



Installation, use  
and maintenance manual

# Modular Light

› Modular L

**Translation of the original instructions**

Modular Light heat recovery units guarantee high quality indoor air at low energy costs. The range consists of six sizes, customisable by adding external modules.

Armed with an extremely flexible development, Daikin air handling units are able to satisfy all types of technical requirements.

Daikin systems guarantee respect for the environment since they are based on high levels of energy efficiency. Reduced ecological impact and low energy consumption make Daikin recovery units ideal for any type of market.

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# 1 Important warnings



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.

## Purpose of the manual

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.
- Use.
- Information for instructing personnel authorised for its use.
- Maintenance activities.


All information refers in general to any unit of the Modular Light ranges. 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 schematic 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.

In the case of divergent information between this manual and the schematic, the schematic will prevail.

## Intended use of the machine

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.

These ranges of units are designed for use in NON-explosive environments. For installation in potentially explosive environments, the manufacturer can design and manufacture suitable machines (anti-explosion) that will be identified by the mark .

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 machine



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 machine



**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 machine'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, in order 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 or temperatures exceeding 40°C (104°F).



After installation is complete, instruct the user on the correct use of the machine.

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.

In order 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.**

# Residual risks

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



The machine is equipped with safety devices to prevent risks of damage to persons and for proper operation. Always pay attention to the symbols and safety devices 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.

# 2 Machine characteristics

## Environmental conditions



Modular Light heat recovery units are designed for use in indoor environments, installed on the ceiling. The unit cannot operate in environments containing explosive material and with a high concentration of dust.



Outside air temperature	-25°C to +45°C
Operating environment temperature	+5°C to +45°C
Temperature of the environment with the machine off (e.g., storage, transport, etc.)	-40°C to +60°C



Thanks to its modularity, each machine is able to adapt to different needs in terms of air flow and thermodynamic treatments.



The optimised choice of every detail, the search for maximum efficiency in each component, the adoption of specific materials and constructive solutions transform environment friendliness and energy savings into valid and advanced technological solutions.

## Environmental contamination

Depending on the installation operating environment, specific regulations must be followed and all the necessary precautions must be taken to avoid environmental issues (a system that operates in a hospital or chemical environment can have problems different from those in other sectors, even from the point of view of disposal of consumable parts, filters, etc.).

It is mandatory for the buyer to inform and train workers regarding proper procedures.

## Noise



The machines have been designed and manufactured in such a way as to produce sound emissions below the threshold of **80 dB(A)**. It should be noted that every environment has its own acoustic characteristics that can greatly affect the noise perceived during operation, therefore it is necessary to consider the noise data provided as a point of reference, while it is up to the buyer to perform specific sound level measurements at the installation site and during the machine's actual use.

# Ceiling and air duct specifications

The **ceiling** where you plan to install the machine **must** be:

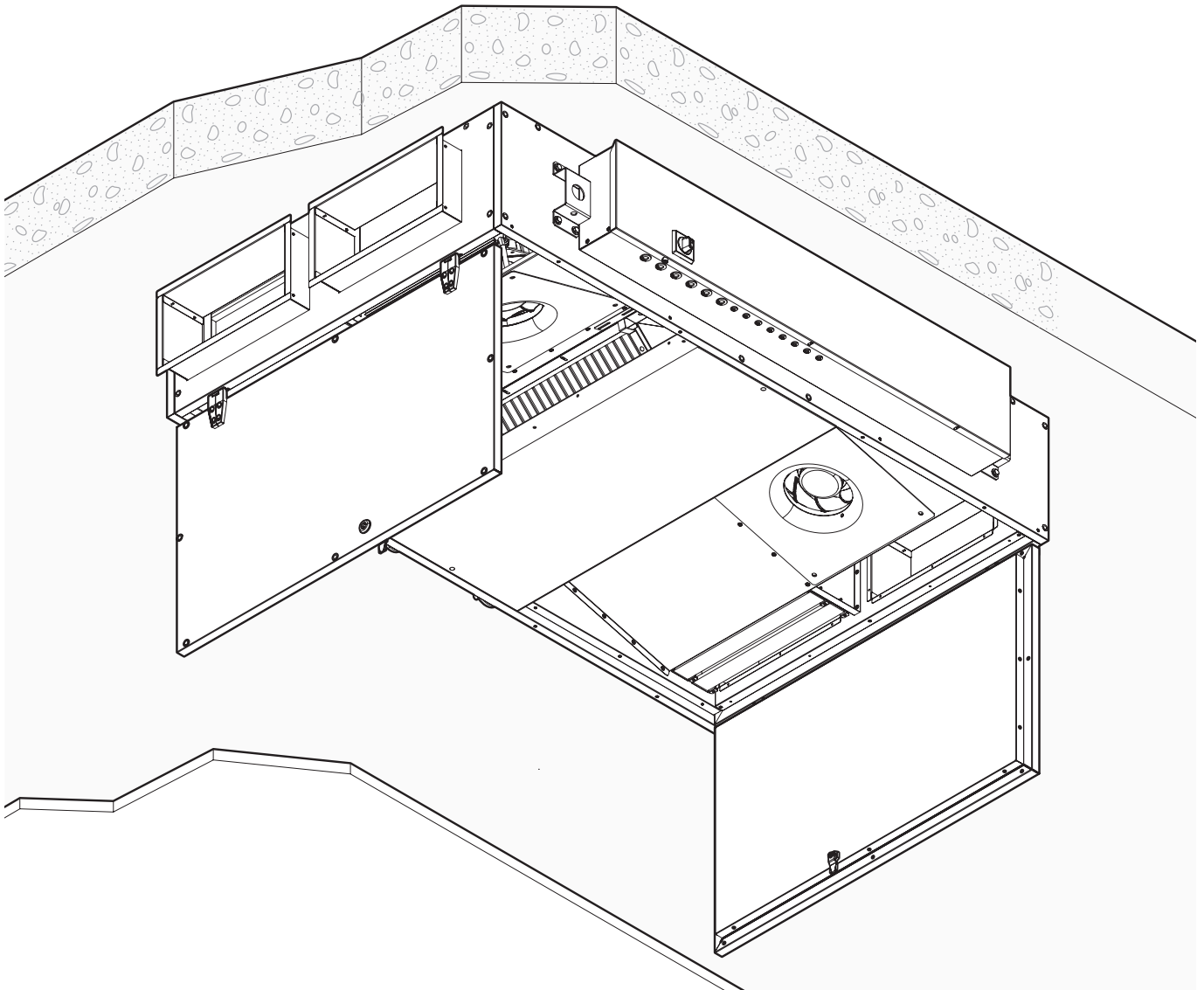
- Perfectly flat and without roughness.
- Vibration resistant.
- Able to **support the weight of the equipment considering an appropriate safety margin** (see table of technical data on page 12).

The equipment installed on the ceiling can adapt easily to the presence of a false ceiling.

In fact, without sufficient space for up-and-over door opening, the inspection door can be transformed into a panel able to slide on accessory guides (optional)

If provided, the **air ducts** must be connected directly to the machine, taking care to insert a suitable anti-vibration system between the machine itself and the duct. When assembly is completed they must not be taut, in order to avoid damage and transmission of vibrations.

To ensure the seal of the connections and the integrity of the machine, it is essential that the air ducts be supported by special brackets that do not weigh directly on the machine.



