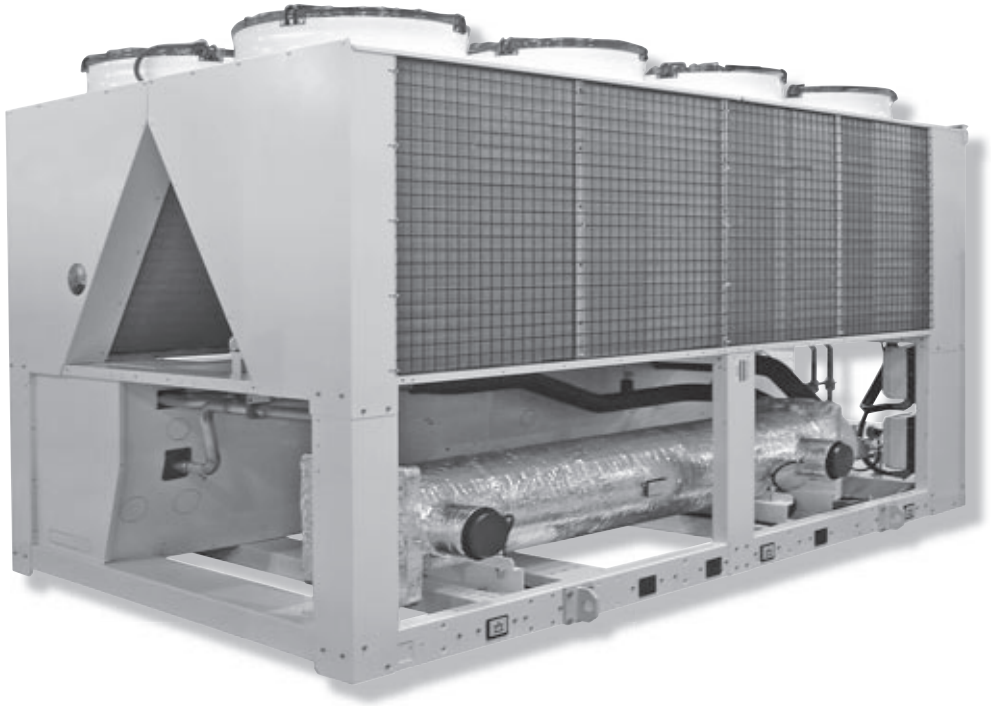
Библиотека СОК

Installation and maintenance manual

SLS 1402 ÷ 8404



English

293 ↓ 1646 kW

HFC134a

Air cooled chillers with screw compressors

IOM SLS134-N.2GB
Date : **July 2007**
Supersedes : **IOM SLS134-N.1GB/11.05**

CE

Table of contents

1 FOREWORD

1.1 Introduction

Itelco-Industry 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 Itelco-Industry's 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 Itelco-Industry's preliminary written authorisation.

This warranty shall apply providing that the installation instructions have been complied with (either issued by Itelco-Industry, or deriving from the current practice), and the Form 1 ("Start-up") has been filled-in and mailed to Itelco-Industry (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 Itelco-Industry's Authorised After-Sales Service.
- Maintenance must be performed only by skilled personnel - from one of Itelco-Industry's Authorised After-Sales Centers.
- Use only original Itelco-Industry 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 Itelco-Industry, which reserves any and all rights thereon. This manual may not be copied, in whole or in part, without Itelco-Industry's written authorization.

2 SAFETY

2.1 Foreword

These units must be installed in conformity with the provisions of Machinery Directive 98/37/EC, Low Voltage Directive 73/23/EC, Pressure Vessels Directive 97/23/EC, Electromagnetic Interference Directive 89/336/EC, 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. Itelco-Industry may not be held liable for any problems deriving from the replacement of original refrigerant or the introduction of hydrocarbons.

Itelco-Industry units are designed and manufactured according to the requirements of European Standard PED 97/23/EC (pressure vessels).

– The used refrigerants are included in group II (non-hazardous fluids).

– The maximum working pressure values are mentioned on the unit's data plate.

– Suitable safety devices (pressure switches and safety valves) have been provided, to prevent any anomalous overpressure inside the plant.

– The vents of the safety valves are positioned and oriented in such a way as to reduce the risk of contact with the operator, in the event that the valve is operated. Anyway, the installer will convey the discharge of the valves far from the unit.

– Dedicated guards (removable panels with tools) and danger signs indicate the presence of hot pipes or components (high surface temperature).

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

It is the User's responsibility to ensure that the unit is fit for the conditions of intended use and that both installation and maintenance are carried out by experienced personnel, capable of respecting all the recommendations provided by this manual. It is important that the unit is adequately supported, as detailed in this manual. Non-compliance with these recommendations may create hazardous situations for the personnel.

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

The unit has not been design to withstand loads and/or stress that may be transmitted by adjacent units, piping and/or structures. Each external load or stress transmitted to the unit may break or cause breakdowns in the unit's structure, as well as serious dangers to people. In these cases, any form of warranty will automatically become null and void.

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

2.2 Definitions

OWNER: means the legal representative of the company, body or individual who owns the plant where Itelco-Industry 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 Itelco-Industry 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 Itelco-Industry 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 Itelco-Industry or, in all EC countries, excluding Italy, under his full responsibility, by the distributor of Itelco-Industry product, to perform any routine and extraordinary maintenance operations, as well as any regulation, control, servicing operations and the replacement of pieces, as may be necessary during the life of the unit.

2.3 Access to the unit

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

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

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

2.4 General precautions

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

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

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

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

2.5 Precautions against residual risks

Prevention of residual risks caused by the control system

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

Prevention of residual mechanical risks

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

Prevention of residual electrical risks

- connect the unit to the mains according to the instructions provided in this manual
- periodically carry out all the maintenance operations specified by this manual
- disconnect the unit from the mains by the external disconnecting switch before opening the electrical board
- check the proper grounding of the unit before start-up

- check all the electrical connections, the connecting cables, and in particular the insulation; replace worn or damaged cables
- periodically check the board's internal wiring
- do not use cables having an inadequate section or flying connections, even for limited periods of time or in an emergency

Prevention of other residual risks

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

2.6 Precautions during maintenance operations

Maintenance operations can be carried out by authorised technicians only.
Before performing any maintenance operations:

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

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

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

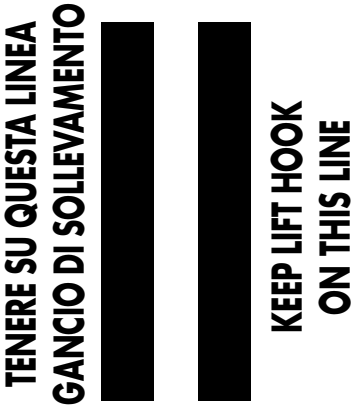
The following precautions must be always adopted:

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

2.7 Safety labels

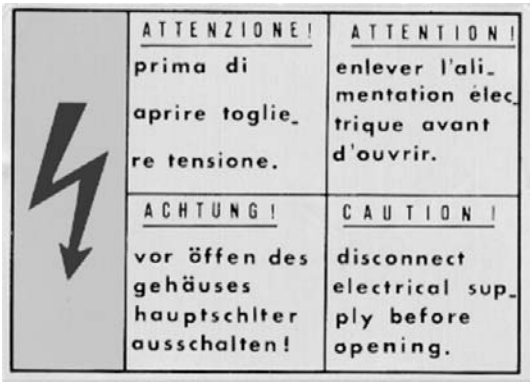
The labels below will be affixed to each unit in the indicated point:

Identification of the refrigerant - External door

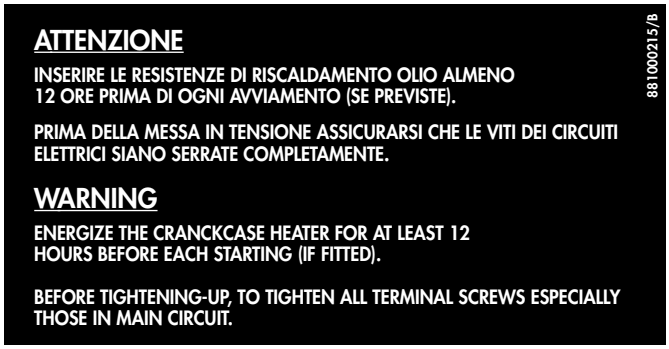


Gravity centre - Base

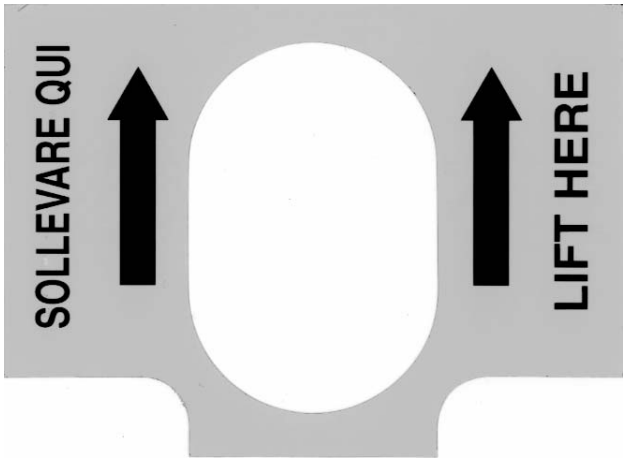
Identification of the unit - Outside, on the right-hand front column



Electrical warning Adjacent to the master switch



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



Lifting point - Base

CERTIFICATO DI COLLAUDO PRODUZIONE ITELCO-CLIMA
ITELCO-CLIMA PRODUCTION TEST CERTIFICATE
UNITA' ARIA-ARIA/ARIA-ACQUA - SEMICENTRALI- CHILLER AIR/AIR AIR/WATER

PROGR. COLL. NUMBER CHECK	DESCRIZIONE DEI TEST DESCRIPTION OF QUALITY CHECK	TIMBRO OPERAT. INSP. CODE
01	VERIFICA ASSEMBLAGGIO VERIFY ASSEMBLY COMPLETE	
02	VERIFICA VISIVA CABLAGGIO COLLEG. ELETTRICI E CONNESSIONE VERIFY WIRING CONNECTIONS	
03	VUOTO E CARICA REF. VACUUM AND CHARGE TEST	
04	VERIFICA CON CERCAFUGHE TENUTA CIRCUITO FRIGORIFERO REFRIGERANT LEAK TEST	
05	PROVE FUNZIONALI CON RILIEVI TEMPERATURE/PRESSIONI-RUMORE FUNCTION AND RUN TEST NOISE TEST	
06	VERIFICA INTERVENTI SICUREZZE PRESSIONE E TEMPERATURA CHECK OPERATION AND SAFETY DEVICES	
07	VERIFICA TENUTA CIRCUITO IDR. E FUNZIONAMENTO POMPA (SU PACK) HYDRAULIC CIRCUIT TEST (PUMP CHECK ONLY FOR PACK UNIT)	
08	VERIFICA MONTAGGIO ACCESSORI (SE PREVISTI) E DOCUMENTAZIONE CHECK ACCESSORIES/DOCUMENTATION	
09	CONTROLLO ESTETICO FINALE E PULIZIA INTERNA VISUAL CHECK FOR DIRT AND DAMAGE	

Final Test Certificate - Inside the external door

EIN - INLET

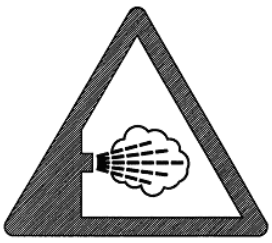
ENTRÉE - ENTRATA

AUS - OUTLET

SORTIE - USCITA

Fitting identification - Adjacent to fittings

Grounding connection - On the electrical board, adjacent to the connection



Warning - safety valves' vents

Warning - high-temperature zones Adjacent to hot pipes or components

2.8 Safety regulations

Refrigerant data	**Safety data: R134a**
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	R134a: 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	R134a: 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	R134a: Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	R134a: Not specified.
Conditions to avoid	Do not use in the presence of flames, burning surfaces and excess humidity.
Hazardous reactions	May react with sodium, potassium, barium and other alkaline metals. Incompatible substances: magnesium and alloys with magnesium concentrations > 2%.
Hazardous decomposition products	R134a: 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	R134a: 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

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.

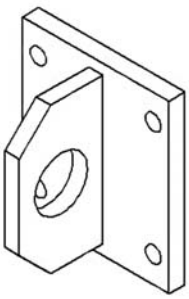
In case of damage, note it down on the carrier's delivery note and issue a claim according to the instructions provided in the delivery note.

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

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

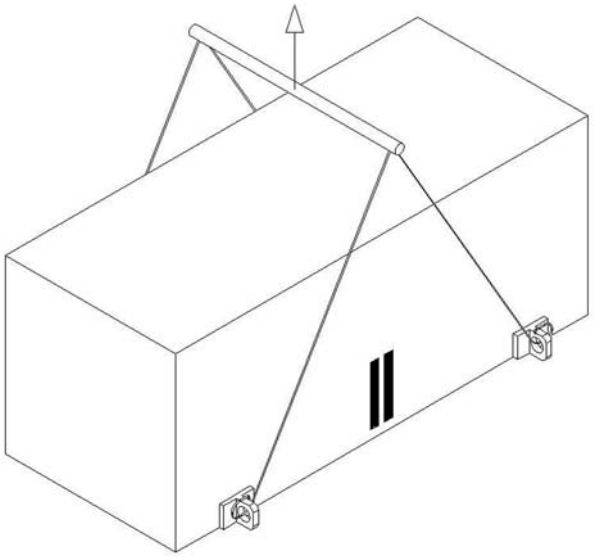
3.2 Lifting

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

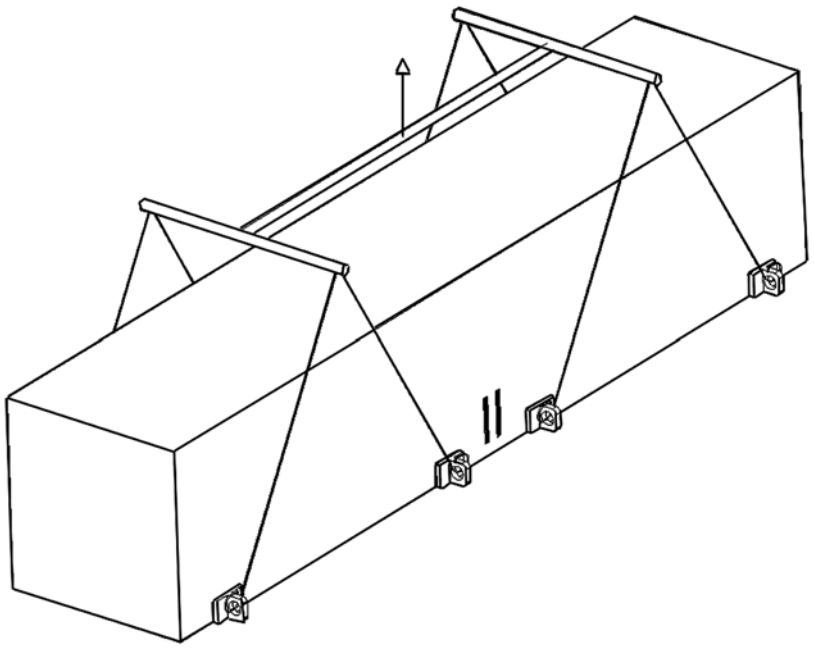


It is recommended to use a spacer to prevent cables from damaging the unit (see the figure).

Lifting 4/6 mt



Lifting 6 mt/8 mt/10 mt/12 mt



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

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

Unit must be lifted carefully.
To lift unit slowly and regularly.

To lift and displace the unit:

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

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

During the lifting and handling of the unit, be careful not to damage the finned pack of the coils positioned on the sides of the unit. The sides of the unit must be protected by cardboard or plywood sheets.

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

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

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

3.3 Anchoring

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

3.4 Storage

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

- plug or seal every single opening, such as water fittings
- do not store the appliance in a room where the temperature exceeds 50°C for the units using R134a and, if possible, do not expose to direct sunlight
- it is recommended to store the unit in a roof where traffic is minimized, to prevent the risk of accidental damage
- the unit must not be washed with a steam jet
- take away and leave to the site manager all the keys providing access to the control board

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

4 INSTALLATION

4.1 Positioning of the unit

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

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

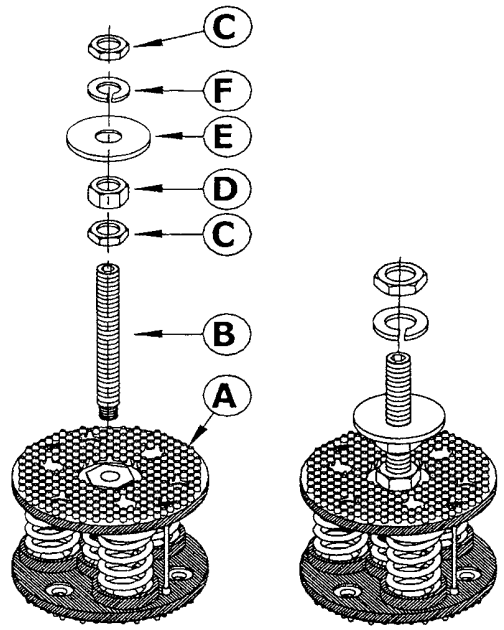
When the unit is to be installed on the ground, it is necessary to provide a concrete base, to ensure a uniform distribution of the weights.

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

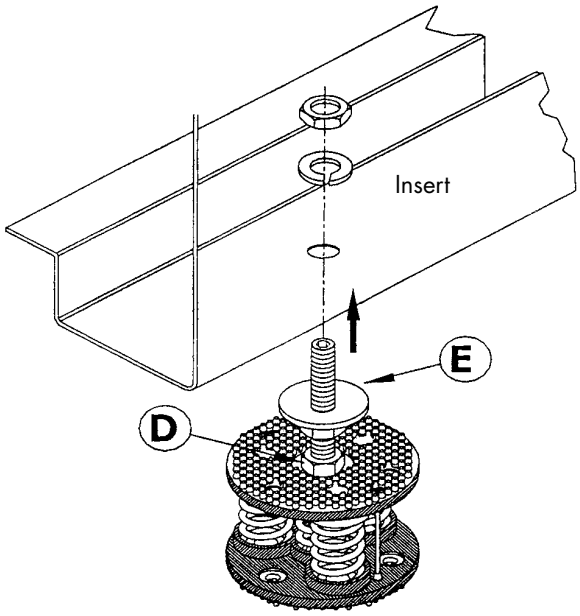
- the longitudinal axis of the unit must be parallel to the direction of prevailing winds, so as to ensure a uniform distribution of the air on finned exchangers
- the unit must not be installed near boilers' vent pipes
- the unit must not be installed leeward with respect to sources of air contaminated by greases, such as, for example, the outlets to kitchen exhaust hoods into the atmosphere. Otherwise, the grease is likely to deposit on the fins of the refrigerant /air exchangers, and would fix every type of atmospheric impurity, resulting in the quick clogging of the exchangers
- lthe unit must not be installed in areas subject to considerable snow falling
- the unit must not be installed in areas subject to flooding, under gutters etc.
- the unit must not be installed in air shafts, narrow courts or other small places, where the noise may be reflected by the walls or the air ejected by fans may short-circuit itself on refrigerant/air heat exchangers or condenser
- the place of installation must be have all the necessary spaces for air circulation and maintenance operations (see Chapter 9).

4.2 Spring Isolator Installation

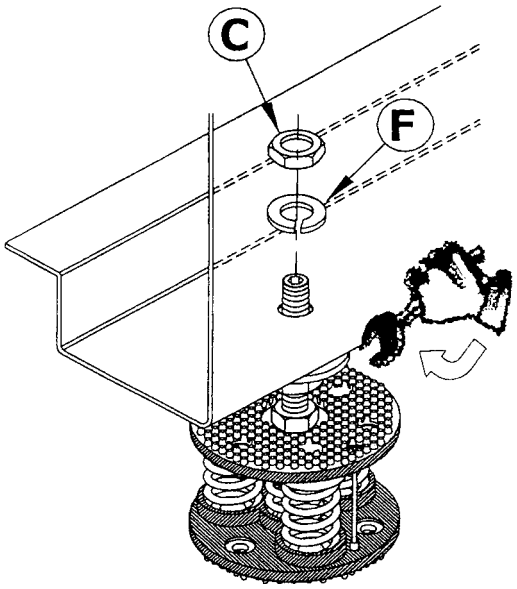
- Prepare the base, that must be flat and plane.
- Lift the appliance and insert shock absorbers as follows:



1) Proceed to assemble the jack components.



2) Fit the jack in the threaded housing on the upper plate of the antivibration mount. Next fit the jack mounted on the antivibration mount in the hole in the machine base.



3) Make sure the machine base is resting on the flat washer (pos. E) of the jack. To offset any levelling problems, adjust the top nut (pos.D) using an adeguate spanner. Lock in position with grower washer (pos.F) and low nut (pos.C).

At the end of this operation, make sure the machine is elastic on the axes and compensating antivibration joints can be fitted in the water connections.

4.3 External hydraulic circuit

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

The external hydraulic circuit should consist of the following elements:

- A circulation pump that 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, to disable the appliance when the water is not circulating.

The flow switch must be connected (terminals 1-2) as shown in the wiring diagram of the "User's Terminal Box" (Paragraph 4.7).

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

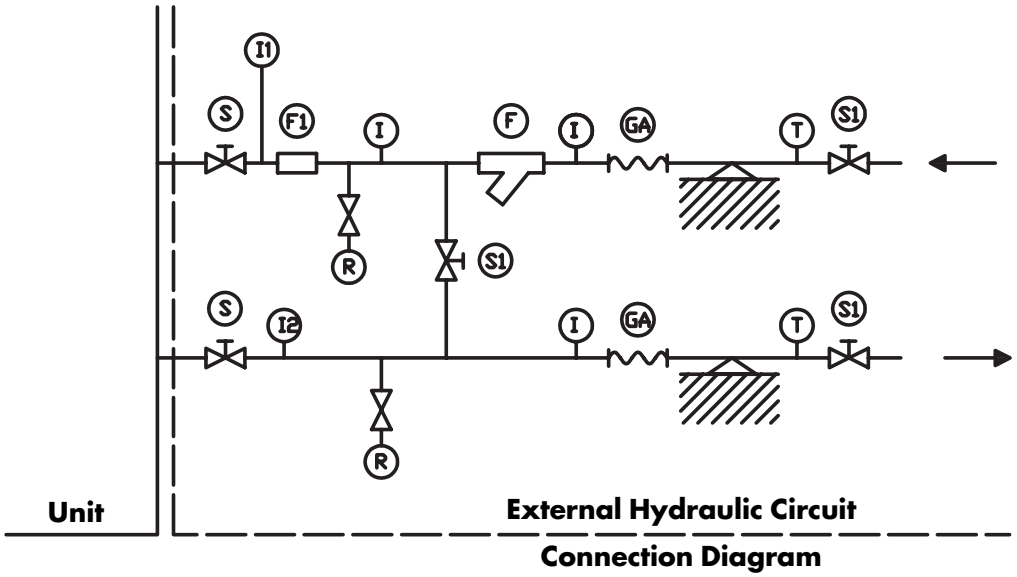
As a general rule, the flow switch shall be mounted on a horizontal pipe, at a distance from the curves equal to 10 times the diameter of the pipe and far from valves or other components that are likely to hinder the water flow upstream of or downstream from the flow switch.

- 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 condenser.
- The discharge points (provided with plugs, cocks etc.) must be arranged in the lowest point of the piping.

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.

Flow Switch Installation



Connection Diagram

Legends:

I: Pressure gauge connection
S: Gate valve
F1: Flow Switch
GA: Flexible hoses
R: Drain cock
T: Thermometer
F: Filter
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.

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.

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

4.4 Hydraulic connection

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

4.5 Draining the defrosting waste water (for heat pump unit only)

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

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

4.6 Power supply

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

It is important that the appliance is grounded.

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

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

The unit conforms to EN 60204-1.

The following connections shall be provided:

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

4.7 Electrical connections

The unit must be installed on site according to the Machinery Directive (98/37/EC), the Low Voltage Directive (73/23/EC), the Electromagnetic Interference Directive (89/336/EC) 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).

