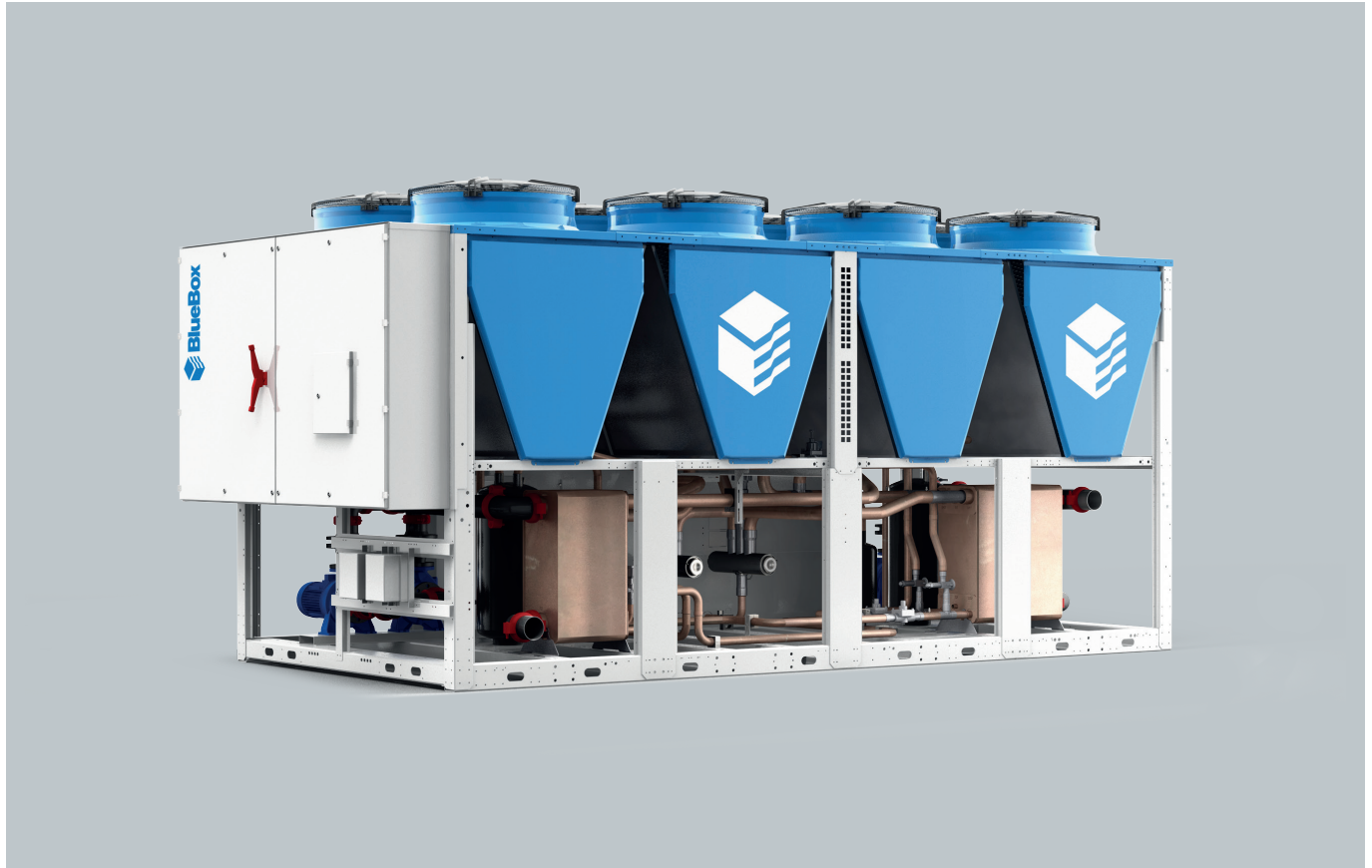


Omicron Rev S4

100÷450 kW



General

High efficiency, modular multi-purpose unit for 4-pipe systems with scroll compressors, 2 refrigerant circuits, plate heat exchangers for the user-side cooling and heating circuits, air source and axial fans

Configurations

HE: High efficiency unit

HE/LN: Low noise unit

SLN: Super low noise unit

Optional hydronic module

Strengths

- ▶ High efficiency in all conditions
- ▶ Single unit to meet the system load
- ▶ Minimum impact of defrost cycles
- ▶ Wide operating limits
- ▶ Advanced Bluethink controller with integrated web server
- ▶ Multilogic function for multi-unit systems
- ▶ Flowzer: system with variable water flow rate implemented on each circuit
- ▶ Blueeye supervision system



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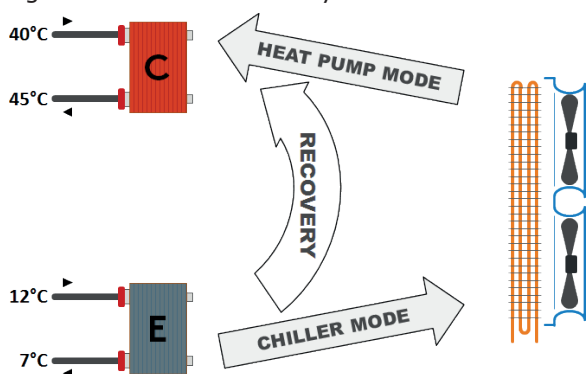
APPLICATION AND OPERATING PRINCIPLE

Multi-purpose units are machines designed for use in all applications where there may be a simultaneous and independent demand for hot and cold water production.

In particular, this occurs for all systems that use 4-pipe terminals, such as for example dual aspect buildings, buildings with large glazed surfaces or high-insulation buildings with non-homogeneous crowding levels.

The 4-pipe multi-purpose unit is able to meet simultaneous and independent heat loads of opposite sign, with the advantage of working in heat recovery operation: whenever there is a simultaneous demand for cooling and heating, the multi-purpose unit will work in recovery mode, and move the thermal energy from rooms that need to be cooled to those that need to be heated.

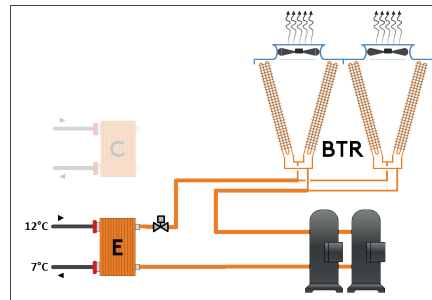
If the two heat loads are not balanced, then the controller works in mixed mode to recover as much thermal energy as possible and use the air exchanger as heat source with which to exchange the missing amount of capacity for meeting both demands of the system.



The 4-pipe multi-purpose unit can therefore work indirectly all year round to meet all the thermal and cooling energy demands of the system and is therefore an alternative to conventional systems based on the chiller/boiler combination with the additional non-negligible advantage of waste heat recovery.

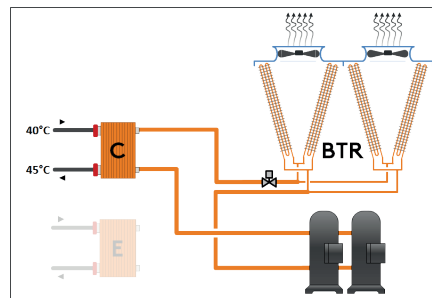
Depending on the various scenarios that can occur over the span of a day, the multi-purpose unit can work with different modes and change from one to another fully automatically.

Cooling mode



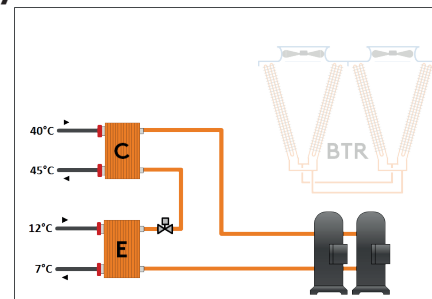
The unit works in this mode when the system requires only cold water production. It uses the finned coil "BTR" as source-side heat exchanger and produces chilled water at exchanger "E", connected to the circuit dedicated to water distribution for only air conditioning in the building.

Heating mode



The unit works in this mode when the system requires only heating. It uses the finned coil "BTR" as source-side heat exchanger and produces hot water at exchanger "C", connected to the circuit dedicated to water distribution for only heating in the building.

Recovery mode



When there is a simultaneous demand for hot water and cold water in the system, the multi-purpose unit behaves like a water/water heat pump, and manages condensation on exchanger "C" and evaporation on exchanger "E" and therefore works simultaneously on the two hydronic circuits of the system.

The change from one configuration to another takes place fully automatically while trying to optimize the energy spent based on the demand from users.

Since all the units are also dual circuit, the recovery mode can be used on one circuit while the other works in cooling or heating mode, and this is essential to meet unbalanced hot/cold load demands and in any case obtain the maximum level of energy recovery.

Omicron Rev S4

High efficiency, modular multi-purpose unit for 4-pipe systems with scroll compressors, 2 refrigerant circuits, plate heat exchangers for the user-side cooling and heating circuits, air source and axial fans

PRODUCT DESCRIPTION

BODY

The body is modular with a load-bearing frame, made of galvanized sheet-iron coated with polyester powder RAL 5017/7035 which makes it highly resistant to weather conditions. All screws and bolts are stainless steel.

COMPRESSORS

The compressors are hermetic orbiting spiral scroll compressors connected in tandem, fitted with oil level sight glass, oil equalization line and electronic protection.

SOURCE-SIDE HEAT EXCHANGER

The exchangers are made with finned pack coils with copper tubes and aluminium fins.

The coil/fan sections are made so as to be completely separate between the refrigerant circuits. This allows management of independent, never simultaneous, defrost cycles.

The fins have an increased fin pitch to reduce frost formation and to facilitate the outflow of condensed water during defrosting.

At the base of each coil, there is an Anti-Ice Circuit: this prevents ice formation in the lower part of the coil and therefore allows the unit to operate even with extremely harsh temperatures and with high humidity levels.

The Anti-Ice Circuit is shut off by a solenoid valve managed by the controller of the unit to ensure this is running only when the coils work as evaporator and only when the external air temperature makes it really necessary.

The V-shaped arrangement of the coils enables them to be protected from hail and makes the unit compact. It also guarantees an increase in the air intake surface, and leaves ample space for distribution of the components of the refrigerant circuit and the hydraulic circuit.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils. For installations within a kilometre of the coast, use of the accessory is strongly recommended Coil treated with anti-corrosion paints.

FANS

The fans are axial fans, directly coupled to a three-phase 6-pole electric motor, with integrated thermal overload protection (klixon) and IP 54 protection rating.

The fan includes the shroud, designed to optimize its efficiency and reduce noise emission to a minimum, and the safety guard.

COLD USER-SIDE HEAT EXCHANGER

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

On the hydraulic connections of the heat exchanger, there are pipe taps for the differential pressure switch, and wells for the temperature probes.

HOT USER-SIDE HEAT EXCHANGER

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

On the hydraulic connections of the heat exchanger, there are pipe taps for the differential pressure switch, and wells for the temperature probes.

REFRIGERANT CIRCUIT

The unit uses refrigerant gas R410A.

Each refrigerant circuit of the unit comprises:

- shut-off valve in the liquid line
- 5/16" charging valves
- liquid sight glass
- replaceable solid cartridge dehydrator filter
- two electronic expansion valves per circuit
- mechanical thermostatic valve dedicated to defrosting
- 4-way reversing valve
- suction separator
- fluid accumulator
- pressure transducers for reading high and low pressure values
- high pressure switches
- safety valves
- Anti-Ice Circuit with solenoid valve

The pipes of the circuit and the exchanger are insulated with extruded closed-cell expanded elastomer that is resistant to UV rays.

ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanized sheet-iron box with forced ventilation and IP54 protection rating.

The electrical control panel of the basic unit comprises:

- main disconnect switch
- automatic circuit breakers for compressors with fixed calibration
- fuses for protecting the fans and auxiliary circuits
- fan contactors
- phase-cutting fan speed adjuster
- thermal magnetic circuit breakers for pumps (if present)
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts for compressors, fans and pumps (when present)
- digital input for general ON/OFF

- digital input for cold circuit ON/OFF
- digital input for hot circuit ON/OFF
- external air temperature probe
- microprocessor controller with display accessible from the outside

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

Standard power supply of the unit is 400V/3~/50Hz

CONTROL BLUETHINK

Main controller functions

The microprocessor control allows the following functions:

- water temperature control, with control of water at the outlet on the cold exchanger and on the hot 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
- sliding defrost management
- sliding defrost management
- management of independent, never simultaneous, defrost cycles on the two refrigerant circuits
- digital input for general ON/OFF
- digital input for cold circuit ON/OFF
- digital input for hot circuit ON/OFF
- digital input for hot circuit ON/OFF
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page

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

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 information on the unit, such as serial n°, size, type of refrigerant
- display of the general status of the machine: water inlet and outlet temperatures, external air temperature, operating mode, evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, fans, pumps, electronic expansion valves
- display in real time of the graphs of the main quantities

- display of the graphs of logged quantities
- display of alarm log
- display of the status of all the I/Os of the controller
- management of users on several levels
- remote ON/OFF
- remote set point change
- remote time band change
- remote summer winter mode selection

Display

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

- water inlet and outlet temperature of the cold circuit
- water inlet and outlet temperature of the hot circuit
- 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.

