Installation, operation and maintenance manual

Professional W

D-EIMAH3011-23_01EN

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Translation of the original instructions

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Summary

1 Important warning

The pictogram shows a situation of immediate danger or a dangerous situation that might cause injuries or death.

The pictogram shows that it is necessary to adopt suitable behaviour in order to avoid jeopardising staff safety and cause damages to the equipment.

The pictogram shows particularly important technical information that should be taken into consideration by the people installing or using the equipment.

IMPORTANT

The machines covered by this manual represent an excellent investment and deserve attention and care both for a correct installation and for keeping them in good working condition.

Proper maintenance of the machinery is essential for its safety and reliability. All installation, assembly, connections to the electrical network and ordinary/extraordinary maintenance must be carried out only by technicians who comply with the legal requirements.

WARNING

Before installing the unit, read this manual carefully. If you do not clearly understand the instructions in this manual, it is absolutely forbidden to operate the machine.

IMPORTANT

This manual describes the features and procedures common to the entire series of units.

All units are shipped with a general drawing, with dimensions and weights characteristic of the specific machine.

THE SPECIFIC DRAWING MUST BE CONSIDERED AN INTEGRAL PART OF THIS MANUAL.

In case of discrepancy between this manual and the drawing, what is on the drawing will prevail.

Warnings for the operator

- **BEFORE USING THE UNIT READ THIS USER AND MAINTENANCE MANUAL**
- **THE OPERATOR MUST BE INSTRUCTED AND TRAINED TO USE THE UNIT**
- **THE OPERATOR MUST CAREFULLY FOLLOW ALL INSTRUCTIONS, SAFETY RULES AND LIMITS OF USE OF THE UNIT.**

Service

Before carrying out any repairs, it is advisable to contact authorized personnel, especially if it is necessary to intervene for extraordinary maintenance.

Purpose of the manual

This **manual** was drawn up to provide operators and technicians responsible for the installation and maintenance of the machine with the information and instructions that are vital and essential to operate correctly and in safe conditions.
The purpose of this **manual** is to guide the installer and qualified operator in the installation, maintenance, and proper and safe use of the equipment. For this reason, **it is mandatory for all personnel involved in installation, maintenance, and supervision of the machine to read this manual.** Contact the manufacturer if any points are unclear or difficult to understand. This manual contains information regarding:

- Technical specifications of the machine.
- Instructions for transport, handling, installation, and assembly.
- Tuning after installation and use.
- Information for instructing personnel authorised for its use.
- Maintenance and demolition.

All the information refers to any Professional W unit. All the units are shipped together with a **technical schematic** indicating the specific weight and size of the machine received. It must be considered an integral part of this manual and therefore it must be kept with the utmost care in all its parts.
If the manual or drawing is lost, it is important to request a copy from the manufacturer, specifying the unit's serial number and date of purchase that can be found on the invoice.

Intended use of the unit

This appliance has the function of treating the air intended to condition civil and industrial environments.

Any other use is not in accordance with the intended use and therefore dangerous. This range is designed to be used in Non-explosive environments.

If the machine is used in critical situations, by type of system or environmental context, the customer must identify and adopt the technical and operational measures to avoid damage of any kind.

Safety regulations

Skills required for the installation of the unit

Installers must perform operations according to their professional qualifications: all activities not within one's expertise (i.e., electrical connections) must be carried out by specialised and qualified staff so as not to endanger one's safety and the safety of the other operators interacting with the machine.

Transport and equipment handling operator: authorised person with recognised expertise in using transport and lifting equipment.

Technical installer: expert technician, sent or authorized by the manufacturer or its representative, with adequate skills and training to install the machine.
Assistant: technician subject to care obligations while lifting and assembling the equipment. He must be suitably trained and informed about the operations to perform and the safety plans of the site/installation location.

In this manual, the technician competent to carry out each operation is specified.

Skills required for the use and maintenance of the unit

Generic operator: AUTHORISED to run the machine using commands placed on the keypad of the electrical control panel. Performs only machine control operations, power on/off.
Maintenance mechanic (qualified): AUTHORISED to carry out maintenance, adjustments, replacement, and repair of mechanical parts. It must be a person competent in mechanical systems, therefore able to perform mechanical maintenance in a satisfactory and safe manner, must possess theoretical preparation and manual experience. NOT AUTHORISED to work on electrical systems.
Manufacturer's technician (qualified): AUTHORISED to perform complicated operations in every situation. Operates in accordance with the user.

Maintenance electrician (qualified): AUTHORISED to perform service of an electric nature, adjustments, maintenance, and electrical repairs. AUTHORISED to operate in the presence of an active electrical connection inside the control panels and junction boxes. It must be a person competent in electronics and electrical engineering, therefore able to work on electrical systems satisfactorily and safely, must possess theoretical knowledge and proven experience. NOT AUTHORISED to work on mechanical systems.

Installers, users, and maintenance staff for the machine must also:

- Be responsible and experienced adults without physical impairments, in perfect psychological and physical condition.

- Master the unit's operating cycle, therefore participate in theoretical/practical training alongside an expert machine operator, or alongside a technician of the manufacturer.

In this manual, the technician competent to carry out each operation is specified.

Read this manual carefully before machine installation and maintenance and keep it for any further future consultation by the various operators. Do not remove, tear out or rewrite any part of this manual.

All installation, assembly, electrical connections to the mains and ordinary/extraordinary maintenance must be performed **only by qualified personnel authorised by the Retailer or Manufacturer** after turning off the unit electrically and using personal protective equipment (i.e., gloves, protective goggles, etc.), in compliance with the regulations in force in the country the equipment is to be used in and the laws regarding the systems and safety in the workplace.

Installation, use or maintenance other than those specified in the manual may cause damage, injury, or death, invalidate the warranty, and relieve the Manufacturer of any liability.

Use protective clothing and suitable equipment while handling or installing the equipment, to prevent accidents and safeguard your own and other people's safety. Individuals not assigned to installation or maintenance are NOT allowed to stand or pass through the work area while the machine is assembled.

Disconnect the equipment from the mains before installing or maintaining it.

Before installing the equipment, check that the systems comply with the legal provisions in force in the country of use and meet the specifications on the serial number plate.

It is the responsibility of the user/installer to check the static and dynamic stability relative to the installation and to arrange environments so that **people who are not competent or authorised DO NOT have access to the machine or to its commands.**

It is the responsibility of the user/installer to make sure that **weather conditions** do not affect the safety of persons and property during installation, use and maintenance.

Make sure the air intake is not located near any exhausts, flue-gases, or other contaminating elements.

Do not install the equipment in places exposed to strong winds, salt air, open flames, temperatures exceeding 40°C (122°F) with indirect/direct solar radiation or temperature below -5°C (23°F). Max humidity must not exceed 95% non-condensing.

After installation is complete, train the user on the correct use of the unit.

If the equipment does not work or functional or structural alterations are noted, disconnect it from the mains and contact a service centre authorised by the Manufacturer or Retailer, without attempting to repair it on your own. For any replacements request the use of original spare parts.

Unauthorised actions, tampering or modifications that do not follow the information provided in this manual can cause damage, injuries or fatal accidents and void the warranty.

The serial number plate on the unit provides important technical information, essential in case of machine maintenance or repairs. We recommend that you do not remove, damage, or modify it.

To ensure correct and safe conditions of use, it is recommended to have the unit maintained and checked at least annually by a service centre authorised by the manufacturer or dealer.

Failure to follow these instructions may cause damage and injuries, even fatal, voids the warranty and relieves the Manufacturer of any liability.

Information ownership

The use of this documentary material is allowed only to the customer to whom the manual has been supplied as a kit for the machine and only for the purposes of installation, use and maintenance of the machine to which the manual refers.

The Manufacturer declares that the information contained in this manual is congruent with the technical and safety specifications of the machine to which the manual refers.

The drawings, diagrams and technical data shown are updated to the date of publication of this document and are valid exclusively for the machine they accompanied.

The Manufacturer reserves the right to make changes or improvements to this documentary material without notice.

The Manufacturer accepts no responsibility for direct or indirect damage to persons, things or pets resulting from the use of this documentary material or the machine in conditions other than those provided for.

Residual risks

Despite having implemented and adopted all the safety measures indicated by applicable regulations, some residual risks remain. In some operations of replacement, adjustment and tooling maximum attention is always required to work in the best possible conditions.

List of operations with residual risks

Risks for qualified personnel (electrician and mechanic)

- Handling - during unloading and handling it is necessary to pay attention to all the steps listed in this manual regarding the points of reference
- Installation - during installation it is necessary to pay attention to all the steps listed in this manual regarding the points of reference The installer must ensure the static and dynamic stability of the machine's site of installation.
- Maintenance - during maintenance it is necessary to pay attention to all the steps listed in this manual, and to high temperatures that may be present in the heat transfer fluid lines to/from the unit.
- Cleaning - the machine must be cleaned only when it is switched off, by turning off the switch installed by the electrician and the switch located on the unit itself. The key for interrupting the power supply must be kept by the operator until the end of the cleaning operations. Internal cleaning of the machine must be carried out using the protections required by current regulations. While the inside of the machine does not contain hazards, it is necessary to pay the utmost attention so that accidents do not occur during cleaning. The heat exchange coils that have a potentially sharp finned pack must be cleaned using protective glasses and gloves suitable for handling metals.

During adjustment, maintenance, and cleaning there are residual risks of variable entity. Being operations that must be performed with guards disabled, it is necessary to pay particular attention to avoid damage to persons and things.

Always pay close attention when performing the operations specified above.

Remember that these operations must always be performed by authorised personnel. All work must be completed in accordance with the legal provisions relating to work safety. Remember that the unit in question is an integral part of a larger system that includes other components, depending on the final characteristics of realisation and the mode of use. Therefore, in the end it is the responsibility of the user and assembler to assess the residual risks and their respective preventive measures.

For more information about the possible risks, please refer to the RAD (Risk Assessment Document) available from the manufacturer.

Safety devices

For each of the operations described in this manual, the means of protection that the personnel in charge are required to use and the rules of conduct that allow to safeguard the safety of the operators themselves are indicated.

Always pay attention to the safety symbols on the machine. It should only operate with the safety devices engaged and with fixed or movable guards installed correctly and in the proper position.

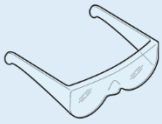
If during installation, use or maintenance the safety devices have been temporarily removed or disabled, the machine can be operated **exclusively** by the qualified technician who made this change. It is **mandatory** to prevent other people's access to the machine. When finished, restore the devices to their proper status as soon as possible.

For installation, maintenance and demolition operations, the use of the following personal protective equipment is mandatory:

Suitable protective clothing:

Safety helmet

Safety footwear



Safety goggles

Cut-resistant gloves

For each of the operations described in this manual, the means of protection that the personnel in charge are required to use are indicated (possibly in addition to those that the personnel is required to wear in the place of installation of the machine) together with the rules of conduct that allow safeguarding the safety of the operators themselves.

General information on safety

Design criteria

The principles and concepts contained in the harmonized standards indicated in *Table 2* were adopted for the design of the machine.

ACTIVITY	FREQUENCY
EN ISO 12100: 2010	Safety of machinery - General principles for design - Part 1: Basic terminology, methodology
EN ISO 13857: 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN ISO 14120: 2015	Safety of machinery - General requirements for the design and construction of fixed and movable guards
IEC EN 60204-1: 2018	Safety of machines - Electrical equipment of machinery - Part 1: General requirements

Table 2 - Main harmonized standards used in the design of Professional W units

Compliance with the relevant paragraphs of the harmonized standards has made it possible to eliminate or reduce risks in the best possible way, during both normal operation and adjustment and maintenance operations, throughout the life cycle of the machine.
The components used have been carefully chosen from those available on the market, the materials making up the machine and the accessory tools do not constitute a risk to people's health and integrity. All parts supplied by third parties are CE marked (when required) and comply with the relevant reference directives. All the details have been strictly checked in compliance with the quality standards prescribed by the regulations in force.

Furthermore, the necessary warning and protection measures against residual risks (see, in this regard, the active passive safety measures described below) have been adopted for the machine.

Passive safety measures

Metal structure that encloses the individual parts of the machine

Panic handles with opening also from inside the unit

Metal mesh or protective casing to protect the fan unit and the corresponding transmission components.

