flow rate to the heat exchanger.

In the required minimum load condition (that is, with all system terminals switched off) the necessary minimum volume (Vmin) must be ensured by the relevant tank to be installed between the unit and the separator or the bypass pipe.
The bypass valve Vbp is controlled through a 0-10 V signal and must therefore be installed within 30 m of the unit.
The pressure transducers of the system Δpp provide a 4-20 mA signal and require two 1/4" female fittings. These transducers must be installed within 200 m of the unit, near the system terminal that is affected by the highest line head losses or in any case in a position where it is possible to measure an adequate pressure value.
Further details can be found in the relevant manual.

FVPS **FLOWZER VPS - automatic management of variable flow rate, including balancing of flow rates between primary and secondary circuits;**



Bluethink solution for a variable flow rate system, consisting of a primary circuit plus secondary circuit.

It is obligatory for the option to be combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit. The accessory is not compatible with Multilogic. Please contact our sales department for further details.

The unit must include the advanced BlueThink controller and just one heat exchanger on the user side.

The option offers a complete default package to guarantee simple selection, purchasing and commissioning.

Flowzer VPS has the advantage of:

- being ideal for renovations of existing systems, especially for comfort applications
- achieving a complete variable flow system, with maximum energy saving
- implementing a flexible design, e.g. for scalable or multi-zone systems

The maximum energy saving is achieved thanks to the advanced algorithm, which prevents hunting by the inverter and balances the pump speed and the recirculation flow rate to a minimum.

With refurbishments, the system's capex is limited to the unit and its commissioning.

The dimensions of the inverter of the unit and of the pump module can be favoured by the low design discharge head of the primary circuit.

The operating principle can be summarized as follows:

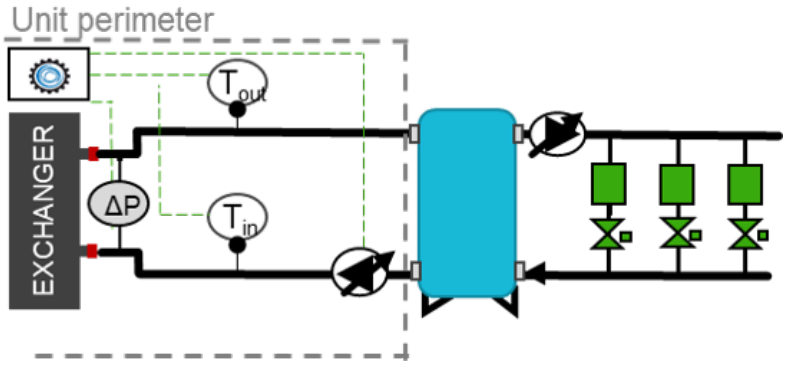
- Flowzer VPS performs a smart check of the flow rate in the primary circuit and balances it with the flow rate in the secondary circuit.
- the system controller modulates the pump speed according to the condition detected by the system sensors T
- if the system terminals are switched off, the flow rate of the secondary circuit will decrease; therefore the direction of flow is detected indirectly as temperature difference by the system sensors through the separator or the bypass pipe
- The check thus contributes to reducing the speed of the primary pump until the min. flow threshold in the heat exchanger of the unit is exceeded.
- this flow rate is indirectly monitored through the losses detected by the differential pressure transducer Δpe

In the required minimum load condition (that is, with all system terminals switched off) the necessary minimum volume (Vmin) must be ensured by the relevant tank to be installed between the unit and the separator or the bypass pipe.

The temperature sensors of the system T provide a 4-20 mA signal and require 1/2" female fittings.

Further details can be found in the relevant manual.

FVPD **FLOWZER VPS with TD-based control - automatic management of the variable flow rate, including control with constant temperature difference (TD) in the heat exchanger on the user side in systems featuring both the primary and secondary circuits.**



Bluethink solution for variable flow systems - ideal for systems featuring a primary and a secondary circuit physically divided by a heat exchanger or a tank with multiple connections.

flowzer vps with TD-based control includes:

- a differential pressure transducer, installed at the factory at the ends of the user-side heat exchanger of the unit (Δpe)

The option must be necessarily combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit. The option is not compatible with the Multilogic version. Please refer to the HYZER solutions for the compatibility between variable flow systems and multi-machine systems.

The unit must include the advanced Bluethink controller and just one heat exchanger on the user side.

The option offers a complete default package to guarantee simple selection, purchasing and commissioning.

flowzer vps with TD-based control offers the following advantages:

- a full package that is easy to install as all the regulating devices are pre-assembled and pre-wired in the unit;
- achieving a complete variable flow system, with maximum energy saving
- the ideal solution to refurbish existing systems where the T different must be kept constant in the system, especially in comfort applications;

The maximum energy saving is achieved thanks to the advanced algorithm, which prevents hunting by the inverter and balances the pump speed and the recirculation flow rate to a minimum.

The dimensions of the inverter of the unit and of the pump module can be favoured by the low design discharge head of the primary circuit.

The operating principle can be summarized as follows:

- flowzer vps with TD-based control performs smart monitoring of the flow rate in the primary circuit, keeping the T difference constant in the heat exchanger;
- the system controller modulates the pump speed according to the condition detected by the temperature sensors (T) in the system, which are installed at the inlet and outlet of the heat exchanger on the user side;
- the difference in the water temperature (T) and flow rate are inversely proportional, which is why if the T difference is reduced at the same performance level, the water flow exceeds the flow required by the system and the pump speed is reduced in order to save energy;

on the other hand, when the load increases, the T difference increases in the system and the pump speed is increased accordingly.

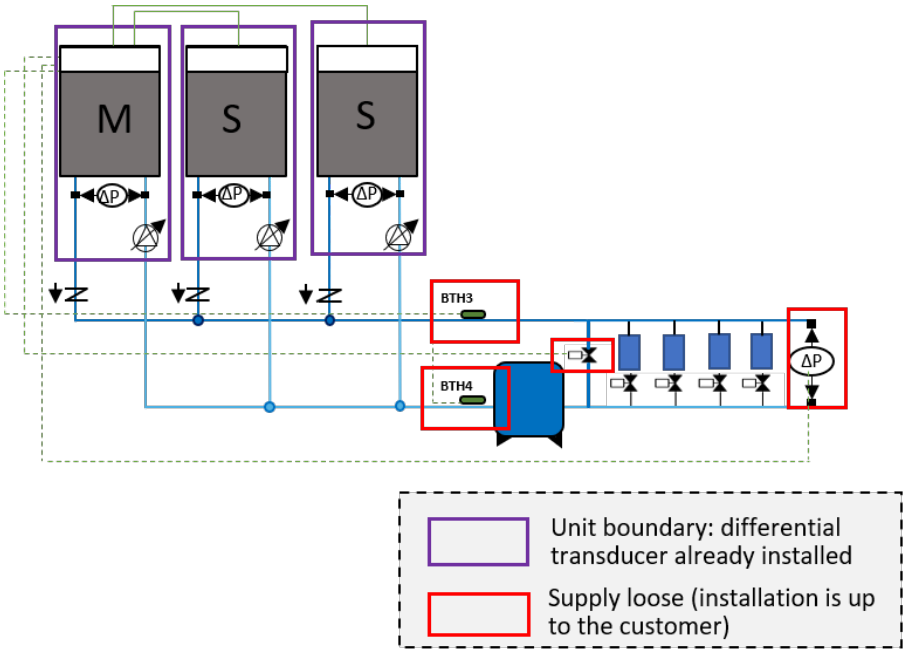
- The check contributes to reducing/increasing the speed of the pump in the primary circuit until the min./max. flow threshold admitted in the heat exchanger of the unit is exceeded.
- this flow rate is indirectly monitored through the losses detected by the differential pressure transducer Δpe

The temperature sensors of the system output a 4-20 mA signal.

Further details can be found in the relevant manual.

HFx HYZER E VFPP function

The HYZER E VFPP function combines the Multilogic function, which is designed to manage multi-machine systems, with the FLOWZER VFPP control for variable flow systems.



It is obligatory for the option to be combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit.

Units operate according to the Master/Slave logic that is typical of a Multilogic system. For additional details, please refer to the FMx option.

The HYZER E function requested with the unit can be:

- **HF0:** HYZER E VFPP function for Slave units;
- **HF2:** HYZER E VFPP function for the Master unit in order to manage up to 2 Slave units;
- **HF6:** HYZER E VFPP function for the Master unit in order to manage up to 6 Slave units.

If you need to connect more than 6 slaves (up to 31), you can ask for a quotation from our sales department.

For the slave units, the accessory includes:

- programming of the unit as slave of a system of machines in Multilogic network

For the master units, the accessory includes:

- programming of the unit as master of a system of machines in Multilogic network
- entering of the parameters necessary for connection with the individual slave units
- installation in the electrical control panel of a network switch to allow the units to be connected in a LAN network.
- the supply of 2 temperature probes to be positioned on the delivery and return manifold for system thermoregulation (supplied with the system - installation and wiring by the customer);
- the supply of two pressure transducers (supplied with the system - installation and wiring by the customer) to be installed near the system terminal that is affected by the highest head losses in the line or in any case in a position where it is possible to measure an adequate pressure value.
- The option also includes the supply of a bypass valve controlled by a 0-10 V signal, which must be selected in function of the system capacity. Please refer to the VBx options for correct selection.

The connection between the master unit and the slave units made with a CAT cable. 5E/UTP (prepared by the customer) with RJ45 connectors. Maximum cable length 100m.

For further details, please refer to the controller manual.

VBx VFPP bypass valve for HYZER E

The option is supplied with the bypass valve, which is selected according to the system capacity.

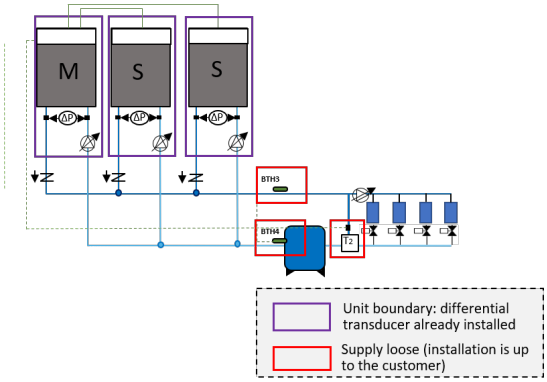
This option must be selected with either the "HYZER E VFPP function for Master unit to manage up to 2 Slave units" or "HYZER E VFPP function for Master unit to manage up to 6 Slave units".

	System capacity range**	Quantity	Diameter	Qmax**
	kW	-	in	m³/h
S_A	<240	1	2 1/2"	41.3
S_B	240÷335	1	3"	57.6
S_C	335÷570	1	4"	98
S_D	570÷850	1	5"	146.2
S_E	850÷1250	1	6"	215
S_F	1250÷1700	2	2 x 5''	2 x 146.2
S_G	1700÷2500	2	2 x 6''	2 x 215

** values based on a 5 °C temperature difference between the delivery and the return temperature

HSx HYZER E VPS function

The HYZER E VPS function combines the Multilogic function, which is used to manage multi-machine systems, with the FLOWZER VPS control for variable flow systems.



It is obligatory for the option to be combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit.

Units operate according to the Master/Slave logic that is typical of a Multilogic system. For additional details, please refer to the FMx option.

VPS control requires the installation on the machine of a differential transducer at the ends of the user-side heat exchanger in order to keep the flow rate in the system within a specific min. value allowed.

For additional details on the FLOWZER VPS logic, please refer to the dedicated FVPS option.

The networked units may be of different types, and the same observations as for the Multilogic option apply:

- if there are both chiller units and heat pumps in the network, the Master unit must obligatorily be one of the HP units;
- if there are both free-cooling and non free-cooling units in the network, the Master unit must obligatorily be one of the free-cooling units.

The HYZER E function requested with the unit can be:

- **HS0:** HYZER E VPS function for Slave units;
- **HS2:** HYZER E VPS function for the Master unit in order to manage up to 2 Slave units;
- **HS6:** HYZER E VPS function for the Master unit in order to manage up to 6 Slave units.

If you need to connect more than 6 slaves (up to 31), you can ask for a quotation from our sales department.

For the slave units, the accessory includes:

- programming of the unit as slave of a system of machines in Multilogic network

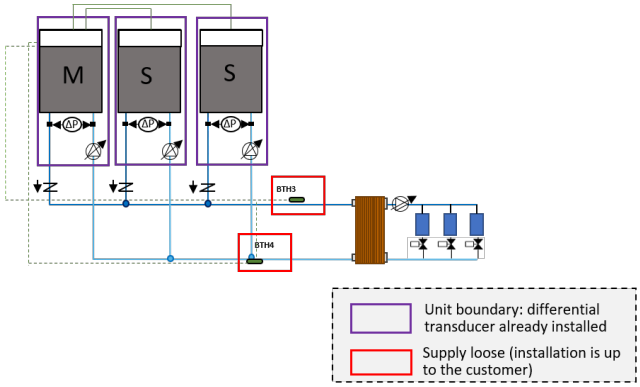
For the master units, the accessory includes:

- programming of the unit as master of a system of machines in Multilogic network
- entering of the parameters necessary for connection with the individual slave units
- installation in the electrical control panel of a network switch to allow the units to be connected in a LAN network.
- the supply of 2 temperature probes to be installed on the delivery manifold and on the bypass branch, which are typical of VPS control (supplied with the system - installation and wiring by the customer).

The connection between the master unit and the slave units made with a CAT cable. 5E/UTP (prepared by the customer) with RJ45 connectors. Maximum cable length 100m.

For further details, please refer to the controller manual.

HDx HYZER E VPS with DT-based control function



The HYZER E VPS with TD-based control function combines the Multilogic function, which is used to manage multi-machine systems, with the FLOWZER VPS with DT-based control control for variable flow systems.

It is obligatory for the option to be combined with the Flowzer VP (inverter) and with one of the hydraulic modules that can be selected for the unit.

Units operate according to the Master/Slave logic that is typical of a Multilogic system. For additional details, please refer to the FMx option.

VPS with DT-based control control requires the installation on the machine of a differential transducer at the ends of the user-side heat exchanger in order to keep the flow rate in the system within a specific min. value allowed.

For additional details on the FLOWZER VPS with TD-based control logic, please refer to the dedicated FVPS with DT-based control option.

The networked units may be of different types, and the same observations as for the Multilogic option apply:

- if there are both chiller units and heat pumps in the network, the Master unit must obligatorily be one of the HP units;
- if there are both free-cooling and non free-cooling units in the network, the Master unit must obligatorily be one of the free-cooling units.