Management of defrost cycles

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system (patent n° 1335232): during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensed water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

The combination of the sliding intervention threshold and the patented defrost system allows the number and duration of defrost cycles to be optimized and reduced to the minimum.

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
- low pressure safety device with automatic reset and limited tripping managed by the controller
- high pressure safety valves
- antifreeze probe at the outlet of the user-side heat exchangers
- differential pressure switch already fitted on the user-side heat exchangers
- overtemperature protection for compressors and fans

TESTING

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

PACKAGING

There are yellow lifting brackets at the base of the unit to allow lifting with lifting beam.

The unit is wrapped in a protective transparent polyethylene stretch film.

VERSIONS

Omicron Rev S4 HE

These units involve the use of exchangers with high exchange surface area in order to make high efficiency units.

Omicron Rev S4 SLN

These units involve the use of a soundproofed compressor compartment and fans with speed adjuster calibrated with a reduced air flow rate. The speed reduction of the fans is such that, under nominal operating conditions in chiller mode, the air flow rate and noise level are lower than those of the high efficiency version of the unit.

In any case, the use of the speed adjuster to reduce the air flow rate allows rotation of the fans at maximum speed when external air temperature conditions are particularly critical and therefore guarantees the same operating limits as the high efficiency versions.

In heat pump mode, the fans always operate at 100% speed and therefore guarantee the same performance levels as the high efficiency version.

OPTIONS

/LN: low noise unit

In the unit with /LN option, all the compressors are enclosed in a compartment that is fully soundproofed with sound absorbing material and soundproofing material.

/HAT: unit for high external air temperatures

The unit fitted with this accessory adopts an electrical control panel made using specific components to withstand high temperatures, special cables and oversize protection parts.

The accessory enables the unit to work with external air temperatures of over 46°C as indicated in the section on operating limits.

With this accessory, operation is guaranteed with external air temperature up to 50°C.

For higher temperatures up to about 55°C, a set-up with air conditioning of the electrical control panel is necessary; the unit works in capacity reduction mode. The feasibility of this set-up must be assessed: please contact our sales department.

HYDRAULIC MODULES

All units can be fitted with hydraulic module in various configurations:

- /1P/1R: hydraulic module with one pump on the cold circuit and one pump on the hot circuit
- /2P/2R: hydraulic module with two pumps on the cold circuit and two pumps on the hot circuit

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

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.

DESCRIPTION OF ACCESSORIES

Refrigerant circuit accessories

The "(S)" symbol indicates that the option is present as standard in the unit, provided this is not in conflict with other selected accessories.

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 accessory uses a condenser, and not an ordinary battery, as energy storage: this allows it to be unaffected by the memory effect of normal batteries and eliminates its need for maintenance.

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.

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.

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.

RG Fan speed adjuster (S)

The control manages the speed of the fans through a phase cutting speed governor, in order to optimize the operating conditions and efficiency of the unit.

This control also has the effect of reducing the noise level of the unit: in fact, the typical conditions under which the control will be modulating the speed of the fans are those of the night, spring and autumn.

For units equipped with EC fans, the same function is carried out using the electronically commutated motor of the fans and is supplied as standard.

RPP Refrigerant leak detector with automatic pump down

With this accessory, a refrigerant leak detector is placed inside each compressor compartment. Detection of a refrigerant leak is managed by the control through a specific alarm and display of a specific icon on the display of the control. For all the circuits of the unit, the alarm also starts the machine stopping procedure with pump down, confining all the refrigerant in the coils.

The accessory includes the capacitive backup battery.

The accessory can be applied only to units in LN or SLN set-up.

RPR Refrigerant leak detector

With this accessory, a refrigerant leak detector is placed inside each compressor compartment. Detection of a refrigerant leak is managed by the controller through a specific alarm and display of a specific icon on the display of the controller. This alarm stops the unit.

The accessory can be applied only to units in LN or SLN set-up.

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

Fan accessories

VEC EC fans

With this accessory, EC fans, with electronically commutated brushless motor, are used for the ventilating section. These guarantee very high efficiency levels for all working conditions and allow a 15% saving on the power absorbed by each fan working at full capacity.

Also, through a 0-10V analogue signal sent to each fan, the microprocessor carries out condensation/evaporation control by continuous adjustment of the air flow rate as the external air temperature changes, with a further reduction in electrical absorption and noise emission.

VEM Oversize EC fans

With this accessory, oversize EC fans, with electronically commutated brushless motor, are used for the ventilating section. These guarantee very high efficiency levels for all working conditions. Through a 0-10V analogue signal sent to each fan, the microprocessor carries out condensation/evaporation control by continuous adjustment of the air flow rate as the external air temperature changes, with a further reduction in electrical absorption and noise emission.

Oversize EC fans allow a residual available discharge head of about 100Pa to be obtained.

RECP Pressure recuperator

Normally, the air ejected by the fan has a high speed and this manifests itself as kinetic energy that is dissipated into the environment.

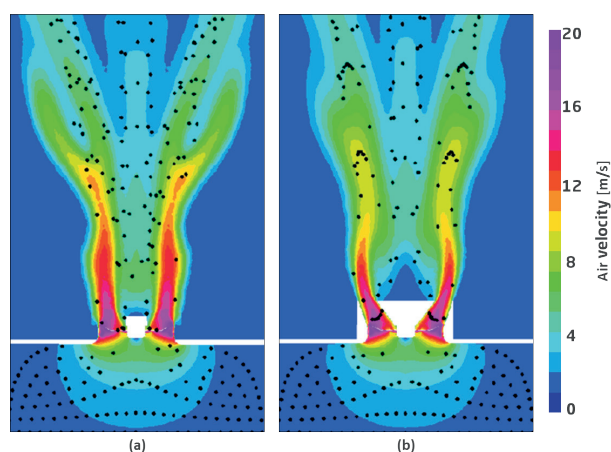
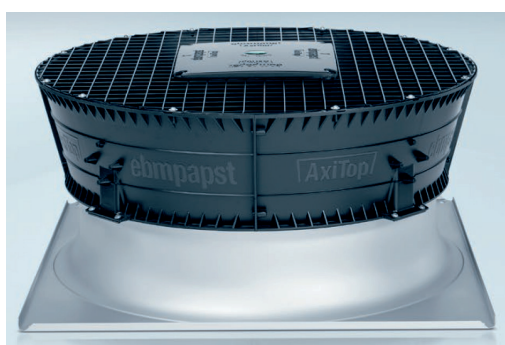
The pressure recuperator is a passive element situated on the ejection duct of each individual fan designed to allow better conversion of kinetic energy into static pressure, which manifests itself as a higher pressure generated by the fan.

This higher pressure can have at least two possible applications:

- For the same fan speed, the pressure recuperator allows an increase of about 50Pa in the available pressure of the ventilating section to be obtained. This can be useful for overcoming the head losses that may be present in specific installations. The increase in available pressure is to be considered in addition to the increase that can already be obtained with the application of oversize EC fans
- for the same pressure differential on the air, the pressure recuperator allows the same air flow rate to be obtained with a lower number of revolutions of the fan. This automatically produces a reduction of up to 3 dB(A) in the noise emission of the unit and a reduction in the absorption of the fan, with an immediate increase in the overall efficiency of the unit.

To allow optimization of the performance of the accessory, combination with the speed adjuster or EC fans is necessary. In this last case, the higher efficiency of the EC fans (especially when operating at low speed) is added to the performance improvement generated by the pressure recuperator.

The accessory is supplied separately from the unit on one or more pallets and it must compulsorily be installed (by the customer) before the first start-up of the machine.



(a) fan only;

(b) fan with pressure recuperator

Hydraulic circuit accessories

The "(S)" symbol indicates that the option is present as standard in the unit, provided this is not in conflict with other selected accessories.

FVPF FLOWZER VP - Inverter for manual pump adjustment cold circuit

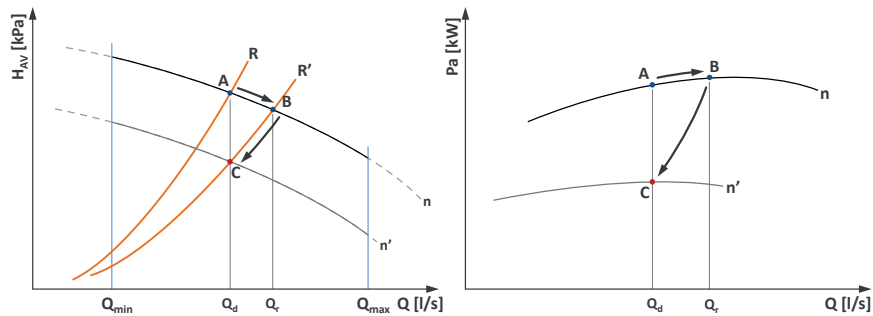
FVPC FLOWZER VP - Inverter for manual pump adjustment hot circuit

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 Q_d .

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 Q_r higher than Q_d .

In this condition, besides having a different flow rate from the nominal flow rate (and therefore also a different thermal gradient), there is also higher pump power absorption.



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.

Use of the Flowzer VP allows the power absorption of the pump to be considerably reduced with consequent energy saving. By way of example:

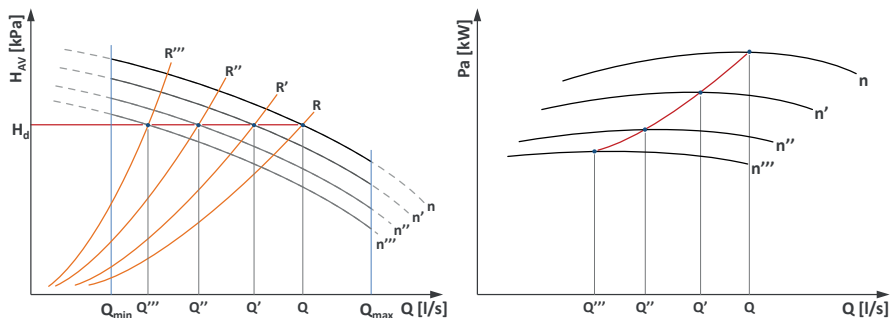
- a 10% reduction in flow rate gives a reduction in absorbed power of about 23%
- a 30% reduction in flow rate gives a reduction in absorbed power of about 50%

FVDF FLOWZER VD - Transducer for automatic adjustment cold circuit

FVDC FLOWZER VD - Transducer for automatic adjustment hot circuit

Flowzer VD requires a pressure transducer to be installed in the machine. Through this transducer, the inverter can gauge the actual pressure at the ends of the system and 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 inverter, the available discharge head value H_d that the unit must maintain.

As can be seen in the graph, as the system user points close, the resistance curve of the system shifts to the left and therefore the inverter will be able to reduce the pump speed in order to keep the available discharge head of the unit constant. By doing so, an immediate reduction in the power absorbed by the pump will be obtained.

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).

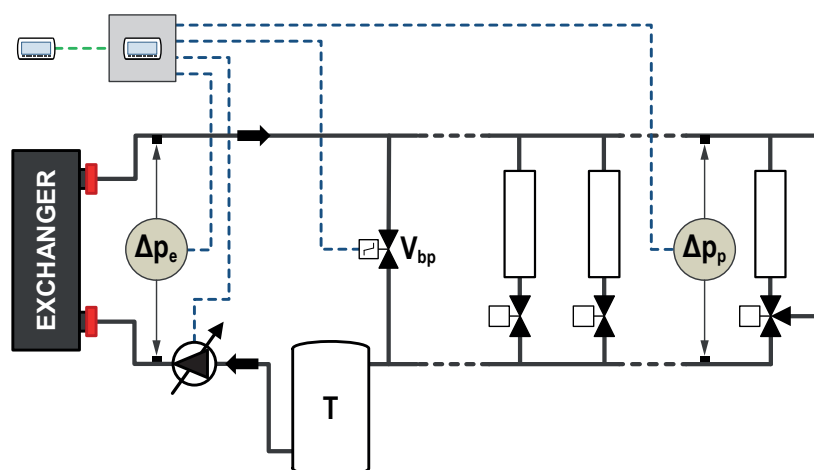
The use of this accessory also allows the pump speed to be adapted to possible fouling of the filter on the hydraulic circuit.