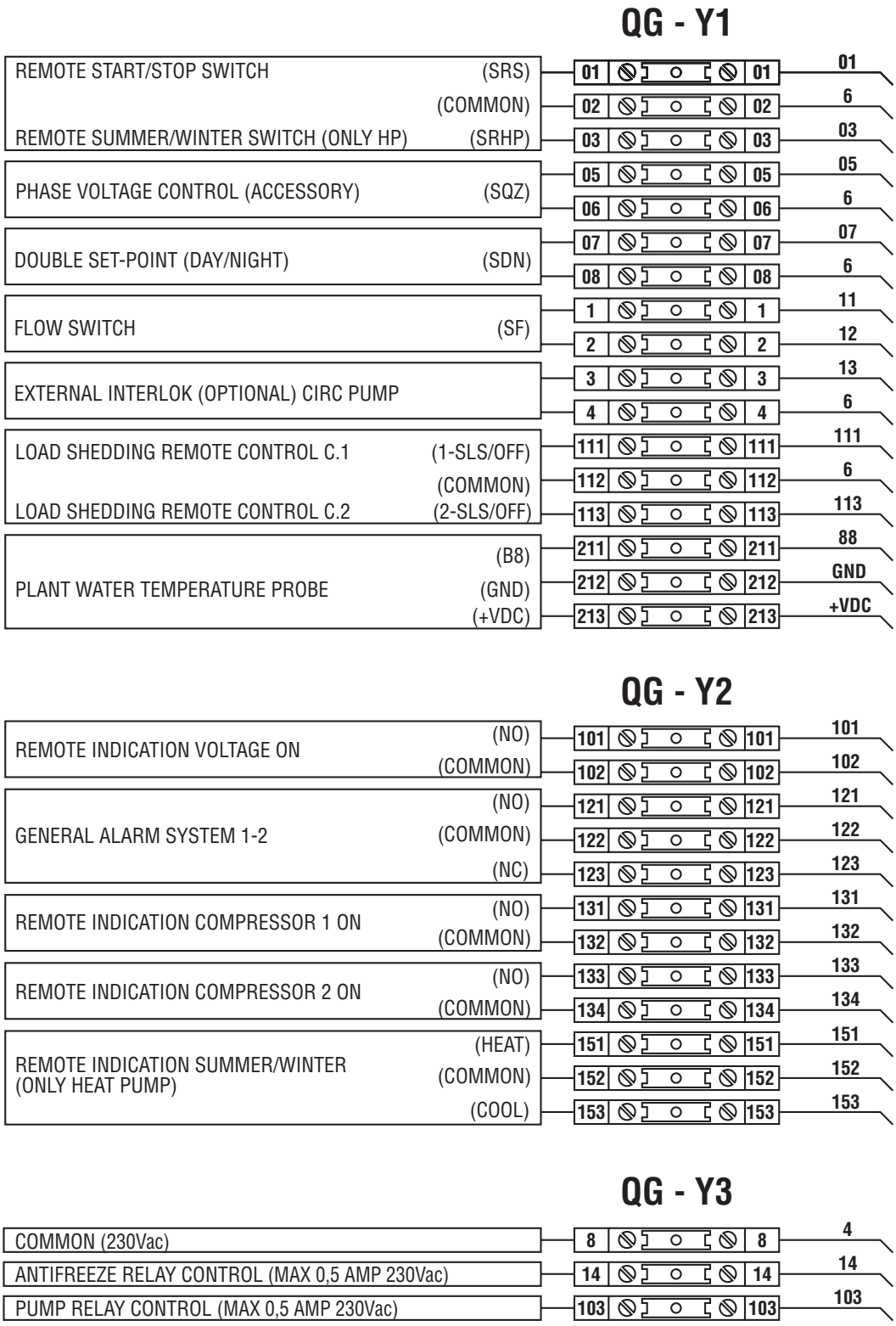
For 3-phase systems, check also that the unbalance between the phases does not exceed 2%. To perform this check, measure the differences between the voltage of each phase couple and their mean value during operation. The maximum % value of these differences (unbalance) must not exceed 2% of the mean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

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

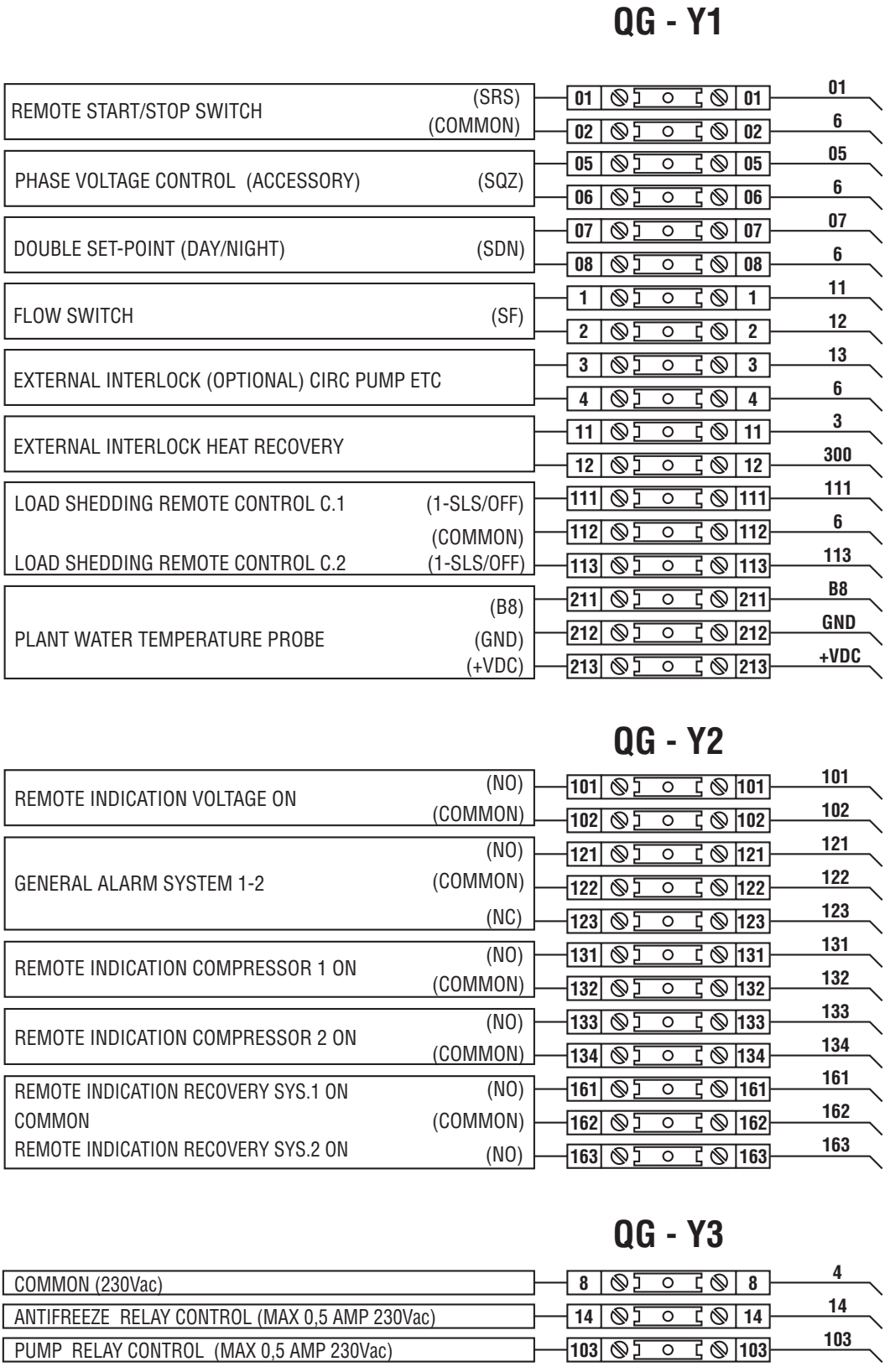
Supplying the unit through a line whose unbalance exceeds the permissible value will automatically void the warranty.

The twin units SLS twin units are provided with two switchboards positioned at the ends of the units. A switchboard is identified as "Master" and includes the control panel (keyboard - display), the other as auxiliary "Slave". Each switchboard must be connected to the relative power supply line. A single point for power supply can be provided using a shunt board (supplied as an accessory).

Terminal box - SLS



Terminal box - SLS-R

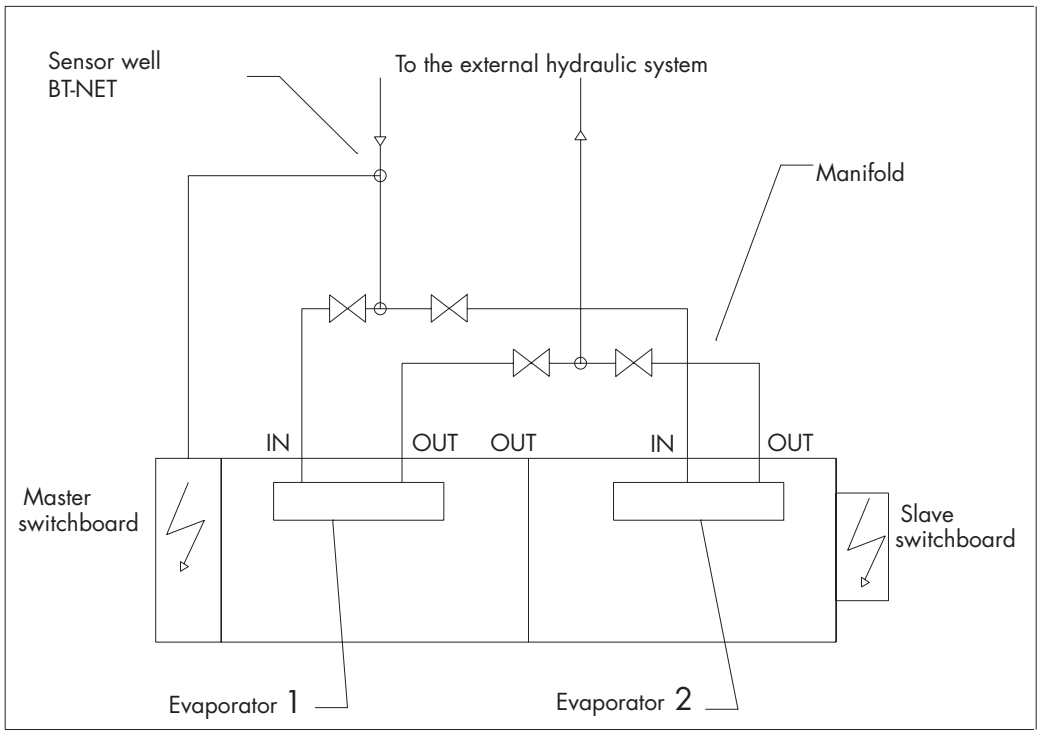


4.8 Connecting the temperature sen sor of coupled units' manifold (SLS at 4 circuits)

For the SLS units at 4 circuits the two heat exchangers (of shell and tube type) must be connected in parallel through a manifold (to be provided by the customer). The supplied temperature control sensor for the water returning from the plant is not installed on the unit.

The sensor, through the relevant well, must be positioned on the manifold which connects the two heat exchangers, as explained in the instructions below.

Position Sensor from manifold Twin units



4.9 Total heat recovery features

Temperature sensors

Temperature sensors for recovery system water control, BTRin e BTRout, are supplied by factory with the unit, already wired, and must be fitted on the water connections at the heat reclaim condenser inlet and outlet (see wiring diagram)

Three-way valve

The three-way valve must be installed on-site. It permits bypassing the heat reclaim condenser for correct operation at low return water temperature.
Water and electrical connections, as well as thermal insulation must be made at the time of installation on-site.
The best position is close to heat reclaim condenser (to achieve a small water circuit).

NOTE: The space required by this valve does not permit installation on the factory

Forced shuttering

When recovery system is on, a commutation from air condensing and water condensing takes place. At the same time compressor is automatically shuttered to the 50% of its capacity for 2 minuts to allow the control of condensation in the transient phase. The same process takes place when the system commutates from water condensing to air condensing.

5 START-UP

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

The operations carried out by Itelco-Industry 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 by Itelco-Industry.

- Check the section of power supply and grounding cables; make sure that terminals are tightened and check the correct operation of contactors, with the master 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 position of temperature sensor to defrost (only heat pump).
- 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 master 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).
- 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 current absorption upon the start of the compressor and in case of stabilised operation.
- The fan's current absorption.

Check that the condensing and evaporation temperatures, during operation at high and low pressure detected by the pressure gauges of the refrigerant, are within the following range:
(On the units not provided with HP/LP pressure gauges for the refrigerant, connect a pressure gauge to the Schreader valves on the refrigeration circuit).

HP side	Approx. 15 to 21°C above the temperature of the air entering the condenser, for R134a 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 OPERATION

The units SLS are equipped with a microprocessor control logic and regulation management system.

The system consists of a unit logic board and a liquid crystal control panel which manages the control, starting, shutdown and display functions.

6.1 General Informations

■ **Introduction**

The information and the operating instructions of the electronic control system mounted on the unit are listed here below.

■ **Main characteristics**

– Microprocessor control
– User friendly easy reachable keyboard
– Proportional – Integral control of return water temperature (RWT)
– Hysteresis type control of leaving chilled water temperature (LWT)
– Access code to Service Level
– Acoustic and LED alarm indication
– Backlighted liquid crystals display
– Closed loop condensing pressure control
– Start and stop pump down logic
– Cooling capacity steps rotation
—Oil recovery function
– Night (or Double set point) function management
– Compressor and pump working hours meter
– Discharge and suction pressure display
– Memorized alarms history
– 4 set point time programs

Possibility to connect:
– Serial Communication Card RS485: to connect the ***Chiller Control*** to a BMS (Carel or Modbus type)
– Remote Display Terminal
– Remote control
– Phase monitoring kit
– Black Box

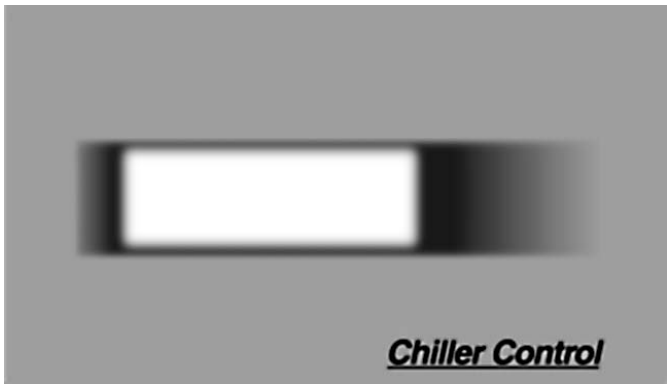
■ **"Chiller Control" system for SLS two screw compressors unit**

These cooling only water chillers are provided with a microprocessor board having a default program for the management of two refrigeration circuits each one equipped with one twin screws compressor, one low pressure transducer and one high pressure transducer. The control system consists of:
- INTERNAL ELECTRONIC PCB
- TERMINAL UNIT WITH DISPLAY AND KEYBOARD
- CHILLED FLUID TEMPERATURE SENSORS
- AMBIENT AIR TEMPERATURE SENSORS
- COIL TEMPERATURE SENSORS
- HIGH PRESSURE TRANSDUCER
- LOW PRESSURE TRANSDUCER

6.2 Keyboard – Display Terminal Unit

■ **General Information**

The figure which follows shows the terminal unit with open access door.
On the figure it is possible to see the microprocessor managed 4 lines – 20 columns LCD display, the keyboard and the LEDs which allow to program all the control parameters as setpoints, differential band, alarm thresholds and to perform the main functions.

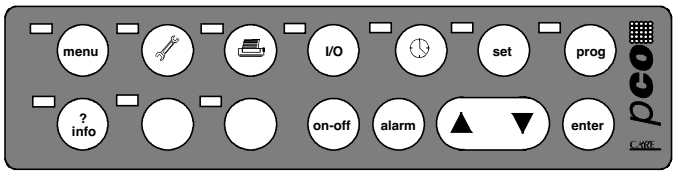


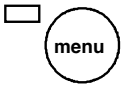
■ **Keyboard**

The terminal unit allows the operator to perform the following operations:

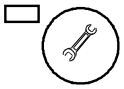
– initial configuration of the unit
– modification of the main working parameters
– displaying of the alarms and their notification by "buzzer"
– displaying of all the measured parameters.

The connection between the terminal unit and the board is realized by a 6 ways phone cable.
The connection between the terminal unit and the main board is not strictly necessary to the normal operation of the controller.

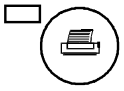




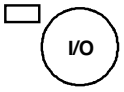
Access to the displaying mask of the main parameters and unit status mask.



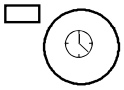
Access to devices maintenance parameters (elapsed working hour of the device and reset of the hours meter, alarm history) (Service Level)



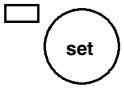
Not Available



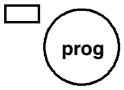
Access to the displaying masks of digital and Analog inputs and outputs status and of the software release.



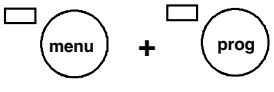
Access to clock programming mask



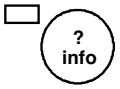
Access to the displaying / programming masks of the control setpoint (User Level – Setpoint)



Access to "Service level" masks



Pushing this key together it is possible to access to the "Manufacturer Level"



Used only for unit with four compressors or back to back configuration with Master Slave. Switch the displaying Master unit control / Slave unit control.

The LEDs of each keys light up when the function related to the key is active.

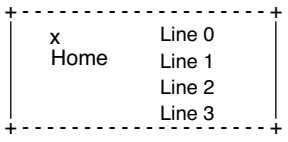
Figure 1

1. **On/Off** key: it allows to switch on and off the unit. Unit status is indicated by the lighting of the green LED.
2. **Alarm** key: it is used to display the alarms, to manually reset the alarms and to arrest the buzzer. If the key is lighted in red it means that at least one alarm was detected.
   Pushing one time this key the buzzer is arrested and the mask related the active alarm is displayed.
   Pushing it a second time the alarm is reset.
3. **Upward** arrow key: it allows to program the control parameters and to move between the masks (not backlighted).
4. **Downward** arrow key: it allows to program the control parameters and to move between the masks (not backlighted).
5. **Enter** key: it allows to move the cursor inside the masks and to save the programmed parameters. This key is continuously backlighted (in yellow) to show that the unit is under power.

■ Display

The unit is equipped with a 4 lines – 20 columns LCD display.

The parameters and the operation information are shown in pages called "masks"
The navigation inside each mask is possible using as follows the terminal unit keys.



When cursor position corresponds to the left corner of the upper part of the display (Home) pushing the ▲▼ arrow keys it is possible to access to the masks which are associated to the selected field. If a mask contains parameters programming fields, pushing the key ENTER the cursor will move to those fields. When it reaches one of the programming fields, using the ▲▼ arrow keys it is possible to modify the relevant value within its programming range. The modified value must be confirmed pushing the ENTER key.

6.3 Functions / Keys / Configurations

■ Alarms table

Code	Alarm Description	Comp 1 Status	Comp 2 Status	Fan #1 Status	Fan #2 Status	Pump Status	Notes
AL00	Compressor stop	Due to auto-reset alarm. Just stored into the historical					
AL01	Wrong power	Off	Off	Off	Off	Off	Phase monitor (1)
AL02	Antifreeze alarm	Off	Off	Off	Off	On	
AL03	Interlock	Off	Off	Off	Off	Off	
AL04	Flow switch alarm	Off	Off	Off	Off	Off	
AL05	System #1 low suction pressure	Off	On	Off	On	On	
AL06	System #2 low suction pressure	On	Off	On	Off	On	
AL07	System #1 high discharge pressure	Off	On	Off	On	On	
AL08	System #2 high discharge pressure	On	Off	On	Off	On	
AL09	Compressor #1 thermal protection	Off	On	Off	On	On	
AL10	Compressor #2 thermal protection	On	Off	On	Off	On	
AL11	Recovery antifreeze alarm	On	On	On	On	On	
AL12	System #1 group #1 fan thermal protection	On	On	Off gr. # 1	On	On	
AL13	System #1 group #2 fan thermal protection	On	On	Off gr. # 2	On	On	
AL14	System #2 group #1 fan thermal protection	On	On	On	Off gr. # 1	On	
AL15	System #2 group #2 fan thermal protection	On	On	On	Off gr. # 2	On	
AL16	System #1 compressor differential pressure	Off	On	Off	On	On	
AL17	System #2 compressor differential pressure	On	Off	On	Off	On	
AL18	Clock board failure	On	On	On	On	On	
AL21	B1-Tin sensor failure	Off	Off	Off	Off	On	
AL22	B2-LP1 sensor failure	Off	On	Off	On	On	
AL23	B3-DP1 sensor failure	Off	On	On	On	On	
AL24	B4-Tair sensor failure	On	On	On	On	On	
AL25	B5-Tout sensor failure	Off	Off	Off	Off	On	
AL26	B6-LP2 sensor failure	On	Off	On	Off	On	
AL27	B7-DP2 sensor failure	On	Off	On	On	On	
AL28	B8-Tplan sensor failure	Off	Off	Off	Off	On	
AL29	B9-Trin/TC1 sensor failure	On	On	On	On	On	note (2)
AL30	B10-Trout/TC2 sensor failure	On	On	On	On	On	note (2)
AL31	System #1 compressor maintenance	On	On	On	On	On	
AL32	System #2 compressor maintenance	On	On	On	On	On	
AL33	Pump maintenance	On	On	On	On	On	
AL36	System #1 Low pressure	Off	On	Off	On	On	Just stored into the historical
AL37	System #2 Low pressure	On	Off	On	Off	On	Just stored into the historical

Note:
1 = Check power phases rotation and/or minimum voltage. It works only in case the Phases Monitor (accessory) is installed.
2 = It forces to leave the recovery mode. Recovery mode inhibited.

■ "Menu" key

Pushing the "Menu" key the main mask is displayed:

```
U:1 RWT ..... 0.0 °C
SYS#1: OFF
SYS#2: OFF
Unit..   ON
```

In this mask the following items are displayed:
– unit serial number and control temperature
– system #1 status
– system #2 status
– unit status

■ I/O (input / output) Status

Pushing the "I/O" key it is possible to access to all the masks showing the values read by all the sensors installed on the unit.

SENSOR	USE
Tin	Entering chilled fluid temperature
Tout	Leaving chilled fluid temperature
TpLAN	Installation control sensor (in case of "Chiller Network") Control sensor unit 4 compressors
SP #1	System #1 suction pressure transducer
DP #1	System #1 discharge pressure transducer
SP #2	System #2 suction pressure transducer
DP #2	System #2 discharge pressure transducer
Tair	Ambient air temperature
TC #1	Coil 1 temperature (only heat pump)
TC #2	Coil 2 temperature (only heat pump)
TRin	Heat recovery heat exchanger entering water temp.
TRout	Heat recovery heat exchanger leaving water temp.

The following items are also displayed:

1. Chiller Control digital inputs and outputs status
2. Analog outputs driving the fan speed controllers
3. Code and release of the "Chiller Control" software.

■ Maintenance

Pushing the "Maintenance" key it is possible to access to the following information masks:

1.ALARM HISTORY

```
N°0000
AL000    00:00    00/00/00
Setpoint ..... 00.0 °C
Temperature ..... 00.0 °C
```

Pushing the "Enter" the cursor enter in the list of the memorized alarms. At this point the arrow keys allow to scroll the masks of all the memorized alarms which show the date, time, code and the controlled water temperature (entering or leaving) at the moment in which the alarm itself was detected.

2. PUMP WORKING HOURS

```
U:1
Pump..... 00000 h
```

3. COMPRESSORS WORKING HOURS

```
U:1 SYS #1
Compressor          00000 h
U:1 SYS #2
Compressor          00000 h
```

4. PASSWORD (*)

```
U:1
Digit password
        0000
```

Note (*): Contact Itelco Clima Service Department to access to the following masks.

RST_HOUR METERS

```
Reset hours U:1
pymp ..... N
compressors
SYS #1 N  SYS #2 N
```

MSK_FILTERS

```
Enabling software
filters ..... S
Threshold ..... 00.5 °C
Interval ..... 020 sec
```

M_DISABLE

```
Enabling
compressors
SYS #1=Y  SYS #2=Y
```

M_OFFSET1

```
Sensors calibration
Tin ..... 0.0 °C
SP #1 ..... 0.0 bar
DP #1 ..... 0.0 bar
```

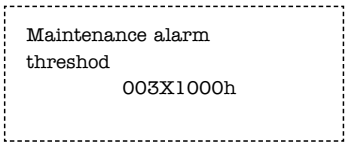
M_OFFSET2

```
Tair ..... 0.0 °C
Tout ..... 0.0 °C
SP #2 ..... 0.0 bar
DP #2 ..... 0.0 bar
```

M_OFFSET3

```
Sensors calibration
TpLAN ..... 0.0 °C
TRin ..... 0.0 °C
TRout ..... 0.0 °C
```

HOUR_THRES



■ Setpoint

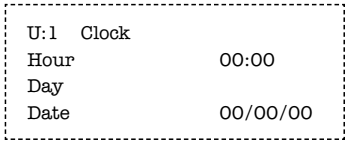
Pushing the "Set" key it is possible to access to user's Setpoint level. The following table contains the details of the parameters which is possible to set with the relevant limitations and default values:

User's Setpoints	Control of	Low Limit	High Limit	Default
System #1 ON/OFF System #2 ON/OFF	– –	OFF OFF	ON ON	OFF OFF
Cooling Setpoint	Inlet Outlet	8 6	20 20	10 8
Heating Setpoint	Inlet Outlet	20 20	48 50	43 45
Glycol setpoint	Inlet Outlet	–15 –15	20 20	10 8
Band Dead band	Inlet Outlet	1 1	10 6	5 2
Language Selection	—	ITA | ENG | GER | FRA | SPA		ITA
Recovery System #2 ON/OFF System #1 ON/OFF	 — —	 OFF OFF	 ON ON	 OFF OFF
Recovery Setpoint Band	 Recovery Recovery	 30 2	 50 6	 45 4

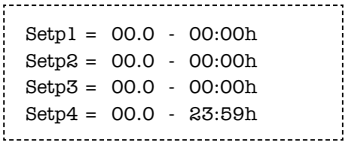
■ Clock Key

To have access to the following mask:

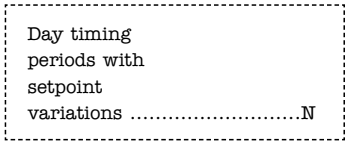
DATE, DAY AND TIME



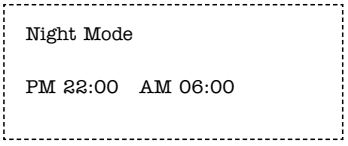
SETPOINTS TIMING



TIMING PERIODS ENABLING



NIGHT SETBACK MODE (*)



(*) Only if this mode is enabled in Service Level.

