MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

RC IT COOLING

INSTALLATION, USE AND MAINTENANCE MANUAL

Translation of the Original Instructions

NEXT

Air Conditioners for IT Cooling

All series with Under (U) air delivery, Over (O) air delivery and Displacement (DL)					
b-NEXT DX	**t-NEXT DX**	**i-NEXT DX**	**w-NEXT S**	**w-NEXT2 S**	**NEXT X TYPE**
b-NEXT DW	**t-NEXT DF DX**	**i-NEXT DF DX**	**w-NEXT DF**	**w-NEXT2 K**	
	t-NEXT DW	**i-NEXT DW**	**w-NEXT HD S**	**w-NEXT2 DF**	
	t-NEXT DF DW	**i-NEXT DF DW**	**w-NEXT HD K**		
	t-NEXT FC DW	**i-NEXT FC DW**			

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EN

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Before carrying out any operation on the machine

read this manual carefully

and make sure you understand

all indications and information contained in the document

Keep this document in a known place

and easily reachable

for the whole period of the machine's operational life.

RC IT COOLING

1 GENERAL REQUIREMENTS

1.1 GENERAL INFORMATION AND SAFETY

1.1.1 OBJECTIVE OF THIS MANUAL

This manual, which is an integral part of the machine (1), has been prepared by the manufacturer to provide the information necessary to all persons authorized to interact with the machine during its useful life: The Purchasers, Plant Designers, Carriers, Handlers, Installers, expert Operators, specialized Engineers and Users.

Apart from adopting a good usage technique, the persons who receive this information must read it carefully and must implement it strictly.
The time devoted to the reading of this information will allow you to avoid any health and safety hazard, as well as any financial damage.

This information has been written by the manufacturer in its original language (Italian) as "ORIGINAL INSTRUCTION".
The information is even available in English as "TRANSLATION OF ORIGINAL INSTRUCTION" and may be translated into other languages to meet any legislative and/or business requirements.
Even though this information does not fit the machine perfectly, this does not prejudice its function.

Keep this manual in a well-known and easily accessible place, so that it will be always available for future reference, when necessary.

The manufacturer reserves the right to modify the product without prior notice.
To highlight the most important sections of this text, some symbols have been adopted whose meaning is described below.

DANGER
Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury

MANDATORY
Indicates that any unsafe practices must be avoided which could prejudice health and safety and cause financial damage

INFORMATION
Indicates any important technical information that must not be neglected

(1) this term is used for simplicity, as defined in Machinery Directive.

1.1.2 GLOSSARY AND TERMS

Several terms that recur throughout this manual are described below, to provide a more complete explanation of their meaning.

Manufacturer: is the company that has designed and built the machine in compliance with current laws and adopting all the rules of good construction techniques, paying attention to the safety and health of people interacting with the machine.

Purchaser: he is responsible for any purchase and must supervise the organization and assignment of tasks, ensuring compliance with all applicable laws.

Owner: Legal representative of the company, body or natural person who owns the plant in which the machine is installed: he is responsible for checking compliance with all the safety regulations indicated by this manual as well as by current national legislation.

Designer: a competent skilled person appointed and authorized to prepare a project that must consider all the legislative, regulatory, and workmanlike performance principles applicable to the plant. In any case, apart from conforming to the manufacturer's instructions, he must consider all safety-related matters for the people who must interact with the machine during its expected useful life.

Installer: a competent skilled person duly authorized and responsible for the setting-up of the machine/plant, according to project specifications and the manufacturer's directions and in conformity with the applicable industrial safety laws.

User: a person authorized to control the use of the machine according to the "instructions for use" and the industrial safety laws in force.

Carriers: those who deliver the machine using suitable means of transportation. They must load and position the machine properly, to prevent any sudden displacement during the transportation.

When any loading/unloading means are used, these must conform to the markings affixed on the machine to ensure their safety and for the safety of all the people who could interact with these operations.

Handlers: they arrange the machine properly and affix all the necessary markings for safe and correct handling. On receipt of the machine, they ensure handling to the installation point, according to the instructions affixed on it. All these operators must have adequate skills and must comply with the instructions provided for their safety and for the safety of the people who could interact with these jobs.

Maintenance technician: Person authorized by the owner to perform on the machine all the adjustment and control operations specifically indicated in this manual, to which it must strictly follow, limiting its action to what is clearly permitted**.**

Expert operator: a person appointed and authorized by the User or the Purchaser to proceed with the use of the machine and the relevant ordinary maintenance jobs, according to the manufacturer's instructions. In case of failures not covered by this manual, he must request the intervention of a skilled Engineer.

Skilled Engineer: Person authorized directly by the Manufacturer to carry out all the ordinary and extraordinary maintenance operations, as well as any adjustment, control, repair and replacement of parts that may be necessary during the life of the machine.
Outside the Italian territory and in the countries where the Manufacturer is directly present with his own subsidiary, the Distributor is obliged, under his own complete responsibility, to equip himself with adequate and proportional Technicians to the territorial extension and to the business.

Ordinary maintenance: all the jobs necessary for maintaining the machine in perfect working order. These jobs are scheduled by the manufacturer, who sets out the necessary core competences and procedures.

Extraordinary maintenance: all the jobs necessary for maintaining the machine in perfect working order. These jobs cannot be predicted, are not scheduled by the manufacturer and must be carried out by a specialized Engineer only.

1.1.3 ENCLOSED DOCUMENTATION

The following documentation is delivered to the customer together with the machine:

- **Installation, Use and maintenance manual**: includes the list of scheduled maintenance operations.
- **Wiring Diagram**: specific for the machine. It is used by the operators working on the electrical system, to identify the various components and connections.
- **Dimensional lay-out** and lifting
- **Refrigerant / Hydraulic diagrams**
- **Recommended spare parts list:** indicates the spare parts that should be always available
- **Assembly instructions for possible accessories:** the methods of installation on the machine are described.
- **CE Conformity Declaration**: indicates that the machines follow the European Directives in force.

1.1.4 SAFETY REGULATIONS

During the design and production stages, the manufacturer has paid close attention to all possible sources of safety and health hazard to the people who interact with the machine. Apart from complying with the applicable laws, the manufacturer has adopted all the applicable "workmanlike performance rules". The aim of this information is to make users aware of the attention necessary for preventing any hazard. Caution is however mandatory.
Safety is also in the hands of all operators interacting with the machine.
Carefully read the instructions in the supplied manual and those applied directly on the machine, in particular respect those concerning safety.

The installation of this machine within a plant requires a global project that considers all "workmanlike performance" requirements, as well as legislative and regulatory principles. Special care must be devoted to all the technological instructions and information indicated by the manufacturer.
Do not tamper with, remove, or bypass the safety devices installed on the machine. Failure to meet this requirement will result in serious safety and health hazard to people.

The personnel that carries out any type of job during the life of the machine must be adequately qualified and skilled from a technical standpoint and must have gained experience in this specific sector.
The lack of these requirements could prejudice the health and safety of people.

During the normal use or for any job on the machine, keep the perimeter space in adequate conditions, to prevent any safety and health hazard to people. Some stages may require the help of one or more assistants. In these cases, we recommend that you train and inform them properly on the type of activity to be carried out, to prevent any safety and health hazard to people.

Handle the machine according to the information provided directly on the packaging and in the instructions for use delivered by the manufacturer.

During handling, if necessary, seek the help of one or more assistants to receive adequate signals.
The personnel that loads, unloads and handles the machine must be adequately qualified, skilled, and experienced in this specific sector and must be in command of the lifting equipment to be used.

During the installation stage, respect the perimeter space indicated by the manufacturer, considering also any other surrounding activity. This requirement must be met also according to the applicable industrial safety laws.

The installation and connections must be carried out, about the machine, according to the manufacturer's instructions. The person responsible for these operations must consider also all the applicable regulatory and legislative requirements, ensuring the workmanlike execution of the installation and connection jobs. Once the installation is completed and before starting the machine, he must make sure, through a general check, that these requirements have been met.

If the machine is to be transferred using any means of transportation, check that these are fit for their intended use and load/ unload the machine in such a way that there is no hazard to the operator and the people directly involved.
Before moving the machine using the said means of transportation, make sure that the machine and its components are anchored to such means firmly and that their profile does not exceed the maximum fixed volume. If necessary, prepare the appropriate DANGERs.

The operator, apart from being well-informed about the use of the machine, must be properly qualified and experienced, based on the type of job to be effectuate.

Use the machine only for the purposes recommended by the manufacturer. Using the machine for any improper job may result in serious safety and health hazard and financial damage.

The machine has been designed and manufactured in such a way that it can satisfy all the working conditions indicated by the manufacturer.
Tampering with any device to obtain any different performance may result in safety and health hazard and financial damage.

Do not use the machine if the safety devices have not been perfectly installed and are not effective. Failure to meet this requirement may result in serious safety and health hazard.
Keep the machine in perfect working order, carrying out the scheduled maintenance jobs recommended by the manufacturer.
Proper maintenance will ensure better performance, longer life, and the constant maintenance of safety requirements.

Before carrying out any regulation and maintenance job on the machine, activate all the safety devices provided and consider whether the personnel involved and the operators nearby must be informed properly or not. In particular, carefully indicate the neighbouring areas and prevent the access to all devices that, if activated, are likely to cause unpredictable dangers, causing damage to people's safety and health.

The regulation and maintenance jobs must be effectuating by authorized operators, who must arrange all the necessary safety conditions, according to the procedures indicated by the manufacturer.

All maintenance jobs that require any specific technical skill or expertise must be carries out only by qualified personnel, adequately experienced in the relevant sector of intervention.

To carry out any maintenance jobs in areas that are difficult of access or dangerous, ensure proper safety conditions for yourself and for other people, according to the applicable industrial safety laws.

Replace any worn components with original spare parts only. Use the components recommended by the manufacturer, so as to ensure the machine performance and the expected safety level.

