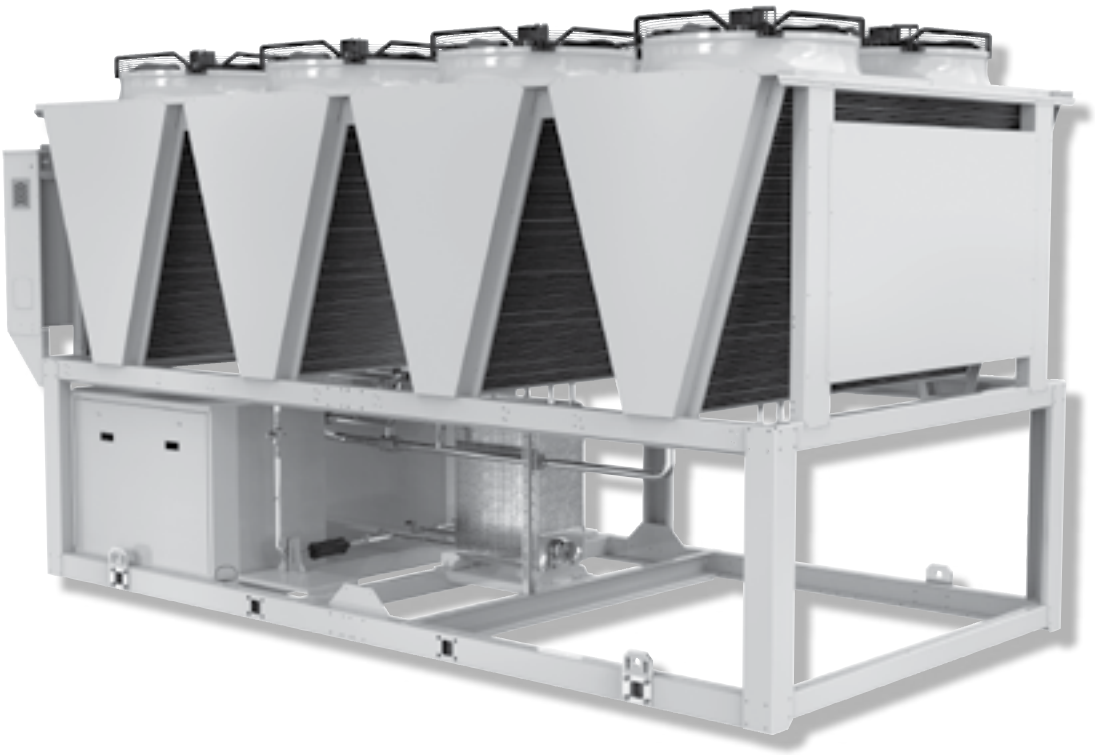
Installation and maintenance manual
Manuel d'installation et de maintenance
Installations- und Wartungshandbuch
Manuale di installazione e di manutenzione
Manual de instalación y de mantenimiento

SYSCROLL 140-360
AIR EVO CO/RE/HP/TR



English | Français | Deutsch | Italiano | Español

144 ↓ 362 kW

145 ↓ 361 kW

HFC 410A

Air Cooled Water Chillers and Heat Pumps
Refroidisseurs de liquide à condensation par air et pompes à chaleur air-eau
Luftgekühlte Flüssigkeitskühler und Wärmepumpen
Refrigeratori d'Acqua e Pompe di Calore Raffreddati ad Aria
Enfriadores de Agua y Bomba de Calor Condensadas con Aire

Part number / Code / Code / Codice / Código: **361549/H**
Supersedes / Annule et remplace / Annulliert und ersetzt / Annulla e sostituisce / Anula y sustituye: **361549/G**
Notified Body / Organisme Notifié / Benannte Zertifizierungsstelle / Organismo Notificato / Organismo Notificado **N°. 0425**

CE EAC

ISO 9001:2015 certified management system

English

Table of Contents

1 - Foreword

1.1 Introduction

Units, manufactured to state-of-the-art design and implementation standards, ensure top performance, reliability and fitness to any type of air-conditioning systems.

These units are designed for cooling water or glycoled water (and for water heating in heat pump models) and are unfit for any purposes other than those specified in this manual.

This manual includes all the information required for a proper installation of the units, as well as the relevant operating and maintenance instructions.

It is therefore recommended to read this manual carefully before installation or any operation on the machine. The chiller installation and maintenance must be carried out by skilled personnel only (where possible, by one of Authorised Service Centers).

The manufacturer may not be held liable for any damage to people or property caused by improper installation, start-up and/or improper use of the unit and/or failure to implement the procedures and instructions included in this manual.

1.2 Warranty

These units are delivered complete, tested and ready for being operated. Any form of warranty will become null and void in the event that the appliance is modified without manufacturer's preliminary written authorisation.

This warranty shall apply providing that the installation instructions have been complied with (either issued by manufacturer, or deriving from the current practice), and the Form 1 ("Start-up") has been filled-in and mailed to manufacturer (attn. After-Sales Service).

In order for this warranty to be valid, the following conditions shall be met:

- The machine must be operated only by skilled personnel from Authorised After-Sales Service.
- Maintenance must be performed only by skilled personnel - from one of Authorised After-Sales Centers.
- Use only original spare parts.
- Carry out all the planned maintenance provided for by this manual in a timely and proper way.

Failure to comply with any of these conditions will automatically void the warranty.

1.3 Emergency stop / Normal stop

The emergency stop of the unit can be enabled using the master switch on the control panel (move down the lever).

For a normal stop, press the relevant push-buttons.

To restart the appliance, follow the procedure detailed in this manual.

1.4 An introduction to the manual

For safety reasons, it is imperative to follow the instructions given in this manual. In case of any damage caused by non-compliance with these instructions, the warranty will immediately become null and void.

Conventions used throughout the manual:

	The Danger sign recalls your attention to a certain procedure or practice which, if not followed, may result in serious damage to people and property.
	The Warning sign precedes those procedures that, if not followed, may result in serious damage to the appliance.
	The Notes contain important observations.
	The Useful Tips provide valuable information that optimises the efficiency of the appliance.

2.1 Foreword

These units must be installed in conformity with the provisions of Machinery Directive 2006/42/EC, Pressure Equipment Directive 2014/68/EU, Electromagnetic Compatibility Directive 2014/30/EU, as well as with other regulations applicable in the country of installation. If these provisions are not complied with, the unit must not be operated.

The unit must be grounded, and no installation and/or maintenance operations may be carried out before deenergising the electrical panel of the unit.

Failure to respect the safety measures mentioned above may result in electrocution hazard and fire in the presence of any short-circuits.

Inside the heat exchangers, the compressors and the refrigeration lines, this unit contains liquid and gaseous refrigerant under pressure. The release of this refrigerant may be dangerous and cause injuries.

The units are not designed to be operated with natural refrigerants, such as hydrocarbons. Manufacturer may not be held liable for any problems deriving from the replacement of original refrigerant or the introduction of hydrocarbons.

Units are designed and manufactured according to the requirements of European Standard PED 2014/68/EU (pressure equipment).

- The used refrigerants are included in group II (non-hazardous fluids).
- The maximum working pressure values are mentioned on the unit's data plate.
- Suitable safety devices (pressure switches and safety valves) have been provided, to prevent any anomalous overpressure inside the plant.
- The vents of the safety valves are positioned and oriented in such a way as to reduce the risk of contact with the operator, in the event that the valve is operated. Anyway, the installer will convey the discharge of the valves far from the unit.
- Dedicated guards (removable panels with tools) and danger signs indicate the presence of hot pipes or components (high surface temperature).

The guards of the fans (only for units provided with air heat exchangers) must be always mounted and must never be removed before de-energising the appliance.

It is the User's responsibility to ensure that the unit is fit for the conditions of intended use and that both installation and maintenance are carried out by experienced personnel, capable of respecting all the recommendations provided by this manual.

It is important that the unit is adequately supported, as detailed in this manual. Non-compliance with these recommendations may create hazardous situations for the personnel.

The unit must rest on a base which meets the characteristics specified in this manual; a base with inadequate characteristics is likely to become a source of serious injury to the personnel.

The unit has not been design to withstand loads and/or stress that may be transmitted by adjacent units, piping and/or structures.

Each external load or stress transmitted to the unit may break or cause breakdowns in the unit's structure, as well as serious dangers to people. In these cases, any form of warranty will automatically become null and void.

The packaging material must not be disposed of in the surrounding environment or burnt.

2.2 Definitions

OWNER: means the legal representative of the company, body or individual who owns the plant where unit has been installed; he/she has the responsibility of making sure that all the safety regulations specified in this manual are complied with, along with the national laws in force.

INSTALLER: means the legal representative of the company who has been given by the owner the job of positioning and performing the hydraulic, electric and other connections of unit to the plant: he/she is responsible for handling and properly installing the appliance, as specified in this manual and according to the national regulations in force.

OPERATOR: means a person authorised by the owner to do on unit all the regulation and control operations expressly described in this manual, that must be strictly complied with, without exceeding the scope of the tasks entrusted to him.

ENGINEER: means a person authorised directly by manufacturer or, in all EC countries, excluding Italy, under his full responsibility, by the distributor of product, to perform any routine and extraordinary maintenance operations, as well as any regulation, control, servicing operations and the replacement of pieces, as may be necessary during the life of the unit.

2.3 Access to the unit

The unit must be placed in an area which can be accessed also by OPERATORS and ENGINEERS; otherwise the unit must be surrounded by a fence at not less than 2 meters from the external surface of the machine.

OPERATORS and ENGINEERS must enter the fenced area only after wearing suitable clothing (safety shoes, gloves, helmet etc.). The INSTALLER personnel or any other visitor must always be accompanied by an OPERATOR.

For no reason shall any unauthorised personnel be left alone in contact with the unit.

2.4 General precautions

The OPERATOR must simply use the controls of the unit; he must not open any panel, other than the one providing access to the control module.

The INSTALLER must simply work on the connections between plant and machine; he must not open any panels of the machine and he must not enable any control.

When you approach or work on the unit, follow the precautions listed below:

- do not wear loose clothing or jewellery or any other accessory tat may be caught in moving parts
- wear suitable personal protective equipment (gloves, goggles etc.) when you have to work in the presence of free flames (welding operations) or with compressed air
- if the unit is placed in a closed room, wear ear protection devices
- cut off connecting pipes, drain them in order to balance the pressure to the atmospheric value before disconnecting them, disassemble connections, filters, joints or other line items
- do not use your hands to check for any pressure drops
- use tools in a good state of repair; be sure to have understood the instructions before using them
- be sure to have removed all tools, electrical cables and any other objects before closing and starting the unit again

2.5 Precautions against residual risks

Prevention of residual risks caused by the control system

- be sure to have perfectly understood the operating instructions before carrying out any operation on the control panel
- when you have to work on the control panel, keep always the operating instructions within reach
- start the unit only after you have checked its perfect connection to the plant
- promptly inform the ENGINEER about any alarm involving the unit
- do not reset manual restoration alarms unless you have identified and removed their cause

Prevention of residual mechanical risks

- install the unit according to the instructions provided in this manual
- carry out all the periodical maintenance operations prescribed by this manual
- wear a protective helmet before accessing the interior of the unit
- before opening any panelling of the machine, make sure that it is secured to it by hinges
- do not touch air condensation coils without wearing protective gloves
- do not remove the guards from moving elements while the unit is running
- check the correct position of the moving elements' guards before restarting the unit

Prevention of residual electrical risks

- connect the unit to the mains according to the instructions provided in this manual
- periodically carry out all the maintenance operations specified by this manual
- disconnect the unit from the mains by the external disconnecting switch before opening the electrical board
- check the proper grounding of the unit before start-up
- check all the electrical connections, the connecting cables, and in particular the insulation; replace worn or damaged cables

2 - Safety (continued)

- periodically check the board's internal wiring
- do not use cables having an inadequate section or flying connections, even for limited periods of time or in an emergency

Prevention of other residual risks

- make sure that the connections to the unit conform to the instructions provided in this manual and on the unit's panelling
- if you have to disassemble a piece, make sure that it has been properly mounted again before restarting the unit
- do not touch the delivery pipes from the compressor, the compressor and any other piping or component inside the machine before wearing protective gloves
- keep a fire extinguisher fir for electrical appliances near the machine
- on the units installed indoor, connect the safety valve of the refrigeration circuit to a piping network that can channel any overflowing refrigerant outside
- remove and leak of fluid inside and outside the unit
- collect the waste liquids and dry any oil spillage
- periodically clean the compressor compartment, to remove any fouling
- do not store flammable liquids near the unit
- do not disperse the refrigerant and the lubricating oil into the environment
- weld only empty pipes; do not approach flames or other sources of heat to refrigerant pipes
- do not bend/hit pipes containing fluids under pressure

2.6 Precautions during maintenance operations

Maintenance operations can be carried out by authorised technicians only.

Before performing any maintenance operations:

- disconnect the unit from the mains with the external disconnecting switch
- place a warning sign "do not turn on - maintenance in progress" on the external disconnecting switch
- make sure that on-off remote controls are inhibited
- wear suitable personal protective equipment (helmet, safety gloves, goggles and shoes etc.)

To carry out any measurements or checks which require the activation of the machine:

- work with the electrical board open only for the necessary time
- close the electrical board as soon as the measurement or check has been completed
- for outdoor units, do not carry out any operations in the presence of dangerous climatic conditions (rain, snow, mist etc.)

The following precautions must be always adopted:

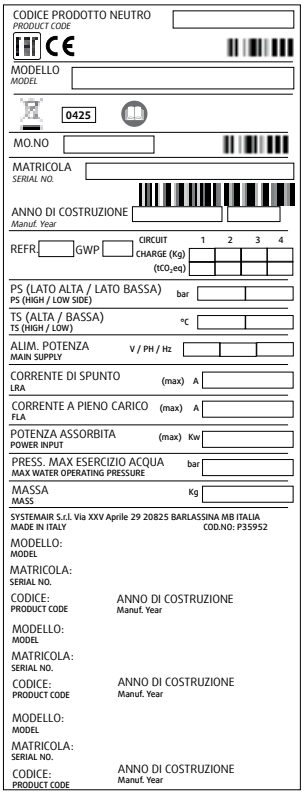
- do not scatter the fluids of the refrigeration circuit in the surrounding environment
- when replacing an eprom or electronic cards, use always suitable devices (extractor, antistatic bracelet, etc.)
- to replace a compressor, the evaporator, the condensing coils or any other weighty element, make sure that the lifting equipment is consistent with the weight to be lifted
- in air units with independent compressor compartment, do not access the fan compartment unless you have disconnected the machine by the disconnecting switch on the board and you have placed a warning sign "do not turn on - maintenance in progress"
- contact manufacturer for any modifications to the refrigeration, hydraulic or wiring diagram of the unit, as well as to its control logics
- contact manufacturer if it is necessary to perform very difficult disassembly and assembly operations
- use only original spare parts purchased directly from manufacturer or the official retailers of the companies on the recommended spare parts list
- contact manufacturer if it is necessary to handle the unit one year after its positioning on site or if you wish to dismantle it.

2 - Safety (continued)

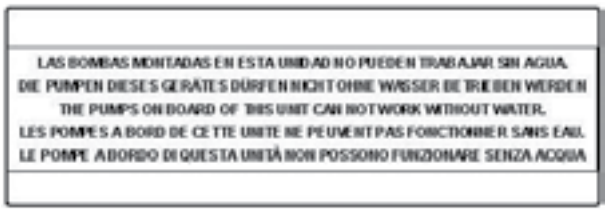
2.7 Safety labels

Identification of the refrigerant - External door

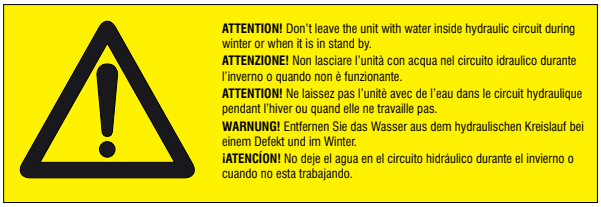
Identification of the unit Outside, on the right-hand front column



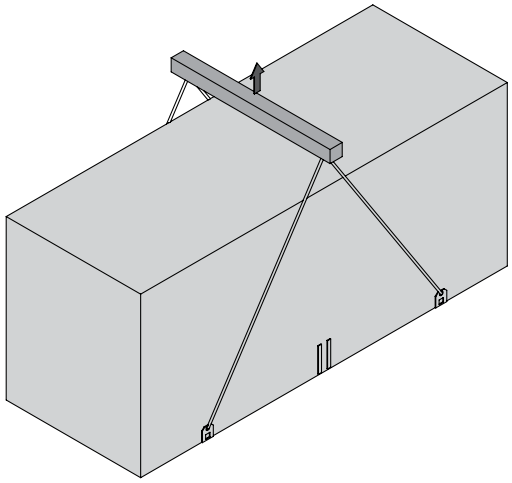
Pump operation - Outside, on the right-hand front column



Circuit drain - Outside, on the right-hand front column



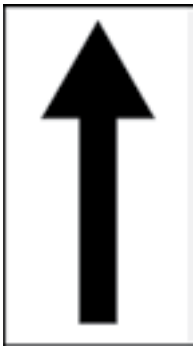
Instruction for the lifting



Sequence phase control on the electrical board

Gravity centre - Base

Instruction for the lifting



Electrical warning
Adjacent to the master switch

	**ATTENZIONE !** Prima di aprire togliere tensione	**ATTENTION !** Enlever l'alimentation electrique avant d'ouvrir
ACHTUNG ! Vor Öffnen des Gehäuses Hauptschalter betätigen	**CAUTION !** Disconnect electrical supply before opening	**ATENCION !** Cortar la corrente antes de abrir el aparato

Start-up warning - Outside the door of the electrical board

ATTENZIONE

INSERIRE LE RESISTENZE DI RISCALDAMENTO OLIO ALMENO 12 ORE PRIMA DI OGNI AVVIAMENTO (SE PREVISTE)
PRIMA DELLA MESSA IN TENSIONE ASSICURARSI CHE LE VITI DEI CIRCUITI ELETTRICI SIANO SERRATE COMPLETAMENTE

WARNING

ENERGIZE THE CRANCKCASE HEATER FOR AT LEAST 12 HOURS BEFORE EACH STARTING (IF FITTED)
BEFORE TIGHTENING-UP, TO TIGHTEN ALL TERMINAL SCREWS ESPECIALLY THOSE IN MAIN CIRCUIT

WARNUNG

OLSUMPFHEIZUNG (FALLS VORHANDEN) 12 STUNDEN VOR DEM START EINSCHALTEN
VOR INBETRIEBNAHME ALLE SCHRAUBENVERBINDUNGEN NACHZIEHEN, BESONDERS DIE ELEKTRISCHEN ANSCHLUSSE

ATTENTION

ALIMENTER ELECTRIQUEMENT LA RESISTANCE DE CARTER AU MOINS 12 HEURES AVANT CHAQUE DEMARRAGE (SI MONTE SUR LE PRODUIT)
AVANT DE DEMARRER LA MACHINE, VERIFIER LE SERRAGE DE TOUTES LES BORNES A VIS, SPECIALEMENT DANS LE BOITIER ELECTRIQUE

ATENTION

ATENCIÓN ALIMENTAR ELÉCTRICAMENTE LA RESISTENCIA DE CARTER AL MENOS 12 HORAS ANTES DE CADA PUESTA EN MARCHA (SI ESTA EQUIPADA EN LA UNIDAD)
ANTES DE LA PUESTA EN MARCHA, COMPROBAR QUE LOS BORNES ESTAN BIEN APRETADOS, ESPECIALMENTE EN EL CUADRO ELÉCTRICO

035B00057-000 **MADE IN ITALY**

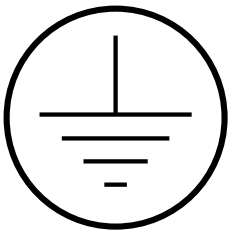
Final Test Certificate - Inside the external door

QUALITY CHECK PROOF

MODEL/TYPE MODELLO/TIPO	SERIAL NUMBER-PRODUCTION LOT N° DI SERIE-LOTTO DI PRODUZIONE	P. NUMBER CODE CODICE	MANUFACTURED YEAR ANNO DI COSTRUZIONE

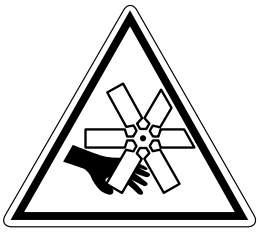
NUMBER CHECK NUMERO CONTROLLI	DESCRIPTION OF INSPECTION DESCRIZIONE DEI TEST DI CONTROLLO	INSPECTOR REFERENCE TIMBRO OPERATORE
01	PRELIMINARY PROOF PRESSURE TEST AND LEAK TEST WITH ELIUM AND NITROGEN AT MINIMUM 10 BAR (REFRIGERANT SIDE) IN COMPLIANCE WITH TEST SPECIFICATION - MARK WITH PENS PROVA PRELIMINARE DI PRESSIONE E TENUTA CIRCUITO CON ELIO E AZOTO AD ALMENO 10 BAR (LATO REFRIGERANTE), IN ACCORDO ALLA SPECIFICA DI COLLAUDO - SEGNARE CON PENNARELLO	
	CARRY OUT AN ADDITIONAL LEAK TEST WITH ELIUM AND NITROGEN AT 2,5 BAR (WATER SIDE) - MARK WITH PENS EFFETTUARE UNA PROVA PRELIMINARE DI TENUTA CON ELIO E AZOTO A 2,5 BAR (LATO ACQUA) - SEGNARE CON PENNARELLO	
02	VACUM TEST CARRIED OUT VUOTO ESEGUITO	
03	REFRIGERANT CHARGE CARICA REFRIGERANTE	
04	CHECK WIRINGS CABLE CONNECTION VERIFICA CABLAGGIO ELETTRICO	
05	SAFETY TEST: CONTINUITY, INSULATION, DIELECTRICAL STRENGTH PROVE DI SICUREZZA: CONTINUITÁ, ISOLAMENTO, RIGIDITÁ	
06	RUNNING TEST WITH SAFETY DEVICES COLLAUDO FUNZIONALE COMPLETO CON INTERVENTO SICUREZZA E RILIEVI	
07	LEAK TEST ON REFRIGERANT CIRCUIT DURING RUNNING CONDITION - MARK WITH PEN VERIFICA TENUTA CIRCUITO REFRIGERANTE DURANTE IL FUNZIONAMENTO - SEGNARE CON PENNARELLO	
08	FINAL LEAK TEST ON REFRIGERANT CIRCUIT AFTER RUNNING - MARK WITH PENS VERIFICA FINALE TENUTA CIRCUITO REFRIGERANTE DOPO IL COLLAUDO FUNZIONALE - SEGNARE CON PENNARELLO	
09	CHECK ASSEMBLY PARTS VAERIFICA ASSEMBLAGGIO PARTI	
10	CHECK MOUNTED ACCESSORIES OR SUPPLY LOOSE CONTROLLO ACCESSORI MONTATI E/O FORNITI A BORDO UNITÁ	
11	CHECK DOCS SUPPLY (CE, IOM, START UP FORM, WIRING DIAGRAM, RULE) VERIFICA DOCUMENTI FORNITI CON L'UNITÁ	
12	CHECK STICKERS, LABELLING VERIFICA TARGHETTE	
13	AESTHETICAL CHECK AND CLEANING CONTROLLO ESTETICO PULIZIA	
14	CHECK TEST SHEET AND CHECK LIST FILLED UP CONTROLLO COMPILAZIONE SCHEDA DI COLLAUDO E CHECK LIST	

Grounding connection on the electrical board, adjacent to the connection

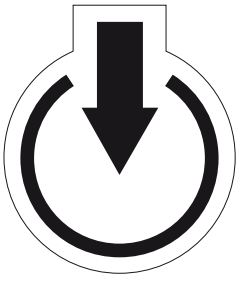


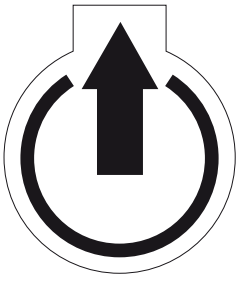
Read the instruction on the electrical board

Fan Danger



Fitting identification - Adjacent to fittings





2.8 Safety regulations

REFRIGERANT DATA	SAFETY DATA: R410A
Toxicity	Low
Contact with skin	If sprayed, the refrigerant is likely to cause frost burns. If absorbed by the skin, the danger is very limited; it may cause a slight irritation, and the liquid is degreasing. Unfreeze the affected skin with water. Remove the contaminated clothes with great care - in the presence of frost burns, the clothes may stick to the skin. Wash with plenty of warm water the affected skin. In the presence of symptoms such as irritation or blisters, obtain medical attention.
Contact with eyes	Vapours do not cause harmful effects. The spraying of refrigerant may cause frost burns. Wash immediately with a proper solution or with tap water for at least 10 minutes, and then obtain medical attention.
Ingestion	Very unlikely - should something happen, it will cause frost burns. Do not induce vomiting. Only if the patient is conscious, wash out mouth with water and give some 250 ml of water to drink. Then, obtain medical attention.
Inhalation	R410A: remarkable concentrations in the air may have an anaesthetic effect, up to fainting. The exposure to considerable amounts may cause irregular heartbeat, up to the sudden death of the patient. Very high concentrations may result in the risk of asphyxia, due to the reduction in the oxygen percentage in the atmosphere. Remove the patient to fresh air and keep warm and at rest. If necessary, give oxygen. In case of breathing difficulties or arrest, proceed with artificial respiration. In case of cardiac arrest, proceed with cardiac massage. Then, obtain medical attention.
Recommendations	Semiotics or support therapy is recommended. Cardiac sensitisation has been observed that, in the presence of circulating catecholamines such as adrenalin, may cause cardiac arrhythmia and accordingly, in case of exposure to high concentrations, cardiac arrest.
Prolonged exposure	R410A: a study on the effects of exposure to 50,000 ppm during the whole life of rats has identified the development of benign testicle tumour. This situation should therefore be negligible for personnel exposed to concentrations equal to or lower than professional levels.
Professional levels	R410A: Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	R410A: Not specified
Conditions to avoid	Do not use in the presence of flames, burning surfaces and excess humidity.
Hazardous reactions	May react with sodium, potassium, barium and other alkaline metals. Incompatible substances: magnesium and alloys with magnesium concentrations > 2%.
Hazardous decomposition products	R410A: Halogen acids produced by thermal decomposition and hydrolysis.

2.8 Safety regulations (continued)

REFRIGERANT DATA	SAFETY DATA: R410A
General precautions	Do not inhale concentrated vapours. Their concentration in the atmosphere should not exceed the minimum preset values and should be maintained below the professional threshold. Being more weighty than the air, the vapour concentrates on the bottom, in narrow areas. Therefore, the exhaust system must work at low level.
Respiratory system protection	If you are in doubt about the concentration in the atmosphere, it is recommended to wear a respirator approved by an accident-prevention Authority, of the independent or oxygen type.
Storage	Cylinders must be stored in a dry and fresh place, free from any fire hazard, far from direct sunlight or other sources of heat, radiators etc. Keep a temperature below 50 °C.
Protective clothing	Wear overalls, protective gloves and goggles or a mask.
Accidental release measures	It is important to wear protective clothing and a respirator. Stop the source of the leak, if you can do this without danger. Negligible leaks can be left evaporating under the sun, providing that the room is well ventilated. Considerable leaks: ventilate the room. Reduce the leak with sand, earth or other absorbing substances. Make sure that the liquid does is not channelled into gutters, sewers or pits where the vapours are likely to create a stuffy atmosphere.
Disposal	The best method is recovery and recycling. If this method is not practicable, dispose according to an approved procedure, that shall ensure the absorption and neutralization of acids and toxic agents.
Fire fighting information	R410A: Not flammable in the atmosphere.
Cylinders	The cylinders, if exposed to fire, shall be cooled by water jets; otherwise, if heated, they may explode.
Protective fire fighting equipment	In case of fire, wear an independent respirator and protective clothing.

2.8 Safety regulations (continued)

LUBRICANT OIL DATA	SAFETY DATA: POLYESTER OIL (POE)
Classification	Not harmful.
Contact with skin	May cause slight irritation. Does not require first aid measures. It is recommended to follow usual personal hygiene measures, including washing the exposed skin with soap and water several times a day. It is also recommended to wash your overalls at least once a week.
Contact with eyes	Wash thoroughly with a suitable solution or tap water.
Ingestion	Seek medical advice immediately.
Inhalation	Seek medical advice immediately.
Conditions to avoid	Strong oxidising substances, caustic or acid solutions, excess heat. May corrode some types of paint or rubber.
Protection of the respiratory system	Use in well ventilated rooms.
Protective clothing	Always wear protective goggles or a mask. Wearing protective gloves is not mandatory, but is recommended in case of prolonged exposure to refrigerant oil.
Accidental release measures	It is important to wear protective clothing and, especially, goggles. Stop the source of the leak. Reduce the leak with absorbing substances (sand, sawdust or any other absorbing material available on the market).
Disposal	The refrigerant oil and its waste will be disposed of in an approved incinerator, in conformity with the provisions and the local regulations applicable to oil waste.
Fire fighting information	In the presence of hot liquid or flames, use dry powder, carbon dioxide or foam. If the leak is not burning, use a water jet to remove any vapours and to protect the personnel responsible for stopping the leak.
Cylinders	The cylinders exposed to a fire will be cooled with water jets in case of fire.
Fire fighting protective equipment	In case of fire, wear an independent respirator.

3 - Transport, Lifting and Positioning

Refrigerators are supplied assembled (apart from standard antivibrating rubber supports, that will be installed on site). The equipment are full of refrigerant and oil, in the quantity required for a proper operation.