FVFF FLOWZER VFPP – Kit for variable flow rate primary circuit pump with bypass valve included cold circuit

FVFC FLOWZER VFPP – Kit for variable flow rate primary circuit pump with bypass valve included hot circuit

The Flowzer VFPP allows you to implement a variable flow rate primary hydraulic circuit using a single pumping unit driven by inverter and a modulating bypass valve, all managed by a dedicated controller installed in the unit.

This accessory allows you to implement an alternative plant-engineering solution to the classic system with a fixed flow rate primary circuit and a secondary circuit, if necessary with inverter driven pump.



Use of the Flowzer VFPP allows you to:

- simplify the system by eliminating a pumping unit
- shut off the hydraulic circuit breaker with the modulating bypass valve that will open only if necessary
- use a single inverter on the single pumping unit and therefore guarantee, in all operating conditions, the lowest energy consumption due to just pumping.

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.

It is the best compromise between the minimum pump speed and the bypass valve closed as much as possible.

The operating principle of the Flowzer VFPP can be summarized as follows:

- The Flowzer VFPP system controller modulates the pump speed based on the reading by the system transducer Δp_p in order to keep the pressure at the set levels. This means that, as a result of the switching off of user points, there will be a slowing down of the pump.
- the pump will be able to slow down until the flow rate to the exchanger reaches the minimum allowed (flow rate gauged indirectly through the transducer Δp_e). When this threshold is exceeded, the Flowzer VFPP controller opens the valve V_{bp} to recirculate the flow rate that is not required by the system, but is necessary to guarantee the minimum flow rate to the exchanger.

To work correctly, in the maximum capacity reduction condition of the system (that is, with all the two-way valves closed), the Flowzer VFPP needs the volume of water that the unit processes to be greater than or equal to the required minimum volume (V_{min}) that must be concentrated in tank T, situated between the unit and the bypass valve.

If, on some user points, the system uses three-way valves situated in the final part of the system branch (as in the figure), even when the user point is switched off, the valve guarantees a minimum circulation of water on the distribution lines, thereby preventing the water in the lines from stagnating for long periods of time with possible thermal drift problems. In this way, when any user point is reactivated, the temperature of the water in the line will already be the correct one, so preventing thermal inertia effects.

The bypass valve V_{bp} supplied with the Flowzer VFPP is controlled through an 0-10V signal and therefore you are advised to install it within 30m of the unit.

The pressure traducer Δp_p is a differential transducer and therefore, to install it, you will only need to have two 1/4" female fittings in a suitable part of the system. This transducer is connected to the machine controller with a 4-20mA signal and therefore you are advised to install it within 200m of the unit.

The position in which to install this transducer should be chosen considering that:

- to ensure correct reading of the transducer, it is advisable for the capillaries not to exceed a length of one metre
- to ensure the correct pressure is available for all user points, you are advised to position the transducer near the user point that is affected by the highest load losses of the line or in any case in a part where the average pressure of the system can be measured.

	Bypass valve diameter	
	Cold circuit	hot circuit
9.4	2"	2"
13.4	2"	2"
18.4	2"1/2	2"1/2
20.4	2"1/2	2"1/2
22.4	2"1/2	3"
26.4	3"	3"
30.4	3"	4"
33.4	3"	4"
37.4	4"	4"
42.4	4"	4"
47.4	4"	4"

IVPO Soundproofed pump compartment ...

With this accessory, the motor and the impeller of the pumps are enclosed in a compartment that is fully soundproofed with sound absorbing material and soundproofing material.

RA Antifreeze heater ...

These are electric heaters inserted on the user-side heat exchanger, on the pumps and in the tank (depending on the configuration of the machine) to prevent damage to the hydraulic components due to ice formation during periods when the machine is stopped.

The antifreeze heater is present as standard on both user-side heat exchangers.

FLUS Flow switches on both hydraulic circuits (in place of water differential pressure switches)

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.

Application of this accessory is compulsory for units that use non-glycol water and work with a yearly cycle where external air temperatures are zero or below.

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

PFPF User-side pump with Pulse function cold circuit

PFPC User-side pump with Pulse function hot circuit

As standard, the unit is set to keep the system-side circulation pump on all the time, even when the set point temperature is reached.

But when the unit is provided with this accessory, on reaching the set point, the controller will switch off the pump and start it again at regular intervals for a sufficient time to measure the water temperature. If the controller verifies that the water temperature is still in set point condition, it will switch off the pump again. Otherwise the controller will start the compressors again to meet the requirements of the system.

This accessory therefore allows electrical absorption due to pumping to be drastically reduced, especially in spring and autumn when the load is extremely low.

V3MC 3-way modulating valve on hot circuit

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.

This accessory obligatorily requires the option "Signal for 3-way modulating valve"

Accessory supplied loose.

VSIW Safety valve on both circuits (S)

With this accessory, a safety valve is inserted in the hydraulic circuit of the unit: when the calibration pressure is reached, the valve opens and, by discharging (to be routed by the customer), prevents the system pressure from reaching limits that are dangerous for the components present in the system. The valves have positive action, that is, performance is guaranteed even if the diaphragm deteriorates or breaks.

The safety valve is inserted as standard on both hydraulic circuits.

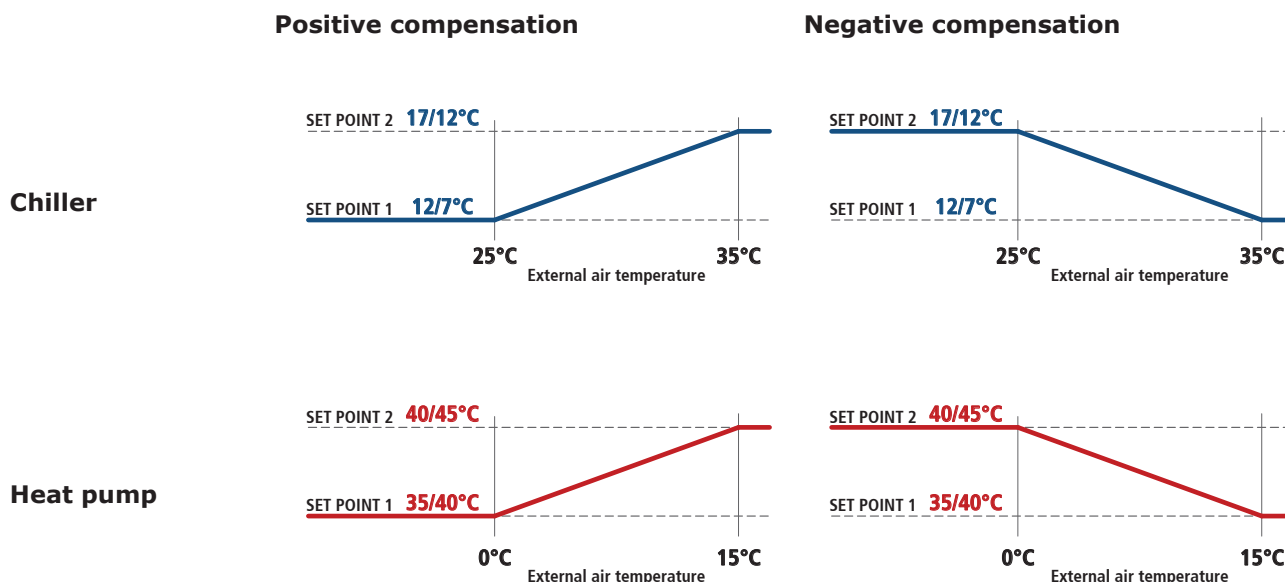
Electrical accessories

The "(S)" symbol indicates that the option is present as standard in the unit, provided this is not in conflict with other selected accessories.

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:



CSTI OK signal for additional heat source

Through a potential free contact, the controller gives the OK signal to an additional heat source to intervene in support of the unit to meet the heat load.

The OK signal to the additional source is given only if the external air temperature is lower than a settable threshold and if the set point temperature of the hot-side water is not reached within a set time.

CSTS OK signal for substitute heat source

Through a potential free contact, the controller gives the OK signal to an alternative heat source so that it will meet the total heat load demand when the external air temperature is lower than a settable threshold.

For external air temperatures below this threshold, hot water production through the use of the compressors is disabled.

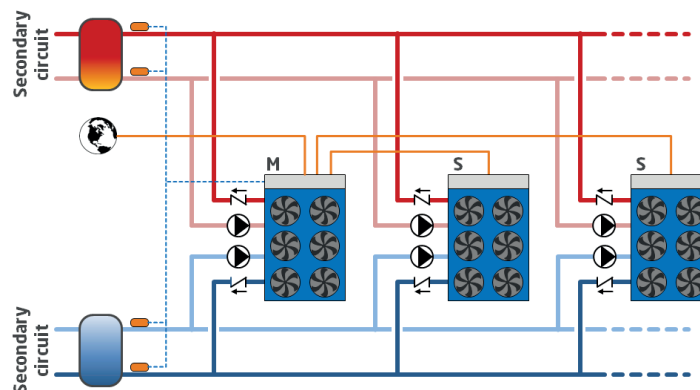
GLO **Modbus Lonworks Gateway**

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. Enabling of read/write access should be requested when ordering.

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.



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 requires:

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

For the master units, the accessory requires:

- 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.

IACV 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.

NSS Night Shift System

This accessory is applied to high efficiency /LN version units with speed governor or to SLN units.

In the day time slot, which is normally the one with the highest heat load, priority is given to efficiency and therefore the machine works with a fan control curve that maximises the EER. In this time slot, therefore, the unit is a high efficiency low noise machine (equivalent to HE/LN).

In the night time band (or in any case from time band decided by the customer), the priority changes to limiting the noisiness of the machine and therefore the controller carries out an adjustment of the control ramp of the condensing fans, thereby reducing the air flow rate and consequently the noise emission level. So, in this time band, the unit is a super low noise machine (equivalent to SLN).

In any case, if there is a need for additional cooling capacity, the controller will manage the demand, if necessary, by accelerating the fans and keeping condensation within the correct operating limits.

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

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. Enabling of read/write access should be requested when ordering.

R1PF Relay for management of 1 external pump cold circuit**R1PC Relay for management of 1 external pump hot circuit**

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

R2PF Relay for management of 2 external pumps, cold circuit**R2PC Relay for management of 2 external pumps, hot circuit**

This accessory can be requested for units without 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.

RIF Power factor correction to $\cos\phi \geq 0.9$

With this accessory, an electrical control panel, containing power factor correction condensers to bring the $\cos\phi$ of the unit to being greater than 0.95, is supplied loose. The condensers 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.

SEDC Double set point from digital input hot circuit

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 highest set point.

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

- set point 1 at 45°C
- set point 2 at 40°C

SEDF Double set point from digital input cold circuit

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 lowest set point.

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

- set point 1 at 7°C
- set point 2 at 12°C

SEVC Variable set point with remote signal hot circuit

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 highest set point.

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

- 0V will correspond to a set point of 45°C
- 10V will correspond to a set point of 40°C

SEVF Variable set point with remote signal cold circuit

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 lowest set point.

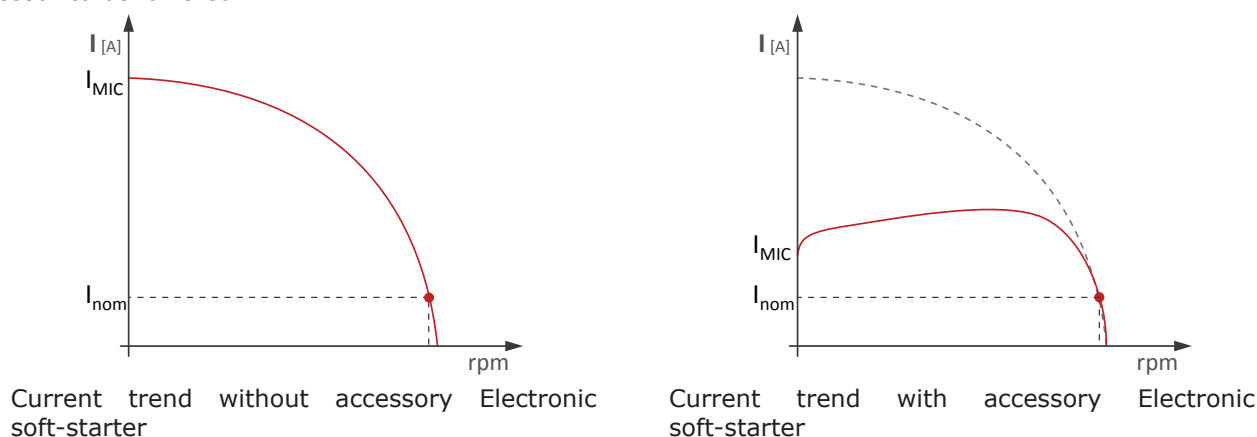
Unless otherwise specified in the order, the controller will be set at the factory with 0-10V analogue input and with the following temperatures:

- 0V will correspond to a set point of 7°C
- 10V will correspond to a set point of 12°C

SOFT Electronic soft-starter

The scroll compressors have DOL (Direct On Line) starting and therefore the maximum inrush current I_{MIC} will be 4/5 times its nominal current I_{nom} .