1.1.5 PRECAUTIONS AGAINST RESIDUAL RISKS

Prevention of residual mechanical risks

- install the machine according to the provisions of this manual;
- perform all the maintenance operations provided for in this manual regularly;
- wear protective equipment (gloves, eye protection, helmet, ...) appropriate to the operations to be performed; do not wear clothes or accessories that can be entangled or sucked in by the air, collect and tie the hair to the head before accessing the inside of the machine;
- before opening a panelling of the machine, make sure that it is solidly connected to it by hinges;
- the fins of the heat exchangers, the edges of the components and the metal panels can generate cutting injuries;
- do not remove the guards on moving parts while the machine is operating;
- make sure that the protections to the moving parts are correctly positioned before restarting the machine;
- fans, motors and transmissions may be in motion: before accessing them, always wait for their shut down and take precautions to prevent their start;
- the machine and the pipes have very hot and very cold surfaces which cause the risk of burns;
- do not exceed the maximum admissible pressure (PS) of the water circuit of the machine as indicated;
- before removing elements along the pressurized water circuits, intercept the concerned section of piping and evacuate the fluid gradually until the pressure of the circuit is balanced to atmospheric pressure;
- do not use your hands to check for refrigerant leaks.

Prevention of residual electrical risks

- disconnect the machine from the mains using the external disconnector before opening the electrical panel;
- verify the correct grounding of the machine before starting it;
- the machine must be installed in a suitable place; if it is intended for indoor use, it cannot be installed outdoors;
- do not use cables with inadequate section or non-compliant connections even for limited periods or for emergencies;

- in case of a machine with power factor correction capacitors, wait 3 minutes, since the power supply to the machine has been removed, before accessing the electrical panel.

Prevention of residual environmental risks
The machine contains substances and components hazardous to the environment such as refrigerant gas and lubricating oil.
Maintenance and disposal operations must only be carried out by qualified personnel.

Refrigerant gas:
The refrigerant circuit contains fluorinated greenhouse gases covered by the Kyoto Protocol.
The fluorinated greenhouse gases contained in the refrigeration circuit cannot be discharged into the atmosphere.
The refrigerant gas must be recovered in accordance with the regulations in force.

Refrigerant	R134a	R410A	R407C
GWP100	1430	2088	1774

Lubricating oil:
The compressors and the refrigerant circuit contain lubricating oil.
The oil must be recovered in accordance with the regulations in force.
Do not dispose of oil in the environment.

Prevention of residual risks of different nature

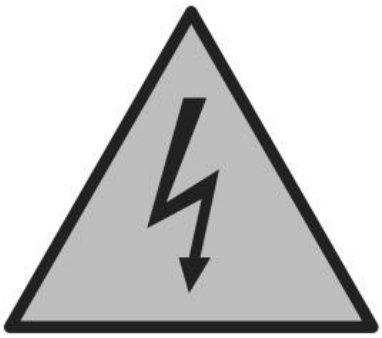
- the machine contains pressurized refrigerant gas: no operation must be carried out on pressure equipment except during maintenance performed by competent and qualified personnel;
- make the system connections to the machine following the instructions given in this manual and on the pictograms arranged on the panelling of the machine;
- the water circuit contains harmful substances. Do not drink from the water circuit and prevent the contents from coming into contact with the skin, eyes and clothes;
- to avoid an environmental risk, ensure that any fluid leaks are recovered in suitable devices in compliance with local regulations;
- in case of disassembly of a piece, make sure of its correct reassembly before restarting the machine;
- in the event that the current regulations require to set up fire protection systems near the machine, check that these are suitable for extinguishing fires on electrical equipment, compressor lubricating oil, refrigerant, as required by the safety data sheets of these fluids (for example a fire extinguisher CO_2);
- if the machine is equipped with overpressure release devices (safety valves): in case of intervention of these devices, the refrigerant gas is released at high temperature / speed; prevent the projection from damaging people or things; properly convey the discharges according to the provisions of EN 378-3 and local regulations, paying attention to convey fluids belonging to a safety group other than A1 to open and safe places.
- the safety devices must be maintained in efficiency and checked periodically as required by current regulations;
- keep all lubricants in duly marked containers;
- do not store flammable liquids near the system;
- perform brazing or welding only on empty pipes and cleaned from any residual lubricating oil; do not bring flames or other heat sources near the pipes containing refrigerant fluid;
- do not operate with open flames near the machine;
- the machines must be installed in structures protected from lightning as required by applicable laws and technical standards;
- do not bend or hit pipes containing pressurized fluids;
- on the machines it is not allowed neither to walk nor to support other bodies;
- the overall assessment of the fire risk of the place of installation (egg calculation of fire load) is the responsibility of the user;
- during any movement, firmly secure the machine to the means of transport to avoid shift and overturns;
- the machine must be transported in compliance with current regulations considering the characteristics of the fluids contained and their characterization described in the safety data sheet;
- inadequate transport can cause damage to the machine and generates refrigerant leaks. Before the first start-up, check whether the cooling circuit is under pressure;
- accidental expulsion of refrigerant in a closed area can cause lack of oxygen and therefore the risk of asphyxiation: install the machine in a suitably ventilated environment in accordance with EN 378-3 and the local regulations in force and provide, when necessary, refrigerant detectors;
- unless otherwise authorized by the Manufacturer, the machine must be installed in environments that are not classified as explosion-proof (SAFE AREA).

1.1.6 DISCONNECTOR EXTERNAL TO THE MACHINE (NOT SUPPLIED)

To isolate the machine from the main power source. As prescribed by the EN 60204-1 standard, the disconnector handle must be easily accessible and positioned at a height between 0.6 and 1.9 meters from the service level. At the place of installation, it must be considered how the machine will be positioned, because the machine could be placed on a raised base with respect to the walking surface and consequently the height of the disconnector could no longer meet the requirements of the standard. In this case the installer must provide a gangway or similar solution that will allow operators easy access to the safety device.

1.1.7 SAFETY SIGNS

Safety signs are provided on the internal panelling of the electrical panel as listed below:



Live machine

Internal components
automatically operated

Hot surfaces
Danger of burns

1.1.8 REQUEST FOR ASSISTANCE

For any requirement, please contact an authorized centre (Italian Market) and Distributors (foreign market). For any request for technical assistance regarding the machine, please indicate the data specified on the identification plate, the serial number, the access conditions and the perimeter area of installation.
Indicate also the approximate hours of use and the type of defect identified.
In case of alarm, indicate the relevant number and the signalled message.

1.2 MACHINE IDENTIFICATION

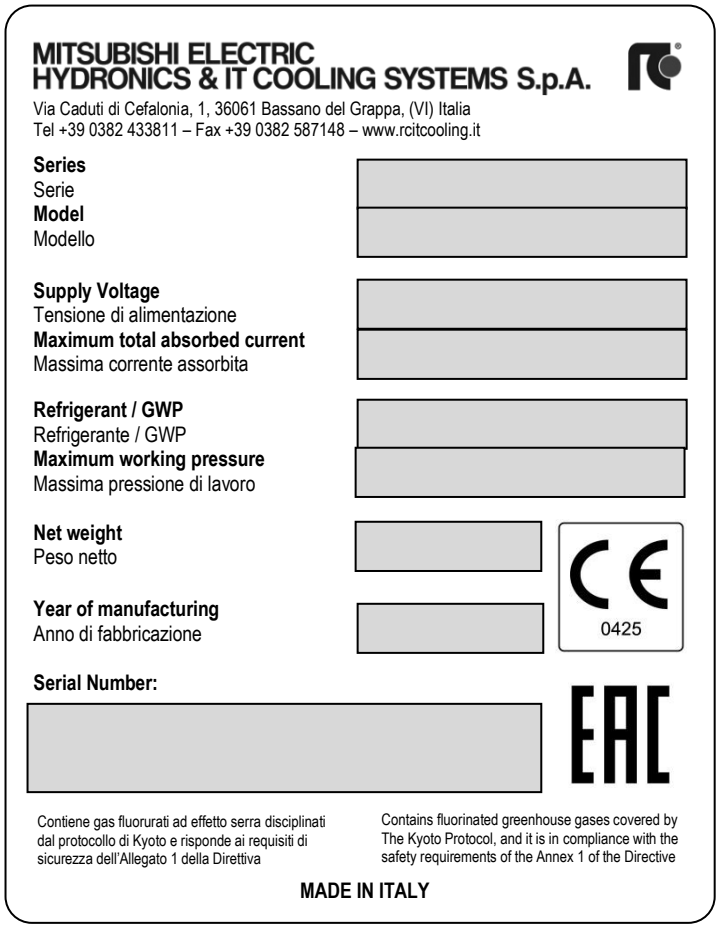
1.2.1 NOMENCLATURE

The alphanumeric code of the machine model, shown on the identification plate, represents precise technical specifications that are indicated in the figure shown.

NEXT	**Series identification** **w-NEXT:** Packaged air conditioner with chilled water supply. **w-NEXT2:** Air conditioner in 2 sections with chilled water supply. **t-NEXT**: Packaged air conditioner with scroll ON/OFF compressors **i-NEXT**: Packaged air conditioner with scroll BLDC inverter compressors
NEXT	**Standard series**
NEXT DF	**Dual Fluid series**
NEXT FC	**Free-Cooling series**
DX	direct expansion with remote air-cooled condenser.
DW	direct expansion with built-in water-cooled condenser.
	Version (only for CW series)
S	standard version
K	compact version
	Air flow
U	Down flow air delivery (U)
O	Upper flow air delivery (O)
DL	Displacement air delivery (DL)
000	**Cooling capacity (kW) at nominal conditions**
	Refrigerant circuits (only for DX and DW series)
S	One refrigerant circuit
D	Two refrigerant circuits
	Type and Number of compressors (only for DX and DW series)
P	Scroll on/off compressor for R410A
M	Scroll BLDC inverter compressor for R410A
1, 2	Number of compressors
	Size
E	Frame type E

1.2.2 IDENTIFICATION LABEL

The type of machine is shown on the label applied directly on the machine, normally inside the panel of the electrical panel.
It contains the references and all the information necessary for safe operation.



