WSAN-XSC 352-602

AIR-COOLED HEAT PUMP FOR EXTERNAL INSTALLATION FROM 86 TO 151 KW

SPINCHILLER represents the very latest step in the evolution of chiller units.Designed specifically to optimize efficiency at partial loads, units of the SPINCHILLER series offer lower energy consumption — under normal operating conditions — than any other chiller of similar rated capacity.

Eurovent energy efficiency classificaton class A in heating mode

WSAN-XSC 352 - 602 (R-410A)		
Size	Cooling [kW]	Heating [kW]
352	86.3	99.7
402	97.1	112
432	106	123
452	116	134
502	126	142
552	137	153
602	151	175

REPLACE: BT041001GB-00

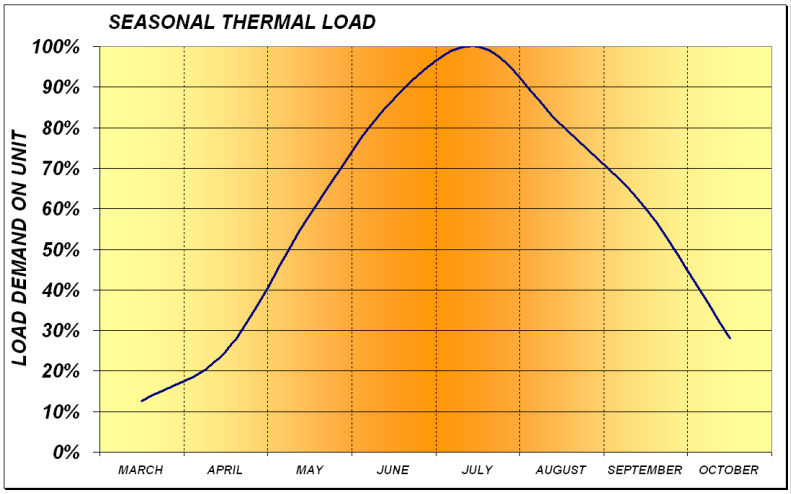
The SPINCHILLER series signals a turning point in the development of this type of unit. It incorporates all the newest technology currently available, and is characterized by:
EFFICIENCY
thanks to special features of construction, the SPINCHILLER guarantees high energy efficiency, especially when operating under partial load conditions;
SELF-ADAPT CAPABILITY
evolved electronics ensure that the operating parameters of the chiller can be adapted to the load conditions of the overall system, optimizing power consumption, minimizing noise and extending the life of components;
RELIABILITY SCROLL
compressors and newly designed electronic controllers combine to give levels of reliability unattainable hitherto with conventional units of similar rated capacity

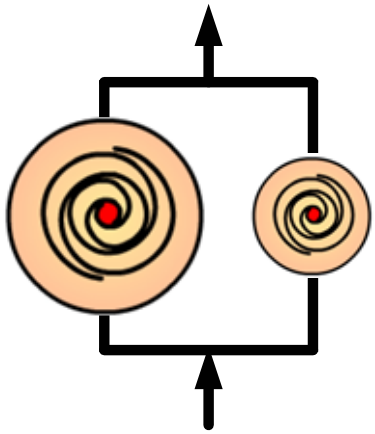
BT07M004GB-00

Clivet is partecipating in the EUROVENT Certification Programme "Liquid Chilling Packages". Products are listed in the EUROVENT Directory of Certified Products and in the site www.eurovent-certification.com. Eurovent Chillers Certification Programme covers air cooled packaged chillers up to 600 kW and water cooled packaged chillers up to 1500 kW.

Comfort is a human right. Care for the environment is a human duty.

The SPINCHILLER is an appliance of new conception, designed especially to operate with increasing efficiency as thermal load reduces, yet able to handle the maximum load demand whenever necessary. Because of significant diurnal and seasonal variations in load, chillers must operate for prolonged periods under partial load conditions. A SPINCHILLER unit always ensures conditions of maximum comfort coupled with ultra high efficiency for most of the system's working life, which means a big saving in electrical energy. This reflects the corporate policy of CLIVET, namely: offering fundamental and concrete solutions to help safeguard the well-being of people and their environment. By way of example, here is a seasonal thermal load graph relating to a multi-use building (shops, offices and apartments) located in the Milan area.



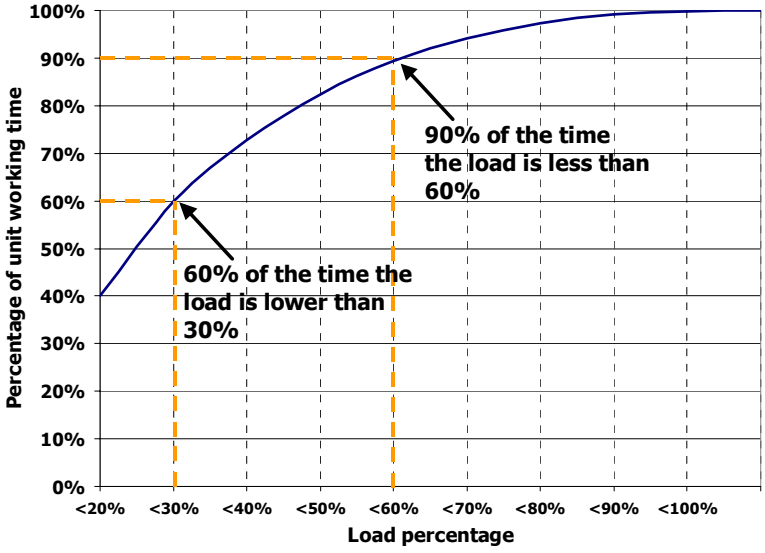


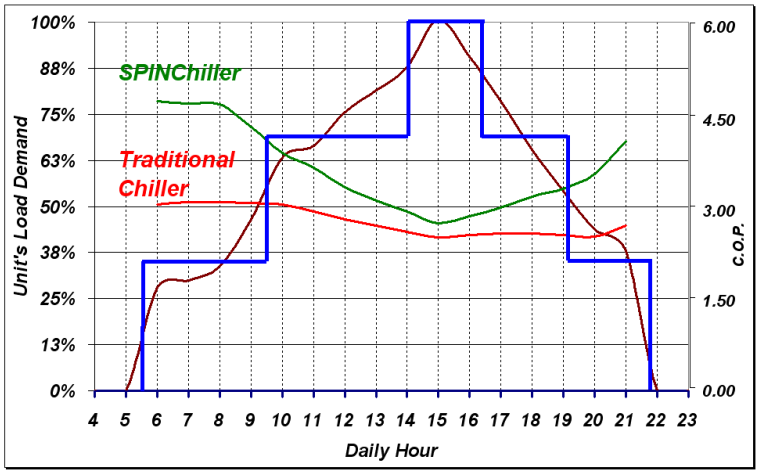
MULTIPLE HIGH EFFICIENCY SCROLL COMPRESSORS IN THE SAME COOLING CIRCUIT

The bases for the design approach of SPINCHILLER is the choice to use several SCROLL compressors, installed on a single refrigeration circuit rather than on the traditional separate circuits.In addition, the use of compressors of compressors of various powers makes it possible to increase the number of power steps, and hence provides greater flexibility in stepping. In the way, the unit can perfectly follow the load of the system. The highly developed electronic control that SPINCHILLER is equipped with optimized activation of the compressors and balances their operating cycles.

HIGH EFFICIENCY AT PARTIAL LOADS

The unit in an air-conditioning system is selected on the basis of the maximum load the system is designed to handle. In practice however, maximum load conditions account only for a small percentage of the overall operating time, whereas the partial load operation is the true condition in which the unit had to operate. Simulation tests conducted in different buildings have shown that systems operate on average for 90% of total operating time with thermal load lower than 60%. Accordingly, operating efficiency under partial load conditions is a key consideration when selecting a chiller.



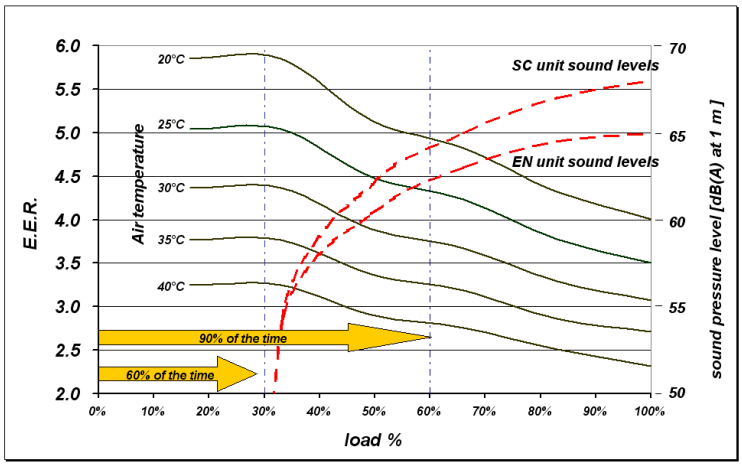


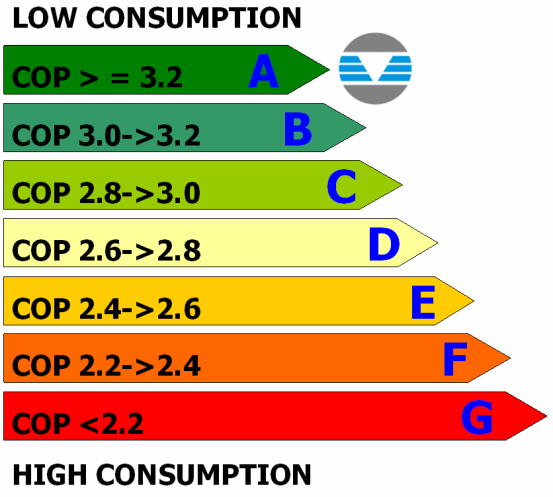
RESPONSE TO CHANGING LOAD

The higher efficiency of the SCROLL compressor and the special constructional features highlight the thermodynamic efficiency of the SPINChiller units. The graph to the side illustrates the extreme smoothness with which capacity delivered is adapted to the demand and shows how, even when not all the compressors are in operation, the efficiency of the SPINChiller remains higher than that of a conventional chiller, ACHIEVING EVEN DOUBLE THE EFFICIENCY WHEN OPERATING AT UNDER 50% LOAD. An advanced control system optimises the operating cycle and the rotation sequence of the compressors, significantly prolonging their service life. To obtain maximum efficiency, the electronic control activates the compressors according to the most favourable ratio between the heat exchange surfaces, so that the condensing and evaporation temperatures are always at the most beneficial values.

NOISE TOO IS LOAD-DEPENDENT

The electronic condensation control, included as standard on all SPINCHILLER units, is designed to adjust the speed of the fans automatically as the thermal load reduces. Given that the fans are the main source of noise in a chiller, this is a feature that brings important benefits, especially at night-time, when the demand on the system is less but sensitivity to noise is greatest.
From the graph, it will be seen that for 90% of operating time, the sound pressure level is around 6-8 dB(A) lower than would be the case when operating at maximum load.





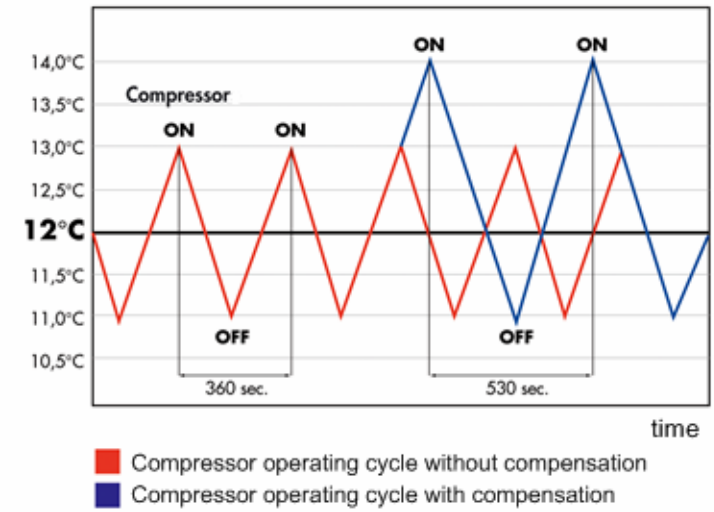
ENERGY EFFICIENCY CLASS (heating)

In the scenario of rapid climate change in which we live today, the commitment to respect for the environment and a more rational use of resources focuses even greater attention on the energy efficiency of buildings and systems. The interest that Clivet has always dedicated to energy efficiency pays off in this new series of air-water heat pumps, WSAN-XSC. Class "A" according to the EUROVENT energy efficiency classification in heating operation for air-water unit.

Optimized operation as heat pump

A special precaution in the refrigerant circuit allows frost prevention at the base of air exchanger during operation in heat pump.

ICE PROTECTION SYSTEM



SLIDING TEMPERATURE

The electronic control that SPINCHILLER is equipped with makes it possible to adapt the temperature of the water generated by the unit the perceived load conditions according to a concept of SCROLLING TEMPERATURE that seeks the best balance between power to be supplied and the energy used to produce it.

STANDARD UNIT SPECIFICATIONS

COMPRESSOR
A oil heater is automatically switched on at the compressor shut-down to prevent oil dilution by the refrigerant.
hermetic orbiting scroll compressor complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. Fitted on rubber antivibration mounts and complete with oil charge

STRUCTURE
hot-galvanized and painted plate structure with pre-painted aluminium external panelling to ensure maximum weatherability. The uniform distribution of the weight of the unit is guaranteed by the base structure, made up of galvanized and painted plate section bars, and featuring holes to simplify the lifting and earthing of the unit.

INTERNAL EXCHANGER
direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates with large exchange surface and complete with external heat and anti-condensate insulation.
the exchanger comes complete with:
differential pressure switch, water side
antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

EXTERNAL EXCHANGER
Direct expansion finned exchanger, made from copper pipes in staggered rows and mechanically expanded to the fin collars. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.
The coils are complete with integral subcooling circuit which assures the correct refrigerant feeding of the expansion valve. This circuit prevents the formation of frost on the exchanger during winter operation. Available in different options as per optional list.

FAN
Helical fans with sickle-shaped blades with "Winglets" at the end, coupled directly to a three phase electric external rotor motor with thermal protection incorporated in version IP 54. Housed in aerodynamically shaped nozzles to increase efficiency and minimize noise levels. They are fitted with protective safety guard grilles.

REFRIGERANT CIRCUIT
The circuit is complete with:
- replaceable anti-acid solid cartridge dehydrator filter
- sight glass with moisture indicator
- liquid receiver
- electronic expansion valve (see details further on)
- non-return valve
- 4-way reverse cycle valve
- high pressure switch
- low pressure switch
- high pressure safety valve
- low pressure safety valve
- liquid line shut-off valve
- compressor discharge shut-off valve
- compressor suction shut-off valve

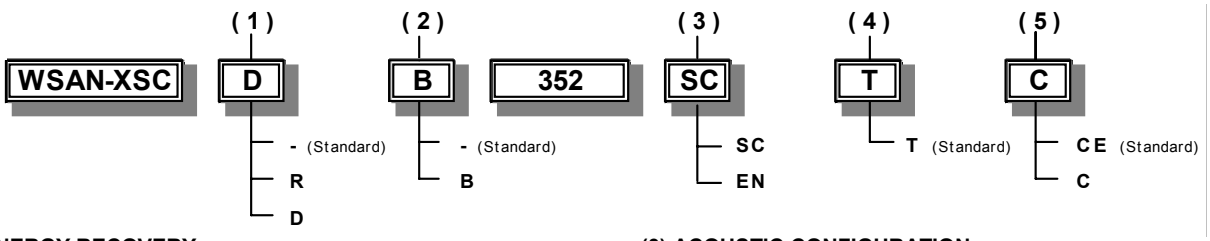
ELECTRICAL PANEL
the Power Section includes:
- main door lock isolator switch
- isolating transformer for auxiliary circuit power supply
- compressor circuit breaker
- fan overload circuit breakers
- compressor control contactor
- fan control contactors
- phase-cutting fan speed control

the control section includes:
- proportional + integral water temperature control
- antifreeze protection
- compressor overload protection and timer
- self-diagnosis system with immediate display of the error code
- compressor operating hour display
- remote ON/OFF control
- Remote HEAT/COOL control
- automatic compressor start rotation control
- relay for remote cumulative fault signal
- input for demand limit (absorbed power limit according to an external signal 0÷10V or 4÷20mA)
- prealarm function for water anti-ice and high refrigerant gas pressure
- display of the set values, the error codes and the parameter index
- ON/OFF and alarm reset buttons
- interface terminal with graphic display
- Electronic for Elfo Control system (optional)

ACCESSORIES
- Condenser coil in copper/aluminium with acrylic coating
- Copper/copper condenser coil
- condenser coil and compressor compartment protection grill.
- steel mesh strainer to be mounted at the exchanger inlet. Should the filter not be installed in the water system, Clivet declines all responsibility and the warranty on the equipment automatically expires .
- high and low pressure gauges
- Hydro Pack (see page 8)
- Anti-ice electric heaters utility side for hydronic group
- 250 l. storage tank with antifreeze electric heater
- phase monitor
- power factor correction capacitors (cosfi > 0.9)
- Free contacts for compressor state
- Electric heaters on condensate collection tray
- breakaway current reducing device (soft start)
- set point compensation with 4-20 mA or 0-10 V signal
- set point compensation according to the outside enthalpy
- remote microprocessor control unit
- data logger (device for the acquisition of status and regulation values, as well as for recording the operation conditions in the surrounding of alarm events)
- spring antivibration mounts
- ECOBreeze (see page 7)
- Master-Slave function
- CAN/LON WORKS serial converter kit
- CAN/MODBUS serial converter kit

TEST
All the units are factory-tested in specific steps, before shipping them. After the approval, the moisture contents present in all circuits are analyzed, in order to ensure the respect of the limits set by the manufacturers of the different components.