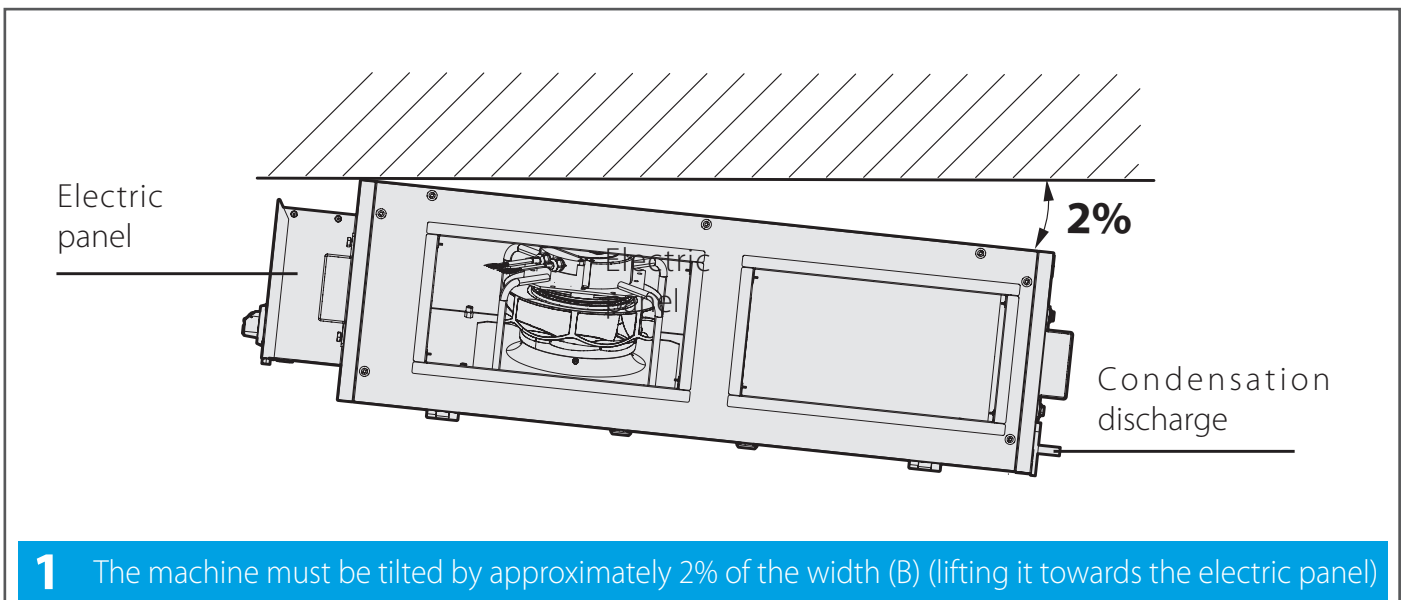
# Technical data

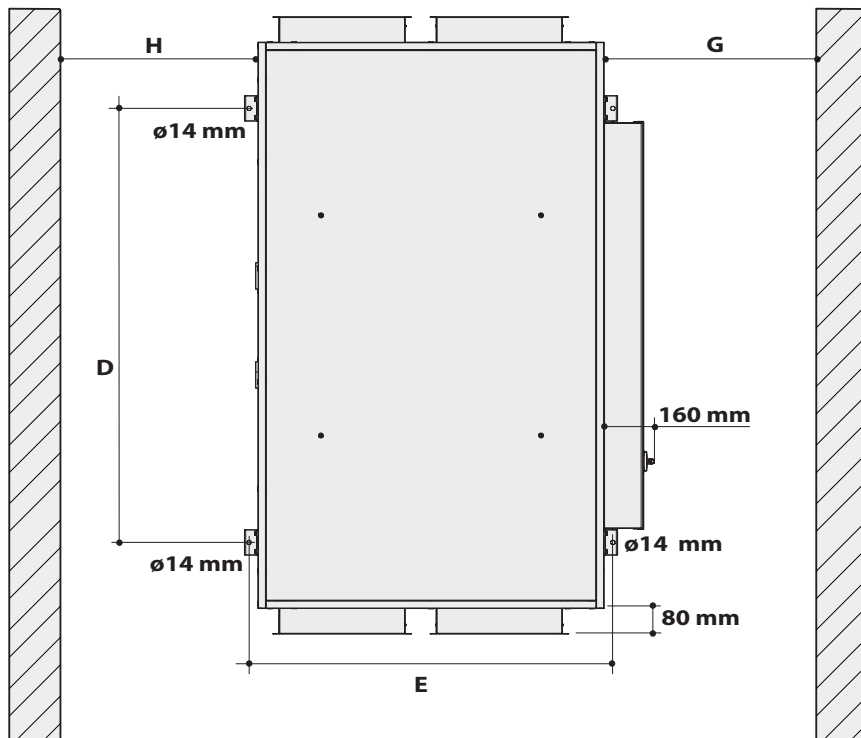
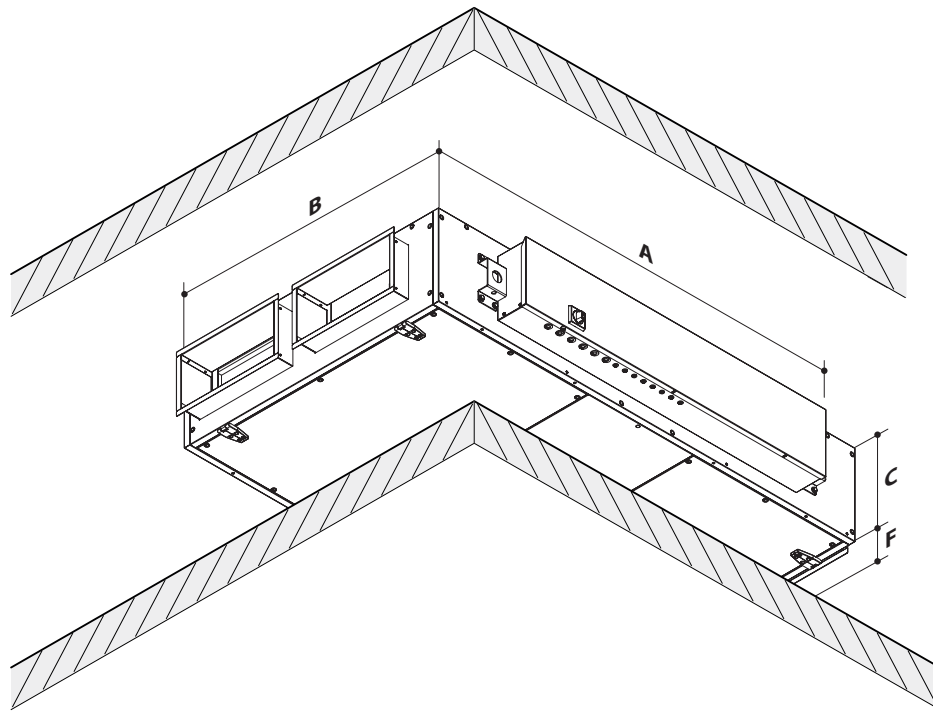
TECHNICAL DATA TABLE	SIZE						
		2	3	4	5	6	7
Nominal air flow rate	m <sup>3</sup> /h	300	600	1200	1500	2500	3000
Heat efficiency	%	89	89	89	89	90	89
FLA	A	2.80	4.50	4.50	4.70	8.90	9.30
FLI	W	371	1033	1033	1033	2033	2033
Electrical connection		200-277 V, 1 ph					

WEIGHT TABLE	SIZE						
		2	3	4	5	6	7
Gross weight with packaging	kg	135	190	285	295	370	375
Device weight	kg	125	180	270	280	355	360
Door weight	kg	2x10,0	2x12,0	2x18,0	2x18,0	2x22,0	2x22,0
Filter weight	kg	2x0,2	2x0,3	2x0,5	2x0,5	2x0,5	2x0,5
Fan weight	kg	2x2,5	2x8,5	2x8,5	2x9,0	4x8,5	4x9,0
Recuperator weight	kg	1x9,0	1x14,0	2x15,0	2x15,0	2x24,0	2x24,0
Tank panel weight	kg	1x13,0	1x16,0	1x24,0	1x24,0	1x29,0	1x29,0

## Preheating external coil

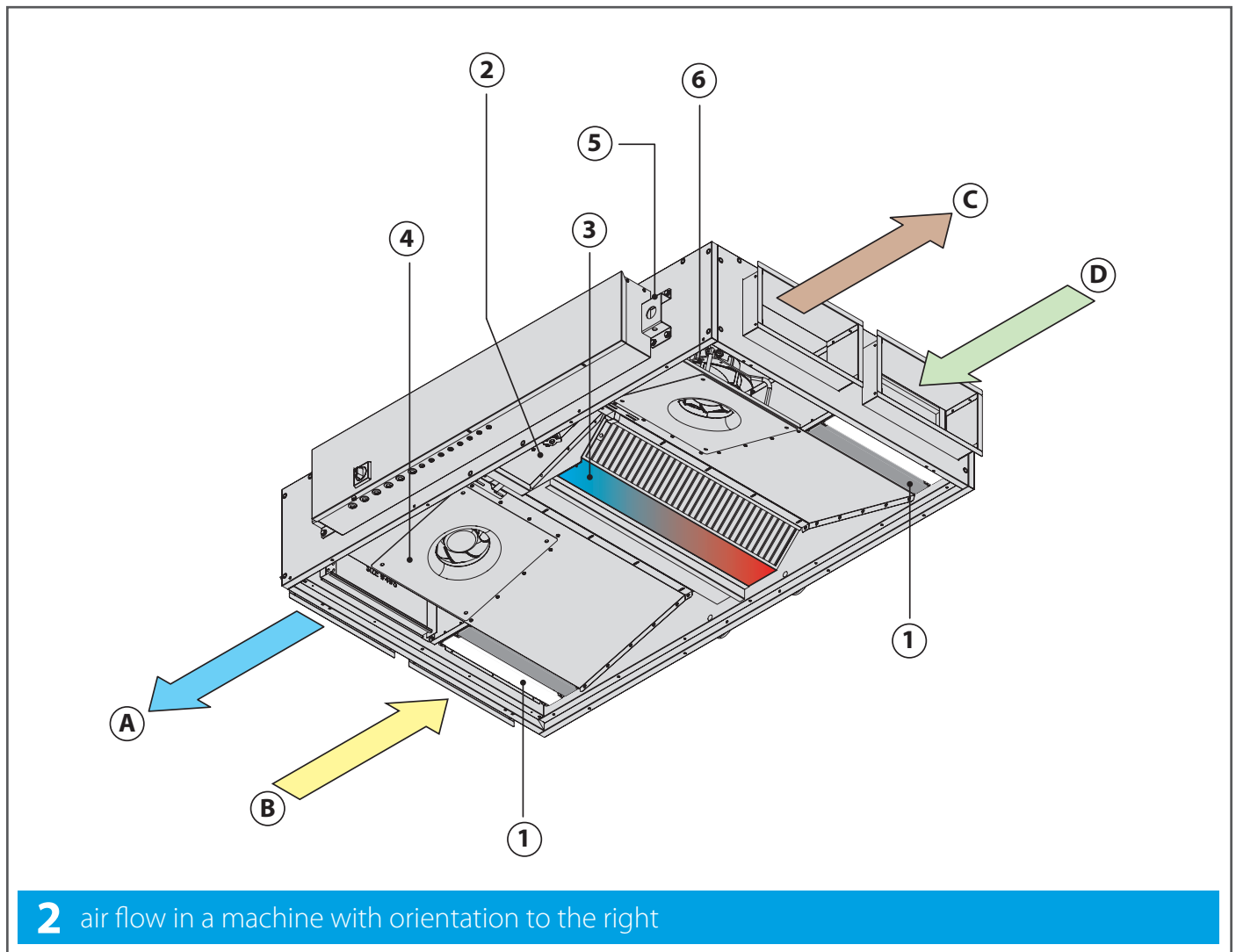
Kindly make sure that the frontal velocity through the preheating element is maintained above 1.5 m/s for safety reasons.





