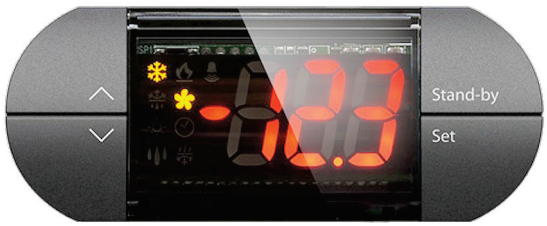
IDHD-Series

Industrial Dehumidifiers

130 to 3000 lpd | Basic Control | Advanced Control

IOM Manual



1 PREAMBLE

This manual indicates the intended use of the unit and provides instructions on transportation, installation, assembly, adjustment and use. It provides information on maintenance, ordering of spare parts, the presence of residual risks and personnel training.

The user manual must be read and used as follows:

- Every unit operator and the staff in charge must carefully read the entire manual and comply with the indications given;
- The employer is obliged to ensure that the operator possesses the skills required to operate the unit and has carefully read the manual; the employer must also provide the operator with details about the risk of accidents, especially those deriving from noise, about the personal protective equipment provided and the general accident prevention regulations, required by international laws or regulations or those applicable in the country of use.
- The manual must always be available to the user, managers and operators in charge of transportation, installation, use, maintenance, repairs and final dismantling.
- Keep the manual away from sources of humidity and heat and treat it as an integral part of the unit for its entire duration, passing on the manual to any other user or subsequent owner of the unit;
- Make sure that any update is included in the text;
- Under no circumstances are any parts of the manual to be removed, torn or rewritten. If the manual is mislaid or partially damaged and, therefore, the contents can no longer be fully read, a new manual should be requested from the manufacturer by communicating the serial number of the machine found on the data plate.

Pay utmost attention to the following symbols. Their purpose is to highlight specific information such as:

Dangerous situations that could arise while using the unit, in order to guarantee personal safety.

Dangerous situations that could arise while using the unit, in order to prevent damaging property and the unit itself.

Additional information or suggestions for the unit to be used correctly.

The manufacturer has the right to update the production and manuals, without being obliged to update previous versions, except for exceptional cases.
This manual reflects the applicable technology at the time the unit is sold and cannot be considered inadequate due to subsequent updates based on new technology.
For any requests for updates of the use and maintenance manual or supplements, which are to be considered an integral part of the manual, please refer to the contact information indicated in this manual.
Contact the manufacturer for further information and to submit any proposals on how to improve the manual.
The manufacturer kindly asks you to communicate the address of the new owner if the unit is passed on to third parties, in order to facilitate the forwarding of any supplements of the manual to the new user.

1.1 LIABILITY

The unit is covered by the warranty in accordance with the contractual agreements established at the time of sale.

The manufacturer is deemed exempt from any liability and obligation, and the warranty required by the sales contract will be voided for any accident or damage to persons or property, which may derive from:

- **failure to comply with the instructions provided in this manual regarding unit management, use, maintenance and accidents beyond the normal and proper use of the unit;**

- alterations made to the unit and safety devices without prior written authorisation from the manufacturer;
- attempts to perform the repairs yourself or by an unauthorised technician;
- failure to perform regular maintenance work or maintenance performed using non-original spare parts.

In any case, if the user attributes the accident to a defect in the unit, he must prove that the damage caused was a main and direct consequence of this “defect”.

1.2 OPERATING RULES

The operating rules described in this manual are an integral part of the unit supply.
These rules are also intended for operators previously trained specifically to operate this type of unit and contain all the necessary and important information for operating safely and optimal use of the unit.
Rushed and incomplete training leads to improvisation, which is the cause of many accidents.

Read carefully and comply strictly with the following recommendations before starting work:

the unit must be started up for the first time only by qualified personnel authorised by the manufacturer;

- When installing or servicing the unit, the rules indicated in this manual must be complied with, together with those on board the unit and, in any case, all necessary precautions must be taken;
- Potential accidents to persons and property can be prevented by following these technical instructions with reference to the Machinery Directive 2006/42/EC and subsequent amendments. In all cases, always comply with the national safety regulations;
- Do not remove or damage the safety devices, labels and notices, especially those imposed by law and replace them if no longer legible.

The Machinery Directive 2006/42/EC provides the following definitions:

DANGER ZONE:	*any zone within and/or around machinery in which a person is subject to a risk to his health or safety.*
EXPOSED PERSON:	*any person wholly or partially in a danger zone.*
OPERATOR:	*the person or persons installing, operating, adjusting, maintaining, cleaning, repairing or moving machinery.*

All the operators must comply with international accident prevention regulations and those applicable in the country of use in order to prevent potential accidents.

Please note that the European Union has issued certain Directives regarding health and safety of workers, including: Directive 89/391/EEC, 89/686/EEC, 89/654/EEC, 89/655/EEC, 89/656/EEC, 86/188/EEC, 92/58/EEC and 92/57/EEC, which every employer is obliged to comply with and enforce.

The units have been designed and built according to the current state-of-the-art and technical rules in force.
Applicable laws, provisions, regulations, decrees and directives for such machinery have been complied with.
The materials used and the parts of equipment, as well as production procedures, quality and control assurance comply with the highest standards of safety and reliability.
Unit performance, continuous operation and durability are maintained by using the above-mentioned materials and parts for the purposes specified in this user manual, handling them with due care and performing thorough maintenance and up-to-standard service.

1.3 INTENDED USE

The ID units are industrial dehumidifiers designed for use in environments where high humidity damages the structure or the product;
The SP units are dehumidifiers for swimming pools designed for use in environments where high humidity causes discomfort and where corrosive substances, such as chlorine, are present;
The IT units are industrial dehumidifiers with temperature control designed for use in environments where high humidity damages the structure or the product and where it is necessary to heat or cool the air;
The ST units are dehumidifiers for swimming pools with temperature control designed for use in environments where high humidity causes discomfort and where corrosive substances, such as chlorine, are present and it is necessary to heat or cool the air.

Its use is recommended within the operating limits indicated in this manual.

Install the unit in places where there is no risk of explosion, corrosion, fire and where there are no vibrations and electromagnetic fields. It is also prohibited to operate in any way other than that stipulated or disregard required safety operations.

The units are designed for use in swimming pools or places where substantial amounts of chlorine and other corrosive substances are used. It is extremely important to leave the unit switched on as much as possible to avoid the deposit of corrosive substances which could otherwise damage it.

- The unit will be turned off for routine and extraordinary maintenance; it is a good idea to carry out maintenance and turn it on again as soon as possible.
- Do not stop the unit for seasonal breaks.

1.4 RESIDUAL RISK AREAS

It has not been possible to eliminate certain residual risks during the design phase, found in some areas of the unit, or protect them with guards due to specific features of the unit. Every operator must be aware of the residual risks present in this unit and exercise extreme caution to avoid any accidents.

Residual risks:

- *risk of short circuit and fire caused by short circuit;*
- *risk of explosion due to the presence of pressurised circuits and risk of pollution due to the presence of refrigerant in the circuit;*
- *risk of burns due to the presence of very hot pipes:*
- *risk of shearing.*

1.5 INTERVENTION AND MAINTENANCE

It is important to remember that the user manual can never replace adequate user experience. This manual represents a reminder of the main activities to be performed by operators who have received specific training, for example by attending training courses held by the manufacturer, with reference to particular maintenance operations.

Carefully read the following recommendations:

- Constant, accurate preventive maintenance guarantees a high level of safety when operating the unit. Never postpone any repairs required which should be only be carried out by specialised personnel, using original spare parts.
- Plan each intervention carefully;
- The operator's workplace must be kept clean, tidy and free from objects that could hinder movements.
- Operators must not perform awkward operations, in uncomfortable positions, that could compromise their balance;
- Operators must pay attention to the risk of clothing and/or hair being caught or entangled in moving parts. A cap should be worn to keep long hair in place;
- Chains, bracelets and rings can also pose a hazard;
- The workplace must be adequately lit for the work to be carried out. Insufficient or excessive lighting can pose a risk;
- Wait about 10 minutes after switching the unit off before performing any maintenance in order to prevent burns;

- ***do not repair the high-pressure pipes with welding;***
- ***the fluids under pressure in the refrigerant circuit and the presence of electrical components may cause hazardous situations during installation and maintenance work;***

- Limit the amount of time the refrigerant circuit is open. Even if briefly exposed to air, oils tend to absorb large amounts of humidity, which results in the formation of weak acids;
- Only qualified personnel may perform work on the unit;
- Before performing any kind of work or maintenance on the unit, make sure it has been disconnected from the power supply;
- Make sure the safety devices function correctly and you have no doubts on how they work; otherwise, do not start-up the unit;
- Only use the tools indicated by the manufacturer of the unit. In order to prevent personal injury, do not use worn or damaged, poor quality or makeshift tools;

- ***once the unit has been cleaned, the operator must make sure there are no worn or damaged parts or others that are not fastened securely; otherwise, a maintenance technician should be contacted;***

- Always keep the unit installation area clean and tidy. Oil and grease stains, and scattered tools or broken parts are hazardous as staff could slip or fall;
- It is prohibited to use flammable fluids to clean the unit.

Do not use diesel, petroleum or solvents to clean the unit as they leave an oily film that encourages dust to settle, while solvents (even if weak) damage the paintwork and encourage the formation of rust. If a jet of water penetrates the electrical equipment, the contacts oxidise and the unit may malfunction. Therefore, do not use jets of water or steam on the sensors, connectors or any electrical part.

Make sure that the pressurised pipes, or other components subject to wear, are intact. Also make sure there are no leaking fluids or hazardous substances.
Should there be a leak, the operator must not restart the unit before having resolved the problem.

1.6 GENERAL SAFETY RULES

1.6.1 WEARING PROTECTIVE CLOTHING

Every operator must use personal protective equipment such as gloves, helmet, safety goggles, safety shoes and noise protection ear muffs.

1.6.2 FIRE EXTINGUISHER AND FIRST AID

Place a first aid kit and an extinguisher near the unit.
Periodically check that the fire extinguishers are loaded and all operators know how to use them.
If a fire breaks out, use the fire extinguisher according to the relative regulations in force and contact the fire brigade.
Periodically check that the first aid kit is complete.
Make sure the emergency telephone numbers are readily available and nearby.

AVVERTENZA
CAUTION

The owner of the property where the unit is installed is responsible for providing the fire extinguisher and the first aid kit.

1.6.3 MAINTENANCE AND INSPECTION WARNING SIGNS

Place a notice with the wording: “UNDER MAINTENANCE” on all sides of the unit.
Carefully check the unit according to the list of operations specified in this manual.

1.6.4 SAFETY WARNING SIGNS

Generic alarm

Electric voltage hazard

Risk of burns

Hazard: moving mechanical parts

Shearing risk

2 DESCRIPTION OF THE PRODUCT

The ID, SP, IT and ST series of dehumidifiers are designed for use in commercial and industrial settings and swimming pools with high latent pressure load where 24h/day operation is required. They are typically installed in places, such as swimming pools, dairies, basements, laundries, food seasoning chambers, warehouses and anywhere in general where the formation of condensation damages the structure or product.
The IT and ST units are suitable where, in addition to the dehumidifier, you need to control the temperature and either heat or cool it. This solution avoids the installation of two separate units (a dehumidifier and an HVAC), thus reducing purchase, maintenance and power consumption costs.
The ID, SP, IT and ST dehumidifiers combine avant-garde technical solutions with pleasing aesthetics.
These units have been designed to be connected to rigid ducts.
The exclusive use of high quality components in the refrigerant, hydraulic, air duct and electrical components makes these units state-of-the-art dehumidifiers in terms of efficiency, reliability and noise output. They have also been designed to allow easy inspection and maintenance work.
A large number of accessories also allow you to solve any type of request, and if the standard range and accessories do not meet the customer's needs, the Company is available to create specific solutions.

2.1 SERIES

There are 18 models to choose from, classified by frame and dehumidifying performance:

2.1.1 Frame 2

0130	0160	0190

2.1.2 Frame 3

0210	0260	0300

2.1.3 Frame 4

0350	0450	0580

2.1.4 Frame 5

0750	0950

2.1.5 Frame 6

1100	1400

2.1.6 Frame 7

1500	1700	1900	2200

2.1.7 Frame 8

3000

Units with the same frame have the same external measurements.
The numeric value indicates the dehumidification capacity in litres per day

2.2 INTERNAL COMPONENTS

2.2.1 Refrigerant circuits

The refrigerant circuit is constructed entirely in-house, using only major brand components, Cu-DHP quality copper pipes and qualified operators and processes in accordance with Pressure Equipment Directive 97/23/EC. All the machines are made with a single or dual refrigerant circuit with eco-friendly R410a refrigerant.

Refrigerant components:

- The compressors are scroll-type compressors by major international brands. The motors are thermally protected by an internal protection that controls the winding temperature and disables the power supply when needed.
- molecular sieve filter dryer,
- thermostatic valve,
- liquid indicator,
- solenoid valve shut-off valve,
- Schrader valve for checks and/or maintenance,
- heat exchanger coils, coils with surface treatment for greater resistance to corrosive atmospheres are used in the units for swimming pools.
- copper pipe and aluminium fin.

2.2.2 Ventilation

The ventilation is a conventional centrifugal type with standard or high pressure, or an advanced electronic type, therefore guaranteeing maximum efficiency in terms of operating costs and possibility of use;

- The standard centrifugal fans have forward-curve blades, directly connected to a belt drive and pulleys with an asynchronous electric motor.
- The advanced fans are radial with backward-curve blades, directly connected to an electric brushless motor with permanent magnets, thus guaranteeing lower power consumption and less noise emission.

With these fans, you also have an ACF option which allows the unit to automatically adjust to the flow of air without requiring manual adjustment with dampers and thus ensuring the planned flow rate.

2.3 STRUCTURE

The unit is manufactured to an exclusive design which not only makes it look aesthetically pleasing, but also allows total access to all the components when the unit is closed. This aspect together with the use of top-quality devices reduces the sound levels to an absolute minimum.
Most of the panels can be removed to allow complete access to the unit. For routine maintenance, access is required to the filters, fans and compressor compartment which is facilitated by removable panels, allowing unhindered work access.
All the screws and fasteners are made of non-oxidizing materials, stainless steel or carbon steels with surface passivation treatments.
The layout of the components guarantees easy access and optimal weight distribution on the base of the unit.

2.4 OPTIONS AVAILABLE

OPTIONS AND FUNCTIONS	ID - SP basic control	IT - ST basic control	ID - SP - IT - ST advanced control
External version	OPTION	OPTION	OPTION
Filter holder frame for ducted suction with G2 filters	OPTION	OPTION	OPTION
Filter holder frame for ducted suction with G4 filters	OPTION	OPTION	OPTION
Filter holder frame for ducted suction with F7 filters	OPTION	OPTION	OPTION
High efficiency, electronic, radial fans with inverter and brushless motor	—	—	OPTION
ACF = Automatic control flow	—	—	OPTION
High pressure centrifugal fans	OPTION	OPTION	OPTION
Water post-heating coil with modulating 3-way on/off valve	OPTION	—	—
Water post-heating coil with modulating 3-way valve	—	—	OPTION
Oversized water post-heating coil with modulating 3-way on/off valve	OPTION	—	—
Oversized water post-heating coil with modulating 3-way valve	—	—	OPTION
Water post-cooling coil with 3-way on/off valve	OPTION	—	—
Water post-cooling coil with modulating 3-way valve	—	—	OPTION
Desuperheater	OPTION	OPTION	OPTION
Desuperheater for pool water	OPTION	OPTION	OPTION
Dirty filter sensor	—	—	OPTION
Soft start	OPTION	OPTION	OPTION
Silent version with soundproofing of the compressor compartment	OPTION	OPTION	OPTION
Clock board - time bands	—	—	OPTION
Mechanical humidistat	OPTION	OPTION	—
Electronic timed hygrometer	OPTION	OPTION	—
Hot gas defrost	OPTION	OPTION	OPTION
Remote user terminal	—	—	OPTION
Pressure gauges	OPTION	OPTION	OPTION
Duct temperature and humidity sensor	—	—	OPTION
Electric post-heating coils	OPTION	—	OPTION
Modbus serial board	—	—	OPTION
Lonworks serial board	—	—	OPTION
Bacnet serial board	—	—	OPTION
Konnex serial board	—	—	OPTION
Swivel wheels	OPTION	—	OPTION
Thermal insulation 20 mm thickness	OPTION	OPTION	OPTION

2.4.1 Advanced control

Advanced control consists of a programmable board and a graphic display which allows a higher number of functions and options to be combined and a simpler, more complete user interface.
All the software for managing and optimising the refrigerant circuit, the electronic and electro-mechanical components is implemented and developed in-house by a highly specialised team.