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.



If the unit is equipped with accessory "Power factor correction to $\cos\phi \geq 0.9$ ", this last will be electro-mechanically connected only at the end of the acceleration ramp of the soft-starter.

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.

SV5 Signal for 3-way modulating valve

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.

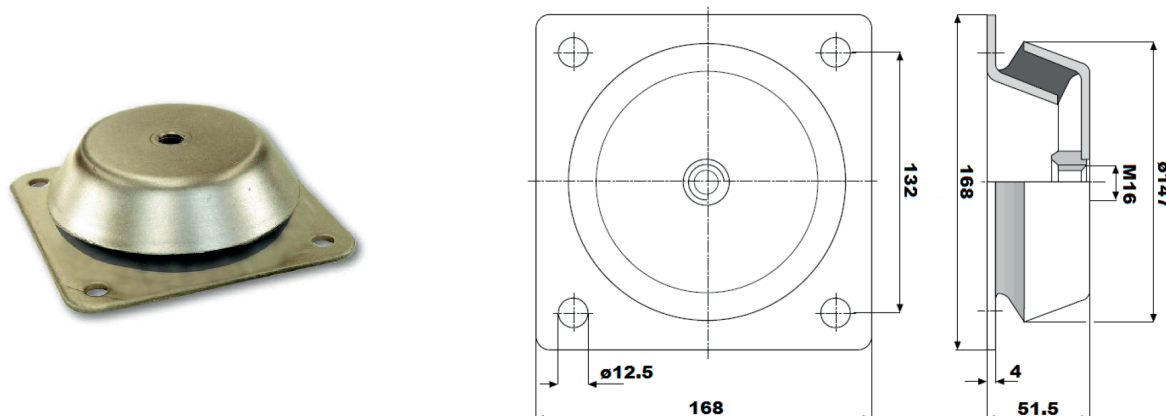
If the temperature of the water entering the hot exchanger is too low (for example, after the machine has been stopped for an extended period), through this signal, the controller of the unit will control the valve so as to recirculate part of the flow rate at the outlet and ensure that the unit always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

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

Other accessories

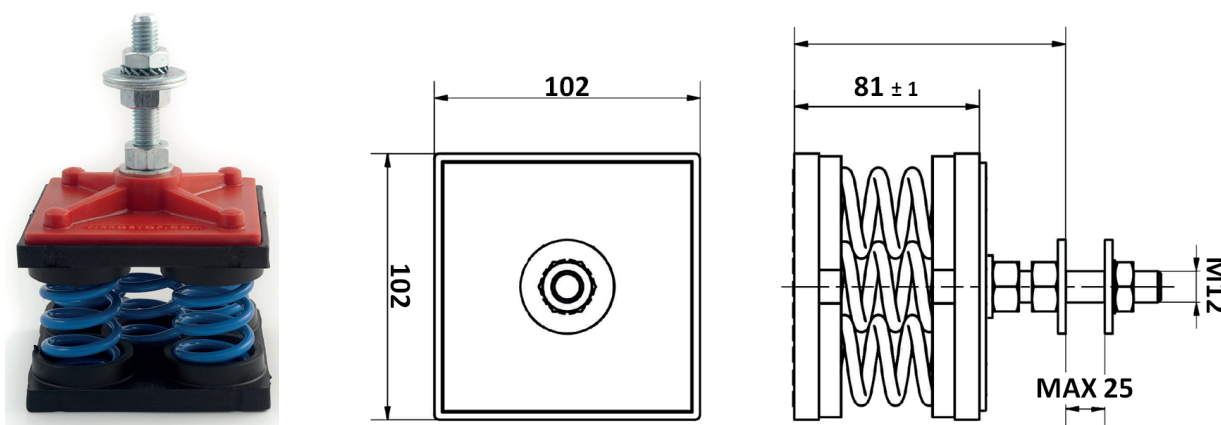
AG Rubber anti-vibration mounts

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.



ALPR Pre-painted aluminium coil

This accessory uses finned pack coils with copper tubes and aluminium fins pre-painted with an anti-corrosion treatment.

ANTC Coil treated with anti-corrosion paints

The treatment is applied exclusively to finned pack coils with copper tubes and aluminium fins and consists of aluminium passivation and coating with a polyurethane base; a double layer of paint, of which the first passivates the aluminium and acts as primer and the second is a polyurethane based surface coating. The product has high resistance to corrosion and all environmental conditions.

The choice of whether or not to treat the exchanger should be made in relation to the environment in which the unit is to be installed and through observation of other structures and machinery with exposed metal surfaces present in the destination environment.

The cross observation criterion is the most valid method of selection currently available without having to carry out preliminary tests or measurements with instruments. The identified reference environments are:

- marine coastal
- industrial
- urban with a high housing density
- rural

Please note that in cases where different conditions co-exist, even for short periods, the choice must be suitable for preserving the exchanger in the harsher environmental conditions and not in conditions between the worst and best situation.

Particular attention must be given to cases where an environment that is not particularly aggressive becomes aggressive as a consequence of a local and/or temporal concomitant cause such as, for example, due to the presence of a heating flue outlet or an industrial kitchen or a solvent extraction fan in a small craft business. Protective treatment of the exchanger is strongly recommended if at least one of the points below is verified:

- there are obvious signs of corrosion of the exposed metal surfaces in the installation area
- the distance from the coast is less than 20 km
- the prevailing winds come from the sea towards the unit
- the environment is industrial with a significant concentration of pollutants
- the environment is urban with a high population density
- the environment is rural with the presence of organic discharges and effluents.

For chiller units, this accessory also includes the "Cu/Al coil" accessory.

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 separately with the unit.

PREA Unit suitable to be disassembled on site

The unit is delivered so that it can be disassembled easily on site if this makes the installation operations easier.

A unit requested with this option is supplied:

- screwed instead of riveted
- with plugged and not welded pipes
- without refrigerant charge
- untested
- covered by the warranty only if reassembled and screwed together by personnel authorized by the factory

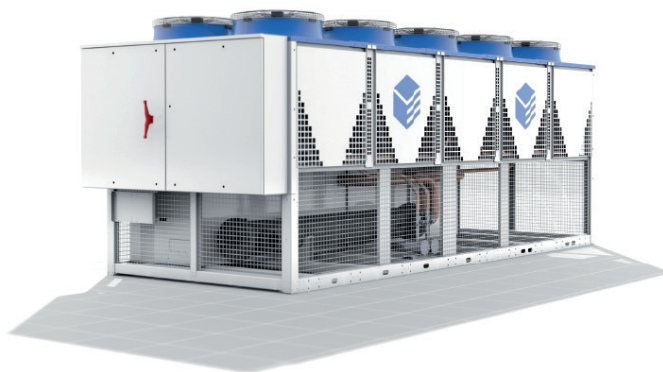
PRAC Steel profiles frames for container shipment

This accessory foresees the mounting of steel profiles frames on the unit for its loading into container.

When this accessory is required it's for the shipping of the unit into container and its loading is mandatory to be done at the factory

RAT Anti-intrusion nets

An arc-welded, painted net (RAL colour 7035) is installed to close off the external openings so as to prevent access to the technical compartment by unauthorized personnel.



SLIT Special pallet/skid for container shipment

The unit is placed on a skid that makes the container loading and unloading operations easier.

The accessory is mandatory if shipping by container is required

STL Brackets for transport over long distances

The accessory consists of adding reinforcing bars to the structural metalwork. This allows the strength of the structure to be increased for long distance road transport.

TECHNICAL SPECIFICATIONS

OMICRON REV S4 HE

			9.4	13.4	18.4	20.4	22.4	26.4	30.4	33.4	37.4	42.4	47.4
Cooling (A35°C; W7°C)													
Refrigeration capacity	(1)	kW	99	116	171	198	223	264	293	330	372	411	453
Total absorbed power	(1)	kW	32	38	54	63	73	85	94	104	118	134	150
EER	(1)		3,12	3,02	3,15	3,13	3,06	3,12	3,10	3,16	3,14	3,07	3,01
ESEER													
Heating (A7°C/87%; W45°C)													
Heating capacity	(2)	kW	104	119	182	204	226	286	308	358	394	433	464
Total absorbed power	(2)	kW	32	36	55	62	69	87	94	108	119	132	142
COP	(2)		3,30	3,28	3,31	3,30	3,28	3,29	3,28	3,31	3,30	3,29	3,27
SCOP													
Cooling + Heating (W7°C; W45°C)													
Refrigeration capacity	(3)	kW	94	109	164	187	209	247	270	314	348	386	420
Heating capacity	(3)	kW	122	142	213	243	273	323	353	409	455	504	551
Total absorbed power	(3)	kW	28	33	49	56	64	77	84	95	106	118	130
EER	(3)		3,31	3,28	3,33	3,31	3,28	3,22	3,21	3,31	3,28	3,26	3,22
COP	(3)		4,31	4,28	4,33	4,31	4,28	4,22	4,21	4,31	4,28	4,26	4,22
TER	(3)		7,62	7,55	7,66	7,62	7,55	7,44	7,42	7,61	7,56	7,51	7,45
Compressors													
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step		%	25%	25%	25%	21%	25%	22%	25%	23%	25%	25%	25%
Refrigerant charge		kg	24	24	42	42	42	71	72	89	89	97	97
Fans													
Quantity		n°	2	2	4	4	4	6	6	8	8	8	8
Total air flow rate		m3/h	40.000	40.000	80.000	80.000	80.000	120.000	120.000	160.000	160.000	160.000	160.000
Cold-side heat exchanger													
Quantity		n°	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Water flow rate (A35°C; W7°C)	(1)	m3/h	17,1	20,0	29,5	34,1	38,5	45,6	50,4	56,8	64,2	70,9	78,2
Head loss (A35°C; W7°C)	(1)	kPa	20	26	24	30	36	21	25	23	28	27	32
Hot-side heat exchanger													
Quantity		n°	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Water flow rate (A7°C/87%; W45°C)	(2)	m3/h	17,9	20,5	31,2	35,0	38,7	49,1	52,9	61,5	67,6	74,4	79,7
Head loss (A7°C/87%; W45°C)	(2)	kPa	24	31	28	28	34	17	17	16	20	19	23
Hydraulic modules													
Standard pumps, cold circuit													
Pump model			P1	P1	P1	P2	P2	P3	P3	P4	P4	P4	P4
Available head (1P)	(1)	kPa	134	122	101	147	126	139	131	150	136	130	112
Available head (2P)	(1)	kPa	130	117	88	131	107	126	116	141	126	118	97
Standard pumps, hot circuit													
Pump model			P1	P1	P2	P3	P3	P3	P3	P4	P5	P5	P6
Available head (1R)	(2)	kPa	118	90	110	129	104	123	106	120	143	131	140
Available head (2R)	(2)	kPa	110	80	88	116	87	114	94	105	124	108	111
Noise levels													
Sound power level of basic unit	(4)	dB(A)	85	85	86	88	89	90	91	92	93	93	93
Sound pressure level of basic unit	(5)	dB(A)	53	53	54	56	57	58	59	60	61	61	61
Sound power level of LN version	(4)	dB(A)	81	81	82	84	85	86	87	88	89	89	89
Sound pressure level of LN version	(5)	dB(A)	49	49	50	52	53	54	55	56	57	57	57
Dimensions and weights of basic unit													
Length		mm	2.297	2.297	2.297	2.297	2.297	5.002	5.002	5.002	5.002	5.002	5.002
Depth		mm	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256
Height		mm	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443
Operating weight of basic version		kg	1.606	1.622	1.958	1.985	2.002	3.496	3.524	3.866	3.912	3.996	4.056

(1) External air temperature 35°C; cold-side exchanger inlet-outlet water temperature 12-7°C

(2) External air temperature 7°C DB, 6°C WB; hot-side exchanger inlet-outlet water temperature 40-45°C

(3) Cold-side exchanger inlet-outlet water temperature 12-7°C; Hot-side exchanger inlet-outlet water temperature 40-45°C

(4) Sound power level obtained from measurements carried out in accordance with standard ISO 3744. Reference conditions: External air temperature 35°C; evaporator inlet-outlet water temperature 12-7°C.

(5) Sound pressure level measured at a distance of 10 metres from the unit in free field, with directivity factor Q=2. Reference conditions: External air temperature 35°C; evaporator inlet-outlet water temperature 12-7°C. These values are to be considered approximate and non-binding.

