

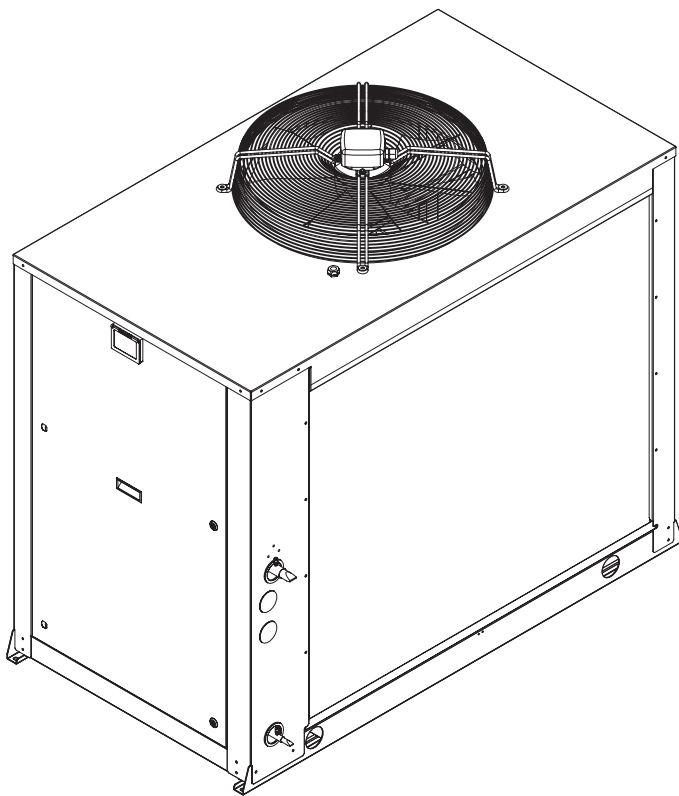


CMA

CONDENSING UNIT FOR COOLING ONLY AND HEAT PUMP
WITH CYCLE REVERSAL AND HELICAL FANS

20.9 ÷ 56.4 kW IN COOLING MODE

20.1 ÷ 50.8 kW IN HEATING MODE



INSTALLATION AND OPERATION MANUAL

Dear customer,

Thank you for having purchased a FERROLI air conditioner. It is the result of lengthy experience, dedicated planning research and has been made with top-quality materials and avant-garde technologies. Moreover, the CE marking guarantees that the appliance complies with the European Machine Directive governing safety matters. The quality level is constantly supervised, thus FERROLI products stand for Safety, Quality and Reliability.

Ask the Dealer from whom you purchased the appliance for the address of our nearest Assistance Service if you do not already know it.

The information in this manual may be subject to modifications following product improvements.

Thank you once again
FERROLI S.p.A



GB	“CE” DECLARATION OF CONFORMITY We, the undersigned, hereby declare under our responsibility, that the machine in question complies with the provisions established by Directives : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC and subsequent modifications.
DE	“EG” KONFORMITÄTSERKLÄRUNG Wir, die Unterzeichner dieser Erklärung, erklären unter unseren ausschließlichen Verantwortung, daß die genannte Maschine den Bestimmungen der folgenden EG-Richtlinien entspricht : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC und anschließende Novellierungen.
FR	DECLARATION “CE” DE CONFORMITE Nous soussignés déclarons, sous notre entière responsabilité, que la machine en objet est conforme aux prescriptions des Directives : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC et modifications suivantes.
IT	DICHIARAZIONE “CE” DI CONFORMITÀ Noi sottoscritti dichiariamo, sotto la nostra responsabilità, che la macchina in questione è conforme alle prescrizioni delle Direttive : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC e successive modificazioni.
ES	DECLARACION “CE” DE CONFORMIDAD Quienes subscribimos la presente declaracion, declaramos, bajo nuestra exclusiva responsabilidad, que la maquina en objeto respeta lo prescrito par las Directivas : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC y sucesivas modificaciones.
PT	DECLARAÇÃO “CE” DE CONFORMIDADE Nós, signatários da presente, declaramos sob a nossa exclusiva responsabilidade, que a máquina em questão está em conformidade com as prescrições das Directrizes : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC e sucessivas modificações.
NL	“EG” CONFORMITEITSVERKLARING Wij ondergetekenden verklaren hierbij op uitsluitend eigen verantwoording dat de bovengenoemde machine conform de voorschriften is van de Richtlijnen : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC en volgende wijzigingen.
DK	“CE” OVERENSSTEMMELSESERKLERING Underfegnede forsikrer under eget ansvar al den ovennævnte maskine er i overensstemmelse med vilkårene i direktiveme : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC med ændringer.
SE	FÖRSÄKRAN OM “CE” ÖVERENSSTÄMMELSE Underfecnade försäkrar under eget ansvar alt ovannämnda maskin överensstämmer med villkoren i direktiv : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC med ändringar.
NO	BEKREFTELSE OM ÆCEØ OVERENSSTEMMELSE Underfegnede forsikrer under eget ansvar al den ovennevnte maskinen er i overensstemmelse med vilkårene i direktivene : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC med endringer.
FI	“CE” VAATIMUSTENMUKAISUUSVAKUUTUS Allekirjoittaneet vakuutamme omalla vastuullamme että yllämainittu kone noudattaa ehtoja direktiiveissä : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC muutoksin.
GR	ΔΗΛΩΣΗ ΣΥΜΒΑΤΟΤΗΤΑΣ “EE” Εμετς που υπογραφομε την παρoυσα, δηλωνoυμε υπο την αποκλειστικη μας ευθυνη, οτι το μηχανημα συμμορφoυται οτα οσ α ορτζουν οι Οδηγιες : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC και επακολοιθες τροποποιησετς.
HR	IZJAVA O “CE” SUGLASNOSTI Mi niže potpisani izjavljujemo, pod našom odgovornošću, da ova Mašina odgovara zahtjevima iz Direktiva : 98/37/EC , 2006/95/EC , 2004/108/EC , 97/23/EC i naknadne izmjene.
PL	DEKLARACJA ZGODNOŚCI “CE” My niżej podpisani oświadczamy z pełną odpowiedzialnością, że niżej wymienione urządzenie w pełni odpowiada postanowieniom przyjętym w następujących Dyrektywach: 98/37/EC, 2006/95/EC, 2004/108/EC, 97/23/EC i kolejne modyfikacje.

Il legale rappresentante
Dante Ferrolì

TABLE OF CONTENTS

GENERAL SPECIFICATIONS	4
GENERAL RULES	4
DECLARATION OF CONFORMITY	4
PRESENTATION OF THE UNIT	4
IDENTIFICATION PLATE	5
IDENTIFICATION CODE OF THE UNIT	5
DESCRIPTION OF THE COMPONENTS	6
OPTIONAL EQUIPMENT AND ACCESSORIES	8
MECHANICAL ACCESSORIES	8
ELECTRICAL ACCESSORIES	8
MECHANICAL OPTIONS	8
ELECTRICAL OPTIONS	8
ACCESSORIES-MODELS COMBINATIONS	8
GENERAL SPECIFICATIONS IN COOLING MODE	9
SR GENERAL TECHNICAL SPECIFICATIONS	9
PERFORMANCES IN THE STANDARD COOLING MODE AB-7M5	10
GENERAL SPECIFICATIONS IN HEATING MODE	11
SP GENERAL TECHNICAL SPECIFICATIONS	11
PERFORMANCES IN THE STANDARD COOLING MODE AB-7M5	12
PERFORMANCES IN THE STANDARD HEATING MODE AB-7M5	13
NOISE LEVEL	14
NOISE LEVELS OF SR AND SP UNIT BASIC VERSION VB	14
NOISE LEVELS OF SR AND SP UNIT BASIC VERSION VB + SILENCING KIT ACCESSORY KS	14
OPERATING RANGE	15
OPERATING RANGE	15
ARRIVAL	16
INSPECTIONS ON ARRIVAL	16
SAFETY REGULATIONS	16
HANDLING	16
STORAGE	16
DIMENSIONAL DATA	17
OVERALL DIMENSIONS	17
MINIMUM SPACE REQUIRED FOR OPERATION AND WEIGHTS	17
WEIGHTS AND CENTERS OF GRAVITY ON ARRIVAL AND DURING OPERATION	18
WEIGH AND CENTER OF GRAVITY DURING TRASPORT	18
WEIGH AND CENTER OF GRAVITY DURING OPERATION	18
REFRIGERANT CONNECTIONS	19
REFRIGERANT CONNECTIONS	19
WARNING: UNIT CHARGED WITH R410A REFRIGERANT	20
ELECTRICAL CONNECTIONS	21
GENERAL RULES	21
ELECTRIC PANEL STRUCTURE	21
COMPOSITION OF THE ELECTRICAL EQUIPMENT	21
ELECTRICAL CONNECTIONS	22
MONITORING SYSTEM	24
THERMOSTATING MODE SETTINGS	24
CONDENSING UNIT IN CONJUNCTION WITH A WATER EXCHANGER	24
SOLUTION A WITH REGULATION VIA DIGITAL INPUTS - WITH 2 THERMOSTATS	24
SOLUTION B WITH REGULATION VIA AIR INLET TEMPERATURE PROBE AND ANTIFREEZE ALARM WITH THERMOSTAT	25
SOLUTION C WITH REGULATION VIA WATER INLET AND OUTLET WITH TEMPERATURE PROBE	26
CONDENSING UNIT IN CONJUNCTION WITH A DIRECT EXPANSION EXCHANGER	27
SOLUTION A WITH REGULATION VIA DIGITAL INPUTS - WITH 2 THERMOSTATS	27
SOLUTION B WITH REGULATION VIA AIR INLET TEMPERATURE PROBE AND ANTIFREEZE ALARM WITH THERMOSTAT	28
SOLUTION C WITH REGULATION VIA AIR INLET INLET AND COIL TEMPERATURE WITH TEMPERATURE PROBE	29
THERMOSTATED FAN OPERATING MODE	30
HOT-START FUNCTION	30
USER INTERFACE	31
LED STATUSES	32
DISPLAY FUNCTIONS	33
MONITORING FUNCTIONS	34
OPERATING SET-POINT SETTINGS	35
ALARMS	36
ALARM CODES	37
MENU STRUCTURE	38
SETTING AT WORK	39
GENERAL RULES	39
MAINTENANCE	39
GENERAL RULES	39
ROUTINE MAINTENANCE	40
SAFETY AND POLLUTION	40
GENERAL CONSIDERATIONS	40
GENERAL RECOMMENDATIONS ABOUT THE REFRIGERANTS USED	40
FIRST AID	41

GENERAL SPECIFICATIONS

General specifications

- This manual and the wiring diagram supplied with the unit must be kept in a dry place and ready to hand for future consultation when required.
- This manual has been compiled to ensure that the unit is installed in the correct way and to supply comprehensive information about how to correctly use and service the appliance. **Before proceeding with the installation phase, please carefully read all the information in this manual, which describes the procedures required to correctly install and use the unit.**
- Strictly comply with the instructions in this manual and conform to the current safety standards.
- The appliance must be installed in accordance with the laws in force in the country in which the unit is installed.
- Unauthorized tampering with the electrical and mechanical equipment will **VOID THE WARRANTY**.
- Check the electrical specifications on the identification plate before making the electrical connections. Read the instructions in the specific section where the electrical connections are described.
- If the unit must be repaired for any reason, this must only be done by a specialized assistance center recognized by the manufacturer and using genuine spare parts.
- The manufacturer also declines all liability for any damage to persons or property deriving from failure of the information in this manual to correspond to the actual machine in your possession.
- **Proper uses: this series of chillers is designed to produce cold or hot water for use in hydronic systems for conditioning/heating purposes. The units are not suitable for the production of domestic hot water. Any use differing from this proper use or beyond the operating limits indicated in this manual is forbidden unless previously agreed with the manufacturer.**

Declaration of conformity

The company hereby declares that the machine in question complies with the matters prescribed by the following Directives:

- Machine Directive **98/37 EEC**
- Low voltage Directive **73/23 EEC**
- Electromagnetic compatibility Directive **EMC 89/336 EEC**
- Directive governing pressurized vessels **97/23 EEC**

Presentation of unit

The new series of industrial Motorized condenser units available in the Cooling Only (**SR**) and Heat Pump (**SP**) versions, has been designed to meet the particular and specific air conditioning needs of the service and business sector where solutions with a remote controlled evaporator/condenser are required. These units cannot operate on their own as they must be used in conjunction with a system that evaporates/condenses in air or water. Certain typical applications for this type of unit are used in conjunction with coils with extended surfaces installed within an air treatment system and used in together with a water evaporator/condenser in order to build split hydronic systems. This new series of industrial refrigerators covers 6 construction sizes with a rated refrigerating capacity of from **20.9** a **56.4 kW** and rated thermal power of from **20.1** a **50.8 kW**. It has been designed to satisfy the heating and cooling requirements of both tertiary and commercial sector installations of small-medium capacity. These units are equipped with helical fans suited for outdoor installation: the framework and panelling are made of painted, galvanized plate of suitable thickness, all the fixing elements are made of stainless steel and/or galvanized, the enclosure containing the electrical equipment and all the components exposed to dirt and moisture have minimum protection class IP54. The electric panel contains the thermal and magneto-thermal protections for the most important parts and the microprocessor controller. All the units are supplied as standard with the power supply phase sequence meter and monitor. In designing the units, special attention has been paid to the problem of noise in order to

comply with increasingly strict legislation on noise pollution. All the units have the standard outfit of 1 **SCROLL** compressor specifically designed for working **with R410A ecological refrigerant gas**. The compressor, equipped with thermal protection inside the motor and outlet overtemperature, is installed in a special compartment protected from the air flow in order to facilitate routine and special maintenance work.

The finned coil, with a large surface area for thermal exchange, is composed of copper pipes and notched aluminium fins.

The fans are helical with crescent-shaped blades to increase efficiency and decrease noise. They are coupled directly with the single-phase motor (external rotor type) and equipped with thermal protection. All the units can work with evaporating temperature from 3 to 10°C °C (summer operation) and with condensing temperature from 35 e 60°C (winter operation, for SP Heat Pumps only); in addition, they are fitted as standard for summer/winter operation with low/high temperatures of the outside air thanks to a condensation/evaporation control system with continuous fan speed control.

The standard outfit can be supplemented with a vast range of accessories.

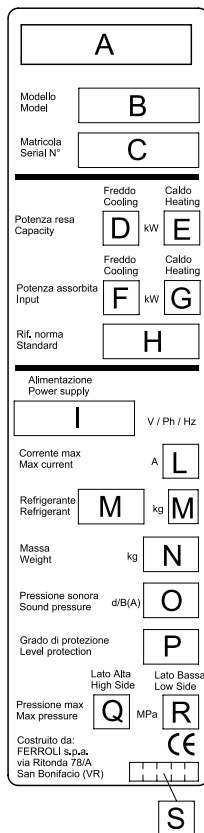
Especially noteworthy:

- **Silencing Kit (KS)**, composed of lagging on the refrigerator circuit compartment and compressor with soundproofing material that, associated with reduced fan speed, enables reducing the level of noise emitted by the unit under nominal conditions by approximately 6dB.

All the units are carefully built and tested one by one. Installation merely requires the electrical and plumbing connections.

GENERAL SPECIFICATIONS

Identification plate of the Unit



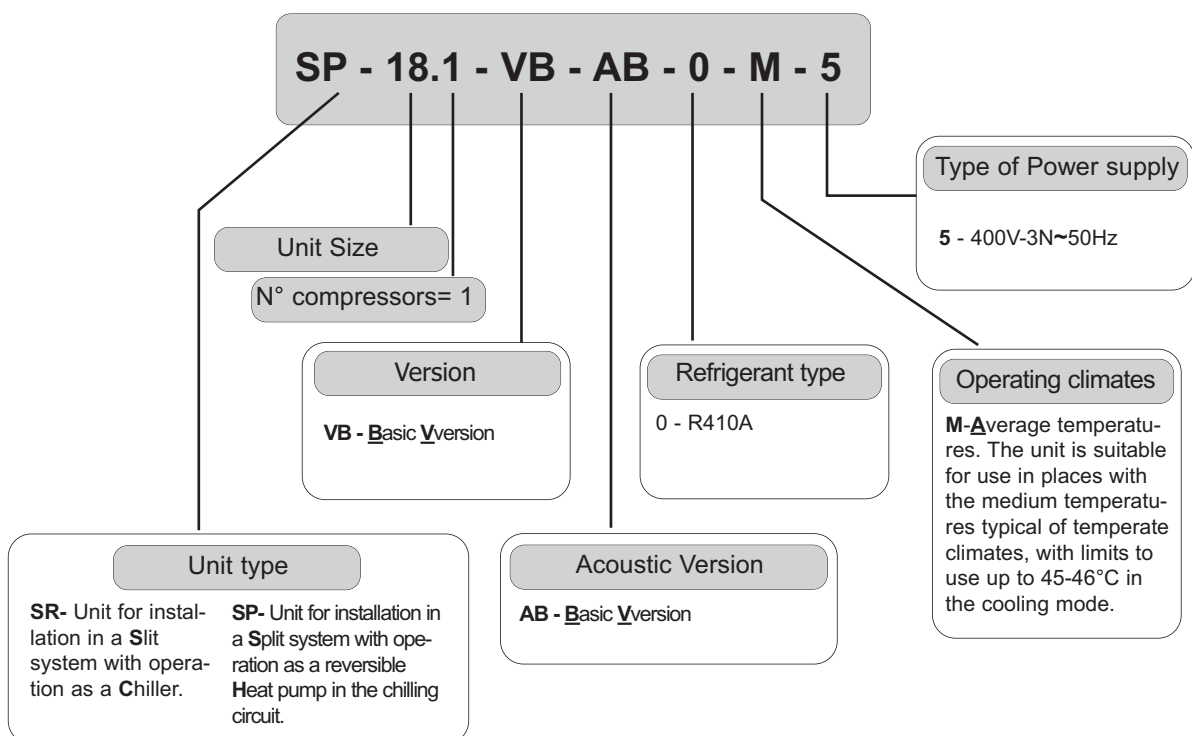
The figure on the left depicts the identification plate of the unit, affixed to the outer left-hand side of the Electric Panel.

