

Tender Specification

SyScroll 85-135 Air CO / HP

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SERIES: SyScroll 85-135 Air CO / HP / RE

TYPE: Air cooled water chiller, heat pump and condensing unit

TECHNOLOGY: multi-scroll compressors, R410A refrigerant

CAPACITY RANGE:

Cooling → 84-132 [kW]

Heating → 82-128 [kW]

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1 General description

SyScroll Air CO / HP / RE units have been designed and optimized to operate with R410A refrigerant and scroll compressors

Thanks to multi-scroll technology and asymmetric design in tandem combination, it is possible to reach very high level of seasonal performances (ESEER up to 4,4), in line with Ecodesign requirements

SyScroll Air CO units are available in 5 sizes, with a nominal capacity range from 84 to 132 [kW]

SyScroll Air HP units are available in 5 sizes, with a nominal capacity range from 79 to 125 [kW] in cooling mode and from 82 to 128 [kW] in heating mode

All units are equipped with a single refrigerant circuit, equipped with 2 compressors in tandem design

SyScroll Air can be supplied with 2 acoustic options:

- Basic Low Noise (-): the units are equipped with delta connected fans. The chillers are supplied with compressors box to reduce the noise emissions
- Super Low Noise (S): the units are equipped with star connected fans, fitted with a speed controller which allows the units to operate with a

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very low rotation speed. Besides very low fan deck sound emission, the chillers are supplied with compressors box and soundproof jackets on compressors

To increase its application field, SyScroll Air range is available in three additional versions:

- HT (High Temperature) version: same equipment as the basic version, but also fitted with brushless EC fan motors to ensure low energy consumption and to operate on a wider envelope
- HPF (High Pressure Fans) version: same equipment as the basic version, but also fitted with brushless EC fan motors so as to provide external static pressure up to 120 [Pa]
- BC (Brine Cooling) version: same equipment as the basic version, but also fitted with EC fan motors, electronic expansion valve and suction accumulator to ensure a precise control of suction superheat

Partial heat recovery option is available:

- Desuperheater: plate type heat exchanger fitted on the compressor discharge line, to recover about 20 % of the total heat rejected to the condenser

Several hydraulic options are available in order to cover a wide range of requirements in terms of pump available static pressure, redundancy and inertia water side

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The general operation status of the unit is steadily managed by a microprocessor implementing a dedicated developed software, ensuring a total protection of compressor inside its operating envelope and including parameter customization according application field

2 Key points

- High seasonal performances → ESEER up to 4.4
- Common configuration for the different versions → Easy upgrade of the units in stock or on field
- Microchannel coils for CO version → Significant reduction on refrigerant charge and operating weight
- Compressors box → Remarkable sound reduction even for the basic noise version
- Control platform → Modular architecture, compressor envelope integration, corrective actions in border line areas, easy-friendly user interface

- Several options / accessories provided with standard delivery:
 - Sequence phase control → safe electric installation
 - Control circuit transformer → power supply without neutral
 - Control data logger → thermodynamic parameters recording
 - Water flow switch → protection against low water flow
 - Antifreeze electrical heater → protection against BPHE freezing

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3 Cabinet

The cabinet is made of heavy gauge galvanized steel.

All galvanized steel components are individually painted by a special painting process before the assembly of the unit. This painting system performs a homogeneous protection to the corrosion.

The painting is a polyester powder based type, colored in RAL 7040. The units are suitable for outdoor installation, directly on the building roof or at the ground level

4 Compressors

Compressors are of hermetic scroll type and fitted with an electronic control system ensuring protection against high temperature and excessive load.

All compressors have direct-on-line starting and are mounted on rubber vibration isolators in order to minimize noise and vibration transmission

5 Evaporator

Indoor heat exchangers are brazed stainless steel plate type. They are insulated with a 19 [mm] thick closed cell polyethylene foam material and provided with Victaulic connections.

They are protected by a antifreeze electric heater to ensure a good protection against freezing at low ambient temperature when the unit is switched off.

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Maximum working pressure is 10 [bar] water side and 45 [bar] refrigerant side

6 Condenser

Condenser coils are made of seamless copper tubes, arranged in staggered rows, mechanically expanded into corrugated aluminum fins.

In Cooling only version (CO) condenser coils are microchannel type, made of 100% aluminum (fins, tubes and headers) with the exception of copper pipe couplings. Additional surface coating is provided for the standard delivery in order to further improve resistance to corrosion.

7 Condenser fans

Basic units (in all different sound versions) are equipped with axial fans, direct drive with asynchronous three-phase motors.

Special fan with electronic brushless type motors are used in HT and HPF versions.