OMICRON REV S4 SLN

			9.4	13.4	18.4	20.4	22.4	26.4	30.4	33.4	37.4	42.4	47.4
Cooling (A35°C; W7°C)													
Refrigeration capacity	(1)	kW	95	109	164	189	211	254	282	316	356	391	426
Total absorbed power	(1)	kW	33	40	55	65	75	86	97	106	121	139	157
EER	(1)		2,91	2,71	3,01	2,92	2,80	2,94	2,90	2,99	2,93	2,82	2,72
ESEER													
Heating (A7°C/87%; W45°C)													
Heating capacity	(2)	kW	104	119	182	204	226	286	308	358	394	433	464
Total absorbed power	(2)	kW	32	36	55	62	69	87	94	108	119	132	142
COP	(2)		3,30	3,28	3,31	3,30	3,28	3,29	3,28	3,31	3,30	3,29	3,27
SCOP			0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Recovery (W7; W45°C)													
Refrigeration capacity	(3)	kW	94	109	164	187	209	247	270	314	348	386	420
Heating capacity	(3)	kW	122	142	213	243	273	323	353	409	455	504	551
Total absorbed power	(3)	kW	28	33	49	56	64	77	84	95	106	118	130
EER	(3)		3,31	3,28	3,33	3,31	3,28	3,22	3,21	3,31	3,28	3,26	3,22
COP	(3)		4,31	4,28	4,33	4,31	4,28	4,22	4,21	4,31	4,28	4,26	4,22
TER	(3)		7,62	7,55	7,66	7,62	7,55	7,44	7,42	7,61	7,56	7,51	7,45
Compressors													
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2	4/2
Minimum capacity reduction step		%	25%	25%	25%	21%	25%	22%	25%	23%	25%	25%	25%
Refrigerant charge		kg	24	24	42	42	42	71	72	89	89	97	97
Fans													
Quantity		n°	2	2	4	4	4	6	6	8	8	8	8
Total air flow rate SLN		m3/h	32.000	32.000	64.000	64.000	64.000	96.000	96.000	128.000	128.000	128.000	128.000
Cold-side heat exchanger													
Quantity		n°	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Water flow rate (A35°C; W7°C)	(1)	m3/h	16,4	18,9	28,3	32,6	36,5	43,7	48,6	54,5	61,4	67,5	73,5
Head loss (A35°C; W7°C)	(1)	kPa	18	23	22	27	32	19	22	21	25	24	28
Hot-side heat exchanger													
Quantity		n°	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Water flow rate (A7°C/87%; W45°C)	(2)	m3/h	17,9	20,5	31,2	35,0	38,7	49,1	52,9	61,5	67,6	74,4	79,7
Head loss (A7°C/87%; W45°C)	(2)	kPa	24	31	28	28	34	17	17	16	20	19	23
Hydraulic modules													
Standard pumps, cold circuit (A35°C; W7°C)													
Pump model			P1	P1	P1	P2	P2	P3	P3	P4	P4	P4	P4
Available head (1P)		kPa	138	129	109	158	141	147	141	157	145	139	126
Available head (2P)		kPa	134	124	97	143	124	135	127	149	135	129	113
Standard pumps, hot circuit (W7; W45°C)													
Pump model			P1	P1	P2	P3	P3	P3	P3	P4	P5	P5	P6
Available head (1R)		kPa	118	90	110	129	104	123	106	120	143	131	140
Available head (2R)		kPa	110	80	88	116	87	114	94	105	124	108	111
Noise levels													
Sound power level of SLN unit	(4)	dB(A)	78	78	79	81	82	83	84	85	86	86	86
Sound pressure level of SLN unit	(5)	dB(A)	46	46	47	49	50	51	52	53	54	54	54
Dimensions and weights of basic unit													
Length		mm	2.297	2.297	2.297	2.297	2.297	5.002	5.002	5.002	5.002	5.002	5.002
Depth		mm	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256	2.256
Height		mm	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443	2.443
Operating weight of basic version		kg	1.796	1.812	2.149	2.175	2.191	3.670	3.698	4.044	4.090	4.172	4.216

(1) External air temperature 35°C; cold-side exchanger inlet-outlet water temperature 12-7°C

(2) External air temperature 7°C DB, 6°C WB; hot-side exchanger inlet-outlet water temperature 40-45°C

(3) Cold-side exchanger inlet-outlet water temperature 12-7°C; Hot-side exchanger inlet-outlet water temperature 40-45°C

(4) Sound power level obtained from measurements carried out in accordance with standard ISO 3744. Reference conditions: External air temperature 35°C; evaporator inlet-outlet water temperature 12-7°C.

(5) Sound pressure level measured at a distance of 10 metres from the unit in free field, with directivity factor Q=2. Reference conditions: External air temperature 35°C; evaporator inlet-outlet water temperature 12-7°C. These values are to be considered approximate and non-binding.

ELECTRICAL SPECIFICATIONS

OMICRON REV S4 HE - OMICRON REV S4 SLN

			9.4	13.4	18.4	20.4	22.4	26.4
General electrical specifications								
Max. absorbed power (FLI)	(1)	kW	44	52	82	95	108	128
Max. absorbed current (FLA)	(1)	A	78	91	138	151	163	202
Nominal current (Inom)	(2)	A	66	75	120	128	138	145
cosφ standard unit	(2)		0,79	0,79	0,76	0,81	0,82	0,86
Nominal current with power factor correction (Inom)	(2)	A	54	62	99	109	109	128
cosφ unit with power factor correction	(2)		0,97	0,96	0,95	0,95	0,95	0,97
Maximum inrush current (MIC)	(3)	A	172	189	282	339	352	364
Maximum inrush current with soft-starter (MIC)	(4)	A	127	142	213	249	262	280
Power supply			400/3~/52					
Power supply for auxiliary circuits			230-24/1~/52					
Suggested line section	(5)	mm²	3x25+1G18	3x35+1G27	3x50+1G27	3x70+1G37	3x70+1G37	3x120+1G72
Suggested line protection	(6)		NH00gG 100A	NH00gG 125A	NH00gG 160A	NH1gG 200A	NH1gG 200A	NH1gG 250A
Electrical specifications for fans								
Rated power of standard fan		n° x kW	2 x 2,0	2 x 2,0	4 x 2,0	4 x 2,0	4 x 2,0	6 x 2,0
Rated current of standard fan		n° x A	2 x 4,3	2 x 4,3	4 x 4,3	4 x 4,3	4 x 4,3	6 x 4,3
			30.4	33.4	37.4	42.4	47.4	
General electrical specifications								
Max. absorbed power (FLI)	(1)	kW	140	157	170	190	204	
Max. absorbed current (FLA)	(1)	A	218	254	282	320	341	
Nominal current (Inom)	(2)	A	152	193	226	258	273	
cosφ standard unit	(2)		0,87	0,87	0,88	0,85	0,86	
Nominal current with power factor correction (Inom)	(2)	A	137	176	208	228	244	
cosφ unit with power factor correction	(2)		0,97	0,96	0,95	0,96	0,96	
Maximum inrush current (MIC)	(3)	A	380	479	507	515	563	
Maximum inrush current with soft-starter (MIC)	(4)	A	296	365	392	409	443	
Power supply			400/3~/52					
Power supply for auxiliary circuits			230-24/1~/52					
Suggested line section	(5)	mm²	3x120+1G72	3x150+1G97	3x150+1G97	2x(3x70) +1G97	2x(3x70) +1G97	
Suggested line protection	(6)		NH1gG 250A	NH2gG 315A	NH2gG 315A	NH2gG 400A	NH2gG 400A	
Electrical specifications for fans								
Rated power of standard fan		n° x kW	6 x 2,0	8 x 2,0	8 x 2,0	8 x 2,0	8 x 2,0	
Rated current of standard fan		n° x A	6 x 4,3	8 x 4,3	8 x 4,3	8 x 4,3	8 x 4,3	
Rated power of EC fan		n° x kW	6 x 1,9	8 x 1,9	8 x 1,9	8 x 1,9	8 x 1,9	
Rated current of EC fan		n° x A	6 x 2,9	8 x 2,9	8 x 2,9	8 x 2,9	8 x 2,9	
Rated power of oversize EC fans		n° x kW	6 x 3,0	8 x 3,0	8 x 3,0	8 x 3,0	8 x 3,0	
Rated current of oversize EC fans		n° x A	6 x 4,5	8 x 4,5	8 x 4,5	8 x 4,5	8 x 4,5	

- (1) Data regarding the unit without accessories working in maximum power absorption conditions
- (2) Datum related to the unit without accessories working in standard conditions (A35°C; W12-7°C)
- (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.

PUMP DATA

Model	Rated power	Rated current	Qmin	Qmax
	kW	A	m³/h	m³/h
P1	1,5	3,2	12	42
P2	2,2	4,5	12	42
P3	3,0	6,4	24	72
P4	4,0	8,7	38	110
P5	5,5	10,6	42	126
P6	7,5	13,6	42	132

USER-SIDE EXCHANGER FLOW RATE FIELDS

The units are sized and optimized for the following nominal conditions: external air 35°C, inlet-outlet of the user-side 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

OMICRON REV S4 HE

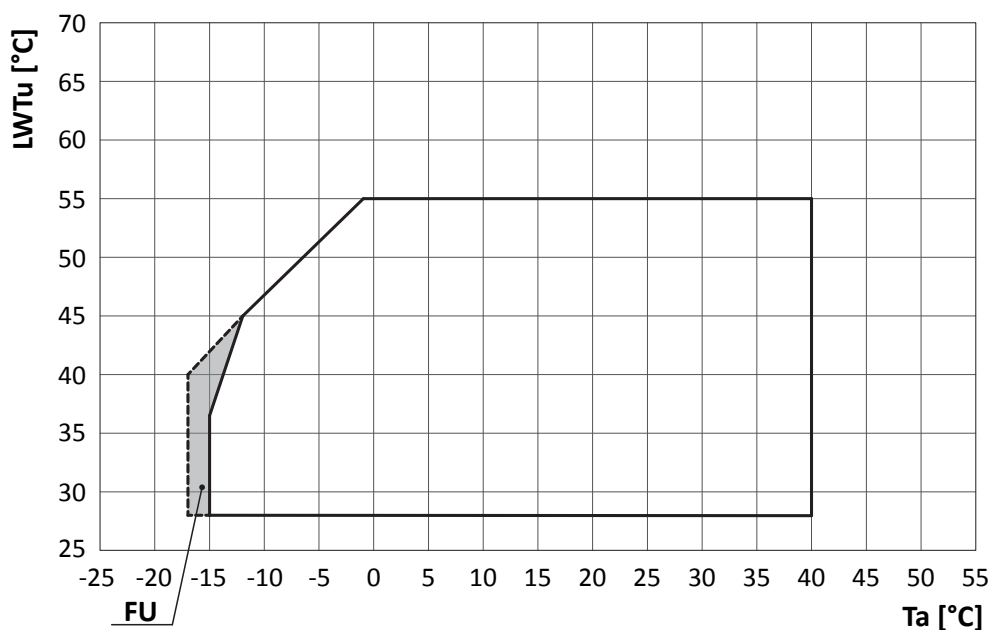
	Cold-side heat exchanger		Hot-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
9.4	8,5	25,6	8,9	26,8
13.4	10,0	30,0	10,2	30,7
18.4	14,7	44,2	15,6	46,7
20.4	17,1	51,2	17,5	52,5
22.4	19,2	57,7	19,4	58,1
26.4	22,8	68,3	24,5	73,6
30.4	25,2	75,7	26,5	79,4
33.4	28,4	85,2	30,7	92,2
37.4	32,1	96,3	33,8	101,3
42.4	35,5	106,4	37,2	111,6
47.4	39,1	117,2	39,9	119,6

OMICRON REV S4 SLN

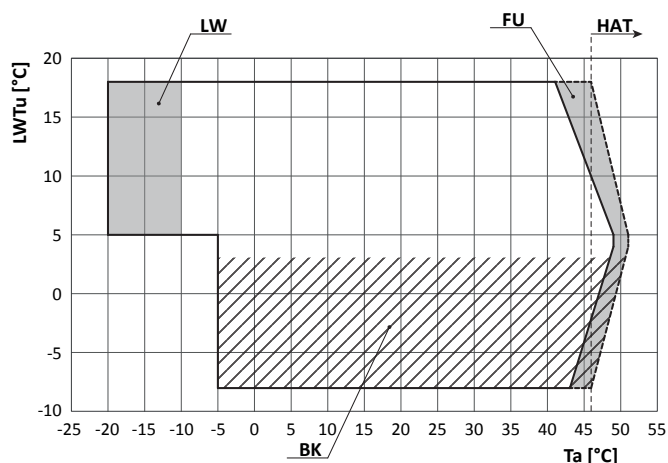
	Cold-side heat exchanger		Hot-side heat exchanger	
	Qmin	Qmax	Qmin	Qmax
	m³/h	m³/h	m³/h	m³/h
9.4	8,2	24,6	8,9	26,8
13.4	9,4	28,3	10,2	30,7
18.4	14,2	42,5	15,6	46,7
20.4	16,3	48,9	17,5	52,5
22.4	18,2	54,7	19,4	58,1
26.4	21,9	65,6	24,5	73,6
30.4	24,3	73,0	26,5	79,4
33.4	27,3	81,8	30,7	92,2
37.4	30,7	92,0	33,8	101,3
42.4	33,7	101,2	37,2	111,6
47.4	36,7	110,2	39,9	119,6