Another advantage of the advanced control is that it allows numerous options to be installed which are not available for the basic control.

Personalised software is available on request in special version.

2.4.2 External version
The unit can be installed externally thanks to structural and electrical modifications, thus avoiding the need for a dedicated technical room.

This option combined with any of the water coils requires the advanced control.

2.4.3 Filter holder frame for ducted suction with G2 filters
It consists of a G2 filter and a frame inserted on the intake of the dehumidifier which makes it easier to connect to the suction ducts and remove the air filters when when the duct is installed.

2.4.4 Filter holder frame for ducted suction with G4 filters
It consists of a G4 filter and a frame inserted on the intake of the dehumidifier which makes it easier to connect to the suction ducts and remove the air filters when when the duct is installed.

2.4.5 Filter holder frame for ducted suction with F7 filters
It consists of a F7 filter and a frame inserted on the intake of the dehumidifier which makes it easier to connect to the suction ducts and remove the air filters when when the duct is installed.

2.4.6 High efficiency, electronic, radial fans with inverter and brushless motor
The electronic radial fans with backward-curved blades connected to a brushless motor and in-built inverter are the new standard in ventilation technology for industrial environments. These fans combine high aerodynamic efficiency with noise minimisation.
The in-built inverter means the number of revolutions can be modulated, which when combined with the ACF system makes it especially suited for installations where it is important to have accurate air flow control.

2.4.7 ACF: Automatic control flow
This option allows you to set a constant air flow in the unit and if a pressure loss occurs along the ducts which differs from the estimate by the system designer, the unit will automatically adjust to maintain the air flow requested, regardless of the shape, length and pressure loss of the duct.

This option is only available with high-efficiency, electronic radial fans with inverter and brushless motor.

2.4.8 High pressure centrifugal fans
On conventional centrifugal fans with a directly connected motor or belt drive, a high pressure option is possible to guarantee up to 200 Pa available on intake.
Higher pressures are available on request in special version.

2.4.9 Water post-heating coil with modulating 3-way on/off valve
It consists of a water post-heating coil with a 3-way on/off valve which heats the room thanks to the hot water from the boiler, following a range of temperatures set on the user control.
This option cannot be combined with electric post-heating coils, an oversized water post-heating coil with a 3-way on/off valve or a water post-cooling coil with a 3-way on/off valve.

2.4.10 Water post-heating coil with modulating 3-way valve
It consists of a water post-heating coil with a modulating 3-way valve which accurately heats the room thanks to the hot water from the boiler, following a range of temperatures set on the user control.
The modulating valve is not available for units up to model 300. An on/off valve is installed in its place.

2.4.11 Oversized water post-heating coil with modulating 3-way on/off valve
It consists of an oversized water post-heating coil with a modulating 3-way valve which accurately heats the room thanks to the hot water from a heat pump, following a range of temperatures set on the user control.
This option cannot be combined with electric post-heating coils, a water post-heating coil with a 3-way on/off valve or a water post-cooling coil with a 3-way on/off valve.

2.4.12 Oversized water post-heating coil with modulating 3-way valve
It consists of an oversized water post-heating coil with a modulating 3-way valve which accurately heats the room thanks to the hot water from a heat pump, following a range of temperatures set on the user control.
The modulating valve is not available for units up to model 300. An on/off valve is installed in its place.

2.4.13 Water post-cooling coil with 3-way on/off valve
It consists of a water post-cooling coil with a modulating 3-way valve which cools the room thanks to the cold water from the chiller, following a range of temperatures set on the user control.
This option cannot be combined with electric post-heating coils, a water post-heating coil with a 3-way on/off valve or an oversized water post-heating coil with a 3-way on/off valve.

2.4.14 Water post-cooling coil with modulating 3-way valve
It consists of a water post-cooling coil with a modulating 3-way valve which accurately cools the room thanks to the cold water from the chiller, following a range of temperatures set on the user control.

The modulating valve is not available for units up to model 300. An on/off valve is installed in its place.

2.4.15 Desuperheater
It consists of a brazed plate heat exchanger which can transfer the heat of the compressor into the water. It is ideal wherever water needs to be heated.

The desuperheater must not come into direct contact with the pool water and requires an intermediate exchanger.

2.4.16 Desuperheater for pool water
It consists of a tube-in-tube heat exchanger which can transfer the heat of the compressor into the water. It is ideal for public and private swimming pools where the pool water needs to be heated.

2.4.17 Dirty filter sensor
It consists of a differential pressure switch which detects when the filters are clogged, preventing the unit from working properly.
With this option, the filters are cleaned when indicated and not according to a set timetable.

2.4.18 Softstart
It consists of a softstart device for each compressor with the aim of reducing the inrush current on start-up, following a pre-set ramp.

2.4.19 Silent version with soundproofing of the compressor compartment
It allows the noise emitted by the compressor to be decreased and thus makes the dehumidifier particularly silent. It consists of a sound absorbing mat in the compressor compartment that attenuates the noise emitted by the compressor.

2.4.20 Clock board - time bands
It consists of an additional clock board and relevant control software which allows the dehumidifier to be operated according to daily time slots, by setting the values for humidity, temperature, and unit on-off.

2.4.21 Mechanical humidistat
This is a hygrometer which, when placed in the room and connected to the dehumidifier, activates dehumidification when the set humidity value is exceeded.

2.4.22 Electronic timed hygrometer
This is a wall-mounted room device and connected to the unit which takes a humidity reading and controls dehumidification. The humidity setting required can be fixed or associated with time slots.

2.4.23 Hot gas defrost
It consists of a gas valve that injects hot gas into the evaporator coil allowing quick defrost and extending the minimum temperature limit for the dehumidifier.

2.4.24 Remote user terminal
It consists of an additional, external, wall-mounted device which controls the functions of the dehumidifier. The built-in electronic control and the remote terminal are identical in size, appearance and electronics (hardware).

2.4.25 Pressure gauges
The units can be supplied with pressure gauges, one connected to the high pressure and one to the low pressure for each refrigerant circuit.
They allow you to instantly display the pressure levels for the circuit.

2.4.26 Duct temperature and humidity sensor
This is a temperature and humidity sensor pre-wired to the electrical panel and ready to be inserted in the extraction fan duct.

2.4.27 Electric post-heating coils
These are electric coils which heat the fresh air supply. Safety is guaranteed by a thermostat which immediately switches off the coils in the event of overheating and sets off an alarm.

It cannot be combined with water coils with the basic control unit.

2.4.28 Modbus serial board
There is a connection slot for a RS485 Modbus serial board allowing for supervision from a remote unit or a home automation system.
(additional information available on request from the technical department).

2.4.29 Lonworks serial board
There is a connection slot for a RS485 Lonworks serial board allowing for supervision from a remote unit or a home automation system. (additional information available on request from the technical department).

2.4.30 Bacnet serial board
There is a connection slot for a RS485 Bacnet serial board allowing for supervision from a remote unit or a home automation system. (additional information available on request from the technical department).

2.4.31 Konnex serial board
There is a connection slot for a RS485 Connex serial board allowing for supervision from a remote unit or a home automation system. (additional information available on request from the technical department).

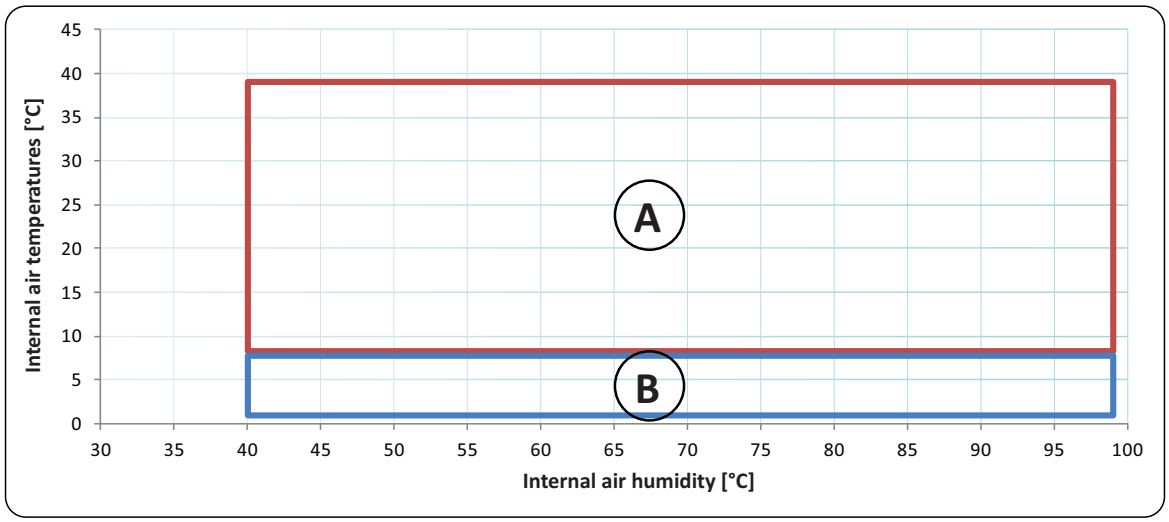
2.4.32 Swivel wheels
This option allows the unit to be easily, safely and effortlessly transported from one area to another.
This option is available up to model 0950.

2.4.33 Thermal insulation 20 mm thickness
Reduces the heat exchange between the outside and the air flow in the machine. This is made possible by inserting a thermal insulator inside the machine covering the entire frame.

2.5 OPERATING LIMITS

Outside the limits indicated below, unit operation is not guaranteed.

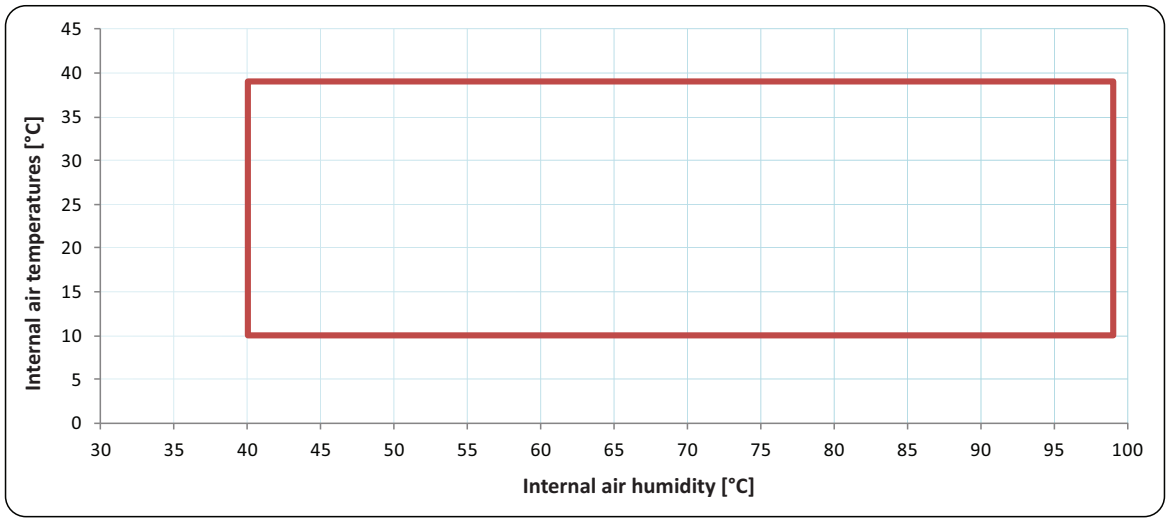
2.5.1 ID - IT



A Static defrost operational limit
B Additional operational limit with hot gas defrost option installation

The graph refers to the values read on the inlet side of the evaporating coil.

2.5.2 SP - ST



2.6 ELECTRIC CIRCUITS

The electric panel is built and wired in accordance with standard EN 60204-1. The control panel is protected by a magneto-thermic switch.
All the remote controls work with low voltage signals, powered by an isolation transformer.

ATTENZIONE
WARNING

Do not disconnect the unit by removing voltage through the protection upstream of the unit; this device must be used to disconnect the entire maintenance unit. To turn off, use the user terminal.

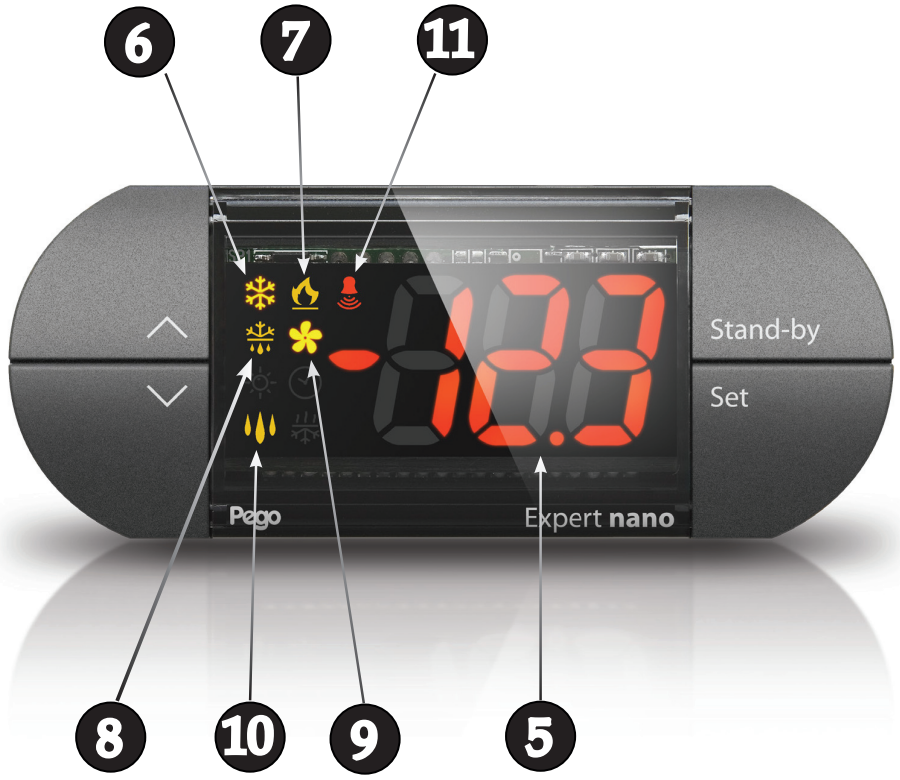
2.7 REFRIGERANT AND HYDRAULIC CIRCUITS

All the copper pipes are made to our specifications in order to maintain complete control over the construction process and implicitly improve the quality of our products. Every pipe meets the requirements laid down by Pressure Equipment Directive 97/23/EC and is checked by the FEM calculation method at the point of maximum stress on a 180° bend and the maximum pressure allowed by safety standards, taking into account appropriate safety coefficients.
All the units are fitted with a stainless steel condensate drip tray at the base of the exchangers.

3 BASIC USER TERMINAL

The controller governs all the machine functions and devices. Dehumidification is activated by the reading from an external hygrometer.
Remember that the compressor has a 5-minute delayed start or re-start setting to avoid any mechanical damage to inner parts. If the compressor does not start, wait a few minutes.
Any error or problem is displayed on the screen based on the troubleshooting table shown below.
By default, the fan is always on and does not depend on the compressor starting. This factory setting can be changed. Please refer to the installation section.

3.1 KEYS AND DISPLAY



UP (▲)

Increases the values/scrolls up the parameters; turns off an audible alarm if present.

DOWN (▼)

Decreases the values/scrolls down the parameters.

STAND-BY

Turns the unit on and off. At start-up, an audible alarm is given.

SET

Allows you to set the parameters.

5 Temperature values or parameters

6 Compressor icon

OFF	= compressor off
ON	= compressor on
FLASHING	= compressor off, in stand-by

7 Heating icon

OFF = heating off
ON = heating on

8 Defrost icon

OFF = defrost off
ON = defrost on

9 Ventilation icon

OFF = ventilation off
ON = ventilation on

10 Dehumidification request icon

ON = digital input on
FLASHING = digital input off

11 Alarm present icon

OFF = no alarm present
FLASHING = alarm present

3.2 MAIN COMMANDS

3.2.1 Switching on and off

The machine status is shown on the display, either ON or OFF
To switch it on or off, press the STAND-BY key.