Fans are equipped with externally mounted nozzle profile housing generating low sound levels

8 Refrigerant circuit

All the units are equipped with a single refrigerant circuit, equipped with liquid line and discharge line shut-off valves, filter-drier with solid core, sight glass,

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solenoid valve and thermostatic expansion valve (electronic expansion valve is available as option).

Heat pump units (HP) are additionally provided with 4-way reversing valve, suction accumulator and liquid receiver.

9 Control panel

A new optimized control with an easy-friendly interface, manages unit operation under different load and temperature condition and can provide:

- Compressor management
 - Power on/off
 - Anti-cycle
 - Tandem unloading for high pressure, high temperature and/or high compressor pressure ratio
- Chilled and hot water temperature regulation (return water temperature RWT - P+I type or leaving water temperature LWT - neutral band type)
- Automatic control of suction superheating through electronic expansion valve (option) with optimized functions (cooling, heating, start-up and defrost)
- Evaporator antifreeze protection
- Defrost management
- High and low pressure operating conditions management
- External interlocks management
- Remote control management

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- Unit power on / off
- Unit cool / heat operation
- Summary alarm signal
- Remote signaling, by dry contacts:
 - Voltage presence
 - Compressors in operation
 - General alarm
- Hydro-kit management: start-up of pump, antifreeze heater of external tank

Unit controller can display all operating parameters such as:

- Return water temperature
- Leaving water temperature
- Outdoor ambient temperature
- Refrigerant discharge pressure
- Refrigerant suction pressure
- Refrigerant suction temperature
- Refrigerant discharge temperature
- Refrigerant coil temperature

Unit controller can display various alarms and operation status:

- Low / High pressure
- Evaporator antifreeze
- Lack of water flow
- Compressor operation / operating hours

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- Pump operation / operating hours
- Compressor thermal protection
- Fan thermal protection
- Faulty sensors

10 Safety and control devices

Each unit is complete with the following safety and control devices

Safety

- Power disconnect switch with an emergency stop function
- Phase sequence control
- High pressure switch
- Low pressure switch
- Evaporator antifreeze electric heater
- Crankcase oil electric heater
- Water flow switch
- Safety valve on discharge line

Control

- High pressure transducer
- Low pressure transducer

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- Discharge gas temperature probe
- Return water temperature sensor
- Leaving water temperature sensor (with an antifreeze function)
- Suction temperature sensor (for EEV control)
- Outdoor ambient temperature sensor
- Coil temperature sensors (HP only)

11 Optional hydro kits

On board mounted and remote hydro-kits are available as option.

On board hydro kits can be supplied with or without buffer tank while remote hydro kits (supplied loose for field installation) are always provided with internal tank.

On board hydro kit without buffer tank are provided with following components:

- Single or double pump with low available static pressure (100 [kPa]) or high available static pressure (200 [kPa])
- Expansion tank (18 [l] for all models)
- Check valves (in case of 2 pumps)
- Safety valve
- Automatic air vent valve
- Thermal insulation for pipes and water pump(s)

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On board hydro kit with buffer tank are provided with following components:

- Single or double pump with low available static pressure (100 [kPa]) or high available static pressure (200 [kPa])
- Buffer tank (205 [l] from 85 to 105 size, 320 [l] from 120 to 135 size)
- Expansion tank (18 [l] for all models)
- Check valves (in case of 2 pumps)
- Safety valve
- Automatic air vent valve
- Thermal insulation for pipes and water pump(s)
- Antifreeze electric heater inside buffer tank

12 Factory installed options

- Lonwork protocol kit for BMS
- Bacnet protocol kit for BMS
- Compressors soft-starter
- Fan speed control for low ambient operation
- Double set point
- Power factor correction capacitors
- Electronic expansion valve
- Compressor overload protection
- Automatic circuit breaker
- HP & LP gauges
- E-coating for Microchannel and Al/Cu coils

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- Blue fins treatment for Al/Cu coils
- Condenser coils with copper fins
- Coil grilles
- Chiller grilles
- Compressor jackets
- Desuperheater
- On board hydro kits 1P/2P with/without tank

13 Field installed accessories

- Remote ON/OFF control
- Remote keyboard panel
- Sequencer, up to max four units
- Master and slave control, up to max four units
- Anti-vibration spring
- Water pressure switch
- Water filter
- Remote hydro kits with buffer tank, 1 or 2 low or high pressure pump(s), relevant accessories and with or without antifreeze heater

14 Conformity with standards

The units are in conformity with the following standards:

- Machine Directive: 2006/42/EC

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- Electromagnetic Compatibility Directive: 2014/30/EU
- Pressure Equipment Directive: 2014/68/EU