

# Omega Sky LGW

227÷1096 kW



## General

Indoor water-condensed liquid chiller and reversible heat pump with very low GWP; screw compressors, dry expansion shell-and-tube evaporator with low refrigerant charge and shell-and-tube condenser.

## Configurations

OH: non-reversible heat pump version

/LN: silenced unit

## Strengths

- ▶ Efficient energy performance: SEER up to 6,4
- ▶ No-Glycol Free-Cooling options
- ▶ Reduced refrigerant charge
- ▶ Refrigerant R1234ze with GWP<1
- ▶ Easy handling: depth ≤ 900 mm for single-compressor sizes
- ▶ Hot water production up to 65 ° C
- ▶ BlueThink advanced control with integrated web server. Multilogic function and Blueeye® supervision system. (options)

**BlueBox**   
by Swegon



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## **Omega Sky LGW**

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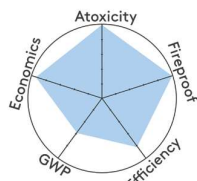
## THE FUTURE OF REFRIGERANTS THAT REDUCE GREENHOUSE EFFECT



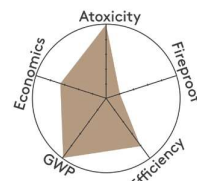
R1234ze



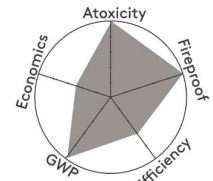
R1234yf



R134a



Propane (R290)



Carbon Dioxide (R744)

To reduce the emission into the atmosphere of gases that contribute to increasing the greenhouse effect, the European Union has set itself the target of reducing the use of F-gases by two-thirds of the 2014 level by 2030. Although these fluids have allowed a drastic reduction in the use of high ODP (Ozone Depletion Potential) refrigerants, their high GWP value and their longevity in the atmosphere (if released, they remain there for hundreds of years) contribute to the increase in global warming up to 8,000 times more than carbon dioxide.

The application of these regulations will lead to a progressive reduction in the use of refrigerants such as R134a and R410A and therefore substitute refrigerant fluids will gradually take hold.

There already exist various alternatives to F-Gases but, for each of them, the safety, investment and sustainability implications need to be carefully considered.

F-gases such as R410A or R134a have the indisputable advantage of being non-toxic and absolutely non-flammable. Paradoxically, the chemical properties that make these refrigerants safe are the same ones that cause such a prolonged resistance of the molecule in the atmosphere and therefore a high GWP.

If, in searching for an alternative, we look at natural refrigerants, such as carbon dioxide (R744), ammonia (R717) or hydrocarbons such as propane (R290), we actually have very low or zero GWP, but their toxicity and/or extreme flammability will have to be accepted. This will turn into higher costs of the machine and of the system in order to guarantee their safety.

In fact, the technological costs arising from the use of the various refrigerants must also be considered:

- units that use carbon dioxide as refrigerant need to work with such high pressure values (even higher than 100bar) that they are potentially explosive. This involves extremely onerous construction choices that justify their use only in the refrigeration field
- units that use ammonia must obligatorily be made completely of steel and use specific compressors and components. To this are added the setting up costs that, in view of the extreme toxicity of the fluid, will have to prevent contamination and poisoning hazards. All this limits the use of this fluid to only extremely high capacity systems, normally above a MW
- for units that use propane, all the necessary counter-measures must be taken to prevent the risk of explosion due to its very high flammability, and this turns into the obligation to use ATEX components, which are extremely costly

### WHY R1234ZE

LGW stands for Low Global Warming Potential and identifies the units using the HFO refrigerant R1234ze.

LGW aims at offering an environmentally and economically sustainable alternative to conventional models based on R134a refrigerant.

R1234ze is a pure compound (Hydro-Fluoro-Olefin) featuring GWP<1 (\*), equivalent to natural fluids.

R1234ze is rated as non dangerous (PED group 2 fluid).

It is also classified as A2L according to ASHRAE standard 34:

- Non toxic.
- Lower flammability fluid (or mildly flammable).

Thus LGW units represent the best future-proof choice, especially in Countries that:

- Impose legislation restrictions or bans on units with high GWP refrigerants.
- Offer incentive schemes for systems with low environmental impact.
- Impose specific taxation on high GWP refrigerants - or are likely to do it in the future.

Moreover, its minimum GWP value is decisive for projects:

- Addressed to obtain building certification credits linked to the adoption of best available environmental solutions.
- Adopting voluntary targets to minimize the system's environmental footprint.

All this is also beneficial to unit's commissioning, operation and maintenance – leading to overall cost effectiveness.

Specific measures are implemented on LGW models, to ease their adoption into the most stringent projects and enhance the overall safety features.

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## Omega Sky LGW

Indoor water-condensed liquid chiller and reversible heat pump with very low GWP; screw compressors, dry expansion shell-and-tube evaporator with low refrigerant charge and shell-and-tube condenser.

### STRUCTURE

Consists of polyester powder coated hot dip galvanised sheet steel profiles (RAL 9005).

The electrical control panel is made in a polyester powder-coated hot dip galvanised sheet steel box (RAL 7035).

### REFRIGERANT

Refrigerant R1234ze (GWP<1\*)

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

### COMPRESSORS

Semi-hermetic screw compressors with continuous capacity reduction of output capacity by 25 up to 100%, with high energy efficiency especially in cooling applications.

The capacity reduction of the entire unit is always continuous, from the minimum capacity reduction step, based on the number of compressors, up to 100%.

difference between delivery and suction.

All the compressors are fitted with check valve on delivery side, metal mesh filter on suction side and electronic protection with temperature sensors directly inserted in the windings and on the delivery pipe.

The machine is started and switched off with a forced 25% capacity reduction of each compressor and starting is of the "star-delta" type.

All the compressors are supplied as standard with a crankcase heater and a delivery valve. They are installed on anti-vibration mounts in order to reduce vibration transmission to the structure.

### SOURCE-SIDE HEAT EXCHANGER

Flooded shell-and-tube heat exchanger, with single water passage on tube side. Steel shell, and tube bundle made with copper tubes. The heads can be removed for tube inspection and cleaning. Victaulic couplings on water side (complete with nipple for connection).

### USER-SIDE HEAT EXCHANGER

Dry-expansion shell-and-tube heat exchanger.

Sized to maximize the efficiency of the unit, by keeping the overall dimensions and the refrigerant charge down to a minimum.

The heat exchanger consists of a steel shell insulated with closed-cell foam material, while the tube bundle is made with copper tubes.

The heads can be removed for tube inspection and cleaning.

Victaulic couplings on water side (complete with nipple for connection).

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

### REFRIGERANT CIRCUIT

The model consists of sizes with 1 or 2 refrigerant circuits, each equipped with compressor.

Each refrigerant circuit of the unit comprises:

- discharge valve for each compressor
- shut-off valve in the liquid line
- charging sockets
- liquid sight glass
- replaceable solid cartridge dehydrator filter
- electronic expansion valve
- pressure transducers for reading the high and low pressure values and relevant evaporating and condensing temperatures
- high pressure switch
- a safety valve.

The pipes of the refrigerant circuit and the heat exchanger on the user side are insulated with extruded closed-cell expanded elastomer.

Compared to the mechanical expansion valve, the electronic expansion valve allows machine stability to be reached more quickly and better superheating control to maximize the use of the evaporator in all load conditions. This also acts as shut-off valve on the liquid line, thereby preventing hazardous refrigerant migrations during compressor stops.

The basic version does not include the R1234ze refrigerant detector. The refrigerant detector is standard equipment for the LN version.

### ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanised sheet-iron box with forced ventilation and IP21 protection rating.

The electrical control panel of the basic unit comprises:

- main disconnect switch
- fuses to protect the compressors and the auxiliary circuits
- compressor contactors
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts
- microprocessor controller with display accessible from the outside
- Capacitive backup battery for electronic expansion valve

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

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

### CONTROL BLUETHINK

Programmable microprocessor control, having proprietary control algorithms.

The control allows the following functions:

- water temperature adjustment, with outgoing water control
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the log of all machine inputs, outputs and states

- water temperature adjustment, with outgoing water control
- automatic rotation of compressor starting sequence
- recording of the alarm log
- management of capacity reduction of the compressors during starting, switching off and load tracking
- management of capacity reduction of the compressors in the event of operation outside the limits

### Connection resources

The control includes the following connection resources:

- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol; access to integrated web server
- digital input for remote setting of state (on/off)
- digital input for selection of double set point

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 web server with preloaded web page, which is accessed via password and user management on several levels.

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

- display of the main characteristics of the unit such as serial number, size, refrigerant
- display of the general status of the machine: water inlet and outlet temperatures on user side and source side, mode, evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors and electronic expansion valves
- display of graphs of the main quantities, as trends in real time and also as log data
- display of alarm log
- remote setting of (on/off)
- remote setting of set point
- remote setting of time band
- remote setting of summer/winter mode

### Human-Machine Interface

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

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

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

## CONTROLS AND SAFETY DEVICES

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

- double high pressure switch with manual reset for each compressor
- high pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller via specific pressure transducer
- low pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller via specific pressure transducer
- high pressure safety valve
- operation probe at the outlet of the user-side heat exchanger that also acts as antifreeze probe
- thermal overload protection for compressors
- water differential pressure switch installed at the factory

## TESTING

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

## CERTIFICATIONS AND REFERENCE STANDARDS

The manufacturer has implemented and keeps the Management Systems listed below and it is certified against them:

- Quality Management System according to standard UNI EN ISO 9000;
- Environmental Management System according to standard UNI EN ISO 14000;
- Health and Safety Management System according to standard BS OHSAS 18000 (as converted into UNI EN ISO 45000).

These management systems ensure that the company puts in place any and all actions and initiatives to define and monitor the standards defined by its Management, which are stated in its Quality, Environmental and Safety policies.

To meet the safety requirements, the unit was designed and manufactured in compliance with the directives and product regulations below:

- PED Directive: safety criteria to be followed when designing pressure equipment; Units from 31.1 to 159.2 are approved PED III category.
- Machinery Directive: safety criteria to be followed when designing machinery;
- Low Voltage Directive: safety criteria to be followed when designing electrical machine parts;
- Electromagnetic Compatibility Directive: electromagnetic compatibility criteria to be followed when designing electrical machine parts;
- WEEE Directive: criteria for product management at the end of its life cycle as waste with a view to environmental protection.

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The units are manufactured, tested and checked with reference to the European standards specified in the Declaration of CE Conformity, in accordance with the requirements and procedures of our Quality System.

The installation, use and storage of units featuring mildly flammable refrigerants (A2L pursuant to standard ASHRAE 34), such as R1234ze, must meet the European standards and regulations and the local laws, where applicable.

For further details, please refer to the "Instruction manual for operation and maintenance".

### **Responsibilities and obligations exclusive to the installer:**

- to carry out a specific risk assessment according to the European regulations/standards above and/or the local laws in order to define the necessary measures for conformity;
- to comply with the requirements and to take the measures resulting from the outcomes of the risk assessment, pursuant to the relevant regulations and standards.

### **VERSIONS**

Alongside the basic version of the unit, there is the following version:

#### **OH: non-reversible heat pump**

This is a heat pump for heating only. Compared to the basic version, both user-side and source-side heat exchangers are insulated. The units are equipped with a compressor specifically selected for the production of water up to 65 ° C.

### **OPTIONS**

#### **/LN: low noise version**

The unit includes a soundproofing compartment on the compressor consisting of a rigid outer cowling made of galvanised and painted sheet metal (RAL 7035), lined with sound absorbing matting with high acoustic impedance material in between.

The compressor compartment is supplied with a R1234ze refrigerant detector and a pushing fan designed to take the air from outside the compartment and push it inside the compartment until it comes out of the outlet grille specifically installed on the compartment side opposite the fan.

If the gas detector senses leaking refrigerant, the machine electronic controller causes all the fitted and operating compressors to instantly stop and an alarm message to appear on the display.

In addition, the alarm signal is provided on a clean contact in the terminal board of the electrical panel of the unit: this allows, after prior preparation by the installer, to disconnect the unit from voltage to prevent any source of ignition.

#### **/DC: unit with total recovery condenser**

In addition to the basic set-up (chiller unit), the following are included:

- for each condenser, a section for recovering 100% of the condensation heat on each refrigerant circuit.
- a temperature probe at the inlet of each heat recovery heat exchanger
- potential free contact in the electrical control panel for activation of heat recovery. When required by the system, through the closing of a contact, the controller automatically manages activation of heat recovery. Heat recovery management is carried out through a control on the temperature of the return water. The controller also automatically manages safety deactivation of heat recovery, if the condensing pressure becomes too high, and switches to using the source-side heat exchanger.

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## DESCRIPTION OF ACCESSORIES

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

### Refrigerant circuit accessories

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

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

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

Accessory supplied loose.

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

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

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

Accessory supplied loose.

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

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

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

Incompatible with condensation control with modulating valve.

#### **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.

#### **RUBA Compressor suction valves**

The valves situated 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.

The compressor discharge valve is standard on all compressors

#### **VS Liquid line solenoid valve**

This accessory prevents refrigerant migration that could damage the compressor on starting.

#### **BK Brine Kit LGW**

This accessory is compulsory if a water temperature set point lower than +5°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.

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**SIN Independent 0-10V signals for condensation control**

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

There is a signal for each refrigerant circuit and therefore the accessory is suitable for combination on units in which the sources of each circuit are managed independently.

Incompatible with condensation control with modulating valve.



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## Hydraulic circuit accessories

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### **CFC Flanged hydraulic connections + counterflanges**

Depending on the version of the unit, flanges and counterflanges are supplied for:

- user side
- on the source side.
- recovery side

Accessory supplied loose.

### **CISL Hydraulic connections on same side**

This accessory makes it possible to have the condenser connections on the same side as the evaporator connections. Weld-on connections.

For units with 1 condenser, the accessory consists of bends and couplings at the inlet and outlet of the condenser; for units with 2 condensers, the accessory consists of manifolds to join up the connections of the condensers at both inlet and outlet.

In the case of the DC version, connections for the relevant hydraulic circuit are included.

For LC/DC units, the connections refer to heat recovery only.

Accessory supplied loose.

### **KFC FC/NG kit**

The kit is available only for the basic model (chiller).

This option includes "FC/NG management"

It consists of a module, supplied separately in a separate package.

The module carries out the free-cooling mode without using glycol. The mode is managed by the BlueThink controller of the main chiller unit.

The kit is fully panelled with epoxy polyester powder coated sheet metal (RAL 7035) and lined with matting made of sound absorbing and soundproofing material.

The kit comprises:

- a water-water heat exchanger: brazed AISI stainless steel plate heat exchanger with anti-condensation insulation made of closed-cell insulating material. The heat exchanger makes the separation between the source side (glycol) and the user side (non-glycol) and allows transfer of cooling capacity from one side to the other during operation in free cooling mode.
- a 3-way modulating valve: the valve, complete with servo control, allows the free cooling circuit to be fed and the condensation control to be carried out when the unit is working in mixed chiller / free cooling mode.
- an inverter-controlled source-side pump: the inverter allows the water flow rate to be modulated on the source side in order to carry out condensation control or control of output capacity at the free cooling heat exchanger.

The kit must be hydraulically and electrically connected to the main chiller unit; operation to be carried out on site by the customer.

### **PVX Variable flow setup for HYZER X**

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

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

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

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

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

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

Two shut-off valves are supplied together with water/water machines that need to be installed on the source- and user-side circuits of the unit (installation by customer).