3.2.2 Setting the desired temperature

The IT and ST units can heat and cool.
The ID and SP units with electric coils or post-heating water coils can heat.
In these cases, a required temperature value is set on the control unit which can be changed as follows:

- Hold down the UP (▲) and DOWN (▼) keys for 3 seconds to enter the user menu
- Use the UP (▲) and DOWN (▼) keys to go to SEc
- Hold down the SET key to display the temperature; press the UP (▲) and DOWN (▼) keys to modify the setting and release the SET key to exit edit mode.
- Hold down the UP (▲) and DOWN (▼) keys for 3 seconds to exit the menu

3.3 USER MENU

In the user menu, you can read the temperature sensors, change the required temperature and view the software release.

To access the user menu:

- Hold down the UP (▲) and DOWN (▼) keys for 3 seconds. When you enter the menu, there is an audible beep.
- Use the UP (▲) and DOWN (▼) keys to select the variable to view or modify
- You can now modify the value by holding down the SET key and pressing the UP (▲) or DOWN (▼) key.
- To exit the menu, hold down the UP (▲) and DOWN (▼) keys for 3 seconds or wait 30 seconds without pressing any keys. You will hear a beep to confirm.

NAME	*DESCRIPTION*	*DEFAULT*
SEc	Setting the desired temperature	26.0 °C
tAC	Air temperature reading	Reading
tEU	Defrost temperature reading	Reading
rEL	Software release	Reading

3.4 OTHER FUNCTIONS

3.4.1 Manual defrost activation

If the temperature reading on the defrost sensor is below 5°C, you can manually activate defrosting by holding down the (▼) for 3 seconds which will be confirmed by an audible beep.

3.4.2 Forced manual defrost termination

During defrosting, press the (▼) key for 3 seconds to abort defrosting which will be confirmed by an audible beep.
This function cannot be activated from the programming menu.

4 ADVANCED USER TERMINAL

All the software for managing and optimising the refrigerant circuit, the electronic and electro-mechanical components is implemented and developed in-house by a highly specialised team.
The following functions are available:

- ON/OFF unit,
- ON/OFF dehumidify,
- setting humidity value (set humidity),
- setting required temperature value (set temperature) [optional],
- alarm display and incorrect phase sequence display,
- reading of all sensors,
- display of components status,
- time band control [optional]
- season selection: summer and winter [optional],
- display of clogged filters [optional],

4.1 USE OF BUTTONS

ARROW BUTTON ↑ ↓

To scroll the pages or change the selected value.

PRG BUTTON

To access the display page and change the advanced parameters.
A password must be entered.

ESC BUTTON

To exit without changing a value or go back to the previous page.

ENTER BUTTON ↵

To turn the unit on or off from the home page.
In the other pages, it allows you to enter and change a value or to confirm the change and go back to scrolling.

ALARM BUTTON

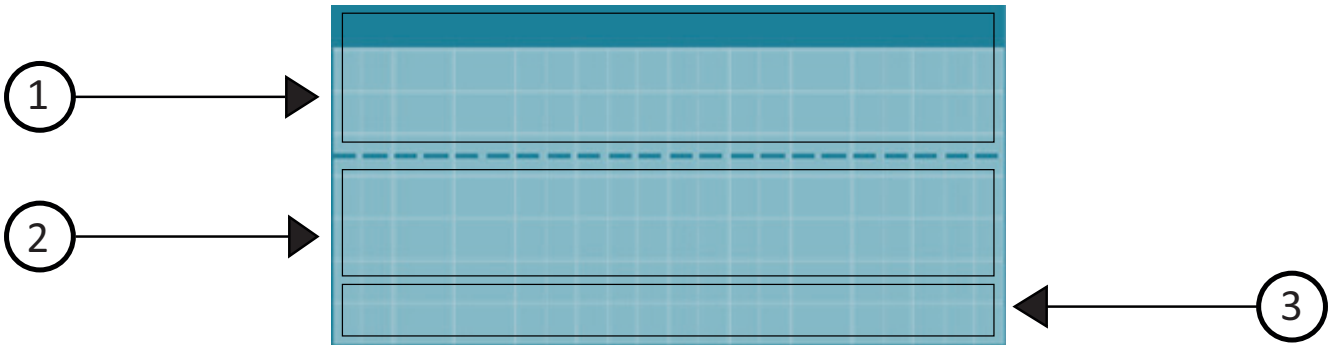
The ALARM button turns red if there is an alarm.
It allows you to access the alarm page:

- if there are no active alarms, it will display: no alarm present;
- if one or more alarms are active, a page will be displayed for each active alarm.

ATTENZIONE
WARNING

The images and illustrations on the following pages may all differ depending on the unit purchased, the options installed and any software changes implemented after this document has been published.

4.2 MAIN PAGE



1

Indication of dehumidifier status:

- unit ON
- unit OFF by display
- unit OFF by contact (switched off remotely)
- unit OFF by time bands
- unit OFF by serial (switched off remotely)

2

Information on the current operational state of the unit:

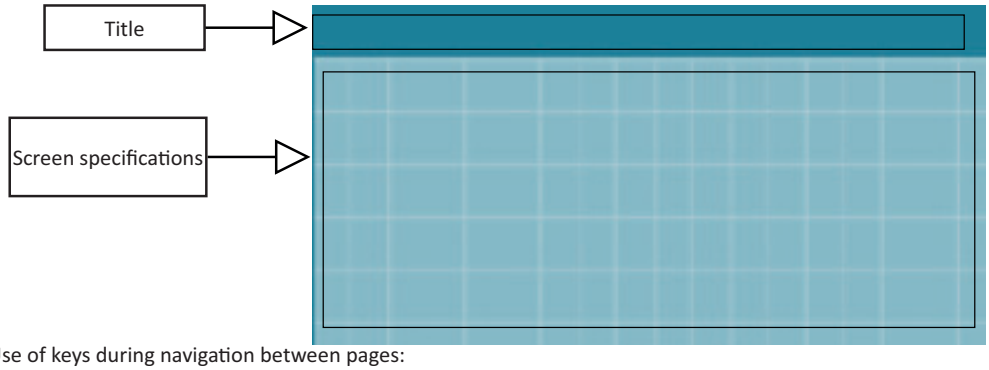
- *unit starting: unit start-up procedure*
- *ventilation: the compressor is idle and the unit is in ventilation mode only*
- *dehumidification: the unit is in dehumidification and is working regularly*
- *compressor shutdown for __: there is a fault in the refrigerant circuit, refer to the section on malfunctions and faults*

3

Indication of one of the following faults (refer to the section on malfunctions and faults):

- *clogged filters: the air filter is dirty or clogged*
- *fault probe __: fault of a probe in the unit*
- *phase sequence error: the phases are inverted or a power phase is missing*

4.3 OTHER USER PAGES



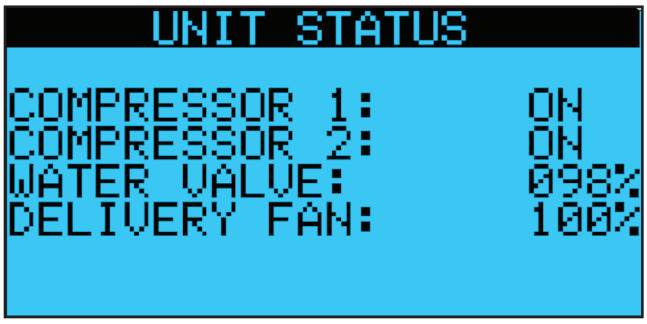
Use of keys during navigation between pages:

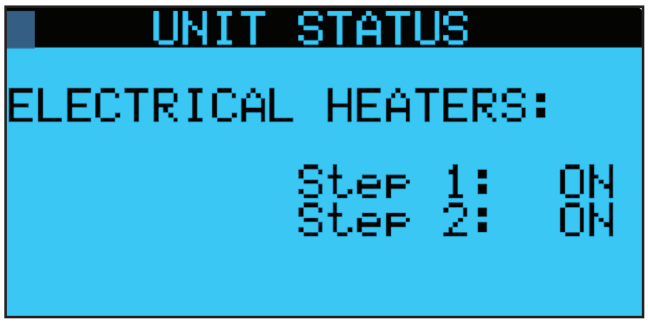
- press the ↑ ↓ keys to scroll through the pages
- press the **Esc** key to return to the home page

Every single page is explained below:

- unit status
- sensors
- adjustments
- clock/time bands
- flow rate
- software info

4.3.1 Unit status





The pages are display-only and allow you to check the state of the dehumidifier.

press the ↓ key and this screen will be displayed from the home page where the states of the following devices will be displayed:

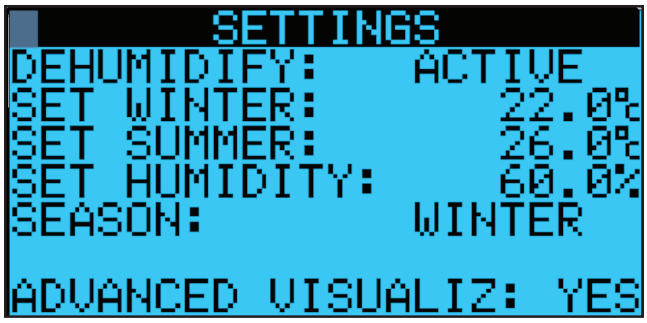
- Compressors
- Fans
- Hot water valve *
- Electric elements *

** states shown only if the relevant option has been purchased*
The second page is shown only if the relevant option has been purchased

4.3.2 Sensors

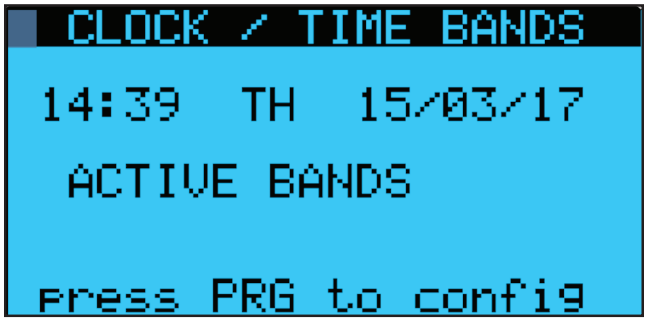
The page is display-only and allows you to view the values read from the sensors.

4.3.3 Regulations



This page allows you to modify the unit settings, refer to the next paragraph.

4.3.4 Clock/time bands



The page is present only if the clock board has been purchased.

AVVERTENZA
CAUTION

Use of the keys during navigation:

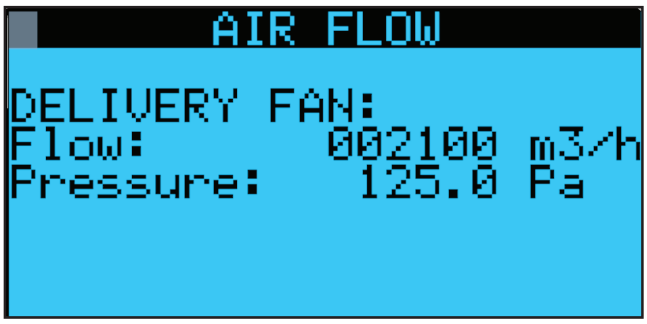
- press the **Enter** ↵ key for edit mode and the time bands flash
- press the ↑ ↓ keys to scroll through the pages
- press the **Esc** key to return to the home page
- press the **Prg** key to access the clock and time bands settings page (additional information in the specific paragraph)

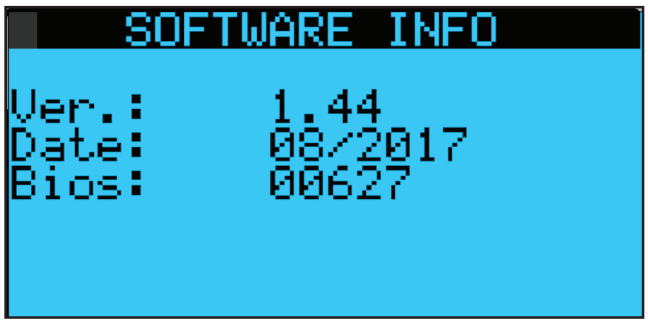
AVVERTENZA
CAUTION

Use of the keys during edit:

- press the **Enter** ↵ key to exit edit mode and go back to navigation page
- with the ↑ ↓ keys you can modify the time band activation
- press the **Esc** key to exit edit and go back to the navigation page
- press the **Prg** key to access the clock and time bands settings page (additional information in the specific paragraph)

4.3.5 Other information pages





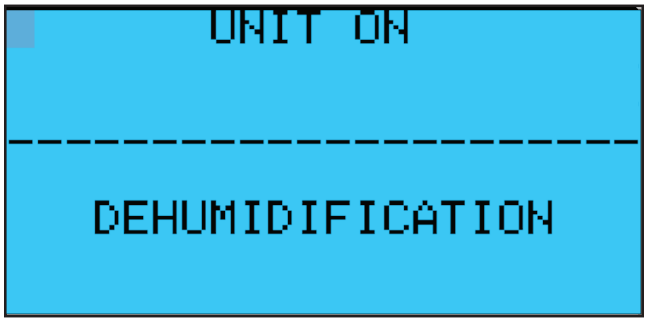
These pages are display-only. They are shown only if advanced display is activated.

- FLOW RATE: only displayed if the ACF option is present. The effective flow rate and the pressure measured by the transducer are shown
- SOFTWARE INFO: indicates the software version installed and the development date.

4.4 CONTROLS

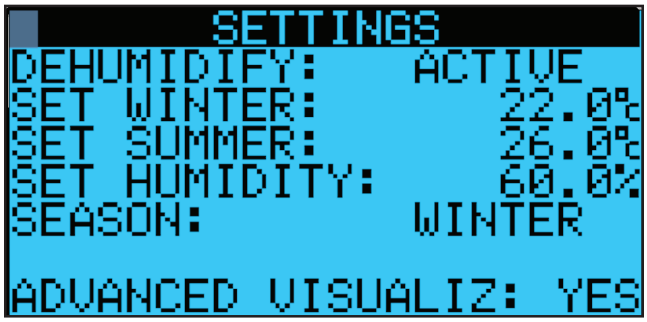
4.4.1 Switching on and off

- from the home page, use the **Enter** ↵ key to switch on or off



4.4.2 Setting the operational values

- from the home page, use the ↑ ↓ keys scroll to the settings page



AVVERTENZA
CAUTION

Use of the keys during navigation:

- press the **Enter** ↵ key to edit the settings and the first value flashes
- press the ↑ ↓ keys to scroll through the pages
- press the **Esc** key to return to the home page

AVVERTENZA
CAUTION

Use of the keys during edit:

- when you press the **Enter** ↵ key, the next value flashes or if it is the last value, you return to the navigation page
- use the ↑ ↓ keys to change the value that is flashing
- press the **Esc** key to return to the navigation page

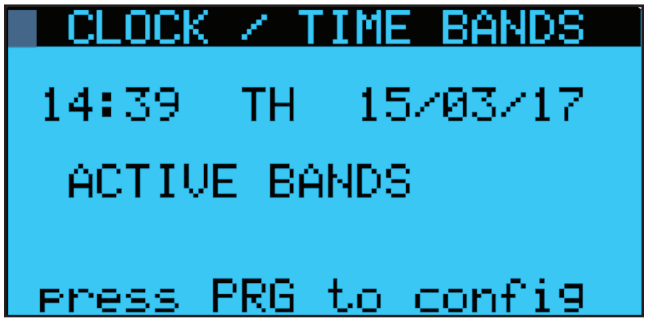
Let's take a look in detail at what can be modified:

- enable or disable dehumidification
- set the desired temperature in winter mode
- set the desired temperature in summer mode
- set the desired humidity
- set the season (the summer setting will not appear if not present and you can only set the winter mode)
- set the advanced display (the last two pages of the user menu will be displayed)

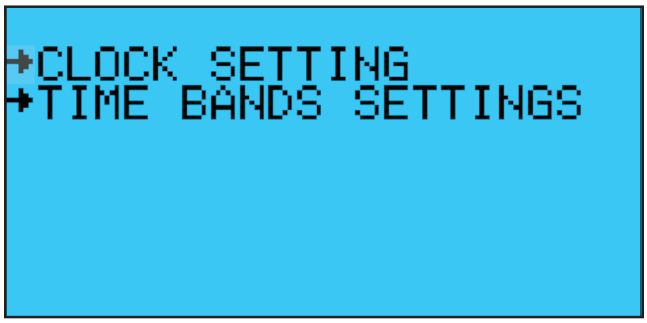
Some settings will only be displayed if certain options are installed

4.5 TIME BAND SETTINGS

From the home page, with the ↑ ↓ keys, scroll through the pages and go to the CLOCK/TIME BANDS page



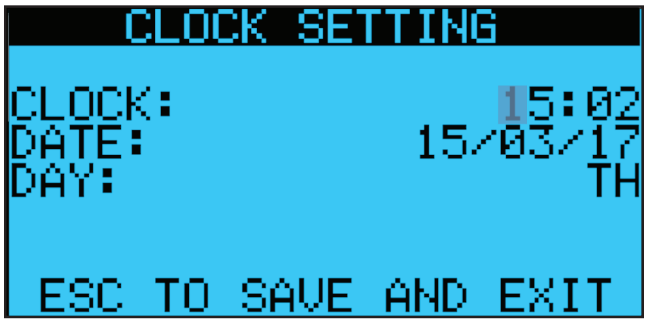
Press **Prg**



You are in the settings page, here you can set the time and then configure the time bands.
Both settings are shown below

4.5.1 Adjusting the time

With the ↑ ↓ keys, move to ADJUST TIME and press **Enter** ↵



AVVERTENZA
CAUTION

Use of keys:

- with the ↑ ↓ keys, you can change the flashing value
- press the **Enter** ↵ key to move to the next value
- press the **Esc** key to exit and return to the previous page

4.5.2 Adjusting the time bands

The control manages the time slots in 2 programs: weekdays and weekends.
Each program allows you to manage the settings for on/off, temperature and humidity.
Once you have finished changing the two programs, you must assign a program to each day of the week.