CONFIGURATION CODE



(1) ENERGY RECOVERY
Total energy recovery(R)
performed using braze-welded plate exchangers suitable for recovering 100% of the condensing heat for the production of hot water
In addition, exchangers are complete with antifreeze heater to protect against the risk of ice.
Partial energy recovery(D)
made using tube bundle exchangers to recover the desuperheating heat, up to 25% of the total heat of the unit.
In addition, exchangers are complete with antifreeze heater to protect against the risk of ice.

(2) LOW TEMPERATURE
Water low temperature(B)
this version allows unit operation in the range of water and glycol mix temperatures between +4 and -8°C.
Two Versions are available:
- Unit only for low temperatures
- Unit with double set-point operating set-point

(Please contact our Sales office for special conditions)

(3) ACOUSTIC CONFIGURATION
Acoustic configuration with compressor soundproofing(SC)
this configuration is obtained by inserting the compressors in a soundproof enclosure.
Extremely low noise acoustic configuration(EN)
this configuration is reached by inserting the compressor in an soundproofed enclosure and reducing the fan speed.

(4) ENERGY EFFICIENCY
Energy efficiency for temperate climate(T)
standard

(5) HEAT EXCHANGERS APPROVALS
Heat exchangers approvals C = CLIVET (Internal Testing)(CLV)
Heat exchangers approvals CE = PED (European Testing)(PED)

COMPATIBILITY OF WSAN-XSC OPTIONS

OPTIONS	DESCRIPTION	352	402	432	452	502	552	602
D + R	Partial energy recovery, Total energy recovery,	⊗	⊗	⊗	⊗	⊗	⊗	⊗
D + 1PM	Partial energy recovery, Hydropack with 1 pump +1 in stand-by,	✓	✓	✓	⊗	⊗	⊗	⊗
D + 1P1SB	Partial energy recovery, Hydropack with 1 pump,	✓	✓	✓	⊗	⊗	⊗	⊗
D + 2PM	Partial energy recovery, Hydropack with 2 pumps,	✓	✓	✓	✓	✓	✓	✓
D + 2P1SB	Partial energy recovery, Hydropack with 2 pumps + 1 in stand-by,	✓	✓	✓	✓	✓	✓	✓
D + 3PM	Partial energy recovery, Hydropack with 3 pumps,	✓	✓	✓	✓	✓	✓	✓
D + 3P1R	Partial energy recovery, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard,	✓	✓	✓	✓	✓	✓	✓
D + 1PM + A250R	Partial energy recovery, Hydropack with 1 pump +1 in stand-by, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	⊗	⊗	⊗	⊗
D + 1P1SB + A250R	Partial energy recovery, Hydropack with 1 pump, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	⊗	⊗	⊗	⊗
D + 2PM + A250R	Partial energy recovery, Hydropack with 2 pumps, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	✓	✓	✓	✓
D + 2P1SB + A250R	Partial energy recovery, Hydropack with 2 pumps + 1 in stand-by, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	✓	✓	✓	✓
D + 3PM + A250R	Partial energy recovery, Hydropack with 3 pumps, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	✓	✓	✓	✓
D + 3P1R + A250R	Partial energy recovery, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 250 l. storage tank with antifreeze electric heater	✓	✓	✓	✓	✓	✓	✓
R + 1PM	Total energy recovery, Hydropack with 1 pump + 1 in stand-by,	✓	✓	✓	⊗	⊗	⊗	⊗
R + 1P1SB	Total energy recovery, Hydropack with 1 pump,	✓	✓	✓	⊗	⊗	⊗	⊗
R + 2PM	Total energy recovery, Hydropack with 2 pumps,	✓	✓	✓	✓	✓	✓	✓
R + 2P1SB	Total energy recovery, Hydropack with 2 pumps + 1 in stand-by,	✓	✓	✓	✓	✓	✓	✓
R + 3PM	Total energy recovery, Hydropack with 3 pumps,	✓	✓	✓	✓	✓	✓	✓
R + 3P1R	Total energy recovery, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard,	✓	✓	✓	✓	✓	✓	✓
R + 1PM + A250R	Total energy recovery, Hydropack with 1 pump + 1 in stand-by, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
R + 1P1SB + A250R	Total energy recovery, Hydropack with 1 pump, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
R + 2PM + A250R	Total energy recovery, Hydropack with 2 pumps, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
R + 2P1SB + A250R	Total energy recovery, Hydropack with 2 pumps + 1 in stand-by, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
R + 3PM + A250R	Total energy recovery, Hydropack with 3 pumps, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
R + 3P1R + A250R	Total energy recovery, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 250 l. storage tank with antifreeze electric heater	⊗	⊗	⊗	⊗	⊗	⊗	⊗
A250R + 1PM	250 l. storage tank with antifreeze electric heater, Hydropack with 1 pump + 1 in stand-by,	✓	✓	✓	⊗	⊗	⊗	⊗
A250R + 1P1SB	250 l. storage tank with antifreeze electric heater, Hydropack with 1 pump,	✓	✓	✓	⊗	⊗	⊗	⊗
A250R + 2PM	250 l. storage tank with antifreeze electric heater, Hydropack with 2 pumps,	✓	✓	✓	✓	✓	✓	✓
A250R + 2P1SB	250 l. storage tank with antifreeze electric heater, Hydropack with 2 pumps + 1 in stand-by,	✓	✓	✓	✓	✓	✓	✓
A250R + 3PM	250 l. storage tank with antifreeze electric heater, Hydropack with 3 pumps,	✓	✓	✓	✓	✓	✓	✓
A250R + 3P1R	250 l. storage tank with antifreeze electric heater, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard,	✓	✓	✓	✓	✓	✓	✓
A250RPS + 1PM + PUA2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 1 pump + 1 in stand-by, 2 poles type A pump	✓	✓	✓	⊗	⊗	⊗	⊗
A250RPS + 1PM + PUB2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 1 pump + 1 in stand-by, 2 poles type B pump	✓	✓	✓	⊗	⊗	⊗	⊗
A250RPS + 1P1SB + PUA2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 1 pump, 2 poles type A pump	✓	✓	✓	⊗	⊗	⊗	⊗
A250RPS + 1P1SB + PUB2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 1 pump, 2 poles type B pump	✓	✓	✓	⊗	⊗	⊗	⊗
A250RPS + 2PM + PUA2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 2 pumps, 2 poles type A pump	✓	✓	✓	✓	✓	✓	✓
A250RPS + 2P1SB + PUA2	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 2 pumps + 1 in stand-by, 2 poles type A pump	✓	✓	✓	✓	✓	✓	✓
A250RPS + 3PM	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with 3 pumps,	⊗	⊗	⊗	⊗	⊗	⊗	⊗
A250RPS + 3P1R	250 l. storage tank with antifreeze electric heater and primary-secondary circuit, Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard,	⊗	⊗	⊗	⊗	⊗	⊗	⊗
1PM + PUA2	Hydropack with 1 pump + 1 in stand-by, 2 poles type A pump,	✓	✓	✓	⊗	⊗	⊗	⊗
1P1SB + PUA2	Hydropack with 1 pump, 2 poles type A pump,	✓	✓	✓	⊗	⊗	⊗	⊗
2PM + PUA2	Hydropack with 2 pumps, 2 poles type A pump,	✓	✓	✓	✓	✓	✓	✓
2P1SB + PUA2	Hydropack with 2 pumps + 1 in stand-by, 2 poles type A pump,	✓	✓	✓	✓	✓	✓	✓
3PM + PUA2	Hydropack with 3 pumps, 2 poles type A pump,	✓	✓	✓	✓	✓	✓	✓
3P1R + PUA2	Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 2 poles type A pump,	✓	✓	✓	✓	✓	✓	✓
1PM + PUB2	Hydropack with 1 pump + 1 in stand-by, 2 poles type B pump,	✓	✓	✓	⊗	⊗	⊗	⊗
1P1SB + PUB2	Hydropack with 1 pump, 2 poles type B pump,	✓	✓	✓	⊗	⊗	⊗	⊗
2PM + PUB2	Hydropack with 2 pumps, 2 poles type B pump,	✓	✓	✓	✓	✓	✓	✓
2P1SB + PUB2	Hydropack with 2 pumps + 1 in stand-by, 2 poles type B pump,	✓	✓	✓	✓	✓	✓	✓
3PM + PUB2	Hydropack with 3 pumps, 2 poles type B pump,	✓	✓	✓	✓	✓	✓	✓
3P1R + PUB2	Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 2 poles type B pump,	✓	✓	✓	✓	✓	✓	✓
1PM + PUC2	Hydropack with 1 pump + 1 in stand-by, 2 poles type C pump,	✓	✓	✓	⊗	⊗	⊗	⊗
1P1SB + PUC2	Hydropack with 1 pump, 2 poles type C pump,	✓	✓	✓	⊗	⊗	⊗	⊗
2PM + PUC2	Hydropack with 2 pumps, 2 poles type C pump,	✓	✓	✓	✓	✓	✓	✓
2P1SB + PUC2	Hydropack with 2 pumps + 1 in stand-by, 2 poles type C pump,	✓	✓	✓	✓	✓	✓	✓
3PM + PUC2	Hydropack with 3 pumps, 2 poles type C pump,	✓	✓	✓	✓	✓	✓	✓
3P1R + PUC2	Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 2 poles type C pump,	✓	✓	✓	✓	✓	✓	✓
1PM + PUD2	Hydropack with 1 pump + 1 in stand-by, 2 poles type D pump,	✓	✓	✓	⊗	⊗	⊗	⊗
1P1SB + PUD2	Hydropack with 1 pump, 2 poles type D pump,	✓	✓	✓	⊗	⊗	⊗	⊗
2PM + PUD2	Hydropack with 2 pumps, 2 poles type D pump,	✓	✓	✓	✓	✓	✓	✓
2P1SB + PUD2	Hydropack with 2 pumps + 1 in stand-by, 2 poles type D pump,	✓	✓	✓	✓	✓	✓	✓
3PM + PUD2	Hydropack with 3 pumps, 2 poles type D pump,	✓	✓	✓	✓	✓	✓	✓
3P1R + PUD2	Hydropack with nr.3 pumps + nr.1 spare pump fitted onboard, 2 poles type D pump,	✓	✓	✓	✓	✓	✓	✓
PFCP + SFSTR	Power factor correction capacitors (cosfi > 0.9), Soft Start,	⊗	⊗	⊗	⊗	⊗	⊗	⊗

SOUND LEVELS

Acoustic configuration: compressors soundproofing (SC)

Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
352	66	77	85	82	75	77	71	69	65	84
402	66	77	85	82	77	78	72	69	66	84
432	66	77	85	82	78	77	72	69	66	85
452	66	77	85	82	78	77	72	69	66	84
502	66	77	86	83	78	78	72	69	67	85
552	66	77	86	83	79	79	73	70	68	86
602	67	78	87	84	80	79	74	70	68	86

Measures according to ISO 3744 regulations, with respect to the EUROVENT 8/1 certification.
the sound levels refer to the unit at full load, in the rated test conditions.
The sound pressure level refers to a distance of 1m from the external surface of the units operating in an open field.
data referred to the following conditions :
internal exchanger water = 12/7°C
outdoor air temperature 35°C
the sound levels EN version is valid within the operation limits relative to these acoustic versions; make reference to the noise data relative to SC version for higher external air temperature and in any case included within the operation limits of SC version.

Acoustic configuration: Extremely low noise (EN)

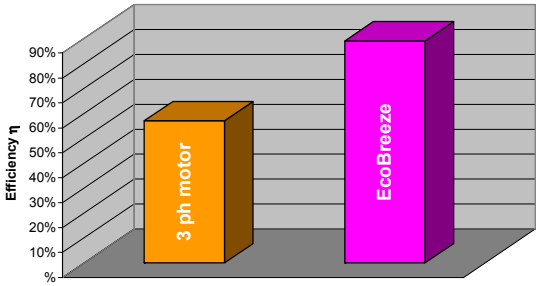
Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
352	62	78	81	75	70	75	66	64	61	80
402	62	78	81	76	73	76	69	67	63	81
432	62	78	81	77	75	76	69	66	63	81
452	62	78	81	77	75	76	69	66	63	81
502	62	78	83	78	75	77	69	65	64	82
552	62	78	83	78	76	78	70	68	65	83
602	63	78	83	79	77	78	70	67	65	83

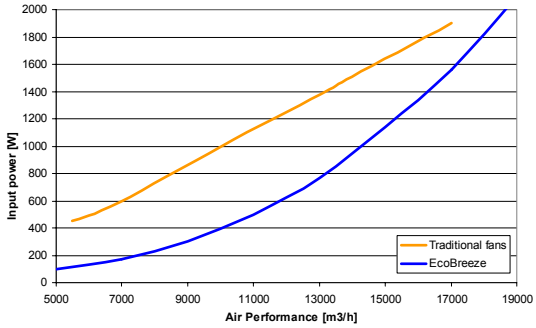
Accessory:ECOBreeze

Within the range of air condensation-based products, Clivet introduces an innovative technology based on the deployment of fans driven by Brushless motors, completely electronically-controlled, characterised by extremely high efficiency and which allow a very advanced adjustment of fan speeds.

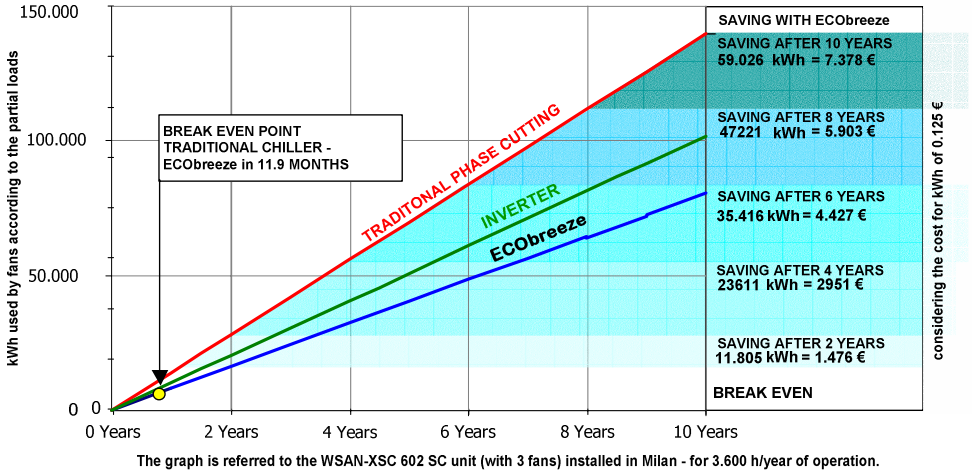
The ECOBreeze option envisages the utilisation of special fans driven by electrical Brushless motors. This technology envisages a permanent-magnets rotor, coupled with a very advanced magnetic field electronic switching control to the stator, directly integrated within the motor itself. A veritable “feather in the cap” is the electronic switching device that manages the precise and effective modulation of the fan’s rotation speed and, therefore, of the fan’s capacity. The management of this device is entrusted to the unit’s general control system, thus assuring complete integration with the other refrigerating unit’s components; this also allows the attaining of an exceptional overall efficiency. Furthermore, by integrating the control directly within the fan, one is guaranteed absolute suitability in the regulator/fan pair, differently from what is experienced in traditional systems. Finally, under particularly demanding or emergency conditions, for example should the environment temperature rise beyond the limits foreseen, before shutting the delivered power and/or setting the unit under alarm, the control device will detect the specific situation and will force the fans to a rotation speed beyond the nominal value, thus assuring an additional capacity of about 15% of the specified value. In this way, it is possible to assure the production of refrigerated water also when traditional units would be forced into alarm conditions.