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

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

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

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## Electrical accessories

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

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

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

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

### SETD Double set point from digital input

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

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

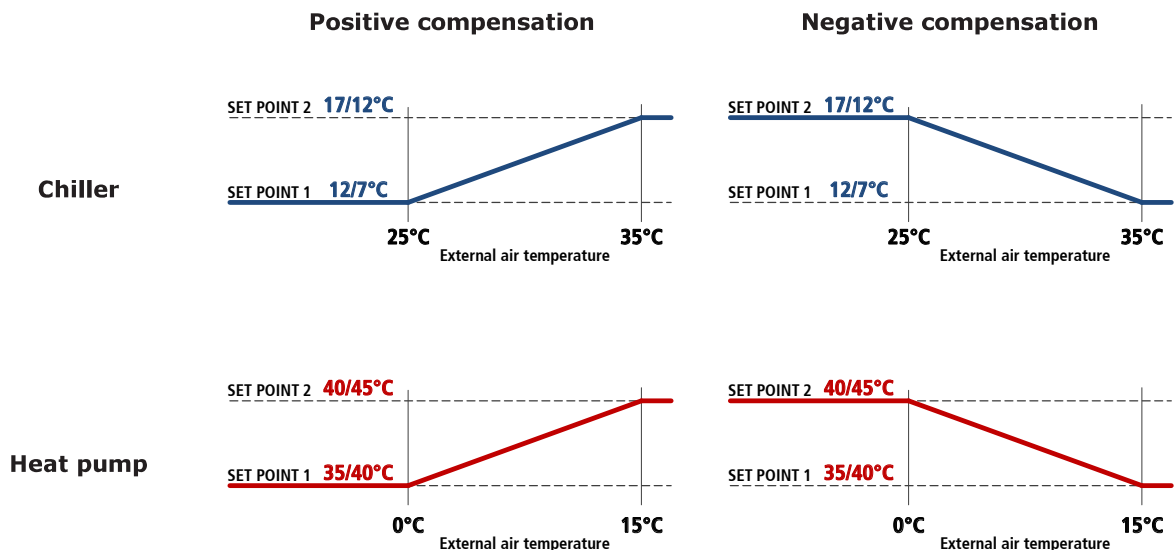
Unless otherwise specified in the order, the controller will be set at the factory with the following temperatures:

- in chiller mode, set point 1 to 7°C and set point 2 to 12°C
- in heat pump mode set point 1 to 45°C and set point 2 to 40°C

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

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

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



### IA Automatic circuit breakers (instead of fuses)

This accessory requires the installation of automatic circuit breakers, 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.

### SOFT Electronic soft-starter

Screw compressors (excluding inverter-controlled ones) are switched on using star-delta starting since this method allows very small effective average inrush currents to be obtained, but, as can be seen in the following diagrams, the connection change generates current peaks lasting a few ms.



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**SETV Variable set point with remote signal**

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

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

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

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

**DAM Double power supply with manual switching**

A manual switch to which to connect two separate power supply lines (for example, one from the mains power line and one from the uninterruptible power supply unit) is installed in the electrical control panel of the unit.

The switching from one line to another is manual and obligatorily requires passing through the OFF position.

**DAA Double power supply with automatic switching**

A motor-driven automatic switch to which to connect two separate power supply lines (for example, one from the mains power line and one from the uninterruptible power supply unit) is installed in the electrical control panel of the unit.

The switching from one line to another is automatic and obligatorily requires passing through the OFF position.

When this accessory is requested, the power supply of the unit must compulsorily include neutral.

**ENM Energy meter**

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

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

**ENML Energy meter with current limiter**

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

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

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

**GFC FC/NG management**

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

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

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

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

More specifically, the system will consist of:

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

**RIF Power factor correction to  $\cos\phi \geq 0.95$** 

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

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

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- R1PR Relay for management of 1 external heat recovery-side pump**  
This accessory can be requested for units without heat recovery pumps (for DC units) and allows a pump outside the machine to be controlled.
- R2PR Relay for management of 2 external heat recovery-side pumps**  
This accessory can be requested for units without heat recovery pumps (for DC units) and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.  
Dwie pompy są sterowane przez dwa osobne przekaźniki.
- R1PU Relay for management of 1 external user-side pump**  
This accessory can be requested for units without user-side pumps and allows a pump outside the machine to be controlled.
- R2PU Relay for management of 2 external user-side pumps**  
This accessory can be requested for units without user-side pumps and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.  
Dwie pompy są sterowane przez dwa osobne przekaźniki.
- RE1S Relay for management of 1 external source-side pump**  
This accessory can be requested for units without source-side pumps and allows a pump outside the machine to be controlled.
- RE2S Relay for management of 2 external source-side pumps**  
This accessory can be requested for units without source-side pumps and allows two pumps outside the machine to be controlled with a running/stand-by logic by implementing a rotation on the hours of operation.  
Dwie pompy są sterowane przez dwa osobne przekaźniki.
- 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
- FARE Fast Restart**  
The Fast Restart accessory enables the controller to carry out a fast restart of the unit following a blackout, in order to reduce machine down times to a minimum.  
This accessory requires the provision of a power supply line dedicated to the controller (uninterruptible power supply unit installed by the customer) and a maximum and minimum voltage relay in the electrical control panel. In this way, the controller of the unit will always remain powered even during a blackout.  
Once the main power supply returns after a blackout, the starting of the first compressor takes place within 60 seconds and the full capacity of the unit is reached in about 180 seconds (a time that depends on the number of compressors and the instant load level).  
In order to protect component service life, the controller may carry out the Fast Restart procedure no more than 3 times in an hour and 5 times in one day.  
Also, to make it easier to carry out any maintenance on the power supply line dedicated to the controller, there is a selector switch inside the electrical control panel to allow the controller to be powered directly from the main power supply of the machine.  
Includes "Maximum and minimum voltage relay".
- TERM Remote-controlled user terminal panel**  
This accessory allows the terminal normally situated on the machine to be replicated on a support situated at a distance. It is particularly suitable when the unit is placed in an area that is not easily accessible.  
The accessory is supplied loose and is to be installed by the customer at a maximum distance of 120m from the unit. We advise using a cable of the following type: "TECO O.R. FE 2x2xAWG24 SN/ST/PUR".  
For this accessory, there is a dedicated serial port.



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**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.

**PSN SNMP protocol**

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

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

**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.

**SMAR Smartlink function predisposition**

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

The option is incompatible with:

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

**SW4P Network switch with 4 ports**

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

**SW8P Network switch with 8 ports**

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

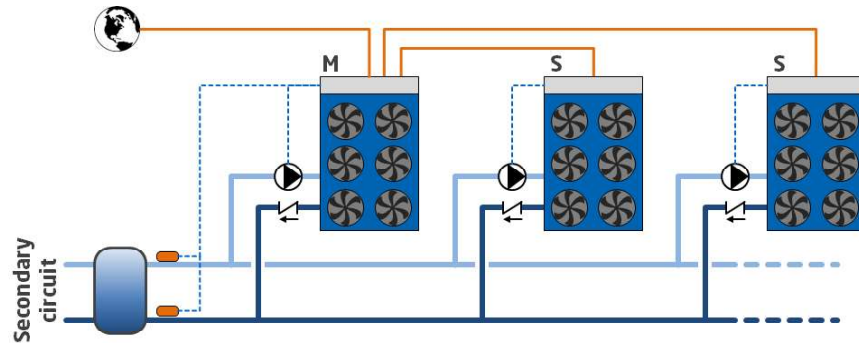
Requires Blueye via Ethernet.

**WIFI Wi-Fi**

The accessory includes the supply of a Hot Spot WiFi already installed, wired and configured, complete with antenna.This accessory requires the Ethernet port of the controller to be available or, alternatively, a network switch with at least one available port to be present in the machine.

## 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.

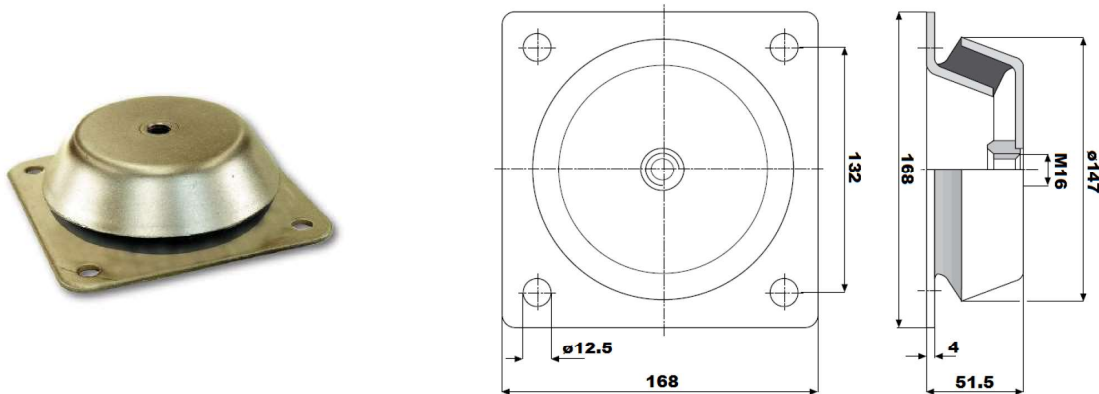
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## Other accessories

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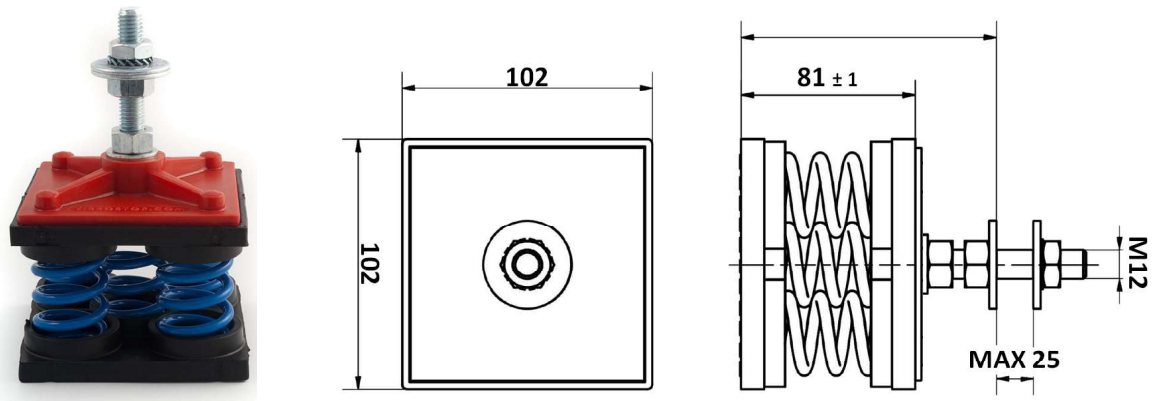
### AG Rubber anti-vibration mounts

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.



### FLUS Flow switch

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

### GABB Packaging in wooden crate

The unit is protected by a custom-made wooden cage, including a wooden sled designed for loading into containers and a fixing system. The accessory can be used for container shipping. Loading on containers must be carried out at the factory. The accessory is incompatible with "Skid for shipping in containers".

### KFW Water filter kit

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

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

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

Accessory supplied loose.

Depending on the version of the unit, user side and source side filters are supplied, and for DC version units, heat recovery side filters are also supplied.

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**SLCO Skid for shipping in container**

The accessory provides for the installation of a wooden sled for loading and a fixing system inside the container by a strap. The accessory must be used for shipping in container. Loading on containers must be carried out at the factory. The accessory is incompatible with "Packaging in wooden crate".

**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

# TECHNICAL SPECIFICATIONS

## OMEGA SKY LGW

			31.1	36.1	43.1	50.1	58.1	66.1	70.1	79.1
<b>Cooling</b>										
Refrigeration capacity	(1)	kW	227	257	313	351	402	460	501	551
Total absorbed power	(1)	kW	45	52	62	70	79	90	101	113
EER	(1)		4,99	4,98	5,03	5,05	5,09	5,14	4,96	4,89
ESEER	(10)		6,26	6,19	6,07	6,28	6,42	6,22	6,2	6,2
IPLV	(9)		7,01	6,92	6,72	7,02	7,23	7,01	6,95	6,89
Eurovent efficiency class	(1)		B	B	B	A	A	A	B	B
<b>Evaporator</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(1)	m <sup>3</sup> /h	39	44	54	61	69	79	86	95
Head loss	(1)	kPa	42	34	40	40	40	36	30	33
<b>Condenser</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(1)	m <sup>3</sup> /h	47	53	64	72	83	94	103	114
Head loss	(1)	kPa	18	16	17	18	17	18	21	25
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Minimum capacity reduction step	(8)	%	25%	25%	25%	25%	25%	25%	25%	25%
Refrigerant charge	(7)	kg	39	37	64	64	58	57	59	61
<b>Noise levels</b>										
Sound power lev.	(4)	dB(A)	91	91	91	91	92	93	94	95
Sound pressure lev.	(5)	dB(A)	73	73	73	72	74	75	76	77
Sound power levels LN	(4)	dB(A)	86	86	86	86	87	88	89	90
Sound pressure levels LN	(5)	dB(A)	68	68	68	67	69	70	71	72
<b>Dimensions and weights**</b>										
Length		mm	4180	4180	4090	4680	4120	4180	4180	4460
Depth		mm	900	900	900	900	900	900	900	900
Height		mm	1900	1900	1950	1950	1950	1990	2000	2000
Operating weight		kg	2039	2067	2676	2749	2899	3151	3205	3280

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

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

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

(7) Theoretical values referred to the basic unit (without DC). The amount of gas actually charged in the unit may differ.

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

(9) Reference to AHRI 550/590, user-side heat exchanger outlet temperature 6,7 °C. Source-side heat exchanger inlet temperatures : part load 100% - W 35°C; part load 75% - W 26,7°C; part load 50% - W 18,3°C; part load 25% - W 12,8°C.

(10) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

\*\* Basic unit without included accessories



## OMEGA SKY LGW

			63.2	72.2	88.2	101.2	116.2	132.2	143.2	159.2
<b>Cooling</b>										
Refrigeration capacity	(1)	kW	451	512	628	699	810	924	1000	1096
Total absorbed power	(1)	kW	90	103	124	139	157	179	202	226
EER	(1)		5	4,98	5,07	5,04	5,15	5,17	4,94	4,85
ESEER	(10)		6,39	6,4	5,97	6,32	6,48	6,32	6,29	6,3
IPLV	(9)		6,84	6,82	6,55	6,88	7	6,93	6,81	6,77
Eurovent efficiency class	(1)		B	B	A	B	A	A	B	B
<b>Evaporator</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(1)	m <sup>3</sup> /h	78	88	108	120	139	159	172	189
Head loss	(1)	kPa	33	31	40	44	32	33	29	32
<b>Condenser</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(1)	m <sup>3</sup> /h	93	105	129	144	166	189	206	227
Head loss	(1)	kPa	18	16,5	17,5	18,1	17,2	18,1	21	25
<b>Compressors</b>										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%
Refrigerant charge	(7)	kg	78	74	128	123	115	112	116	120
<b>Noise levels</b>										
Sound power lev.	(4)	dB(A)	94	94	94	94	95	96	97	98
Sound pressure lev.	(5)	dB(A)	75	75	75	75	76	77	78	79
Sound power levels LN	(4)	dB(A)	89	89	89	89	90	91	92	93
Sound pressure levels LN	(5)	dB(A)	70	70	70	70	71	72	73	74
<b>Dimensions and weights**</b>										
Length		mm	4600	4600	5280	5380	5250	5250	5380	5380
Depth		mm	1300	1360	1360	1360	1360	1360	1360	1360
Height		mm	1850	1850	1930	1930	2010	2010	2020	2020
Operating weight		kg	3851	3917	5126	5266	5608	5914	6427	6600

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

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

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

(7) Theoretical values referred to the basic unit (without DC). The amount of gas actually charged in the unit may differ.

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

(9) Reference to AHRI 550/590, user-side heat exchanger outlet temperature 6,7 °C. Source-side heat exchanger inlet temperatures : part load 100% - W 35°C; part load 75% - W 26,7°C; part load 50% - W 18,3°C; part load 25% - W 12,8°C.