The HYZER E function requested with the unit can be:

- **HD0:** HYZER E VPS with TD-based control function for Slave units;
- **HD2:** HYZER E VPS with TD-based control function for the Master unit in order to manage up to 2 Slave units;
- **HD6:** HYZER E VPS with TD-based control function for the Master unit in order to manage up to 6 Slave units.

If you need to connect more than 6 slaves (up to 31), you can ask for a quotation from our sales department.

For the slave units, the accessory includes:

- programming of the unit as slave of a system of machines in Multilogic network

For the master units, the accessory includes:

- programming of the unit as master of a system of machines in Multilogic network
- entering of the parameters necessary for connection with the individual slave units
- installation in the electrical control panel of a network switch to allow the units to be connected in a LAN network.

The connection between the master unit and the slave units made with a CAT cable. 5E/UTP (prepared by the customer) with RJ45 connectors. Maximum cable length 100m.

For further details, please refer to the controller manual.

PVX **Variable flow setup for HYZER X**

The dedicated HYZER X controller is designed to manage the different units, devices and components that make up a hydronic system.

Systems featuring this controller require that the PVX option be installed at the ends of the user-side heat exchanger of a differential pressure transducer so that the machine is set up for variable flow rate control.

This option is mandatory in all units making up the system.

For additional information on the product HYZER X, please refer to the specific technical catalogue.

VIX **Shut-off valves for systems with external pumps for HYZER X**

Systems featuring the HYZER X controller enable the selection of the shut-off valve used in systems that have an external pumping unit.

The option is always supplied separately from the unit and is for installation by the customer.

FLMX **User-side flow meter for HYZER X**

Systems featuring the HYZER X controller enable the selection of the flow meter option to calculate the flow rate and the performances of the units.

The option is supplied with the system for installation on the user side (installation by customer).

TECHNICAL SPECIFICATIONS

SIGMA SKY R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2
Cooling									
Refrigeration capacity	(1)	kW	44,1	54,6	63,3	72,8	81,8	95,7	108,7
Total absorbed power	(1)	kW	9,1	11,1	12,9	15	16,9	19,7	22,2
EER	(1)		4,85	4,92	4,9	4,86	4,85	4,85	4,89
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	50	50	50	44	50	32
Refrigerant charge	(3)	kg	3,6	4,1	4,7	5,3	6,1	6,9	7,8
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	7,6	9,4	10,9	12,5	14,1	16,5	18,7
Head loss	(1)	kPa	20,2	17	17	18	20	21	23
Source-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	9,1	11,3	13,1	15	16,9	19,8	22,4
Head loss	(1)	kPa	17,6	20	21	23	24	26	27
Noise levels									
Sound power lev.	(4)	dB(A)	71	72	73	75	76	77	79
Sound pressure lev.	(5)	dB(A)	56	56	57	59	60	61	63
Sound power level XLN vers.	(4)	dB(A)	67	68	69	71	72	73	75
Sound pressure level XLN vers.	(5)	dB(A)	52	52	53	55	56	57	59
Dimensions and weights**									
Length		mm	1443	1490	1490	1490	1490	1490	1490
Depth		mm	795	795	795	795	795	795	795
Height		mm	1029	1900	1900	1900	1900	1900	1900
Operating weight		kg	362	513	529	559	573	590	635

SIGMA SKY R7

			12.2	14.2	15.2	17.2	19.2	20.2
Cooling								
Refrigeration capacity	(1)	kW	122,1	136,9	152,1	174,1	194,6	201,7
Total absorbed power	(1)	kW	24,8	28	31,2	35,5	40,2	41,5
EER	(1)		4,92	4,89	4,88	4,9	4,84	4,86
Compressors								
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	44	50	45	50	38
Refrigerant charge	(3)	kg	8,7	8,6	9,5	10,9	11,7	12,7
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	21	23,6	26,2	30	33,5	34,8
Head loss	(1)	kPa	25	39,6	40,9	40	40,3	40,6
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	25,2	28,2	31,4	35,9	40,2	41,6
Head loss	(1)	kPa	33	24,9	25,6	26,9	27,6	28,6
Noise levels								
Sound power lev.	(4)	dB(A)	81	82	82	83	85	86
Sound pressure lev.	(5)	dB(A)	65	66	66	66	68	69
Sound power level XLN vers.	(4)	dB(A)	77	78	78	79	81	82
Sound pressure level XLN vers.	(5)	dB(A)	61	62	62	62	64	65
Dimensions and weights**								
Length		mm	1490	1490	1490	1686	1686	1686
Depth		mm	795	795	795	795	795	795
Height		mm	1900	1900	1900	1900	1900	1900
Operating weight		kg	671	677	690	839	943	878

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY R7

			16.4	18.4	21.4	24.4	27.4	30.4
Cooling								
Refrigeration capacity	(1)	kW	163,8	191,5	217,5	243	273,6	303,8
Total absorbed power	(1)	kW	33,8	39,6	44,8	49,9	56,2	62,4
EER	(1)		4,85	4,84	4,86	4,87	4,87	4,87
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step	(2)	%	22	25	21	25	22	25
Refrigerant charge	(3)	kg	11,6	13,5	15,4	17,2	22,9	26
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	28,2	33	37,5	41,8	47,1	52,3
Head loss	(1)	kPa	24,1	25,2	26,3	27,7	28,8	31
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	33,9	39,6	44,9	50,1	56,5	62,7
Head loss	(1)	kPa	28,8	31	33	36,1	40,5	39,1
Noise levels								
Sound power lev.	(4)	dB(A)	79	80	82	83	84	85
Sound pressure lev.	(5)	dB(A)	61,5	62,5	64,5	65,5	66,5	67,5
Sound power level XLN vers.	(4)	dB(A)	75	76	78	79	80	81
Sound pressure level XLN vers.	(5)	dB(A)	57,5	58,5	60,5	61,5	62,5	63,5
Dimensions and weights**								
Length		mm	2323	2323	2323	2323	2715	2715
Depth		mm	876	876	876	876	936	936
Height		mm	1990	1990	1990	1990	1996	1996
Operating weight		kg	1069	1086	1185	1244	1370	1401

SIGMA SKY R7

			35.4	40.4	45.4	50.4	57.5	65.6
Cooling								
Refrigeration capacity	(1)	kW	348,2	400	453,9	504,1	575,6	649,7
Total absorbed power	(1)	kW	71,1	82,5	92,5	102,6	119	134,7
EER	(1)		4,9	4,85	4,91	4,92	4,84	4,82
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	5/2	6/2
Minimum capacity reduction step	(2)	%	23	19	17	25	14	12
Refrigerant charge	(3)	kg	32,6	36	42,8	48,7	55,2	68,4
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	60	68,8	78,1	86,8	99,1	111,8
Head loss	(1)	kPa	20	21	22	23	23	24
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	71,8	82,6	93,6	103,9	119	134,3
Head loss	(1)	kPa	39,4	40,8	41	40,7	40,4	40,7
Noise levels								
Sound power lev.	(4)	dB(A)	86	89	90	91	90	91
Sound pressure lev.	(5)	dB(A)	68	71	72	73	72	73
Sound power level XLN vers.	(4)	dB(A)	82	85	86	87	86	87
Sound pressure level XLN vers.	(5)	dB(A)	64	67	68	69	68	69
Dimensions and weights**								
Length		mm	2715	2715	2715	2715	3330	3330
Depth		mm	936	936	936	936	936	936
Height		mm	1996	1996	1996	1996	1996	1996
Operating weight		kg	1673	1704	1907	2041	2354	2575

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

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SIGMA SKY OH R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2
Reheating									
Heating capacity	(1)	kW	51	63	73	84	94,4	110,4	125,1
Total absorbed power	(1)	kW	11,4	14	16,2	18,8	21,2	24,8	27,8
COP	(1)		4,46	4,49	4,49	4,47	4,46	4,46	4,51
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	50	50	50	44	50	43
Refrigerant charge	(3)	kg	3,6	4,1	4,7	5,3	6,1	6,9	7,8
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	9	11	13	14	16	19	21
Head loss	(1)	kPa	16	18	19	21	22	24	25
Source-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	11	14	16	19	21	25	28
Head loss	(1)	kPa	46	38	38	41	46	48	52
Noise levels									
Sound power lev.	(4)	dB(A)	71	72	73	75	76	77	79
Sound pressure lev.	(5)	dB(A)	56	56	57	59	60	61	63
Sound power level XLN vers.	(4)	dB(A)	67	68	69	71	72	73	75
Sound pressure level XLN vers.	(5)	dB(A)	52	52	53	55	56	57	59
Dimensions and weights**									
Length		mm	1443	1490	1490	1490	1490	1490	1490
Depth		mm	795	795	795	795	795	795	795
Height		mm	1029	1900	1900	1900	1900	1900	1900
Operating weight		kg	362	513	529	559	573	590	635

SIGMA SKY OH R7

			12.2	14.2	15.2	17.2	19.2	20.2
Reheating								
Heating capacity	(1)	kW	140,2	157,3	174,8	199,9	224,3	232,2
Total absorbed power	(1)	kW	30,8	35	38,9	44,7	50,7	51,7
COP	(1)		4,55	4,49	4,49	4,47	4,42	4,49
Compressors								
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	44	50	45	50	38
Refrigerant charge	(3)	kg	8,7	8,6	9,5	10,9	11,7	12,7
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	24	27	30	34	39	40
Head loss	(1)	kPa	30	23	23	25	28	26
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	32	36	39	45	50	52
Head loss	(1)	kPa	57	90	93	91	101	92
Noise levels								
Sound power lev.	(4)	dB(A)	81	82	82	83	85	86
Sound pressure lev.	(5)	dB(A)	65	66	66	66	68	69
Sound power level XLN vers.	(4)	dB(A)	77	78	78	79	81	82
Sound pressure level XLN vers.	(5)	dB(A)	61	62	62	62	64	65
Dimensions and weights**								
Length		mm	1490	1490	1490	1686	1686	1686
Depth		mm	795	795	795	795	795	795
Height		mm	1900	1900	1900	1900	1900	1900
Operating weight		kg	671	677	690	839	943	878

(1) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

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SIGMA SKY OH R7

			16.4	18.4	21.4	24.4	27.4	30.4
Reheating								
Heating capacity	(1)	kW	189,1	221	250,5	279,6	314,7	349,4
Total absorbed power	(1)	kW	42,3	49,5	55,6	61,6	69,3	77,1
COP	(1)		4,47	4,46	4,51	4,54	4,54	4,53
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step	(2)	%	22	25	21	25	22	25
Refrigerant charge	(3)	kg	11,6	13,5	15,4	17,2	22,9	26
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	32	38	43	48	54	60
Head loss	(1)	kPa	27	29	30	33	37	36
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	42	50	56	63	71	79
Head loss	(1)	kPa	55	57	60	63	66	71
Noise levels								
Sound power lev.	(4)	dB(A)	79	80	82	83	84	85
Sound pressure lev.	(5)	dB(A)	61,5	62,5	64,5	65,5	66,5	67,5
Sound power level XLN vers.	(4)	dB(A)	75	76	78	79	80	81
Sound pressure level XLN vers.	(5)	dB(A)	57,5	58,5	60,5	61,5	62,5	63,5
Dimensions and weights**								
Length		mm	2323	2323	2323	2323	2715	2715
Depth		mm	876	876	876	876	936	936
Height		mm	1990	1990	1990	1990	1996	1996
Operating weight		kg	1069	1086	1185	1244	1370	1401

SIGMA SKY OH R7

			35.4	40.4	45.4	50.4	57.5	65.6
Reheating								
Heating capacity	(1)	kW	400,5	460,5	521,6	579	663,5	749,3
Total absorbed power	(1)	kW	87,9	101,5	113,8	126,3	146,5	165,8
COP	(1)		4,55	4,54	4,58	4,58	4,53	4,52
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	5/2	6/2
Minimum capacity reduction step	(2)	%	23	19	17	25	14	12
Refrigerant charge	(3)	kg	32,6	36	42,8	48,7	55,2	68,4
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	69	79	90	100	114	129
Head loss	(1)	kPa	36	40	38	37	37	37
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	90	104	118	131	150	169
Head loss	(1)	kPa	45	52	50	52	52	55
Noise levels								
Sound power lev.	(4)	dB(A)	86	89	90	91	90	91
Sound pressure lev.	(5)	dB(A)	68	71	72	73	72	73
Sound power level XLN vers.	(4)	dB(A)	82	85	86	87	86	87
Sound pressure level XLN vers.	(5)	dB(A)	64	67	68	69	68	69
Dimensions and weights**								
Length		mm	2715	2715	2715	2715	3330	3330
Depth		mm	936	936	936	936	936	936
Height		mm	1996	1996	1996	1996	1996	1996
Operating weight		kg	1673	1704	1907	2041	2354	2575

(1) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

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SIGMA SKY HPW R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2
Cooling									
Refrigeration capacity	(1)	kW	44,1	54,6	63,3	72,8	81,8	95,7	108,7
Total absorbed power	(1)	kW	9,1	11,1	12,9	15	16,9	19,7	22,2
EER	(1)		4,85	4,92	4,9	4,86	4,85	4,85	4,89
Reheating									
Heating capacity	(2)	kW	51	63	73	84	94,4	110,4	125,1
Total absorbed power	(2)	kW	11,4	14	16,2	18,8	21,2	24,8	27,8
COP	(2)		4,46	4,49	4,49	4,47	4,46	4,46	4,51
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	50	50	50	44	50	43
Refrigerant charge	(6)	kg	3,6	4,1	4,7	5,3	6,1	6,9	7,8
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	8	9	11	13	14	16	19
Head loss	(1)	kPa	20	17	17	18	20	21	23
Water flow rate	(2)	m³/h	11	14	16	19	21	25	28
Head loss	(2)	kPa	46	38	38	41	46	48	52
Source-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate	(1)	m³/h	9	11	13	15	17	20	22
Head loss	(1)	kPa	18	20	21	23	24	26	27
Water flow rate	(2)	m³/h	9	11	13	14	16	19	21
Head loss	(2)	kPa	16	18	19	21	22	24	25
Noise levels									
Sound power lev.	(4)	dB(A)	71	72	73	75	76	77	79
Sound pressure lev.	(5)	dB(A)	56	56	57	59	60	61	63
Sound power level XLN vers.	(4)	dB(A)	67	68	69	71	72	73	75
Sound pressure level XLN vers.	(5)	dB(A)	52	52	53	55	56	57	59
Dimensions and weights**									
Length		mm	1443	1490	1490	1490	1490	1490	1490
Depth		mm	795	795	795	795	795	795	795
Height		mm	1029	1900	1900	1900	1900	1900	1900
Operating weight		kg	362	513	529	559	573	590	635

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

(6) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the “Minimum water content in the system” section.

