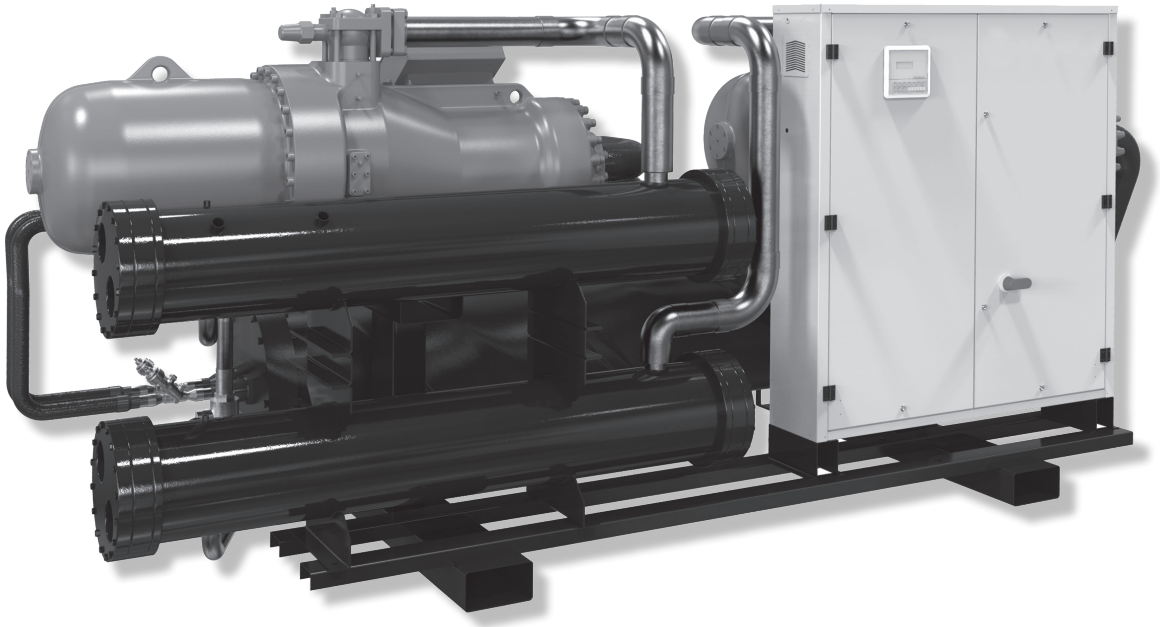
Installation and maintenance manual
Manuel d'installation et de maintenance
Installations- und Wartungshandbuch
Manuale di installazione e di manutenzione
Manual de instalación y de mantenimiento

SYSCREW 440-1550
WATER EVO CO/HP/RC



English | Français | Deutsch | Italiano | Español

410 ↓ 1.460 kW

470 ↓ 1.650 kW

r134a

R513A

Water/water Cooled Screw Chillers
Réfrigérateurs Froid Seulement eau/eau à compresseurs à vis
Wassergekulte Wasserkühler mit Schraubenkompressoren
Refrigeratori Solo Freddo acqua/acqua con compressori a vite
Refrigeradores Sólo Frío agua/agua con compresores a tornillo

Part number / Code / Code / Codice / Código: **367236/H**
Supersedes / Annule et remplace / Annulliert und ersezt / Annulla e sostituisce / Anula y sustituye: **367236/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.

This manual and its contents, as well as the documentation which accompanies the unit, are and remain the property of manufacturer, which reserves any and all rights thereon. This manual may not be copied, in whole or in part, without manufacturer's written authorization.

2 - Safety

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 Compability 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 vessels directive).

- 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 RC units, with remote air 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 cooled coils (RC versions) or shell and tube condensers (CO / HP versions) without 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:

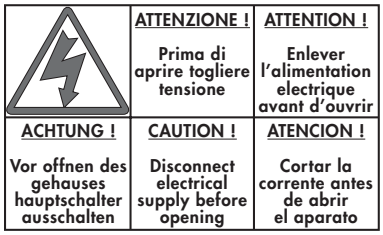
- do not scatter the fluids of the refrigeration circuit in the surrounding environment
- when replacing an eprom or electronic cards, use always suitable devices (extractor, antistatic bracelet, etc.)
- to replace a compressor, the evaporator, the condensing coils or any other weighty element, make sure that the lifting equipment is consistent with the weight to be lifted
- in units connected to a air remote condenser, 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

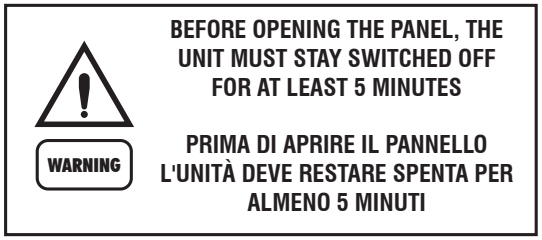
Identification of the refrigerant - External door

Electrical warning - Adjacent to the master switch

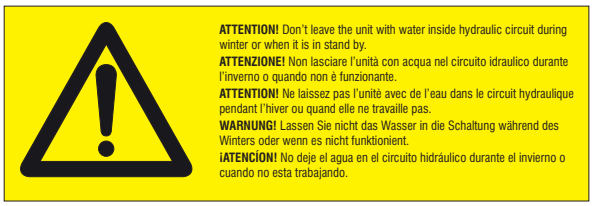


Read the instruction on the electrical board

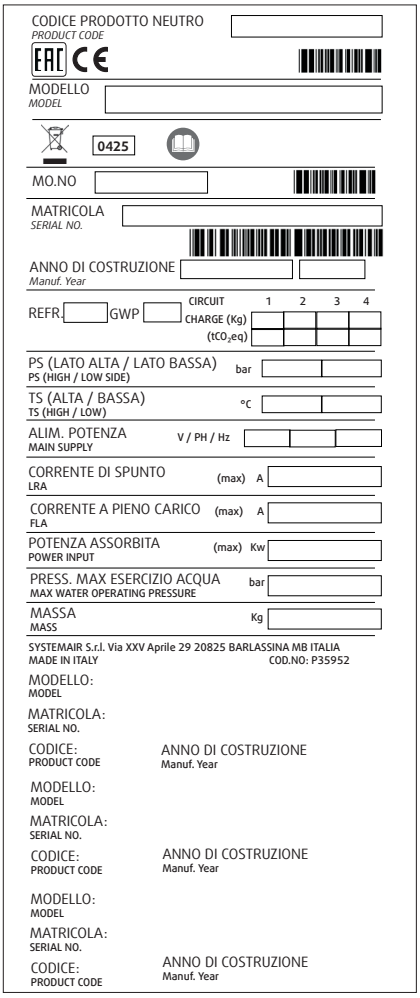
On the compressor box



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



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



Gravity centre - Base

Grounding connection on the electrical board, adjacent to the connection

2 - Safety (continued)

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

GB **ATTENTION: IMPORTANT NOTICE FOR COMMISSIONING**

Before the start up make sure:
- that the shipping protection has been removed
- that all gas shut off valves, compressor suction and discharge valves, liquid line valves have been opened- Note: open all shut off valves completely (loosen the stuffing nut, if necessary) and check the seal
- that all electrical circuit screws are well-tightened
- that there is no oil trace in the refrigerant circuit
- that the crankcase oil heater has been started at least 12 hours before the start-up (touch compressor body by one hand)
- the compressor oil level through the compressor sight glass
- the evaporator water flow rate and its pressure drop

I **ATTENZIONE: ISTRUZIONE PER IL PRIMO AVVIAMENTO**

Prima dell'avviamento verificare:
- Che la protezione di spedizione sia stata rimossa
- Che tutti i rubinetti del gas, mandata e aspirazione compressore,linea del liquido siano stati aperti (Nota: aprire completamente tutti i rubinetti (allentando se serve il premistoppa) e verificare la tenuta
- Che tutte le viti del circuito elettrico siano ben serrate
- Che non ci siano macchie di olio nel circuito frigorifero
- Che la resistenza olio del carter sia stata avviata almeno 12 ore prime dell'avviamento (toccare la base del compressore con una mano)
- Il livello olio dei compressori attraverso il vetro spia del compressore
- La corretta portata d'acqua all'evaporatore, e le sue perdite di carico

D **ACHTUNG: WICHTIGER INBETRIEBNAHME-HIN WEIS**

Vor der Inbetriebnahme bitte folgendes überprüfen:
- dass der Versandschutz entfernt worden ist;
- dass alle Gasventile, Förder- und Saugventile vom Kompressor und die Leitung der Flüssigkeit geöffnet worden sind (Anm.: bitte alle Ventile vollständig öffnen (wenn nötig, die Stopfbüchse lösen) und die Dichtigkeit prüfen
- dass alle Schrauben vom Stromkreis gut festgezogen sind
- dass kein Ölfleck im Kühlkreis vorhanden ist
- dass der Ölheizer vom Gehäuse wenigstens 12 Stunden vor der Inbetriebnahme gestartet worden ist (die Basis vom Kompressor mit einer Hand berühren)
- den Ölstand der Kompressoren durch das Schauglas vom Kompressor
- den richtigen Evaporator-Wasserdurchsatz und dessen Strömungsverluste

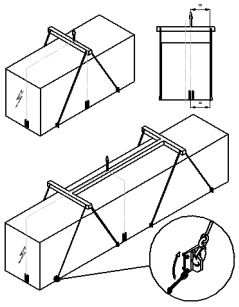
F **ATTENTION: INSTRUCTIONS POUR LA PREMIERE MISE EN ROUTE**

Avant le démarrage s'assurer:
- qu'on a enlevé la protection d'expédition
- qu'on a ouvert tous les robinets du gaz, de refoulement et aspiration du compresseur, ligne du liquide- Note: ouvrir complètement tous les robinets (desserrer le presse-étoupe si nécessaire) et vérifier l'étanchéité
- qu'on a bien serré tous les vis du circuit électrique
- qu'il n'y a pas de taches d'huile dans le circuit frigorifique
- qu'on a démarré la résistance huile du carter au moins 12 heures avant le démarrage (toucher la base du compresseur avec une main)
- le niveau huile des compresseurs à travers le regard du compresseur
- le débit correct de l'eau à l'évaporateur et ses pertes de charge

E **ATENCIÓN: INSTRUCCIONES PARA LA PRIMERA PUESTA EN MARCHA**

Antes de la puesta en marcha compruebe:
- Que la protección de envío se haya quitado
- Que todos los grifos del gas, descarga y aspiración compresor, líneas del líquido se hayan abierto (Nota: abra completamente todos los grifos (en su caso aflojando el prensaestopas) y compruebe la estanqueidad
- Que todos los tornillos de circuito eléctrico estén bien apretados
- Que no hayan manchas de aceite en el circuito de refrigeración
- Que la resistencia aceite del cárter se haya puesto en marcha al menos 12 horas antes del arranque (toque la base del compresor con una mano)
- El nivel de aceite de los compresores a través de la mirilla del compresor
- El caudal de agua correcto al evaporador, y sus pérdidas de carga

Instruction for the lifting



Fitting identification - Adjacent to fittings

EIN - INLET
ENTRÉE - ENTRATA
AUS - OUTLET
SORTIE - USCITA

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	

Warning - Safety valve vents	Warning - High temperature zone adjacent to hot pipes or components
	

2.8 Safety regulations

REFRIGERANT DATA	SAFETY DATA: R134a/R513A
R134a	ASHRAE Number: R134a Composition: R134a ASHRAE Safety classification: A1
R513A	ASHRAE Number: R513A Composition: HFO-1234yf /R134a ASHRAE Safety classification: A1
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	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	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	Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	Not specified

2 - Safety (continued)

2.8 Safety regulations (continued)

REFRIGERANT DATA	SAFETY DATA: R134a/R513A
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	Halogen acids produced by thermal decomposition and hydrolysis.
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 45 °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	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.

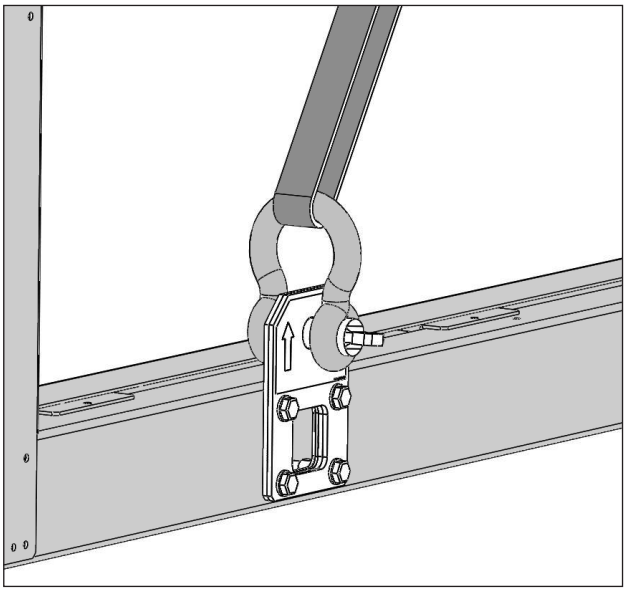
In case of damage, note it down on the carrier's delivery note and issue a claim according to the instructions provided in the delivery note.

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

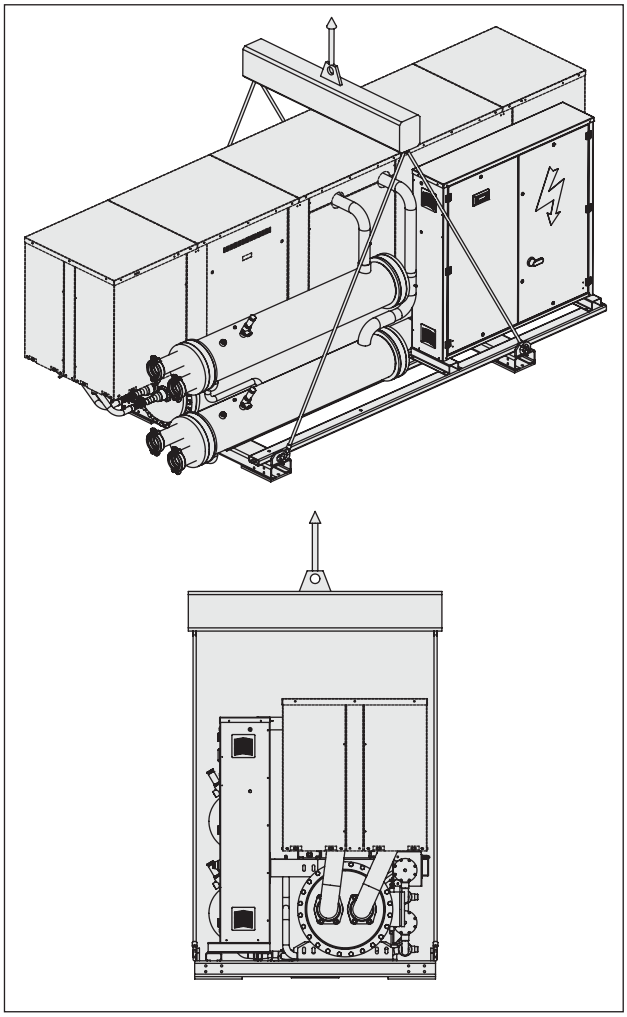
Please note that manufacturer may not be held liable for any damage to the equipment during transportation, even though the carrier has been appointed by the factory.

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). For sizes equipped with 1 compressor (440-770) the minimum size of the spacer is 1350 mm. For sizes equipped with 2 compressors (860-1550) the minimum size of the spacer is 1520 mm.



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.

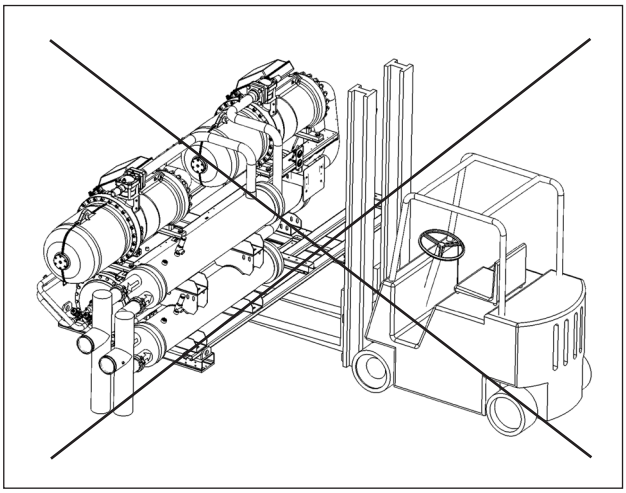
To lift unit slowly and regularly.

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.

3 - Transport, Lifting and Positioning (continued)

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 electrical board, installed on one side 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.

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 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

DANGER	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 indoor installation on a solid surface. Standard accessories include antivibrating rubber supports, that must be positioned under the base.

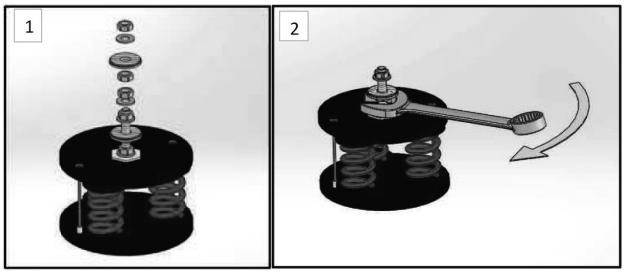
When the unit is to be installed on the ground, it is necessary to provide a concrete base, to ensure a uniform distribution of the weights.

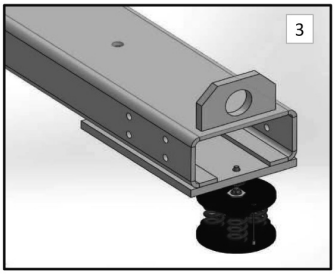
As a general rule, no special sub-bases are required. However, if the unit is to be installed on the top of inhabited rooms, it is advisable to rest it on spring shock absorbers (optional), that will minimise the transmission of any vibration to the structures.

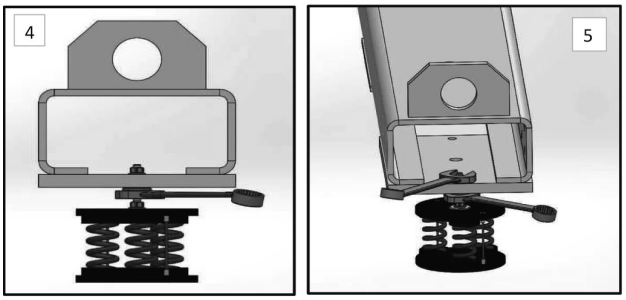
To choose the place of installation of the unit, bear in mind to guarantee all the necessary spaces for air circulation and maintenance operations (see Chapter 9).

4.2 Spring Isolator Installation

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







4.3 Hydraulic connection of the evaporator

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 hydraulic circuit must ensure the water flow to the evaporator under any working or adjustment conditions.

The circuit shall be composed by the following elements:

- A circulation pump which can ensure the necessary capacity and discharge head.
- The capacity of the primary hydraulic circuit should not be less than 7.5 litres/KW of cooling capacity, in order to prevent the repeated start-up of the compressor and any damage to it. If the water capacity in the primary piping of the circuit and in the evaporator is lower than this value, an insulated storage tank shall be installed.
- A membrane expansion vessel provided with safety valve with vent, that must be visible.

