



ecodesign
Engineering & Environmental Design

NEW CHILLERS ECODESIGN 2017

NEW WecoSpar

A digital system





Economizer, increase 15% of capacity, with less energy (optional)

Inner air box with fan split to prevent torque between fans

Industrial high temperature chiller

For extreme conditions, with or without adiabatic systems

Discharge pressure and temperature control to cold areas or countries, with inverters and antifreeze systems, to avoid and prevent formation of ice in the fins of the condensers.



Fans speed inverter, to control the pressure on condensers

Large condensers Δt 13°C or 14°C


Independent protections for compressor motors

fans 800 mm Rpm 910 axial EC system



Large condensers, with Δt 14°C support high air conditions

Above 45°C, condensers are in V position to get fresh ambient air

 Large space for technical assistance and maintenance

Screw compressor

With by motor ratio 3, to support high temperatures above 50°C until 70°C



Compressors

They shall be semi hermetically, or screw, of high volumetric efficiency, with 3-phase (two-pole) motors.

The compressors shall have internal thermal contacts, for protection against overload, locked motor or extreme high discharge pressure. In addition, they shall be equipped with crankcase oil heater.

Their construction shall have low noise and low vibration operation.

Compressors shall be mounted in a separate noise- insulated space of the Unit, on appropriate vibration absorbing supports, in order to ensure a noise-free operation.

Water to refrigerant heat exchanger

It shall be of high efficiency and externally well insulated.

Brazed stainless steel plate heat exchangers shall be used up to a total compressor absorbed power of 25 kW and shell and tube type in larger Units.

Fans

They shall have 3-phase (6-pole or 8-pole) motors with external rotor, closed type IP 54 (according to DIN 40050). The bearings of the motors shall be closed type, filled with special lubricant, thus requiring no maintenance and guaranteeing noiseless performance.

Fan wheels shall be of axial type, statically and dynamically balanced according to VDI 2060, with aerodynamically designed blades for quiet operation. The motor shall be protected against over current

by internal thermal contacts according to VDE 0730.

Protective steel fan guards shall be furnished according to DIN 31001.

ErP 2015 norm



Very low noise speed

**Variable fan control speed
With the new DC inverter fan**

Filter-drier

Consisting of a blend of highly effective desiccants. The quality features built into it assure years of service on any refrigeration system.



Air to Water

The Unit shall be equipped With at least two or four Compressors and two or four Independent refrigerant circuits. Starting delay shall assure that the compressors do not start simultaneously in order to reduce the starting current. For Units with total compressor

Water to refrigerant heat exchanger

It shall be of high efficiency and externally well insulated. Shell and tube evaporator Brazed stainless steel plate heat Exchangers shall be used up to a total compressor absorbed power of 25 kW and shell and tube type in larger Units.

Air to refrigerant heat exchanger (condensers) Large condensers

It shall be manufactured from seamless copper tubes and aluminium fins with properly formed surface for high heat transfer efficiency. Copper tubes shall be mechanically expanded into the aluminium fins accomplishing a good contact thus maximum heat transfer. **Adiabatic** system is also providing with more than +48C on air. The chillers with +50C they add a tropical condenseur.