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SIGMA SKY HPW R7

			12.2	14.2	15.2	17.2	19.2	20.2
Cooling								
Refrigeration capacity	(1)	kW	122,1	136,9	152,1	174,1	194,6	201,7
Total absorbed power	(1)	kW	24,8	28	31,2	35,5	40,2	41,5
EER	(1)		4,92	4,89	4,88	4,9	4,84	4,86
Reheating								
Heating capacity	(2)	kW	140,2	157,3	174,8	199,9	224,3	232,2
Total absorbed power	(2)	kW	30,8	35	38,9	44,7	50,7	51,7
COP	(2)		4,55	4,49	4,49	4,47	4,42	4,49
Compressors								
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	50	44	50	45	50	38
Refrigerant charge	(6)	kg	8,7	8,6	9,5	10,9	11,7	12,7
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	21	24	26	30	34	35
Head loss	(1)	kPa	25	40	41	40	40	41
Water flow rate	(2)	m³/h	32	36	39	45	50	52
Head loss	(2)	kPa	57	90	93	91	101	92
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	25	28	31	36	40	42
Head loss	(1)	kPa	33	25	26	27	28	29
Water flow rate	(2)	m³/h	24	27	30	34	39	40
Head loss	(2)	kPa	30	23	23	25	28	26
Noise levels								
Sound power lev.	(4)	dB(A)	81	82	82	83	85	86
Sound pressure lev.	(5)	dB(A)	65	66	66	66	68	69
Sound power level XLN vers.	(4)	dB(A)	77	78	78	79	81	82
Sound pressure level XLN vers.	(5)	dB(A)	61	62	62	62	64	65
Dimensions and weights**								
Length		mm	1490	1490	1490	1686	1686	1686
Depth		mm	795	795	795	795	795	795
Height		mm	1900	1900	1900	1900	1900	1900
Operating weight		kg	671	677	690	839	943	878

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

(6) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the “Minimum water content in the system” section.

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Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY HPW R7

			16.4	18.4	21.4	24.4	27.4	30.4
Cooling								
Refrigeration capacity	(1)	kW	163,8	191,5	217,5	243	273,6	303,8
Total absorbed power	(1)	kW	33,8	39,6	44,8	49,9	56,2	62,4
EER	(1)		4,85	4,84	4,86	4,87	4,87	4,87
Reheating								
Heating capacity	(2)	kW	189,1	221	250,5	279,6	314,7	349,4
Total absorbed power	(2)	kW	42,3	49,5	55,6	61,6	69,3	77,1
COP	(2)		4,47	4,46	4,51	4,54	4,54	4,53
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step	(2)	%	22	25	21	25	22	25
Refrigerant charge	(6)	kg	11,6	13,5	15,4	17,2	22,9	26
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	28,2	33	37,5	41,8	47,1	52,3
Head loss	(1)	kPa	24,1	25,2	26,3	27,7	28,8	31
Water flow rate	(2)	m³/h	42,5	49,7	56,5	63,2	71,1	79
Head loss	(2)	kPa	54,8	57,3	60	63,2	65,7	70,5
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	33,9	39,6	44,9	50,1	56,5	62,7
Head loss	(1)	kPa	28,8	31	33	36,1	40,5	39,1
Water flow rate	(2)	m³/h	32,5	38	43	48	54,1	60
Head loss	(2)	kPa	26,6	28,6	30,3	33,1	37,2	35,8
Noise levels								
Sound power lev.	(4)	dB(A)	79	80	82	83	84	85
Sound pressure lev.	(5)	dB(A)	61,5	62,5	64,5	65,5	66,5	67,5
Sound power level XLN vers.	(4)	dB(A)	75	76	78	79	80	81
Sound pressure level XLN vers.	(5)	dB(A)	57,5	58,5	60,5	61,5	62,5	63,5
Dimensions and weights**								
Length		mm	2323	2323	2323	2323	2715	2715
Depth		mm	876	876	876	876	936	936
Height		mm	1990	1990	1990	1990	1996	1996
Operating weight		kg	1069	1086	1185	1244	1370	1401

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

(6) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the “Minimum water content in the system” section.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com
Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY HPW R7

			35.4	40.4	45.4	50.4	57.5	65.6
Cooling								
Refrigeration capacity	(1)	kW	348,2	400	453,9	504,1	575,6	649,7
Total absorbed power	(1)	kW	71,1	82,5	92,5	102,6	119	134,7
EER	(1)		4,9	4,85	4,91	4,92	4,84	4,82
Reheating								
Heating capacity	(2)	kW	400,5	460,5	521,6	579	663,5	749,3
Total absorbed power	(2)	kW	87,9	101,5	113,8	126,3	146,5	165,8
COP	(2)		4,55	4,54	4,58	4,58	4,53	4,52
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	5/2	6/2
Minimum capacity reduction step	(2)	%	23	19	17	25	14	12
Refrigerant charge	(6)	kg	32,6	36	42,8	48,7	55,2	68,4
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	60	68,8	78,1	86,8	99,1	111,8
Head loss	(1)	kPa	20	21	22	23	23	24
Water flow rate	(2)	m³/h	90,4	103,9	117,9	131	149,5	168,8
Head loss	(2)	kPa	45,4	51,7	50,1	52,4	52,4	54,7
Source-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate	(1)	m³/h	71,8	82,6	93,6	103,9	119	134,3
Head loss	(1)	kPa	39,4	40,8	41	40,7	40,4	40,7
Water flow rate	(2)	m³/h	68,8	79,1	89,6	99,5	114	128,8
Head loss	(2)	kPa	36,2	40,4	37,6	37,4	37,1	37,3
Noise levels								
Sound power lev.	(4)	dB(A)	86	89	90	91	90	91
Sound pressure lev.	(5)	dB(A)	68	71	72	73	72	73
Sound power level XLN vers.	(4)	dB(A)	82	85	86	87	86	87
Sound pressure level XLN vers.	(5)	dB(A)	64	67	68	69	68	69
Dimensions and weights**								
Length		mm	2715	2715	2715	2715	3330	3330
Depth		mm	936	936	936	936	936	936
Height		mm	1996	1996	1996	1996	1996	1996
Operating weight		kg	1673	1704	1907	2041	2354	2575

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

(6) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the “Minimum water content in the system” section.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com
Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY Hi R7

			4.1	6.1	8.2	10.2	12.2
Cooling							
Refrigeration capacity	(1)	kW	39,6	58,9	80,4	103,2	123,4
Total absorbed power	(1)	kW	8,4	12,4	17	21,8	26
EER	(1)		4,72	4,76	4,72	4,74	4,75
Compressors							
Compressors/Circuits		n°/n°	1/1	1/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	21	21	12	14	11
Refrigerant charge	(3)	kg	3,6	5	6,1	7,7	8,2
User-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	6,8	10,1	13,8	17,8	21,3
Head loss	(1)	kPa	20,2	23,3	20	24	25
Source-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	8,2	12,2	16,7	21,4	25,6
Head loss	(1)	kPa	17,6	22,3	24	27	33
Noise levels							
Sound power lev.	(4)	dB(A)	84	85	85	86	87
Sound pressure lev.	(5)	dB(A)	69	70	69	70	71
Sound power level XLN vers.	(4)	dB(A)	80	81	81	82	83
Sound pressure level XLN vers.	(5)	dB(A)	65	66	65	66	67
Dimensions and weights**							
Length		mm	1443	1443	1490	1490	1490
Depth		mm	795	795	795	795	795
Height		mm	1029	1029	1900	1900	1900
Operating weight		kg	333	341	606	649	708

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com
Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY Hi OH R7

			4.1	6.1	8.2	10.2	12.2
Heating							
Heating capacity	(1)	kW	46	68,3	93,4	120	142,9
Total absorbed power	(1)	kW	10,3	15,2	20,9	26,8	31,6
COP	(1)		4,28	4,3	4,35	4,41	4,24
Compressors							
Compressors/Circuits		n°/n°	1/1	1/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	21	21	12	14	11
Refrigerant charge	(3)	kg	3,6	5	6,1	7,7	8,2
User-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	4,1	6,1	8,3	10,7	12,8
Head loss	(1)	kPa	12,3	18,3	25	32,1	38,4
Source-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	3,4	5,1	6,9	8,9	10,6
Head loss	(1)	kPa	10,9	16,2	22,1	28,5	34
Noise levels							
Sound power lev.	(4)	dB(A)	84	85	85	86	87
Sound pressure lev.	(5)	dB(A)	68,5	69,5	68,5	69,5	70,5
Sound power level XLN vers.	(4)	dB(A)	80	81	81	82	83
Sound pressure level XLN vers.	(5)	dB(A)	64,5	65,5	64,5	65,5	66,5
Dimensions and weights**							
Length		mm	1443	1443	1490	1490	1490
Depth		mm	795	795	795	795	795
Height		mm	1029	1029	1900	1900	1900
Operating weight		kg	333	341	606	649	708

(1) Source exchanger inlet-outlet water temperature 10/7 ° C; user exchanger inlet-outlet water temperature 40/45 ° C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com
Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY Hi HPW R7

			4.1	6.1	8.2	10.2	12.2
Cooling							
Refrigeration capacity	(1)	kW	39,6	58,9	80,4	103,2	123,4
Total absorbed power	(1)	kW	8,4	12,4	17	21,8	26
EER	(1)		4,72	4,76	4,72	4,74	4,75
Heating							
Heating capacity	(1)	kW	46	68,3	93,4	120	142,9
Total absorbed power	(1)	kW	10,3	15,2	20,9	26,8	31,6
COP	(1)		4,28	4,3	4,35	4,41	4,24
Compressors							
Compressors/Circuits		n°/n°	1/1	1/1	2/1	2/1	2/1
Minimum capacity reduction step	(2)	%	21	21	12	14	11
Refrigerant charge	(3)	kg	3,6	5	6,1	7,7	8,2
User-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	6,8	10,1	13,8	17,8	21,3
Head loss	(1)	kPa	20,2	23,3	20	24	25
Water flow rate	(2)	m³/h	10,3	15,3	20,9	26,9	32,1
Head loss	(2)	kPa	24,6	28,3	24,4	29,2	30,5
Source-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate	(1)	m³/h	6,8	10,1	13,8	17,8	21,3
Head loss	(1)	kPa	20,2	23,3	20	24	25
Water flow rate	(2)	m³/h	10,3	15,3	20,9	26,9	32,1
Head loss	(2)	kPa	24,6	28,3	24,4	29,2	30,5
Noise levels							
Sound power lev.	(4)	dB(A)	84	85	85	86	87
Sound pressure lev.	(5)	dB(A)	69	70	69	70	71
Sound power level XLN vers.	(4)	dB(A)	80	81	81	82	83
Sound pressure level XLN vers.	(5)	dB(A)	65	66	65	66	67
Dimensions and weights**							
Length		mm	1443	1443	1490	1490	1490
Depth		mm	795	795	795	795	795
Height		mm	1029	1029	1900	1900	1900
Operating weight		kg	333	341	606	649	708

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

(3) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

(4) Unit operating at nominal operating capacity, without any accessories, with source-side heat exchanger inlet-outlet water temperature 30-35°C and user-side heat exchanger inlet-outlet water temperature 12-7°C.Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(5) Values obtained from the sound power level (condition in note 4), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.

** Basic unit without included accessories

The certified standard performances and data can be verified in https://www.eurovent-certification.com
Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

ECODESIGN

INTRODUCTION

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use.

The Directive contains various regulations; as regards chiller products and heat pumps, the regulations of interest are the following:

- Regulation 2013/813, for small heat pumps (Pdesign ≤ 400 kW)
- Regulation 2016/2281, for chillers and heat pumps with Pdesign > 400 kW
- Regulation 2013/811, for heat pumps with Pdesign ≤ 70 kW.

The last-mentioned regulation (2013/811) regards the labelling (Ecolabel certification) of small heat pumps.

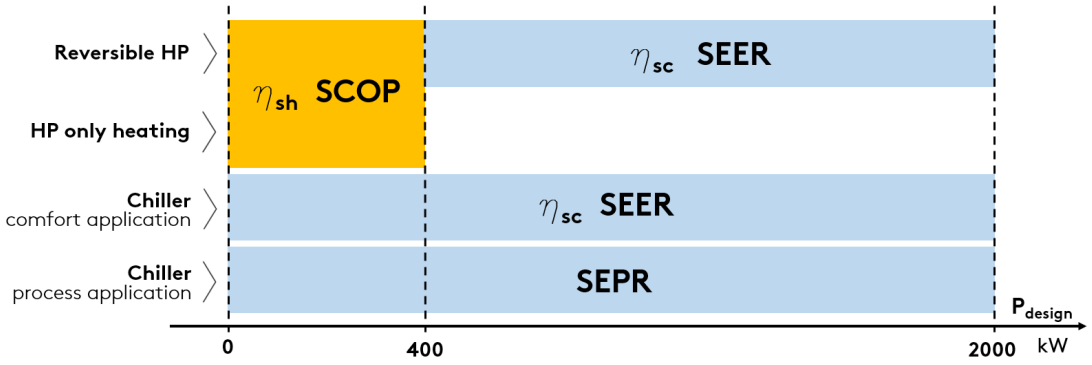
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

These efficiency limits are defined through ratios, which are respectively:

- ηsh (SCOP), with reference to regulation 2013/813
- ηsc (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

As regards regulation 2016/2281, with effect from 1st January 2021, the required minimum efficiency limit will be raised (Tier 2) from the current threshold (Tier 1).

The figure below schematically illustrates the correspondence between product and reference energy ratio.



Some notes and clarifications:

For comfort applications, regulation 2016/2281 sets the ηsc (SEER) ratio in two different operating conditions:

- SEER calculated with machine inlet/outlet water temperature of 12/7°C (low temperature application),
- SEER calculated with machine inlet/outlet water temperature of 23/18°C (medium temperature application).

The minimum efficiency requirement is the same, but can be met at condition 12/7°C or at condition 23/18°C, depending on the application envisaged for the machine.

Regulation 2013/813 distinguishes two different types: at low temperature and at medium temperature.

The following refer to the application at low temperature: (low temperature application) all heat pumps whose maximum delivery temperature for heating purposes is lower than 52°C with source at temperature of -7°C and -8°C wet bulb (air-water unit) or inlet 10°C (water-water unit), at the reference design conditions for an average climate.For these, the efficiency ratio is "low temperature application" (outlet water temperature 35°C).

For all the other heat pumps, the efficiency ratio is related to "medium temperature application" (outlet water temperature 55°C).