The capacity of the expansion vessel must allow for an expansion of at least 2% of the volume of the fluid in the circuit (evaporator, piping, user circuit and standby tank, if any). The expansion vessel needs not be isolated, because no water can circulate inside it.

A flow switch will stop the unit when the water is not circulating or a flow rate problem occurs.

To install the flow switch, follow the manufacturer's instructions.

As a general rule, the flow switch shall be mounted on a horizontal pipe, at a distance from the curves equal to 10 times the diameter of the pipe and far from valves or other components that are likely to hinder the water flow upstream of or downstream from the flow switch.

- The bleed valves must be mounted on the highest point of the piping.
- The stop valves must be mounted on the piping of the water entering/leaving the evaporator.
- The drain points (provided with plugs, cocks etc.) must be arranged in the lowest point of the piping.

The flow switch must be connected (terminals 1-2) as shown in the wiring diagram of the "User's Terminal Box".

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

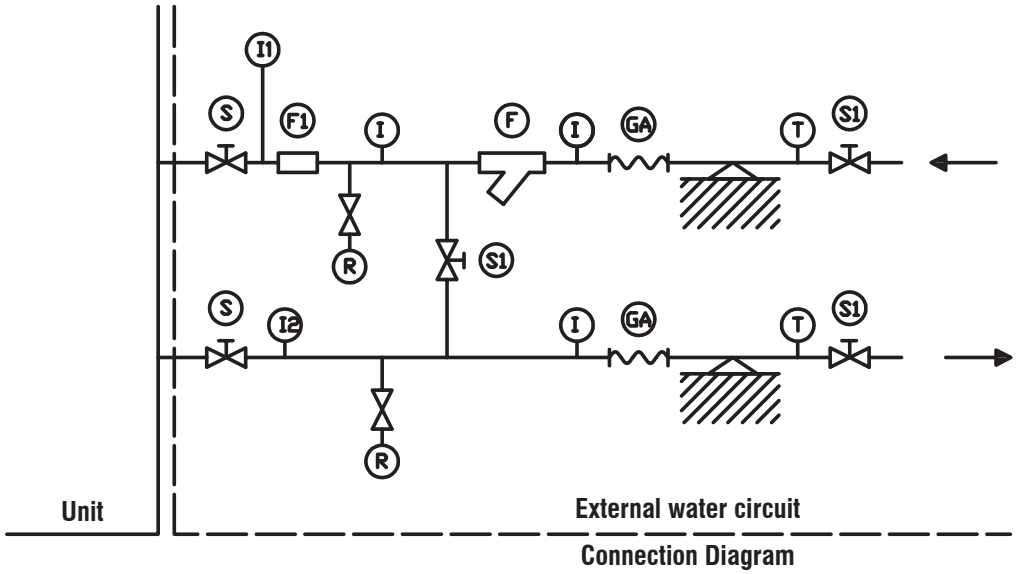
Caution
If the water circuit is to be drained for a time exceeding one month, the circuit must be fully charged with nitrogen to prevent any risk of corrosion by differential venting

4 - Installation (continued)

Then:

- Provide the evaporator with a by-pass circuit equipped with a valve to wash the plant.
- Insulate the piping, to prevent the risk of heat loss.
- Position a filter on the suction side of the evaporator of the heat recovery condenser.

Standard hydraulic circuit



Connection Diagram

COMPONENTS			
I	Pressure gauge connection	**R**	Drain cock
S	Gate valve	**T**	Thermometer
F1	Flow Switch	**F**	Filter
GA	Flexible hoses	**I1/I2**	Pressure gauge connection to measure pressure drop or head pressure

Before filling the circuit, it is important to check that it is free from any foreign matter, sand, gravels, rust, welding deposits, waste and other materials that may damage the evaporator.

If necessary, the water required to fill the circuit must be treated to obtain the requested pH.

When cleaning the lines, it is recommended to create a circuit by-pass. It is important to mount a filtering medium (30 mesh) upstream of the chiller.

4 - Installation (continued)

4.4 Hydraulic connection of the condenser

The external hydraulic circuit must ensure the water flow to the condenser under any working or adjustment conditions.

The cooling of the units is generally ensured by connecting the condenser to a cooling tower, though the units can be cooled also with well water.

In the presence of a water-cooled condenser, it is necessary to check the flow rate and/or the temperature of the cooling fluid that flows through the condenser, so as to maintain the refrigerant pressure at values that can ensure a satisfactory operation.

When a cooling tower is used, the simplest regulation methods consist of checking the operation or the speed of the fan or the air volume, by means of a damper, once the pilot thermostat has been installed in the basin of the tower.

Alternatively, or if no water from a cooling tower is used, you can adopt a recirculaton system provided with a 3-way valve.

This circuit shall consist of:

- A circulation pump that can ensure the necessary capacity and discharge head.
- A flow meter to turn off the appliance when no water is circulating.

The flow meter must be connected in series, as shown in the wiring diagram of the control panel.

4.5 Hydraulic connection

The water inlet/outlet fittings shall conform to the instructions provided by the plates affixed neat the connection points.

To install the flow meter, follow the manufacturer's instructions.

As a general rule, the flow meter shall be mounted on a horizontal pipe, at a distance from the curves equal to 10 times the diameter of the pipe and far from valves or other components that are likely to hinder the water flow upstream of or downstream from the flow meter.

- The bleed valves must be mounted on the highest point of the piping.
- The stop valves must be mounted on the piping of the water entering/leaving the condenser.
- The discharge points (provided with plugs, cocks etc.) must be arranged in the lowest point of the piping.

Furthermore:

- Provide the condenser with a by-pass circuit, equipped with a shutoff valve.
- Insulate piping, to prevent the risk of heat loss.
- Install a filter on the suction side of the condenser.
- A three-way valve should be installed on-site. It permits to bypass the condenser for correct operation at low return water temperature. The best position is close to the condenser.

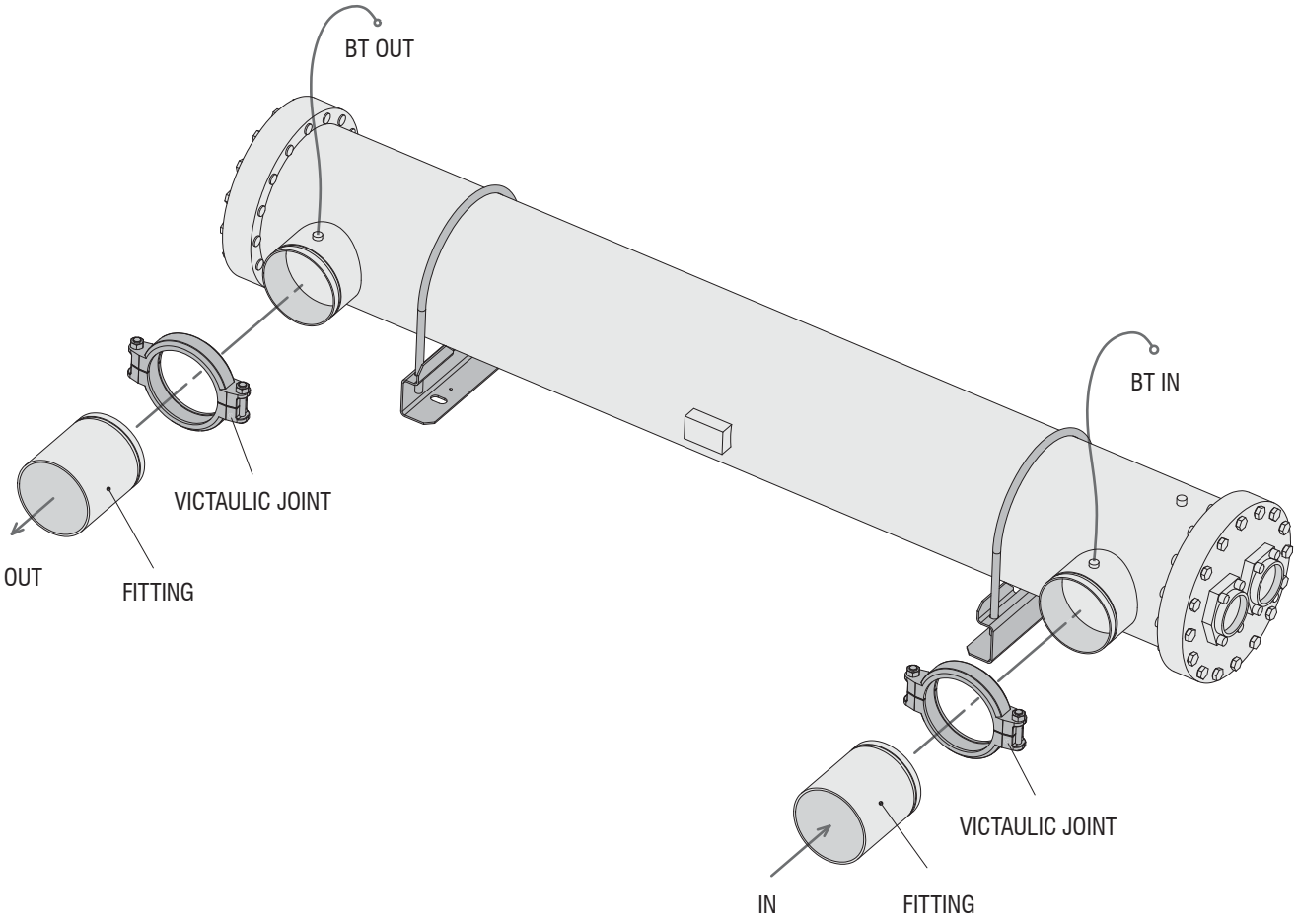
To install the flow meter, follow the diagram illustrated in paragraph 4.3.

4 - Installation (continued)

4.6 Connection of water temperature sensors (on shell and tube evaporator)

The units are provided with fittings for hydraulic connections between heat exchangers and plant.

Each fitting 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.

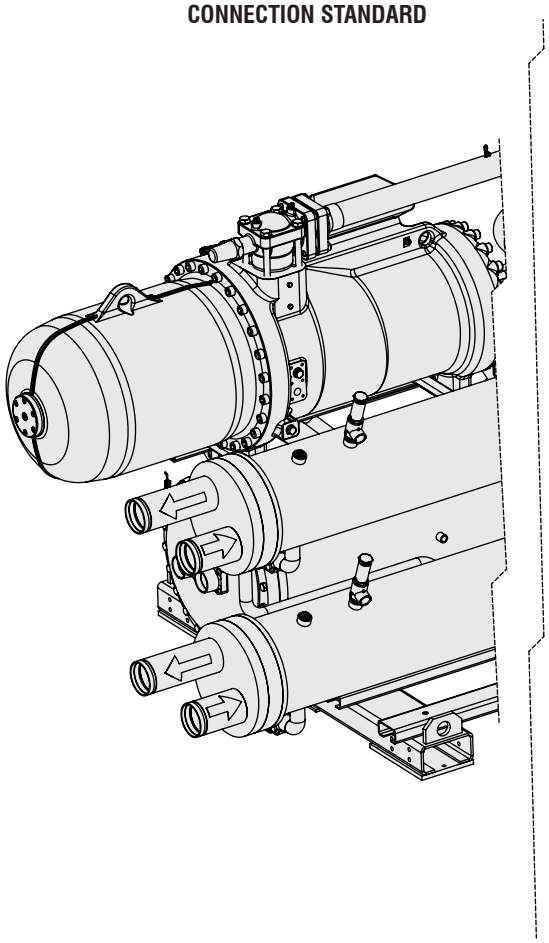


4 - Installation (continued)

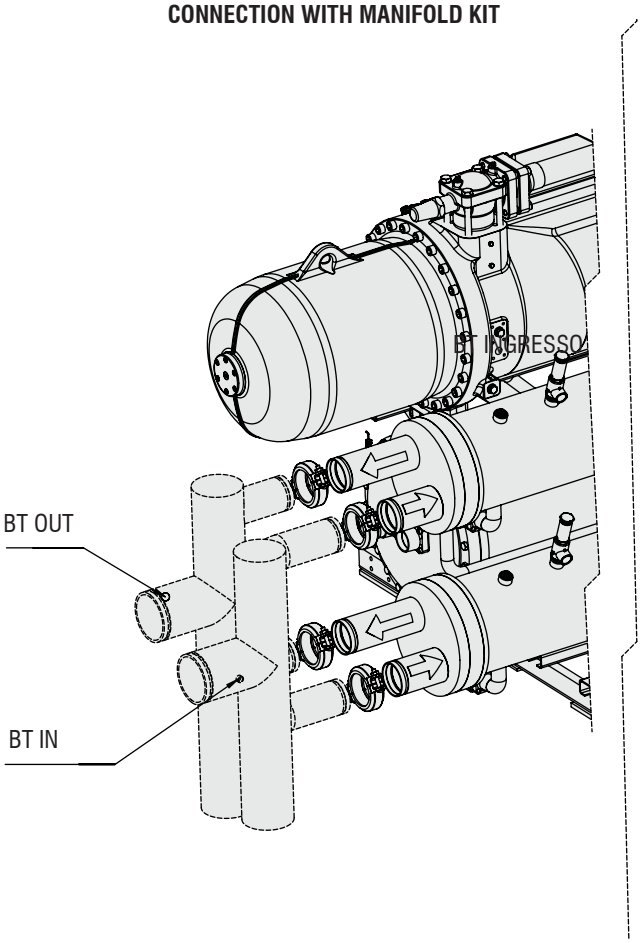
4.7 Connection of water temperature sensors (on shell and tube condenser/s)

Hydraulic connections between condenser/s and plant are supplied separately and must be installed during the installation of the unit. Inlet / outlet water temperature probes should be placed inside dedicated water probes pockets to be provided over the installation. Kit manifold accessory (offered as an option for units equipped with two compressors) is already including water probes pockets.

CONNECTION STANDARD



CONNECTION WITH MANIFOLD KIT



4 - Installation (continued)

4.8 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.

4.9 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.

	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.

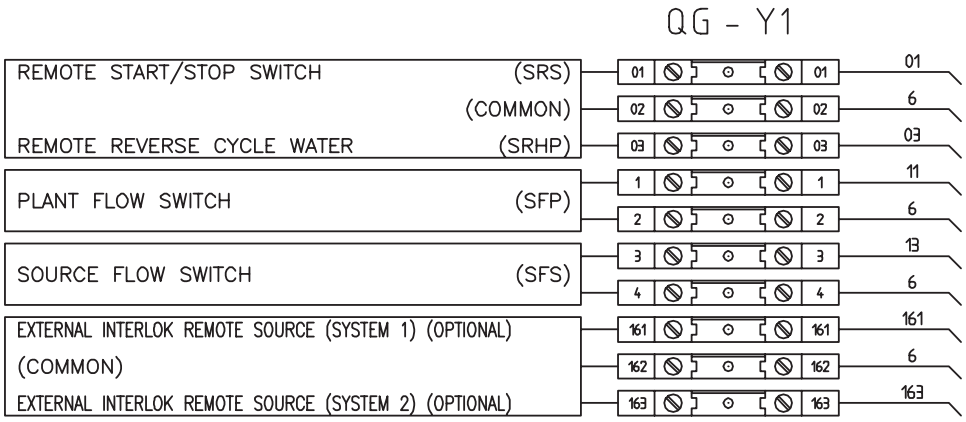
The maximum % value of these differences (unbalance) must not exceed 2% of the mean voltage.

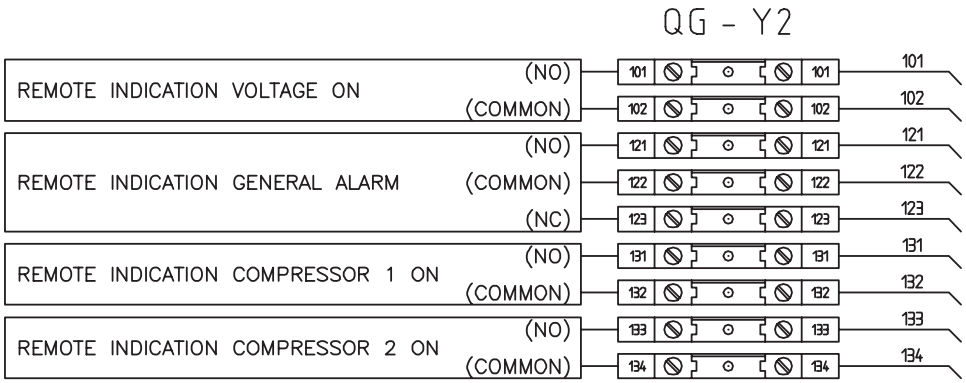
If the unbalance is unacceptable, contact the Energy Distributor to solve this problem.

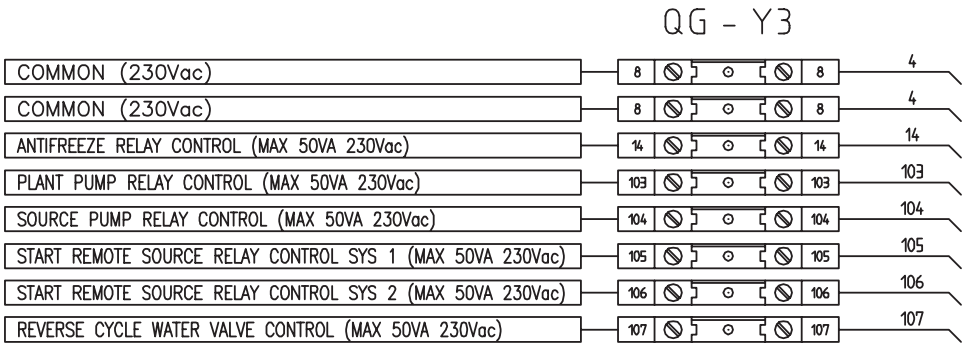
	Supplying the unit through a line whose unbalance exceeds the permissible value will automatically void the warranty.

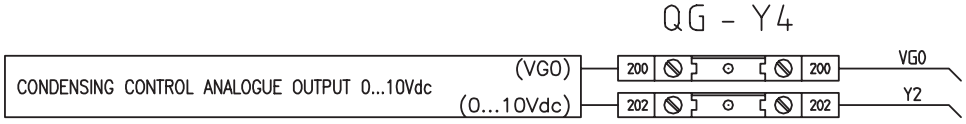
4 - Installation (continued)

Electrical connections









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.
- 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. 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 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 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.
- Check the oil level in the compressor's sight glass.

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

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. 2 to 7 °C above the temperature of condenser leaving water temperature, for 134a units.
LP side	Approx. 2 to 7 °C below the temperature of the leaving chilled water, for R134a units.

5.4 Delivery to the customer

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

6 - Control

6.1 General information

Introduction

This document contains the information and the operating instructions for 1/2 screw compressors of step type.

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 control (RWT)

– Neutral zone control on the leaving water temperature (LWT)

– Access code to enter the Manufacturer's Level

– Access code to enter the Assistance Level

– Alarm and LED

– Backlighted LCD

– Rotation of the compressor operation

– 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)

– RS485 serial port to connect the chiller control to a BMS network.

The following accessories can be also connected:

– Remote Display Terminal

– Wire Remote Control.

– Double set point.

The control system consists of:

a) Main Board. Units are provided with a microprocessor card which is fully programmed by default for the control of a chiller equipped with a HP transducer and a LP transducer for each circuit.

b) EEV controllers (two separate drivers) to the management of the electronic expansion valves.

