

IP-B/ST/AS 301 Air cooled water chillers - Scroll compressors



This picture is a mere indication of the product range selected. It may not correspond to the model/unit chosen.

Structure

Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Base made of galvanized steel sheet, oven-painted with polyurethane powders. Equipped with sturdy support feet that facilitate the handling of the unit and allow a simple and quick installation. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. Panelling made of galvanized steel, externally coated with plastic film (PVC). Fastening to the aluminium frame is made with stainless steel screws mounted flush on the panels. Internal carpentry in galvanized steel sheet. Rainwater collection tray, in case of outdoor installation, complete with conveyable discharge without the disassembly of any panel. Sealing gaskets fitted on panels' edges, made coextruded plastic with differentiated consistency.

Compressor

Hermetic scroll compressor with spirals orbiting specially designed and optimized for use with the selected refrigerant. These compressors, the latest generation, give high energy performance. The electric motor is cooled by refrigerant suction gas and it is protected against any abnormalities with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. The compressor is complete with oil charge. The compressor is fitted on rubber antivibration mounts in order to reduce vibration to the structure. These compressors give a reduced noise level, a limited inrush current and a high MTBF (mean time between failures). The electrical terminals of the motor are placed in a dedicated box realized with IP54 protection.

Fan(s)

Low speed, axial-flow fans fitted with accident-prevention protective grille on air inlet; directly coupled motor with built-in thermal cut-out. Aerodynamic housing and the profile of blades increase efficiency and decrease noise level. Protection degree IP 54.

Air heat exchangers

Finned coil made with copper pipes arranged on staggered rows, mechanically expanded inside a pack of aluminium fins offering a high exchange surface area.

Water heat exchangers

Brazed plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure

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switch. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.

The refrigerant-side evaporation is controlled by a water-side actuated thermostatic valve entirely managed by the microprocessor system mounted on board. The evaporator is equipped with a differential pressure switch to stop the unit in case of low water flow.

Heat exchangers that work at low temperature are thermally insulated and covered by polyurethane foam to protect from condensation. The heat exchanger connections are placed near the outside edge of the machine.

Air vent valve included.

Differential pressure switch included.

Standard thermal insulation thickness: 9 mm.

Electric board

Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components:

- Main isolator switch
- Door interlock safety device
- Contactor and protection (fuse) for compressor(s), fan(s) and pump (if present) (overload switch standard for units 21, 31 and 51)
- Power supply without neutral
- Phase monitoring sequence relay

Control

The microprocessor control system in addition to providing a rapid and intuitive digital interface to the user, manages all machine control operations offering, thanks to the possibilities given by the electronics, a thorough safety and complete on the operation of the whole system. The LCD display is backlit type. Using the display, you can monitor the performance of the system variables and display all the working conditions or the settings.

In more detail, you can perform the following functions:

- Programming of the machine with password-protected access to ensure safety to the most sensitive parameters
- View by display the alarms detected, the historicization of alarms can be found by querying the display (only with clock card)
- LED display of the active functions
- Visualization of all the measured
- Operator interface with digital display
- Remote Management cumulative alarm free power contact
- Ready for ON/OFF remotely
- Alarm reset and unlock unit from keyboard
- Self-diagnostic Functions
- Ability to output serial interfacing with external supervision systems (optional only by additional card)

Refrigerant circuit

The refrigerant circuit is specifically designed for the selected refrigerant gas, in order to minimize load losses and to avoid capacity reduction. The circuit is entirely made of copper tube brazed with silver alloy and it is isolated on the suction part, in order to avoid condensation.

The circuit's main components are:

- Molecular sieve that retains mechanical impurities and dry the circuit in order to eliminate moisture traces
- Safety valve, that ensures circuit's opening before reaching critical operating conditions (if applicable in accordance with the regulations).
- Moisture-liquid sight glass: coloured indicator of liquid passage for the verification of the charge and of the moisture content of the gas.
- Oil level management with equalizer tube only for tandem configurations.
- Refrigerant charge and oil
- Thermostatic expansion valve as standard
- Optional electronic expansion valve, standard from model 252
- HP and LP pressure safety switch

The refrigerant circuit is realized in compliance with PED Directive (2014/68/EU).

Water circuit

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The Base solution, as interface to the plant, includes the water fittings of the evaporator only. However a pumping system is necessary for properly circulating the fluid.

Sound levels

Sound levels are obtained by means of theoretical calculations that could deviate from the real conditions of the place of installation of the unit.