Information signs

Return air

Fan section

Damper

Cooling coil inlet

Cooling coil outlet

Control Panel

Condensate drain

Filter

ID Plate

Safety signs

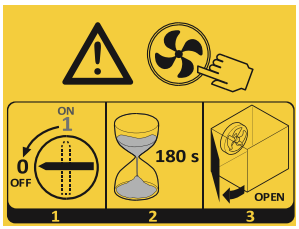
Safety signs on the external structure of the unit

Lifting
(Over packaging)

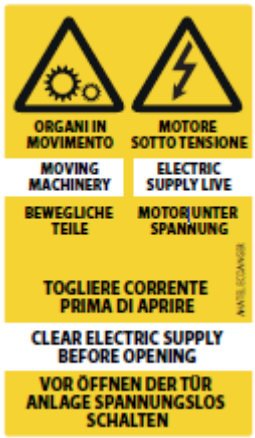
Fire risk (filters)

Positive pressure
Safety handle

Risk of
Electric shock

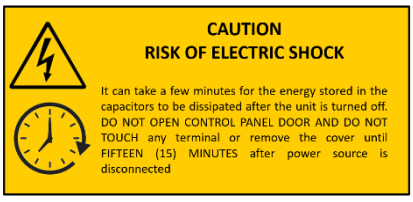


Danger of
running
fans

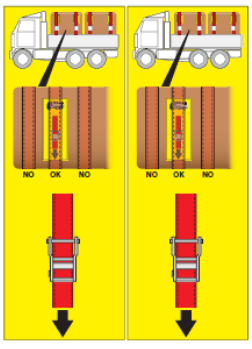


Mechanical/Electrical
shock

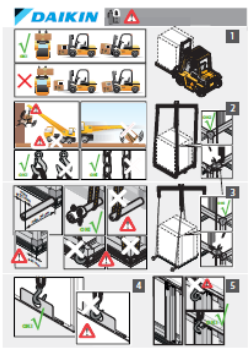
Ground
Connection



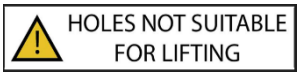
Electric
shock
hazard



UNIT load straps
(on the packaging)



UNIT safe handling
(on the packaging)



Holes in the base frame not suitable for lifting operations

Active safety measures

Emergency button positioned on the control panel.

Double click doors in correspondence of the positive pressure sections (fan section).

Components present in PROFESSIONAL W UNITS

The unit is designed and built for air handling. In general, no material present on the unit is dangerous for the operators responsible for managing the machine itself. However, it is necessary to pay attention to the handling operations of the filters, which could cause allergy or irritation to the operators.
The user of the unit must therefore provide adequate PPE (for example, goggles, masks, gloves or protective clothing), independent from the supply of the unit itself, to the operators who work in contact or within the range of action of the materials that generate hazards of the type indicated above. Waste products resulting from normal maintenance on the unit must be disposed of by the purchaser of the unit in compliance with the regulations in force in the country of installation of the unit. Disposal must be carried out in such a way as not to harm the environment, people and animals, in compliance with the relevant legislative provisions.

Training

It is the responsibility of the unit buyer/user to provide adequate instruction and training to machine operators.

Optional

In agreed cases, additional training may be provided through the one-on-one instruction of operators by the Manufacturer’s technical staff.

2 Unit characteristics

The UNIT is designed and built for air handling and can have different configurations depending on the type of treatment requested by the customer. In this sense, the unit consists of one or several sections, each of them with a specific function, which may or may not be present according to the type of treatment requested.

The supporting structure consists of profiles made by aluminium alloy extrusion. The stainless-steel fixing screws are concealed in the profile itself so as to have smooth surfaces on the inside. The panels of the structure consist of two zinc-plated box press-folded sheets injected with polyurethane. Alternatively, as an insulator, mineral wool can be used. Where necessary, along the panels, doors with locked handles and/or portholes are installed to inspect the inside of the machine.

Find below the main sections of the machine.

Fan section

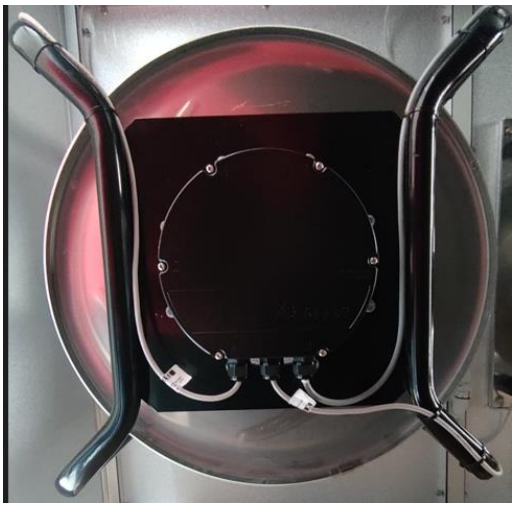
The standard construction involves the use of single or twin double inlet centrifugal fans. The customer has the possibility to select the model, according to requirements. The available options are:

EC Fan

These fans use electronically controlled motors, better known precisely as EC, capable of always working at maximum efficiency and allowing considerable energy savings, compared to traditional asynchronous motors (i.e., in alternating current). This technology makes it possible to integrate an extremely quiet and high-performance DC (direct current) motor on the AC (alternating current) fans, which allows a very precise adjustment of the speed, to obtain the required air flow, reducing the absorbed power. This simplifies the components necessary for these functions, compared to fans with traditional motors. The possibilities of controlling the fan speed are: 0 -10 V DC / 4-20 mA signal, PWM, or via the MODBUS serial RS485 communication protocol

Main advantages of EC fans compared to conventional motors:

- Superior energy efficiency
- Lower operating costs
- Low noise level
- Precise speed control and adjustment
- Superior aeraulic performance
- Electronic protection integrated in the motor



Accessories supplied with the fans

The control logics of the units involves the use of components designed to measure the pressure or air flow. Depending on the customer's selection, the following can be used: differential pressure switches, Magnehelic, Minhelic, pressure transducers to control fan air flow rate or pressure.

For safety reasons, it is also possible to select accessories, such as protection grids applied directly on the impellers or on the section inspection and disconnecting switches connected directly to the motor for any power outages.

Filtering Section

Pre-filters

The filter medium used for these filters is folded water repellent fibreglass with constant calibration spec Ing. The separation of the layers takes place through continuous thermoplastic threads. The frame used is in galvanized steel, complete with side handles.

Accessories for filters

At the customer's request, it is possible to add accessory components to measure the clogging of the filter cells. For this purpose, the following can be selected: differential, Magnehelic, Minihelic pressure switches.

Coils

The heat exchanger coils are used for heating the air with hot or superheated water or steam, or for cooling fed with chilled water, brine solutions, water and glycol mixtures or direct expansion. Alternatively, electric batteries can also be used where the air is heated by passing close to electrical resistances.

Water coils

The water coils can be equipped with:

- Drainage tank in SS430 standard, on request in SS304 or SS316 stainless steel

- PICV valves on request

- work with drinking water (not completely demineralized or softened).

- require periodic replacement (or cleaning) of the cylinder.

- have a modulation suitable for comfort or industrial applications without extreme requirements.

Dampers

The dampers consist of a frame and a series of galvanized steel or extruded aluminium blades. The damper control can be manual or motorized.

For the dampers there may be microswitches, positioned on the dampers themselves, capable of communicating the correct opening of these components before starting the unit. Alternatively, if there are motorized dampers on the unit, a timer allows the automatic stop (start) of the fan when the dampers are closed (opened).

According to the type of damper (with manual opening, motorized on/off, modulating, spring return), there are different types of actuators, which are shown in the figure below:

3 Receiving of the packages

Handle the equipment following the Manufacturer's instructions on the packaging and in this manual. Always use personal protective equipment.

The means and method of transport must be chosen by the transport operator according to the type, weight and size of the machine. If necessary, draw up a "safety plan" to guarantee the safety of the people directly involved.

At the moment of receiving the machine check the integrity of the packaging and the number of parcels sent:

A) There is visible damage/one or more packages is missing: **do not** install, but **promptly** notify the Manufacturer and the carrier that made the delivery.
B) There is NO visible damage: move the machine to the site of installation.

N.B.: The packaging is guaranteed for a period of 6 months from the date of manufacture of the same (indicative label placed on the packaging). The company will not be held responsible for any damage due to oxidation or rust formation on any part or component of the unit, after this period. The 6-month warranty is in any case subject to the perfect state of conservation of the wrapping constituting the packaging.

Read the packaging symbols

Externally, the packaging bears all the information necessary to transport the equipment safely: compliance with these instructions ensures operators are safe and prevents any damages to the equipment.

The figure shows the symbols applied to the packaging:

Indicates top and bottom

Indicates that the package must be stored in a dry place because its contents are sensitive to humidity

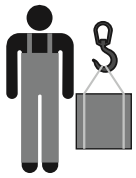
Shows that the package must be handled with care because its contents are fragile

Shows the package's centre of gravity

Shows the position of the cables so that the package can be lifted correctly

Shows the maximum weight that can be placed on top of the package

4 Transport



During the lifting and transport phases there are risks associated with:

- Operations on the machine by unqualified, untrained, uninformed or improperly equipped personnel.
- Incorrect choice or incorrect use of the means of transport and handling (for example, crane, hoist, forklift truck) of the machine components; crushing of handling operators; loss of load stability during transport and handling operations; projection of moving parts of the machine that cannot be removed or fixed properly.
- collisions of parts or components of the machine with people or objects due to unexpected movements of the machine itself or incorrect behaviour by the operators responsible for the operation; impact or fall of machine components, with damage to the machine itself and its protections.
- unhealthy positions or excessive efforts for the operators assigned to transport and handling the machine components.
- Packages can be handled with a lifting hook or pallet truck of suitable capacity. The choice of the most suitable means and method lies with the operator.
- The operating area must be perfectly free from objects or people not involved in the transport.

If the unit is moved using hooks, use some spreader bars between the lifting cables to prevent damage to the unit and ensure no excessive stress is placed on the side panels.

Lifting


Never use two lifting devices at the same time.


Never stand under suspended loads.


If steel ropes are used, always apply the end eye to the lifting hook.


When using steel ropes, be careful not to create sharp bends, i. e. with a radius of curvature smaller than that of the rope end eyelets.


Use ropes of adequate length, so that the angle between the ropes and the horizontal plane is always >= 75° (angle between the ropes <= 30°).


If lifting eyebolts are provided, the end shackles of the ropes must be screwed by hand and turned in their direction of work.

Lifting using hooks

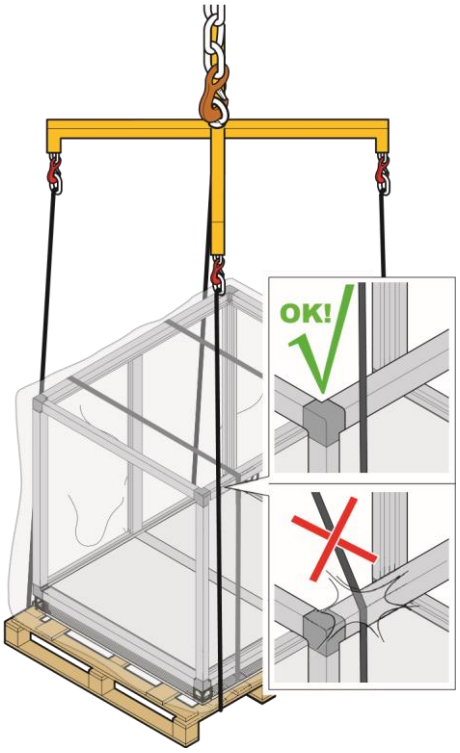

Use hooks of adequate capacity and material for the weight of the packaging to be lifted. Make sure that the safety latch is in the correct position while lifting.


DO NOT handle the equipment if the field of vision is poor or in the presence of obstacles along the way (e. g. electrical cables, lintels, etc.) When the loads are lifted, the range of action of the lifting equipment must remain free of persons.

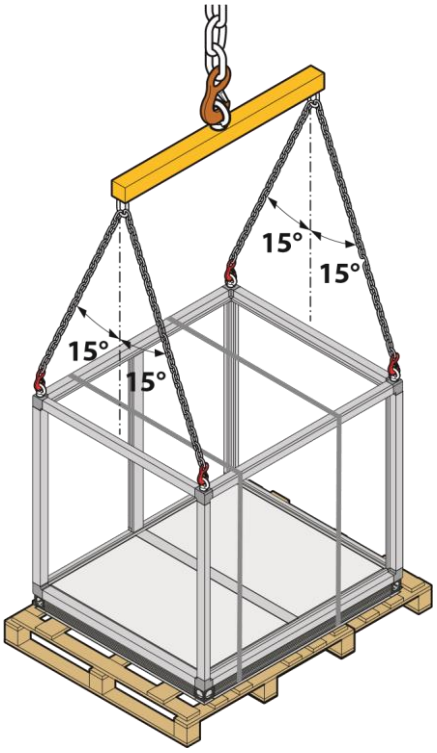

Use perfectly serviceable hooks, chains or steel cables of adequate capacity and material, without any joints or extensions. To guarantee efficiency, carry out periodic checks.