C) Keyboard & Display Terminal.

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/Keyboard

The display is an LCD 8 lines x 22 columns. The quantities and the information about the operation of the unit are alternated in the form of subsequent screens, named "masks".

It is possible to move inside the masks with the terminal keys as described below.

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 (evaporator)	
5	Main board - Leaving Water temperature Sys 1 sensor fault (evaporator)	
6	Main board - Leaving Water temperature Sys 2 sensor fault (evaporator)	
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 - Return Water temperature sensor fault (condenser)	
14	Main board - Leaving Water temperature sensor fault (condenser)	
16	Serious alarm (SQZ)	
17	Flow switch / Plant interlock	
18	Oil Safety Sys 1 manual reset	
19	Oil Safety Sys 2 manual reset	
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	
27	Thermal protection compressor 1 Sys 2 manual reset	
32	Remote condenser Fan Thermal protection Sys 1 (RC version only)	
34	Remote condenser Fan Thermal protection Sys 2 (RC version only)	
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 Sys 1	
46	ΔT Water Too High Sys 2	
47	Wrong Water Trend Sys 1	
48	Wrong Water Trend Sys 2	
49	Antifreeze alarm manual reset Sys 1	
50	Antifreeze alarm manual reset Sys 2	
52	Plant pump maintenance	
53	Compressor 1 Sys 1 maintenance	
56	Compressor 1 Sys 2 maintenance	
59	Driver 1 LAN disconneted manual reset	
60	Driver 2 LAN disconneted manual reset	
61	EPROM Error Driver 1	
62	EPROM Error Driver 2	
63	Driver 1 S1 Sensor fault	
65	Driver 1 S2 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	

6 - Control (continued)

Alarm code	Description	Notes
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	
83	Expansion board 1 - Chillernet sensor fault	
84	Expansion board 1 - 4-20 mA remote set-point fault	
87	Low delta pressure Sys 1 manual reset	
88	Low delta pressure Sys 2 manual reset	
89	Flow switch / Source interlock	
90	Source pump maintenance	
118	Oil Safety Sys 1 auto reset	
119	Oil Safety Sys 2 manual reset	
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	
127	Thermal protection compressor 1 Sys 2 auto reset	
132	Fan Thermal protection Group 2 Sys 1 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 LAN disconnected automatic reset	
160	Driver 2 LAN disconnected automatic reset	
187	Low delta pressure Sys 1 auto reset	
188	Low delta pressure Sys 2 auto reset	

6.3 Setpoint

Pressing the Set key allows you to enter the Set point level accessible to the user. The parameters that can be set are listed below, along with the limit values and the default values (standard shop settings):

User parameters	Control mode	Min value	Max value	Default
Cooling Setpoint	RWT Return Control	9	15	10
	LWT Leaving Control	6	15	8
Heating Setpoint	RWT Return Control	25	54	40
	LWT Leaving Control	30	60	45
Cooling Setpoint - glycol water	RWT Return Control	-5	15	10
	LWT Leaving Control	-8	15	8
Proportional band	RWT Return Control	1	10	5
Neutral band	LWT Leaving Control	1	6	2
Languages	——	ITA ENG FRE GER SPA		ITA
System On/Off				
System 1 #	——	OFF	ON	OFF
System 2 #	——	OFF	ON	OFF
Unit management		Cooling		

6.4 Protection and Safety Equipment

Refrigeration system

The units are filled with R134a/R513A refrigerant fluid of non hazardous type (group II). Safety device (pressure switch and safety valves) with the sets below indicated are provided on the discharge and suction line of each circuit.

Discharge Line
Pressure relief valve 22 bar.
Pressure switch 19.8 bar for HP/RC/BC version,
15.5 bar for CO version.

Suction line
Pressure relief valve 14.5 bar.
Pressure switch 0.5 bar.

Frost Protection for the Chilled Fluid

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.

An accessory kit for thermal protection (ACB) is available, for any overcurrent of compressors, which shall be shop-mounted.

Flow switch

A 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.).

7 - Product Description

7.1 Introduction

SYSCREW WATER EVO units are designed for indoor installation. They can be equipped with one or two circuits (depending on the model) and may be used to cool water to the evaporator and / or to heat water to the condenser. When heating capacity is not the required useful effect, is is necessary to match the unit with a cooling tower or well water in order to reject condenser heat load.

The units are suitable for indoor installation.
This series includes the following versions:

VERSION	DESCRIPTION
Standard version (STD) Super Low Noise version (S)	Water cooled or air cooled (RC version) chillers operating with R134a or R513A refrigerant.

CO versions are equipped with dedicated compressors optimized for low condensing pressure.

Special Version

Brine version: units with dedicated evaporators to allow operation with brine (ethylene or propylene) temperature down to -8 °C.

Available options:

OPTIONS	DESCRIPTION
Desuperheater (DES)	The heat recovery is carried out by a desuperheater mounted on the compressor's discharge line.
Totaly heat recovery	Not available. For information, please contact commercial office.

7.2 General specifications

The units are supplied complete and provided with all connecting pipes for the refrigerant and internal wiring.

The refrigeration circuit of each unit undergoes a pressure test, is drained, vacuumised, dehydrated and filled with refrigerant, and includes the necessary oil. Once assembled, each unit is subjected to a complete final testing and the correct operation of all refrigeration circuits is checked.

The base and the frame of each unit are made of very thick galvanised sheet, and are secured by screw and stainless bolts. All panels are secured by screw and tropicalised steel bolts, they can be disassembled for easy access to internal components.

All galvanised steel parts are painted with white polyester resin, to ensure the resistance of the unit to corrosion and weather agents over time.

7.3 Compressors

The units are provided with high power, high efficiency and low vibration level semi-hermetic screw compressors (oil injection or external cooling with plate-type exchangers) to reduce the compressor's discharge temperature (on request for special application).

The capacity control can be both of the step type (as standard) or of the stepless type (on request). It is handled by capacity control solenoid valves, handled by the microprocessor of the appliance.

The motor's terminals are weatherproof, according to standard IP-54.

7.4 Refrigeration circuits

Units are equipped with one or two independent circuits with screw compressors and shell and tube heat exchanger.

Each refrigerant circuit includes: a service valve for refrigerant filling, shutoff valves for suction lines (on request), as well as for the delivery and liquid lines, an electronic expansion valve, that completely closed (as a solenoid valve) makes it possible to start/ stop the compressor, a dehydrating cartridge filter, a sight glass with humidity indicator.

Furthermore, each circuit is equipped with safety devices in accordance with PED 2014/68/EU: high and low pressure switches, safety valves providing protection in case of fire or malfunction of compressors.

7.5 Water heat exchangers

Evaporator

The units are provided with a direct-expansion refrigerant/water shell and tube heat exchanger with several refrigeration circuits.

Evaporators are insulated with flexible insulation, based on closed cell synthetic rubber in black color, 9 mm thick, highly resistant to water and to water vapour. A synthetic leather coating, 1.1 mm thick, protects the outer surface.

Condenser

All units are equipped with one or two condensers, one each circuit. Heat exchanger is shell and tube type, arranged for ispection, cleaning and maintenance operation.

Desuperheater

All range except sizes 700, 770, 1400 and 1550 is available with desuperheaters (DES). DES is refrigerant/water heat exchanger with brazed plates.

DES is fitted on the compressor discharge pipe and it's dimensioned to recover about the 10% of total rejected heat. Units with a single compressor are provided with a single heat exchanger, while units with two compressors are provided with two heat exchangers, one each circuit

Total heat recovery condenser

All units can be equipped with total heat recovery condenser (TR) on special request. TR is refrigerant / water heat exchanger with brazed plates or shell and tube, according to chiller size. TR is fitted on the compressor discharge line in series with the standard condensing circuit. Heat recovery function is enabled supplying heat recovery exchanger with water. Units with a single compressor are provided with a single heat exchanger, while units with two compressors are provided with two heat exchangers, one each circuit. Heat recovery condensers are insulated with flexible insulation, based on closed cell synthetic rubber in black color, 9 mm thick.

7.6 Electric power supply and control system

All units are provided with a microprocessor and a "Chiller Control" system.

The electrical connection of the controls and the startup units for the motor are carried out and tested in the factory. The power supply and control components are separate and accessible from different doors.

A door stop disconnecting switch is always mounted on the door of the unit. Protection level is in accordance with IP54 standard.

The power supply compartment includes:

- Master switch
- Network isolator, contactors, compressor fuses

Control panel includes:

- A transformer for auxiliaries, fuses, relay and electronic card, a thermostat for the compressor's delivery temperature
- The keyboard and the display of the "Chiller-Control" microcomputer, mounted on the door of the control section.

7.7 Accessories

List of available accessories, provided separately, to be mounted on site by the installer:

Water flow switch

Prevents the operation of the unit when the chilled fluid is insufficient. It is advisablem to install a flow switch, to ensure the correct operation of the unit.

Water filter

Filter to be mounted on the suction side of the water heat exchanger. It is mandatory to install a water filter to remove impurities from the water suplly.

Antivibrating supports (AVM)

Isolating spring supports, equipped with bolts for fastening to the base. They are supplied separated from the unit and must be mounted on site by the customer, at his own expense.

Remote wall terminal

Makes it possible to check the unit through a remote terminal, up to a maximum distance of 400 meters.

Modem GSM

Makes it possible to check the working mode or the switching on/off of the unit via SMS. In case of any alarms, the unit sends an SMS to the user.

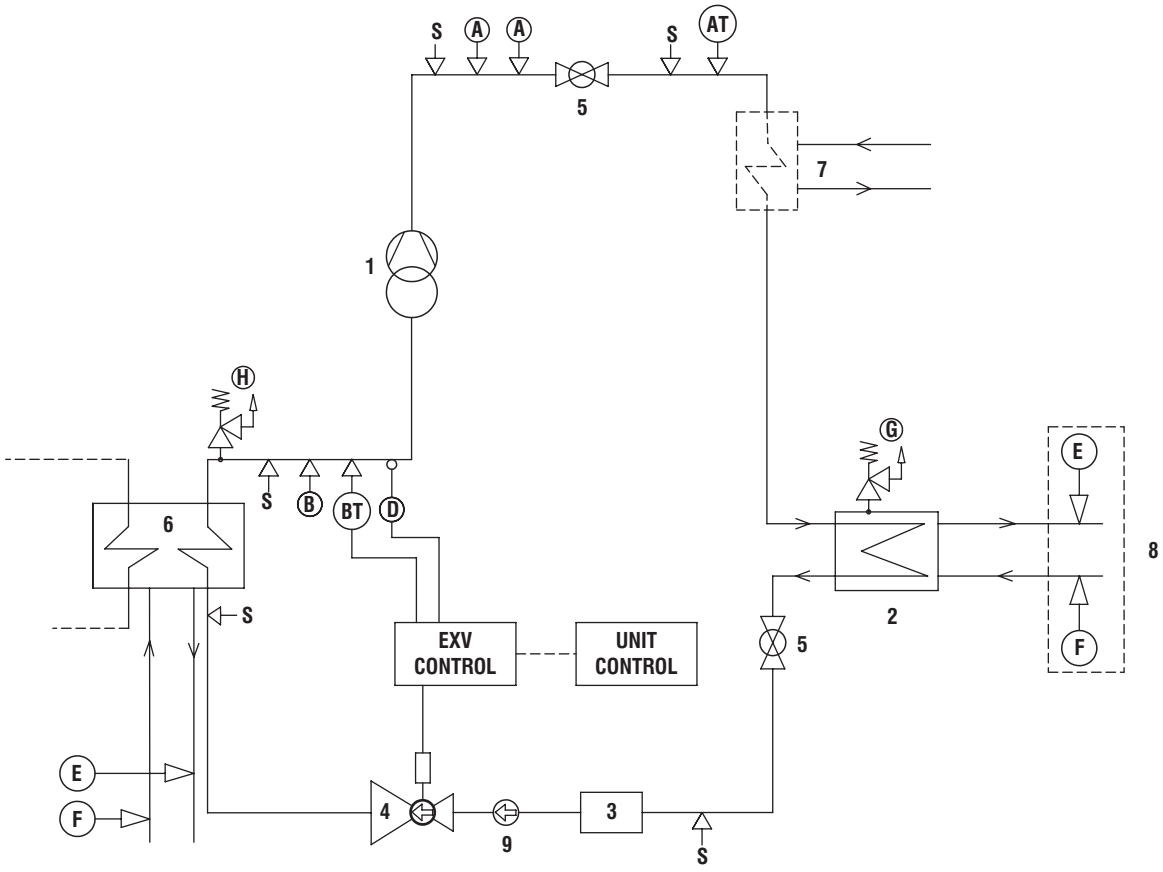
RS-485 serial card (for MODBUS or LONWORK or BACNET)

A communication interface makes it possible to control and manage the unit from a local station, with RS485 connection, up to a distance of 1000 m.

It is possible to obtain the remote control and the management, by inserting the control into the management plant of the building.

7 - Product Description (continued)

Refrigerant circuit - CO/HP/BC versions



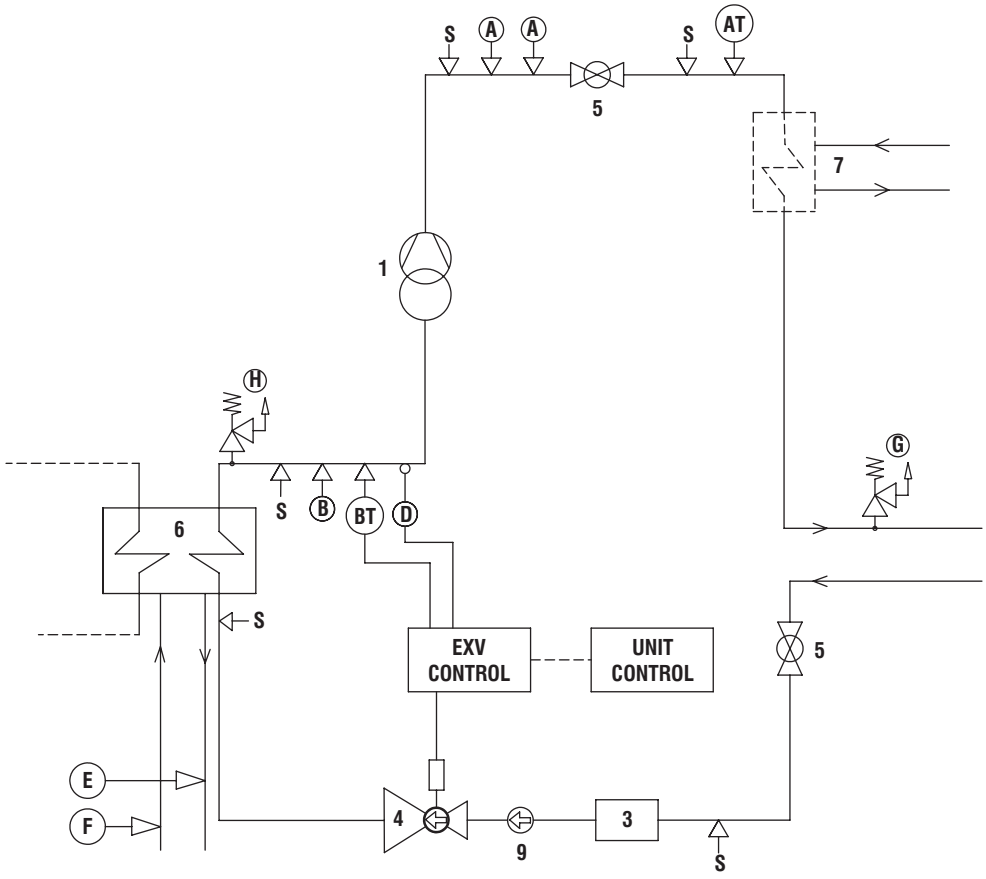
COMPONENTS	
1	Compressor (Screw type)
2	Water cooled condenser
3	Filter drier
4	Electronic expansion valve
5	Globe valve
6	Heat exchanger (Shell & Tube Type)
7	Desuperheater (Optional)
8	Water temperature sensor (HP version only)
9	Sight glass

SAFETY / CONTROL DEVICES	
A	High pressure switch 15.5 bar (CO) 19.8 bar (HP/BC)
B	Low pressure switch (0.5 bar)
AT	High pressure transducer
BT	Low pressure transducer
D	Suction temperature sensor
E	Outlet water temperature sensor
F	Inlet water temperature sensor
G	PED pressure relief valve HP side (22 bar)
H	PED pressure relief valve LP side (14.5 bar)
S	Shrader connection (Service only)
	Pipe connection with Shrader valve

Note: For reasons of readability, one circuit only is shown.