The ratios must be calculated according to the reference European heating season in average climatic conditions.

The minimum efficiency requirements set by the regulations are indicated below.

REGULATION 2016/2281, comfort application

TYPE OF UNIT		MINIMUM REQUIREMENT	
SOURCE	**Pdesign**	**ηsc [%]**	**SEER**
air	< 400 kW	161	4,1
air	≥ 400 kW	179	4,55
water	< 400 kW	200	5,075
water	≥ 400 kW and < 1500 kW	252	6,375
water	≥ 1500 kW	272	6,875

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT
SOURCE	**Pdesign**	**SEPR**
air	< 400 kW	5
air	≥ 400 kW	5,5
water	< 400 kW	7
water	≥ 400 kW and < 1500 kW	8
water	≥ 1500 kW	8,5

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		ηsh [%]	**SCOP**
air	low temperature application	125	3,2
water	low temperature application	125	3,325
air	medium temperature application	110	2,825
water	medium temperature application	110	2,95

The conformity of the product must be checked according to the type of application, whether comfort or process, and at the required outlet water temperature.

The two schematic tables below, respectively for comfort application and for process application, indicate the reference of the required conformity according to the type of product and the set point temperature (reference to regulations 2016/2281 and 2013/813).

Important note: for mixed comfort and process applications, the reference application for conformity is the comfort application.

COMFORT APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
Chiller	< 18°C	SEER/ηsc low temperature application	2016/2281
	≥ 18°C	SEER/ηsc medium temperature application	2016/2281
Heat pumps (reversible and only heating) Pdesign≤400kW		SCOP/ηsh	2013/813
Reversible heat pumps Pdesign>400kW	< 18°C	SEER/ηsc low temperature application	2016/2281
	≥ 18°C	SEER/ηsc medium temperature application	2016/2281
Heat pumps only heating Pdesign>400kW		-	-

PROCESS APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
Chiller	≥ +2°C , ≤ 12°C	SEPR	2016/2281
	> 12°C	-	-
	> -8°C , < +2°C	-	-

- = exemption from Ecodesign

Some specifications and notes follow.

Partly completed machinery

The term partly completed machinery refers to all units without a user-side or source-side heat exchanger, and therefore to all LC, LE, LC/HP and LE/HP versions. Since these are "non-complete" machines, conformity with Ecodesign depends on combination with the remote heat exchanger.

All the partly completed machinery is CE marked and accompanied by a declaration of conformity. Installation in European Union countries is therefore allowed; correct selection and installation of the remote heat exchanger must be ensured, in accordance with the above cases.

SIGMA SKY RANGE

As regards, specifically, the Sigma Sky range, below the regulations of interest for the different units in the different configurations.

Sigma Sky R7 and Sigma Sky Hi R7:

- regulation 2016/2281

Sigma Sky HPW:

- regulation 2013/813 and 2013/811 for units from size 4.2 to 7.2
- regulation 2013/813 for the remaining units

Sigma Sky OH:

- regulation 2013/813 and 2013/811 for units from size 4.2 to 7.2
- regulation 2013/813 for the remaining units

Sigma Sky Hi OH R7 :

- regulation 2013/813 and 2013/811 for units from size 4.1 to 6.1
- regulation 2013/813 for the remaining units

The tables below give information on the conformity of the units and the seasonal energy performance ratios with regard to the reference regulation.

SIGMA SKY R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
REGULATION 2016/2281															
Pdesign	(1)	kW	44,1	54,6	63,3	72,8	81,8	95,7	108,7	122,1	136,9	152,1	174,1	194,6	201,7
COMFORT															
ηsc	(1)	%	213	212	213	223	224	225	227	221	223	221	224	227	226
SEER	(1)		5,4	5,37	5,39	5,64	5,66	5,7	5,76	5,6	5,65	5,59	5,68	5,75	5,72
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PROCESS															
SEPR	(3)		(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

SIGMA SKY R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
REGULATION 2016/2281														
Pdesign	(1)	kW	163,8	191,5	217,5	243	273,6	303,8	348,2	400	453,9	504,1	575,6	649,7
COMFORT														
ηsc	(1)	%	229	230	231	228	229	228	230	238	253	256	255	253
SEER	(1)		5,8	5,83	5,84	5,77	5,79	5,78	5,83	6,02	6,4	6,46	6,45	6,4
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PROCESS														
SEPR	(3)		(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

SIGMA SKY OH R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
REGULATION 2013/813															
Low Temperature Application															
Pdesign	(1)	kW	52,6	64,7	75	86,8	97,5	114,1	129,5	145,3	163,1	181,2	207,1	232,1	240,7
ηsh	(1)	%	220	221	223	222	220	221	222	222	221	219	219	219	218
SCOP	(1)		5,71	5,73	5,77	5,74	5,7	5,71	5,76	5,74	5,71	5,69	5,68	5,67	5,64
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Medium Temperature Application															
Pdesign	(2)	kW	49,5	60,9	70,6	81,4	91,5	107,1	121,1	135,6	152,6	169,6	194,2	218,7	224,6
ηsh	(2)	%	176	179	180	176	175	175	179	180	182	181	179	177	181
SCOP	(2)		4,595	4,68	4,7025	4,5875	4,57	4,5625	4,6675	4,705	4,74	4,7225	4,6725	4,63	4,725
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811															
Ecolabel LT	(3)		A+++	A+++	-	-	-	-	-	-	-	-	-	-	-
Ecolabel MT	(4)		A+++	A+++	-	-	-	-	-	-	-	-	-	-	-

E = Exempt from Ecodesign

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY OH R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
REGULATION 2013/813														
Low Temperature Application														
Pdesign	(1)	kW	195,4	228,2	259,3	289,8	326,3	362,3	414,9	477,4	540,9	600,2	688,1	776,8
ηsh	(1)	%	223	222	223	227	225	225	231	233	230	231	229	231
SCOP	(1)		5,77	5,75	5,77	5,87	5,84	5,83	5,96	6,02	5,96	5,97	5,92	5,98
Compliance	(1)		Y	Y	Y	Y	Y	Y	E	E	E	E	E	E
Medium Temperature Application														
Pdesign	(2)	kW	183,3	214,3	242,9	271	304,9	338,8	389,4	445,8	505	560,8	642,6	726,8
ηsh	(2)	%	180	180	182	188	188	187	187	191	188	188	187	189
SCOP	(2)		4,69	4,7	4,76	4,89	4,9	4,87	4,89	4,99	4,91	4,9	4,88	4,93
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	E	E	E	E	E
REGULATION 2013/811														
Ecolabel LT	(3)		-	-	-	-	-	-	-	-	-	-	-	-
Ecolabel MT	(4)		-	-	-	-	-	-	-	-	-	-	-	-

E = Exempt from Ecodesign

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

SIGMA SKY HPW R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
REGULATION 2013/813															
Low Temperature Application															
Pdesign	(1)	kW	52,6	64,7	75	86,8	97,5	114,1	129,5	145,3	163,1	181,2	207,1	232,1	240,7
ηsh	(1)	%	220	221	223	222	220	221	222	222	221	219	219	219	218
SCOP	(1)		5,71	5,73	5,77	5,74	5,7	5,71	5,76	5,74	5,71	5,69	5,68	5,67	5,64
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Medium Temperature Application															
Pdesign	(2)	kW	49,5	60,9	70,6	81,4	91,5	107,1	121,1	135,6	152,6	169,6	194,2	218,7	224,6
ηsh	(2)	%	176	179	180	176	175	175	179	180	182	181	179	177	181
SCOP	(2)		4,595	4,68	4,7025	4,5875	4,57	4,5625	4,6675	4,705	4,74	4,7225	4,6725	4,63	4,725
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811															
Ecolabel LT	(3)		A+++	A+++	-	-	-	-	-	-	-	-	-	-	-
Ecolabel MT	(4)		A+++	A+++	-	-	-	-	-	-	-	-	-	-	-

E = Exempt from Ecodesign

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY HPW R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4
REGULATION 2013/813									
Low Temperature Application									
Pdesign	(1)	kW	195,4	228,2	259,3	289,8	326,3	362,3	414,9
ηsh	(1)	%	223	222	223	227	225	225	231
SCOP	(1)		5,77	5,75	5,77	5,87	5,84	5,83	5,96
Compliance	(1)		Y	Y	Y	Y	Y	Y	E
Medium Temperature Application									
Pdesign	(2)	kW	183,3	214,3	242,9	271	304,9	338,8	389,4
ηsh	(2)	%	180	180	182	188	188	187	187
SCOP	(2)		4,69	4,7	4,76	4,89	4,9	4,87	4,89
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
REGULATION 2013/811									
Ecolabel LT	(3)		-	-	-	-	-	-	-
Ecolabel MT	(4)		-	-	-	-	-	-	-

E = Exempt from Ecodesign

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

SIGMA SKY HPW R7

			40.4	45.4	50.4	57.5	65.6
REGULATION 2016/2281							
Pdesign	(1)	kW	400	453,9	504,1	575,6	649,7
COMFORT							
ηsc	(1)	%	238	253	256	255	253
SEER	(1)		6,02	6,4	6,46	6,45	6,4
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y
PROCESS							
SEPR	(3)		(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY Hi R7

			4.1	6.1	8.2	10.2	12.2
REGULATION 2016/2281							
Pdesign	(1)	kW	39,6	58,9	80,4	103,2	123,4
COMFORT							
ηsc	(1)	%	235	249	239	249	241
SEER	(1)		5,96	6,3	6,06	6,3	6,09
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y
PROCESS							
SEPR	(3)		(RFQ)	(RFQ)	(RFQ)	(RFQ)	(RFQ)
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

SIGMA SKY Hi OH R7

			4.1	6.1	8.2	10.2	12.2
REGULATION 2013/813							
Low Temperature Application							
Pdesign	(1)	kW	46	68,3	93,4	120	142,9
ηsh	(1)	%	231	232	226	232	228
SCOP	(1)		5,98	6	5,85	5,99	5,89
Compliance	(1)		Y	Y	Y	Y	Y
Medium Temperature Application							
Pdesign	(2)	kW	45	66,7	90,9	116,7	138,6
ηsh	(2)	%	180	184	185	186	187
SCOP	(2)		4,71	4,79	4,83	4,86	4,86
Compliance	(2)		Y	Y	Y	Y	Y
REGULATION 2013/811							
Ecolabel LT	(3)		A+++	-	-	-	-
Ecolabel MT	(4)		A+++	A+++	-	-	-

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY Hi HPW R7

			4.1	6.1	8.2	10.2	12.2
REGULATION 2013/813							
Low Temperature Application							
Pdesign	(1)	kW	46	68,3	93,4	120	142,9
ηsh	(1)	%	231	232	226	232	228
SCOP	(1)		5,98	6	5,85	5,99	5,89
Compliance	(1)		Y	Y	Y	Y	Y
Medium Temperature Application							
Pdesign	(2)	kW	45	66,7	90,9	116,7	138,6
ηsh	(2)	%	180	184	185	186	187
SCOP	(2)		4,71	4,79	4,83	4,86	4,86
Compliance	(2)		Y	Y	Y	Y	Y
REGULATION 2013/811							
Ecolabel LT	(3)		A+++	-	-	-	-
Ecolabel MT	(4)		A+++	A+++	-	-	-

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 30/35°C, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

(2) User exchanger water inlet / outlet temperature 47/55 ° C (SCOP MT), Average climate profile, with reference to regulation 2013/813 and to EN 14825.

(3) Energy efficiency class with reference to regulation 2013/811, conditions of note (1) - (low temperature applications).

(4) Energy efficiency class in reference to regulation 2013/811, conditions of note (2) - (medium temperature applications).

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

ELECTRICAL SPECIFICATIONS

SIGMA SKY R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
General electrical specifications															
Max. absorbed current (FLA)	(1)	A	29,2	33,4	39	45,1	52,3	59,6	66,4	73,3	82,5	91,6	102,8	113,9	118,8
Rated current (Inom)	(2)	A	18,8	23,2	27	36,2	41	49,3	52,2	55	62,2	69	76,5	84	87,8
cosφ standard unit	(2)		0,83	0,77	0,77	0,82	0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,87	0,85
Nominal current with power factor correction (Inom)	(2)	A	15,9	18,2	21,7	30,3	34,0	39,6	43,1	45,9	51,4	57	65,6	74,6	76,9
cosφ unit with power factor correction	(2)		0,98	0,98	0,96	0,98	0,97	0,97	0,97	0,97	0,98	0,98	0,98	0,98	0,97
Max. inrush current (MIC)	(3)	A	107	145	159	170	209	216	270	277	324	333	356	367	454
Maximum inrush current with soft-starter (MIC)	(4)	A	70	94	103	111	134	141	174	181	209	218	232	243	291
Power supply			400V / 3ph / 50Hz												
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz												
Suggested line section	(5)	mm²	4G10 FG16OR16		4G16 FG16OR16		4G25 FG16OR16		4G35 FG16OR16		3x50+1G25 FG16R16		3x70+1G35 FG16R16		
Suggested line protection	(6)		NH00gG 50A		NH00gG 63A		NH00gG 80A		NH00gG 100A		NH00gG 125A		NH00gG 160A		

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
General electrical specifications														
Max. absorbed current (FLA)	(1)	A	104,6	119,2	132,9	146,6	164,9	183,2	205,5	237,5	264,7	291,8	337,7	383,5
Rated current (Inom)	(2)	A	81,36	98,5	104,5	110,5	124	138	153	175,6	195	214	248	282
cosφ standard unit	(2)		0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,85	0,86	0,87	0,86	0,86
Nominal current with power factor correction (Inom)	(2)	A	68,8	79,2	86,2	92,3	103,5	114,1	131,1	153,9	172,9	191,9	219,9	250
cosφ unit with power factor correction	(2)		0,97	0,97	0,97	0,97	0,97	0,98	0,98	0,97	0,97	0,97	0,97	0,97
Max. inrush current (MIC)	(3)	A	261	275	336	350	406	424	459	573	600	627	673	719
Maximum inrush current with soft-starter (MIC)	(4)	A	186	201	240	254	291	310	335	409	437	464	510	555
Power supply			400V / 3ph / 50Hz											
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz											
Suggested line section	(5)	mm²	3x70+1G35 FG16R16		3x95+1G50 FG16R16		3x120+1G70 FG16R16		3x185+1G95 FG16R16		2x(3x95)+1G95 FG16R16		2x(3x120)+1G120 FG16R16	
Suggested line protection	(6)		NH00gG 160A		NH1gG 200A		NH1gG 250A		NH2gG 315A		NH2gG 400A		NH3gG 500A	