(10) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

\*\* Basic unit without included accessories

## OMEGA SKY LGW OH

			31.1	36.1	43.1	50.1	58.1	66.1	70.1	79.1
<b>Heating</b>										
Heating capacity	(2)	kW	259	291	339	391	454	519	563	608
Total absorbed power	(2)	kW	60	67	77	88	101	115	128	138
COP	(2)		4,35	4,36	4,41	4,45	4,48	4,52	4,4	4,4
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(2)	m³/h	44	50	58	67	77	88	96	104
Head loss	(2)	kPa	16	16	15	16	15	16	18	21
<b>Source-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(2)	m³/h	58	64	76	87	100	114	124	134
Head loss	(2)	kPa	82	67	61	79	75	68	58	61
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Minimum capacity reduction step	(7)	%	25%	25%	25%	25%	25%	25%	25%	25%
Refrigerant charge	(6)	kg	39	37	64	64	58	57	59	61
<b>Noise levels</b>										
Sound power lev.	(8)	dB(A)	95	95	96	96	97	98	99	99
Sound pressure lev.	(5)	dB(A)	77	77	78	77	79	80	81	81
Sound power levels LN	(8)	dB(A)	90	90	91	91	92	93	94	94
Sound pressure levels LN	(5)	dB(A)	72	72	73	72	74	75	76	76
<b>Dimensions and weights**</b>										
Length		mm	4180	4180	4090	4680	4120	4180	4180	4460
Depth		mm	900	900	900	900	900	900	900	900
Height		mm	1900	1900	1950	1950	1950	1990	2000	2000
Operating weight		kg	2039	2067	2676	2749	2899	3151	3205	3280

- (2) Temperature of input-output water to/from source-side heat exchanger 10/7°C; temperature of input-output water to/from user-side heat exchanger 40/45°C. Values compliant with standard EN 14511
- (5) Values obtained from the sound power level (condition in note 8), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.
- (6) Theoretical values referred to the basic unit (without DC). The amount of gas actually charged in the unit may differ.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Unit operating at nominal operating capacity, with no options of any kind, with source-side heat exchanger input/output water temperature of 10/7°C and user-side heat exchanger water inlet-outlet temperature of 47/55°C. Climate profile Average, with reference to the 2013/813 regulation and the EN 14825 standard.

\*\* Basic unit without included accessories

## OMEGA SKY LGW OH

			63.2	72.2	88.2	101.2	116.2	132.2	143.2	159.2
<b>Heating</b>										
Heating capacity	(2)	kW	513	582	684	784	904	1029	1121	1211
Total absorbed power	(2)	kW	117	133	154	175	201	229	253	273
COP	(2)		4,4	4,38	4,45	4,47	4,49	4,5	4,44	4,43
<b>User-side heat exchanger</b>										
Quantity		n°	2	2	2	2	2	2	2	2
Water flow rate	(2)	m³/h	88	99	116	133	154	175	191	205
Head loss	(2)	kPa	16	16	15	15	15	15	18	21
<b>Source-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate	(2)	m³/h	113	128	151	173	200	228	247	265
Head loss	(2)	kPa	67	61	73	84	60	64	54	58
<b>Compressors</b>										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(7)	%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%	12,5%
Refrigerant charge	(6)	kg	78	74	128	123	115	112	116	120
<b>Noise levels</b>										
Sound power lev.	(8)	dB(A)	98	98	99	99	100	101	102	102
Sound pressure lev.	(5)	dB(A)	79	79	80	80	81	82	83	83
Sound power levels LN	(8)	dB(A)	93	93	94	94	95	96	97	97
Sound pressure levels LN	(5)	dB(A)	74	74	75	75	76	77	78	78
<b>Dimensions and weights**</b>										
Length		mm	4600	4600	5280	5380	5250	5250	5380	5380
Depth		mm	1300	1360	1360	1360	1360	1360	1360	1360
Height		mm	1850	1850	1930	1930	2010	2010	2020	2020
Operating weight		kg	3851	3917	5126	5266	5608	5914	6427	6600

- (2) Temperature of input-output water to/from source-side heat exchanger 10/7°C; temperature of input-output water to/from user-side heat exchanger 40/45°C. Values compliant with standard EN 14511
- (5) Values obtained from the sound power level (condition in note 8), referred to a distance of 1 m from the unit in free field with directivity factor Q = 2. Non-binding values.
- (6) Theoretical values referred to the basic unit (without DC). The amount of gas actually charged in the unit may differ.
- (7) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (8) Unit operating at nominal operating capacity, with no options of any kind, with source-side heat exchanger input/output water temperature of 10/7°C and user-side heat exchanger water inlet-outlet temperature of 47/55°C. Climate profile Average, with reference to the 2013/813 regulation and the EN 14825 standard.

\*\* Basic unit without included accessories

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# ECODESIGN

## INTRODUCTION

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

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

- Regulation 2013/813, for small heat pumps ( $P_{\text{design}} \leq 400$  kW)
- Regulation 2016/2281, for chillers and heat pumps with  $P_{\text{design}} > 400$  kW
- Regulation 2013/811, for heat pumps with  $P_{\text{design}} \leq 70$  kW.

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

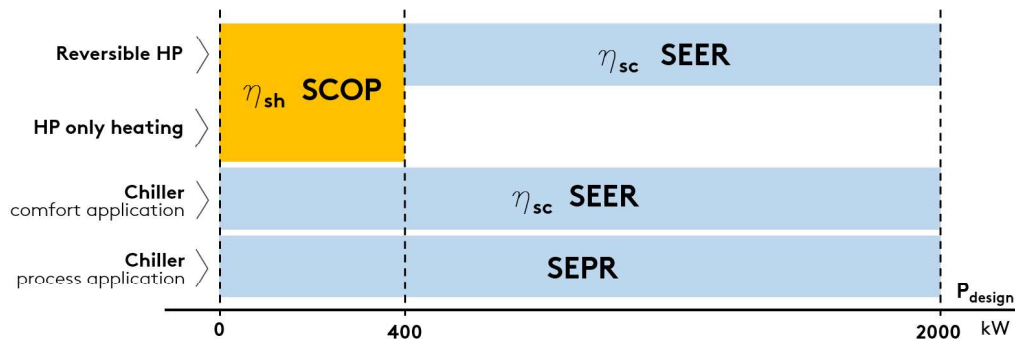
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

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

- $\eta_{\text{sh}}$  (SCOP), with reference to regulation 2013/813
- $\eta_{\text{sc}}$  (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

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

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



Some notes and clarifications:

For comfort applications, regulation 2016/2281 sets the  $\eta_{\text{sc}}$  (SEER) ratio in two different operating conditions:

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

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

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

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

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

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

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

REGULATION 2016/2281, comfort application

TYPE OF UNIT		MINIMUM REQUIREMENT			
		Tier 1		Tier 2 (2021)	
SOURCE	Pdesign	$\eta_{sc}$ [%]	SEER	$\eta_{sc}$ [%]	SEER
air	< 400kW	149	3,8	161	4,1
air	$\geq$ 400kW	161	4,1	179	4,55
water	< 400kW	196	5,1	200	5,2
water	$\geq$ 400kW and < 1500kW	227	5,875	252	6,5
water	$\geq$ 1500kW	245	6,325	272	7

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT	
		Tier 1	Tier 2 (2021)
SOURCE	Pdesign	SEPR	SEPR
air	< 400kW	4,5	5
air	$\geq$ 400kW	5	5,5
water	< 400kW	6,5	7
water	$\geq$ 400kW and < 1500kW	7,5	8
water	$\geq$ 1500kW	8	8,5

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		$\eta_{sh}$ [%]	SCOP
air	low temperature application	125	3,2
water	low temperature application	125	3,325
air	medium temperature application	110	2,825
water	medium temperature application	110	2,95

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

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

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

#### COMFORT APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
<b>Chiller</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps (reversible and only heating) P<sub>design</sub> ≤ 400kW</b>		SCOP/η <sub>sh</sub>	2013/813
<b>Reversible heat pumps P<sub>design</sub> &gt; 400kW</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps only heating P<sub>design</sub> &gt; 400kW</b>		-	-

- = exemption from Ecodesign

#### PROCESS APPLICATION

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

- = exemption from Ecodesign

Some specifications and notes follow.

#### Partly completed machinery

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

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

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## **GAMMA OMEGA SKY LGW**

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use. Several regulations are part of the directive, and set mandatory seasonal efficiency targets for sale in the European Union.

The unit therefore, to be CE marked and sold in the EU market, must comply with the minimum requirements imposed by the regulations in question.

With reference to the Omega Sky LGW range, below is a list of concerned regulations relating to the different units in their various configurations:

- Regulation 2016/2281, for chillers and heat pumps with  $P_{design} > 400$  kW

Minimum efficiency requirements are imposed through seasonal energy efficiency indices, respectively:

- $\eta_{sc}$  (SEER) for comfort applications
- SEPR for process applications.

As regards the 2016/2281 regulation starting from 1 January 2021, the minimum required efficiency limit will be raised (Tier 2) compared to the current standard (Tier 1).

With reference to the Omega Sky LGW range, below is a list of concerned regulations relating to the different units in their various configurations:

### **Omega Sky LGW:**

- regulation 2016/2281

### **Omega Sky LGW OH:**

- Regulation 2013/813, from size 31.1 to 50.1
- As these are heat pumps for heating applications only with  $P_{design} > 400$  kW, sizes from 58.1 onwards are exempt from conformity requirements; All OH units are CE marked.

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

## OMEGA SKY LGW

			31.1	36.1	43.1	50.1	58.1	66.1	70.1	79.1
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kw	227	257	313	351	402	460	501	551
<b>COMFORT</b>										
$\eta_{sc}$	(1)		236%	237%	249%	251%	256%	255%	254%	253%
SEER	(1)		5,97	5,99	6,3	6,36	6,47	6,45	6,42	6,41
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(3)		7,35	7,31	7,2	7,18	RFQ	RFQ	RFQ	RFQ
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	RFQ	RFQ	RFQ	RFQ
			<b>63.2</b>	<b>72.2</b>	<b>88.2</b>	<b>101.2</b>	<b>116.2</b>	<b>132.2</b>	<b>143.2</b>	<b>159.2</b>
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kw	451	512	628	699	810	924	1000	1096
<b>COMFORT</b>										
$\eta_{sc}$	(1)		254%	257%	255%	257%	258%	258%	256%	253%
SEER	(1)		6,42	6,5	6,46	6,5	6,53	6,52	6,47	6,4
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(3)		RFQ	RFQ	RFQ	RFQ	RFQ	RFQ	RFQ	RFQ
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		RFQ	RFQ	RFQ	RFQ	RFQ	RFQ	RFQ	RFQ

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

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

- = value not necessary: conformity is already provided at the most restrictive condition (1).

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

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

## OMEGA SKY LGW OH

			31.1	36.1	43.1	50.1
<b>REGULATION 2013/813</b>						
Pdesign	(1)	kw	253	284	333	390
Compliance	(1)		Y	Y	Y	Y
$\eta_{sh}$	(1)		162%	162%	160%	162%
SCOP MT	(1)		4,25	4,26	4,2	4,25

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

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

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



# ELECTRICAL SPECIFICATIONS

## OMEGA SKY LGW

		31.1	36.1	43.1	50.1	58.1	66.1	70.1	79.1	
<b>General electrical specifications</b>										
Max. absorbed power (FLI)	(1)	kW	66	76	90	101	114	129	144	159
Max. absorbed current (FLA)	(1)	A	113	130	149	167	185	217	240	266
Rated current (Inom)	(2)	A	85	99	111	124	137	163	181	202
cosφ standard unit	(2)		0,79	0,78	0,78	0,83	0,86	0,81	0,83	0,82
Nominal current with power factor correction (Inom)	(2)	A	69	81	96	108	122	138	156	173
cosφ unit with power factor correction	(2)		0,97	0,95	0,96	0,95	0,96	0,96	0,96	0,96
Max. inrush current (MIC)	(3)	A	267	314	318	436	465	586	650	805
Power supply		V/ph/Hz	400V / 3ph / 50Hz							
Power supply for auxiliary circuits		V/ph/Hz	230V-24V / 1ph / 50Hz							
Suggested line section	(4)	mm <sup>2</sup>	3x70+1G37		3x95+1G51		3x120+1G72		3x150+1G97	
Suggested line protection	(5)		NH00gG 160A		NH1gG 200A		NH1gG 250A		NH2gG 315A	NH2gG 315A

- (1) Data regarding the unit without accessories working in maximum power absorption conditions
- (2) Data referring to the unit without options and operating in standard conditions: source-side heat exchanger input/output water temperature 30/35°C; user-side heat exchanger input/output water temperature 12/7°C.
- (3) Max. effective RMS current value when the last compressor gets started (FLA of entire unit - FLA of largest compressor + LRA of largest compressor)
- (4) These values are calculated 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.
- (5) The correct system for line protection must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

## OMEGA SKY LGW

		63.2	72.2	88.2	101.2	116.2	132.2	143.2	159.2	
<b>General electrical specifications</b>										
Max. absorbed power (FLI)	(1)	kW	133	151	180	201	229	259	289	319
Max. absorbed current (FLA)	(1)	A	227	260	297	333	371	434	480	532
Rated current (Inom)	(2)	A	171	198	222	249	273	326	362	404
cosφ standard unit	(2)		0,79	0,78	0,83	0,83	0,86	0,81	0,83	0,82
Nominal current with power factor correction (Inom)	(2)	A	139	163	192	217	244	275	313	346
cosφ unit with power factor correction	(2)		0,97	0,95	0,96	0,95	0,96	0,95	0,95	0,96
Max. inrush current (MIC)	(3)	A	380	444	467	603	650	803	890	1071
Power supply		V/ph/Hz	400V / 3ph / 50Hz							
Power supply for auxiliary circuits		V/ph/Hz	230V-24V / 1ph / 50Hz							
Suggested line section	(4)	mm <sup>2</sup>	3x120+1G72	3x150+1G97	3x240+1G120		2x(3x120+1G70)		2x(3x150+1G95)	
Suggested line protection	(5)		NH1gG 250A	NH2gG 315A	NH2gG 400A		NH3gG 500A		NH3gG 630A	

- (1) Data regarding the unit without accessories working in maximum power absorption conditions
- (2) Data referring to the unit without options and operating in standard conditions: source-side heat exchanger input/output water temperature 30/35°C; user-side heat exchanger input/output water temperature 12/7°C.
- (3) Max. effective RMS current value when the last compressor gets started (FLA of entire unit - FLA of largest compressor + LRA of largest compressor)
- (4) These values are calculated 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.
- (5) The correct system for line protection must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

## OMEGA SKY LGW OH

			31.1	36.1	43.1	50.1	58.1	66.1	70.1	79.1
<b>General electrical specifications</b>										
Max. absorbed power (FLI)	(1)	kW	97	111	121	139	160	181	199	217
Max. absorbed current (FLA)	(1)	A	162	183	198	222	262	295	326	358
Rated current (Inom)	(2)	A	107	121	134	146	178	198	219	246
cosφ standard unit	(2)		0,8	0,81	0,85	0,87	0,83	0,84	0,83	0,82
Nominal current with power factor correction (Inom)	(2)	A	90	101	119	132	155	176	191	213
cosφ unit with power factor correction	(2)		0,95	0,96	0,96	0,96	0,95	0,95	0,95	0,95
Max. inrush current (MIC)	(3)	A	371	394	586	650	805	805	917	917
Power supply		V/ph/Hz	400V / 3ph / 50Hz							
Power supply for auxiliary circuits		V/ph/Hz	230V-24V / 1ph / 50Hz							
Suggested line section	(4)	mm <sup>2</sup>	3x95+1G51	3x120+1G72			3x150+1G97			
Suggested line protection	(5)		NH1gG 200A	NH1gG 250A			NH2gG 315A	NH2gG 400A		

- (1) Data regarding the unit without accessories working in maximum power absorption conditions
- (2) Data referring to the unit without options and operating in standard conditions: source-side heat exchanger input/output water temperature 30/35°C; user-side heat exchanger input/output water temperature 12/7°C.
- (3) Max. effective RMS current value when the last compressor gets started (FLA of entire unit - FLA of largest compressor + LRA of largest compressor)
- (4) These values are calculated 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.
- (5) The correct system for line protection must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

## OMEGA SKY LGW OH

			63.2	72.2	88.2	101.2	116.2	132.2	143.2	159.2
<b>General electrical specifications</b>										
Max. absorbed power (FLI)	(1)	kW	194	221	243	277	319	361	399	434
Max. absorbed current (FLA)	(1)	A	324	367	396	444	524	590	652	716
Rated current (Inom)	(2)	A	214	241	268	292	355	396	438	492
cosφ standard unit	(2)		0,8	0,81	0,85	0,87	0,83	0,84	0,83	0,82
Nominal current with power factor correction (Inom)	(2)	A	181	203	238	269	310	347	381	426
cosφ unit with power factor correction	(2)		0,95	0,96	0,96	0,95	0,95	0,96	0,95	0,95
Max. inrush current (MIC)	(3)	A	533	577	784	872	1067	1100	1243	1275
Power supply		V/ph/Hz	400V / 3ph / 50Hz							
Power supply for auxiliary circuits		V/ph/Hz	230V-24V / 1ph / 50Hz							
Suggested line section	(4)	mm <sup>2</sup>	3x150+1G97	2x(3x120+1G70)			2x(3x150+1G95)	3x(3x120+1G70)		
Suggested line protection	(5)		NH2gG 400A	NH3gG 500A			NH3gG 630A	NH3gG 800A		

- (1) Data regarding the unit without accessories working in maximum power absorption conditions
- (2) Data referring to the unit without options and operating in standard conditions: source-side heat exchanger input/output water temperature 30/35°C; user-side heat exchanger input/output water temperature 12/7°C.
- (3) Max. effective RMS current value when the last compressor gets started (FLA of entire unit - FLA of largest compressor + LRA of largest compressor)
- (4) These values are calculated 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.
- (5) The correct system for line protection must be determined by a qualified technician based on the length of the line, the type of cable used and the type of installation.