TECHNICAL DATA TABLE	SIZE						
		2	3	4	5	6	7
Length (A)	mm	1660	1800	2000	2000	2000	2000
Width (B)	mm	920	1100	1600	1600	2000	2000
Height (C)	mm	280	350	415	415	500	500
Hole distance (D)	mm	1380					
Hole distance (E)	mm	976	1156	1656		2056	
F (up-and-over doors)	mm	630	670	675			
F (sliding doors)	mm	70					
G	mm	500					
H	mm	300					

# Summary of machine operation



- ① Filter and pre-filter
- ② Exchanger by-pass
- ③ Heat exchanger
- ④ Delivery motor-driven fan group
- ⑤ Delivery motor-driven fan group
- ⑥ Intake motor-driven fan group
- Ⓐ Supply air
- Ⓑ Internal air
- Ⓒ Exhaust air
- Ⓑ Air from outside

Pos.	Component name	Construction material
1	Filter	galvanised steel frame, fibreglass filter unit
2	Bypass	aluzinc
3	Heat exchanger	aluminium
4	Fan motor assembly	size 2: composite board frame and impeller size 3,4,5,6,7: steel frame, composite board impeller
5	Brackets	galvanised steel

# 3 Receipt of the cartons



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.



Upon receipt of the machine check the integrity of the packaging and the amount of parcels sent:

A) There is visible damage/one or more cartons is missing: **do not** install, but **promptly** notify the Manufacturer and the carrier that made the delivery.

Alternatively you can accept the shipment "subject to verification": this will make it possible to open the cartons and check if the internal components are indeed damaged. In the latter case, as noted previously, **promptly** notify the Manufacturer and the carrier that made the delivery.

Before opening the cartons, it is recommended to take good quality pictures to document the damage.

B) There is NO visible damage: move the machine to the site of installation.

# 4 Transport



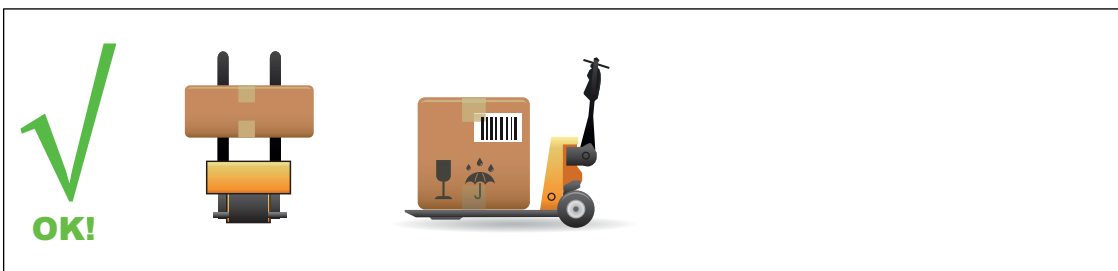
Packages can be handled with a pallet truck of suitable capacity or with a forklift. The choice of the most suitable means and method lies with the operator.



The operating area must be perfectly free from objects or people not involved in the transport.



If 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.





# 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 received contents:

- Installation and maintenance manual (IOM)
- Wiring diagram
- Declaration of conformity

Check therefore that you have received all the components and that they are undamaged

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.

**DAIKIN**

AHU Codifica / Product number: **D** ALB07LBMNADBT00 POS Code: A83665

Matricola / Serial number: **I** 18C0144 Data / Date: **E** 4/2018 Peso / Weight: **C** 373

PORTATA ARIA / AIR FLOW

Mandata / Supply Fan: **F** 3000 m<sup>3</sup>/h Ripresa / Return Fan: **G** m<sup>3</sup>/h

Corrente / Current: **H** 9.3 A Tensione / Voltage: 230V/1Ph/50-60Hz

MESSA IN FUNZIONE / START UP instructions.

**A** DAIKIN APPLIED EUROPE S.p.A. Via Piani di Santa Maria, 72 00040 Ariccia - (ROMA) IT MADE IN ITALY

**A:** Manufacturer's name and data

**B:** CE markings

**C:** Machine weight

**D:** Code and POS

**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

MANUFACTURER INFORMATION:

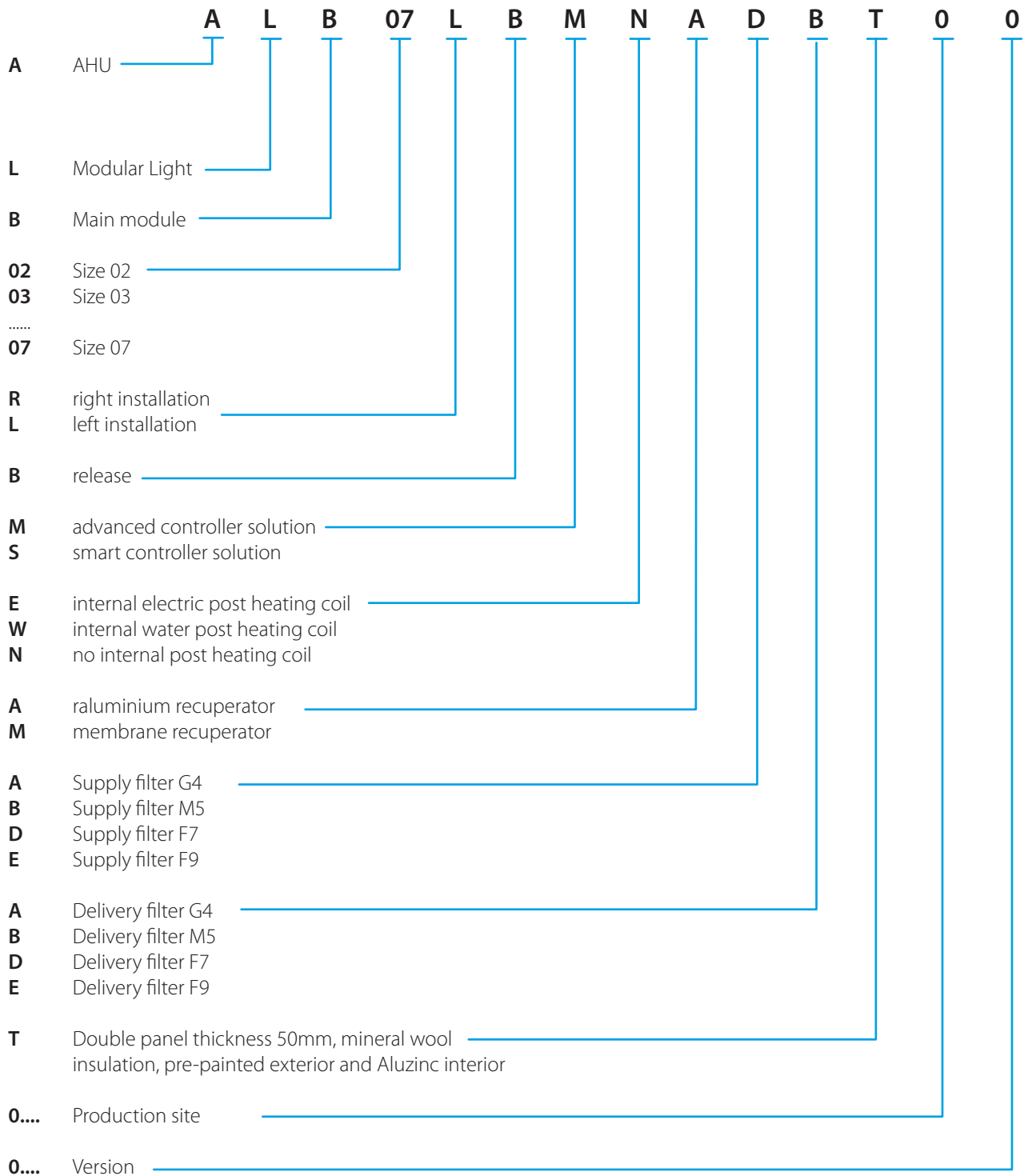
DAIKIN APPLIED EUROPE S.P.A.

Via Piani di Santa Maria, 72 - 00040 Ariccia (Roma) - Italy

Tel: (+39) 06 93 73 11 - Fax: (+39) 06 93 74 014

<http://www.daikinapplied.eu>

# Product nomenclature



Modular Light will be produced according to customer needs. However, we still designed a standard version indicated by only 7 digits ALB01R(L)A and that uniquely identifies a right/left machine, aluminium counter-current exchanger, double 50mm panel, with Microtech controller, no internal post heating coil, F7 at supply, M5 at delivery, version 01.

# Storage waiting for installation

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

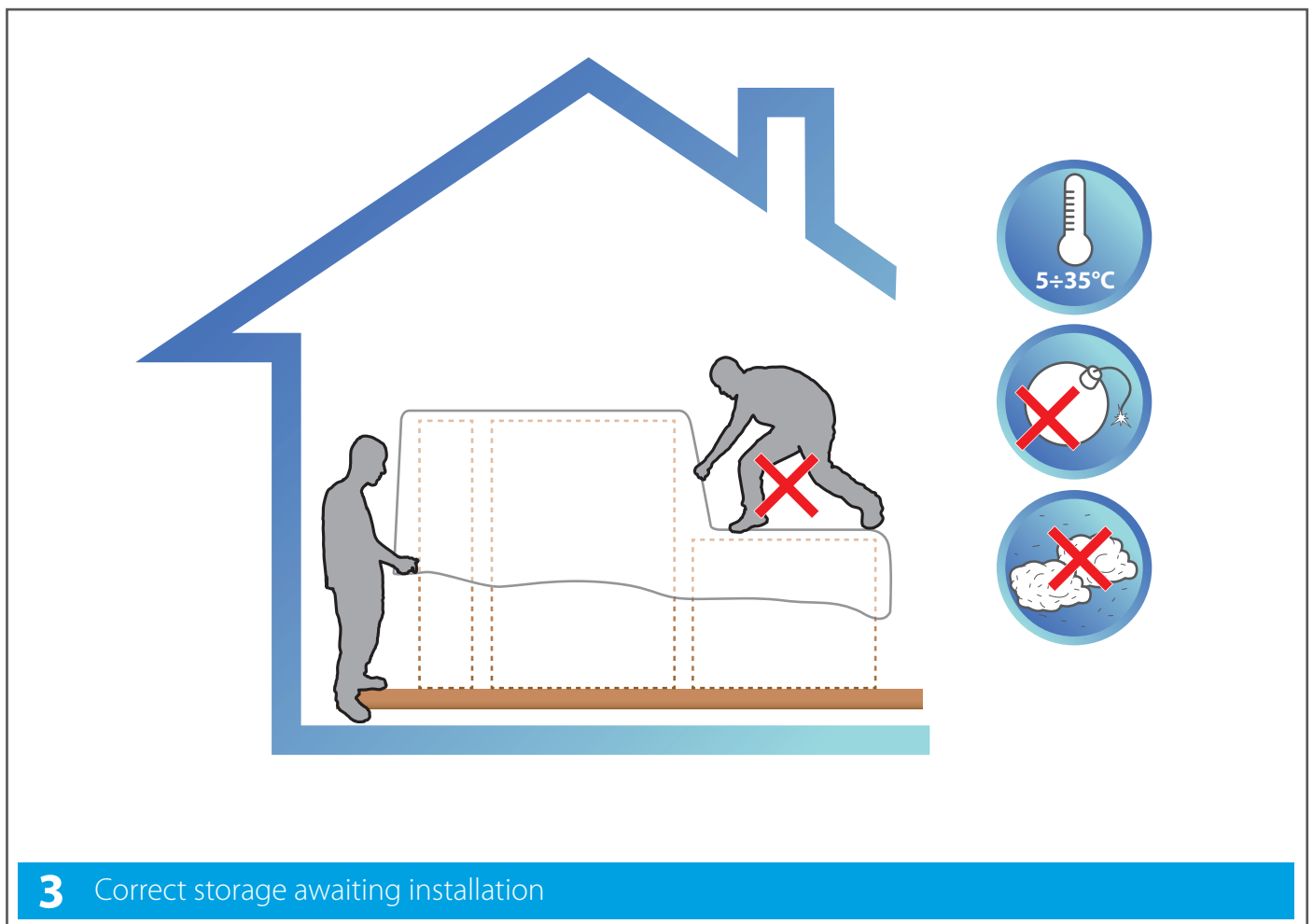
- Is dedicated exclusively to the storage of the components.
- Is covered and protected from the weather (preferably prepare a closed area), with adequate temperature and humidity.
- Is accessible only to operators tasked with the assembly.
- Can support the weight of the equipment (check the load rating) 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 of the storage area are maintained and cover the machine with a canvas.