Make sure the ground the lifting equipment rests on is stable and not subject to subsidence. Check the flatness of the ground. Do not move the lifting device with the machine suspended in the air.

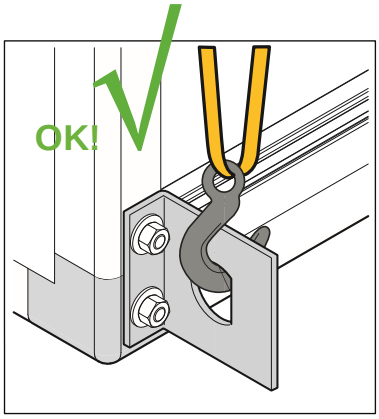
Lifting with ropes

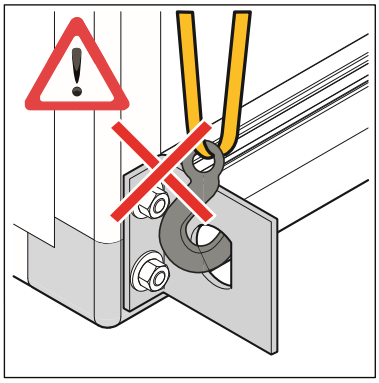


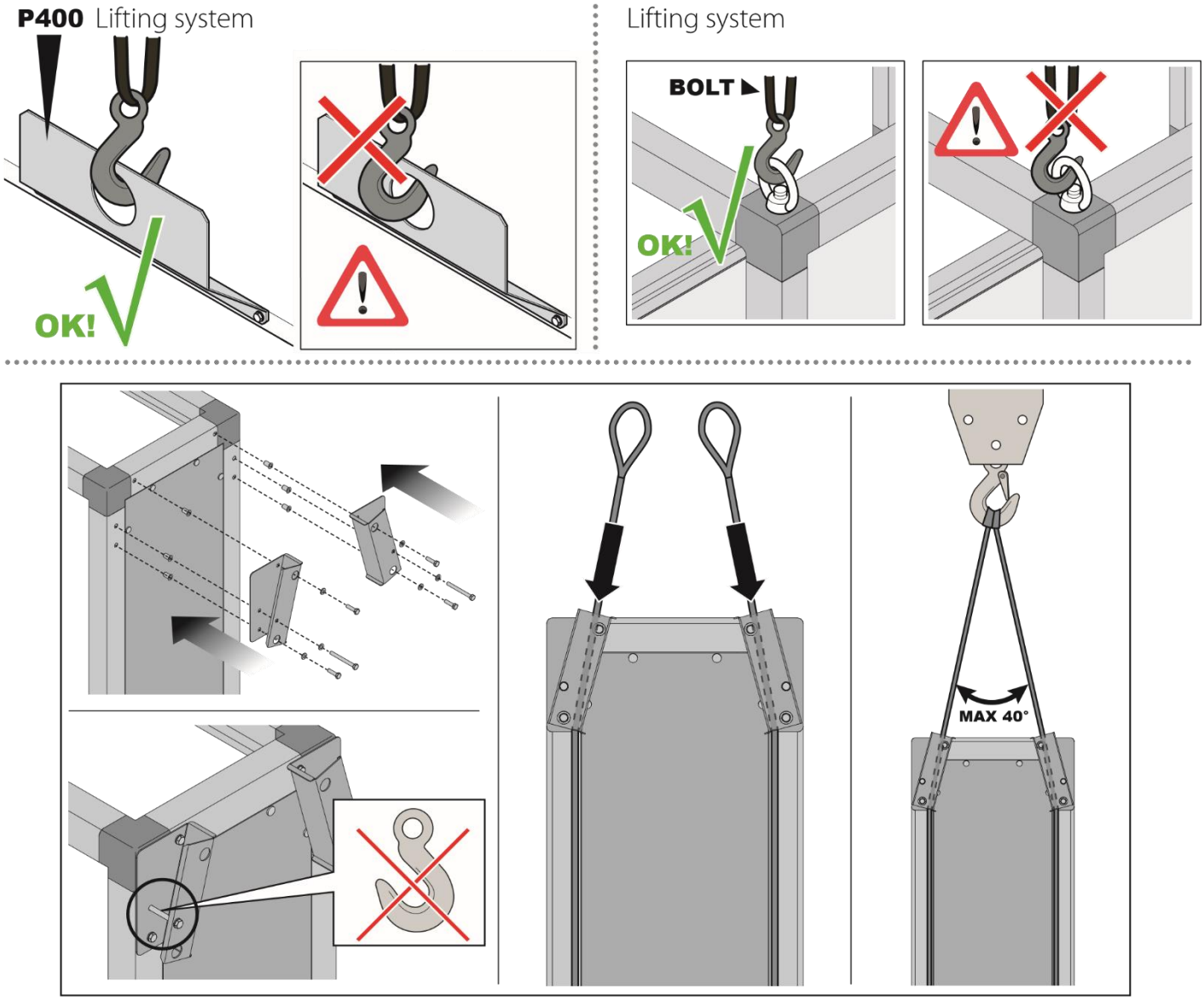
Lifting with eyebolts



Lifting with bracket + hook





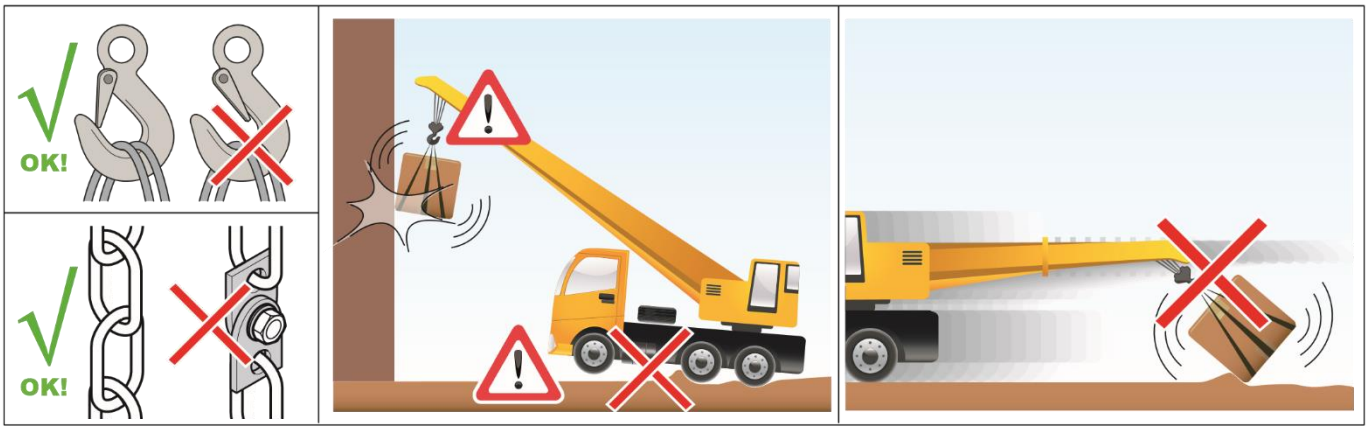


To lift the rotary heat exchanger, where present, use the plates positioned in the upper part of the section, as guide for the roll-over ropes.

N. B.: Do not use the rope guide plates to lift the section for any reason and strictly follow the instructions given in the illustrations.

Before lifting it, check the position of the centre of gravity and that the equipment is correctly anchored to the lifting points provided, then slowly lift the package to the minimum height necessary and move it carefully to prevent any dangerous vibrations.

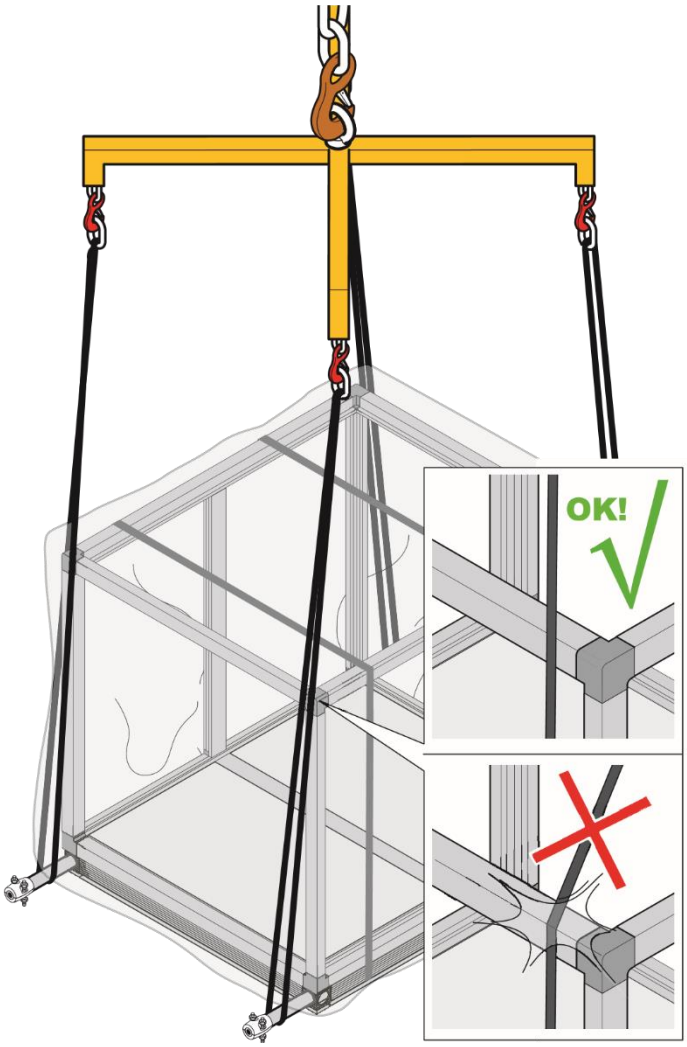
Avoid sudden stops while lifting or lowering the package, to prevent any dangerous oscillations.



Lifting using a pallet truck

If transport is done using a pallet truck make sure it is suitable for the weight and size of the machine. Insert the forks into the points provided for handling (usually in a central position) so as to keep the centre of gravity of the load in balance. Move the equipment carefully, avoiding sudden movements.

Lifting non-palletised equipment

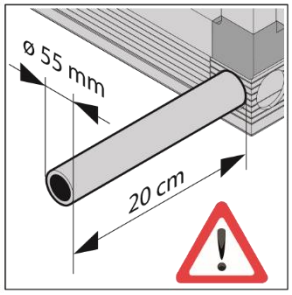


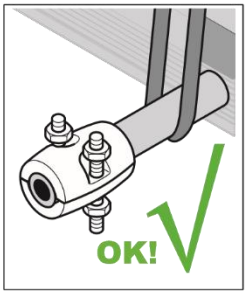
The equipment must be lifted using tubes (not supplied) inserted into the holes provided on the apparatus (ø holes = 60 mm).

The type and diameter of the lifting tubes depend on the weight of the machine to handle. It is the transport operator's responsibility to make the right choice.
Use steel tubes that are in good condition and undamaged.

The ends of the lifting tubes must be closed mechanically to prevent them from coming out of the holes provided.

Position the lifting ropes as shown in the figure, in the part of the tube nearest the equipment.





5 Unpacking and verification of integrity

We recommend the equipment be unpacked after moving it to its installation location and only when it is to be installed. This operation must be performed using personal protection equipment (i.e., gloves, safety shoes, etc.).

Do not leave the packing unattended: it is potentially harmful to children and animals (suffocation hazard).

Some packing materials must be kept for future use (wooden crates, pallets, etc.), while those that cannot be reused (i.e., polystyrene, strapping, etc.) must be disposed of in compliance with the regulations in force in the country of installation: this will protect the environment!

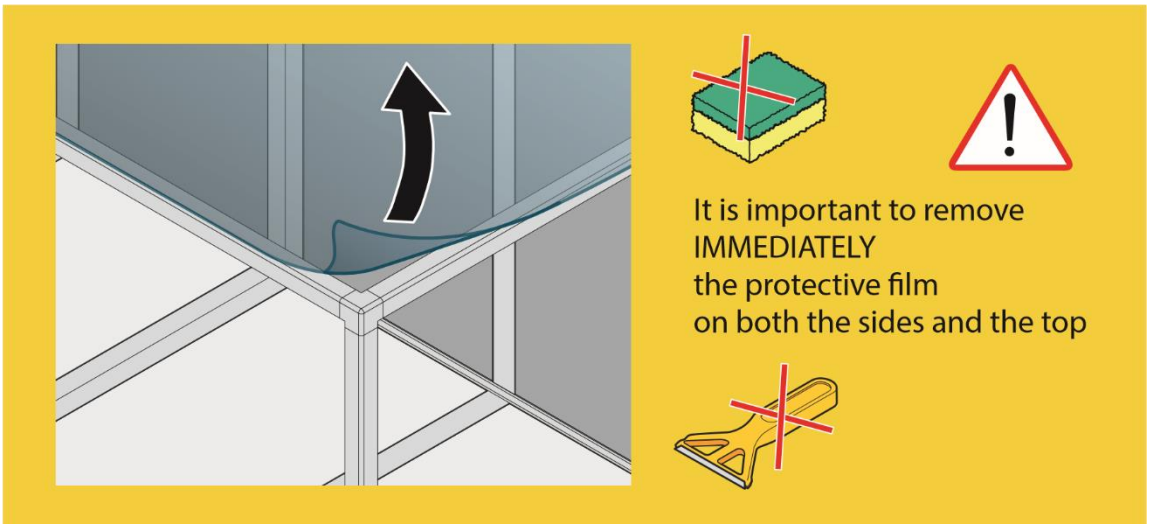
After unpacking

After unpacking, check the integrity of the machine and any additional modules. In case of damaged or missing parts.