7 GENERAL DESCRIPTION

7.1 Introduction

The SLS units are water chillers/air-water heat pumps with screw compressors provided with two or four refrigeration circuits.

These units are fit for cooling and heating water or intermediate fluids (glycoled water) for air-conditioning applications or industrial processes.

The units are fit for outdoor installation of the roof of a building or at ground level.

The series includes the following versions:

Standard / High Efficiency Versions	Description
SLS Base Low Noise Version (BLN) SLS Low Noise Version (LN) SLS Extra Low Noise Version (ELN)	Chillers/ heat pumps with air condensation, working with R134a

Available options:

Options	Description
SLS/D	The heat recovery is carried out through a desuperheater mounted on the compressor's delivery line.
SLS/R	The unit features an additional water heat exchanger on the gas discharge line fitted in parallel with the standard cooling circuit. The heat recovery function is by means of a four-way valve.

7.2 General specifications

The SLS 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 stainless steel screws and bolts. All panels are secured by screw and tropicalised steel bolts, they can be disassembled for easy access to internal components. All panels can be disassembled for easy access to internal components. All galvanised steel parts are painted with white polyester resin (RAL 9001).

7.3 Compressors

The SLS units are provided with high power, high efficiency and low vibration level semi-hermetic screw compressors. The capacity control, of the step type, 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 SLS STD, from 1402 up to 4802 (15 sizes), have two independent refrigeration circuits with a scroll compressor each and "Shell & Tube" heat exchangers. Twin units from SLS 5004 up to 8404 (8 sizes) have four independent circuits with screw compressor each and "Shell & Tube" heat exchangers.

SLS HE (High Efficiency) units from 1402 up to 4802 (15 sizes) have two independent circuits with screw compressors each and "Shell & Tube" heat exchangers. Twin units from 4804 up to 8404 have four independent circuits with screw compressor and "Shell & Tube" heat exchangers.

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, a thermostatic expansion valve with external equalizer, a solenoid valve that makes it possible to start/stop the compressor, a dehydrating cartridge filter, a sight glass with humidity indicator, a differential oil pressure switch. Furthermore, each circuit is equipped with safety devices in accordance with PED 97/23/EC: high and low pressure switches, safety valves providing protection in case of fire or malfunction of compressors.

7.5 Water heat exchanger

Evaporator

All SLS R134a units have a “Shell & Tube” water heat exchanger with direct expansion multi refrigerant circuits. The tube bundle can be removed for inspection or maintenance.

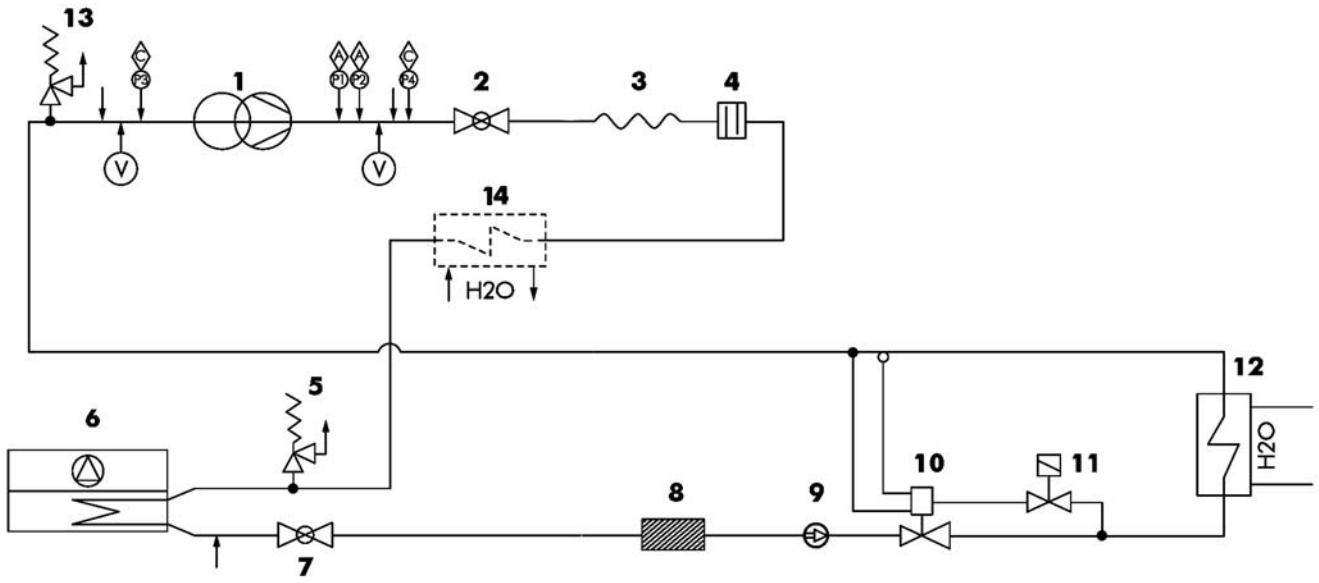
The evaporators are insulated with UV ray-proof 19 mm-thick anti-condensate closed-cell polyethylene material.The external surface is provided with wire resistors (130 Watt), which prevent frosting at low temperatures (down to –18°C) when the unit is off.

Desuperheater

All units are available with desuperheaters (DSH). DSH is refrigerant / water heat exchanger with brazed plates, of "Dual Circuit" type, fitted on the compressor discharge pipe.

Each unit is equipped with 2 exchangers, one for each circuit. Exchangers are insulated with UV ray-proof 19 mm-thick anticondensate closed-cell polyethylene material.

SLS - refrigerant circuit of unit with shell & tube evaporator



Components:

1 Screw compressor
2 Screw compressor’s delivery cock
3 Flexible hose (absorber) (only for ELN)
4 Silencer (only for ELN)
5 Safety valve
6 Coil
7 Liquid cock
8 Filter
9 Sight glass
10 Thermostatic valve
11 Solenoid valve
12 Shell & Tube exchanger
13 Safety valve
14 Desuperheater (optional)

Safety devices:

A HP pressure switch
B LP pressure switch
C Transducer

Note: the units are equipped with two refrigeration circuits. Only one circuit is illustrated for the sake of simplicity.

V Suction points for vacuum

Filling/discharge and pressure intakes Freon

Total heat recovery condenser

All units are available with total heat recovery condenser (THRC). THRC is refrigerant / water heat exchanger shell and tube type, according to chiller size. THRC is fitted on the compressor discharge pipe in parallel with the standard cooling circuit.

The heat recovery function is by means of a four-way valve. Each unit is equipped with 2 exchangers, one for each circuit. Exchangers are insulated with UV ray-proof 19 mm-thick anticondensate closed-cell polyethylene material.

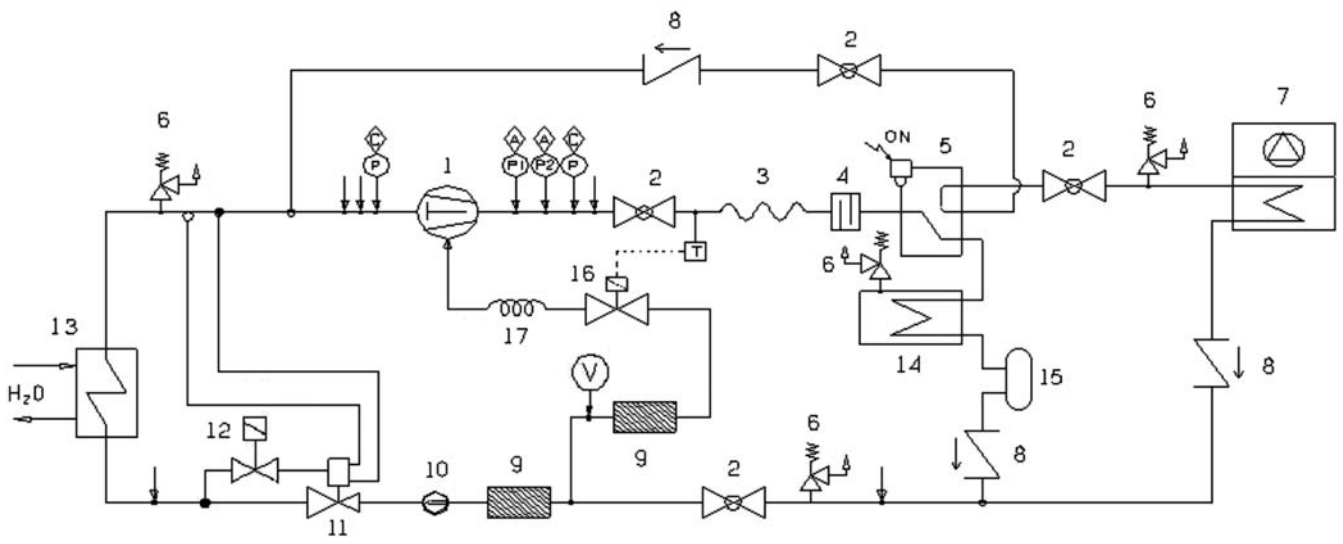
7.6 Air heat exchanger

Coils are made of copper pipes in staggered rows, mechanically expanded inside an aluminium finned pack.

7.7 Fans

The condenser's fans are of large diameter (800 mm) axial type. They are provided with external diffusers (nozzles), that reduce the aeraulic motor to a large extent. Each fan is provided with galvanised steel accident-prevention guard, painted after assembly. Finally, the fans' motors are completely closed, protection class IP54, protection thermostat immersed in windings.

SLS - Refrigerant circuit of units with total heat recovery



Components:

1 Screw compressor
2 Shut of valve
3 Flexible hose absorber (Standard on ELN version)
4 Silencer (Standard on ELN version)
5 4-way valve
6 Safety valve
7 Coil
8 Non-return valve
9 Filter
10 Sight glass
11 Thermostatic valve
12 Solenoid valve
13 Evaporator
14 Heat recovery heat exchanger
15 Liquid receiver
16 Solenoid valve
17 Capillary

Safety devices:

A HP pressure switch
C Transducer

Note: the units are equipped with two circuits. Only one is illustrated for the sake of simplicity . Liquid injection is op tional

V Suction points for vacuum

Filling/discharge and pressure intakes Freon

7.8 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 start-up 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 available, and is mounted on the door of the appliance, supply side. The cabinet includes also another door, that can be opened from the top, waterproofed according to IP 54 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.

7.9 "Chiller Control"

The "Chiller Control" unit consists of an expandable interface card and a controller.

The function of the expandable interface card is to monitor the inputs and control the outputs:

- Digital inputs, such as alarm and control signals.
- Analog inputs, such as temperature/pressure measuring signals.
- Digital outputs for exciting the control relay and the remote-control switch.

The microprocessor will execute the logic that controls:

- The LED and the display of the alarm signals and the operation of the appliance.
- The compressor's start-up logic (excitation of the winding and stop), potential regulation (3+3 steps).
- The display of the compressor's working hours and the temperature of the water to the evaporator.
- The anti-cycling and delay timing upon start-up.
- The automatic advance/delay sequence for the compressor start-up.
- The fan stop.

Reference and parameter control:

- User level: the operator can modify any data with the 'ENTER', '+' and '-' keys.
- Service level: password protected access by the authorised personnel.

7.10 Accessories

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

Flow switch

Prevents the operation of the unit if the circulating chilled fluid is insufficient. It is recommended 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.

Antivibrating supports (AVM)

Isolating spring supports, provided with bolts for fastening onto the base. They are supplied separate from the unit, and shall be mounted on site at the customer's expense.

Remote keyboard panel

Makes it possible to control the unit through the remote terminal, up to a maximum distance of 200 meters.

Chiller Data Logger

Records continuously the essential thermodynamic operating parameters, during the 10 minutes that precede the last alarm.

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 MODBUS serial card

A communication interface allows you to control and manage the unit from a local station, with RS485 connection, up to a distance of 1000 m.
It is therefore possible to obtain remote control and management by integrating these functions into the building's control system.

External hydronic kit

Hydronic kits consisting of pumps and storage tanks (1,000 to 1,500 litres).

Single Point supply box

This accessory is available for SLS twin units, and makes it possible to obtain only one power supply point.

8 TECHNICAL DATA

8.1 Pressure drops

Evaporator SLS STD

		1402	1602	1802	1902	2002	2202	2502	2702
K	10^{-3} kPa/(l/s)^2)	141,4	141,4	65,9	65,9	65,9	65,9	55,6	55,6
Min. water flow rate	l/s	8,7	9,7	10,9	12,3	13,6	14,3	15,3	16,3
Nominal water flow rate	l/s	14,0	15,6	17,5	19,6	21,8	23,0	24,5	26,1
Max. water flow rate	l/s	23,3	26,0	29,1	32,7	36,3	38,3	40,9	43,5
Min. pressure drops	kPa	10,8	13,4	7,9	9,9	12,2	13,6	13,1	14,8
Nominal pressure drops	kPa	27,7	34,4	20,1	25,4	31,2	34,7	33,5	37,9
Max. pressure drops	kPa	77,0	95,4	55,9	70,5	86,7	96,5	92,9	105,3

		3002	3202	3402	3602	4202	4602	4802	5004*
K	10^{-3} kPa/(l/s)^2)	63,6	41,2	41,2	41,2	29,8	31,8	31,8	55,6
Min. water flow rate	l/s	18,5	19,7	21,5	22,7	24,6	27,1	28,7	15,3
Nominal water flow rate	l/s	29,6	31,5	34,3	36,3	39,3	43,4	46,0	24,5
Max. water flow rate	l/s	49,4	52,6	57,2	60,4	65,6	72,4	76,6	40,9
Min. pressure drops	kPa	21,8	16,0	19,0	21,2	18,0	23,4	26,3	13,1
Nominal pressure drops	kPa	55,8	41,0	48,6	54,2	46,1	59,9	67,2	33,5
Max. pressure drops	kPa	155,1	113,8	135,0	150,5	128,1	166,5	186,7	92,9

		5404*	5704*	6004*	6404*	6804*	7204*	8404*
K	10^{-3} kPa/(l/s)^2)	55,6	63,6	63,6	41,2	41,2	41,2	29,8
Min. water flow rate	l/s	16,3	17,4	18,5	19,7	21,5	22,7	24,6
Nominal water flow rate	l/s	26,1	27,9	29,6	31,5	34,3	36,3	39,3
Max. water flow rate	l/s	43,5	46,5	49,4	52,6	57,2	60,4	65,6
Min. pressure drops	kPa	14,8	19,3	21,8	16,0	19,0	21,2	18,0
Nominal pressure drops	kPa	37,9	49,4	55,8	41,0	48,6	54,2	46,1
Max. pressure drops	kPa	105,3	137,3	155,1	113,8	135,0	150,5	128,1

* Data refers to one evaporator

Desuperheater SLS STD

		1402	1602	1802	1902	2002	2202	2502	2702
K	10^{-3} kPa/(l/s)^2)	2027,4	2027,4	2027,4	1280,2	1280,2	1280,2	895,9	895,9
Min. water flow rate	l/s	1,0	1,1	1,3	1,4	1,6	1,7	1,8	2,0
Nominal water flow rate	l/s	1,7	1,9	2,1	2,4	2,7	2,8	3,1	3,3
Max. water flow rate	l/s	2,6	3,0	3,4	3,8	4,3	4,6	4,9	5,2
Min. pressure drops	kPa	2,0	2,5	3,3	2,6	3,3	3,7	3,0	3,4
Nominal pressure drops	kPa	5,6	7,1	9,2	7,2	9,1	10,4	8,4	9,5
Max. pressure drops	kPa	14,2	18,1	23,7	18,3	23,3	26,6	21,4	24,4

		3002	3202	3402	3602	4202	4602	4802	5004*
K	10^{-3} kPa/(l/s)^2)	558,3	558,3	558,3	424,7	424,7	344,4	344,4	895,9
Min. water flow rate	l/s	2,1	2,3	2,5	2,7	2,9	3,2	3,4	1,8
Nominal water flow rate	l/s	3,5	3,8	4,2	4,5	4,9	5,3	5,6	3,1
Max. water flow rate	l/s	5,7	6,1	6,6	7,2	7,9	8,5	8,9	4,9
Min. pressure drops	kPa	2,5	2,9	3,5	3,1	3,7	3,5	3,9	3,0
Nominal pressure drops	kPa	7,0	8,2	9,6	8,5	10,3	9,7	10,8	8,4
Max. pressure drops	kPa	18,0	21,0	24,6	21,7	26,3	24,8	27,5	21,4

		5404*	5704*		6004*	6404*	6804*	7204*	8404*
K	10^{-3} kPa/(l/s)^2)	895,9	895,9	558,3	558,3	558,3	558,3	424,7	424,7
Min. water flow rate	l/s	2,0	2,0	2,1	2,1	2,3	2,5	2,7	2,9
Nominal water flow rate	l/s	3,3	3,3	3,5	3,5	3,8	4,2	4,5	4,9
Max. water flow rate	l/s	5,2	5,2	5,7	5,7	6,1	6,6	7,2	7,9
Min. pressure drops	kPa	3,4	3,4	2,5	2,5	2,9	3,5	3,1	3,7
Nominal pressure drops	kPa	9,5	9,5	7,0	7,0	8,2	9,6	8,5	10,3
Max. pressure drops	kPa	24,4	24,4	18,0	18,0	21,0	24,6	21,7	26,3

* Data refers to one evaporator

Total heat recovery condenser SLS STD

		1402	1602	1802	1902	2002	2202	2502	2702
K	10^{-3} kPa/(l/s)^2)	448,4	389,9	389,9	253,4	253,4	170,5	170,5	170,5
Min. water flow rate	l/s	5,5	6,2	7,0	7,9	8,7	9,3	9,9	10,6
Nominal water flow rate	l/s	8,8	9,9	11,1	12,6	13,9	14,8	15,9	16,9
Max. water flow rate	l/s	14,7	16,5	18,6	20,9	23,2	24,7	26,5	28,2
Min. pressure drops	kPa	13,6	15,0	18,9	15,6	19,1	14,6	16,8	19,1
Nominal pressure drops	kPa	34,9	38,3	48,3	40,0	49,0	37,4	43,0	48,9
Max. pressure drops	kPa	96,9	106,5	134,2	111,1	136,0	104,0	119,4	135,9

		3002	3202	3402	3602	4202	4602	4802
K	10^{-3} kPa/(l/s)^2)	63,7	63,7	63,7	63,7	63,7	55,0	55,0
Min. water flow rate	l/s	11,7	12,6	13,7	14,5	16,0	17,3	18,3
Nominal water flow rate	l/s	18,7	20,1	21,9	23,3	25,5	27,6	29,3
Max. water flow rate	l/s	31,2	33,5	36,5	38,8	42,6	46,0	48,9
Min. pressure drops	kPa	8,7	10,1	12,0	13,5	16,2	16,4	18,5
Nominal pressure drops	kPa	22,4	25,8	30,6	34,5	41,6	42,0	47,3
Max. pressure drops	kPa	62,2	71,6	85,0	95,9	115,5	116,6	131,3

Evaporator SLS HE

		1402	1602	1802	1902	2002	2402	2602	2802
K	10^{-3} kPa/(l/s)^2)	141,4	141,4	65,9	65,9	65,9	55,6	63,6	63,6
Min. water flow rate	l/s	9,1	10,1	11,3	12,7	14,0	15,9	17,1	18,0
Nominal water flow rate	l/s	14,5	16,1	18,1	20,3	22,3	25,4	27,3	28,9
Max. water flow rate	l/s	24,2	26,9	30,1	33,8	37,2	42,3	45,5	48,1
Min. pressure drops	kPa	11,7	14,4	8,4	10,6	12,8	14,0	18,5	20,7
Nominal pressure drops	kPa	29,8	36,9	21,5	27,2	32,8	35,8	47,3	52,9
Max. pressure drops	kPa	82,9	102,4	59,7	75,5	91,2	99,3	131,4	147,1

		3002	3202	3402	3602	4202	4602	4802	4804*
K	10^{-3} kPa/(l/s)^2)	28,6	41,2	41,2	41,2	29,8	31,8	31,8	55,6
Min. water flow rate	l/s	19,3	21,1	23,2	25,1	26,7	27,9	29,5	15,9
Nominal water flow rate	l/s	30,9	33,7	37,2	40,1	42,7	44,6	47,3	25,4
Max. water flow rate	l/s	51,5	56,2	62,0	66,9	71,2	74,3	78,8	42,3
Min. pressure drops	kPa	10,7	18,3	22,2	25,9	21,2	24,7	27,7	14,0
Nominal pressure drops	kPa	27,3	46,8	57,0	66,4	54,4	63,2	71,0	35,8
Max. pressure drops	kPa	75,8	130,1	158,2	184,4	151,1	175,5	197,2	99,3

		5204*	5604*	6004*	6404*	6804*	7204*	7804*	8404*
K	10^{-3} kPa/(l/s)^2)	63,6	63,6	28,6	29,8	29,8	29,8	29,9	29,9
Min. water flow rate	l/s	17,1	18,0	19,3	21,0	22,1	23,3	24,4	25,2
Nominal water flow rate	l/s	27,3	28,9	30,9	33,6	35,4	37,2	39,1	40,3
Max. water flow rate	l/s	45,5	48,1	51,5	56,0	59,0	62,0	65,2	67,2
Min. pressure drops	kPa	18,5	20,7	10,7	13,1	14,6	16,1	17,9	19,0
Nominal pressure drops	kPa	47,3	52,9	27,3	33,6	37,4	41,3	45,8	48,6
Max. pressure drops	kPa	131,4	147,1	75,8	93,5	103,8	114,7	127,1	135,0

* Data refers to one evaporator

Desuperheater SLS HE

		1402	1602	1802	1902	2002	2202	2502	2702
K	10^{-3} kPa/(l/s)^2)	2095,8	2095,8	1362,3	1362,3	937,7	937,7	588,8	588,8
Min. water flow rate	l/s	1,0	1,2	1,3	1,5	1,7	1,9	2,0	2,1
Nominal water flow rate	l/s	1,7	1,9	2,1	2,4	2,7	3,0	3,2	3,4
Max. water flow rate	l/s	2,8	3,2	3,6	4,0	4,5	5,0	5,3	5,6
Min. pressure drops	kPa	2,3	3,0	2,5	3,1	2,6	3,3	2,3	2,3
Nominal pressure drops	kPa	5,9	7,6	6,3	7,9	6,8	8,4	6,0	6,7
Max. pressure drops	kPa	16,4	21,0	17,5	21,9	18,8	23,4	16,7	18,7

		3002	3202	3402	3602	4202	4602	4802	5004*
K	10^{-3} kPa/(l/s)^2)	588,8	381,4	381,4	381,4	270,0	270,0	270,0	937,7
Min. water flow rate	l/s	2,3	2,5	2,7	2,9	3,2	3,3	3,5	1,9
Nominal water flow rate	l/s	3,7	4,0	4,3	4,7	5,1	5,3	5,6	3,0
Max. water flow rate	l/s	6,1	6,6	7,2	7,8	8,5	8,9	9,4	5,0
Min. pressure drops	kPa	3,1	2,3	2,8	3,2	2,8	3,0	3,3	3,3
Nominal pressure drops	kPa	8,0	6,0	7,1	8,3	7,0	7,7	8,5	8,4
Max. pressure drops	kPa	22,1	16,6	19,7	23,0	19,6	21,4	23,7	23,4