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY OH R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
General electrical specifications															
Max. absorbed current (FLA)	(1)	A	29,2	33,4	39	45,1	52,3	59,6	66,4	73,3	82,5	91,6	102,8	113,9	118,8
Rated current (Inom)	(2)	A	18,8	23,2	27	36,2	41	49,3	52,2	55	62,2	69	76,5	84	87,8
cosφ standard unit	(2)		0,83	0,77	0,77	0,82	0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,87	0,85
Nominal current with power factor correction (Inom)	(2)	A	15,9	18,2	21,7	30,3	34,0	39,6	43,1	45,9	51,4	57	65,6	74,6	76,9
cosφ unit with power factor correction	(2)		0,98	0,98	0,96	0,98	0,97	0,97	0,97	0,97	0,98	0,98	0,98	0,98	0,97
Max. inrush current (MIC)	(3)	A	107	145	159	170	209	216	270	277	324	333	356	367	454
Maximum inrush current with soft-starter (MIC)	(4)	A	70	94	103	111	134	141	174	181	209	218	232	243	291
Power supply			400V / 3ph / 50Hz												
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz												
Suggested line section	(5)	mm²	4G10 FG16OR16		4G16 FG16OR16		4G25 FG16OR16		4G35 FG16OR16		3x50+1G25 FG16R16		3x70+1G35 FG16R16		
Suggested line protection	(6)		NH00gG 50A		NH00gG 63A		NH00gG 80A		NH00gG 100A		NH00gG 125A		NH00gG 160A		

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY OH R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
General electrical specifications														
Max. absorbed current (FLA)	(1)	A	104,6	119,2	132,9	146,6	164,9	183,2	205,5	237,5	264,7	291,8	337,7	383,5
Rated current (Inom)	(2)	A	81,36	98,5	104,5	110,5	124	138	153	175,6	195	214	248	282
cosφ standard unit	(2)		0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,85	0,86	0,87	0,86	0,86
Nominal current with power factor correction (Inom)	(2)	A	68,8	79,2	86,2	92,3	103,5	114,1	131,1	153,9	172,9	191,9	219,9	250
cosφ unit with power factor correction	(2)		0,97	0,97	0,97	0,97	0,97	0,98	0,98	0,97	0,97	0,97	0,97	0,97
Max. inrush current (MIC)	(3)	A	261	275	336	350	406	424	459	573	600	627	673	719
Maximum inrush current with soft-starter (MIC)	(4)	A	186	201	240	254	291	310	335	409	437	464	510	555
Power supply			400V / 3ph / 50Hz											
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz											
Suggested line section	(5)	mm²	3x70+1G35 FG16R16		3x95+1G50 FG16R16		3x120+1G70 FG16R16		3x185+1G95 FG16R16		2x(3x95)+1G95 FG16R16		2x(3x120)+1G120 FG16R16	
Suggested line protection	(6)		NH00gG 160A		NH1gG 200A		NH1gG 250A		NH2gG 315A		NH2gG 400A		NH3gG 500A	

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY HPW R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
General electrical specifications															
Max. absorbed current (FLA)	(1)	A	29,2	33,4	39	45,1	52,3	59,6	66,4	73,3	82,5	91,6	102,8	113,9	118,8
Rated current (Inom)	(2)	A	18,8	23,2	27	36,2	41	49,3	52,2	55	62,2	69	76,5	84	87,8
cosφ standard unit	(2)		0,83	0,77	0,77	0,82	0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,87	0,85
Nominal current with power factor correction (Inom)	(2)	A	15,9	18,2	21,7	30,3	34,0	39,6	43,1	45,9	51,4	57	65,6	74,6	76,9
cosφ unit with power factor correction	(2)		0,98	0,98	0,96	0,98	0,97	0,97	0,97	0,97	0,98	0,98	0,98	0,98	0,97
Max. inrush current (MIC)	(3)	A	107	145	159	170	209	216	270	277	324	333	356	367	454
Maximum inrush current with soft-starter (MIC)	(4)	A	70	94	103	111	134	141	174	181	209	218	232	243	291
Power supply			400V / 3ph / 50Hz												
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz												
Suggested line section	(5)	mm²	4G10 FG16OR16		4G16 FG16OR16		4G25 FG16OR16		4G35 FG16OR16		3x50+1G25 FG16R16		3x70+1G35 FG16R16		
Suggested line protection	(6)		NH00gG 50A		NH00gG 63A		NH00gG 80A		NH00gG 100A		NH00gG 125A		NH00gG 160A		

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY HPW R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
General electrical specifications														
Max. absorbed current (FLA)	(1)	A	104,6	119,2	132,9	146,6	164,9	183,2	205,5	237,5	264,7	291,8	337,7	383,5
Rated current (Inom)	(2)	A	81,36	98,5	104,5	110,5	124	138	153	175,6	195	214	248	282
cosφ standard unit	(2)		0,82	0,78	0,8	0,81	0,81	0,81	0,84	0,85	0,86	0,87	0,86	0,86
Nominal current with power factor correction (Inom)	(2)	A	68,8	79,2	86,2	92,3	103,5	114,1	131,1	153,9	172,9	191,9	219,9	250
cosφ unit with power factor correction	(2)		0,97	0,97	0,97	0,97	0,97	0,98	0,98	0,97	0,97	0,97	0,97	0,97
Max. inrush current (MIC)	(3)	A	261	275	336	350	406	424	459	573	600	627	673	719
Maximum inrush current with soft-starter (MIC)	(4)	A	186	201	240	254	291	310	335	409	437	464	510	555
Power supply			400V / 3ph / 50Hz											
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz											
Suggested line section	(5)	mm²	3x70+1G35 FG16R16		3x95+1G50 FG16R16		3x120+1G70 FG16R16		3x185+1G95 FG16R16		2x(3x95)+1G95 FG16R16		2x(3x120)+1G120 FG16R16	
Suggested line protection	(6)		NH00gG 160A		NH1gG 200A		NH1gG 250A		NH2gG 315A		NH2gG 400A		NH3gG 500A	

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY HI R7

			4.1	6.1	8.2	10.2	12.2
General electrical specifications							
Max. absorbed current (FLA)	(1)	A	25	32	54,8	62	69
Rated current (Inom)	(2)	A	16	24	36	47	51
cosφ standard unit	(2)		0,97	0,97	0,9	0,89	0,9
Max. inrush current (MIC)	(3)	A	5	5	199	202	256
Maximum inrush current with soft-starter (MIC)	(4)	A	5	5	124	128	160
Power supply			400V / 3ph / 50Hz				
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz				
Suggested line section	(5)	mm²	4G10 FG16OR16		4G25 FG16OR16	4G35 FG16OR16	
Suggested line protection	(6)		CH14gG 40A	NH00gG 50A	NH00gG 80A	NH00gG 100A	NH00gG 100A

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY HI OH R7

			4.1	6.1	8.2	10.2	12.2
General electrical specifications							
Max. absorbed current (FLA)	(1)	A	25	32	54,8	62	69
Rated current (Inom)	(2)	A	16	24	36	47	51
cosφ standard unit	(2)		0,97	0,97	0,9	0,89	0,9
Max. inrush current (MIC)	(3)	A	5	5	199	202	256
Maximum inrush current with soft-starter (MIC)	(4)	A	5	5	124	128	160
Power supply			400V / 3ph / 50Hz				
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz				
Suggested line section	(5)	mm²	4G10 FG16OR16		4G25 FG16OR16	4G35 FG16OR16	
Suggested line protection	(6)		CH14gG 40A	NH00gG 50A	NH00gG 80A	NH00gG 100A	NH00gG 100A

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

SIGMA SKY HI HPW R7

			4.1	6.1	8.2	10.2	12.2
General electrical specifications							
Max. absorbed current (FLA)	(1)	A	25	32	54,8	62	69
Rated current (Inom)	(2)	A	16	24	36	47	51
cosφ standard unit	(2)		0,97	0,97	0,9	0,89	0,9
Max. inrush current (MIC)	(3)	A	5	5	199	202	256
Maximum inrush current with soft-starter (MIC)	(4)	A	5	5	124	128	160
Power supply			400V / 3ph / 50Hz				
Power supply for auxiliary circuits			230V-24V / 1ph / 50 Hz				
Suggested line section	(5)	mm²	4G10 FG16OR16		4G25 FG16OR16	4G35 FG16OR16	
Suggested line protection	(6)		CH14gG 40A	NH00gG 50A	NH00gG 80A	NH00gG 100A	NH00gG 100A

(1) Data regarding the unit without accessories working in maximum power absorption conditions

(2) Data referring to the basic unit without any accessory operating in standard conditions

(3) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + LRA of the largest compressor)

(4) Maximum effective RMS value of the current when the last compressor starts (FLA of the entire unit - FLA of the largest compressor + 0.6 x LRA of the largest compressor)

(5) These values are determined for cables with operating temperature of 40°C, EPR insulation and a line with a maximum length of 50m. The line section must be determined by a qualified technician based on the protection devices, the length of the line, the type of cable used and the type of installation.

(6) The correct line protection part must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

HYDRAULIC MODULES

SIGMA SKY R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
User-side hydraulic modules															
Small pumps															
Pump model downsized (1Pr)			P1	P3	P3	P3	P3	P5	P5	P6	P7	P7	P7	P7	P9
Pump model downsized (2Pr)			P1	P3	P3	P3	P3	P5	P5	P6	P7	P7	P7	P7	P9
Available head (1Pr)	(1)	kPa	133	148	139	144	134	140	121	150	160	151	129	124	134
Available head (2Pr)	(1)	kPa	107	109	111	129	117	118	92	115	145	133	104	96	104
Standard pumps															
Pump model standard (1P)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Pump model standard (2P)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Available head (1P)	(1)	kPa	182	200	190	194	184	180	162	175	206	196	175	170	182
Available head (2P)	(1)	kPa	156	161	162	179	167	158	133	140	191	178	150	142	152
Oversize pumps															
Pump model oversized (1PM)			P11	P11	P11	P11	P12	P12	P12	P13	P14	P14	P15	P15	P15
Pump model oversized (2PM)			P11	P11	P11	P11	P12	P12	P12	P13	P14	P14	P15	P15	P15
Available head (1PM)	(1)	kPa	223	221	209	213	228	207	193	199	260	238	227	228	216
Available head (2PM)	(1)	kPa	189	170	174	196	206	178	156	154	240	213	196	193	177
Source-side hydraulic modules															
Standard pumps															
Pump model standard (1S)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Pump model standard (2S)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Available head (1S)	(1)	kPa	200	185	187	181	166	153	176	206	195	182	193	188	177
Available head (2S)	(1)	kPa	163	155	171	161	141	121	161	188	172	156	160	151	154

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
User-side hydraulic modules														
Small pumps														
Pump model downsized (1Pr)			P16	P16	P21	P22	P22	P22	P29	P29	P31	P31	P32	P34
Pump model downsized (2Pr)			P41	P41	P64	P47	P47	P47	P53	P53	P54	P54	P55	P60
Available head (1Pr)	(1)	kPa	116	99	101	131	120	107	115	97	121	105	145	184
Available head (2Pr)	(1)	kPa	107	95	98	125	114	100	100	81	101	82	119	148
Standard pumps														
Pump model standard (1P)			P17	P17	P22	P23	P23	P23	P31	P31	P32	P32	P34	P38
Pump model standard (2P)			P42	P42	P43	P48	P48	P48	P54	P54	P55	P55	P57	P61
Available head (1P)	(1)	kPa	166	152	148	196	187	175	157	139	181	167	211	232
Available head (2P)	(1)	kPa	157	145	169	184	174	161	143	122	163	147	212	223
Oversize pumps														
Pump model oversized (1PM)			P18	P25	P26	P26	P26	P34	P34	P34	P34	P38	P39	P40
Pump model oversized (2PM)			P43	P49	P50	P50	P50	P57	P57	P57	P61	P61	P62	P63
Available head (1PM)	(1)	kPa	187	186	241	232	220	243	252	239	218	226	268	309
Available head (2PM)	(1)	kPa	173	194	236	226	213	243	254	243	232	219	259	291
Source-side hydraulic modules														
Standard pumps														
Pump model standard (1S)			P17	P22	P23	P23	P23	P31	P32	P32	P33	P34	P38	P38
Pump model standard (2S)			P42	P47	P48	P48	P48	P54	P55	P55	P56	P57	P61	P61
Available head (1S)	(1)	kPa	146	132	188	176	159	136	175	161	167	188	213	199
Available head (2S)	(1)	kPa	140	127	175	162	144	122	158	143	166	190	203	187

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY OH R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
User-side hydraulic modules															
Small pumps															
Pump model downsized (1Pr)			P3	P3	P3	P5	P5	P5	P6	P7	P7	P7	P9	P9	P9
Pump model downsized (2Pr)			P3	P3	P3	P5	P5	P5	P6	P7	P7	P7	P9	P9	P9
Available head (1Pr)	(1)	kPa	147	134	137	142	127	112	147	161	150	136	145	139	128
Available head (2Pr)	(1)	kPa	110	104	121	122	102	80	132	143	127	110	112	102	105
Standard pumps															
Pump model standard (1P)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Pump model standard (2P)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Available head (1P)	(1)	kPa	200	185	187	181	166	153	176	206	195	182	193	188	177
Available head (2P)	(1)	kPa	163	155	171	161	141	121	161	188	172	156	160	151	154
Oversize pumps															
Pump model oversized (1PM)			P11	P11	P11	P12	P12	P12	P13	P14	P14	P14	P15	P15	P15
Pump model oversized (2PM)			P11	P11	P11	P12	P12	P12	P13	P14	P14	P14	P15	P15	P15
Available head (1PM)	(1)	kPa	221	202	203	210	199	191	198	251	248	233	226	218	208
Available head (2PM)	(1)	kPa	172	165	184	183	168	176	180	228	220	199	182	169	179
Source-side hydraulic modules															
Standard pumps															
Pump model standard (1S)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Pump model standard (2S)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Available head (1S)	(1)	kPa	182	200	190	194	184	180	162	175	206	196	175	170	182
Available head (2S)	(1)	kPa	156	161	162	179	167	158	133	140	191	178	150	142	152