- **Do not move, install, or repair** damaged components and the machine in general.
- **Take quality photos** to document the damage.
- **Find the serial number plate** on the machine and note the machine's serial number.
- Immediately **notify** the carrier that delivered the machine.
- **Promptly** contact the Manufacturer (keep on hand the serial number of your machine).

Please note that complaints or claims of damage reported after 10 days of receipt of the machine cannot be accepted.

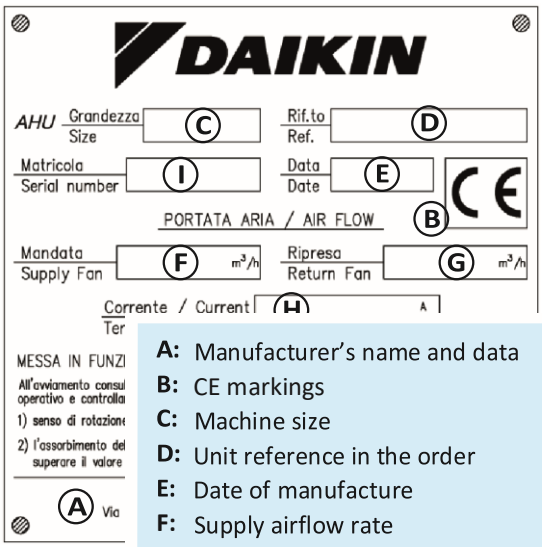
MANUFACTURER INFORMATION:
DAIKIN APPLIED EUROPE S.P.A.



Reading the serial number plate

Identification

For a quick identification of the control unit, just refer to the data shown on the CE plate, placed on the external panelling of a section of the control unit (generally the supply fan section), such as the one shown in the figure.



A: Manufacturer's name and data
B: CE markings
C: Machine size
D: Unit reference in the order
E: Date of manufacture
F: Supply airflow rate
G: Delivery airflow rate
H: Electrical specifications (frequency, number of phases, absorption in plate conditions)
I: Machine serial number

The plate briefly contains the following information:

1) Manufacturer's name and address
2) CE mark
3) Size of the control unit with serial number
4) Unit reference in the order
5) Date of manufacture
6) Supply airflow rate
7) Return airflow rate
8) Main supply voltage
9) Frequency
10) Number of phases
11) Total electrical current absorbed (in rated conditions)

Further additional information, both of a constructive and of a performance nature, is however shown in the specific graphic and technical drawings delivered together with the unit and also attached to this manual.

Storage waiting for installation

Waiting for the installation, the components of the machine and the relative documents must be stored in an area that:

- Is dedicated exclusively to the storage of the components.
- Temperature must be within -25°C and 60°C
- Is covered and protected from the weather (preferably prepare a closed area), with adequate temperature and humidity.
- Is accessible only to operators tasked with the assembly.

- Can support the weight of the equipment (check the load rating) and has a stable floor.
- Is free from other components, especially if they are potentially explosive/incendiary/toxic.

If you cannot proceed with the installation straight away, check periodically that the above-mentioned conditions about the storage area are guaranteed.

6 Installation

All installation, assembly, electrical connections to the mains and extraordinary maintenance must be performed **only by qualified personnel authorised by the Retailer or Manufacturer,** in compliance with the regulations in force in the country the equipment is to be used and the standards on the systems and safety in the workplace.

During installation, the area must be free from people and objects not used for the assembly.

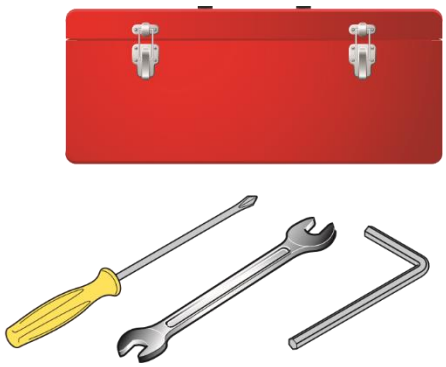
Any movement carried out after unpacking must be done with the doors closed. Do not move the units by pulling on the doors, if present, the uprights or other protruding parts that are not an integral part of the structure.

Do not step on the units!

Before starting, make sure you have all the necessary equipment. Use only equipment that is in good condition and undamaged.

There are two different types of hooks, refer to the assembly instructions for the one in your possession.

Before starting, make sure you have all the necessary equipment. Use only equipment that is in good condition and undamaged.



Before proceeding with the installation of the machine, it is necessary to prepare the power supplies and utilities necessary for the correct operation of the system and, if required, consulting in advance with the Manufacturer's Technical Office.
The machine does not require special environmental conditions for its operation. For a correct installation it is sufficient to prepare a level support surface, indispensable for

the correct operation of the machine and to guarantee the regular opening of the inspection doors.
The altitude of the installation room must be less than 1,000 meters above sea level (at higher altitudes the electric motors deliver powers lower than the nominal ones).
The installation in the workplace must be done in such a way that the machine and its equipment are accessible to allow it to start, stop and carry out maintenance work on the machine.
For the choice of location, in general, care must be taken that an operator can move around the machine without hindrance. The minimum distance to the nearest wall must in any case be at least equal to the width of the machine.
Where there are no means of transport to move the machine, its positioning must take into account the free space required for any repairs. It is of course necessary to plan enough space for regular operation, as well as for machine maintenance, including all the space for any peripheral equipment.

To operate the unit requires:

- Electrical connections;

- Water connections;

- Air duct connections.

Installation procedure

Before installation, read the safety instructions on the first pages of this manual.
Contact the Manufacturer if any points are unclear or not perfectly understandable. A check mark next to each step will help to confirm complete and proper installation.

- ☐ Step 1: Position the unit page 38
- ☐ Step 2: Fasten the units to the ground (optional) page 43
- ☐ Step 3: Make the connections page 48
- ☐ Step 4: Perform a trial run page 74

After installation store this manual and the assembly sheet that accompanied the machine in a place that is dry and clean. This way it will be accessible to operators in the future who need to consult it.
Do not remove, tear out or write on any part of this manual besides the space set aside for notes:

Installer/maintenance notes

Step 1: Positioning of the unit

Check that a suitable **base** has been prepared (fig. 1) for the support and installation of the machine. It must be stable, perfectly flat, made of reinforced concrete and have the capacity to support the weight of the machine.

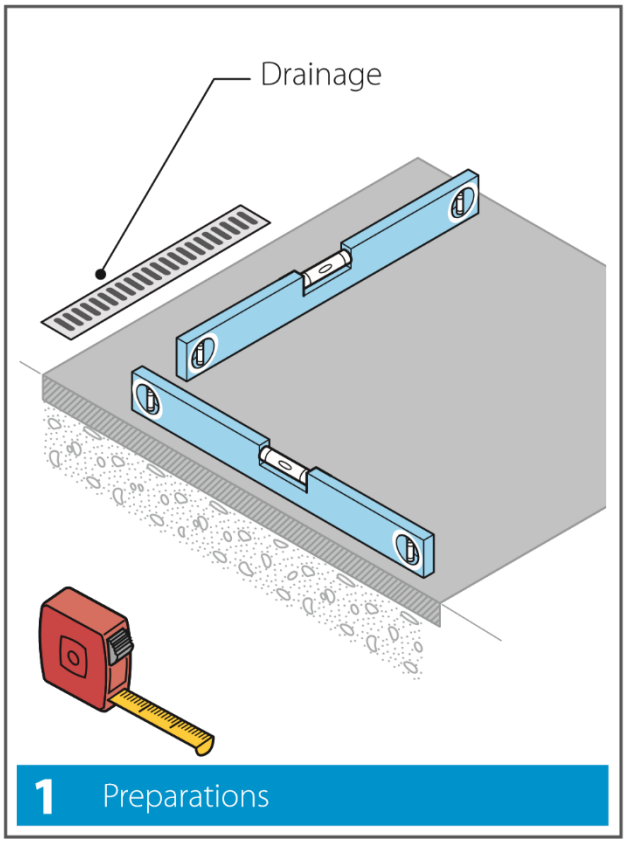
For the size of the base and the weight to be supported, refer to the executive drawing delivered when the machine was ordered.

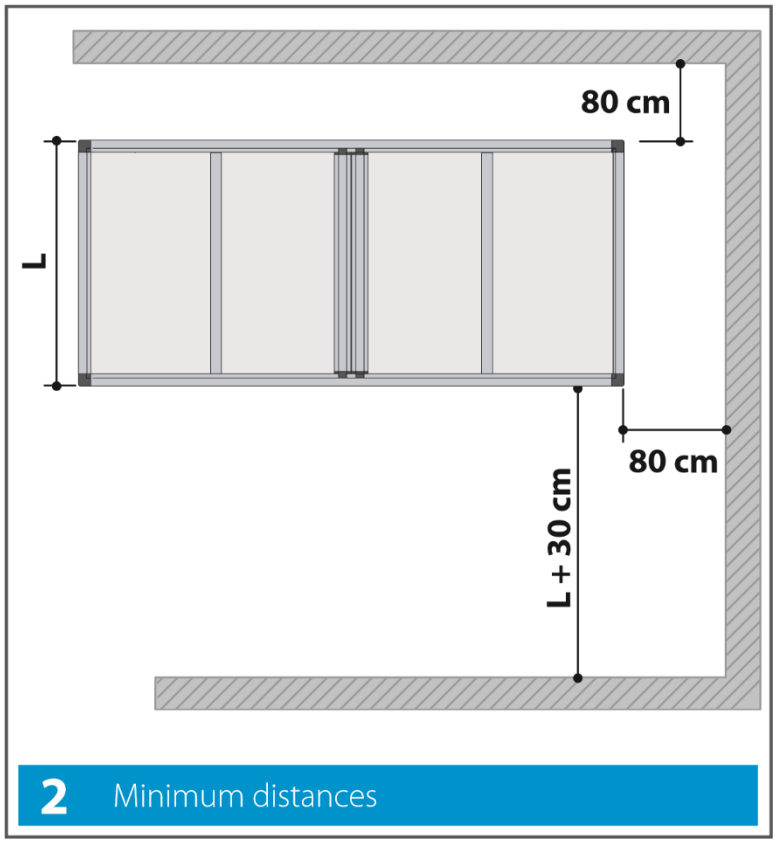
The installation site must also include (fig. 1):

- Suitable **drainage** to convey and drain the water in case of accidental breakage of pipes that carry the fluids to the machine.
- An **electrical system** compliant with current regulations and with specifications that meet the needs of the machine.
- A **water/gas connection** (in the case of connection to coils supplied by water or gas).
- A drainpipe with **drain siphon** connected to the sewerage system.
- an **aeraulic system** (ducts for the air to be conveyed to the environments).

Position the unit above the base. Make sure that the area chosen for the placement has **sufficient space** to allow for subsequent installation and maintenance all around the unit (including replacement of any internal components, for example the removal of heat exchange coils, filters, etc.) (fig. 2 indicates the minimum distances to be maintained). It is advisable to check the extraction side of the components before installing the machine.

Warning! The machines were designed to operate in technological spaces or outdoors. They CANNOT operate in environments with explosives, where there is a high presence of dust, high humidity, or high temperatures unless specific modifications are requested during production.





The acceptance criteria for the flatness of the CRAH are defined by the following points:

- It is mandatory to ensure that the doors can be opened. Any interference between the door and the profile will be avoided with the correct levelling, by inserting metal plates between the base of the section and the ground.

- The flatness of the CRAH support surface will be checked as in point 1 above along the entire perimeter of the CRAH. On the sides without doors, non-coplanarity of a maximum of 2*mm/m is allowed

*In case of non-flatness of the ground, there may be misalignment between different sections

After installation, the following conditions must be met:

- The difference in height of the support base and consequently of the machine can be 1 mm per meter max.
- The height difference over the entire length and width of the machine can be 5 mm max.