OPERATING LIMITS

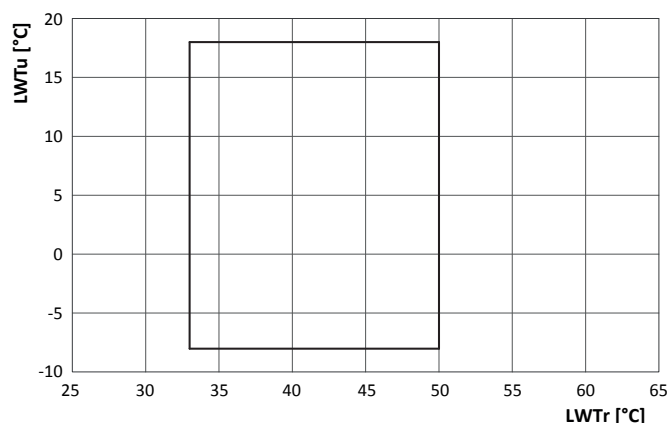
HEATING



COOLING



TOTAL RECOVERY



- Ta:** external air temperature
- LWTu:** water outlet temperature from the user-side heat exchanger
- LWTr:** water outlet temperature from the recovery exchanger
- LW:** in the indicated area, the unit can work only where there is no wind
- HAT:** the "HAT" accessory is obligatory in the area indicated by the arrow. With this accessory, operation is guaranteed with external air temperature up to 50°C. For higher temperatures up to about 55°C, a set-up with air conditioning of the electrical control panel is necessary; the unit works in capacity reduction mode. The feasibility of this set-up must be assessed: please contact our sales department.
- HWT:** in the indicated area, the unit can work only if fitted with the "HWT" accessory
- FU:** in the indicated area, the control could actuate a forced capacity reduction of the compressors so as to prevent tripping of the safety devices
- BK:** For LWTu below +3°C, it is mandatory to fit the "Brine Kit" accessory

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

NOISE LEVELS

OMICRON REV S4 HE

	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	Lp
9.4	89	57	78	46	77	45	81	49	79	47	79	47	76	44	71	39	85	53
13.4	89	57	78	46	77	45	81	49	80	48	79	47	75	43	70	38	85	53
18.4	90	58	79	47	78	46	80	48	81	49	81	49	76	44	72	40	86	54
20.4	89	57	79	47	80	48	82	50	81	49	84	52	77	45	71	39	88	56
22.4	89	57	79	47	81	49	82	50	82	50	85	53	78	46	69	37	89	57
26.4	92	59	82	49	82	49	85	53	86	53	84	52	78	46	73	41	90	58
30.4	93	60	83	50	82	50	86	53	86	54	86	53	79	47	74	42	91	59
33.4	94	61	84	51	83	51	88	55	87	55	86	54	81	48	78	45	92	60
37.4	94	62	84	52	84	51	89	57	88	56	87	54	82	49	80	48	93	61
42.4	94	62	84	52	86	54	89	56	88	55	85	53	80	48	87	55	93	61
47.4	93	60	83	50	87	54	90	57	90	57	85	52	80	48	77	44	93	61

OMICRON REV S4 HE /LN

	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	Lp
9.4	84	52	74	42	73	41	77	45	75	43	75	43	72	40	67	35	81	49
13.4	84	52	74	42	73	41	77	45	76	44	75	43	71	39	67	35	81	49
18.4	85	53	75	43	74	42	76	44	77	45	77	45	73	41	68	36	82	50
20.4	85	53	75	43	76	44	78	46	78	46	80	48	73	41	67	35	84	52
22.4	85	53	75	43	78	46	78	46	78	46	81	49	74	42	66	34	85	53
26.4	87	55	78	45	78	46	81	49	82	49	80	48	75	42	70	37	86	54
30.4	88	56	79	46	79	46	82	49	82	50	82	49	76	43	71	38	87	55
33.4	89	57	80	47	79	47	84	51	83	51	82	50	77	44	74	42	88	56
37.4	90	57	80	48	80	47	85	53	84	52	83	50	78	46	76	44	89	57
42.4	90	57	80	48	82	50	85	52	84	51	81	49	77	44	83	51	89	57
47.4	89	56	79	47	83	50	86	53	86	53	81	48	77	44	73	40	89	57

OMICRON REV S4 SLN

	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	Lp
9.4	81	49	71	39	70	38	73	41	72	40	72	40	69	37	64	32	78	46
13.4	81	49	71	39	70	38	74	42	73	41	72	40	69	37	64	32	78	46
18.4	82	50	72	40	71	39	73	41	74	42	74	42	70	38	65	33	79	47
20.4	82	50	73	41	73	41	75	43	75	43	77	45	71	39	65	33	81	49
22.4	82	50	72	40	75	43	76	44	75	43	78	46	71	39	64	32	82	50
26.4	91	58	81	48	79	46	80	47	78	45	76	43	72	40	69	36	83	51
30.4	92	60	82	49	80	47	81	48	79	46	77	44	73	41	70	37	84	52
33.4	88	55	78	46	77	45	81	49	80	48	79	46	74	42	72	40	85	53
37.4	87	54	77	45	77	44	82	49	81	49	80	47	75	43	74	41	86	54
42.4	86	54	78	45	79	47	82	49	81	48	78	46	74	41	80	48	86	54
47.4	85	53	76	44	80	47	83	50	82	50	78	46	74	41	70	38	86	54

Reference conditions: external air temperature 35°C; evaporator inlet/outlet water temperature 12/7°C; unit without accessories operating at nominal speed.

Lw: sound power levels obtained from measurements carried out in accordance with standard ISO 3744. In particular, Lw tot is the only binding value and complies with the Eurovent certification programme (8/1) where applicable.

Lp: Lp: sound pressure levels measured at a distance of 10 metres from the unit in free field with directivity factor Q=2. These values (including Lp tot) are calculated starting from the sound power levels and are therefore to be considered approximate and non-binding.

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
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.

Larger amounts of water are in any case always preferable, because they allow a smaller number of starts and switch-offs of the compressors, less wear of them and an increase in the efficiency of the system as a consequence of a reduction in the number of transients. It should also be pointed out that, for air-water units working in heat pump mode, the minimum amount of water must consider the need of the unit to carry out defrosting. Having an adequate buffering volume will allow prevention of too high drifts of the delivered water temperature at the end of the defrost cycle.

The following experimental formula allows the minimum water volume of the system to be calculated:

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,25$$

where

V_{min} is the minimum water content of the system measured in l

P_{tot} is the total cooling capacity of the machine measured in kW

N is the number of capacity reduction steps

ΔT is the differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K

ρ is the density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered and therefore 1000kg/m³

c_p is the specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered and therefore 4.186kJ/(kgK)

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 radii 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 user-side exchangers and of any recovery exchangers
- if the installation includes several units side by side, you should consider that the minimum distance between units is 3 metres
- you should avoid all obstructions that can limit air circulation to the source-side exchanger or that can cause recirculation between air supply and intake
- you should consider the orientation of the unit to limit, as far as possible, exposure of the source-side exchanger to solar radiation
- if the installation area is particularly windy, the orientation and positioning of the unit must be such as to avoid air recirculation on the coils. If necessary, we advise making windbreak barriers in order to prevent malfunctioning.

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
- it must allow level installation of the unit: although the unit is installed on a horizontal base, make slopes in the support surface to convey rain water or defrost water to drains, wells or in any case to places where it cannot generate an accident hazard due to ice formation. All heat pump version units are equipped with discharge manifolds for the condensed water; these can be manifolded to facilitate condensate discharge.

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 on before positioning the unit on the ground.

In the event of installation on roofs or intermediate floors, the pipes must be isolated from the walls and ceilings.

It is advisable to avoid installation in cramped places, to prevent reverberations, reflections, resonances and acoustic interactions with elements outside the unit.

It is essential that any work done to soundproof the unit does not affect its correct installation or correct operation and, in particular, does not reduce the air flow rate to the source-side exchanger.

Installations that require the use of treated coils

If the unit has to be installed in an environment with a particularly aggressive atmosphere, coils with special treatments are available as options.

- pre-painted aluminium coils
- coils with anti-corrosion treatment

A description of the individual accessories is available in the "Description of accessories" section.

The type of coil treatment should be chosen with regard to the environment in which the unit is to be installed, through observation of other structures and machinery with exposed metal surfaces present in the destination environment.

The cross observation criterion is the most valid method of selection currently available without having to carry out preliminary tests or measurements with instruments. The identified reference environments are:

- coastal/marine
- industrial
- urban with a high housing density
- rural

Please note that in cases where different conditions co-exist, even for short periods, the choice must be suitable for preserving the exchanger in the harsher environmental conditions and not in conditions between the worst and best situation.

Particular attention must be given in cases where an environment that is not particularly aggressive becomes aggressive as a consequence of a concomitant cause, for example, the presence of a flue outlet or an extraction fan.

We strongly suggest choosing one of the treatment options if at least one of the points listed below is verified:

- there are obvious signs of corrosion of the exposed metal surfaces in the installation area
- the prevailing winds come from the sea towards the unit
- the environment is industrial with a significant concentration of pollutants
- the environment is urban with a high population density
- the environment is rural with the presence of organic discharges and effluents

In particular, for installations near the coast, the following instructions apply:

for installations between 1 and 20 km from the coast of reversible units or units with Cu/Al coils, we strongly recommend using the accessory "Coil treated with anti-corrosion paints"

for distances within a kilometre of the coast, we strongly recommend using the accessory "Coil treated with anti-corrosion paints" for all units.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils.

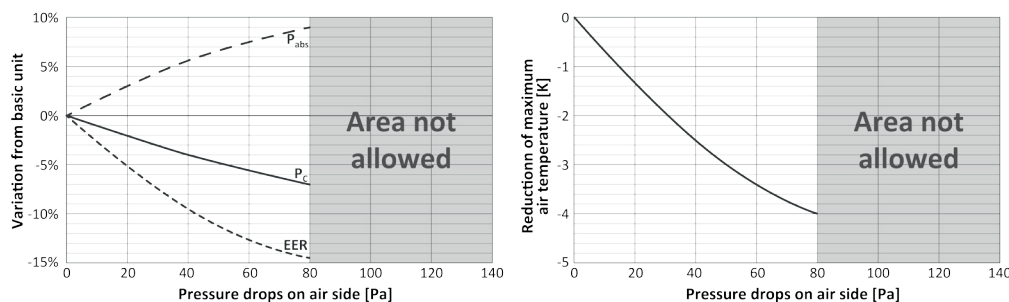
Aeraulic head losses and options available for the ventilating section

With the exception of units for which oversize fans are required, as standard, the units are designed considering that, at the nominal air flow rate, the fans work with null available pressure.

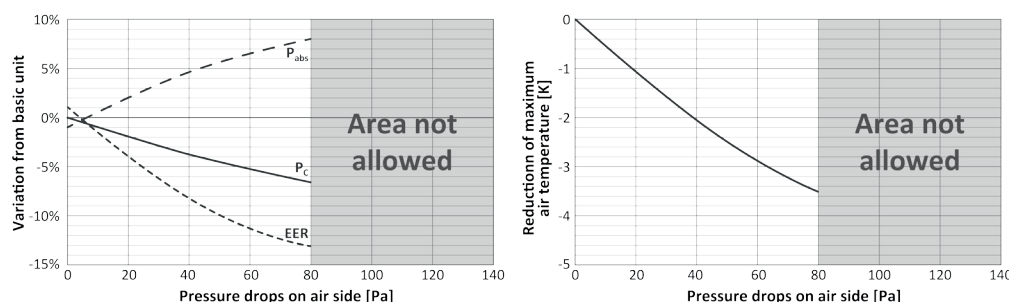
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

The following diagrams show the trend of cooling capacity (P_c), EER, total absorbed power (P_{abs}) and reduction of the maximum external air temperature in chiller operating mode, depending on the aeraulic head losses that the fans will have to overcome.