3.1 Inspection

When the unit is delivered, it is recommended to check it carefully and to identify any damage occurred during transportation. The goods are shipped ex-factory, at the buyer's risk. Check that the delivery includes all the components listed in the order.

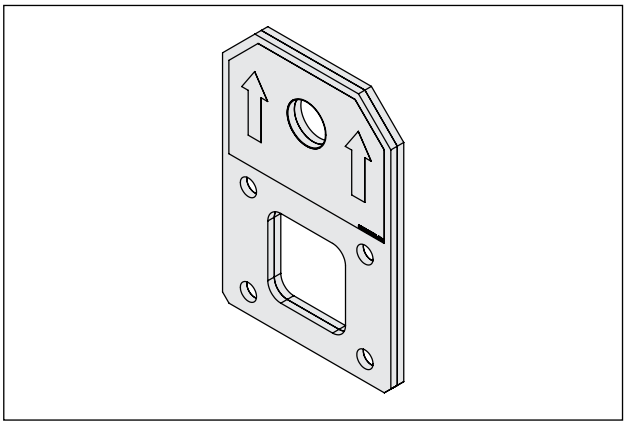
In case of damage, note it down on the carrier's delivery note and issue a claim according to the instructions provided in the delivery note.

In the presence of any serious damage, that does not affect the surface only, it is recommended to inform manufacturer immediately.

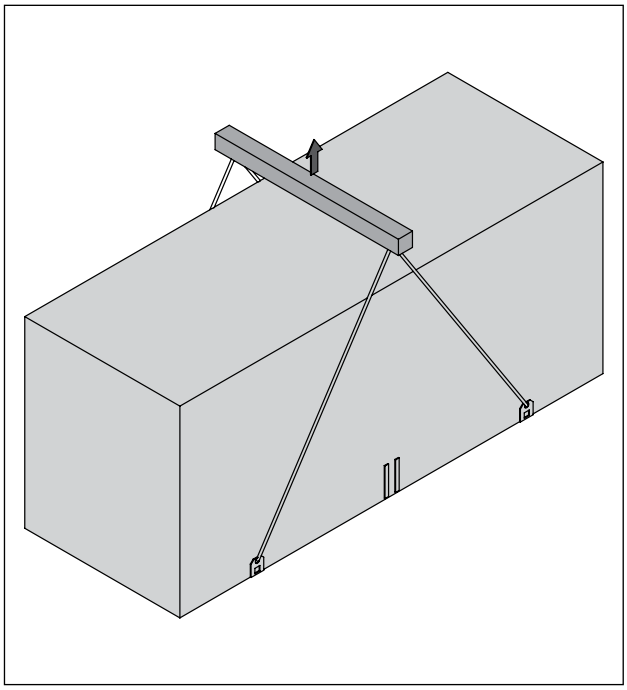
Please note that manufacturer may not be held liable for any damage to the equipment during transportation, even though the carrier has been appointed by the factory.

3.2 Lifting

The unit must be lifted by using the hooks inserted into the relevant eyebolts (see the figure).



It is recommended to use a spacer to prevent cables from damaging the unit (see the figure).



Before positioning the unit, make sure that the place of installation is appropriate and sturdy enough to hold the weight and to withstand the stress caused by the operation of the whole assembly.

Do not displace the unit on rollers, and do not lift it with a lift truck.

Unit must be lifted carefully.

To lift unit slowly and regularly.

To lift and displace the unit:

- Insert and secure eyebolts into the holes marked on the frame.
- Insert spacer between cables.
- Hook near the barycentre of the unit.
- The cables must be long enough to form, if tensioned, an angle of at least 45° with respect to the horizontal plane.

For lifting operations, use only tools and material fit for this purpose, in accordance with accident-prevention regulations.

During the lifting and handling of the unit, be careful not to damage the finned pack of the coils positioned on the sides of the unit.

The sides of the unit must be protected by cardboard or plywood sheets.

It is recommended not to remove the protective plastic envelope, that should prevent scraps from penetrating into the appliance and any damage to the surfaces, until the unit is ready for operation.

The lifting eyebolts protrude from the base of the unit; it is therefore recommended to remove them once the unit has been lifted and positioned, if in your opinion they are likely to become a source of hazard and injury.

The eyebolts must be mounted on the unit whenever it shall be displaced and then lifted again.

3.3 Anchoring

It is not essential to secure the unit to the foundations, unless in areas where there is a serious risk of earthquake, or if the appliance is installed on the top of a steel frame.

3.4 Storage

When the unit is to be stored before installation, adopt a few precautions to prevent any damage or risk of corrosion or wear:

- plug or seal every single opening, such as water fittings
- do not store the appliance in a room where the temperature exceeds 50 °C for the units using R410A and, if possible, do not expose to direct sunlight
- minimum storage temperature is -25 °C
- it is recommended to store the unit in a roof where traffic is minimized, to prevent the risk of accidental damage
- the unit must not be washed with a steam jet
- take away and leave to the site manager all the keys providing access to the control board

Finally, it is recommended to carry out visual inspections at regular intervals.

4 - Installation

4.1 Positioning of the unit

Before installing the unit, make sure that the structure of the building and/or the supporting surface can withstand the weight of the appliance. The weights of the units are listed in Chapter 8 of this manual.

These units have been designed for outdoor installation on a solid surface. Standard accessories include antivibrating rubber supports, that must be positioned under the base.

When the unit is to be installed on the ground, it is necessary to provide a concrete base, to ensure a uniform distribution of the weights.

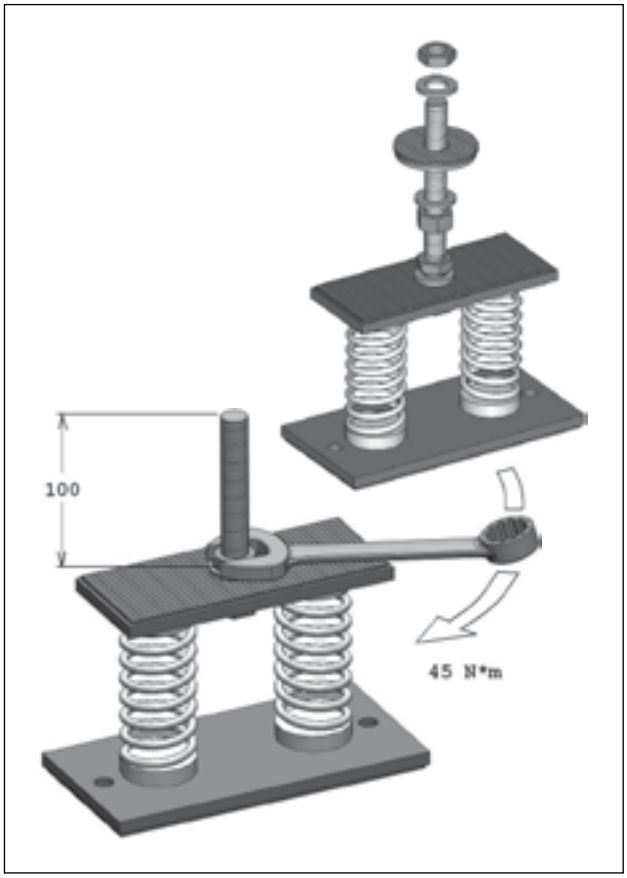
As a general rule, no special sub-bases are required. However, if the unit is to be installed on the top of inhabited rooms, it is advisable to rest it on spring shock absorbers (optional), that will minimise the transmission of any vibration to the structures.

To choose the place of installation of the unit, bear in mind that:

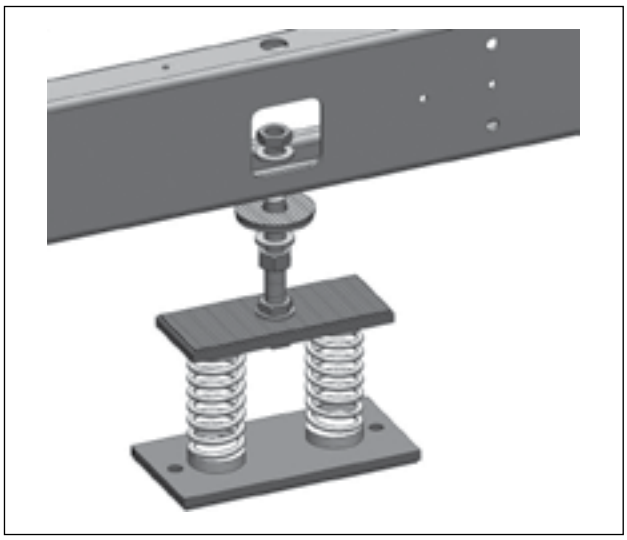
- the longitudinal axis of the unit must be parallel to the direction of prevailing winds, so as to ensure a uniform distribution of the air on finned exchangers
- the unit must not be installed near boilers' vent pipes
- the unit must not be installed leeward with respect to sources of air contaminated by greases, such as, for example, the outlets to kitchen exhaust hoods into the atmosphere. Otherwise, the grease is likely to deposit on the fins of the refrigerant /air exchangers, and would fix every type of atmospheric impurity, resulting in the quick clogging of the exchangers
- the unit must not be installed in areas subject to considerable snow falling
- the unit must not be installed in areas subject to flooding, under gutters etc.
- the unit must not be installed in air shafts, narrow courts or other small places, where the noise may be reflected by the walls or the air ejected by fans may short-circuit itself on refrigerant/air heat exchangers or condenser
- the place of installation must be have all the necessary spaces for air circulation and maintenance operations (see Chapter 8).

4.2 Spring Isolator Installation

- Prepare the base, that must be flat and plane.
- Lift the appliance and insert shock absorbers as follows:



1) Procede to assemble the jack components. Fit the jack in the threaded housing on the upper plate of the antivibration mount.



2) Fit the jack mounted on the antivibration mount in the hole in the machine base.

4 - Installation (continued)

4.3 External Water Circuit

The flow switch and the filter water, although not included in the supply, must always be fitted such as plant components.
Their installation is mandatory for warranty.

The external water circuit shall guarantee a constant water flow rate through the circulating refrigerant/water heat exchanger (evaporator) under steady operating conditions and in case of a load variation.

The circuit shall be composed by the following elements:

- A circulation pump which can ensure the necessary flow rate and head.
- The total content of the primary water circuit shall never be lower than 3 l/kW in terms of refrigerating capacity. If the total water volume in the primary circuit should be unable to reach such a value, an additional heat-insulated storage tank should be installed. This tank is intended to avoid any repetitive start of the compressor.
- A membrane expansion tank complete with a safety valve and a drain which shall be visible.

RECOMMENDED WATER COMPOSITION		
PH	7,5 - 9	
Electrical conductivity	10 - 500	μS/cm
Total hardness	4,5 - 8,5	dH
Temperature	< 60	[°C]
Alkalinity (HCO_3^-)	70-300	ppm
Alkalinity / Sulphates (HCO_3^-/ SO_4^{2-})	> 1	ppm
Sulphates (SO_4^{2-})	< 70	ppm
Chlorides (Cl^-)	< 50	ppm
Free Chlorine	< 0,5	ppm
Phosphates (PO_4^{3-})	< 2	ppm
Ammonia (NH_3)	< 0,5	ppm
Ammonium Ion (NH_4^+)	< 2	ppm
Manganese Ion (Mn^{2+})	< 0,05	ppm
Free Carbon Dioxide (CO_2)	< 5	ppm
Hydrogen Sufide (H_2S)	< 0,05	ppm
Oxygen Content	< 0,1	ppm
Nitrates (NO_3^-)	< 100	ppm
Manganese (Mn)	< 0,1	ppm
Iron (Fe)	< 0,2	ppm
Aluminium (Al)	< 0,2	ppm

Caution
If the water circuit is to be drained for a time exceeding one month, the circuit must be fully charged with nitrogen to prevent any risk of corrosion by differential venting

The expansion tank shall be dimensioned in such a way that it can absorb a 2% expansion of the total volume of the water in the plant (exchanger, pipelines, uses and storage tank, if available).

The expansion tank shall never be insulated when the circulating fluid is not flowing through it.

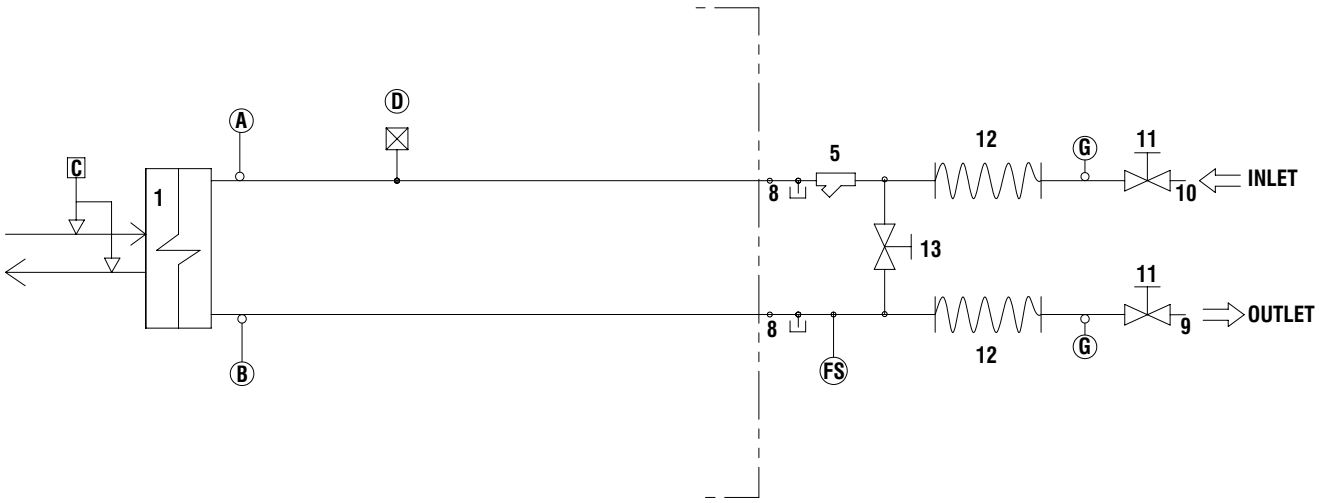
A water flow switch is mounted as a standard. It will stop the unit whenever a flow rate problem occurs.

In addition:

- Install on/off valves (accessory) on the lines at the inlet and outlet of the manifolds of the exchangers (evaporator).
- Arrange a by-pass complete with an on/off valve between the manifolds of the heat exchangers.
- Arrange air vent valves at the high points of the water lines.
- Arrange drain points complete with plugs, clocks, etc. in the proximity of the low points of the water lines.
- Insulate the water lines to prevent the heat from blowing back into the unit.

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 140-170-300-330-360 - R410A - Basic Unit

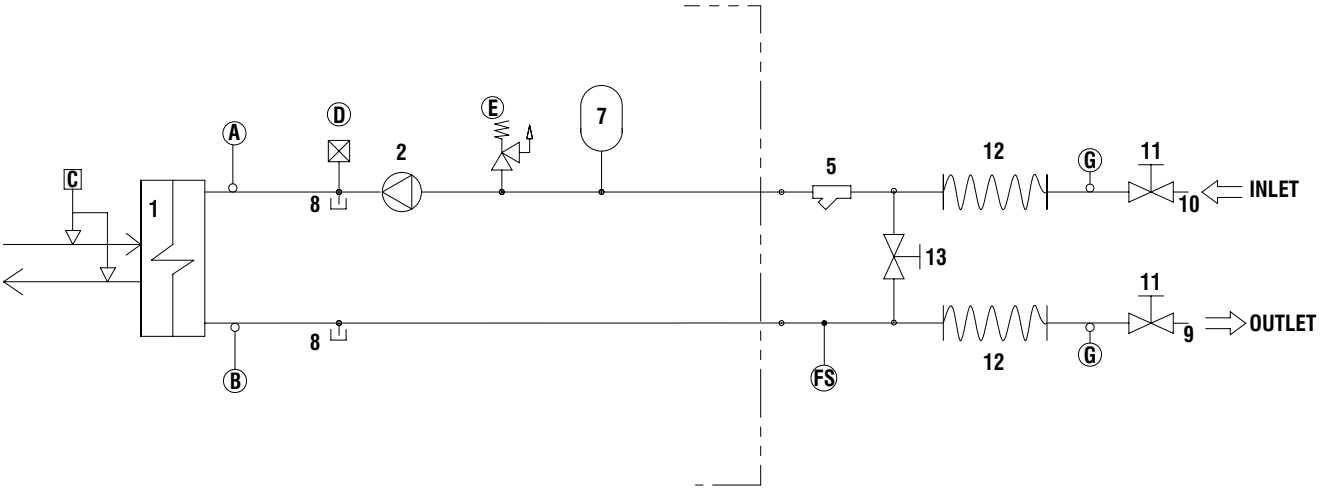


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_---_	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 140-170-300-330-360 - R410A - 1P Unit

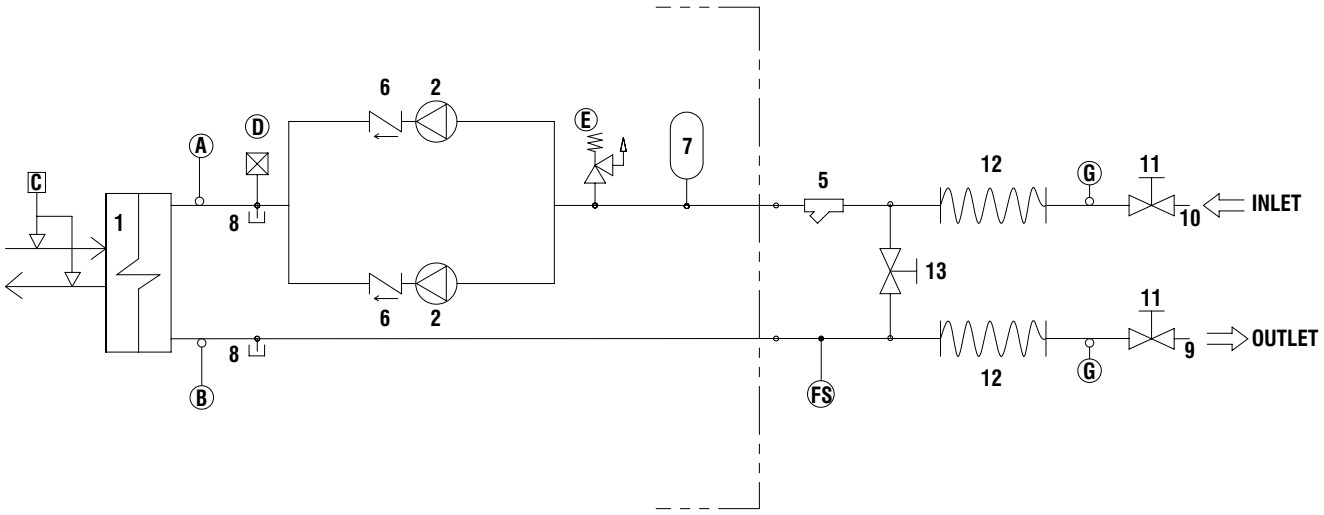


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_ _ _	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 140-170-300-330-360 - R410A - 2P Unit

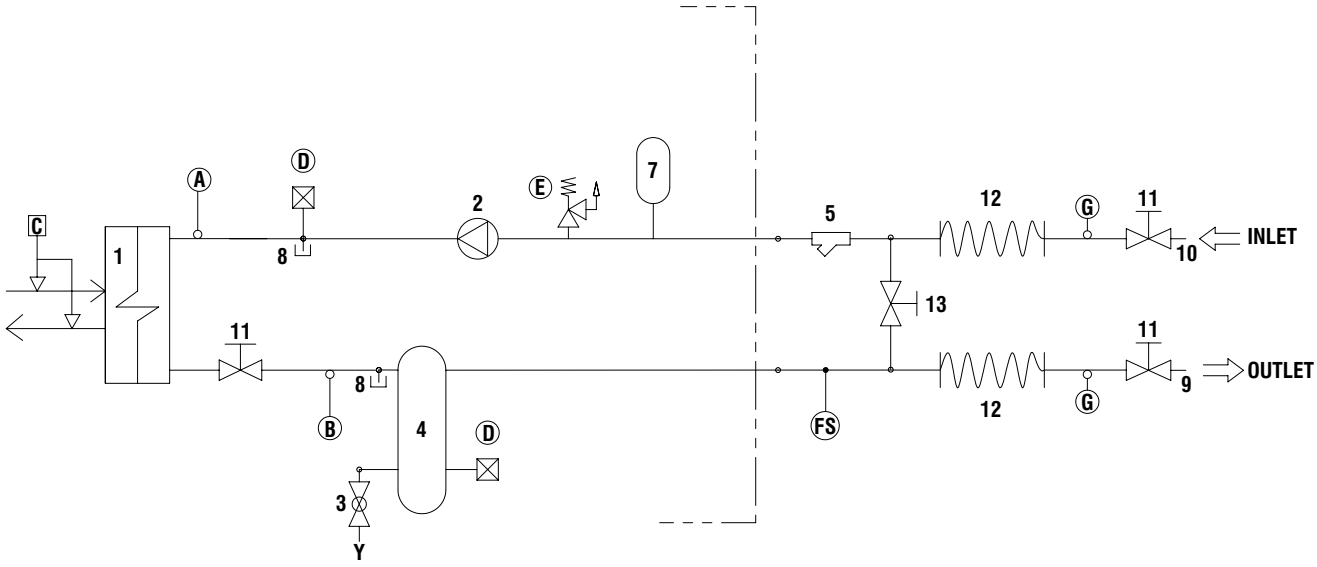


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_ _ _	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 140-170-300-330-360 - R410A - 1P+T Unit

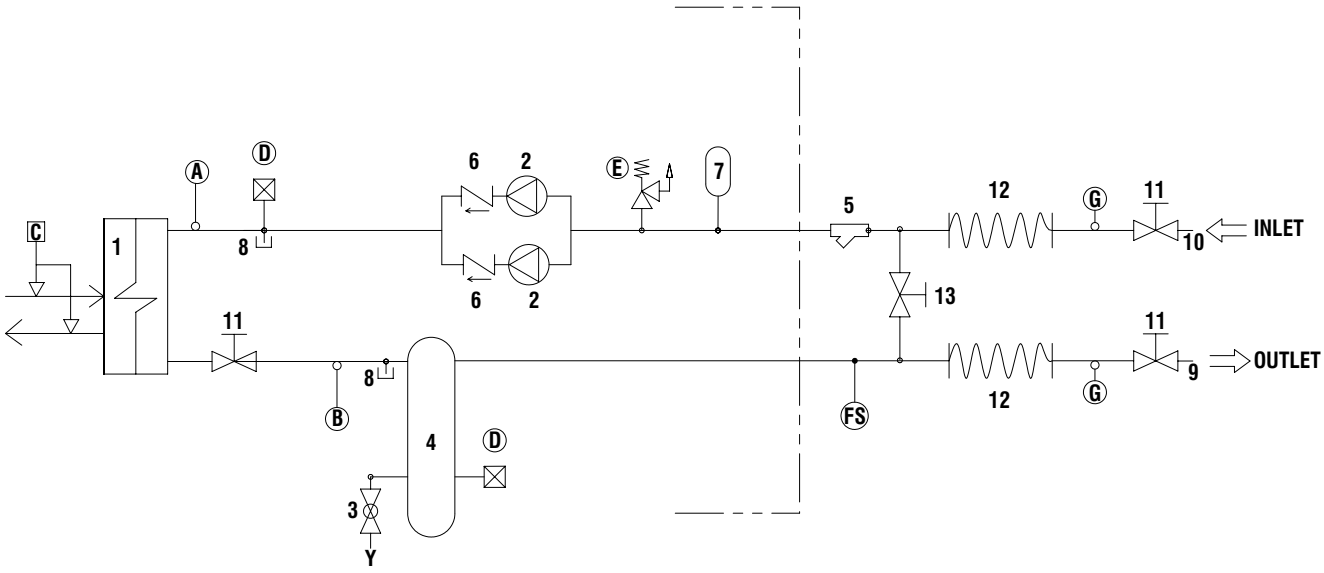


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
—--—	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 140-170-300-330-360 - R410A - 2P+T Unit

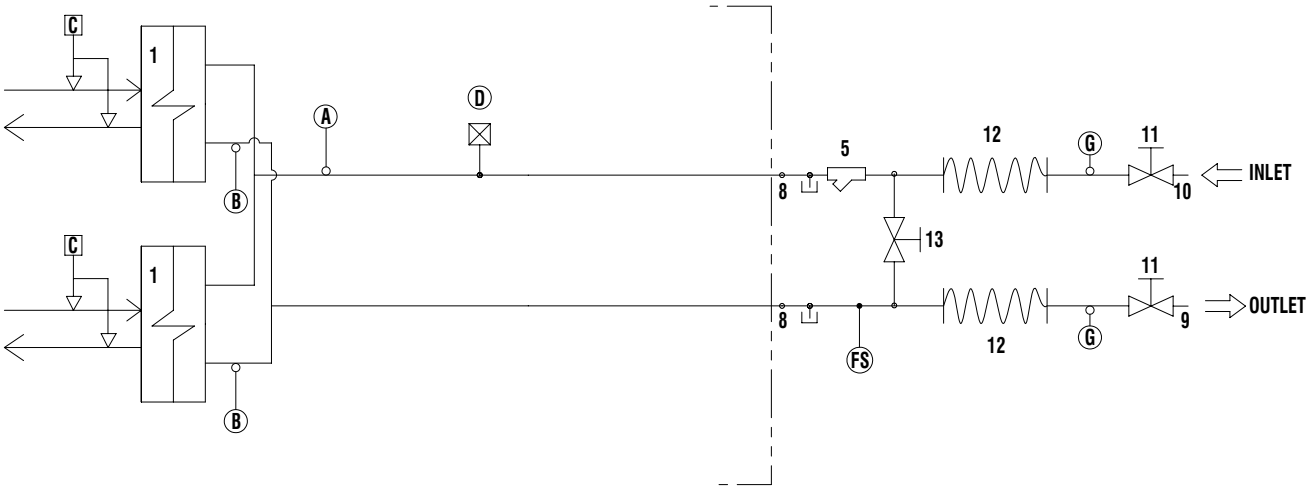


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_ _ _	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 230-260-280 - R410A - Basic Unit

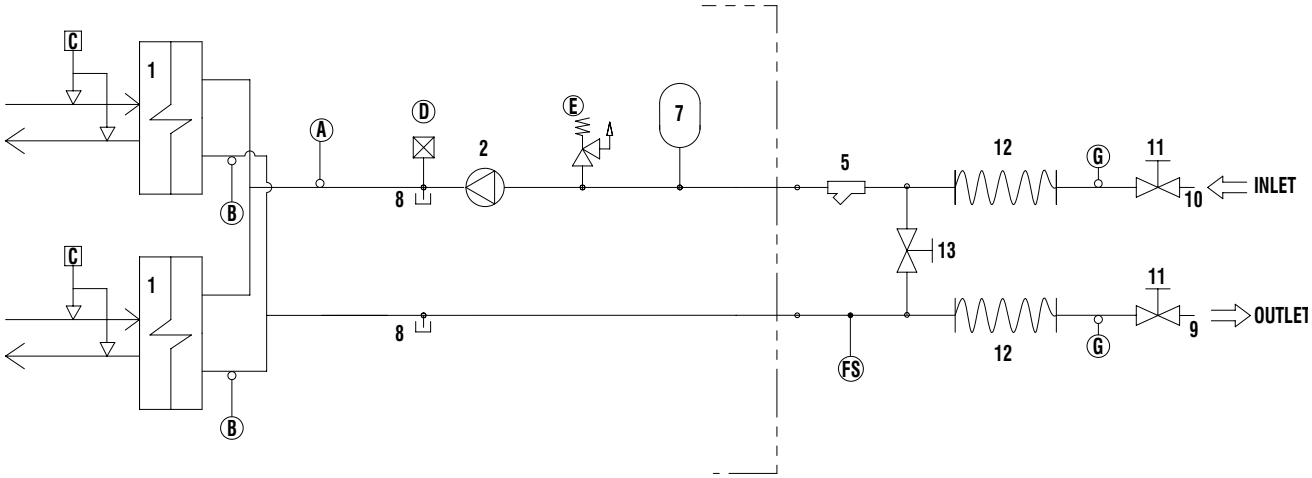


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_ _ _	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 230-260-280 - R410A - 1P Unit

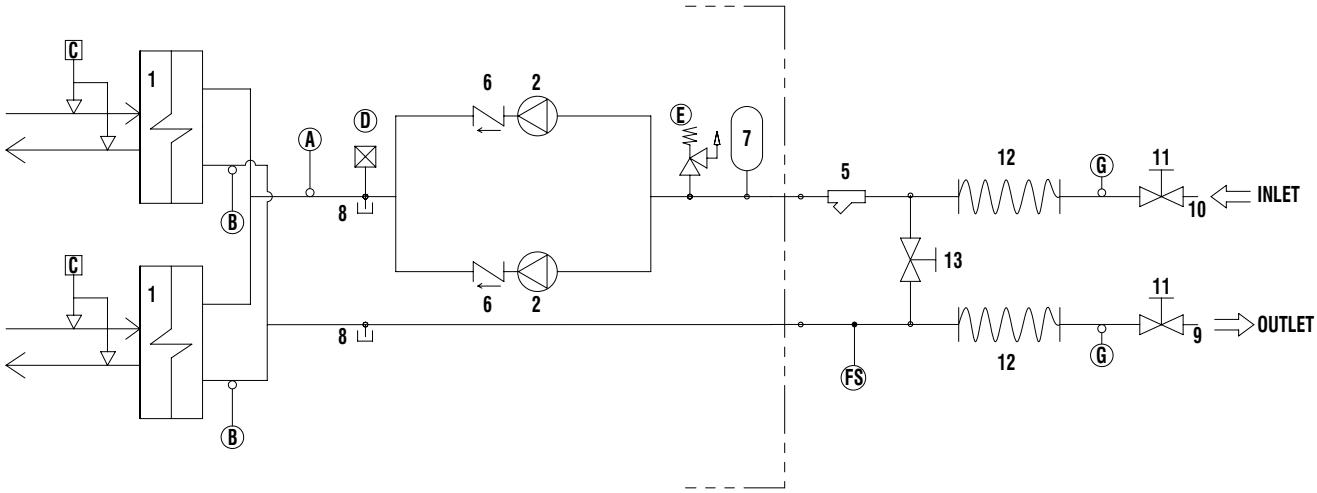


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
—·-·—	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 230-260-280 - R410A - 2P Unit