If these conditions are not met due to uneven or yielding foundations, appropriate measures must be taken (e.g. spacers of appropriate thickness).

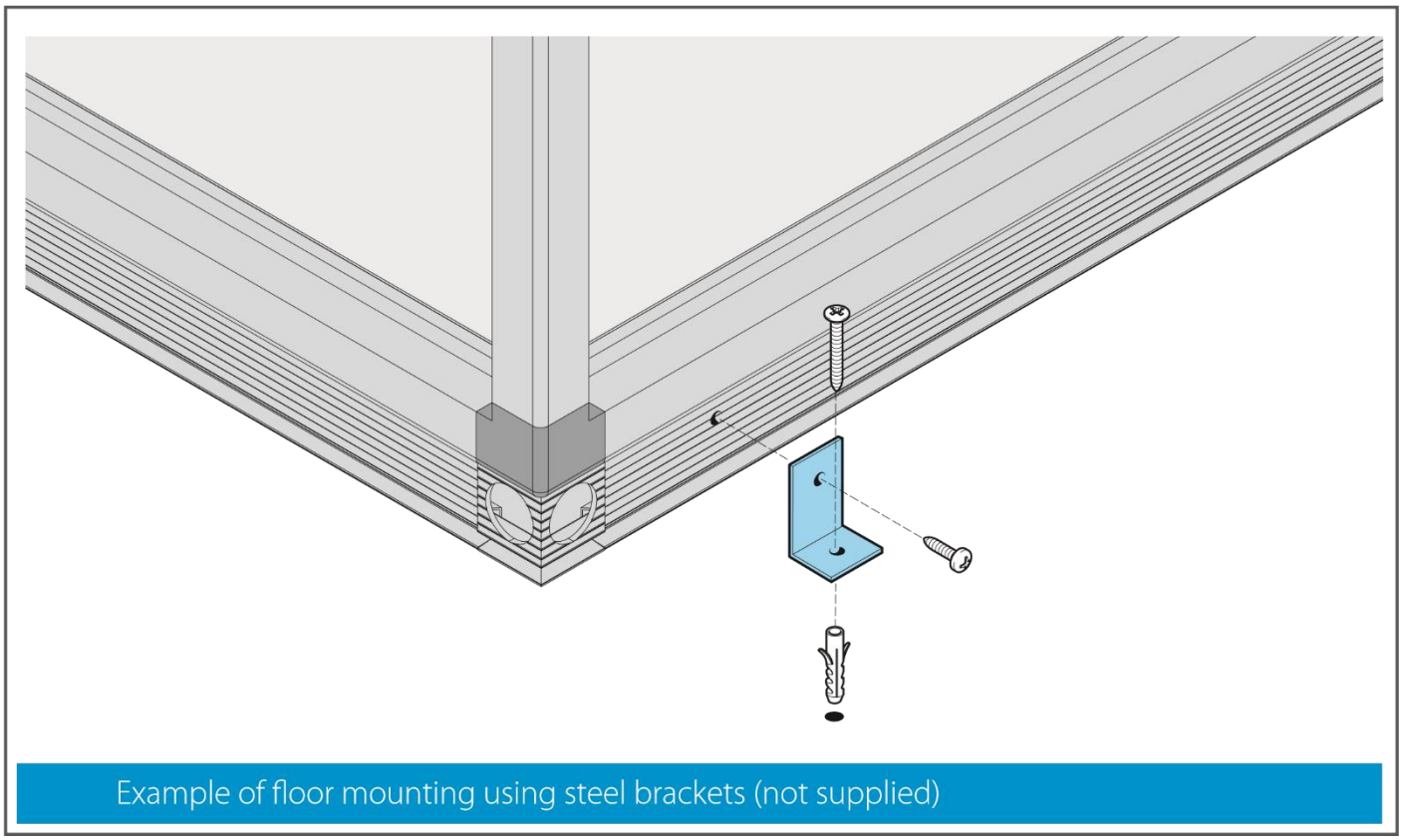
Warning! If these structural conditions are not met, there may be difficulties in opening the doors and dampers and other types of problems with the machine.

After installation store this manual and the assembly sheet that accompanied the machine in a place that is dry and clean. This way it will be accessible to operators in the future who need to consult it.

Step 2: Fasten the units to the ground (optional)

After positioning the units, make sure they are perfectly level, if necessary, inserting suitable solid and stable shims under the supports.
Finish by fastening them to the ground (tools and fastening components not included). The installer is responsible for choosing the most suitable means of fastening based on experience (the drawing includes an example).

There is no need to insert vibration damping material between the machine and the ground as the moving internal parts transmit no residual vibrations to the outside.



Example of floor mounting using steel brackets (not supplied)

Notes

Step 3: Make the connections

To operate the unit requires:

- An electrical connection.
- electrical connection of the fans (unit without control panel)
- A connection to the aeraulic circuit (air ducts).

Electrical connections

Always refer to the wiring diagram that is specific to the unit that you bought (it was shipped with the unit). If it is not on the machine or has been lost, contact the salesperson of reference who will send a copy (specify the machine's serial number).

Before connecting the machine make sure that:

- The voltage and frequency of the power supply correspond to the parameters of the machine.
- The electrical system being connected has sufficient capacity to supply the nominal electric power of the machine to be installed and meets current regulations.

Before connecting the power supply, make sure that the switch on the electrical panel has been turned off

The electrical connection must be:

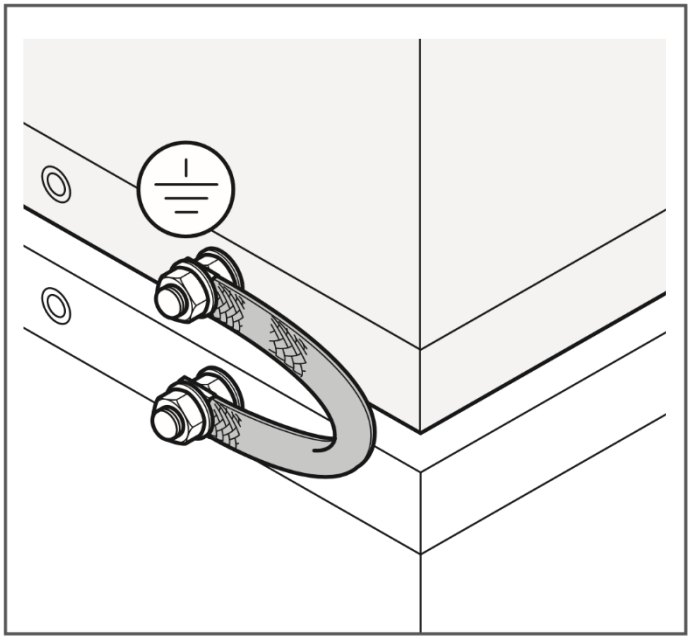
- Performed by qualified personnel after cutting off the facility's power supply.
- executed in a fixed and permanent way, without intermediate joints, in compliance with the regulations of the country of installation and guaranteeing its correct operation.
- The power supply is sufficient for the machine (see technical specifications).
- Includes a functioning grounded plug; for multiple units it is necessary to combine them all with metal ties.
- Preferably situated in a dedicated room, **locked,** and protected from atmospheric agents. If there is also a key switch, the key must be removed when cutting the power supply and returned to its position only after finishing service operations.

During installation and maintenance, make sure that **no other person** besides the one who is working has access to the electrical cabinets or switches.

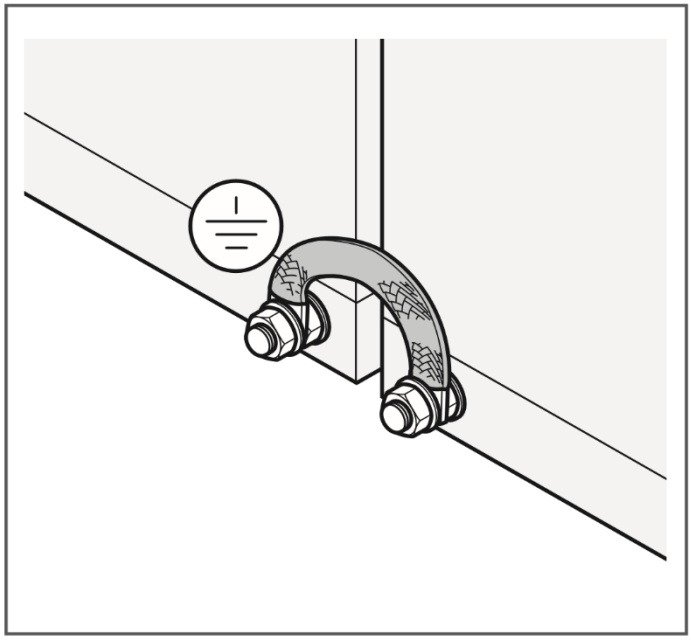
The actual supply voltage of the user devices **must not deviate more than 10%** from the expected nominal voltage. Higher voltage differences cause damage to users and to the electrical system, malfunctioning of fans, noise. It is therefore essential to check the alignment of the actual voltage values with the nominal values. Line frequency must be within 0.99 and 1.01 of nominal value, up to 0.98 and 1.02 for short time. Voltage unbalance must not exceed 2% deviation. Voltage must not interrupt for more than 3ms at any random cycle and more than 1s must pass between two successive

interruptions. Voltage dips must not exceed 20% of the RMS voltage of supply line. More than 1s must pass between successive dips.

The Manufacturer is not responsible for connections made in a manner that does not comply with regulations, with the specifications of this manual, and in the event of tampering with any electrical component of the machine.



Ground connection of two superimposed modules.



Position of the ground connection on the bases of two adjacent modules.

Additional warnings regarding the connection to the power supply:

It is necessary to install a suitable differential-type protection upstream of the machine's power supply connection points, to be able to isolate each of its elements in the event of malfunctions; the choice of the differential protection device must not be in conflict with the provisions of the law, the local regulations, the characteristics of the plant's electrical system and of the machine itself. The unit is compatible with TT-IT-TN power supply systems.

They are recommended, where not in contrast with local laws or system characteristics, differential switches with adjustable current and trip time that cannot be affected by high frequency. The cables connecting the various elements of the machine to the power supply must be shielded or must pass through metal ducting, to reduce electromagnetic interference. The shield or metal ducting must be earthed.

Once the system has been set up, the machine can be connected to the electricity supply network. The actual supply voltage of the user devices must not deviate more than 10% from the expected normal voltage. Higher voltage differences cause damage to users and to the electrical system, malfunctioning of fans, noise. It is therefore essential to check the compliance of the actual voltage values with the nominal values. Before connecting

the electrical panel, make sure that, during installation and maintenance, no other person besides the one who is working has access to the electrical cabinets or switches.

 After connecting, make sure that:

The ground connection is sufficient (using the appropriate tool). An incorrect connection, ineffective and lacking the grounding circuit, is contrary to safety regulations and is a source of danger that can damage the components of the machine.

PE cable must be sized according to regulations:

Cross-sectional area of line conductors S mm^2	Minimum cross-sectional area of the corresponding protective conductor (PE) S_p mm^2
$S \leq 16$	S
$16 < S \leq 35$	16
$S > 35$	$S/2$

The connections are correct, and the current consumption of the motor is lower than indicated on the nameplate.

It is the responsibility of the machine buyer/user to provide adequate instruction and training to machine operators.

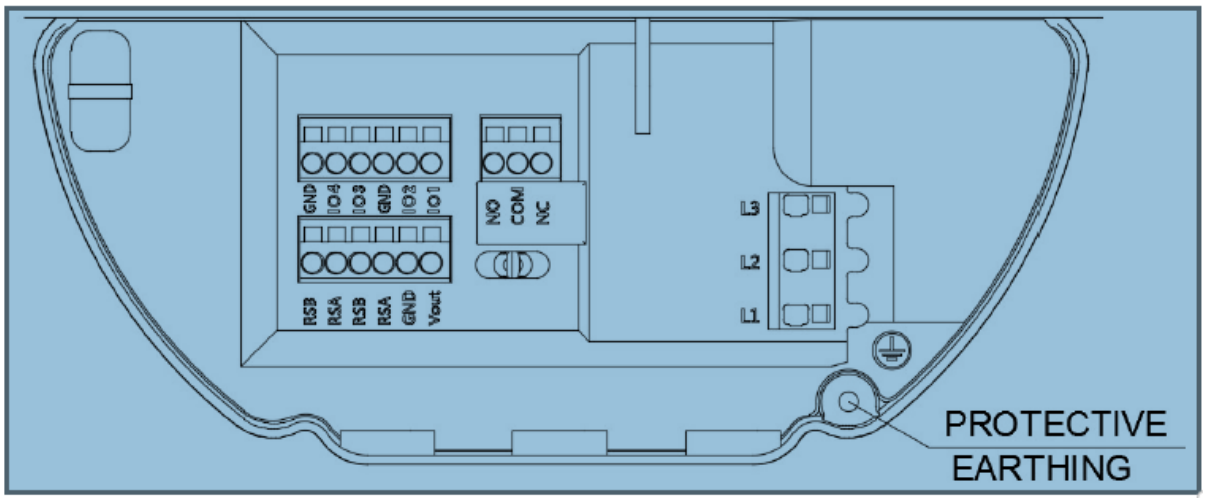
Optional:

In agreed cases, additional training may be provided through the one-on-one instruction of operators by the Manufacturer’s technical staff.