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY OH R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
User-side hydraulic modules														
Small pumps														
Pump model downsized (1Pr)			P16	P21	P22	P22	P22	P29	P31	P31	P32	P32	P37	P37
Pump model downsized (2Pr)			P41	P64	P47	P47	P47	P53	P54	P54	P55	P55	P60	P60
Available head (1Pr)	(1)	kPa	93	85	122	108	89	94	116	101	141	123	144	129
Available head (2Pr)	(1)	kPa	90	80	116	102	82	79	97	80	118	95	128	112
Standard pumps														
Pump model standard (1P)			P17	P22	P23	P23	P23	P31	P32	P32	P33	P34	P38	P38
Pump model standard (2P)			P42	P47	P48	P48	P48	P54	P55	P55	P56	P57	P61	P61
Available head (1P)	(1)	kPa	146	132	188	176	159	136	175	161	167	188	213	199
Available head (2P)	(1)	kPa	140	127	175	162	144	122	158	143	166	190	203	187
Oversize pumps														
Pump model oversized (1PM)			P19	P26	P26	P26	P34	P34	P34	P34	P38	P39	P40	P40
Pump model oversized (2PM)			P45	P50	P50	P50	P57	P57	P57	P57	P61	P62	P63	P63
Available head (1PM)	(1)	kPa	239	233	221	205	227	224	209	192	198	242	283	263
Available head (2PM)	(1)	kPa	244	233	219	203	234	232	218	201	197	239	269	246
Source-side hydraulic modules														
Standard pumps														
Pump model standard (1S)			P17	P17	P22	P23	P23	P23	P31	P31	P32	P32	P34	P38
Pump model standard (2S)			P42	P42	P43	P48	P48	P48	P54	P54	P55	P55	P57	P61
Available head (1S)	(1)	kPa	166	152	148	196	187	175	157	139	181	167	211	232
Available head (2S)	(1)	kPa	157	145	169	184	174	161	143	122	163	147	212	223

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY HPW R7

			4.2	5.2	6.2	7.2	8.2	9.2	11.2	12.2	14.2	15.2	17.2	19.2	20.2
User-side hydraulic modules															
Small pumps															
Pump model downsized (1Pr)			P1	P3	P3	P3	P3	P5	P5	P6	P7	P7	P7	P7	P9
Pump model downsized (2Pr)			P1	P3	P3	P3	P3	P5	P5	P6	P7	P7	P7	P7	P9
Available head (1Pr)	(1)	kPa	133	148	139	144	134	140	121	150	160	151	129	124	134
Available head (2Pr)	(1)	kPa	107	109	111	129	117	118	92	115	145	133	104	96	104
Standard pumps															
Pump model standard (1P)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Pump model standard (2P)			P2	P4	P4	P4	P4	P6	P6	P7	P8	P8	P8	P8	P10
Available head (1P)	(1)	kPa	182	200	190	194	184	180	162	175	206	196	175	170	182
Available head (2P)	(1)	kPa	156	161	162	179	167	158	133	140	191	178	150	142	152
Oversize pumps															
Pump model oversized (1PM)			P11	P11	P11	P11	P12	P12	P12	P13	P14	P14	P15	P15	P15
Pump model oversized (2PM)			P11	P11	P11	P11	P12	P12	P12	P13	P14	P14	P15	P15	P15
Available head (1PM)	(1)	kPa	223	221	209	213	228	207	193	199	260	238	227	228	216
Available head (2PM)	(1)	kPa	189	170	174	196	206	178	156	154	240	213	196	193	177
Source-side hydraulic modules															
Standard pumps															
Pump model standard (1S)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Pump model standard (2S)			P4	P4	P4	P6	P6	P6	P7	P8	P8	P8	P10	P10	P10
Available head (1S)	(1)	kPa	200	185	187	181	166	153	176	206	195	182	193	188	177
Available head (2S)	(1)	kPa	163	155	171	161	141	121	161	188	172	156	160	151	154

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY HPW R7

			16.4	18.4	21.4	24.4	27.4	30.4	35.4	40.4	45.4	50.4	57.5	65.6
User-side hydraulic modules														
Small pumps														
Pump model downsized (1Pr)			P16	P16	P21	P22	P22	P22	P29	P29	P31	P31	P32	P34
Pump model downsized (2Pr)			P41	P41	P64	P47	P47	P47	P53	P53	P54	P54	P55	P60
Available head (1Pr)	(1)	kPa	116	99	101	131	120	107	115	97	121	105	145	184
Available head (2Pr)	(1)	kPa	107	95	98	125	114	100	100	81	101	82	119	148
Standard pumps														
Pump model standard (1P)			P17	P17	P22	P23	P23	P23	P31	P31	P32	P32	P34	P38
Pump model standard (2P)			P42	P42	P43	P48	P48	P48	P54	P54	P55	P55	P57	P61
Available head (1P)	(1)	kPa	166	152	148	196	187	175	157	139	181	167	211	232
Available head (2P)	(1)	kPa	157	145	169	184	174	161	143	122	163	147	212	223
Oversize pumps														
Pump model oversized (1PM)			P18	P25	P26	P26	P26	P34	P34	P34	P34	P38	P39	P40
Pump model oversized (2PM)			P43	P49	P50	P50	P50	P57	P57	P57	P61	P61	P62	P63
Available head (1PM)	(1)	kPa	187	186	241	232	220	243	252	239	218	226	268	309
Available head (2PM)	(1)	kPa	173	194	236	226	213	243	254	243	232	219	259	291
Source-side hydraulic modules														
Standard pumps														
Pump model standard (1S)			P17	P22	P23	P23	P23	P31	P32	P32	P33	P34	P38	P38
Pump model standard (2S)			P42	P47	P48	P48	P48	P54	P55	P55	P56	P57	P61	P61
Available head (1S)	(1)	kPa	146	132	188	176	159	136	175	161	167	188	213	199
Available head (2S)	(1)	kPa	140	127	175	162	144	122	158	143	166	190	203	187

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY Hi R7

			4.1	6.1	8.2	10.2	12.2
User-side hydraulic modules							
Small pumps							
Pump model downsized			P1	P3	P3	P5	P6
Available head (1Pr)	(1)	kPa	148	136	135	124	149
Available head (2Pr)	(1)	kPa	127	111	118	97	114
Standard pumps							
Pump model standard			P2	P4	P4	P6	P7
Available head (1P)	(1)	kPa	197	188	185	164	174
Available head (2P)	(1)	kPa	176	163	168	137	139
Oversize pumps							
Pump model oversized			P11	P11	P12	P12	P13
Available head (1PM)	(1)	kPa	225	206	228	196	198
Available head (2PM)	(1)	kPa	197	175	207	162	152
Source-side hydraulic modules							
Standard pumps							
Pump model standard			P4	P4	P6	P7	P8
Available head (1S)	(1)	kPa	202	191	167	179	205
Available head (2S)	(1)	kPa	171	176	142	165	187

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY Hi OH R7

			4.1	6.1	8.2	10.2	12.2
User-side hydraulic modules							
Small pumps							
Pump model downsized			P3	P3	P5	P6	P7
Available head (1Pr)	(1)	kPa	149	140	127	152	160
Available head (2Pr)	(1)	kPa	118	125	102	138	142
Standard pumps							
Pump model standard			P4	P4	P6	P7	P8
Available head (1P)	(1)	kPa	202	191	167	179	205
Available head (2P)	(1)	kPa	171	176	142	165	187
Oversize pumps							
Pump model oversized			P11	P11	P12	P13	P14
Available head (1PM)	(1)	kPa	224	208	200	202	250
Available head (2PM)	(1)	kPa	183	190	169	185	226
Source-side hydraulic modules							
Standard pumps							
Pump model standard			P2	P4	P4	P6	P7
Available head (1S)	(1)	kPa	197	188	185	164	174
Available head (2S)	(1)	kPa	176	163	168	137	139

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

SIGMA SKY Hi HPW R7

			4.1	6.1	8.2	10.2	12.2
User-side hydraulic modules							
Standard pumps							
Pump model standard			P2	P4	P4	P6	P7
Available head (1P)	(1)	kPa	197	188	185	164	174
Available head (2P)	(1)	kPa	176	163	168	137	139
Source-side hydraulic modules							
Standard pumps							
Pump model standard			P4	P4	P6	P7	P8
Available head (1S)	(1)	kPa	202	191	167	179	205
Available head (2S)	(1)	kPa	171	176	142	165	187

(1) Source side heat exchanger inlet/outlet water temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Values compliant with standard EN 14511

PUMP DATA

	Rated power	Rated current	Min. flow rate	Max. flow rate
	kW	A	m³/h	m³/h
P1	0,9	2,1	3,6	9,6
P2	0,9	2,4	3,6	9,6
P3	1,1	2,5	7	18
P4	1,5	3,2	7	18
P5	1,5	3,4	12	28,8
P6	1,9	4,5	12	31,2
P7	2,2	4,5	12	42
P8	3	6,1	12	42
P9	3	6,1	24	72
P10	4	8,7	24	72
P11	3	6,1	7	18
P12	3	6,1	12	31,2
P13	4	8,7	12	42
P14	5,5	10,4	12	42
P15	7,5	13,7	24	72
P16	2,2	4,5	12	44
P17	3	6,3	12	50
P18	4	7,6	15	55
P19	5,5	10,5	12	56
P20	7,5	14,1	14	64
P21	3	6,3	20	48
P22	4	7,6	27	63,6
P23	5,5	10,5	27	82,3
P24	7,5	14,1	27	101
P25	5,5	10,5	20	85
P26	7,5	14,1	20	95
P27	9,2	17,2	23,8	108
P28	11	20,2	23,8	115
P29	4	7,6	24	90
P30	11	20,2	36	134,7
P31	5,5	10,5	36	108,5
P32	7,5	14,1	30	126
P33	9,2	17,2	30	138
P34	11	20,2	30	148
P35	15	26,6	36	172
P36	18,5	33	36	180
P37	11	20,2	50	210
P38	15	26,6	50	230
P39	18,5	33	68	271,4
P40	22	40,4	68	303,2

	Rated power	Rated current	Min. flow rate	Max. flow rate
	kW	A	m³/h	m³/h
P41	2,2	4,5	12	42
P42	3	6,3	14	45
P43	4	7,6	15	48
P44	4	7,6	10	44
P45	5,5	10,5	14	50
P46	7,5	14,1	15	56
P47	4	7,6	26	74,8
P48	5,5	10,5	26	89,8
P49	5,5	10,5	20	85
P50	7,5	14,1	20	95
P51	9,2	20,2	20	100
P52	11	20,2	20	108
P53	4	7,6	16,6	90
P54	5,5	10,5	36	108,5
P55	7,5	14,1	25	120
P56	9,2	20,2	25	117
P57	11	20,2	30	140
P58	15	26,6	35	165
P59	18,5	33	40	170
P60	11	20,2	35	160
P61	15	26,6	40	185
P62	18,5	33	45	205
P63	22	40,4	50	225
P64	3	6,3	18	59

FLOW RATE RANGES OF HEAT EXCHANGERS

The units are sized and optimized for the following nominal conditions:

- inlet-outlet of the source-side heat exchanger 30/35°C
- inlet-outlet of the user-side heat exchanger 12/7°C

The units can work at design conditions different from nominal conditions, provided that:

- the design condition falls within the operating limits specified below
- the unit is equipped with all the accessories necessary for operation of the unit (e.g. brine kit, condensation control)
- the flow rate at design conditions (that is, of the specific application) must always come within the allowed flow rate ranges specified below. If the design conditions require a water flow rate that does not come within the allowed operating range, you must contact our sales department that will identify the most suitable solution for the specific application.

SIGMA SKY R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.2	3,8	12,2	4,6	13,7
5.2	4,7	15	5,6	16,9
6.2	5,5	17,4	6,5	19,6
7.2	6,3	20,1	7,5	22,6
8.2	7	22,5	8,5	25,4
9.2	8,2	26,4	9,9	29,7
11.2	9,4	30	11,2	33,6
12.2	10,5	33,7	12,6	37,7
14.2	11,8	37,8	14,1	42,4
15.2	13,1	42	15,7	47,1
17.2	15	48	17,9	53,8
19.2	16,8	53,6	20,1	60,3
20.2	17,4	55,6	20,8	62,5
16.4	14,1	45,2	16,9	50,8
18.4	16,5	52,8	19,8	59,4
21.4	18,7	59,9	22,5	67,4
24.4	20,9	67	25,1	75,2
27.4	23,6	75,4	28,2	84,7
30.4	26,2	83,7	31,3	94
35.4	30	95,9	35,9	107,7
40.4	34,4	110,1	41,3	123,9
45.4	39,1	125	46,8	140,4
50.4	43,4	138,8	51,9	155,8
57.5	49,5	158,5	59,5	178,5
65.6	55,9	178,9	67,2	201,5

SIGMA SKY OH R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.2	4,6	13,7	3,8	12,2
5.2	5,6	16,9	4,7	15
6.2	6,5	19,6	5,5	17,4
7.2	7,5	22,6	6,3	20,1
8.2	8,5	25,4	7	22,5
9.2	9,9	29,7	8,2	26,4
11.2	11,2	33,6	9,4	30
12.2	12,6	37,7	10,5	33,7
14.2	14,1	42,4	11,8	37,8
15.2	15,7	47,1	13,1	42
17.2	17,9	53,8	15	48
19.2	20,1	60,3	16,8	53,6
20.2	20,8	62,5	17,4	55,6
16.4	16,9	50,8	14,1	45,2
18.4	19,8	59,4	16,5	52,8
21.4	22,5	67,4	18,7	59,9
24.4	25,1	75,2	20,9	67
27.4	28,2	84,7	23,6	75,4
30.4	31,3	94	26,2	83,7
35.4	35,9	107,7	30	95,9
40.4	41,3	123,9	34,4	110,1
45.4	46,8	140,4	39,1	125
50.4	51,9	155,8	43,4	138,8
57.5	59,5	178,5	49,5	158,5
65.6	67,2	201,5	55,9	178,9

SIGMA SKY HPW R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.2	3,8	12,2	4,6	13,7
5.2	4,7	15	5,6	16,9
6.2	5,5	17,4	6,5	19,6
7.2	6,3	20,1	7,5	22,6
8.2	7	22,5	8,5	25,4
9.2	8,2	26,4	9,9	29,7
11.2	9,4	30	11,2	33,6
12.2	10,5	33,7	12,6	37,7
14.2	11,8	37,8	14,1	42,4
15.2	13,1	42	15,7	47,1
17.2	15	48	17,9	53,8
19.2	16,8	53,6	20,1	60,3
20.2	17,4	55,6	20,8	62,5
16.4	14,1	45,2	16,9	50,8
18.4	16,5	52,8	19,8	59,4
21.4	18,7	59,9	22,5	67,4
24.4	20,9	67	25,1	75,2
27.4	23,6	75,4	28,2	84,7
30.4	26,2	83,7	31,3	94
35.4	30	95,9	35,9	107,7
40.4	34,4	110,1	41,3	123,9
45.4	39,1	125	46,8	140,4
50.4	43,4	138,8	51,9	155,8
57.5	49,5	158,5	59,5	178,5
65.6	55,9	178,9	67,2	201,5