With the ↑ ↓ keys, move to ADJUST TIME and press **Enter** ↵

AVVERTENZA
CAUTION

Use of the keys during navigation:

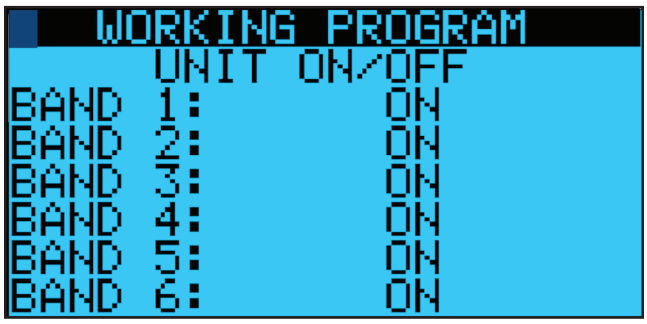
- use the ↑ ↓ keys to scroll through the pages.
- press the **Enter** ↵ key to edit the settings and the first value flashes
- press the **Esc** key to return to the home page

AVVERTENZA
CAUTION

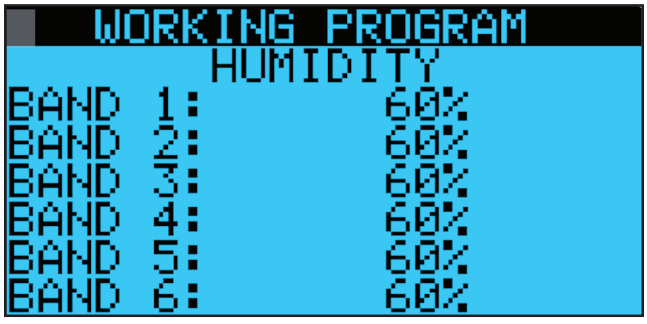
Use of the keys during edit:

- use the ↑ ↓ keys to change the value that is flashing
- when you press the **Enter** ↵ key, the next value flashes or if it is the last value, you return to the navigation page
- press the **Esc** key to return to the navigation page

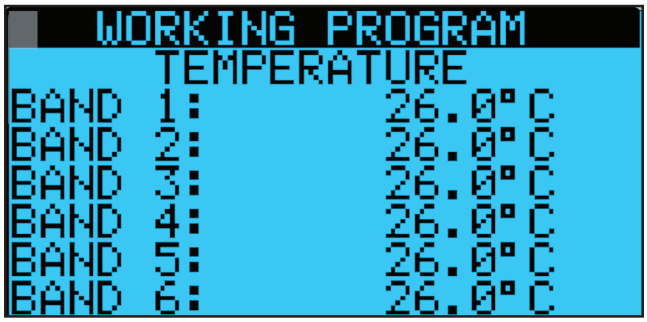
You are on the home page, from here you can set the duration of each single time band for the weekday program.



On the second page, you can set the start and end time for the unit for each time band



On the third page, you can set the humidity level for each time band



On the fourth page, you can set the temperature for each time band
This page only appears if at least one temperature control option is present

All the settings pages for the weekends are shown below which are the same as the pages for the weekdays.

The final page allows you to assign a program to each day of the week.

Once all the settings have been completed, you can exit by pressing the **Esc** key several times

AVVERTENZA
CAUTION

Remember to enable the time bands, see the previous paragraph

5 TECHNICAL DATA

5.1 TECHNICAL DATA TABLE

5.1.1 Frame 2

Model	um	130	160	190
Compressor	type	rotary	rotary	scroll
Refrigerant circuits	no.	1	1	1
Refrigerant	type	R410A	R410A	R410A
Dehumidification capacity	L/24h	128	157	190
Cooling capacity (IT - ST only)	kW	6,5	8	10
Compressor power	kW	1,4	2,1	3,4
Compressor current	A	6,3	9,7	16,8
Absorbed power with standard centrifugal fans	kW	1,7	2,5	3,8
Absorbed current with standard centrifugal fans	A	7	11	18
Absorbed power with high pressure centrifugal fans	kW	1,6	2,4	3,7
Absorbed current with high pressure centrifugal fans	A	7	11	18
Absorbed power with radial fans	kW	1,6	2,2	3,6
Absorbed current with radial fans	A	7	10	17
Maximum power absorbed	kW	2,5	3,6	5,3
Maximum current absorbed	A	11	16	25
Inrush current	A	40	65	100
Power supply	V/Ph/Hz	230 / 1~ + N / 50		
Heating capacity hot water coil	kW	9,8	9,8	9,8
Nominal flow water coil	m^3/h	0,84	0,84	0,84
Loss of water pressure	kPa	38	38	38
Blower fans	no.	1	1	1
Recirculation air flow rate	m^3/h	1200	1600	1600
Static pressure with standard centrifugal fans	Pa	50	50	50
Static pressure with high pressure centrifugal fans	Pa	100	130	130
Static pressure with radial fans	Pa	450	400	400
Desuperheater heating capacity	kW	2	2,5	2,8
Desuperheater water flow rate	m^3/h	0,35	0,43	0,48
Dimensions (base x depth x height)	mm	700 x 550 x 900		
Weight	Kg	100	105	110
External unit (IT- ST only)				
Maximum power	kW	0,17	0,17	0,17
Maximum current	A	1,35	1,35	1,35
Power supply	V/Ph/Hz	230 / 1~ + N / 50		
Dimensions (base x depth x height)	mm	748 x 404 x 575		
Weight	Kg	24	24	24

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.1.2 Frame 3

Model	um	210	260	300
Compressor	type	scroll	scroll	scroll
Refrigerant circuits	no.	1	1	1
Refrigerant	type	R410A	R410A	R410A
Dehumidification capacity	L/24h	210	268	302
Cooling capacity (IT - ST only)	kW	11	15	16
Compressor power	kW	3,2	4,1	4,2
Compressor current	A	6,1	7,4	7,6
Absorbed power with standard centrifugal fans	kW	3,7	4,8	4,9
Absorbed current with standard centrifugal fans	A	8	10	10
Absorbed power with high pressure centrifugal fans	kW	3,5	4,8	4,9
Absorbed current with high pressure centrifugal fans	A	7	10	10
Absorbed power with radial fans	kW	3,4	4,5	4,7
Absorbed current with radial fans	A	6	8	8
Maximum power absorbed	kW	5,5	6,8	7
Maximum current absorbed	A	10	14	15
Inrush current	A	51	68	68
Power supply	V/Ph/Hz	400 / 3~ + N / 50		
Heating capacity hot water coil	kW	16,5	17	17
Nominal flow water coil	m^3/h	1,42	1,46	1,46
Loss of water pressure	kPa	30	31	31
Blower fans	no.	1	1	1
Recirculation air flow rate	m^3/h	2000	2800	2800
Static pressure with standard centrifugal fans	Pa	50	50	50
Static pressure with high pressure centrifugal fans	Pa	100	100	100
Static pressure with radial fans	Pa	550	350	350
Desuperheater heating capacity	kW	2,9	4,6	4,8
Desuperheater water flow rate	m^3/h	0,5	0,8	0,8
Dimensions (base x depth x height)	mm	700 x 850 x 900		
Weight	Kg	120	130	140
External unit (IT- ST only) – Maximum power	kW	0,34	0,34	0,34
External unit (IT- ST only) – Maximum current	A	2,7	2,7	2,7
External unit (IT- ST only) – Power supply	V/Ph/Hz	230 / 1~ + N / 50		
External unit (IT- ST only) – Dimensions (base x depth x height)	mm	1303 x 404 x 575		
External unit (IT- ST only) – Weight	Kg	34	34	34

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.1.3 Frame 4

Model	um	350	450	580
Compressor	type	scroll	scroll	scroll
Refrigerant circuits	no.	1	1	1
Refrigerant	type	R410A	R410A	R410A
Dehumidification capacity	L/24h	358	452	581
Cooling capacity (IT - ST only)	kW	19	23	30
Compressor power	kW	4,2	5,1	7,7
Compressor current	A	7,6	9	13,7
Absorbed power with standard centrifugal fans	kW	5,2	6	8,8
Absorbed current with standard centrifugal fans	A	12	13	18
Absorbed power with high pressure centrifugal fans	kW	4,7	5,9	8,9
Absorbed current with high pressure centrifugal fans	A	10	13	19
Absorbed power with radial fans	kW	4,6	5,5	8,3
Absorbed current with radial fans	A	8	9	14
Maximum power absorbed	kW	8,5	10	13,4
Maximum current absorbed	A	16	18	24
Inrush current	A	69	72	102
Power supply	V/Ph/Hz	400 / 3~ + N / 50		
Heating capacity hot water coil	kW	26,5	26,5	27
Nominal flow water coil	m^3/h	2,28	2,28	2,32
Loss of water pressure	kPa	40	40	40
Blower fans	no.	1	1	1
Recirculation air flow rate	m^3/h	3800	4000	4800
Static pressure with standard centrifugal fans	Pa	50	50	50
Static pressure with high pressure centrifugal fans	Pa	130	110	130
Static pressure with radial fans	Pa	550	540	450
Desuperheater heating capacity	kW	4,3	5,8	8,1
Desuperheater water flow rate	m^3/h	0,7	1	1,4
Dimensions (base x depth x height)	mm	830 x 850 x 1350		
Weight	Kg	220	230	240
External unit (IT- ST only) – Maximum power	kW	0,34	0,51	0,51
External unit (IT- ST only) – Maximum current	A	2,7	4	4
External unit (IT- ST only) – Power supply	V/Ph/Hz	230 / 1~ + N / 50		
External unit (IT- ST only) – Dimensions (base x depth x height)	mm	1303 x 404 x 575	1858 x 404 x 575	
External unit (IT- ST only) – Weight	Kg	42	58	64

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.1.4 Frame 5

Model	um	750	950
Compressor	type	scroll	scroll
Refrigerant circuits	no.	1	1
Refrigerant	type	R410A	R410A
Dehumidification capacity	L/24h	760	955
Cooling capacity (IT - ST only)	kW	38	50
Compressor power	kW	9	11,6
Compressor current	A	17	22
Absorbed power with standard centrifugal fans	kW	10	13,2
Absorbed current with standard centrifugal fans	A	19	24
Absorbed power with high pressure centrifugal fans	kW	10,6	13
Absorbed current with high pressure centrifugal fans	A	21	27
Absorbed power with radial fans	kW	9,8	12
Absorbed current with radial fans	A	18	23
Maximum power absorbed	kW	16,3	20
Maximum current absorbed	A	29	35
Inrush current	A	153	203
Power supply	V/Ph/Hz	400 / 3~ + N / 50	
Heating capacity hot water coil	kW	48	55
Nominal flow water coil	m^3/h	4,13	4,73
Loss of water pressure	kPa	36	38
Blower fans	no.	1	1
Recirculation air flow rate	m^3/h	7000	8200
Static pressure with standard centrifugal fans	Pa	130	130
Static pressure with high pressure centrifugal fans	Pa	250	250
Static pressure with radial fans	Pa	450	400
Desuperheater heating capacity	kW	11,5	14,5
Desuperheater water flow rate	m^3/h	2	2,5
Dimensions (base x depth x height)	mm	1000 x 1400 x 1350	
Weight	Kg	410	430
External unit (IT- ST only) – Maximum power	kW	1,02	1,02
External unit (IT- ST only) – Maximum current	A	8,1	8,1
External unit (IT- ST only) – Power supply	V/Ph/Hz	230 / 1~ + N / 50	
External unit (IT- ST only) – Dimensions (base x depth x height)	mm	1858 x 404 x 1130	
External unit (IT- ST only) – Weight	Kg	102	128

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.1.5 Frame 6

Model	um	1100	1400
Compressor	type	scroll	scroll
Refrigerant circuits	no.	2	2
Refrigerant	type	R410A	R410A
Dehumidification capacity	L/24h	1120	1350
Cooling capacity (IT - ST only)	kW	56	66
Compressor power	kW	6	7,2
Compressor current	A	11,4	14,3
Absorbed power with standard centrifugal fans	kW	14	16,8
Absorbed current with standard centrifugal fans	A	26	32
Absorbed power with high pressure centrifugal fans	kW	14	17
Absorbed current with high pressure centrifugal fans	A	31	38
Absorbed power with radial fans	kW	13	15,9
Absorbed current with radial fans	A	24	31
Maximum power absorbed	kW	23	26,6
Maximum current absorbed	A	43	50
Inrush current	A	126	173
Power supply	V/Ph/Hz	400 / 3~ + N / 50	
Heating capacity hot water coil	kW	76	83
Nominal flow water coil	m^3/h	6,54	7,14
Loss of water pressure	kPa	55	58
Blower fans	no.	2	2
Recirculation air flow rate	m^3/h	11000	12500
Static pressure with standard centrifugal fans	Pa	200	200
Static pressure with high pressure centrifugal fans	Pa	300	300
Static pressure with radial fans	Pa	480	450
Desuperheater heating capacity	kW	14	18
Desuperheater water flow rate	m^3/h	2,4	3,1
Dimensions (base x depth x height)	mm	1000 x 1950 x 1640	
Weight	Kg	650	720
External unit (IT- ST only)			
Maximum power	kW	1,36	1,36
Maximum current	A	10,8	10,8
Power supply	V/Ph/Hz	230 / 1~ + N / 50	
Dimensions (base x depth x height)	mm	2413 x 404 x 1130	
Weight	Kg	147	147

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.1.6 Frame 7

Model	um	1500	1700	1900	2200
Compressor	type	scroll	scroll	scroll	scroll
Refrigerant circuits	no.	2	2	2	2
Refrigerant	type	R410A	R410A	R410A	R410A
Dehumidification capacity	L/24h	1480	1710	1870	2180
Cooling capacity (IT - ST only)	kW	75	86	96	110
Compressor power	kW	7,9	9	10	11,6
Compressor current	A	15	17	17,8	22
Absorbed power with standard centrifugal fans	kW	18	20	22	26
Absorbed current with standard centrifugal fans	A	34	39	40	50
Absorbed power with high pressure centrifugal fans	kW	19	21	23	27
Absorbed current with high pressure centrifugal fans	A	39	45	47	57
Absorbed power with radial fans	kW	17	19	21	25
Absorbed current with radial fans	A	32	36	37	46
Maximum power absorbed	kW	29	35	38	42
Maximum current absorbed	A	53	59	63	71
Inrush current	A	175	183	196	239
Power supply	V/Ph/Hz	400 / 3~ + N / 50			
Heating capacity hot water coil	kW	98	107	107	118
Nominal flow water coil	m^3/h	8,43	9,2	9,2	10,15
Loss of water pressure	kPa	60	63	63	68
Blower fans	no.	2	2 / 3	2 / 3	2 / 3
Recirculation air flow rate	m^3/h	13000	15000	15000	17000
Static pressure with standard centrifugal fans	Pa	200	200	200	200
Static pressure with high pressure centrifugal fans	Pa	300	300	300	300
Static pressure with radial fans	Pa	450	480	480	450
Desuperheater heating capacity	kW	19	22	25	29
Desuperheater water flow rate	m^3/h	3,2	3,8	4,3	5
Dimensions (base x depth x height)	mm	1000 x 2500 x 1640			
Weight	Kg	780	840	900	950
External unit (IT- ST only)					
Maximum power	kW	3,4	3,4	3,4	3,4
Maximum current	A	5,7	5,7	5,7	5,7
Power supply	V/Ph/Hz	400 / 3~ + N / 50			
Dimensions (base x depth x height)	mm	3800 x 900 x 1144			
Weight	Kg	332	332	332	332