1.3 MAIN CHARACTERISTICS OF THE MACHINES

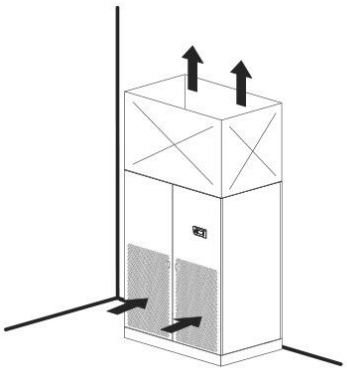
1.3.1 GENERAL DESCRIPTION

The machines of this series are designed and manufactured for being used in Hi-Tech air conditioning plants.
The machine must be installed inside the room or however protected by weathering.
The machines are equipped with a microprocessor control, that allows the monitoring of all functions and the communication with external supervision systems.
The machines are fully factory-assembled, provided with control equipment to reduce installation time and costs.
As a rule, the installation simply requires refrigerant, hydraulic and electrical connections.
To ensure top performance and safety for people, the product and the environment, before proceeding with the installation, prepare a complete project of the plant which the machine will belong to, analysing all the critical points predicted or predictable during its life, from installation to dismission.

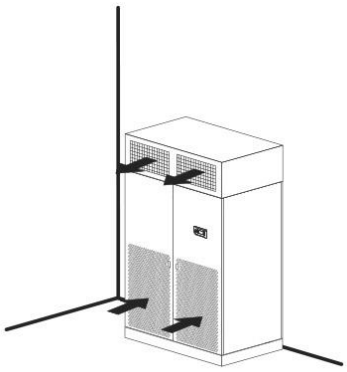
1.3.2 CONFIGURATION OF THE OVER MACHINES "O"

The ducts shown in the diagrams are not provided.
The plenums shown in the diagrams are accessories on request.

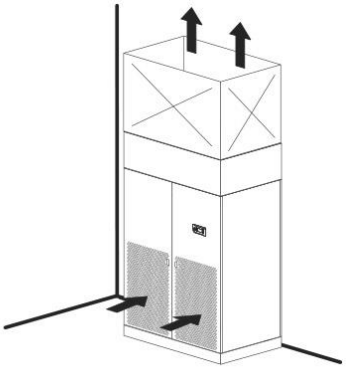
Front air intake and top air delivery. The machine can be installed on any type of flooring, provided it is stable and can support the weight of the machine.



Standard machine with ducted air delivery (duct not supplied)

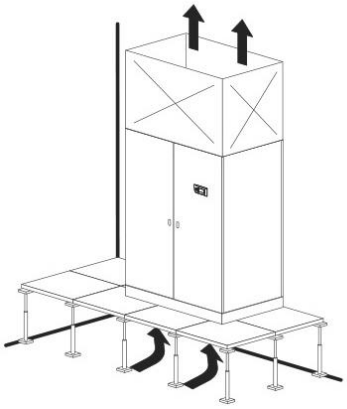


Machine with air delivery plenum (accessory) for direct air distribution in the room. The plenum can also contain soundproofing partitions (accessory)

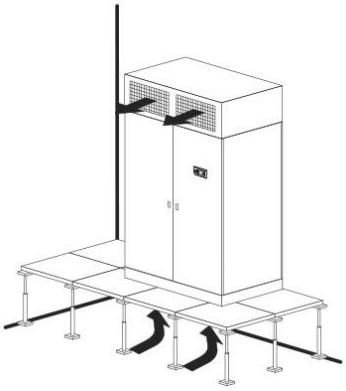


Machine with plenum and ducted air delivery. The plenum can contain high efficiency filters (accessory) or soundproofing partitions (accessory)

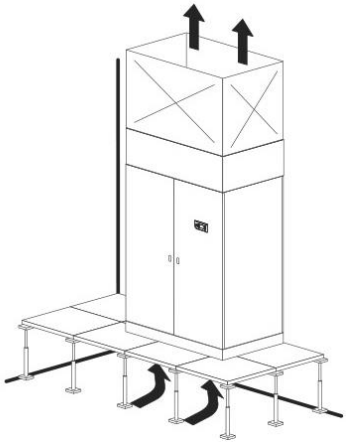
Air intake from bottom and top air delivery (on request). The machine must be installed on a raised floor to allow air intake from the bottom. Front panelling without grid.



Standard machine with ducted air delivery (duct not supplied)



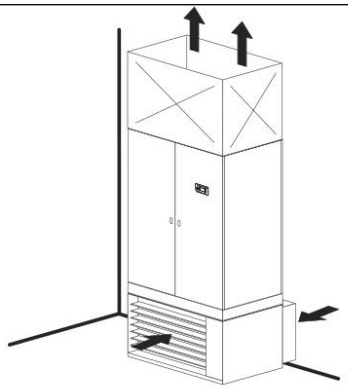
Machine with air delivery plenum (accessory) for direct air distribution in the room. The plenum can also contain soundproofing partitions (accessory)



Machine with plenum and ducted air delivery. The plenum can contain high efficiency filters (accessory) or soundproofing partitions (accessory)

MANDATORY
For stability reasons, only one plenum can be installed on the machines

Air intake from bottom and top air delivery with direct free-cooling system (configuration on request).
The machine can be installed on any type of flooring, provided it is stable and can support the weight of the machine. Front panelling without grid.

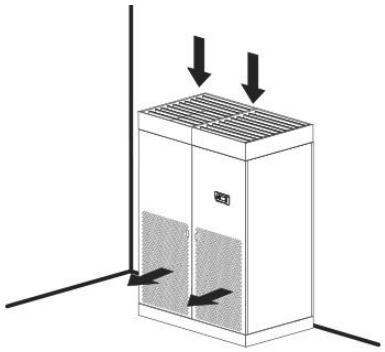


Machine with plenum on air suction for direct free-cooling (accessory). The plenum must be in communication with the outside to allow the intake of external air (air intake duct not supplied).

MANDATORY
For stability reasons, only one plenum can be installed on the machines

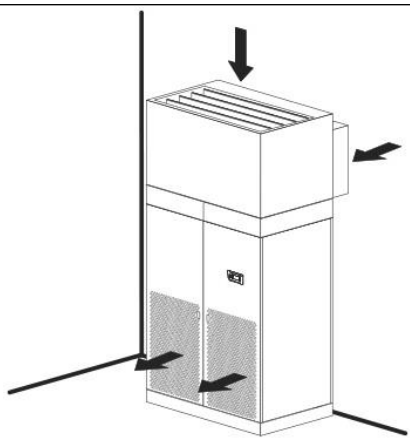
1.3.3 CONFIGURATION OF THE DISPLACEMENT MACHINES "DL"

Air intake from top and front air delivery. The machine can be installed on any type of flooring, provided it is stable and can support the weight of the machine.



Standard machine with front air delivery.
The installation foresees positioning the machine in front of the cold aisle for optimal air distribution.

Air intake from top and front air delivery with direct free-cooling system. The machine can be installed on any type of flooring, provided it is stable and can support the weight of the machine.



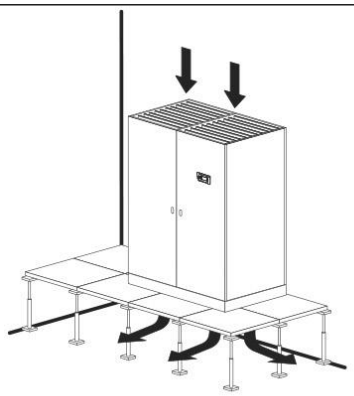
Standard machine with front air delivery.
The installation foresees positioning the machine in front of the cold aisle for optimal air distribution.

The plenum must be in communication with the outside to allow the intake of external air (air intake duct not supplied).

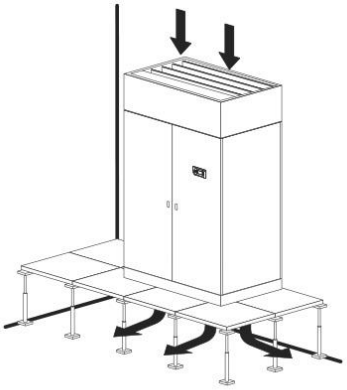
MANDATORY
For stability reasons, only one plenum can be installed on the machines

1.3.4 CONFIGURATION OF THE UNDER MACHINES "U"

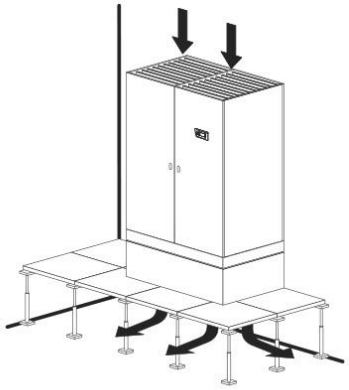
Packaged machines. Air intake from the top and air delivery from the bottom. The machine must be installed on a raised floor, provided it is stable and can support the weight of the machine.



Standard machine with underfloor air delivery

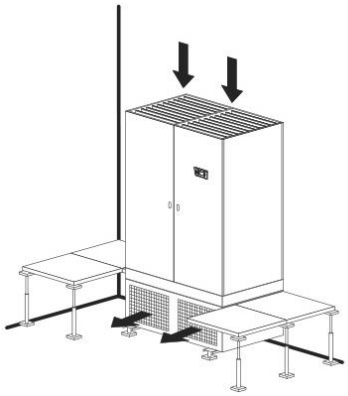


Machine with plenum on air intake. The plenum can contain soundproofing partitions (accessory).