A description of the data is given below:

- A** - Trademark
- B** - Model
- C** - Serial number
- D** - Refrigerating power
- E** - Heating power
- F** - Electric power input in the COOLING mode
- G** - Electric power input in the HEATING mode
- H** - Reference standard
- I** - Electric power supply
- L** - Maximum current input
- M** - Type of refrigerant and weight of charge
- N** - Shipping weight of the unit
- O** - Acoustic pressure
- P** - IP Protection degree
- Q** - Maximum pressure on top side
- R** - Maximum pressure on bottom side
- S** - PED certification authority

Identification code of the unit

The codes that identify the units are listed below and include the sequences of letters that determine the meanings for the various versions and set-ups.



GENERAL SPECIFICATIONS

Description of the components

The technical features of the main components in the units are: (Fig. 1).

1. **The fans** are helical with crescent-shaped blades to increase efficiency and decrease noise. They are coupled directly with the single-phase motor (external rotor type). There is thermal protection in the winding against operating trouble.

2. **Electric control and monitoring panel.** This is housed in a metal casing in which the various electrical components are positioned on one metal plate.

a. The main components are:

- Main door-locking circuit-breaker.
- Power supply phase sequence meter and monitor
- Compressor protection fuses
- Compressor contactor
- Fuse to protect the resistors (casing and antifreeze)
- Insulating and safety transformer to power the auxiliary circuit

and controller board, protected by a fuse.

- Magneto-thermal protection and pump contactor (**for units with the storage and pumping module accessory, MAP**)

- Wiring board
- Fan speed control board.

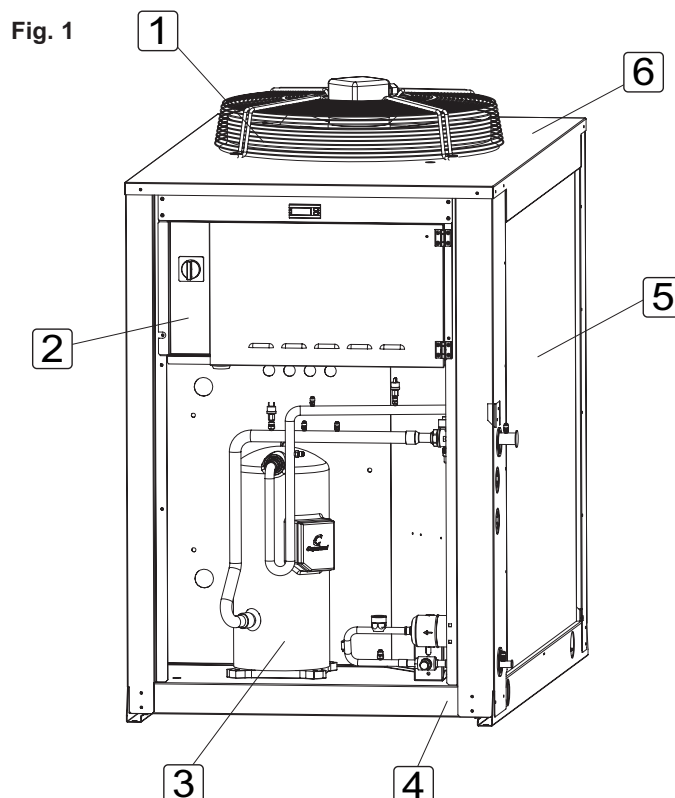
b. The monitoring section includes:

- User interface terminal with LCD
- On-off key.
- Operating mode selector key.
- Compressor on-off LED.
- Antifreeze heaters on LED.
- Defrosting request/activation LED
- Check-control with fault code display.

- Compressor operating hour count (display protected by a **PASSWORD** only accessible to assistance service staff)
- Start-up time settings
- Parameter entry via the keyboard
- Functions associated with the digital inputs
 - High and low pressure
 - Power supply phase sequence monitor
 - Compressor protection
 - Thermal protection of fans
 - Differential pressure switch on wet side
 - Remote ON/OFF command
 - Remote controlled operating mode changes (heating/cooling)
 - Pump protection
- Functions associated with the digital outputs
 - Compressor control
 - Cycle reversing valve (for heat pump only)
 - Antifreeze heating element
 - Water circulating pump control
 - General remote alarm
- Functions associated with the analog outputs
 - Condensation and evaporating pressure monitoring through infinite regulation of the fan speed
- Functions associated with the analog inputs
 - Water inlet and outlet temperature
 - Temperature of the coils

The main functions of the monitoring system are:

- Water temperature regulation



GENERAL SPECIFICATIONS

3. **Compressor**, of the **SCROLL** type with an orbiting spiral equipped with thermal protection and oil heater. datore dell'olio. With Silencing Kit KS accessory has a soundproofing jacket and acoustic insulation around the entire compressor compartment in order to reduce the noise level. The internal protection shuts down the compressor in cases of overtemperature of the motor windings and/or delivery gas.

4. Bearing structure made of galvanized sheet metal panels coated with polyurethane powder paint to ensure good protection against adverse weather conditions.

5. **The condensating coils** are the finned aluminium pack type with a notched profile to increase the coefficient of thermal exchange and they have copper pipes arranged in staggered rows. At the bottom there is a sub-cooling section.

6. **The covering panels** are made of galvanized plate and painted with polyurethane powders to provide good resistance to dirt and moisture.

7. **The high pressure switch**, with a fixed setting, is installed on the delivery pipe and shuts down the compressor if the working pressure is higher than permissible. If it trips, the unit shuts down and can only restart by resetting with the user interface terminal.

8. **The low pressure switch**, with a fixed setting, is installed on the suction pipe and shuts down the compressor if the working pressure is lower than permissible. It is automatically restored when the pressure increases. If it trips frequently, the unit shuts down and can only restart by resetting with the user interface terminal.

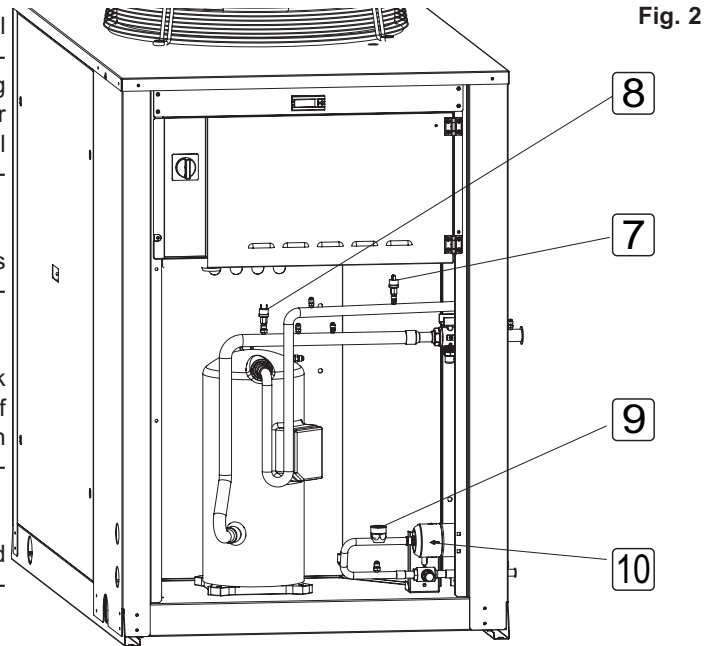
9. **The liquid and moisture flow indicator** signals the medium flowing in the circuit, indicating the correct cooling load. The fluid gauge moreover signals the moisture content of the refrigerant by changing its colour.

10. **The dewatering filter**, mechanical type, is used to hold back debris and any traces of moisture in the circuit.

Check valves (SP units only) allow the refrigerant to be forced to pass through the appropriate exchangers according to the operating cycle.

The 4-way cycle inversion valve (SP units only) reverses the direction of flow of refrigerant as summer/winter operation is changed over.

The liquid receiver (SP units only) is a storage tank to limit the changes in cooling load required by the machine as summer/winter operation is changed over.



OPTIONAL EQUIPMENT AND ACCESSORIES

Mechanical accessories

GM - Pressure gauges. Consisting of 2 pressure gauges that display the pressure of the refrigerant fluid on the compressor's intake and delivery.

GP - Coils protective grilles. Consisting of metal grilles that protect the coils with extended surfaces.

AVG - Rubber vibration dampers. Consisting of 4 rubber vibration dampers to fix under the unit. They reduce the mechanical vibrations generated by the compressor and fan/s during their normal operation, that are transmitted to the bearing surface of the machine. The insulation degree provided by the vibration dampers is about 90%.

KS - Silencing Kit, composed of the lagging of the refrigerating circuit compartment and the compressor with soundproofing material that, associated with reduced fan speed, enables reducing the level of noise emitted by the unit under nominal conditions by approximately 6dB.

Electrical accessories

CR - Remote control. This can be used to select all the monitoring and display functions of the control unit on the machine at a maximum distance of 100 meters away. It must be installed by using a cable with three strands or three wires in **PVC** of the **N07-VK** type with a 1mm² section. The transmission line must be installed in a raceway separate from any electric powering wires (**230/400 V**).

The control unit has the following buttons:



MODE key : used to select the operating mode

ON/OFF key : used to turn the unit ON/OFF and to reset the alarms

Mode + ON/OFF keys : used to access and quit the various menu levels

UP key: scrolls forwards through the menu items or increases the value of a parameter

Tasto DOWN: scrolls backwards through the menu items or decreases the value of a parameter.

OP - Programmer clock. Allows the unit to be turned on and off depending on the programmed time setting (up to 14 switching actions can be programmed as required throughout the 7 days of the week).

INT - RS485 serial interface, for communications via MODBUS protocol.

SFM - Power supply phase sequence meter and monitor.

Mechanical options

Special finned heat exchangers

- Coils with copper fins
- Coils with tin-coated copper fins
- Coils with aluminium fins with acrylic coating

Electrical options

Supply voltage different from standard 400V-3+N-50Hz.
By specific request, contact our Sales Office.

Accessories-models combinations

MODEL ACCESSORY CODE			19	22	26	30	40	51
Mechanical accessories	Rubber vibration dampers	AVG (F)	•	•	•	•		
		AVG1 (F)					•	•
	Pressure gauges	GM10 (M)	•	•	•	•	•	•
		Coils protective grilles	GP36 (M)	•	•	•	•	
		GP41 (M)					•	•
Electrical accessories	Remote control	CR (F)	•	•	•	•	•	•
	Programmer clock	OP (F)	•	•	•	•	•	•
	RS485 serial interface	INT2 (M)	•	•	•	•	•	•
	Power supply phase sequence meter and monitor	SFM (M)	•	•	•	•	•	•

NOTES:

(M): mounted in the factory

(F): supplied for installation by customer

GENERAL SPECIFICATIONS IN COOLING MODE

SR general technical specifications

The following data refer to units that operate in the **Cooling Mode** only using **R410A refrigerant**

Model	19	22	26	30	40	51	UM
Refrigerant	R410A						
Gross cooling capacity ⁽¹⁾	20,9	24,2	28,3	31,6	44,5	56,4	kW
Gross total power input	7,25	8,00	9,15	10,6	13,5	18,5	kW
EER ⁽¹⁾	2,88	3,03	3,10	2,99	3,30	3,04	W/W
Refrigerant charge ⁽²⁾	4,5	4,7	6,5	6,5	9,6	10,6	kg

Compressor specifications

Type	SCROLL						
Quantity	1						N°
Control capacity	0-100						%
Power input ⁽¹⁾	6,60	7,35	8,50	9,90	12,19	17,23	kW

Fan specifications

Number of fans	1			2			N°
Diameter [Ø]	630						mm
Maximum speed	900						rpm
Motor input power ⁽¹⁾	650						W
Total air flow rate on cooling ⁽¹⁾	2540	2540	2440	2440	4500	4310	l/s

Coils specification

Type	Copper pipes notched aluminium fins						/
Quantity	1						N°
Total frontal area	1.43			2.03			m ²

Silencing Kit data (KS accessory)

Gross cooling capacity ⁽¹⁾	20,1	23,0	26,5	29,4	41,6	52,1	kW
Gross total power input	7,30	8,12	9,41	10,95	13,78	19,24	kW
EER ⁽¹⁾	2,75	2,83	2,82	2,68	3,02	2,71	W/W
Compressor power input ⁽¹⁾	6,9	7,7	9,0	10,5	13,0	18,4	kW

NOTES:

(1): The data refer to:

-Compressor: Evaporation temperature (dew point) 5°C.
 Superheating 5 K
 Subcooling 5 K

- Outdoor air temperature 35°C D.B.

(2) Take as reference the refrigerant charge value on the Unit Identification plate.

GENERAL SPECIFICATIONS IN COOLING MODE

Performances in the standard cooling mode AB-7M5

MODEL	TE	OUTDOOR AIR TEMPERATURE (°C D.B.)											
		20		25		30		35		40		45	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
19	3	22,7	5,3	21,8	5,7	20,9	6,1	20,0	6,5	18,5	7,3	16,9	8,1
	4	23,2	5,4	22,3	5,8	21,3	6,2	20,4	6,6	18,9	7,4	17,3	8,2
	5	23,6	5,4	22,7	5,8	21,8	6,2	20,9	6,6	19,3	7,4	17,8	8,2
	6	24,1	5,4	23,2	5,8	22,3	6,2	21,4	6,6	19,8	7,4	18,3	8,2
	7	24,6	5,5	23,7	5,9	22,8	6,3	21,9	6,7	20,3	7,5	18,8	8,3
	8	25,1	5,5	24,2	5,9	23,3	6,3	22,4	6,7	20,8	7,5	19,3	8,3
	9	25,6	5,5	24,7	5,9	23,8	6,3	22,9	6,7	21,3	7,5	19,8	8,3
	10	26,1	5,6	25,2	6,0	24,3	6,4	23,4	6,8	21,8	7,6	20,2	8,3
22	3	26,3	6,0	25,3	6,4	24,2	6,8	23,2	7,3	21,4	8,2	19,6	9,0
	4	26,8	6,0	25,8	6,4	24,7	6,9	23,7	7,3	21,9	8,2	20,0	9,1
	5	27,3	6,0	26,3	6,5	25,2	6,9	24,2	7,4	22,4	8,2	20,6	9,1
	6	27,9	6,1	26,9	6,5	25,8	6,9	24,8	7,4	23,0	8,3	21,2	9,2
	7	28,5	6,1	27,5	6,5	26,4	7,0	25,4	7,4	23,6	8,3	21,7	9,2
	8	29,1	6,1	28,0	6,6	27,0	7,0	25,9	7,5	24,1	8,3	22,3	9,2
	9	29,6	6,2	28,6	6,6	27,6	7,1	26,5	7,5	24,7	8,4	22,9	9,3
	10	30,2	6,2	29,2	6,7	28,1	7,1	27,1	7,5	25,2	8,4	23,4	9,3
26	3	30,8	6,9	29,6	7,4	28,3	7,9	27,1	8,4	25,0	9,4	22,9	10,5
	4	31,4	6,9	30,1	7,4	28,9	7,9	27,7	8,5	25,6	9,5	23,4	10,5
	5	32,0	7,0	30,8	7,5	29,5	8,0	28,3	8,5	26,2	9,5	24,1	10,5
	6	32,7	7,0	31,4	7,5	30,2	8,0	29,0	8,5	26,9	9,6	24,7	10,6
	7	33,4	7,1	32,1	7,6	30,9	8,1	29,7	8,6	27,6	9,6	25,4	10,6
	8	34,0	7,1	32,8	7,6	31,6	8,1	30,3	8,6	28,2	9,6	26,1	10,7
	9	34,7	7,1	33,4	7,7	32,2	8,2	31,0	8,7	28,9	9,7	26,7	10,7
	10	35,3	7,2	34,1	7,7	32,9	8,2	31,6	8,7	29,5	9,7	27,4	10,8
30	3	36,0	7,2	34,7	7,7	33,5	8,2	32,3	8,8	30,2	9,8	28,0	10,8
	4	36,6	7,3	35,4	7,8	34,2	8,3	32,9	8,8	30,8	9,8	28,7	10,8
	5	37,2	7,3	36,0	7,8	34,8	8,3	33,5	8,8	31,4	9,8	29,3	10,8
	6	37,8	7,4	36,6	7,9	35,4	8,4	34,1	8,9	32,0	9,9	30,0	10,9
	7	38,4	7,4	37,2	7,9	36,0	8,4	34,7	8,9	32,6	9,9	30,6	10,9
	8	39,0	7,5	37,8	8,0	36,6	8,5	35,3	9,0	33,2	10,0	31,2	11,0
	9	39,6	7,5	38,4	8,0	37,2	8,5	35,9	9,0	33,8	10,0	31,8	11,0
	10	40,2	7,6	39,0	8,1	37,8	8,6	36,5	9,1	34,4	10,1	32,4	11,1
41	3	48,4	10,1	47,2	10,1	46,0	10,1	44,8	10,1	43,6	10,1	42,4	10,1
	4	49,0	10,2	47,8	10,2	46,6	10,2	45,4	10,2	44,2	10,2	43,0	10,2
	5	49,6	10,3	48,4	10,3	47,2	10,3	46,0	10,3	44,8	10,3	43,6	10,3
	6	50,2	10,4	49,0	10,4	47,8	10,4	46,6	10,4	45,4	10,4	44,2	10,4
	7	50,8	10,5	49,6	10,5	48,4	10,5	47,2	10,5	46,0	10,5	44,8	10,5
	8	51,4	10,6	50,2	10,6	49,0	10,6	48,0	10,6	46,8	10,6	45,6	10,6
	9	52,0	10,7	50,8	10,7	49,6	10,7	48,6	10,7	47,4	10,7	46,2	10,7
	10	52,6	10,8	51,4	10,8	50,2	10,8	49,2	10,8	48,0	10,8	47,0	10,8
51	3	61,4	14,0	60,2	14,0	59,0	14,0	57,8	14,0	56,6	14,0	55,4	14,0
	4	62,0	14,1	60,8	14,1	59,6	14,1	58,4	14,1	57,2	14,1	56,0	14,1
	5	62,6	14,2	61,4	14,2	60,2	14,2	59,0	14,2	57,8	14,2	56,6	14,2
	6	63,2	14,3	62,0	14,3	60,8	14,3	59,6	14,3	58,4	14,3	57,2	14,3
	7	63,8	14,4	62,6	14,4	61,4	14,4	60,2	14,4	59,0	14,4	57,8	14,4
	8	64,4	14,5	63,2	14,5	62,0	14,5	60,8	14,5	59,6	14,5	58,4	14,5
	9	65,0	14,6	63,8	14,6	62,6	14,6	61,4	14,6	60,2	14,6	59,0	14,6
	10	65,6	14,7	64,4	14,7	63,2	14,7	62,0	14,7	60,8	14,7	59,6	14,7

TE = Compressor suction saturation temperature (dew point) in °C
kWf = Refrigerating power (kW).
kWa = Compressor power input (kW).