SIGMA SKY Hi R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.1	3,4	10,9	4,1	12,3
6.1	5,1	16,2	6,1	18,3
8.2	6,9	22,1	8,3	25
10.2	8,9	28,5	10,7	32,1
12.2	10,6	34	12,8	38,4

SIGMA SKY Hi OH R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.1	4,1	12,3	3,4	10,9
6.1	6,1	18,3	5,1	16,2
8.2	8,3	25	6,9	22,1
10.2	10,7	32,1	8,9	28,5
12.2	12,8	38,4	10,6	34

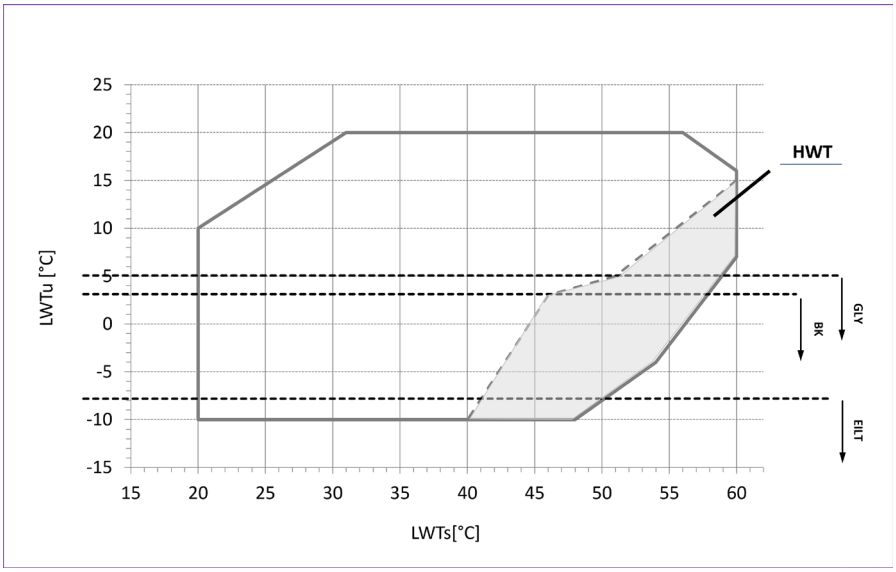
SIGMA SKY Hi HPW R7

	User-side heat exchanger		Source-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
4.1	3,4	10,9	4,1	12,3
6.1	5,1	16,2	6,1	18,3
8.2	6,9	22,1	8,3	25
10.2	8,9	28,5	10,7	32,1
12.2	10,6	34	12,8	38,4

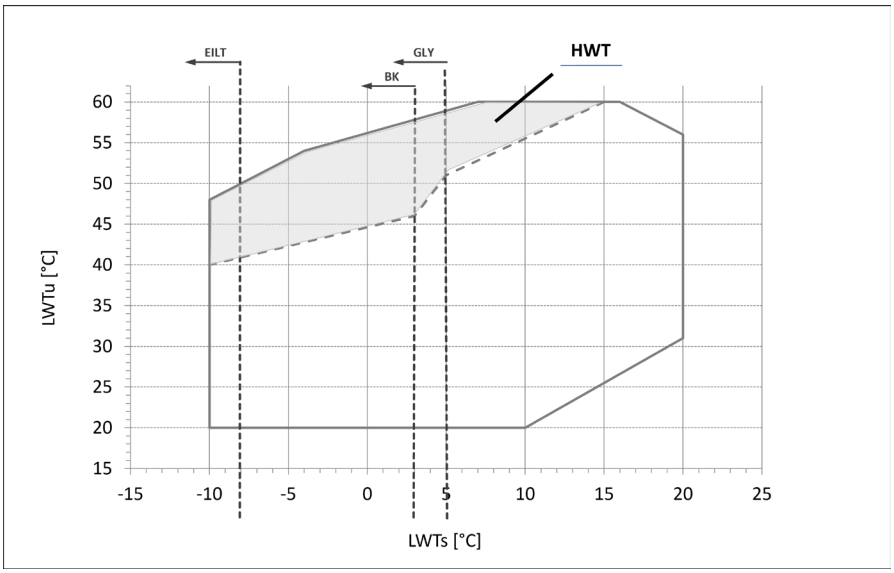
OPERATING LIMITS

Sigma SKY R7 - Sigma SKY OH R7 - Sigma SKY HPW R7

COOLING



HEATING



LWTs: water outlet temperature from the source-side heat exchanger

LWTu: water outlet temperature from the user-side heat exchanger

LWTr: water outlet temperature from the recovery exchanger

BK: For LWTu below +3°C, it is mandatory to fit the "Brine Kit" accessory

HWT: For certain operating conditions it is necessary to select the HWT accessory. Refer to the dashed operating envelope where HTW is necessary.

For LWTu below +5°C, it is compulsory to use suitable percentages of antifreeze additives (glycols) to prevent ice formation in the exchanger.

For LWTs below +5°C, it is compulsory to use suitable percentages of antifreeze additives (glycols) to prevent ice formation in the heat exchanger.

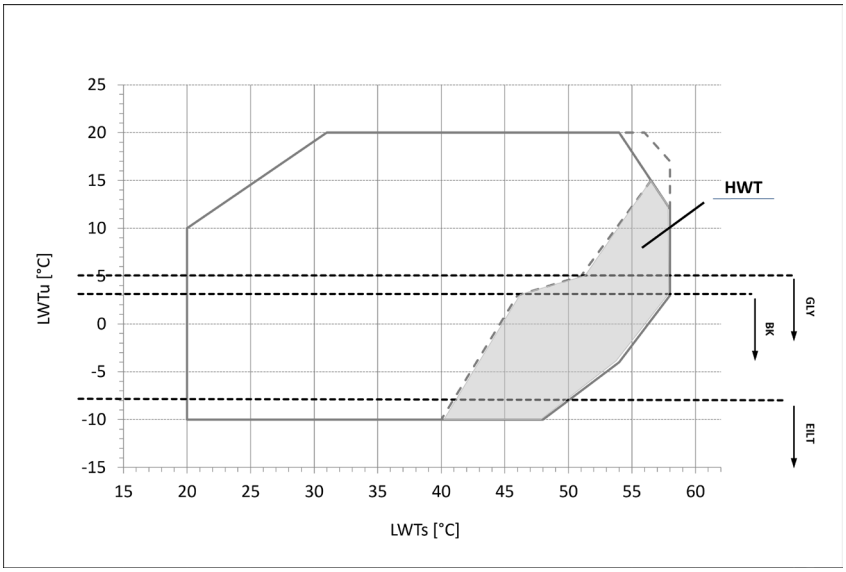
The inlet and outlet temperatures of the user-side exchanger must be given on ordering to allow correct setting of the alarm parameters and verification of the sizing of the expansion valve.

The cooling set point can then be changed by the customer in an interval that, compared to the set point given on ordering, ranges from -1K up to the maximum temperature allowed by the above-stated operating limits.

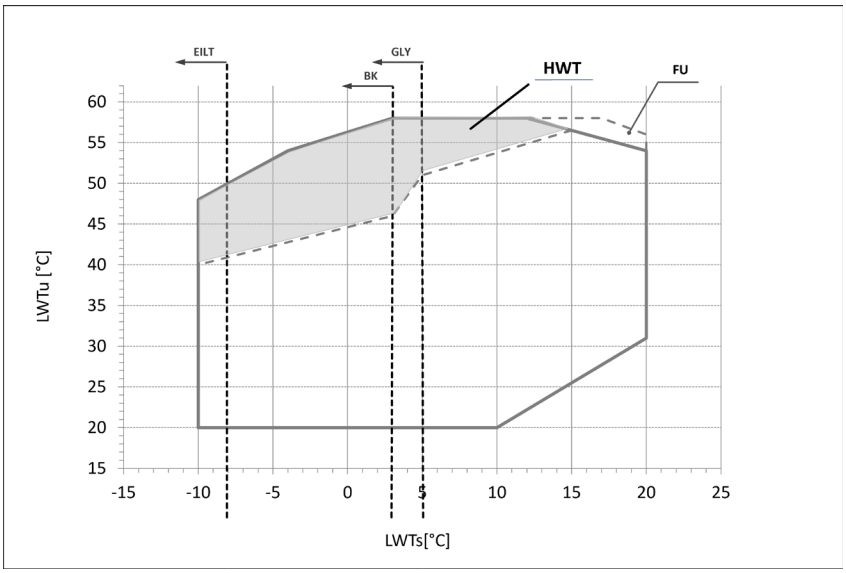
The unit will be optimized to work at the set point temperatures given on ordering. For different set points, the cooling capacity provided and the level of efficiency of the machine could decrease and move away from these conditions.

Sigma SKY Hi R7 - Sigma SKY Hi OH R7 - Sigma SKY Hi HPW R7

COOLING



HEATING



LWTs: water outlet temperature from the source-side heat exchanger

LWTu: water outlet temperature from the user-side heat exchanger

LWTr: water outlet temperature from the recovery exchanger

BK: For LWTu below +3°C, it is mandatory to fit the "Brine Kit" accessory

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The unit will be optimized to work at the set point temperatures given on ordering. For different set points, the cooling capacity provided and the level of efficiency of the machine could decrease and move away from these conditions.

NOISE LEVELS

SIGMA SKY R7 - SIGMA SKY OH R7 - SIGMA SKY HPW R7

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw_tot	Lp_tot
4.2	72	56	82	67	75	60	67	51	62	47	53	37	44	28	41	26	**71**	**56**
5.2	73	57	83	67	76	60	68	51	63	47	54	37	45	28	42	26	**72**	**56**
6.2	74	58	84	68	77	61	69	52	64	48	55	38	46	29	43	27	**73**	**57**
7.2	76	60	86	70	79	63	71	54	66	50	57	40	48	31	45	29	**75**	**59**
8.2	77	61	87	71	80	64	71	55	67	51	58	41	49	32	46	30	**76**	**60**
9.2	78	62	88	72	81	65	73	56	68	52	59	42	50	33	47	31	**77**	**61**
11.2	80	63	90	74	83	67	74	58	70	54	61	44	52	35	49	33	**79**	**63**
12.2	82	66	92	76	85	69	76	60	72	56	63	46	54	37	51	35	**81**	**65**
14.2	83	67	93	77	86	70	78	61	73	57	64	47	55	38	52	36	**82**	**66**
15.2	83	67	93	77	86	70	78	61	73	57	64	47	55	38	52	36	**82**	**66**
17.2	84	67	94	77	87	70	79	62	74	57	65	48	56	39	53	36	**83**	**66**
19.2	86	69	96	79	89	72	81	64	76	59	67	50	58	41	55	38	**85**	**68**
20.2	87	70	97	80	90	73	82	65	77	60	68	51	59	42	56	39	**86**	**69**
16.4	80	62	90	73	83	66	74	57	70	53	61	43	52	34	49	32	**79**	**62**
18.4	81	64	91	74	84	67	75	58	71	54	62	44	53	35	50	33	**80**	**63**
21.4	83	66	93	76	86	69	78	60	73	56	64	46	55	37	52	35	**82**	**65**
24.4	84	67	94	77	87	70	78	61	74	57	65	47	56	38	53	36	**83**	**66**
27.4	85	67	95	78	88	71	79	62	75	58	66	48	57	39	54	37	**84**	**67**
30.4	86	68	96	79	89	72	81	63	76	59	67	49	58	40	55	38	**85**	**68**
35.4	87	69	97	79	90	72	82	64	77	59	68	50	59	41	56	38	**86**	**68**
39.4	90	72	100	82	93	75	85	67	80	62	71	53	62	44	59	41	**89**	**71**
45.4	91	73	101	83	94	76	85	67	81	63	72	54	63	45	60	42	**90**	**72**
50.4	92	74	102	84	95	77	86	68	82	64	73	55	64	46	61	43	**91**	**73**
57.5	91	73	101	83	94	76	86	68	81	63	72	54	63	45	60	42	**90**	**72**
65.6	92	74	102	84	95	77	86	68	82	64	73	55	64	46	61	43	**91**	**73**

Reference conditions: source-side heat exchanger inlet-outlet temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Unit operating at nominal operating capacity, without any accesories.

Lw: sound power levels. Lw_tot is the only binding value. Values obtained from measures taken according to standard ISO 3744.

Lp: sound pressure levels calculated from sound power levels, related to distance of 1m from the unit in free field with directivity factor Q=2. Non-binding values.

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

SIGMA SKY R7 - SIGMA SKY OH R7 - SIGMA SKY HPW R7 /XLN

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw_tot	Lp_tot
4.2	68	53	78	63	71	56	63	47	58	43	49	33	40	24	37	22	**67**	**52**
5.2	69	52	79	63	72	56	63	47	59	43	50	33	41	24	38	22	**68**	**52**
6.2	70	53	80	64	73	57	64	48	60	44	51	34	42	25	39	23	**69**	**53**
7.2	72	56	82	66	75	59	67	50	62	46	53	36	44	27	41	25	**71**	**55**
8.2	73	57	83	67	76	60	67	51	63	47	54	37	45	28	42	26	**72**	**56**
9.2	74	58	84	68	77	61	68	52	64	48	55	38	46	29	43	27	**73**	**57**
11.2	76	60	86	70	79	63	70	54	66	50	57	40	48	31	45	29	**75**	**59**
12.2	78	62	88	72	81	65	73	56	68	52	59	42	50	33	47	31	**77**	**61**
14.2	79	63	89	73	82	66	74	57	69	53	60	43	51	34	48	32	**78**	**62**
15.2	79	63	89	73	82	66	73	57	69	53	60	43	51	34	48	32	**78**	**62**
17.2	80	63	90	73	83	66	74	57	70	53	61	44	52	35	49	32	**79**	**62**
19.2	82	65	92	75	85	68	76	59	72	55	63	46	54	37	51	34	**81**	**64**
20.2	83	66	93	76	86	69	77	60	73	56	64	47	55	38	52	35	**82**	**65**
16.4	76	59	86	69	79	62	71	53	66	49	57	39	48	30	45	28	**75**	**58**
18.4	77	60	87	70	80	63	71	54	67	50	58	40	49	31	46	29	**76**	**59**
21.4	79	62	89	72	82	65	74	56	69	52	60	42	51	33	48	31	**78**	**61**
24.4	80	63	90	73	83	66	75	57	70	53	61	43	52	34	49	32	**79**	**62**
27.4	81	63	91	74	84	67	76	58	71	54	62	44	53	35	50	33	**80**	**63**
30.4	82	65	92	75	85	68	77	59	72	55	63	45	54	36	51	34	**81**	**64**
35.4	83	65	93	75	86	68	77	59	73	55	64	46	55	37	52	34	**82**	**64**
39.4	86	68	96	78	89	71	80	62	76	58	67	49	58	40	55	37	**85**	**67**
45.4	87	69	97	79	90	72	81	63	77	59	68	50	59	41	56	38	**86**	**68**
50.4	88	70	98	80	91	73	82	64	78	60	69	51	60	42	57	39	**87**	**69**
57.5	87	69	97	79	90	72	82	64	77	59	68	50	59	41	56	38	**86**	**68**
65.6	88	70	98	80	91	73	82	64	78	60	69	51	60	42	57	39	**87**	**69**

Reference conditions: source-side heat exchanger inlet-outlet temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Unit operating at nominal operating capacity, without any accesories.