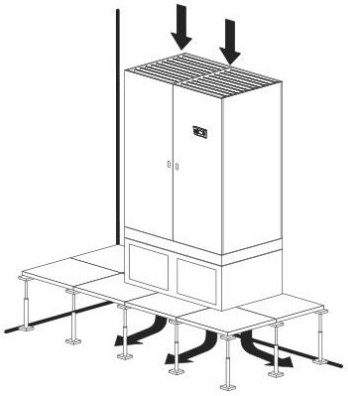


Machine with plenum on air delivery. The plenum can contain high efficiency filters (accessory) or soundproofing partitions (accessory)

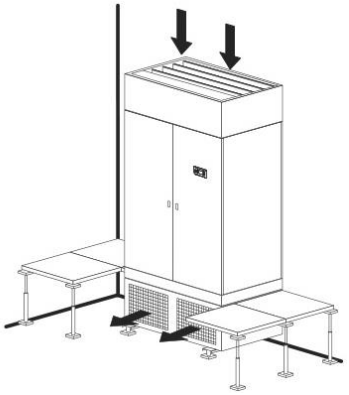
Machines in two sections: Air intake from the top and air delivery from the bottom.
The machine has a separate fan section and must be installed on a raised floor.



Standard machine with fan section installed in the underfloor

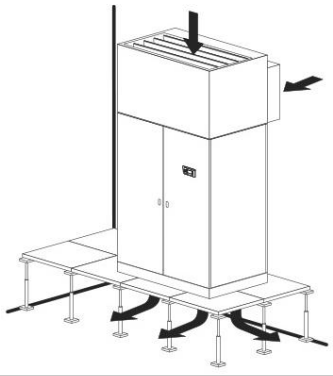


Standard machine with a fan section installed on the floor



Machine with plenum on air intake. The plenum can contain high efficiency filters (accessory) or soundproofing partitions (accessory)

Packaged machines with direct free-cooling system. Air intake from the top and air deliver from the bottom. The machine must be installed on a raised floor, provided it is stable and can support the weight of the machine.



Machine with plenum on air suction for direct free-cooling (accessory). The plenum must be in communication with the outside to allow the intake of external air (air intake duct not supplied).

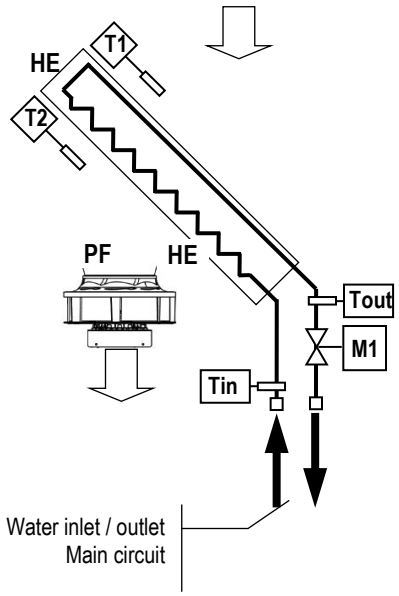
MANDATORY
For stability reasons, only one plenum can be installed on the machines

1.4 CHARACTERISTICS OF CHILLED WATER MACHINES

1.4.1 STANDARD CHILLED WATER MACHINES: w-NEXT / w-NEXT2 / w-NEXT DL / NEXT X TYPE

The machines are basically made up of a heat exchange section.
They work cooling and dehumidifying the air of the room to be conditioned.
The room air is conveyed through the cooling coil by the supply fan(s). The cooling effect is obtained through the chilled water coming from a remote chiller.
The heat, subtracted in the heat exchanger section from the air to be cooled, is transferred to the water that will be cooled by the remote chiller.
A motorized valve controls the water flow in the heat exchanger section.
In order to prevent the formation of ice in the hydraulic circuit, we recommend the use of glycol mixtures with a concentration appropriate to the operating temperatures of the mixture and / or winter outdoor air in the installation area.

UNDER



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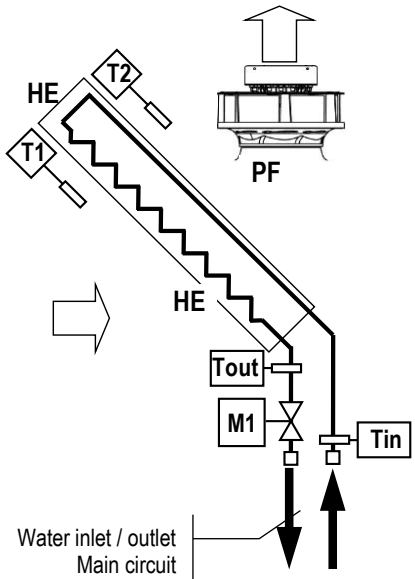
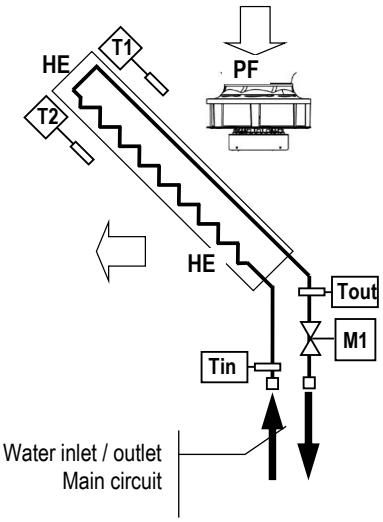
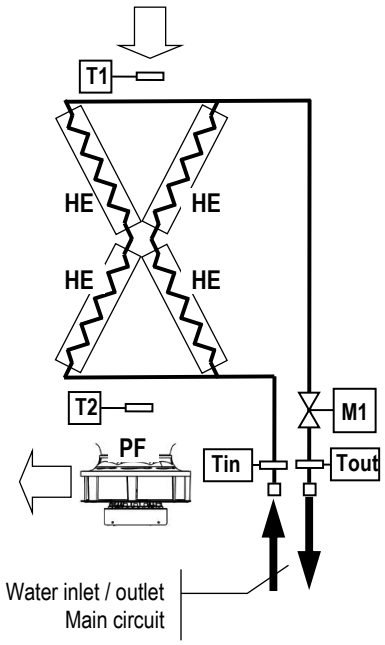


DISPLACEMENT



X TYPE



LEGENDA

M1	2-vie modulating valve for main coil	Tin	Chilled water inlet temperature probe
HE	Main coil	Tout	Chilled water outlet temperature probe. The Tout probe is only present if the DEHUMIDIFICATION control function is active (w-NEXT series). Always present in NEXT X TYPE series
PF	Plug Fan.		
T1	Air return temperature probe		
T2	Air supply temperature probe		

1.4.2 CHILLED WATER MACHINES IN DUAL FLUID VERISON: w-NEXT DF / w-NEXT2 DF

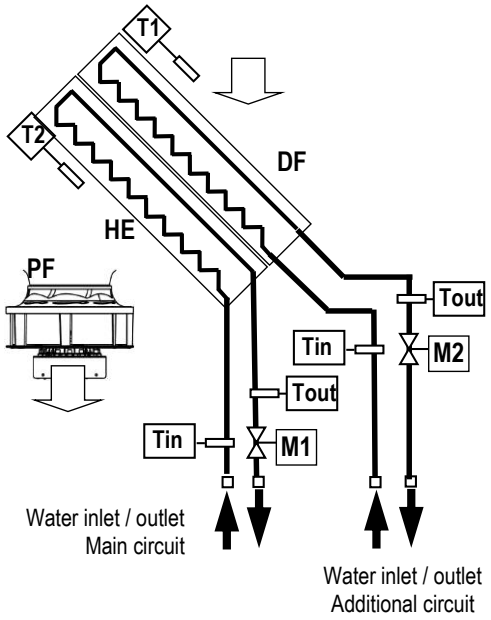
The machines consist of two independent heat exchange sections:

- Main cooling coil section
- Additional cooling coil section

They work cooling and dehumidifying the air of the room to be conditioned.
The room air is conveyed through the main cooling coil by the supply fan(s). The cooling effect is obtained through the chilled water coming from a remote chiller.
The heat, subtracted in the heat exchanger section (main coil) from the air to be cooled, is transferred to the water that will be cooled by the remote chiller.
A motorized valve controls the water flow in the heat exchanger section

The additional cooling coil section is powered by a second cooling source such as well water, chilled water from a second chiller or a dry-cooler.
The priority for inserting the two circuits can be set in the machine management program.
The additional cooling section can be used as a back-up of the main system to guarantee continuity of operation, or in addition to the main cooling section.
A motorized valve controls the water flow in the additional cooling coil section.
In case of use of well water we recommend the installation of an intermediate exchanger.
In order to prevent the formation of ice in the hydraulic circuit, we recommend the use of glycol mixtures with a concentration appropriate to the operating temperatures of the mixture and / or winter outdoor air in the installation area