The standard performances refer to 10K gas superheating and 0K sub-cooling of the fluid, and to operation of the unit with all the fans to top speed. Also consider the unit installed at zero meters above sea level (Pb = 1013 mbar).

GENERAL SPECIFICATIONS IN HEATING MODE

SP general technical specifications

The following data refer to units that operate in the **Cooling Mode** only using **R410A** refrigerant

Model	19	22	26	30	40	51	UM	
Refrigerant	R410A							
Gross cooling capacity ⁽¹⁾	20,7	24,0	28,1	30,8	42,7	54,9	kW	
Gross heating capacity ⁽²⁾	20,1	23,2	27,2	29,1	40,5	50,8	kW	
Gross total power input	In cooling mode ⁽¹⁾	7,05	7,80	8,95	10,30	13,0	18,1	kW
	In heating mode ⁽²⁾	7,3	8,1	9,5	10,1	13,6	17,4	kW
EER ⁽¹⁾	2,93	3,08	3,14	2,99	3,29	3,03	W/W	
COP ⁽²⁾	2,75	2,88	2,87	2,87	2,98	2,92	W/W	
Refrigerant charge ⁽³⁾	4,7	5,5	7,0	7,0	10	11	kg	

Compressor specifications

Type	SCROLL							
Quantity	1							N°
Control capacity	0-100							%
Power input	In cooling mode ⁽¹⁾	6,40	7,15	8,30	9,65	11,68	16,82	kW
	In heating mode ⁽²⁾	6,7	7,4	8,8	9,5	12,3	16,1	kW

Fan specifications

Number of fans	1				2		N°	
Diameter [Ø]	630							mm
Maximum speed	900							rpm
Maximum motor input power ⁽¹⁾⁽²⁾	650							W
Total air flow rate on cooling ⁽³⁾	2540	2540	2440	2440	4500	4310	l/s	
Total air flow rate on heating ⁽²⁾	2430	2430	2340	2340	4310	4310	l/s	

Coils specification

Type	Copper pipes notched aluminium fins							/
Quantity	1							N°
Total frontal area	1.43				2.03		m ²	

Silencing Kit data (KS accessory)

Gross cooling capacity ⁽¹⁾	19,8	22,8	26,3	28,7	40,0	50,8	kW	
Gross heating capacity ⁽²⁾	20,1	23,2	27,2	29,1	40,5	50,8	kW	
Gross total power input	In cooling mode ⁽¹⁾	7,09	7,91	9,20	10,68	13,24	18,79	kW
	In heating mode ⁽²⁾	7,3	8,1	9,5	10,1	13,6	17,4	kW
EER ⁽¹⁾	2,80	2,89	2,86	2,69	3,02	2,70	W/W	
COP ⁽²⁾	2,7	2,9	2,9	2,9	3,0	2,9	W/W	
Compressor power input	In cooling mode ⁽¹⁾	6,7	7,5	8,8	10,3	12,4	18,0	kW
	In heating mode ⁽²⁾	6,7	7,4	8,8	9,5	12,3	16,1	kW

NOTES:

(1): The data refer to:

- Compressor: Evaporation temperature (dew point) 5°C.

Superheating 5 K

Subcooling 5 K

- Outdoor air temperature 35°C D.B.

(2): The data refer to:

- Compressor: Condensation temperature (dew point) 50°C.

Superheating 5 K

Subcooling 5 K

- Outdoor air temperature 7°C D.B., 6°C W.B.

(3) Take as reference the refrigerant charge value on the Unit Identification plate.

GENERAL SPECIFICATIONS IN HEATING MODE

Performances in the standard cooling mode AB-7M5

MODEL	TE	OUTDOOR AIR TEMPERATURE (°C D.B.)											
		20		25		30		35		40		45	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
19	3	22,5	5,2	21,6	5,6	20,7	6,0	19,8	6,3	18,3	7,1	16,7	7,9
	4	22,9	5,2	22,0	5,6	21,1	6,0	20,2	6,4	18,7	7,1	17,1	7,9
	5	23,4	5,2	22,5	5,6	21,6	6,0	20,7	6,4	19,1	7,2	17,6	7,9
	6	23,9	5,3	23,0	5,7	22,1	6,0	21,2	6,4	19,7	7,2	18,1	8,0
	7	24,4	5,3	23,5	5,7	22,6	6,1	21,7	6,5	20,2	7,2	18,6	8,0
	8	24,9	5,3	24,0	5,7	23,1	6,1	22,2	6,5	20,6	7,3	19,1	8,0
	9	25,4	5,4	24,5	5,8	23,6	6,1	22,7	6,5	21,1	7,3	19,6	8,1
	10	25,8	5,4	24,9	5,8	24,0	6,2	23,1	6,6	21,6	7,3	20,0	8,1
	11	26,3	5,4	25,4	5,8	24,5	6,2	23,6	6,6	22,1	7,4	20,5	8,1
12	26,8	5,5	25,9	5,9	25,0	6,2	24,1	6,6	22,5	7,4	21,0	8,2	
22	3	26,1	5,8	25,1	6,2	24,0	6,6	23,0	7,1	21,2	7,9	19,4	8,8
	4	26,6	5,8	25,6	6,3	24,5	6,7	23,5	7,1	21,7	8,0	19,9	8,8
	5	27,1	5,9	26,1	6,3	25,0	6,7	24,0	7,2	22,2	8,0	20,4	8,9
	6	27,7	5,9	26,7	6,3	25,6	6,8	24,6	7,2	22,8	8,0	21,0	8,9
	7	28,3	5,9	27,2	6,4	26,2	6,8	25,2	7,2	23,4	8,1	21,6	8,9
	8	28,8	6,0	27,8	6,4	26,8	6,8	25,7	7,3	23,9	8,1	22,1	9,0
	9	29,4	6,0	28,4	6,4	27,3	6,9	26,3	7,3	24,5	8,2	22,7	9,0
	10	30,0	6,0	28,9	6,5	27,9	6,9	26,8	7,3	25,0	8,2	23,2	9,0
	11	30,5	6,1	29,5	6,5	28,4	6,9	27,4	7,4	25,6	8,2	23,8	9,1
12	31,0	6,1	30,0	6,5	29,0	7,0	27,9	7,4	26,1	8,3	24,3	9,1	
26	3	30,6	6,7	29,4	7,2	28,1	7,7	26,9	8,2	24,8	9,2	22,7	10,2
	4	31,1	6,8	29,9	7,3	28,7	7,8	27,5	8,3	25,4	9,3	23,3	10,3
	5	31,8	6,8	30,5	7,3	29,3	7,8	28,1	8,3	26,0	9,3	23,9	10,3
	6	32,4	6,8	31,2	7,3	30,0	7,8	28,8	8,3	26,7	9,3	24,6	10,3
	7	33,1	6,9	31,9	7,4	30,7	7,9	29,5	8,4	27,4	9,4	25,2	10,4
	8	33,8	6,9	32,6	7,4	31,3	7,9	30,1	8,4	28,0	9,4	25,9	10,4
	9	34,4	7,0	33,2	7,5	32,0	8,0	30,8	8,5	28,7	9,5	26,6	10,5
	10	35,1	7,0	33,9	7,5	32,6	8,0	31,4	8,5	29,3	9,5	27,2	10,5
	11	35,7	7,1	34,5	7,6	33,3	8,1	32,1	8,5	30,0	9,5	27,8	10,5
12	36,3	7,1	35,1	7,6	33,9	8,1	32,7	8,6	30,6	9,6	28,5	10,6	
30	3	33,5	7,8	32,2	8,4	30,8	9,0	29,5	9,6	27,2	10,7	24,9	11,9
	4	34,1	7,9	32,8	8,4	31,5	9,0	30,1	9,6	27,8	10,8	25,5	11,9
	5	34,8	7,9	33,5	8,5	32,1	9,1	30,8	9,7	28,5	10,8	26,2	12,0
	6	35,6	8,0	34,2	8,5	32,9	9,1	31,6	9,7	29,2	10,9	26,9	12,0
	7	36,3	8,0	35,0	8,6	33,6	9,2	32,3	9,7	30,0	10,9	27,7	12,1
	8	37,0	8,1	35,7	8,6	34,4	9,2	33,0	9,8	30,7	11,0	28,4	12,1
	9	37,7	8,1	36,4	8,7	35,1	9,3	33,7	9,8	31,4	11,0	29,1	12,2
	10	38,4	8,2	37,1	8,7	35,8	9,3	34,4	9,9	32,1	11,0	29,8	12,2
	11	39,1	8,2	37,8	8,8	36,5	9,4	35,1	9,9	32,8	11,1	30,5	12,3
12	39,8	8,3	38,5	8,8	37,2	9,4	35,8	10,0	33,5	11,1	31,2	12,3	
41	3	46,5	9,5	44,6	10,2	42,8	10,9	40,9	11,6	37,7	13,0	34,5	14,4
	4	47,3	9,5	45,5	10,2	43,6	10,9	41,8	11,6	38,6	13,0	35,4	14,4
	5	48,3	9,6	46,4	10,3	44,6	11,0	42,7	11,7	39,5	13,1	36,3	14,5
	6	49,3	9,6	47,4	10,3	45,6	11,0	43,7	11,7	40,5	13,1	37,3	14,5
	7	50,3	9,7	48,5	10,4	46,6	11,1	44,8	11,8	41,6	13,2	38,4	14,6
	8	51,3	9,8	49,5	10,5	47,6	11,2	45,8	11,9	42,6	13,3	39,4	14,7
	9	52,3	9,8	50,5	10,5	48,6	11,2	46,8	11,9	43,6	13,3	40,4	14,7
	10	53,3	9,9	51,4	10,6	49,6	11,3	47,7	12,0	44,5	13,4	41,3	14,8
	11	54,3	9,9	52,4	10,6	50,6	11,3	48,7	12,0	45,5	13,4	42,3	14,8
12	55,2	10,0	53,4	10,7	51,5	11,4	49,7	12,1	46,5	13,5	43,3	14,9	
51	3	59,7	13,6	57,4	14,6	55,0	15,6	52,6	16,7	48,5	18,7	44,4	20,7
	4	60,8	13,7	58,5	14,7	56,1	15,7	53,7	16,7	49,6	18,8	45,5	20,8
	5	62,0	13,8	59,7	14,8	57,3	15,8	54,9	16,8	50,8	18,8	46,7	20,9
	6	63,4	13,9	61,0	14,9	58,6	15,9	56,2	16,9	52,1	18,9	48,0	20,9
	7	64,7	14,0	62,3	15,0	59,9	16,0	57,6	17,0	53,4	19,0	49,3	21,0
	8	66,0	14,0	63,6	15,1	61,2	16,1	58,9	17,1	54,7	19,1	50,6	21,1
	9	67,3	14,1	64,9	15,1	62,5	16,1	60,1	17,2	56,0	19,2	51,9	21,2
	10	68,5	14,2	66,1	15,2	63,8	16,2	61,4	17,2	57,3	19,3	53,2	21,3
	11	69,8	14,3	67,4	15,3	65,0	16,3	62,6	17,3	58,5	19,3	54,4	21,4
12	71,0	14,4	68,6	15,4	66,3	16,4	63,9	17,4	59,8	19,4	55,6	21,4	

TE = Compressor suction saturation temperature (dew point) in °C
kWf = Refrigerating power (kW).
kWa = Compressor power input (kW).

The standard performances refer to 10K gas superheating and 0K sub-cooling of the fluid, and to operation of the unit with all the fans to top speed. Also consider the unit installed at zero meters above sea level (Pb = 1013 mbar).

GENERAL SPECIFICATIONS IN HEATING MODE

Performances in the standard heating mode AB-7M5

MODEL	TC	OUTDOOR AIR TEMPERATURE (°C W.B.)													
		-6		-2		2		6		9		12		15	
		kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa	kWt	kWa
19	35	17,6	4,6	19,2	4,7	20,7	4,8	22,1	4,9	22,8	4,9	23,5	5,0	24,0	5,0
	40	16,8	5,2	18,5	5,3	20,0	5,4	21,4	5,5	22,1	5,5	22,7	5,6	23,3	5,7
	45	16,2	5,6	17,8	5,8	19,3	5,8	20,7	5,9	21,4	6,0	22,0	6,0	22,6	6,1
	50	15,6	6,3	17,2	6,5	18,7	6,6	20,1	6,7	20,8	6,7	21,4	6,8	22,0	6,9
	55	14,9	7,0	16,5	7,1	18,0	7,2	19,4	7,3	20,1	7,4	20,7	7,5	21,3	7,6
	60	14,1	7,7	15,7	7,8	17,2	7,9	18,6	8,1	19,3	8,2	19,9	8,2	20,5	8,3
22	35	20,3	5,1	22,2	5,2	23,9	5,3	25,5	5,4	26,3	5,5	27,1	5,5	27,7	5,6
	40	19,4	5,8	21,3	5,9	23,0	6,0	24,7	6,1	25,5	6,1	26,2	6,2	26,9	6,3
	45	18,7	6,3	20,5	6,4	22,3	6,5	23,9	6,6	24,7	6,7	25,5	6,7	26,1	6,8
	50	18,0	7,0	19,8	7,2	21,6	7,3	23,2	7,4	24,0	7,5	24,8	7,5	25,4	7,7
	55	17,2	7,7	19,0	7,9	20,8	8,0	22,4	8,1	23,2	8,2	23,9	8,3	24,6	8,4
	60	16,2	8,5	18,1	8,7	19,8	8,8	21,5	9,0	22,3	9,1	23,0	9,1	23,7	9,3
26	35	23,8	6,1	26,0	6,2	28,0	6,3	29,9	6,4	30,9	6,5	31,7	6,5	32,5	6,6
	40	22,8	6,9	25,0	7,0	27,0	7,1	28,9	7,2	29,9	7,3	30,7	7,4	31,5	7,5
	45	21,9	7,4	24,1	7,6	26,1	7,7	28,0	7,8	29,0	7,9	29,8	8,0	30,6	8,1
	50	21,1	8,4	23,3	8,5	25,3	8,7	27,2	8,8	28,2	8,9	29,0	9,0	29,8	9,1
	55	20,1	9,2	22,3	9,4	24,3	9,5	26,2	9,7	27,2	9,8	28,1	9,9	28,9	10,0
	60	19,0	10,1	21,2	10,3	23,3	10,5	25,2	10,6	26,1	10,8	27,0	10,9	27,8	11,0
30	35	25,5	6,6	27,8	6,7	30,0	6,8	32,0	6,9	33,0	7,0	34,0	7,1	34,8	7,2
	40	24,4	7,4	26,7	7,6	28,9	7,7	30,9	7,8	32,0	7,9	32,9	7,9	33,7	8,1
	45	23,4	8,0	25,8	8,2	27,9	8,3	30,0	8,5	31,0	8,6	31,9	8,6	32,8	8,8
	50	22,6	9,0	24,9	9,2	27,1	9,4	29,1	9,5	30,1	9,6	31,0	9,7	31,9	9,8
	55	21,5	9,9	23,9	10,1	26,0	10,3	28,1	10,5	29,1	10,6	30,0	10,7	30,9	10,8
	60	20,4	10,9	22,7	11,2	24,9	11,3	26,9	11,5	27,9	11,6	28,9	11,7	29,7	11,9
41	35	35,4	8,5	38,7	8,7	41,7	8,8	44,6	9,0	46,0	9,1	47,3	9,2	48,4	9,3
	40	33,9	9,6	37,2	9,8	40,2	9,9	43,1	10,1	44,5	10,2	45,8	10,3	46,9	10,4
	45	32,6	10,4	35,8	10,6	38,9	10,8	41,7	10,9	43,1	11,1	44,4	11,2	45,6	11,3
	50	31,4	11,7	34,6	11,9	37,7	12,1	40,5	12,3	41,9	12,4	43,2	12,5	44,4	12,7
	55	30,0	12,9	33,2	13,1	36,2	13,3	39,1	13,5	40,5	13,7	41,8	13,8	43,0	14,0
	60	28,4	14,1	31,6	14,4	34,6	14,7	37,5	14,9	38,9	15,1	40,2	15,2	41,4	15,4
51	35	44,5	11,2	48,5	11,4	52,3	11,6	55,9	11,8	57,7	11,9	59,3	12,0	60,8	12,2
	40	42,6	12,5	46,6	12,8	50,4	13,0	54,0	13,2	55,8	13,4	57,4	13,5	58,9	13,7
	45	40,9	13,6	45,0	13,9	48,8	14,1	52,3	14,3	54,1	14,5	55,7	14,6	57,2	14,8
	50	39,4	15,3	43,4	15,6	47,2	15,9	50,8	16,1	52,6	16,3	54,2	16,4	55,7	16,7
	55	37,6	16,8	41,7	17,2	45,5	17,4	49,0	17,7	50,8	17,9	52,4	18,1	53,9	18,3
	60	35,6	18,5	39,6	18,9	43,4	19,2	47,0	19,5	48,8	19,7	50,4	19,9	51,9	20,2

TC = Compressor condensing temperature (dew point) in °C
kWt = Thermal power (kW).
kWa = Compressor power input (kW).

The standard performances refer to outdoor air with 87% relative humidity and to operation of the unit with all the fans to top speed. Also consider the unit installed at zero meters above sea level (Pb = 1013 mbar).