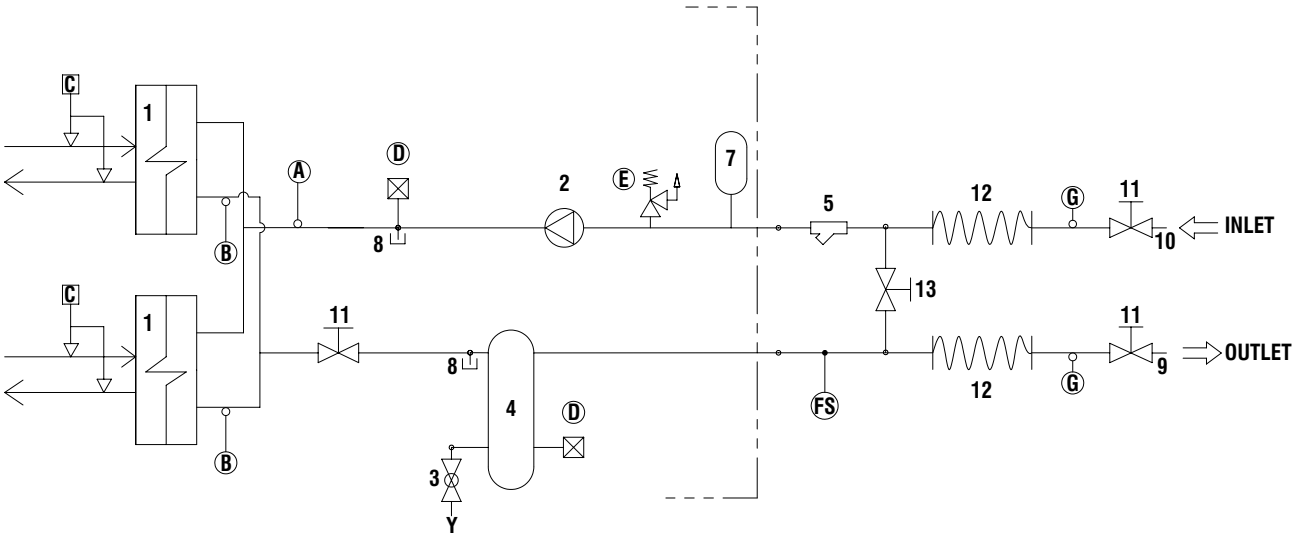


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
—·-·—	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 230-260-280 - R410A - 1P+T Unit

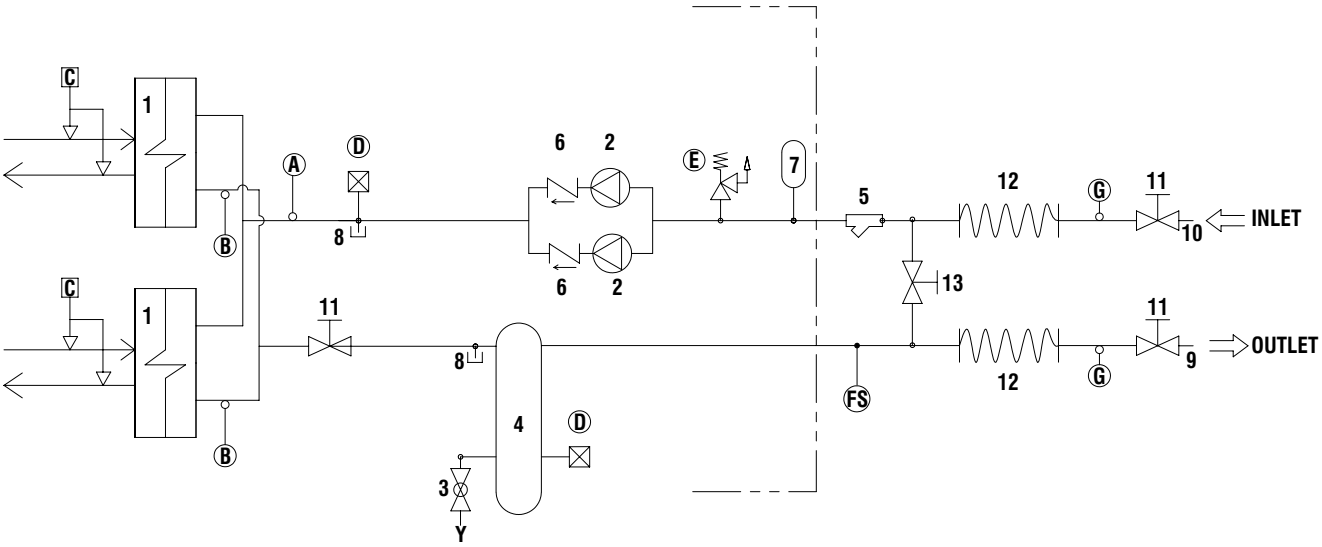


COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
_ _ _	Unit side
O	Probes

4 - Installation (continued)

Hydraulic Circuit Diagram - SYSCROLL 230-260-280 - R410A - 2P+T Unit



COMPONENTS	
1	Plate heat exchanger
2	Pump
3	Draining valve
4	Water buffer tank
5	Water filter
6	Non-return valve
7	Pressure expansion tank
8	Pressure point/drainage
9	Water outlet
10	Water inlet
11	Globe valve
12	Flexible pipes
13	By pass valve

SAFETY/CONTROL DEVICES	
A	Inlet water temperature sensor
B	Outlet water temperature sensor
C	Water differential pressure switch
D	Vent valve
E	Water safety valve.....(6Bar)
FS	Flow switch
G	Thermometer
—·-·—	Unit side
O	Probes

4 - Installation (continued)

4.4 Water connections

The attachments at the water inlet and outlet shall be connected in compliance with the instructions which can be found on the labels in the proximity of the attachments.

Connect the water lines of the plants with the attachments of the unit whose diameters and positions are shown by Chapter 8.

4.5 Defrost water drainage (only for Heat Pump units)

When heat pump units work in heating mode, during defrosting cycles, they may discharge water from the base. This is why the units should be installed at least 200 mm above the floor level, so as to allow the free drainage of waste water, without the risk of producing ice banks.

The heat pump units must be installed in positions where the defrosting water cannot create any damage.

4.6 Power supply

Before carrying out any operations on the electrical system, make sure that the unit is deenergised.

It is important that the appliance is grounded.

The company in charge of the installation shall conform to the standards applicable to outdoor electrical connections.

The manufacturer may not be held liable for any damage and/or injury caused by failure to comply with these precautions.

The unit conforms to EN 60204-1.

The following connections shall be provided:

- A 3-phase and grounding connection for the power supply circuit.
- The electrical distribution system shall meet the power absorbed by the appliance.
- The disconnecting and magnetothermal switches must be sized to control the starting current of the unit.
- The power supply lines and the insulation devices must be designed in such a way that every line independent.
- It is recommended to install differential switches, to prevent any damage caused by phase drops.
- The fans and compressors are supplied through contactors controlled from the control panel.
- Each motor is provided with an internal safety thermal device and external fuses.
- The power supply cables must be inserted into dedicated openings on the front of the unit, and the will enter the electrical board through holes drilled on the bottom of the board.

4.7 Electrical connections

The unit must be installed on site according to the Machinery Directive 2006/42/EC, Electromagnetic Compatibility Directive 2014/30/EU and the usual procedures and standards applicable in the place of installation.

The unit must not be operated if its installation has not been carried out according to the instructions provided in this manual.

The power supply lines must consist of insulated copper conductors, dimensioned for the maximum absorbed current.

Connection to terminals must be performed according to the diagram of connections (User's Terminal Box) provided in this manual and according to the wiring diagram which accompanies the unit.

WARNING	Before connecting the power supply lines, check that the available voltage value does not exceed the range specified in the Electric Data (Chapter 8).

For 3-phase systems, check also that the unbalance between the phases does not exceed 2%. To perform this check, measure the differences between the voltage of each phase couple and their mean value during operation.

The maximum % value of these differences (unbalance) must not exceed 2% of the mean voltage.

If the unbalance is unacceptable, contact the Energy Distributor to solve this problem.

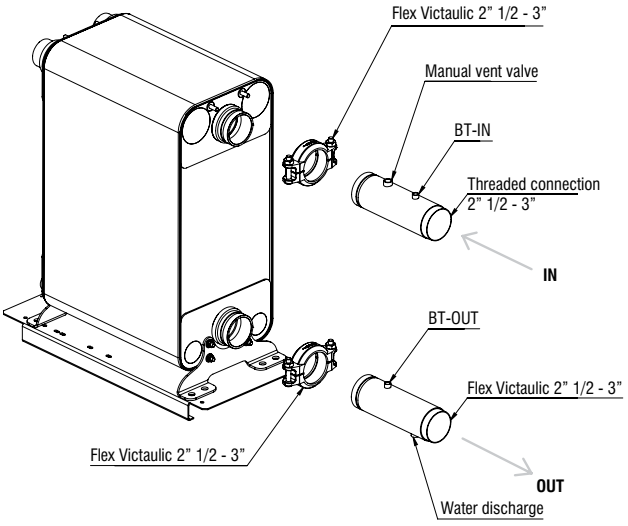
WARNING	Supplying the unit through a line whose unbalance exceeds the permissible value will automatically void the warranty.

4.8 Connecting plate-type evaporator temperature sensors

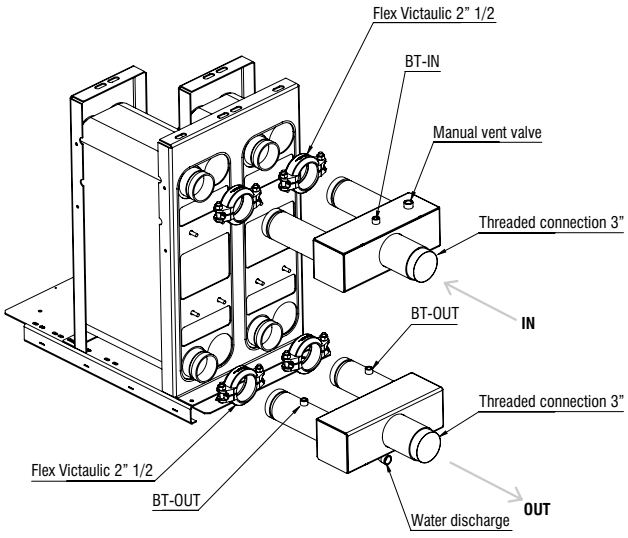
Only Cooling and Heat Pump units are provided with fittings for hydraulic connections between heat exchangers and plant.

Each fittings is complete with sensor well to fasten temperature sensor (BT-IN and BT-OUT). Fittings are supplied separate and must be mounted during the installation of the unit, as explained in the instruction below.

SYSCROLL 140-170-300-330-360

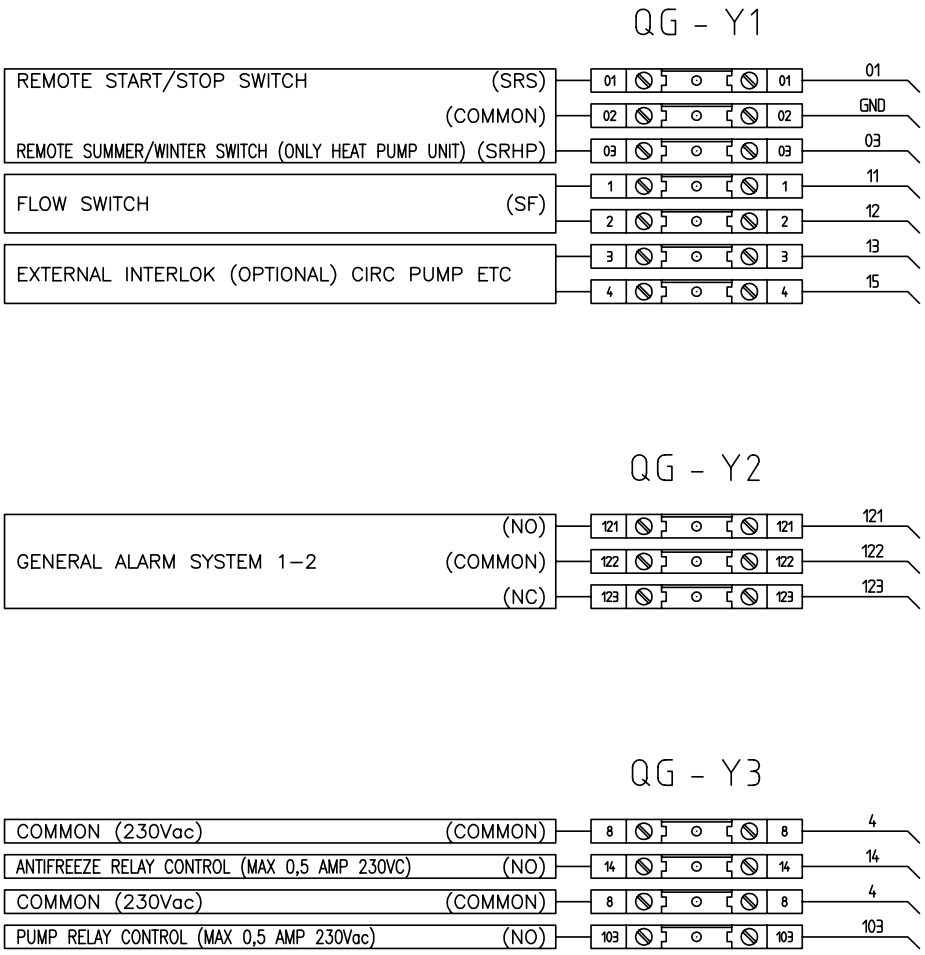


SYSCROLL 230-260-280



4 - Installation (continued)

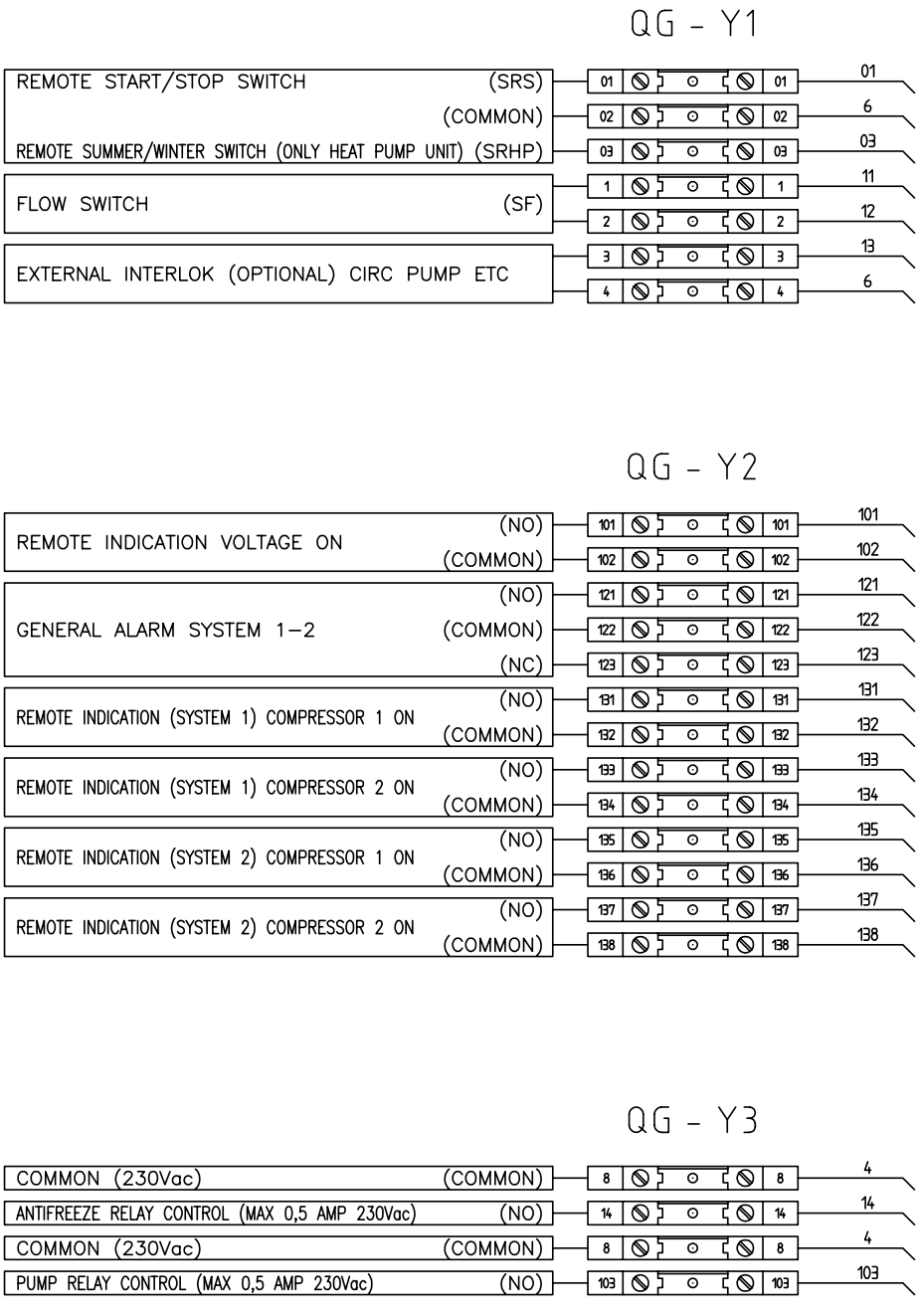
SYSCROLL 140-170 AIR EVO CO-HP - Electrical Connections



Note: For the other version refer to documentation attached to machine.

4 - Installation (continued)

SYSCROLL 230-360 AIR EVO CO-HP - Electrical Connections



MORSETTIERA UTENTE / USER TERMINALS

Note: For the other version refer to documentation attached to machine.

5 - Start-Up

The unit must be started for the first time by personnel suitably trained by one Authorised Service Centre. Failure to meet this requirement will immediately void the warranty.

The operations carried out by authorised personnel are limited to the start-up of the unit, and do not include any other operation on the plant, such as, for example, electrical and hydraulic connections etc.

All the other operations before start-up, including oil pre-heating for at least 12 hours, must be performed by the Installer.

5.1 Preliminary check

The checks listed below shall be performed before starting the unit and before the arrival of the personnel authorised.

- Check the section of power supply and grounding cables; make sure that terminals are tightened and check the correct operation of contactors, with the main switch open.
- Check that any voltage and phase variation in the power supply does not exceed the prefixed thresholds.
- Connect the contacts of the flow switch and the thermal relay of the pump and of the other devices (if any), to terminals 1-2 and 3-4, respectively.
- Check that the components of the external water circuit (pump, user equipment, filters, power supply tank and reservoir, if any) have been installed properly, and according to the manufacturer's instructions.
- Check the filling of the hydraulic circuits, and make sure that the fluid circulation is correct, without any trace of leaks and air bubbles. If you use ethylene glycol as antifreeze, check that its percentage is correct (do not exceed 35% glycol percentage).
- Check that the direction of rotation of the pumps is correct, and that fluids have been circulating for at least 12 hours for both pumps. Then, clean the filters on the suction side of the pumps.
- Adjust the liquid distribution network in such a way that the flow rate is within the specified range.
- Check that the water quality is up to the specifications.
- Check that oil heaters, if any, have been turned on at least 12 hours before.

5.2 Start-up

Start-up sequence:

- Turn on the Main switch (at least 12 hours before).
- Check that the oil in the compressor has reached the requested temperature (the minimum temperature outside the pan must be approx. 40°C) and that the auxiliary control circuit is energised.
- Check the operation of all the external equipment, and make sure that the control devices of the plant are properly calibrated.
- Start the pump and check that the water flow is correct.
- Set the desired fluid temperature on the control board.
- Start the appliance (see Chapter 6).
- Check the correct direction of rotation of compressors. Scroll compressors cannot compress the refrigerant when they rotate in the opposite direction. To make sure that they are rotating in the correct direction, simply check that, just after the start-up of the compressor, the pressure drops on the LP side and rises on the HP side. Furthermore, if a scroll compressor rotate in the opposite direction, there is a considerable rise in the sound level of the unit, as well as in a dramatic reduction of current absorption compared to normal values. In case of wrong rotation, the scroll compressor can be definitely damaged. Phase monitor is assembled in the unit as a standard to prevent wrong compressors rotation.
- After about 15 minutes of operation check that there are no bubbles, through the sight glass on the liquid line.

The presence of bubbles may indicate that a part of the refrigerant charge has been released in one or more points. It is important to remove these leaks before proceeding.

- Repeat the start-up procedure after removing the leaks.

5.3 Checking the operation

Check the following:

- The temperature of the water entering the evaporator.
- The temperature of the water leaving the evaporator.
- The level of the water flow rate in the evaporator, if possible.
- The current absorption upon the start of the compressor and in case of stabilised operation.
- The fan's current absorption.

Check that the condensing and evaporation temperatures, during operation at high and low pressure detected by the pressure gauges of the refrigerant, are within the following range:

(On the units not provided with HP/LP pressure gauges for the refrigerant, connect a pressure gauge to the Shrader valves on the refrigeration circuit).

HP side	Approx. 11 to 15 °C above the temperature of the air entering the condenser, for R410A units.
LP side	Approx. 2 to 4 °C below the temperature of the leaving chilled water, for R410A units.

5.4 Delivery to the customer

- Train the user according to the instructions provided in Section 6.

6 - Control

6 General information

Introduction

This document contains the information and the operating instructions for 4 compressors & electronic control.

This information is for the after-sales service and the production operators, for the end-of-line testing.

Main characteristics

– Microprocessor control

– User-friendly keyboard

– Proportional and integral control of the return water temperature (RWT)

– Hysteresis control of the leaving water temperature (LWT)

– Access code to enter the Manufacturer's Level

– Access code to enter the Service Level

– Alarm and LED

– Backlighted LCD

– Pump-Down logic

– Rotation of the compressor operation

– Oil return function

– Night mode (or Low Noise) control

– Counting of the pump/compressors' hours of operation

– Display of discharge and suction pressure values

– Display of temperature sensor

– History of stored alarms (option)

– Built-in serial Communication RS485 Card; to connect the "Chiller Control" to a BMS network

The following accessories can be also connected:

– Remote Display Terminal

– Wire Remote Control.

6.1 Control with 4 compressors. The "CHILLER CONTROL" system

The machines with 4 scroll compressors are provided with a microprocessor card which is fully programmed by default for the control of a chiller of cold only type with 2 circuits, 2 compressors per circuit, a high-pressure transducer per circuit.

The control system consists of:

Keyboard & Display Terminal

General information

The figure shows the terminal with the front door open.

It is provided with a LCD 8 lines x 22 columns, keyboard and microprocessor-controlled LED's, so as to allow the programming of the control parameters (setpoint, differential bands, alarm thresholds) and themain operations to be carried out by the user.

Terminal & Key Board description

The terminal makes it possible to carry out the following operations:

– the initial configuration of the machine

– the change of all the main operating parameters

– the display of the detected alarms

– the display of all the measured quantities

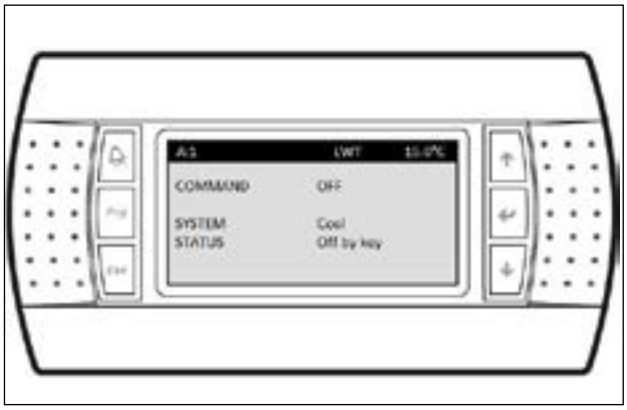
The terminal and the card are connected by a 6-way phone cable.

The connection of the terminal to the basic card is not essential for the normal operation of the controller.

6 - Control (continued)

Esc	**Esc key:** allows you to move from one mask to another.
	Alarm key: used to display the alarms, to reset them in manual. Press it one to display the mask of the activated alarm, press it again to reset the alarm signal.
Prg + Esc	**Prg+Esc keys:** Pressing these keys at the same time,allows you to turn the unit on/off.
	Up-down keys: allows you to set the control parameters' values and to move from one mask to another (not backlighted).
	Enter key: used to move the cursor inside the masks and to save the values of the set parameters.
+	**Alarm+Enter keys:** press these keys at the same time to enter the "storical alarm" after 1' come back at status machine menu.

6.2 Display



6.3 Keyboard

Arrows key - Up/Down/Enter

If the cursor is in the top left-hand corner (Home), press the UP/DOWN keys to access the subsequent masks associated to the selected branch. If a mask includes some value setting fields and you press the ENTER key, the cursor will reach these fields.

Once you have reached the quantity setting field, you can modify any value (within the expected limits) by pressing the UP/DOWN keys.

After you have selected the desired value, press the ENTER key again to store it.

6 - Control (continued)

Alarms

Alarm code	Description	Notes
1	Main board - EPROM Failure	
2	Main board - Clock card Failure	
3	Main board - External air temperature sensor fault	
4	Main board - Return Water temperature sensor fault	
5	Main board - Leaving Water temperature sys 1 sensor fault	
6	Main board - Leaving Water temperature sys 2 sensor fault	
7	Main board - Low pressure sys 1 sensor fault	
8	Main board - Low pressure sys 2 sensor fault	
9	Main board - High pressure sys 1 sensor fault	
10	Main board - High pressure sys 2 sensor fault	
11	Main board - Discharge temperature sys 1 sensor fault	
12	Main board - Discharge temperature sys 2 sensor fault	
13	Main board - Coil Temperature sys 1 sensor fault	
14	Main board - Coil Temperature sys 2 sensor fault	
15	Flow switch / Interlock / Serious alarm (SQZ)	
16	Serious alarm (SQZ)	
17	Flow switch / Interlock	
20	High pressure switch Sys 1	
21	High pressure switch Sys 2	
22	Low pressure Sys 1 switch manual reset	
23	Low pressure Sys 2 switch manual reset	
24	Thermal protection compressor 1 Sys 1 manual reset	
25	Thermal protection compressor 2 Sys 1 manual reset	
27	Thermal protection compressor 1 Sys 2 manual reset	
28	Thermal protection compressor 2 Sys 2 manual reset	
30	Fan Thermal protection manual reset	
31	Fan Thermal protection Group 1 Sys 1 manual reset	
32	Fan Thermal protection Group 2 Sys 1 manual reset	
33	Fan Thermal protection Group 1 Sys 2 manual reset	
34	Fan Thermal protection Group 2 Sys 2 manual reset	
35	Low refrigerant cutout Sys 1 manual reset	
36	Low refrigerant cutout Sys 2 manual reset	
37	Low pressure alarm Sys 1 manual reset	
38	Low pressure alarm Sys 2 manual reset	
39	Out of envelope Sys 1 manual reset	
40	Out of envelope Sys 2 manual reset	
41	High pressure Sys 1 manual reset	
42	High pressure Sys 2 manual reset	
43	High limit discharge temperature Sys1 manual reset	
44	High limit discharge temperature Sys2 manual reset	
45	ΔT Water Too High Sys1	
46	ΔT Water Too High Sys2	
47	Wrong Water Trend Sys1	
48	Wrong Water Trend Sys2	
49	Antifreeze alarm Sys 1 manual reset	
50	Antifreeze alarm Sys 2 manual reset	
51	Antifreeze alarm Recovery manual reset	
52	Pump maintenance	
53	Compressor 1 Sys 1 maintenance	
54	Compressor 2 Sys 1 maintenance	
56	Compressor 1 Sys 2 maintenance	
57	Compressor 2 Sys 2 maintenance	
59	Driver 1 LAN disconneted	
60	Driver 2 LAN disconneted	
61	EPROM Error Driver 1	

Alarm code	Description	Notes
62	EPROM Error Driver 2	
63	Driver 1 S1 Sensor fault	
64	Driver 1 S3 Sensor fault	
65	Driver 1 S2 Sensor fault	
66	Driver 1 S4 Sensor fault	
67	Driver 2 S1 Sensor fault	
68	Driver 2 S2 Sensor fault	
69	EEV motor Error (Check viring) Sys 1	
70	EEV motor Error (Check viring) Sys 2	
71	Driver 1 Battery alarm	
72	Driver 2 Battery alarm	
73	Autotune alarm Sys 1	
74	Autotune alarm Sys 2	
75	Low suction alarm Sys 1	
76	Low suction alarm Sys 2	
79	Expansion board 1 OFF LINE	
80	Expansion board 2 OFF LINE	
81	Expansion board 1 - sensor 1 fault	
82	Expansion board 1 - sensor 2 fault	
83	Expansion board 1 - sensor 3 fault	
84	Expansion board 1 - sensor 4 fault	
85	Safety Extra Heater	
86	Recovery Flow switch	
91	SYS 1 - High refrig. cutout manual reset	
92	SYS 2 - High refrig. cutout manual reset	
93	EVD 1 - Parameters Transmission Error	
94	EVD 2 - Parameters Transmission Error	
95	EVD 1 - Parameters Communication Error	
96	EVD 2 - Parameters Communication Error	
122	Low pressure Sys 1 switch auto reset	
123	Low pressure Sys 2 switch auto reset	
124	Thermal protection compressor 1 Sys 1 auto reset	
125	Thermal protection compressor 2 Sys 1 auto reset	
127	Thermal protection compressor 1 Sys 2 auto reset	
128	Thermal protection compressor 2 Sys 2 auto reset	
130	Fan Thermal protection auto reset	
131	Fan Thermal protection Group 1 Sys 1 auto reset	
132	Fan Thermal protection Group 2 Sys 1 auto reset	
133	Fan Thermal protection Group 1 Sys 2 auto reset	
134	Fan Thermal protection Group 2 Sys 2 auto reset	
135	Low refrigerant cutout Sys 1 auto reset	
136	Low refrigerant cutout Sys 2 auto reset	
137	Low pressure alarm Sys 1 auto reset	
138	Low pressure alarm Sys 2 auto reset	
139	Out of envelope Sys 1 auto reset	
140	Out of envelope Sys 2 auto reset	
141	High pressure Sys 1 auto reset	
142	High pressure Sys 2 auto reset	
143	High limit discharge temperature Sys1 auto reset	
144	High limit discharge temperature Sys2 auto reset	
159	Driver 1 offline auto reset	
160	Driver 2 offline auto reset	
187	SYS 1 - Low delta pressure Auto Reset	
188	SYS 2 - Low delta pressure Auto Reset	
191	SYS 1 - High refrig. cutout auto reset	
192	SYS 2 - High refrig. cutout auto reset	

6.4 Protection and Safety Equipment

Defrosting System (only for HP models)

The HP units are provided with an automatic defrosting system, which prevents the formation of excessive ice banks on coolant/air exchangers during heat pump operation.