Sound Power: this is the acoustic emission of the unit when operating. It is dependent on operating conditions.

Sound power level in compliance with ISO 3744.

Sound Pressure: this is the measurement of the effect of the acoustic emission generated by the unit at a certain distance and in the acoustic environment (reflection, absorption, directivity) in which it operates. The value will depend on the sound power of the unit, the directivity of the source and the reflectivity of the surroundings. Sound pressure level (average value), calculated for unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

It is assumed that sound power and sound pressure are linked together by defining the space and conditions as follows:

- the source is omnidirectional, i.e. the acoustic emission is the same in all directions
- the conditions are free field, i.e. at 1 meter from the source there is no effect from acoustic wave reflections with the exception of the support plane

The power is therefore distributed over an imaginary sphere around the unit and the following relationship applies:

- sound pressure at 1 m = sound power - 11 dB (A)

Selected accessories

- Spring vibration isolation mounting (Kit). The system prevents the transmission of vibrations to the structure where the unit is located.
- Metallic protection panel, used to protect the condensing coil from accidental impacts.
- ElectroFin® treatment delivers corrosion durability protection for fins and tubes, increasing efficiency and length of service.
- Modulating condensing control by regulation of fans speed using cutting phase system.
- Certificate according to Pressure Equipment Directive 2014/68/EU (PED).
- Pressure safety switch installed on the Low Pressure side (LP). The pressure switch is in compliance with EN 378-2:2016 Standard.
- Pressure safety switch installed on the High Pressure side (HP). The pressure switch is in compliance with EN 378-2:2016 Standard.
- Gauges for the control of low and high refrigerant pressures, embedded in glycerine.
- Crankcase electric heater directly installed on the compressor in order to evaporate any drops of liquid.
- Electronic expansion valve for the accurate and timely control of the superheater level, after evaporation and many others operative functions.
- Passive oil control: the compressor sumps are linked via tubes (equalisation lines).
- Brazed plate-type evaporator made of AISI 316 steel (brazed with Cu) complete with water differential pressure switch. Shell covered with closed-cell neoprene anti-condensate material.
- Differential pressure switch with the function to prevent the failure of the machine due to reduced or absent water flow.
- Electromechanical flow switch prevents the failure of the machine due to reduced or absent water flow.
- Manual air vent valve for discharging air from water circuit.
- Thermal insulation for heat exchanger with special thickness of 9 mm.
- Power supply with no neutral.
- Sequence phases relay mounted directly inside the electrical box and with the function of stopping the unit in the case where the phase sequence is not correct.
- Display with 3 digits and digital point.
- Meter for the counting of operating hours.
- Remote controlled On/Off switch.

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CONFIGURED UNIT TECHNICAL DATA

Unit	IP-B/ST/AS
Model	301
Refrigerant fluid	R410A

Cooling conditions

Fluid - User side	Propylene Glycol 25%
Fouling factor - User side	m ² °C/W 0.0000176
Inlet fluid temperature - User side	°C 5.0
Outlet fluid temperature - User side	°C 0.0
External air temperature	°C 27.0
Height a.s.l.	m 0

Cooling performances

Cooling capacity	kW	58.2
Compressors power input	kW	16.7
Total power input (A1)	kW	19.0
Flow rate - User side	l/s	2.89
Pressure drops - User side	kPa	32
EER gross (A1)		3.06
Air flow rate	m ³ /h	28400
Available static pressure	Pa	0
Fans power input	kW	2.3
Fans absorbed current	A	4.50

(A1) Compressor and fans power - selected operating conditions

Compressors

Type	Scroll
Number	2
Refrigerant circuits	1

Fans

Type	AC
Number	2
Rated power input	kW 3.9
Rated absorbed current	A 7.8

Heat exchanger - User side

Type	Brazed Plate
Number	1

ELECTRICAL DATA (Theoretical calculations)

Power supply	V-ph-Hz	400-3-50
Control power supply	V-ph-Hz	24-1-50 / 230-1-50
Maximum power input without pump	kW	29.9
Locked rotor current – LRA without pump	A	136.0
Full load current - FLA without pump	A	67.5

Power line must not be sized according to electrical data supplied with this offer