Connections

EC fans connection

DAIKIN fans - Connection terminal blocks



Key:

Power supply: L1 – L2 - L3 = 400/3/50-60 Hz ÷ PE = Ground

Terminals

GND: reference for analogue signal and Modbus line

RSA-RSB: Modbus line

C/COM-NC: Fan alarm signal digital output (open clean contact with fan not powered and in case of failure, closed contact with fan in normal operation).

IO1: Fan operation enabling. Closed contact between IO1 and GND; the fan starts. Open contact between IO1 and GND; the fan stops.

IO2: 4-20 mA analogue signal input for fan speed modulation

IO3: 0-10 V analogue signal input for fan speed modulation

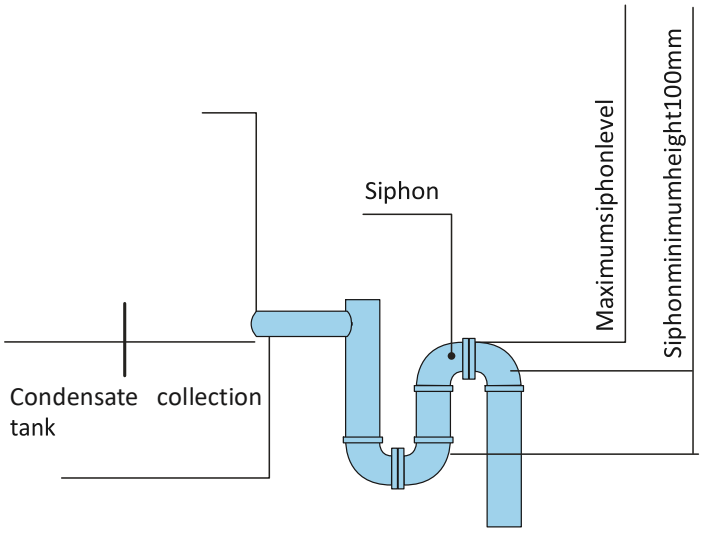
PLEASE NOTE: The fans are driven and monitored by Modbus communication protocol.

Water drainage connections

Drain and siphon

In correspondence with the humidification sections and the thermal exchange cooling coils, the CRAHs are equipped with a threaded drain that **protrudes laterally for about 80 mm.** To allow a regular flow of water, each drain must be fitted with a properly sized SIPHON.

IMPORTANT

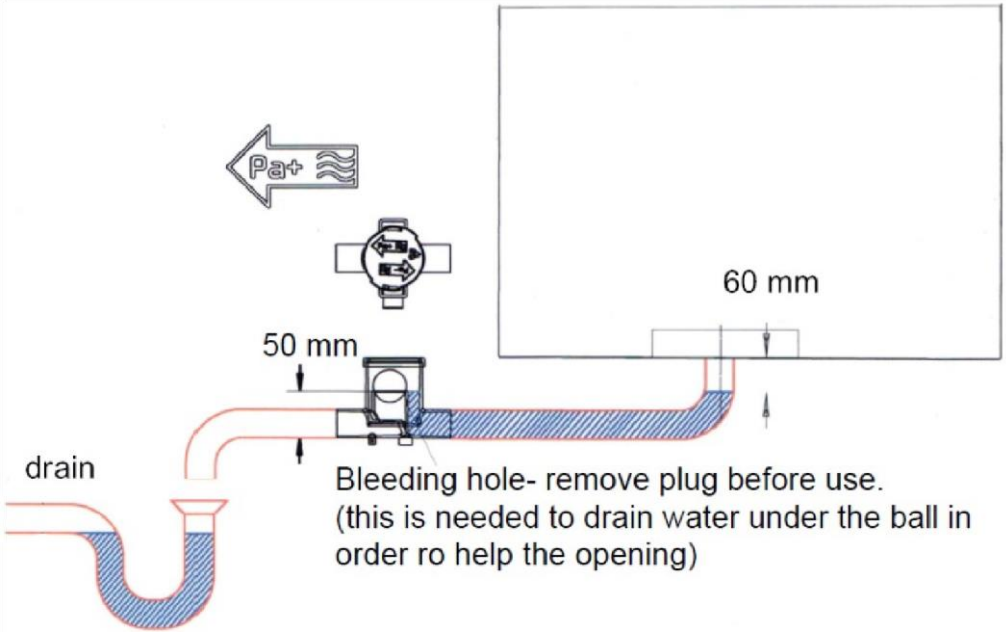


CONDENSATE COLLECTION TANK

With an upper fan head of about 100 mm and a total static pressure, exceeding 1000Pa, increase the height of the siphon by 10 mm every 10 mm of head and every 100Pa of total static.

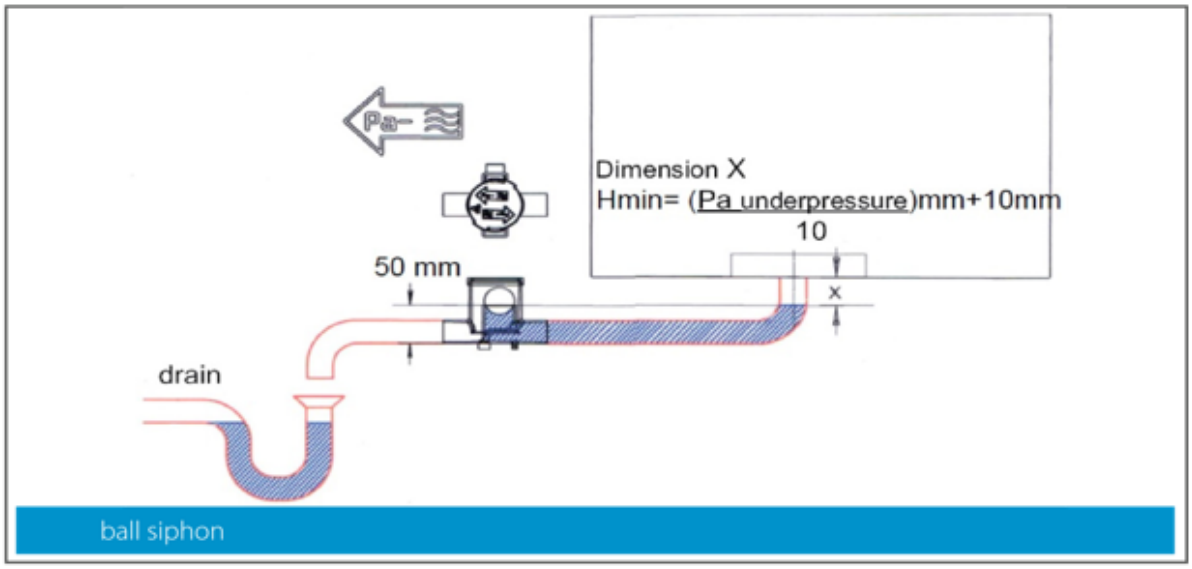
Drain siphon

Ball siphon - Installation with positive pressure basin (section downstream of the fan)

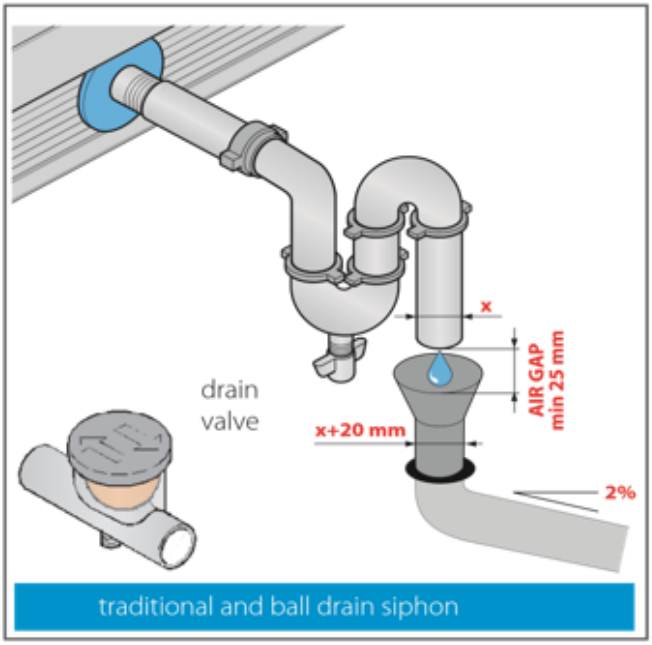


ball siphon

Ball siphon - Installation with negative pressure basin (section upstream of the fan)



ball siphon



traditional and ball drain siphon

To avoid overflows from the collection tank and consequent flooding of the machine as well as the room in which it is installed, the siphon must have a **purge valve** that allows the removal of impurities deposited on the bottom.

In order not to affect the operation of the drainage system, siphons operating under pressure must NOT be connected to others operating under vacuum.

The drainage pipe to the sewerage network:

- **Must not be connected directly to the siphon.** This in order to absorb returns of air or slurry and to make the correct outflow of waste water visible.
- Must have a larger diameter at the machine drain and a minimum inclination of 2% in order to ensure proper operation.

For fan heads not exceeding 1000 Pa (100 mm of water column), H = 100 mm can be considered; for every 100 Pa (10 mm of water column) of fan pressure more than the initial pressure, increase the height “H” by 10 mm. In the case of humidification systems with recirculation pump, to avoid increasing the concentration of salts in the humidification tank, it is important to continuously drain some water into the overflow, appropriately adjusting the valve installed in the by-pass pipe derived from the delivery pipe to the pump. To avoid excessive consumption of water in the humidification tanks it is necessary to adjust the float valve.

In order not to affect the operation of the drainage system, siphons operating under pressure must NOT be connected to others operating under vacuum.

Water coil connections

Connections to water are required for the installation of a water coil.
For the **water** it is necessary to connect the manifolds to **piping having a size that is sufficient for the flow rates envisaged:** to avoid damage to the heat exchange coil in correspondence with the junction between the steel fluid supply manifold and the copper circuits, it is necessary, when fixing the system pipe, to use a double wrench so as not to overload the coil connections.

To ensure optimum heat exchange of the coils it is necessary to:
- WASH them prior to connecting them to the network.
- Completely eliminate the air present in the water circuit using suitable valves.

Apart from the heat transfer fluid used, the thermal exchange with the air occurs in flow, with counter flow injection with respect to the flow of the treated air. Connect the pipes following the indications of the plates placed on the machine's panel.

Take care that no moisture or dirt enters the heat exchange coil.