UNDER



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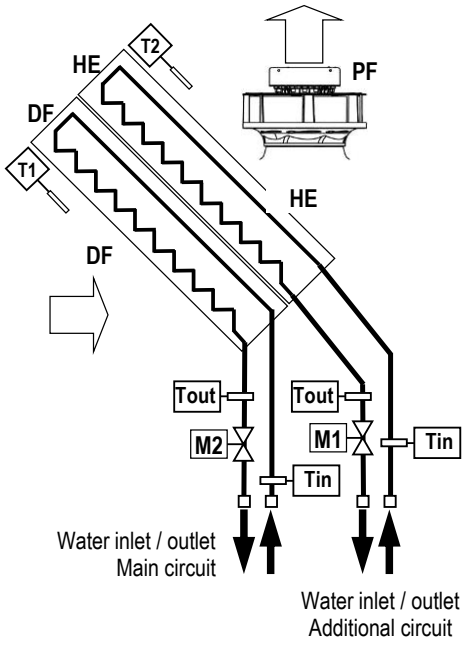
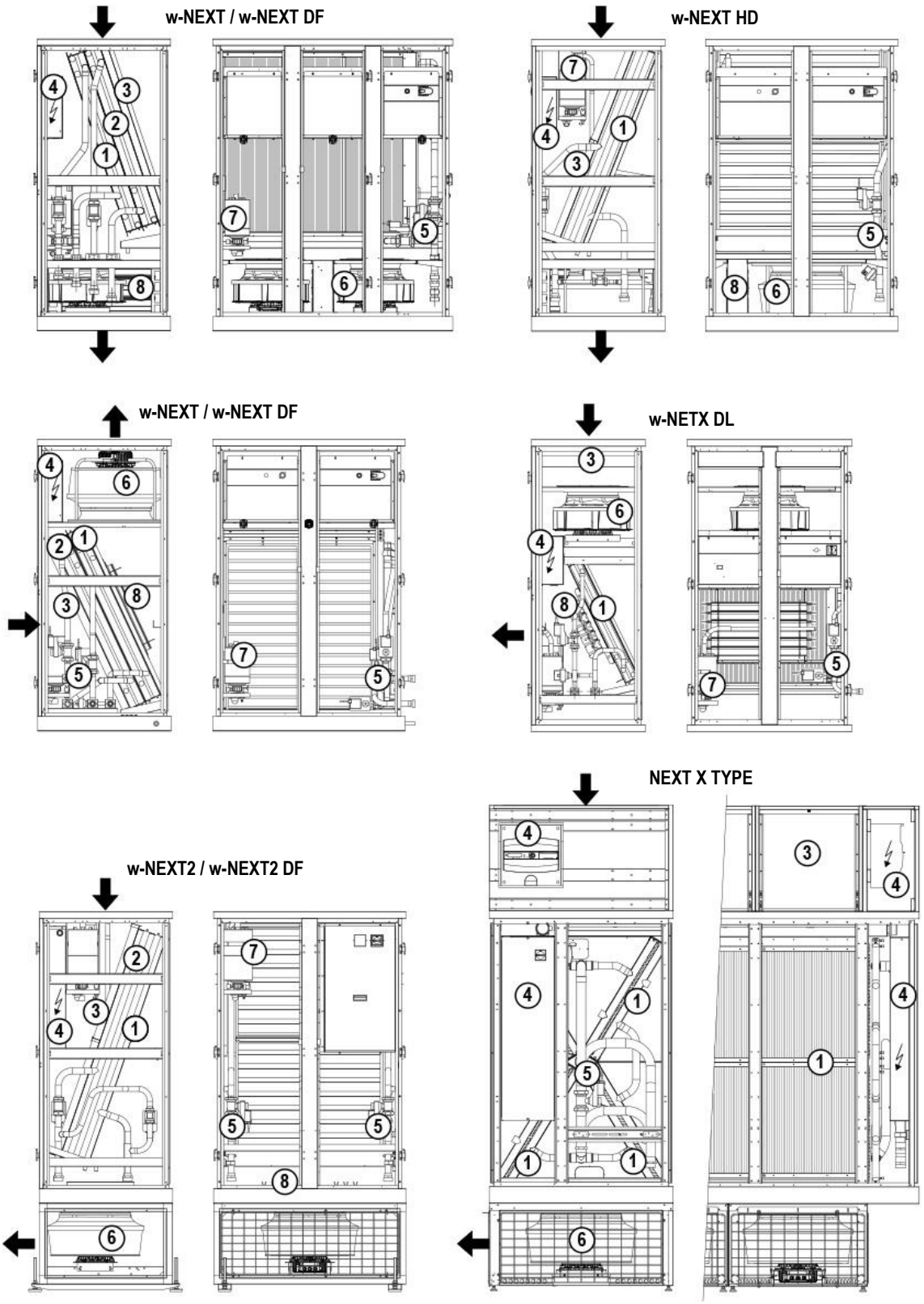


LEGENDA:

M1	2-way modulating valve for main coil
HE	Main coil
M2	2-way modulating valve for additional coil
DF	Additional coil
PF	Plug Fan.

T1	Air return temperature probe
T2	Air supply temperature probe
Tin	Chilled water inlet temperature probe
Tout	Chilled water outlet temperature probe. The Tout probe is only present if the DEHUMIDIFICATION control function is active

1.4.2.1 Main components of the chilled water machines



LEGENDA
1. Main coil
2. Additional coil (version DF)
3. Air filter
4. Electric panel
5. 2-way valves for chilled water flow control
6. Plug Fan
7. Humidifier (accessory)
8. Electric heater (accessory)

1.4.2.2 Working limits of the chilled water machines

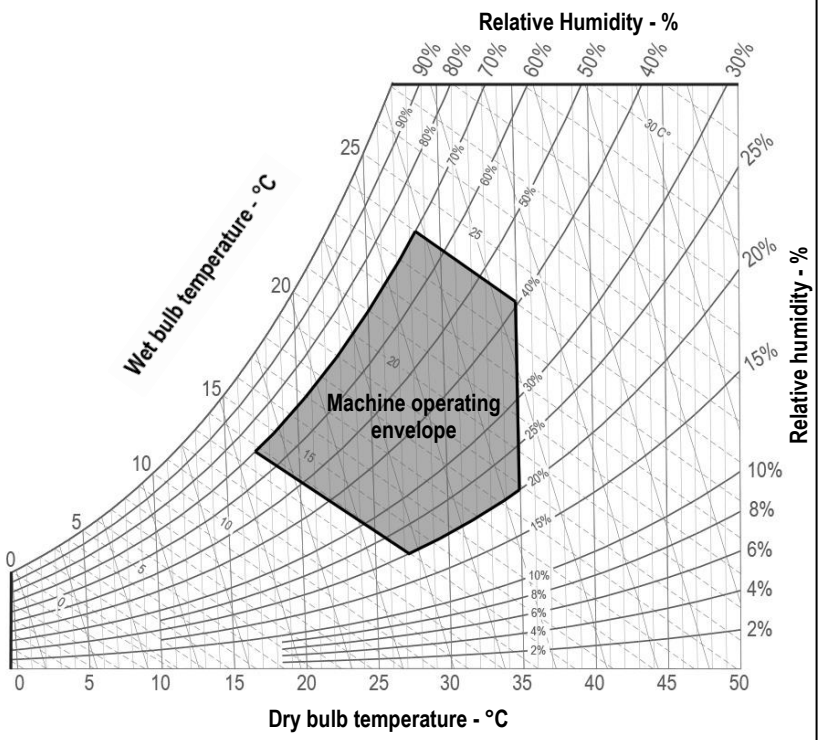
w-NEXT S / w-NEXT2 K / w-NEXT HD S / w-NEXT2 S / w-NEXT2 DF

ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
17°C minimum temperature with dry bulb.
35°C maximum temperature with dry bulb.
Room air humidity:
20%UR minimum relative humidity.
70%UR maximum relative humidity.

CHILLED WATER TEMPERATURE
7°C minimum inlet temperature
12°C maximum inlet temperature
ΔT 4°C minimum ΔT between inlet and outlet
ΔT 6°C maximum ΔT between inlet and outlet

HYDRAULIC CIRCUIT
10 Bar maximum working pressures

POWER SUPPLY
± 10% maximum tolerance of the supply voltage (V)



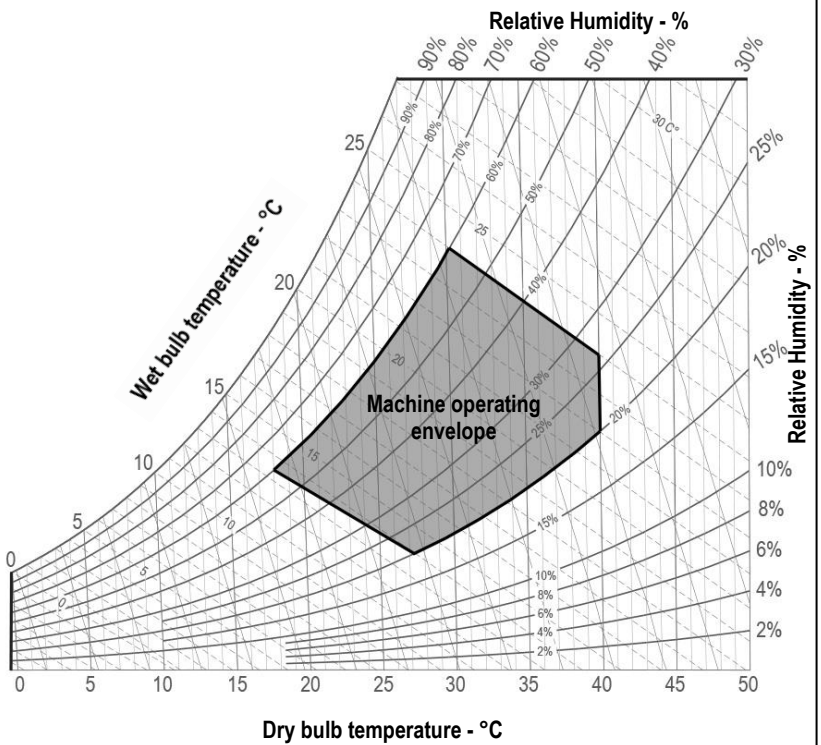
w-NEXT DF / w-NEXT HD K

ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
18°C minimum temperature with dry bulb.
40°C maximum temperature with dry bulb.
Room air humidity:
20%UR minimum relative humidity.
60%UR maximum relative humidity.