		5404*	5704*	6004*	6404*	6804*	7204*	7804*		8404*
K	10^{-3} kPa/(l/s)^2)	588,8	588,8	588,8	381,4	381,4	381,4	381,4	270,0	270,0
Min. water flow rate	l/s	2,0	2,1	2,3	2,5	2,7	2,9	2,9	3,2	3,2
Nominal water flow rate	l/s	3,2	3,4	3,7	4,0	4,3	4,7	4,7	5,1	5,1
Max. water flow rate	l/s	5,3	5,6	6,1	6,6	7,2	7,8	7,8	8,5	8,5
Min. pressure drops	kPa	2,3	2,6	3,1	2,3	2,8	3,2	3,2	2,8	2,8
Nominal pressure drops	kPa	6,0	6,7	8,0	6,0	7,1	8,3	8,3	7,0	7,0
Max. pressure drops	kPa	16,7	16,7	22,1	16,6	19,7	23,0	23,0	19,6	19,6

* Data refers to one evaporator

Total heat recovery condenser SLS HE

		1402	1602	1802	1902	2002	2202	2502	2702
K	10^{-3} kPa/(l/s)^2)	448,4	389,9	389,9	253,4	164,7	153,4	118,3	118,3
Min. water flow rate	l/s	5,5	6,2	7,0	7,9	8,8	9,7	10,4	11,2
Nominal water flow rate	l/s	8,8	9,9	11,1	12,6	14,1	15,4	16,7	17,9
Max. water flow rate	l/s	14,7	16,5	18,6	20,9	23,4	25,7	27,8	29,9
Min. pressure drops	kPa	13,6	15,0	18,9	15,6	12,7	14,3	12,9	14,9
Nominal pressure drops	kPa	34,9	38,3	48,3	40,0	32,5	36,6	32,9	38,1
Max. pressure drops	kPa	96,9	106,5	134,2	111,1	90,3	101,6	91,4	105,8

		3002	3202	3402	3602	4202	4602	4802
K	10^{-3} kPa/(l/s)^2)	118,3	63,7	63,7	55,0	55,0	55,0	55,0
Min. water flow rate	l/s	12,0	12,6	13,7	15,5	16,7	17,3	18,3
Nominal water flow rate	l/s	19,2	20,1	21,9	24,8	26,7	27,6	29,3
Max. water flow rate	l/s	32,1	33,5	36,5	41,3	44,5	46,0	48,9
Min. pressure drops	kPa	17,1	10,1	12,0	13,2	15,3	16,4	18,5
Nominal pressure drops	kPa	43,8	25,8	30,6	33,8	39,3	42,0	47,3
Max. pressure drops	kPa	121,6	71,6	85,0	93,8	109,0	116,6	131,3

8.2 Technical data

SLS STD-BLN/STD-LN/STD-ELN		1402	1602	1802	1902	2002	2202	2502	2702	3002	3202	3402	3602
Nominal voltage	V/ph/Hz	400-3-50											
Number of circuits		2	2	2	2	2	2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25	25	25	25	25	25
Refrigerant													
Type		R134a											
Charge (1)	kg	39+39	43+43	50+50	54+54	58+58	59+59	61+61	64+64	68+68	71+71	74+74	78+78
Compressors													
Type		Screw											
Number		2	2	2	2	2	2	2	2	2	2	2	2
Start-up type		Part-Winding					S/D (Star- delta)						
Evaporator													
Type		Shell & Tube											
Number		1	1	1	1	1	1	1	1	1	1	1	1
Minimum water content	l	114	114	162	162	162	162	184	184	222	295	295	295
Condenser													
Type		Coil type (Al/Cu)											
Hydraulic connections													
Type		Victaulic											
Inlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"	6"	8"	8"	8"
Outlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"	6"	8"	8"	8"
Weights													
Shipping STD-BLN	kg	4020	4040	4290	4650	5210	5210	5310	5330	6960	7600	7760	7930
Shipping STD-LN/STD-ELN	kg	4140	4160	4410	4770	5330	5330	5430	5450	7080	7720	7880	8050
Operating STD-BLN	kg	4130	4150	4450	4810	5370	5380	5500	5520	7180	7890	8060	8220
Operating STD-LN/STD-ELN	kg	4250	4270	4570	4930	5490	5500	5620	5640	7300	8010	8180	8340
Dimensions													
Length	mm	4000	4000	4000	4000	4000	4000	4000	4000	6000	6000	6000	6000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

SLS STD-BLN/STD-LN/STD-ELN		4202	4602	4802	5004	5404	5704	6004	6404	6804	7204	8404
Nominal voltage	V/ph/Hz	400-3-50										
Number of circuits		2	2	2	4	4	4	4	4	4	4	4
Number of steps		6	6	6	9	9	9	9	9	9	9	9
Capacity steps	%	25	25	25	25	25	25	25	25	25	25	25
Refrigerant												
Type		R134a										
Charge (1)	kg	86+86	95+95	100+100	61+61/ 61+61	64+64/ 64+64	64+64/ 68+68	68+68/ 68+68	71+71/ 71+71	74+74/ 74+74	78+78/ 78+78	86+86/ 86+86
Compressors												
Type		Screw										
Number		2	2	2	4	4	4	4	4	4	4	4
Start-up type		S/D (Star- delta)										
Evaporator												
Type		Shell & Tube										
Number		1	1	1	2	2	2	2	2	2	2	2
Minimum water content	l	462	423	423	184	184	184+222	222	295	295	295	462
Condenser												
Type		Coil type (Al/Cu)										
Hydraulic connections												
Type		Victaulic										
Inlet diameter	inch	8"	8"	8"	6"	6"	6"	6"	8"	8"	8"	8"
Outlet diameter	inch	8"	8"	8"	6"	6"	6"	6"	8"	8"	8"	8"
Weights												
Shipping STD-BLN	kg	8210	10820	10850	10620	10660	12290	13910	15190	15520	15850	16420
Shipping STD-LN/STD-ELN	kg	8330	10940	10970	10860	10900	12530	14150	15430	15760	16090	16660
Operating STD-BLN	kg	8680	11240	11270	10990	11030	12690	14350	15780	16110	16440	17350
Operating STD-LN/STD-ELN	kg	8800	11360	11390	11230	11270	12930	14590	16020	16350	16680	17590
Dimensions												
Length	mm	6000	8000	8000	8000	8000	10000	12000	12000	12000	12000	12000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

Technical data

SLS-R STD-BLN/STD-STD-LN/STD-ELN		1402	1602	1802	1902	2002	2202	2502	2702
Nominal voltage	V/ph/Hz	400/3/50							
Number of circuits		2	2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25	25
Refrigerant									
Type		R134a							
Charge (1)	kg	39+39	43+43	50+50	54+54	58+58	59+59	61+61	64+64
Compressors									
Type		Screw							
Number		2	2	2	2	2	2	2	2
Start-up type		Part-Winding					Y/Δ		
Evaporator									
Type		Shell & Tube							
Number		1	1	1	1	1	1	1	1
Minimum water content	l	114	114	162	162	162	162	184	184
Hydraulic connections									
Type		Victaulic							
Inlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"
Outlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"
Total heat recovery cond.									
Type		Shell & Tube							
Number		2	2	2	2	2	2	2	2
Minimum water content	l	15	17	17	28	28	31	31	31
Hydraulic connections									
Type		Gas threaded male type							
Inlet diameter	inch	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	3"
Outlet diameter	inch	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	3"
Condenser									
Type		Coil type (Al/Cu)							
Weights									
Shipping STD-BLN	kg	4300	4340	4660	5180	5740	5770	5870	5890
Shipping STD-LN/STD-ELN	kg	4420	4460	4780	5300	5860	5890	5990	6010
Operating STD-BLN	kg	4440	4490	4860	5400	5960	6000	6120	6140
Operating STD-LN/STD-ELN	kg	4560	4610	4980	5520	6080	6120	6240	6260
Dimensions									
Length	mm	4000	4000	4000	4000	4000	4000	4000	4000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

SLS-R STD-BLN/STD-STD-LN/STD-ELN		3002	3202	3402	3602	4202	4602	4802
Nominal voltage	V/ph/Hz	400/3/50						
Number of circuits		2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25
Refrigerant								
Type		R134a						
Charge (1)	kg	68+68	71+71	74+74	78+78	86+86	95+95	100+100
Compressors								
Type		Screw						
Number		2	2	2	2	2	2	2
Start-up type		Y/Δ						
Evaporator								
Type		Shell & Tube						
Number		1	1	1	1	1	1	1
Minimum water content	l	222	295	295	295	462	423	423
Hydraulic connections								
Type		Victaulic						
Inlet diameter	inch	6"	8"	8"	8"	8"	8"	8"
Outlet diameter	inch	6"	8"	8"	8"	8"	8"	8"
Total heat recovery cond.								
Type		Shell & Tube						
Number		2	2	2	2	2	2	2
Minimum water content	l	48	48	48	48	48	52	52
Hydraulic connections								
Type		Gas threaded male type						
Inlet diameter	inch	4"	4"	4"	4"	4"	5"	5"
Outlet diameter	inch	4"	4"	4"	4"	4"	5"	5"
Condenser								
Type		Coil type (Al/Cu)						
Weights								
Shipping STD-BLN	kg	7710	8350	8520	8680	8970	11830	11860
Shipping STD-LN/STD-ELN	kg	7830	8470	8640	8800	9090	11950	11980
Operating STD-BLN	kg	8030	8740	8910	9070	9530	12360	12390
Operating STD-LN/STD-ELN	kg	8150	8860	9030	9190	9650	12480	12510
Dimensions								
Length	mm	6000	6000	6000	6000	6000	8000	8000
Width	mm	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

Technical data

SLS HE-BLN/HE-LN/HE-ELN		1402	1602	1802	1902	2002	2402	2602	2802	3002	3202	3402	3602
Nominal voltage	V/ph/Hz	400-3-50											
Number of circuits		2	2	2	2	2	2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25	25	25	25	25	25
Refrigerant													
Type		R134a											
Charge (1)	kg	40+40	45+45	51+51	56+56	64+64	73+73	75+75	78+78	82+82	87+87	92+92	97+97
Compressors													
Type		Screw											
Number		2	2	2	2	2	2	2	2	2	2	2	2
Start-up type		P/W (Part-winding)					S/D (Star-delta)						
Evaporator													
Type		Shell & Tube											
Number		1	1	1	1	1	1	1	1	1	1	1	1
Minimum water content	l	114	114	162	162	162	184	222	222	295	295	295	295
Condenser													
Type		Coil type (Al/Cu)											
Hydraulic connections													
Type		Victaulic											
Inlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"
Outlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"
Weights													
Shipping HE-BLN	kg	4090	4110	4360	4790	6170	6340	6580	6760	7470	10370	10400	10500
Shipping HE-LN/HE-ELN	kg	4210	4230	4480	4910	6290	6460	6700	6880	7590	10490	10520	10620
Operating HE-BLN	kg	4210	4230	4530	4950	6330	6530	6800	6980	7770	10670	10690	10790
Operating HE-LN/HE-ELN	kg	4330	4350	4650	5070	6450	6650	6920	7100	7890	10790	10810	10910
Dimensions													
Length	mm	4000	4000	4000	4000	6000	6000	6000	6000	6000	8000	8000	8000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

SLS HE-BLN/HE-LN/HE-ELN		4202	4602	4802	4804	5204	5604	6004	6404	6804	7204	7804	8404
Nominal voltage	V/ph/Hz	400-3-50											
Number of circuits		2	2	2	4	4	4	4	4	4	4	4	4
Number of steps		6	6	6	9	9	9	9	9	9	9	9	9
Capacity steps	%	25	25	25	25	25	25	25	25	25	25	25	25
Refrigerant													
Type		R134a											
Charge (1)	kg	103+103	105+105	108+108	73+73/ 73+73	75+75/ 75+75	78+78/ 78+78	82+82/ 82+82	87+87/ 87+87	90+90/ 90+90	93+93/ 93+93	96+96/ 96+96	99+99/ 99+99
Compressors													
Type		Screw											
Number		2	2	2	4	4	4	4	4	4	4	4	4
Start-up type		S/D (Star-delta)											
Evaporator													
Type		Shell & Tube											
Number		1	1	1	2	2	2	2	2	2	2	2	2
Minimum water content	l	462	423	423	184	222	222	295	462	462	462	423	423
Condenser													
Type		Coil type (Al/Cu)											
Hydraulic connections													
Type		Victaulic											
Inlet diameter	inch	8"	8"	8"	6"	6"	6"	8"	8"	8"	8"	8"	8"
Outlet diameter	inch	8"	8"	8"	6"	6"	6"	8"	8"	8"	8"	8"	8"
Weights													
Shipping HE-BLN	kg	10790	11240	11270	12680	13160	13510	14940	16050	16100	16140	16480	16610
Shipping HE-LN/HE-ELN	kg	10910	11360	11390	12920	13400	13750	15180	16290	16340	16380	16720	16850
Operating HE-BLN	kg	11250	11700	11730	13050	13600	13960	15530	16980	17020	17060	17330	17460
Operating HE-LN/HE-ELN	kg	11370	11820	11850	13290	13840	14200	15770	17220	17260	17300	17570	17700
Dimensions													
Length	mm	8000	8000	8000	12000	12000	12000	12000	12000	12000	12000	12000	12000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

Technical data

SLS-R HE-BLN/HE-LN/HE-ELN		1402	1602	1802	1902	2002	2402	2602	2802
Nominal voltage	V/ph/Hz	400/3/50							
Number of circuits		2	2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25	25
Refrigerant									
Type		R134a							
Charge (1)	kg	40+40	45+45	51+51	56+56	64+64	73+73	75+75	78+78
Compressors									
Type		Screw							
Number		2	2	2	2	2	2	2	2
Start-up type		Part-Winding					Y/Δ		
Evaporator									
Type		Shell & Tube							
Number		1	1	1	1	1	1	1	1
Minimum water content	l	114	114	162	162	162	184	222	222
Hydraulic connections									
Type		Victaulic							
Inlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"
Outlet diameter	inch	5"	5"	6"	6"	6"	6"	6"	6"
Total heat recovery cond.									
Type		Shell & Tube							
Number		2	2	2	2	2	2	2	2
Minimum water content	l	15	17	17	28	32	34	36	36
Hydraulic connections									
Type		Gas threaded male type							
Inlet diameter	inch	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	3"
Outlet diameter	inch	2"1/2	2"1/2	2"1/2	3"	3"	3"	3"	3"
Condenser									
Type		Coil type (Al/Cu)							
Weights									
Shipping HE-BLN	kg	4370	4420	4740	5320	6730	6920	7170	7340
Shipping HE-LN/HE-ELN	kg	4490	4540	4860	5440	6850	7040	7290	7460
Operating HE-BLN	kg	4520	4560	4930	5540	6950	7170	7460	7640
Operating HELN/HE-ELN	kg	4640	4680	5050	5660	7070	7290	7580	7760
Dimensions									
Length	mm	4000	4000	4000	4000	6000	6000	6000	6000
Width	mm	2200	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

SLS-R HE-BLN/HE-LN/HE-ELN		3002	3202	3402	3602	4202	4602	4802
Nominal voltage	V/ph/Hz	400/3/50						
Number of circuits		2	2	2	2	2	2	2
Number of steps		6	6	6	6	6	6	6
Capacity steps	%	25	25	25	25	25	25	25
Refrigerant								
Type		R134a						
Charge (1)	kg	82+82	87+87	92+92	97+97	103+103	105+105	108+108
Compressors								
Type		Screw						
Number		2	2	2	2	2	2	2
Start-up type		Y/Δ						
Evaporator								
Type		Shell & Tube						
Number		1	1	1	1	1	1	1
Minimum water content	l	295	295	295	295	462	423	423
Hydraulic connections								
Type		Victaulic						
Inlet diameter	inch	8"	8"	8"	8"	8"	8"	8"
Outlet diameter	inch	8"	8"	8"	8"	8"	8"	8"
Total heat recovery cond.								
Type		Shell & Tube						
Number		2	2	2	2	2	2	2
Minimum water content	l	36	48	48	52	52	52	52
Hydraulic connections								
Type		Gas threaded male type						
Inlet diameter	inch	3"	4"	4"	5"	5"	5"	5"
Outlet diameter	inch	3"	4"	4"	5"	5"	5"	5"
Condenser								
Type		Coil type (Al/Cu)						
Weights								
Shipping HE-BLN	kg	8060	11130	11150	11510	11800	12290	12320
Shipping HE-LN/HE-ELN	kg	8180	11250	11270	11630	11920	12410	12440
Operating HE-BLN	kg	8420	11520	11540	11910	12370	12820	12850
Operating HELN/HE-ELN	kg	8540	11640	11660	12030	12490	12940	12970
Dimensions								
Length	mm	6000	8000	8000	8000	8000	8000	8000
Width	mm	2200	2200	2200	2200	2200	2200	2200
Height	mm	2550	2550	2550	2550	2550	2550	2550

(1) Indicative value. Always refer to the value specified on the unit's label.

8.3 Electrical data - Standard Unit

SLS STD-BLN		1402	1602	1802	1902	2002	2202	2502	2702
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	82	118	138	156	174	190	200	210
Max power input	kW	164	184	204	220	236	256	267	278
Nominal current	A	148	202	230	264	298	324	342	360
Max. current (FLA)	A	264	304	348	370	392	462	478	494
Max. start-up current (LRA)	A	393	467	560	661	678	497	524	535
External fuses	(A)	315	315	400	400	400	500	500	500
Wire cross area (1)	mm^2	240	240	2x120	2x120	2x120	2x185	2x185	2x185

SLS STD-BLN		3002	3202	3402	3602	4202	4602	4802	5004
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	218	246	260	274	288	343	360	200+200
Max power input	kW	286	330	351	371	389	454	472	267+267
Nominal current	A	376	425	449	473	497	575	602	342+342
Max. current (FLA)	A	510	568	603	638	668	726	776	478+478
Max. start-up current (LRA)	A	646	604	683	708	808	923	958	868
External fuses	(A)	630	630	800	800	800	800	800	500+500
Wire cross area (1)	mm^2	2x240	2x240	2x300	2x300	2x300	2x300	2x300	2x185+2x185

SLS STD-BLN		5404	5704	6004	6404	6804	7204	8404
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50						
Nominal power input	kW	210+210	210+235	235+235	246+246	260+260	274+274	288+288
Max power input	kW	278+278	278+310	310+310	330+330	351+351	371+371	389+389
Nominal current	A	360+360	360+399	399+399	425+425	449+449	473+473	497+497
Max. current (FLA)	A	494+494	494+559	559+559	568+568	603+603	638+638	668+668
Max. start-up current (LRA)	A	890	985	1051	1016	1120	1169	1290
External fuses	(A)	500+500	500+630	630+630	630+630	800+800	800+800	800+800
Wire cross area (1)	mm^2	2x185+2x185	2x185+2x240	2x240+2x240	2x240+2x240	2x300+2x300	2x300+2x300	2x300+2x300

(1) The dimensioning of the unit's power cables is the responsibility of the installer, who shall consider: the rating, the maximum working temperature in the room, the type of insulation and the cable laying, the maximum length of the power supply line.

Electrical data - Standard Unit

SLS STD-LN / STD-ELN		1402	1602	1802	1902	2002	2202	2502	2702
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	79	115	134	151	168	184	194	204
Max power input	kW	161	181	200	215	230	250	261	272
Nominal current	A	141	195	220	252	284	310	328	346
Max. current (FLA)	A	257	297	338	358	378	448	464	480
Max. start-up current (LRA)	A	386	460	550	650	664	483	510	521
External fuses	(A)	315	315	400	400	400	500	500	500
Wire cross area (1)	mm^2	240	240	2x120	2x120	2x120	2x185	2x185	2x185

SLS STD-LN / STD-ELN		3002	3202	3402	3602	4202	4602	4802	5004
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	209	237	251	265	279	333	350	194+194
Max power input	kW	277	321	342	362	380	444	462	261+261
Nominal current	A	356	405	429	453	476	551	578	328+328
Max. current (FLA)	A	490	548	583	618	648	702	752	464+464
Max. start-up current (LRA)	A	625	584	663	687	788	899	934	841
External fuses	(A)	630	630	800	800	800	800	800	500+500
Wire cross area (1)	mm^2	2x240	2x240	2x300	2x300	2x300	2x300	2x300	2x185+2x185

SLS STD-LN / STD-ELN		5404	5704	6004	6404	6804	7204	8404
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50						
Nominal power input	kW	204+204	204+226	226+226	237+237	251+251	265+265	279+279
Max power input	kW	272+272	272+301	301+301	321+321	342+342	362+362	380+380
Nominal current	A	346+346	346+379	379+379	405+405	429+429	453+453	476+476
Max. current (FLA)	A	480+480	480+539	539+539	548+548	583+583	618+618	648+648
Max. start-up current (LRA)	A	863	958	1011	975	1079	1128	1249
External fuses	(A)	500+500	500+630	630+630	630+630	800+800	800+800	800+800
Wire cross area (1)	mm^2	2x185+2x185	2x185+2x240	2x240+2x240	2x240+2x240	2x300+2x300	2x300+2x300	2x300+2x300

(1) The dimensioning of the unit's power cables is the responsibility of the installer, who shall consider: the rating, the maximum working temperature in the room, the type of insulation and the cable laying, the maximum length of the power supply line.

Electrical data - High Efficiency Unit

SLS HE-BLN		1402	1602	1802	1902	2002	2402	2602	2802
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	86	122	142	158	174	194	204	214
Max power input	kW	168	188	208	222	236	260	271	282
Nominal current	A	156	210	238	268	298	332	350	368
Max. current (FLA)	A	272	312	356	374	392	470	486	502
Max. start-up current (LRA)	A	401	475	568	665	678	505	532	543
External fuses	(A)	315	315	400	400	400	500	500	500
Wire cross area (1)	mm^2	240	240	2x120	2x120	2x120	2x185	2x185	2x185

SLS HE-BLN		3002	3202	3402	3602	4202	4602	4802	4804
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	218	246	260	274	296	347	364	194+194
Max power input	kW	286	330	351	371	397	458	476	260+260
Nominal current	A	376	425	449	473	513	583	610	332+332
Max. current (FLA)	A	510	568	603	638	684	734	784	470+470
Max. start-up current (LRA)	A	646	604	683	708	824	931	966	846
External fuses	(A)	630	630	800	800	800	800	800	500+500
Wire cross area (1)	mm^2	2x240	2x240	2x300	2x300	2x300	2x300	2x300	2x185+2x185

SLS HE-BLN		5204	5604	6004	6404	6804	7204	7804	8404
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	204+204	214+214	235+235	252+252	273+273	274+274	274+288	322+322
Max power input	kW	271+271	282+282	310+310	334+334	383+383	371+371	371+389	432+432
Nominal current	A	350+350	368+368	399+399	422+422	452+452	473+473	473+497	540+540
Max. current (FLA)	A	486+486	502+502	559+559	608+608	638+638	638+638	638+668	668+668
Max. start-up current (LRA)	A	895	906	1051	1120	1170	1169	1190	1333
External fuses	(A)	500+500	500+500	630+630	630+630	800+800	800+800	800+800	800+800
Wire cross area (1)	mm^2	2x185+2x185	2x185+2x185	2x240+2x240	2x240+2x240	2x300+2x300	2x300+2x300	2x300+2x300	2x300+2x300

(1) The dimensioning of the unit's power cables is the responsibility of the installer, who shall consider: the rating, the maximum working temperature in the room, the type of insulation and the cable laying, the maximum length of the power supply line.

Electrical data - High Efficiency Unit

SLS HE-LN / HE-ELN		1402	1602	1802	1902	2002	2402	2602	2802
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	82	118	136	152	168	187	197	207
Max power input	kW	164	184	202	216	230	253	264	275
Nominal current	A	146	200	224	254	284	315	333	351
Max. current (FLA)	A	262	302	342	360	378	453	469	485
Max. start-up current (LRA)	A	391	465	555	652	664	488	515	526
External fuses	(A)	315	315	400	400	400	500	500	500
Wire cross area (1)	mm^2	240	240	2x120	2x120	2x120	2x185	2x185	2x185

SLS HE-LN / HE-ELN		3002	3202	3402	3602	4202	4602	4802	4804
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	209	237	251	265	284	335	352	186,5+186,5
Max power input	kW	277	321	342	362	385	446	464	252,5+252,5
Nominal current	A	356	405	429	453	486	556	583	315+315
Max. current (FLA)	A	490	548	583	618	657	707	757	453+453
Max. start-up current (LRA)	A	625	584	663	687	797	904	939	812
External fuses	(A)	630	630	800	800	800	800	800	500+500
Wire cross area (1)	mm^2	2x240	2x240	2x300	2x300	2x300	2x300	2x300	2x185+2x185

SLS HE-LN / HE-ELN		5204	5604	6004	6404	6804	7204	7804	8404
Nominal voltage	V(%)-ph-Hz	400 ±10% / 3 / 50							
Nominal power input	kW	196,5+196,5	206,5+206,5	226+226	243+243	264+264	265+265	265+279	313+313
Max power input	kW	263,5+263,5	274,5+274,5	301+301	325+325	374+374	362+362	362+380	423+423
Nominal current	A	333+333	351+351	379+379	402+402	432+432	453+453	453+476	520+520
Max. current (FLA)	A	469+469	485+485	539+539	588+588	618+618	618+618	618+648	648+648
Max. start-up current (LRA)	A	861	872	1011	1079	1129	1128	1149	1292
External fuses	(A)	500+500	500+500	630+630	630+630	800+800	800+800	800+800	800+800
Wire cross area (1)	mm^2	2x185+2x185	2x185+2x185	2x240+2x240	2x240+2x240	2x300+2x300	2x300+2x300	2x300+2x300	2x300+2x300

(1) The dimensioning of the unit's power cables is the responsibility of the installer, who shall consider: the rating, the maximum working temperature in the room, the type of insulation and the cable laying, the maximum length of the power supply line.