Example of connection to water coils

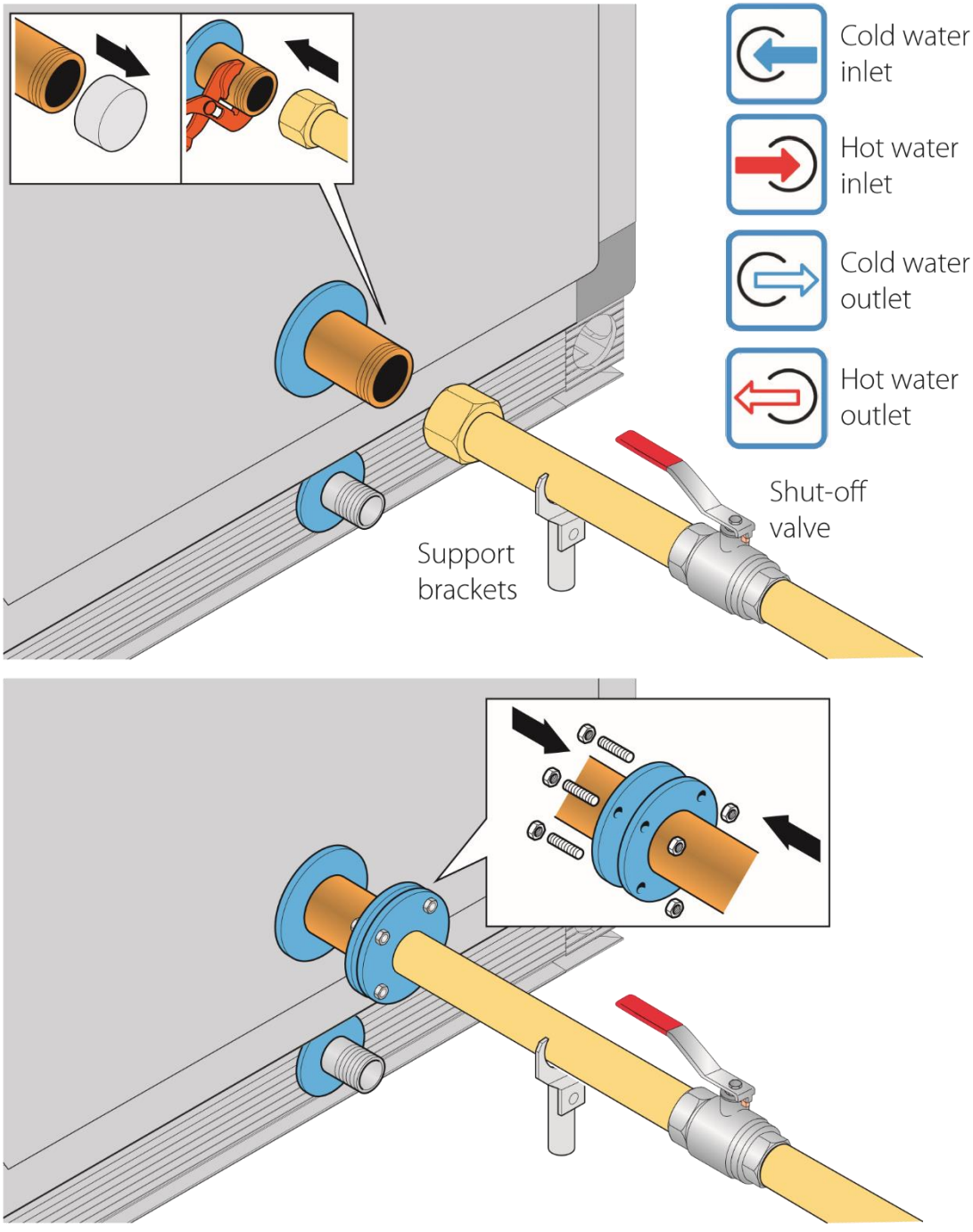
Water-based heat exchange coils

The heat exchange coils are installed with horizontal or vertical pipes.

The circuit pipes must have a size based on the nominal flow rate calculated from the thermal output of the project and indicated in the data sheet of the unit.

Do not use the heat exchange coil connections to support the weight of the piping. It is necessary to prepare appropriate fasteners and brackets (not supplied).

Shut-off valves must be included to exclude the heat exchange coil from the water circuit.



Example of connection to water coils

Acceptability limits of the quality of the water supplying the coils

PH (25°C)	6.8÷8.0		Iron (mg Fe / l)	< 1.0
Electrical conductivity µS/cm (25°C)	< 800		Sulphide ion (mg S2- / l)	None
Chloride ion (mg Cl- / l)	< 200		Ammonium ion (mg NH4+ / l)	< 1.0
Sulphate ion (mg SO24- / l)	< 200		Silica (mg SiO2 / l)	< 50
Total hardness (mg CaCO3 / l)	< 200		Antifreeze	< 60%

Water and steam coil execution **PN16**

Heat exchange coil connections

Note:
After the connection, make sure that there is no air in the system, using the special valves positioned on the water circuit. Shut-off valves must be provided to exclude the battery from the hydraulic circuit. All batteries must be complete with a special valve for complete drainage of the battery itself and for air vent.

Water coils

The piping of the water coil circuit must be sized calculating the water flow rate necessary to obtain the design heat output.

Step 4: Perform a trial run

To commission the unit, it is necessary (tick **"√"** the operations completed):

	Check the proper connection of the fluid inlet and outlet piping to the thermal exchange coils (if present).
	Vent the air from the heat exchange coils.
	Check that there is a suitable siphon for all the water being drained.
	Inspect the correct installation and adequate electrical connection, together with a mechanical and electrical check.
	Insert an anti-vibration coupling between the unit and the ducts if any
	Check the tightening of screws and bolts (especially those used to attach motors and fans).
	Check the integrity of the various accessories.
	Remove extraneous materials (e.g., assembly sheets, tools, clips, etc.) and dirt (footprints, dust, etc.) from inside the sections.

7 Control instructions and preparation for the start-up of the unit and its maintenance

Generalities

The CRAH must not be started until all the work and checks described in this chapter have been completed!

Before starting work, all power switches must be turned **off and locked out.** Furthermore, all the hydraulic and electrical connections to the respective components of the CRAH must already be made and the unit must be connected to the duct system.

After carrying out the above-mentioned connections, it is necessary **to set up the machine,** according to the following:

- Check that the coils are connected correctly (input / output).

- Ensure that all coils are vented.

Check that the system is filled with the correct concentration of glycol if any.

In addition, the start-up instructions described for water coils must be observed.

Water coil

Check that the fluid flow direction through the coil matches the arrows on the coil connections. The direction of the flow must always be such that the water and air are in counterflow.
Incorrect connection will cause a loss of coil capacity. Water batteries are equipped with thin aluminium fins which are susceptible to mechanical damage. A little damage does not affect the exchange capacity of the coil.
However, if the fins are deformed over large surface areas, this could affect performance.

The folded fins can be “combed” with a special tool, so that they can practically return to their original shape.
One comb is suitable for the different fin spacings as shown in the following figure.

Make sure the correct fin spacing is selected when using the comb.
Check that the hydraulic circuit is filled with the correct fluid (water or a mixture of water + glycol) and make sure that the coil and the hydraulic circuit are completely vented (open the vent valves suitably positioned on the highest points of the system until all the air is vented).

The presence of air inside a coil determines the reduction of its exchange capacity and can cause uneven temperatures on its front section.

- Check that the drains are made and connected correctly, checking the correct flow of the condensate.

- Provide for the realization of the siphons.

- Provide for an anti-vibration joint between the ducts and the unit if any

- Check the correct installation of filters.

After removing the filters from the packaging (they are placed in to prevent deterioration during transport), insert the absolute and active charcoal pocket filters into the containment section, paying attention to ensure a rigid assembly and a perfect seal of the gaskets.

The air filters protect the unit and the ducting system from contamination and have a great impact on the quality of the air in the building.
Inspect the filters to check for any damage in the filter medium and check that the filter modules are installed correctly in the filter frames.
Make sure that the measuring tubes are connected properly and in place and are not kinked or pinched. Keep in mind that the life of the filters is significantly reduced after the initial start-up of the unit due to any excessive loads of dust in the air and the presence of other pollutants inside the building. If the CRAH was put into operation even during the construction period of the system, we recommend you replace all filters after commissioning, as described below.

- **Thoroughly clean the building,** the ducts, and the air conditioning system, before starting the unit.

Check that the connections and the motor current draw are correct.

Do not start the motor-fan units without first checking the completion of the machine connections with all the necessary ducts.

A few moments after the first start-up, check the absorbed current value, which for no reason must exceed that of the motor plate.

Check the correct operation of the dampers, checking that the blades of the dampers themselves can rotate freely and do not rub against the housing, ducts, flexible flanges or there are other obstacles. Ducts and anything else must not weight on the dampers but must be supported and held in position by special brackets.

Check that the actuators open and close the dampers correctly.
Check the opening both dampers inside the unit and of any external shutters.

Closed dampers can cause excessive pressures / negative pressures in the CRAH or in the duct system if the fan is on.
The closure of one or more dampers can seriously damage the structure of the unit itself, the air distribution ducts and also the exchange pack of a plate heat exchanger (both crossflow and counter-flow).

Before start-up, if there are shutters with class 4 air loss, according to EN 1751, these must be lubricated in all joints with a suitable lubricant with high adhesion and life.

- Check that all the electrical components, such as microswitches, disconnectors, lights, pressure switches, probes, inverters, etc. are connected correctly and powered.

- Remove any foreign materials from inside the unit.

- Check and keep the inside of the unit adequately clean.

- Check the integrity of the anti-vibration supports and other components.

After carrying out all the inspections and checks described above, it is possible to start and test the entire CRAH.

For further precautions, refer to the manufacturer's manual

Checking the unit safety devices

Checking the efficiency of the safety devices fitted on the machine MUST be carried out prior to commissioning.

Use the following procedure:

- Open one of the inspection doors fitted with a microswitch on the unit, if present.

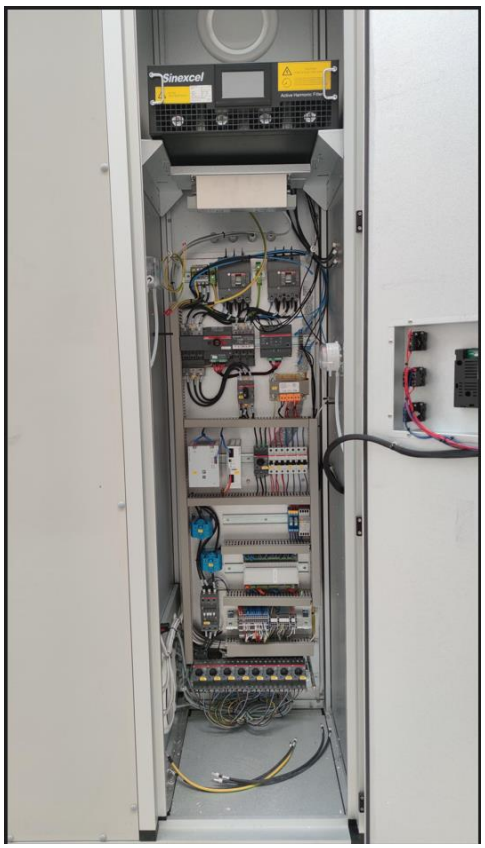
- Check it is impossible to start the unit.

- Close the door and open another door fitted with a microswitch, if present. Repeat the operation for all interlocked inspection doors, checking each time that the unit cannot be started.

- Similarly, press the emergency button on the outside of the control panel and check that the unit cannot be started.

Use of the unit

It is essential, for the correct operation of the unit and to avoid probable breakages or failure, to check the mechanical connection of the actuators to the shaft of the dampers before starting the unit.



Control Panel

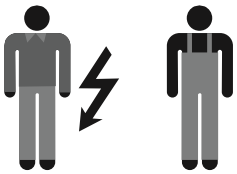
The sequence that leads to the **automatic start-up of the unit** is as follows:

- Open the electrical panel.
- Check and if necessary power on the unit by acting on the internal main switches.

For all the detailed necessary informations to run the unit, **refer to the Professional W Operating manual and to the electrical wiring diagram**.

The unit does not require further intervention by the operator as it has automated start-up and shutdown and these steps are managed by the controller.
If you want to permanently turn off the controller, you must turn off the automatic switch and manage at the main switch.

8 Maintenance



Safety precautions for maintenance

Ordinary and extraordinary maintenance must be carried out **solely by the operator assigned to perform maintenance** (mechanical and electrical maintenance staff) according to the regulations in force in the country of use and respecting the laws regarding systems and work safety. Remember that, by operator assigned to perform maintenance is meant the person who can work on the unit to perform ordinary and extraordinary maintenance, repairs and fine tuning. This person must be an expert operator, properly instructed and trained, given the risks involved in such operations.

Before performing any ordinary and extraordinary maintenance, the unit **must always be stopped (by disconnecting it from the mains)** turning the master switch OFF. The switch must have a key that must be removed and held by the operator who will perform the operations until the end of the maintenance itself.

It is absolutely prohibited to remove any protections from moving parts and unit protection devices with the unit connected to the mains or operational. Adjustments made with safety devices disengaged must be performed **by a single person,** expert and authorised, and during this activity it is necessary to prevent access to the area of the unit by other people. Upon completing the adjustments with safety devices disengaged, the protections must be re-engaged as soon as possible.

During maintenance the operational space surrounding the unit for 1.5 metres must be free of obstacles, clean and well lit. It is prohibited for unqualified people to pass through or remain in this space.

Use personal protective clothing (safety shoes, safety glasses, gloves, etc.) compliant with regulations.

Before carrying out repairs or other work on the unit, **always declare out loud** your intentions to other operators who are in the unit area and make sure that they have heard and understood the warning.

When carrying out maintenance operations with the doors open, **never enter the unit and close the access doors behind you.**

Ordinary maintenance

The most significant and important operations relating to ordinary maintenance can be summarized as follows: - Periodic check of the cleanliness of the filters.

- Check of the control and regulation bodies

The indications given in the previous chapter 7 "Control instructions and preparation for starting the unit and its maintenance" remain valid

The proper maintenance of the systems maintains efficiency (reducing costs), consistent performance over time, and increases the usable life of the equipment.