## FLOW RATE RANGES OF HEAT EXCHANGERS

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

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

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

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

the design condition falls within the operating limits specified below

the unit is equipped with all the accessories necessary for operation of the unit (e.g. brine kit, condensation control)

the flow rate at design conditions (that is, of the specific application) must always come within the allowed flow rate ranges specified below. If the design conditions require a water flow rate that does not come within the allowed operating range, you must contact our sales department that will identify the most suitable solution for the specific application.

### OMEGA SKY LGW

	Evaporator		Condenser	
	Qmin	Qmax	Qmin	Qmax
	m <sup>3</sup> /h	m <sup>3</sup> /h	m <sup>3</sup> /h	m <sup>3</sup> /h
<b>31.1</b>	20	59	33	70
<b>36.1</b>	22	66	37	79
<b>43.1</b>	27	81	45	96
<b>50.1</b>	30	91	50	108
<b>58.1</b>	35	104	58	124
<b>66.1</b>	40	119	66	141
<b>70.1</b>	43	129	72	155
<b>79.1</b>	47	142	80	171
<b>63.2</b>	39	116	65	139
<b>72.2</b>	44	132	74	158
<b>88.2</b>	54	162	90	193
<b>101.2</b>	60	181	101	215
<b>116.2</b>	70	209	116	249
<b>132.2</b>	80	239	132	284
<b>143.2</b>	86	258	144	309
<b>159.2</b>	94	283	159	340

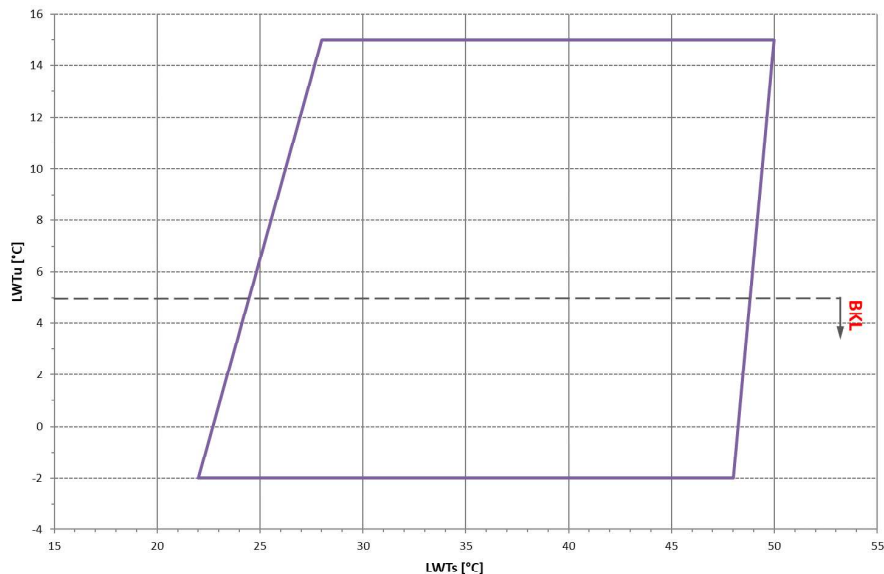
### OMEGA SKY LGW OH

	Evaporator		Condenser	
	Qmin	Qmax	Qmin	Qmax
	m <sup>3</sup> /h	m <sup>3</sup> /h	m <sup>3</sup> /h	m <sup>3</sup> /h
<b>31.1</b>	29	73	34	67
<b>36.1</b>	32	98	39	75
<b>43.1</b>	38	113	46	87
<b>50.1</b>	44	112	50	101
<b>58.1</b>	51	134	60	117
<b>66.1</b>	58	139	66	134
<b>70.1</b>	63	166	68	145
<b>79.1</b>	68	182	73	157
<b>63.2</b>	57	138	68	132
<b>72.2</b>	65	179	78	150
<b>88.2</b>	76	197	93	176
<b>101.2</b>	88	211	101	202
<b>116.2</b>	101	245	120	233
<b>132.2</b>	115	291	133	266
<b>143.2</b>	125	355	135	289
<b>159.2</b>	135	387	146	313

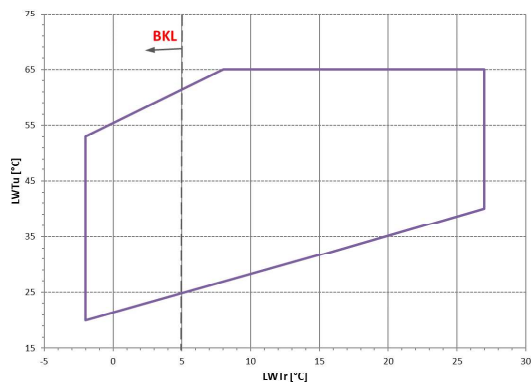
# OPERATING LIMITS

## Omega Sky LGW - Omega Sky LGW OH

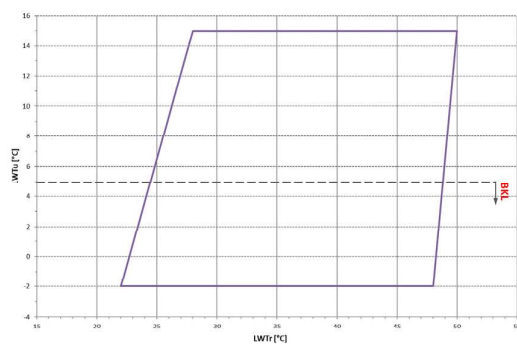
### COOLING



### HEATING



### TOTAL RECOVERY



- LWts:** water outlet temperature from the source-side heat exchanger
- LWtu:** water outlet temperature from the user-side heat exchanger
- LWtr:** water outlet temperature from the recovery exchanger
- BK:** For LWtu below +5°C, it is mandatory to fit the "Brine Kit LGW" 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

## OMEGA SKY LGW

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz		Lw_tot	Lp_tot
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp		
<b>31.1</b>	63	45	74	55	88	69	88	70	88	69	81	62	79	60	66	47	<b>91</b>	<b>73</b>
<b>36.1</b>	63	45	74	55	88	69	88	70	88	69	81	62	79	60	66	47	<b>91</b>	<b>73</b>
<b>43.1</b>	63	45	74	55	88	69	88	70	88	69	81	62	79	60	66	47	<b>91</b>	<b>73</b>
<b>50.1</b>	64	45	75	56	88	69	89	70	88	69	81	62	76	57	66	47	<b>91</b>	<b>72</b>
<b>58.1</b>	71	53	62	44	90	72	88	69	90	71	82	63	73	54	63	45	<b>92</b>	<b>74</b>
<b>66.1</b>	93	74	86	68	83	65	93	74	89	70	83	65	73	54	66	48	<b>93</b>	<b>75</b>
<b>70.1</b>	66	47	76	57	88	70	92	74	91	72	85	67	71	53	52	33	<b>94</b>	<b>76</b>
<b>79.1</b>	71	52	65	47	89	70	93	75	92	74	84	66	72	54	59	41	<b>95</b>	<b>77</b>
<b>63.2</b>	63	44	66	47	86	67	93	74	90	71	85	66	71	52	63	44	<b>94</b>	<b>75</b>
<b>72.2</b>	59	40	69	50	85	66	91	72	91	72	87	68	70	51	57	38	<b>94</b>	<b>75</b>
<b>88.2</b>	66	47	77	57	90	71	91	72	91	71	84	64	82	62	69	49	<b>94</b>	<b>75</b>
<b>101.2</b>	67	48	78	58	91	71	92	72	91	71	84	65	79	60	69	50	<b>94</b>	<b>75</b>
<b>116.2</b>	74	55	65	46	93	74	91	71	93	73	84	65	76	56	66	47	<b>95</b>	<b>76</b>
<b>132.2</b>	96	76	89	70	86	67	96	76	92	72	86	67	76	56	69	50	<b>96</b>	<b>77</b>
<b>143.2</b>	69	50	79	59	91	72	95	76	94	74	88	69	74	55	55	36	<b>97</b>	<b>78</b>
<b>159.2</b>	74	54	68	49	92	72	96	77	95	76	87	68	75	56	62	43	<b>98</b>	<b>79</b>

## OMEGA SKY LGW /LN

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz		Lw_tot	Lp_tot
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp		
<b>31.1</b>	60	41	69	51	82	64	83	65	83	64	76	58	74	56	62	43	<b>86</b>	<b>68</b>
<b>36.1</b>	60	41	69	51	82	64	83	65	83	64	76	58	74	56	62	43	<b>86</b>	<b>68</b>
<b>43.1</b>	60	41	69	51	82	64	83	65	83	64	76	58	74	56	62	43	<b>86</b>	<b>68</b>
<b>50.1</b>	60	41	71	52	83	64	84	65	83	64	77	58	72	53	63	44	<b>86</b>	<b>67</b>
<b>58.1</b>	67	49	59	40	85	66	83	64	85	66	77	58	69	50	60	41	<b>87</b>	<b>69</b>
<b>66.1</b>	88	69	81	63	78	60	88	69	84	65	79	60	69	50	63	44	<b>88</b>	<b>70</b>
<b>70.1</b>	62	44	71	53	84	65	87	69	86	67	81	62	67	49	49	31	<b>89</b>	<b>71</b>
<b>79.1</b>	67	48	62	43	84	65	88	70	87	69	80	61	68	50	56	37	<b>90</b>	<b>72</b>
<b>63.2</b>	60	41	63	44	81	62	88	69	85	66	80	61	67	48	60	41	<b>89</b>	<b>70</b>
<b>72.2</b>	55	36	65	46	80	61	86	67	86	67	82	63	66	47	54	35	<b>89</b>	<b>70</b>
<b>88.2</b>	63	43	72	53	85	66	86	67	86	66	79	60	77	58	65	45	<b>89</b>	<b>70</b>
<b>101.2</b>	63	44	74	54	86	66	87	67	86	66	80	60	75	55	66	46	<b>89</b>	<b>70</b>
<b>116.2</b>	70	51	62	42	88	68	86	66	88	68	80	60	72	52	63	43	<b>90</b>	<b>71</b>
<b>132.2</b>	90	71	84	65	81	62	91	71	87	67	82	62	72	52	66	46	<b>91</b>	<b>72</b>
<b>143.2</b>	65	46	74	55	86	67	90	71	89	69	84	64	70	51	52	33	<b>92</b>	<b>73</b>
<b>159.2</b>	70	50	65	45	87	67	91	72	90	71	83	63	71	52	59	39	<b>93</b>	<b>74</b>

Reference conditions: source-side heat exchanger input/output water temperature 30/35°C; user-side heat exchanger input/output water temperature 12/7°C; unit operating at rated capacity, without any option.

**Lw**: sound power levels.

Values obtained from measures taken according to standard ISO 3744.

Lw\_tot is the only binding value.

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

The acoustic data are related to standard conditions in referable and reproducible operating conditions. All data with the exception of Lw\_tot are provided for illustrative purposes only and can not be used for forecasting purposes or for the verification of binding limits.

With special reference to noise emissions, the Manufacturer takes liability for their conformity, limited to the declared Lw\_tot value. Any and all other Manufacturer's liability for the impact of such emissions in relation to the location of the machine and other conditions related to machine installation is excluded. The environment and the installation conditions, as well as the operating modes, can alter the sound emissions. Any assessment concerning these conditions falls within the area of competence of the plant designer and/or the fitter.

## OMEGA SKY LGW OH

	Octave bands [dB]																Total [dB(A)]	
	63 Hz		125 Hz		250 Hz		500 Hz		1000 Hz		2000 Hz		4000 Hz		8000 Hz			
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw_tot	Lp_tot
<b>31.1</b>	67	49	72	53	85	66	91	72	93	74	88	69	70	51	59	41	<b>95</b>	<b>77</b>
<b>36.1</b>	76	57	76	58	83	65	92	74	92	73	86	68	71	52	61	42	<b>95</b>	<b>77</b>
<b>43.1</b>	74	55	87	69	93	75	91	72	93	75	85	66	79	61	67	49	<b>96</b>	<b>78</b>
<b>50.1</b>	72	53	85	66	95	77	92	74	93	74	86	67	77	58	66	48	<b>96</b>	<b>77</b>
<b>58.1</b>	73	54	83	64	99	81	94	76	92	73	88	69	69	50	60	41	<b>97</b>	<b>79</b>
<b>66.1</b>	72	54	84	66	98	80	94	75	95	77	88	69	78	59	67	48	<b>98</b>	<b>80</b>
<b>70.1</b>	80	61	84	65	97	79	93	75	97	79	87	68	77	59	68	49	<b>99</b>	<b>81</b>
<b>79.1</b>	78	60	76	57	94	76	96	78	96	78	88	70	80	61	66	47	<b>99</b>	<b>81</b>
<b>63.2</b>	70	51	75	56	88	69	94	75	96	77	91	72	73	54	62	44	<b>98</b>	<b>79</b>
<b>72.2</b>	79	60	79	61	86	68	95	77	95	76	89	71	74	55	64	45	<b>98</b>	<b>79</b>
<b>88.2</b>	77	57	90	72	96	78	94	75	96	78	88	69	82	64	70	52	<b>99</b>	<b>80</b>
<b>101.2</b>	75	55	88	69	98	80	95	77	96	77	89	70	80	61	69	51	<b>99</b>	<b>80</b>
<b>116.2</b>	76	56	86	67	102	84	97	79	95	76	91	72	72	53	63	44	<b>100</b>	<b>81</b>
<b>132.2</b>	75	56	87	69	101	83	97	78	98	80	91	72	81	62	70	51	<b>101</b>	<b>82</b>
<b>143.2</b>	83	63	87	68	100	82	96	78	100	82	90	71	80	62	71	52	<b>102</b>	<b>83</b>
<b>159.2</b>	81	62	79	60	97	79	99	81	99	81	91	73	83	64	69	50	<b>102</b>	<b>83</b>

## OMEGA SKY LGW OH /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_tot	Lp_tot
<b>31.1</b>	62	44	67	48	80	61	86	67	88	69	83	64	65	46	54	36	<b>90</b>	<b>72</b>
<b>36.1</b>	71	52	71	53	78	60	87	69	87	68	81	63	66	47	56	37	<b>90</b>	<b>72</b>
<b>43.1</b>	69	50	82	64	88	70	86	67	88	70	80	61	74	56	62	44	<b>91</b>	<b>73</b>
<b>50.1</b>	67	48	80	61	90	71	87	68	88	69	81	62	72	53	61	42	<b>91</b>	<b>72</b>
<b>58.1</b>	68	49	78	59	94	76	89	71	87	68	83	64	64	45	55	36	<b>92</b>	<b>74</b>
<b>66.1</b>	67	49	79	61	93	75	89	70	90	72	83	64	73	54	62	43	<b>93</b>	<b>75</b>
<b>70.1</b>	75	56	79	60	92	74	88	70	92	74	82	63	72	54	63	44	<b>94</b>	<b>76</b>
<b>79.1</b>	73	55	71	52	89	71	91	73	91	73	83	65	75	56	61	42	<b>94</b>	<b>76</b>
<b>63.2</b>	65	46	70	51	83	64	89	70	91	72	86	67	68	49	57	38	<b>93</b>	<b>74</b>
<b>72.2</b>	74	55	74	55	81	62	90	71	90	71	84	65	69	50	59	40	<b>93</b>	<b>74</b>
<b>88.2</b>	72	52	85	66	91	72	89	69	91	72	83	63	77	58	65	46	<b>94</b>	<b>75</b>
<b>101.2</b>	70	50	83	63	93	74	90	71	91	71	84	64	75	55	64	45	<b>94</b>	<b>75</b>
<b>116.2</b>	71	51	81	61	97	78	92	73	90	70	86	66	67	47	58	38	<b>95</b>	<b>76</b>
<b>132.2</b>	70	51	82	63	96	77	92	72	93	74	86	66	76	56	65	45	<b>96</b>	<b>77</b>
<b>143.2</b>	78	58	82	62	95	76	91	72	95	76	85	65	75	56	66	46	<b>97</b>	<b>78</b>
<b>159.2</b>	76	57	74	54	92	73	94	75	94	75	86	67	78	58	64	44	<b>97</b>	<b>78</b>

Reference conditions: source-side heat exchanger input/output water temperature 10/7°C; user-side heat exchanger input/output water temperature 47/55°C; unit operating at rated capacity, without any option.