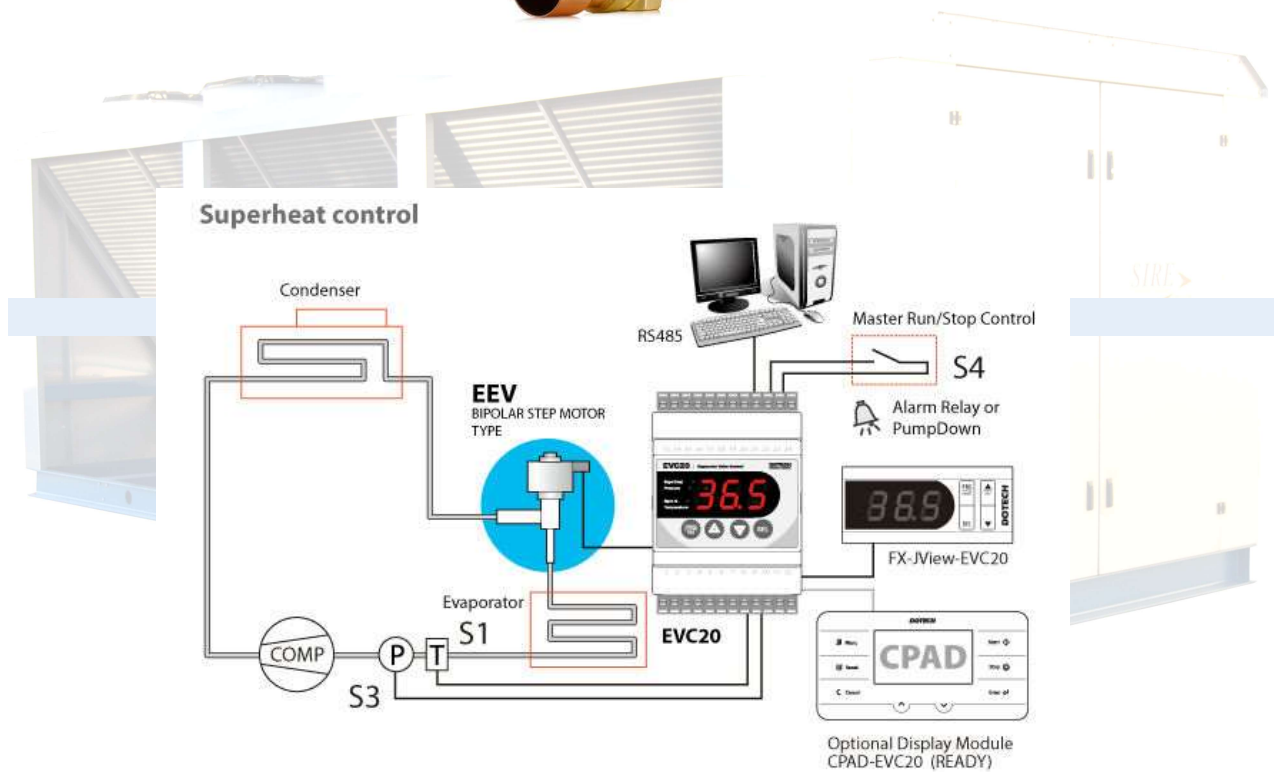


The very new microchannel condenser is also providing, by demand in this model. However, we advise the use of this condenser only in clean places or far away from the sea area, with a clean ambient.



Expansion control device

Electronic expansion valves are also used.



Refrigerant pressure gauges

Glycerine type pressure gauges shall be used for measuring the suction and discharge pressure of each refrigerant circuit; our electronic advices are used also, to provide reading pression points

Housing

The structure base of the chiller is made in UPN steel with 160mm x 6mm thickness

The unit housing shall consist of a frame construction of galvanized our **stainless steel**, profiles at least 1,5mm thick assembled with bolts and cast stainless steel, our galvanized corner joints. The outer panels shall be galvanized our stainless steel and internally noise insulated in the compressors department (when demanded).

Frame panels shall be finished in stainless steel or dry powder epoxy resin paint, our stainless steel to provide an additional weather-proof protection.

Electrical panel

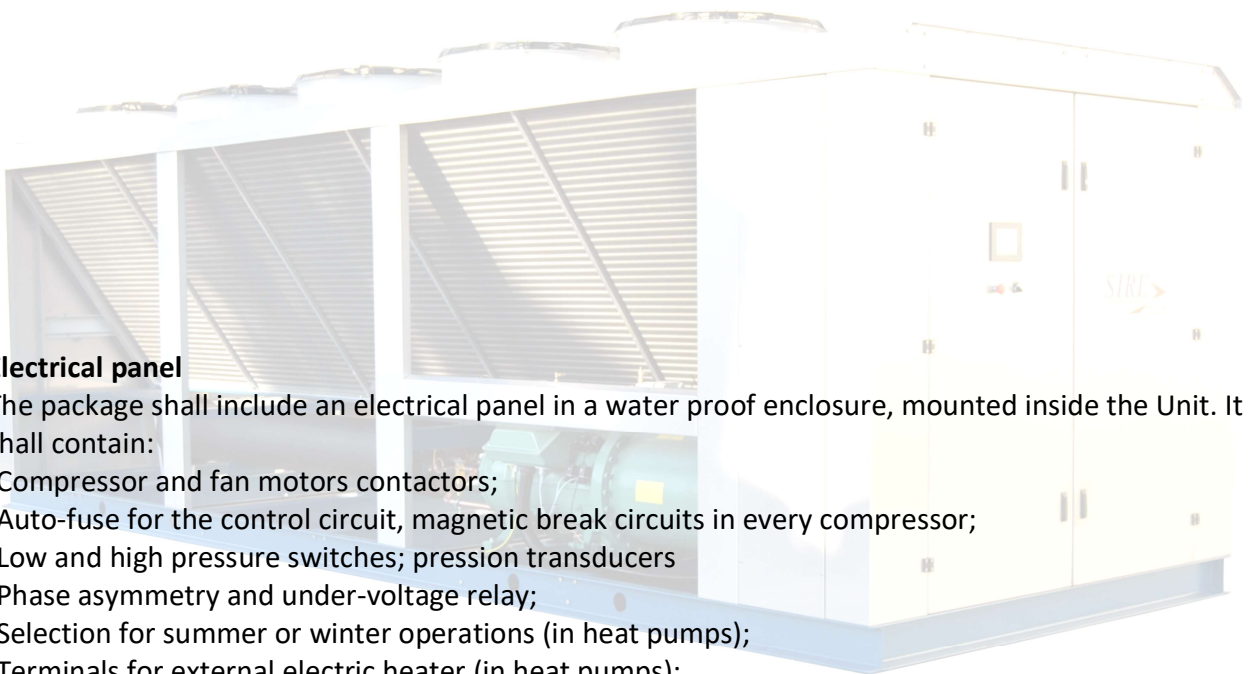
The package shall include an electrical panel in a water proof enclosure, mounted inside the Unit. It shall contain:

- Compressor and fan motors contactors;
- Auto-fuse for the control circuit, magnetic break circuits in every compressor;
- Low and high pressure switches; pressure transducers
- Phase asymmetry and under-voltage relay;
- Selection for summer or winter operations (in heat pumps);
- Terminals for external electric heater (in heat pumps);
- Indicating lamps for crankcase heater;
- Indicating lamps for phase asymmetry and under voltage;

Microprocessor based controller

The package shall include microprocessor based controller, which should provide the following functions:

- Temperature control (heating, cooling);
- Freeze-up protection;
- Compressor starting delay;
- Operation of the fans and of the water pump;
- Selection of the compressor starting order;
- Protection against high and low refrigerant pressure as well as low flow (connection with relevant switches);
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The electric panel board, contain; contactors, phase asymmetries and under voltage relay, (in some models) thermal protections, fuses, control circuit breakers, INT relays, switch breaker, and the microprocessor our PLC controller. The electrical panel is in a water proof enclosure system.

MICROPROCESSADOR

SIRE has as control equipment, one of the most advanced types of Microprocessor (several).

This equipment in the series is based on some of the following items:

The controller, checking all the parameters, control systems, and functions of the unit, and protects whenever it is necessary.

The same where necessary provides all the functions of alarm that you are against it, the figures are usually visible on their monitors.

The programming system provides sophisticated means, for some of the functions described below:



System P + I or P

Control of adjustable temperature...

Several step points...

Control of water pumps...

Delays to the start of compressors (part. wending) conform capacity...

Starting in empty...

Control of capacity...

Selection of variable start of compressors...

Protection against high and low pressure, oil, ice, etc....

Display for reading codes, errors, failures...

remote controls when requested

Modbus system is possible

All kind of diagnostic codes

Monitoring of fazes control

And yet for some more advanced microprocessors, various types of connections including modems and other external systems (options)

all this facility depending for the kind of chiller selected.

SIRE provide to our costumer the possibility of cooperation to building all kind of chiller situation by client design and by their demand

SIRE Chiller capacity control

The system is prepared to give different work conditions in the chiller

1

Stepped capacity control with control at inlet

All compressors and the relevant capacity control steps will be proportionally positioned in the band. Increasing temperature values will cause the control steps to be subsequently input. Each step will be input according to the set delay times. The compressors will be started at the first entered capacity control stage. If special management of the first capacity control stage was selected, control will be effected according to the description in the dedicated section. In any event, the times for the capacity controls will be applied as described.

2

Stepped capacity control with control at outlet

A description of stepped capacity control of 4 compressors with four capacity control steps each:

Activation of compressors

if the water temperature measured by the probe located at the evaporator outlet exceeds the threshold of Control Set-point + Control Band the number of power stages will be increased - the power stages were input according to the set parameter known as "delay between power-up of different devices"

3

Continuous capacity control

A maximum number of four compressors are managed, with continuous capacity control. The compressor's capacity is controlled by two relay outputs, which, when suitably controlled, enable compressor power to be increased or reduced, varying the capacity of the compression chamber. Compressor power is controlled by sending impulses to the outputs of the capacity control relays. These impulses command the compressor to be charged or discharged. These impulses are at a constant frequency, settable, and of variable duration between two minimum and maximum limits, also settable. As there is no acquisition regarding the absolute position of the compressor 's capacity control valve, and, consequently, as no direct verification is possible of the power percentage input in the circuit, a time based control is run. With this control, when a set time threshold is reached, the compressor is considered fully charged/discharged and thus control of the capacity control impulses is suspended.