Electric motor intrinsic efficiency guarantees a consumption reduction in every operation conditions.





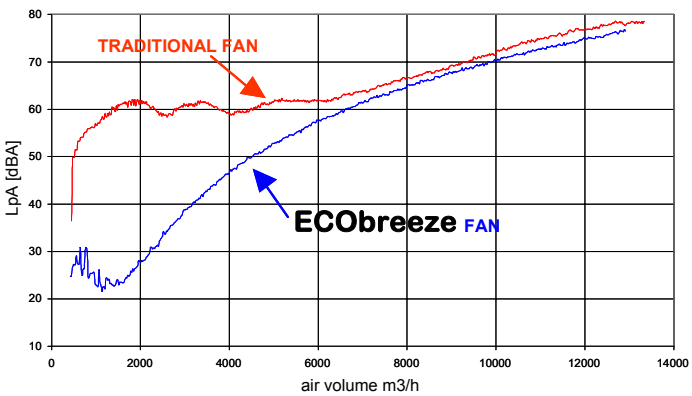
The final result confirms that in comparison to the traditional three-phase induction motors, also with frequency and/or voltage governing, the internal losses within the iron are reduced by 60%, those of the copper by 40%, whereas the intrinsic consumption is about half of that of a traditional modulator (inverter, phase adjuster). The energy cutback, and therefore the money saved, under all operating conditions are truly remarkable and the initial investment is repaid in very few months. From that moment onwards the reduced operative costs turn directly into an economic gain for the user.



The graph is referred to the WSAN-XSC 602 SC unit (with 3 fans) installed in Milan - for 3.600 h/year of operation.

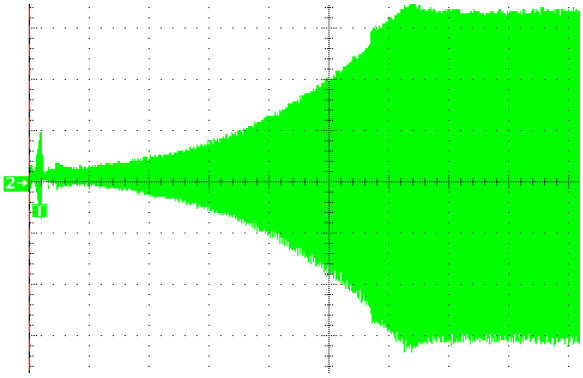
When fans turn at minimum necessary speed, noise emissions are reduced.

In addition to this, a generalised reduction in noise emission is obtained, due to the effect of both the rotation speed which is always modulated to the most suitable value, in keeping with the operation conditions, and the technology deployed in the governing which doesn't induce particular frequencies and vibrations in the rotation.



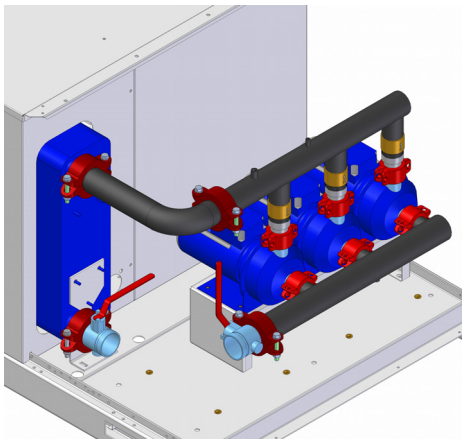
The start-up is progressive, without start absorption peaks.

The current damping at start-up (see diagram) due to the control typology, but also to the absence of brushing contacts for the power supply to the rotor, drastically reduce the harmful stresses for the lifetime of the component. In the final analysis, the fan’s life can be considered as practically unlimited (greater than 80,000 hours).



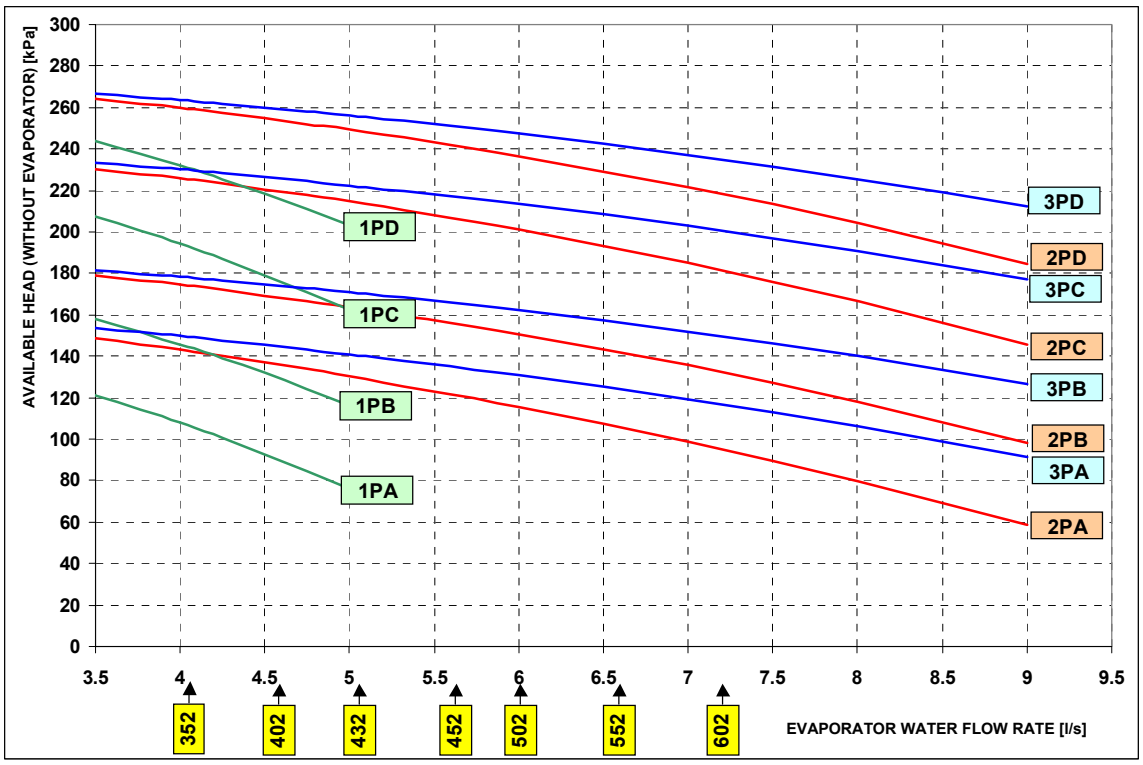
Accessory: Hydropack

New concept of pumping station and reserve pump.



The outfitting of the refrigeration groups with the Hydropack accessory makes it possible to provide the necessary flow rate/static pressure with different versions based on the power of the system.
1) HYDROPACK with 1 pump,
for low-power units you can choose the basic solution with 1 pump.
2) HYDROPACK with 1 pump + 1 standby,
also for low-power units you can include a second pump for complete reliability. If one pump shuts down, the other one automatically starts up and the unit control signals the shutdown of the pump that is out of order. The micro-processor automatically balances the hours of operation of both pumps.
3) HYDROPACK with 2 pumps,
to take full advantage of the Hydropack, you can choose the solution with 2 pumps. If one pump shuts down the unit continues running normally at about 60% load, which is in any case more reliable than traditional systems with a single high-power pump.
4) HYDROPACK with 2 pumps + 1 standby,
a third backup pump can be included for complete reliability. This ensures the design water flow rate in all circum-stances. In fact, if there is a failure, the third pump automatically cuts in and the unit control signals the shutdown of the pump that is out of order.
5) HYDROPACK with 3 pumps,
with the solution with 3 pumps always active, the shutdown of a pumps still allows normal operation at up to 80% of the load, again with a notification of shutdown. In this case, it is possible to provide, on request, a reserve pump (not installed). Replacement occurs in just a few minutes thanks to the simplicity of the connections.

Self-adjustment:
The modular pumping system makes it possible to automatically reduce the water flow rate if the temperature increases above the operating limit (excluding hydropack with 1 pump). The device is also very useful during start-ups, on weekends and after a long period of inactivity. When the temperature of water in the hydronic circuit is especially high, this prevents undesired shutdowns due to overload resulting in call-outs of service technicians to assist in restarting.
The range of pumps available for these units is suitable to satisfy the most common system requirements.
For each value 352÷602 it is possible to select from among 4 characteristics (A,B,C,D) of static pressure.



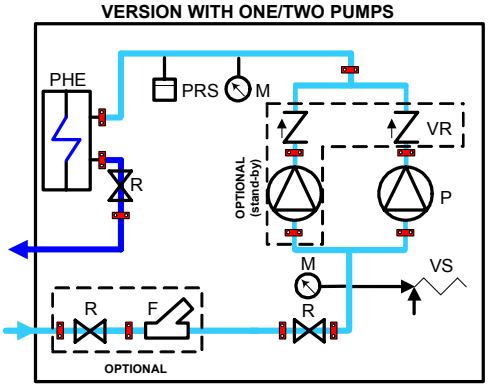
Technical Specifications		
Pump	Rated absorbed power [kW]	Rated absorbed current [A]
A	1.12	2.2
B	1.43	2.7
C	1.84	3.5
D	2.28	4.8
2PA	2.2	4.3
2PB	2.9	5.4
2PC	3.7	7.0
2PD	4.6	9.6
3PA	3.4	6.5
3PB	4.3	8.1
3PC	5.5	10.5
3PD	6.8	14.5

Attention: the evaporator pressure drops have to be taken from the heads represented in these diagrams in order to obtain the available head values.
Attention:in case of unit equipped with water filter accessory, the pressure drops of filter must be removed from pump discharge head curves.

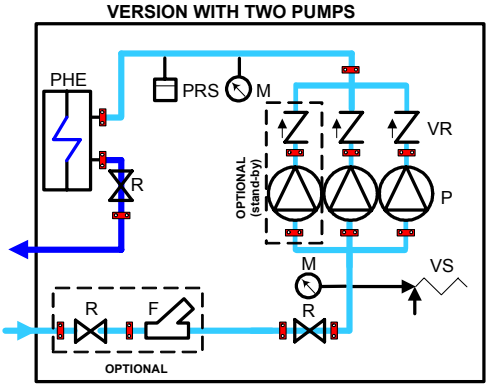
Ready to start:

SpinChiller-units can be supplied with a pumping station on utility side. In this way connection activities are reduced to hydraulic pipe ones and to electric supply.

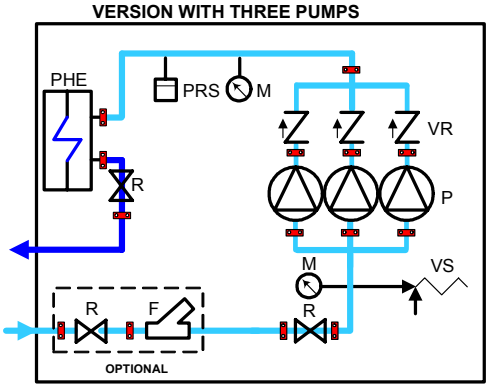
VERSION WITH ONE/TWO PUMPS



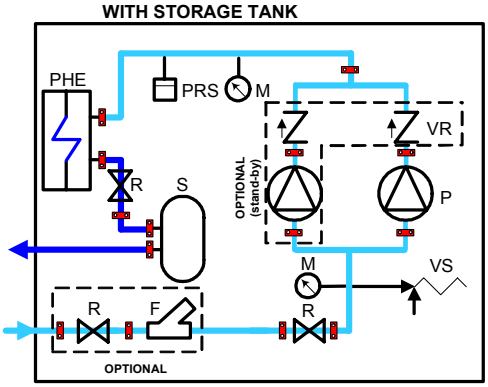
VERSION WITH TWO PUMPS



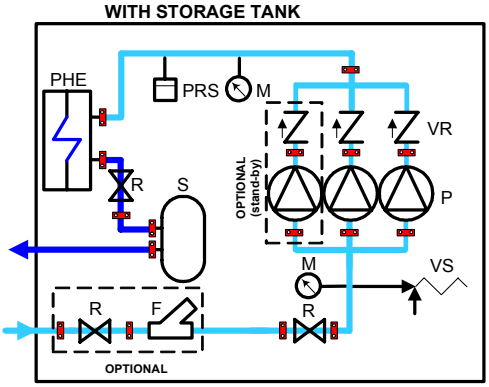
VERSION WITH THREE PUMPS



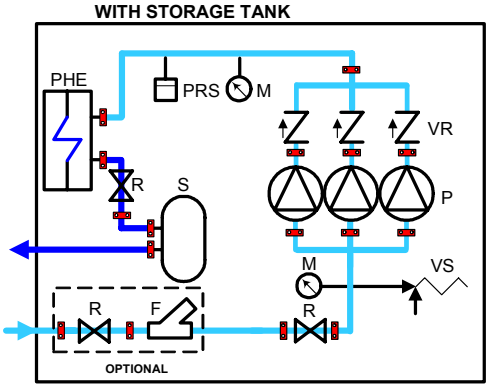
VERSION WITH ONE/TWO PUMPS WITH STORAGE TANK



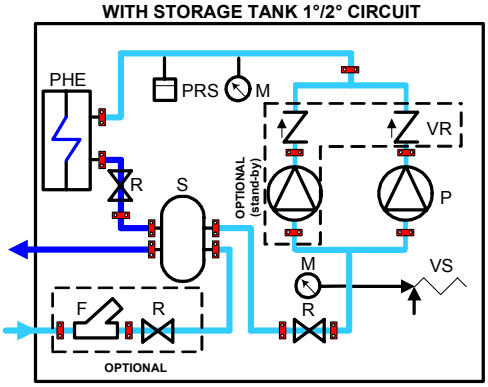
VERSION WITH TWO PUMPS WITH STORAGE TANK



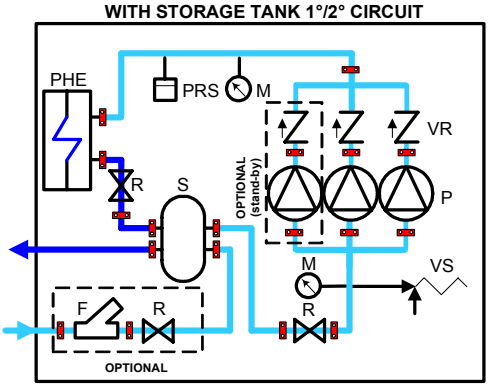
VERSION WITH THREE PUMPS WITH STORAGE TANK



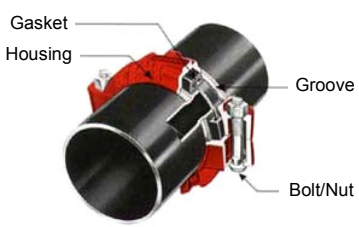
VERSION WITH ONE/TWO PUMPS WITH STORAGE TANK 1°/2° CIRCUIT



VERSION WITH TWO PUMPS WITH STORAGE TANK 1°/2° CIRCUIT



Multi-pump hydronics group composed of:
- R = cut-off valves,
- F = steel mesh filter (optional),
- S = storage tank of 250 litres with anti-freeze heating element,
- M = pressure gauges,
- VS = safety valve (6 Bar),
- P = monobloc electric pumps with high-performance single rotor,
- VR = non-return valve,
- PRS = system charge safety pressure switch (keeps pumps from operating if there is no water),
- PHE = evaporator
- kit composed of two solid rapid connections for pump removal in case of malfunction.