Electrical data - Compressors

Compressors SLS STD		1402	1602	1802	1902	2002	2202	2502	2702
Number	n°	2	2	2	2	2	2	2	2
Nominal power input	kW	2x37	2x55	2x63	63+79	2x79	2x87	87+97	2x97
Max power input	kW	2x78	2x88	2x96	96+110	2x110	2x120	120+131	2x131
Nominal current	A	2x66	2x93	2x103	103+133	2x133	2x146	146+164	2x164
Max. current (FLA)	A	2x124	2x144	2x162	162+180	2x180	2x215	215+231	2x231
Max. start-up current (LRA)	A	2x290	2x350	2x423	423+520	2x520	2x314	314+341	2x341
Oil treater power input	W	2x200	2x200	2x200	200+300	2x300	2x300	2x300	2x300

Compressors SLS STD		3002	3202	3402	3602	4202	4602	4802	5004
Number	n°	2	2	2	2	2	2	2	4
Nominal power input	kW	97+114	2x111	111+125	2x125	2x132	149+166	2x166	2x(87+97)
Max power input	kW	131+155	2x153	153+174	2x174	2x183	204+222	2x222	2x(120+131)
Nominal current	A	164+187	2x189	189+213	2x213	2x224	246+273	2x273	2x(146+164)
Max. current (FLA)	A	231+280	2x260	260+295	2x295	2x310	310+360	2x360	2x(215+231)
Max. start-up current (LRA)	A	341+436	2x374	374+453	2x453	2x543	586+650	2x650	2x(314+341)
Oil treater power input	W	2x300	2x300	2x300	2x300	2x300	2x300	2x300	4x300

Compressors SLS STD		5404	5704	6004	6404	6804	7204	8404
Number	n°	4	4	4	4	4	4	4
Nominal power input	kW	2x97+2x97	2x97+97+114	2x(97+114)	2x111+2x111	2x(111+125)	2x125+2x125	2x132+2x132
Max power input	kW	2x131+2x131	2x131+131+155	2x(131+155)	2x153+2x153	2x(153+174)	2x174+2x174	2x183+2x183
Nominal current	A	2x164+2x164	2x164+164+187	2x(164+187)	2x189+2x189	2x(189+213)	2x213+2x213	2x224+2x224
Max. current (FLA)	A	2x231+2x231	2x231+231+280	2x(231+280)	2x260+2x260	2x(260+295)	2x295+2x295	2x310+2x310
Max. start-up current (LRA)	A	2x341+2x341	2x341+341+436	2x(341+436)	2x374+2x374	2x(374+453)	2x453+2x453	2x543+2x543
Oil treater power input	W	4x300	4x300	4x300	4x300	4x300	4x300	4x300

Electrical data - Compressors

Compressors SLS HE		1402	1602	1802	1902	2002	2402	2602	2802
Number	n°	2	2	2	2	2	2	2	2
Nominal power input	kW	2x37	2x55	2x63	63+79	2x79	2x87	87+97	2x97
Max power input	kW	2x78	2x88	2x96	96+110	2x110	2x120	120+131	2x131
Nominal current	A	2x66	2x93	2x103	103+133	2x133	2x146	146+164	2x164
Max. current (FLA)	A	2x124	2x144	2x162	162+180	2x180	2x215	215+231	2x231
Max. start-up current (LRA)	A	2x290	2x350	2x423	423+520	2x520	2x314	314+341	2x341
Oil treater power input	W	2x200	2x200	2x200	200+300	2x300	2x300	2x300	2x300

Compressors SLS HE		3002	3202	3402	3602	4202	4602	4802	4804
Number	n°	2	2	2	2	2	2	2	4
Nominal power input	kW	97+114	2x111	111+125	2x125	2x132	149+166	2x166	2x87+2x87
Max power input	kW	131+155	2x153	153+174	2x174	2x183	204+222	2x222	2x120+2x120
Nominal current	A	164+187	2x189	189+213	2x213	2x224	246+273	2x273	2x146+2x146
Max. current (FLA)	A	231+280	2x260	260+295	2x295	2x310	310+360	2x360	2x215+2x215
Max. start-up current (LRA)	A	341+436	2x374	374+453	2x453	2x543	586+650	2x650	2x314+2x314
Oil treater power input	W	2x300	2x300	2x300	2x300	2x300	2x300	2x300	4x300

Compressors SLS HE		5204	5604	6004	6404	6804	7204	7804	8404
Number	n°	4	4	4	4	4	4	4	4
Nominal power input	kW	2x(87+97)	2x97+2x97	2x(97+114)	2x111+2x111	2x(111+125)	2x125+2x125	2x125+2x132	2x132+2x132
Max power input	kW	2x(120+131)	2x131+2x131	2x(131+155)	2x153+2x153	2x(153+174)	2x174+2x174	2x174+2x183	2x183+2x183
Nominal current	A	2x(146+164)	2x164+2x164	2x(164+187)	2x189+2x189	2x(189+213)	2x213+2x213	2x213+2x224	2x224+2x224
Max. current (FLA)	A	2x(215+231)	2x231+2x231	2x(231+280)	2x260+2x260	2x(260+295)	2x295+2x295	2x295+2x310	2x310+2x310
Max. start-up current (LRA)	A	2x(314+341)	2x341+2x341	2x(341+436)	2x374+2x374	2x(374+453)	2x453+2x453	2x453+2x543	2x543+2x543
Oil treater power input	W	4x300	4x300	4x300	4x300	4x300	4x300	4x300	4x300

Electrical data - Fans

Fans SLS STD BLN		1402	1602	1802	1902	2002	2202	2502	2702	3002	3202	3402	3602
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	4	4	6	7	8	8	8	8	12	12	12	12
Rated power per fan	kW	2	2	2	2	2	2	2	2	2	2	2	2
Max. absorbed current per fan	A	4	4	4	4	4	4	4	4	4	4	4	4

Fans SLS STD BLN		4202	4602	4802	5004	5404	5704	6004	6404	6804	7204	8404
Power supply	V-ph-Hz	400 ± 10% / 3/ 50										
Number	n°	12	14	14	16	16	20	24	24	24	24	24
Rated power per fan	kW	2	2	2	2	2	2	2	2	2	2	2
Max. absorbed current per fan	A	4	4	4	4	4	4	4	4	4	4	4

Fans SLS STD LN / STD-ELN		1402	1602	1802	1902	2002	2202	2502	2702	3002	3202	3402	3602
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	4	4	6	7	8	8	8	8	12	12	12	12
Rated power per fan	kW	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
Max. absorbed current per fan	A	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3

Fans SLS STD LN / STD-ELN		4202	4602	4802	5004	5404	5704	6004	6404	6804	7204	8404
Power supply	V-ph-Hz	400 ± 10% / 3/ 50										
Number	n°	12	14	14	16	16	20	24	24	24	24	24
Rated power per fan	kW	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
Max. absorbed current per fan	A	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3

Fans SLS HE BLN		1402	1602	1802	1902	2002	2402	2602	2802	3002	3202	3402	3602
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	6	6	8	8	8	10	10	10	12	12	12	12
Rated power per fan	kW	2	2	2	2	2	2	2	2	2	2	2	2
Max. absorbed current per fan	A	4	4	4	4	4	4	4	4	4	4	4	4

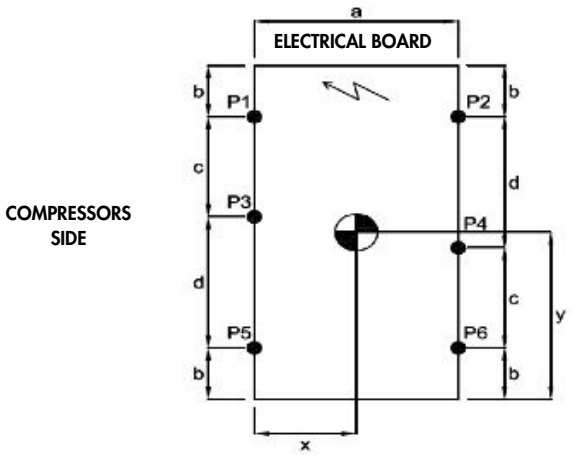
Fans SLS HE BLN		4202	4602	4802	4804	5204	5604	6004	6404	6804	7204	7804	8404
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	16	16	16	20	20	20	24	24	24	24	24	24
Rated power per fan	kW	2	2	2	2	2	2	2	2	2	2	2	2
Max. absorbed current per fan	A	4	4	4	4	4	4	4	4	4	4	4	4

Fans SLS HE LN/ELN		1402	1602	1802	1902	2002	2402	2602	2802	3002	3202	3402	3602
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	6	6	8	8	8	10	10	10	12	12	12	12
Rated power per fan	kW	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
Max. absorbed current per fan	A	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3

Fans SLS HE LN/ELN		4202	4602	4802	4804	5204	5604	6004	6404	6804	7204	7804	8404
Power supply	V-ph-Hz	400 ± 10% / 3/ 50											
Number	n°	16	16	16	20	20	20	24	24	24	24	24	24
Rated power per fan	kW	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
Max. absorbed current per fan	A	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3

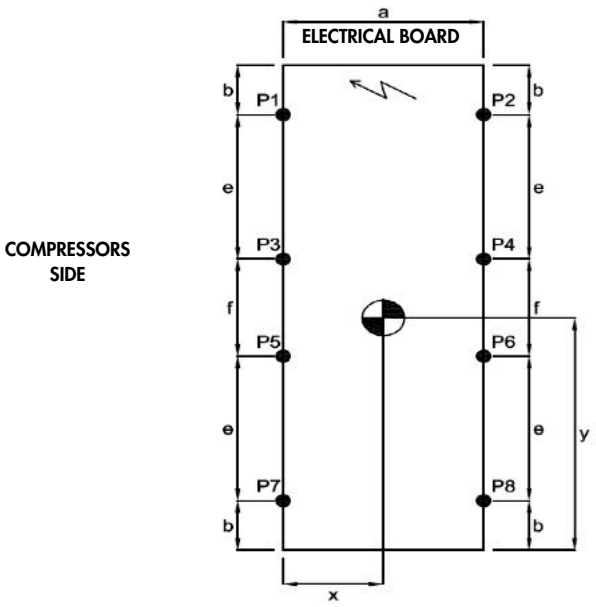
8.4 Position of antivibration mounting springs and weight distribution on supports

SLS, SLS-R 1402-2702 STD-BLN / STD-LN / STD-ELN
SLS, SLS-R 1402-1902 HE-BLN / HE-LN / HE ELN



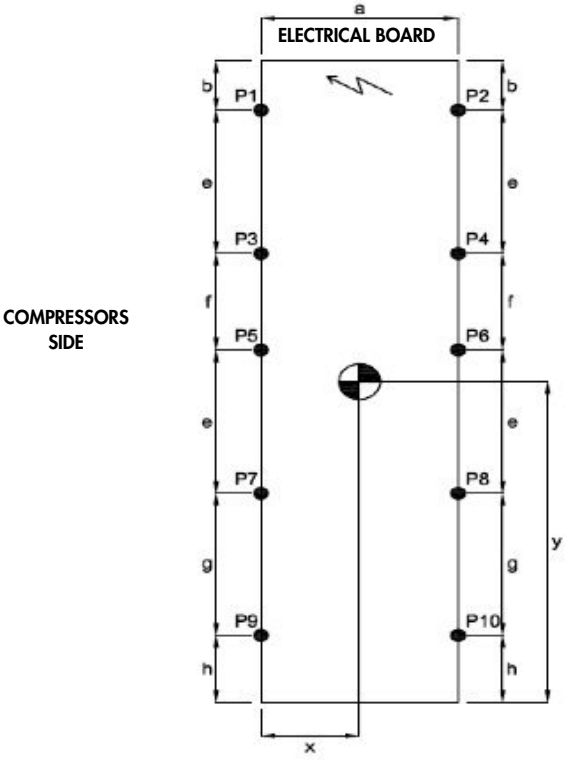
P1-P6 - Unit supporting points

SLS, SLS-R 3002-4202 STD-BLN / STD-LN / STD-ELN
SLS, SLS-R 2002-13002 HE-BLN / HE-LN / HE ELN



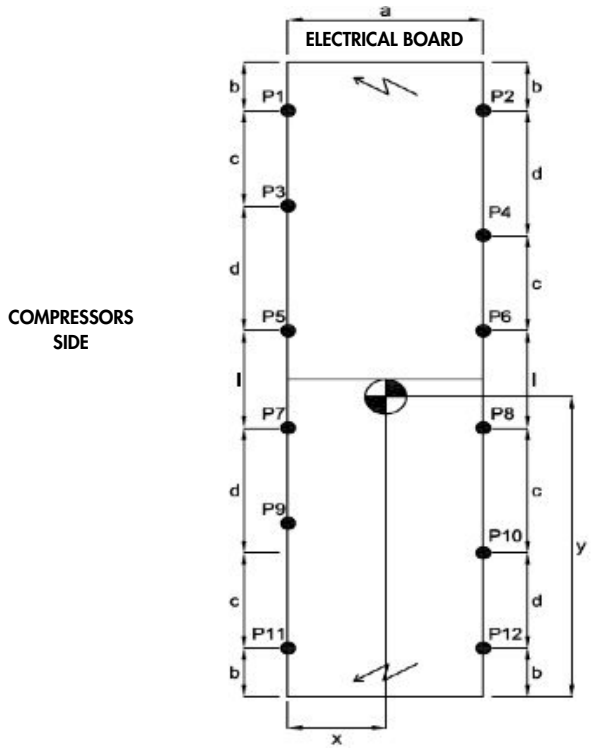
P1-P8 - Unit supporting points

SLS, SLS-R 4602-4802 STD-BLN / STD-LN / STD-ELN
SLS, SLS-R 3202-4802 HE-BLN / HE-LN / HE ELN



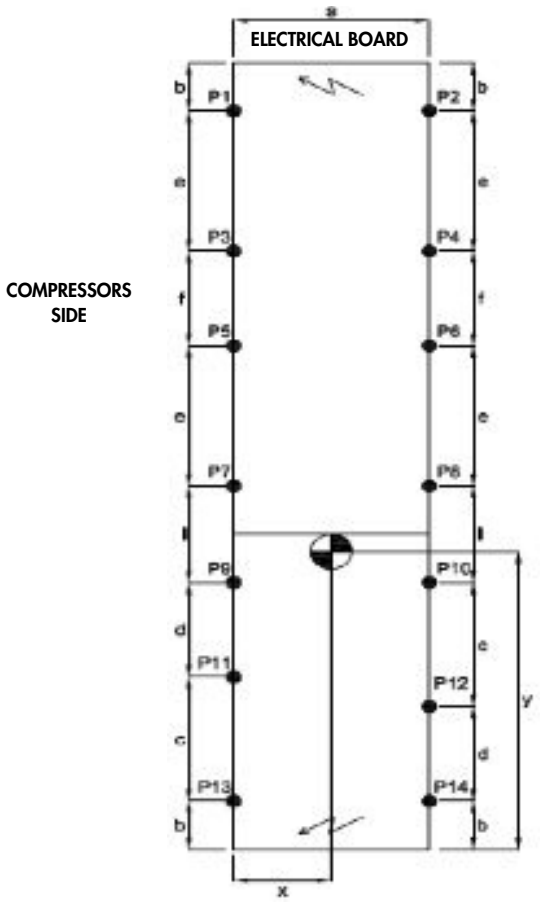
P1-P10 - Unit supporting points

SLS 5004-5404 STD-BLN / STD-LN / STD-ELN



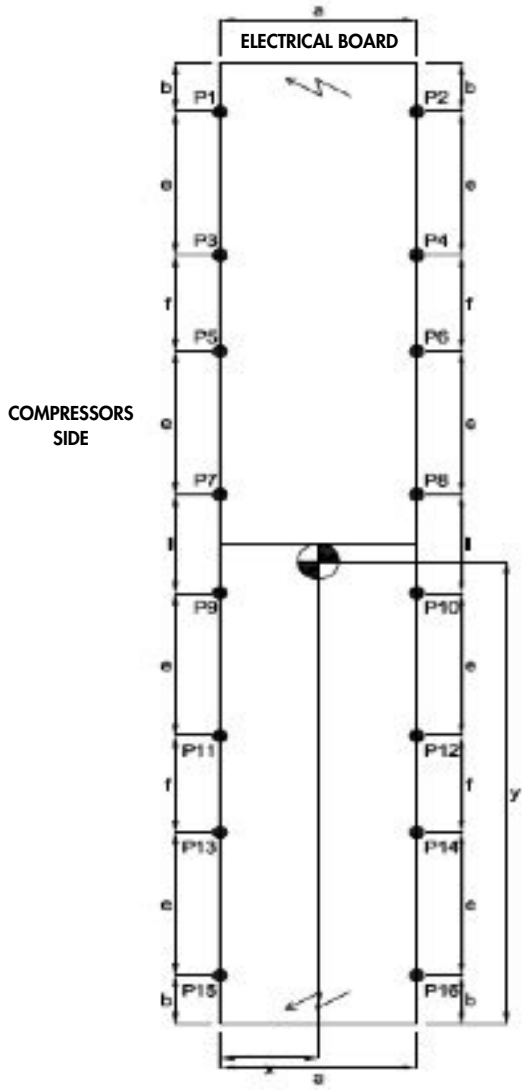
P1-P12 - Unit supporting points

SLS 5704 STD-BLN / STD-LN / STD-ELN



P1-P14 - Unit supporting points

SLS 6004-8404 STD-BLN / STD-LN / STD-ELN
SLS 4804-8404 HE-BLN / HE-LN / HE ELN



P1-P16 - Unit supporting points

SLS STD 1402 - 8404 BLN version

SLS STD	Weight distribution (kg)																Shipping Weight	Operating Weight	POSITION P1-P12							POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	780	650	760	620	730	600	-	-	-	-	-	-	-	-	-	-	4020	4130	2099	615	1208	1583	-	-	-	-	-	970	2060
1602	780	650	760	620	730	600	-	-	-	-	-	-	-	-	-	-	4040	4150	2099	615	1208	1583	-	-	-	-	-	970	2060
1802	820	730	790	690	760	660	-	-	-	-	-	-	-	-	-	-	4290	4450	2099	615	1208	1583	-	-	-	-	-	970	2060
1902	900	730	890	720	870	700	-	-	-	-	-	-	-	-	-	-	4650	4810	2099	615	1208	1583	-	-	-	-	-	970	2060
2002	1060	840	1010	780	950	730	-	-	-	-	-	-	-	-	-	-	5210	5370	2099	615	1208	1583	-	-	-	-	-	970	2060
2202	1060	840	1010	780	950	730	-	-	-	-	-	-	-	-	-	-	5210	5380	2099	615	1208	1583	-	-	-	-	-	970	2060
2502	1070	870	1020	810	960	760	-	-	-	-	-	-	-	-	-	-	5310	5500	2099	615	1208	1583	-	-	-	-	-	970	2060
2702	1080	880	1030	810	960	760	-	-	-	-	-	-	-	-	-	-	5330	5520	2099	615	1208	1583	-	-	-	-	-	970	2060
3002	970	790	980	800	990	810	1010	830	-	-	-	-	-	-	-	-	6960	7180	2099	615	-	-	1792	1206	-	-	-	990	3020
3202	1100	900	1090	890	1080	890	1070	880	-	-	-	-	-	-	-	-	7600	7890	2099	615	-	-	1792	1206	-	-	-	990	3020
3402	1110	920	1100	920	1090	920	1080	910	-	-	-	-	-	-	-	-	7760	8060	2099	615	-	-	1792	1206	-	-	-	990	3020
3602	1140	940	1130	930	1120	930	1110	920	-	-	-	-	-	-	-	-	7930	8220	2099	615	-	-	1792	1206	-	-	-	990	3020
4202	1120	960	1110	950	1100	950	1090	940	-	-	-	-	-	-	-	-	8210	8680	2099	615	-	-	1792	1206	-	-	-	990	3020
4602	1430	1300	1290	1170	1200	1080	1070	950	940	810	-	-	-	-	-	-	10820	11240	2099	615	-	-	1792	1206	1776	838	-	1030	4520
4802	1430	1300	1300	1170	1210	1080	1080	950	940	810	-	-	-	-	-	-	10850	11270	2099	615	-	-	1792	1206	1776	838	-	1030	4520
5004	1030	830	1030	820	1020	820	1020	810	1010	810	1010	800	-	-	-	-	10620	10990	2099	615	1208	1583	-	-	-	-	1233	970	4050
5404	1040	830	1030	820	1030	820	1020	810	1010	810	1010	800	-	-	-	-	10660	11030	2099	615	1208	1583	-	-	-	-	1233	970	4050
5704	980	790	990	800	990	800	1000	810	1010	820	1020	830	1030	830	-	-	12290	12690	2099	615	1208	1583	1792	1206	-	-	1233	970	4830
6004	950	770	970	780	970	790	980	800	990	810	1000	820	1010	830	1020	840	13910	14350	2099	615	-	-	1792	1206	-	-	1233	990	5990
6404	1070	880	1080	880	1080	880	1080	890	1090	890	1090	890	1090	900	1100	900	15190	15780	2099	615	-	-	1792	1206	-	-	1233	990	5990
6804	1080	910	1090	910	1090	910	1090	920	1100	920	1100	930	1100	930	1110	930	15520	16110	2099	615	-	-	1792	1206	-	-	1233	990	5990
7204	1110	910	1120	920	1120	920	1130	930	1130	930	1130	930	1140	940	1140	940	15850	16440	2099	615	-	-	1792	1206	-	-	1233	990	5990
8404	1160	990	1160	990	1160	1000	1170	1000	1170	1000	1170	1010	1170	1010	1180	1010	16420	17350	2099	615	-	-	1792	1206	-	-	1233	990	5990

SLS STD 1402 - 8404 LN/ELN version

SLS STD	Weight distribution (kg)																Shipping Weight	Operating Weight	POSITION P1-P12								POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	810	660	790	630	760	610	-	-	-	-	-	-	-	-	-	-	4140	4250	2099	615	1208	1583	-	-	-	-	-	960	2060
1602	810	660	790	630	760	610	-	-	-	-	-	-	-	-	-	-	4160	4270	2099	615	1208	1583	-	-	-	-	-	960	2060
1802	850	750	820	700	780	670	-	-	-	-	-	-	-	-	-	-	4410	4570	2099	615	1208	1583	-	-	-	-	-	960	2060
1902	950	760	920	720	880	690	-	-	-	-	-	-	-	-	-	-	4770	4930	2099	615	1208	1583	-	-	-	-	-	960	2060
2002	1090	850	1040	790	980	730	-	-	-	-	-	-	-	-	-	-	5330	5490	2099	615	1208	1583	-	-	-	-	-	960	2060
2202	1100	850	1040	790	980	740	-	-	-	-	-	-	-	-	-	-	5330	5500	2099	615	1208	1583	-	-	-	-	-	960	2060
2502	1110	890	1050	820	980	770	-	-	-	-	-	-	-	-	-	-	5430	5620	2099	615	1208	1583	-	-	-	-	-	960	2060
2702	1110	890	1060	820	980	770	-	-	-	-	-	-	-	-	-	-	5450	5640	2099	615	1208	1583	-	-	-	-	-	960	2060
3002	990	790	1010	810	1020	820	1030	840	-	-	-	-	-	-	-	-	7080	7300	2099	615	-	-	1792	1206	-	-	-	980	3020
3202	1120	920	1110	910	1100	900	1090	890	-	-	-	-	-	-	-	-	7720	8010	2099	615	-	-	1792	1206	-	-	-	980	3020
3402	1130	950	1120	930	1110	930	1100	910	-	-	-	-	-	-	-	-	7880	8180	2099	615	-	-	1792	1206	-	-	-	980	3020
3602	1160	960	1150	940	1140	940	1130	920	-	-	-	-	-	-	-	-	8050	8340	2099	615	-	-	1792	1206	-	-	-	980	3020
4202	1210	1030	1190	1010	1180	1010	1170	990	-	-	-	-	-	-	-	-	8330	8800	2099	615	-	-	1792	1206	-	-	-	980	3020
4602	1450	1320	1310	1180	1220	1090	1080	950	940	820	-	-	-	-	-	-	10940	11360	2099	615	-	-	1792	1206	1776	838	-	1020	4520
4802	1450	1330	1310	1190	1220	1090	1080	960	940	820	-	-	-	-	-	-	10970	11390	2099	615	-	-	1792	1206	1776	838	-	1020	4520
5004	1050	850	1050	840	1040	840	1040	830	1030	830	1030	820	-	-	-	-	10860	11230	2099	615	1208	1583	-	-	-	-	1233	950	4050
5404	1060	850	1050	840	1050	840	1040	830	1030	830	1030	820	-	-	-	-	10900	11270	2099	615	1208	1583	-	-	-	-	1233	950	4050
5704	990	800	1000	810	1010	820	1020	830	1030	840	1040	840	1040	850	-	-	12530	12930	2099	615	1208	1583	1792	1206	-	-	1233	960	4820
6004	970	790	980	800	990	810	1000	820	1010	830	1020	840	1030	840	1040	860	14150	14590	2099	615	-	-	1792	1206	-	-	1233	980	5980
6404	1090	890	1090	890	1090	900	1100	900	1100	910	1110	910	1110	910	1110	920	15430	16020	2099	615	-	-	1792	1206	-	-	1233	980	5980
6804	1100	920	1100	930	1100	930	1110	930	1110	940	1120	940	1120	940	1120	950	15760	16350	2099	615	-	-	1792	1206	-	-	1233	980	5980
7204	1130	930	1130	930	1140	940	1140	940	1140	950	1150	950	1150	950	1160	960	16090	16680	2099	615	-	-	1792	1206	-	-	1233	980	5980
8404	1170	1010	1170	1010	1180	1010	1180	1020	1180	1020	1190	1020	1190	1020	1190	1030	16660	17590	2099	615	-	-	1792	1206	-	-	1233	980	5980