7 - Product Description (continued)

Refrigerant circuit - RC version



COMPONENTS	
1	Compressor (Screw type)
3	Filter drier
4	Electronic expansion valve
5	Globe valve
6	Heat exchanger (Shell & Tube Type)
7	Desuperheater (Optional)
9	Sight glass

SAFETY / CONTROL DEVICES	
A	High pressure switch (19.8 bar)
B	Low pressure switch (0.5 bar)
AT	High pressure transducer
BT	Low pressure transducer
D	Suction temperature sensor
E	Outlet water temperature sensor
F	Inlet water temperature sensor
G	PED pressure relief valve HP side (22 bar)
H	PED pressure relief valve LP side (14.5 bar)
S	Shrader connection (Service only)
	Pipe connection with Shrader valve

8 - Technical Data

8.1 Pressure drops

Evaporator Pressure drop

CO Version Model	Nom Capacity R513A	Nom Capacity R134a	Qnom. R513A	Qnom. R134a	Qnom. ΔTw=3K	Qnom. ΔTw=8K	K	Δp nom R513A	Δp nom R134a	Δp nom ΔTw=3K	Δp nom ΔTw=8K
	kW	kW	l/h	l/h	l/h	l/h	kPa/(l/h)2	kPa	kPa	kPa	kPa
440	419	407	72006	70056	120010	43785	5,300E-09	27,5	26,0	76,3	10,2
490	472	457	81113	78666	135189	49166	5,300E-09	34,9	32,8	96,9	12,8
570	539	523	92753	89896	154588	56185	5,300E-09	45,6	42,8	126,7	16,7
630	602	580	103523	99745	172539	62340	5,300E-09	56,8	52,7	157,8	20,6
700	664	655	114279	112576	190464	70360	2,055E-09	26,8	26,0	74,6	10,2
770	735	719	126358	123599	210597	77250	2,055E-09	32,8	31,4	91,1	12,3
860	825	791	141900	136031	236500	85020	3,379E-09	68,0	62,5	189,0	24,4
920	874	846	150343	145498	250572	90936	3,379E-09	76,4	71,5	212,1	27,9
990	937	910	161090	156534	268483	97834	1,492E-09	38,7	36,6	107,6	14,3
1070	1019	981	175277	168713	292128	105446	1,453E-09	44,6	41,4	124,0	16,2
1130	1072	1040	184346	178964	307244	111853	1,453E-09	49,4	46,5	137,1	18,2
1220	1159	1127	199391	193816	332318	121135	7,737E-10	30,8	29,1	85,4	11,4
1280	1226	1181	210887	203192	351479	126995	7,737E-10	34,4	31,9	95,6	12,5
1400	1335	1303	229546	224106	382577	140066	1,008E-09	53,1	50,6	147,5	19,8
1550	1458	1414	250764	243167	417940	151979	1,008E-09	63,4	59,6	176,0	23,3

HP Version Model	Nom Capacity R513A	Nom Capacity R134a	Qnom. R513A	Qnom. R134a	Qnom. ΔTw=3K	Qnom. ΔTw=8K	K	Δp nom R513A	Δp nom R134a	Δp nom ΔTw=3K	Δp nom ΔTw=8K
	kW	kW	l/h	l/h	l/h	l/h	kPa/(l/h)2	kPa	kPa	kPa	kPa
440	419	413	72068	71036	120113	44398	6,442E-09	33,5	32,5	92,9	12,7
490	479	474	82388	81528	137313	50955	4,628E-09	31,4	30,8	87,3	12,0
570	547	539	94084	92708	156807	57943	5,022E-09	44,5	43,2	123,5	16,9
630	612	604	105264	103888	175440	64930	5,022E-09	55,6	54,2	154,6	21,2
700	673	663	115756	114036	192927	71273	2,747E-09	36,8	35,7	102,2	14,0
770	731	721	125732	124012	209553	77508	2,747E-09	43,4	42,2	120,6	16,5
860	818	804	140696	138288	234493	86430	2,018E-09	40,0	38,6	111,0	15,1
920	882	869	151704	149468	252840	93418	1,644E-09	37,8	36,7	105,1	14,3
990	946	936	162712	160992	271187	100620	1,327E-09	35,1	34,4	97,6	13,4
1070	1013	1004	174236	172688	290393	107930	1,448E-09	44,0	43,2	122,1	16,9
1130	1083	1065	186276	183180	310460	114488	1,448E-09	50,2	48,6	139,5	19,0
1220	1156	1137	198832	195564	331387	122228	1,448E-09	57,2	55,4	159,0	21,6
1280	1217	1198	209324	206056	348873	128785	1,448E-09	63,4	61,5	176,2	24,0
1400	1340	1323	230480	227556	384133	142223	8,729E-10	46,4	45,2	128,8	17,7
1550	1451	1432	249572	246304	415953	153940	8,729E-10	54,4	53,0	151,0	20,7

Conditions: Evaporator EWT/LWT 12/7°C

8 - Technical Data (continued)

Condenser pressure drops

CO Version Model	Condenser n°	Nom Capacity R513A	Nom Capacity R134a	Qnom. R513A	Qnom. R134a	Qnom. ΔTw=3K	Qnom. ΔTw=8K	K	Δp nom R513A	Δp nom R134a	Δp nom ΔTw=3K	Δp nom ΔTw=8K
		kW	kW	l/h	l/h	l/h	l/h	kPa/(l/h)2	kPa	kPa	kPa	kPa
440	1	507	492	87151	84548	145251	52843	4,157E-09	31,6	29,7	87,7	11,6
490	1	573	554	98498	95288	164163	59555	4,157E-09	40,3	37,7	112,0	14,7
570	1	654	632	112546	108630	187577	67894	3,997E-09	50,6	47,2	140,6	18,4
630	1	729	702	125460	120682	209100	75426	2,006E-09	31,6	29,2	87,7	11,4
700	1	808	793	139050	136338	231750	85211	2,006E-09	38,8	37,3	107,7	14,6
770	1	893	871	153656	149776	256094	93610	1,609E-09	38,0	36,1	105,5	14,1
860	1/2	501	480	86190	82565	143650	51603	4,157E-09	30,9	28,3	85,8	11,1
920	1/2	532	514	91533	88369	152555	55231	4,157E-09	34,8	32,5	96,7	12,7
990	1/2	569	551	97863	94839	163105	59274	4,157E-09	39,8	37,4	110,6	14,6
1070	1	608	555	104576	95460	174293	59663	4,157E-09	45,5	37,9	126,3	14,8
	2	626	631	107672	108532	180887	67295	3,997E-09	46,3	47,1	130,8	18,1
1130	1/2	650	629	111786	108177	186310	67611	3,997E-09	50,0	46,8	138,8	18,3
1220	1	654	650	112488	111800	187480	69875	3,997E-09	50,6	50,0	140,5	19,5
	2	749	708	128828	121776	214713	76110	3,138E-09	52,1	46,5	144,7	18,2
1280	1/2	742	713	127620	122673	212700	76671	3,138E-09	51,1	47,2	142,0	18,4
1400	1/2	810	788	139398	135594	232330	84746	1,609E-09	31,3	29,6	86,9	11,6
1550	1/2	888	859	152813	147794	254689	92371	1,609E-09	37,6	35,2	104,4	13,7

HP Version Model	Condenser n°	Nom Capacity R513A	Nom Capacity R134a	Qnom. R513A	Qnom. R134a	Qnom. ΔTw=3K	Qnom. ΔTw=8K	K	Δp nom R513A	Δp nom R134a	Δp nom ΔTw=3K	Δp nom ΔTw=8K
		kW	kW	l/h	l/h	l/h	l/h	kPa/(l/h)2	kPa	kPa	kPa	kPa
440	1	504	496	86688	85312	144480	53320	2,753E-09	20,7	20,0	57,5	7,8
490	1	576	569	99072	97868	165120	61168	2,753E-09	27,0	26,4	75,0	10,3
570	1	661	648	113692	111456	189487	69660	2,753E-09	35,6	34,2	98,8	13,4
630	1	742	728	127624	125216	212707	78260	2,753E-09	44,8	43,2	124,5	16,9
700	1	813	804	139836	138288	233060	86430	1,044E-09	20,4	20,0	56,7	7,8
770	1	887	875	152564	150500	254273	94063	1,727E-09	40,2	39,1	111,7	15,3
860	1/2	493,5	485	84882	83334	141470	52084	2,753E-09	19,8	19,1	55,1	7,5
920	1/2	532	523	91504	89956	152507	56223	2,753E-09	23,0	22,3	64,0	8,7
990	1/2	570,5	563	98126	96836	163543	60523	2,753E-09	26,5	25,8	73,6	10,1
1070	1	569	562	97868	96664	163113	60415	2,753E-09	26,4	25,7	73,2	10,0
	2	653	646	112316	111112	187193	69445	2,163E-09	27,3	26,7	75,8	10,4
1130	1/2	654	641	112488	110166	187480	68854	2,163E-09	27,4	26,3	76,0	10,3
1220	1	656	643	112832	110596	188053	69123	2,163E-09	27,5	26,5	76,5	10,3
	2	740	725	127280	124700	212133	77938	1,727E-09	28,0	26,9	77,7	10,5
1280	1/2	735	721	126420	123926	210700	77454	1,727E-09	27,6	26,5	76,7	10,4
1400	1/2	809,5	802	139234	137944	232057	86215	1,044E-09	20,2	19,9	56,2	7,8
1550	1/2	877	866	150844	148952	251407	93095	1,044E-09	23,8	23,2	66,0	9,1

Conditions: Condenser EWT/LWT 30/35°C

8 - Technical Data (continued)

Desuperheater pressure drop

Model	Nom. Capacity	Qnom.	Qmax.	Qmin.	K	Dp nom	DP max	DP min
	kW	l/h	l/h	l/h	kPa/(l/h) ^ 2	kPa	kPa	kPa
440	34	5927	9878	3704	2.285E-08	0.8	2.2	0.3
490	38	6596	10993	4122	2.285E-08	1.0	2.8	0.4
570	44	7603	12672	4752	1.380E-08	0.8	2.2	0.3
630	49	8492	14154	5308	1.380E-08	1.0	2.8	0.4
700	not available							
770	not available							
860	34	5841	9734	3650	2.285E-08	0.8	2.2	0.3
920	36	6245	10409	3903	2.285E-08	0.9	2.5	0.3
990	39	6663	11105	4164	2.285E-08	1.0	2.8	0.4
1070	42	7146	11911	4466	1.380E-08	0.7	2.0	0.3
1130	44	7556	12594	4723	1.380E-08	0.8	2.2	0.3
1220	47	8160	13599	5100	1.380E-08	0.9	2.6	0.4
1280	50	8573	14288	5358	1.380E-08	1.0	2.8	0.4
1400	not available							
1550	not available							

(*) Capacity referred to only one circuit.

8 - Technical Data (continued)

8.2 Technical data

SYSCREW WATER EVO CO STD / S		440	490	570	630	700	770	860
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50						
Number of refrigerant circuits		1						2
Start-up Type		SD						
Total capacity steps	%	50-75-100						25-50-62-75-87-100
COMPRESSOR								
Number		1						2
Type		Screw						
INTERNAL HEAT EXCHANGER (EVAPORATOR)								
Number		1						
Type		Shell & tube (Pure counterflow)						
Water connections	inch	6	6	6	6	8	8	8
EXTERNAL HEAT EXCHANGER (CONDENSER)								
Number		1						2
Type		Shell & tube						
Water connections	inch	4	4	5	5	5	5	4 / 4
REFRIGERANT								
Type / GWP		R134a / 1430						
Charge (1)	kg	54	54	74	92	93	87	114
	tCO_2eq	77,2	77,2	105,8	131,6	133,0	124,4	163,0
Type / GWP		R513A / 631						
Charge (1)	kg	54	54	74	92	93	87	114
	tCO_2eq	34,1	34,1	46,7	58,1	58,7	54,9	71,9
DESUPERHEATER								
Number		1						2
Type		PHE						
Water connections	inch	2”1/2				N.A.		2”1/2
WEIGHT (STD VERSION)								
Shipping	kg	2475	2485	2658	2770	3134	3176	4636
Operating	kg	2690	2700	2875	3003	3472	3521	5000
WEIGHT (S VERSION)								
Shipping	kg	2669	2679	2852	2964	3328	3370	5024
Operating	kg	2884	2894	3069	3197	3666	3715	5388
DIMENSIONS (STD VERSION)								
Length	mm	4250	4250	4210	4210	4180	4180	4510
Width	mm	1350	1350	1350	1350	1350	1350	1520
Height	mm	1650	1650	1650	1650	1650	1650	1710
DIMENSIONS (S VERSION)								
Length	mm	4250	4250	4210	4210	4180	4180	4510
Width	mm	1350	1350	1350	1350	1350	1350	1520
Height	mm	1750	1750	1750	1750	1750	1750	1780

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

8 - Technical Data (continued)

SYSCREW WATER EVO CO STD / S		920	990	1070	1130	1220	1280	1400	1550
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50							
Number of refrigerant circuits		2							
Start-up Type		SD							
Total capacity steps	%	25-50-62-75-87-100							
COMPRESSOR									
Number		2							
Type		Screw							
INTERNAL HEAT EXCHANGER (EVAPORATOR)									
Number		1							
Type		Shell & tube (Pure counterflow)							
Water connections	inch	8	10	10	10	10	10	10	10
EXTERNAL HEAT EXCHANGER (CONDENSER)									
Number		2							
Type		Shell & tube							
Water connections	inch	4 / 4	5 / 5	5 / 5	5 / 5	5 / 5	5 / 5	5 / 5	5 / 5
REFRIGERANT									
Type / GWP		R134a / 1430							
Charge (1)	kg	114	115	153	161	155	149	185	185
	tCO_2eq	163,0	164,5	218,8	230,2	221,7	213,1	264,6	264,6
Type / GWP		R513A / 631							
Charge (1)	kg	114	115	153	161	155	149	185	185
	tCO_2eq	71,9	72,6	96,5	101,6	97,8	94,0	116,7	116,7
DESUPERHEATER									
Number		2							
Type		PHE							
Water connections	inch	2”1/2						N.A.	
WEIGHT (STD VERSION)									
Shipping	kg	4646	5082	5270	5462	5547	5587	6037	6091
Operating	kg	5010	5642	5818	6012	6077	6124	6698	6752
WEIGHT (S VERSION)									
Shipping	kg	5034	5470	5658	5850	5935	5975	6425	6479
Operating	kg	5398	6030	6206	6400	6465	6512	7086	7140
DIMENSIONS (STD VERSION)									
Length	mm	4510	4600	4650	4650	4650	4650	5350	5350
Width	mm	1520	1520	1520	1520	1520	1520	1520	1520
Height	mm	1710	1710	1710	1710	1710	1710	1710	1710
DIMENSIONS (S VERSION)									
Length	mm	4510	4690	4690	4690	4690	4690	5400	5400
Width	mm	1520	1520	1520	1520	1520	1520	1520	1520
Height	mm	1780	1780	1780	1780	1780	1780	1780	1780

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

8 - Technical Data (continued)

SYSCREW WATER EVO HP STD / S		440	490	570	630	700	770	860
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50						
Number of refrigerant circuits		1						2
Start-up Type		SD						
Total capacity steps	%	50-75-100						25-50-62-75-87-100
COMPRESSOR								
Number		1						2
Type		Screw						
INTERNAL HEAT EXCHANGER (EVAPORATOR)								
Number		1						
Type		Shell & tube (Pure counterflow)						
Water connections	inch	6	6	6	6	8	8	8
EXTERNAL HEAT EXCHANGER (CONDENSER)								
Number		1						2
Type		Shell & tube						
Water connections	inch	4	4	4	4	5	5	4 / 4
REFRIGERANT								
Type / GWP		R134a / 1430						
Charge (1)	kg	77	77	82	82	132	106	159
	tCO_2eq	110,1	110,1	117,3	117,3	188,8	151,6	227,4
Type / GWP		R513A / 631						
Charge (1)	kg	77	77	82	82	132	106	159
	tCO_2eq	48,6	48,6	51,7	51,7	83,3	66,9	100,3
DESUPERHEATER								
Number		1						2
Type		PHE						
Water connections	inch	2”1/2				N.A.		2”1/2
WEIGHT (STD VERSION)								
Shipping	kg	2799	2888	2987	2907	3610	3437	5268
Operating	kg	3055	3186	3277	3197	4027	3824	5818
WEIGHT (S VERSION)								
Shipping	kg	2993	3082	3181	3201	3804	3631	5656
Operating	kg	3249	3380	3471	3491	4221	4017	6205
DIMENSIONS (STD VERSION)								
Length	mm	4590	4590	4630	4630	4320	4560	5110
Width	mm	1450	1450	1450	1450	1450	1450	1520
Height	mm	1650	1650	1650	1650	1650	1650	1680
DIMENSIONS (S VERSION)								
Length	mm	4590	4590	4630	4630	4320	4560	5130
Width	mm	1450	1450	1450	1450	1450	1450	1520
Height	mm	1750	1750	1750	1750	1750	1750	1780

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

8 - Technical Data (continued)

SYSCREW WATER EVO HP STD / S		920	990	1070	1130	1220	1280	1400	1550
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50							
Number of refrigerant circuits		2							
Start-up Type		SD							
Total capacity steps	%	25-50-62-75-87-100							
COMPRESSOR									
Number		2							
Type		Screw							
INTERNAL HEAT EXCHANGER (EVAPORATOR)									
Number		1							
Type		Shell & tube (Pure counterflow)							
Water connections	inch	8	10	10	10	10	10	10	10
EXTERNAL HEAT EXCHANGER (CONDENSER)									
Number		2							
Type		Shell & tube							
Water connections	inch	4 / 4	4 / 4	4 / 5	5 / 5	5 / 5	5 / 5	5 / 5	5 / 5
REFRIGERANT									
Type / GWP		R134a / 1430							
Charge (1)	kg	159	160	200	240	231	221	274	274
	tCO_2eq	227,4	228,8	286,0	343,2	330,3	316,0	391,8	391,8
Type / GWP		R513A / 631							
Charge (1)	kg	159	160	200	240	231	221	274	274
	tCO_2eq	100,3	101,0	126,2	151,4	145,8	139,5	172,9	172,9
DESUPERHEATER									
Number		2							
Type		PHE							
Water connections	inch	2”1/2						N.A.	
WEIGHT (STD VERSION)									
Shipping	kg	5313	5495	5929	6136	6159	6181	7055	7135
Operating	kg	5841	6119	6545	6768	6807	6844	7991	8071
WEIGHT (S VERSION)									
Shipping	kg	5701	5883	6317	6524	6547	6569	7443	7523
Operating	kg	6229	6506	6932	7155	7194	7232	8378	8458
DIMENSIONS (STD VERSION)									
Length	mm	5110	5100	5100	5000	5000	5000	5300	5300
Width	mm	1520	1520	1520	1520	1520	1520	1580	1580
Height	mm	1680	1680	1680	1680	1680	1680	1710	1710
DIMENSIONS (S VERSION)									
Length	mm	5130	5120	5120	5020	5020	5020	5320	5320
Width	mm	1520	1520	1520	1520	1520	1520	1580	1580
Height	mm	1780	1780	1780	1780	1780	1780	1780	1780

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

8 - Technical Data (continued)

SYSCREW WATER EVO RC STD / S		440	490	570	630	700	770	860
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50						
Number of refrigerant circuits		1						2
Start-up Type		SD						
Total capacity steps	%	50-75-100						25-50-62-75-87-100
COMPRESSOR								
Number		1						2
Type		Screw						
INTERNAL HEAT EXCHANGER (EVAPORATOR)								
Number		1						
Type		Shell & tube (Pure counterflow)						
Water connections	inch	6	6	6	6	8	8	8
REMOTE CONDENSER CONNECTIONS								
Type		To be brazed						
Inlet refrigerant connections Circuit 1	inch	1.5/8"	1.5/8"	2.1/8"	2.1/8"	2.1/8"	2.1/8"	1.5/8"
Outlet refrigerant connections Circuit 1	inch	3.1/8"	3.1/8"	3.5/8"	3.5/8"	4.1/8"	4.1/8"	3.1/8"
Inlet refrigerant connections Circuit 2	inch	-	-	-	-	-	-	1.5/8"
Outlet refrigerant connections Circuit 2	inch	-	-	-	-	-	-	3.1/8"
REFRIGERANT								
Type / GWP		R134a / 1430						
Charge (1)	kg	55	61	64	76	78	80	64+64
	tCO_2eq	78,7	87,2	91,5	108,7	111,5	114,4	91,5 + 91,5
Type / GWP		R513A / 631						
Charge (1)	kg	55	61	64	76	78	80	64+64
	tCO_2eq	34,7	38,5	40,4	48,0	49,2	50,5	40,4 + 40,4
DESUPERHEATER								
Number		1						2
Type		PHE						
Water connections	inch	2"1/2				N.A.		2"1/2
WEIGHT (STD VERSION)								
Shipping	kg	2159	2169	2285	2305	2676	2716	4425
Operating	kg	2302	2312	2456	2476	2952	2992	4804
WEIGHT (S VERSION)								
Shipping	kg	2353	2363	2479	2499	2870	2910	4812
Operating	kg	2496	2506	2650	2670	3146	3186	5191
DIMENSIONS (STD VERSION)								
Length	mm	3620	3620	4210	4210	4180	4180	4400
Width	mm	1350	1350	1350	1350	1350	1350	1520
Height	mm	1650	1650	1650	1650	1650	1650	1710
DIMENSIONS (S VERSION)								
Length	mm	3620	3620	4210	4210	4180	4180	4650
Width	mm	1350	1350	1350	1350	1350	1350	1520
Height	mm	1750	1750	1750	1750	1750	1750	1770

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

8 - Technical Data (continued)