NOISE LEVELS

Noise levels of SR and SP unit Basic Version VB ⁽¹⁾

Mod.	SWL (dB)										SPL (dBA)		
	Octave bands (Hz)								Total		1m	5m	10m
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)			
19	89,0	81,0	80,0	76,0	72,0	67,0	62,0	52,0	90,3	78,0	61,9	51,9	46,5
22	90,0	81,5	80,5	76,5	73,0	67,0	62,0	52,0	91,2	78,5	62,4	52,4	47,0
26	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91,3	79,0	62,9	52,9	47,5
30	90,0	82,0	81,0	77,0	73,5	67,0	64,0	52,0	91,3	79,0	62,9	52,9	47,5
40	92,0	84,0	83,0	78,5	76,0	69,5	65,0	54,0	93,3	81,0	64,4	54,7	49,4
51	92,0	85,0	83,5	79,0	76,0	70,5	66,0	55,0	93,5	81,5	64,9	55,2	49,9

(1): Water temperature: inlet 12°C - outlet 7°C. Outdoor temperature 35°C.

SWL = Sound power levels, with reference to 1×10^{-12} W.

SPL = Sound pressure levels, with reference to 2×10^{-5} Pa.

The sound pressure levels are values calculated by applying the **ISO-3744 relation (Eurovent 8/1)** and refer to a distance of 1,5,10 meters away from the external surface of units operating in the open field with directivity factor 2 and the units operating in nominal conditions in the cooling mode.

Noise levels of SR and SP unit Basic Version VB + Silencing Kit accessory KS ⁽¹⁾

Mod.	SWL (dB)										SPL (dBA)		
	Octave bands (Hz)								Total		1m	5m	10m
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)			
19	87,0	76,0	75,0	71,5	66,5	61,0	57,0	47,0	87,7	73,0	56,9	46,9	41,5
22	87,0	76,0	75,0	71,5	66,5	61,0	57,0	47,0	87,7	73,0	56,9	46,9	41,5
26	87,0	76,0	75,5	72,0	67,0	61,0	58,0	50,0	87,8	73,5	57,4	47,4	42,0
30	87,0	76,0	75,5	72,0	67,0	61,0	58,0	50,0	87,8	73,5	57,4	47,4	42,0
40	90,0	80,0	76,5	73,5	69,5	64,0	61,0	54,0	90,7	75,5	58,9	49,2	43,9
51	90,0	80,0	77,0	74,0	70,0	65,0	62,0	54,0	90,8	76,0	59,4	49,7	44,4

(1): Water temperature: inlet 12°C - outlet 7°C. Outdoor temperature 35°C.

SWL = Sound power levels, with reference to 1×10^{-12} W.

SPL = Sound pressure levels, with reference to 2×10^{-5} Pa.

The sound pressure levels are values calculated by applying the **ISO-3744 relation (Eurovent 8/1)** and refer to a distance of 1,5,10 meters away from the external surface of units operating in the open field with directivity factor 2 and the units operating in nominal conditions in the cooling mode.

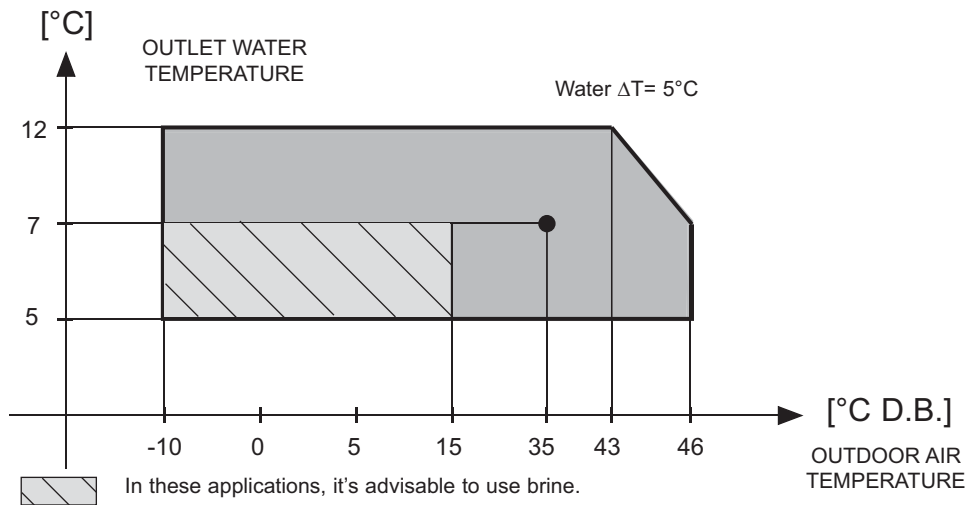
OPERATING RANGE

Operating range

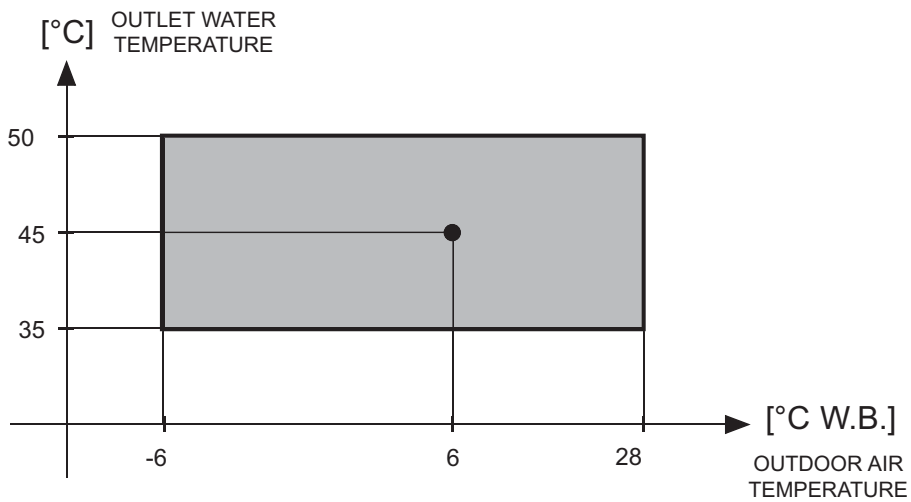
The graphs below give the operating ranges within which correct operation of the units is guaranteed. The use of the units in conditions differing from those indicated will void the warranty with which the product is supplied. In the following table, there are the thermal water head limit values of the unit.

Thermal Water Head		Limit value
Minimun	°C	3
Maximus	°C	8

COOLING MODE



HEATING MODE



ARRIVAL

Inspections on arrival

As soon as the unit is consigned, it is essential to make sure that all the ordered items have been received and that the dispatch is complete. Carefully check that the load has not been damaged. If visible damage is discovered, immediately inform the haulage contractor and write "**Collected with reserves owing to evident damage**" on the consignment note. Delivery at the plant means that any damages will be reimbursed by the insurance company as established by law.

Safety prescriptions

Comply with the current safety provisions in relation to the equipment used to handle the unit and the ways in which these operations are carried out.

Handling

Before moving the unit, check its weight on the data plate with the general specifications of the appliance and consult the **Main Features** section of this manual. Make sure that the unit is handled with care, that it is not jolted in any way and that none of its functional parts is damaged.

Comply with the following instructions when lifting and positioning the unit:

• Handling with a lift truck or similar

The unit has four wooden bases so that it can be transported in a longitudinal direction (**not sideways**). Place something suitable in between to separate the truck from the unit in order to prevent the surfaces of the bank or electric panel from being damaged if the unit has to be moved sideways (**Fig.1**). Do not allow the unit or any of its parts to drop on to the ground. Remember that the heaviest part is the one where the compressor is installed (**electric panel side**).

Fig.1

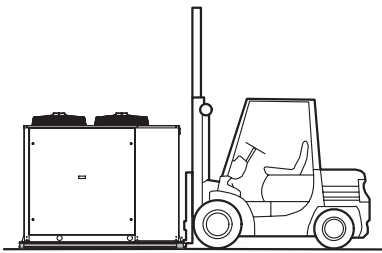


Fig.2

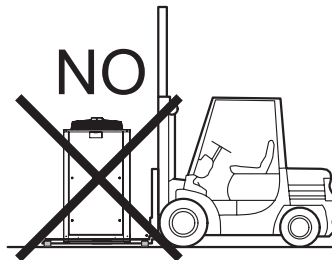
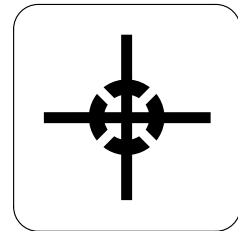
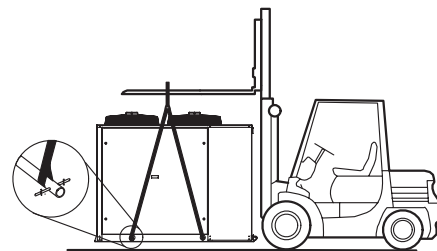
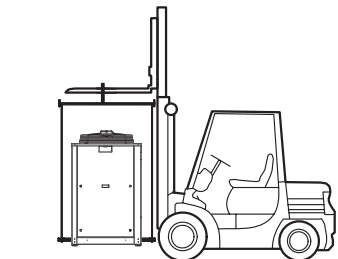


Fig.3



• Lifting and handling with a crane or similar

- Position metal tubes of an adequate thickness in the holes on the base of the unit in order to lift it.
- The ends of the tubes must project to an adequate extent to allow safety components to be inserted and the lifting belts to be fitted.
- Consult the tables in the **When the appliance arrives** section for the venter of gravity position.
- Use spacer bars in the top part of the unit to prevent the banks and plastic parts covering the unit from being crushed and damaged.



WARNING:

Before proceeding with the handling operations, read the information on the wrapping to ensure the safety of persons and property. Also be sure to:

- Handle the load with care
- Avoid stacking other objects on top of the unit

Storage

The units must be stored in a dry place sheltered from the sun, rain, sand and wind.

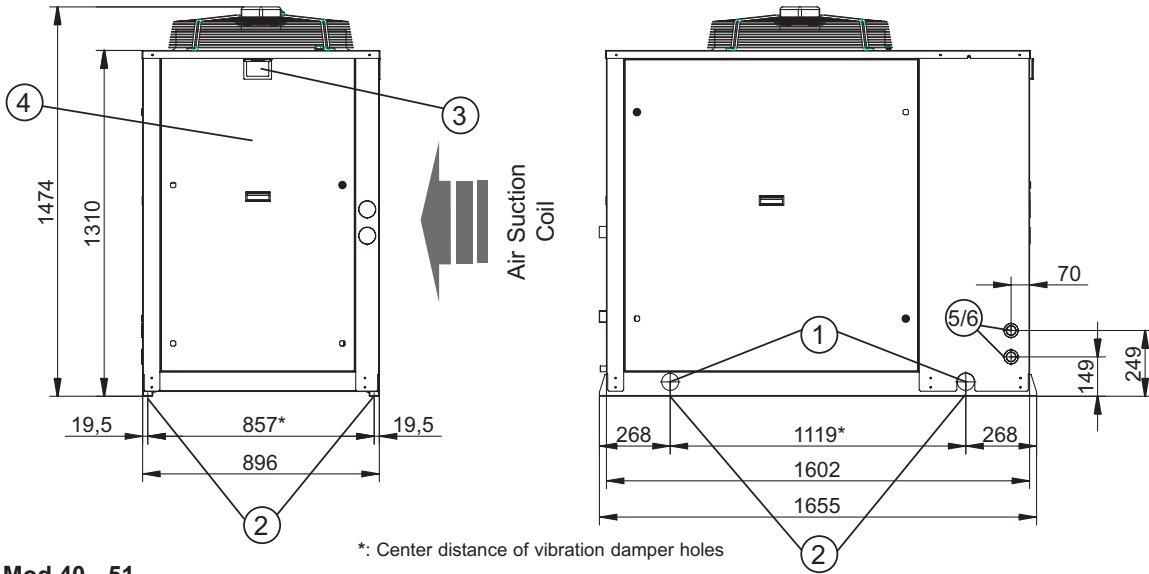
The storage conditions are:

- Do not stack the units
- Maximum temperature = **60°C**
- Minimum temperature = **-10°C**
- Humidity = **90%**

DIMENSIONAL DATA

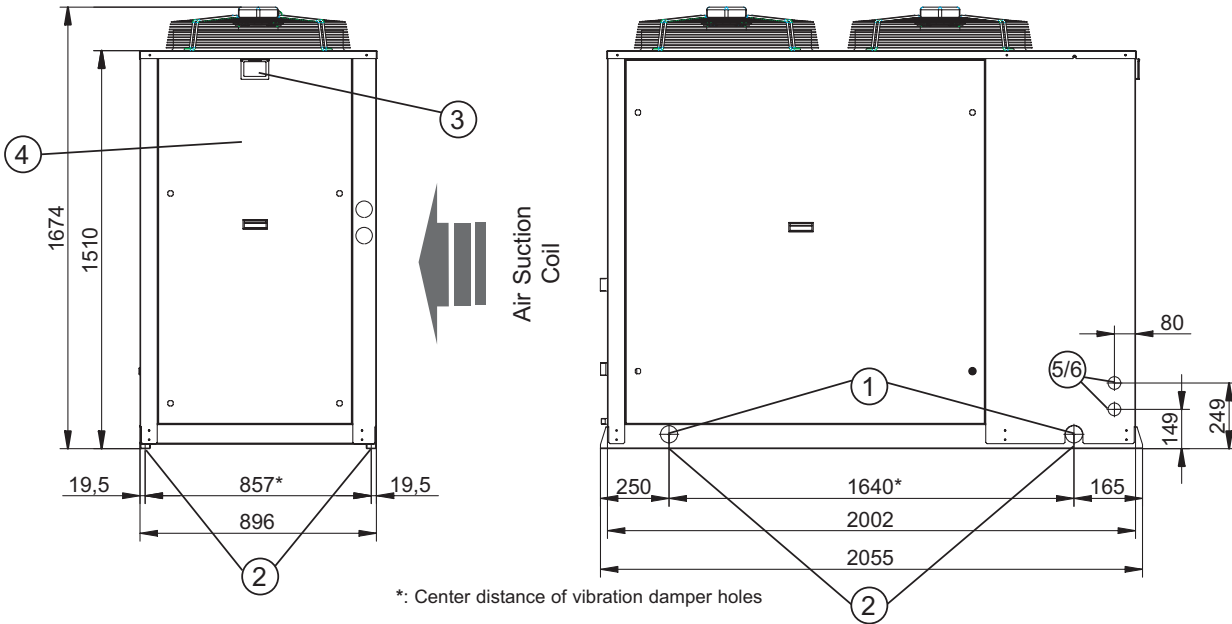
Overall dimensions

Mod. 19 - 22 - 26 - 30



*: Center distance of vibration damper holes

Mod.40 - 51



*: Center distance of vibration damper holes

N.B.: Measurements given in mm.

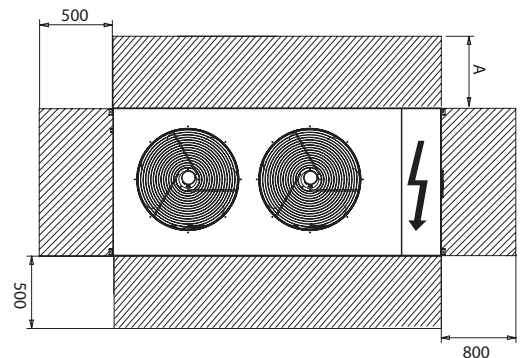
Description of the components

- 1 - Lifting holes - nr.4 - Ø65 mm
- 2 - Vibration-damping fixing holes - nr.4 - Ø13 mm
- 3 - Electric control and monitoring panel
- 4 - Compressor compartment access panel
- 5 - Electric power supply input hole - nr.1 - Ø36 mm
- 6 - Accessory cable inlet hole - nr.1 - Ø36 mm

Minimum space required for operation

Refer to the figure alongside for the dimensions of the unit. To correctly install the unit, comply with the measurements for the free area that must be left around the machine, as shown in the figure. The distances must be doubled if the unit is to be installed in a pit. **NOTE: Allow for a clear area of not less than 2.5 meters above unit.**

The functional areas must be doubled if multiple units are installed.



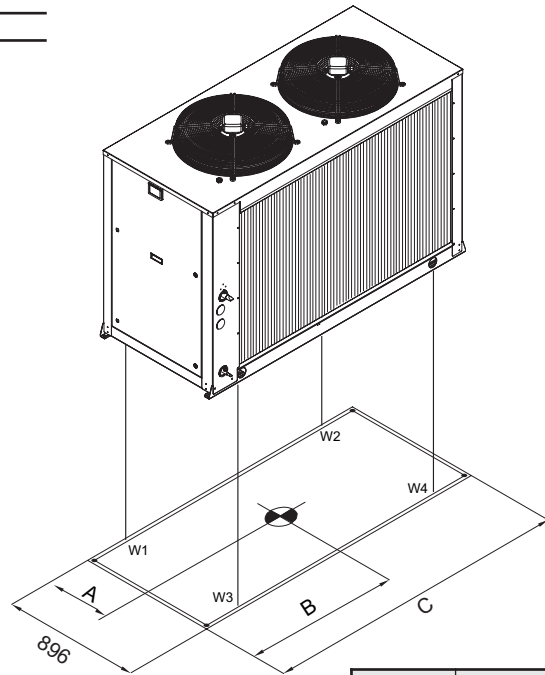
Mod.	19÷30	40-51
A	1100	1400

WEIGHTS AND CENTERS OF GRAVITY DURING TRASPORT AND OPERATION

Weigh and center of gravity during trasport

SR UNIT

Mod.	Basic Version		
	A [mm]	B [mm]	Weight [kg]
19	424	579	273
22	421	575	278
26	432	582	292
30	430	579	296
40	445	717	425
51	451	708	471



SP UNIT

Mod.	Basic Version		
	A [mm]	B [mm]	Weight [kg]
19	424	576	279
22	422	571	283
26	433	579	298
30	431	576	301
40	447	716	430
51	452	707	479

Mod.	C	UM
19-30	1602	mm
40-51	2002	mm

Weigh and center of gravity during operation

Consider the following center of gravity positions of the machine and the load on the supports to correctly match the machine itself with the bearing structure (with reference to the figures on the previous pages).