This system, which is part of the electronic control system, is of the time/suction pressure type, and when the suction pressure detected by a sensor drops below a fixed limit, once the preset time is over, switches from heating to cooling the operation of the unit, with the fans stopped.

During the defrosting cycle the compressor works normally, but the coil's fans remain off. The defrosting cycle stops after the coil has been defrosted, and at this point the unit can work in heating mode again.

Both circuits are defrosted at the same time. For safety purposes, fans are started also during defrosting, if the discharge pressure reaches considerable values.

Frost Protection for the Chilled Fluid

These units are provided with frost protection for the chilled fluid. This protection consists of an electrical resistor positioned in contact with the coolant/circulating fluid exchanger, which is activated (although the unit is off) when the temperature of the fluid drops below 5 °C - the standard value for a non-glycol unit.

If the leaving water temperature drops below 4 °C (standard value for a non-glycol unit) the machine's antifreeze alarm is activated. If the circulating fluid is water, before the beginning of the cold season it is advisable to drain the circuit to prevent water frosting.

If the circuit cannot be drained, it is essential to avoid de-energizing the unit, so as to permit the activation, when necessary, of the frost protection.

Compressor protection

Compressors are equipped with a heating element to prevent oil dilution, which may result in remarkable risks of failure of compressors.

The windings of the compressors' motors are provided with a thermal protection.

For models an accessory kit for thermal protection is available, for any overcurrent of scroll compressors, which shall be shop-mounted.

Electrical flow switch

To ensure the correct operation of the unit, a electrical flow switch must be installed, to prevent the unit working in case of insufficient circulation of the chilled fluid.

The electrical flow switch must be carefully installed, according to the instructions given by the Manufacturer.

The electrical flow switch must be installed on the pressing side of the circulation pump for the fluid, just upstream of the heat exchanger's inlet. The electrical flow switch must be installed in a horizontal straight length of piping, in a position reasonably far (both upstream and downstream) from localized pressure drops (curves, valves etc.).

Differential pressure switch

This pressure switch halts the operation of the unit in the event that it does not detect a sufficient pressure drop through the exchanger.

6 - Control (continued)

6.5 HPF version configuration

Units equipped with High pressure fan (HPF) can be set-up on the field to give the unit a specific static pressure.

By entering parameter in service level - Max Speed (Vdc) - it is possible to modify high static pressure. The table below shows the correspondance between chiller model, fan RPM, high static pressure.

Model	Fan Static Pressure (Pa)	Fan RPM	Parameter in Service Level: Max Speed (Vdc)
140	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	87	1.050	9,4
	123	1.100	10,0
170	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	87	1.050	9,4
	123	1.100	10,0
230	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0
260	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0
280	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0
300	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0
330	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0
360	0	900	8,1
	25	950	8,5
	56	1.000	9,0
	88	1.050	9,4
	124	1.100	10,0

7 - Product Description

7.1 General Information

Units are one-block type with single refrigerant circuit. They are intended to cool down the water required for any air-conditioning application as well as any other fluid, such as for example glycol water. These units are completely assembled at works. They are equipped with all the refrigerating connections and the internal electrical wiring required for a rapid installation on the field. An operation test is performed after assembly, with water flowing through the refrigerant/ water exchanger in order to make sure that the refrigerating circuit is properly working. The refrigerating circuit of every unit is pressure tested before inspection, drained and charged with R410A. A low noise level is the result of a careful study. It is achieved on chillers by using technologically advanced components without negatively affecting the operation performances and limits of the units.

7.2 Body and Frame

The base and frame of these units are made with galvanized steel elements, assembled with stainless steel screws. All panels can be removed to ensure easy access to internal components. All galvanized steel parts are protected by epoxy powder paint.

7.3 Compressors

The models are equipped with two SCROLL hermetic tandem compressors with an internal motor protection. The compressors of all models are assembled on rubber shock absorbers. Their motors can be directly started. They are cooled down by the aspirated refrigerant gas and equipped with internal thermistor protections against overloads. Overload protections are automatically reset after having tripped. The compressor terminal box has an IP21/54 protection degree. Compressors are powered on and off by the microprocessor of the unit control system which is intended to control the delivery of the thermal refrigerating capacity.

7.4 Evaporators

Evaporators are made of stainless steel plates. They are thermally insulated by means of a thick flexible insulating mattress with closed cells. The maximum operating pressures correspond to 10 bar for the water side and to 45 bar for the refrigerant side. Antifreeze protection for the water in the exchangers is ensured by electrical heaters and differential pressure switches.

7.5 Condensing/evaporating coils

Coils are of reversible type and are made of copper tubes arranged in staggered rows and mechanically expanded inside an aluminium finned pack. The maximum operating pressure on the refrigerant side of the condensing coils is 45 bar. The condensing coils mounted on cooling only units are of microchannel type.

7.6 Condenser Fans

The condenser fans are of a helical type. They are directly coupled and have an impeller with wing contoured aluminium blades. Each fan is equipped with a galvanised steel accident-prevention protection which is painted after manufacture. The fans motors are completely closed. They have an IP54 protection degree and a protection thermostat embedded in the windings.

7.7 Fans Control

All models have a step speed controller as a standard. It will act according to the condensing pressure and allow the operation down to an Air temperature operation of +10°C.

7.8 Refrigerating Circuit

Each unit has a single refrigerating circuit equipped with external service valves intended to measure the refrigerant pressure and charge, sight glass with a humidity indicator, dryer filter and thermal expansion valve. Refrigerating circuit is also complete with high pressure switch as well as high and low transducer.

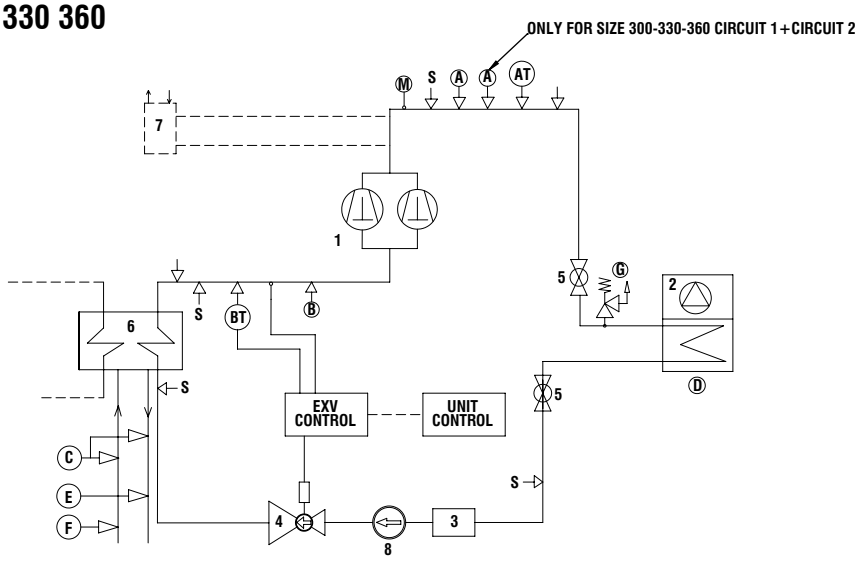
7.9 Control Supply Panel

All components of the control system and those necessary to start the motors are shop connected and tested. The control compartment contains an electronic card and a control board with an external keyboard and display, to show the operational functions, as well as the intervention of the alarms and the working blocks.

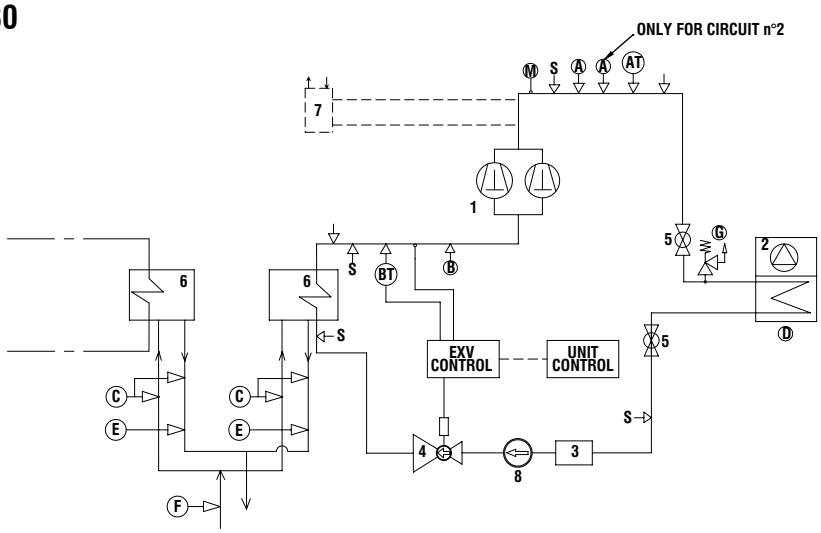
7 - Product Description (continued)

Refrigerant flow diagram - SYSCROLL AIR EVO CO

Unit 140 170 300 330 360



Unit 230 260 280



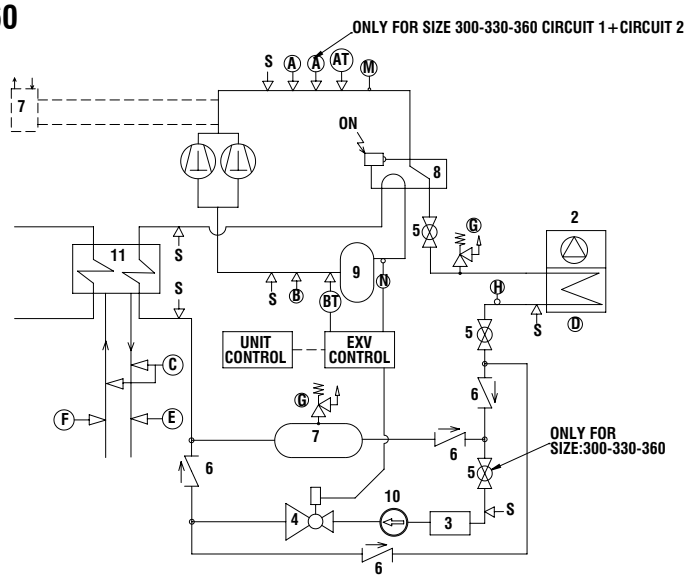
COMPONENTS	
1	Tandem Scroll type compressor
2	Air cooled condenser
3	Filter drier
4	Electronic expansion valve
5	Globe valve
6	Heat exchanger
7	Desuperheater (optional)
8	Sight glass

SAFETY / CONTROL DEVICES	
A	High pressure switch
AT	High pressure transducer
B	Low pressure switch
BT	Low pressure transducer
C	Water differential pressure switch
D	Air temperature sensor
E	Outlet water temperature sensor
F	Inlet water temperature sensor
G	PED pressure relief valve (45 bar)
M	Discharge temperature sensor
S	5/16" Schrader connection (service only)
⏚	Pipe connection with Schrader valve

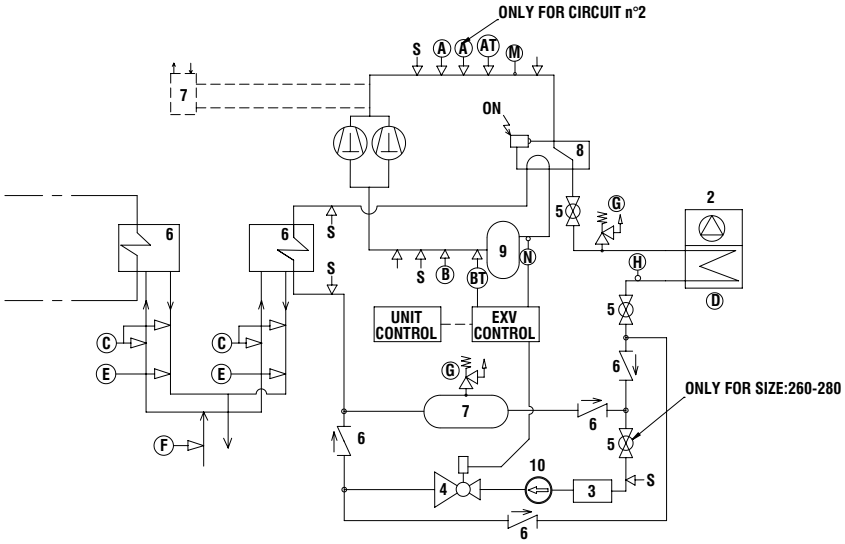
7 - Product Description (continued)

Refrigerant flow diagram - SYSCROLL AIR EVO HP

Unit 140 170 300 330 360



Unit 230 260 280



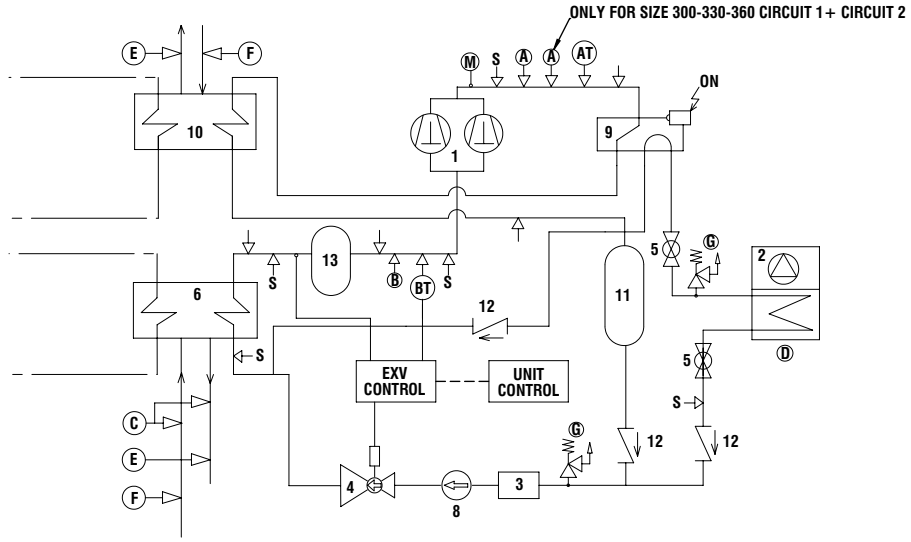
COMPONENTS	
1	Tandem Scroll type compressor
2	Air cooled condenser
3	Filter drier
4	Electronic expansion valve
5	Globe valve
6	Check valve
7	Liquid receiver
8	Four-way valve
9	Suction accumulator
10	Sight glass
11	Heat exchanger
12	Desuperheater (opzione)

SAFETY/CONTROL DEVICES	
A	High pressure switch
AT	High pressure transducer
B	Low pressure switch
BT	Low pressure transducer
C	Water differential pressure switch
D	Air temperature sensor
E	Outlet water temperature sensor
F	Inlet water temperature sensor
G	PED pressure relief valve
H	Defrost temperature sensor
M	Discharge temperature sensor
N	Suction temperature sensor
S	5/16” valve connection (service only)
	Pipe connection with Shrader valve

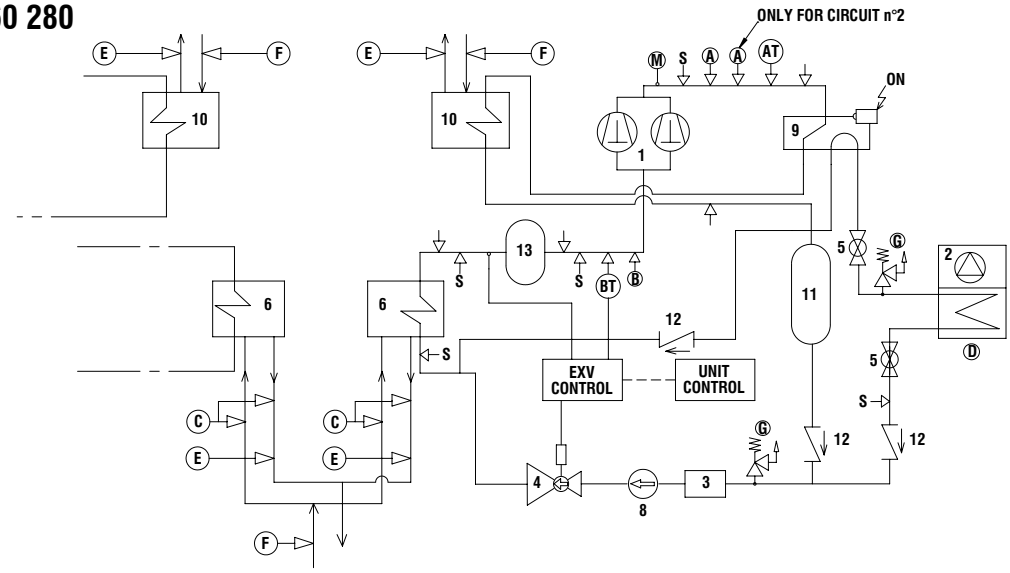
7 - Product Description (continued)

Refrigerant flow diagram - SYSCROLL AIR EVO TR

Unit 140 170 300 330 360



Unit 230 260 280

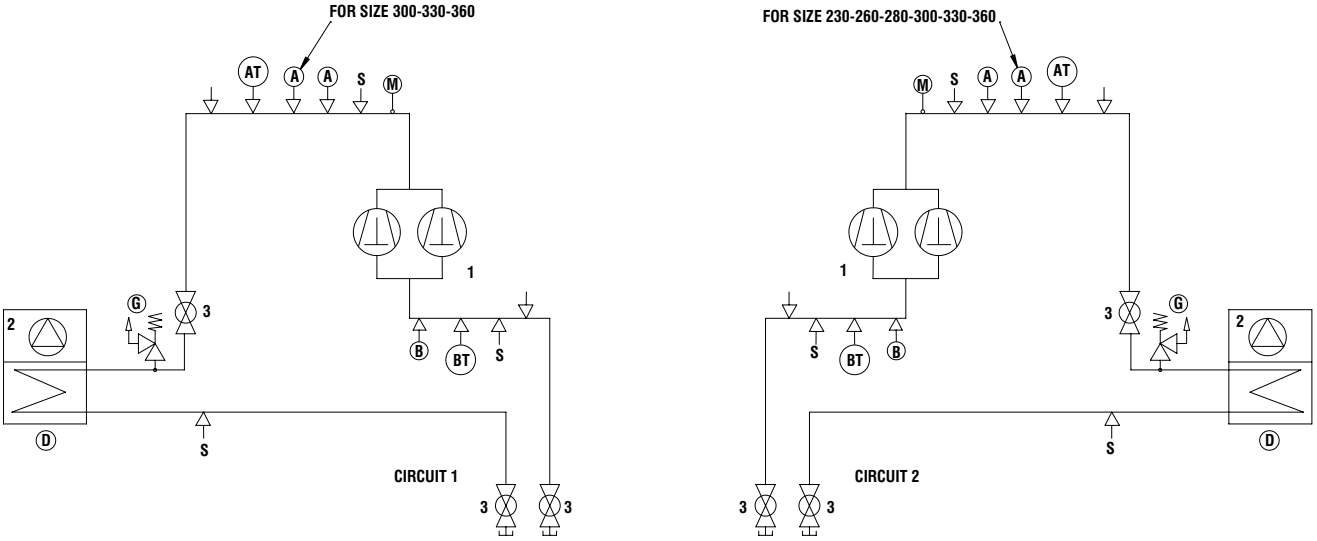


COMPONENTS	
1	Compressor trio/tandem scroll type
2	Air cooled condenser
3	Filter drier
4	Electronic expansion valve
5	Globe valve
6	Heat exchanger
7	Desuperheater (optional)
8	Sight glass
9	Four-way valve
10	Heat recover
11	Liquid receiver
12	Ceck valve
13	Suction accumulator

SAFETY / CONTROL DEVICES	
A	High pressure switch (40,5 bar)
AT	High pressure transducer
AF	Access fitting sae flare 1/4”
B	Low pressure switch (1,5 bar)
BT	Low pressure transducer
C	Water differential pressure switch (105 mbar)
D	Air temperature sensor
E	Outlet water temperature sensor
F	Inlet water temperature sensor
G	PED pressure relief valve (45 bar)
M	Discharge temperature sensor
S	5/16" Schrader connection (service only)
	Pipe connection with Schrader valve

7 - Product Description (continued)

Refrigerant flow diagram - SYSCROLL AIR EVO RE



COMPONENTS	
1	Compressor trio/tandem scroll type
2	Air cooled condenser
3	Globe valve

SAFETY / CONTROL DEVICES	
A	High pressure switch (40,5 bar)
AT	High pressure transducer
AF	Access fitting sae flare 1/4”
B	Low pressure switch (1,5 bar)
BT	Low pressure transducer
D	Air temperature sensor
G	PED pressure relief valve (45 bar)
M	Discharge temperature sensor
S	5/16» Schrader connection (service only)
	Pipe connection with Schrader valve

8 - Technical Data

8.1 Pressure drops

EVAPORATOR PRESSURE DROP - SYSCROLL AIR EVO CO		140	170	230	260	280	300	330	360
K	kPa/(l/s) ^ 2	0.6	0.6	0.3	0.2	0.2	0.1	0.1	0.1
Minimum flow rate	l/s	4.9	5.8	7.9	9.0	9.7	10.6	11.3	12.4
Nominal flow rate	l/s	6.9	8.1	11.0	12.6	13.6	14.8	15.8	17.3
Maximum flow rate	l/s	11.5	13.5	18.4	21.0	22.7	24.7	26.4	28.8
Minimum pressure drop	kPa	14	19	18	18	21	15	17.5	20.9
Nominal pressure drop	kPa	27	37	35	35	41	30	34.3	41.0
Maximum pressure drop	kPa	76	104	97	97	113	84	95.4	113.8

EVAPORATOR PRESSURE DROP - SYSCROLL AIR EVO HP		140	170	230	260	280	300	330	360
K	kPa/(l/s) ^ 2	0.6	0.6	0.3	0.2	0.2	0.1	0.1	0.1
Minimum flow rate	l/s	4.7	5.3	7.3	8.3	8.9	9.8	10.5	11.7
Nominal flow rate	l/s	6.6	7.4	10.2	11.7	12.5	13.8	14.7	16.3
Maximum flow rate	l/s	10.9	12.3	17.1	19.5	20.9	23.0	24.5	27.2
Minimum pressure drop	kPa	13	16	15	15	18	13	15	19
Nominal pressure drop	kPa	25	31	30	30	35	26	30	37
Maximum pressure drop	kPa	68	87	84	84	96	72	83	101

CONDENSER PRESSURE DROP - SYSCROLL AIR EVO HP		140	170	230	260	280	300	330	360
K	kPa/(l/s) ^ 2	0.6	0.6	0.3	0.2	0.2	0.1	0.1	0.1
Minimum flow rate	l/s	4.9	5.6	7.8	8.9	9.5	10.4	11.1	12.3
Nominal flow rate	l/s	6.9	7.9	10.9	12.5	13.3	14.6	15.6	17.2
Maximum flow rate	l/s	11.5	13.1	18.2	20.8	22.2	24.3	26.0	28.7
Minimum pressure drop	kPa	14	18	17	18	20	15	17	21
Nominal pressure drop	kPa	27	36	34	34	39	29	33	41
Maximum pressure drop	kPa	75	99	95	96	109	81	92	113

CONDENSER PRESSURE DROP - SYSCROLL AIR EVO TR		140	170	230	260	280	300	330	360
K	kPa/(l/s) ^ 2	0.6	0.6	0.3	0.2	0.2	0.1	0.1	0.1
Minimum flow rate	l/s	6.2	7.5	10.1	11.4	12.4	13.5	14.2	15.8
Nominal flow rate	l/s	8.7	10.4	14.1	16.0	17.4	18.9	19.9	22.1
Maximum flow rate	l/s	14.5	17.4	23.5	26.6	29.0	31.5	33.2	36.8
Minimum pressure drop	kPa	22	32	29	29	34	25	28	34
Nominal pressure drop	kPa	43	62	57	56	67	49	54	67
Maximum pressure drop	kPa	120	173	159	157	185	136	151	186

(*) At nominal condition (12°/7°C -- 40°/45°C).

DESUPERHEATER PRESSURE DROP		140	170	230	260	280	300	330	360
K	kPa/(l/s) ^ 2	30.6	30.6	7.2	6.2	6.2	5.0	5.0	5.0
Minimum flow rate	l/s	1.3	1.5	2.0	2.3	2.5	2.7	2.9	3.2
Nominal flow rate	l/s	1.8	2.1	2.8	3.2	3.5	3.8	4.0	4.4
Maximum flow rate	l/s	2.9	3.5	4.7	5.3	5.8	6.3	6.7	7.4
Minimum pressure drop	kPa	12	17	7	8	9	9	10	13
Nominal pressure drop	kPa	24	33	14	16	19	18	20	25
Maximum pressure drop	kPa	66	92	40	44	52	50	57	69

(*) Refers to only one Condenser, at nominal condition (35°C-12°/7°C - 40°/45°C).