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

Dimensions

Length	mm	2580
Width	mm	990
Height	mm	2268

Sound levels

Sound power (4)	dB(A)	85
Sound pressure (5)	dB(A)	53

Weight

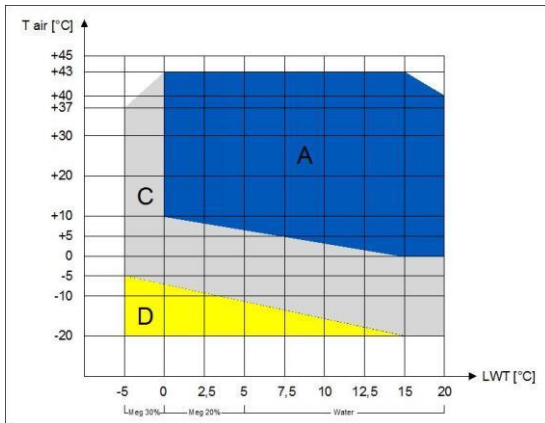
Net weight	kg	885
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(4) Sound power levels calculated according to ISO 3744.

(5) Sound pressure levels measured at a distance of 10 meters from the unit in free field and directivity factor $Q=2$

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OPERATING LIMITS



The chart represents the operational limits of the unit in relation to the selected reference conditions.

Legend:

Area A: Standard operating area

Area C: Operating area with modulating fan speed control (option)

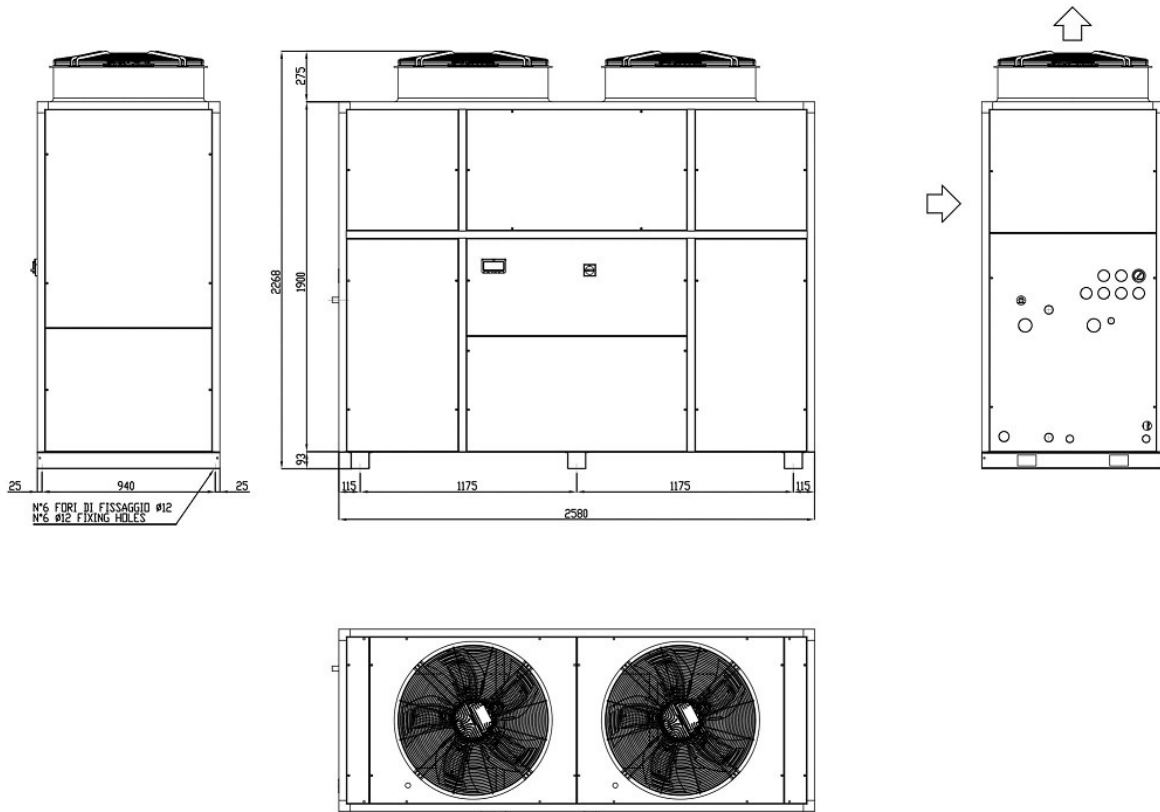
Area D: Operating area with EC Fans (option)

T air: Outdoor air temperature [°C]

LWT: Evaporator outlet temperature [°C]

MEG: Mixture of ethylene glycol

DIMENSIONAL DRAWING



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