SR UNIT

Mod.	Basic Version							total kg
	Center of gravity position during operation ^(mm)		Load on bearing points (kg)					
	A	B	W1	W2	W3	W4	Peso	
19	422	578	105	40	93	36	275	
22	419	574	108	41	95	36	279	
26	430	581	110	43	102	39	294	
30	428	577	113	43	103	39	298	
40	443	715	144	73	141	71	429	
51	447	706	160	79	159	78	476	

SP UNIT

Mod.	Basic Version							total kg
	Center of gravity position during operation ^(mm)		Load on bearing points (kg)					
	A	B	W1	W2	W3	W4	Peso	
19	422	575	108	41	96	36	280	
22	420	570	111	41	97	36	285	
26	431	578	113	43	104	40	300	
30	428	574	115	43	105	40	303	
40	444	714	145	73	143	72	433	
51	449	705	162	79	163	80	483	

Vibration-damper installation

To prevent the operating unit from transmitting vibrations to the bearing structure, vibration dampening materials should be inserted under the bearing points.

The unit can be supplied with the rubber vibration dampening accessory. This must be mounted by the installer.

REFRIGERANT CONNECTIONS

Refrigerant connections

To ensure that the system operates correctly, first make sure that the connection pipes have been properly sized.

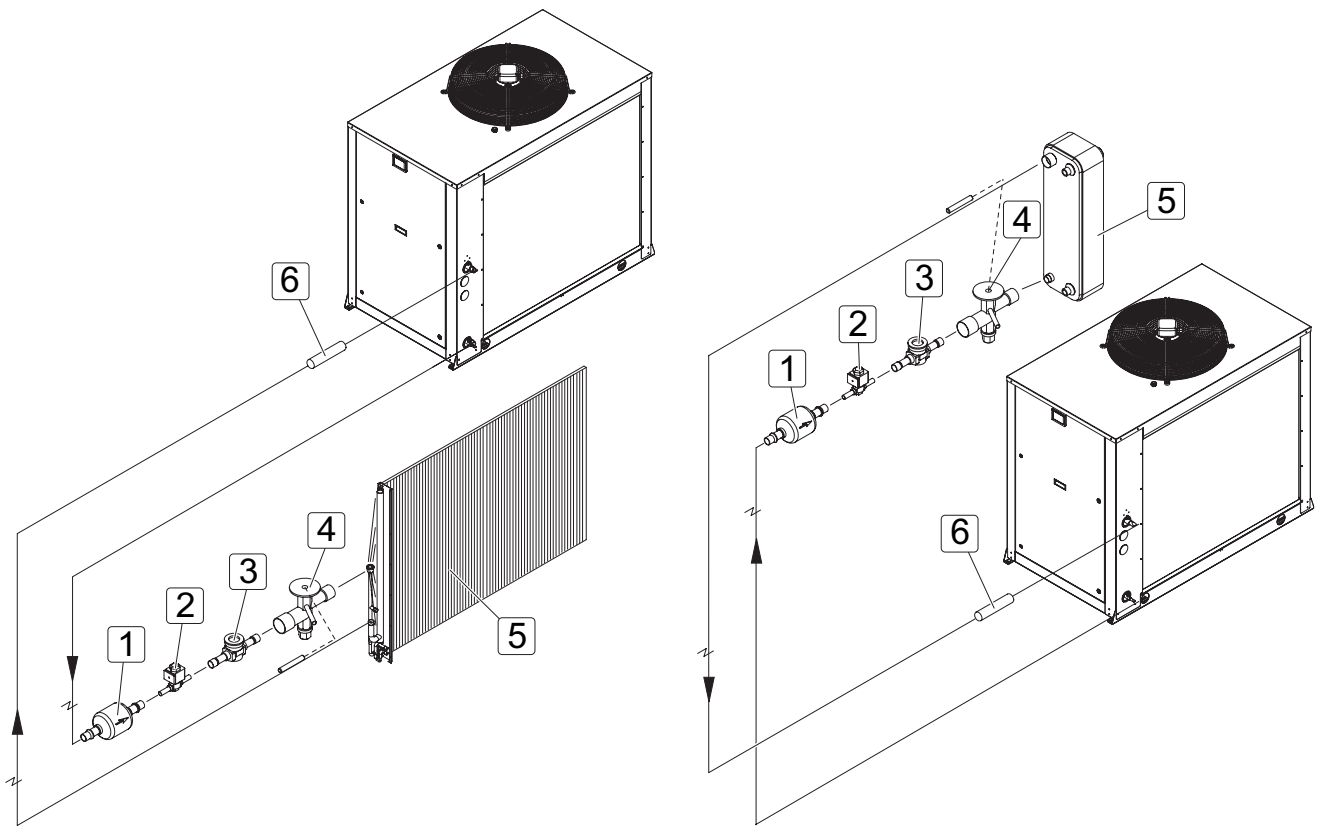
In particular, the connection pipes must guarantee the following conditions:

1. They must make sure that sufficient refrigerant reaches the evaporator.
2. The pipes must be prevented from becoming sources of high and excessive losses of head.
3. The pipes must make sure that oil flows back to the compressor in a uniform way so as to ensure that the compressor itself is correctly lubricated.
4. They must prevent fluid refrigerant from flowing into the compressor.

It is therefore advisable to comply with the following instructions:

- install the unit as near to the evaporator as possible so as to reduce the loss of head and prevent the unit from becoming inefficient.
- Size the fluid line for a 0.5°C saturation temperature differential value (it is current practice to express water pressure drop as differential value of the saturation temperature).
- Size the gas line for a 1°C saturation temperature differential value.
- Prevent the circuit from being polluted by particles of impurities and moisture as far as possible by installing a filter to ensure that it remains clean, dry and unclogged.

The reference diagrams for installing the Refrigerant pipes are given below.



Legend

- 1 Filter
- 2 Solenoid valves
- 3. Fluid telltale
- 4 Thermostatic valve

5 Coils:

Direct expansion Coils and a plate type Heat Exchanger have been shown. The type of Exchanger to use is left to the discretion of the

actual installer.

6. Vibration damping connection

REFRIGERANT CONNECTIONS

WARNING: UNIT CHARGED WITH R410A REFRIGERANT

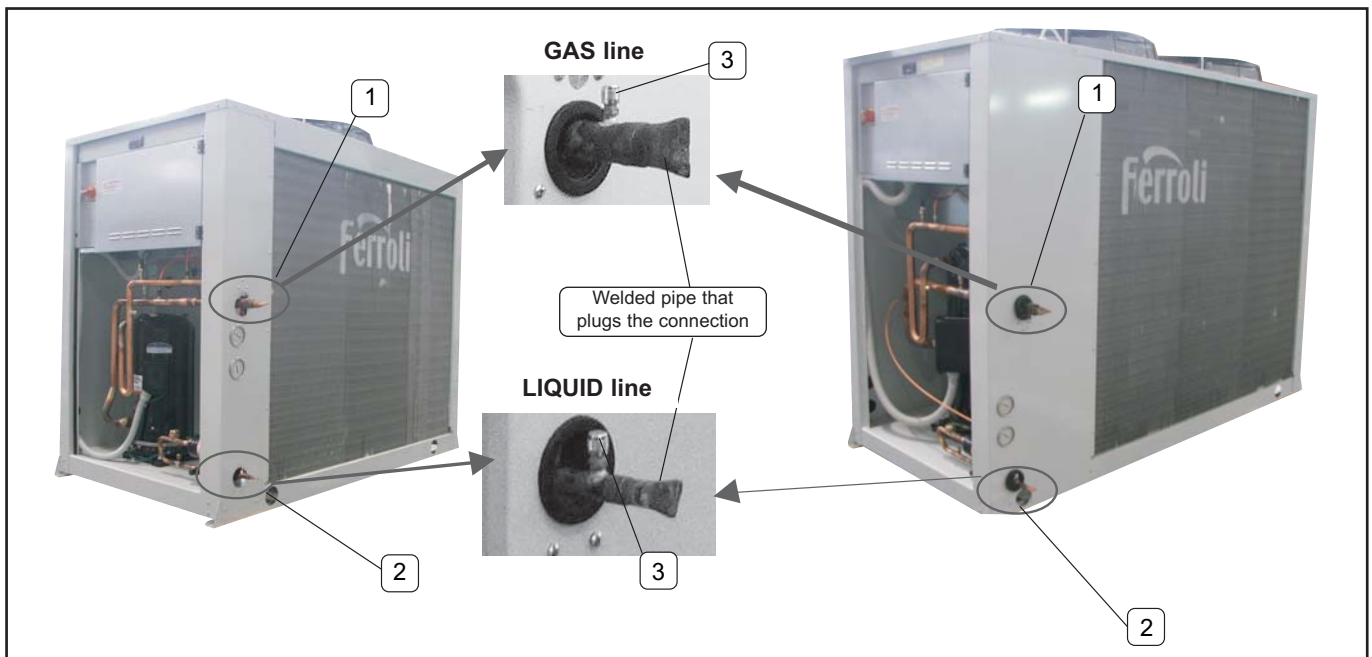
The refrigerating connections for the liquid and gas lines are on the right-hand side of the unit.

The photos below illustrate the connections and their positions

- 1- Gas connecting line
- 2- Liquid connecting line
- 3- 1/4" SAE pin pressure tap

Ball valve for the liquid line (inside the unit)

Ball valve for the gas line (inside the unit)



Both the Liquid connection and the Gas connection are equipped with a closed Ball valve. Moreover, both connections are plugged by a section of welded pipe.

Proceed as described below to install the unit and make the Liquid and Gas line connections:

1- Remove the welded pipe that closes the liquid connection and the welded pipe that closes the gas connection.

NOTE: each pipe section is charged with Nitrogen, which can be emptied by means of the pressure tap (3).

2- Weld the liquid and gas connections to the evaporator system

3- Carry out the vacuum operation for the connections

4- Open the Ball valves

5- Check the operating parameters. A Superheating value of 5°C and a Sub-cooling value of 5°C should be obtained.

To obtain these values, modify the refrigerant charge value as shown in the table below and use the thermostatic valve if necessary.

Mod.	Gas connection		Liquid connection	
	External diameter [mm]	Refrigerant fluid R410A [g/m]	External diameter [mm]	Refrigerant fluid R410A [g/m]
19	22x1	10	15.88x1	144
22	28x1	17	15.88x1	144
26	28x1	17	15.88x1	144
30	28x1	17	15.88x1	144
40	35x1.5	26	15.88x1	144
51	35x1.5	26	18x1	191

ELECTRICAL CONNECTIONS

General rules

The appliance must be wired in compliance with the laws in force in the country where it is installed, at the time installation takes place. The units are supplied after having been fully wired in the factory and are pre-engineered for connection to the mains source. The electric panel is built in compliance with the technical standards in force in the European Union.

Electric panel structure

All the electrical components are housed in a closed casing protected against adverse weather conditions and accessible for inspection by opening the screen-printed front door, equipped with main door-locking disconnecter.

Composition of the electrical equipment

The electrical equipment consists of an electromechanical part formed by the power circuit, comprising the disconnecter, the contactors, the fuse protections, the transformer and a second circuit formed by the monitoring system with microprocessor.

NOTE: REFER TO THE WIRING DIAGRAM SUPPLIED WITH THE UNIT FOR THE LAYOUT OF THE ELECTRIC PANEL.

Electrical connections

All electrical connections must be carried out by qualified personnel in the absence of electric power. The table below gives the electrical specifications of the different constructional configurations of the units.

Basic Version VB

MODEL	19	22	26	30	40	51
Power supply [V-ph-Hz]	400 - 3+N - 50					
FLA TOTALE [A]	19,5	24,5	25,5	28,5	38	47
FLI TOTALE [kW]	9,9	11	12,8	14,2	18,4	24
MIC TOTALE [A]	99	115	122	122	205	232

Compressor specifications

MODEL	19	22	26	30	40	51
Power supply [V-ph-Hz]	400 - 3 - 50					
FLA [A]	16,0	21,0	22,0	25,0	31,0	40,0
LRA [A]	95	111	118	118	198	225
FLI [kW]	9,1	10,2	12,0	13,4	16,8	22,4

Fan specifications

MODEL	19	22	26	30	40	51
Power supply [V-ph-Hz]	230 - 1 - 50					
FLA [A]	3,5				7	
LRA [A]	7,5					
FLI [kW]	0,8				1,6	

NOTES:

Values valid for **SP** and **SR** units, **BASIC** and **SILENCED** versions
FLA= Power draw at maximum tolerated conditions
LRA= Surge current

FLI= Electric power draw at maximum tolerated conditions
MIC= Maximum surge current of the unit

ELECTRICAL CONNECTIONS

1) Connection to the electricity main

- **Power supply line;**

The machine's power line should be routed in compliance with the current standards governing the classification of the places in which they are installed. The machine's powering line should be installed along a precise route so that it is as short as possible and unbroken.

Pass the line through the hole at the base of the machine's left-hand panel. It is advisable to replace the rubber core hitch in the above mentioned hole with a cable clamp, so as to fix the line firmly to the structure of the machine. After this, proceed inside the compressor compartment until reaching the hole at the bottom of the electric panel. An adequately sized cable clamp should also be used in this case. Connect the conductors straight to the input terminals of the machine's main circuit-breaker.

- **Powering system;**

The power cables of the machine's power supply line must be off-taken from a three-phase symmetric voltage system with a neutral conductor and a separate ground protection conductor. In accordance with standard **EN60335-1**, the tolerated minimum section for the cables used must comply with the table below:

MODEL	19	22	26	30	40	51
Section (mm ²) ⁽¹⁾	6	6	10	16	16	25

(1): With reference to flexible cable with polychloroprene sheathing type **H05RN-F**.

NOTE: The section of the cables must be checked and sized to suit the real conditions of use.

- **Protection on the supply side;**

An automatic circuit-breaker able to provide protection against over-currents and indirect contacts that may occur when the machine is operating must be installed on the supply side of the above mentioned line.

It is advisable to install an automatic switch to limit the effective short-circuit current in the machine's connection point. This allows a protection device with a lower breaking capacity than that required in the connection point to be sized as main circuit-breaker of the machine.

When it comes to the type of installation and the environmental conditions in the installation site, the line and switch must be coordinated in compliance with the current laws governing electrical safety.

- **Protection conductor** (ground wire);

The protection conductor from the powering line must be connected straight to the ground screw, identified by code "**PE**", able to provide equipotential connections for all the metal components and structural parts of the machine.

- **Neutral conductor:**

The neutral conductor in the line must be connected to the neutral terminal bearing the letter "**N**", corresponding to the fourth pole of the panel's main disconnecter.

2) Electric panel

- **Protection degree:**

The casing of the electric panel is made of thermoformed plastic material, with IP54 protection degree on a level with the door accessible from the outside. The other parts of the casing provide a minimum protection degree equivalent to IP22, as established by the current laws in force: this is achieved since the panel is protected against the penetration of solid foreign bodies and against adverse weather conditions by the structure of the machine that houses it.

- **Operation during starting and stopping:**

The panel door is fitted with a red handle on a yellow background that acts straight on the main circuit-breaker. The handle also locks the door since it ensures that the machine is only powered when the door is shut. The stopping function accomplished by the main switch is classified as type "0" since stopping occurs by immediately shutting off the power supply.

- **Emergency function:**

This handle also acts as an emergency stop since it can be directly accessed from outside and stands out owing to its characteristic red colour.

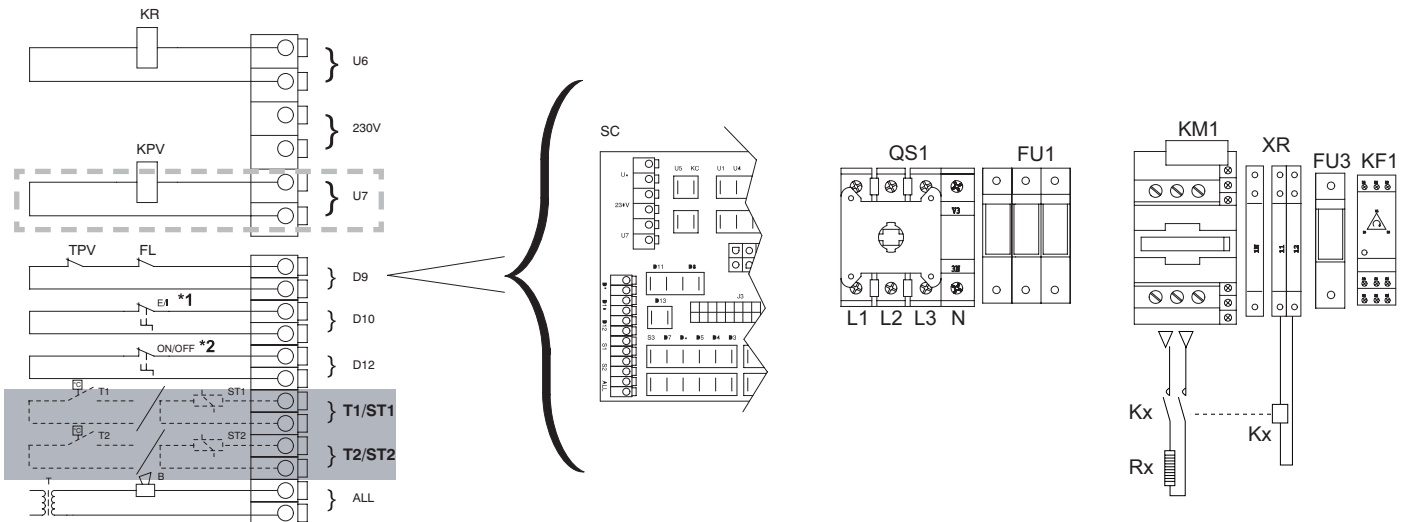
ELECTRICAL CONNECTIONS

3) reference standards

- To guarantee that the electrical products sold on the European Union market are safe, we complied with the descriptions given in the following Directives:
 - q Low voltage Directive **73/23 EEC**, also including the following harmonized standard: **CEI EN 60335-1** and **60335-2-40**. Date of publication **1998 - 04**.
 - q **CEI EN 60204-1**. Safety of machinery. Electrical equipment of machines. Part 1: General rules.
 - q Directive **89/336 EEC** and **92/31 EEC** concerning “**Electromagnetic compatibility**”;

4) Connections to make in the installation site

Connection layout (detail of the wiring diagram affixed to the machine).
Description of the individual components to connect in the installation site.