8 - Technical Data (continued)

8.2 Technical data

SYSCROLL AIR EVO CO _		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	8	9.5	10	9.5	10	18	21	21
	tCO_2eq	16.7	19.8	20.9	19.8	20.9	37.6	43.8	43.8
Charge Circuit Two (1)	kg	8	9.5	15	19	19	21	21	21
	tCO_2eq	16.7	19.8	31.3	39.7	39.7	43.8	43.8	43.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	24.9	29.1	39.7	45.3	48.9	53.4	57.0	62.2
Pressure drop	kPa	27	37	35	35	41	30	34	41
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	900	900	900	900	900	900	900	900
Total airflow	m^3/h	68.400	68.400	112.500	135.000	135.000	157.500	180.000	180.000
Total input power	kW	5.1	5.1	8.5	10.2	10.2	11.9	13.6	13.6
Total input power(*)	kW	4.5	4.5	7.5	9.0	9.0	10.5	12.0	12.0
Total input power(**)	kW	7.8	7.8	13.0	15.6	15.6	18.2	20.8	20.8
External static pressure	Pa	0 or 120 Pa (**)							
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.139	1.183	1.665	1.859	1.922	2.089	2.206	2.380
Operating	kg	1.157	1.200	1.693	1.890	1.953	2.227	2.345	2.519
ADDITIONAL WEIGHT									
EC-HPF versions	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(*) High Efficiency Units (EC) with inverter fans.
(**) HPF Units with high static pressure fans.
(1) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO CO_L		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	8	9.5	10	9.5	10	18	21	21
	tCO_2eq	16.7	19.8	20.9	19.8	20.9	37.6	43.8	43.8
Charge Circuit Two (1)	kg	8	9.5	15	19	19	21	21	21
	tCO_2eq	16.7	19.8	31.3	39.7	39.7	43.8	43.8	43.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	24.1	28.1	38.5	44.0	47.5	51.8	55.4	60.3
Pressure drop	kPa	26	35	33	33	38	28	32	38
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	700	700	700	700	700	700	700	700
Total airflow	m^3/h	55.000	55.000	92.500	111.000	111.000	129.500	148.000	148.000
Total input power	kW	3.6	3.6	6.0	7.2	7.2	8.4	9.6	9.6
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2”1/2 / 2”1/2		3” / 3”					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1” / 1”							
WEIGHT									
Shipping	kg	1.139	1.183	1.665	1.859	1.922	2.089	2.206	2.380
Operating	kg	1.157	1.200	1.693	1.890	1.953	2.227	2.345	2.519
ADDITIONAL WEIGHT									
EC	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO CO_S		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	8	9.5	10	9.5	10	18	21	21
	tCO_2eq	16.7	19.8	20.9	19.8	20.9	37.6	43.8	43.8
Charge Circuit Two (1)	kg	8	9.5	15	19	19	21	21	21
	tCO_2eq	16.7	19.8	31.3	39.7	39.7	43.8	43.8	43.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	22.9	26.4	36.1	41.6	44.6	48.7	52.5	56.7
Pressure drop	kPa	23	31	29	29	34	25	29	34
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	550	550	550	550	550	550	550	550
Total airflow	m^3/h	44.000	44.000	72.500	87.000	87.000	101.500	116.000	116.000
Total input power	kW	2.7	2.7	4.5	5.4	5.4	6.3	7.2	7.2
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.144	1.188	1.670	1.864	1.927	2.094	2.211	2.385
Operating	kg	1.162	1.205	1.698	1.895	1.958	2.232	2.350	2.524
ADDITIONAL WEIGHT									
EC	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO CO_HT		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	8	9.5	10	9.5	10	18	21	21
	tCO_2eq	16.7	19.8	20.9	19.8	20.9	37.6	43.8	43.8
Charge Circuit Two (1)	kg	8	9.5	15	19	19	21	21	21
	tCO_2eq	16.7	19.8	31.3	39.7	39.7	43.8	43.8	43.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	25.1	29.4	40.0	45.7	49.4	53.8	57.4	62.8
Pressure drop	kPa	28	38	36	36	42	31	35	42
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Total airflow	m^3/h	80.500	80.500	132.500	159.000	159.000	185.500	212.000	212.000
Total input power	kW	7.8	7.8	13.0	15.6	15.6	18.2	20.8	20.8
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2”1/2 / 2”1/2		3” / 3”					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1” / 1”							
WEIGHT									
Shipping	kg	1.169	1.213	1.715	1.919	1.982	2.159	2.286	2.460
Operating	kg	1.187	1.230	1.743	1.950	2.013	2.297	2.425	2.599
ADDITIONAL WEIGHT									
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO HP _		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (3)	kg	23	23.5	27	28	28	43	53	54
	tCO_2eq	48.0	49.1	56.4	58.5	58.5	89.8	110.7	112.8
Charge Circuit Two (3)	kg	23	23.5	42.5	52	54	55	53	54
	tCO_2eq	48.0	49.1	88.7	108.6	112.8	114.8	110.7	112.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow Cooling	m^3/h	23.6	26.7	36.9	42.1	45.1	49.6	53.0	58.8
Water pressure drop Cooling	kPa	25	31	30	30	35	26	30	37
Water flow Heating (1)	m^3/h	24.8	28.4	39.3	45.0	47.9	52.4	56.1	62.0
Water pressure drop Heating (1)	kPa	27	36	34	34	39	29	33	41
Water flow Heating (2)	m^3/h	25.5	29.1	40.1	46.0	48.9	53.3	57.3	63.1
Water pressure drop Heating (2)	kPa	29	37	36	36	41	30	35	42
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	900	900	900	900	900	900	900	900
Total airflow	m^3/h	68.400	68.400	112.500	135.000	135.000	157.500	180.000	180.000
Total input power	kW	5.1	5.1	8.5	10.2	10.2	11.9	13.6	13.6
Total input power(*)	kW	4.5	4.5	7.5	9.0	9.0	10.5	12.0	12.0
Total input power(**)	kW	7.8	7.8	13.0	15.6	15.6	18.2	20.8	20.8
External static pressure	Pa	0 or 120 Pa (**)							
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.294	1.337	2.049	2.312	2.427	2.564	2.748	2.925
Operating	kg	1.312	1.355	2.078	2.343	2.458	2.702	2.887	3.063
ADDITIONAL WEIGHT									
EC-HPF versions	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) Data refers to 45°C leaving warm water temperature and 7°C ambient coil air temperature with 87% R.H., NET value refear to EN14511.
(2) Data refers to 35 °C leaving warm water temperature and 7 °C ambient coil air temperature with 87% R.H., NET value refear to EN14511, according to DM 28_12_12.
(3) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.
(*) High Efficiency Units (EC) with inverter fans.
(**) HPF Units with high static pressure fans.

8 - Technical Data (continued)

SYSCROLL AIR EVO HP_L		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (3)	kg	23	23.5	27	28	28	43	53	54
	tCO_2eq	48.0	49.1	56.4	58.5	58.5	89.8	110.7	112.8
Charge Circuit Two (3)	kg	23	23.5	42.5	52	54	55	53	54
	tCO_2eq	48.0	49.1	88.7	108.6	112.8	114.8	110.7	112.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow Cooling	m^3/h	22.9	25.8	35.7	40.9	43.7	48.2	51.6	57.0
Water pressure drop Cooling	kPa	23	29	28	28	33	25	28	34
Water flow Heating (1)	m^3/h	24.2	27.8	38.4	43.8	46.7	51.4	55.0	60.7
Water pressure drop Heating (1)	kPa	26	34	33	33	37	28	32	39
Water flow Heating (2)	m^3/h	24.7	28.4	39.0	44.7	47.5	52.1	56.0	61.6
Water pressure drop Heating (2)	kPa	27	36	34	34	39	29	33	40
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	700	700	700	700	700	700	700	700
Total airflow	m^3/h	55.000	55.000	92.500	111.000	111.000	129.500	148.000	148.000
Total input power	kW	3.6	3.6	6.0	7.2	7.2	8.4	9.6	9.6
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.294	1.337	2.049	2.312	2.427	2.564	2.748	2.925
Operating	kg	1.312	1.355	2.078	2.343	2.458	2.702	2.887	3.063
ADDITIONAL WEIGHT									
EC	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) Data refers to 45°C leaving warm water temperature and 7°C ambient coil air temperature with 87% R.H., NET value refear to EN14511.
(2) Data refers to 35 °C leaving warm water temperature and 7 °C ambient coil air temperature with 87% R.H., NET value refear to EN14511, according to DM 28_12_12.
(3) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO HP_S		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (3)	kg	23	23.5	27	28	28	43	53	54
	tCO_2eq	48.0	49.1	56.4	58.5	58.5	89.8	110.7	112.8
Charge Circuit Two (3)	kg	23	23.5	42.5	52	54	55	53	54
	tCO_2eq	48.0	49.1	88.7	108.6	112.8	114.8	110.7	112.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow Cooling	m^3/h	21.7	24.2	33.6	38.6	41.1	45.4	48.9	53.6
Water pressure drop Cooling	kPa	21	26	25	25	29	22	25	30.3
Water flow Heating (1)	m^3/h	23.8	27.3	37.7	43.0	45.8	50.6	54.0	59.8
Water pressure drop Heating (1)	kPa	25	33	32	32	36	27	31	38
Water flow Heating (2)	m^3/h	24.2	27.9	38.3	43.8	46.5	51.2	54.8	60.5
Water pressure drop Heating (2)	kPa	26	34	33	33	37	28	32	39
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	550	550	550	550	550	550	550	550
Total airflow	m^3/h	44.000	44.000	72.500	87.000	87.000	101.500	116.000	116.000
Total input power	kW	2.7	2.7	4.5	5.4	5.4	6.3	7.2	7.2
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.299	1.342	2.054	2.317	2.432	2.569	2.753	2.930
Operating	kg	1.317	1.360	2.083	2.348	2.463	2.707	2.892	3.068
ADDITIONAL WEIGHT									
EC	kg	30	30	50	60	60	70	80	80
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) Data refers to 45°C leaving warm water temperature and 7°C ambient coil air temperature with 87% R.H., NET value refear to EN14511.
(2) Data refers to 35 °C leaving warm water temperature and 7 °C ambient coil air temperature with 87% R.H., NET value refear to EN14511, according to DM 28_12_12.
(3) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO HP_HT		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (3)	kg	23	23.5	27	28	28	43	53	54
	tCO_2eq	48.0	49.1	56.4	58.5	58.5	89.8	110.7	112.8
Charge Circuit Two (3)	kg	23	23.5	42.5	52	54	55	53	54
	tCO_2eq	48.0	49.1	88.7	108.6	112.8	114.8	110.7	112.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow Cooling	m^3/h	23.8	26.9	37.2	42.4	45.5	50.1	53.4	59.3
Water pressure drop Cooling	kPa	25	32	31	31	35	26	30	37
Water flow Heating (1)	m^3/h	25.2	28.9	39.8	45.6	48.6	53.1	56.8	62.8
Water pressure drop Heating (1)	kPa	28	37	35	35	40	30	34	42
Water flow Heating (2)	m^3/h	25.9	29.7	40.8	46.8	49.8	54.2	58.1	64.1
Water pressure drop Heating (2)	kPa	30	39	37	37	42	31	36	43
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Antifreeze Heater	W	130	130	130+130	130+130	130+130	130	130	130
AIR COOLED CONDENSER									
Number of coils		5	5	6	6	6	7	8	8
Total coil face area per coil	m^2	12	12	14.4	14.4	14.4	16.8	19.2	19.2
FANS									
Number of fans		3	3	5	6	6	7	8	8
Nominal speed	rpm	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Total airflow	m^3/h	80.500	80.500	132.500	159.000	159.000	185.500	212.000	212.000
Total input power	kW	7.8	7.8	13.0	15.6	15.6	18.2	20.8	20.8
WATER CONNECTIONS (EVAPORATOR)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	2"1/2 / 2"1/2		3" / 3"					
WATER CONNECTIONS (DESUPERHEATER)									
Type		Male GAS Threaded							
Inlet Diameter / Outlet Diameter	inch	1" / 1"							
WEIGHT									
Shipping	kg	1.324	1.367	2.099	2.372	2.487	2.634	2.828	3.005
Operating	kg	1.342	1.385	2.128	2.403	2.518	2.772	2.967	3.143
ADDITIONAL WEIGHT									
Desuperheater versions	kg	8.5	8.5	17	19	19	23	23	23
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) Data refers to 45°C leaving warm water temperature and 7°C ambient coil air temperature with 87% R.H., NET value refear to EN14511.
(2) Data refers to 35 °C leaving warm water temperature and 7 °C ambient coil air temperature with 87% R.H., NET value refear to EN14511, according to DM 28_12_12.
(3) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO TR		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	23	23.5	27	28	28	43	53	54
	tCO_2eq	48.0	49.1	56.4	58.5	58.5	89.8	110.7	112.8
Charge Circuit Two (1)	kg	23	23.5	42.5	52	54	55	53	54
	tCO_2eq	48.0	49.1	88.7	108.6	112.8	114.8	110.7	112.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
EVAPORATOR									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	24.5	29.3	39.8	45.0	49.0	53.2	55.9	62.1
Water pressure drop	kPa	26	38	35	34	41	30	33	41
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Inlet/outlet water connection	inch	2"1/2 / 2"1/2		3" / 3"					
RECOVERY CONDENSER									
Number		1	1	2	2	2	1	1	1
Type		Plate							
Water flow	m^3/h	31.3	37.6	50.8	57.5	62.5	67.9	71.7	79.5
Water pressure drop	kPa	43	62	57	56	67	49	54	67
Water volume	l	11.4	11.4	21.1	23.4	23.4	32.4	32.4	32.4
Inlet/outlet water connection	inch	2"1/2 / 2"1/2		3" / 3"					
WEIGHT									
Shipping	kg	1.331	1.375	2.081	2.348	2.411	2.696	2.879	3.043
Operating	kg	1.342	1.386	2.109	2.379	2.442	2.834	3.018	3.182
ADDITIONAL WEIGHT									
EC versions	kg	30	30	50	60	60	70	80	80
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) The refrigerant value are indicative values for standard units. The actual data are indicated on the unit label.

8 - Technical Data (continued)

SYSCROLL AIR EVO RE		140	170	230	260	280	300	330	360
Power supply	V/ph/Hz	400V/3/50Hz							
Total capacity steps	%	25-50-75-100	25-50-75-100	19-38-69-100	17-39-67-100	16-37-68-100	24-48-71-100	23-50-73-100	25-50-75-100
REFRIGERANT									
Type / GWP		R410A / 2.088							
Charge Circuit One (1)	kg	8	9.5	10	9.5	10	18	21	21
	tCO_2eq	16.7	19.8	20.9	19.8	20.9	37.6	43.8	43.8
Charge Circuit Two (1)	kg	8	9.5	15	19	19	21	21	21
	tCO_2eq	16.7	19.8	31.3	39.7	39.7	43.8	43.8	43.8
COMPRESSOR									
Number		4	4	4	4	4	4	4	4
Type / Oil type		Scroll / POE							
N° of loading stages		0/100	0/100	0/100	0/100	0/100	0/100	0/100	0/100
AIR COOLED CONDENSER									
Number of coils		2	2	5	6	6	7	8	8
Total coil face area per coil	m^2	4.6	4.6	2.4	2.4	2.4	2.4	2.4	2.4
FANS									
Number of fans		3	3	5	6	6	7	8	8
SYSCROLL AIR EVO RE_									
Nominal speed	rpm	900	900	900	900	900	900	900	900
Total airflow	m^3/h	68.400	68.400	112.500	135.000	135.000	157.500	180.000	180.000
Total input power	kW	5.1	5.1	8.5	10.2	10.2	11.9	13.6	13.6
SYSCROLL AIR EVO RE_L									
Nominal speed	rpm	700	700	700	700	700	700	700	700
Total airflow	m^3/h	55.000	55.000	92.500	111.000	111.000	129.500	148.000	148.000
Total input power	kW	3.6	3.6	6.0	7.2	7.2	8.4	9.6	9.6
SYSCROLL AIR EVO RE_S									
Nominal speed	rpm	550	550	550	550	550	550	550	550
Total airflow	m^3/h	44.000	44.000	72.500	87.000	87.000	101.500	116.000	116.000
Total input power	kW	2.7	2.7	4.5	5.4	5.4	6.3	7.2	7.2
SYSCROLL AIR EVO RE_HT									
Nominal speed	rpm	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
Total airflow	m^3/h	80.500	80.500	132.500	159.000	159.000	185.500	212.000	212.000
Total input power	kW	7.8	7.8	13.0	15.6	15.6	18.2	20.8	20.8
REFRIGERANT CONNECTIONS									
Refrigerant In connections	inch	1 5/8”	1 5/8”	1 5/8” - 2 1/8”	1 5/8” - 2 1/8”	1 5/8” - 2 1/8”	2 1/8”	2 1/8”	2 1/8”
Refrigerant Out connections	inch	7/8”	7/8”	7/8” - 1 1/8”	7/8” - 1 1/8”	7/8” - 1 1/8”	1 1/8”	1 1/8”	1 1/8”
WEIGHT									
Shipping	kg	1.107	1.150	1.542	1.726	1.788	1.946	2.061	2.235
ADDITIONAL WEIGHT									
EC/HT/HPF versions	kg	30	30	50	60	60	70	80	80
DIMENSIONS									
Length	mm	4.000	4.000	3.500	3.500	3.500	4.550	4.550	4.550
Width	mm	1.100	1.100	2.150	2.150	2.150	2.150	2.150	2.150
Height	mm	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500

(1) The value is representing the contribution to the global refrigerant charge given by the standard unit only. Contribution of connection piping and remote evaporator is not included here.

8 - Technical Data (continued)

8.3 Unit electrical data

- Version			140	170	230	260	280	300	330	360
Power	Nominal	kW	47.5	54.7	72.6	84.05	90.35	96.8	105	117.6
Input	Maximum	kW	64.5	73.5	97.6	113.05	121.95	130.6	141.4	159.2
Current	Nominal	A	88.02	109.58	135.84	151.11	161.36	172.35	186.5	207
Input	Maximum	A	135.7	147.7	184.9	208.2	224.9	238.8	259.4	292.8
Max Start-up current			244.7	287.7	423.2	452.8	469.5	483.4	504	537.4

L-S Version			140	170	230	260	280	300	330	360
Power	Nominal	kW	45.1	52.3	68.6	79.25	85.55	91.2	98.6	111.2
Input	Maximum	kW	62.1	71.1	93.6	108.25	117.15	125	135	152.8
Current	Nominal	A	82.32	103.88	126.34	139.71	149.96	159.05	171.3	191.8
Input	Maximum	A	130	142	175.4	196.8	213.5	225.5	244.2	277.6
Max Start-up current			239	282	413.7	441.4	458.1	470.1	488.8	522.2

HT-HPF Version			140	170	230	260	280	300	330	360
Power	Nominal	kW	51.1	58.3	78.6	91.25	97.55	105.2	114.6	127.2
Input	Maximum	kW	68.1	77.1	103.6	120.25	129.15	139	151	168.8
Current	Nominal	A	90.72	112.28	140.34	156.51	166.76	178.65	193.7	214.2
Input	Maximum	A	138.4	150.4	189.4	213.6	230.3	245.1	266.6	300
Max Start-up current			247.4	290.4	427.7	458.2	474.9	489.7	511.2	544.6

EC Version			140	170	230	260	280	300	330	360
Power	Nominal	kW	47.5	54.7	72.85	84.35	90.65	97.15	105.4	118
Input	Maximum	kW	64.5	73.5	97.85	113.35	122.25	130.95	141.8	159.6
Current	Nominal	A	86.22	107.78	132.84	147.51	157.76	168.15	181.7	202.2
Input	Maximum	A	133.9	145.9	181.9	204.6	221.3	234.6	254.6	288
Max Start-up current			242.9	285.9	420.2	449.2	465.9	479.2	499.2	532.6

Pump electrical data

Model	Low Pressure		High Pressure	
	Nominal power	Max. running current	Nominal power	Max. running current
	kW	A	kW	A
140	2.2	4.64	4.0	7.63
170	2.2	4.64	4.0	7.63
230	3.0	6.14	5.5	10.4
260	3.0	6.14	5.5	10.4
280	3.0	6.14	5.5	10.4
300	4.0	7.63	7.5	14.0
330	4.0	7.63	7.5	14.0
360	4.0	7.63	7.5	14.0

8 - Technical Data (continued)

Compressors electrical data

Model	Power input nominal Cond. compressor	Nom. Cond. current compressor	Power input max. Cond. compressor	Max. running current compressor FLA	Starting current compressor LRA	Nominal power factor	Unit fuse size	Cable section
	kW	A	kW	A	A		A	mm²
140	10.5	19.1	14.7	31.0	140	0.79	160	95
	10.5	19.1	14.7	31.0	140	0.79		
	10.5	19.1	14.7	31.0	140	0.79		
	10.5	19.1	14.7	31.0	140	0.79		
170	12.3	24.5	17.0	34.0	174	0.72	200	95
	12.3	24.5	17.0	34.0	174	0.72		
	12.3	24.5	17.0	34.0	174	0.72		
	12.3	24.5	17.0	34.0	174	0.72		
230	12.3	24.5	17.0	34.0	174	0.72	250	120
	12.3	24.5	17.0	34.0	174	0.72		
	19.3	33.7	27.1	48.7	287	0.83		
	19.3	33.7	27.1	48.7	287	0.83		
260	12.3	24.5	17.0	34.0	174	0.72	250	185
	15.5	25.6	21.6	36.7	240	0.87		
	19.3	33.7	27.1	48.7	287	0.83		
	25.6	44.0	36.0	65.4	310	0.84		
280	12.3	24.5	17.0	34.0	174	0.72	315	185
	15.5	25.6	21.6	36.7	240	0.87		
	25.6	44.0	36.0	65.4	310	0.84		
	25.6	44.0	36.0	65.4	310	0.84		
300	19.3	33.7	27.1	48.7	287	0.83	315	240
	19.3	33.7	27.1	48.7	287	0.83		
	19.3	33.7	27.1	48.7	287	0.83		
	25.6	44.0	36.0	65.4	310	0.84		
330	19.3	33.7	27.1	48.7	287	0.83	315	240
	25.6	44.0	36.0	65.4	310	0.84		
	19.3	33.7	27.1	48.7	287	0.83		
	25.6	44.0	36.0	65.4	310	0.84		
360	25.6	44.0	36.0	65.4	310	0.84	400	240
	25.6	44.0	36.0	65.4	310	0.84		
	25.6	44.0	36.0	65.4	310	0.84		
	25.6	44.0	36.0	65.4	310	0.84		

8 - Technical Data (continued)

Fans electrical data

- Version	Number of fans	Nominal power per fan	Max. running current per fan	Total fan power	Total max. fan current
140	3	2.1	4.1	6.3	12.3
170	3	2.1	4.1	6.3	12.3
230	5	2.1	4.1	10.5	20.5
260	6	2.1	4.1	12.6	24.6
280	6	2.1	4.1	12.6	24.6
300	7	2.1	4.1	14.7	28.7
330	8	2.1	4.1	16.8	32.8
360	8	2.1	4.1	16.8	32.8

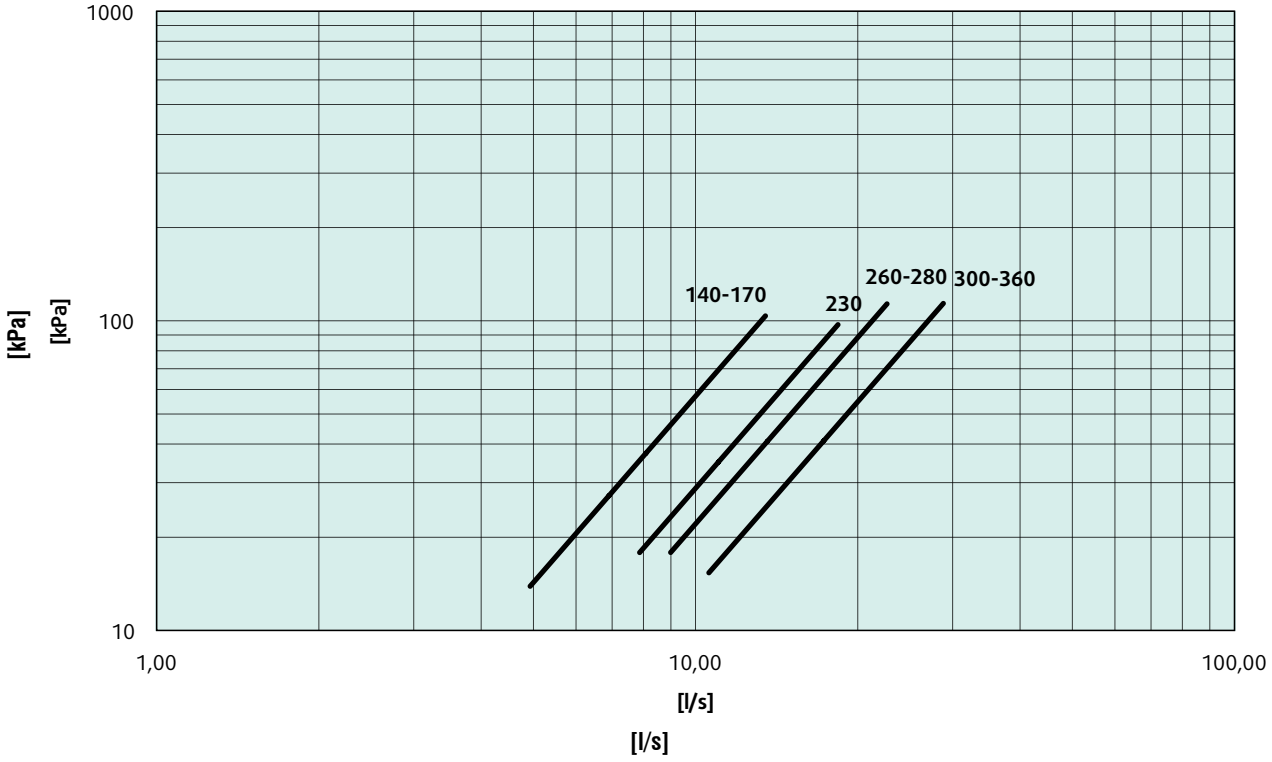
L-S Version	Number of fans	Nominal power per fan	Max. running current per fan	Total fan power	Total max. fan current
140	3	1.15	2.2	3.5	6.6
170	3	1.15	2.2	3.5	6.6
230	5	1.15	2.2	5.8	11.0
260	6	1.15	2.2	6.9	13.2
280	6	1.15	2.2	6.9	13.2
300	7	1.15	2.2	8.1	15.4
330	8	1.15	2.2	9.2	17.6
360	8	1.15	2.2	9.2	17.6

EC-HT-HPF	Number of fans	Nominal power per fan	Max. running current per fan	Total fan power	Total max. fan current
140	3	3.1	4.8	9.3	14.4
170	3	3.1	4.8	9.3	14.4
230	5	3.1	4.8	15.5	24.0
260	6	3.1	4.8	18.6	28.8
280	6	3.1	4.8	18.6	28.8
300	7	3.1	4.8	21.7	33.6
330	8	3.1	4.8	24.8	38.4
360	8	3.1	4.8	24.8	38.4

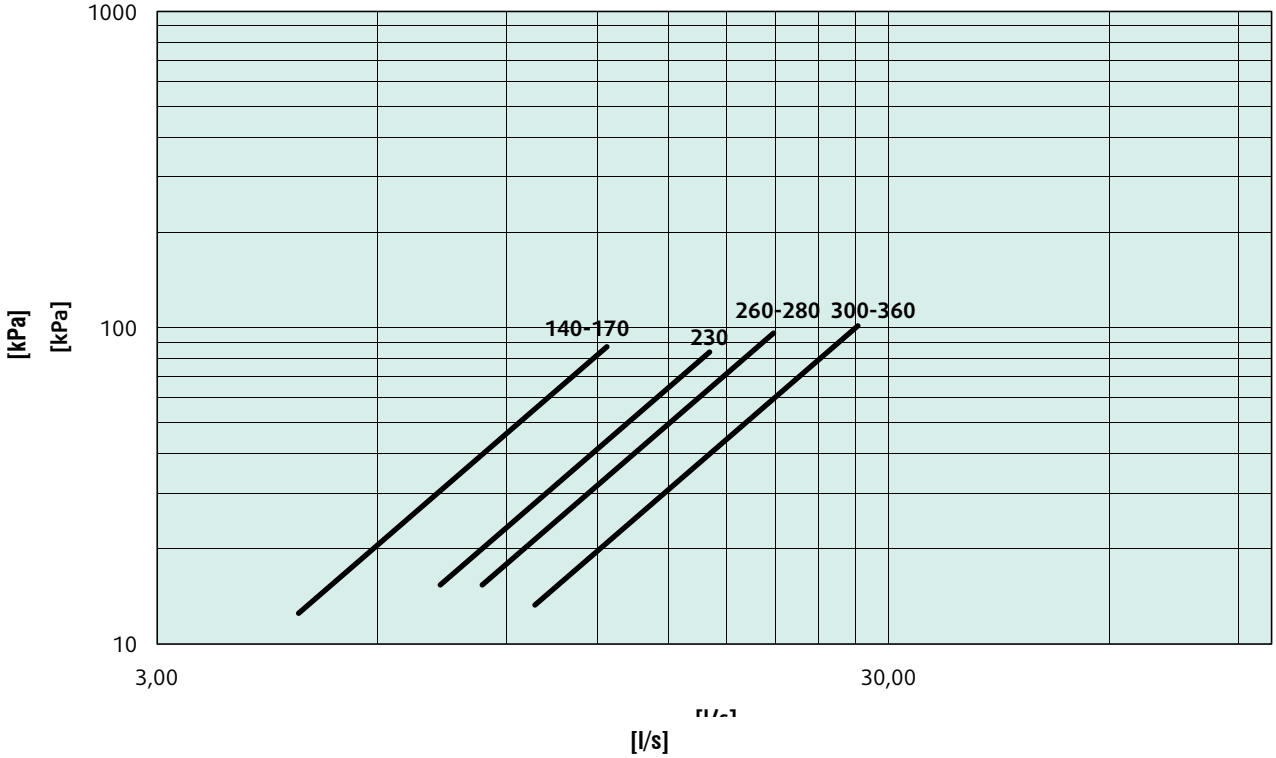
8 - Technical Data (continued)

8.4 Hydraulic features

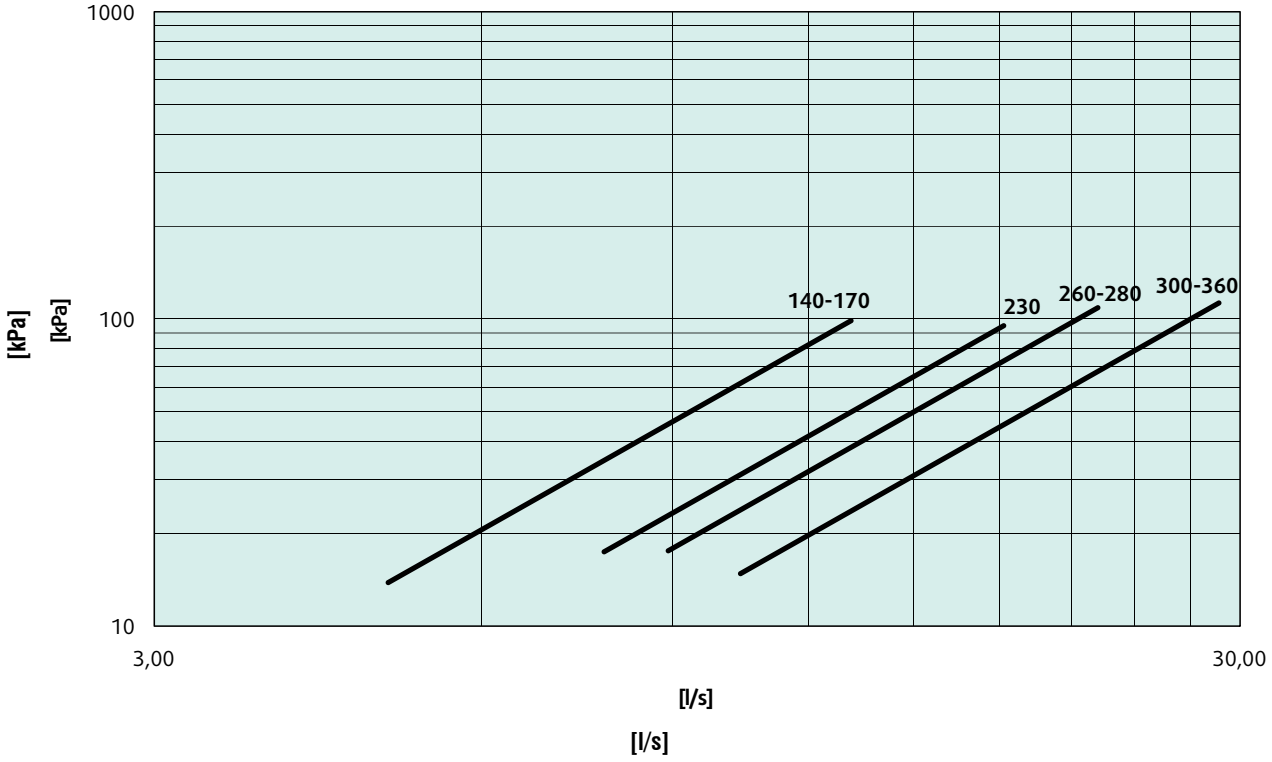
Evaporator Water Pressure Drop Curves - SYSCROLL AIR EVO CO