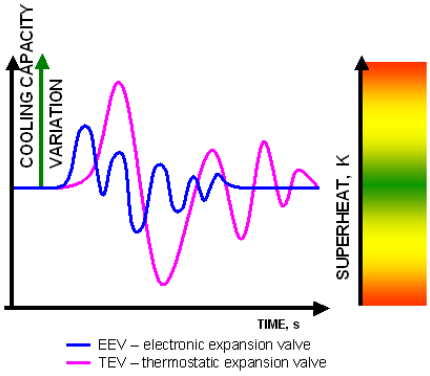
More specifically, all main components (including the pre-setting of the connection to the system) are hydraulically connected through swift-latch connections instead of the traditional welding, flanging and threading, with obvious advantages for the user.
- They can be easily dismantled, affording an advantage in the inspection and maintenance operations.
- Work times are reduced by 90%.
- The deployment of specialised personnel is not necessary.
- The moving of single components is made very simple.
- Weight is reduced since at even piping dimensions the joints weigh half as much as the flanges.
- Utilisation of standard components that are available anywhere in the market.

Standard electronic expansion valve

Efficiency is in the standard scope of supply as a result of the electronic expansion valve. This element optimizes the superheating in any load condition thus offering a large number of advantages which can be summed up as follows:
- Fast and precise action due to the microprocessor based control with PID algorithms and to the step-motor.
- High energetic efficiency in all conditions, thanks to the reduction of transients, in terms of amplitude and duration, following load variations.
- Extended operating limits of the unit concerning minimum partial load and minimum air temperature at condenser.
- Better operating conditions for the compressor, thanks to the lower discharge gas temperature and preventing liquid return and insufficient lubrication.
- Easy unit set-up, even in special application seen the flexibility of the valve and its control parameters .
- More responsible use of refrigerant as the overall quantity required is smaller.
- Enhanced reliability of the operation of refrigerant circuit due to simplification of its components, to the control of the maximum operating pressure (MOP) and to the individual alarm condition indication.

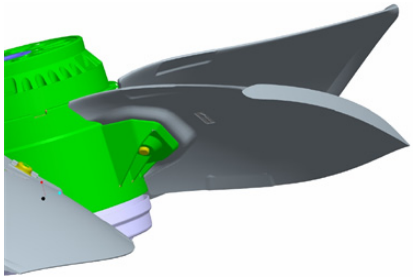
Transient and effect on superheating

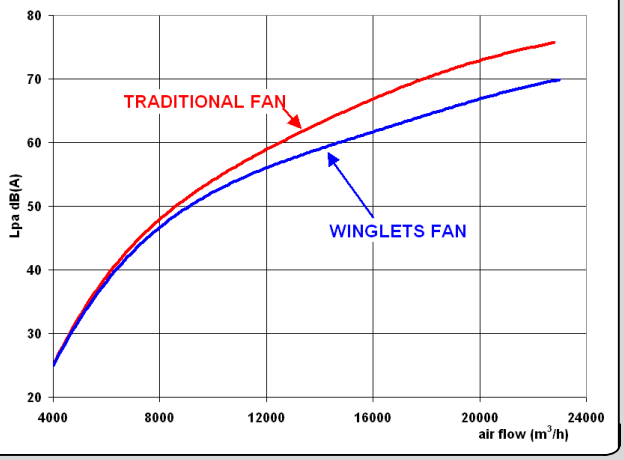
The instability of the superheating coming from the variation of the capacity supplied is reduced and is rapidly zeroed by the PID control and its fast reaction. This allows a steady operation, within the safety limits, around the most favorable value.



New generation of fans

SPINchiller has a new axial-flow fan projected in the best European laboratories in collaboration with the builder. The result of the search allowed the development of the innovative "Winglets" airfoil-vane blade at the end of the blade.
The development of these new blades allowed to get some important advantages both for the sound, with a media reduction of 6 dB (A), and for the energy with the consumption reduction of 10%.





Seasonal efficiency=ESEER

ESEER:
Guarantee in the performance means to be able to plan realistically the energy consumption and then the costs.
The ESEER = European Seasonal Energy Efficiency Ratio, contrarily to the simple EER, is calculated as a combination of different operating conditions, which have been recently declared by Eurovent/CEN, in order to demonstrate the chiller efficiency while operating also in off-design conditions, normal in the mid-season.

	Conditions			
	Weight	Load (%)	Air	Water
a	3	100	35	12 / 7
b	33	75	30	10.8 / 7
c	41	50	25	9.5 / 7
d	23	25	20	8.3 / 7

EERa =	2.72	x 0.03+
EERb =	3.32	x 0.33+
EERc =	4.26	x 0.41+
EERd =	4.24	x 0.23+
ESEER =	**3.90**	

Example of calculation referred to the unit WSAN-XSC 502 SC.
- a,b,c,d, = partial load conditions and air temperature used for the ESEER calculation.
-Weight % = space of time during which the unit works at the described conditions (used in the weighted sum).
-Load % = partialization of the unit drop (referred to nominal capacity).
-Air temperature = condensate coil intake air temperature.
-Water temperature = evaporator water temperature.
-EERa,b,c,d = EER calculated according to the partial load conditions

Acoustic configuration: compressors soundproofing (SC)

GENERAL TECHNICAL SPECIFICATIONS

Size			352	402	432	452	502	552	602
COOLING									
Cooling capacity	1	kW	86.3	97.1	106	116	126	137	151
Compressor power input		kW	27.8	32	37.9	38.6	42.5	49.2	54.1
Total power input	2	kW	31.6	35.8	41.7	42.4	46.3	53	59.6
Heating capacity total recovery	3	kW	112	127	142	152	166	183	203
Heating capacity partial recovery	3	kW	28.5	32.3	36	38.7	42.1	46.5	51.3
EER			2.73	2.71	2.54	2.73	2.72	2.59	2.54
ESEER			3.87	3.87	3.83	3.87	3.9	3.85	3.61
HEATING									
Heat output	4	kW	99.7	112	123	134	142	153	175
Compressor power input		kW	27.2	30.8	34.4	37.1	40.5	43.8	48.7
Total power input		kW	31	34.6	38.2	40.9	44.3	47.6	54.2
COP			3.22	3.24	3.22	3.27	3.21	3.21	3.23
COMPRESSOR									
Type of compressors			SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
No. of Compressors		Nr	2	2	2	2	2	2	2
Rated power (C1)		HP	35	40	43	45	50	55	60
Oil charge (C1)		l	8	11	10	10	11	13	13
Refrigerant circuits		Nr	1	1	1	1	1	1	1
INTERNAL EXCHANGER									
Type of internal exchanger	5		PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of internal exchangers		Nr	1	1	1	1	1	1	1
Water flow rate (Internal Exchanger)		l/s	4.1	4.6	5.1	5.5	6	6.5	7.2
internal exchanger pressure drop		kPa	63	64	64	60	58	58	64
Water content		l	6	6.5	7	8	9	9.5	10
EXTERNAL SECTION FANS									
Type of fans	6		AX	AX	AX	AX	AX	AX	AX
Number of fans		Nr	2	2	2	2	2	2	3
Standard air flow		l/s	12947	12947	12947	12667	12667	12667	17648
CONNECTIONS									
Water fittings			2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2
NOISE LEVELS									
Sound Pressure Level (10m)		dB(A)	52	53	53	53	53	54	54

(1) data referred to the following conditions :
internal exchanger water = 12/7°C
external exchanger air intake 35°C
(2) According to EUROVENT the Total Power Input does not consider the pump share, required to overcome the pressure drop for the solution circulation inside the exchangers.
(3) recovery exchanger water=40/45°C
(4) data referred to the following conditions :
internal exchanger water = 40/45°C
external exchanger air intake = 6.1 °C W.B.
(5) PHE = plates
S&T = tube bundle
(6) AX = axial-flow fan

Acoustic configuration: compressors soundproofing (SC)

OPERATING LIMITS (COOLING)

Size			352	402	432	452	502	552	602
EXTERNAL EXCHANGER									
Max air intake temperature	1	°C	45	45	45	45	45	45	45
Max air intake temperature	2	°C	48	48	48	48	48	48	48
Min. air intake temperature	3	°C	-10	-10	-10	-10	-10	-10	-10
Min. air intake temperature	4	°C	-7	-7	-7	-7	-7	-7	-7
Min. air intake temperature	5	°C	2	2	2	2	2	2	2
Min. air intake temperature	6	°C	11	11	11	11	11	11	11
INTERNAL EXCHANGER									
Max water inlet temperature		°C	23	23	23	23	23	23	23
Min. water outlet temperature	7	°C	5	5	5	5	5	5	5
Min. water outlet temperature	8	°C	-8	-8	-8	-8	-8	-8	-8

OPERATING LIMITS (HEATING)

EXTERNAL EXCHANGER									
Max air temperature inlet (WB)	9	°C	23	23	23	23	23	23	23
Min air temperature inlet (WB)		°C	-5	-5	-5	-5	-5	-5	-5
INTERNAL EXCHANGER									
Min. water outlet temperature		°C	30	30	30	30	30	30	30
Max water outlet temperature		°C	50	50	50	50	50	50	50

data referred to the following conditions :
internal exchanger water = 12/7°C
difference between inlet / outlet water temperature = 5°C
Warning: the still air condition is meant as absence of air flow to the unit. Any wind condition can let air pass through the condenser coil thus worsening the operating limits of the unit (see limits with air speed at 0,5 m/s & 1 m/s).
Note: In any case, the unit should never be exposed to or operated, transported and/or stored at temperatures below -10°C.
ATTENTION: IN CASE OF PREDOMINANT WINDS, WINDBREAK BARRIERS ARE NECESSARY.

(1) Max inlet temperature - unit at full load
(2) Max inlet air temperature - capacity-controlled unit with standard limit device
(3) Min inlet air temperature - unit at full load and motionless ambient air
(4) Min inlet air temperature - unit at partial load and motionless ambient air
(5) Min inlet air temperature - unit at partial load and air speed of 0.5 m/s.
(6) Min inlet air temperature - unit at partial load and air speed of 1 m/s.
(7) standard unit
external exchanger air intake 35°C
(8) B = Low Temperature
external exchanger air intake 35°C
Fluid with ethylene glycol of 40%
(9) unit at full load
internal exchanger water = 40/45°C

Acoustic configuration: compressors soundproofing (SC) / Voltage: 400/3/50

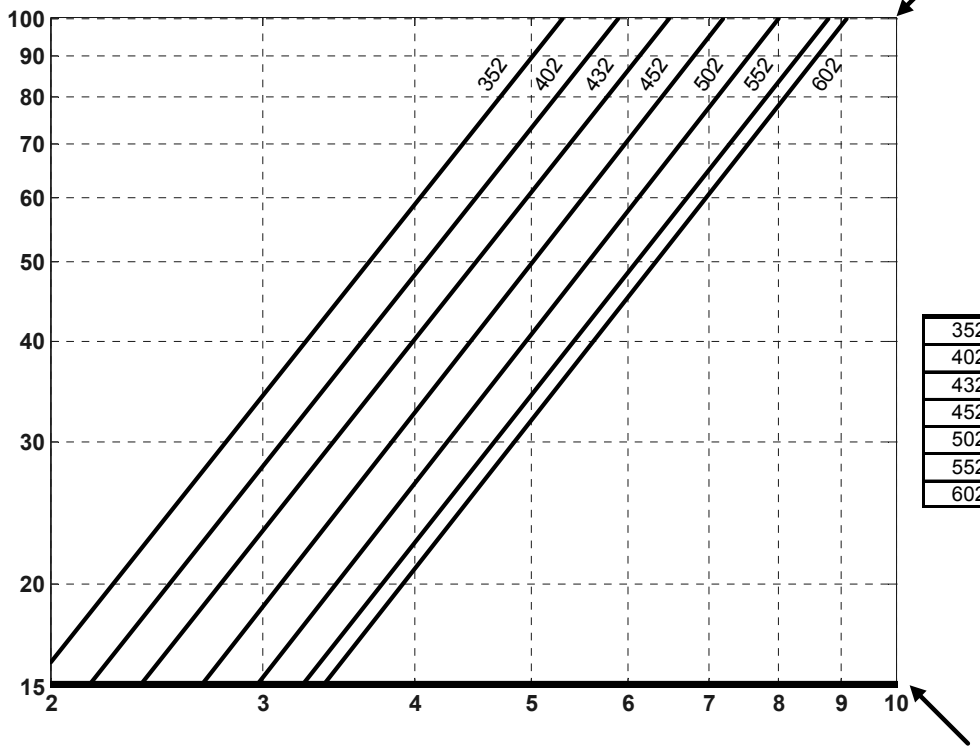
ELECTRICAL DATA

Size			352	402	432	452	502	552	602
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS									
F.L.A. - Total		A	79.3	90.6	91.7	97.2	106.6	117.9	128.6
F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION									
F.L.I. - Total		kW	46.7	51.8	55.3	58.1	64.5	69.6	77.8
M.I.C. MAXIMUM INRUSH CURRENT									
M.I.C. - Value		A	79.3	90.6	91.7	97.2	106.6	117.9	128.6

voltage unbalance: max 2 %
power supply: 400/3/50 Hz +/-6%
Electrical data refer to standard units; according to the installed accessories, the data can suffer light variations.

INTERNAL EXCHANGER PRESSURE DROPS (SC-EN)

EVAPORATOR PRESSURE DROP LIMIT. CAUTION: DO NOT USE OVER THIS LIMIT



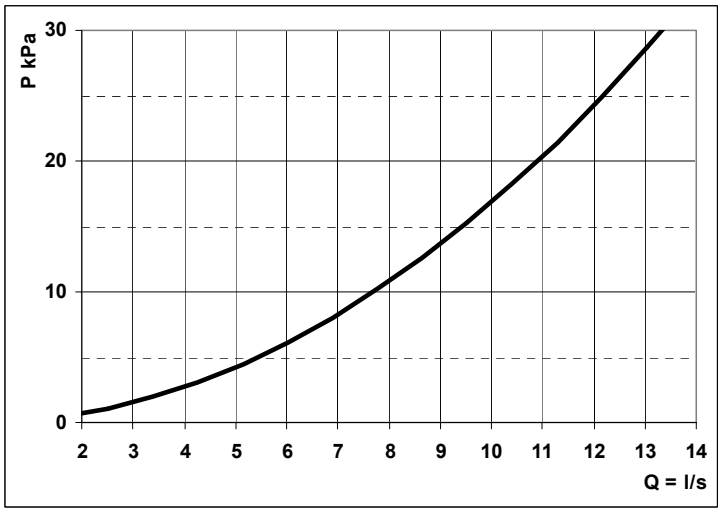
	Qmin [l/s]	Qmax [l/s]
352	1.9	5.3
402	2.2	5.9
432	2.4	6.5
452	2.7	7.2
502	3.0	8.0
552	3.2	8.8
602	3.4	9.1

EVAPORATOR PRESSURE DROP LIMIT. CAUTION: DO NOT USE UNDER THIS LIMIT

ACCESSORIES

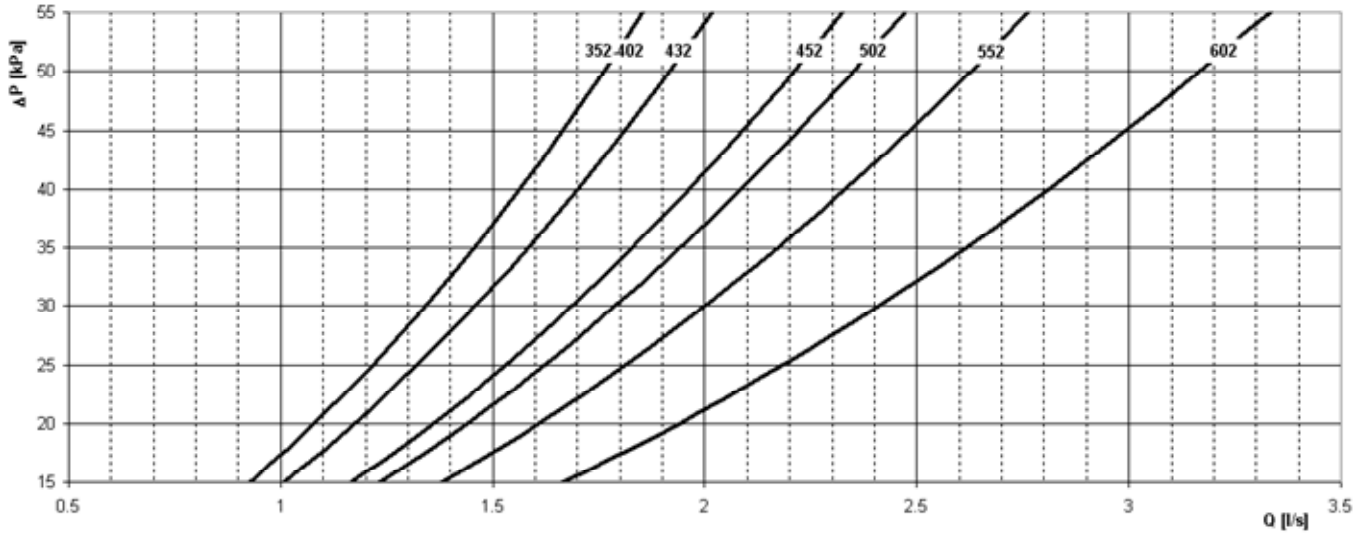
WATER FILTER

Pressure drop of the "water filter" accessory to be added to the pressure drop of the unit.