SYSCREW WATER EVO RC STD / S		920	990	1070	1130	1220	1280	1400	1550
Power supply	V/Ph/Hz	400 (± 10%) / 3 / 50							
Number of refrigerant circuits		2							
Start-up Type		SD							
Total capacity steps	%	25-50-62-75-87-100							
COMPRESSOR									
Number		2							
Type		Screw							
INTERNAL HEAT EXCHANGER (EVAPORATOR)									
Number		1							
Type		Shell & tube (Pure counterflow)							
Water connections	inch	8	10	10	10	10	10	10	10
REMOTE CONDENSER CONNECTIONS									
Type		To be brazed							
Inlet refrigerant connections Circuit 1	inch	1.5/8”	1.5/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”
Outlet refrigerant connections Circuit 1	inch	3.1/8”	3.1/8”	3.1/8”	3.1/8”	3.1/8”	3.1/8”	4.1/8”	4.1/8”
Inlet refrigerant connections Circuit 2	inch	1.5/8”	1.5/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”	2.1/8”
Outlet refrigerant connections Circuit 2	inch	3.1/8”	3.1/8”	3.1/8”	3.1/8”	3.1/8”	3.1/8”	4.1/8”	4.1/8”
REFRIGERANT									
Type / GWP		R134a / 1430							
Charge (1)	kg	64+64	64+64	71+76	74+76	76+78	77+80	84+87	91+94
	tCO_2eq	91,5 + 91,5	91,5 + 91,5	101,5 + 108,7	105,8 + 108 7	108,7 + 111,5	110,1 + 114,4	120,1 + 124,4	130,1 + 134,4
Type / GWP		R513A / 631							
Charge (1)	kg	64+64	64+64	71+76	74+76	76+78	77+80	84+87	91+94
	tCO_2eq	40,4 + 40,4	40,4 + 40,4	44,8 + 48,0	46,7 + 48,0	48,0 + 49,2	48,6 + 50,5	53,0 + 54,9	57,4 + 59,3
DESUPERHEATER									
Number		2							
Type		PHE							
Water connections	inch	2”1/2						N.A.	
WEIGHT (STD VERSION)									
Shipping	kg	4435	4526	4613	4673	4739	4759	5073	5153
Operating	kg	4814	4998	5071	5131	5170	5190	5596	5676
WEIGHT (S VERSION)									
Shipping	kg	4822	4913	5000	5060	5126	5146	5460	5540
Operating	kg	5201	5385	5458	5518	5557	5577	5983	6063
DIMENSIONS (STD VERSION)									
Length	mm	4400	4600	4650	4650	4650	4650	5350	5350
Width	mm	1520	1520	1520	1520	1520	1520	1520	1520
Height	mm	1710	1710	1710	1710	1710	1710	1710	1710
DIMENSIONS (S VERSION)									
Length	mm	4650	4650	4650	4650	4650	4650	5400	5400
Width	mm	1520	1520	1520	1520	1520	1520	1520	1520
Height	mm	1770	1770	1770	1770	1770	1770	1770	1770

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

8 - Technical Data (continued)

8.3 Electrical data - SYSCREW WATER EVO CO - R134a

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	82	137	132	233	318	0,86	> 0.90	300
490	1	1	S/D	94	157	147	266	436	0,87	> 0.90	300
570	1	1	S/D	107	175	167	306	465	0,89	> 0.90	300
630	1	1	S/D	120	203	186	345	586	0,85	> 0.90	300
700	1	1	S/D	136	227	220	378	650	0,86	> 0.90	300
770	1	1	S/D	150	255	240	411	805	0,86	> 0.90	300
860	1	2	S/D	82	137	132	233	318	0,86	> 0.90	300
	2		S/D	82	137	132	233	318	0,86	> 0.90	300
920	1	2	S/D	82	137	132	233	318	0,86	> 0.90	300
	2		S/D	93	156	147	266	436	0,87	> 0.90	300
990	1	2	S/D	95	158	147	266	436	0,86	> 0.90	300
	2		S/D	95	158	147	266	436	0,86	> 0.90	300
1070	1	2	S/D	95	158	147	266	436	0,87	> 0.90	300
	2		S/D	108	176	167	306	465	0,89	> 0.90	300
1130	1	2	S/D	107	175	167	306	465	0,89	> 0.90	300
	2		S/D	107	175	167	306	465	0,89	> 0.90	300
1220	1	2	S/D	109	177	167	306	465	0,89	> 0.90	300
	2		S/D	124	209	186	345	586	0,85	> 0.90	300
1280	1	2	S/D	123	207	186	345	586	0,85	> 0.90	300
	2		S/D	123	207	186	345	586	0,85	> 0.90	300
1400	1	2	S/D	136	227	220	378	650	0,86	> 0.90	300
	2		S/D	136	227	220	378	650	0,86	> 0.90	300
1550	1	1	S/D	148	250	240	411	805	0,86	> 0.90	300
	2	2	S/D	148	250	240	411	805	0,86	> 0.90	300

STD - S Version			440	490	570	630	700	770	860	920	990	1070	1130	1220	1280	1400	1550
Current input	Nominal	A	137	157	175	203	227	255	274	293	316	334	350	386	414	454	500
	Maximum	A	233	266	306	345	378	411	466	499	532	572	612	651	690	756	822
Power input	Nominal	kW	82	94	107	120	136	150	164	175	190	203	215	233	245	272	296
	Maximum	kW	132	147	167	186	220	240	264	279	294	314	334	353	372	440	480
Max Start-up current		A	318	436	465	586	650	805	551	669	702	731	771	892	931	1.028	1.216
UNIT (aM) FUSES		A	250	315	315	400	400	500	630	630	630	630	630	800	800	800	1.000
Phase WIRE SECTION		mm^2	120	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x300

(*) Power factor correction capacitor option.

8 - Technical Data (continued)

Electrical data - SYSCREW WATER EVO CO - R513A

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	86	143	132	233	318	0,86	> 0.90	300
490	1	1	S/D	98	163	147	266	436	0,87	> 0.90	300
570	1	1	S/D	111	180	167	306	465	0,89	> 0.90	300
630	1	1	S/D	123	208	186	345	586	0,85	> 0.90	300
700	1	1	S/D	140	233	220	378	650	0,86	> 0.90	300
770	1	1	S/D	155	260	240	411	805	0,86	> 0.90	300
860	1	2	S/D	86	143	132	233	318	0,86	> 0.90	300
	2		S/D	86	143	132	233	318	0,86	> 0.90	300
920	1	2	S/D	86	143	132	233	318	0,86	> 0.90	300
	2		S/D	98	163	147	266	436	0,87	> 0.90	300
990	1	2	S/D	98	163	147	266	436	0,86	> 0.90	300
	2		S/D	98	163	147	266	436	0,86	> 0.90	300
1070	1	2	S/D	98	163	147	266	436	0,87	> 0.90	300
	2		S/D	111	180	167	306	465	0,89	> 0.90	300
1130	1	2	S/D	111	180	167	306	465	0,89	> 0.90	300
	2		S/D	111	180	167	306	465	0,89	> 0.90	300
1220	1	2	S/D	111	180	167	306	465	0,89	> 0.90	300
	2		S/D	125	210	186	345	586	0,85	> 0.90	300
1280	1	2	S/D	125	210	186	345	586	0,85	> 0.90	300
	2		S/D	125	210	186	345	586	0,85	> 0.90	300
1400	1	2	S/D	139	232	220	378	650	0,86	> 0.90	300
	2		S/D	139	232	220	378	650	0,86	> 0.90	300
1550	1	1	S/D	154	259	240	411	805	0,86	> 0.90	300
	2	2	S/D	154	259	240	411	805	0,86	> 0.90	300

STD - S Version			**440**	**490**	**570**	**630**	**700**	**770**	**860**	**920**	**990**	**1070**	**1130**	**1220**	**1280**	**1400**	**1550**
Current input	Nominal	A	143	163	180	208	233	260	286	306	326	343	360	390	420	464	518
	Maximum	A	233	266	306	345	378	411	466	499	532	572	612	651	690	756	822
Power input	Nominal	kW	86	98	111	123	140	155	171	183	196	209	222	236	250	278	309
	Maximum	kW	132	147	167	186	220	240	264	279	294	314	334	353	372	440	480
Max Start-up current		A	318	436	465	586	650	805	551	669	702	731	771	892	931	1.028	1.216
UNIT (aM) FUSES		A	250	315	315	400	400	500	630	630	630	630	630	800	800	800	1.000
Phase WIRE SECTION		mm^2	120	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x300

(*) Power factor correction capacitor option.

8 - Technical Data (continued)

Electrical data - SYSCREW WATER EVO HP - R134a

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	98	163	144	280	436	0,87	> 0.90	300
490	1	1	S/D	111	180	161	310	465	0,89	> 0.90	300
570	1	1	S/D	129	217	188	320	586	0,86	> 0.90	300
630	1	1	S/D	147	244	212	360	650	0,87	> 0.90	300
700	1	1	S/D	165	275	240	413	805	0,87	> 0.90	300
770	1	1	S/D	179	301	259	447	917	0,86	> 0.90	300
860	1	2	S/D	97	161	144	280	436	0,86	> 0.90	300
	2		S/D	97	161	144	280	436	0,86	> 0.90	300
920	1	2	S/D	97	161	144	280	436	0,87	> 0.90	300
	2		S/D	110	179	161	310	465	0,89	> 0.90	300
990	1	2	S/D	110	179	161	310	465	0,89	> 0.90	300
	2		S/D	110	179	161	310	465	0,89	> 0.90	300
1070	1	2	S/D	110	179	161	310	465	0,89	> 0.90	300
	2		S/D	128	215	188	320	586	0,86	> 0.90	300
1130	1	2	S/D	128	215	188	320	586	0,86	> 0.90	300
	2		S/D	128	215	188	320	586	0,86	> 0.90	300
1220	1	2	S/D	128	215	188	320	586	0,86	> 0.90	300
	2		S/D	144	239	212	360	650	0,88	> 0.90	300
1280	1	2	S/D	144	239	212	360	650	0,87	> 0.90	300
	2		S/D	144	239	212	360	650	0,87	> 0.90	300
1400	1	2	S/D	165	275	240	413	805	0,87	> 0.90	300
	2		S/D	165	275	240	413	805	0,87	> 0.90	300
1550	1	1	S/D	177	299	259	447	917	0,86	> 0.90	300
	2	2	S/D	177	299	259	447	917	0,86	> 0.90	300

STD - S Version			440	490	570	630	700	770	860	920	990	1070	1130	1220	1280	1400	1550
Current input	Nominal	A	163	180	217	244	275	301	322	340	358	394	430	454	478	550	598
	Maximum	A	280	310	320	360	413	447	560	590	620	630	640	680	720	826	894
Power input	Nominal	kW	98	111	129	147	165	179	195	208	220	238	256	272	289	329	354
	Maximum	kW	155	175	204	222	254	277	310	330	350	379	408	426	444	508	554
Max Start-up current		A	436	465	586	650	805	917	716	745	775	896	906	970	1.010	1.218	1.364
UNIT (aM) FUSES		A	315	315	400	400	500	500	630	630	630	800	800	800	800	1.000	1.000
Phase WIRE SECTION		mm^2	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x240	2x300	2x300

(*) Power factor correction capacitor option.

8 - Technical Data (continued)

Electrical data - SYSCREW WATER EVO HP - R513A

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	101	168	144	280	436	0,87	> 0.90	300
490	1	1	S/D	114	185	161	310	465	0,89	> 0.90	300
570	1	1	S/D	134	224	188	320	586	0,86	> 0.90	300
630	1	1	S/D	153	252	212	360	650	0,87	> 0.90	300
700	1	1	S/D	174	286	240	413	805	0,87	> 0.90	300
770	1	1	S/D	182	305	259	447	917	0,86	> 0.90	300
860	1	2	S/D	101	168	144	280	436	0,86	> 0.90	300
	2		S/D	101	168	144	280	436	0,86	> 0.90	300
920	1	2	S/D	101	168	144	280	436	0,87	> 0.90	300
	2		S/D	114	185	161	310	465	0,89	> 0.90	300
990	1	2	S/D	114	185	161	310	465	0,89	> 0.90	300
	2		S/D	114	185	161	310	465	0,89	> 0.90	300
1070	1	2	S/D	114	185	161	310	465	0,89	> 0.90	300
	2		S/D	133	222	188	320	586	0,86	> 0.90	300
1130	1	2	S/D	133	222	188	320	586	0,86	> 0.90	300
	2		S/D	133	222	188	320	586	0,86	> 0.90	300
1220	1	2	S/D	133	222	188	320	586	0,86	> 0.90	300
	2		S/D	150	249	212	360	650	0,88	> 0.90	300
1280	1	2	S/D	150	249	212	360	650	0,87	> 0.90	300
	2		S/D	150	249	212	360	650	0,87	> 0.90	300
1400	1	2	S/D	173	283	240	413	805	0,87	> 0.90	300
	2		S/D	173	283	240	413	805	0,87	> 0.90	300
1550	1	1	S/D	180	303	259	447	917	0,86	> 0.90	300
	2	2	S/D	180	303	259	447	917	0,86	> 0.90	300

STD - S Version			440	490	570	630	700	770	860	920	990	1070	1130	1220	1280	1400	1550
Current input	Nominal	A	168	185	224	252	286	305	336	353	370	407	444	471	498	566	606
	Maximum	A	280	310	320	360	413	447	560	590	620	630	640	680	720	826	894
Power input	Nominal	kW	101	114	134	153	174	182	202	215	228	247	266	283	300	345	360
	Maximum	kW	155	175	204	222	254	277	310	330	350	379	408	426	444	508	554
Max Start-up current		A	436	465	586	650	805	917	716	745	775	896	906	970	1.010	1.218	1.364
UNIT (aM) FUSES		A	315	315	400	400	500	500	630	630	630	800	800	800	800	1.000	1.000
Phase WIRE SECTION		mm^2	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x240	2x300	2x300

(*) Power factor correction capacitor option.

8 - Technical Data (continued)

Electrical data - SYSCREW WATER EVO RC - R134a

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	100	166	144	280	436	0,87	> 0.90	300
490	1	1	S/D	111	181	161	310	465	0,89	> 0.90	300
570	1	1	S/D	129	217	188	320	586	0,86	> 0.90	300
630	1	1	S/D	145	242	212	360	650	0,87	> 0.90	300
700	1	1	S/D	168	278	240	413	805	0,87	> 0.90	300
770	1	1	S/D	178	300	259	447	917	0,86	> 0.90	300
860	1	2	S/D	99	165	144	280	436	0,86	> 0.90	300
	2		S/D	99	165	144	280	436	0,86	> 0.90	300
920	1	2	S/D	99	165	144	280	436	0,87	> 0.90	300
	2		S/D	111	181	161	310	465	0,89	> 0.90	300
990	1	2	S/D	113	183	161	310	465	0,89	> 0.90	300
	2		S/D	113	183	161	310	465	0,89	> 0.90	300
1070	1	2	S/D	113	183	161	310	465	0,89	> 0.90	300
	2		S/D	131	220	188	320	586	0,86	> 0.90	300
1130	1	2	S/D	130	218	188	320	586	0,86	> 0.90	300
	2		S/D	130	218	188	320	586	0,86	> 0.90	300
1220	1	2	S/D	132	220	188	320	586	0,86	> 0.90	300
	2		S/D	149	246	212	360	650	0,88	> 0.90	300
1280	1	2	S/D	147	244	212	360	650	0,87	> 0.90	300
	2		S/D	147	244	212	360	650	0,87	> 0.90	300
1400	1	2	S/D	168	278	240	413	805	0,87	> 0.90	300
	2		S/D	168	278	240	413	805	0,87	> 0.90	300
1550	1	1	S/D	176	297	259	447	917	0,86	> 0.90	300
	2	2	S/D	176	297	259	447	917	0,86	> 0.90	300

STD - S Version			**440**	**490**	**570**	**630**	**700**	**770**	**860**	**920**	**990**	**1070**	**1130**	**1220**	**1280**	**1400**	**1550**
Current input	Nominal	A	166	181	217	242	278	300	330	346	366	403	436	466	488	556	594
	Maximum	A	280	310	320	360	413	447	560	590	620	630	640	680	720	826	894
Power input	Nominal	kW	100	111	129	145	168	178	197	210	225	244	259	280,9	294	335	352
	Maximum	kW	155	175	204	222	254	277	310	330	350	379	408	426	444	508	554
Max Start-up current		A	436	465	586	650	805	917	716	745	775	896	906	970	1010	1218	1364
UNIT (aM) FUSES		A	315	315	400	400	500	500	630	630	630	800	800	800	800	1000	1000
Phase WIRE SECTION		mm^2	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x240	2x300	2x300

(*) Power factor correction capacitor option.

8 - Technical Data (continued)

Electrical data - SYSCREW WATER EVO RC - R513A

Model	System	Circuit	Compressor start mode	Nominal power input	Nominal current input	Maximum power input	Maximum current input - FLA	Start-up current - LRA	Nominal power factor	Corrected power factor*	Carter oil absorbed power (230 Vac)
				(kW)	(A)	(kW)	(A)	(A)	-	-	(W)
440	1	1	S/D	100	166	144	280	436	0,87	> 0.90	300
490	1	1	S/D	111	181	161	310	465	0,89	> 0.90	300
570	1	1	S/D	129	217	188	320	586	0,86	> 0.90	300
630	1	1	S/D	145	242	212	360	650	0,87	> 0.90	300
700	1	1	S/D	168	278	240	413	805	0,87	> 0.90	300
770	1	1	S/D	178	300	259	447	917	0,86	> 0.90	300
860	1	2	S/D	99	165	144	280	436	0,86	> 0.90	300
	2		S/D	99	165	144	280	436	0,86	> 0.90	300
920	1	2	S/D	99	165	144	280	436	0,87	> 0.90	300
	2		S/D	111	181	161	310	465	0,89	> 0.90	300
990	1	2	S/D	113	183	161	310	465	0,89	> 0.90	300
	2		S/D	113	183	161	310	465	0,89	> 0.90	300
1070	1	2	S/D	113	183	161	310	465	0,89	> 0.90	300
	2		S/D	131	220	188	320	586	0,86	> 0.90	300
1130	1	2	S/D	130	218	188	320	586	0,86	> 0.90	300
	2		S/D	130	218	188	320	586	0,86	> 0.90	300
1220	1	2	S/D	132	220	188	320	586	0,86	> 0.90	300
	2		S/D	149	246	212	360	650	0,88	> 0.90	300
1280	1	2	S/D	147	244	212	360	650	0,87	> 0.90	300
	2		S/D	147	244	212	360	650	0,87	> 0.90	300
1400	1	2	S/D	168	278	240	413	805	0,87	> 0.90	300
	2		S/D	168	278	240	413	805	0,87	> 0.90	300
1550	1	1	S/D	176	297	259	447	917	0,86	> 0.90	300
	2	2	S/D	176	297	259	447	917	0,86	> 0.90	300

STD - S Version			440	490	570	630	700	770	860	920	990	1070	1130	1220	1280	1400	1550
Current input	Nominal	A	166	181	217	242	278	300	330	346	366	403	436	466	488	556	594
	Maximum	A	280	310	320	360	413	447	560	590	620	630	640	680	720	826	894
Power input	Nominal	kW	100	111	129	145	168	178	197	210	225	244	259	280,9	294	335	352
	Maximum	kW	155	175	204	222	254	277	310	330	350	379	408	426	444	508	554
Max Start-up current		A	436	465	586	650	805	917	716	745	775	896	906	970	1010	1218	1364
UNIT (aM) FUSES		A	315	315	400	400	500	500	630	630	630	800	800	800	800	1000	1000
Phase WIRE SECTION		mm^2	185	185	240	240	2x185	2x185	2x185	2x185	2x185	2x240	2x240	2x240	2x240	2x300	2x300

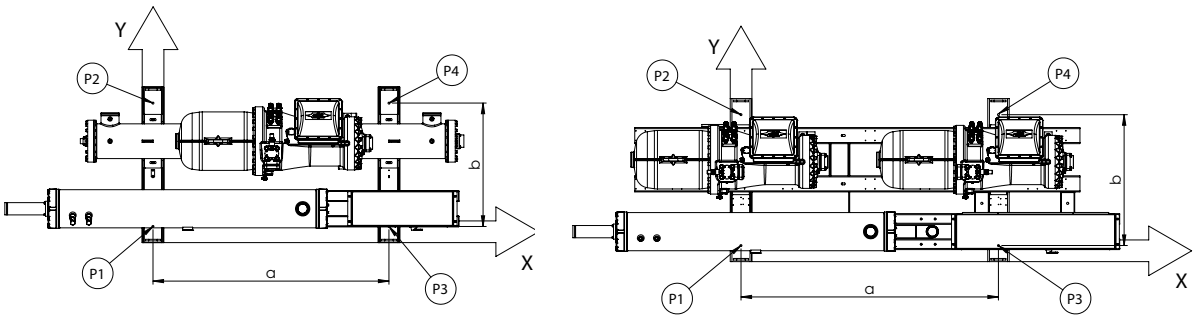
(*) Power factor correction capacitor option.