The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

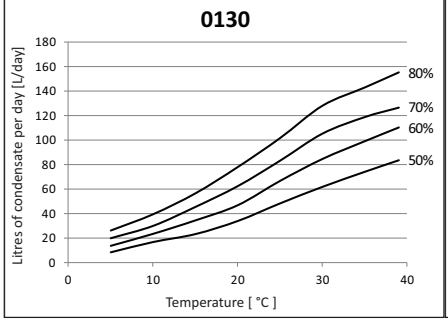
5.1.7 Frame 8

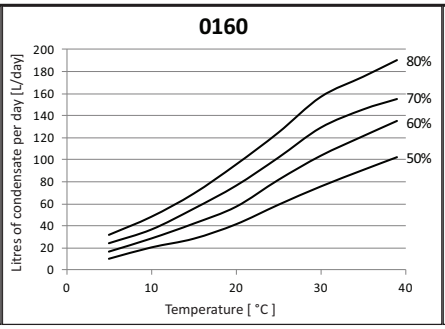
Model	um	3000
Compressor	type	scroll
Refrigerant circuits	no.	2
Refrigerant	type	R410A
Dehumidification capacity	L/24h	2960
Cooling capacity (IT - ST only)	kW	148
Compressor power	kW	15,1
Compressor current	A	25
Absorbed power with standard centrifugal fans	kW	35
Absorbed current with standard centrifugal fans	A	58
Absorbed power with high pressure centrifugal fans	kW	36
Absorbed current with high pressure centrifugal fans	A	79
Absorbed power with radial fans	kW	35
Absorbed current with radial fans	A	57
Maximum power absorbed	kW	62
Maximum current absorbed	A	107
Inrush current	A	273
Power supply	V/Ph/Hz	400 / 3~ + N / 50
Heating capacity hot water coil	kW	168
Nominal flow water coil	m^3/h	14,45
Loss of water pressure	kPa	60
Blower fans	no.	3 / 4
Recirculation air flow rate	m^3/h	25000
Static pressure with standard centrifugal fans	Pa	200
Static pressure with high pressure centrifugal fans	Pa	300
Static pressure with radial fans	Pa	400
Desuperheater heating capacity	kW	37
Desuperheater water flow rate	m^3/h	6,4
Dimensions (base x depth x height)	mm	1000 x 3390 x 1640
Weight	Kg	1250
External unit (IT- ST only) – Maximum power	kW	5,2
External unit (IT- ST only) – Maximum current	A	8,55
External unit (IT- ST only) – Power supply	V/Ph/Hz	400 / 3~ + N / 50
External unit (IT- ST only) – Dimensions (base x depth x height)	mm	5550 x 900 x 1144
External unit (IT- ST only) – Weight	Kg	535

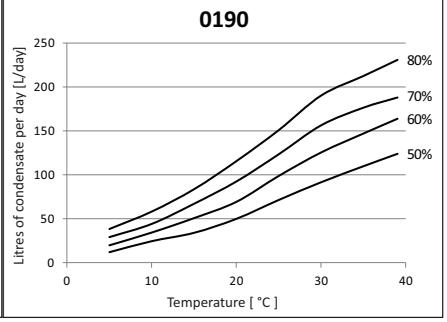
The dehumidification capacity, the cooling capacity, the currents and electrical power are declared with ambient air at 30°C/80% RH, with nominal flow rate + 50 Pa available; for the IT and ST models with external air at 30°C/50% RH.
The heating capacity of the hot water coil is declared with water in at 80°C and out at 70°C, air 30°C and nominal flow rate.
The water pressure drops are declared at nominal water flow rates.
The static pressures available are declared at the nominal air flow rate.