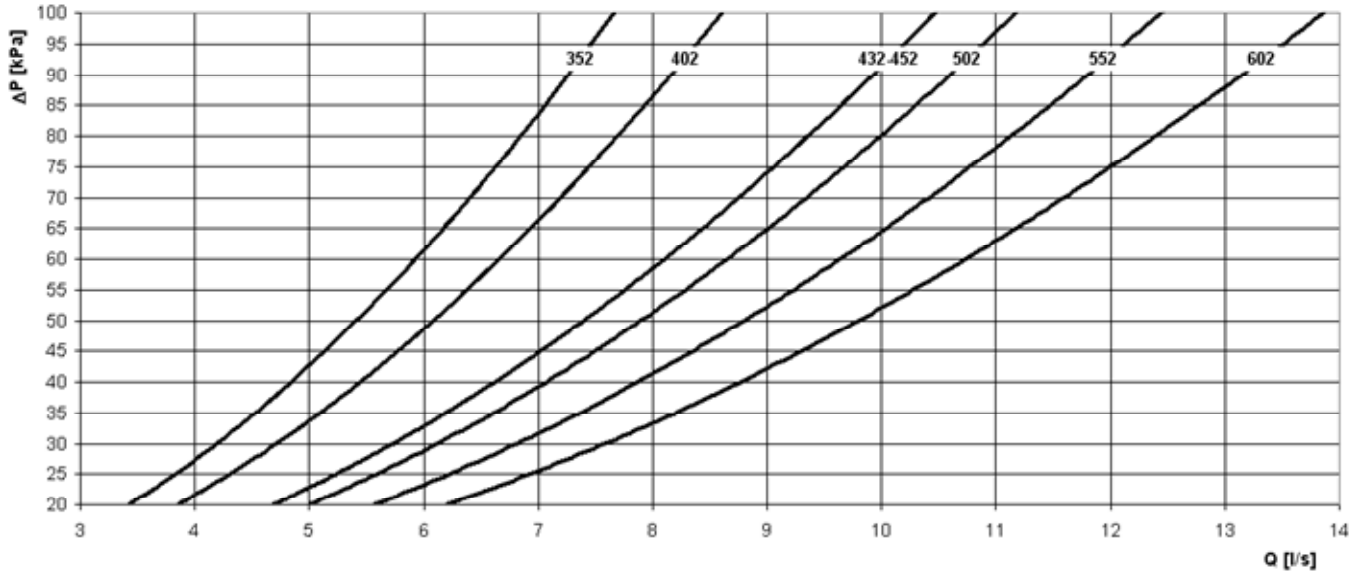
Q = water flow
dP = pressure drop

EXCHANGER PRESSURE DROP PARTIAL ENERGY RECOVERY



Q[L/S]= WATER-FLOW RATE
DP = PRESSURE DROP

EXCHANGER PRESSURE DROP TOTAL ENERGY RECOVERY



Q[L/S]= WATER-FLOW RATE
DP = PRESSURE DROP

ACOUSTIC CONFIGURATION: COMPRESSORS SOUNDPROOFING (SC)

COOLING PERFORMANCE

Size	To (ºC)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (ºC)													
		25		30		32		35		38		41		43	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
352	5	92.2	22.5	87.4	24.8	85.4	25.8	82.3	27.4	79.1	29.1	75.8	30.8	73.6	32.1
	6	94.7	22.6	89.6	25.0	87.5	26.0	84.3	27.6	81.1	29.3	77.7	31.0	75.5	32.3
	7	97.0	22.7	91.8	25.1	89.6	26.2	86.3	27.8	83.0	29.5	79.6	31.2	77.3	32.4
	8	99.2	22.8	93.8	25.2	91.6	26.3	88.3	27.9	84.9	29.6	81.5	31.3	79.1	32.6
	9	101.2	23.0	95.8	25.3	93.6	26.3	90.3	27.9	86.8	29.6	83.3	31.4	80.9	32.7
	10	103.0	23.2	97.7	25.3	95.5	26.3	92.2	27.9	88.7	29.6	85.1	31.4	82.7	32.8
402	5	104.1	26.0	98.6	28.7	96.3	29.8	92.7	31.6	89.1	33.4	85.3	35.4	82.7	36.7
	6	106.8	26.1	101.0	28.9	98.6	30.0	94.9	31.8	91.1	33.7	87.2	35.6	84.6	36.9
	7	109.3	26.3	103.3	29.0	100.8	30.2	97.1	32.0	93.2	33.9	89.2	35.8	86.5	37.1
	8	111.5	26.5	105.5	29.2	103.0	30.3	99.2	32.1	95.3	34.0	91.2	35.9	88.5	37.2
	9	113.5	26.7	107.6	29.3	105.1	30.4	101.3	32.2	97.3	34.0	93.2	36.0	90.4	37.3
	10	115.2	27.0	109.5	29.4	107.1	30.5	103.4	32.2	99.4	34.0	95.3	36.0	92.4	37.3
432	5	113.5	31.1	107.9	34.1	105.5	35.4	101.9	37.3	98.1	39.4	94.1	41.5	91.4	43.0
	6	116.8	31.2	110.6	34.3	108.0	35.6	104.1	37.7	100.1	39.7	95.9	41.9	93.1	43.3
	7	119.7	31.3	113.2	34.5	110.5	35.8	106.4	37.9	102.2	40.0	97.9	42.1	95.0	43.6
	8	122.2	31.6	115.7	34.7	113.0	36.0	108.8	38.0	104.5	40.1	100.1	42.3	97.1	43.7
	9	124.3	31.9	118.1	34.8	115.5	36.1	111.3	38.0	107.0	40.1	102.5	42.3	99.3	43.8
	10	126.0	32.2	120.5	34.9	118.0	36.1	114.0	38.0	109.6	40.0	105.0	42.2	101.7	43.8
452	5	122.6	31.6	116.5	34.7	114.0	36.1	110.1	38.1	106.1	40.3	102.1	42.6	99.3	44.1
	6	126.3	31.9	119.9	35.0	117.3	36.3	113.2	38.4	109.1	40.6	104.8	42.8	101.9	44.4
	7	129.5	32.1	122.9	35.2	120.2	36.6	116.0	38.6	111.7	40.8	107.3	43.0	104.2	44.6
	8	132.1	32.3	125.4	35.5	122.6	36.8	118.4	38.8	114.0	41.0	109.4	43.2	106.4	44.8
	9	134.2	32.5	127.5	35.7	124.6	37.0	120.3	39.0	115.9	41.2	111.3	43.4	108.2	45.0
	10	135.9	32.7	129.0	35.8	126.2	37.2	121.9	39.2	117.5	41.4	113.0	43.6	109.9	45.1
502	5	132.9	34.9	125.9	38.3	123.1	39.7	118.7	41.9	114.2	44.2	109.6	46.5	106.6	48.1
	6	137.1	35.3	129.9	38.6	126.9	40.0	122.3	42.2	117.7	44.5	113.0	46.8	109.8	48.5
	7	140.8	35.6	133.3	38.9	130.2	40.3	125.6	42.5	120.8	44.8	116.0	47.1	112.7	48.7
	8	143.9	35.8	136.3	39.2	133.2	40.6	128.4	42.8	123.6	45.0	118.6	47.4	115.3	49.0
	9	146.6	36.1	138.8	39.4	135.7	40.8	130.9	43.0	126.0	45.3	121.0	47.6	117.6	49.2
	10	148.7	36.3	140.9	39.6	137.8	41.0	132.9	43.2	128.0	45.5	123.0	47.8	119.6	49.4
552	5	145.8	40.6	137.9	44.4	134.7	46.0	129.8	48.5	124.9	51.0	119.8	53.6	116.4	55.4
	6	150.0	41.0	141.9	44.8	138.6	46.4	133.5	48.8	128.4	51.3	123.2	53.9	119.7	55.7
	7	153.9	41.4	145.5	45.2	142.1	46.8	136.9	49.2	131.6	51.7	126.3	54.2	122.7	56.0
	8	157.2	41.7	148.7	45.5	145.3	47.1	140.0	49.5	134.6	52.0	129.1	54.6	125.4	56.3
	9	160.2	42.1	151.6	45.9	148.1	47.4	142.7	49.8	137.2	52.3	131.7	54.9	127.9	56.7
	10	162.7	42.4	154.1	46.2	150.5	47.8	145.1	50.2	139.6	52.7	133.9	55.2	130.1	57.0
602	5	158.4	44.7	150.5	48.9	147.3	50.6	142.3	53.3	137.2	56.0	132.0	58.8	128.4	60.8
	6	164.0	45.0	155.7	49.2	152.2	51.0	146.9	53.7	141.3	56.5	135.7	59.4	131.8	61.4
	7	168.6	45.3	159.9	49.5	156.3	51.3	150.7	54.1	145.0	56.9	139.1	59.8	135.0	61.8
	8	172.1	45.6	163.3	49.8	159.6	51.6	154.0	54.3	148.2	57.1	142.2	60.0	138.2	62.0
	9	174.6	46.0	165.8	50.1	162.1	51.8	156.6	54.4	150.9	57.2	145.1	60.0	141.2	61.9
	10	175.9	46.5	167.3	50.4	163.8	52.0	158.5	54.5	153.2	57.1	147.7	59.8	144.0	61.7

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
To = Internal exchanger water outlet temperature in° C
DT = difference between inlet / outlet water temperature = 5°C

ACOUSTIC CONFIGURATION: COMPRESSORS SOUNDPROOFING (SC)

HEATING PERFORMANCE

Size	Ta (°C) DB/WB	EVAPORATOR INLET/OUTLET WATER TEMPERATURE (°C)									
		30 / 35		35 / 40		40 / 45		42 / 47		45 / 50	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
352	-5 / -5.4	77.8	21.3	77.7	23.5	77.5	26.3				
	0 / -0.6	87.5	21.5	86.4	23.8	85.2	26.7	84.8	28.0	84.0	30.1
	5 / 3.9	98.1	21.8	96.3	24.1	94.5	27.0	93.7	28.3	92.7	30.6
	7 / 6.1	103.7	22.0	101.7	24.2	99.7	27.2	98.8	28.5	97.6	30.8
	10 / 8.2	109.5	22.1	107.3	24.4	105.1	27.4	104.2	28.7	102.8	31.0
	15 / 13	123.8	22.6	121.4	24.8	118.9	27.8	117.9	29.2	116.4	31.6
402	-5 / -5.4	87.6	24.2	85.9	26.7	85.7	29.9				
	0 / -0.6	97.2	24.4	95.8	27.0	95.7	30.3	96.0	31.8		
	5 / 3.9	108.2	24.7	106.7	27.3	106.1	30.6	106.1	32.1	106.3	34.6
	7 / 6.1	114.2	24.9	112.6	27.5	111.6	30.8	111.3	32.3	111.0	34.8
	10 / 8.2	120.5	25.1	118.6	27.7	117.0	31.0	116.4	32.5	115.6	34.9
	15 / 13	136.2	25.5	133.5	28.2	130.1	31.4	128.6	32.8	126.2	35.1
432	-5 / -5.4	96.9	27.1	96.9	29.9						
	0 / -0.6	107.4	27.4	107.0	30.3	105.7	33.8				
	5 / 3.9	119.5	27.8	118.6	30.7	116.6	34.2	115.5	35.8	113.6	38.3
	7 / 6.1	126.2	28.0	125.0	30.9	122.7	34.4	121.5	35.9	119.4	38.5
	10 / 8.2	133.0	28.2	131.5	31.1	129.0	34.6	127.7	36.1	125.4	38.6
	15 / 13	150.3	28.6	148.0	31.6	145.0	35.0	143.6	36.5	141.3	38.9
452	-5 / -5.4	105.1	29.0	103.1	32.0	101.8	36.0				
	0 / -0.6	118.0	29.4	116.2	32.4	114.2	36.5	113.3	38.4	112.1	41.6
	5 / 3.9	131.5	29.8	129.5	32.8	127.0	36.9	125.9	38.8	124.2	42.0
	7 / 6.1	138.6	30.0	136.3	33.1	133.7	37.1	132.6	39.0	130.7	42.2
	10 / 8.2	145.6	30.2	143.1	33.2	140.4	37.3	139.2	39.3	137.4	42.5
	15 / 13	162.7	30.6	159.5	33.7	156.5	37.8	155.5	39.7	153.9	42.9
502	-5 / -5.4	112.8	31.3	108.3	34.4						
	0 / -0.6	125.7	31.8	123.8	34.9	121.6	39.8	120.6	42.3		
	5 / 3.9	140.3	32.3	139.5	35.4	134.6	40.2	131.4	42.6	125.5	46.7
	7 / 6.1	148.2	32.5	147.6	35.7	141.8	40.5	138.0	42.8	130.8	46.9
	10 / 8.2	156.4	32.8	155.6	35.9	149.2	40.7	145.1	43.1	137.2	47.1
	15 / 13	176.9	33.3	174.7	36.5	168.1	41.3	164.2	43.7	157.0	47.7
552	-5 / -5.4	120.5	34.1	120.5	37.6						
	0 / -0.6	133.1	34.6	132.7	38.1	131.7	43.2	131.0	45.8		
	5 / 3.9	147.7	35.1	146.9	38.6	145.5	43.6	144.7	46.1	143.4	50.3
	7 / 6.1	155.8	35.4	154.7	38.9	153.2	43.8	152.5	46.3	151.2	50.4
	10 / 8.2	164.2	35.7	162.8	39.1	161.2	44.1	160.5	46.5	159.3	50.5
	15 / 13	185.5	36.2	183.3	39.8	181.6	44.6	181.1	47.0	180.4	50.9
602	-5 / -5.4	136.8	37.9	137.0	41.9						
	0 / -0.6	152.2	38.7	151.7	42.6	150.9	48.0				
	5 / 3.9	170.0	39.3	168.8	43.2	166.8	48.4	165.8	50.9	164.0	55.0
	7 / 6.1	179.8	39.7	178.3	43.5	175.5	48.7	173.9	51.1	171.3	55.1
	10 / 8.2	189.9	39.9	188.1	43.8	184.3	48.9	182.2	51.2	178.5	55.2
	15 / 13	215.6	40.6	213.0	44.5	206.4	49.5	202.6	51.7	195.8	55.4

kWt = internal exchanger heat power (kW)
kWe = Compressor power input in kW
Ta = external exchanger air intake temperature
WB = wet bulb
DB = dry bulb

Acoustic configuration: Extremely low noise (EN)