While waiting for the finale installation, always provide an insulating base (e.g., wood blocks) between the floor and the machine itself.



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!

# 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.



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



## 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.

<input type="checkbox"/>	Step 1: Mark the drilling points .....	page 21
<input type="checkbox"/>	Step 2: Make the connections .....	page 23
<input type="checkbox"/>	Step 3: Perform a trial run .....	page 26
<input type="checkbox"/>	Step 4: Safety signs.....	page 27

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:

### Step 0: Lift the unit to the ceiling

Lift the unit up to the ceiling.



To facilitate the operations of lifting and to ensure the safety of the installers, we recommend the use of extensible pantograph lifts of the appropriate type and dimensions for the weight and size of the unit to be installed.

During lifting protective apparel must be worn to prevent injury, and individuals not assigned to installation or maintenance are NOT allowed to stand or pass through the work area.

## Step 1: Mark the drilling points

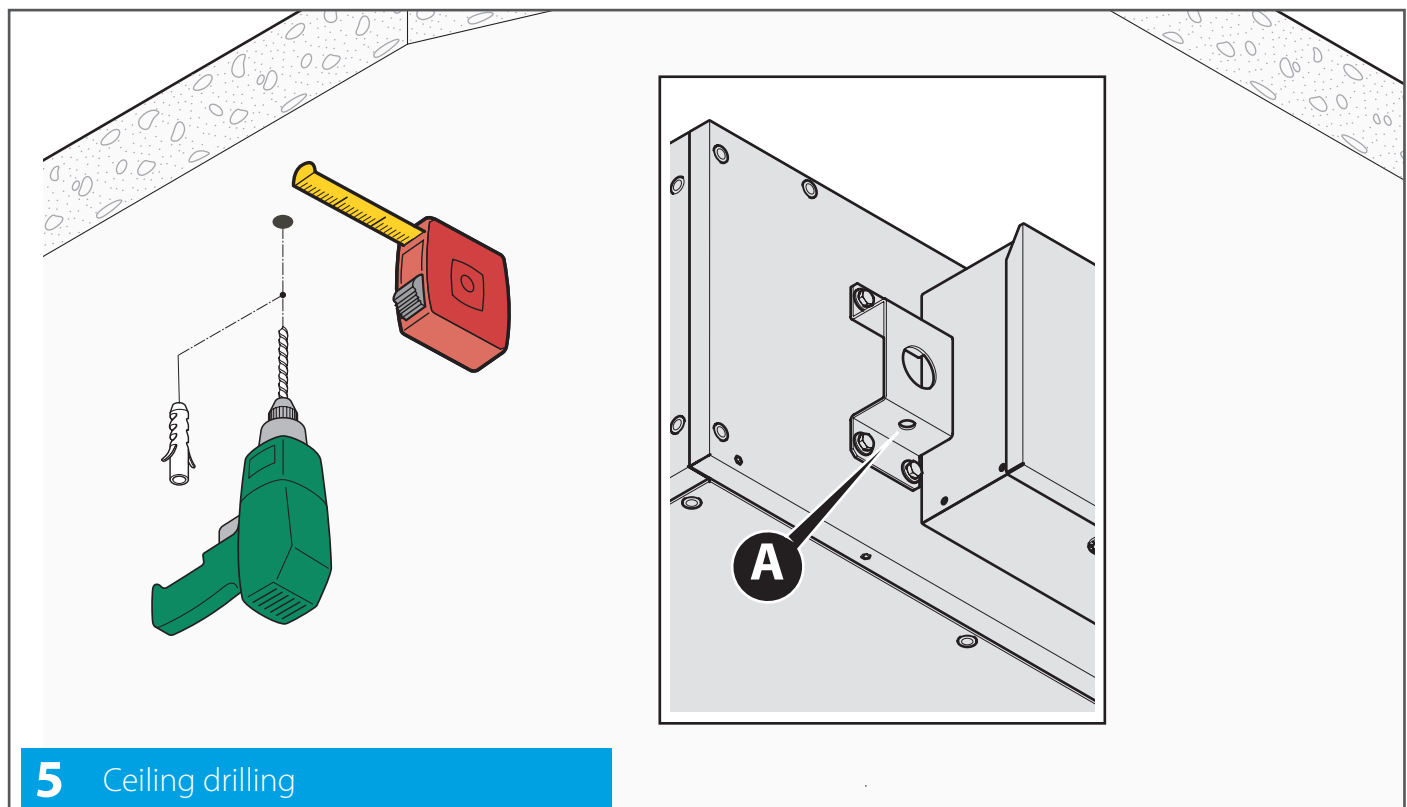
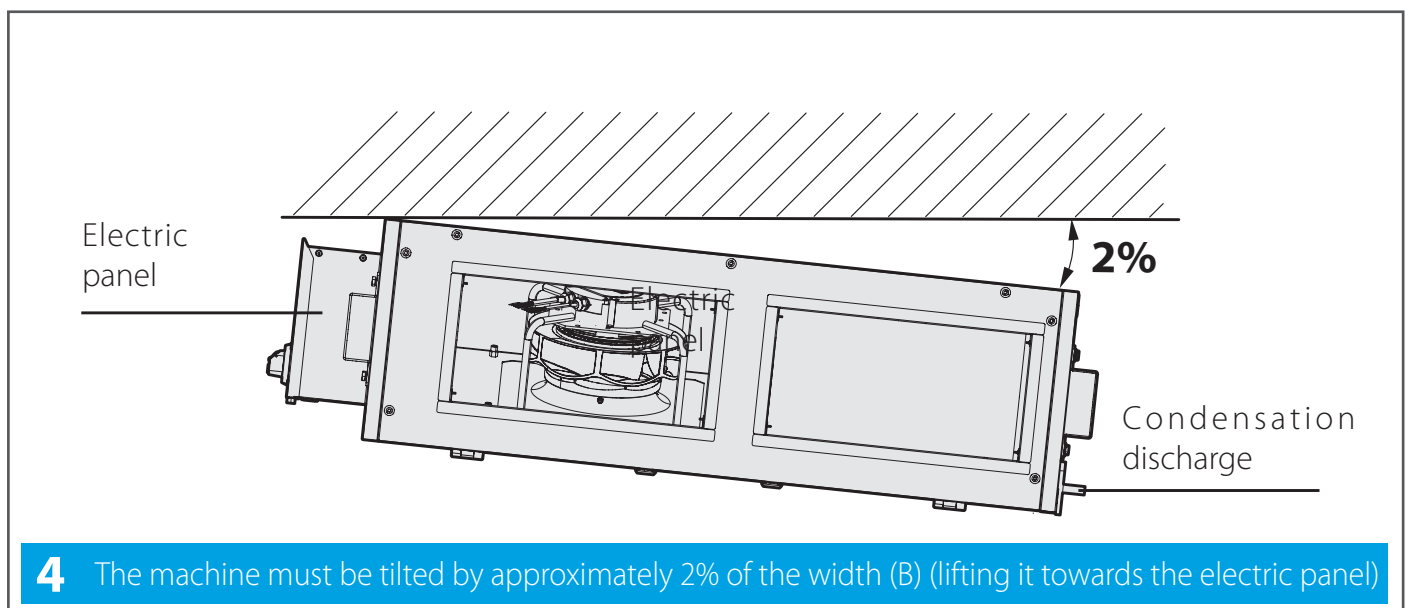
Make sure that the **ceiling** where you plan to install the machine is:

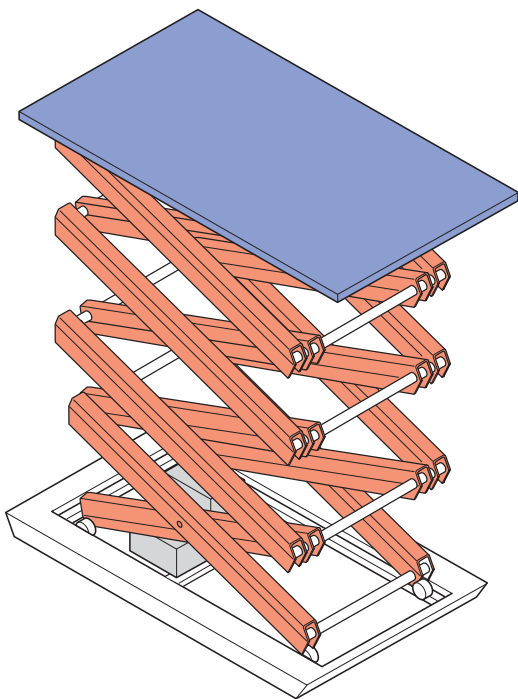
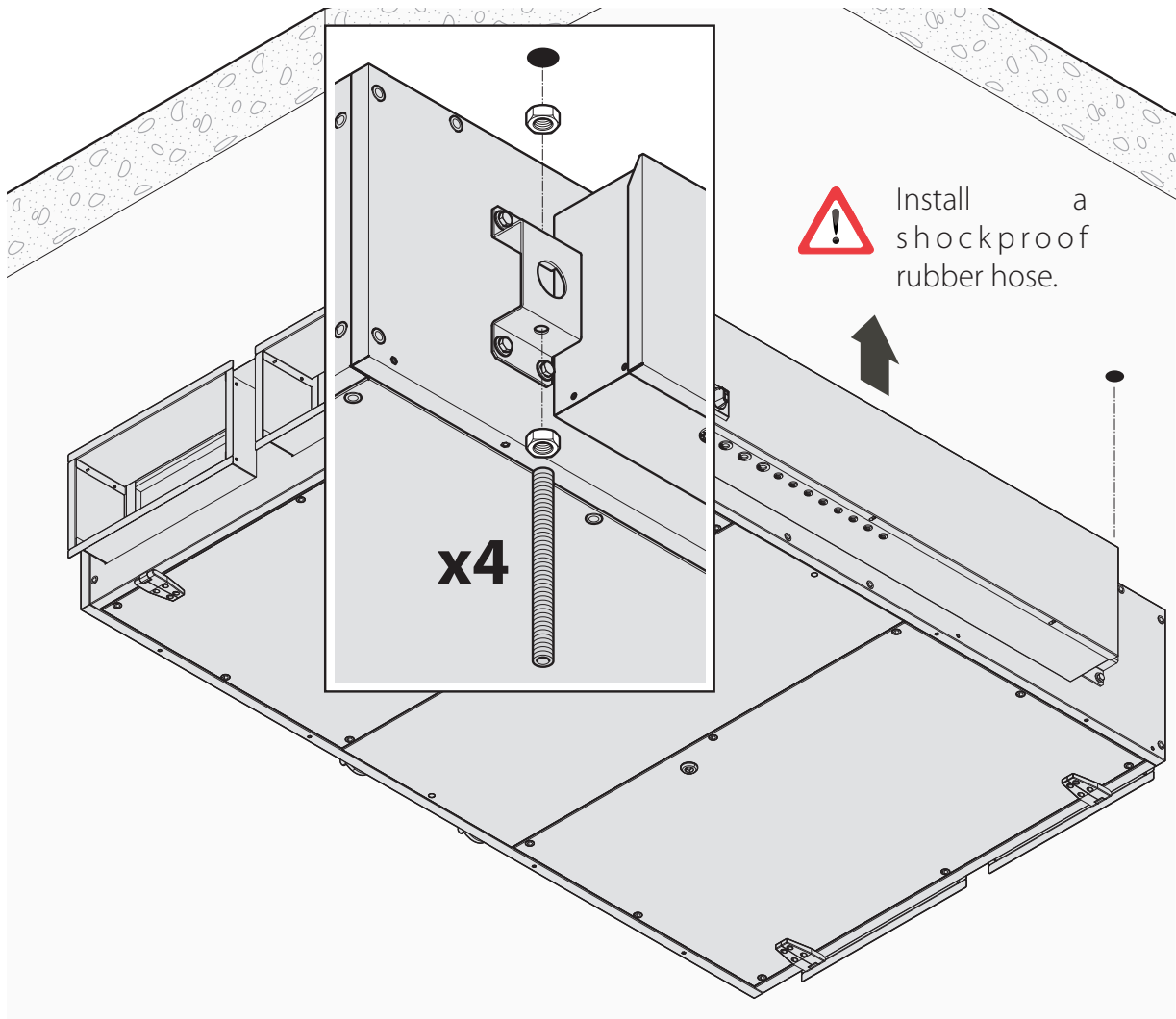
- Vibration resistant.
- Able to **support the weight of the equipment** (see table of technical data on page 12).

The installation site must also include (fig. 4):

- An **electrical system** compliant with current regulations and with specifications that meet the needs of the machine;
- a **coolant gas connection** (in the case of connection to coils supplied by gas).
- A drain pipe with **drain siphon** connected to the sewerage system.
- An **aeraulic system** (ducts for the air to be conveyed to the environments).

Drill  $\varnothing 14$  mm holes at the machine anchor holes **A** (see "technical specifications" table on page 13). Insert the appropriate anchors, lift the machine and fasten it using only the brackets and screws supplied.





While lifting and fastening the unit it is **mandatory** to use protective clothing and suitable equipment, in order to prevent accidents and safeguard your own and other people's safety.

The fastening equipment should be dimensioned according to unit weight.

Individuals not assigned to the installation are NOT allowed to stand or pass through the work area during assembly.



To facilitate the operations of lifting and to ensure the safety of the installers, we recommend the use of extensible pantograph lifts of the appropriate type and dimensions for the weight and size of the unit to be installed.

## 6 Ceiling drilling

## Step 2: Make the connections

To operate the machine requires:

- An electrical connection.
- Drain.
- A connection to the aeraulic circuit (air ducts).

### Electrical connections

For the **power supply** it is necessary to connect the machine to an electrical panel in compliance with current regulations.



**Always refer to the wiring diagram that is specific to the machine 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.

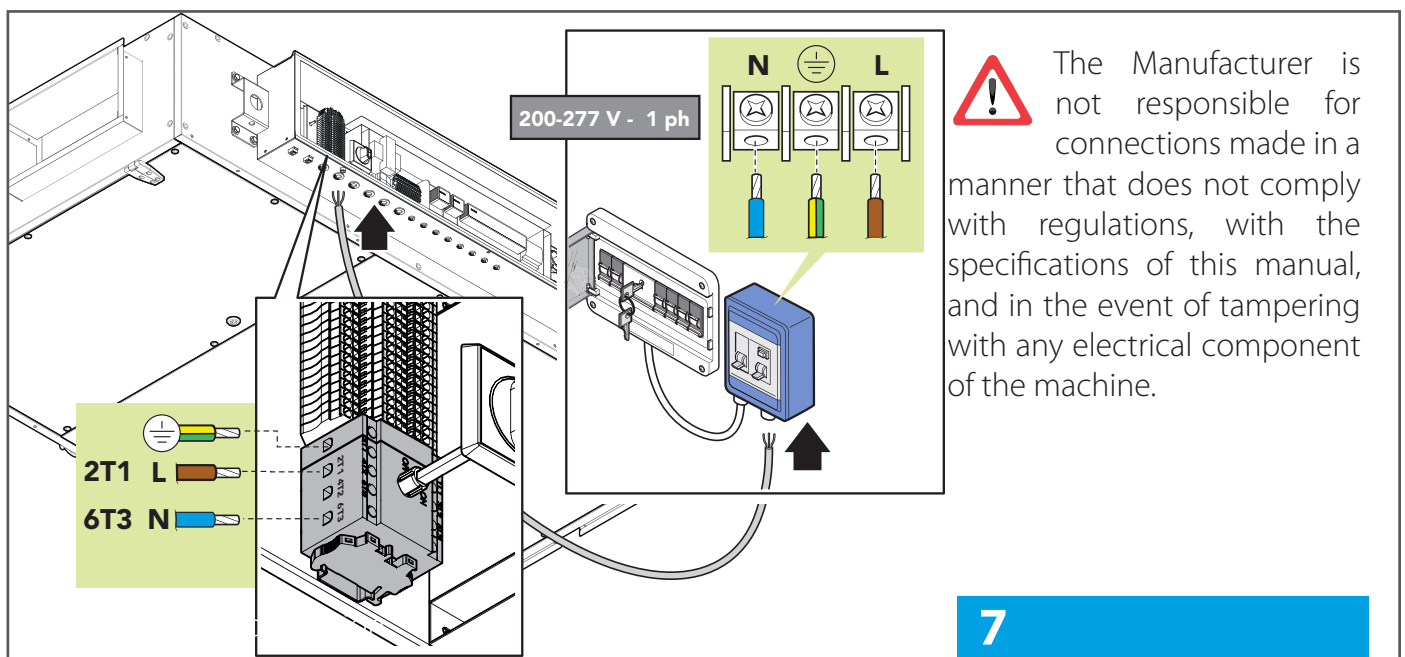


The electrical connection must be:

- Performed by qualified personnel after cutting off the facility's power supply.
- Performed in a fixed and permanent manner, without intermediate splices, in accordance with the regulations of the country of installation.
- 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.
- install a **16A circuit breaker system** or suited to machine absorption