5.2 PERFORMANCE CURVE

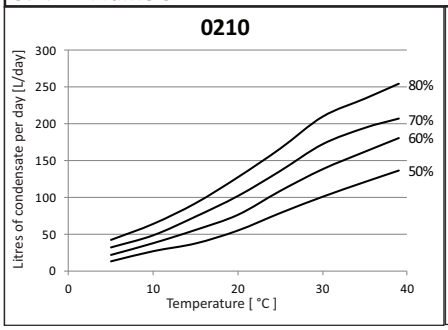
5.2.1 Frame 2

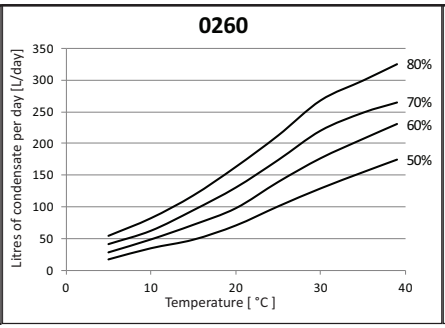


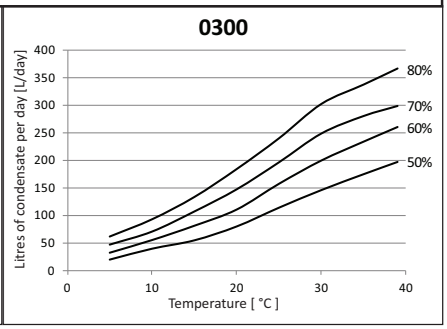




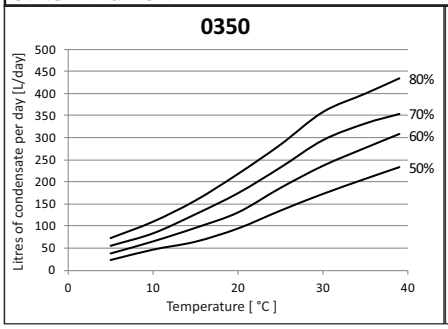
5.2.2 Frame 3

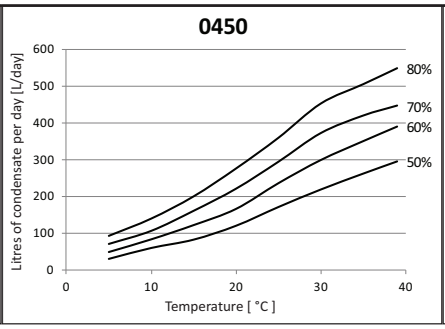


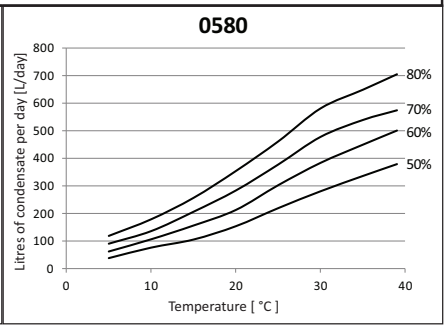




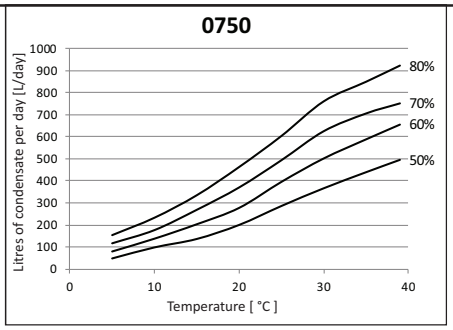
5.2.3 Frame 4

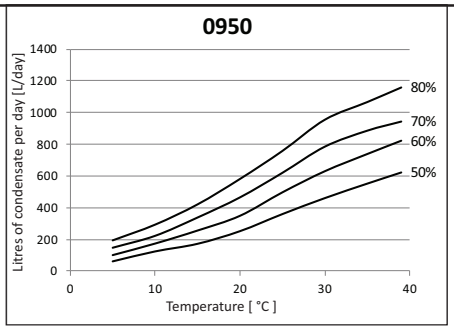




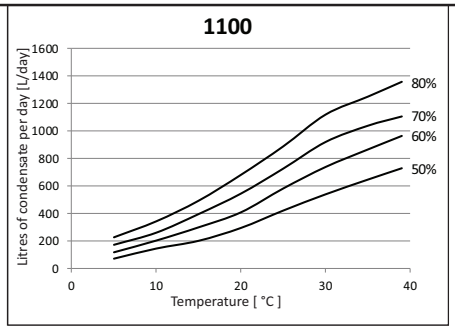


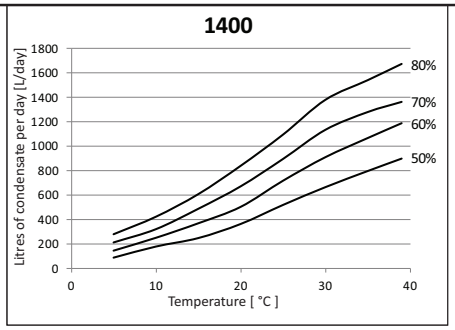
5.2.4 Frame 5



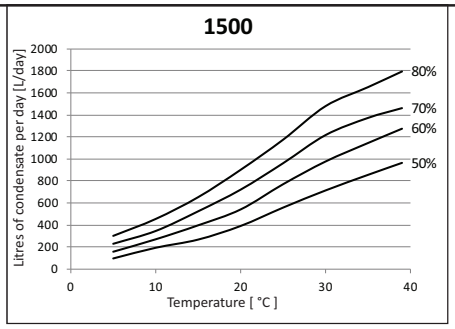


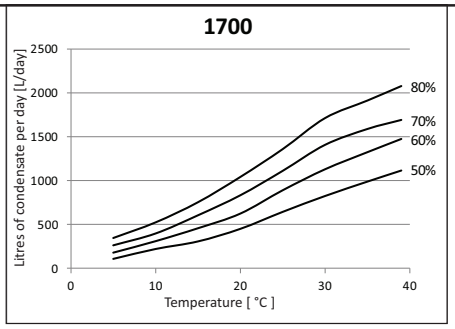
5.2.5 Frame 6

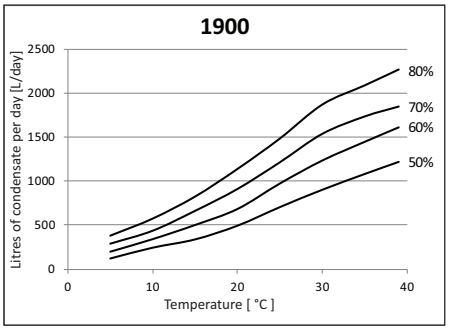


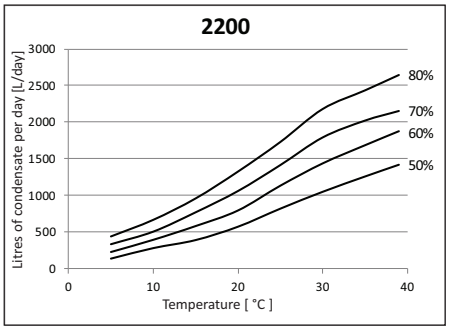


5.2.6 Frame 7

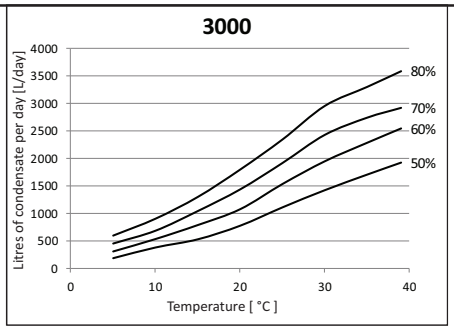






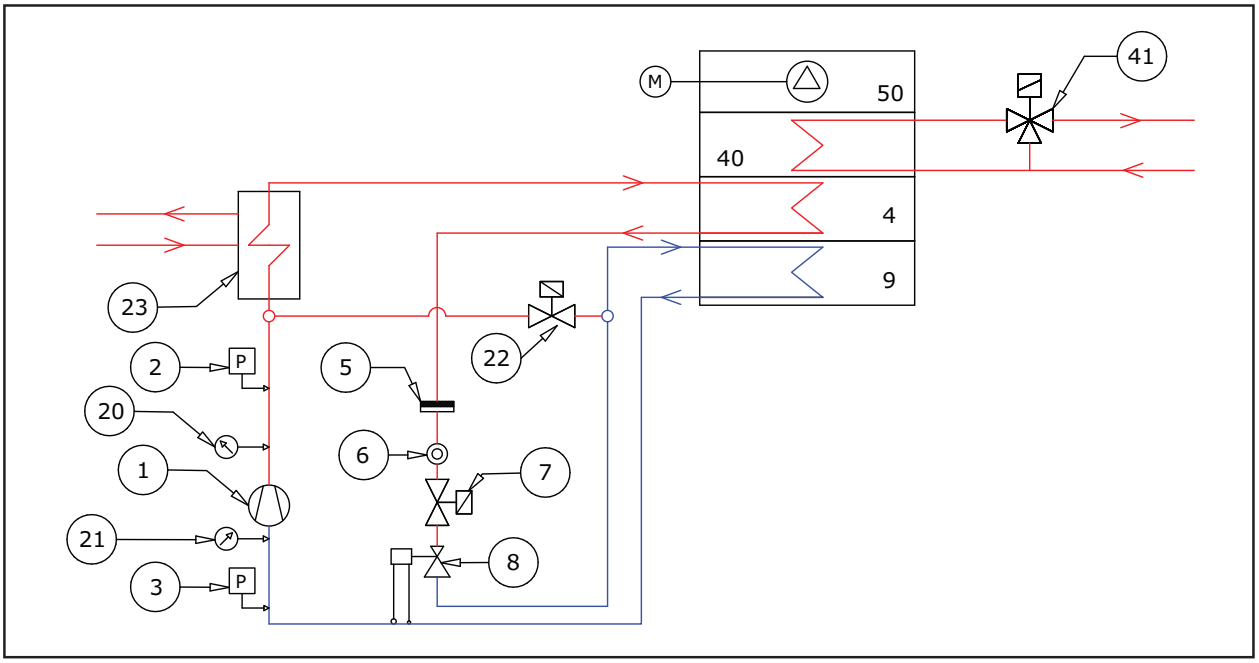


5.2.7 Frame 8

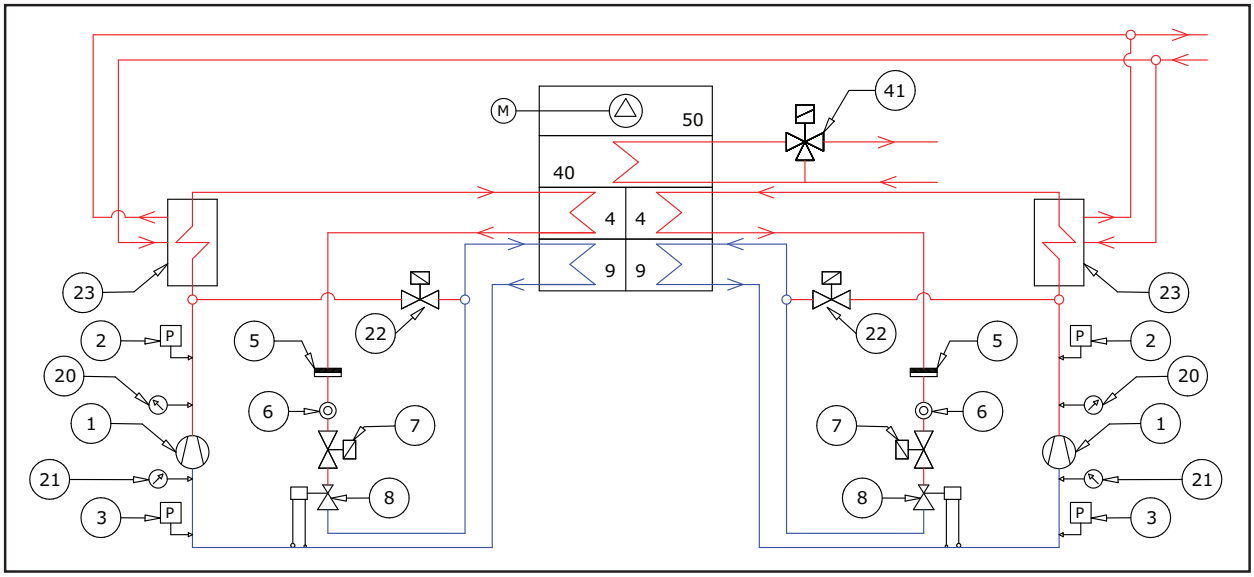


5.3 OPERATIONAL DIAGRAM

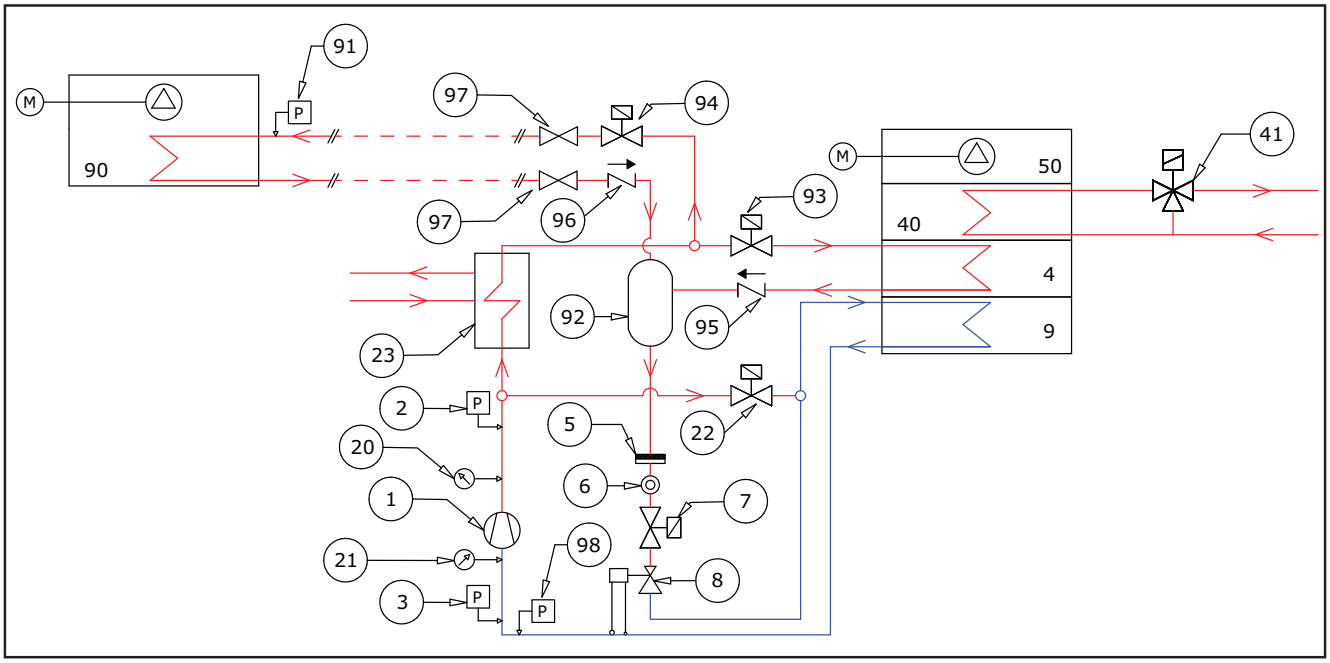
5.3.1 ID - SP single-circuit



5.3.2 ID - SP dual-circuit

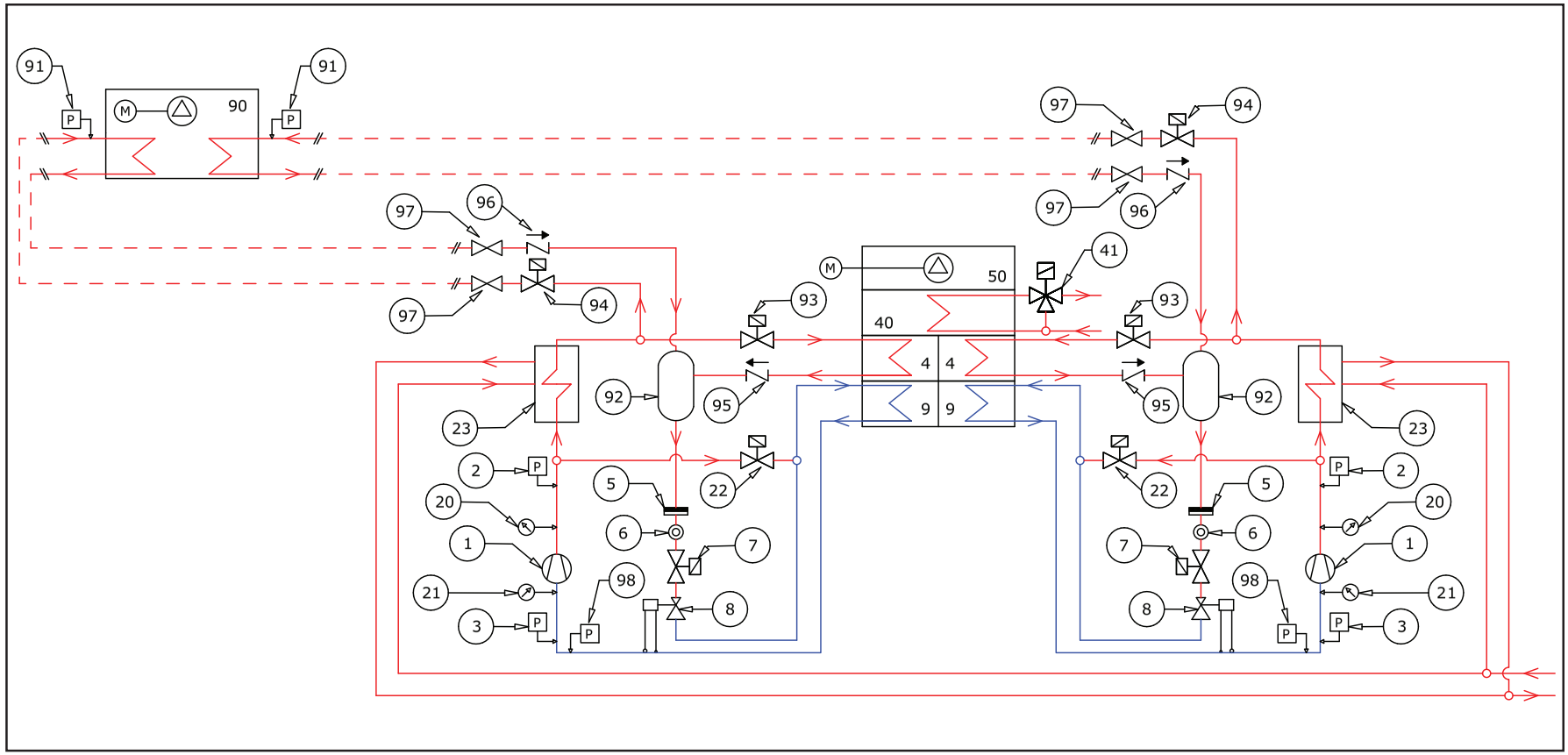


5.3.3 IT - ST single-circuit



1 compressor
2 high-pressure switch
3 low-pressure switch
4 condensing coil
5 dehydrating filter
6 flow indicator
7 liquid solenoid valve
8 thermostatic valve,
9 evaporating coil
20 high-pressure gauge [optional]
21 low-pressure gauge [optional]
22 hot gas defrost solenoid valve [optional]
23 desuperheater [optional]
40 water post-heating coil [optional]
41 3-way water valve [optional]
50 fan/fans
90 external condensate coil including fan
91 high-pressure transducer on external condenser
92 liquid receiver
93 solenoid valve for internal condenser
94 solenoid valve for external condenser
95 non-return valve on internal condenser
96 non-return valve on external condenser
97 gate valve
98 low pressure transducer

5.3.4 IT - ST dual-circuit



1	compressor
2	high-pressure switch
3	low-pressure switch
4	condensing coil
5	dehydrating filter
6	flow indicator
7	liquid solenoid valve
8	thermostatic valve,
9	evaporating coil
20	high-pressure gauge [optional]
21	low-pressure gauge [optional]
22	hot gas defrost solenoid valve [optional]
23	desuperheater [optional]
40	water post-heating coil [optional]
41	3-way water valve [optional]
50	fan/fans
90	external condensate coil including fan
91	high-pressure transducer on external condenser
92	liquid receiver
93	solenoid valve for internal condenser
94	solenoid valve for external condenser
95	non-return valve on internal condenser
96	non-return valve on external condenser
97	gate valve
98	low pressure transducer

6 POST SALES

6.1 TROUBLESHOOTING

6.1.1 Signalling faults

Alarms on the units with basic control are signalled when a red light, next to the control unit, comes on.
Alarms on the units with advanced control are signalled when the alarm bell button, next to the display, comes on.

6.1.2 Troubleshooting

On the next pages you will find a list of the most common reasons that may cause the unit to block or, at least, malfunction. They are listed according to the easily identifiable symptoms.

Take great care when performing the operations suggested for solving the various problems: lack of concentration can cause injuries, even serious ones. We recommend contacting the manufacturer or a qualified technician after having identified the cause.

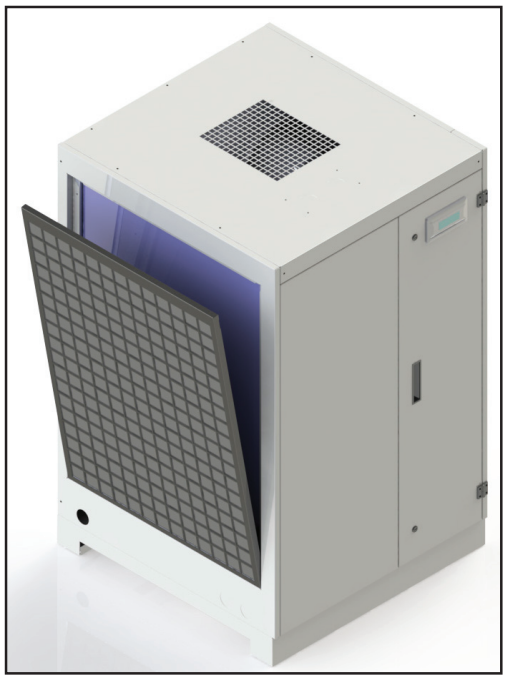
FAULT	*ANALYSIS OF POSSIBLE CAUSES*	*CORRECTIVE ACTIONS*
The unit does not start	No electrical power supply to the unit	Check its presence on the power supply terminals
	No power supply to the electronic board	Check its presence on the terminal boards
	There are alarms present	Check the presence of alarms on the terminal, eliminate the causes and restart the unit.
	Phase sequence relay cut-out (only on model 210)	Check if the sequence of phases is correct (refer to paragraph 8.5.1.)
The compressor does not start	Internal thermal protector cut-out	Unplug the unit, wait for the compressor to cool down and check to see if it restarts by reconnecting the power supply. Identify the cause of the intervention and eliminate it
	High-pressure protection on the refrigerant circuit	Refer to the “High pressure” fault
	Low-pressure protection on the refrigerant circuit	Refer to the “Low pressure” fault
	The set temperature and humidity values do not allow start-up	Define different set of values
	The ambient temperature is too high or too low.	Change the room temperature to between 8°C and 41°C. The minimum limit can be lowered to 2°C with the hot gas defrost option
The fan is noisy.	An excessively high flow rate has been set.	Check the flow rate and lower it, if necessary.
	Air ducts have been installed that are too small and/or with too many bends	Check the air duct layout and correct it
High pressure	Air flow is inadequate	Check if the filters and heat exchange coils are clean.
		Check that all the fans are turning correctly.
	High pressure switch cut-out.	Reset the pressure switch manually by pressing the red button above it (do not reset the pressure switch more than three times. Call a specialised technician)
	Other causes	Call a specialised technician
Low pressure	Air flow is inadequate	Check if the filters and heat exchange coils are clean.
		Check that all the fans are turning correctly.
	A leak in the refrigerant circuit has lost all of part of the gas.	Call a specialised technician
	Other causes	Call a specialised technician

FAULT	*ANALYSIS OF POSSIBLE CAUSES*	*CORRECTIVE ACTIONS*
Ventilation alarm	There is a problem on a fan	Call a specialised technician
Overheating of electric elements	Air flow is inadequate	Check if the filters and heat exchange coils are clean.
		Check that all the fans are turning correctly.
	Other causes	Call a specialised technician
E0	Incorrect reading of ambient air sensor	Check the connection to the sensor and that the sensor is working.
E1	Incorrect reading of evaporation sensor	Check the connection to the sensor and that the sensor is working.
E2	Other causes	Call a specialised technician
EL	Air temperature too low	Increase the air temperature
EH	Air temperature too high	Decrease the air temperature

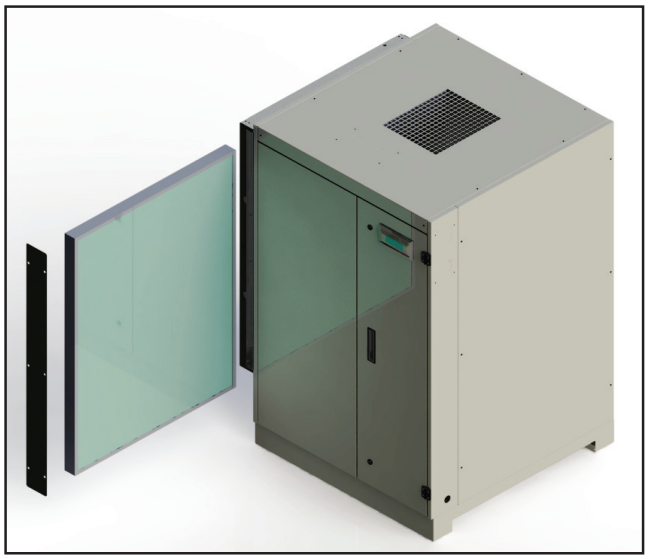
6.2 PERIODIC MAINTENANCE

6.2.1 Cleaning and replacing air filters

Standard unit



Unit with filter holder



Open the panel containing the filter, slide the filter out and wash it under running water, manually removing any impurities that may prevent proper airflow, taking care not to damage it. Any ruined, punctured or otherwise damaged filter must always be replaced.

ATTENZIONE
WARNING

It is extremely important to always insert suction filters on the unit. Without them, the unit will not work properly.

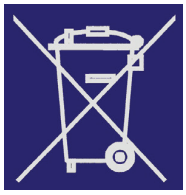
6.3 MAINTENANCE TABLE

To ensure continuity in performance over time, we recommended using this table as a reference for all maintenance carried out and planned for the unit.

MAINTENANCE		Operation of control and safety equipment	Status, fixing and balancing fans	Compressor state and fixing	Normal noise emitted	No compressor oil leakage	No refrigerant leakage from the refrigerant circuit.	No water leakage from the hydraulic circuit	Check terminals on electric panel	Cleaning/replacing air filters	Cleaning/replacing condensate drip pan	Cleaning heat exchange coil				
*YEAR*_______	4th quarter															
	3rd quarter															
	2nd quarter															
	1st quarter															
*YEAR*_______	4th quarter															
	3rd quarter															
	2nd quarter															
	1st quarter															
*YEAR*_______	4th quarter															
	3rd quarter															
	2nd quarter															
	1st quarter															
*YEAR*_______	4th quarter															
	3rd quarter															
	2nd quarter															
	1st quarter															
*YEAR*_______	4th quarter															
	3rd quarter															
	2nd quarter															
	1st quarter															

7 DECOMMISSIONING THE SYSTEM

When the unit reaches the end of its working life and must be removed and replaced, a number of measures must be followed:



- the refrigerant gas it contains should be recovered by specialised personnel and sent to a waste collection facility;
- the lubricating oil in the compressors should also be recovered and sent to a waste collection facility;
- If the structure and the various components cannot be use, they should be demolished and divided into material types. This is particularly important for copper and aluminium of which there are significant quantities in the machine.

This will facilitate the work carried out in the waste collection, disposal and recycling facilities and minimise the environmental impact of such processes.

ATTENZIONE
WARNING

Should the unit, or a part of it, be decommissioned, the parts liable to cause any hazard must be rendered harmless.

Whenever a part is replaced and the used part must be disposed of separately, always refer to the relative laws in force.

Please note it is mandatory to register the loading and unloading of special and toxic-harmful waste.
Special and toxic-harmful waste must be collected by authorised companies.
Special and toxic-harmful waste must be disposed of in compliance with the applicable laws in the user's country.
Dismantle the unit according to the requirements imposed by law in force in the user's country.
Before demolishing the unit, ask the relative Authority to perform an inspection and issue a report.
Lastly, scrap the unit in compliance with the applicable laws in the user's country.

AVVERTENZA
CAUTION

Qualified personnel must dismantle and demolish the unit.