SLS-R STD 1402 - 4802 BLN version

SLS STD	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12								POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	827	691	810	670	789	653	-	-	-	-	-	-	-	-	-	-	4300	4440	2099	615	1208	1583	-	-	-	-	980	2050
1602	836	698	820	677	799	661	-	-	-	-	-	-	-	-	-	-	4340	4490	2099	615	1208	1583	-	-	-	-	980	2050
1802	887	785	865	755	835	733	-	-	-	-	-	-	-	-	-	-	4660	4860	2099	615	1208	1583	-	-	-	-	980	2050
1902	994	820	988	812	980	806	-	-	-	-	-	-	-	-	-	-	5180	5400	2099	615	1208	1583	-	-	-	-	980	2050
2002	1156	927	1114	872	1060	831	-	-	-	-	-	-	-	-	-	-	5740	5960	2099	615	1208	1583	-	-	-	-	980	2050
2202	1162	933	1121	879	1067	838	-	-	-	-	-	-	-	-	-	-	5770	6000	2099	615	1208	1583	-	-	-	-	980	2050
2502	1172	962	1131	909	1078	868	-	-	-	-	-	-	-	-	-	-	5870	6120	2099	615	1208	1583	-	-	-	-	980	2050
2702	1178	966	1136	911	1081	869	-	-	-	-	-	-	-	-	-	-	5890	6140	2099	615	1208	1583	-	-	-	-	980	2050
3002	912	726	1050	864	1144	957	1282	1095	-	-	-	-	-	-	-	-	7710	8030	2099	615	-	-	1792	1206	-	-	1000	2830
3202	1043	843	1155	955	1230	1030	1342	1142	-	-	-	-	-	-	-	-	8350	8740	2099	615	-	-	1792	1206	-	-	1000	2830
3402	1053	873	1166	986	1242	1062	1355	1175	-	-	-	-	-	-	-	-	8520	8910	2099	615	-	-	1792	1206	-	-	1000	2830
3602	1085	882	1198	994	1273	1070	1386	1182	-	-	-	-	-	-	-	-	8680	9070	2099	615	-	-	1792	1206	-	-	1000	2830
4202	1130	959	1240	1069	1314	1143	1424	1253	-	-	-	-	-	-	-	-	8970	9530	2099	615	-	-	1792	1206	-	-	1000	2830
4602	1326	1196	1313	1182	1303	1172	1289	1159	1275	1145	-	-	-	-	-	-	11830	12360	2099	615	-	-	1792	1206	1776	838	1030	4210
4802	1333	1200	1318	1185	1307	1174	1292	1159	1277	1144	-	-	-	-	-	-	11860	12390	2099	615	-	-	1792	1206	1776	838	1030	4210

SLS-R STD 1402 - 4802 LN/ELN version

SLS STD	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12								POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	858	698	842	678	822	662	-	-	-	-	-	-	-	-	-	-	4420	4560	2099	615	1208	1583	-	-	-	-	-	970	2050
1602	866	704	851	684	831	669	-	-	-	-	-	-	-	-	-	-	4460	4610	2099	615	1208	1583	-	-	-	-	-	970	2050
1802	918	791	896	763	868	741	-	-	-	-	-	-	-	-	-	-	4780	4980	2099	615	1208	1583	-	-	-	-	-	970	2050
1902	1024	826	1019	819	1012	814	-	-	-	-	-	-	-	-	-	-	5300	5520	2099	615	1208	1583	-	-	-	-	-	970	2050
2002	1187	934	1146	880	1092	839	-	-	-	-	-	-	-	-	-	-	5860	6080	2099	615	1208	1583	-	-	-	-	-	970	2050
2202	1193	939	1152	886	1099	846	-	-	-	-	-	-	-	-	-	-	5890	6120	2099	615	1208	1583	-	-	-	-	-	970	2050
2502	1202	968	1163	916	1111	877	-	-	-	-	-	-	-	-	-	-	5990	6240	2099	615	1208	1583	-	-	-	-	-	970	2050
2702	1208	972	1167	918	1113	877	-	-	-	-	-	-	-	-	-	-	6010	6260	2099	615	1208	1583	-	-	-	-	-	970	2050
3002	871	796	1009	934	1102	1027	1241	1166	-	-	-	-	-	-	-	-	7830	8150	2099	615	-	-	1792	1206	-	-	-	990	2830
3202	996	919	1108	1031	1184	1107	1296	1219	-	-	-	-	-	-	-	-	8470	8860	2099	615	-	-	1792	1206	-	-	-	990	2830
3402	1003	951	1116	1064	1192	1140	1305	1253	-	-	-	-	-	-	-	-	8640	9030	2099	615	-	-	1792	1206	-	-	-	990	2830
3602	1036	961	1148	1073	1224	1149	1336	1262	-	-	-	-	-	-	-	-	8800	9190	2099	615	-	-	1792	1206	-	-	-	990	2830
4202	1074	1042	1184	1152	1258	1226	1368	1336	-	-	-	-	-	-	-	-	9090	9650	2099	615	-	-	1792	1206	-	-	-	990	2830
4602	1351	1206	1334	1189	1322	1177	1305	1160	1287	1143	-	-	-	-	-	-	11950	12480	2099	615	-	-	1792	1206	1776	838	-	1030	4220
4802	1357	1210	1339	1192	1326	1179	1308	1161	1290	1142	-	-	-	-	-	-	11980	12510	2099	615	-	-	1792	1206	1776	838	-	1030	4220

SLS HE 1402 - 8404 BLN version

SLS HE	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12							POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	800	670	770	630	740	600	-	-	-	-	-	-	-	-	-	-	4090	4210	2099	615	1208	1583	-	-	-	-	-	1000	2050
1602	800	670	780	630	740	610	-	-	-	-	-	-	-	-	-	-	4110	4230	2099	615	1208	1583	-	-	-	-	-	1000	2050
1802	850	760	810	700	750	660	-	-	-	-	-	-	-	-	-	-	4360	4530	2099	615	1208	1583	-	-	-	-	-	1000	2050
1902	900	760	900	750	890	750	-	-	-	-	-	-	-	-	-	-	4790	4950	2099	615	1208	1583	-	-	-	-	-	1000	2050
2002	860	710	870	710	870	720	880	720	-	-	-	-	-	-	-	-	6170	6330	2099	615	-	-	1792	1206	-	-	-	1010	3000
2402	880	740	880	750	890	750	890	760	-	-	-	-	-	-	-	-	6340	6530	2099	615	-	-	1792	1206	-	-	-	1010	3000
2602	900	810	900	800	900	800	890	800	-	-	-	-	-	-	-	-	6580	6800	2099	615	-	-	1792	1206	-	-	-	1010	3000
2802	940	820	930	810	930	810	930	810	-	-	-	-	-	-	-	-	6760	6980	2099	615	-	-	1792	1206	-	-	-	1010	3000
3002	1020	890	1030	900	1040	910	1060	920	-	-	-	-	-	-	-	-	7470	7770	2099	615	-	-	1792	1206	-	-	-	1010	3000
3202	1320	1170	1220	1070	1160	1000	1060	900	960	810	-	-	-	-	-	-	10370	10670	2099	615	-	-	1792	1206	1776	838	-	1020	4470
3402	1320	1170	1230	1070	1160	1000	1060	910	970	810	-	-	-	-	-	-	10400	10690	2099	615	-	-	1792	1206	1776	838	-	1020	4470
3602	1350	1190	1240	1090	1170	1010	1060	910	960	800	-	-	-	-	-	-	10500	10790	2099	615	-	-	1792	1206	1776	838	-	1020	4470
4202	1410	1280	1290	1160	1210	1070	1090	950	970	830	-	-	-	-	-	-	10790	11250	2099	615	-	-	1792	1206	1776	838	-	1020	4470
4602	1450	1320	1330	1200	1250	1120	1130	1000	1010	880	-	-	-	-	-	-	11240	11700	2099	615	-	-	1792	1206	1776	838	-	1020	4470
4802	1460	1330	1340	1210	1250	1120	1130	1000	1010	880	-	-	-	-	-	-	11270	11730	2099	615	-	-	1792	1206	1776	838	-	1020	4470
4804	880	740	880	740	880	740	880	750	880	750	890	750	890	750	890	750	12680	13050	2099	615	-	-	1792	1206	-	-	1233	1010	5980
5204	880	780	890	790	890	790	900	800	900	800	910	810	910	810	920	820	13160	13600	2099	615	-	-	1792	1206	-	-	1233	1010	5980
5604	920	800	920	800	930	800	930	810	930	810	940	820	940	820	950	830	13510	13960	2099	615	-	-	1792	1206	-	-	1233	1010	5980
6004	1010	870	1020	880	1030	890	1040	900	1040	910	1050	920	1060	920	1070	930	14940	15530	2099	615	-	-	1792	1206	-	-	1233	1010	5980
6404	1120	980	1130	980	1130	980	1130	990	1140	990	1140	990	1140	1000	1140	1000	16650	16980	2099	615	-	-	1792	1206	-	-	1233	1010	5980
6804	1130	980	1130	980	1130	990	1140	990	1140	990	1140	1000	1140	1000	1150	1000	16100	17020	2099	615	-	-	1792	1206	-	-	1233	1010	5980
7204	1130	980	1130	990	1140	990	1140	990	1140	990	1150	1000	1150	1000	1150	1000	16140	17060	2099	615	-	-	1792	1206	-	-	1233	1010	5980
7804	1140	1000	1150	1000	1150	1000	1160	1010	1160	1010	1160	1020	1170	1020	1170	1020	16480	17330	2099	615	-	-	1792	1206	-	-	1233	1010	5980
8404	1160	1000	1160	1010	1160	1010	1170	1010	1170	1010	1170	1020	1180	1020	1180	1020	16610	17460	2099	615	-	-	1792	1206	-	-	1233	1010	5980

SLS HE 1402 - 8404 LN/ELN version

SLS HE	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12								POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	830	670	800	640	770	610	-	-	-	-	-	-	-	-	-	-	4210	4330	2099	615	1208	1583	-	-	-	-	-	980	2050
1602	840	680	810	640	770	620	-	-	-	-	-	-	-	-	-	-	4230	4350	2099	615	1208	1583	-	-	-	-	-	980	2050
1802	880	770	840	710	780	670	-	-	-	-	-	-	-	-	-	-	4480	4650	2099	615	1208	1583	-	-	-	-	-	980	2050
1902	930	770	930	760	920	760	-	-	-	-	-	-	-	-	-	-	4910	5070	2099	615	1208	1583	-	-	-	-	-	980	2050
2002	880	710	890	720	890	720	900	730	-	-	-	-	-	-	-	-	6290	6450	2099	615	-	-	1792	1206	-	-	-	1000	3000
2402	900	750	910	750	910	760	920	760	-	-	-	-	-	-	-	-	6460	6650	2099	615	-	-	1792	1206	-	-	-	1000	3000
2602	930	810	920	810	920	810	920	800	-	-	-	-	-	-	-	-	6700	6920	2099	615	-	-	1792	1206	-	-	-	1000	3000
2802	960	820	960	820	960	820	950	810	-	-	-	-	-	-	-	-	6880	7100	2099	615	-	-	1792	1206	-	-	-	1000	3000
3002	1040	890	1060	910	1070	920	1080	930	-	-	-	-	-	-	-	-	7590	7890	2099	615	-	-	1792	1206	-	-	-	1000	3000
3202	1350	1180	1250	1080	1180	1010	1080	910	970	800	-	-	-	-	-	-	10490	10790	2099	615	-	-	1792	1206	1776	838	-	1010	4470
3402	1350	1180	1250	1080	1180	1010	1080	910	980	810	-	-	-	-	-	-	10520	10810	2099	615	-	-	1792	1206	1776	838	-	1010	4470
3602	1380	1200	1270	1090	1190	1020	1080	910	970	800	-	-	-	-	-	-	10620	10910	2099	615	-	-	1792	1206	1776	838	-	1010	4470
4202	1440	1290	1310	1160	1230	1080	1100	960	980	830	-	-	-	-	-	-	10910	11370	2099	615	-	-	1792	1206	1776	838	-	1010	4470
4602	1480	1340	1350	1210	1270	1130	1140	1000	1020	880	-	-	-	-	-	-	11360	11820	2099	615	-	-	1792	1206	1776	838	-	1010	4470
4802	1480	1340	1360	1210	1270	1130	1150	1000	1020	880	-	-	-	-	-	-	11390	11850	2099	615	-	-	1792	1206	1776	838	-	1010	4470
4804	890	760	900	760	900	760	900	760	900	760	900	770	900	770	910	770	12920	13290	2099	615	-	-	1792	1206	-	-	1233	1000	5980
5204	900	800	900	810	910	810	910	810	920	820	920	820	930	830	930	830	13400	13840	2099	615	-	-	1792	1206	-	-	1233	1000	5980
5604	930	810	940	820	940	820	950	830	950	830	960	830	960	840	960	840	13750	14200	2099	615	-	-	1792	1206	-	-	1233	1000	5980
6004	1020	890	1030	900	1040	910	1050	920	1060	920	1070	930	1070	940	1080	950	15180	15770	2099	615	-	-	1792	1206	-	-	1233	1000	5980
6404	1140	990	1140	1000	1150	1000	1150	1000	1150	1000	1150	1010	1160	1010	1160	1010	16290	17220	2099	615	-	-	1792	1206	-	-	1233	1000	5980
6804	1140	1000	1150	1000	1150	1000	1150	1000	1150	1010	1160	1010	1160	1010	1160	1020	16340	17260	2099	615	-	-	1792	1206	-	-	1233	1000	5980
7204	1150	1000	1150	1000	1150	1000	1150	1010	1160	1010	1160	1010	1160	1010	1170	1020	16380	17300	2099	615	-	-	1792	1206	-	-	1233	1000	5980
7804	1160	1010	1160	1020	1170	1020	1170	1020	1170	1030	1180	1030	1180	1030	1190	1040	16720	17570	2099	615	-	-	1792	1206	-	-	1233	1000	5980
8404	1170	1020	1180	1020	1180	1020	1180	1030	1190	1030	1190	1030	1190	1050	1200	1040	16850	17700	2099	615	-	-	1792	1206	-	-	1233	1000	5980

SLS-R HE 1402 - 4802 BLN version

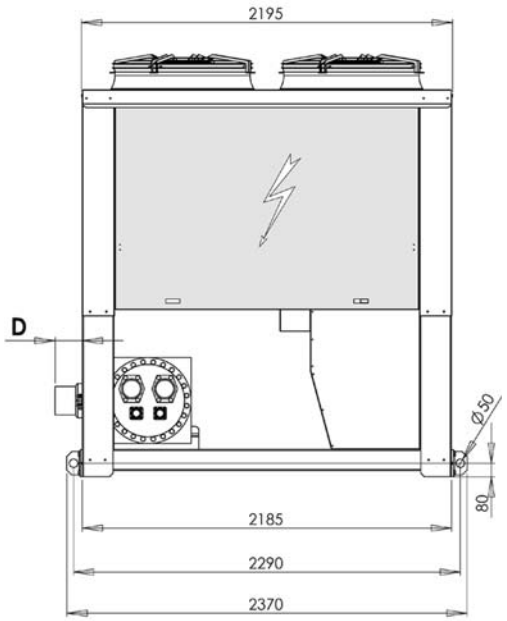
SLS HE	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12								POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	846	711	824	683	796	661	-	-	-	-	-	-	-	-	-	-	4370	4520	2099	615	1208	1583	-	-	-	-	-	1000	2040
1602	853	716	832	688	804	667	-	-	-	-	-	-	-	-	-	-	4420	4560	2099	615	1208	1583	-	-	-	-	-	1000	2040
1802	917	816	878	765	827	726	-	-	-	-	-	-	-	-	-	-	4740	4930	2099	615	1208	1583	-	-	-	-	-	1000	2040
1902	995	847	997	850	999	851	-	-	-	-	-	-	-	-	-	-	5320	5540	2099	615	1208	1583	-	-	-	-	-	1000	2040
2002	827	669	917	760	978	820	1068	911	-	-	-	-	-	-	-	-	6730	6950	2099	615	-	-	1792	1206	-	-	-	1010	2840
2402	842	701	936	794	999	857	1092	950	-	-	-	-	-	-	-	-	6920	7170	2099	615	-	-	1792	1206	-	-	-	1010	2840
2602	869	766	955	852	1013	910	1099	996	-	-	-	-	-	-	-	-	7170	7460	2099	615	-	-	1792	1206	-	-	-	1010	2840
2802	904	778	989	863	1047	921	1132	1006	-	-	-	-	-	-	-	-	7340	7640	2099	615	-	-	1792	1206	-	-	-	1010	2840
3002	985	845	1088	948	1157	1017	1260	1120	-	-	-	-	-	-	-	-	8060	8420	2099	615	-	-	1792	1206	-	-	-	1010	2840
3202	1252	1093	1241	1081	1233	1074	1222	1062	1210	1051	-	-	-	-	-	-	11130	11520	2099	615	-	-	1792	1206	1776	838	-	1020	4180
3402	1255	1094	1243	1083	1236	1075	1224	1064	1213	1053	-	-	-	-	-	-	11150	11540	2099	615	-	-	1792	1206	1776	838	-	1020	4180
3602	1251	1089	1262	1101	1270	1109	1282	1120	1294	1132	-	-	-	-	-	-	11510	11910	2099	615	-	-	1792	1206	1776	838	-	1020	4180
4202	1310	1174	1307	1171	1305	1169	1303	1167	1300	1164	-	-	-	-	-	-	11800	12370	2099	615	-	-	1792	1206	1776	838	-	1020	4180
4602	1332	1221	1349	1219	1348	1217	1345	1214	1342	1212	-	-	-	-	-	-	12290	12820	2099	615	-	-	1792	1206	1776	838	-	1020	4180
4802	1358	1225	1355	1222	1352	1219	1348	1215	1344	1211	-	-	-	-	-	-	12320	12850	2099	615	-	-	1792	1206	1776	838	-	1020	4180

SLS-R HE 1402 - 4802 LN/ELN version

SLS HE	Weight distribution (kg)															Shipping Weight	Operating Weight	POSITION P1-P12							POSITION CENTRE OF GRAVITY	
	F1 (kg)	F2 (kg)	F3 (kg)	F4 (kg)	F5 (kg)	F6 (kg)	F7 (kg)	F8 (kg)	F9 (kg)	F10 (kg)	F11 (kg)	F12 (kg)	F13 (kg)	F14 (kg)	F15 (kg)	F16 (kg)	(kg)	(kg)	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)	i (mm)	x (mm)	y (mm)
1402	876	717	855	690	827	669	-	-	-	-	-	-	-	-	-	-	4490	4640	2099	615	1208	1583	-	-	-	-	-	990	2040
1602	885	723	864	696	837	675	-	-	-	-	-	-	-	-	-	-	4540	4680	2099	615	1208	1583	-	-	-	-	-	990	2040
1802	948	823	910	773	860	735	-	-	-	-	-	-	-	-	-	-	4860	5050	2099	615	1208	1583	-	-	-	-	-	990	2040
1902	1026	854	1028	857	1031	859	-	-	-	-	-	-	-	-	-	-	5440	5660	2099	615	1208	1583	-	-	-	-	-	990	2040
2002	794	731	885	822	946	883	1036	973	-	-	-	-	-	-	-	-	6850	7070	2099	615	-	-	1792	1206	-	-	-	1000	2850
2402	807	765	900	858	963	921	1056	1014	-	-	-	-	-	-	-	-	7040	7290	2099	615	-	-	1792	1206	-	-	-	1000	2850
2602	830	834	916	920	973	978	1059	1064	-	-	-	-	-	-	-	-	7290	7380	2099	615	-	-	1792	1206	-	-	-	1000	2850
2802	863	846	949	932	1006	989	1092	1075	-	-	-	-	-	-	-	-	7460	7760	2099	615	-	-	1792	1206	-	-	-	1000	2850
3002	939	920	1042	1024	1111	1093	1215	1196	-	-	-	-	-	-	-	-	8180	8340	2099	615	-	-	1792	1206	-	-	-	1000	2850
3202	1277	1103	1262	1088	1252	1078	1237	1064	1222	1049	-	-	-	-	-	-	11250	11640	2099	615	-	-	1792	1206	1776	838	-	1020	4190
3402	1280	1105	1265	1090	1255	1081	1241	1066	1226	1051	-	-	-	-	-	-	11270	11660	2099	615	-	-	1792	1206	1776	838	-	1020	4190
3602	1276	1100	1284	1108	1289	1114	1298	1122	1306	1130	-	-	-	-	-	-	11630	12030	2099	615	-	-	1792	1206	1776	838	-	1020	4190
4202	1334	1184	1328	1178	1324	1174	1318	1168	1312	1162	-	-	-	-	-	-	11920	12490	2099	615	-	-	1792	1206	1776	838	-	1020	4190
4402	1376	1232	1370	1226	1366	1222	1360	1216	1354	1210	-	-	-	-	-	-	12410	12940	2099	615	-	-	1792	1206	1776	838	-	1020	4190
4802	1383	1236	1376	1229	1371	1224	1364	1217	1357	1210	-	-	-	-	-	-	12440	12970	2099	615	-	-	1792	1206	1776	838	-	1020	4190