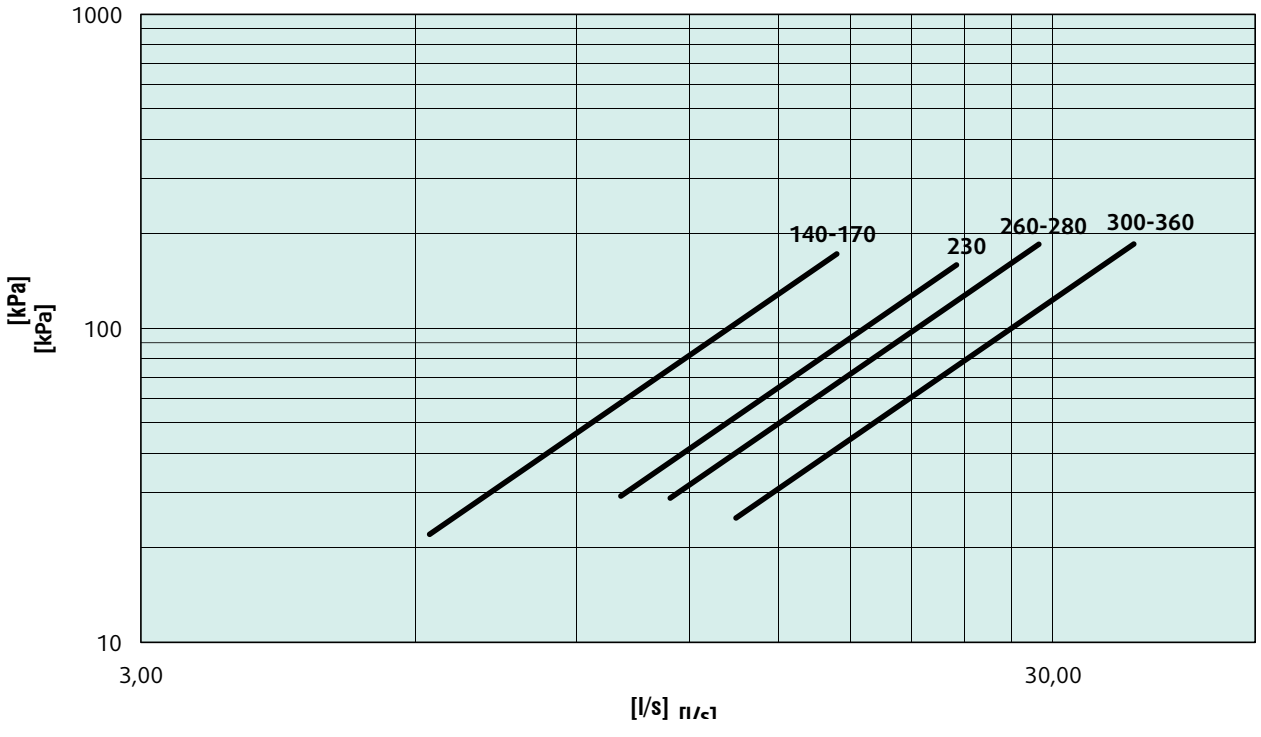
Evaporator Water Pressure Drop Curves - SYSCROLL AIR EVO HP



Condenser Water Pressure Drop Curves - SYSCROLL AIR EVO HP

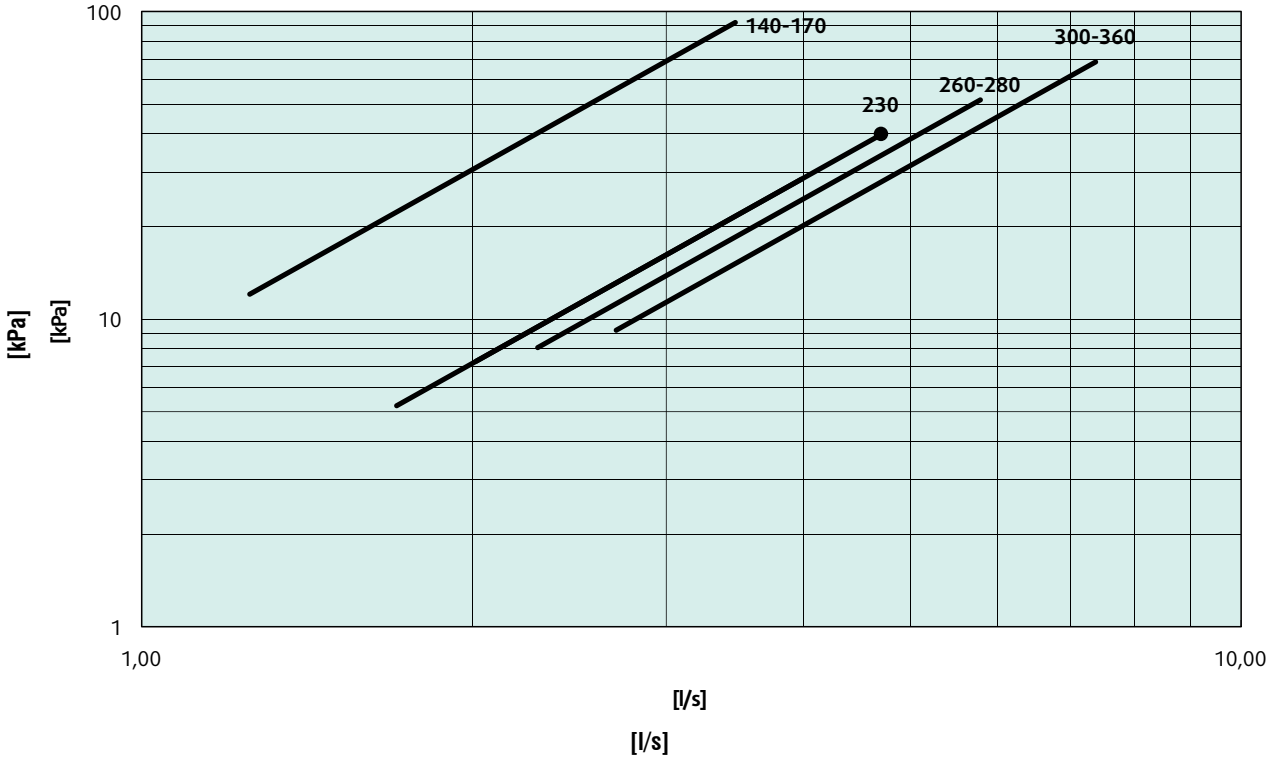


Condenser Water Pressure Drop Curves - SYSCROLL AIR EVO TR



8 - Technical Data (continued)

Desuperheater pressure drop



8.4.1 Variable flow hydronic systems

- **Manual flow control**

1. Application

Provide the user with the required flow rate and hydraulic balance without the need of mechanical balancing valve but taking advantage of the energy consumption optimization of the pump using the frequency drive.

2. Description

SYSCROLL 140-360 AIR EVO is equipped with hydraulic module driven by frequency drive that does not provide continuous modulation of the pump speed but a fixed water flow rate during commissioning.

3. Operation

The pump motor speed limits must be set during the chiller commissioning and in accordance with below rules:

- Pump speed high limit should be referenced to the Nominal Water Flow Rate

- Pump speed low limit should be referenced to the Minimum Water Flow Rate

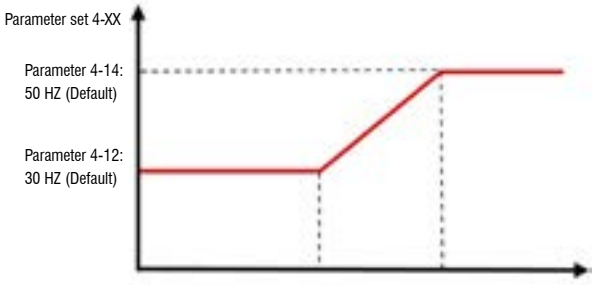


IMAGE 01: Frequency vs Speed behavior

[**Hand On**] enables control of the frequency converter via the LCP. [**Hand On**] also starts the motor and allows entering the required motor frequency with the navigation keys [▲]/ [▼].

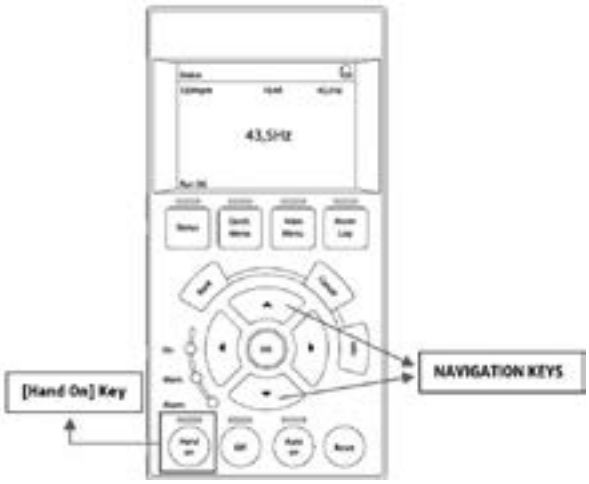


IMAGE 02: LCP DISPLAY

Note: When VPF works at 30 Hz, the absorbed power consumption of the pump is reduced by 80% compared to 50Hz pump operation.

- **Variable primary flow (Constant ΔP)**

1. Application

This option is recommendable on installations with two-way valves on the customer water loop. This method ensures that each branch of the water loop has a uniform water supply without unnecessary energy consumption.

2. Description

For this option, the unit is equipped with a hydraulic module driven by frequency drive. The modulation of the pump speed ensures that the Differential Pressure (DP) remains constant within the system. At minimum partial loads, the minimum flow across the chiller evaporator should be ensured or a by-pass valve should be installed to prevent the evaporator from low flow, which otherwise is very critical to the chiller system.

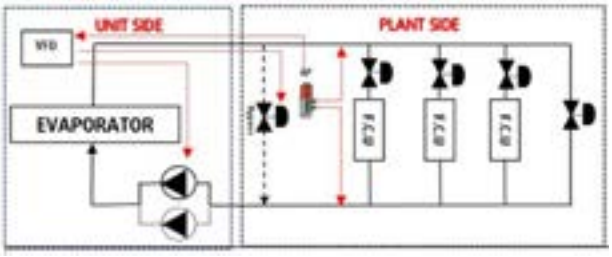


IMAGE 03: Constant ΔP Control diagram

Note: In two-pump configuration, there is an alternation of the pump operation for every 12 hrs.

Note: For the electrical connection of differential pressure transducer, pressure transducers and By-pass valve, refer electrical drawings of the hydraulic module.

3. Operation

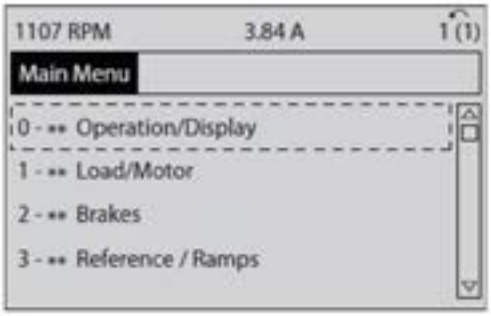
Delta pressure is measured by 1 pressure sensor. The modulation control logic PI of the pump speed starts as soon as pump is in operation in accordance with DP set point fixed on VFD controller. If the load decreases, the control valves are closed and that increases the Delta P, then the speed of the pump is decreased in order to decrease the Delta P until the setpoint. (Decreasing the speed to the half, decreases consumption by 90%).

8 - Technical Data (continued)

IMAGE 04: Control logic

By default, VFD is programmed to operate at [**Auto On**] mode. Customer can change the **SETPOINT** by following the below mentioned instructions:

Press [**Main Menu**] to select the Main Menu mode. The below read out appears on the display. The bottom section on the display shows a list of parameter groups , select Parameter 20-xx Drive Closed Loop which can be selected by toggling the [▲] and [▼] keys and then select 20-21 Setpoint 1 and change the value of default setpoint by [▲] and [▼] keys.



IMPORTANT! The differential pressure transducer, the pressure transducers and the By-pass valve are supplied loose at customer charge. Systemair provides only indications for the plant design with respect to the minimum water flow on the primary heat exchanger.

• Variable primary flow (Constant ΔT)

1. Application

This option is to provide a flow rate in order to maintain constant the delta between the inlet and outlet temperatures of the chiller. This option is to be implemented on the water loops with two or three way valves and can deliver higher energy saving compared to constant DP in the majority of the comfort applications.

2. Description

With this option, **SYSCROLL 140-360 AIR EVO** chillers will be equipped with a hydraulic module driven by a frequency drive, the modulation of the pump speed is to ensure that the DT across the water loop is constant. At minimum partial loads, the minimum flow across the chiller evaporator should be ensured or a by-pass valve should be installed to prevent the evaporator from low flow, which otherwise is very critical to the chiller system.

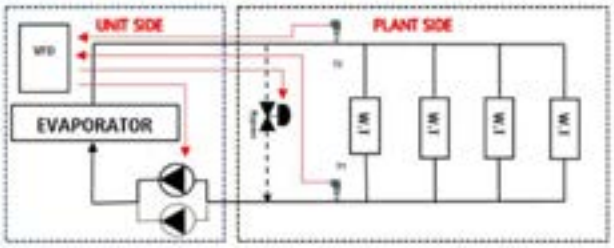


IMAGE 05: Constant ΔT Control diagram

Note: In two-pump configuration, there is an alternation of the pump operation for every 12 hrs.

Note: For the electrical connection of temperature transducers and By-pass valve, refer to electrical drawings of the hydraulic module.

3. Operation

The Entering and leaving temperatures across the chiller are measured directly by the frequency drive controller, through the factory supplied temperature transmitters. A Delta T set point will be preset on the unit controller of the frequency drive (ΔT=5 by default).

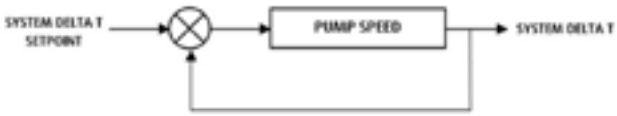
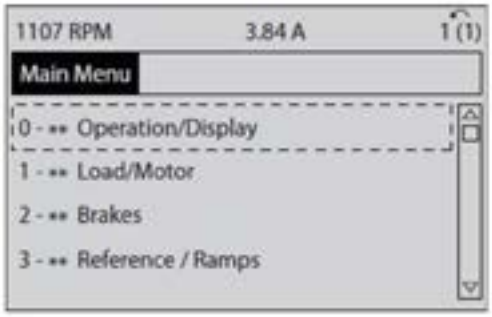


IMAGE 06: Control logic

By default, VFD is programmed to operate at [**Auto On**] mode. Customer can change the **SETPOINT** by following the below mentioned instructions:

Press [**Main Menu**] to select the Main Menu mode. The below read out appears on the display. The bottom section on the display shows a list of parameter groups , select Parameter 20-xx Drive Closed Loop which can be selected by toggling the [▲] and [▼] keys and then select 20-21 Setpoint 1 and change the value of the default setpoint of '5' by [▲] and [▼] keys.

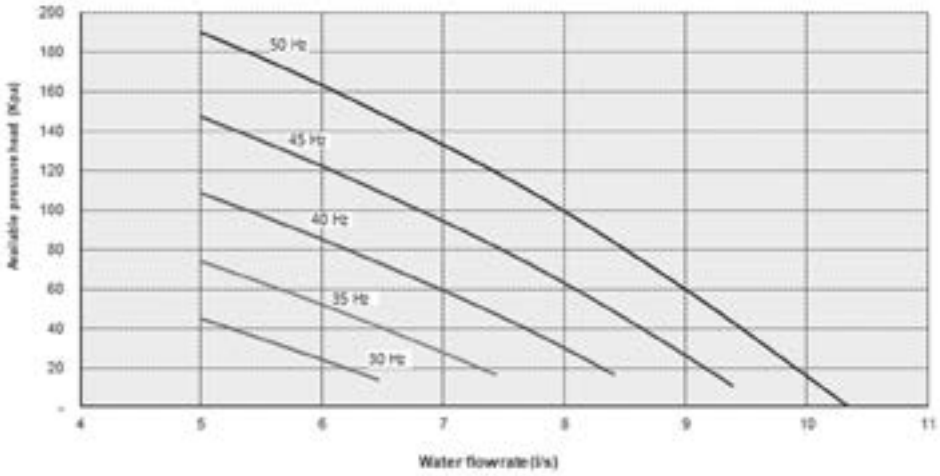


IMPORTANT! The temperature transmitters and By-pass valve are supplied loose at customer charge. Systemair provides only indications for the plant design with respect to the minimum water flow on the primary heat exchanger.

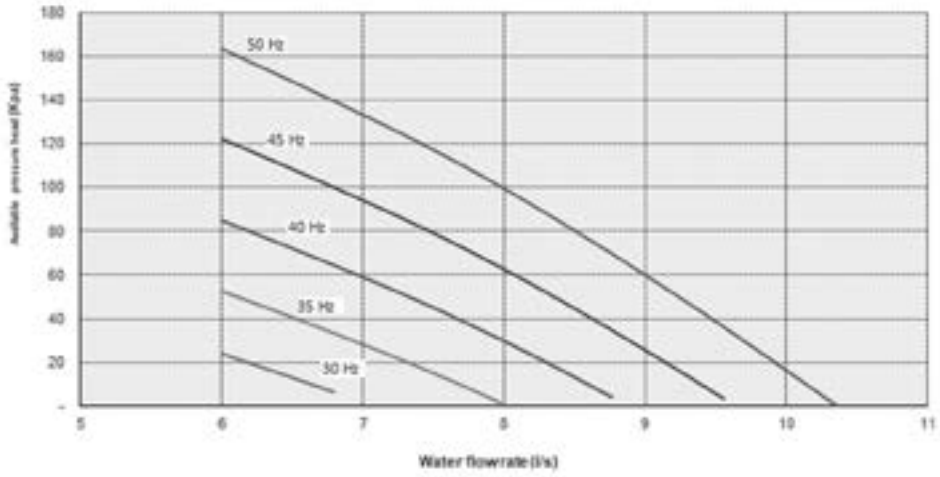
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
Standard pressure pump (1/2PSP)

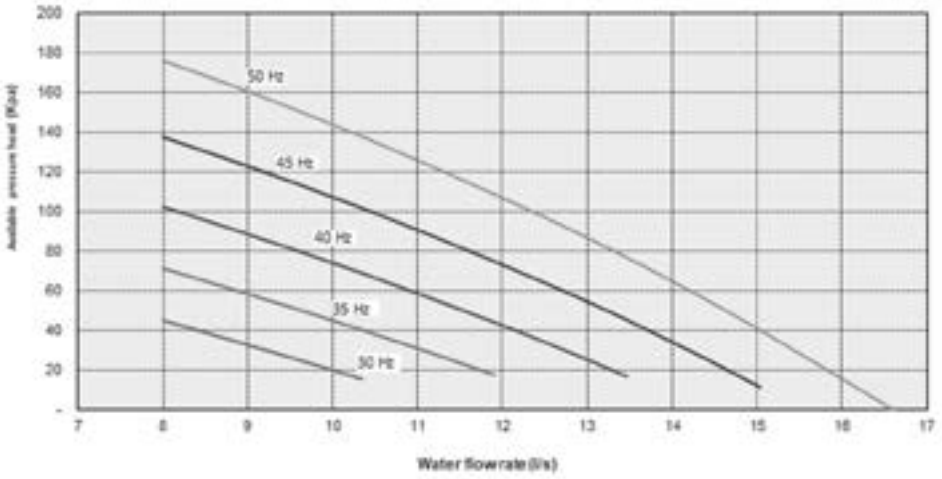
SYSCROLL 140 AIR EVO CO/HP



SYSCROLL 170 AIR EVO CO/HP



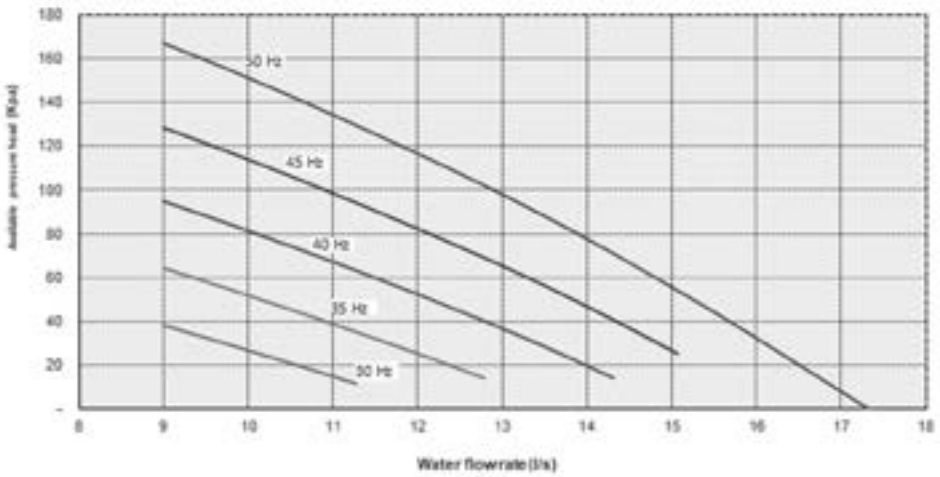
SYSCROLL 230 AIR EVO CO/HP



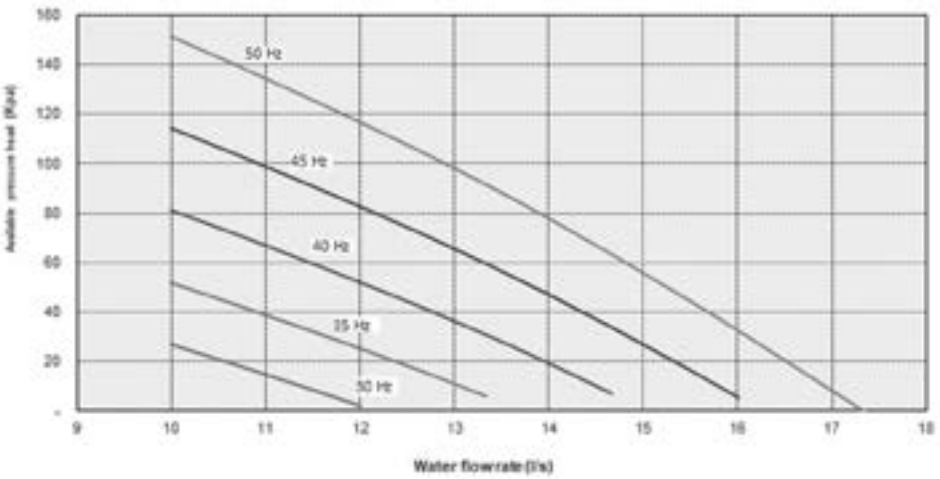
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
Standard pressure pump (1/2PSP) (continued)

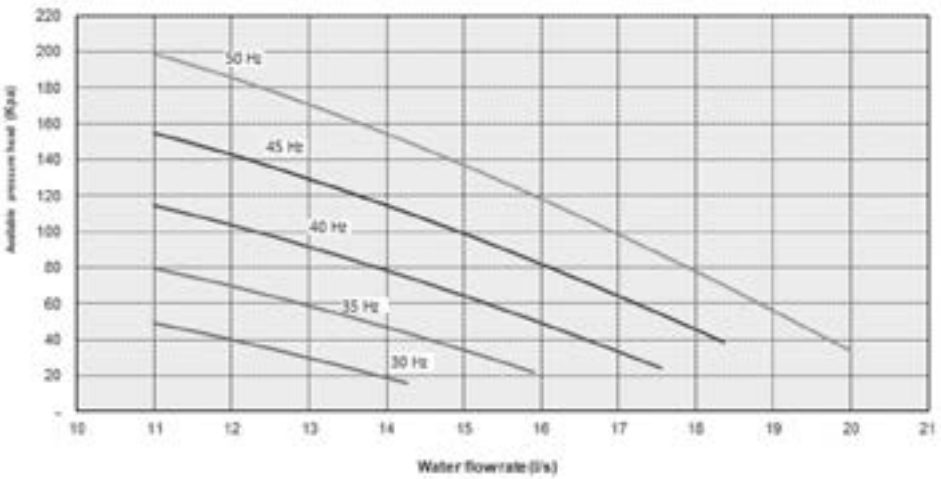
SYSCROLL 260 AIR EVO CO/HP



SYSCROLL 280 AIR EVO CO/HP



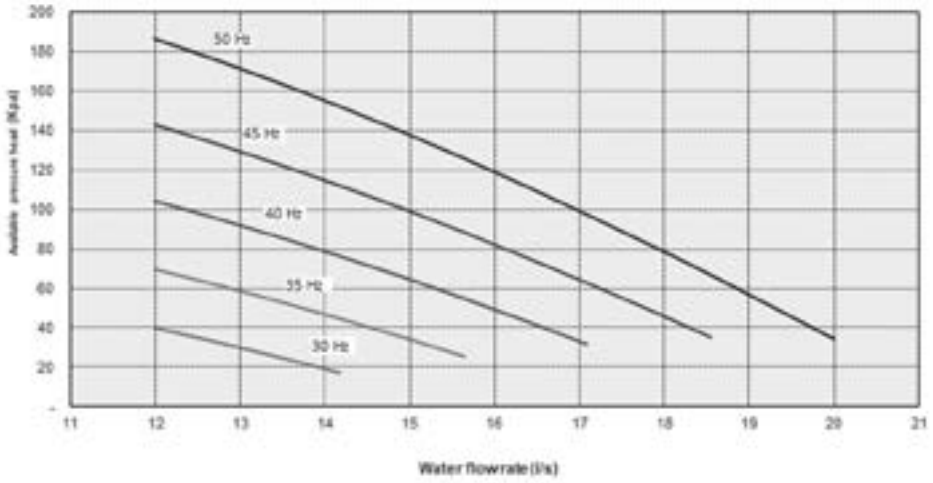
SYSCROLL 300 AIR EVO CO/HP



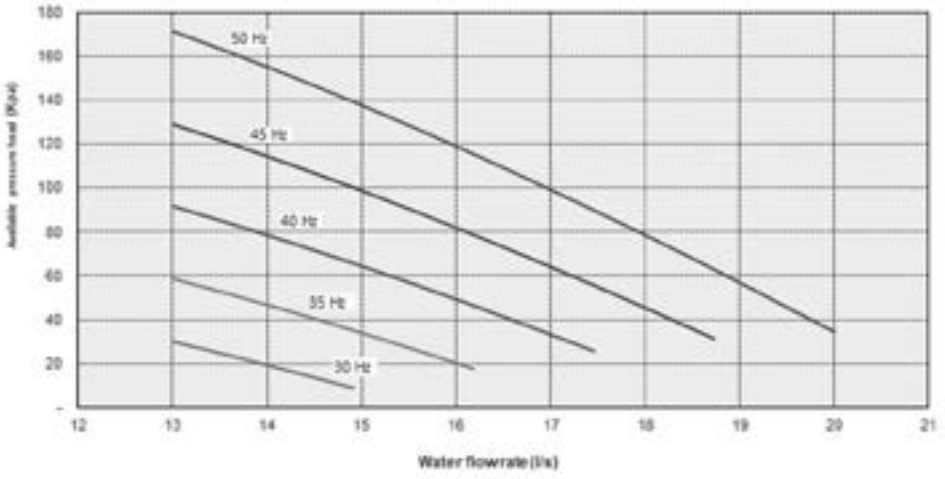
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
Standard pressure pump (1/2PSP) (continued)