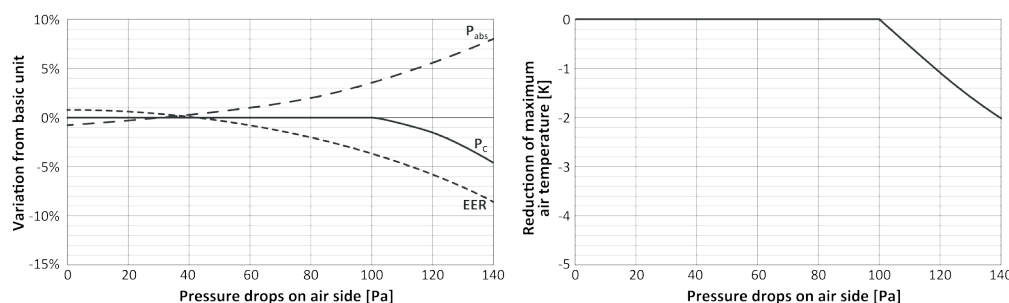
AC fans (Ø 800)



EC fans (Ø 800)



Oversize EC fans (Ø 800)



The indicated values are for the standard machine, without accessories, with AC fans and in any case in the absence of air recirculation.

Example: supposing you expect there to be obstacles that will generate an estimated aeraulic head loss of 60Pa. In this case, there are 3 possibilities:

- use the unit with standard AC fans: compared to ideal conditions, the output power will be reduced by about 5.5%, the total absorbed power will increase by about 7.5%, the EER will be reduced by about 12.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 3.4K compared to the nominal limit
- use the unit with EC fans: compared to the unit with AC fans working in ideal conditions, the output power will be reduced by about 5%, the total absorbed power will increase by about 6.5%, the EER will be reduced by about 11.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 2.8K compared to the nominal limit
- use the unit with oversize EC fans: compared to the unit with AC fans working in ideal conditions, the output power of the unit will be unchanged, the total absorbed power will increase by about 1%, the EER will be reduced by about 2% and the maximum external air temperature will remain the one shown in the diagram of the operating limits.

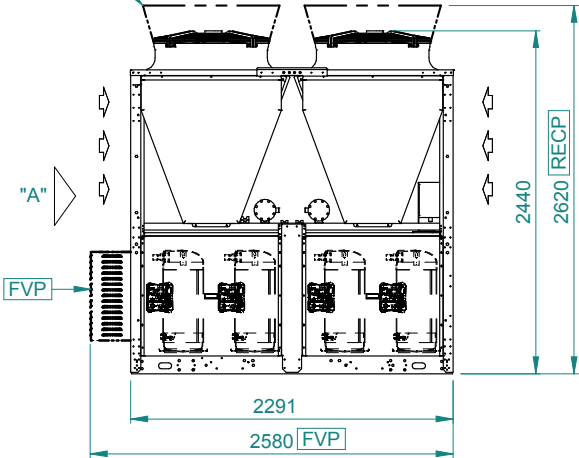
We stress that, for aeraulic head losses higher than 80Pa, only the use of oversize EC fans is allowed.

DIMENSIONAL DIAGRAMS

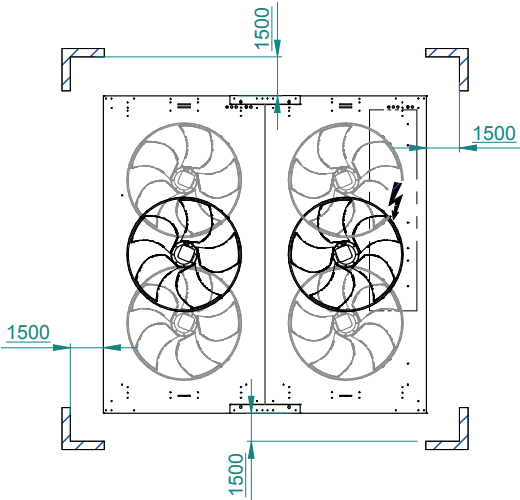
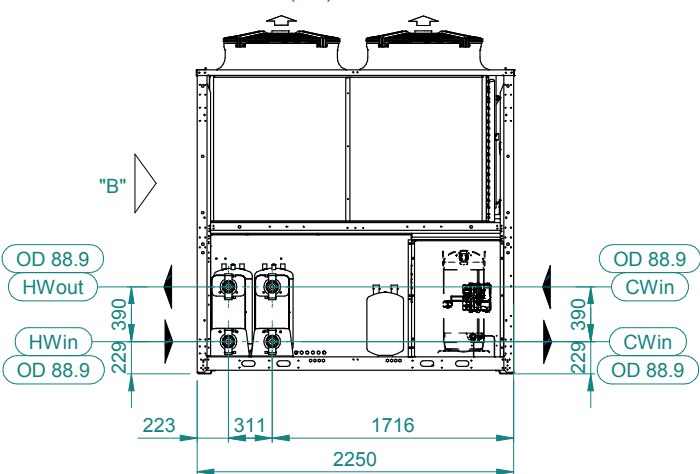
OMICRON REV S4 9.4 - 22.6

A4H054A

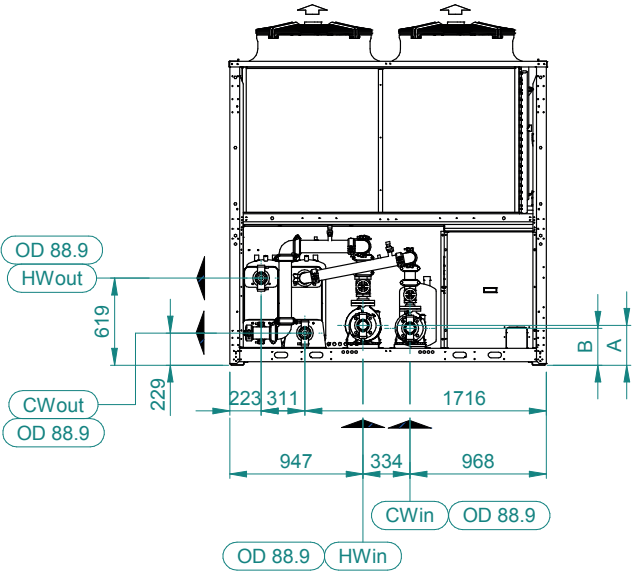
SUPPLIED AS LOOSE PART
[RECP]



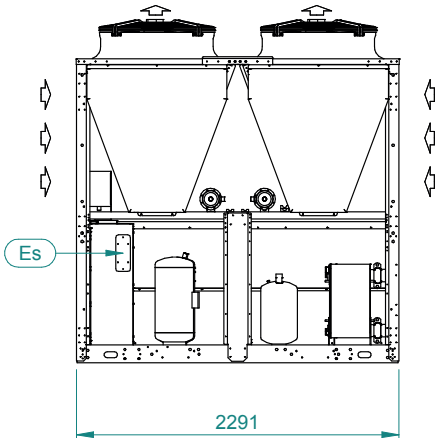
(ST) VERSION



VIEW FROM "A"
ST 1P1R VERSION



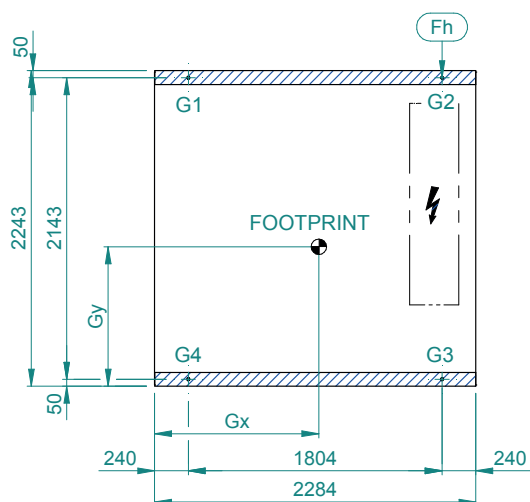
VIEW FROM "B"