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





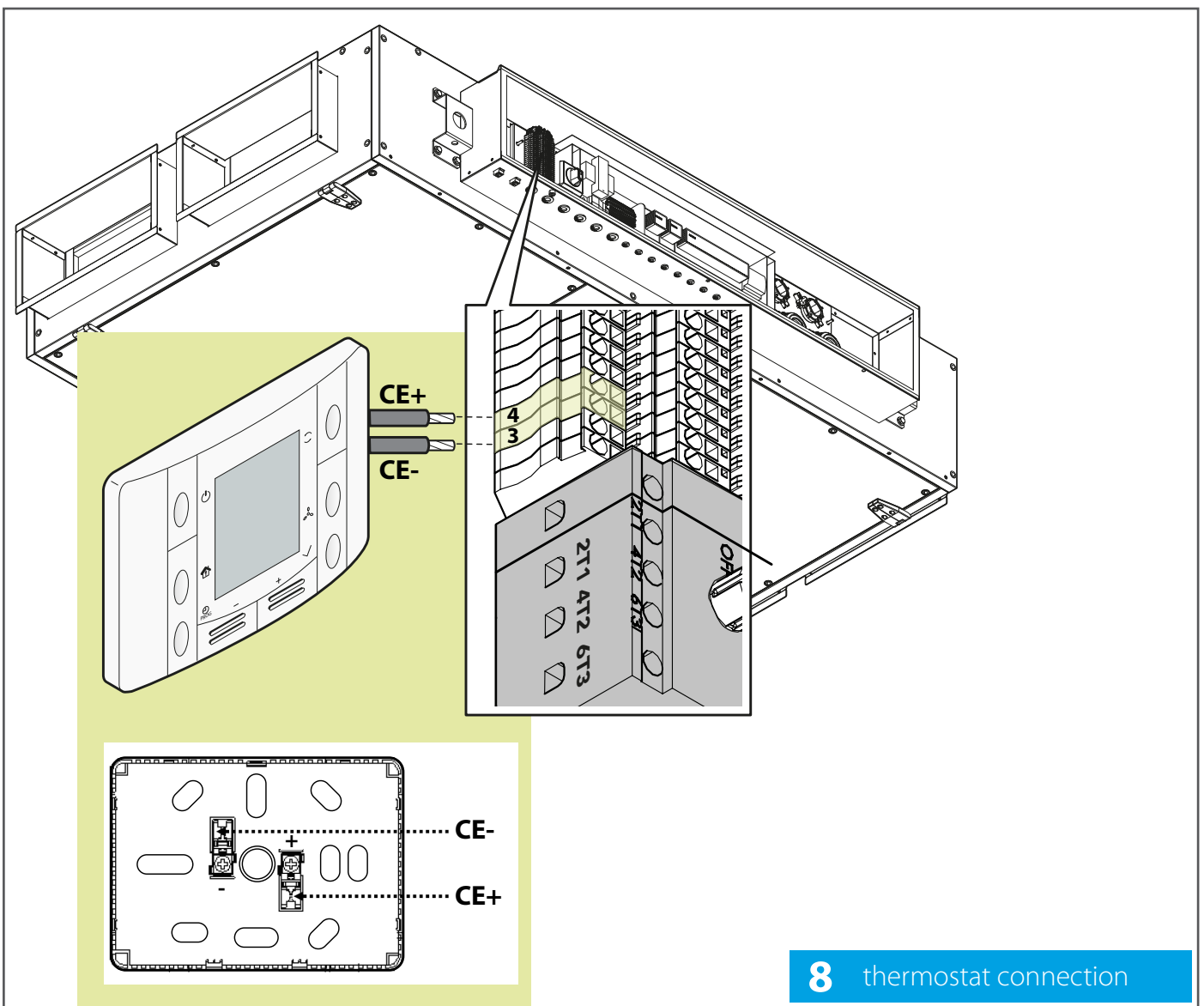
The actual supply voltage of the users **must not deviate more than 10%** from the normal voltage expected. Higher voltage differences cause damage to users and to the electrical system, malfunctioning of fans, noise. It is therefore essential to check the alignment of the actual voltage values with the nominal values.

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 and can damage the components of the machine.
- the motor rotation direction is correct;
- The wiring and motor power draw are correct.

## Ambient thermostat connection

The machine is supplied with an ambient thermostat, which must be connected to the third and fourth terminal from the bottom, as indicated in the figure

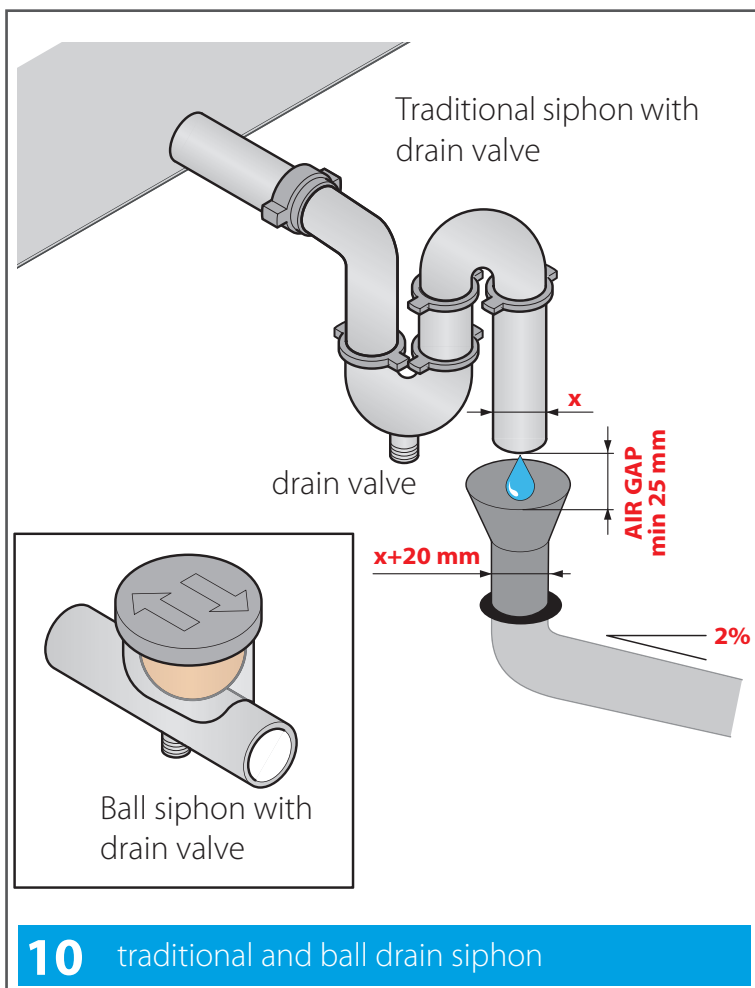
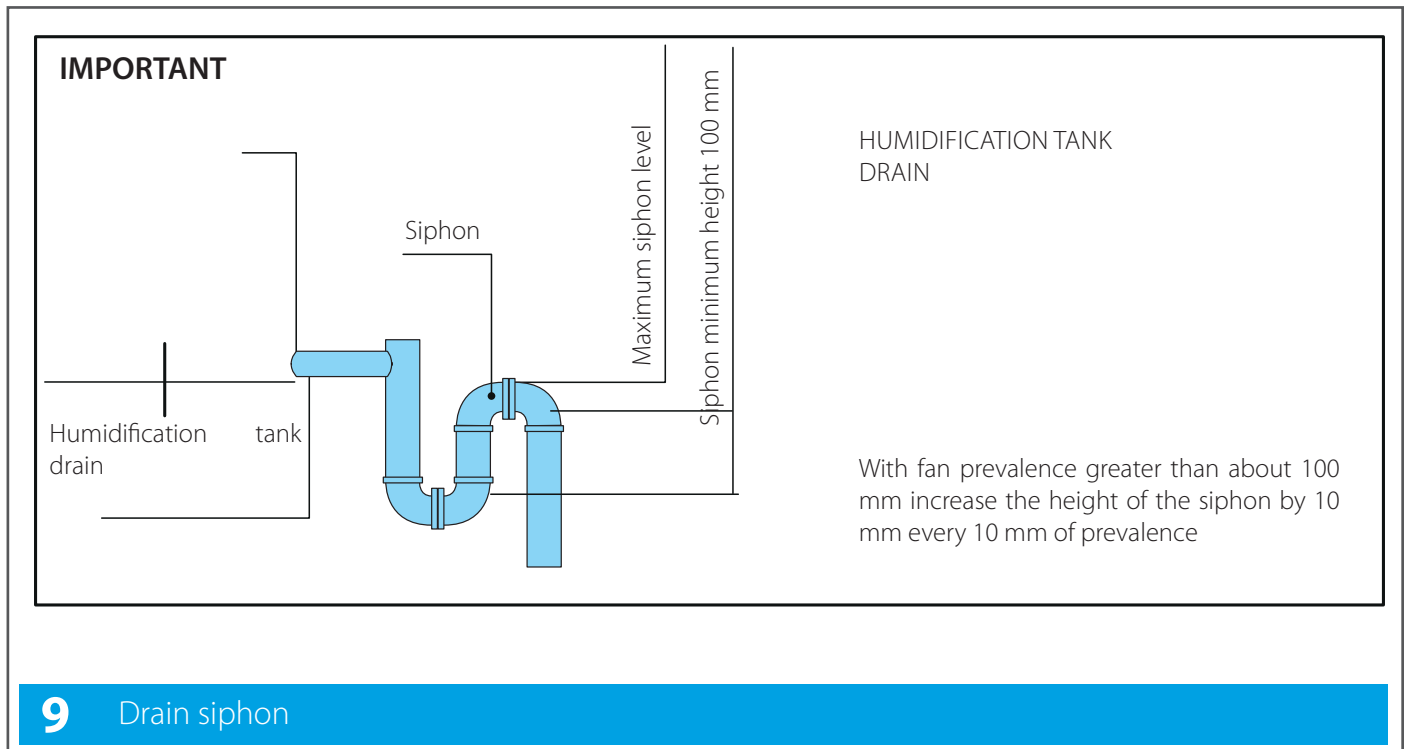


**8** thermostat connection



## Drain and siphon

The machines are equipped with a threaded drain (1/4" M GAS) that protrudes laterally by about 50 mm in order to allow a regular flow of water, each drain must be fitted with a properly sized SIPHON (see fig. 10).



To avoid overflows from the collection tank, 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.

## 10 traditional and ball drain siphon

## Aeraulic connections

Air conduits are not supplied with the machine. The installer must buy and install them separately. Coupling can occur by directly connecting the machine: we recommend installing a suitable shock absorption system between the machine and conduit.

If not using anti-vibration joints it is necessary to:

- Clean the joint surfaces between the duct and the machine/coil.
- Apply a gasket to the flange in order to prevent air infiltration.
- Carefully tighten the connecting screws.
- Use silicone on the gasket in order to optimise the seal.