SYSCROLL 330 AIR EVO CO/HP



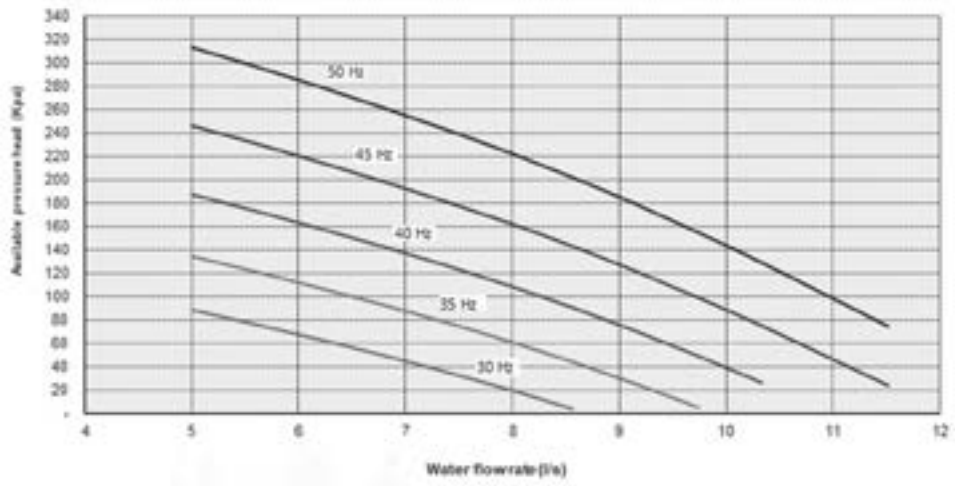
SYSCROLL 360 AIR EVO CO/HP



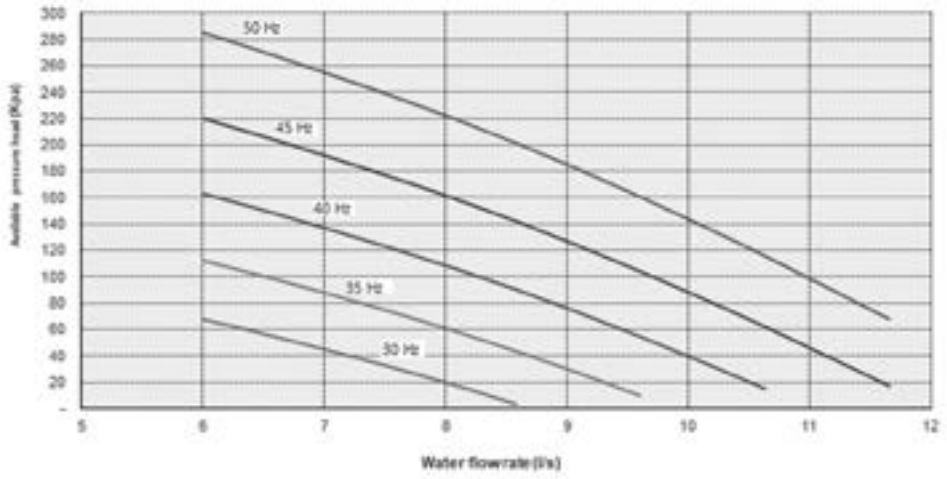
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
High pressure pump (1/2PHP)

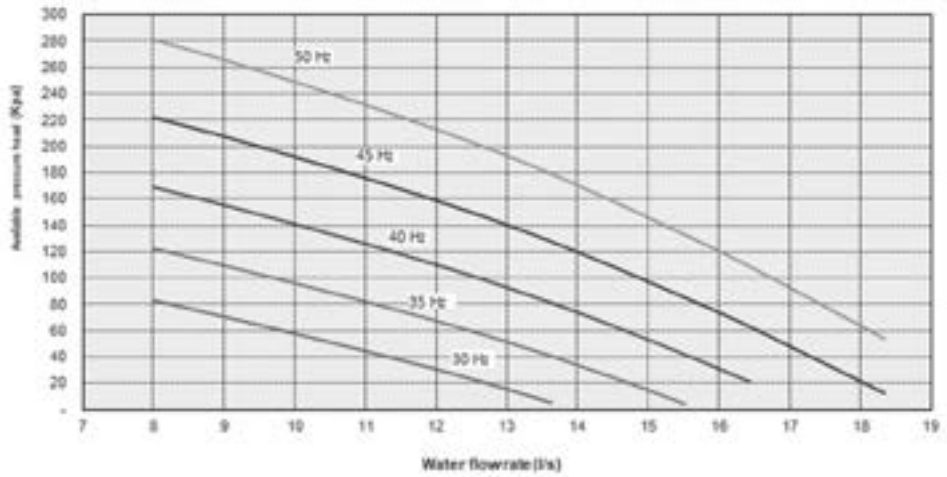
SYSCROLL 140 AIR EVO CO/HP



SYSCROLL 170 AIR EVO CO/HP



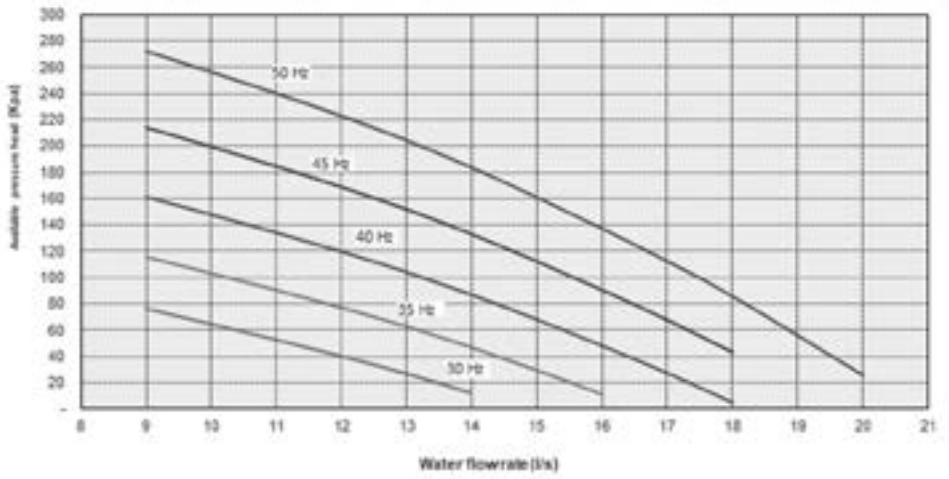
SYSCROLL 230 AIR EVO CO/HP



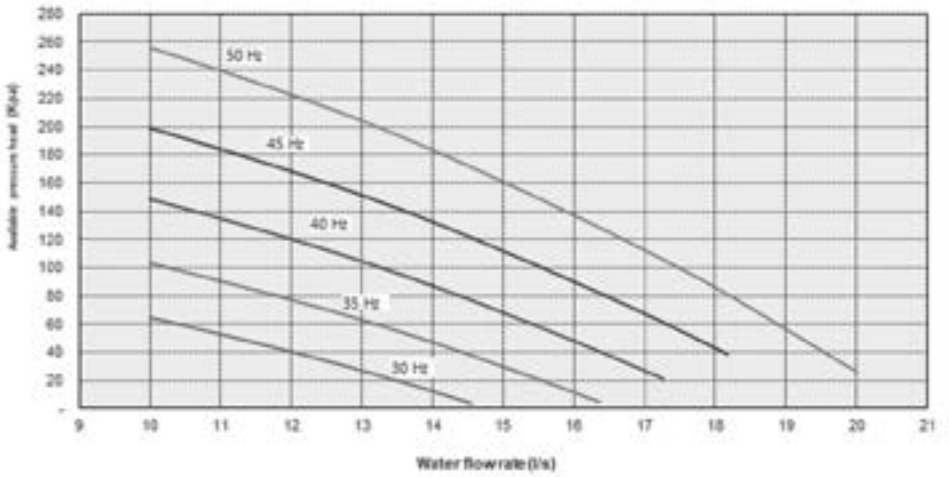
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
High pressure pump (1/2PHP) (continued)

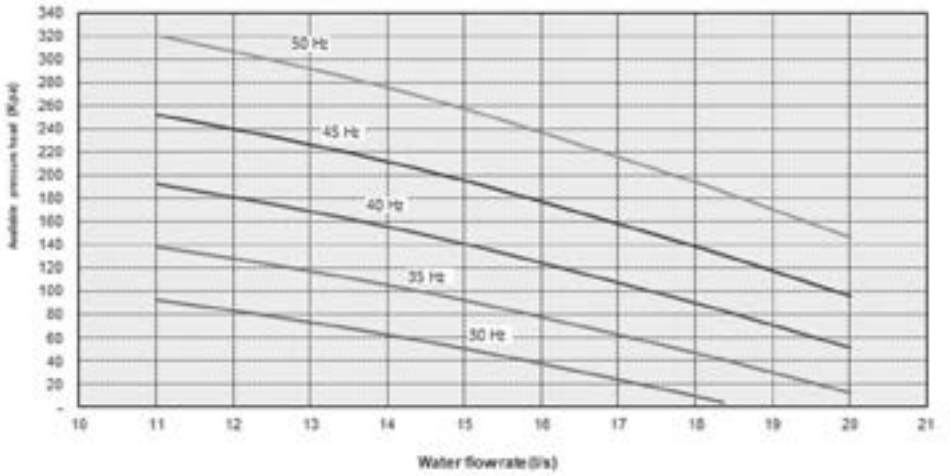
SYSCROLL 260 AIR EVO CO/HP



SYSCROLL 280 AIR EVO CO/HP



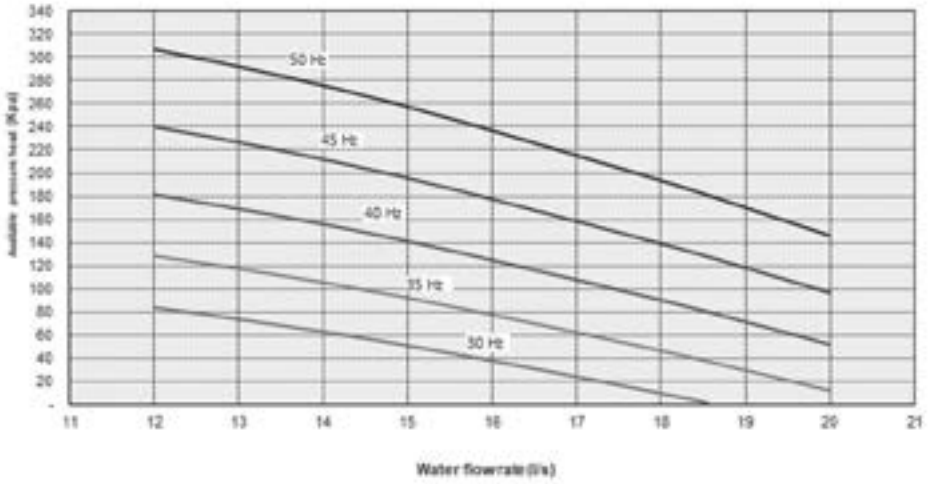
SYSCROLL 300 AIR EVO CO/HP



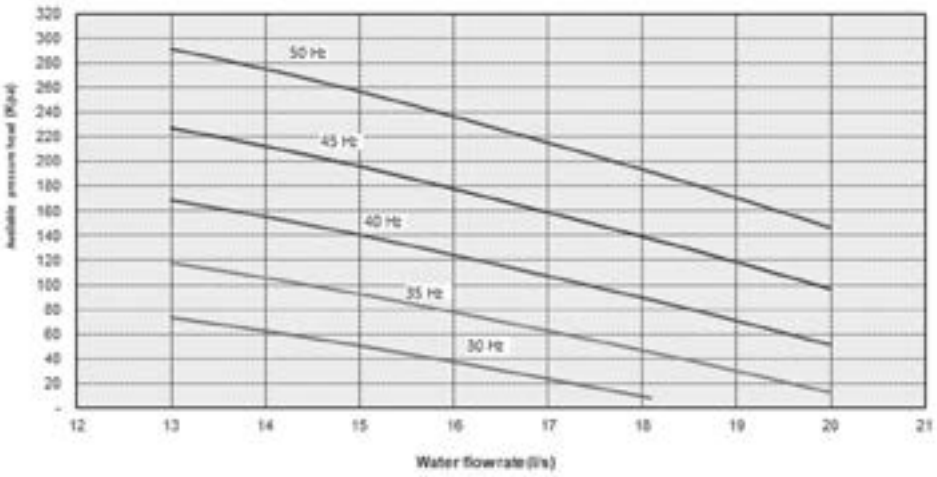
8 - Technical Data (continued)

Available pressure head - SYSCROLL AIR EVO CO/HP
High pressure pump (1/2PHP) (continued)

SYSCROLL 330 AIR EVO CO/HP

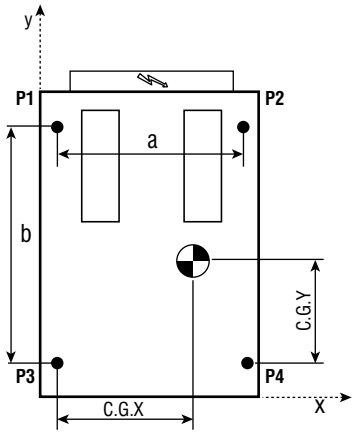


SYSCROLL 360 AIR EVO CO/HP



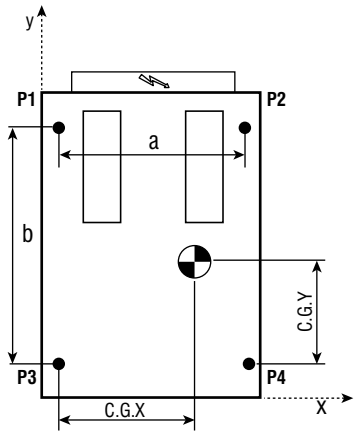
8 - Technical Data (continued)

8.5 Position of shock adsorbers and weight distribution on supports



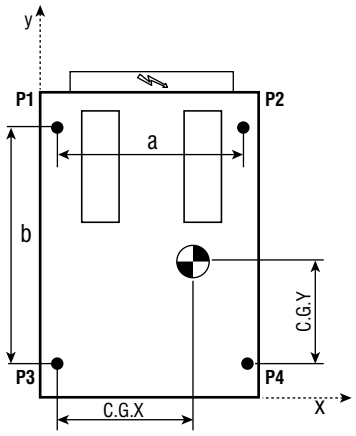
SYS CO	Weight distribution (kg)				Operating weight (kg)	Shipping weight (kg)	P1-P4 coordinates		CG coordinates	
	P1	P2	P3	P4			a (mm)	b (mm)	x (mm)	y (mm)
140	361	343	250	232	1187	1169	1020	2680	529	2251
170	380	362	253	235	1230	1213	1020	2680	530	2277
230	609	576	271	238	1693	1665	2070	2056	1047	1969
260	698	645	300	247	1890	1859	2070	2056	1028	1997
280	742	659	317	234	1953	1922	2070	2056	999	2012
300	802	751	363	311	2227	2089	2070	3060	1040	2670
330	839	817	355	334	2345	2206	2070	3060	1068	2697
360	925	903	357	335	2519	2380	2070	3060	1069	2756
140 1P-SP	368	349	278	259	1253	1225	1020	2680	529	2192
170 1P-SP	387	368	280	261	1296	1268	1020	2680	530	2220
230 1P-SP	607	577	344	314	1842	1797	2070	2056	1054	1854
260 1P-SP	696	646	373	323	2039	1992	2070	2056	1036	1889
280 1P-SP	740	660	390	311	2101	2054	2070	2056	1009	1906
300 1P-SP	788	760	440	412	2400	2239	2070	3060	1062	2510
330 1P-SP	825	826	433	434	2517	2357	2070	3060	1088	2542
360 1P-SP	911	911	434	435	2691	2530	2070	3060	1087	2608
140 2P-SP	366	360	286	280	1291	1263	1020	2680	540	2166
170 2P-SP	385	379	288	282	1334	1306	1020	2680	541	2193
230 2P-SP	593	590	369	366	1918	1857	2070	2056	1084	1802
260 2P-SP	683	659	399	375	2115	2052	2070	2056	1064	1840
280 2P-SP	727	673	415	362	2177	2114	2070	2056	1036	1858
300 2P-SP	769	778	466	475	2488	2313	2070	3060	1095	2439
330 2P-SP	805	844	459	498	2606	2431	2070	3060	1118	2473
360 2P-SP	892	930	460	498	2780	2605	2070	3060	1116	2541
140 1P-SP T	380	361	471	452	1665	1315	1020	2680	533	1854
170 1P-SP T	399	380	474	455	1708	1358	1020	2680	534	1883
230 1P-SP T	729	508	712	491	2440	1898	2070	2056	901	1579
260 1P-SP T	817	573	746	502	2637	2093	2070	2056	895	1619
280 1P-SP T	861	587	763	489	2699	2155	2070	2056	877	1639
300 1P-SP T	902	677	814	589	2983	2331	2070	3060	931	2156
330 1P-SP T	939	743	807	611	3100	2448	2070	3060	956	2196
360 1P-SP T	906	918	719	731	3274	2622	2070	3060	1095	2241
140 2P-SP T	378	372	479	473	1703	1353	1020	2680	541	1841
170 2P-SP T	397	391	482	476	1746	1396	1020	2680	542	1870
230 2P-SP T	723	516	742	535	2517	1959	2070	2056	918	1549
260 2P-SP T	804	585	772	553	2714	2154	2070	2056	920	1588
280 2P-SP T	848	599	789	540	2776	2216	2070	2056	902	1608
300 2P-SP T	887	692	832	637	3048	2382	2070	3060	954	2121
330 2P-SP T	923	758	825	660	3166	2500	2070	3060	979	2161
360 2P-SP T	1010	843	827	660	3340	2674	2070	3060	984	2234
140 1P-HP	369	350	281	262	1262	1234	1020	2680	529	2186
170 1P-HP	388	368	284	265	1305	1277	1020	2680	530	2213
230 1P-HP	605	579	352	326	1862	1817	2070	2056	1059	1839
260 1P-HP	694	648	382	336	2059	2012	2070	2056	1040	1876
280 1P-HP	738	662	399	323	2121	2074	2070	2056	1013	1893
300 1P-HP	785	762	457	434	2438	2277	2070	3060	1068	2479
330 1P-HP	822	828	449	456	2556	2395	2070	3060	1092	2512
360 1P-HP	908	914	451	457	2730	2569	2070	3060	1091	2578
140 2P-HP	366	363	291	288	1309	1281	1020	2680	543	2154
170 2P-HP	385	382	294	291	1352	1324	1020	2680	543	2182
230 2P-HP	588	596	390	399	1973	1912	2070	2056	1096	1767
260 2P-HP	677	665	420	408	2170	2107	2070	2056	1075	1807
280 2P-HP	721	679	437	395	2232	2169	2070	2056	1048	1826
300 2P-HP	764	783	480	500	2526	2351	2070	3060	1103	2410
330 2P-HP	800	849	473	522	2644	2469	2070	3060	1126	2445
360 2P-HP	886	935	474	523	2818	2643	2070	3060	1123	2514

8 - Technical Data (continued)



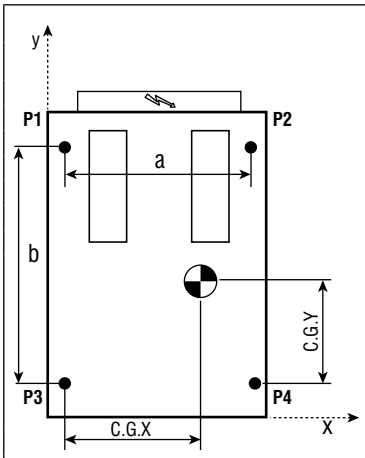
SYS CO	Weight distribution (kg)				Operating weight (kg)	Shipping weight (kg)	P1-P4 coordinates		CG coordinates	
	P1	P2	P3	P4			a (mm)	b (mm)	x (mm)	y (mm)
140 1P-HP T	382	362	475	456	1674	1324	1020	2680	533	1851
170 1P-HP T	401	381	478	458	1717	1367	1020	2680	534	1880
230 1P-HP T	645	582	651	589	2467	1926	2070	2056	1035	1559
260 1P-HP T	815	574	758	517	2665	2120	2070	2056	900	1608
280 1P-HP T	859	589	775	505	2727	2183	2070	2056	882	1627
300 1P-HP T	900	679	830	609	3018	2366	2070	3060	936	2137
330 1P-HP T	936	745	823	632	3136	2484	2070	3060	961	2177
360 1P-HP T	903	921	734	751	3310	2658	2070	3060	1098	2223
140 2P-HP T	379	376	485	482	1721	1371	1020	2680	543	1836
170 2P-HP T	398	395	487	484	1764	1414	1020	2680	543	1864
230 2P-HP T	716	523	755	562	2556	1999	2070	2056	932	1533
260 2P-HP T	799	590	786	578	2753	2194	2070	2056	930	1573
280 2P-HP T	843	605	803	565	2815	2256	2070	2056	912	1593
300 2P-HP T	881	697	849	665	3093	2427	2070	3060	964	2098
330 2P-HP T	917	763	842	688	3211	2545	2070	3060	988	2138
360 2P-HP T	999	854	864	719	3435	2769	2070	3060	1000	2186

8 - Technical Data (continued)

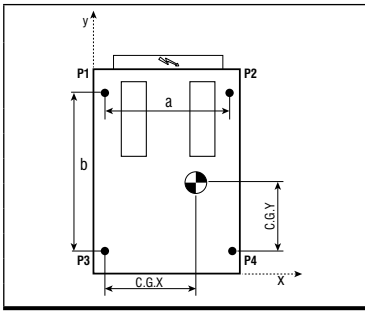


SYS HP	Weight distribution (kg)				Operating weight (kg)	Shipping weight (kg)	P1-P4 coordinates		CG coordinates	
	P1	P2	P3	P4			a (mm)	b (mm)	x (mm)	y (mm)
140	402	387	283	268	1342	1324	1020	2680	534	2238
170	421	406	286	271	1385	1367	1020	2680	534	2262
230	747	710	329	292	2078	2049	2070	2056	1050	1977
260	863	799	372	309	2343	2312	2070	2056	1031	1994
280	923	846	383	306	2458	2427	2070	2056	1022	2016
300	965	917	434	386	2702	2564	2070	3060	1050	2667
330	1027	1006	437	417	2887	2748	2070	3060	1073	2691
360	1114	1093	439	418	3063	2925	2070	3060	1073	2740
140 1P-SP	409	393	311	295	1408	1380	1020	2680	534	2187
170 1P-SP	428	412	314	298	1451	1423	1020	2680	534	2211
230 1P-SP	745	711	402	368	2226	2181	2070	2056	1056	1880
260 1P-SP	860	800	445	386	2491	2444	2070	2056	1037	1906
280 1P-SP	921	847	456	382	2606	2559	2070	2056	1029	1931
300 1P-SP	951	926	512	486	2875	2714	2070	3060	1069	2534
330 1P-SP	1013	1015	514	517	3059	2898	2070	3060	1089	2564
360 1P-SP	1100	1101	517	518	3236	3075	2070	3060	1088	2618
140 2P-SP	407	404	319	316	1446	1418	1020	2680	543	2163
170 2P-SP	426	423	321	319	1489	1461	1020	2680	543	2188
230 2P-SP	731	724	427	420	2303	2242	2070	2056	1080	1835
260 2P-SP	847	814	470	437	2568	2505	2070	2056	1060	1866
280 2P-SP	907	860	481	434	2683	2620	2070	2056	1051	1891
300 2P-SP	932	945	537	550	2963	2789	2070	3060	1096	2474
330 2P-SP	993	1034	540	581	3148	2973	2070	3060	1114	2507
360 2P-SP	1081	1120	542	582	3324	3150	2070	3060	1112	2562
140 1P-SP T	422	406	504	489	1820	1470	1020	2680	536	1878
170 1P-SP T	440	425	507	491	1863	1513	1020	2680	536	1904
230 1P-SP T	865	637	775	547	2825	2283	2070	2056	920	1630
260 1P-SP T	981	727	818	564	3090	2546	2070	2056	917	1672
280 1P-SP T	1041	774	828	561	3205	2661	2070	2056	914	1701
300 1P-SP T	1065	843	886	664	3458	2806	2070	3060	954	2225
330 1P-SP T	1127	932	889	694	3642	2990	2070	3060	977	2266
360 1P-SP T	1214	1018	891	695	3819	3167	2070	3060	981	2325
140 2P-SP T	419	417	512	510	1858	1508	1020	2680	544	1866
170 2P-SP T	438	436	515	512	1901	1551	1020	2680	544	1892
230 2P-SP T	853	650	801	598	2901	2344	2070	2056	942	1601
260 2P-SP T	968	739	844	615	3167	2607	2070	2056	937	1645
280 2P-SP T	1029	786	855	612	3282	2722	2070	2056	934	1673
300 2P-SP T	1050	858	904	712	3523	2857	2070	3060	974	2193
330 2P-SP T	1111	947	907	742	3708	3042	2070	3060	995	2235
360 2P-SP T	1199	1033	909	743	3884	3218	2070	3060	999	2294
140 1P-HP	410	394	314	298	1417	1389	1020	2680	533	2181
170 1P-HP	429	413	317	301	1460	1432	1020	2680	534	2205
230 1P-HP	743	713	411	381	2247	2202	2070	2056	1059	1868
260 1P-HP	858	802	454	398	2512	2465	2070	2056	1041	1895
280 1P-HP	919	849	464	395	2627	2580	2070	2056	1032	1920
300 1P-HP	948	929	528	508	2913	2752	2070	3060	1073	2507
330 1P-HP	1010	1018	531	539	3097	2936	2070	3060	1092	2539
360 1P-HP	1097	1104	533	540	3274	3113	2070	3060	1091	2593
140 2P-HP	407	408	324	324	1464	1436	1020	2680	545	2153
170 2P-HP	426	427	327	327	1507	1479	1020	2680	545	2177
230 2P-HP	726	730	449	453	2357	2296	2070	2056	1091	1805
260 2P-HP	841	819	492	470	2622	2559	2070	2056	1070	1838
280 2P-HP	902	866	502	467	2737	2674	2070	2056	1060	1864
300 2P-HP	927	950	551	574	3002	2827	2070	3060	1103	2449
330 2P-HP	988	1039	554	605	3186	3011	2070	3060	1120	2483
360 2P-HP	1075	1125	556	606	3363	3188	2070	3060	1118	2538

8 - Technical Data (continued)



SYS HP	Weight distribution (kg)				Operating weight (kg)	Shipping weight (kg)	P1-P4 coordinates		CG coordinates	
	P1	P2	P3	P4			a (mm)	b (mm)	x (mm)	y (mm)
140 1P-HP T	423	407	508	492	1829	1479	1020	2680	536	1875
170 1P-HP T	442	426	511	495	1872	1522	1020	2680	536	1901
230 1P-HP T	864	639	787	562	2852	2310	2070	2056	924	1619
260 1P-HP T	979	729	830	579	3117	2573	2070	2056	921	1662
280 1P-HP T	1040	776	840	576	3232	2688	2070	2056	918	1691
300 1P-HP T	1063	845	901	684	3493	2841	2070	3060	958	2207
330 1P-HP T	1124	935	904	715	3678	3025	2070	3060	981	2249
360 1P-HP T	1211	1021	906	716	3854	3202	2070	3060	985	2308
140 2P-HP T	420	420	518	518	1876	1526	1020	2680	545	1861
170 2P-HP T	439	439	520	521	1919	1569	1020	2680	545	1887
230 2P-HP T	847	655	815	623	2941	2383	2070	2056	952	1586
260 2P-HP T	963	745	858	640	3206	2646	2070	2056	946	1631
280 2P-HP T	1023	792	869	637	3321	2761	2070	2056	943	1660
300 2P-HP T	1044	864	921	740	3568	2902	2070	3060	982	2172
330 2P-HP T	1105	953	923	771	3752	3086	2070	3060	1003	2214
360 2P-HP T	1188	1044	946	802	3979	3313	2070	3060	1012	2252

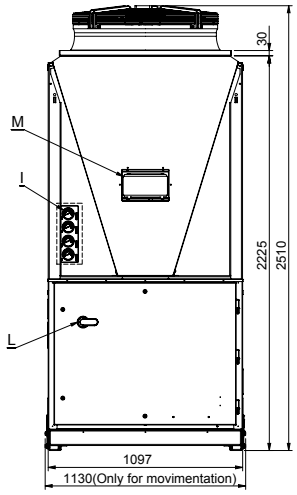


SYS RE	Weight distribution (kg)				Shipping weight (kg)	P1-P4 coordinates		CG coordinates	
	P1	P2	P3	P4		a (mm)	b (mm)	x (mm)	y (mm)
140	349	349	219	219	1137	1020	2680	545	2300
170	368	368	222	222	1180	1020	2680	545	2326
230	530	500	271	242	1542	2070	2056	1047	1909
260	673	621	242	190	1726	2070	2056	1026	2060
280	716	635	259	177	1788	2070	2056	993	2090
300	734	684	289	239	1946	2070	3060	1034	2766
330	769	750	281	261	2061	2070	3060	1067	2792
360	856	835	282	262	2235	2070	3060	1068	2851

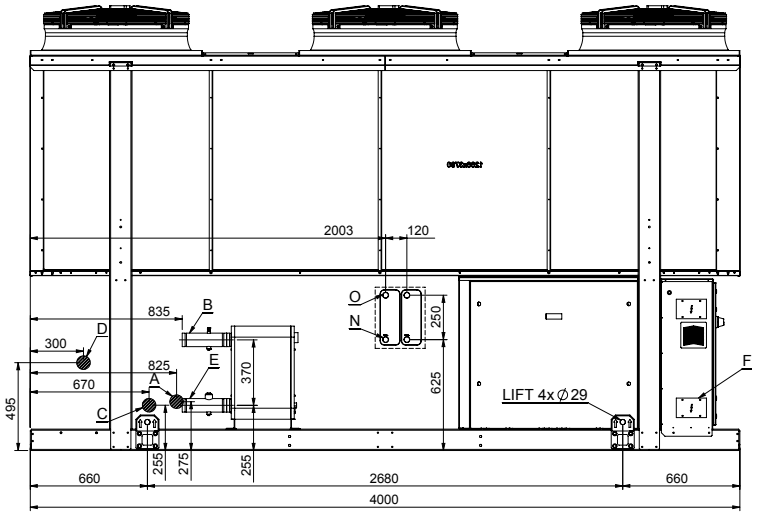
8 - Technical Data (continued)