**Lw**: sound power levels.

Values obtained from measures taken according to standard ISO 3744.

Lw\_tot is the only binding value.

**Lp**: Values obtained from the sound power level, related to a distance of 1 m from the unit in free field with directivity factor Q=2. Non-binding values.

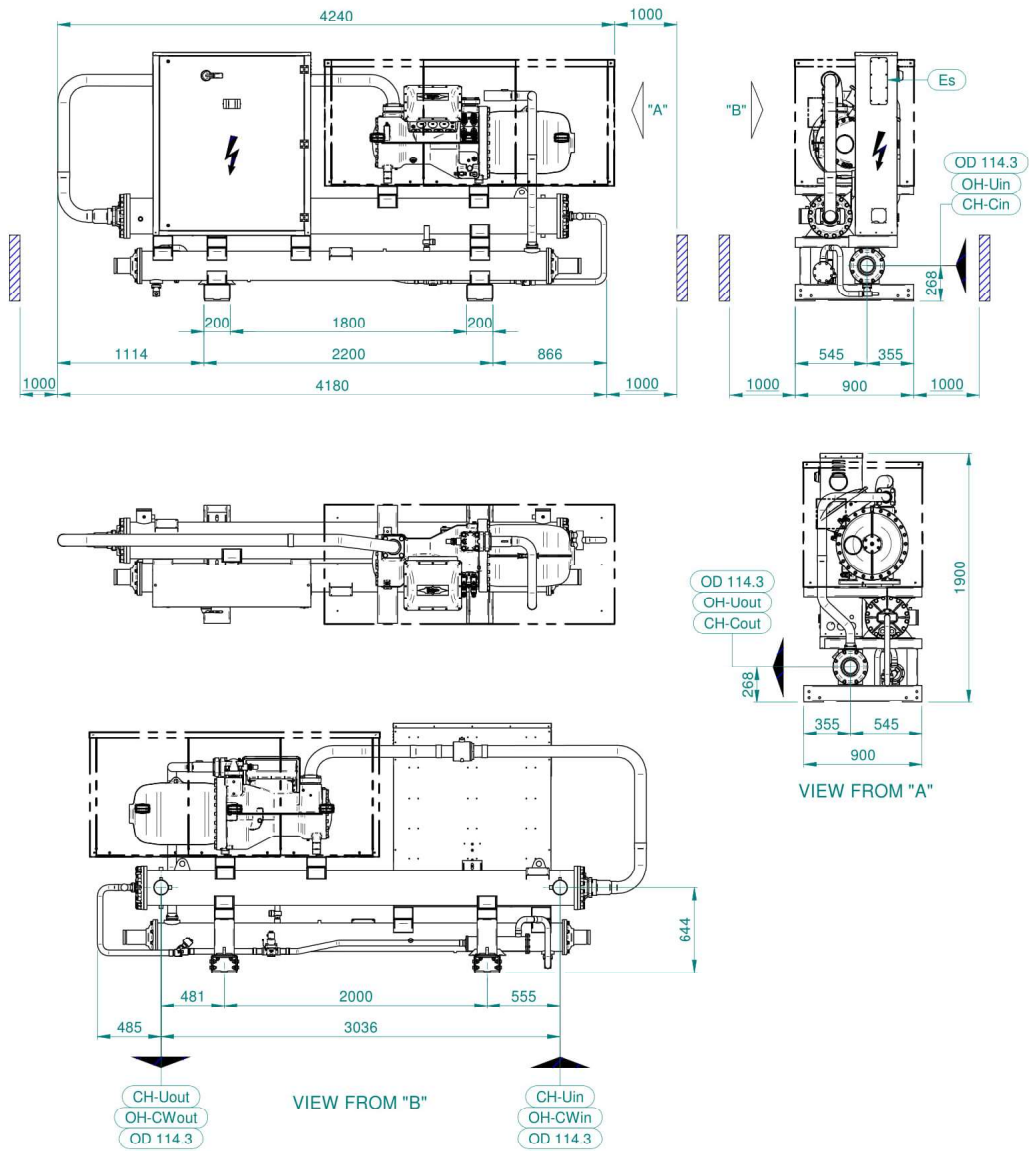
The acoustic data are related to standard conditions in referable and reproducible operating conditions. All data with the exception of Lw\_tot are provided for illustrative purposes only and can not be used for forecasting purposes or for the verification of binding limits.

With special reference to noise emissions, the Manufacturer takes liability for their conformity, limited to the declared Lw\_tot value. Any and all other Manufacturer's liability for the impact of such emissions in relation to the location of the machine and other conditions related to machine installation is excluded. The environment and the installation conditions, as well as the operating modes, can alter the sound emissions. Any assessment concerning these conditions falls within the area of competence of the plant designer and/or the fitter.

# DIMENSIONAL DIAGRAMS

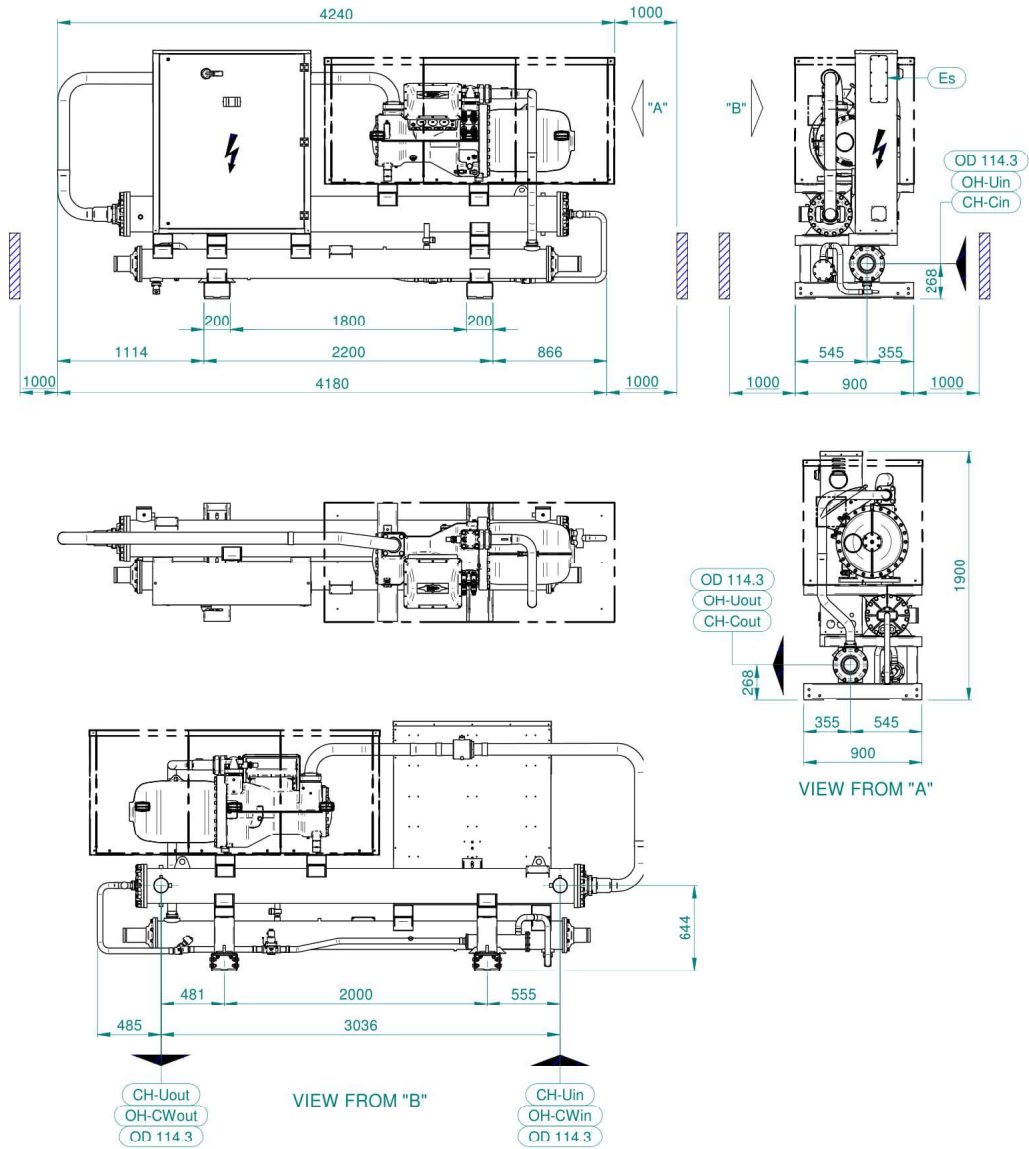
## OMEGA SKY LGW 31.1

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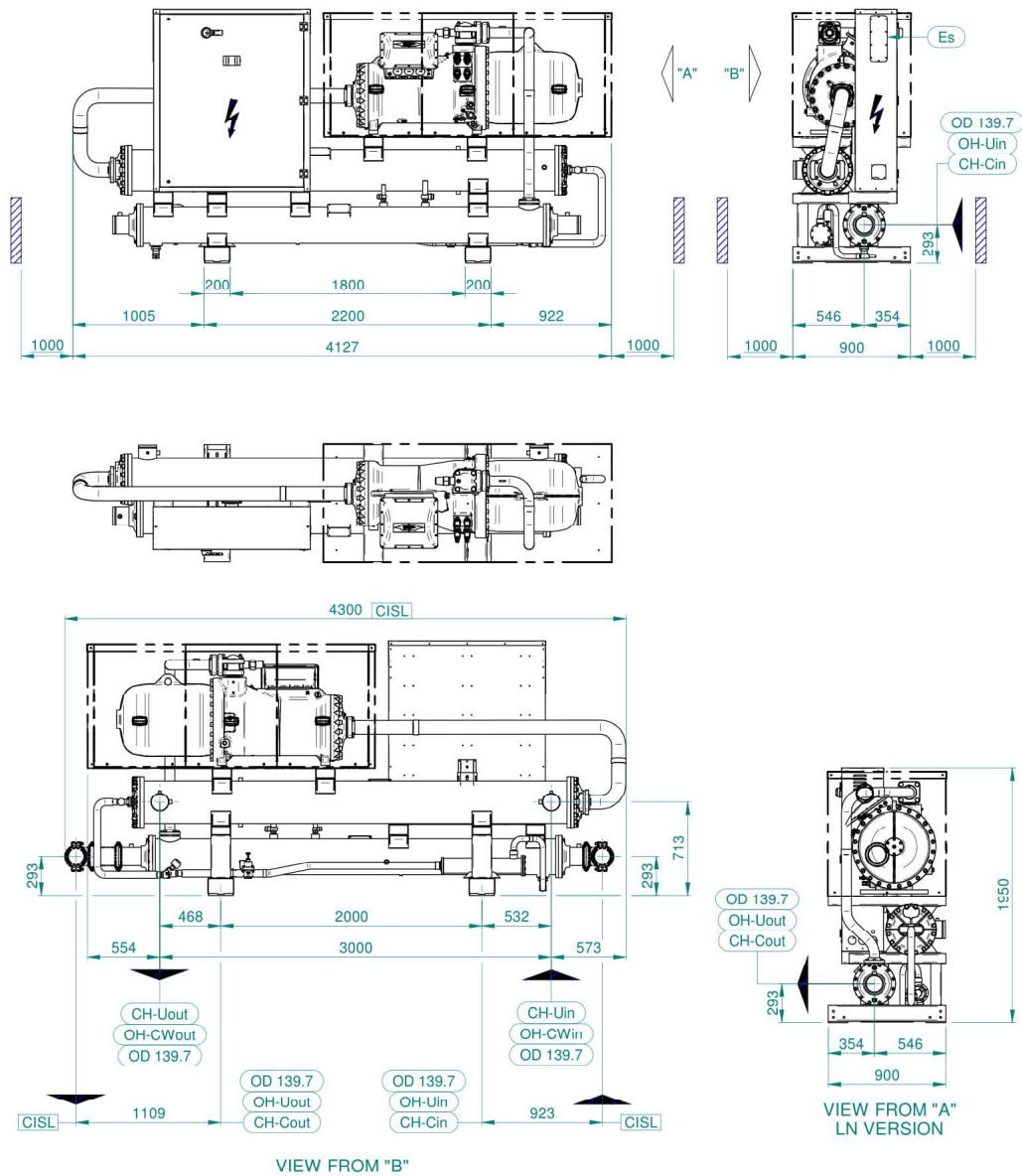
**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