GENERAL TECHNICAL SPECIFICATIONS

Size			352	402	432	452	502	552	602
COOLING									
Cooling capacity	1	kW	83.6	93.7	103	110	118	129	142
Compressor power input		kW	28.3	33.4	38	41.9	47.2	52.5	58.1
Total power input	2	kW	31.5	36.6	41.2	45.1	50.4	55.7	62.7
Heating capacity total recovery	3	kW	112	127	142	152	166	183	203
Heating capacity partial recovery	3	kW	28	31.8	35.2	38	41.3	45.4	50
EER			2.65	2.56	2.5	2.44	2.34	2.32	2.27
ESEER			3.69	3.69	3.58	3.67	3.68	3.72	3.36
HEATING									
Heat output	4	kW	98.7	110	123	131	141	152	171
Compressor power input		kW	27.8	31.2	34.5	37.5	40.9	44.3	50.7
Total power input		kW	30.8	34.4	37.7	40.7	44.1	47.5	55.3
COP			3.2	3.2	3.26	3.22	3.2	3.2	3.09
COMPRESSOR									
Type of compressors			SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
No. of Compressors		Nr	2	2	2	2	2	2	2
Rated power (C1)		HP	35	40	43	45	50	55	60
Oil charge (C1)		l	8	11	10	10	11	13	13
Refrigerant circuits		Nr	1	1	1	1	1	1	1
INTERNAL EXCHANGER									
Type of internal exchanger	5		PHE	PHE	PHE	PHE	PHE	PHE	PHE
No. of internal exchangers		Nr	1	1	1	1	1	1	1
Water flow rate (Internal Exchanger)		l/s	4	4.5	4.9	5.3	5.6	6.2	6.8
internal exchanger pressure drop		kPa	59	60	60	55	51	51	57
Water content		l	6	6.5	7	8	9	9.5	10
EXTERNAL SECTION FANS									
Type of fans	6		AX	AX	AX	AX	AX	AX	AX
Number of fans		Nr	2	2	2	2	2	2	3
Standard air flow		l/s	9605	9605	9605	9281	9281	9281	12196
CONNECTIONS									
Water fittings			2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2
NOISE LEVELS									
Sound Pressure Level (10m)		dB(A)	48	49	49	49	50	51	51

(1) data referred to the following conditions :
internal exchanger water = 12/7°C
external exchanger air intake 35°C
(2) According to EUROVENT the Total Power Input does not consider the pump share, required to overcome the pressure drop for the solution circulation inside the exchangers.
(3) recovery exchanger water=40/45°C
(4) data referred to the following conditions :
internal exchanger water = 40/45°C
external exchanger air intake = 6.1 °C W.B.
(5) PHE = plates
S&T = tube bundle
(6) AX = axial-flow fan

Acoustic configuration: Extremely low noise (EN)

OPERATING LIMITS (COOLING)

Size			352	402	432	452	502	552	602
EXTERNAL EXCHANGER									
Max air intake temperature	1	°C	45	45	45	45	42	40	43
Max air intake temperature	2	°C	47	47	47	47	45	45	45
Max air intake temperature	3	°C	50	50	50	50	48	48	48
Min. air intake temperature	4	°C	-10	-10	-10	-10	-10	-10	-10
Min. air intake temperature	5	°C	-7	-7	-7	-7	-7	-7	-7
Min. air intake temperature	6	°C	2	2	2	2	2	2	2
Min. air intake temperature	7	°C	11	11	11	11	11	11	11
INTERNAL EXCHANGER									
Max water inlet temperature		°C	23	23	23	23	23	23	23
Min. water outlet temperature	8	°C	5	5	5	5	5	5	5
Min. water outlet temperature	9	°C	-8	-8	-8	-8	-8	-8	-8

OPERATING LIMITS (HEATING)

EXTERNAL EXCHANGER									
Max air temperature inlet (WB)	10	°C	23	23	23	23	23	23	23
Min air temperature inlet (WB)		°C	-5	-5	-5	-5	-5	-5	-5
INTERNAL EXCHANGER									
Min. water outlet temperature		°C	30	30	30	30	30	30	30
Max water outlet temperature		°C	50	50	50	50	50	50	50

data referred to the following conditions :
internal exchanger water = 12/7°C
difference between inlet / outlet water temperature = 5°C
Warning: the still air condition is meant as absence of air flow to the unit. Any wind condition can let air pass through the condenser coil thus worsening the operating limits of the unit (see limits with air speed at 0,5 m/s & 1 m/s).
Note: In any case, the unit should never be exposed to or operated, transported and/or stored at temperatures below -10°C.
ATTENTION: IN CASE OF PREDOMINANT WINDS, WINDBREAK BARRIERS ARE NECESSARY.

(1) Max inlet temperature - unit at full load
(2) Inlet air Max Temperature - unit at full load with standard limit device
For the sound levels in this operation condition please refer to the SC version data
(3) Max inlet air temperature - capacity-controlled unit with standard limit device
(4) Min inlet air temperature - unit at full load and motionless ambient air
(5) Min inlet air temperature - unit at partial load and motionless ambient air
(6) Min inlet air temperature - unit at partial load and air speed of 0.5 m/s.
(7) Min inlet air temperature - unit at partial load and air speed of 1 m/s.
(8) standard unit
external exchanger air intake 35°C
(9) B = Low Temperature
external exchanger air intake 35°C
Fluid with ethylene glycol of 40%
(10) unit at full load
internal exchanger water = 40/45°C

Acoustic configuration: Extremely low noise (EN) / Voltage: 400/3/50

ELECTRICAL DATA

Size			352	402	432	452	502	552	602
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS									
F.L.A. - Total		A	79.3	90.6	91.7	97.2	106.6	117.9	128.6
F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION									
F.L.I. - Total		kW	46.7	51.8	55.3	58.1	64.5	69.6	77.8
M.I.C. MAXIMUM INRUSH CURRENT									
M.I.C. - Value		A	79.3	90.6	91.7	97.2	106.6	117.9	128.6

voltage unbalance: max 2 %
power supply: 400/3/50 Hz +/-6%
Electrical data refer to standard units; according to the installed accessories, the data can suffer light variations.

CORRECTION FACTOR FOR ANTIFREEZE SOLUTIONS

% ethylene glycol by weight			5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature		°C	-2.0	-3.9	-6.5	-8.9	-11.8	-15.6	-19.0	-23.4
Safety temperature		°C	3.0	1.0	-1.0	-4.0	-6.0	-10.0	-14.0	-19.0
Cooling Capacity Factor		Nr	0.995	0.990	0.985	0.981	0.977	0.974	0.971	0.968
Compressor input Factor		Nr	0.997	0.993	0.990	0.988	0.986	0.984	0.982	0.981
Internal exchanger Glycol solution flow Factor		Nr	1.003	1.010	1.020	1.033	1.050	1.072	1.095	1.124
Pressure drop Factor		Nr	1.029	1.060	1.090	1.118	1.149	1.182	1.211	1.243

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

FOULING CORRECTION FACTOR

	INTERNAL EXCHANGER	
m² °C/W	**F1**	**FK1**
0.44 x 10^(-4)	1.00	1.00
0.88 x 10^(-4)	0.97	0.99
1.76 x 10^(-4)	0.94	0.98

F1 = Cooling capacity correction factors
FK1 = Compressor power input correction factor

OVERLOAD AND CONTROL DEVICE CALIBRATION

			OPEN	CLOSED	VALUE
High pressure switch		kPa	4050	3300	-
Low pressure switch		kPa	450	600	-
Low pressure switch (Brine)		bar	200	350	-
Antifreeze protection		°C	3.0	5.5	-
High pressure safety valve		kPa	-	-	4500
Low pressure safety valve		kPa	-	-	3000
Max no. of compressor starts per hour		Nr	-	-	10
High compressor discharge temperature safety thermostat		°C	-	-	120

EXCHANGER OPERATING LIMITS

	INTERNAL EXCHANGER		
	DPr (S - B)		DPw
	kPa		kPa
CLIVET (C)	4500	4500	1000
PED (CE)	4500	4500	1000

DPr = Maximum operating pressure on refrigerant side
DPw = Maximum operating pressure on water side
for different approvals contact our sales office

INTEGRATED HEATING CAPACITIES

Anternal exchanger inlet air temperature °C (D.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	OTHERS
Heating capacity multiplication coefficient	0.89	0.88	0.94	1

To obtain the integrated heating capacities (the real heating capacity considering the defrost cycles too), multiply the kWt value in the heating performance tables by the following coefficient.

ACOUSTIC CONFIGURATION: EXTREMELY LOW NOISE (EN)

COOLING PERFORMANCE

Size	To (ºC)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (ºC)													
		25		30		32		35		38		41		43	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
352	5	89.4	23.0	84.7	25.3	82.7	26.3	79.7	27.9	76.6	29.6	73.4	31.3	71.3	32.6
	6	91.8	23.1	86.8	25.5	84.8	26.5	81.6	28.1	78.5	29.8	75.2	31.6	73.0	32.8
	7	93.9	23.2	88.8	25.7	86.7	26.7	83.6	28.3	80.3	30.0	77.0	31.8	74.7	33.0
	8	95.8	23.4	90.8	25.8	88.7	26.8	85.5	28.4	82.1	30.1	78.8	31.9	76.4	33.2
	9	97.6	23.6	92.6	25.9	90.5	26.9	87.3	28.5	84.0	30.2	80.5	32.0	78.1	33.3
	10	99.1	23.9	94.4	26.0	92.4	26.9	89.2	28.5	85.8	30.2	82.2	32.1	79.7	33.5
402	5	100.7	27.2	95.3	29.9	93.1	31.1	89.6	32.9	86.0	34.8	82.3	36.8	79.8	38.1
	6	103.3	27.3	97.6	30.1	95.3	31.3	91.7	33.2	88.0	35.0	84.3	37.0	81.7	38.3
	7	105.7	27.5	99.8	30.3	97.4	31.5	93.7	33.4	90.0	35.2	86.2	37.2	83.6	38.5
	8	107.8	27.7	101.9	30.5	99.5	31.7	95.8	33.5	91.9	35.4	88.0	37.4	85.4	38.7
	9	109.8	28.0	103.9	30.7	101.5	31.8	97.7	33.6	93.8	35.5	89.8	37.5	87.1	38.9
	10	111.6	28.2	105.9	30.8	103.5	31.9	99.7	33.7	95.7	35.6	91.6	37.6	88.7	39.0
432	5	109.8	31.3	104.2	34.3	101.9	35.5	98.3	37.4	94.6	39.4	90.8	41.5	88.3	42.9
	6	112.6	31.5	106.7	34.5	104.3	35.8	100.5	37.7	96.7	39.7	92.7	41.8	90.0	43.2
	7	115.2	31.7	109.1	34.7	106.6	36.0	102.7	38.0	98.7	40.0	94.5	42.1	91.7	43.5
	8	117.7	31.9	111.4	34.9	108.8	36.2	104.8	38.2	100.6	40.2	96.4	42.3	93.5	43.7
	9	120.2	32.1	113.6	35.1	110.9	36.4	106.8	38.3	102.5	40.3	98.2	42.4	95.2	43.9
	10	122.5	32.2	115.7	35.3	113.0	36.5	108.7	38.4	104.4	40.4	100.0	42.5	97.0	43.9
452	5	117.6	34.5	111.4	37.8	108.9	39.2	105.1	41.3	101.2	43.4	97.3	45.6	94.6	47.1
	6	120.9	34.9	114.5	38.2	111.8	39.5	107.9	41.6	103.8	43.7	99.8	45.9	97.0	47.4
	7	123.8	35.2	117.1	38.5	114.4	39.8	110.3	41.9	106.2	44.0	102.0	46.2	99.2	47.7
	8	126.2	35.4	119.4	38.7	116.7	40.1	112.5	42.1	108.3	44.2	104.0	46.4	101.2	47.9
	9	128.2	35.7	121.4	38.9	118.6	40.3	114.4	42.3	110.2	44.4	105.9	46.6	103.0	48.1
	10	129.8	35.8	122.9	39.1	120.2	40.4	116.0	42.5						
502	5	125.6	39.2	118.7	42.7	115.9	44.2	111.6	46.5	107.3	48.9	102.9	51.4		
	6	129.7	39.6	122.2	43.1	119.3	44.6	114.9	46.8	110.5	49.1	106.2	51.5		
	7	133.0	40.0	125.3	43.5	122.2	45.0	117.7	47.2	113.2	49.5	108.8	51.8		
	8	135.7	40.4	127.8	44.0	124.6	45.4	120.0	47.7	115.3	49.9	110.7	52.3		
	9	137.6	40.8	129.7	44.4	126.6	45.9	121.7	48.1	116.9	50.5	111.9	52.9		
	10	138.7	41.2	131.2	44.8	128.0	46.3	123.0	48.7	117.8	51.2	112.4	53.8		
552	5	138.4	43.9	130.7	47.7	127.5	49.3	122.5	51.7	117.4	54.2	112.1	56.7		
	6	142.3	44.3	134.1	48.2	130.8	49.8	126.0	52.1	121.3	54.5	116.6	57.0		
	7	145.8	44.8	137.2	48.6	133.9	50.2	129.1	52.5	124.5	54.9				
	8	148.8	45.2	140.1	49.1	136.7	50.6	131.8	52.9	127.0	55.2				
	9	151.2	45.7	142.6	49.5	139.2	51.0	134.0	53.2						
	10	153.2	46.2	144.9	49.9	141.4	51.3	135.8	53.5						
602	5	151.4	48.4	143.5	52.6	140.2	54.4	135.2	57.1	130.0	59.9	124.7	62.8	121.1	64.8
	6	155.9	49.0	147.7	53.2	144.3	54.9	139.0	57.6	133.6	60.4	128.0	63.3	124.2	65.3
	7	159.9	49.4	151.4	53.6	147.9	55.4	142.4	58.1	136.8	60.9	131.0	63.8	127.0	65.8
	8	163.5	49.7	154.8	53.9	151.1	55.6	145.5	58.4	139.7	61.2	133.6	64.1	129.5	66.2
	9	166.5	49.8	157.7	54.0	153.9	55.8	148.2	58.6	142.1	61.4	135.9	64.4	131.6	66.5
	10	169.2	49.8	160.2	54.0	156.4	55.8	150.4	58.6	144.2	61.6	137.8	64.6	133.3	66.8

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
To = Internal exchanger water outlet temperature in° C
DT = difference between inlet / outlet water temperature = 5°C

ACOUSTIC CONFIGURATION: EXTREMELY LOW NOISE (EN)