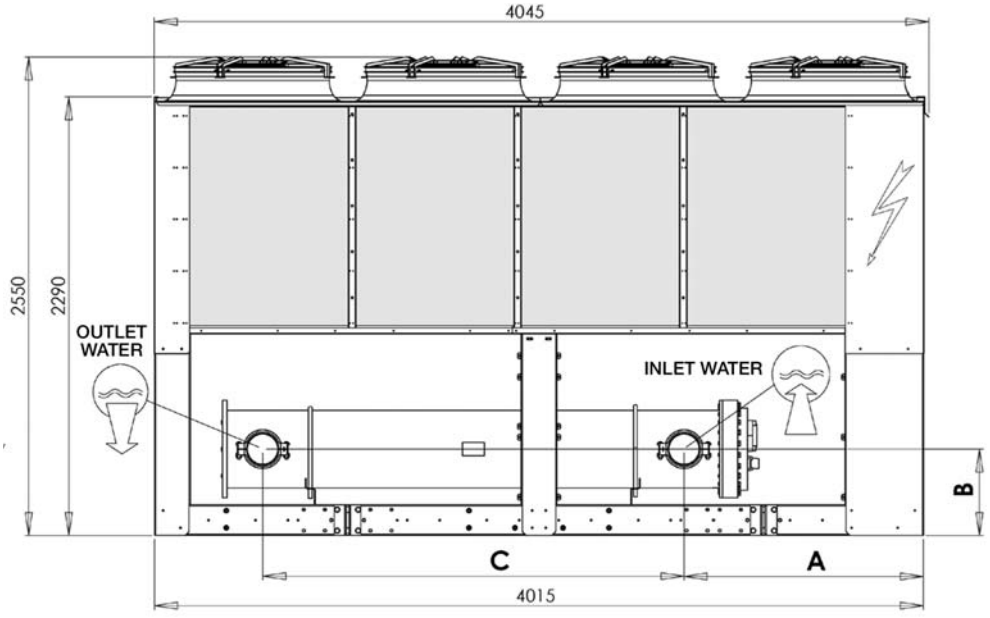
8.5 Overall dimensions

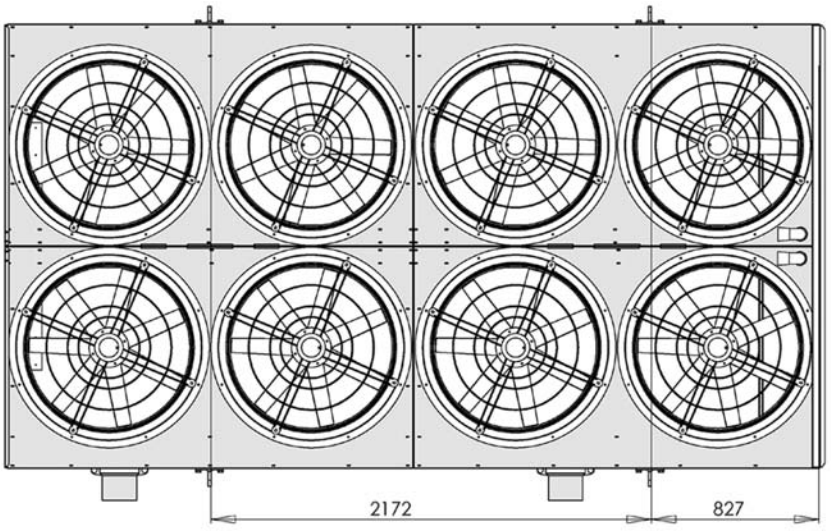
SLS R134a Versions STD 1402-2702 - SLS R134a Versions HE 1402-1902



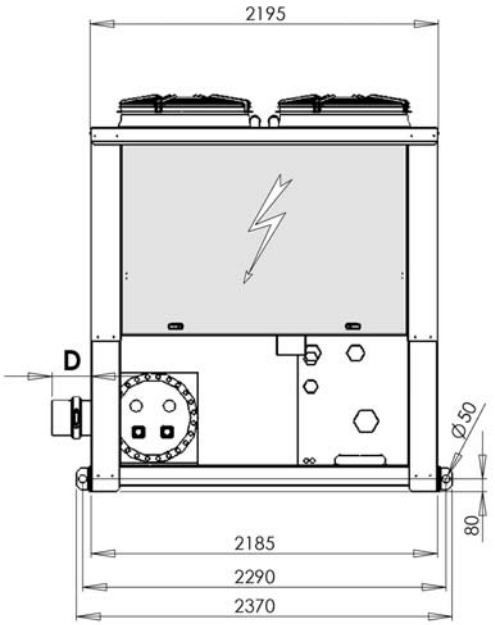
SLS R134a STD Version							
UNIT	A	B	C	D	Inlet water	Outlet water	n° fans
1402	1250	410	2250	80	DN125		4
1602							
1802		450	2200	160	DN150		6
1902							7
2002							8
2202							
2502							
2702							

SLS R134a HE Version							
UNIT	A	B	C	D	Inlet water	Outlet water	n° fans
1402	1250	410	2250	80	DN125		6
1602							
1802		450	2200	160	DN150		8
1902							



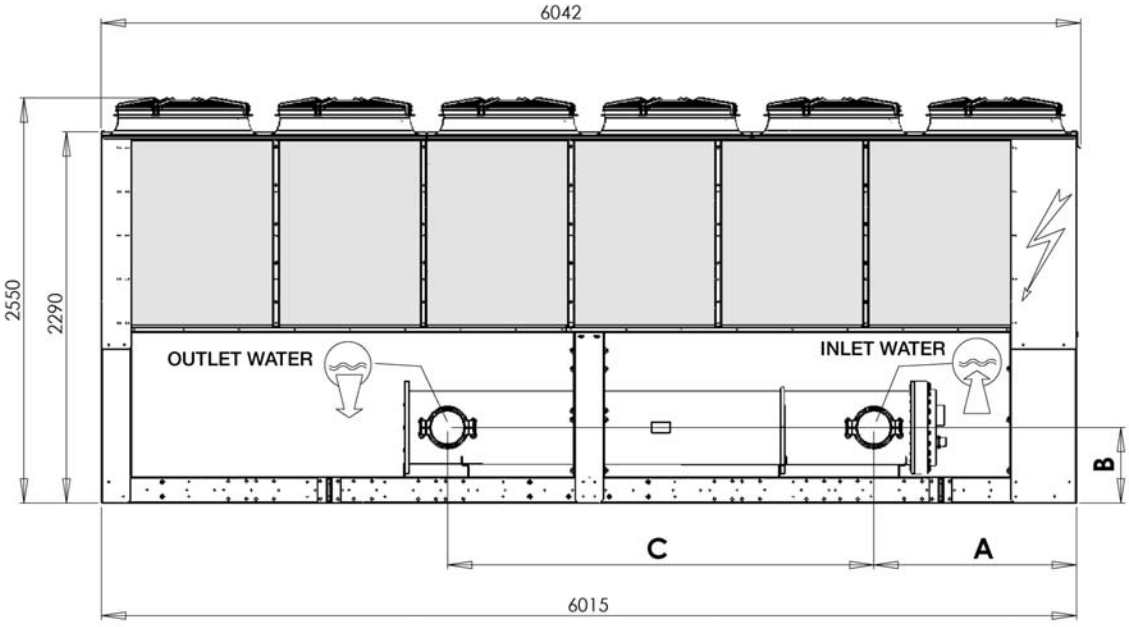


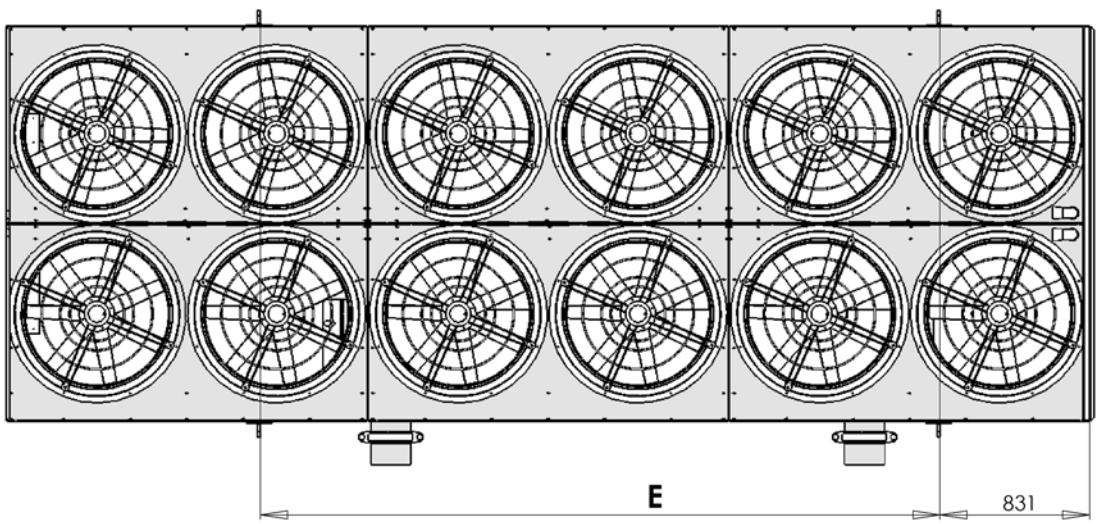
SLS R134a Versions STD 3002-4202 - SLS R134a Versions HE 2002-3002



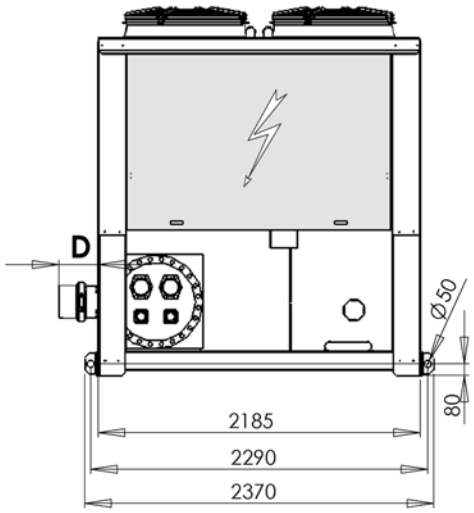
SLS R134a STD Version								
UNIT	A	B	C	D	Inlet water	Outlet water	E	n° fans
3002	1250	450	2700	160	DN150		3772	12
3202		467	3200	195	DN200		3168	12
3402								
3602								
4202		500						

SLS R134a HE Version								
UNIT	A	B	C	D	Inlet water	Outlet water	E	n° fans
2002	1250	450	2200	160	DN150		3772	8
2402								10
2602			2700					
2802								
3002		465	2630	245	DN200			12



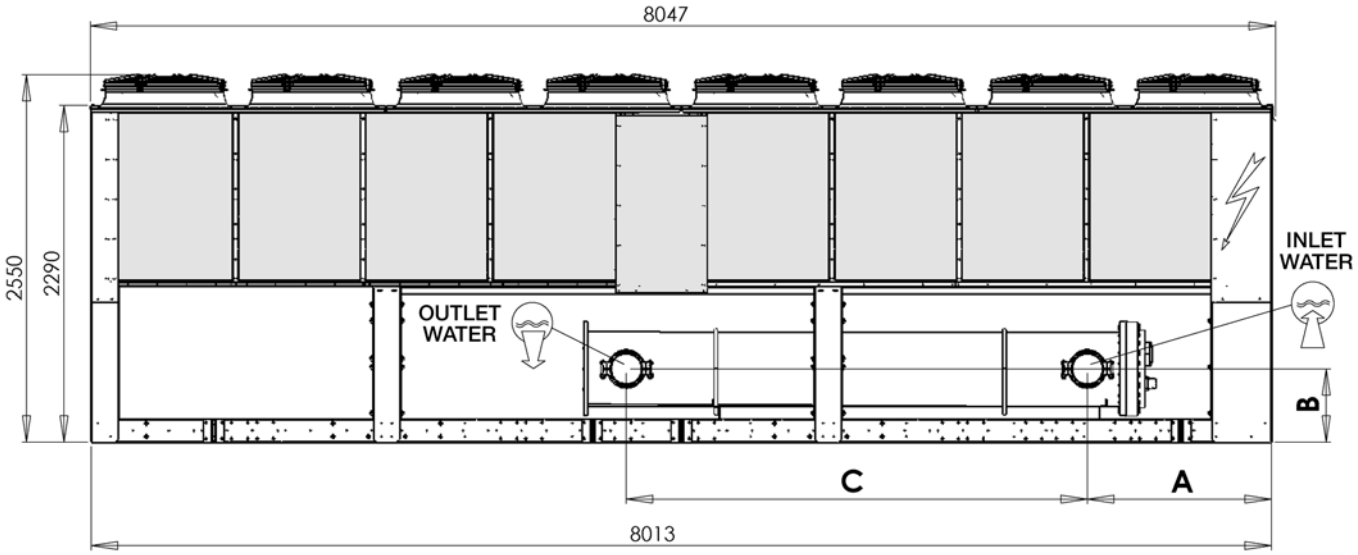


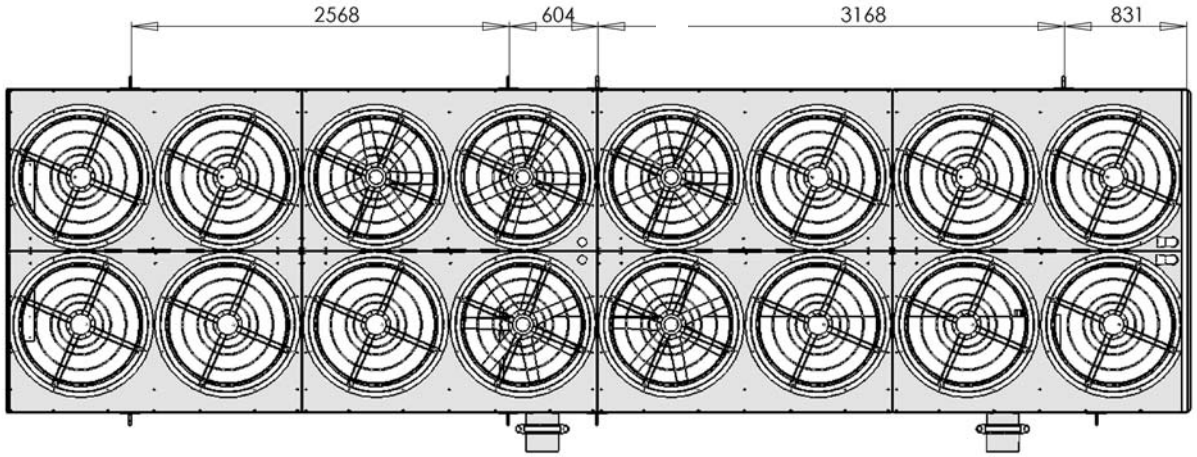
SLS R134a Versions STD 4602-4802 - SLS R134a Versions HE 3202-4802



SLS R134a STD Version							
UNIT	A	B	C	D	Inlet water	Outlet water	n° fans
4602 4802	1250	500	3130	270	DN200		14

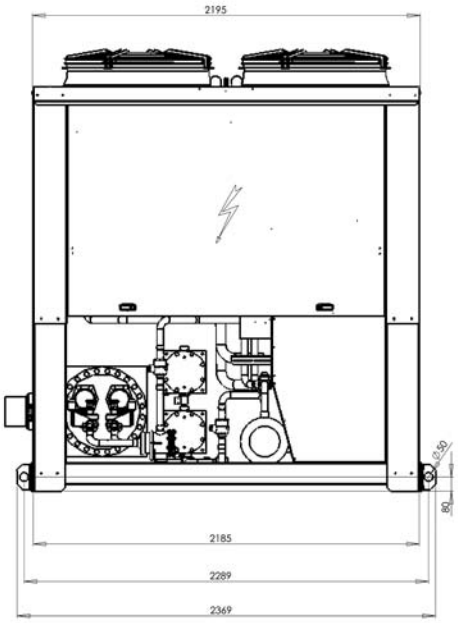
SLS R134a HE Version							
UNIT	A	B	C	D	Inlet water	Outlet water	n° fans
3202	1250	457	3200	195	DN200		14
3402							
3602							16
4202		500					
4602			3130	270			
4802							





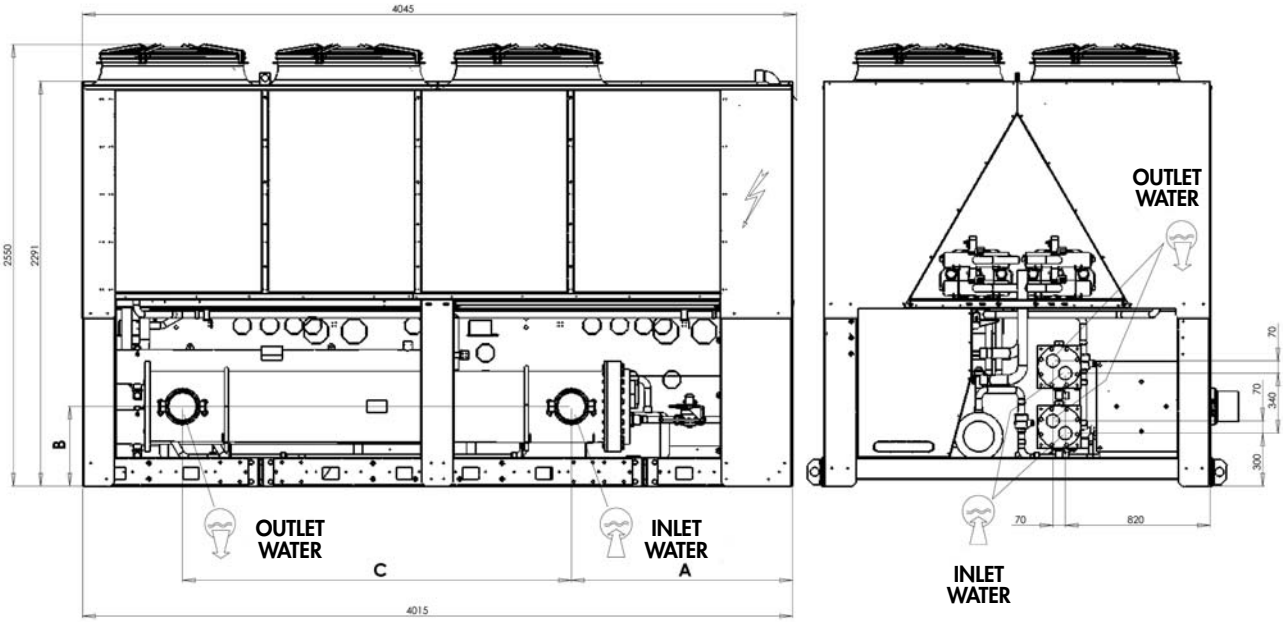
Dimensional drawings of SLS 134a STD 5004-8404 and HE 4804-8404 units are not available

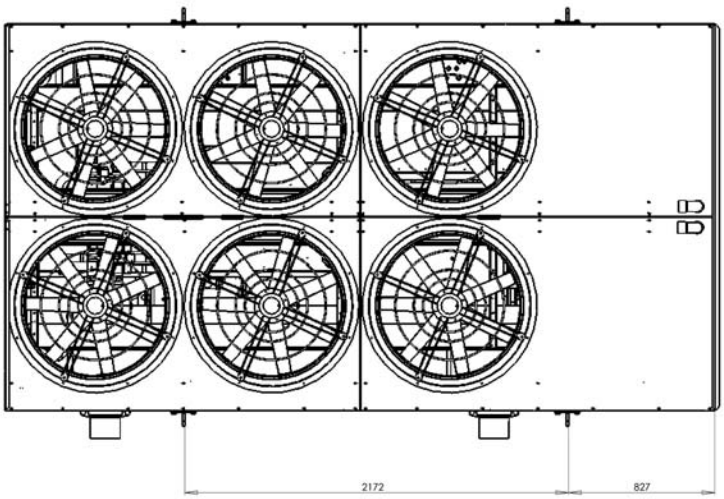
SLS-R R134a Versions STD 1402-1802 - SLS-R R134a Versions 1402-1802



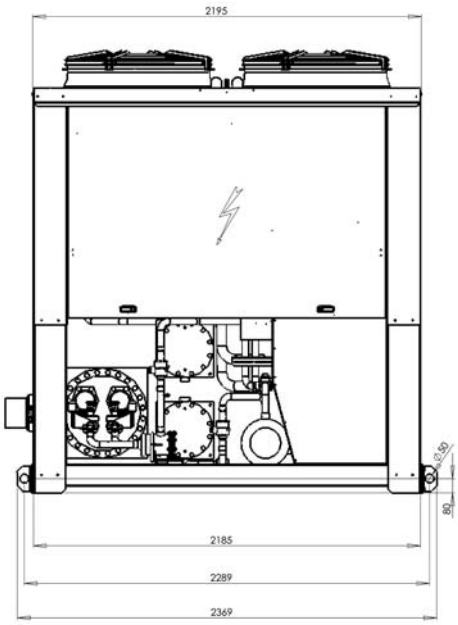
SLS-R R134a STD Version									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
1402	1250	410	2250	80	DN125		G2 1/2		4
1602									
1802		450	2200	160	DN150				6

SLS-R R134a HE Version									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
1402	1250	410	2250	80	DN125		G2 1/2		6
1602									
1802		450	2200	160	DN150				8



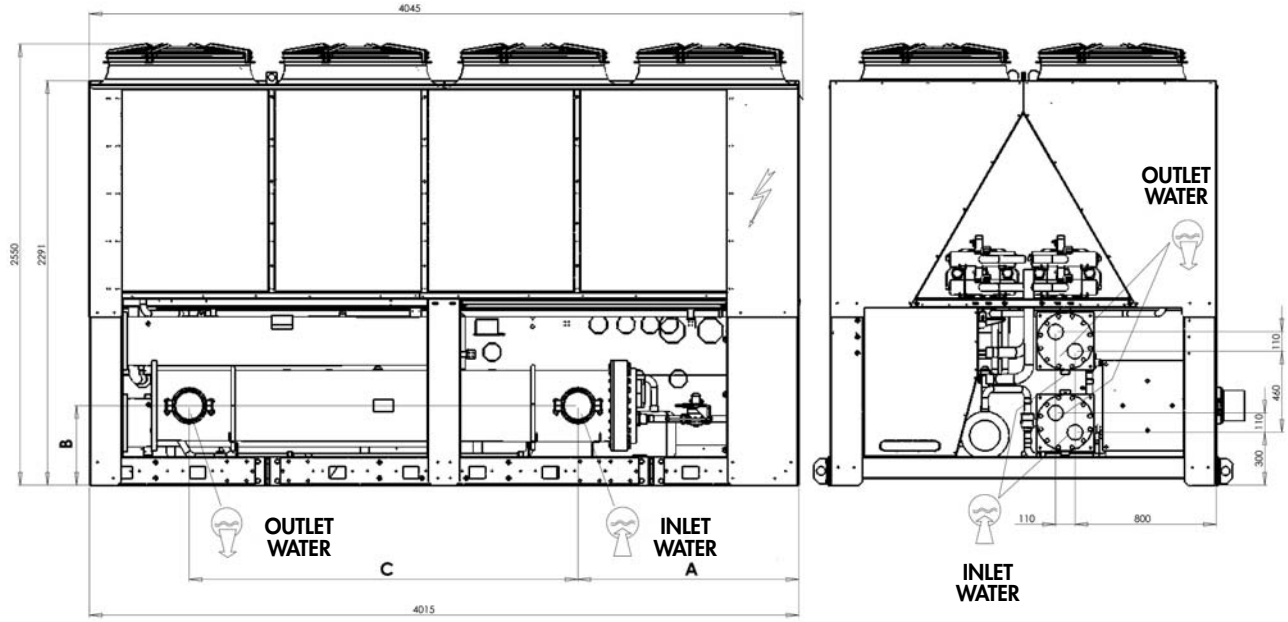


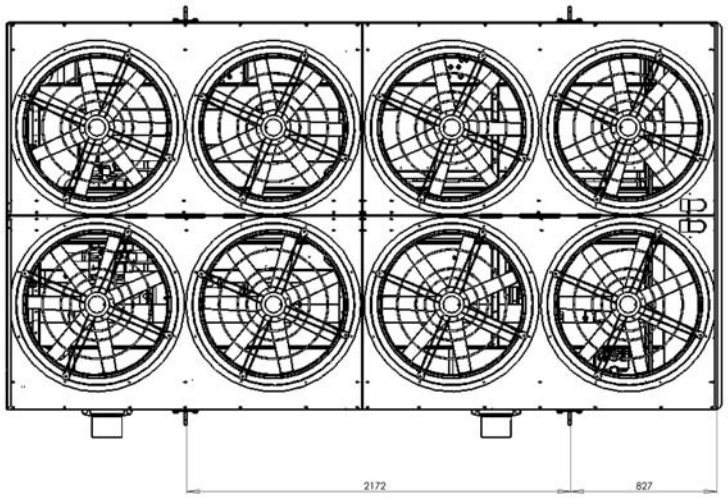
SLS-R R134a Versions STD 1902-2702 - SLS-R R134a Version HE 1902



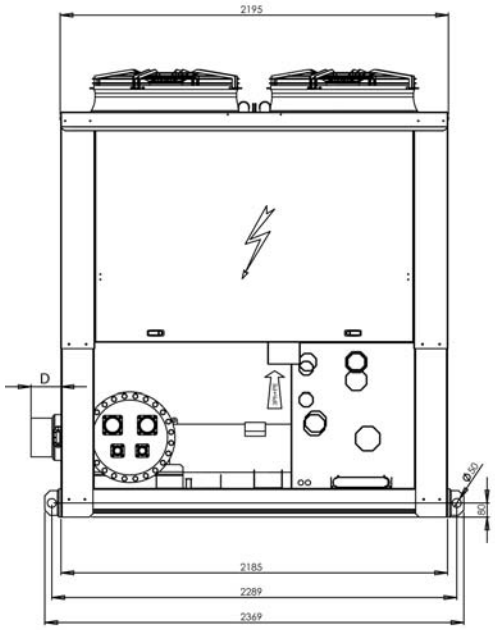
SLS-R R134a STD Version									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
1902	1250	450	2200	160	DN150		G3		7
2002									
2202									8
2502									
2702									

SLS-R R134a HE Version									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
1902	1250	450	2200	160	DN150		G3		8