Lw: sound power levels. Lw_tot is the only binding value. Values obtained from measures taken according to standard ISO 3744.

Lp: sound pressure levels calculated from sound power levels, related to distance of 1m from the unit in free field with directivity factor Q=2. Non-binding values.

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

Sigma SKY Hi R7 - Sigma SKY Hi OH R7 - Sigma SKY Hi HPW R7

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw_tot	Lp_tot
4.1	85	70	95	80	88	73	80	64	75	60	66	50	57	41	54	39	**84**	**69**
6.1	86	71	96	81	89	74	81	65	76	61	67	51	58	42	55	40	**85**	**70**
8.2	86	70	96	80	89	73	81	64	76	60	67	50	58	41	55	39	**85**	**69**
10.2	87	71	97	81	90	74	81	65	77	61	68	51	59	42	56	40	**86**	**70**
12.2	88	72	98	82	91	75	83	66	78	62	69	52	60	43	57	41	**87**	**71**

Sigma SKY Hi R7 - Sigma SKY Hi OH R7 - Sigma SKY Hi HPW R7 /XLN

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw_tot	Lp_tot
4.1	81	66	91	76	84	69	76	60	71	56	62	46	53	37	50	35	**80**	**65**
6.1	82	66	92	77	85	70	76	61	72	57	63	47	54	38	51	36	**81**	**66**
8.2	82	66	92	76	85	69	76	60	72	56	63	46	54	37	51	35	**81**	**65**
10.2	83	67	93	77	86	70	77	61	73	57	64	47	55	38	52	36	**82**	**66**
12.2	84	68	94	78	87	71	79	62	74	58	65	48	56	39	53	37	**83**	**67**

Reference conditions: source-side heat exchanger inlet-outlet temperature 30/35°C; user side heat exchanger inlet/outlet water temperature 12/7°C. Unit operating at nominal operating capacity, without any accesories.

Lw: sound power levels. Lw_tot is the only binding value. Values obtained from measures taken according to standard ISO 3744.

Lp: sound pressure levels calculated from sound power levels, related to distance of 1m from the unit in free field with directivity factor Q=2. Non-binding values.

The certified standard performances and data can be verified in https://www.eurovent-certification.com

Some voluntary data are not certified (i.e. Noise Level for water source units; SCOP for units with Pdesign >70 KW; SCOP MT values).

CONFIGURATIONS THAT ARE NOT POSSIBLE

SIGMA SKY R7 - SIGMA SKY OH R7 - SIGMA SKY HPW R7

CH	BASIC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
HPW	BASIC	OPTIONAL HYDRAULIC MODULE						
				/1P	/2P			
				/1S	/2S			
OH	BASIC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P			
				/1S	/2S			
4.2	A	B'	B'	B'	B'	C'	C'	C'
5.2	B	B	B	B	D	D	D	D
6.2	B	B	B	B	D	D	D	D
7.2	B	B	B	B	D	D	D	D
8.2	B	B	B	B	D	D	D	D
9.2	B	B	B	B	D	D	D	D
11.2	B	D	D	D	D	D	D	D
12.2	B	D	D	D	D	D	D	D
14.2	B	D	D	D	D	D	D	D
15.2	B	D	D	D	D	D	D	D
17.2	C	E	E	E	E	E	E	E
19.2	C	E	E	E	E	E	E	E
20.2	C	E	E	E	E	E	E	E
16.4	F	G	G	G	G	H	H	H
19.4	F	G	G	G	G	H	H	H
21.4	F	G	G	G	G	H	H	H
24.4	F	G	G	G	G	H	H	H
27.4	I	L	L	L	L	M	M	M
30.4	I	L	L	L	L	M	M	M
35.4	I	L	L	L	L	M	M	M
40.4	I	L	L	L	L	M	M	M
45.4	I	L	L	L	L	M	M	M
50.4	I	L	L	L	L	M	M	M
57.6	N	O	O	O	O	P	P	P
65.6	N	O	O	O	O	P	P	P

SIGMA SKY R7 - SIGMA SKY OH R7 - SIGMA SKY HPW R7

CH	/DS	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
HPW	/DS	OPTIONAL HYDRAULIC MODULE						
				/1P	/2P			
				/1S	/2S			
OH								
4.2	A	B'	B'	B'	B'	C'	C'	C'
5.2	B	B	B	B	D	n.a.	n.a.	n.a.
6.2	B	B	B	B	D	n.a.	n.a.	n.a.
7.2	B	B	B	B	D	n.a.	n.a.	n.a.
8.2	B	B	B	B	D	n.a.	n.a.	n.a.
9.2	B	B	B	B	D	n.a.	n.a.	n.a.
11.2	B	D	D	D	D	n.a.	n.a.	n.a.
12.2	B	D	D	D	D	n.a.	n.a.	n.a.
14.2	B	D	D	D	D	n.a.	n.a.	n.a.
15.2	B	D	D	D	D	n.a.	n.a.	n.a.
17.2	C	E	E	E	E	n.a.	n.a.	n.a.
19.2	C	E	E	E	E	n.a.	n.a.	n.a.
20.2	C	E	E	E	E	n.a.	n.a.	n.a.
16.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
19.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
21.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
24.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
27.4	I	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
30.4	I	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
35.4	I	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
40.4	I	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
45.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
50.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
57.6	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
65.6	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

SIGMA SKY R7 - SIGMA SKY OH R7 - SIGMA SKY HPW R7

CH	/DC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
HPW								
OH								
4.2	A	B'	B'	B'	B'	C'	C'	C'
5.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
6.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
7.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
8.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
9.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
11.2	B	D	D	D	D	n.a.	n.a.	n.a.
12.2	B	D	D	D	D	n.a.	n.a.	n.a.
14.2	C	E	E	E	E	n.a.	n.a.	n.a.
15.2	C	E	E	E	E	n.a.	n.a.	n.a.
17.2	C	E	E	E	E	n.a.	n.a.	n.a.
19.2	C	E	E	E	E	n.a.	n.a.	n.a.
20.2	C	E	E	E	E	n.a.	n.a.	n.a.
16.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
19.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
21.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
24.4	F	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
27.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
30.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
35.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
40.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
45.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
50.4	I	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
57.6	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
65.6	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

SIGMA SKY Hi R7 - SIGMA SKY Hi OH R7 - SIGMA SKY Hi HPW R7

CH	BASIC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
OH	BASIC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P			
				/1S	/2S			
4.1	A	B'	B'	B'	B'	C'	C'	C'
6.1	A	B'	B'	B'	B'	C'	C'	C'
8.2	B	B	B	B	D	D	D	D
10.2	B	D	D	D	D	D	D	D
12.2	B	D	D	D	D	D	D	D

SIGMA SKY Hi R7 - SIGMA SKY Hi OH R7 - SIGMA SKY Hi HPW R7

CH	/DS	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
OH								
4.1	A	B'	B'	B'	B'	C'	C'	C'
6.1	A	B'	B'	B'	B'	C'	C'	C'
8.2	B	B	B	B	D	n.a.	n.a.	n.a.
10.2	B	D	D	D	D	n.a.	n.a.	n.a.
12.2	B	D	D	D	D	n.a.	n.a.	n.a.

SIGMA SKY Hi R7 - SIGMA SKY Hi OH R7 - SIGMA SKY Hi HPW R7

CH	/DC	OPTIONAL HYDRAULIC MODULE						
		/1P	/2P	/1P	/2P	/1PS	/2PS	/1PS
				/1S	/2S			/1S
OH								
4.1	A	B'	B'	B'	B'	C'	C'	C'
6.1	A	B'	B'	B'	B'	C'	C'	C'
8.2	B	(RFQ)	(RFQ)	(RFQ)	(RFQ)	n.a.	n.a.	n.a.
10.2	B	D	D	D	D	n.a.	n.a.	n.a.
12.2	B	D	D	D	D	n.a.	n.a.	n.a.

Legenda

UP	User side pumps versions					
	1P	2P	1Pr	2Pr	1PM	2PM
SP	Source pumps version / Source side pumps versions					
	1S	2S	1Sr	2Sr	1SM	2SM
S	Inertial tank on user side loop versions					
	1PS	2PS	1PrS	2PrS	1PMS	2PMS
n.a.	Version not possible					
	Version not available					
(RFQ)	Please contact our sales offices to verify compatibility with the specific configuration and request a quotation					
	Please contact our sales department to verify its compatibility with the specific configuration and require a quotation					
t.b.d	To be defined					
	To be Defined					

Legend: dimensions including the electrical panel

A	Length	Height	Depth
	1443	1029	795
B	1490	1900	795
B'	1443	1900	795
C	1686	1900	795
C'	1639	1900	795
D	2347	1900	795
E	2543	1900	795
F	2330	1990	880
G	3360	1990	880
H	3550	1990	880
I	2715	2000	940
L	3940	2000	940
M	4400	2000	940
N	3330	2000	940
O	4550	2000	940
P	5015	2000	940

INSTALLATION ADVICE

The units described in this document are, by nature, strongly affected by the characteristics of the system, the working conditions and the installation site.

Remember that the unit must be installed by a qualified and skilled technician, and in compliance with the national legislation in force in the destination country.

The installation must be done in such a way that it will be possible to carry out all routine and non-routine maintenance operations.

Before starting any work, you must carefully read the "Installation, operation and maintenance manual" of the machine and do the necessary safety checks to prevent any malfunctioning or hazards.

We give some advice below that will allow you to increase the efficiency and reliability of the unit and therefore of the system into which it is inserted.

Water characteristics

To preserve the life of the exchangers, the water is required to comply with some quality parameters and it is therefore necessary to make sure its values fall within the ranges indicated in the following table:

Total hardness	2,0 ÷ 6,0 °f
	1,2 ÷ 3,4 °d
Langelier index	- 0,4 ÷ 0,4
pH	7,5 ÷ 8,5
Electrical conductivity	10÷500 µS/cm
Organic elements	-
Hydrogen carbonate (HCO3-)	70 ÷ 300 ppm
Sulphates (SO42-)	< 50 ppm
Hydrogen carbonate / Sulphates (HCO3-/SO42-)	> 1
Chlorides (Cl-)	< 50 ppm
Nitrates (NO3-)	< 50 ppm
Hydrogen sulphide (H2S)	< 0,05 ppm
Ammonia (NH3)	< 0,05 ppm
Sulphites (SO3), free chlorine (Cl2)	< 1 ppm
Carbon dioxide (CO2)	< 5 ppm
Metal cations	< 0,2 ppm
Manganese ions (Mn++)	< 0,2 ppm
Iron ions (Fe2+ , Fe3+)	< 0,2 ppm
Iron + Manganese	< 0,4 ppm
Phosphates (PO43-)	< 2 ppm
Oxygen	< 0,1 ppm

Installation of water filters on all the hydraulic circuits is obligatory.

The supply of the most suitable filters for the unit can be requested as accessory. In this case, the filters are supplied loose and must be installed by the customer following the instructions given in the installation, operation and maintenance manual.

Glycol mixtures

With temperatures below 5°C, it is mandatory to work with water and anti-freeze mixtures, and also change the safety devices (anti-freeze, etc.), which must be carried out by qualified authorised personnel or by the manufacturer.

Liquid outlet temperature or minimum ambient temperature	°C	0	-5	-10	-15	-20	-25	-30	-35	-40
Freezing point	°C	-5	-10	-15	-20	-25	-30	-35	-40	-45
Ethylene glycol	%	6	22	30	36	41	46	50	53	56
Propylene glycol	%	15	25	33	39	44	48	51	54	57

The quantity of antifreeze should be considered as % on weight

Minimum water content in the system

For correct operation of the unit, it is necessary to ensure a buffering on the system such as to comply with the minimum operating time considering the greater between the minimum OFF time and the minimum ON time. In short, these contribute to limiting the number of times the compressors are switched on per hour and to preventing undesired deviations from the set point of the delivered water temperature.
The following experimental formula allows the minimum water volume of the system to be calculated:

$$Vmin = \frac{P_{tot} \cdot 1000}{N} \cdot \frac{180}{\Delta T\ \rho\ C_p} + P_{tot} \cdot 0.25$$

where
Vmin is the minimum water content of the system [l]
Ptot is the total cooling capacity of the machine [kW]
N: number of capacity reduction steps
ΔT: differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K
ρ: density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered
cp: specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered
Considering the use of water and grouping together some terms, the formula can be re-written as follows:

$$V_{min} = \frac{P_{tot}}{N} \cdot 17{,}2 + P_{tot} \cdot 0{,}25$$

N is equal to the number of compressors installed in the unit.

Installation site

To determine the best installation site for the unit and its orientation, you should pay attention to the following points:

- compliance with the clearance spaces indicated in the official dimensional drawing of the unit must be guaranteed so as to ensure accessibility for routine and non-routine maintenance operations
- you should consider the origin of the hydraulic pipes and their diameters because these affect the radiuses of curvature and therefore the spaces needed for installing them
- you should consider the position of the cable inlet on the electrical control panel of the unit as regards the origin of the power supply
- if the installation includes several units side by side, you should consider the position and dimensions of the manifolds of the heat exchangers

Once the best position for the unit has been identified, you must check that the support slab has the following characteristics:

- its dimensions must be proportionate to those of the unit: if possible, longer and wider than the unit by at least 30 cm and 15/20cm higher than the surrounding surface
- it must be able to bear at least 4 times the operating weight of the unit
- must allow the unit to be installed in a level position

The units are designed and built to reduce to a minimum the level of vibration transmitted to the ground, but it is in any case advisable to use rubber or spring anti-vibration mounts, which are available as accessory and should be requested when ordering.
The anti-vibration mounts must be fixed to the machine before positioning the unit on the ground.

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