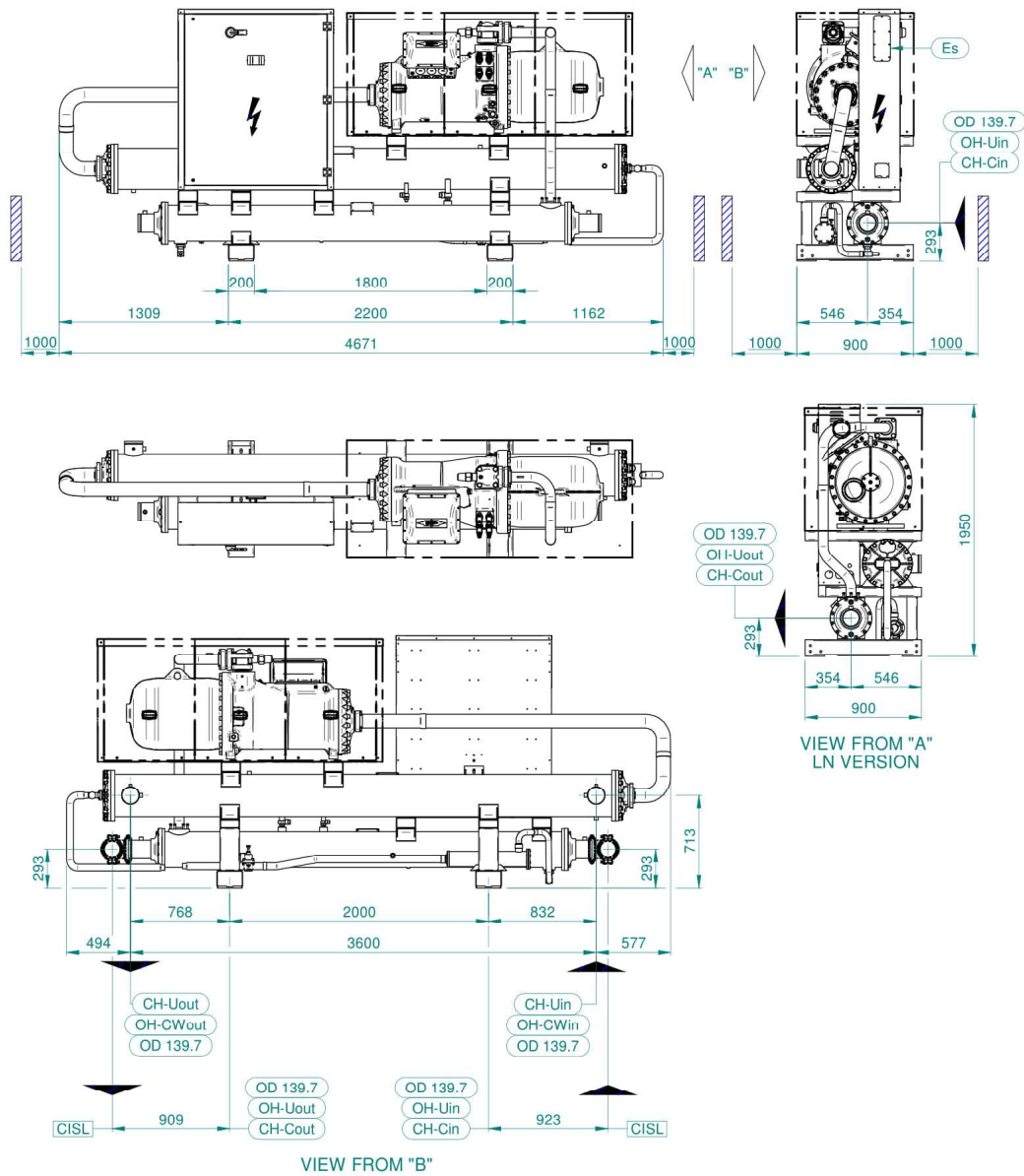


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

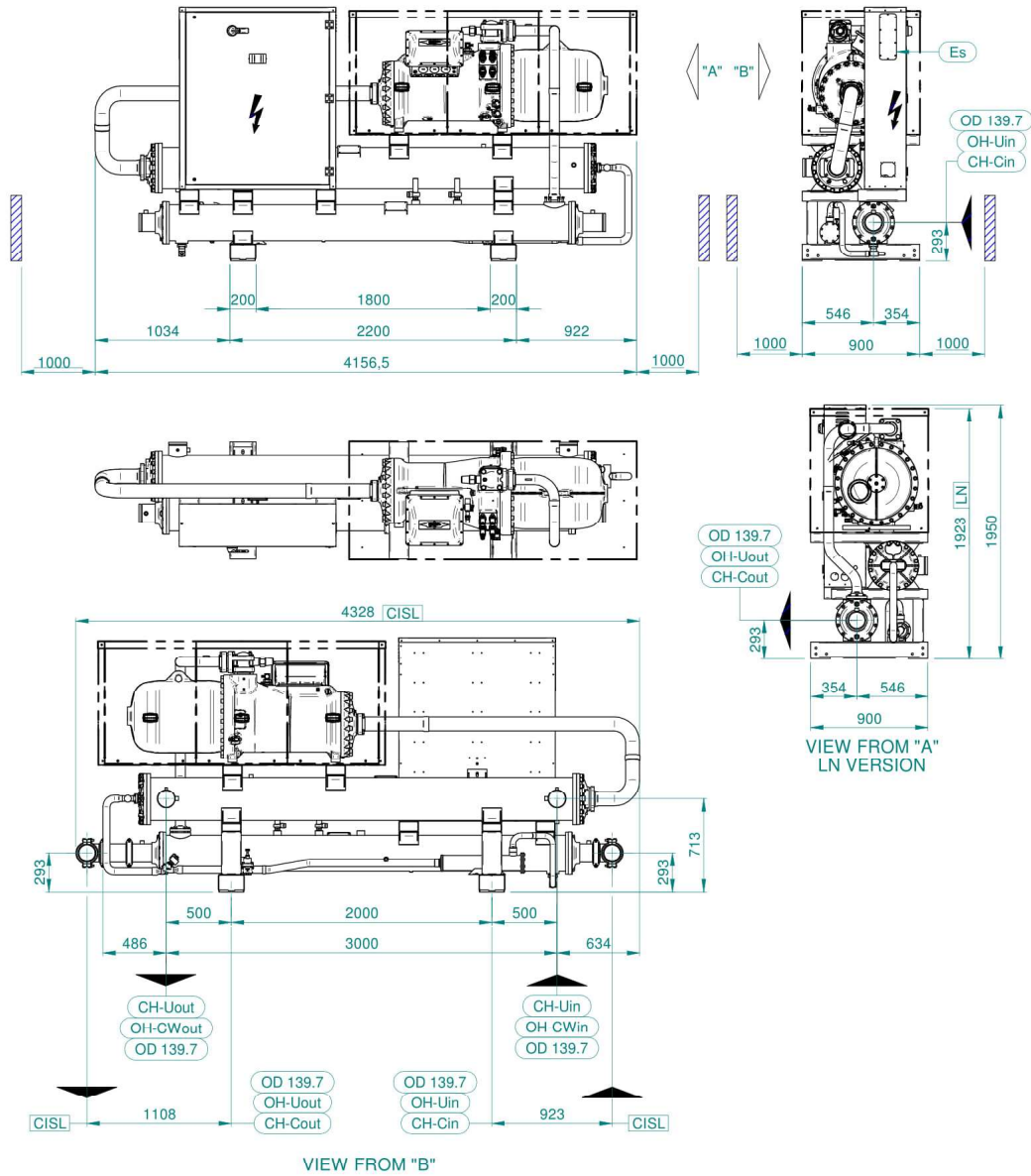




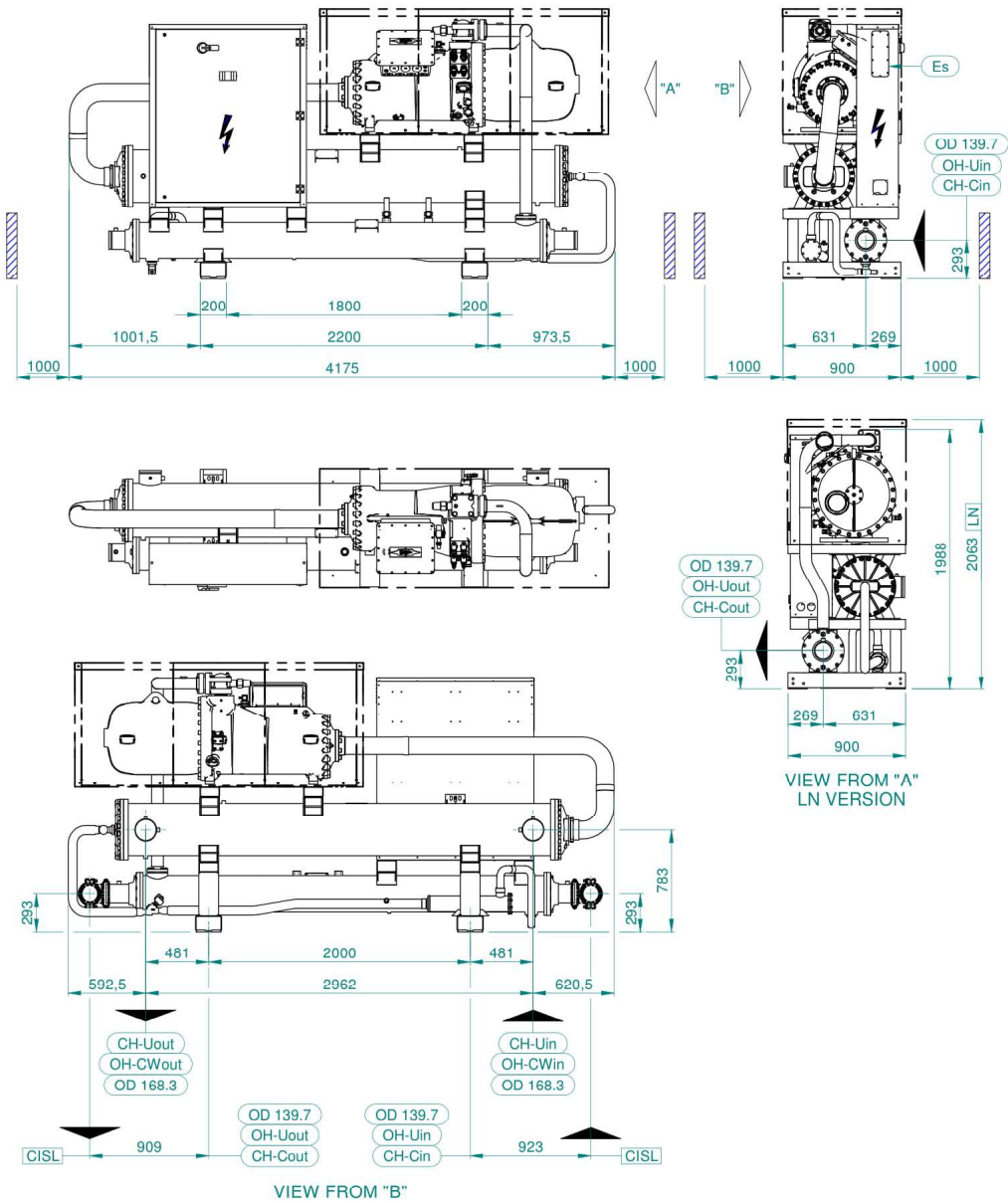
**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



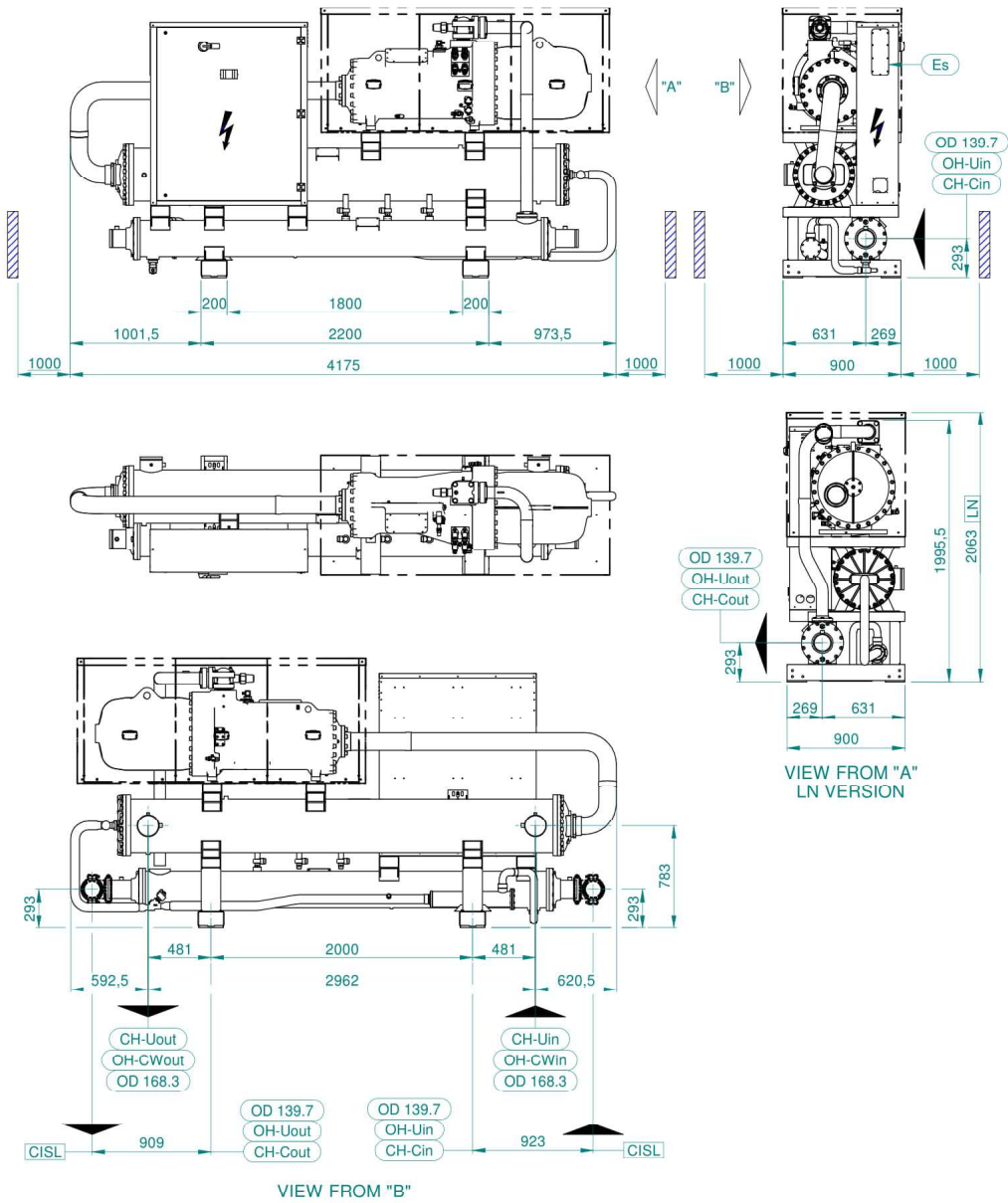
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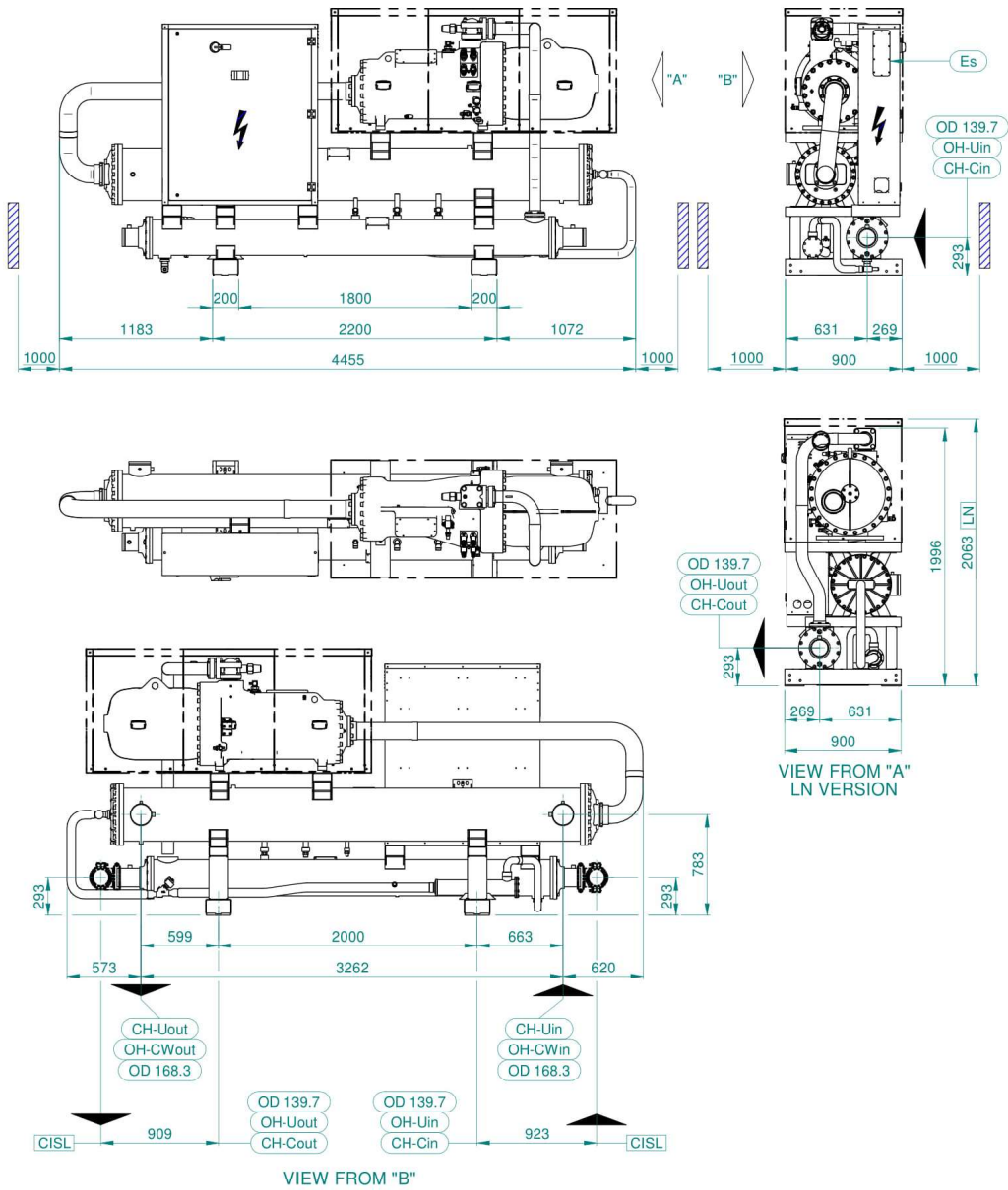
**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