HEATING PERFORMANCE

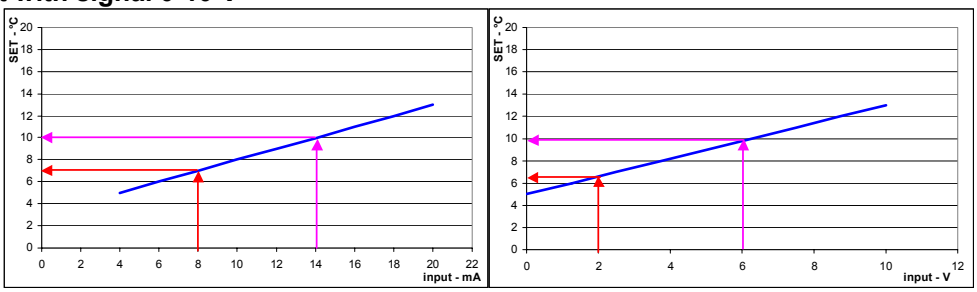
Size	Ta (°C) DB/WB	EVAPORATOR INLET/OUTLET WATER TEMPERATURE (°C)									
		30 / 35		35 / 40		40 / 45		42 / 47		45 / 50	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
352	-5 / -5.4	77.9	21.7	77.4	24.1	76.7	26.9				
	0 / -0.6	86.8	22.0	85.8	24.4	84.4	27.2	83.7	28.5	82.6	30.4
	5 / 3.9	97.0	22.3	95.4	24.8	93.5	27.6	92.7	28.8	91.3	30.8
	7 / 6.1	102.6	22.4	100.8	24.9	98.7	27.8	97.8	29.0	96.3	31.0
	10 / 8.2	108.4	22.6	106.3	25.1	104.1	28.0	103.1	29.2	101.6	31.1
	15 / 13	123.2	23.1	120.5	25.6	117.9	28.4	117.0	29.6	115.6	31.6
402	-5 / -5.4	85.6	24.5	84.6	27.0	85.6	30.3				
	0 / -0.6	95.6	24.7	94.9	27.3	94.3	30.6	94.1	32.1	93.9	34.6
	5 / 3.9	106.7	25.0	105.8	27.7	104.3	31.0	103.5	32.5	102.2	35.0
	7 / 6.1	112.8	25.2	111.7	27.9	109.9	31.2	109.0	32.7	107.4	35.1
	10 / 8.2	119.0	25.4	117.5	28.1	115.6	31.4	114.7	32.9	113.2	35.3
	15 / 13	134.7	25.9	132.0	28.5	130.1	31.8	129.6	33.3	129.0	35.6
432	-5 / -5.4	93.9	27.1	93.0	29.9						
	0 / -0.6	104.8	27.5	103.7	30.3	102.7	33.9				
	5 / 3.9	117.3	27.9	116.1	30.8	116.1	34.3	116.4	35.9	117.4	38.5
	7 / 6.1	124.2	28.1	122.9	31.0	122.9	34.5	123.3	36.1	124.2	38.6
	10 / 8.2	131.3	28.3	129.9	31.2	129.6	34.7	129.7	36.3	130.3	38.8
	15 / 13	149.4	28.7	147.9	31.7	145.5	35.1	144.3	36.7	142.3	39.1
452	-5 / -5.4	104.0	29.3	103.0	32.3	101.3	36.4				
	0 / -0.6	115.7	29.7	114.1	32.7	112.1	36.8	111.1	38.8	109.7	42.0
	5 / 3.9	128.8	30.1	126.7	33.2	124.3	37.3	123.2	39.2	121.6	42.4
	7 / 6.1	135.9	30.3	133.6	33.4	131.0	37.5	129.9	39.4	128.1	42.6
	10 / 8.2	143.1	30.5	140.7	33.6	137.9	37.7	136.7	39.6	134.7	42.8
	15 / 13	161.3	30.9	158.6	34.1	155.3	38.2	153.8	40.1	151.3	43.3
502	-5 / -5.4	106.3	31.5	109.0	34.8						
	0 / -0.6	122.0	32.1	121.0	35.3	119.5	40.2	118.8	42.7	117.7	47.0
	5 / 3.9	138.0	32.6	134.7	35.8	133.5	40.7	133.6	43.1	134.3	47.4
	7 / 6.1	146.3	32.9	142.3	36.0	141.0	40.9	141.2	43.4	142.2	47.6
	10 / 8.2	154.4	33.1	150.1	36.3	148.5	41.2	148.7	43.6	149.7	47.8
	15 / 13	174.1	33.7	170.0	36.9	167.3	41.8	166.7	44.2	166.2	48.4
552	-5 / -5.4	119.7	34.5	118.1	38.0						
	0 / -0.6	133.2	35.0	131.5	38.5	129.7	43.7	128.9	46.2		
	5 / 3.9	148.1	35.6	146.1	39.0	144.6	44.1	144.1	46.6	143.6	50.8
	7 / 6.1	156.2	35.8	154.0	39.3	152.2	44.3	151.6	46.8	150.8	50.9
	10 / 8.2	164.4	36.1	161.9	39.6	159.6	44.6	158.7	47.0	157.4	51.0
	15 / 13	184.7	36.7	181.6	40.2	177.1	45.1	174.9	47.4	171.3	51.3
602	-5 / -5.4	127.8	39.5	130.9	43.7						
	0 / -0.6	144.4	40.3	145.0	44.3	144.4	50.0				
	5 / 3.9	162.9	41.0	161.8	45.0	161.6	50.5	161.8	53.1	162.2	57.4
	7 / 6.1	173.0	41.3	171.3	45.3	170.6	50.7	170.5	53.3	170.7	57.5
	10 / 8.2	183.2	41.6	181.1	45.7	179.4	51.0	178.9	53.5	178.1	57.6
	15 / 13	208.8	42.3	206.5	46.4	201.0	51.6	198.0	53.9	192.5	57.8

kWt = internal exchanger heat power (kW)
kWe = Compressor power input in kW
Ta = external exchanger air intake temperature
WB = wet bulb
DB = dry bulb

TECHNICAL CHARACTERISTICS OF ACCESSORIES

SCP1 - set point compensation with 4-20 mA signal
SPC4 - compensation of set point with signal 0-10 V

The set point compensation with signal 4÷20 mA or 0÷10 V changes the calibration of the set point, increasing or decreasing it depending on the system needs.



SCP3 - set point compensation according to the outside enthalpy

It allows to modulate unit set-point according to the external enthalpy. In this way an higher comfort and continuous energy saving are guaranteed. It optimizes unit energy efficiency, through a set point automatic modulation, according to the external conditions (temperature + humidity). It optimiezs also the defrosting time during winter operation.

PM - phase monitor

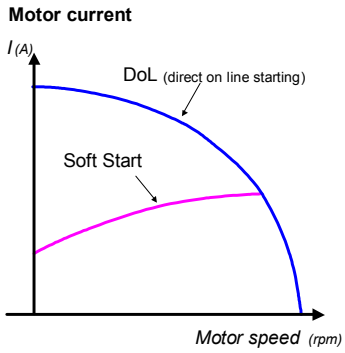
The phase monitor allows to check the right presence of electric supply phases for 400/3/50 units.

PFCP - power factor correction capacitors (cosfi > 0.9)

the power factor correction capacitors increase the cosF value, reducing the apparent current on the supply line to the chiller assembly With costs of less than 0.9 the energy provider applies surcharges for the drawing of reactive energy.

SFSTR - breakaway current reducing device (soft start)

Starting up a motor directly can overload the electricity network, with start-up currents up to 8 times the nominal current. Thanks to the breakaway current reduction device, start-up takes place gradually, with the start-up current being limited during this period of time. The start-up current can therefore be reduced to 3.5 - 4 times the nominal current, meaning that the power systems and protection devices can be sized with lower parameters.



RCMRX - remote microprocessor control unit

the remote control allows the remote display and operation of functions of the microprocessor on the unit

separately supplied accessories

CMSC4 - CAN/MODBUS serial converter kit

The serial communications module with supervisor (MODBUS) provides the unit with an RS 485 outlet. This makes it possible to obtain remote service and supervision with standard modbus protocol. It is possible to connect up to 127 units to a single supervision system. Connection to a PC must be via an RS485/232 converter; the serial RS232 allows maximum length of 10 metres. The serial communication module (MODBUS) is necessary if the unit is connected to ELFOCONTROL.

CMSC6 - CAN/LON WORKS serial converter kit

LonWorks technology is a complete platform for the implementation of network system. These networks consist of smart control systems or "nodes" that interact with their environment and communicate with one another using a common message based on the protocol (LonTalk®). A LonWorks network may have up to 32,685 nodes divided in 255 sub-networks (127 nodes/sub-network). The gateway device is already configured according to the Echelon classification for the type of unit for which it is intended, with a number of managed variables which are the subset of those managed natively by the machine, and in any case able to receive the standard Echelon profiles. The supply of this device does not include configuration and operation of the LonWorks to which it is connected. These actions are left to the supplier of the supervision system.

MSLX - Master-Slave function

The master-slave function allows to control and optimize th eoperation of several units on the same water circuit.
The Clivet Talk local network can be extended to up to 6 units.

separately supplied accessories

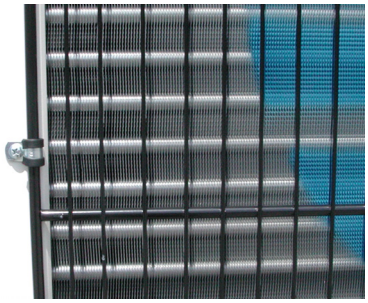
DLX - data logger

The data logger is a sort of black box which records all parameters and tracks them in case of an alarm.

separately supplied accessories

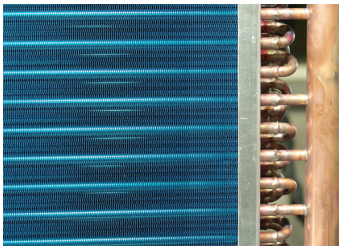
PGCC - condenser coil and compressor compartment protection grill.

The protection grilles prevent access to hazardous parts in the unit by unauthorized personnel.



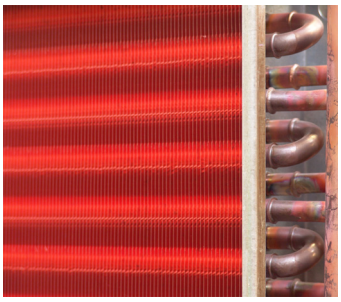
CCCA - copper / aluminium condenser coils with acrylic lining

The package heat exchanger finned coils in copper /aluminium with acrylic covering can be used in places with concentrations in the air of saline and moderately aggressive agents.



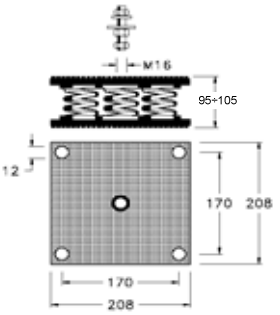
CCCC - copper / copper condenser coils

The package heat exchanger finned coils in copper /copper can be used in places with concentrations in the air of saline and highly aggressive agents.



AMMX - spring antivibration mounts

The spring anti-vibration devices reduce the vibration of the compressor during operation, and are attached to the feet of the base.



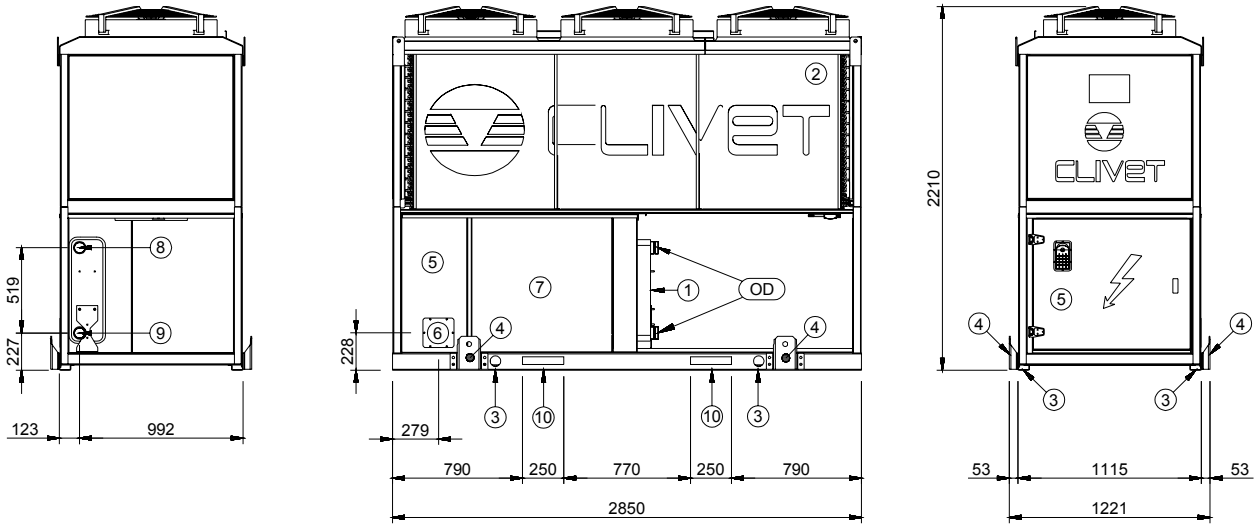
separately supplied accessories

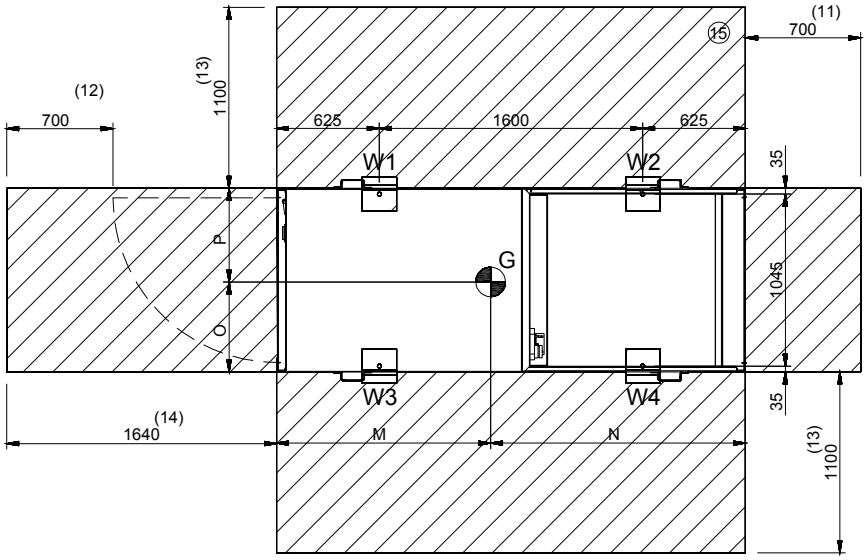
MHP - high and low pressure gauges

Analogue pressure gauges that display the operating pressure in the high and low pressure sections of the refrigerant circuit

DIMENSIONAL DRAWING

DIMENSIONAL: WSAN-XSC 352-602 SETUP " SC - EN "





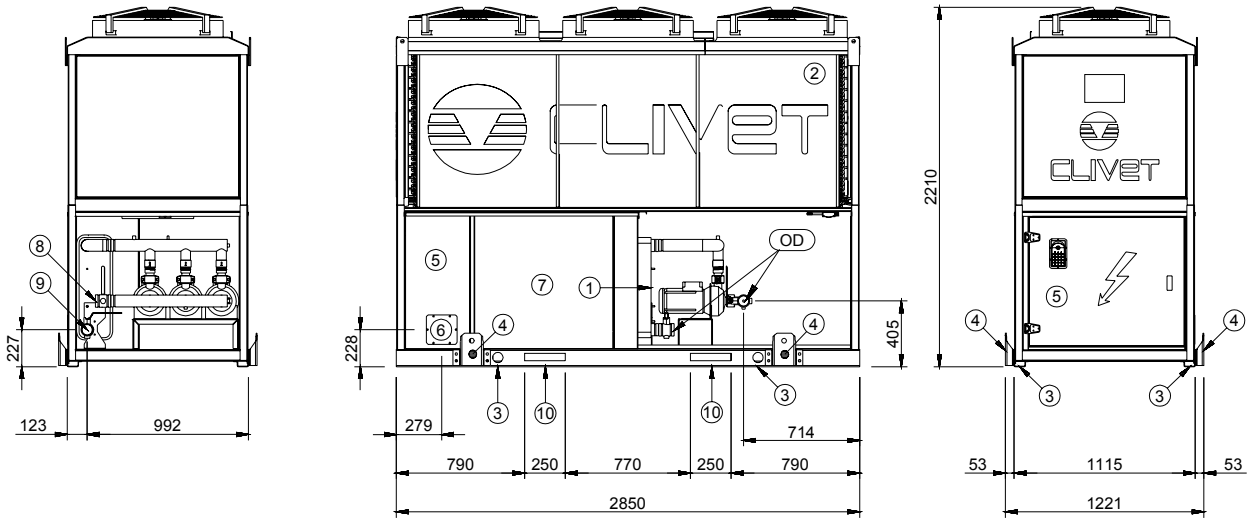
(1) INTERNAL EXCHANGER (EVAPORATOR)
(2) EXTERNAL EXCHANGER (CONDENSER)
(3) HOLE TO HANG UNIT
(4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
(5) ELECTRICAL PANEL
(6) POWER INPUT
(7) SOUNDPROOFED CABIN
(8) INTERNAL EXCHANGER WATER INLET
(9) INTERNAL EXCHANGER WATER OUTLET
(10) LIFTING LUGS
(11) MINIMUM DIMENSION FOR A SAFE PASSAGE.
(12) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
(13) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
(14) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
(15) CLEARANCE ACCESS RECOMMENDED
(G) BARYCENTRE

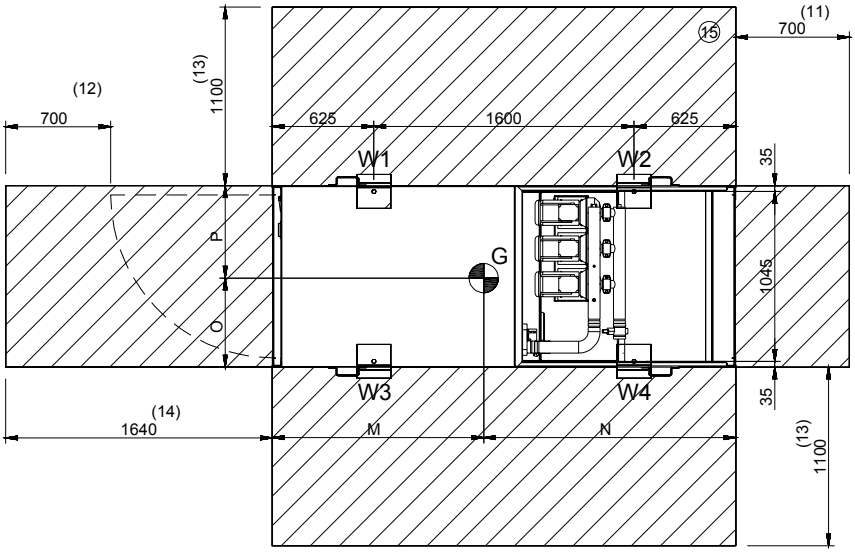
			SC							EN						
Size			**352**	**402**	**432**	**452**	**502**	**552**	**602**	**352**	**402**	**432**	**452**	**502**	**552**	**602**
M		mm	1144	1138	1136	1139	1131	1127	1123	1148	1143	1140	1144	1135	1131	1127
N		mm	1706	1712	1714	1711	1719	1723	1727	1702	1707	1710	1706	1715	1719	1723
O		mm	575	576	575	574	574	574	574	575	575	575	573	574	573	573
P		mm	545	544	545	546	546	546	546	540	540	540	542	541	542	542
OD		mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
Length		mm	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Depth		mm	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Height		mm	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210
W1		kg	352	360	366	373	388	397	404	357	365	371	378	394	402	410
W2		kg	248	252	255	261	269	273	277	253	257	260	266	274	279	283
W3		kg	343	351	357	365	380	388	396	347	355	361	368	383	392	399
W4		kg	239	243	246	253	260	265	268	243	247	250	257	264	268	272
Operating weight		kg	1181	1206	1223	1251	1297	1323	1345	1199	1224	1241	1269	1315	1341	1363
Shipping weight		kg	1175	1199	1216	1243	1288	1313	1335	1193	1217	1234	1261	1306	1331	1353

Particular accessories, executions or versions can bring about a great variation of the mass represented here.
Please contact our Technical Department.