CHILLED WATER TEMPERATURE
10°C minimum inlet temperature
15°C maximum inlet temperature
ΔT 4°C minimum ΔT between inlet and outlet
ΔT 6°C maximum ΔT between inlet and outlet

HYDRAULIC CIRCUIT
10 Bar maximum working pressures

POWER SUPPLY
± 10% maximum tolerance of the supply voltage (V)



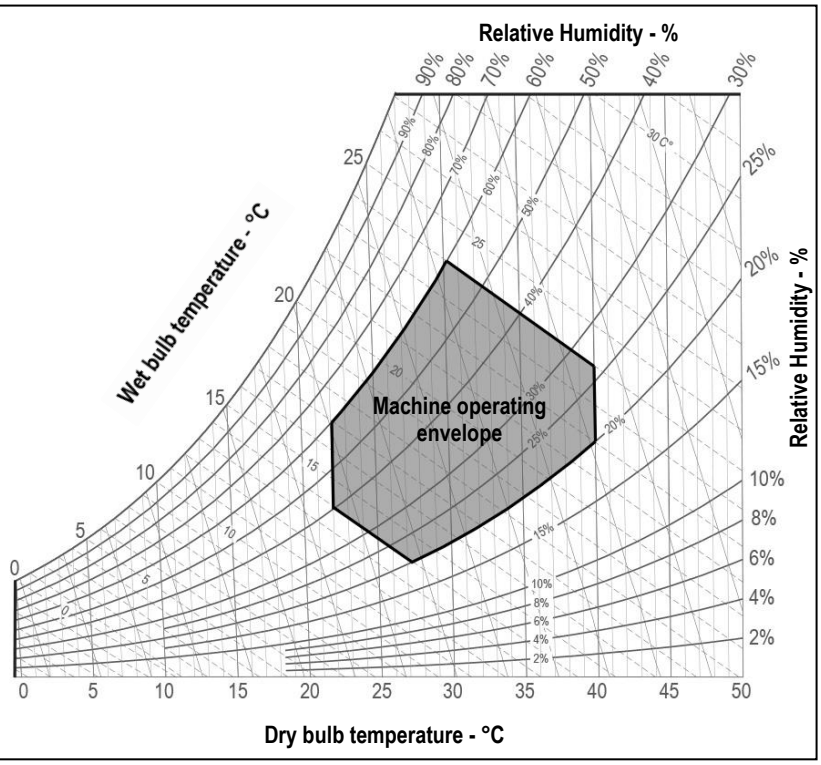
w-NEXT HD K high temperature

ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
22°C minimum temperature with dry bulb.
40°C maximum temperature with dry bulb.
Room air humidity:
20%UR minimum relative humidity.
60%UR maximum relative humidity.

CHILLED WATER TEMPERATURE
15°C minimum inlet temperature
22°C maximum inlet temperature
ΔT 6°C minimum ΔT between inlet and outlet
ΔT 8°C maximum ΔT between inlet and outlet

HYDRAULIC CIRCUIT
10 Bar maximum working pressures

POWER SUPPLY
± 10% maximum tolerance of the supply voltage (V)



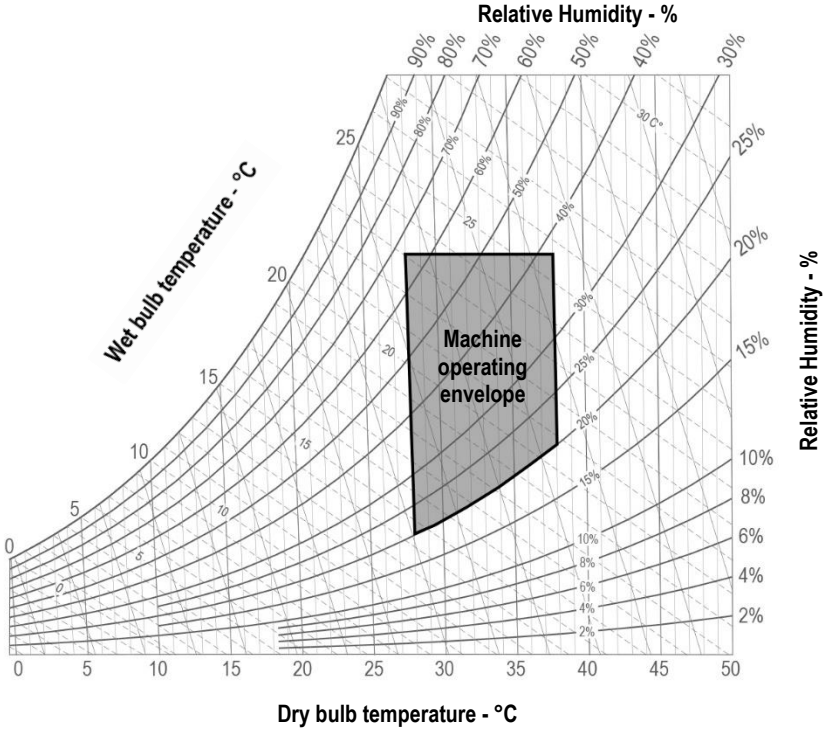
NEXT X TYPE

ROOM AIR CONDITIONS
Room air temperature:
35°C air suction – dry bulb.
25°C air delivery – dry bulb.
Room air humidity:
30%UR operating relative humidity.

CHILLED WATER TEMPERATURE
18°C inlet temperature
28°C outlet temperature
ΔT 10°C ΔT between inlet and outlet

HYDRAULIC CIRCUIT
10 Bar maximum working pressures

POWER SUPPLY
± 10% maximum tolerance of the supply voltage (V)



1.4.2.3 Technical characteristic and technical data of the chilled water machines
For the characteristics and technical data of the machines, refer to the relative technical bulletin.

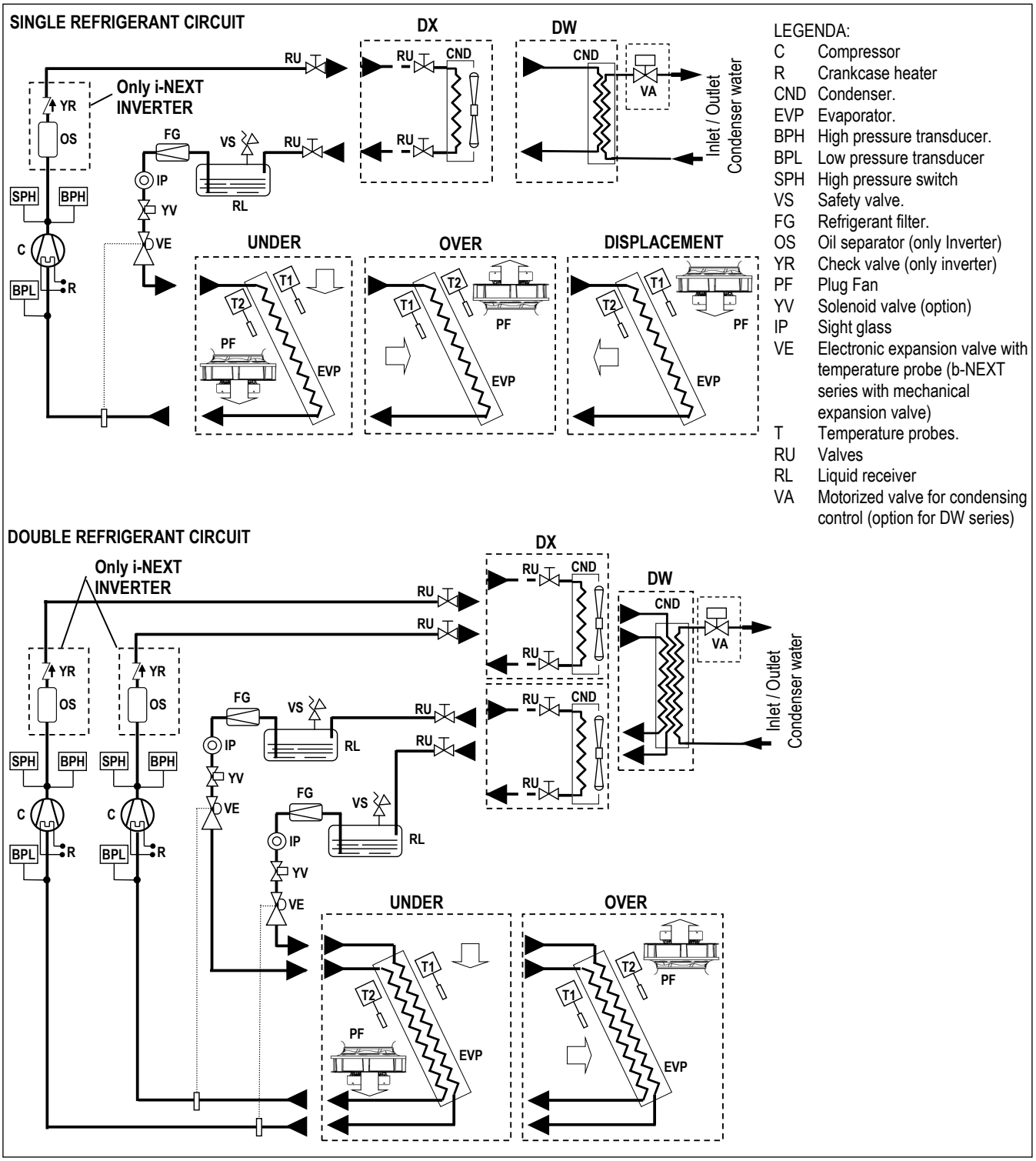
1.5 CHARACTERISTICS OF THE DIRECT EXPANSION MACHINE

1.5.1 DIRECT EXPANSION MACHINE: b-NEXT / t-NEXT / i-NEXT

The machines are basically made up of a heat exchange section and one or more compressors for refrigerant, with the relevant air condensing sections (DX series) or water condensing section (DW series).
They work cooling and dehumidifying the air of the room to be conditioned.
The room air is conveyed through the evaporating coil by the supply fan(s). The cooling effect is obtained through a vapour-compression thermodynamic cycle with compressor(s).
The heat, subtracted in the evaporating coil from the air to be cooled, is transferred to the condenser:

- remote condenser (outdoor finned coil) and given by this to the air (DX series);
- built-in water-cooled condenser and given by this to the water (DW series).

An expansion valve controls the refrigerant flow.