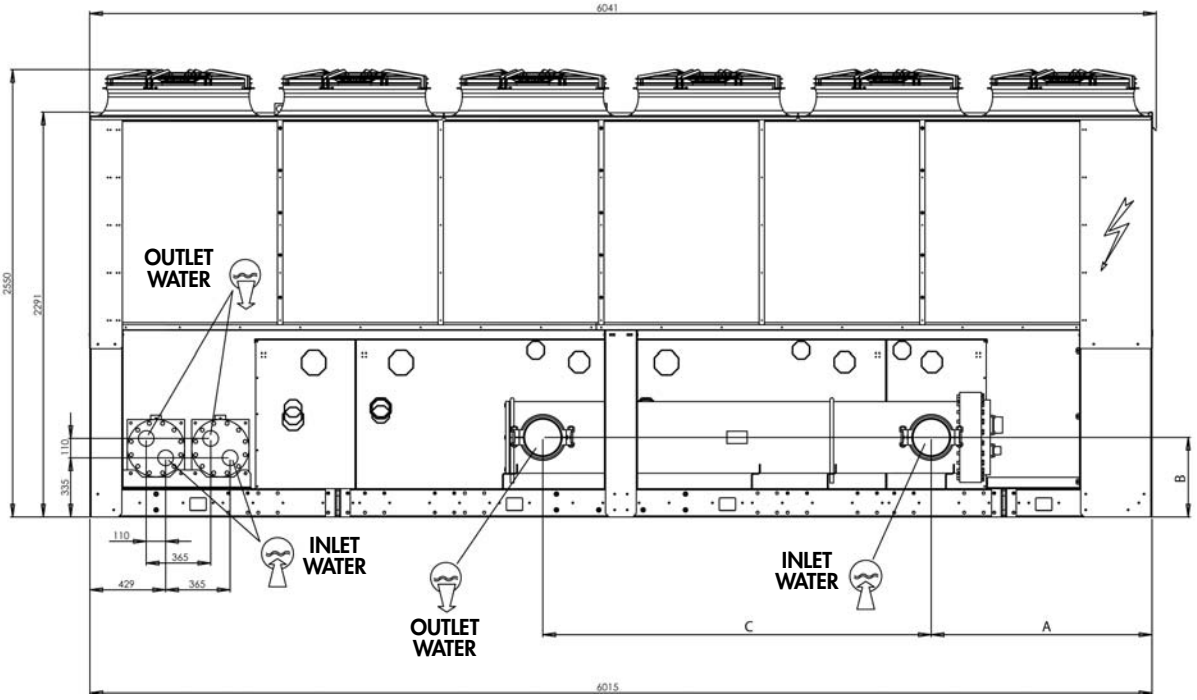


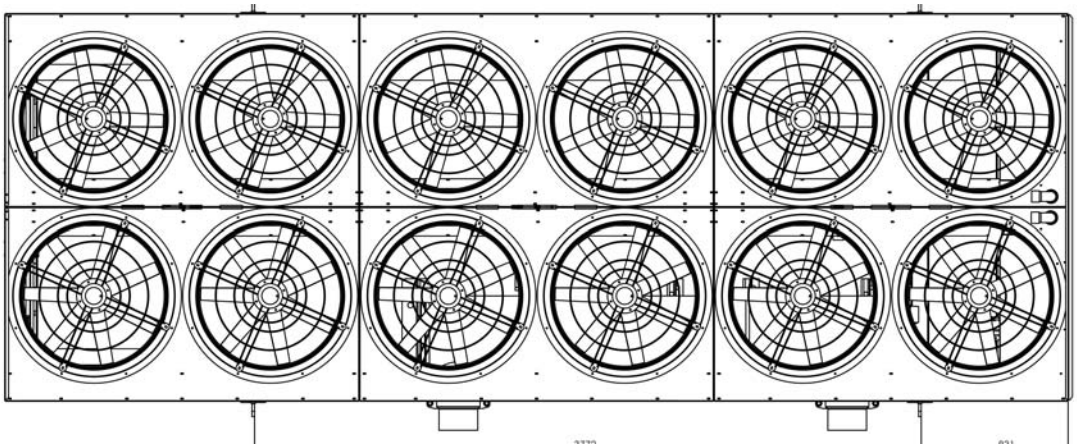


SLS-R R134a Versions HE 2002-3002

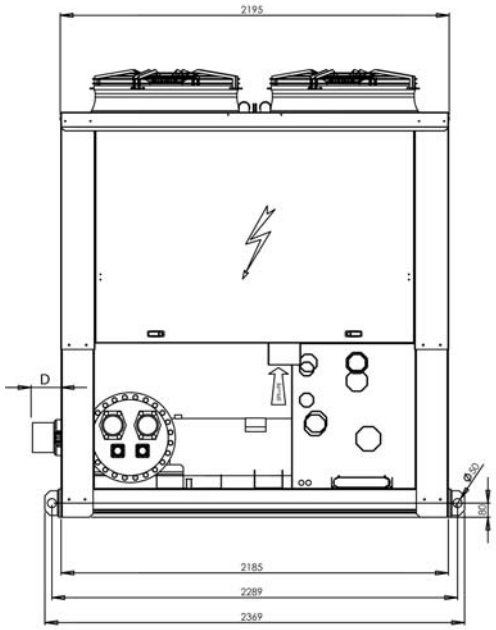


SLS-R R134a HE Version									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
2002	1250	450	2200	160	DN150		G3		8
2402									10
2602			2700						
2802									
3002		465	2630	245	DN200				12

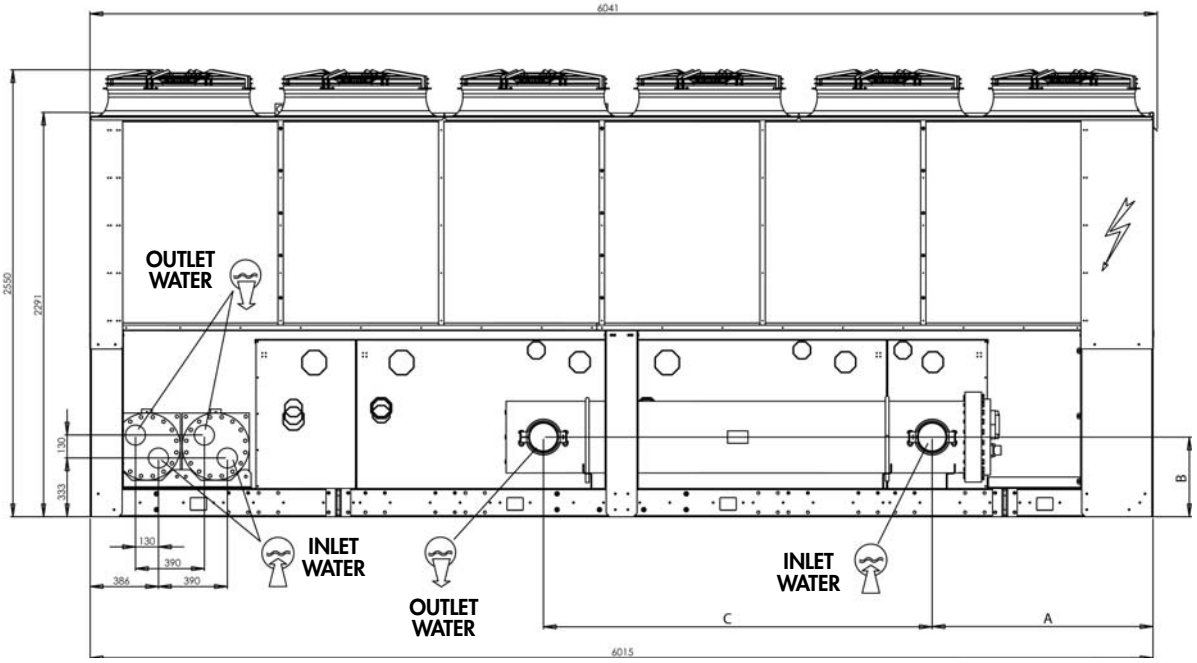


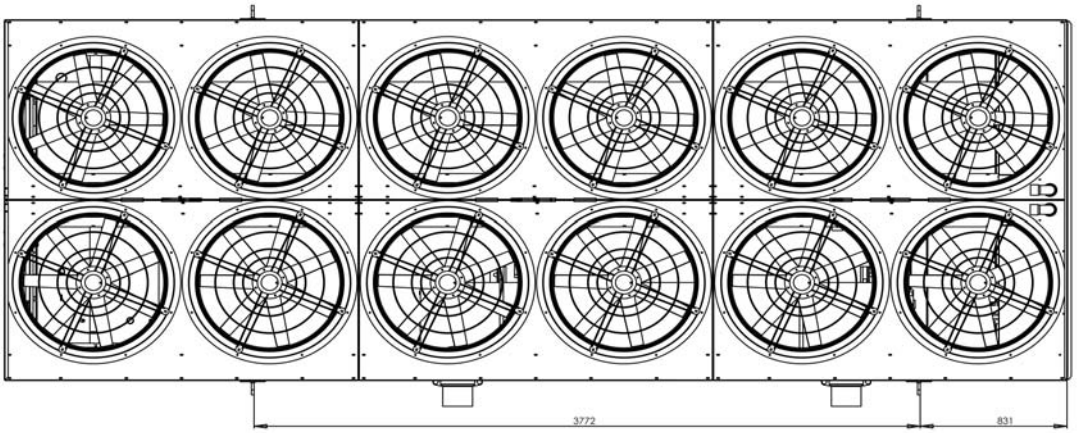


SLS-R R134a Versions STD 3002-4202

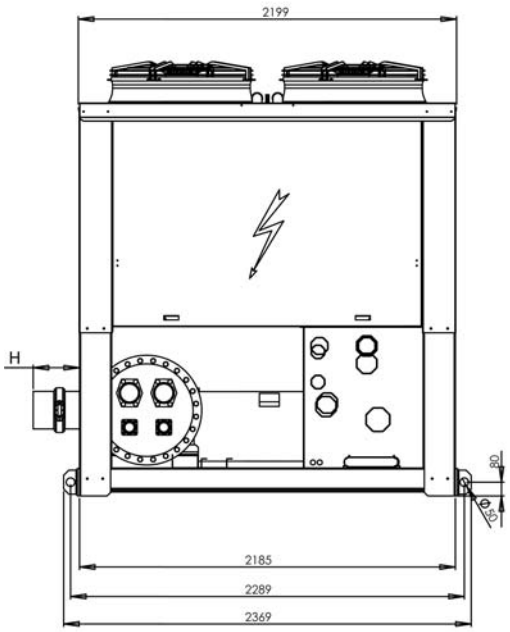


SLS-R R134a STDVersion									
					Evaporator		Condenser		
UNIT	A	B	C	D	Inlet water	Outlet water	Inlet water	Outlet water	N° FAN
3002	1250	450	3200	195	DN150	DN200	G4		12
3202		467							
3402									
3602									
4202		500							



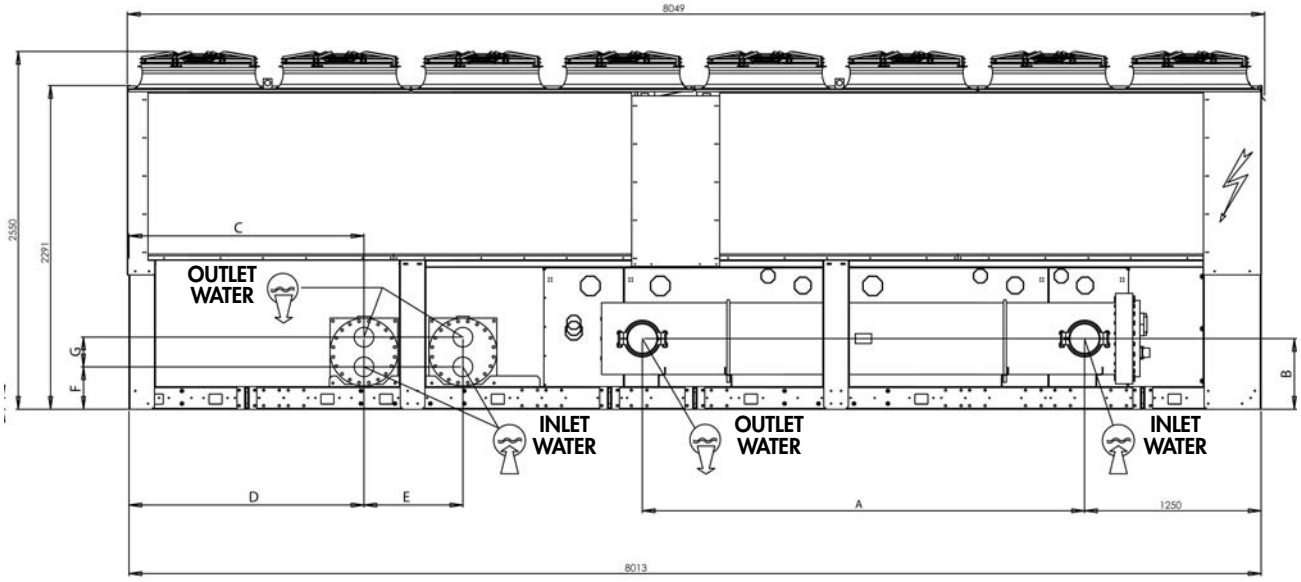


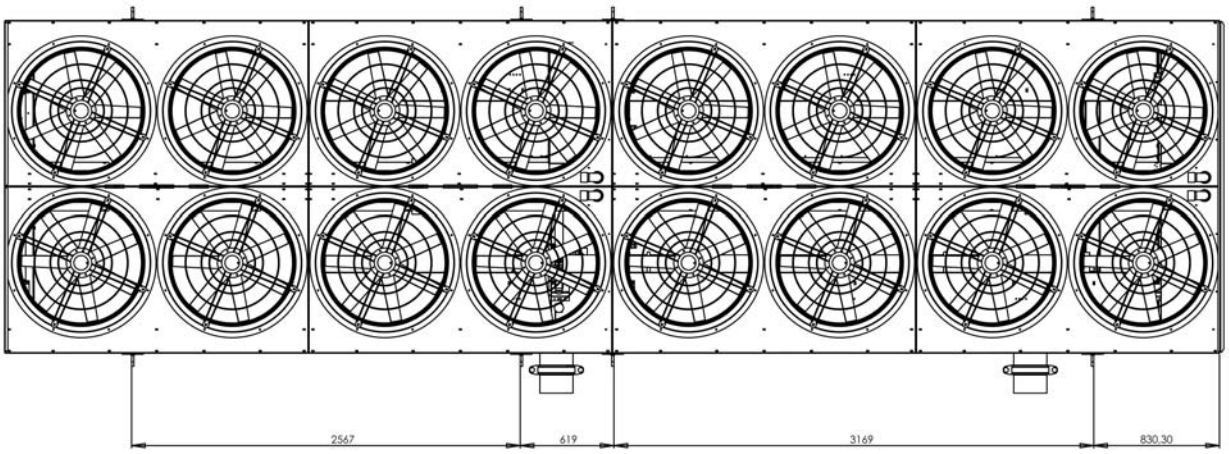
SLS-R R134a Versions STD 4602-4802 - SLS-R R134a Version HE 3202-4802



SLS-R R134a STDE Version													
									Evaporator		Condenser		
UNIT	A	B	C	D	E	F	G	H	In	Out	In	Out	N° FAN
4602	3130	500	1663		700	300	210	270	DN200		G5		14
4802													

SLS-R R134a STDE Version													
									Evaporator		Condenser		
UNIT	A	B	C	D	E	F	G	H	In	Out	In	Out	N° FAN
3202	3200	467	2254	2384	390	130	33	194	DN200		G4		14
3402													
3602			1663		700	300	210				G5		16
4202													
4602	3130	500						270					
4802													

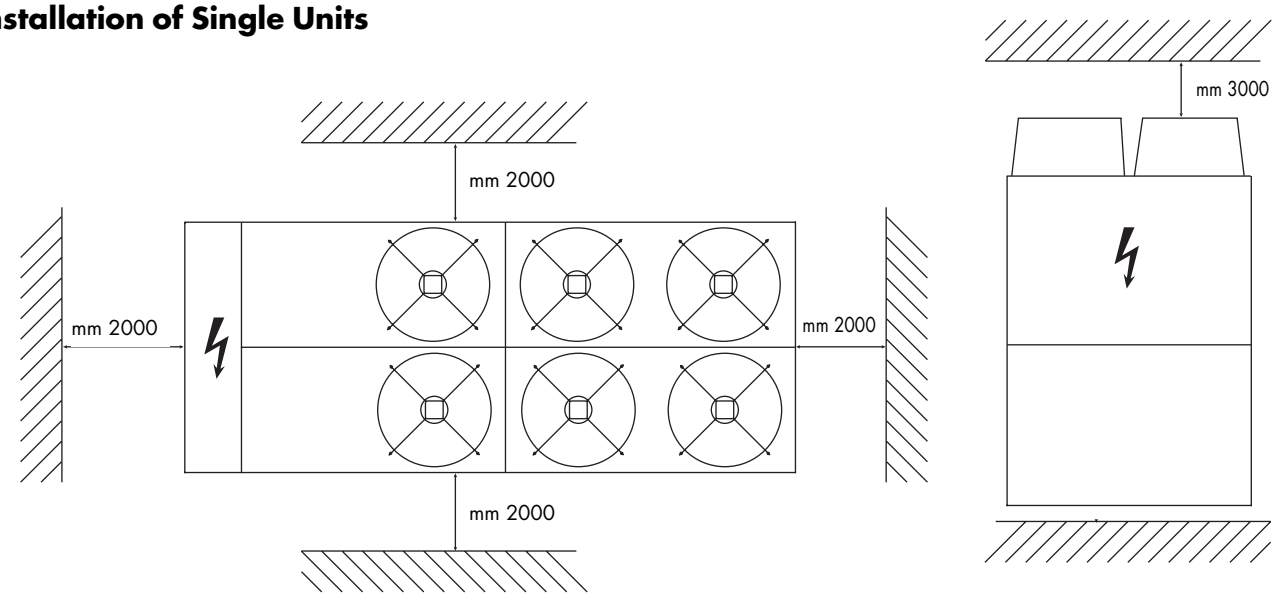




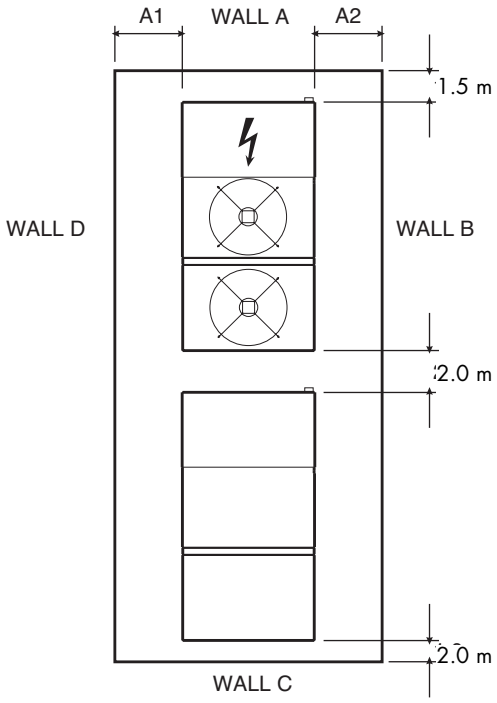
8.6 Service spaces

Units SLS All versions

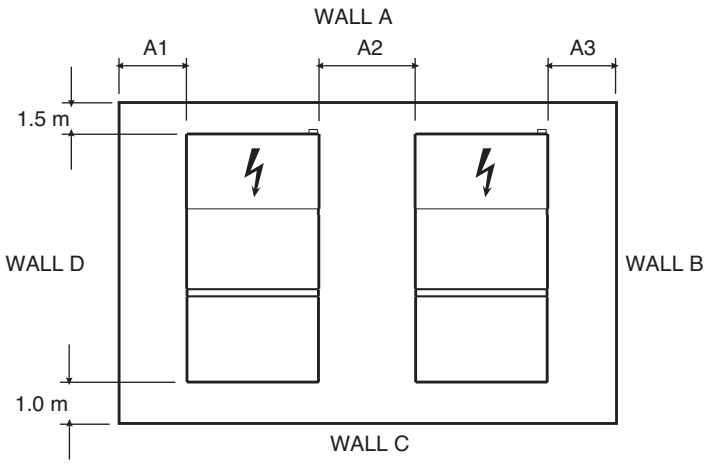
Installation of Single Units



Installation of several Units



ARRANGEMENT 1



ARRANGEMENT 2

	A and C SCREENED B and D SOLID			A and B SOLID C and D SOLID			B and D SCREENED A and C SOLID			A and B SCREENED C and D SOLID			A and D SCREENED B and D SOLID		
	A1	A2	A3	A1	A2	A3	A1	A2	A3	A1	A2	A3	A1	A2	A3
Arrangement 1 (m)	2	2		2	2	1.5	1.5	1.5	1.5	1.0	2	1.5	1.5	2	
Arrangement2 (m)	2	2	2	2	2	2	1.5	2	1.5	1.0	2	2	2	2	2

A wall only may be higher that the units.
The area between the walls must be kept free from any obstacle which may hinder the free air inflow towards the unit(s).

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

Itelco-Industry 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 of Itelco-Industry's 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 Itelco-Industry's 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, Itelco-Industry 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 Itelco-Industry Service Centre.

Scheduled Maintenance

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 tand 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				●	●

9.3 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 50 Pa.

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

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

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

The frequency of the checks to be made on compressors depends on a variety of factors, first of all the working conditions. Anyway, it is advisable to adopt the following tips:

- After 300 hours of work, check the conditions of the oil: a certain amount of impurities from the system may accumulate in the oil of the compressors.
- Check the acidity of the oil every year.
- After 8000 hours of work, carry out a visual inspection on the suction/discharge valves for wear. If necessary, replace these components. If compressors are started/stopped frequently or in particularly demanding working conditions, it is advisable to reduce this period to 5000 hours. Anyway, this time is indicative only.
- After 24000 hours of work, carry out a general overhaul of the compressor. If the compressors work for a period shorter than 40% of a year, the overhaul can be performed every about 5 years. This period depends on the type of application, the working conditions, the duration of start/stop cycles.

If it is necessary to replace the compressor (in case of burning of the winding or mechanical failure), contact one of Itelco-Industry's Service Centres.
The compressors use polyester oil. During maintenance operations on the compressor, or if it opens in any point of the refrigerant circuit, do not forget that this type of oil is highly hygroscopic, and accordingly do not leave it exposed to the atmosphere, as this would require the replacement of the oil.

9.5 Condenser's coils

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

Be careful not to damage the aluminium fins during cleaning.

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

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

9.6 Fans

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

Before starting the appliance, after any maintenance operations involving the disconnection of 3-phase connections, check that the direction of rotation of the fans is the one indicated by the arrow (upward air current). If the direction of rotation is wrong, invert two of the three supply phases to the motor.

9.7 Dehydrating filter

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

9.8 Sight glass

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

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

9.9 Thermostatic expansion valve

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

Procedure to check for overheating:

– Measure the suction pressure with the pressure gauges on the board of the unit o using a pressure gauge connected to the service valve on the suction side.
– From the pressure gauge's temperature scale, measure the saturated suction temperature (Tsa) which corresponds to the pressure value.
– Using a contact pressure gauge affixed to the outlet fitting of the gas of the evaporator, measure the actual temperature (Tse).

Overheating calculation (S):

S = Tse - Tsa

Overheating is regulated through the thermostatic expansion valve.

Make the adjusting screw follow a complete turn, and operate the appliance for five minutes.
Check again and, if necessary, repeat the regulation.

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

9.10 Evaporator

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

To obtain an effective heat exchange, the difference between the temperature of the leaving water and the saturated evaporating temperature must be in the 5 - 7°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.

9.11 Desuperheater and total heat recovery 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 (see Section 8) or measure the temperature of the liquid leaving and entering the exchanger.

To obtain an effective heat exchange chech the following:
- desuperheater: the difference between the temperature of the entering and the leaving water must be about 5°
- total heat recovery condensers: the difference between the temperature of the leaving water and the saturated condensing temperature must be about 10°

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 Itelco-Industry's 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.	IIdentify 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.

Anomaly	Cause	Operation
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 (i) 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	1
Gas filter	2
Thermostatic valve	2
Auxiliary relays	2
Fan's fuses	6
Compressor's fuses	6
Auxiliary fuses	6
Set of compressor contactors	1
Fan's contactor	1
Water sensor	1
Air sensor	1
HP pressure transductor	1
LP pressure transductor	1
Electronic card	1
Keyboard	1
Compressor oil resistor	1

11.2 Oil for compressors

The compressors are lubricated with:

Compressor brand	Refrigerant	Oil
REFCOMP	R134a	DEA SE 170
BITZER	R134a	BITZER BSE 170

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 Itelco-Industry'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 isolation valves are installed on the cooler it might be necessary to drain the complete hydronic system.

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.

As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.

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