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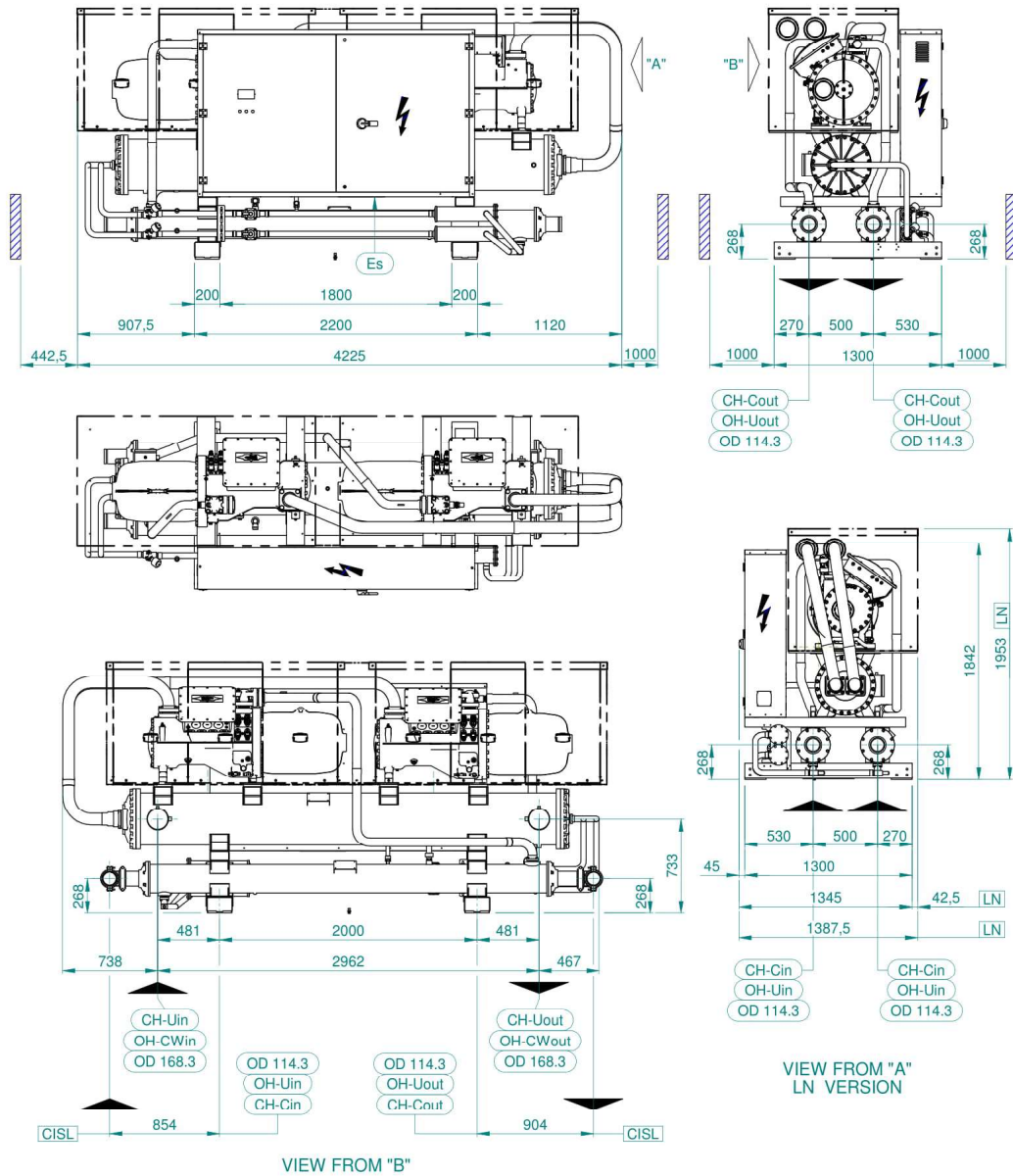


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

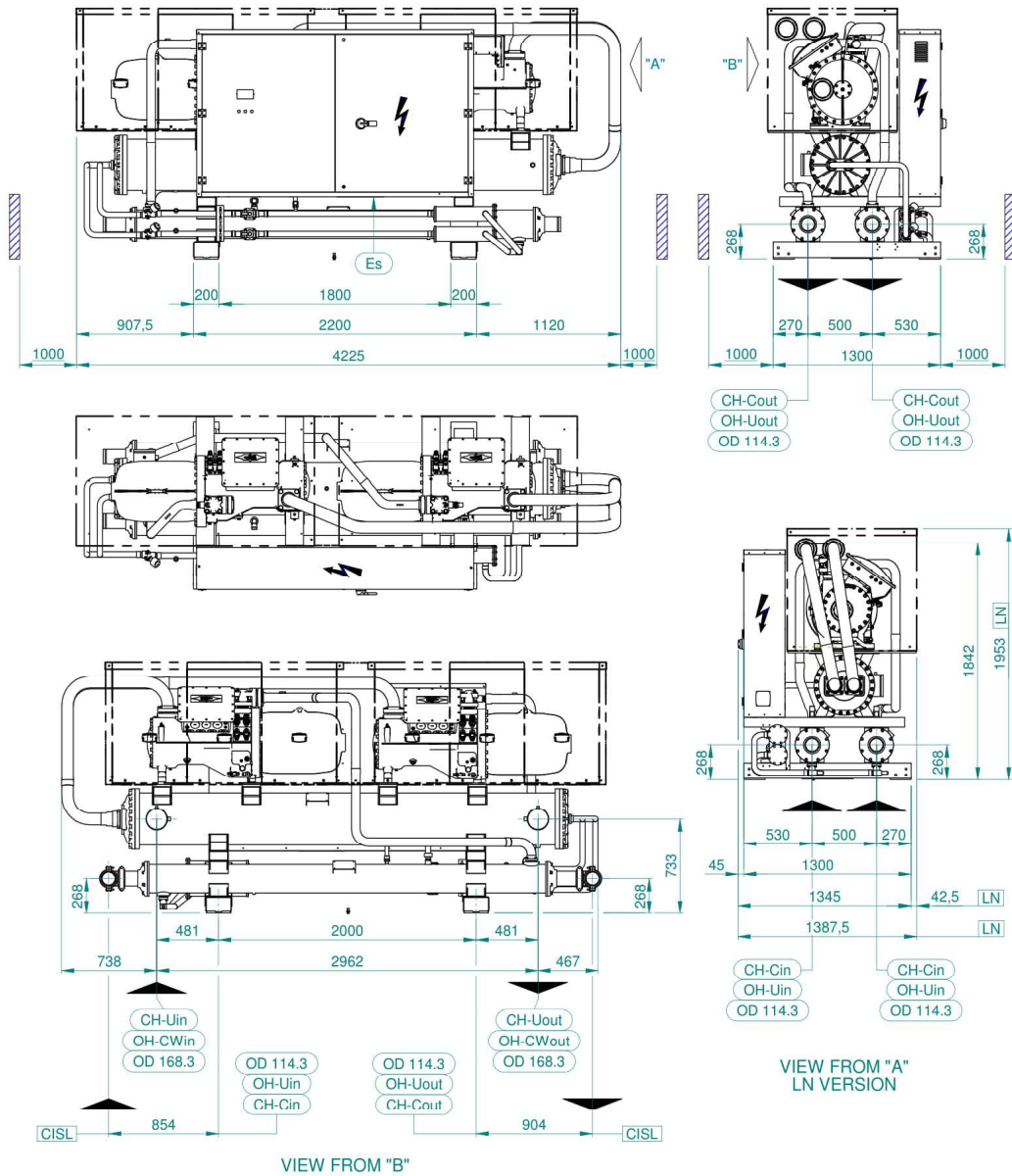


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



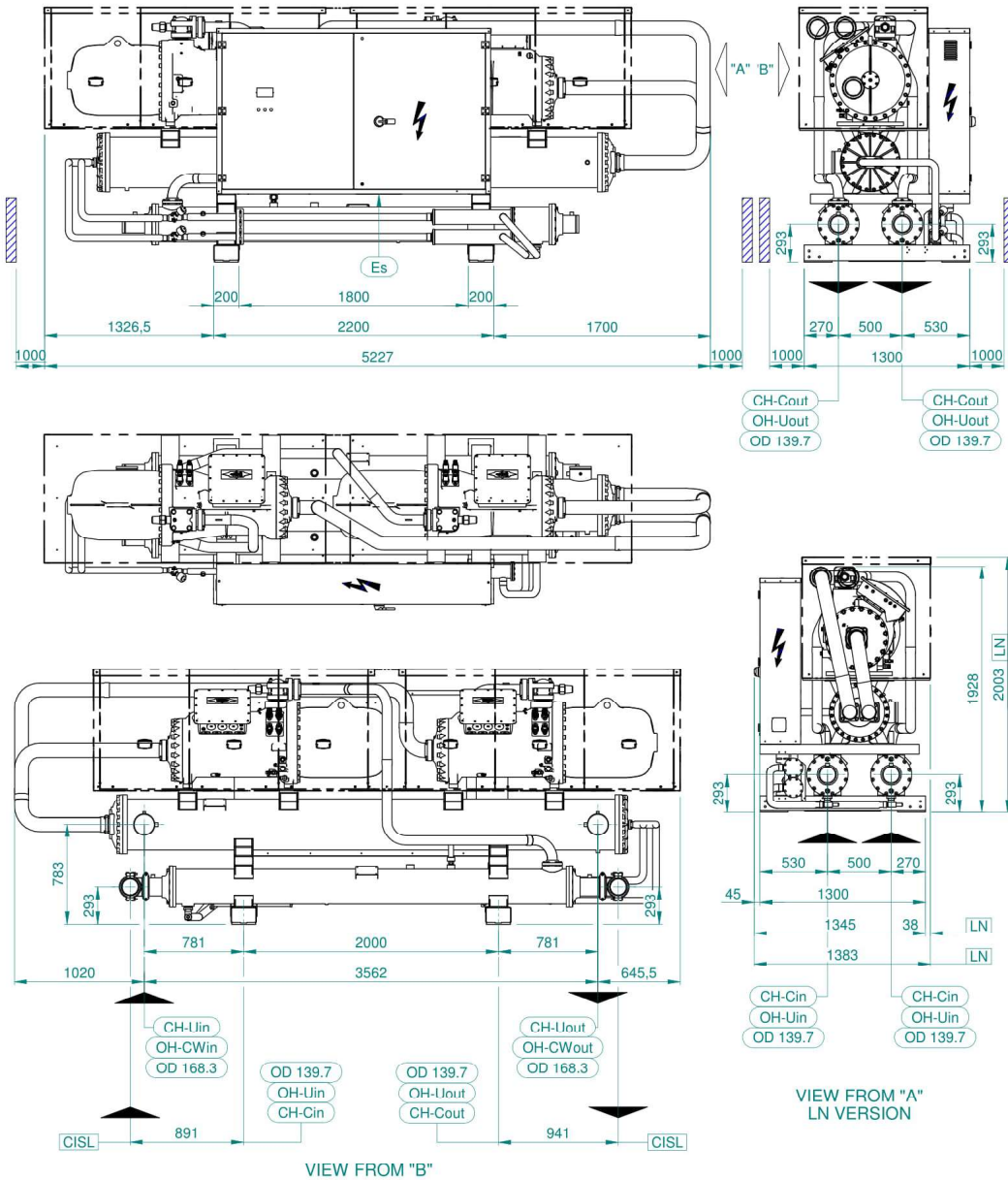


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

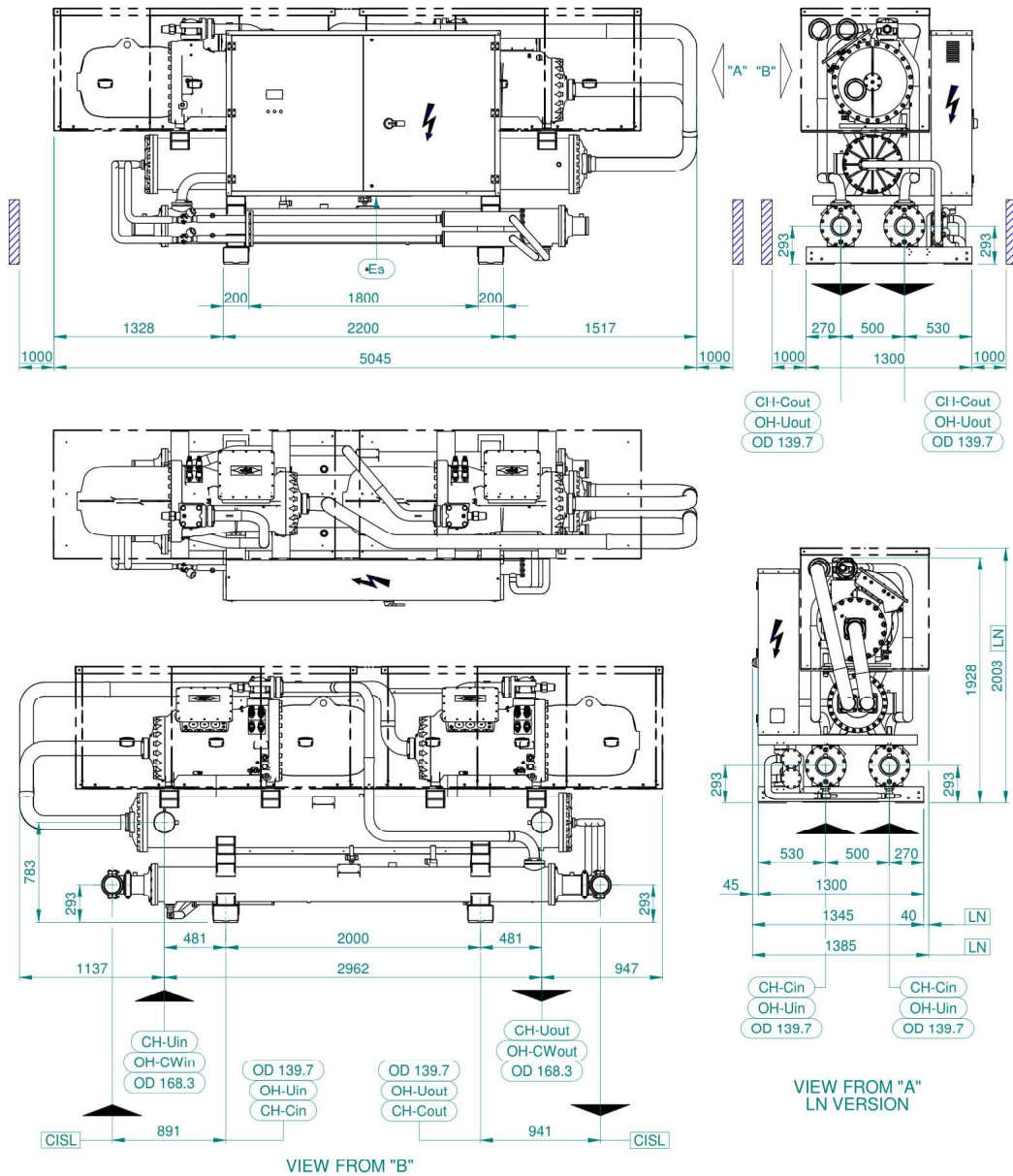


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.