4

Inverter variable speed control

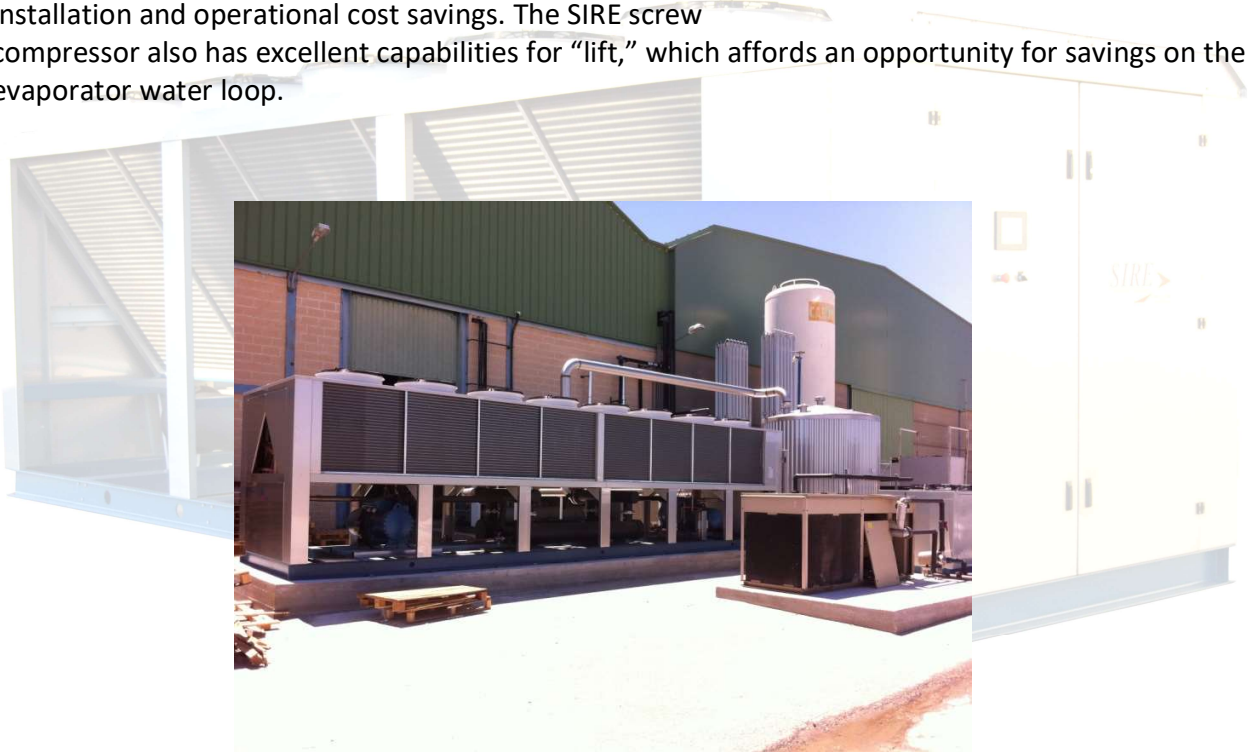
110 .. 1,156 m³/h based on variable speed

Semi-hermetic compact with integrated frequency inverter CSV or outside module inverter

Chilled Water Pump Control — Unit controls provide an output to control the chilled water pump(s). One contact closure to the chiller is all that is required to initiate the chilled water system.

Series Chiller Arrangements

Another energy-saving strategy is to design the system around chillers arranged in series. The actual savings possible with such strategies depends on the application dynamics and should be researched by consulting your SIRE chiller. Systems Solutions Representative and applying the SIRE System analyzer program. It is possible to operate a pair of chillers more efficiently in a series chiller arrangement than in a parallel arrangement. It is also possible to achieve higher entering-to-leaving chiller differentials, which may, in turn, provide the opportunity for lower chilled water design temperature, lower design flow, and resulting installation and operational cost savings. The SIRE screw compressor also has excellent capabilities for “lift,” which affords an opportunity for savings on the evaporator water loop.



-----**Calculated Durability of this chiller 25 Years**-----

Eco device System –W ECODSPAR
Increase more 15% of capacity in the chiller

Sire... chillers between 24 at 36 months of guarantee
The best guarantee in Market



Applicative Norms
Normativas aplicadas
CE Norms

Declare under our sole responsibility that the product ranges DTD.
to which this declaration relates is in conformity with the following standards or other normative document(s).
EN 60529 (2000) Degrees of protection provided by enclosures (IP code)
EN 60335-2-40 (2006) Household and similar electrical appliances, Part 2-40
EN 61000-6-2 (2006) Electromagnetic compatibility (EMC), Part 6-2
EN 61000-6-3 (2007) Electromagnetic compatibility (EMC), Part 6-3
ISO 12100-2 (2004) Safety of machinery, Part 2.
EN 14511-1,2,3,4 (2008) Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space
Machinery 2006/42/EC
Electromagnetic compatibility 2004/108/EC
Low voltage 2006/95/EC

company under Tuv certification