8 - Technical Data (continued)

8.4 Position of shock adsorbers and weight distribution on supports

SYSCREW WATER CO STD	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	596	755	590	749	2690	2475	2200	1050	1095	587
490	598	759	591	752	2700	2485	2200	1050	1094	588
570	664	815	622	774	2875	2658	2200	1050	1068	580
630	740	838	663	762	3003	2770	2200	1050	1044	559
700	817	992	744	919	3472	3134	2200	1050	1054	578
770	851	1018	742	910	3521	3176	2200	1050	1032	575
860	1246	1509	991	1254	5000	4636	2400	1220	1077	674
920	1246	1510	995	1259	5010	4646	2400	1220	1080	674
990	1361	1725	1096	1460	5642	5082	2400	1220	1088	689
1070	1414	1761	1148	1495	5818	5270	2400	1220	1090	683
1130	1505	1825	1181	1501	6012	5462	2400	1220	1071	675
1220	1535	1838	1200	1504	6077	5547	2400	1220	1068	671
1280	1559	1856	1206	1503	6124	5587	2400	1220	1062	669
1400	1610	1893	1456	1739	6698	6037	2400	1220	1145	662
1550	1661	1951	1425	1715	6752	6091	2400	1220	1116	662

SYSCREW WATER CO S	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	625	816	626	817	2884	2669	2200	1050	1101	595
490	627	820	627	820	2894	2679	2200	1050	1100	595
570	692	877	658	842	3069	2852	2200	1050	1075	588
630	769	899	700	829	3197	2964	2200	1050	1052	568
700	847	1052	780	987	3666	3328	2200	1050	1060	584
770	882	1081	777	975	3715	3370	2200	1050	1037	581
860	1414	1738	956	1280	5388	5024	2400	1220	996	683
920	1414	1739	960	1285	5398	5034	2400	1220	998	683
990	1437	1862	1153	1578	6030	5470	2400	1220	1087	696
1070	1490	1899	1204	1613	6206	5658	2400	1220	1090	690
1130	1581	1961	1239	1619	6400	5850	2400	1220	1072	682
1220	1612	1975	1258	1620	6465	5935	2400	1220	1069	678
1280	1637	1992	1263	1620	6512	5975	2400	1220	1063	677
1400	1668	2012	1531	1875	7086	6425	2400	1220	1154	669
1550	1725	2075	1494	1846	7140	6479	2400	1220	1122	670

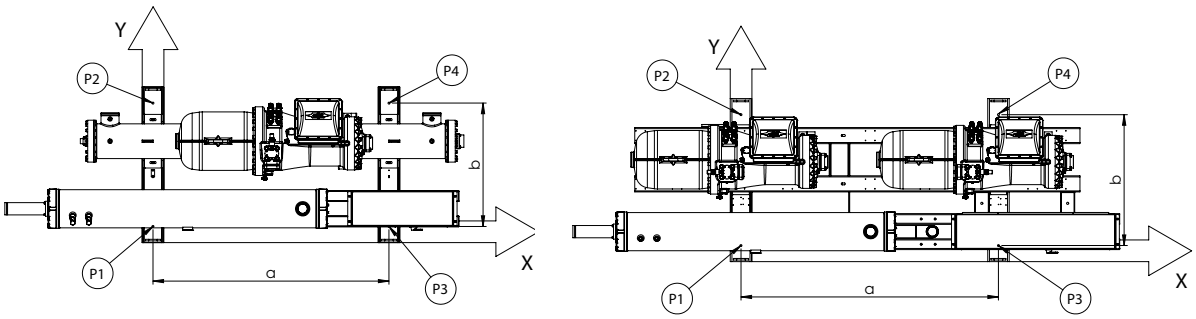


8 - Technical Data (continued)

Position of shock adsorbers and weight distribution on supports

SYSCREW WATER HP STD	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	596	755	590	749	2690	2475	2200	1050	1095	587
490	598	759	591	752	2700	2485	2200	1050	1094	588
570	664	815	622	774	2875	2658	2200	1050	1068	580
630	740	838	663	762	3003	2770	2200	1050	1044	559
700	817	992	744	919	3472	3134	2200	1050	1054	578
770	851	1018	742	910	3521	3176	2200	1050	1032	575
860	1246	1509	991	1254	5000	4636	2400	1220	1077	674
920	1246	1510	995	1259	5010	4646	2400	1220	1080	674
990	1361	1725	1096	1460	5642	5082	2400	1220	1088	689
1070	1414	1761	1148	1495	5818	5270	2400	1220	1090	683
1130	1505	1825	1181	1501	6012	5462	2400	1220	1071	675
1220	1535	1838	1200	1504	6077	5547	2400	1220	1068	671
1280	1559	1856	1206	1503	6124	5587	2400	1220	1062	669
1400	1610	1893	1456	1739	6698	6037	2400	1220	1145	662
1550	1661	1951	1425	1715	6752	6091	2400	1220	1116	662

SYSCREW WATER HP S	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	765	936	688	860	3249	2993	2200	1150	1048	636
490	781	977	713	909	3380	3082	2200	1150	1056	642
570	796	1005	730	940	3471	3181	2200	1150	1058	644
630	799	1012	734	946	3491	3201	2200	1150	1059	645
700	1103	1232	878	1008	4221	3804	2200	1150	983	610
770	974	1206	802	1035	4017	3631	2200	1150	1006	642
860	1699	1899	1204	1403	6205	5656	2400	1220	1009	649
920	1701	1905	1210	1413	6229	5701	2400	1220	1011	650
990	1749	1995	1258	1504	6506	5883	2400	1220	1019	656
1070	1864	2110	1357	1601	6932	6317	2400	1220	1024	653
1130	1973	2187	1391	1604	7155	6524	2400	1220	1005	646
1220	1989	2194	1403	1608	7194	6547	2400	1220	1004	645
1280	2013	2211	1405	1603	7232	6569	2400	1220	998	643
1400	2245	2482	1707	1944	8378	7443	2400	1280	1046	676
1550	2257	2509	1720	1972	8458	7523	2400	1280	1048	678

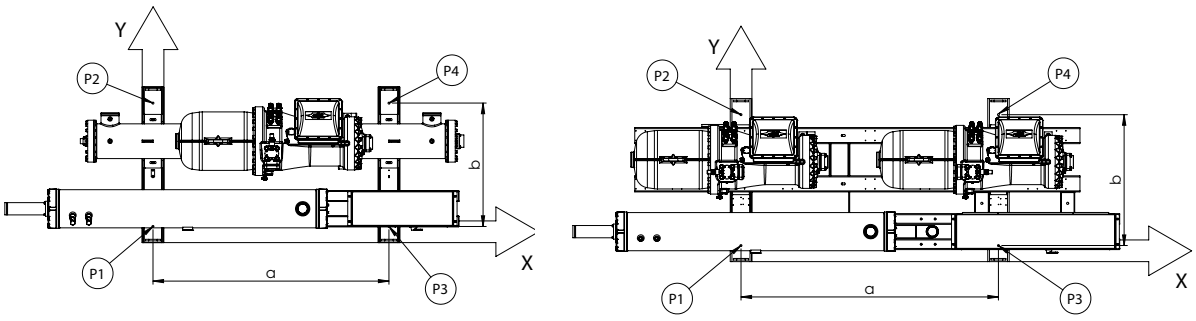


8 - Technical Data (continued)

Position of shock adsorbers and weight distribution on supports

SYSCREW WATER RC STD	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	401	675	476	750	2302	2159	2200	1050	1172	650
490	402	678	478	754	2312	2169	2200	1050	1171	650
570	426	726	502	802	2456	2285	2200	1050	1169	653
630	429	732	506	809	2476	2305	2200	1050	1168	654
700	507	890	586	969	2952	2676	2200	1050	1159	661
770	513	903	593	983	2992	2716	2200	1050	1159	662
860	811	1611	791	1591	4804	4425	2400	1220	1190	813
920	810	1613	794	1597	4814	4435	2400	1220	1192	813
990	844	1676	823	1655	4998	4526	2400	1220	1190	813
1070	842	1690	846	1694	5071	4613	2400	1220	1202	814
1130	865	1727	839	1701	5131	4673	2400	1220	1188	815
1220	866	1736	849	1719	5170	4739	2400	1220	1192	815
1280	874	1749	846	1721	5190	4759	2400	1220	1187	816
1400	823	1775	1023	1975	5596	5073	2400	1220	1285	818
1550	832	1803	1035	2006	5676	5153	2400	1220	1286	819

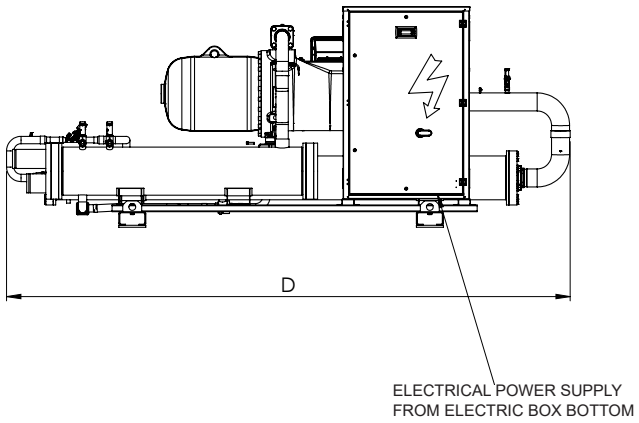
SYSCREW WATER RC S	Weight distribution				Operating weight	Shipping weight	P coordinates		CG	
	P1	P2	P3	P4			a	b	x	y
	kg	kg	kg	kg	kg	kg	mm	mm	mm	mm
440	433	740	508	815	2496	2353	2200	1050	1166	654
490	435	743	510	818	2506	2363	2200	1050	1166	654
570	458	790	535	867	2650	2479	2200	1050	1163	657
630	461	797	538	874	2670	2499	2200	1050	1163	657
700	540	954	619	1033	3146	2870	2200	1050	1155	663
770	546	967	626	1047	3186	2910	2200	1050	1155	664
860	878	1738	858	1718	5191	4812	2400	1220	1191	812
920	877	1739	861	1723	5201	4822	2400	1220	1193	812
990	911	1803	890	1782	5385	4913	2400	1220	1191	812
1070	908	1817	912	1821	5458	5000	2400	1220	1202	813
1130	931	1854	905	1828	5518	5060	2400	1220	1189	814
1220	933	1863	915	1845	5557	5126	2400	1220	1192	814
1280	941	1876	913	1848	5577	5146	2400	1220	1188	815
1400	827	1966	1026	2165	5983	5460	2400	1220	1280	842
1550	835	1994	1038	2196	6063	5540	2400	1220	1280	843



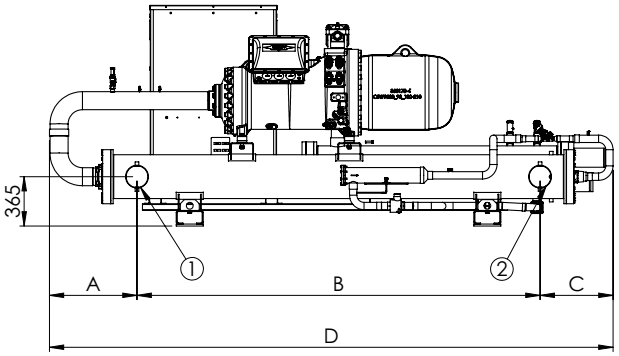
8 - Technical Data (continued)

8.5 Dimensional drawings - SYSCREW 440-770 WATER EVO CO

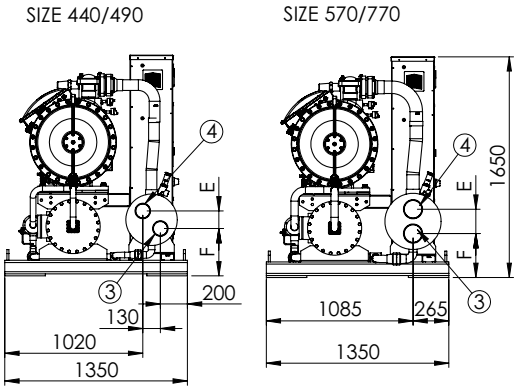
Front view



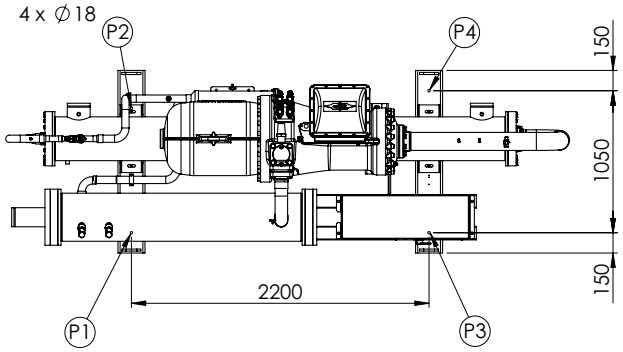
Back view



Side view



Top view



1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Condenser water inlet victaulic connection
4	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

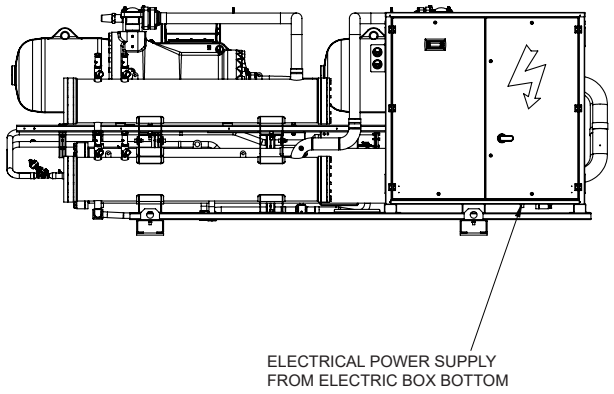
Size	A	B	C	D
440-490	780	2980	490	4250
570	680	2980	550	4210
630	680	2980	550	4210
700-770	720	2860	600	4180

Size	E	F	dia 1-2	dia 3-4
440-490	130	350	DN150 (6”)	DN100 (4”)
570	180	325	DN150 (6”)	DN125 (5”)
630	210	335	DN150 (6”)	DN125 (5”)
700-770	210	335	DN200 (8”)	DN125 (5”)

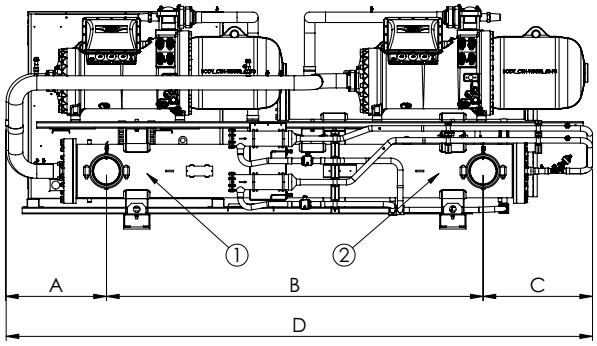
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO CO

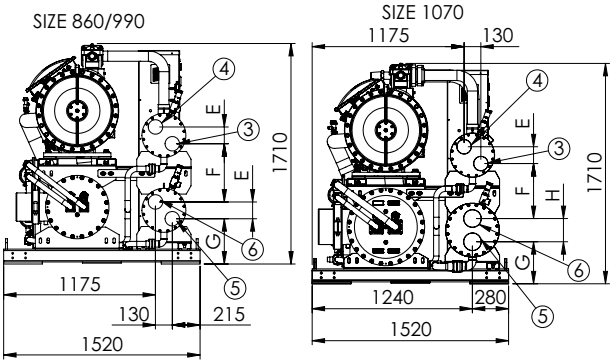
Front view



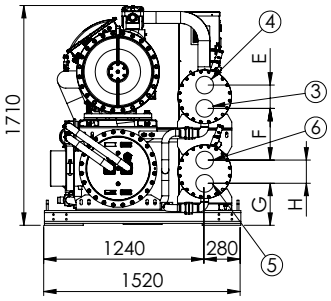
Back view



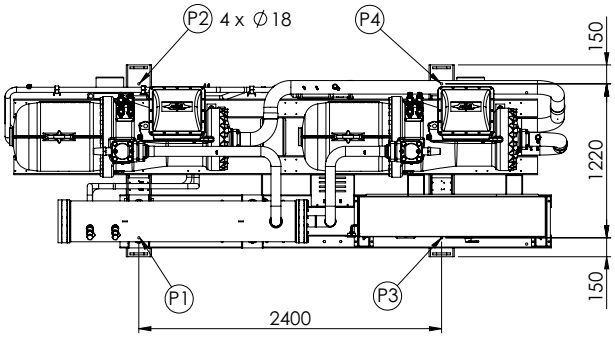
Side view



SIZE 1130/1550



Top view



Size	A	B	C	D	E	F	G	H
860	800	2860	850	4510	130	450	350	-
920	800	2860	850	4510	130	450	350	-
990	850	2860	890	4600	130	450	350	-
1070	850	2860	940	4650	130	425	325	180
1130	850	2860	940	4650	180	400	325	180
1220	850	2860	940	4650	180	400	325	180
1280	850	2860	940	4650	180	400	325	180
1400	860	3570	920	5350	210	450	310	210
1550	860	3570	920	5350	210	450	310	210