If the connection is made with anti-vibration joints, when assembly is completed they should not be taut, so as to avoid damage and the transmission of vibrations.

In order to ensure the seal of the connection and the integrity of the machine's structure, it is essential to make sure that the ducts do not weigh on it, being supported by their own brackets.

### Step 3: Perform a trial run

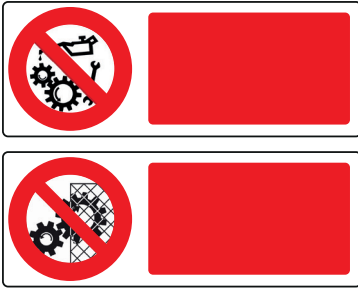
To commission the machine it is necessary (tick "✓" the operations completed):

	check accurate fluid inlet and output pipe connections to the exchange coils (if applicable)
	Check that there is a suitable siphon for all the water being drained.
	place a shock absorbing joint between the machine and conduits (optional);
	check unit integrity;
	Check the integrity of the anti-vibration supports and the various accessories.
	Remove extraneous materials (e.g., assembly sheets, tools, clips, etc.) and dirt (footprints, dust, etc.) from inside the sections.

## Step 4: Safety signs

The machine is supplied with the electricity-specific signs on the access doors to the fan sections.

The buyer must position other appropriate signs in the work area:



**DO NOT REMOVE THE PROTECTIONS AND SAFETY DEVICES  
DO NOT REPAIR - OIL - ADJUST - CLEAN MOVING PARTS**

In addition, the space where the machine is positioned must be integrated into the general signage, specific to the characteristics of the area and workplaces:

**noise - movement - dangerous areas - escape route, etc.**

### **PERSONAL PROTECTIVE EQUIPMENT**

Personal protective equipment should be used when operating the machine, suitable for use in accordance with company criteria and rules.

During machine maintenance, other preventive measures are suggested in addition to the above: safety shoes, gloves, suitable clothing, always compatible with the use and according to company guidelines.

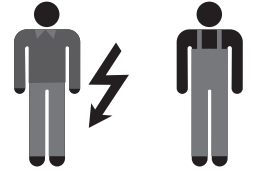
### **TRAINING**

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.

# 7 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 machine 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 machine **must always be stopped (by disconnecting from the mains)** and **the EMERGENCY button engaged**. 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 machine 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 machine 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 machine for a distance of 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 machine, **always declare out loud** your intentions to other operators who are located in the machine area and make sure that they have heard and understood the warning.



# Ordinary maintenance

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

ACTIVITY	FREQUENCY				
	A	B	C	D	E
General cleaning of the machine.		√			
Check and eventual disassembly and washing of filters.				√	
Replacing the filters (when they have deteriorated).	<b>in case of alarm</b>				
Clean the finned surfaces of the heat exchange coils (if provided) with a jet of compressed air and soft brush.	√				
Clean the exchange surfaces of of heat recuperators with a jet of compressed air and soft brush.	√				
Empty and clean the condensate collection basins.		√			
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 condensate drain and cleaning of siphons.		√			
In the case of water coils check for the presence of Legionella.		√			
Check the status of anti-vibration connections.	√				
Cleaning of the heat exchanger		√			
Check tightness of screws and bolts in the fan section.	√				
Check the auger, impeller and various devices, with removal of any buildup.	√				
Check the integrity of piping connected to pressure gauges and pressure switches.		√			
Check the ground connection.		√			
Power connection terminal torque	√				

**A: annual / B: six months / C: quarterly / D: monthly / E: fortnightly**

## General information on cleaning procedures



Read the safety instructions at the beginning of this manual and page. 28



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 water jets are used, pressure must be under 1.5 bar and the temperature should not exceed 60°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 airflow through the unit.

### Cleaning lamellar components

Remove the dust and fibres with a soft bristle brush or a vacuum cleaner.



Be careful when cleaning with compressed air because the exchanger package can be damaged. CLEANING with pressure jets is allowed if the maximum water pressure is 3 bar and a flat nozzle is used (40° - WEG 40/04 type).

Oils, solvents, etc. can be removed with water or hot grease solvents, by washing or immersion. Periodically clean the condensate drain tray and fill the drain siphon with water.

### 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 coils can be washed with a slightly pressurised water jet (max. 1.5 bar). The jet must NOT contain chemicals or microorganisms. Also the water must be sprayed in the opposite direction to the air flow.

For the direct expansion system, all the coolant in the coils must be collected in the receiver before washing the coil with water. This makes it possible to avoid the increase of the pressure and damage to various parts of the pipe, keeping the airflow clean.

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 fan by hand to verify the absence of abnormal noises.

## Cleaning filters



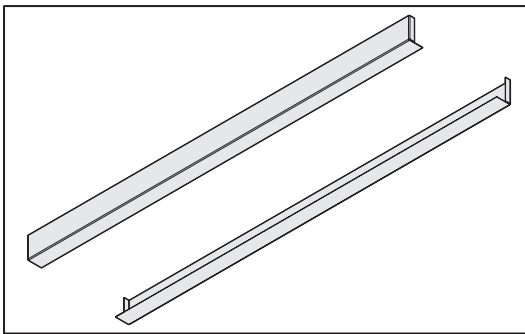
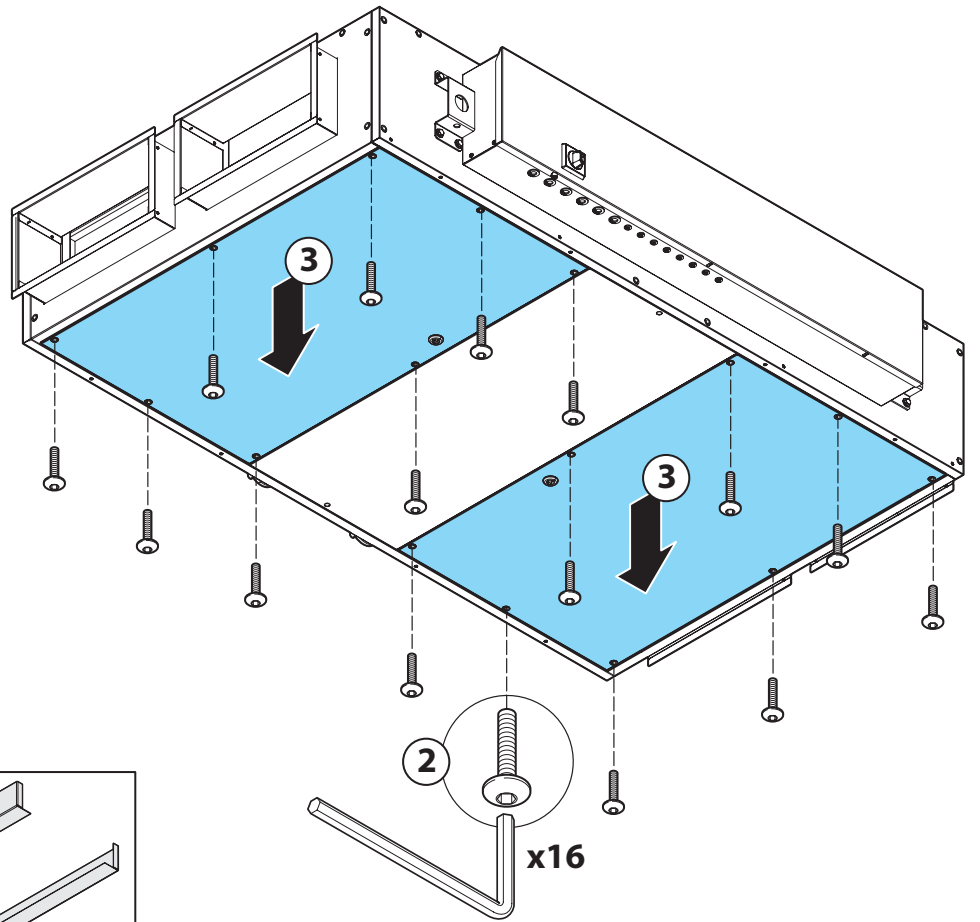
The machine must NOT be running when the filters are removed to avoid drawing in outside air that might be contaminated.

The filters must be cleaned often and carefully to prevent dust and microbial buildup. Usually, compact filters can be cleaned **two** or **three times** before they are replaced. As a general rule, replacement is required after 500-2000 hours of operation (it varies depending on the type of filter, refer to the directions of the manufacturer), but may need to be replaced much sooner if required.

**Compact filters** can be cleaned using a vacuum cleaner or by blowing with compressed air or hot water (not under pressure).

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

At the end of cleaning, it is mandatory to remount the doors.



In the absence of sufficient space for the opening of the up-and-over doors it is possible to remove them and transform the inspection door into a removable panel that can slide on accessory guides (optional).

## 11 Removal of the hinges to make the panel removable



## Correct filter and pre-filter installation (in the event of replacement)

Verify proper installation of the prefilters located on special counter-frames with safety springs or guides. 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.