7.1 ENVIRONMENTAL PROTECTION

The law [reg. EC 2037/00] that regulates the use of stratospheric ozone-depleting substances and greenhouse gases, bans the disposal of refrigerant gases in the environment and requires holders to collect them and return them to the dealer at the end of their useful life or take them to a suitable waste collection facility.
The refrigerant R410A is not harmful to the ozone layer, but is included among the substances responsible for the greenhouse effect and thus falls within the scope of the aforesaid regulations.

ATTENZIONE
WARNING

Therefore, special care should be taken when carrying out maintenance work to minimise refrigerant leaks.

8 INSTALLATION

8.1 PREAMBLE

8.1.1 Inspection

On receiving the unit, check for any damage: the machine left the factory in perfect conditions; immediately report any signs of damage to the carrier and note them on the “Delivery Slip” before signing it.
The manufacturer or its agent must be promptly notified of the extent of the damage.
The Customer must submit a written report describing all significant signs of damage.

8.1.2 Lifting and transport

While the unit is being unloaded and positioned, utmost care must be taken to avoid abrupt or rough manoeuvres. Be very careful when transporting it inside. Do not use the unit components for lifting purposes.

In all lifting operations make sure that the unit is properly secured to prevent accidental falls or overturning. Do not move or lift the unit by the removable panels.

8.1.3 Unpacking

The unit packaging must be removed with care to avoid damaging the machine. Different packing materials have been used: wood, cardboard, nylon etc. They should be separated and taken to suitable waste disposal or recycling facilities to minimise their environmental impact.

8.1.4 Identification of the unit

Each unit has an identification plate on the inner compartment of the electric panel, which bears all the data required for installation, maintenance and unit traceability.

Take note of the model, serial number, the definitive refrigerant load and the reference drawings of the unit found in the table on the side, so that it can easily retrieved if the data plate gets worn.

Modello - Model	
Matricola - Serial number	
Data di produzione - Date of production	
Categoria PED/ CE 97/23 Category	
Procedura di valutazione conformità - Conformity module	
Max temp. di stoccaggio - Max storage temperature [°C]	
Max temp. funzionamento - Max ambient working temperature [°C]	
Min. temp. ambiente di funzionamento-Min. ambient working temp. [°C]	
Potenza frigorifera nominale - Nominal Cooling Capacity [kW]	
Potenza nominale in riscaldamento - Nominal Heating Capacity [kW]	
Refrigerante - Refrigerant [Ashrae 15/1992]	
Carica refrigerante - Refrigerant charge [kg]	
Peso a vuoto - Empty weight [kg]	
Alimentazione - Power supply	
Potenza assorbita Nominale - Nominal power input [kW]	
Corrente nominale - Nominal absorbed current [A]	
Corrente massima - Full load ampere FLA [A]	
Corrente di spunto - Starting Current LRA [A]	
Schema elettrico - Wiring diagram	
Schema frigorifero - Refrigeration diagram	

8.2 PLACEMENT

Pay attention to the following aspects when choosing the best place to install the unit and the relative connections:

- size and origin of water pipes;
- location of electric power supply;
- access for maintenance or repairs;
- solidity of the anchoring surface.

It is of utmost importance to ensure complete accessibility to the unit.

Ensure there is sufficient space to remove the filters from the machine which may be as long as the entire suction duct. You should have complete access to it.
Ensure there is sufficient space in front of the electrical panel to allow any technical work to be performed on it.

For indications on how to extract the filters, refer the section on periodic maintenance.

It is recommended to install anti-vibration material for each anchor or support point to avoid transmitting noise and vibrations.

8.2.1 Unit

All the ID - SP - IT - ST models are designed and built for indoor installation:

Do not install the unit outside and make sure it is not exposed to atmospheric agents such as rain, hail, moisture, and frost.

8.2.2 External condenser (IT - ST only)

All the external condensers have been designed for both internal and external installation.

8.3 HYDRAULIC AND ELECTRICAL CONNECTIONS

8.3.1 Hydraulic connection

It is mandatory to follow the requirements below, when implementing the hydraulic circuit, to comply with the following requirements and in any case, comply with national or local regulations.

Do not distort the hydraulic connections for the unit under any circumstances. Block the unit connections with a spanner and then, turn the hydraulic coupling connections with another.

Use flexible joints to join the pipes in order to dampen vibrations and to compensate for thermal expansion.
The following components should be installed on the piping:

- zone valve (if not required as an option and, therefore, already present in the dehumidifier);
- temperature and pressure indicators for routine maintenance and inspections of the unit. Pressure control allows you to assess the correct functioning of the expansion tank and to detect water leakage in advance;
- shut-off valves (gate valves) to isolate the unit from the water circuit for maintenance;
- metal mesh filter (inlet piping) with mesh no larger than 1 mm, to protect the heat exchanger from waste or impurities inside the piping. This requirement is, above all, necessary for commissioning;
- air vent valve placed on the higher parts of the hydraulic circuit to bleed the air. The pipes inside the machine are fitted with manual air vent valves to bleed the unit: this operation should be carried out when the unit is switched off.
- discharge cock and drain tank, where needed, in order to empty the system for maintenance;
- for process applications, it is recommended to install a decoupling heat exchanger, which avoids the fouling of the heat exchangers

It is extremely important that the water inlet is connected at the height of the "Water Inlet" sign. Otherwise the countercurrent circuitry would not be respected with the risk of malfunction, blockage or breakage of the unit.

The dimensions and position of the hydraulic connections are indicated in the dimension tables and assembly drawings.

The water circuit must guarantee a constant nominal flow rate of water (+/- 15%) in all operating conditions.

8.3.2 Condensate discharge connection

Connect with a flexible rubber hose with an internal diameter of 16 mm. A siphon is created in the unit on the discharge pipe.

The inclination of the discharge pipe must be such as to drain the water from the unit to the outside in all cases. If this does not happen, and the collecting pan inside the unit is filled, overflows may occur with consequent water leakage.

8.3.3 Electrical connection

Wiring must be carried out when the power supply is disconnected.

DANGER OF DEATH

An earth connection is mandatory. The installer must connect the earthing wire with the earthing terminal on the electrical panel marked in yellow and green.

The electrical connection, the power cables and the protections must be implemented according to the electrical wiring diagram attached and in compliance with local and international regulations.

The electrical connection, the power cables and the protections must be implemented according to the electrical wiring diagram attached and in compliance with local and international regulations. Always refer to the electrical wiring diagram as a whole. The following indications are generic and do not fully cover the electrical installation of the unit.

Open the electric control panel, insert the power cord and other cables required into the holes provided, connect to the terminals and mains switch, then close the panel.

For the IT and ST models, hook up the electric power supply for the external condenser; no connection cables are required between the unit and the external condenser.

8.4 REFRIGERANT CONNECTIONS (IT - ST ONLY)

8.4.1 Instructions for connecting the external condenser

The IT and ST units have an external condenser which allows the excess heat to be disposed of externally and air condition the room.

All refrigerant circuit work (laying pipes, soldering of pipes, bends and joints, installation of refrigerant components, circuit pressure, vacuum, gas load, etc.) should only be carried out by specialised personnel with a valid license.

All these operations should be carried out with the power supply switched off.

The maximum distance between the unit and the external condenser is 30 metres, i.e. the combined length of the inlet pipe and the liquid pipe must not exceed 60 metres which is the maximum length for each circuit. The maximum height allowed is 10 metres.

The external condenser is supplied filled with nitrogen (maximum pressure 10 bar), therefore, the refrigerant technician must:

1 make sure that the unit and the external condenser are disconnected from the power supply;
2 connect the pressure gauges to the external condenser to check that it is still pressurised and there have been no leaks during transportation, and check the placement and fastening;
3 position all the pipes, joints, bends and all the material for the refrigerant connection;
4 empty the nitrogen from the external condenser circuits;
5 remove all the welded caps from the external condenser;
6 solder all the components taking care not to overheat the delicate parts, such as the unit valves and the pressure transducers in the external condenser. Always place a wet rag on the delicate parts to lower the heat;
7 carry out a visual check of the entire circuit and make sure there are no leaks or cracks;
8 charge the new pipes and the external condenser with nitrogen to a pressure of about 16 bar;
9 wait at least 24 hours and check the pressure of all the circuits. If the pressure has dropped, there is a leak. Look for the leak, then empty the nitrogen and repair the leak. Repeat the operations from point 8;
10 if there are no leaks in the refrigerant circuit, create a vacuum in each circuit of the external condenser and consequently of the new pipes;
11 add R410A gas as per the indications on the next page;
12 open the valves on the unit.

8.4.2 Sizing of the refrigerant pipes, refrigerant charging and oil top-up.

The following table shows the sizes of the pipe connections of the internal and external units.

Model	um	130	160	190	210	260	300	350	450	580	750	950	1100	1400	1500	1700	1900	2200	3000
No. refrigerant circuits	no.	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
IN internal unit	mm	10	10	10	10	10	10	12	12	16	22	22	16	16	16	16	16	22	22
OUT internal unit	mm	10	10	10	12	12	12	12	16	16	22	22	22	22	22	22	22	22	22
IN external unit	mm	16	16	16	18	18	18	18	22	22	28	28	35	35	35	35	35	35	42
OUT external unit	mm	12	12	12	16	16	16	16	16	16	18	18	22	22	22	22	22	22	28

The table on the following page gives all the information required for choosing the pipes, type and quantity of oil and quantity of refrigerant for the external unit connection. All the data indicated in the table is given for each individual refrigerant circuit.

Notes for the table on the following page:

If the total refrigerant charge (unit charge + external condenser charge + refrigerant top-up due to the length of the line) exceeds the maximum charge allowance for the compressor (**), a top-up of 50 g of oil for every kg of excess refrigerant will be required.

The gas charge for the unit is indicated on the silver-plated label.

(***) A siphon must be installed every 5 m of vertical inlet line.

Model			130	160	190	210	260	300	350	450	580	750	950	1100	1400	1500	1700	1900	2200	3000
Refrigerant load external condenser		kg	0,6	0,6	0,6	0,6	0,6	0,6	1,3	1,4	1,9	1,9	3,8	3,7	3,7	4,5	4,5	4,5	4,5	10
0 - 10 metres	Inlet line (gas)	in (mm)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	3/4 (19)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)
	Liquid line	in (mm)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	3/4 (19)	3/4 (19)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)
	Refrigerant to-up per line metre	kg	0,08	0,08	0,08	0,08	0,08	0,08	0,13	0,14	0,22	0,32	0,32	0,23	0,23	0,23	0,32	0,32	0,32	0,32
	Oil top-up for individual siphon ***	g	5	5	5	10	10	10	10	20	34	54	54	54	54	54	54	54	54	54
10 - 20 metres	Inlet line (gas)	in (mm)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	3/4 (19)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)
	Liquid line	in (mm)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	3/4 (19)	3/4 (19)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)
	Refrigerant to-up per line metre	kg	0,08	0,08	0,08	0,09	0,09	0,09	0,14	0,15	0,22	0,32	0,32	0,23	0,23	0,23	0,32	0,32	0,32	0,32
	Oil top-up for individual siphon ***	g	10	10	10	20	20	20	20	34	34	54	54	54	54	54	54	54	54	54
20 - 30 metres	Inlet line (gas)	in (mm)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	7/8 (22,2)	7/8 (22,2)	1 1/8 (28,6)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)	1 1/8 (28,6)	1 1/8 (28,6)	1 1/8 (28,6)
	Liquid line	in (mm)	3/8 (9,5)	3/8 (9,5)	3/8 (9,5)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	1/2 (12,7)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	7/8 (22,2)	5/8 (15,9)	5/8 (15,9)	5/8 (15,9)	3/4 (19)	7/8 (22,2)	7/8 (22,2)	7/8 (22,2)
	Refrigerant to-up per line metre	kg	0,08	0,08	0,08	0,14	0,14	0,14	0,14	0,22	0,23	0,32	0,45	0,23	0,23	0,23	0,32	0,45	0,45	0,45
	Oil top-up for individual siphon ***	g	10	10	10	20	20	20	20	34	54	54	115	54	54	54	54	115	115	115
Maximum allowance refrigerant load for compressor		kg	2,9	4,7	11,3	11,3	11,3	11,3	11,3	11,3	18	22	22	22	22	22	22	22	22	22
Compressor brand			LG	LG	Sanyo	Sanyo	Sanyo	Sanyo	Sanyo	Sanyo	Sanyo	Danfoss	Danfoss	Danfoss	Danfoss	Danfoss	Danfoss	Danfoss	Danfoss	Danfoss
Recommended oil			FVC68D	FVC68D	PVE FV68S	PVE FV68S	PVE FV68S	PVE FV68S	PVE FV68S	PVE FV68S	PVE FV68S	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ	POE 160SZ

8.4.3 Example:

Unit: ST 2200
Line length: 28 metres (10 vertical metres)

The following values are determined from the table:

- Inlet line diameter: 1 1/8” (28.6mm)
- Liquid line diameter: 7/8” (22.2mm)
- Refrigerant charge external condenser: 4.5 kg
- Refrigerant top-up per line metre: 0.45 kg/metre
- Oil top-up for each siphon: 115 g
- Maximum allowance refrigerant load for compressor: 22 kg
- Oil top-up for every kg of refrigerant in excess: 50 g/kg

The value of the unit refrigerant charge is determined by the silver-plated label: 7 kg

Refrigerant load:

- Top-up charge due to the line length = [line metres] x [gas top-up per line metre] = 28 x 0.45 = 12.6 kg
- Total refrigerant charge = [unit charge] + [external condenser charge] + [top-up charge due to line] = 4.5 + 7 + 12.6 = 24.1 kg
- Top-up refrigerant = [external condenser charge] + [line charge] = 4,5 + 12,6 = 17,1 kg

Oil top-up:

- 10 vertical metres, i.e. 2 siphons
- Oil top-up for the siphons = [oil top-up for each siphon] x [number of siphons] = 115 x 2 = 230 g
- Refrigerant charge over limit = [total refrigerant charge] - [maximum refrigerant charge for compressor] = 24.1 – 22 = 2.1 kg
- Oil top-up for exceeding refrigerant limit = [refrigerant charge over limit] x [oil top-up for every kg of excess refrigerant] = 2.1 x 50 = 105 g
- Total oil top-up = [oil top-up for siphons] + [oil top-up for exceeding refrigerant limit] = 230 + 105 = 335 g

All the values determined refer to a single circuit.

Precautions for long lines (from 20 to 30 metres):

- Inlet check valve: mandatory
- Check valve on liquids: recommended

8.4.4 Characteristics of refrigerant pipes

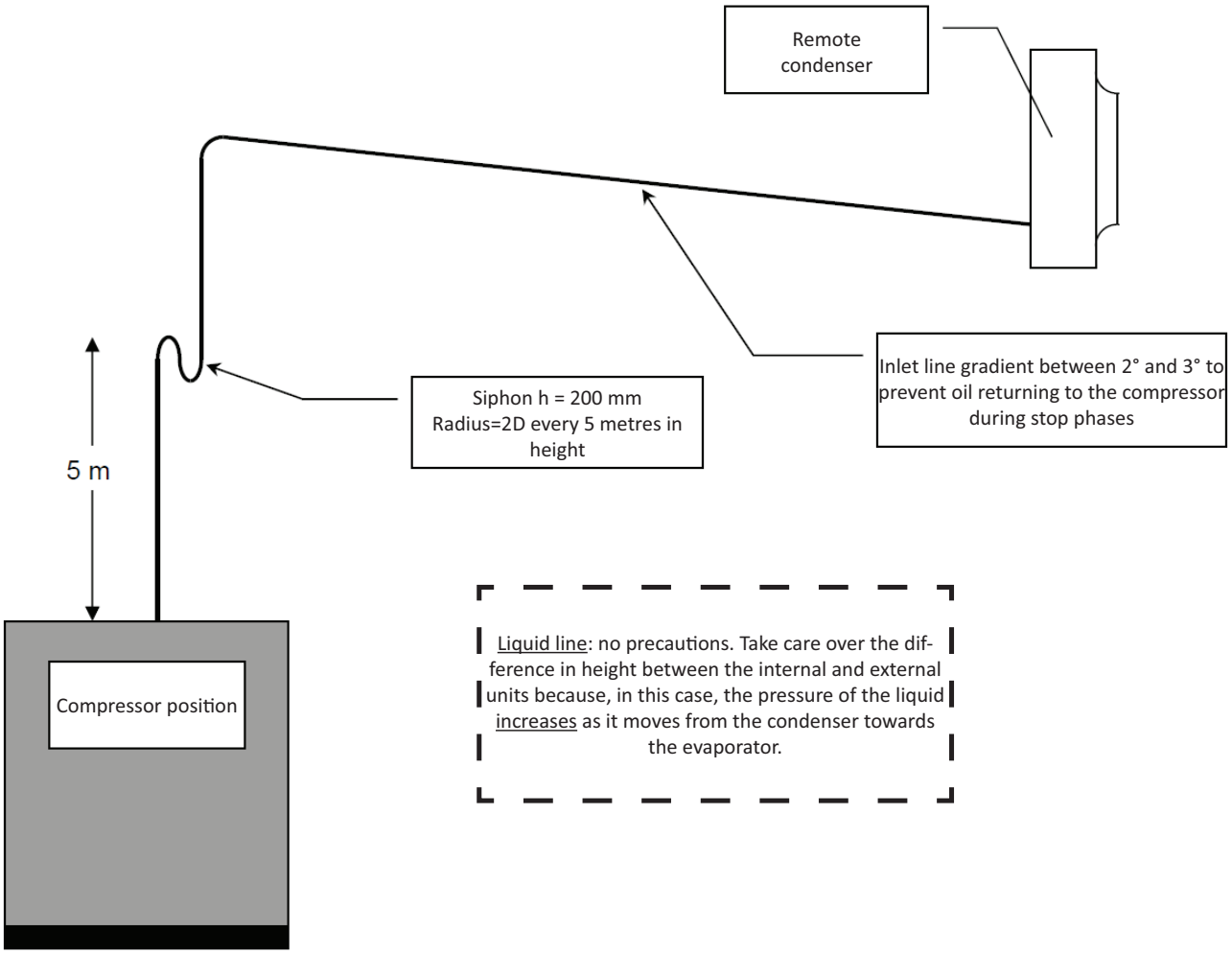
The selection criteria in terms of diameter, material and thickness are given below which are implemented in compliance with the indications given in the EN12735_1_2 and EN14276_2 standards for copper pipes used in refrigerating systems and heat pumps.

