

Omega SKY [R513A] 16.1



Configured unit accessories

A43 - 400/3/50 power supply

General description

Indoor water-condensed liquid chiller with semi-hermetic screw compressors, flooded shell-and-tube condenser and dry-expansion shell-and-tube evaporator.

Refrigerant

Refrigerant R513A standard. R513A is distinguished by its low environmental impact, with GWP=573. It is also a non-toxic and non-flammable fluid: A1 classification in accordance with ASHRAE; PED 2.

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). Units from 43.1 to 116.2 are approved PED III category. Units from 132.2 to 159.2 are approved PED IV category

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. Depending on size, the model consists of 1 or 2 condensers. Steel shell, and tube bundle made with copper tubes. The heads can be removed for tube inspection and cleaning.

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

Each refrigerant circuit of the unit comprises:

- delivery valve for each compressor
- shut-off valve in the liquid line
- charging valves
- 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
- a 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.

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

Standard power supply [V/ph/Hz]

400/3~/50

CONTROLS AND SAFETY DEVICES

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

- high pressure switch with manual reset
- high pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller
- low pressure safety device with automatic reset and limited tripping managed by the controller
- high pressure safety valve
- antifreeze probe at outlet of each evaporator
- water differential pressure switch installed at the factory
- overtemperature protection for compressors and fans

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;
- 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.

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.

CONFIGURED UNIT ACCESSORIES DESCRIPTION



ACCORDING TO EN14511

Unit		Omega SKY [R513A]
Model		16.1
Refrigerant fluid		R513A
Minimum partialization of the unit	%	50
Requested partialization	%	100

Cooling conditions

Fluid - User side		Water
Fouling factor - User side	m ² °C/W	0.0000440
Inlet water temperature - User side	°C	12.0
Outlet water temperature - User side	°C	7.0
Fluid - Source side		Water
Fouling factor - Source side	m ² °C/W	0.0000440
Inlet water temperature - Source side	°C	30.0
Outlet water temperature - Source side	°C	35.0

Cooling performances

Cooling capacity	kW	166.7
Total absorbed power (R1)	kW	32.7
Flow rate - User side	l/s	8.00
Pressure drops - User side	kPa	26.4
EER		5.10
ESEER basic unit (ESE)		6.55
SEER (12/7°C) (B1)		6.09(●)
η sc (12/7°C) (B1)	%	226
SEER Eurovent (12/7°C) (E)		6.09(●)
η sc Eurovent (12/7°C) (E)	%	226
Flow rate - Source side	l/s	9.53
Pressure drops - Source side	kPa	33.7

Sound levels

Lw_tot COOLING (4)	dB(A)	91
Lp_tot COOLING (5)	dB(A)	74

(R1) Compressor power

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

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

(B1) with reference to regulation 2016/2281 and norm EN 14825

(ErP legenda) – Not ErP compliant • ErP compliant o ErP compliant only with option VEC (EC fans)

(E) SEER value certified by Eurovent, referring to base unit, without any accessories (see also: 'ErP legenda')

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

Compressors

Type		
Number		1
Refrigerant circuits		1
Total oil charge	l	16.0
Total Refrigerant charge (R1)	kg	38.0

Heat exchanger - Source side

Type		Shell & tube
Number		1
Water content	l	31.1

Heat exchanger - User side

Type		Shell & tube
Number		1
Water content	l	95.0

Dimensions

Length	mm	3050
Width	mm	900
Height	mm	1900

Weight

Net weight	kg	2100
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(R1) The indicated refrigerant charge is calculated. The refrigerant charge can vary according to different versions/accessories and product updates.

ELECTRICAL DATA (Theoretical calculations)

Power supply	V/ph/Hz	400/3~/50 ±10%
Control power supply	V/ph/Hz	230-24/1~/50

Electrical performances

Maximum absorbed power (E1)	kW	47.60
Maximum starting current - LRA	A	140.0
Full load current - FLA	A	105.0
Rated Load Ampere - RLA	A	

(E1) Mains power supply to allow unit operation

Technical calculations may change according to calculation methods. Technical data may be revised.

Conformity Ecodesign

CE marked unit, compliant to Ecodesign (regulation 2016/2281) according to SEER 12/7°C (low temperature application). The unit can be installed in EU countries.

Data referred to the selected unit, any configuration change may not guarantee the performance and compliance to Ecodesign.

SOUND LEVEL

Sound Level	63 [Hz]	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]		
Lw [dB]	73	76	85	88	88	84	65	54	Lw_tot dB(A)	91
Lp [dB]	65	68	77	80	80	76	57	46	Lp_tot dB(A)	74

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

Lw: sound power levels.

Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

Lw_tot is the only binding value.

Lp: sound pressure levels.

Values calculated from sound power levels, referring to distance of 1m from the unit; source installed on a reflective surface in ideal free field conditions with directivity factor Q=2.

None of the Lp values are binding.

The acoustic data relates to the standard conditions described above, in referable and reproducible operating modes.

All data except Lw_tot are given for the mere purpose of example and can not be used for predictive purposes or for the verification of enforced limits.

With specific reference to the acoustic emissions, the Manufacturer commits to their conformity limited to the declared Lw_tot value.

Any liability of the Manufacturer is excluded concerning the impact of such emissions with reference to the location of the plant and to other conditions related to the installation of the unit.

The environment and the installation's characteristics, besides the operating modes, may alter the acoustic emissions.

The overall acoustic evaluation, with regard to site conditions, remains the responsibility of the installer.