CODE	DESCRIPTION
T1 / ST1	Digital input required for operation in the Cooling mode (Ambient thermostat enabling) / Thermostating NTC probe
T2 / ST2	Antifreeze Alarm digital input (jumper if the antifreeze protection device is not installed) / Antifreeze NTC probe
U6	230V relay (max 1A) to control the antifreeze heating element
230 V	230V to power the programmer clock (accessory)
U7	230V relay (max 1A) to control the fan of the internal unit
D9	Digital input of internal fan's thermal protector / thermal protector of pump + flow switch / differential pressure switch (jumper if the device is not installed)
D10	Summer/Winter (for SP condensing units only)
D12	Digital input for remote ON/OFF command
ALL	Max 24V - 0.5A alarm signalling enabling signal

Note :

***1: SUMMER/WINTER (for SP units only)**

Installation:

- a) Disconnect the unit from the electric power source.
- b) Eliminate the jumper from between the terminals **D10** and connect the selector.
- c) Modify the value of parameter **H27** and set it to value 1 (parameter **H27** belongs to the family of **CNF** configuration parameters. Consult the “**Monitoring system**” if modifications are required, particular the “**Menu structure**” section).

Operation: (see table alongside)

Contact made=operation in the “**cool**” mode

Contact open=operation in the “**heat**” mode

NOTE:After having enabled the remote Summer/Winter selector by modifying the **H27** parameter, it will no longer be possible to change the season with the “mode” key of the controller on the machine.

***2: REMOTE ON/OFF COMMAND**

Installation:

- a) Disconnect the unit from the electric power source.
- b) Eliminate the jumper from between the terminals **D12** and connect the selector.

Operation:

Contact made=unit operating (**ON**)

Contact open=unit stopped (**OFF**)

Controller status	Contact	
	Made	Open
OFF	OFF	OFF
Stand-by	Stand-by	E00
Cool	Cool ❄️	E00
Heat	Heat 🔥	E00

MONITORING SYSTEM

Parameter settings for the various configurations

Appropriate configuration parameters must be entered, depending on the type of exchanger chosen for application to the condensing unit.

The following exchangers can be used:

- water exchanger
- direct expansion exchanger

The following configurations can be obtained if the water exchanger is chosen:

- solution A with regulation via digital inputs - with 2 thermostats
- solution B with regulation via temperature probe water inlet and antifreeze alarm with thermostat
- solution C with regulation via water inlet and outlet with temperature probe

The following configurations can be obtained if the direct expansion exchanger is chosen:

- solution A with regulation via digital inputs - with 2 thermostats
- solution B with regulation via temperature probe air inlet and antifreeze alarm with thermostat
- solution C with regulation via air inlet and coil temperature with temperature probe

The different configurations available are described in detail below.

Condensing unit in conjunction with a water exchanger

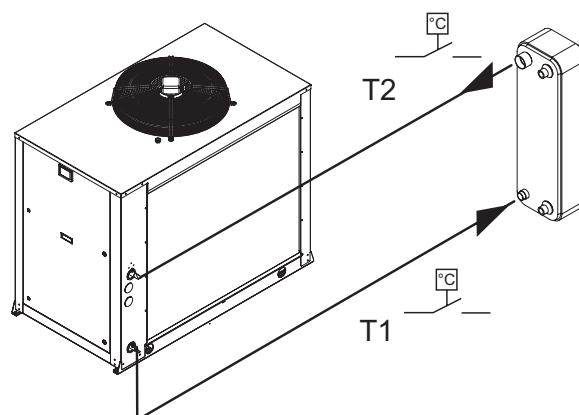
Install a water flow switch or differential pressure switch and connect to terminal board D9.

SOLUTION A with regulation via digital inputs - with 2 thermostats

For Condensing units SR Cooling Mode only

The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	Settings for operation in the cooling mode
H05=3	Digital input for thermoregulation via cooling thermostat
H06=3	Digital input for antifreeze thermostat



T1 = water inlet thermostat connected to input T1/S1

T2 = antifreeze thermostat connected to input T2/S2

Additional heating elements/water antifreeze configuration: not necessary

The heating elements are not handled with the digital antifreeze alarm input.

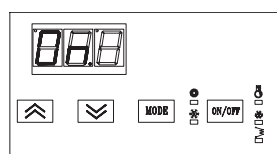
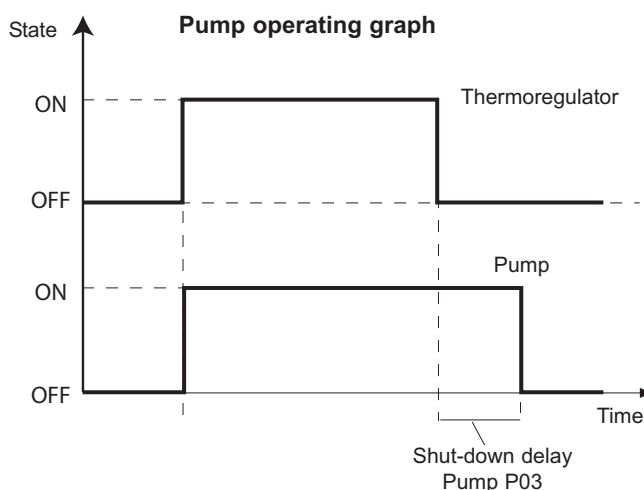
Pump output configuration [par. H22=0]

The pump operating mode must be set for Continuous service [par. P01=0]

The pump activates when the machine is powered and remains on. It turns off after the time selected for parameter P03, when the unit is turned OFF or set to the Stand-by status.

See Graph below.

Never select other types of operation, with parameter P01 differing from 0.



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are 1- display of the unit's status and 2. remote on/off.

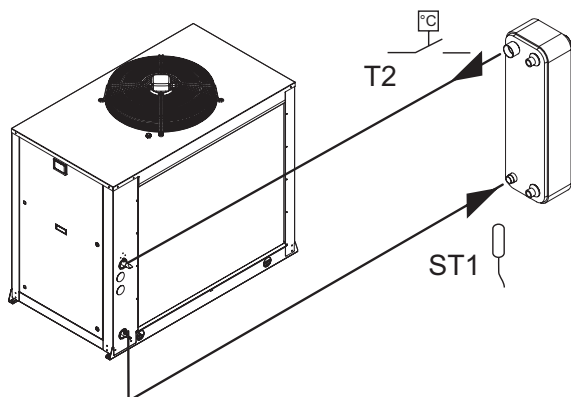
On is displayed if the thermostat is closed and OFF if the thermostat is open.

Refer to point 4 of the **"Connections to make in the installation site"** section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

SOLUTION B with regulation via air inlet temperature probe and antifreeze alarm with thermostat

For Condensing units SR Cooling Mode only and SP Heat Pump units



ST1= water inlet probe
T2= antifreeze thermostat

The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	SR unit for the cooling mode only / H28=1 SP heat pump
H05=1	analog input for exchanger water inlet temperature
H06=3	digital input for antifreeze thermostat

Additional heating elements/water antifreeze configuration: not necessary

The heating elements are not handled with the digital antifreeze alarm input.

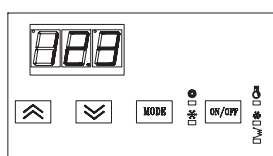
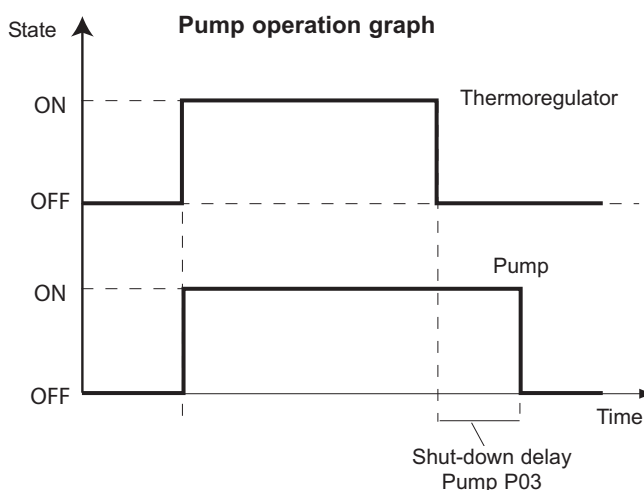
Pump output configuration [par. H22=0]

The pump operating mode must be set for Continuous service [par. P01=0]

The pump activates when the machine is powered and remains on. It turns off after the time selected for parameter P03, when the unit is turned OFF or set to the Stand-by status.

See Graph below.

Never select other types of operation, with parameter P01 differing from 0.



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are 1- display of the operating statuses, 2- cool/heat operating mode change and 3-remote on-off selection.

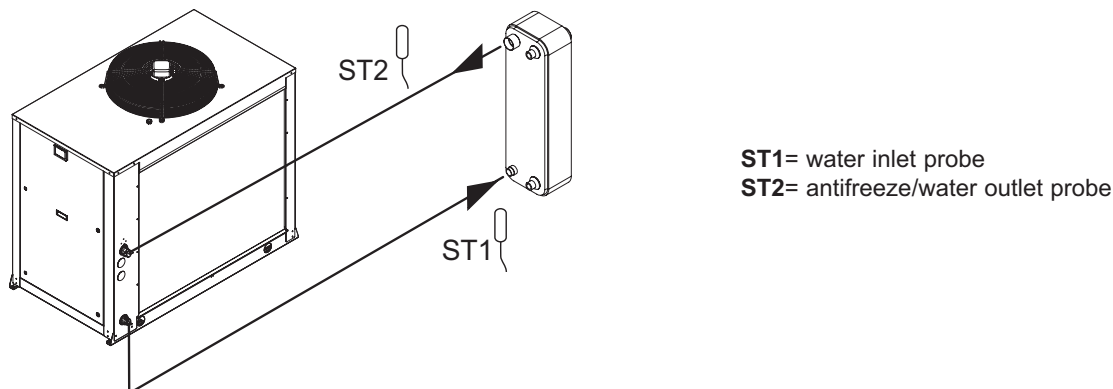
The temperature read by probe ST1 is displayed during normal operation.

Refer to point 4 of the "Connections to make in the installation site" section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

SOLUTION C with regulation via water inlet and outlet with temperature probe

For Condensing units SR Cooling Mode only and SP Heat Pump units



The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	SR unit for the cooling mode only / H28=1 SP heat pump
H05=1	analog input for exchanger water inlet temperature
H06=1	analog output for water outlet probe/antifreeze alarm-heating element control

Additional heating elements/water antifreeze configuration

Enter par.H24=0 to activate the heating element control mode

- select output probe S2 as heating element control in the Cooling and Heating modes, [par.r04=1, r05=1]
- to activate the heating elements during in the defrosting mode only on request of the heating element regulator, select [par.r01=0]
- to activate the heating elements in the Cooling and Heating modes only on request of the heating element regulator, select [par.r02=1]
- to activate the heating elements on request of the heating element regulator in the OFF or Stand-by statuses, select [par.r06=1]

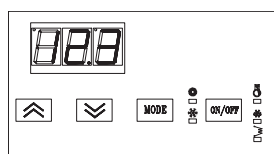
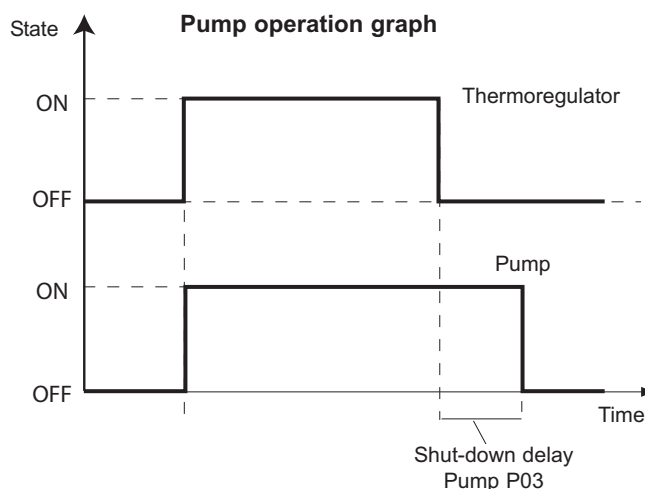
Pump output configuration [par. H22=0]

The pump operating mode must be set for Continuous service [par. P01=0]

The pump activates when the machine is powered and remains on. It turns off after the time selected for parameter P03, when the unit is turned OFF or set to the Stand-by status.

See Graph below.

Never select other types of operation, with parameter P01 differing from 0.



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are
 1- display of the operating statuses, 2- cool/heat operating mode change and
 3-remote on-off selection.

The temperature read by probe ST1 is displayed during normal operation.

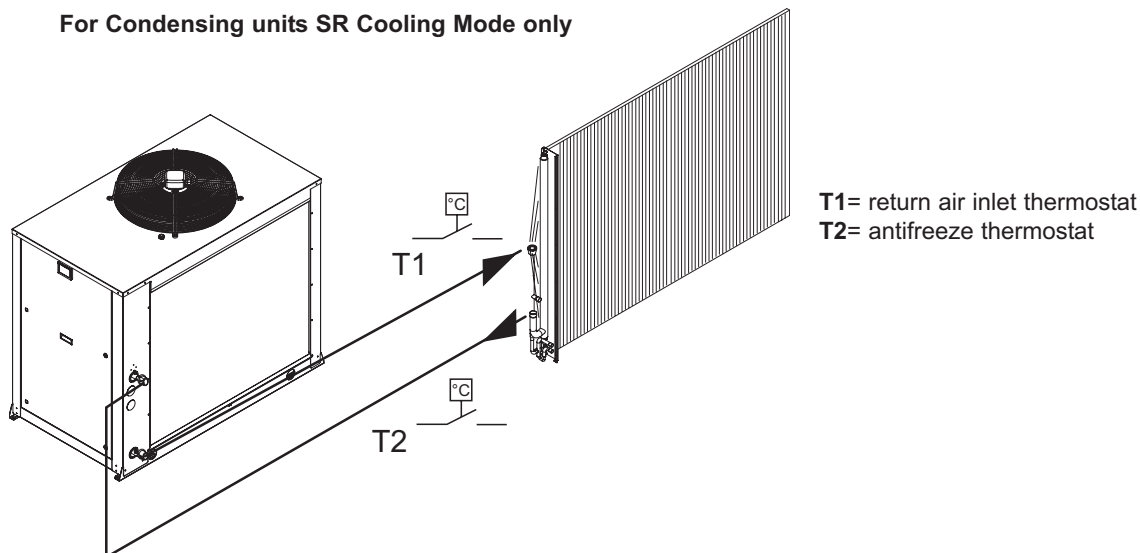
Refer to point 4 of the **"Connections to make in the installation site"** section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

Condensing unit in conjunction with a direct expansion exchanger

SOLUTION A with regulation via digital inputs - with 2 thermostats

For Condensing units SR Cooling Mode only



The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	Settings for operation in the cooling mode
H05=3	digital input for thermoregulation via cooling thermostat
H06=3	digital input for antifreeze thermostat

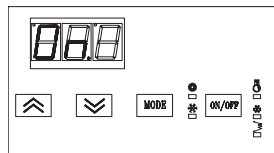
Additional heating elements/antifreeze configuration: not necessary

The heating elements are not handled with the digital antifreeze alarm input (h06=3).

Internal fan configuration [par. H22=1]

Internal fan operation can be handled in the following way:

- Continuous service [par. P01=0]. The fan is always on if the unit is on, regardless of the status of the compressor
 - "Thermostated" service [par. P01=1], in this case, the fan turns on and off in parallel with the compressor.
- see dedicated section.



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are 1- display of the operating statuses and 2- remote on/off control.

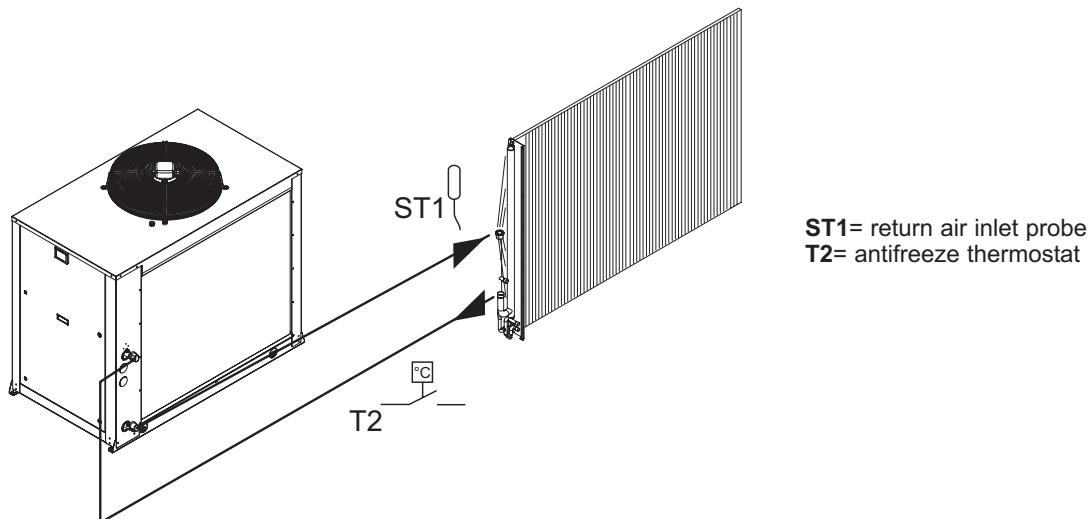
On is displayed if the thermostat is closed and OFF if the thermostat is open.

Refer to point 4 of the "**Connections to make in the installation site**" section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

SOLUTION B with regulation via air inlet temperature probe and antifreeze alarm with thermostat

For Condensing units SR Cooling Mode only and SP Heat Pump units



The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	SR unit for the cooling mode only / H28=1 SP heat pump
H05=1	air temperature probe input ST1 / H05=5 regulation with probe on remote control*
H06=3	digital input for antifreeze thermostat

*: (with H05=5, the regulating probe becomes the one in the remote control)

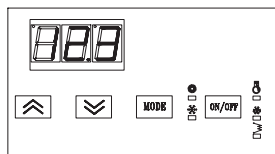
Additional heating elements/water antifreeze configuration: not possible

The heating elements are not handled with the digital antifreeze alarm input.