1.5.2 DIRECT EXPANSION MACHNE IN DUAL FLUID VERSION: t-NEXT DF / i-NEXT DF

The machines consist of two independent heat exchange sections:

- Main direct expansion cooling coil
- Additional chilled water cooling coil

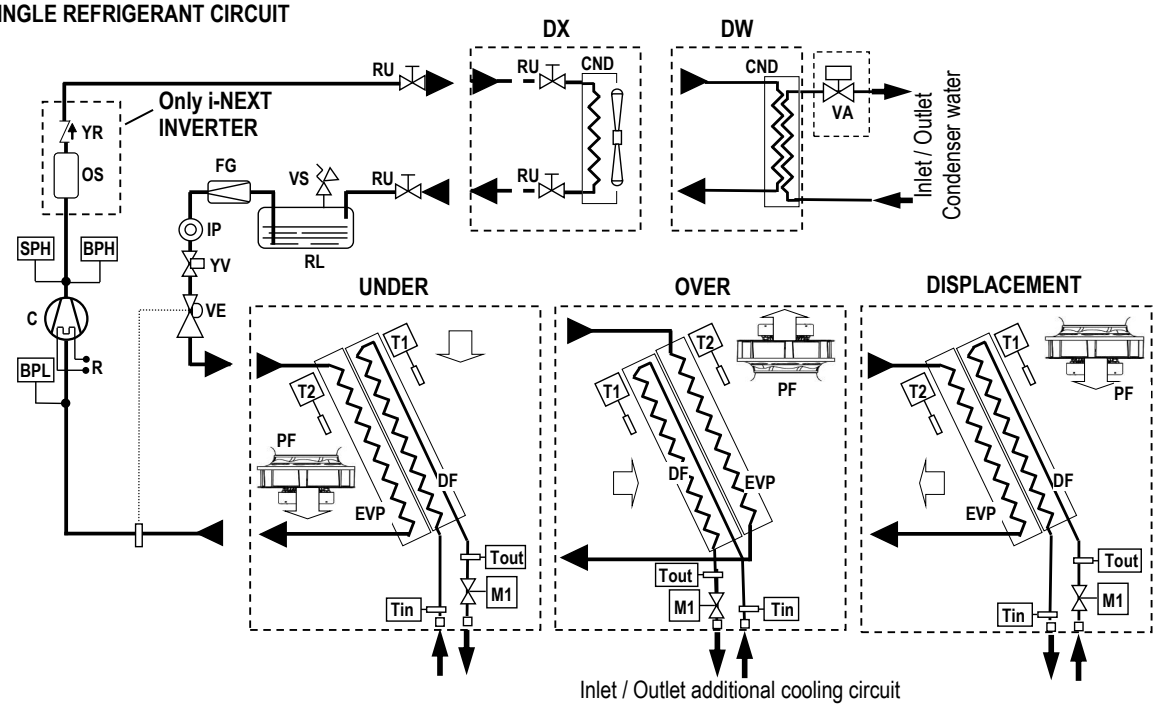
The machines are basically made up of a heat exchange section and one or more compressors for refrigerant, with the relevant air condensing sections (DX series) or water condensing section (DW series).
They work cooling and dehumidifying the air of the room to be conditioned.
The room air is conveyed through the evaporating coil by the supply fan(s). The cooling effect is obtained through a vapour-compression thermodynamic cycle with compressor(s).
The heat, subtracted in the evaporating coil from the air to be cooled, is transferred to the condenser:

- remote condenser (outdoor finned coil) and given by this to the air (DX series);
- built-in water-cooled condenser and given by this to the water (DW series).

An expansion valve controls the refrigerant flow.

The additional cooling coil section is powered by a second cooling source such as well water, chilled water from a second chiller or a dry-cooler.
The priority for inserting the two circuits can be set in the machine management program.
The additional cooling section can be used as a back-up of the main system to guarantee continuity of operation, or in addition to the main cooling section.
A motorized valve controls the water flow in the additional cooling coil section.
In case of use of well water we recommend the installation of an intermediate exchanger.
In order to prevent the formation of ice in the hydraulic circuit, we recommend the use of glycol mixtures with a concentration appropriate to the operating temperatures of the mixture and / or winter outdoor air in the installation area

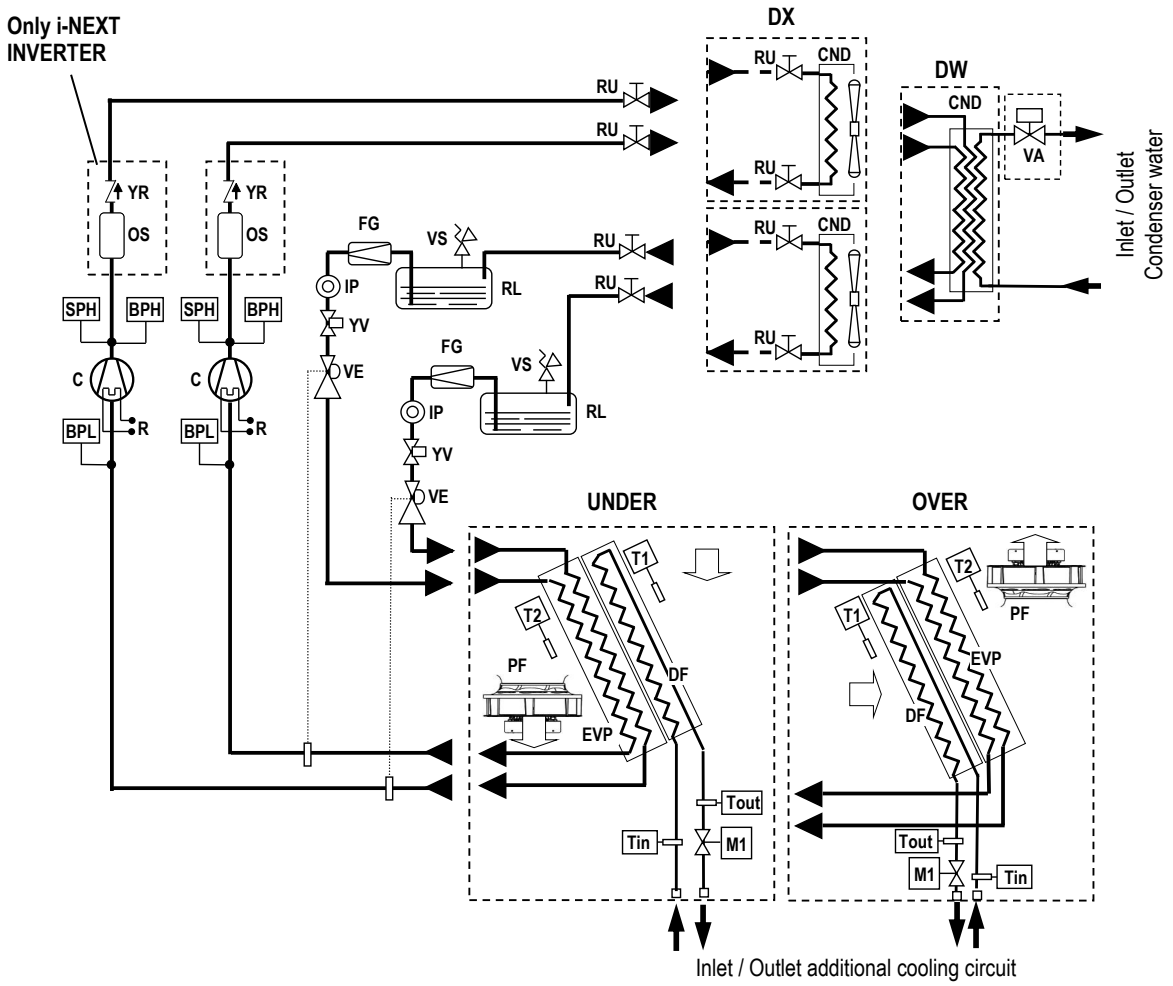
SINGLE REFRIGERANT CIRCUIT



LEGENDA:

C	Compressor
R	Crankcase heater
CND	Condenser.
EVP	Evaporator.
BPH	High pressure transducer.
BPL	Low pressure transducer
SPH	High pressure switch
VS	Safety valve.
FG	Refrigerant filter.
OS	Oil separator (only Inverter)
YR	Check valve (only inverter)
PF	Plug Fan
YV	Solenoid valve (option)
IP	Sight glass
VE	Electronic expansion valve with temperature probe
T	Temperature probes
RU	Valves
RL	Liquid receiver
VA	Motorized valve for condensing control (option for DW series)
M1	2-way motorized valve for additional coil
DF	Additional coil

DOUBLE REFRIGERANT CIRCUIT



LEGENDA:

C	Compressor
R	Crankcase heater
CND	Condenser.
EVP	Evaporator.
BPH	High pressure transducer.
BPL	Low pressure transducer
SPH	High pressure switch
VS	Safety valve.
FG	Refrigerant filter.
OS	Oil separator (only Inverter)
YR	Check valve (only inverter)
PF	Plug Fan
YV	Solenoid valve (option)
IP	Sight glass
VE	Electronic expansion valve with temperature probe
T	Temperature probes
RU	Valves
RL	Liquid receiver
VA	Motorized valve for condensing control (option for DW series)
M1	2-way motorized valve for additional coil
DF	Additional coil