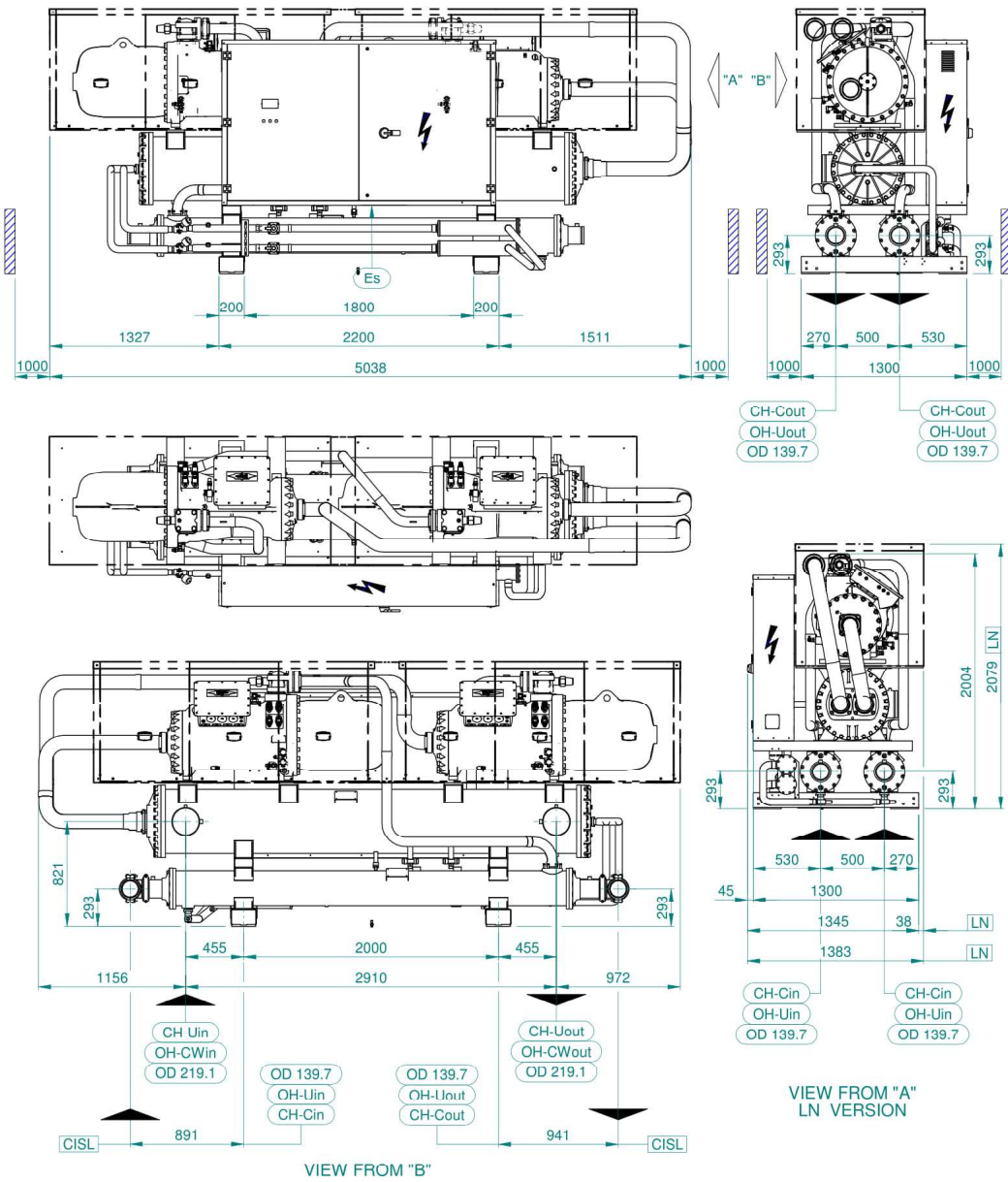




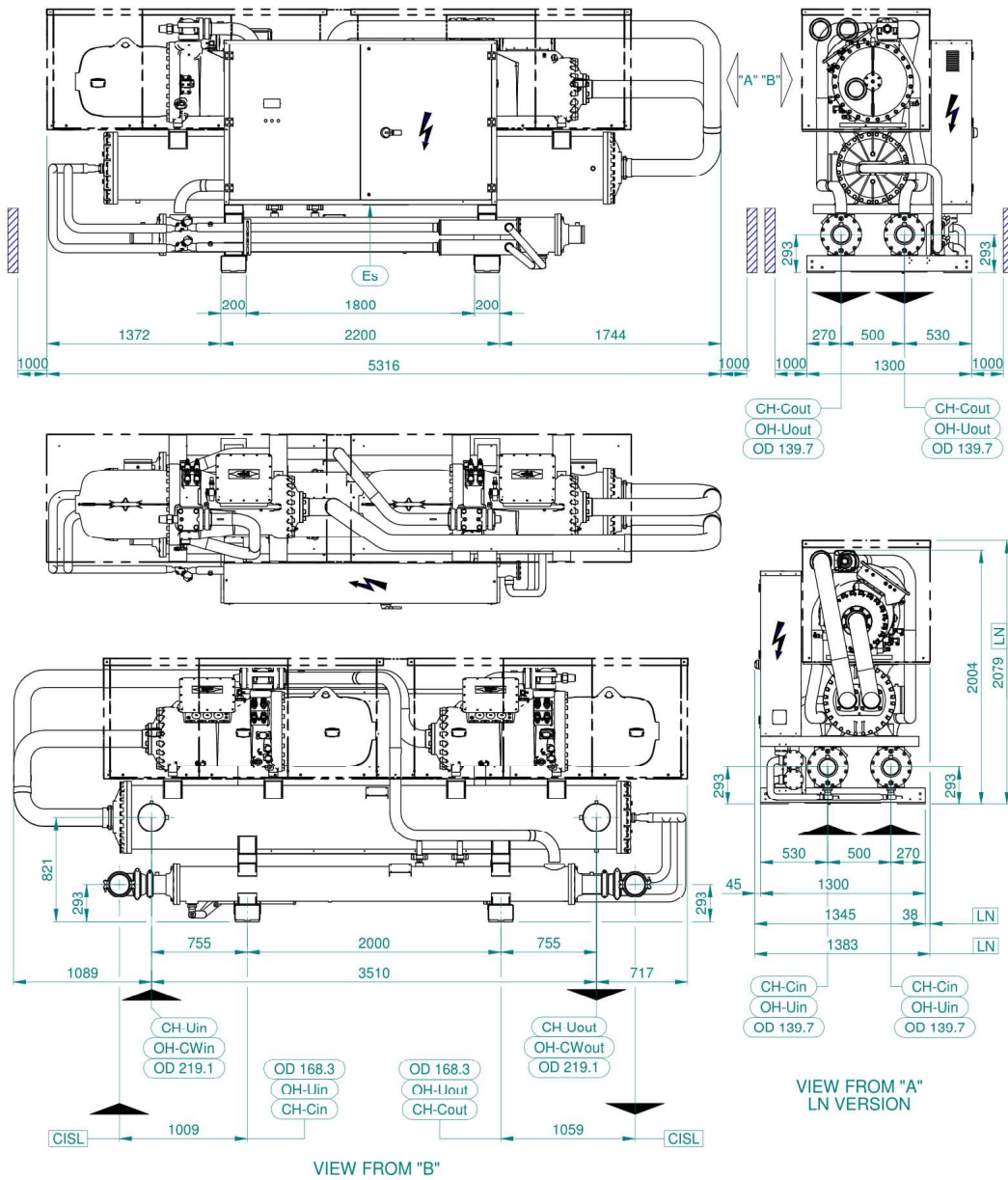
**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



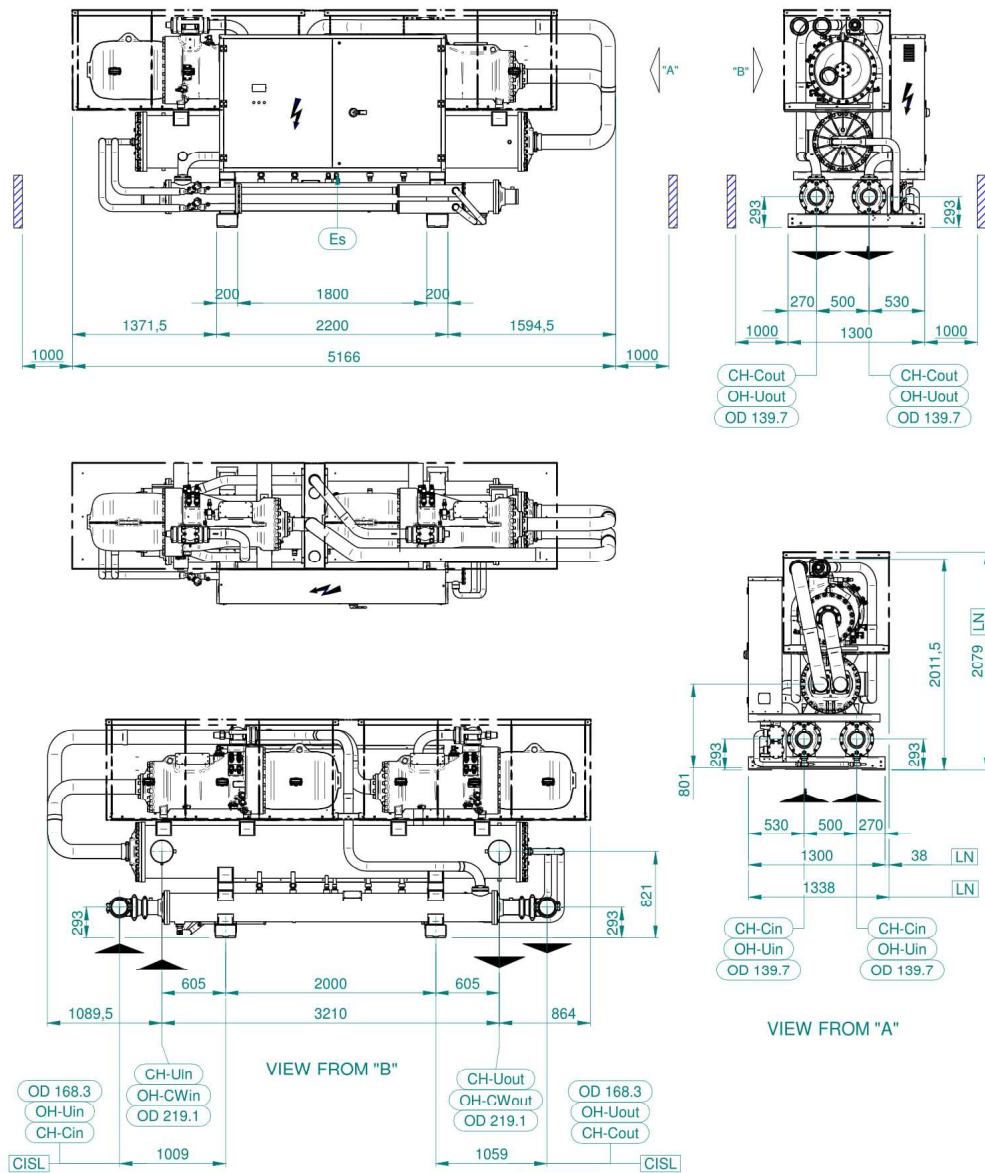
**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



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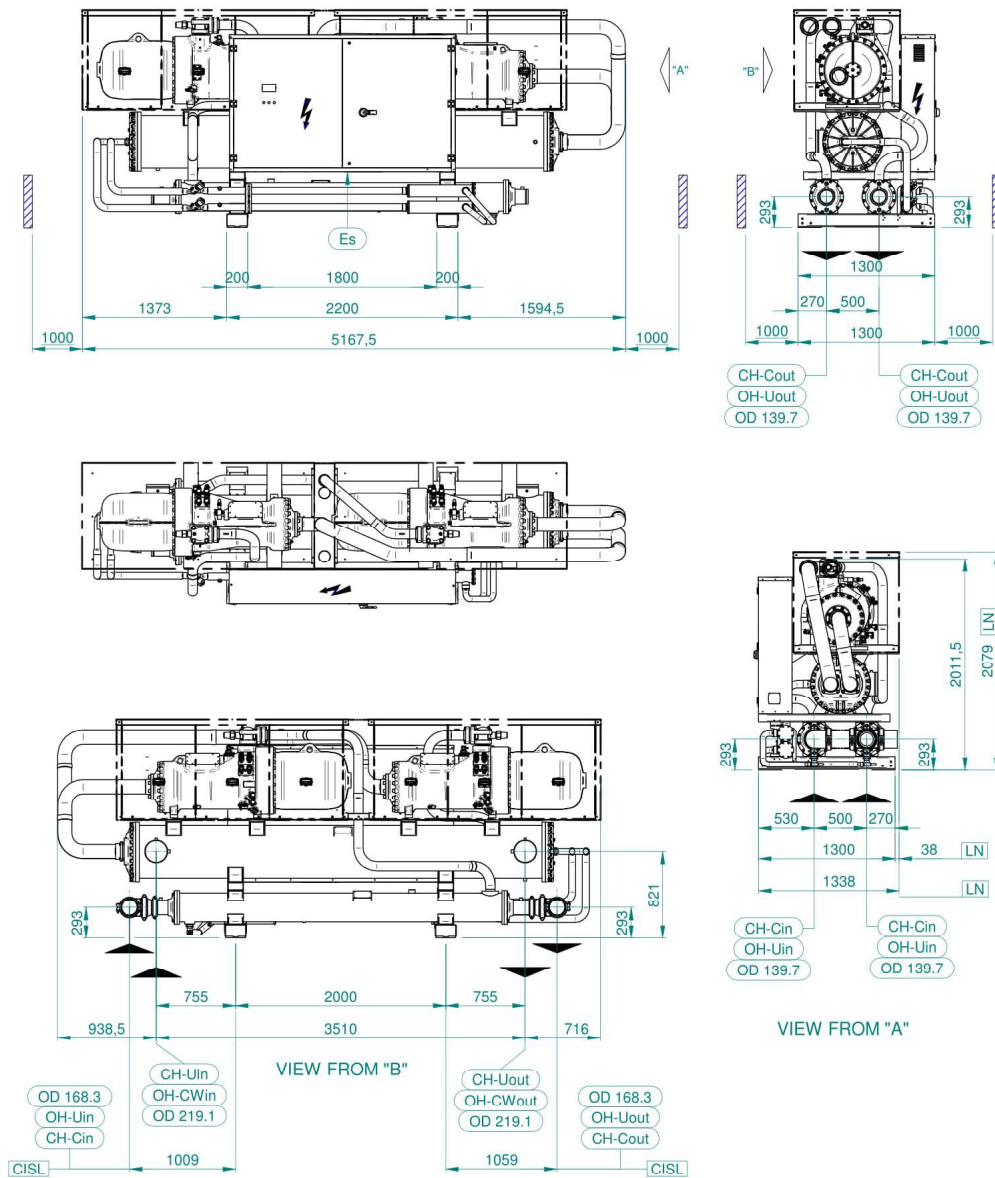


**Note:** These drawings are not contractually binding. For the installation design, refer to the specific dimensional drawing available on request.



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## 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:

<b>Total hardness</b>	2,0 ÷ 6,0 °f
<b>Langelier index</b>	- 0,4 ÷ 0,4
<b>pH</b>	7,5 ÷ 8,5
<b>Electrical conductivity</b>	10÷500 µS/cm
<b>Organic elements</b>	-
<b>Hydrogen carbonate (HCO<sub>3</sub><sup>-</sup>)</b>	70 ÷ 300 ppm
<b>Sulphates (SO<sub>4</sub><sup>2-</sup>)</b>	< 50 ppm
<b>Hydrogen carbonate / Sulphates (HCO<sub>3</sub><sup>-</sup>/SO<sub>4</sub><sup>2-</sup>)</b>	> 1
<b>Chlorides (Cl<sup>-</sup>)</b>	< 50 ppm
<b>Nitrates (NO<sub>3</sub><sup>-</sup>)</b>	< 50 ppm
<b>Hydrogen sulphide (H<sub>2</sub>S)</b>	< 0,05 ppm
<b>Ammonia (NH<sub>3</sub>)</b>	< 0,05 ppm
<b>Sulphites (SO<sub>3</sub>), free chlorine (Cl<sub>2</sub>)</b>	< 1 ppm
<b>Carbon dioxide (CO<sub>2</sub>)</b>	< 5 ppm
<b>Metal cations</b>	< 0,2 ppm
<b>Manganese ions (Mn<sup>++</sup>)</b>	< 0,2 ppm
<b>Iron ions ( Fe<sup>2+</sup> , Fe<sup>3+</sup>)</b>	< 0,2 ppm
<b>Iron + Manganese</b>	< 0,4 ppm
<b>Phosphates (PO<sub>4</sub><sup>3-</sup>)</b>	< 2 ppm
<b>Oxygen</b>	< 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.

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

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The quantity of antifreeze should be considered as % on weight

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## 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.

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,8$$

where

$V_{min}$  is the minimum water content of the system [l]

$P_{tot}$  is the total cooling capacity of the machine [kW]

N: number of capacity reduction steps

$\Delta T$ : differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K

$\rho$ : density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered

$c_p$ : specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered

Considering the use of water and grouping together some terms, the formula can be re-written as follows:

$$V_{min} = \frac{P_{tot}}{N} \cdot 28,66 + P_{tot} \cdot 0,8$$

For the N values, consider the following convention:

- for units with 1 compressor N = 4
- for units with 2 compressors N = 8



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## Installation site

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

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

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

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

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

The anti-vibration mounts must be fixed to the machine before positioning the unit on the ground.

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Company directed and coordinated by Investment Latour (Sweden)