The table below shows the calculation of the minimum pipe thickness, for each diameter, in the bends and straight sections in accordance with the EN14276_2:2011 standard, the minimum curvature radius possible with pressure PT = 50 bar (PS set at 45 bar, therefore PT = 1.5 x PS). Warning: the pipe is not oxidised.

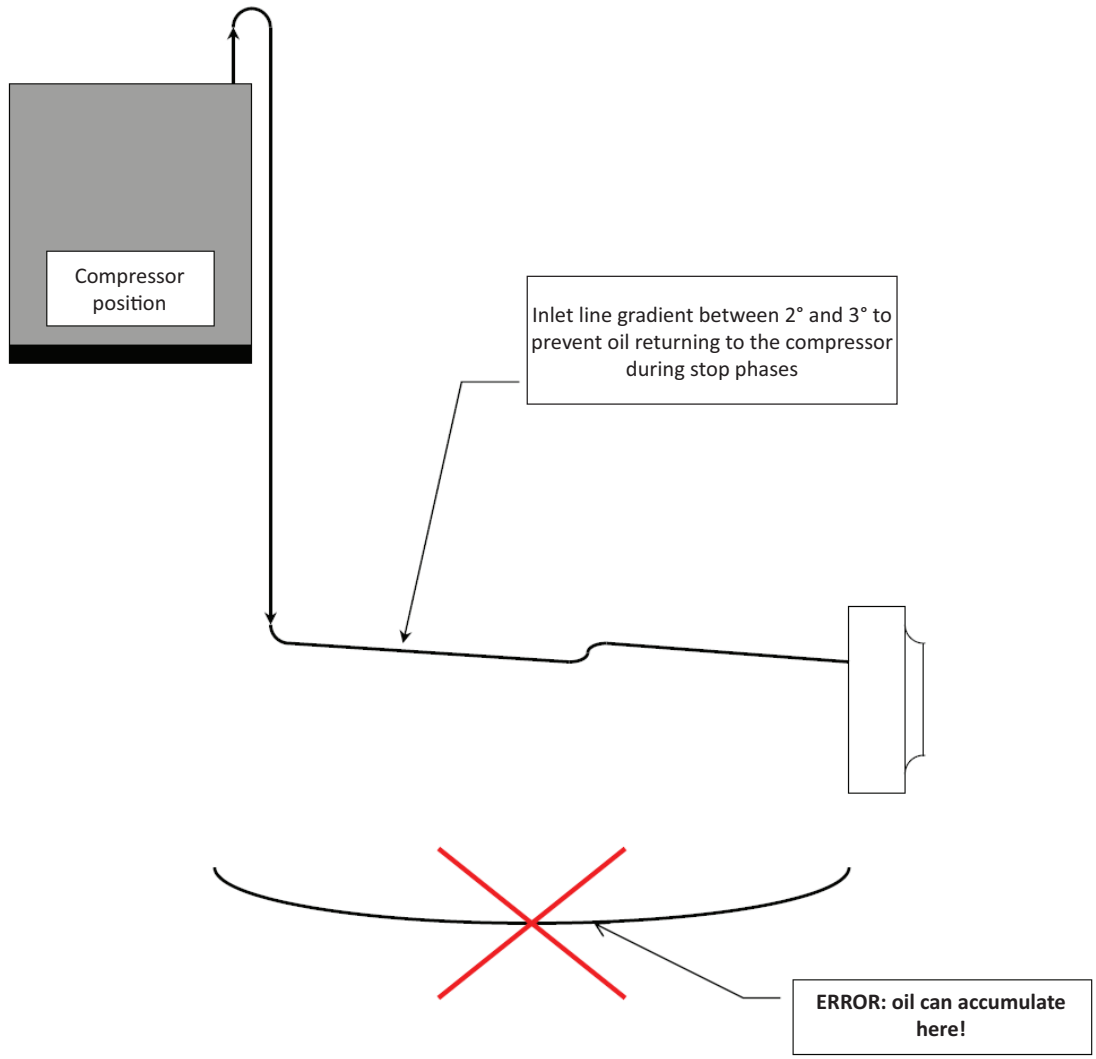
Please consider the commercial thickness in the last column as the minimum usable thickness.

DN	External diameter	Radius of curvature	PT	PED Category	copper σs	Z	Minimum thickness straight	Minimum thickness bend	Commercial thickness
	mm	mm	bar		N/mm²		mm	mm	mm
6	6	12	50	A3 P3	100	0,85	0,179	0,285	1
6	8	16	50	A3 P3	100	0,85	0,239	0,265	1
6	10	20	50	A3 P3	100	0,85	0,298	0,331	1
8	12	24	50	A3 P3	100	0,85	0,358	0,397	1
10	16	26	50	A3 P3	100	0,85	0,477	0,529	1
15	18	18	50	A3 P3	100	0,85	0,537	0,595	1
20	22	33	50	A3 P3	100	0,85	0,657	0,728	1,5
25	28	42	50	A3 P3	100	0,85	0,836	0,926	1,5
32	35	52,5	50	A3 P3	100	0,85	1,045	1,158	1,5
32	42	65	50	A3 P3	100	0,85	1,253	1,389	1,5
50	54	108	50	CAT I	100	1	1,375	1,504	1,5
65	64	89	29	CAT I	100	1	0,95	1,052	2
80	76	152	29	CAT I	100	1	1,128	1,250	2

8.4.5 Inlet line installation (condenser over evaporator/compressor)



8.4.6 Inlet line installation (Condenser below evaporator/compressor)



Liquid line: no precautions. Take care over the difference in height between the internal and external units because, in this case, the pressure of the liquid decreases as it moves from the condenser towards the evaporator. This could cause flash evaporation to occur, resulting in a malfunction of the expansion valve. To avoid this, make sure that the actual subcooling is at least 2°C for every 10 m of vertical line.

8.5 COMMISSIONING

Before starting, check that all the panels are in their position and tightened with their screws.
Follow these instructions carefully for commissioning:

Make sure that all the refrigerant, hydraulic, electrical, and air duct connections are correctly installed and that all the indications on the labels, user manual and wiring diagram are complied with.

Make sure that the refrigerant circuit valves, if present, are open and that the water system is duly bled to completely eliminate any residual air: fill the circuit gradually and open the air vent valves on the top part.
Check that there are no leaks on the water side.

All the units have a user terminal which oversees the overall unit management.

The unit can now be powered up.

8.5.1 Check the correct phase sequence (from model 210)

Check (only models with 3-phase power supply) the correct sequence of the phases.
It is possible to check the correct phase sequence by means of the special relay mounted in the electrical panel. There are two signalling LEDs on the phase sequence relay. When the green LED is on, it indicates all three phases are present. If it is not on, check that to see if the line of one of the three phases has been interrupted. When the yellow LED is on, it indicates that the phases are in the right order. If it is not on, check that the sequence of the phases is correct.

8.5.2 ID - SP unit start-up

After the initial charging, switch on (refer to the user terminal sections).

8.5.3 IT - ST unit start-up

Turn on the external condenser.

In the next steps, you will be asked to change some settings on the display. Always refer to the user terminal sections.

Keep the unit switched off.

Check the gas charge in the circuits. This should be done by a specialised refrigerant technician as indicated previously:

1 configure a set of very high temperatures to condense inside the unit (neutral air and not air-conditioned);
2 switch on the unit and ensure the compressor or compressors also start (if necessary, low the humidity set);
3 Monitor the flow indicator, superheating and subcooling of each circuit. Gas must be charged for every circuit and the thermostat valve adjusted in order:
   a) to see no bubbles in the flow indicator,
   b) to have superheating and subcooling within the range of 5 and 8°C;
4 to lower the temperature set so that it condenses externally and air conditions internally;
5 to check the external condenser is working correctly, when the switch-over to condensing occurs. Hot gas then arrives and the fans must be started;
6 Check the flow indicator for each circuit again. If bubbles are present, add gas which may mean the subcooling and superheating are not correct, but this is not a cause for concern;
7 the gas charge and circuit optimisation are completed, to adjust the temperature and humidity sets to those requested by the customer.

8.6 MODIFYING INSTALLER PARAMETERS

The installer parameters allow you to modify some of the advanced settings of the unit.

Some parameters significantly change the operation of the unit.
ONLY MODIFY THEM IF NECESSARY AND WITH CARE

8.6.1 Basic user terminal

To access the installer parameter settings menu, you must:

1. Hold down the UP (▲) and STAND-BY keys for 5 seconds until the first programmable variable appears on the screen. When you enter the menu, there is an audible beep.
2. Use the UP (▲) and DOWN (▼) keys to select the variable to modify.
3. You can now modify the value by holding down the SET key and pressing the UP (▲) or DOWN (▼) key.
4. When the settings have been changed, hold down the UP (▲) or DOWN (▼) keys (or wait 30 seconds without pressing any keys) until the operating state (OFF or ON) appears on the screen. When you exit the menu, there is an audible beep to confirm.
5. The changes made to the variables are automatically saved when you exit the menu.

PARAMETER	*DESCRIPTION*	*VALUES*	*DEFAULT*
F3	Fan status with idle compressor	0 = fan on with unit ON 1 = fan on only with compressor on 2 = fan on with hygrometer contact closed	0
CN3	Non-editable parameter		-
Ad	IP address for RS485 Modbus	from 1 to 247	1
bdr	Modbus baudrate parameter selection	0 = 300, 1 = 600, 2 = 1200, 3 = 2400, 4 = 4800, 5 = 9600, 6 = 14400, 7 = 19200, 8 = 38400.	5

8.6.2 Advanced user terminal

To access the installer menu, follow these steps:

- press the **Prg** key on the home page to access the page where you enter the password
- the password is requested, enter "***0010***" and confirm by pressing **Enter** ↵

You are now in the installer menu. The options are as follows:

- Change language
- Regulation
- Calibration

Use of the keys during navigation in the page:

- use the ↑ ↓ keys to scroll through the lines
- press **Enter** ↵ to access the highlighted menu
- press the **Esc** key to return to the password request page

8.6.3 Change language

You can change the display language in this menu.

8.6.4 Regulation

This menu consists of 5 pages:

1 remote on/off contact
2 summer/winter *
3 static defrost *
4 hot gas defrost
5 serial communications*

* page not always present.

Use of keys during navigation between pages:

- use the ↑ ↓ keys to scroll through the pages.
- press the **Enter** ↵ key to edit the settings and the first value flashes
- press the **Esc** key to return to the installer page

Use of the keys during edit:

- use the ↑ ↓ keys to change the value that is flashing
- when you press the **Enter** ↵ key, the next value flashes or if it is the last value, you return to the navigation page
- press the **Esc** key to return to the navigation page

Let's look at the various Regulation menu pages in detail:

Page 1 allows you to set the remote on/off contact and invert the logic;

Page 2 allows you to set the season change from the display or from terminal box contact. The logic can be inverted,
This page is displayed only with hot and cold water coils;

Page 3 allows you to adjust the static defrost parameters,
This page is displayed only without the hot gas defrost option;

Page 4 allows you to adjust the hot gas defrost parameters,
This page is displayed only with the hot gas defrost option;

Page 5 allows you to adjust the serial communication parameters,
This page is displayed only with serial options.

8.7 FLOW RATE, PRESSURE AND DUCTING

8.7.1 Calibration of the flow rates for units with centrifugal fan

These units do not allow for flow rate adjustment because the fan is not a modulating version.

8.7.2 Calibration of the flow rates for units with centrifugal fan and ACF option

AVVERTENZA
CAUTION

If the unit includes the optional ACF (automatic control flow) accessory, calibration of the dehumidifier is not necessary.

Thanks to the option which includes a transducer and specific application software, the unit automatically adjusts the inlet flow rate to the nominal values indicated in the technical data table. You can, however, increase or decrease this value to set a more accurate flow rate.

8.7.3 Calibration of the flow rates for units with radial fan and ACF option

ATTENZIONE
WARNING

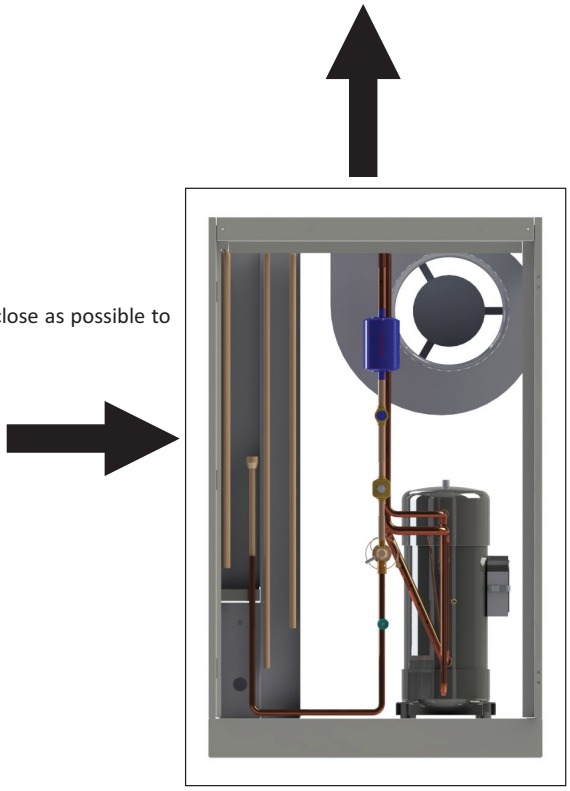
If the ACF option is not installed, the flow rates for air intake of the unit should be measured to calibrate the ventilation correctly.

If a flow rate is measured that is either 10% higher or lower that the nominal rate indicated in the technical data table, the speed must be modified from the on-board user terminal. This function is essential to ensure the unit works correctly.

ATTENZIONE
WARNING

Calibration should be carried out by specialised personnel with specific equipment (anemometer) and knowledge of the unit.

- press the **Prg** key from the home page;
- You enter the password screen;
- Enter the password "***0010***" and press **Enter** ↵;
- You enter the installer menu:
- Press the ↓ key to go to **Calibration** and press **Enter** ↵;
- You enter the calibration screen;
- Press the **Enter** ↵ key until you reach the value you want to edit;
- Use the ↑ ↓ keys to edit the flow rate value;
- Measure the intake flow rate and modify the blower fan speed to make it as close as possible to the nominal air flow rate indicated in the technical data table;
- The blower fan is, therefore, regulated;
- Press the **Enter** ↵ key until the flashing cursor returns to the upper left corner;
- Press the **Esc** key to return to the installer menu;
- Press the **Esc** key to return to the home page;



8.7.4 Unit duct layout

The intake is not pre-configured for ducting. For this, you must order the complete unit including the filter holder frame for intake ducting. Alternatively, a flanged connector larger than the holes can be used. WARNING: it is extremely important to always insert an intake filter.

For air intake ducting, use a a flanged connector larger than the holes.