Internal fan configuration [par. H22=1]

Internal fan operation can be handled in the following ways:

- Continuous service [par. P01=0]. The fan is always on if the unit is on, regardless of the status of the compressor
- “Thermostated” service [par. P01=1] see dedicated section.
- Continuous service in the cooling mode and “thermostated” service in the heating mode [par. P01=3]
- “Thermostated” service in the cooling mode and continuous service in the heating mode [par. P01=2]



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are 1- display of the operating statuses, 2- cool/heat operating mode change and 3-remote on/off control.

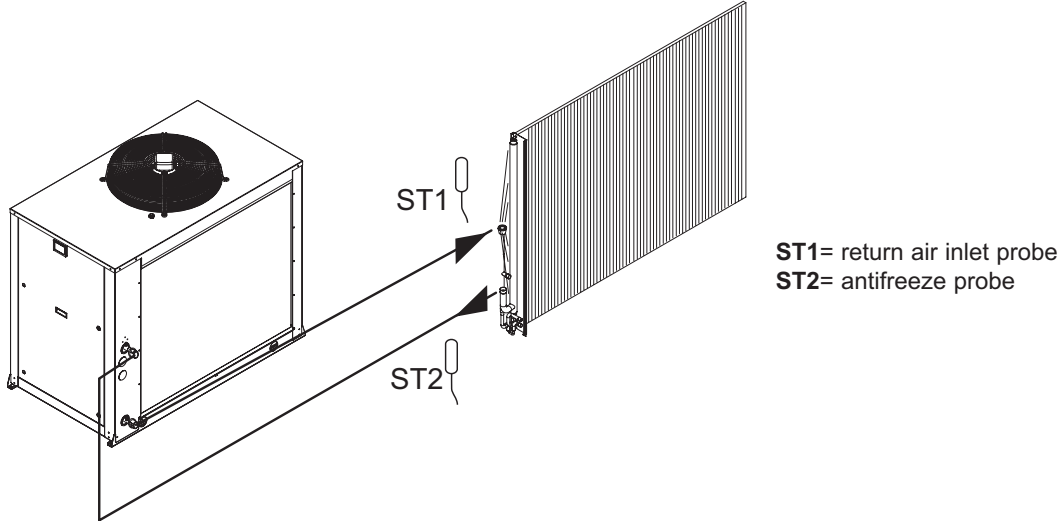
The temperature read by probe ST1 is displayed during normal operation.

Refer to point 4 of the “**Connections to make in the installation site**” section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

SOLUTION C with regulation via air inlet and coil temperature with temperature probe

For Condensing units SR Cooling Mode only and SP Heat Pump units



The parameters required for this configuration are given in the table below:

PARAM.	DESCRIPTION
H28=0	SR unit for the cooling mode only / H28=1 SP heat pump
H05=1	water inlet temperature / H05=5 for regulation probe with probe on remote control
H06=1	coil probe/antifreeze-heating element control digital alarm

Additional heating elements/water antifreeze configuration

Enter par.H24=0 to activate the heating element control mode

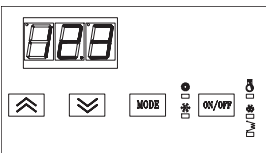
- select output probe S2 as heating element control in the Cooling and Heating modes, [par.r04=1, r05=1]
- to activate the heating elements during in the defrosting mode only on request of the heating element regulator, select [par.r01=0]
- to activate the heating elements in the Cooling and Heating modes only on request of the heating element regulator, select [par.r02=1, r03=1]
- to activate the heating elements on request of the heating element regulator in the OFF or Stand-by statuses, select [par.r06=1]

Internal fan configuration [par. H22=1]

Internal fan operation can be handled in the following ways:

- Continuous service [par. P01=0]
- “Thermostated” service [par. P01=1] see dedicated section.
- Continuous service in the cooling mode and “thermostated” service in the heating mode [par. P01=3]
- “Thermostated” service in the cooling mode and continuous service in the heating mode [par. P01=2]

If the additional / integrating heating elements are installed and on when the request to switch the internal fan to the OFF status is transmitted, first the heating elements are turned off then the fan is turned off after the time entered for parameter P03.



NOTE:

If the remote control accessory is installed in this configuration, the possible commands are 1- display of the operating statuses, 2- cool/heat operating mode change and 3-remote on/off control.

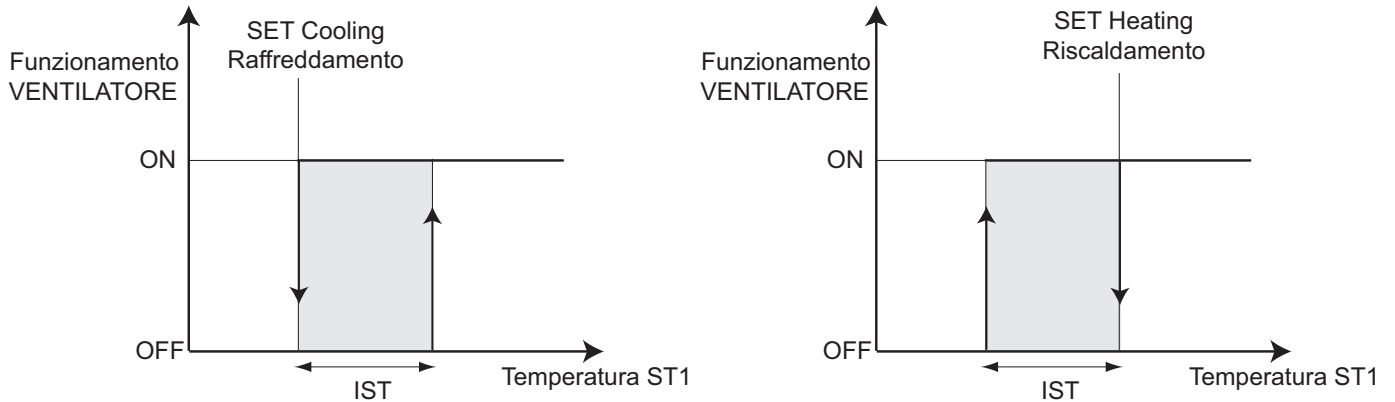
The temperature read by probe ST1 is displayed during normal operation.

Refer to point 4 of the “**Connections to make in the installation site**” section for the electrical connections required for installing the remote control accessory.

MONITORING SYSTEM

Thermostated fan operating mode

In the thermostated operating mode, the fans are turned on and off according to a set-point and a hysteresis. The **cooling set-point** is given by parameter [par. G01=xx] while the hysteresis (IST) is given by [par. C03=xx]. The **heating set-point** is given by parameter [par. G02=xx] while the hysteresis (IST) is given by [par. C03=xx].



If the additional / integrating heating elements are installed and on when the request to switch the internal fan to the OFF status is transmitted, first the heating elements are turned off then the fan is turned off after the time entered for parameter P03.

(Note : if a mechanical thermostat and not the temperature probe is used for regulating in the fan's thermostated operating mode, the operating hysteresis will be given by the intrinsic hysteresis of the mechanical thermostat while the fan will always operate in parallel to the compressor)

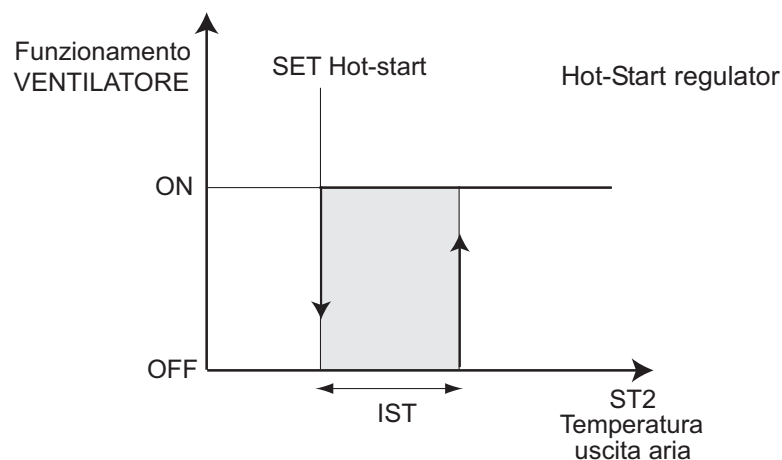
Hot-Start function

The Hot-Start function is only activated if the air outlet probe is installed (ST2). With this function, the internal fan only starts during the Heating mode when the exchanger is sufficiently hot: this prevents annoying blasts of cold air. Just set the two following parameters near to their minimum value if probe ST2 is installed and the Hot-Start function must be deactivated.

Parameters:

F23: Hot-Start set-point

F24: Hot start hysteresis



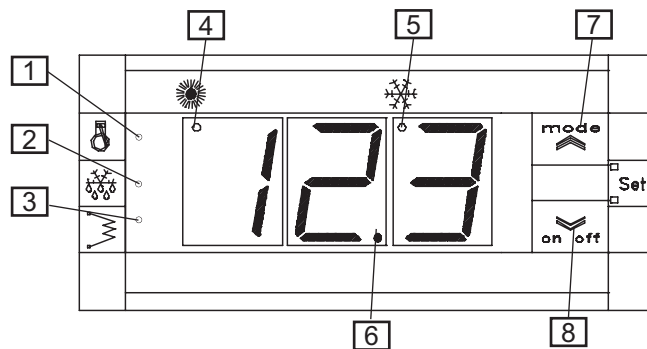
MONITORING SYSTEM

User interface

The controller installed is a highly versatile and easy-to-use instrument. Specially designed to monitor single-circuit heat pumps and chillers, it can be programmed and thus personalized by means of a parameter menu. Various peripherals can be connected to it in order to implement functions that it is unable to handle on its own.

KEY

1. Compressor Led
2. Defrosting Led
3. Antifreeze electric heater Led
4. "HEAT" mode Led
5. "COOL" mode Led
6. Unit off Led / Decimal point Led
7. Tasto **MODE - SCROLL UP**
8. **ON-OFF - SCROLL DOWN** key



1. STATUS

The controller has four **LEDs** on the left side of the interface, that display the status functions of the machine:

- Compressor LED.
- LED for the defrosting function (function available for heat pump units).
- Antifreeze electric heater LED.

MONITORING SYSTEM

1 Compressors LEDs

COMPRESSOR



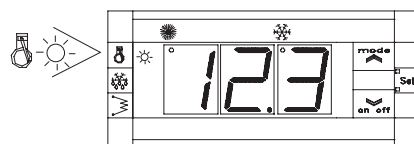
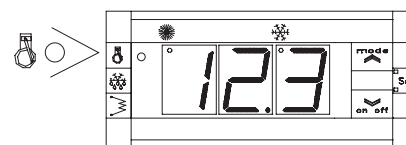
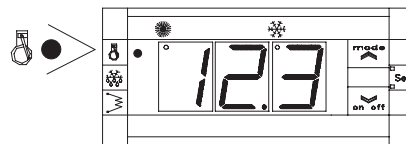
LED STATUS

ON: Compressor on

OFF: Compressor off

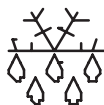
FLASHING: Waiting to start for time counting function

DISPLAY



2 Defrosting LED (version SP only)

DEFROSTING



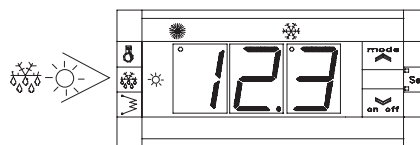
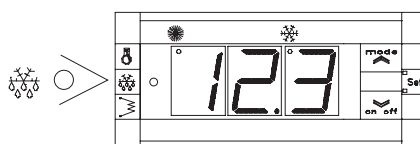
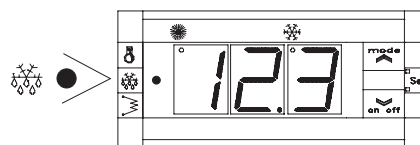
LED STATUS

ON: Defrosting function on

OFF: Defrosting function off

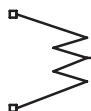
FLASHING: Waiting to start timed defrosting procedure

DISPLAY



3 Antifreeze electric heater LED

HEATING ELEMENT

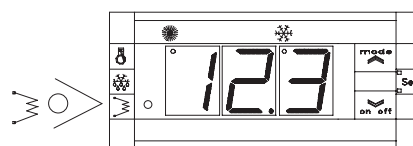
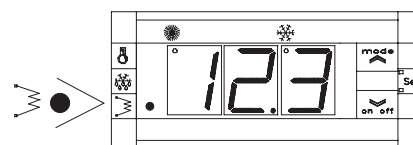


LED STATUS

ON: Heater on

OFF: Heater off

DISPLAY



MONITORING SYSTEM

Display functions

The information displayed (user interface) depends on the configuration chosen for the unit itself.

The temperature detected by ST1, the ON/OFF status of the thermostat or the alarm code (if activated) are displayed during normal machine operation, depending on the configuration used (probe or thermostat).

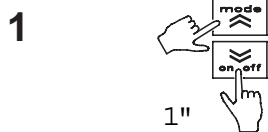
For example, the temperatures of the probes are displayed with configuration B.

Details can be displayed by means of a few simple operations. These operations are described below:

KEYS TO PRESS

DESCRIPTION

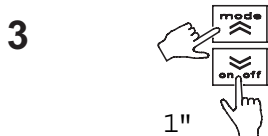
DISPLAY



Keep the mode and on/off keys depressed at the same time for 1 second. The word **SET** will appear on the display.



Press the on/off key repeatedly until the letters **tP** appear on the display.



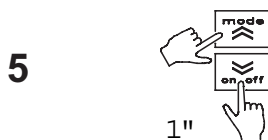
Keep the mode and on/off keys depressed at the same time for 1 second. The message **t01** will appear on the display which, in this configuration, identifies the code of the water inlet probe.



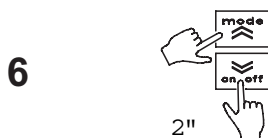
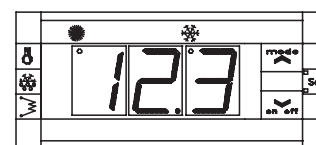
The mode key can be used to select the probe whose value must be known.

The codes that identify the probes in the unit are listed in the table below.

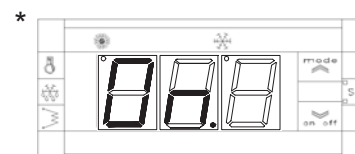
PROBE	DISPLAYED CODE	DESCRIPTION
ST1	t01	Temperature of water/air flowing into the exchanger / digital thermostating input
ST2	t02	Temperature of water/air flowing out of the exchanger / digital antifreeze alarm input
ST3	t03	Coil temperature - condensation/evaporation monitoring
ST4	t04	Used as digital REMOTE ON/OFF input.



Keep the mode and on/off keys depressed for 1 second at the same time to display the value of the probe.
*On will be displayed when the thermostat is closed or OFF when the thermostat is open in the configuration with the thermostat.



Keep the mode and on/off keys depressed for 2 seconds at the same time to quit the newly acquired reading. To see the values of the other probes, repeat the sequence described in points 4 and 5, otherwise keep the mode and on/off keys depressed for 2 seconds at the same time to return to the tP message. Repeat this last operation several times to quit the menu.



MONITORING SYSTEM

Control functions

The control functions allow the user to select the operating mode and enter the operating parameters of the unit.

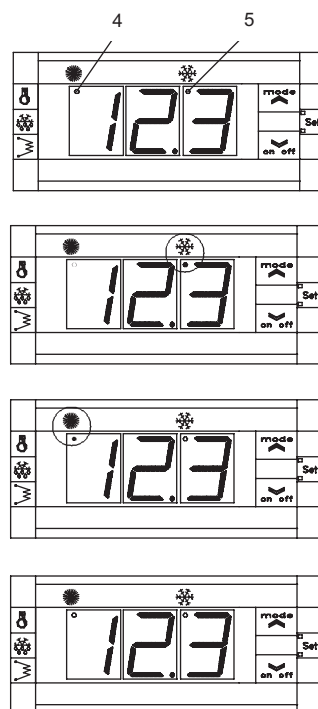
1. Operating mode keys (MODE)

The symbols printed illustrate, with cyclic rotation, the meanings the operating **MODES** take on whenever the key is pressed.

DESCRIPTION

- 1** When the unit is at a standstill, in the “stand-by” status, LEDs **4** and **5** will be off. The temperature of the water/air detected by the probe on the exchanger inlet will appear on the display, otherwise ON/OFF will appear if the thermostats are used.
- 2** Press the *mode* key for **1 second** to turn on the unit in the cooling mode. Led **5** will come on.
- 3** Press the *mode* key for **1 second** to switch from the “Cool” mode to the “Heat” mode (**SP** units only). Led **4** will come on.
- 4** Press the *mode* key again for **1 second** to set the unit back to the “stand-by” status.

DISPLAY



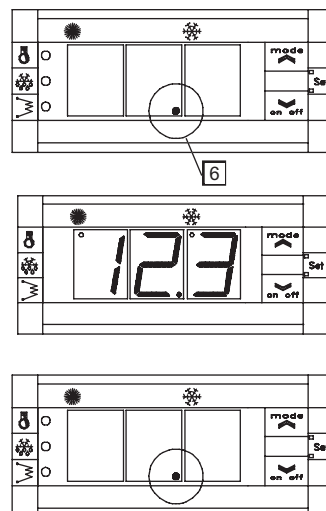
2. ON/OFF modes



The key carries out two separate functions: if pressed for **1 second**, it acts as "alarm reset"; if pressed for **2 seconds**, it turns the controller "on/off".

- 1** When the unit is off, only LED **6** will be lit on the display.
- 2** Press the on/off key for **2 seconds** to turn on the controller. The temperature of the water read by the probe on the evaporator inlet will appear on the display.
- 3** Press the on/off key again for **2 seconds** to turn the controller off again.

DISPLAY

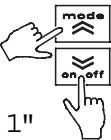
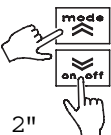


MONITORING SYSTEM

3. MODE + ON/OFF keys

The printed symbols show the functions activated, with cyclic rotation, by pressing the mode and on/off keys at the same time. They allow you to access the menu structure and sub-levels if depressed for **1 second**, or to quit by working through them in reverse if depressed for **2 seconds**.