SIZE	A	B
9.4 - 18.4	263	263
20.4 - 22.4	283	263

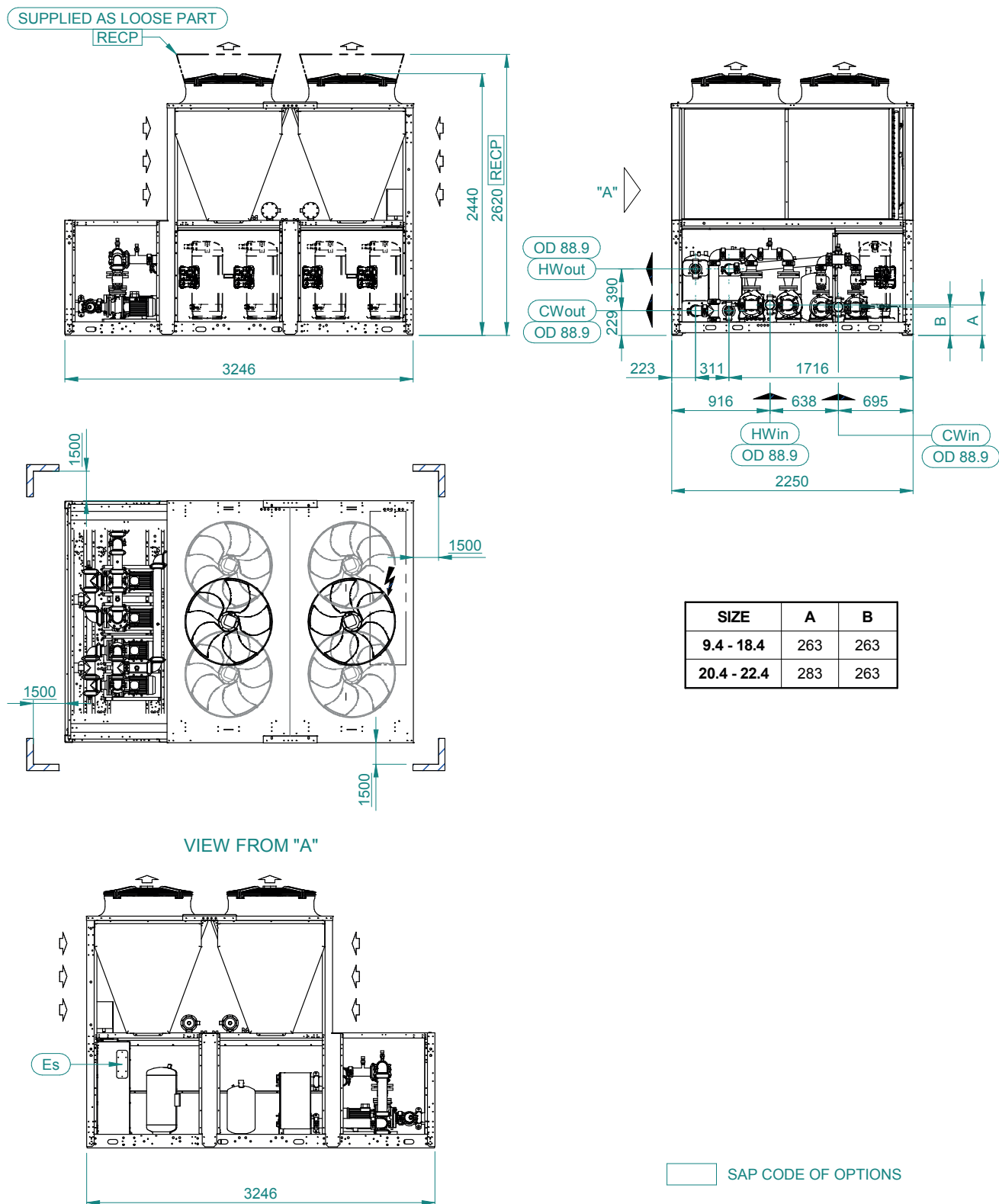
SAP CODE OF OPTIONS

Note: These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

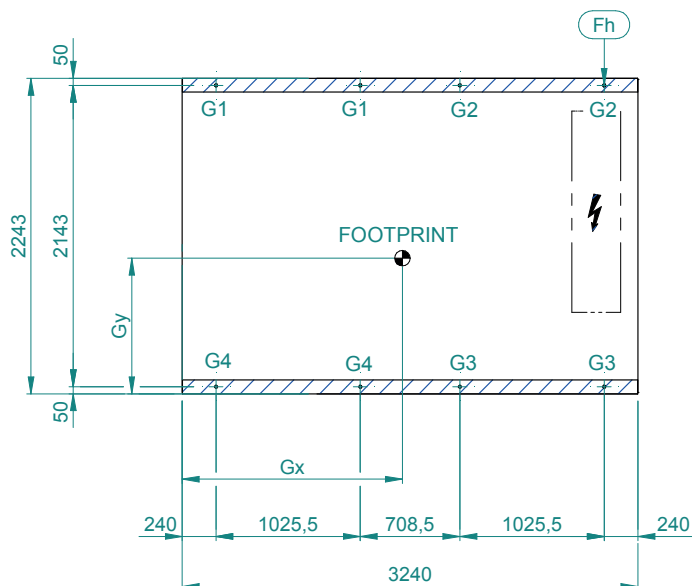


MODEL	WEIGHT(kg)	OPERATING WEIGHT (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)	Gx	Gy
HE 9.4	1594	1606	362	412	443	389	1214	1077
HE 9.4 1P1R	1734	1806	454	423	448	481	1147	1082
HE 9.4 LN	1784	1796	377	423	527	469	1207	998
HE 9.4 1P1R_LN	1924	1996	465	437	530	564	1147	1008
SLN 9.4	1784	1796	377	423	527	469	1207	998
SLN 9.4 1P1R	1924	1996	465	437	530	564	1147	1008
HE 13.4	1610	1622	363	413	450	396	1213	1070
HE 13.4 1P1R	1750	1822	455	424	455	488	1147	1075
HE 13.4 LN	1800	1812	378	424	534	476	1206	992
HE 13.4 1P1R_LN	1939	2011	466	438	536	571	1147	1003
SLN 13.4	1800	1812	378	424	534	476	1206	992
SLN 13.4 1P1R	1939	2011	466	438	536	571	1147	1003
HE 18.4	1937	1958	464	498	516	480	1190	1095
HE 18.4 1P1R	2078	2159	557	508	522	572	1136	1097
HE 18.4 LN	2128	2149	478	510	599	562	1186	1027
HE 18.4 1P1R_LN	2268	2349	568	523	603	655	1137	1034
SLN 18.4	2128	2149	478	510	599	562	1186	1027
SLN 18.4 1P1R	2268	2349	568	523	603	655	1137	1034
HE 20.4	1964	1985	470	501	523	491	1186	1090
HE 20.4 1P1R	2105	2186	563	511	529	583	1133	1093
HE 20.4 LN	2154	2175	484	513	606	572	1183	1024
HE 20.4 1P1R_LN	2294	2375	574	525	610	666	1135	1030
SLN 20.4	2154	2175	484	513	606	572	1183	1024
SLN 20.4 1P1R	2294	2375	574	525	610	666	1135	1030
HE 22.4	1981	2002	472	502	530	498	1186	1084
HE 22.4 1P1R	2131	2212	569	513	536	594	1130	1088
HE 22.4 LN	2170	2191	485	514	613	579	1182	1019
HE 22.4 1P1R_LN	2320	2401	580	527	616	678	1131	1027
SLN 22.4	2170	2191	485	514	613	579	1182	1019
SLN 22.4 1P1R	2320	2401	580	527	616	678	1131	1027

Note: These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

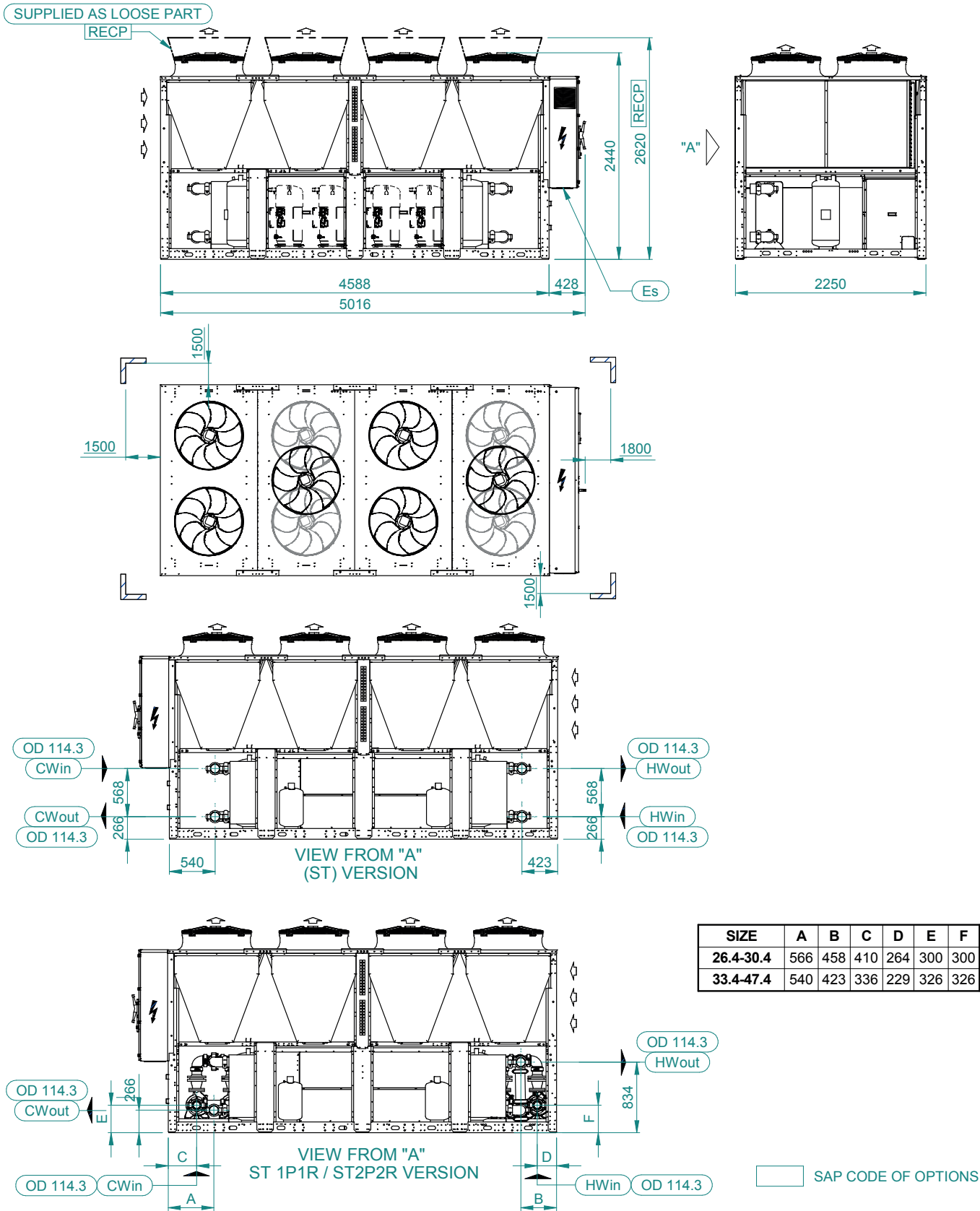


Note: These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

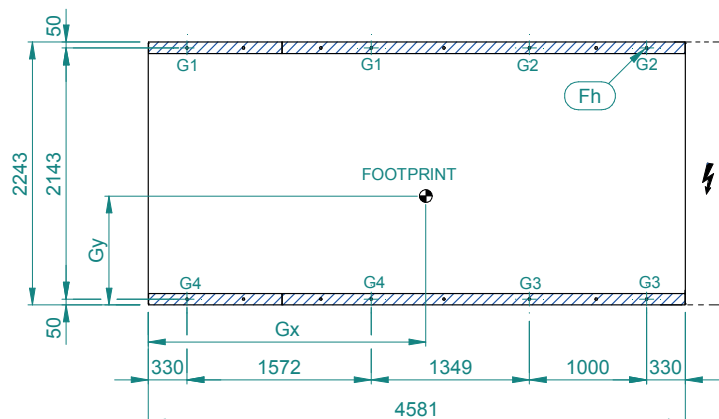


MODEL	WEIGHT(kg)	OPERATING WEIGHT (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)	Gx	Gy
HE 9.4 2P2R	1916	2008	204	274	302	224	1800	1068
HE 9.4 2P2R_LN	2106	2198	201	290	360	248	1827	1002
SLN 9.4 2P2R	2106	2198	201	290	360	248	1827	1002
HE 13.4 2P2R	1932	2024	203	276	307	226	1802	1062
HE 13.4 2P2R_LN	2122	2214	200	292	364	251	1828	997
SLN 13.4 2P2R	2122	2214	200	292	364	251	1828	997
HE 18.4 2P2R	2261	2362	231	341	363	246	1835	1084
HE 18.4 2P2R_LN	2449	2550	228	357	421	269	1855	1026
SLN 18.4 2P2R	2449	2550	228	357	421	269	1855	1026
HE 20.4 2P2R	2287	2388	232	344	369	249	1835	1079
HE 20.4 2P2R_LN	2477	2578	230	359	427	273	1855	1022
SLN 20.4 2P2R	2477	2578	230	359	427	273	1855	1022
HE 22.4 2P2R	2303	2404	236	341	369	256	1823	1074
HE 22.4 2P2R_LN	2495	2596	230	361	432	275	1857	1018
SLN 22.4 2P2R	2495	2596	230	361	432	275	1857	1018

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Note: These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



MODEL	WEIGHT (kg)	OPERATING WEIGHT (kg)	G1 (kg)	G2 (kg)	G3 (kg)	G4 (kg)	Gx	Gy
HE 26.4	3440	3496	376	422	502	448	2511	1015
HE 26.4 1P1R	3670	3766	379	493	572	439	2596	1026
HE 26.4 2P2R	3892	3978	418	443	580	548	2474	968
HE 26.4 LN	3614	3670	385	425	538	487	2500	983
HE 26.4 1P1R_LN	3864	3950	410	437	582	546	2478	959
HE 26.4 2P2R_LN	4068	4154	427	447	615	588	2466	942
SLN 26.4	3614	3670	385	425	538	487	2500	983
SLN 26.4 1P1R	3864	3950	410	437	582	546	2478	959
SLN 26.4 2P2R	4068	4154	427	447	615	588	2466	942
HE 30.4	3465	3524	378	428	508	448	2516	1016
HE 30.4 1P1R	3713	3802	403	439	552	507	2492	989
HE 30.4 2P2R	3915	4004	420	449	585	548	2478	969
HE 30.4 LN	3639	3698	387	431	543	488	2505	985
HE 30.4 1P1R_LN	3891	3980	412	443	588	547	2483	961
HE 30.4 2P2R_LN	4091	4180	429	453	620	588	2471	943
SLN 30.4	3639	3698	387	431	543	488	2505	985
SLN 30.4 1P1R	3891	3980	412	443	588	547	2483	961
SLN 30.4 2P2R	4091	4180	429	453	620	588	2471	943
HE 33.4	3792	3866	412	482	560	479	2538	1026
HE 33.4 1P1R	4042	4146	438	493	605	537	2514	1000
HE 33.4 2P2R	4246	4350	455	503	639	578	2501	982
HE 33.4 LN	3970	4044	422	486	596	518	2527	996
HE 33.4 1P1R_LN	4220	4324	447	497	641	577	2505	973
HE 33.4 2P2R_LN	4420	4524	464	506	674	618	2493	957
SLN 33.4	3970	4044	422	486	596	518	2527	996
SLN 33.4 1P1R	4220	4324	447	497	641	577	2505	973
SLN 33.4 2P2R	4420	4524	464	506	674	618	2493	957
HE 37.4	3838	3912	416	485	568	487	2535	1022
HE 37.4 1P1R	4110	4214	444	497	616	550	2511	995
HE 37.4 2P2R	4310	4414	461	506	649	591	2498	977
HE 37.4 LN	4016	4090	426	489	604	526	2525	993
HE 37.4 1P1R_LN	4286	4390	453	501	652	589	2502	969
HE 37.4 2P2R_LN	4486	4590	470	510	685	630	2490	953
SLN 37.4	4016	4090	426	489	604	526	2525	993
SLN 37.4 1P1R	4286	4390	453	501	652	589	2502	969
SLN 37.4 2P2R	4486	4590	470	510	685	630	2490	953
HE 42.4	3910	3996	429	504	575	490	2538	1033
HE 42.4 1P1R	4184	4300	457	516	624	553	2514	1006
HE 42.4 2P2R	4382	4498	474	525	657	593	2501	988
HE 42.4 LN	4086	4172	439	507	611	529	2528	1004
HE 42.4 1P1R_LN	4356	4472	466	519	659	592	2505	980
HE 42.4 2P2R_LN	4556	4672	483	528	692	633	2493	963
SLN 42.4	4086	4172	439	507	611	529	2528	1004
SLN 42.4 1P1R	4356	4472	466	519	659	592	2505	980
SLN 42.4 2P2R	4556	4672	483	528	692	633	2493	963
HE 47.4	3970	4056	432	505	588	503	2535	1023
HE 47.4 1P1R	4247	4370	456	517	644	568	2517	991
HE 47.4 2P2R	4447	4570	473	526	677	609	2504	974
HE 47.4 LN	4133	4216	436	507	627	538	2531	992
HE 47.4 1P1R_LN	4423	4546	465	521	680	607	2508	966
HE 47.4 2P2R_LN	4623	4746	482	530	713	648	2496	951
SLN 47.4	4133	4216	436	507	627	538	2531	992
SLN 47.4 1P1R	4423	4546	465	521	680	607	2508	966
SLN 47.4 2P2R	4623	4746	482	530	713	648	2496	951

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