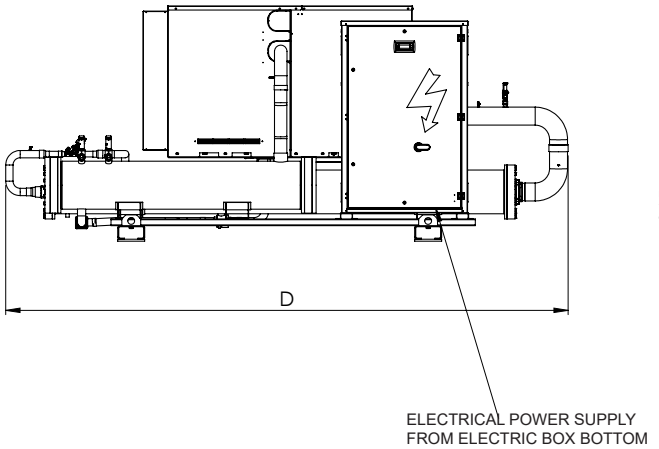
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-5	Condenser water inlet victaulic connection
4-6	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

Size	dia 1-2	dia 3	dia 4	dia 5	dia 6
860	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
920	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
990	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
1070	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN125 (5”)	DN125 (5”)
1130	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1220	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1280	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1400	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1550	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)

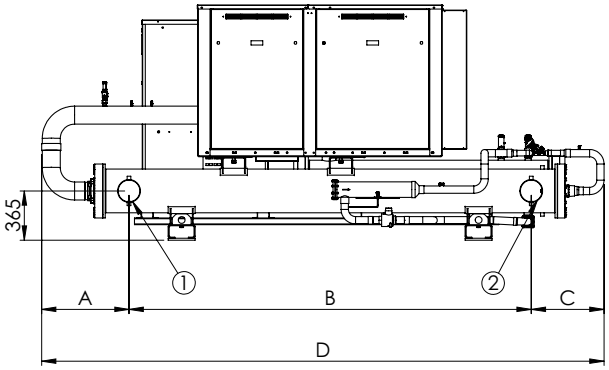
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 440-770 WATER EVO CO_S

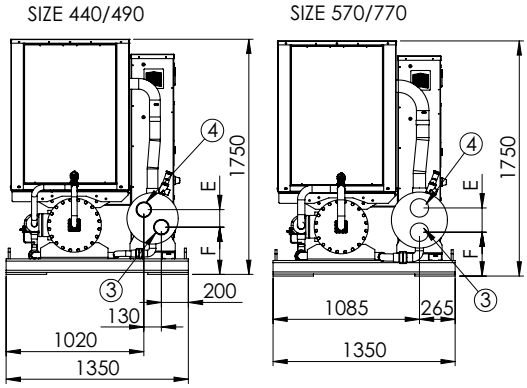
Front view



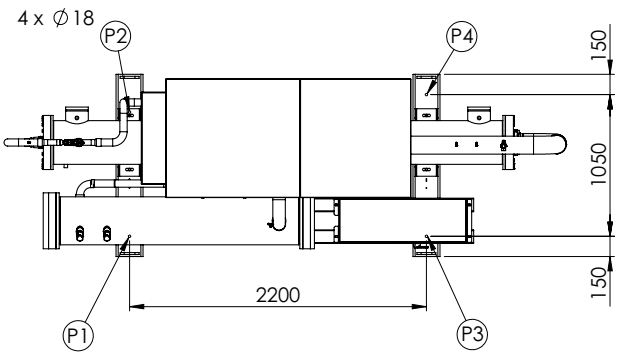
Back view



Side view



Top view



1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Condenser water inlet victaulic connection
4	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

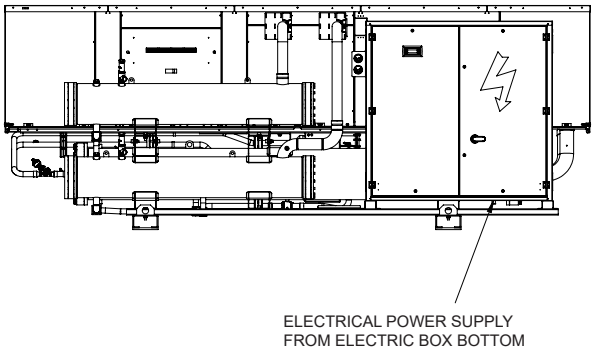
Size	A	B	C	D
440-490	780	2980	490	4250
570	680	2980	550	4210
630	680	2980	550	4210
700-770	720	2860	600	4180

Size	E	F	dia 1-2	dia 3-4
440-490	130	350	DN150 (6”)	DN100 (4”)
570	180	325	DN150 (6”)	DN125 (5”)
630	210	335	DN150 (6”)	DN125 (5”)
700-770	210	335	DN200 (8”)	DN125 (5”)

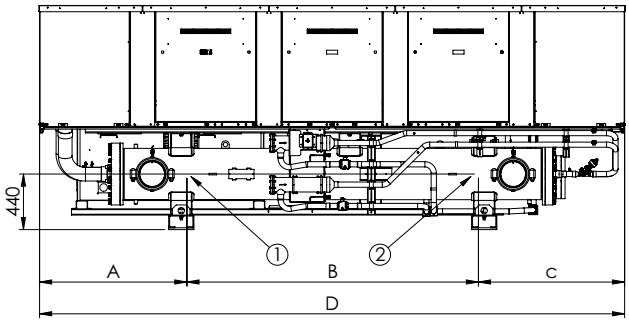
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO CO_S

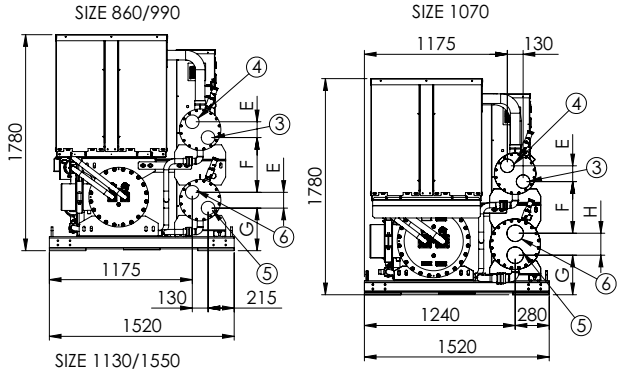
Front view



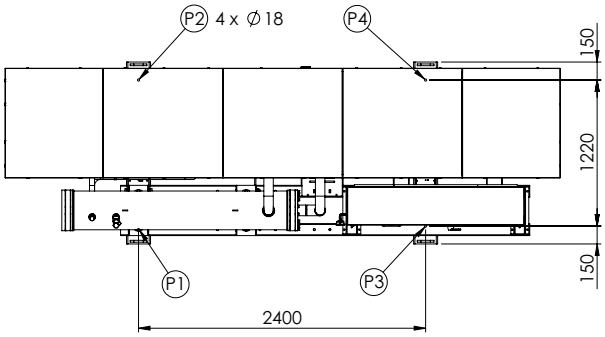
Back view



Side view



Top view



Size	A	B	C	D	E	F	G	H
860	800	2860	850	4510	130	450	350	-
920	800	2860	850	4510	130	450	350	-
990	890	2860	940	4690	130	450	350	-
1070	890	2860	940	4690	130	425	325	180
1130	890	2860	940	4690	180	400	325	180
1220	890	2860	940	4690	180	400	325	180
1280	890	2860	940	4690	180	400	325	180
1400	910	3570	920	5400	210	450	310	210
1550	910	3570	920	5400	210	450	310	210

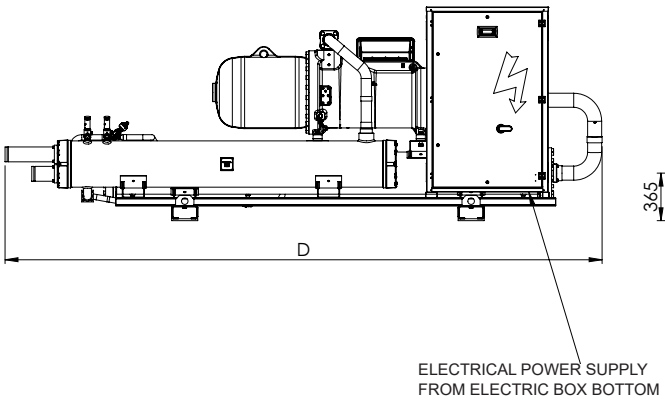
Size	dia 1-2	dia 3	dia 4	dia 5	dia 6
860	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
920	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
990	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
1070	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN125 (5”)	DN125 (5”)
1130	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1220	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1280	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1400	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1550	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)

1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-5	Condenser water inlet victaulic connection
4-6	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

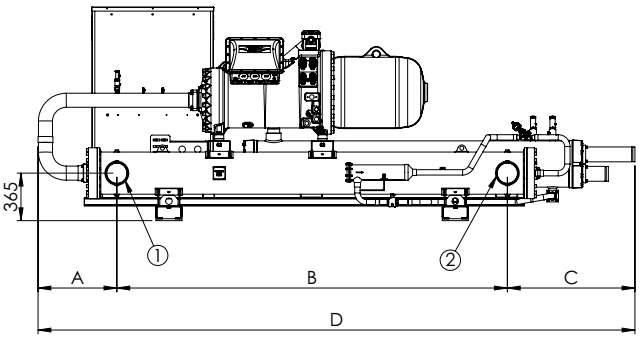
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 440-770 WATER EVO HP

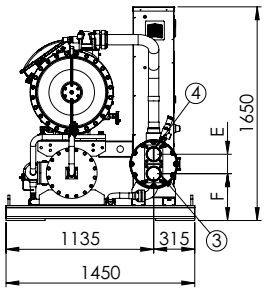
Front view



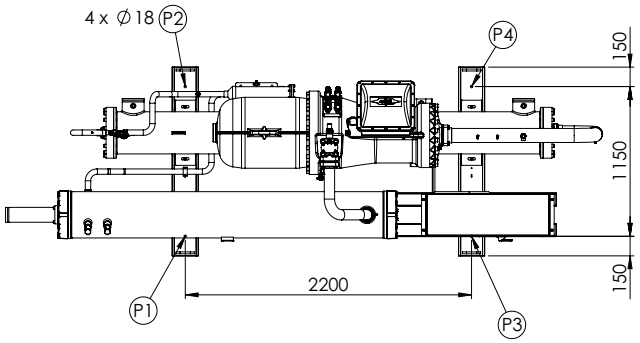
Back view



Side view



Top view



1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Condenser water inlet victaulic connection
4	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

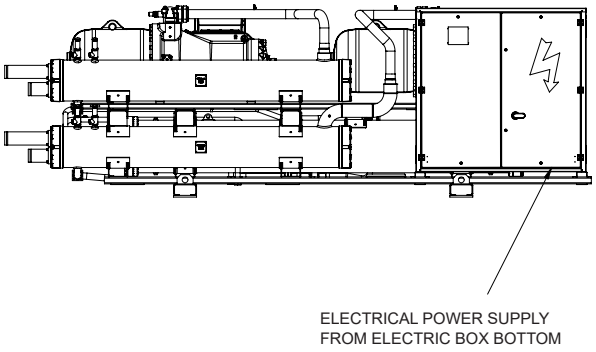
Size	A	B	C	D
440-490	610	3000	980	4590
570	650	3000	980	4630
630	700	2950	670	4320
700-770	720	2950	890	4560

Size	E	F	dia 1-2	dia 3-4
440-490	150	360	DN150 (6”)	DN100 (4”)
570	150	360	DN150 (6”)	DN100 (4”)
630	230	335	DN200 (8”)	DN125 (5”)
700-770	180	360	DN200 (8”)	DN125 (5”)

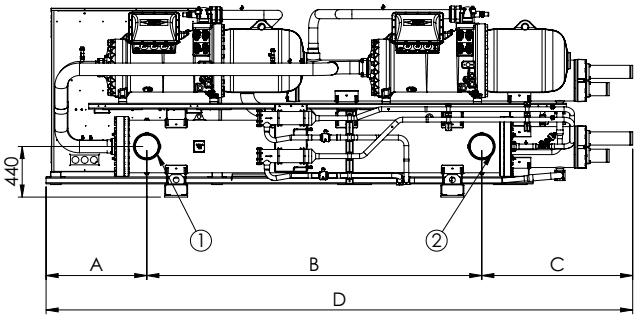
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO HP

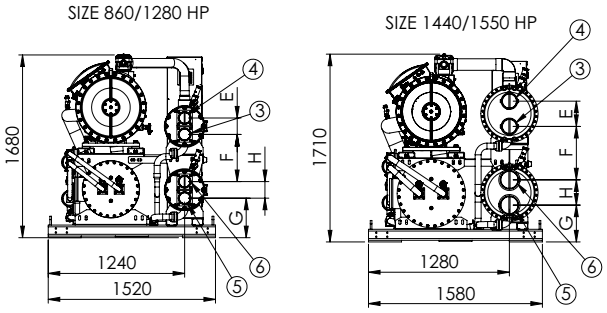
Front view



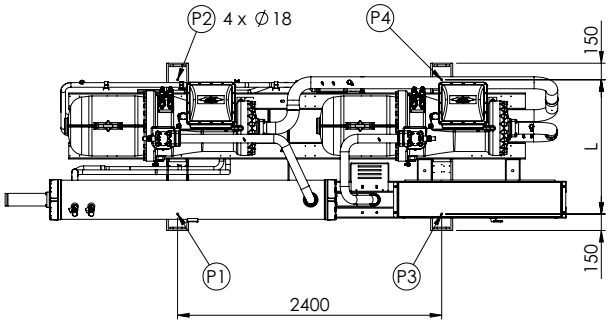
Back view



Side view



Top view



Size	A	B	C	D	E	F	G	H	L
860	880	2910	1320	5110	150	430	360	150	1220
920	880	2910	1320	5110	150	430	360	150	1220
990	900	2860	1340	5100	150	430	360	150	1220
1070	900	2860	1340	5100	150	450	330	180	1220
1130	900	2860	1240	5000	180	455	330	180	1220
1220	900	2860	1240	5000	180	455	330	180	1220
1280	900	2860	1240	5000	180	455	330	180	1220
1400	850	3550	900	5300	230	485	335	230	1280
1550	850	3550	900	5300	230	485	335	230	1280

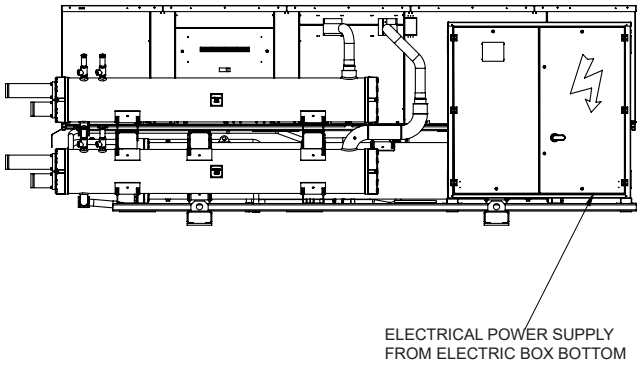
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-5	Condenser water inlet victaulic connection
4-6	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

Size	dia 1-2	dia 3	dia 4	dia 5	dia 6
860	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
920	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
990	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
1070	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN125 (5”)	DN125 (5”)
1130	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1220	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1280	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1400	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1550	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)

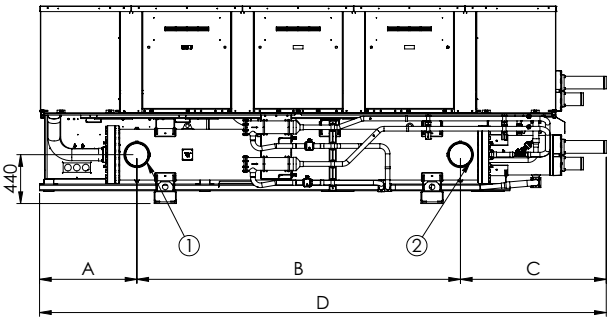
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 440-770 WATER EVO HP_S

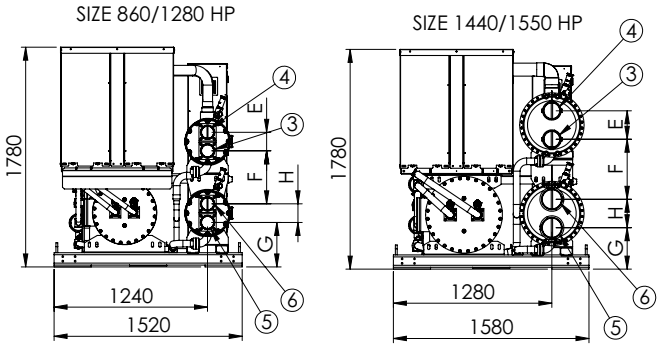
Front view



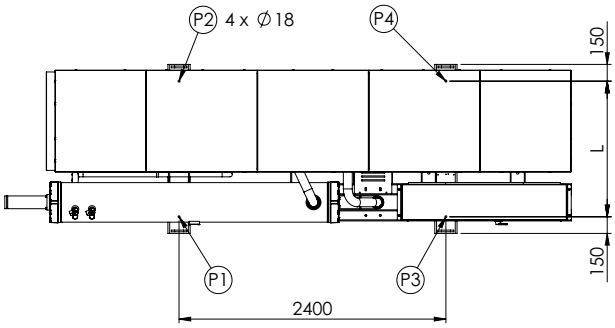
Back view



Side view



Top view



1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Condenser water inlet victaulic connection
4	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

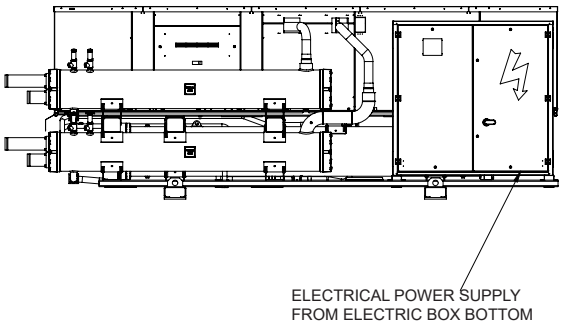
Size	A	B	C	D
440-490	610	3000	980	4590
570	650	3000	980	4630
630	700	2950	670	4320
700-770	720	2950	890	4560

Size	E	F	dia 1-2	dia 3-4
440-490	150	360	DN150 (6”)	DN100 (4”)
570	150	360	DN150 (6”)	DN100 (4”)
630	230	335	DN200 (8”)	DN125 (5”)
700-770	180	360	DN200 (8”)	DN125 (5”)

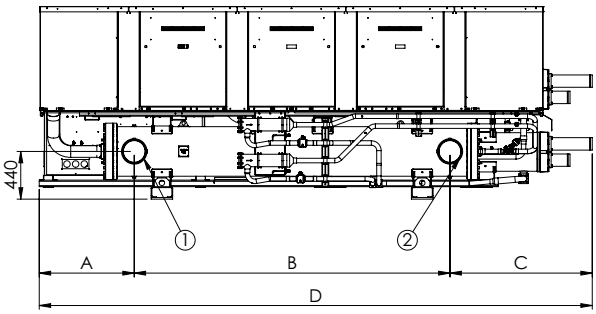
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO HP_S