8.6 Dimensions SYSCROLL AIR EVO 140-170

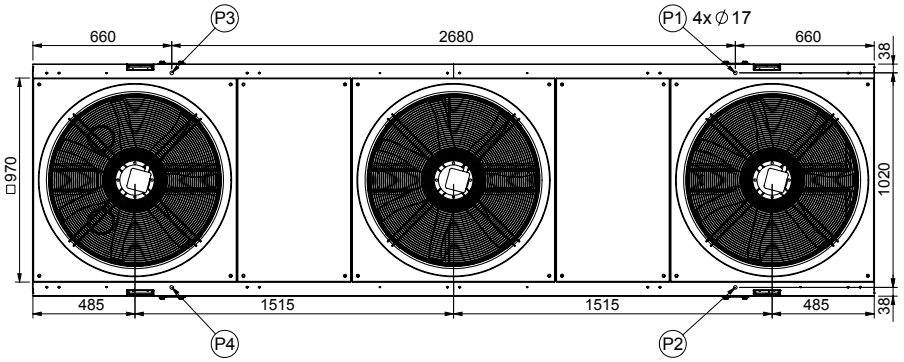
Front view



Side view



Top view



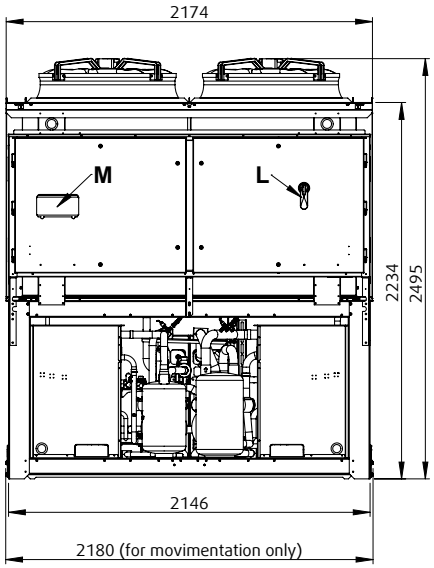
B,E	Water connections 2 1/2" Gas M
A,C,D*	Water connections 2" 1/2 Victaulic Ø 76,1mm * 150mm Victaulic to thread connection (supplied loose)
F	Electrical power supply
I	Gauge kit (Accessory)
L	Main switch
M	Control keypad / display
N	Optional desuperheater water inlet Ø 1" Gas male
O	Optional desuperheater water outlet Ø 1" Gas male
P1,P2,P3,P4	Anti-vibration mount position

Hydraulic option	Water in	Water out
STD	B	E
1P/2P	A	C
1PT/2PT	A	D

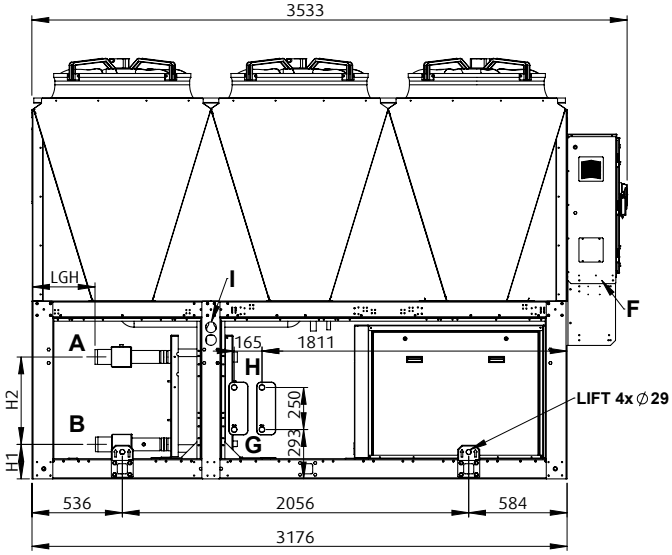
8 - Technical Data (continued)

Dimensions SYSCROLL AIR EVO 230-280

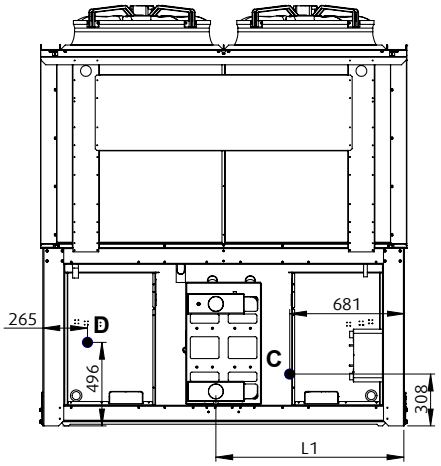
Front view



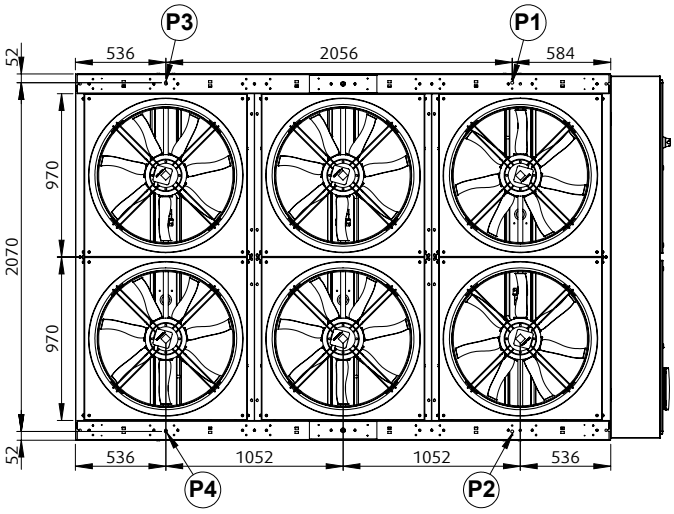
Side view



Back view



Top view



A,B,C,D	Water connections
F	Electrical power supply
I	Gauge kit (Accessory)
L	Main switch
M	Control keypad / display
G	Optional desuperheater water inlet Ø 1" Gas male
H	Optional desuperheater water outlet Ø 1" Gas male
P1,P2,P3,P4	Anti-vibration mount position

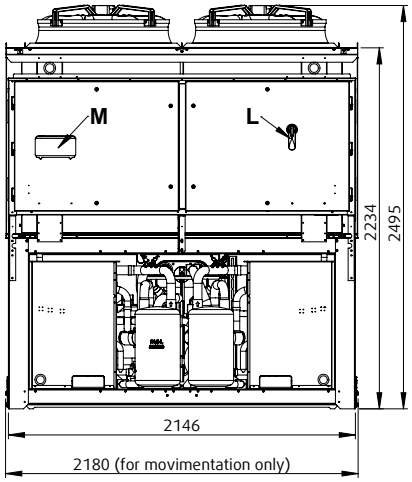
Size	H1	H2	LGH	L1
200	246	370	440	1073
230-260-280	205	520	374	1119

Hydraulic option	Water in	Water out	Size	
			200	230-260-280
STD	B	E	2"1/2 GAS M	3" GAS M
1P/2P	A	C		
1PT/2PT	A	D		
Desuperheat.	G	H	1" GAS M	

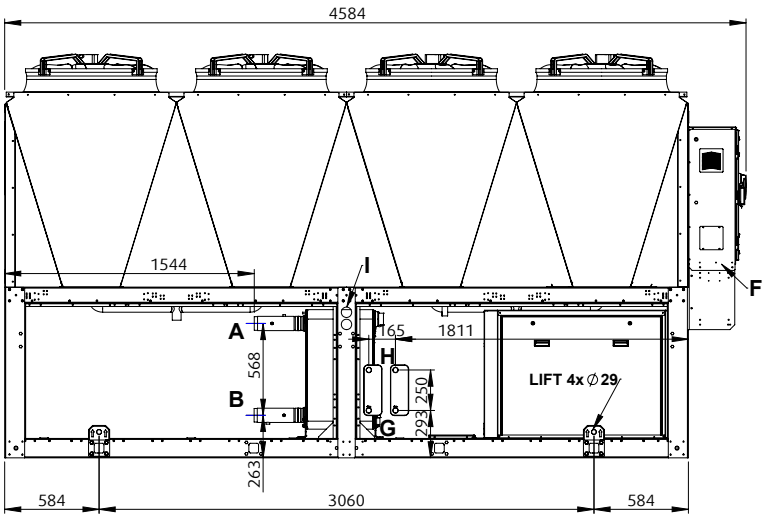
8 - Technical Data (continued)

Dimensions SYSCROLL AIR EVO 300-360

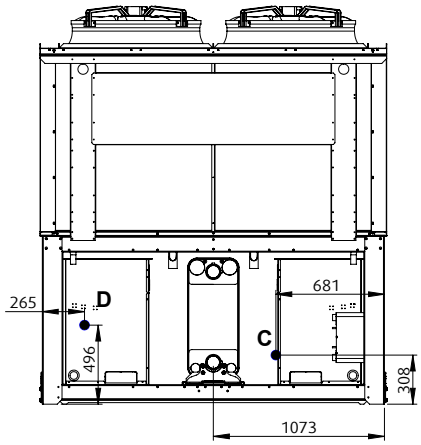
Front view



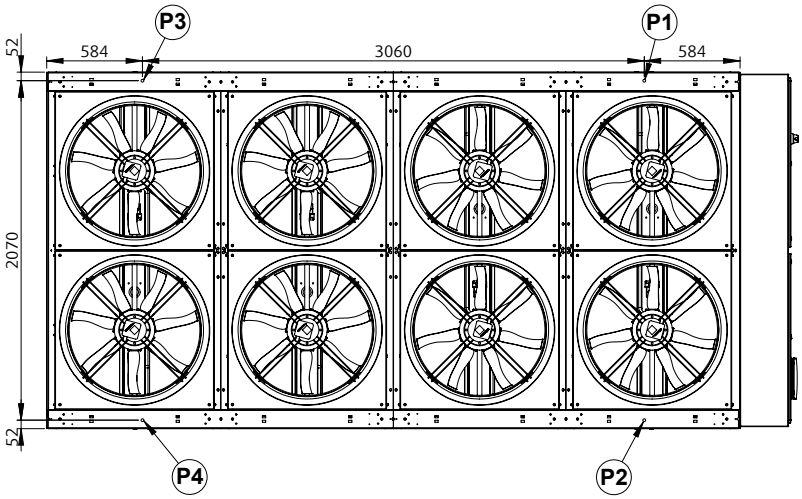
Side view



Back view



Top view



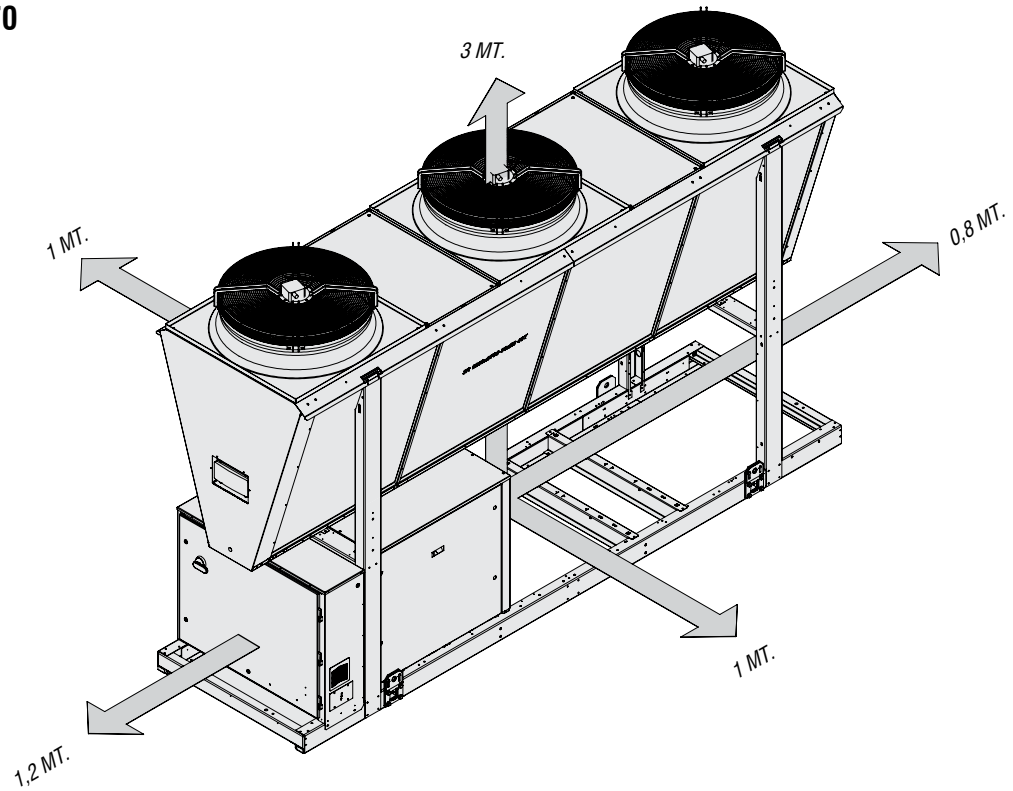
A,B,C,D	Water connections
F	Electrical power supply
I	Gauge kit (Accessory)
L	Main switch
M	Control keypad / display
G	Optional desuperheater water inlet Ø 1" Gas male
H	Optional desuperheater water outlet Ø 1" Gas male
P1,P2,P3,P4	Anti-vibration mount position

Hydraulic option	Water in	Water out	Size
STD	A	B	3"GAS M
1P/2P	C	D	
1PT/2PT	C	D	
Desuperheat.	G	H	1"GAS M

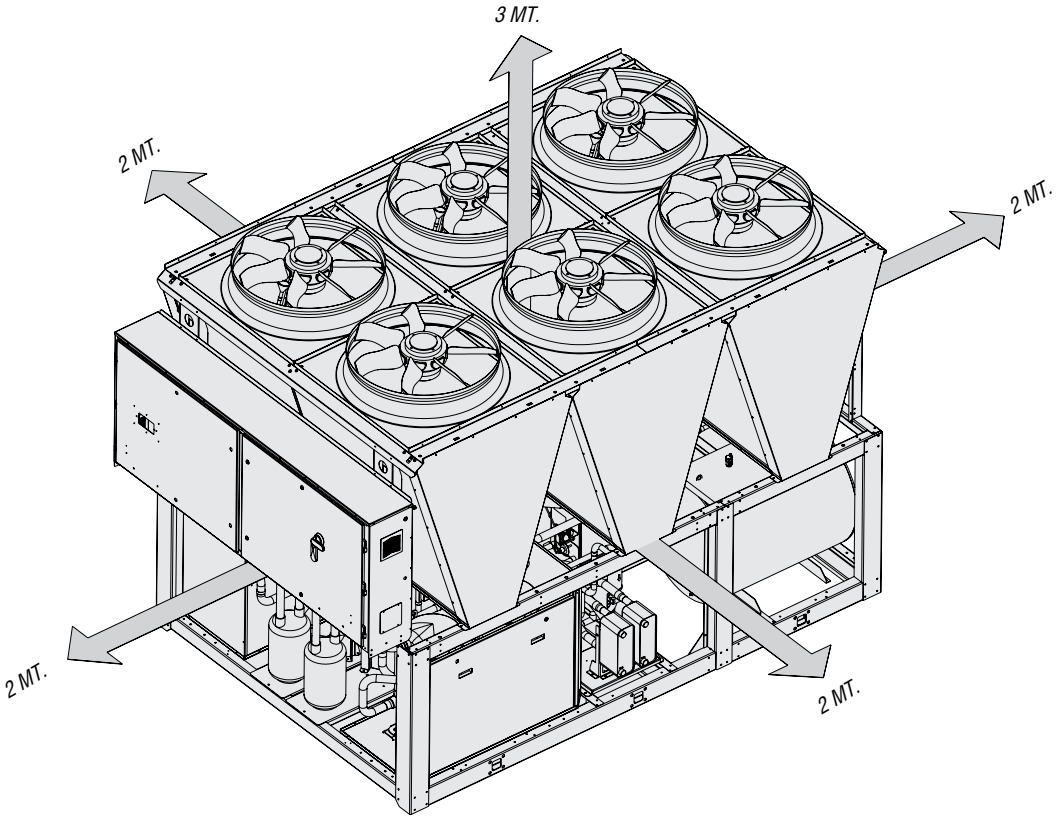
8 - Technical Data (continued)

8.7 Space requirements

Unit 140-170



Unit 230-360



9 - Maintenance

Carefully read the "Safety" section of this manual before carrying out any maintenance operations.

Do not discharge the refrigerant into the atmosphere while the refrigeration circuits are being drained. Use appropriate recovery equipment.

When the recovered refrigerant cannot be re-used, return it to the manufacturer.

Do not throw away the waste oil of the compressor, because it contains refrigerant in solution.

The waste oil must be returned to the manufacturer.

Unless otherwise specified, the operations described below may be carried out only by a trained maintenance operator.

9.1 General requirements

Units have been designed for continuous operation, providing that they are subjected to regular maintenance, within the limits specified in this manual. Each unit must be serviced according to the programme by the User/Customer, and must be inspected at regular intervals by the personnel of one authorised Service Centers.

It is the responsibility of the User to meet these maintenance requirements and/or to enter into an agreement with one of authorised Service Centers, so as to properly safeguard the operation of the appliance.

During the warranty period, in case of damage or failures caused by improper maintenance, manufacturer will not refund the costs incurred to repair the appliance in its original state.

The provisions of this section apply only to standard units; according to the order requirements, other documentation may be added, concerning any modifications or supplementary accessories.

9.2 Planned maintenance

Maintenance inspections must be carried out according to the program below, by a qualified person.

As a general rule, units cannot be repaired directly by the user, who shall not try to service or repair any failures or anomalies identified during daily inspections. If you are in doubt, please contact authorised Service Centre.

Operations	Daily	Weekly	Monthly	Beginning of season	End of season
Check the temperature of the leaving fluid	●				
Check the pressure drops in the heat exchanger		●			
Check for electric absorption		●			
Check suction pressure and temperature		●			
Check delivery pressure and temperature		●			
Check the oil level in the compressor		●			
Check that there are no gas bubbles in the liquid line		●			
Check that the fins of the external coil are clean (if any)			●		
Check the operation of the oil heaters			●		
Check the remote control switches			●		
Check the operation of the LP pressure switch				●	
Check the operation of the HP pressure switch				●	
Check the insulation of the heat exchanger				●	
Check that terminals are tightened				●	
Check that the terminals' screws are tightened				●	
Clean the exterior of the unit with water and soap				●	
Check the density of the antifreeze (if any)				●	●
Check the operation of the flow switches				●	
Check the operation of the solenoid valve				●	●

9 - Maintenance (continued)

9.3 Refrigerant charge

Do not inject refrigerant liquid into the LP side of the circuit. Be very careful, and charge the circuit properly. If the charge is insufficient, the efficiency of the unit will be lower than expected. (In the worst of cases the LP transducer may stop the unit.)

In the presence of an excess charge, the condensing pressure will rise (in the worst of cases, the HP pressure switch may be activated, resulting in the stop of the equipment), and the consumption will increase as well.

It is strictly forbidden to use the compressor as a vacuum pump to drain the plant.

Fill the refrigeration circuit after it has been drained for maintenance purposes (leaks, replacement of the compressor etc.). The amount of the charge is indicated on the plate affixed to the unit.

Before refilling, it is important to drain and de-hydrate the circuit, thus obtaining a minimum abs. pressure value of 50 Pa.

Inject the refrigerant fluid before removing the vacuum, then fill the circuit up to 90% of the total gas requirement (in liquid form). The appliance must be filled through the filling valve on the liquid line, on the outlet side of the condenser.

It is recommended to connect the refrigerant cylinder to the filling valve on the liquid line, and to arrange it in such a way as to inject only liquid refrigerant.

9.4 Compressor

Compressors are delivered with the necessary charge of lubricating oil. During normal operation, this charge is sufficient for the whole life of the unit, providing that the efficiency of the refrigeration circuit is satisfactory and if it has not been overhauled.

If the compressor needs to be replaced (following a mechanical failure or if burnt), contact one of authorised Service Centers.

Compressors use polyester oil. During maintenance operations on the compressor, or if you have to open the refrigerant circuit in any point, remember that this type of oil is highly hygroscopic, and accordingly it is important that it is not left exposed to the weather for prolonged periods, as this would require the replacement of the oil.

In a few cases, the polyester oil may be present also in R22 units (a refrigerant that can be used also in extra UE countries).

9.5 Condenser

The condenser's coils consist of copper pipes and aluminium fins. In the presence of leaks caused by any damage or shock, the coils shall be repaired or replaced by one of authorised Service Centers. To ensure the effective and correct operation of the condenser coils, it is important to keep the condenser's surface perfectly clean, and to check that there is no foreign matter, such as leafs, wires, insects, waste etc. If the coil becomes dirty, there is an increase in the absorption of electric energy. Furthermore, the maximum pressure alarm may be activated and may halt the unit.

Be careful not to damage the aluminium fins during cleaning.

The condenser must be cleaned with a LP compressed air jet, parallel to the aluminium fins, in the direction opposite to the air circulation.

To clean the coil you can use also a vacuum cleaner, or a jet of water and soap.

9.6 Fans

The fans of the condenser, of axial type, are complete with impeller with aerodynamic profile blades and a cylindrical nozzle. The motor's bearings are lubricated forever.

9.7 Dehydrating filter

The refrigeration circuits are provided with dehydrating filters.

The filter clogging is marked by the presence of air bubbles in the sight glass, or by the difference between the temperatures measured downstream from and upstream of the drying filter. If, once the cartridge has been cleaned, there are still some air bubbles, the appliance has lost a part of the refrigerant charge in one or more points, that must be identified and serviced.

9.8 Sight glass

The sight glass is used for inspecting the refrigerant flow and the humidity % of the refrigerant. The presence of bubbles indicates that the dehydrating filter is clogged or the charge insufficient.

A colour indicator is positioned inside the sight glass. If you compare the colour of the indicator to the scale on the ring of the sight glass, you can calculate the percentage of humidity of the refrigerant. If it is excessive, replace the filter's cartridge, operate the appliance for 1 day and then check the humidity % again. When the humidity % is within the pre-determined range, no other operations are required. If the humidity % is still too high, replace the dehydrating filter again, start the unit and operate it for another day.

9 - Maintenance (continued)

9.9 Electronic Expansion Valve

The circuit of the unit is equipped with electronic expansion valve, with external equalizer The valve is shop-calibrated for an overheating of 5°C.

Procedure to check for overheating:

- Measure the suction pressure with the pressure gauges on the board of the unit o using a pressure gauge connected to the service valve on the suction side.

- From the pressure gauge's temperature scale, measure the saturated suction temperature (Tsa) which corresponds to the pressure value.

- Using a contact pressure gauge affixed to the outlet fitting of the gas of the evaporator, measure the actual temperature (Tse).

Overheating calculation (S):

S = Tse - Tsa

Overheating is regulated through the electronic expansion valve.

If the expansion valve cannot be regulated, it is probably broken, and shall be replaced. The replacement must be carried out by a Service Centre.

9.10 Evaporator

Check at regular intervals that the water side of the heat exchanger is perfectly clean. To do this, measure the pressure drop, water side (see Section 8) or measure the temperature of the liquid leaving and entering the heat exchanger, and compare it to the evaporation temperature.

To obtain an effective heat exchange, the difference between the temperature of the leaving water and the saturated evaporating temperature must be in the 2 - 4°C range. A greater difference would indicate a low efficiency of the heat exchanger (i.e. the heat exchanger is dirty).

In this case, the heat exchanger must be subjected to chemical cleaning, an operation that shall be carried out by authorised engineers.

For other maintenance operations (extraordinary overhauling, replacement of the heat exchanger etc.), contact an authorised Service Centre.

10 - Troubleshooting

The table below lists the anomalies of operation of the unit, the relevant causes and the corrective measures. For anomalies of any other type or not listed, contact one of authorised Service Centre for technical assistance.

Anomaly	Cause	Operation
The unit continues to work, but without cooling	Insufficient charge of refrigerant.	Refill.
	The dehydrating filter is clogged.	Replace.
Ice on the suction line	Wrong calibration of overheating.	Increase overheating.
		Check the charge.
Excessive noise	Vibration of lines.	Check the clamping brackets, if any.
	Whistler emitted by the thermostatic expansion valve.	Refill.
		Check the dehydrating filter.
	Noisy compressor.	Seized bearings; replace the compressor.
		Check that the compressor's locknuts are tightened.
Low oil level in the compressor	One or more gas or oil leaks in the circuit.	Identify and remove leaks.
	Mechanical failure of the compressor.	Request the intervention of a Service Centre.
	Anomaly of the oil heater of the compressor's base.	Check the electric circuit and the resistor of the heater of the motor base, and replace defective components.
One or both compressors are not working	Breaking of the electric circuit.	Check the electric circuit and detect any ground dispersions and short circuits. Check fuses.
	Intervention of the HP pressure switch.	Reset the pressure switch and the control panel and restart the appliance. Identify and remove the cause that enabled the pressure switch.
	The fuse of the control circuit is broken.	Check for ground dispersions and short circuits. Replace fuses.
	Loosened terminals.	Check and tighten.
	Halt caused by thermal overload of the electric circuit.	Check the operation of check and safety devices. Identify and remove the cause.
	Wrong wiring.	Check wiring of check and safety devices.
	The line voltage is too low.	Check voltage. If problems regard the system, solve them. If they are caused by the distribution network, inform the Energy Distributor.
	Short-circuit of the compressor's motor.	Check the continuity of the winding.
	Seized compressor.	Replace the compressor.
Activation of the LP alarm, stop of the unit	Gas leak.	Identify and remove the leak.
	Insufficient charge.	Refill.
	Failure of the pressure switch.	Replace the pressure switch.
Activation of the HP alarm, stop of the unit	Failure of the pressure switch.	Check the operation of the pressure switch, replace it if defective.
	The delivery valve is partially closed.	Open the valve and replace it, if faulty.
	Substances with condensable gases in the circuit.	Drain the circuit.
	The fan of the condenser is stopped.	Check cables and motor. If defective, repair or replace.
The liquid line is too hot	Insufficient charge.	Identify and remove the cause of the loss of charge and refill.
Frosting of the liquid line	The valve of the liquid line is partially closed.	Check that valves are open.
	The liquid filter is clogged.	Replace the cartridge or the filter.

11 - Spare Parts

11.1 Spare part list

The table below shows the list of spare parts recommended during the first two years of operation.

Component	Number
Fan	1
Flow switch	1
High pressure transducer	1
Low pressure transducer	1
Expansion valve	1
Gas filter	1
4 way valve	1
Electronic main board	1
Auxiliary circuit trasformer	1
Compressor contactor	2
Pump contactor	1
Water sensor	4
Air sensor	1
Auxiliary contact	4
Driver EEV	1
Fuses	4

11.2 Oil for compressors

The compressors are lubricated with polyester oil (P.O.E.).

11.3 Wiring diagrams

The wiring diagrams are installed inside the doors of the electrical panels of the unit. Any request for wiring diagrams shall be forwarded to manufacturer's Service Centre.

12 - Dismantling, Demolition and Scrapping

During the draining of the refrigeration circuits, do not let the refrigerant overflow in the surrounding atmosphere.

The circuit must be drained using suitable recovery equipment.

Do not disperse the waste oil of the compressors in the environment, since it contains some dissolved refrigerant.

For the disposal, contact the competent authority for information.

Unless otherwise specified, the maintenance operations listed below may be carried out by any trained maintenance operator.

12.1 Generalities

Open each line that supplies the unit, including the ones of control circuits. Make sure that all disconnecting switches are secured in the off position. The power cables can be disconnected and disassembled. Refer to Chapter 4 for the position of connection points.

Remove all the refrigerant from the refrigeration circuits of the unit and store it in suitable containers, using a recovery unit. If its characteristics have remained the same, the refrigerant can be used again. Contact the competent authority to obtain information about disposal. In **NO** event shall the refrigerant be discharged into the atmosphere. The oil in each refrigeration circuit must be drained and collected into a suitable container; then it shall be disposes of in conformity with local regulations that apply to the disposal of waste lubricants. Any oil spillage must be recovered and disposed of in like manner.

Isolate the unit's heat exchangers from the external hydraulic circuits and drain the heat exchange sections of the plant.

If no shutoff valves have been provided, it may be necessary to drain the whole plant.

If a glycoled solution or a similar fluid has been used in the hydraulic circuits, or if chemical additives have been added to the circulating water, the circulating fluid MUST be drained in a proper way.

For NO reason shall a circuit containing glycoled water or a similar solution be discharged directly into the drains or surface waters.

After draining operations, the piping of the hydraulic networks can be disconnected and disassembled.

Once they have been disconnected as specified, the packaged units can be disassembled in a single piece. First of all, disassemble the anchoring screws and then lift the unit from the position of installation, and hook it to the lifting points provided, using suitable lifting equipment.

To this end, refer to Chapter 4 for the installation of these appliances, to Chapter 8 for their weights and Chapter 3 for handling.

The units that, once disconnected, cannot be removed in a single piece, must be dismantled on site; in this case, be very careful with the weight and handling of every single component.

It is always advisable to dismantle the units following the installation steps, but in reverse.

Some residues of oil, glycoled water or similar solutions may remain in certain parts of the unit. These residues must be recovered and disposed of according to the procedures specified above.

It is very important to ensure that, while a component of the unit is being removed, all the others are properly supported.

Use only lifting means of adequate capacity.

Once disassembled, the components of the unit can be disposed of in conformity with current regulations.

12.2 RAEE Directive (only UE)

- The RAEE Directive requires that the disposal and recycling of electrical and electronic equipment must be handled through a special collection, in appropriate centers, separate from that used for the disposal of mixed urban waste.
- The user has the obligation not to dispose of the equipment at the end of the useful life as municipal waste, but to send it to a special collection center.
- The units covered by the RAEE Directive are marked with the symbol shown above.
- The potential effects on the environment and human health are detailed in this manual.

Notes

Notes

Notes

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