Below is a table listing the indicative time intervals relating to the main inspection activities and any replacement of consumable components. As stated above, these are indicative times that may differ in relation to the severity of the operating conditions of the unit (temperature, humidity, degree of cleanliness of the treated air, etc.).

ACTIVITY	FREQUENCY			
	A	B	C	D
General cleaning of the machine.		√		
Check and possibly disassemble and wash flat filters.				√
Replace the filters (when they are clogged or deteriorated).	**in case of alarm**			
Clean the finned surfaces of the heat exchange coils (if present) with a jet of compressed air and a soft brush and/or low-pressure steam and/or hot water under pressure (pay attention to the direction of the water jet, which must be parallel to the fins, therefore perpendicular to the battery crossing surface, to avoid bending and deforming the fins themselves)	√			
Clean the heat recuperator exchange surfaces with a jet of compressed air and a soft brush and/or hot water under pressure (the water jet must be perpendicular to the crossing surfaces of the recuperator itself, so as not to compromise its integrity)	√			
Empty and clean the condensate drain pans.		√		
Visual inspection for corrosion, limescale, release of fibrous substances, any damage, abnormal vibrations, etc. (if possible, it is advisable to extract the components for a more thorough inspection).			√	
Check condensates drain and cleaning of siphons.		√		
Check the status of anti-vibration connections.	√			
Check the tightening of the terminals of the electrical power parts		√		
Check tightness of screws and bolts in the fan section.	√			
Check the ground connection.		√		
Check the fan impeller and its devices, removing any dirt and incrustations	√			
Check the integrity and tightness of the connection tubes of pressure gauges, switches, and transducers		√		

Check the mechanical tightening of actuator hub/damper shafts and that the rotation is correct		√		

A: annual / B: half-yearly / C: quarterly / D: monthly

General information on cleaning procedures

Read the safety instructions at the beginning of this manual.

You should consult with your supplier of chemical products to choose the most suitable for cleaning the unit components.

For the cleaning method refer to the instructions of the detergent manufacturer and carefully read the safety data sheet (SDS).

As general guidelines, refer to the following rules:

- Always use personal protection (safety shoes, safety glasses, gloves, etc.).
- Use mild products (pH between 8 and 9) for washing and disinfecting, in normal concentrations. Detergents must not be toxic, corrosive, flammable or abrasive.
- Use a soft cloth or bristle brushes that do not damage the stainless-steel surfaces.
- If you use water jets, the pressure should be less than 1.5 bar and the temperature must not exceed 80°C.
- For cleaning components like motors, damper motors, bearings, pitot tubes, filters, and electronic sensors (if applicable), do not spray water directly on them.
- After cleaning make sure that you have not damaged the electrical parts and the seals.
- Cleaning operations should not involve the lubricated parts, like rotation shafts, because this could affect their good operation and create problems with durability.
- For the cleaning of finned components or dampers use an industrial vacuum cleaner and/or a compressor. Attention, the compressed air flow must run opposite to the direction of the airflow through the unit and parallel to the fins.

Vents

Periodically check that there are no new sources of contamination near the air intake. Each component must be checked periodically for the presence of contamination, damage, and corrosion. The seal can be protected with glycerine-based lubricants or replaced with a new one, if worn.

Exchange coils

The coils must be cleaned at the slightest sign of contamination.
The coil should be cleaned and washed gently to avoid damaging the fins.
For cleaning using a **mild detergent** suitable for the purpose. Do not use alkaline, acidic or chlorine-based solutions.
The batteries can be washed with a slightly pressurised water jet (1.5 bar max): the jet must NOT contain chemicals or microorganisms; moreover, the water must be sprayed in the opposite direction to the air flow.

For pertinent accessories, refer to the enclosed documentation.

Fans

The fans can be cleaned with compressed air or by brushing them with soap and water or with a mild detergent. Finish the cleaning by rotating the impeller by hand to confirm the absence of abnormal noises.

N.B. check frequently the cleanliness of the fans serving environments with polluted air to be extracted (dust, oils, greases, etc.). The accumulation of pollutants on the impeller can cause imbalance and consequent malfunctions and/or breakdowns.

Cleaning filters

The unit must NOT be running when the filters are removed to avoid drawing in outside air that might be contaminated.

The filters must be cleaned often and carefully to prevent dust and microbial build-up. Usually, compact filters can be cleaned **two or three times** before they are replaced. As a rule, replacement is required after 500--2000 hours of operation (it varies depending on the type of filter, refer to the Manufacturer's instructions), but may need to be replaced much sooner according to requirements and degree of clogging.
Compact filters (G3/G4) can be cleaned using a vacuum cleaner or by blowing on them with compressed air and washing them in water.

Only for versions with up-and-over doors:
if the opening of the doors is difficult because of the narrowness of the available space, it is possible to remove them by unscrewing the screws that hold them. At the end of cleaning, it is mandatory to remount the doors.

Correct filter (in the event of replacement)
Check the installation of the prefilters located on special counter-frames with safety springs or guides is correct. After removing the filters from the packing (that they are placed in to prevent deterioration during transport and at the installation site), insert them into the containment section, paying attention to ensure a rigid assembly and a perfect seal of the gaskets.

Remove the filters from their packaging only when ready to install them to avoid getting them dirty and contaminating them.

Make sure that the internal part of the filters is not contaminated by external agents. This operation must be carried out about an hour after the first start-up of the machine, a period during which the ducts are cleaned of dust and various residues. Proceeding in this way preserves the filtering sections that cannot be regenerated.

Extraordinary maintenance

No one cannot predict extraordinary maintenance as it is normally due to effects of wear or fatigue caused by the incorrect operation of the machine.

Replacement of parts

 The replacement of parts should be performed by expert personnel:

- Qualified maintenance mechanic
- Qualified maintenance electrician
- Manufacturer technician

The unit is designed to be able to perform all the servicing necessary to maintain good efficiency of the components. However, it sometimes happens that a component fails due to malfunction or wear, so for replacement refer to the executive schematic. These are the components that may need replacement:

- Filters
- Fan
- Motor
- Inverter/EC motors
- cooling coils

For some of these operations of a general nature we will not enter to detail as these are operations that fall within the abilities and professional expertise of the staff assigned to perform them.

Consumable parts - Spare parts

During the operation of the machine there are mechanical and electrical components that are most subject to wear. These parts must be monitored to carry out their replacement or repair before they cause problems to the correct operation of the machine with consequent downtime.

Some parts subject to wear

- filters

The annexes will include a sheet listing the parts subject to wear specific to the machine ordered. For special components. See the specific annexes detailing the technical specifications. To purchase the spare parts needed for normal and/or extraordinary maintenance, contact Daikin specifying the serial number of the machine noted in the documentation and on the machine’s plate.

Disposal of used materials - waste

DEFINITION OF WASTE

Waste is any substance and object deriving from human activities or natural cycles that is abandoned or destined to be abandoned.

SPECIAL WASTE

Special waste includes:

- Residues from industrial, agricultural, artisanal, commercial, and service processes that in quality or quantity are considered different from municipal waste.
- Deteriorated or obsolete machinery and equipment.
- Motor vehicles and their parts that can no longer be used.

HARMFUL TOXIC WASTE

Harmful toxic waste is all waste containing or contaminated by substances listed in the annex to the directives 75/442/EEC, 76/442/EEC, 76/403/EEC, 768/319/EEC.

Following are describing the types of waste that may be generated during the lifetime of an CRAH:

- Cell filters from the suction unit.
- Rags or paper soaked with substances used for the cleaning of the various parts of the machine.
- Residues from cleaning the panelling.

Waste from the cell filters is to be handled as special waste or harmful toxic depending on their use, the sector and the environment in which they are used.

Waste and scraps may cause irreparable damage if dispersed in the environment.

ELECTRICAL/ELECTRONIC WASTE

"Implementation of the WEEE Directive 2012/19/EU on electrical and electronic equipment waste".

The logo with the crossed-out bin specifies that the product has been placed on the market after 13 August 2005 and that at the end of its useful life it should not be disposed of with other waste but rather must be collected separately. All equipment is made from recyclable metallic materials (stainless steel, iron, aluminium, galvanised steel, copper, etc.) in a percentage higher than 90% by weight. Before disposal make the equipment unusable by removing the power cord and closing any devices for closing compartments or cavities (where present). It is necessary to pay attention to the management of this product at the end of its life by reducing its negative impact on the environment and improving the effective use of resources, applying the principles of "he who pollutes pays", prevention, preparation for reuse, recycling and recovery. Remember that the illegal or improper disposal of the product may result in the application of sanctions provided for by current provisions of law.

Disposal in Italy

In Italy WEEE equipment must be delivered:

- To Collection Centres (also called ecological islands or ecological platforms). - To the dealer from whom the new equipment was purchased, which is required to collect it free of charge ("one to one" withdrawal).

Disposal in countries of the European Union

The EU Directive on WEEE equipment has been implemented differently by each country, so to dispose of this equipment we suggest contacting local authorities or the dealer to ask for the correct method of disposal.

Diagnostics

General diagnostics

The machine's electrical system includes quality electromechanical components and is therefore extremely durable and reliable over time.
Should there be any malfunctions due to malfunctions of electrical components it will be necessary to act as follows:

- Check the fuses of the power supply for the control circuits and if necessary, replace them with fuses having the same specifications.
- Check if the thermal protection switch for the motor has been triggered or if its fuses have blown.

If this has occurred, it may be caused by:

- Motor overload due to mechanical problems. They need to be solved.
- Incorrect supply voltage. Verify the protection trip threshold.
- Malfunction and/or short circuits in the motor. Identify and replace the failed component.

Electrical maintenance

The machine does not require routine maintenance repairs.
Do not modify the machine for any reason and do not add other devices.
The manufacturer is not liable for resulting malfunctions and problems.
Further clarification is available by contacting the manufacturer's Customer Service.

Service

As for the maximum exploitation of the performance provided by the machine and extraordinary maintenance operations, this manual does not replace the experience of trained and qualified installers, users, and maintenance personnel.
In this case, DAIKIN APPLIED EUROPE S.P.A. Technical Service provides:

- telephone support regarding the characteristics and the simplest interventions that can be performed on the machine.
- dispatch of documentary material.
- training of the User's staff assigned to the MACHINE (only on request).
- interventions to modify the machine (only on request).

Troubleshooting table

MALFUNCTION TYPE	COMPONENT	POSSIBLE CAUSE	SOLUTION
NOISE	Fan impeller	Impeller deformed, unbalanced or loose	Impeller replacement or adjustment
		Nozzle damaged	Replacement or adjustment of the nozzle
		Foreign bodies in the fan	Removal
		Motor or fan not attached well	Improved fastening or component replacement
	Bearings	Bearing worn or deteriorated	component replacement
	Motor	Incorrect supply voltage	Supply voltage change
		Worn bearings	component replacement
		Contact between the rotor and stator	Alignment or component replacement
	Ducts	Excessive speed in the ducts	Check of the fan operation and pressure drops in the circuit and in the ducts
INSUFFICIENT AIR FLOW	Ducts and circuit	Load losses superior to the demand	Check of the pressure drops in accordance with the project data.
		Obstructions in the ducts	Cleaning
	Filters	too dirty	Cleaning
	Inverter	Incorrect setting	Check of the working parameters comparing them with the project
	Heat exchange coils	too dirty	Cleaning
	Fan	Fan malfunction	Check of the impeller rotation, suction, and delivery obstructions
EXCESSIVE AIR FLOW	Circuit/ducts	Load losses inferior to the demand	Check of the total static pressure in compliance with the project data.
	Inverter	Incorrect setting	Check of the inverter working parameters comparing them with the project
INSUFFICIENT THERMAL EFFICIENCY	Heat exchange coil	Water side	-Check the connection of the inlet and outlet pipes to the coil is correct. -Check the temperature of the water entering and leaving the battery which must be in accordance with the project data is correct -Check the water flow rate in the coil in accordance with the project data. -Check the opening and operation of the regulating valves are correct.
		Air side	-Check the air flow that passes through the coil, in accordance with the project data. -Check the coil (no obstruction upstream or downstream).

		Adjustment	-Check the correct operation and calibration of probes, thermostats, and thermometers. -Check the positioning of the control probes and coil operation are correct.
		Excessive air flow	Action on the fans
	Coil water pump	Insufficient water flow	
		insufficient pressure	
		Wrong direction of rotation	
	Fluid	Temperature different from the project	
		Incorrect regulation bodies	
WATER LEAK	Heat exchange coil	Dragging of drops due to high air velocity	
	Fan section	Clogged “overflow” drain	
		Siphon connected incorrectly	

Repair log

DATE	SERVICE TYPE	TIME REQUIRED	SIGNATURE

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