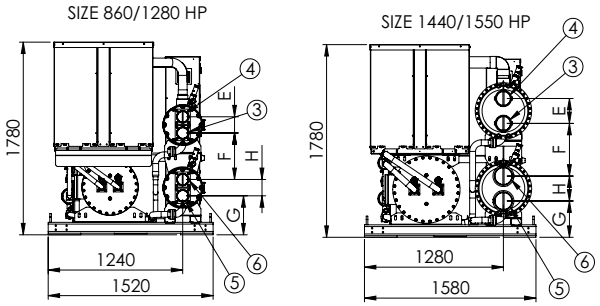
Front view



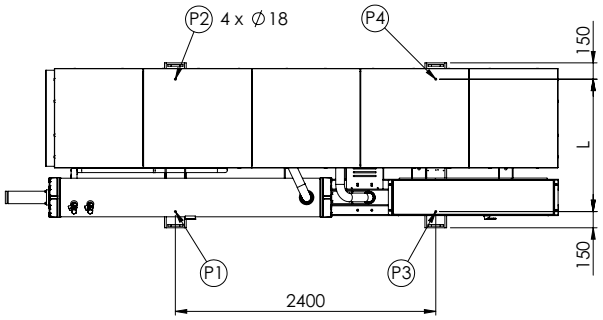
Back view



Side view



Top view



Size	A	B	C	D	E	F	G	H	L
860	900	2910	1320	5130	150	430	360	150	1220
920	900	2910	1320	5130	150	430	360	150	1220
990	920	2860	1340	5120	150	430	360	150	1220
1070	920	2860	1340	5120	150	450	330	180	1220
1130	920	2860	1240	5020	180	455	330	180	1220
1220	920	2860	1240	5020	180	455	330	180	1220
1280	920	2860	1240	5020	180	455	330	180	1220
1400	870	3550	900	5320	230	485	335	230	1280
1550	870	3550	900	5320	230	485	335	230	1280

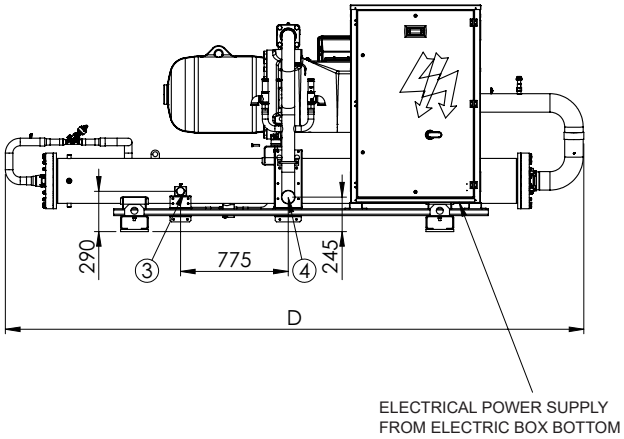
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-5	Condenser water inlet victaulic connection
4-6	Condenser water outlet victaulic connection
P1, P2, P3, P4	AVM position

Size	dia 1-2	dia 3	dia 4	dia 5	dia 6
860	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
920	DN200 (8”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
990	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN100 (4”)	DN100 (4”)
1070	DN250 (10”)	DN100 (4”)	DN100 (4”)	DN125 (5”)	DN125 (5”)
1130	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1220	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1280	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1400	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)
1550	DN250 (10”)	DN125 (5”)	DN125 (5”)	DN125 (5”)	DN125 (5”)

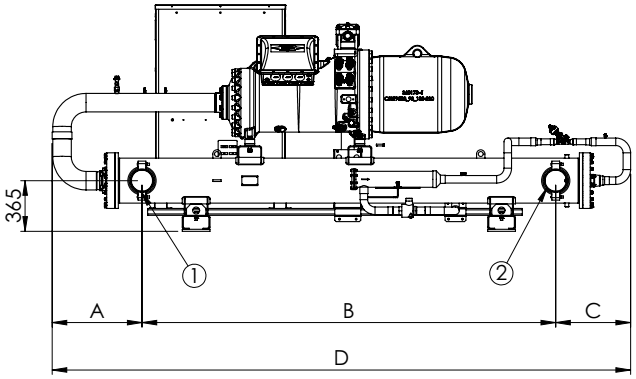
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 440-770 WATER EVO RC

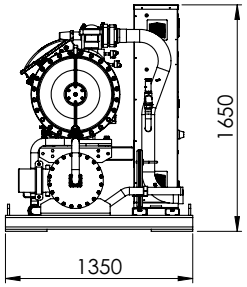
Front view



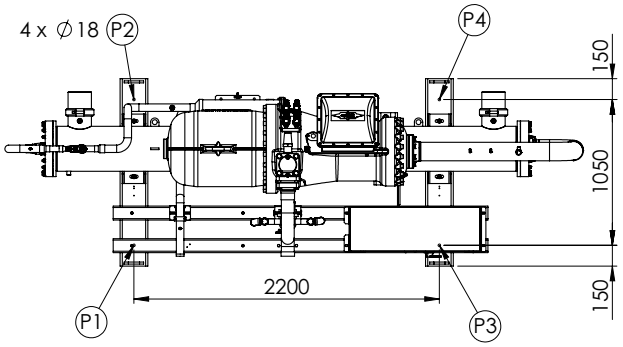
Back view



Side view



Top view



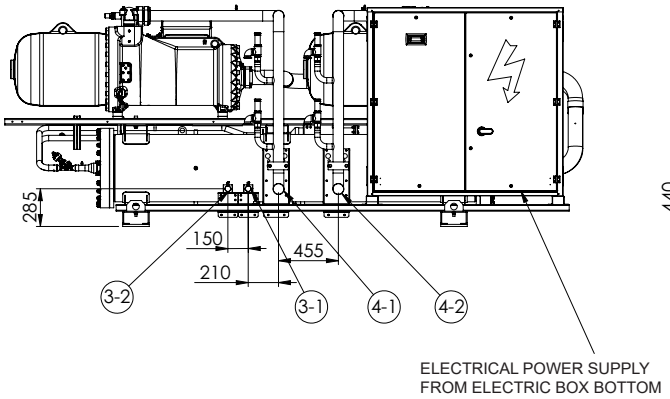
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Liquid connection
4	Discharge connection
P1, P2, P3, P4	AVM position

Size	A	B	C	D	dia 1-2	dia 3	dia 4
440-490	650	2410	560	3620	DN150 (6”)	1 5/8”	3 1/8”
570-630	680	2980	550	4210	DN150 (6”)	2 1/8”	3 5/8”
700-770	720	2860	600	4180	DN200 (8”)	2 1/8”	4 1/8”

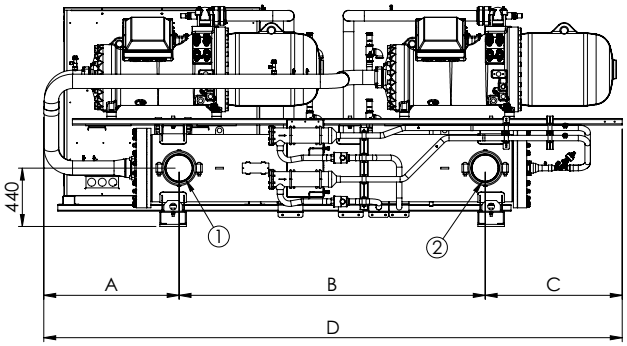
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO RC

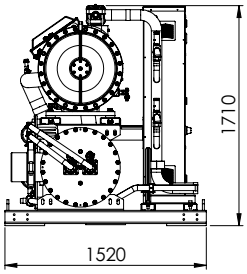
Front view



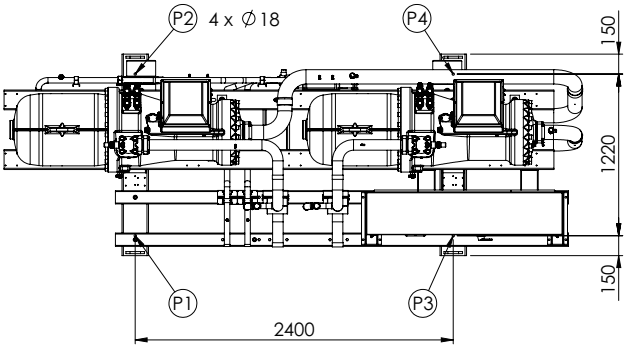
Back view



Side view



Top view



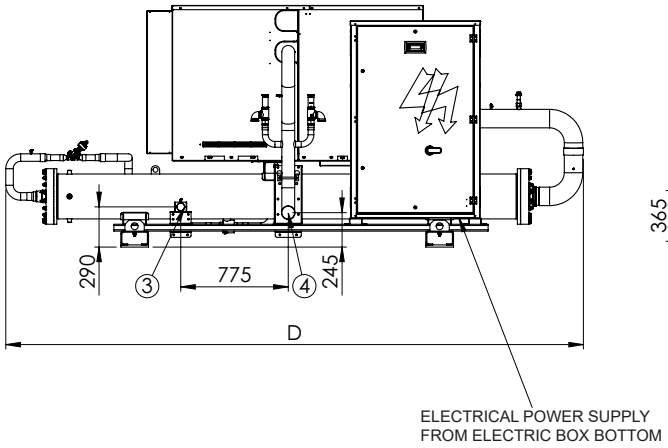
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-1	Liquid connection circ 1
3-2	Liquid connection circ 2
4-1	Discharge connection circ 1
4-2	Discharge connection circ 2
P1, P2, P3, P4	AVM position

Size	A	B	C	D	dia 1-2	dia 3	dia 4
860	1090	2310	1000	4400	DN200 (8”)	1 5/8”	3 1/8”
920	1090	2310	1000	4400	DN200 (8”)	1 5/8”	3 1/8”
990	850	2860	890	4600	DN250 (10”)	1 5/8”	3 1/8”
1070	850	2860	940	4650	DN250 (10”)	2 1/8”	3 1/8”
1130	850	2860	940	4650	DN250 (10”)	2 1/8”	3 1/8”
1220	850	2860	940	4650	DN250 (10”)	2 1/8”	3 1/8”
1280	850	2860	940	4650	DN250 (10”)	2 1/8”	3 1/8”
1400	860	3570	920	5350	DN250 (10”)	2 1/8”	4 1/8”
1550	860	3570	920	5350	DN250 (10”)	2 1/8”	4 1/8”

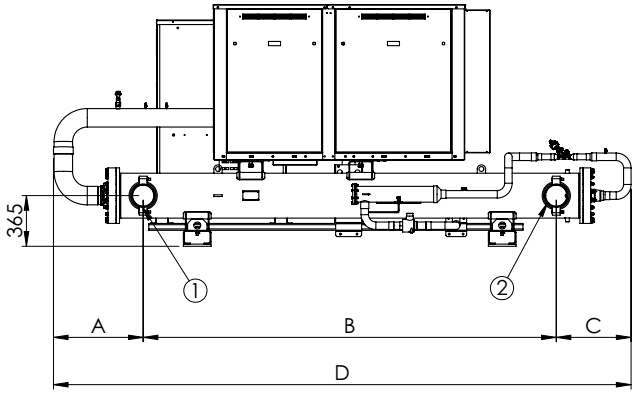
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 440-770 WATER EVO RC_S

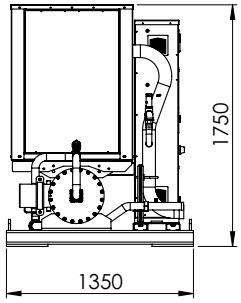
Front view



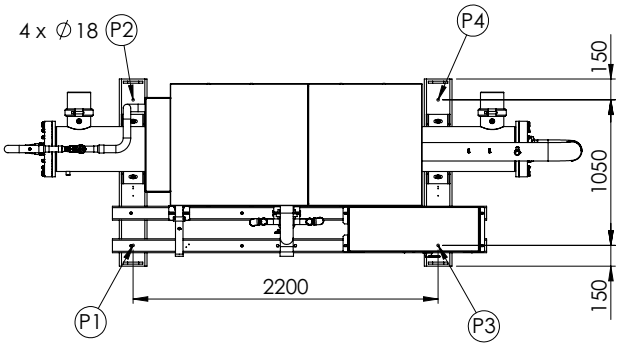
Back view



Side view



Top view



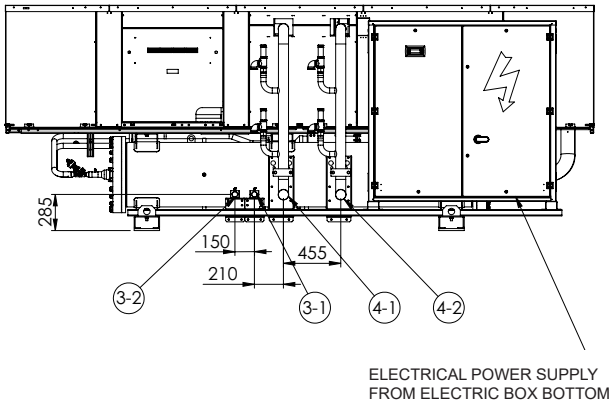
1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3	Liquid connection
4	Discharge connection
P1, P2, P3, P4	AVM position

Size	A	B	C	D	dia 1-2	dia 3	dia 4
440-490	650	2410	560	3620	DN150 (6”)	1 5/8”	3 1/8”
570-630	680	2980	550	4210	DN150 (6”)	2 1/8”	3 5/8”
700-770	720	2860	600	4180	DN200 (8”)	2 1/8”	4 1/8”

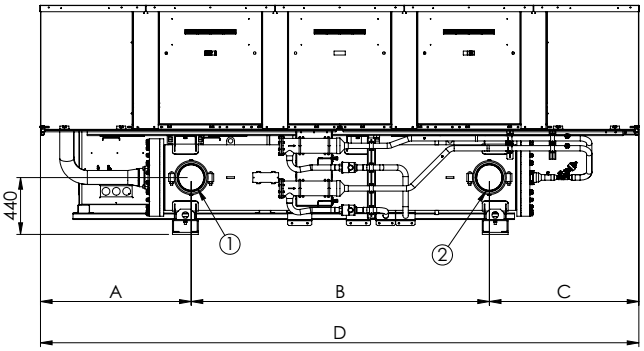
8 - Technical Data (continued)

Dimensional drawings - SYSCREW 860-1550 WATER EVO RC_S

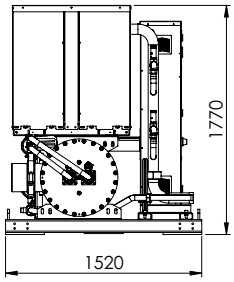
Front view



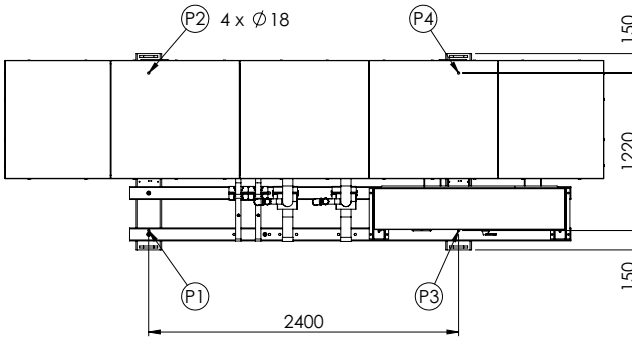
Back view



Side view



Top view

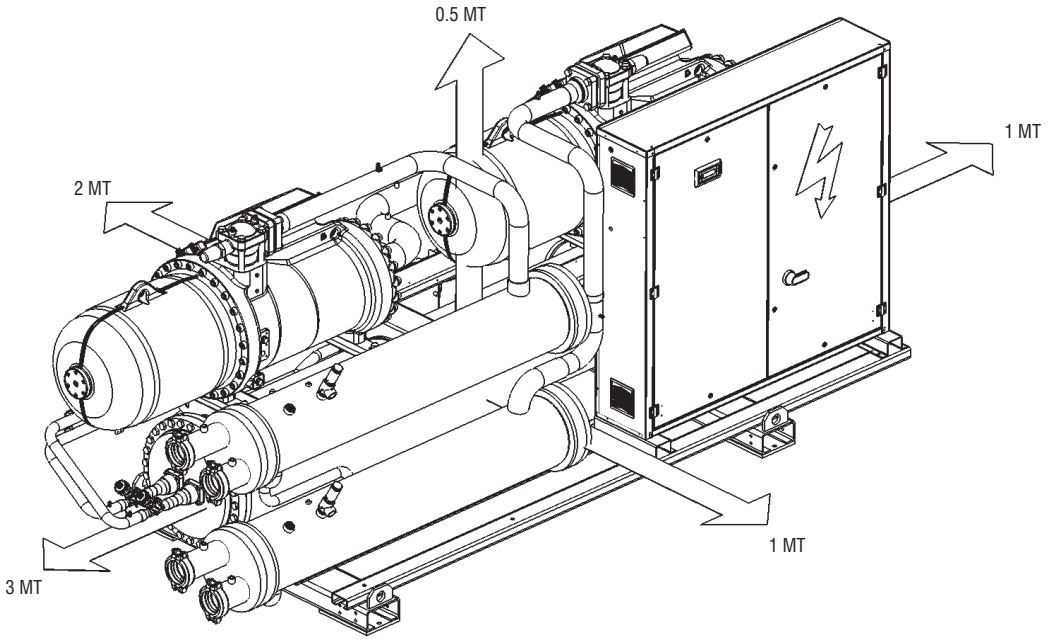


1	Evaporator water inlet victaulic connection
2	Evaporator water outlet victaulic connection
3-1	Liquid connection circ 1
3-2	Liquid connection circ 2
4-1	Discharge connection circ 1
4-2	Discharge connection circ 2
P1, P2, P3, P4	AVM position

Size	A	B	C	D	dia 1-2	dia 3	dia 4
860	1170	2310	1170	4650	DN200 (8”)	1 5/8”	3 1/8”
920	1170	2310	1170	4650	DN200 (8”)	1 5/8”	3 1/8”
990	890	2860	900	4650	DN250 (10”)	1 5/8”	3 1/8”
1070	890	2860	900	4650	DN250 (10”)	2 1/8”	3 1/8”
1130	890	2860	900	4650	DN250 (10”)	2 1/8”	3 1/8”
1220	890	2860	900	4650	DN250 (10”)	2 1/8”	3 1/8”
1280	890	2860	960	4710	DN250 (10”)	2 1/8”	3 1/8”
1400	910	3570	920	5400	DN250 (10”)	2 1/8”	4 1/8”
1550	910	3570	920	5400	DN250 (10”)	2 1/8”	4 1/8”

8 - Technical Data (continued)

8.6 Service spaces



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 pressure switch may be activated, resulting in the halting of 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 0.06 mbar.

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.

Then start the compressor and let the gas flow from the cylinder, up until the liquid flow, which can be observed through the sight glass, is limpid.

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 manufacturer.

If the compressor had to be replaced (due to burning of the winding or to mechanical failure), please contact one of the Authorized 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.

9.5 Condenser

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

To obtain an effective heat exchange, the difference between the temperature of the leaving water and the saturated condensing temperature must be in the 3 - 5°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.

9.6 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.

9.7 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.

9.8 Electronic expansion valve

The circuit of the unit is equipped with electronic expansion valve.

The valve is calibrated for an overheating of 6 °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 expansion valve.

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

9.9 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
HP pressure switch	2 / 4
LP pressure switch	2 / 4
Gas filter	1 / 2
Electronic expansion valve	1 / 2
Auxiliary relays	2
Compressor's fuses	3 / 6
Auxiliary fuses	6
Set of compressor contactors	1
Water sensor	2
Electronic card	1
Keyboard	1
Compressor oil resistor	1 / 2

11.2 Oil for compressors

The compressors are lubricated with Ester oil BSE 170 (Viscosity of 170 St / 40 °C).

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

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