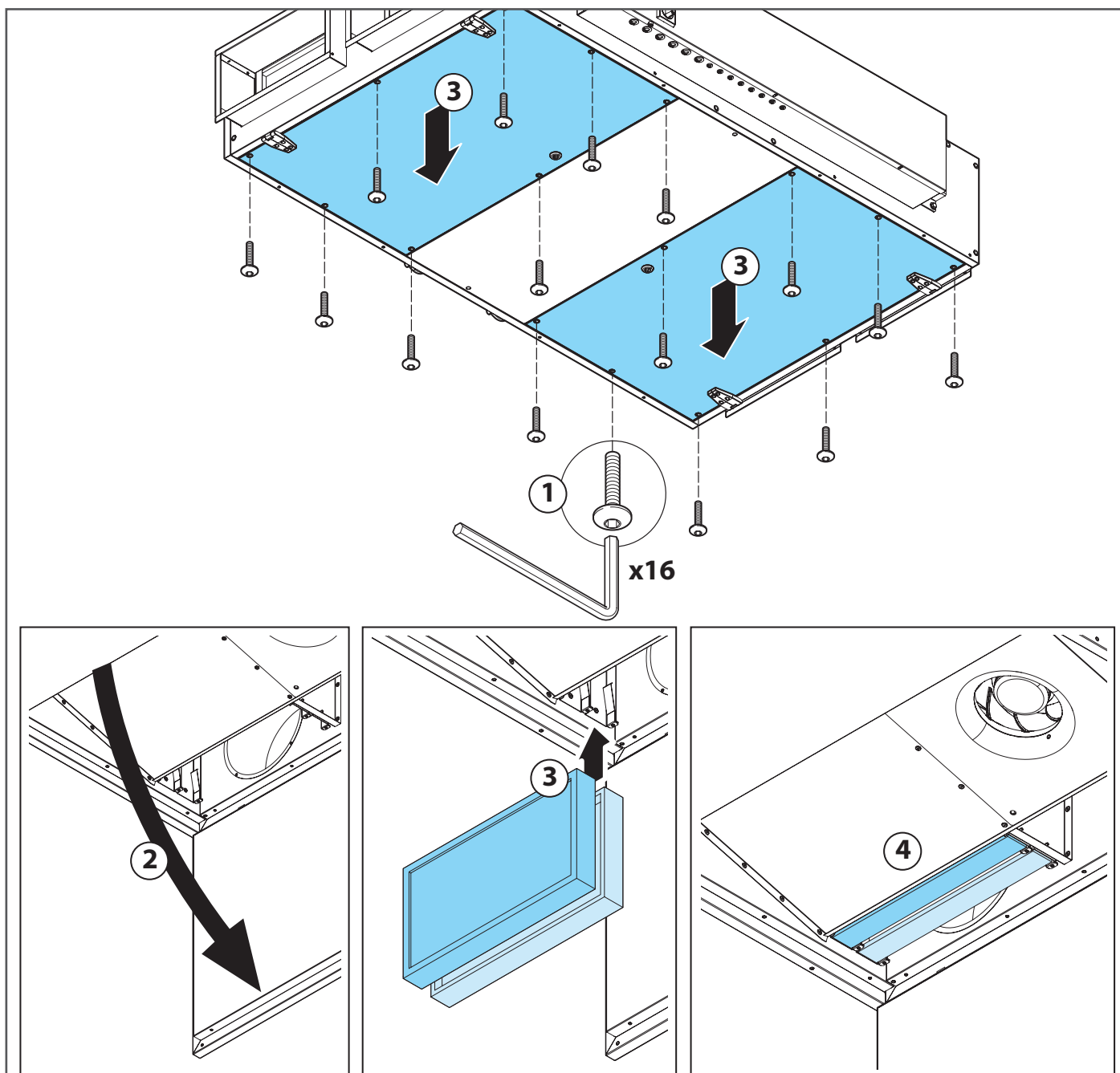


Remove the filters from their packaging only when ready to install them to avoid getting them dirty and contaminating them.



Make sure that the inside of the filter is not contaminated by external agents.

This operation should be carried out about one hour after the first start-up of the machine, the period during which the ducts are cleaned of dust and various debris. Proceeding in this way preserves the filtering sections that cannot be regenerated.



# Extraordinary maintenance

One can not 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 machine 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.

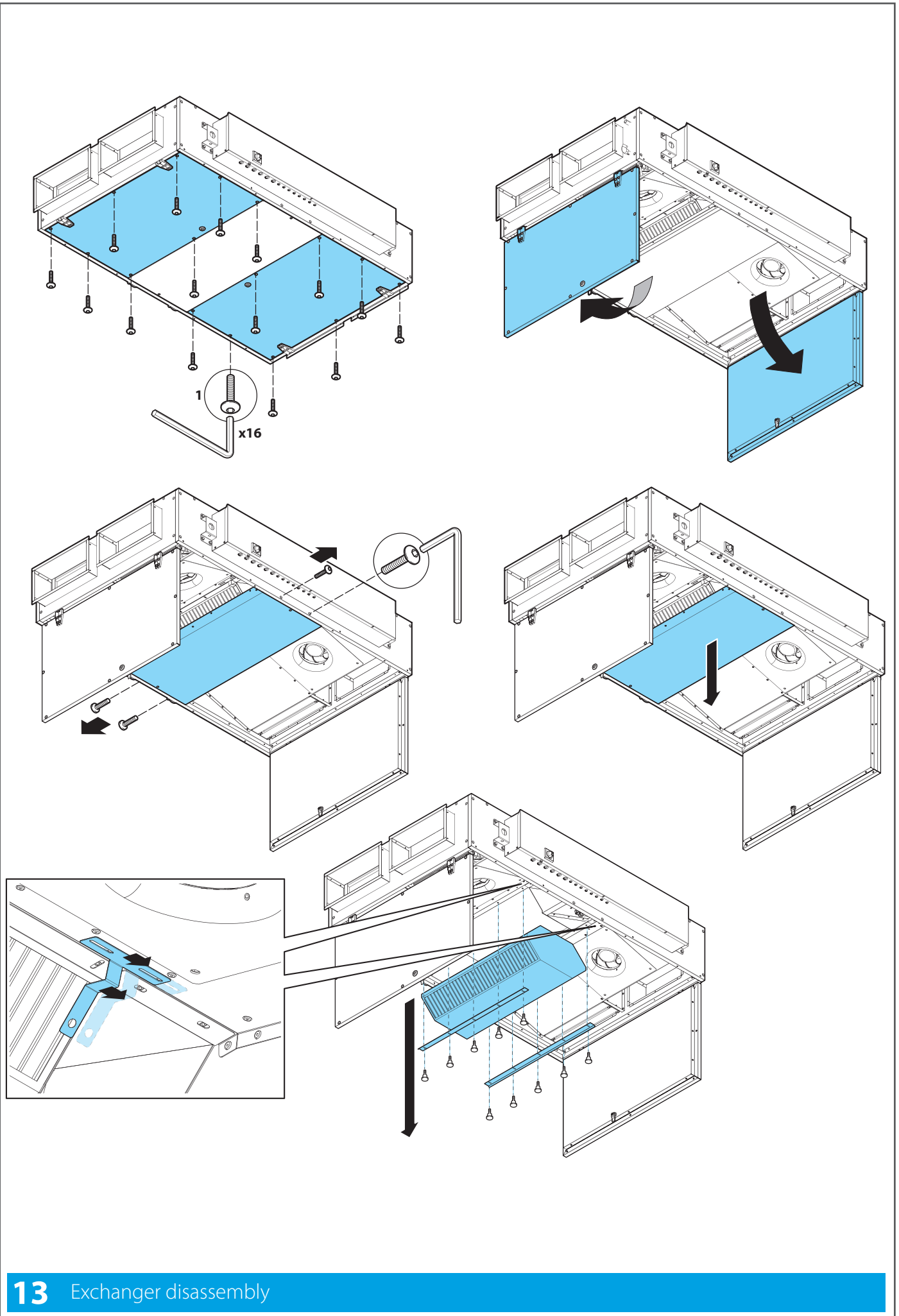
These are the components that may need replacement:

- Filters ▶ see fig. 12
- Recovery/heating/cooling heat exchange coil ▶ see fig. 13
- Fans
- by-pass

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

## Consumable components - Spare parts

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



### 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 Italian Presidential Decree 915/52 implementing directives 75/442/EEC, 76/442/EEC, 76/403/EEC, 768/319/EEC. Following are described the types of waste that may be generated during the lifetime of an air handling unit:

- Cell filters from the suction unit.
- Waste oils and greases from lubricating the fan motor assembly.
- Rags or paper soaked with substances used for the cleaning of the various parts of the machine.
- Residues from cleaning the panelling.
- Drive belts.
- TUV germicidal lamps, which must be disposed of according to current legislation.



Waste from the cell filters are 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

Under art. 13 of Italian Legislative Decree no. 49 of 2014 "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.

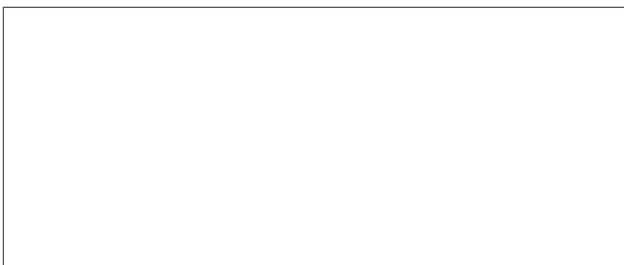
Further clarification is available by contacting the manufacturer's Customer Service.

# Troubleshooting table

MALFUNCTION TYPE	COMPONENT	POSSIBLE CAUSE/SOLUTION
NOISE	Fan impeller	Impeller deformed, unbalanced or loose
		Nozzle damaged
		Foreign bodies in the fan
	Transmission	Motor or fan not attached well
	Bearings	Bearing worn or deteriorated
	Motor	Incorrect supply voltage
		Worn bearings
		Contact between the rotor and stator
	Ducts	Excessive speed in the ducts
		Anti-vibration joint too taut
INSUFFICIENT AIR FLOW	Ducts	Load losses superior to the demand
		Dampers closed
		Obstructions in the ducts
	Filters	too dirty
Heat exchange coils	too dirty	
EXCESSIVE AIR FLOW	Ducts	Load losses inferior to the demand
		Ducts too big
		Terminals not installed
	Machine	Filters not inserted
		Access doors open
		Dampers not calibrated
INSUFFICIENT THERMAL EFFICIENCY	Heat exchange coil	Incorrect connection of inlet/outlet piping
		Heat exchange coil dirty
		Air bubbles in the pipes
		Excessive air flow
	Electric pump	Insufficient water flow
		insufficient pressure
		Wrong direction of rotation
	Fluid	Temperature different from the project
		Incorrect regulation bodies
WATER LEAK	Heat exchange coil	Leak from the heat exchange coil due to corrosion
	Fan section	Dragging of drops due to high air velocity
		Clogged "overflow" drain



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