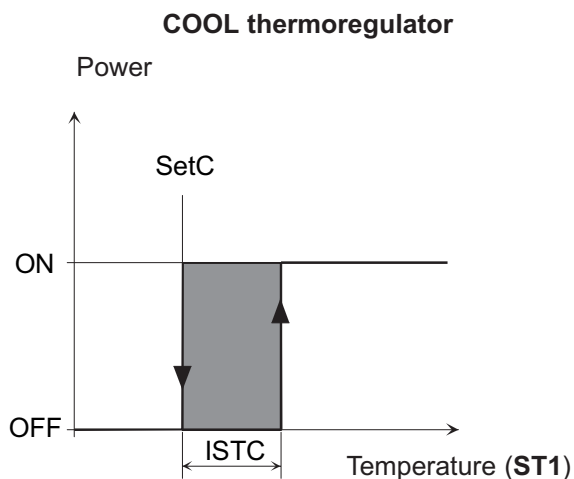
When the mode + on/off keys are pressed for the first time, the status identifying **LEDs** start to flash to indicate the programming phase.

	DESCRIPTION	DISPLAY
1	 <p style="text-align: center;">1"</p>	<p>Keep the on/off and mode keys depressed at the same time for 1 second to switch to a lower display level.</p>
2	 <p style="text-align: center;">2"</p>	<p>Keep the on/off and mode keys depressed at the same time for 2 second to switch to a higher display level.</p>

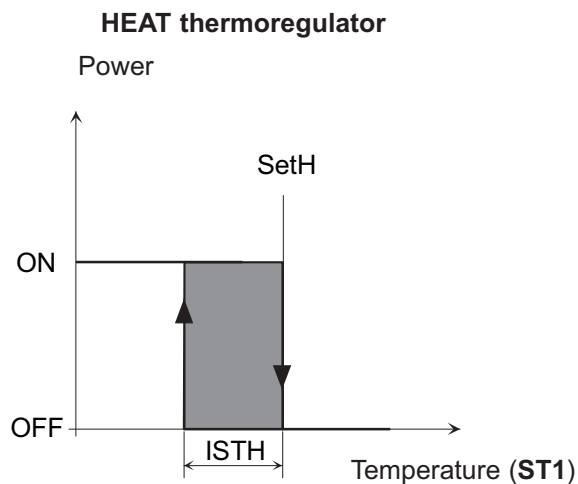
A few examples illustrating how these keys can be used at the same time to move within the menu are given in the **Status** section and in the next chapter, i.e. **How to select the operating Set-Point**.

How to select the operating Set-Point (only for configurations with temperature probe ST1)

The function of the thermoregulator is to maintain the temperature of the water at the inlet of the water heat exchanger / air coil as near as possible to the value programmed as **SET POINT**. The type of regulation made by the controller is the **ON-OFF** type. Once the ideal operating point has been established (**SET-POINT**), the action carried out by the machine will be to switch off the compressor once that value has been reached and to power it again, once the **SET-POINT** has been reached, plus a hysteresis value preset in the factory and which can only be modified by a qualified technician.



SetC = Set-point for operating in the cooling mode
ISTC = Cooling thermoregulator hysteresis
(ST1) = Temperature detected by t01



SetH = Set-point for operating in the heating mode
ISTH = Heating thermoregulator hysteresis
(ST1) = Temperature detected by t01

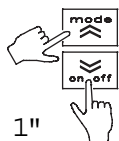
MONITORING SYSTEM

KEYS TO PRESS

DESCRIPTION

DISPLAY

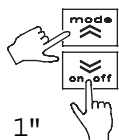
1



Keep the mode and on/off keys depressed at the same time for 1 second. The word **SET** will appear on the display.



2



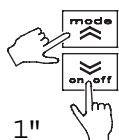
Keep the mode and on/off keys depressed at the same time for 1 second again. The word **Coo** (meaning "Cool") will appear on the display.



In heat pump units, switch to the **Hea** mode (meaning Heating) by pressing the on/off key.



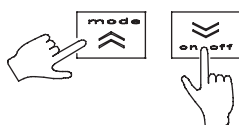
3



Keep the mode and on/off keys depressed at the same time for 1 second. The selected set-point value will appear on the display (in this case, 12°C is the temperature of the water that enters the exchanger).

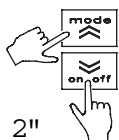


4



Press the mode key to increase the selected set value, while the value decreases when the on/off key is pressed.

5



Keep the mode and on/off keys depressed at the same time for 2 seconds to switch to the previous menu.

Alarms

If faults occur during normal operation, the controller stops the machine and displays the code of the alarm in question. After the alarm has been checked and its cause eliminated, the controller can be reset by pressing the *on/off* key.

1. How to reset the alarms



The printed symbols show the functions activated by pressing the mode and *on/off* key at the same time with cycle rotation. As described previously, the key carries out two separate functions. If pressed for 1 second, it acts as an "alarm reset". If depressed for 2 seconds, it turns the controller "on-off".

MONITORING SYSTEM

DESCRIPTION

- 1 If there is an operating fault, the controller will warn the user by flashing the activated alarm code.
- 2 Press the *on/off* key for 1 second to reset the controller and return to the normal operating mode.

DISPLAY



Alarm codes

The diagram below gives the alarm codes, the relative international identifying symbol and a description of the type of alarm involved. Two of the alarm codes handle several types of fault, i.e. they have several meanings. All the other alarms have only one meaning. Pay particular attention to code **E00**, since this is not an alarm that denotes a machine fault, but one that indicates that the remote on/off switch has been activated or the off status of the unit controlled by the programmer clock (accessory).

E00



Machine stand-by via remote control

E01



Activation of the maximum pressure switch

E01



Activation of thermal protector in compressor

E01



Power line phase presence and sequence monitoring device activation (if installed)

E01



Activation of the compressor delivery pipe temperature probe (if installed)

E02



Activation of the minimum pressure switch

E04



Condensation fan thermal protector activation

E05



Antifreeze safety procedure activation

E06



Exchanger water/air outlet temperature probe faulty (if installed)

E07



Coil probe faulty

E40



Exchanger water/air inlet temperature probe faulty (if installed)

E41



Water pump or internal fan thermal protector activation (if applicable)

E41



Activation of water differential pressure switch on plate-type heat exchanger or air flow switch sensor (if installed)

MONITORING SYSTEM

Menu structure

The menu in the system features a tree structure based on four different levels.

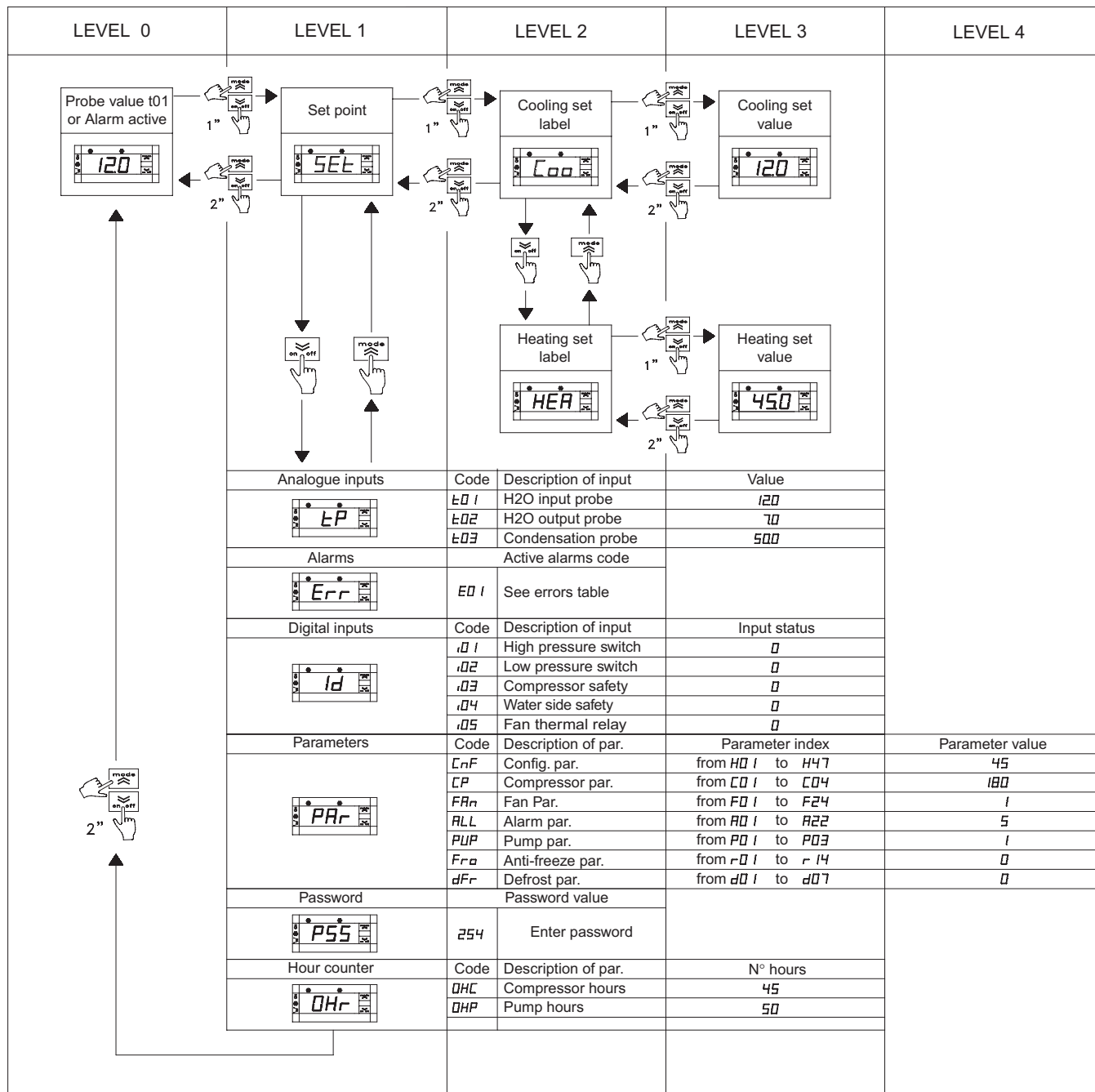
The values that the controller shows on the display during the normal operating mode are identified in **level 0**, i.e. the thermo-regulation temperature (temperature detected by probe "t01" on the exchanger inlet) or an alarm code.

The menu where the seven labels are displayed (titles) is accessed in **livello 1**.

The menus in **level 2** and, successively, in **level 3**, contain a sub-menu or the values in the open menu item.

Lastly, **level 4** contains parameter menu values only.

The diagram below illustrates the structure of the menu with all the parameters that form it.



NOTE: The values in the menu diagram are only indicative

SETTING AT WORK

General Rules

To validate the **contractual warranty**, the machine must be set at work **by technicians from an authorized assistance**. Before they are called, check to make sure that all parts of the installation have been completed, the unit levelled, the wet connections made with the relative air vent and the electrical connections made.

MAINTENANCE

General Rules

Maintenance is of extreme importance if the plant is to operate in a regular way and give fade-free service. Have extraordinary maintenance work done by qualified and authorized personnel. Comply with the safety precautions given in the relative section of this manual and take all the necessary precautions.

The following information is only a guide for the end user.

Routine maintenance

The simple inspections described below, to which the unit must be subjected, do not require specific technical know-how.

Call an authorized assistance center if actual maintenance work is required.

The table below gives a recommended list of inspections which should be carried out at the indicated intervals.

DESCRIPTION	WEEKLY	MONTHLY	EVERY SIX MONTHS
Visual inspection of the unit			•
Inspection of hydraulic circuit (if applicable)		•	
Inspection of electrical system		•	
Inspection of condensing system		•	
Inspection and adjustment of op. parameters	•		

• **Visual inspection of the structure of the unit**

When checking the condition of the parts that form the structure of the unit, pay particular attention to the parts liable to rust. If traces of rust are noted, they must be treated with rust-inhibitor paint in order to eliminate or reduce the problem.

Check to make sure that the external panels of the unit are well fixed.

Bad fixing gives rise to noise and abnormal vibrations.

• **Inspection of the hydraulic circuit (if the Condensing unit is connected to a water heat exchanger)**

Visually check to make sure that there are no leaks from the hydraulic circuit.

• **Inspection of electrical system**

Make sure that the power cable that connects the unit to the distribution panel is not torn, cracked or damaged in a way that could impair its insulation.

• **Inspection of the condensing system**

WARNING: The finned pack exchanger has fins made of aluminium or some other thin material, thus even accidental contact could cause cuts. Comply with the instructions in the relative section.

• Condensing coils

In view of the function of this component, it is very important for the surface of the exchanger to be as free as possible from clogging caused by items that could reduce the fan's air flow rate and, thus, the performances of the unit itself. The following operations may be required:

- Remove all impurities (such as paper scraps, leaves, etc.) that could be clogging the surface of the bank either by hand or using a brush (comply with the above mentioned safety prescriptions).

- If the dirt has deposited on the fins and is difficult to remove by hand, use a jet of compressed air or pressurized water on the aluminium surface of the coils, remembering to direct the jet in a vertical direction to prevent the fins from being damaged.

- "Comb" the coils with the relative tool, using the appropriate comb spacing for the fins if some parts of them are bent or squashed.

• Helical electric fans

Visually inspect these parts to make sure that the electric fans are well fixed to the bearing grille and that this latter is fixed to the structure of the unit. Bad fixing gives rise to noise and abnormal vibrations.

• **Reading and adjustment of the operating parameters**

This can only be done if the optional "Pressure gauge kit" is available (accessory supplied on request).

SAFETY AND POLLUTION

General considerations

The machine has been designed to reduce risks to persons and to the environment in which it is installed, to the minimum. To eliminate residue hazards, it is therefore advisable to become as familiar as possible with the machine in order to avoid accidents that could cause injuries to persons and/or damage to the property.

a. Access to the unit

Only qualified persons who are familiar with this type of machine and who are equipped with the necessary safety protections (footwear, gloves, helmet, etc.) may be allowed to access the machine. Moreover, in order to operate, these persons must have been authorized by the owner of the machine and be recognized by the Manufacturer itself.

b. Elements of risk

The machine has been designed and built so as not to create any condition of risk. However, residue hazards are impossible to eliminate during the planning phase and are therefore listed in the following table along with the instructions on how to neutralize them.

Part in question	Residue hazard	Mode	Precautions
Compressor and delivery pipe	Burns	Contact with the pipes and/or the compressor	Avoid contact by wearing protective gloves
Delivery pipes and bank	Explosion	Excessive pressure	Turn off the machine, check the high pressure switch and safety valve, the fans and condenser
Pipes in general	Ice burns	Leaking coolant	Do not exercise tension on the pipes
Electrical cables, metal parts	Electrocution, serious burns	Defective cable insulation, live metal parts	Adequate electrical protection; correctly ground the unit
Heat exchange bank	Cuts	Contact	Wear protective gloves
Electric fans	Cuts	Contact with the skin	Do not push the hands or objects through the fan grille

c. Pollution

The machine contains **R410A** coolant and lubricating oil. Thus, if the unit is scrapped, these fluids must be recovered and disposed of in accordance with the laws in force in the country where the machine is installed. **The machine must not be abandoned when scrapped.**

General recommendations about the coolant used

The cooling circuit of the machine is filled with **R410A** cooling gas. If it escapes, this gas will damage the atmospheric ozone. When no longer required for use, the machine must therefore be consigned to an authorized disposal center. Indications about the characteristics of this gas and how to act if it should accidentally escape are given below.

Danger indication

- Low toxicity.
- Inhalation of the gas for long periods can have anaesthetic effects.
- Prolonged exposure can alter the heart rate and cause death.
- The product can cause ice burns on the eyes and/or skin.

Limits to long-term professional exposure (LTEL)

R410A

Binary mixture of R-32 (50%) and R-125 (50%)

Dangerous component.....LTEL limit

	ppm
Difluoromethane CF ₂ H ₂	1000
Pentafluoroethane CF ₃ CHF ₂	1000

SAFETY AND POLLUTION

Handling

- Do not inhale refrigerant gas vapours.
- Concentrations of refrigerant gas vapours must be reduced to below the professional exposure limit.
- Ensure efficient ventilation near to the ground since the vapours are heavier than air.
- Prevent the refrigerant from coming into contact with naked flames and hot surfaces since irritating and toxic compounds can form. Do not smoke.
- Avoid contact with the eyes and skin.

Precautions to take if gas accidentally escapes

- Take adequate personal precautions (for the eyes, skin and respiratory tracts) when disposing of escaped gas.
- Isolate the leak source if the conditions are sufficiently safe.
- If the leak is small, allow it to evaporate while ensuring adequate ventilation.
- If the case of an extensive leak, pour sand, soil or other absorbent materials over and around it to prevent it from spreading, and adequately ventilate the area.
- Prevent coolant from infiltrating into sewers, basements, etc., since this could create a toxic atmosphere.
- Do everything necessary to prevent refrigerant from dispersing into the environment.

First aid

- Move the victim away from the toxic source, keep him warm and allow him to rest.
- Administer oxygen if necessary.
- Proceed with artificial respiration if necessary.
- Give heart massage in the case of heart failure.
- Immediately seek medical help.

Contact with the skin:

- Immediately thaw the affected parts under running lukewarm water.
- Remove contaminated clothing (garments may stick to the skin in the case of ice burns) if they have not adhered to the skin.
- Seek medical assistance if necessary.

Contact with the eyes:

- Immediately rinse the eyes with physiologic eyewash or clean water for at least 10 minutes with the eyelids pulled open.
- Seek medical assistance if necessary.

Swallowing:

- Do not make the victim vomit. If the victim is conscious, have him rinse his mouth out with clean water and then drink 200, 300 ml of water.
- Immediately seek medical help.
- Do not administer adrenaline or sympathomimetic drugs after exposure owing to the risk of cardiac arrhythmia.

For further information about the characteristics of the refrigerant, consult the technical briefs that can be obtained from manufacturers of refrigerant products.

The manufacturer declines all liability for inaccuracies in this manual when due to printing or typing errors.



Code 3QE23121



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