DIMENSIONAL DRAWING

DIMENSIONAL: WSAN-XSC 352-602 SETUP " SC - EN " WITH HYDROPACK





(1) INTERNAL EXCHANGER (EVAPORATOR)
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(3) HOLE TO HANG UNIT
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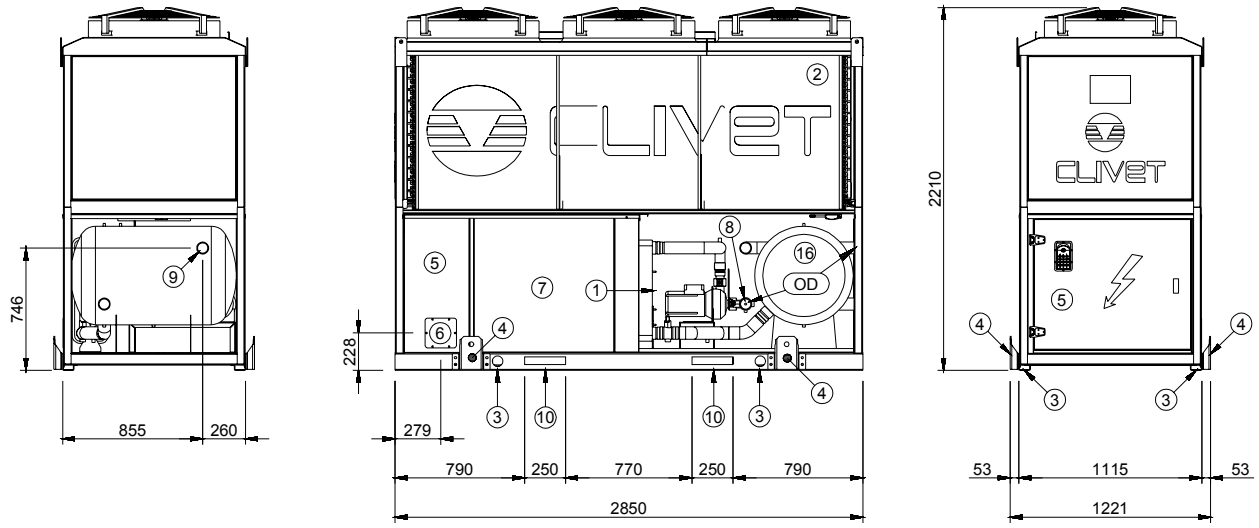
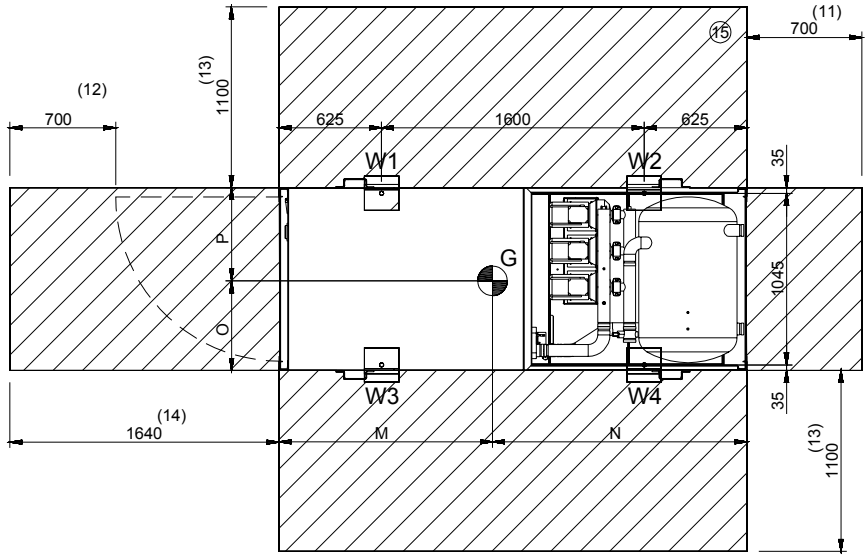
(15) CLEARANCE ACCESS RECOMMENDED
(G) BARYCENTRE

			SC							EN						
Size			**352**	**402**	**432**	**452**	**502**	**552**	**602**	**352**	**402**	**432**	**452**	**502**	**552**	**602**
OD		mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
Length		mm	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Depth		mm	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Height		mm	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210

DIMENSIONAL DRAWING

DIMENSIONAL: WSAN-XSC 352-602 SETUP " SC - EN " WITH HYDROPACK AND STORAGE TANK



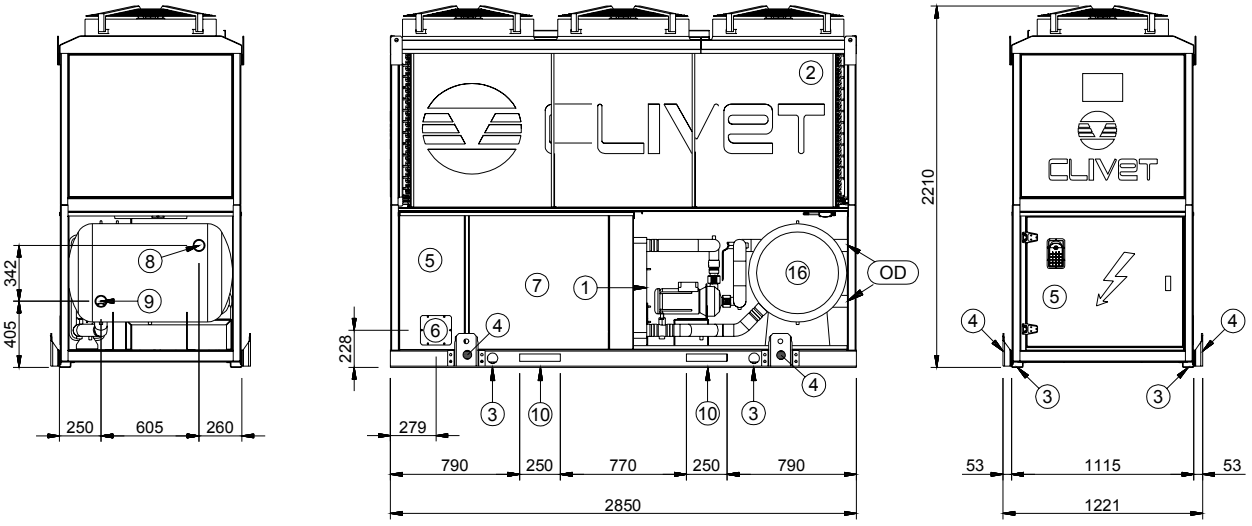


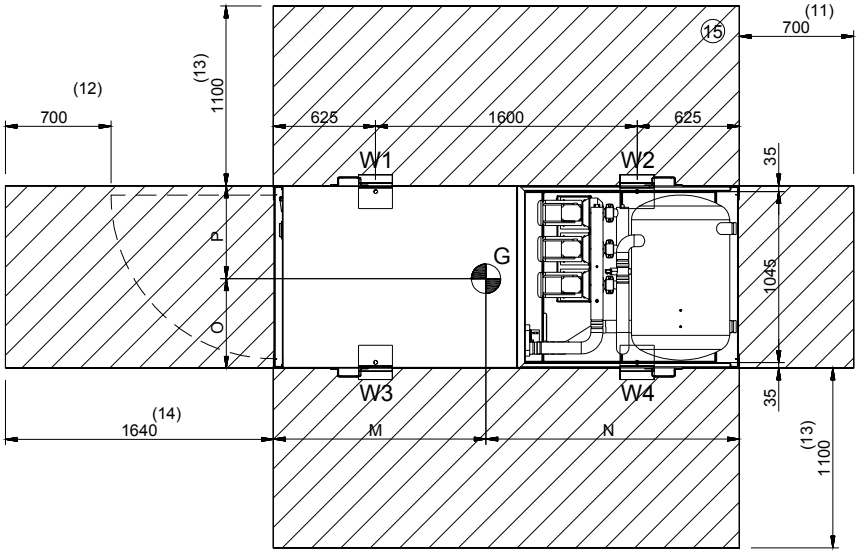
(1) INTERNAL EXCHANGER (EVAPORATOR)
(2) EXTERNAL EXCHANGER (CONDENSER)
(3) HOLE TO HANG UNIT
(4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
(5) ELECTRICAL PANEL
(6) POWER INPUT
(7) SOUNDPROOFED CABIN
(8) INTERNAL EXCHANGER WATER INLET
(9) INTERNAL EXCHANGER WATER OUTLET
(10) LIFTING LUGS
(11) MINIMUM DIMENSION FOR A SAFE PASSAGE.
(12) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
(13) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
(14) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
(15) CLEARANCE ACCESS RECOMMENDED
(16) STORAGE
(G) BARYCENTRE

			SC							EN						
Size			**352**	**402**	**432**	**452**	**502**	**552**	**602**	**352**	**402**	**432**	**452**	**502**	**552**	**602**
OD		mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
Length		mm	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Depth		mm	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Height		mm	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210

DIMENSIONAL DRAWING

DIMENSIONAL: WSAN-XSC 352-602 SETUP " SC - EN " WITH HYDROPACK AND PRIMARY/SECONDARY STORAGE TANK



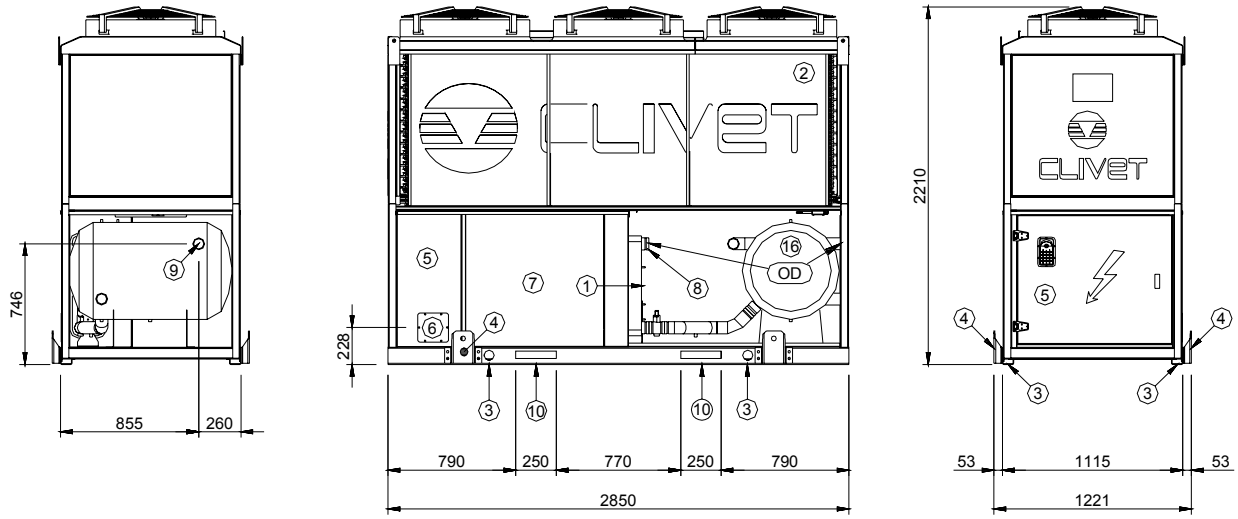


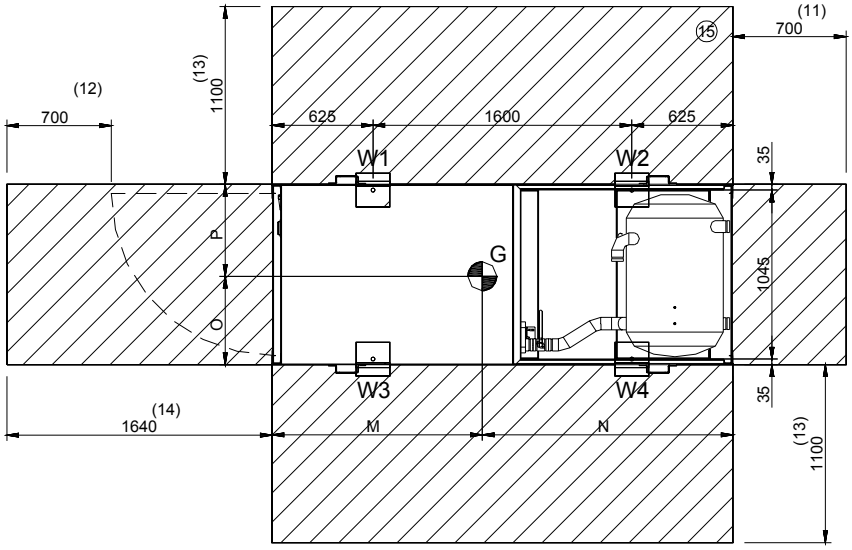
(1) INTERNAL EXCHANGER (EVAPORATOR)
(2) EXTERNAL EXCHANGER (CONDENSER)
(3) HOLE TO HANG UNIT
(4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
(5) ELECTRICAL PANEL
(6) POWER INPUT
(7) SOUNDPROOFED CABIN
(8) INTERNAL EXCHANGER WATER INLET
(9) INTERNAL EXCHANGER WATER OUTLET
(10) LIFTING LUGS
(11) MINIMUM DIMENSION FOR A SAFE PASSAGE.
(12) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
(13) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
(14) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
(15) CLEARANCE ACCESS RECOMMENDED
(16) STORAGE
(G) BARYCENTRE

			SC							EN						
Size			**352**	**402**	**432**	**452**	**502**	**552**	**602**	**352**	**402**	**432**	**452**	**502**	**552**	**602**
OD		mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
Length		mm	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Depth		mm	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Height		mm	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210

DIMENSIONAL DRAWING

DIMENSIONAL: WSAN-XSC 352-602 SETUP " SC - EN " WITH STORAGE TANK





(1) INTERNAL EXCHANGER (EVAPORATOR)
(2) EXTERNAL EXCHANGER (CONDENSER)
(3) HOLE TO HANG UNIT
(4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
(5) ELECTRICAL PANEL
(6) POWER INPUT
(7) SOUNDPROOFED CABIN
(8) INTERNAL EXCHANGER WATER INLET
(9) INTERNAL EXCHANGER WATER OUTLET
(10) LIFTING LUGS
(11) MINIMUM DIMENSION FOR A SAFE PASSAGE.
(12) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
(13) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
(14) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
(15) CLEARANCE ACCESS RECOMMENDED
(16) STORAGE
(G) BARYCENTRE

			SC							EN						
Size			**352**	**402**	**432**	**452**	**502**	**552**	**602**	**352**	**402**	**432**	**452**	**502**	**552**	**602**
OD		mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
Length		mm	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Depth		mm	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Height		mm	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210

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