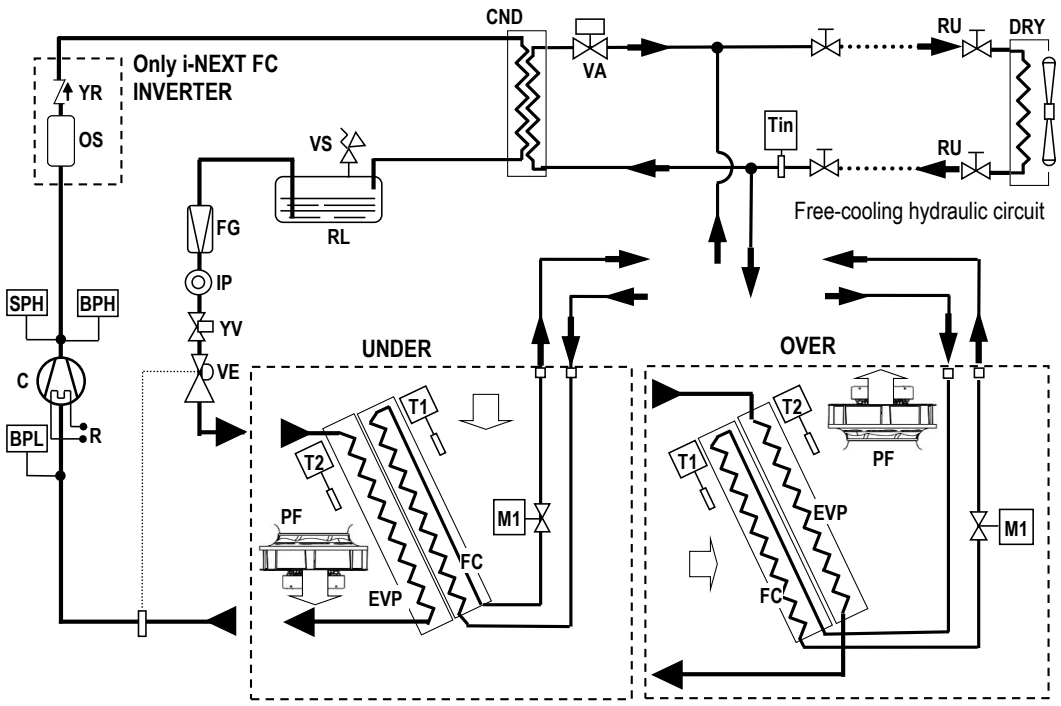
1.5.3 DIRECT EXPANSION MACHINE IN DIRECT FREE COOLING VERSION: t-NEXT FC / i-NEXT FC

The machines consist of two independent heat exchange sections:

- Main direct expansion cooling coil
- Additional chilled water cooling coil

The machines are basically made up of a heat exchange section and one or more compressors for refrigerant, with the relevant water condensing section. They work cooling and dehumidifying the air of the room to be conditioned.
The room air is conveyed through the evaporating coil by the supply fan(s). The cooling effect is obtained through a vapour-compression thermodynamic cycle with compressor(s).
The heat, subtracted in the evaporating coil from the air to be cooled, is transferred to the water-cooled condenser and given by this to the water. The water is then sent to an external cooler (Dry Cooler) which uses outside air to reduce the water temperature
An expansion valve controls the refrigerant flow.
When the outdoor air temperature is favourable, the system activates indirect free-cooling reducing the activity of the compressors, until they stop (total free cooling).
The indirect free-cooling circuit always has the priority of insertion with respect to the refrigerant circuit with compressors, if there are conditions.
The additional indirect free-cooling section is fed by the condensation system water.
The water in the free-cooling circuit is sent to an external cooler (Dry Cooler) which uses external air to reduce the water temperature.
A motorized valve regulates the flow of water in the heat exchange section of the free-cooling coil.
In order to prevent the formation of ice in the hydraulic circuit, we recommend the use of glycol mixtures with a concentration appropriate to the operating temperatures of the mixture and / or winter outdoor air in the installation area

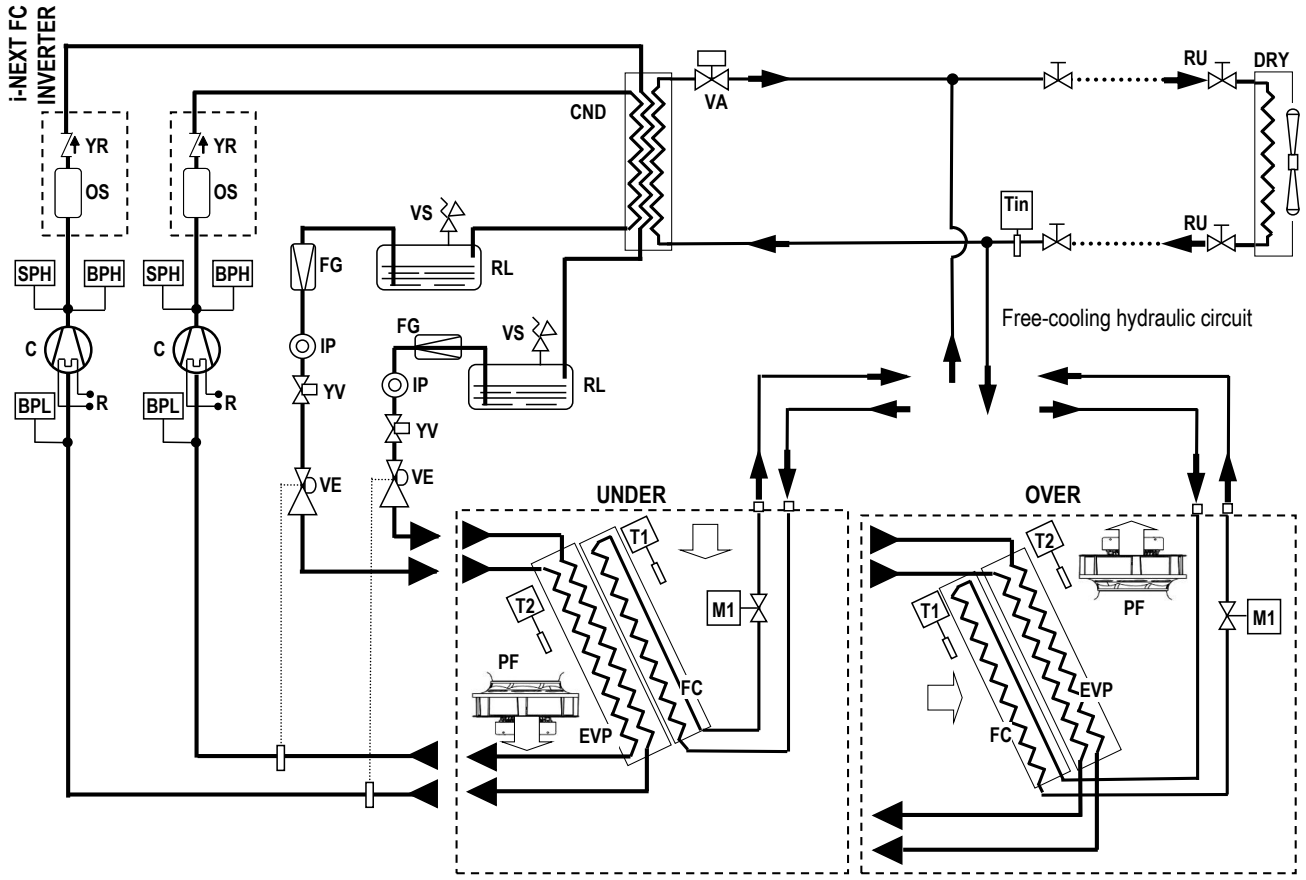
SINGLE REFRIGERANT CIRCUIT



LEGENDA:

C	Compressor
R	Crankcase heater
CND	Condenser.
EVP	Evaporator.
BPH	High pressure transducer.
BPL	Low pressure transducer
SPH	High pressure switch
VS	Safety valve.
FG	Refrigerant filter.
OS	Oil separator (only Inverter)
YR	Check valve (only inverter)
PF	Plug Fan
DRY	Dry Cooler
YV	Solenoid valve (option)
IP	Sight glass
VE	Electronic expansion valve with temperature probe
T	Temperature probes
RU	Valves
RL	Liquid receiver
VA	Motorized valve for condensing control
M1	Motorized valve for free-cooling system
FC	Free cooling additional coil

DOUBLE REFRIGERANT CIRCUIT

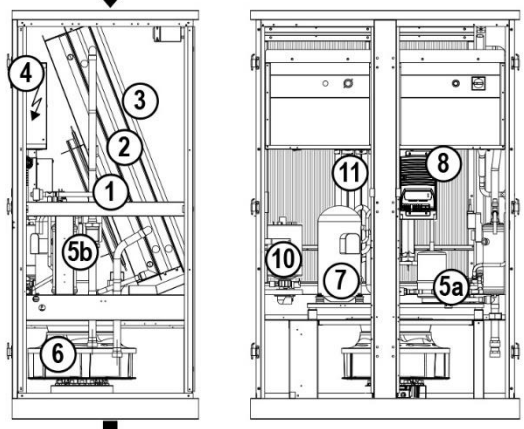


LEGENDA:

C	Compressor
R	Crankcase heater
CND	Condenser.
EVP	Evaporator.
BPH	High pressure transducer.
BPL	Low pressure transducer
SPH	High pressure switch
VS	Safety valve.
FG	Refrigerant filter.
OS	Oil separator (only Inverter)
YR	Check valve (only inverter)
PF	Plug Fan
DRY	Dry Cooler
YV	Solenoid valve (option)
IP	Sight glass
VE	Electronic expansion valve with temperature probe
T	Temperature probes
RU	Valves
RL	Liquid receiver
VA	Motorized valve for condensing control
M1	Motorized valve for free-cooling system
FC	Free cooling additional coil

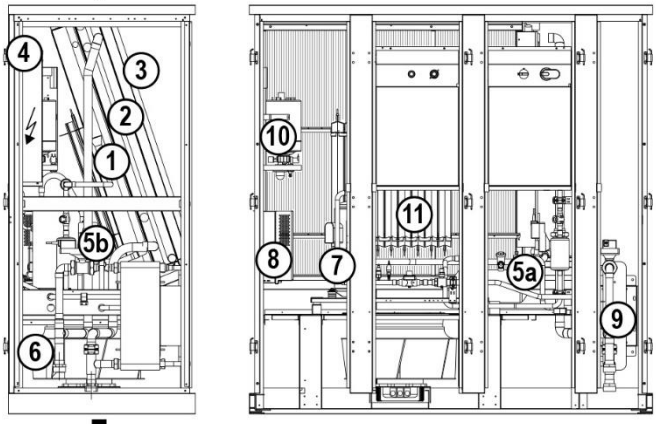
1.5.3.1 Main components of direct expansion machines

b-NEXT / t-NEXT / i-NEXT DX

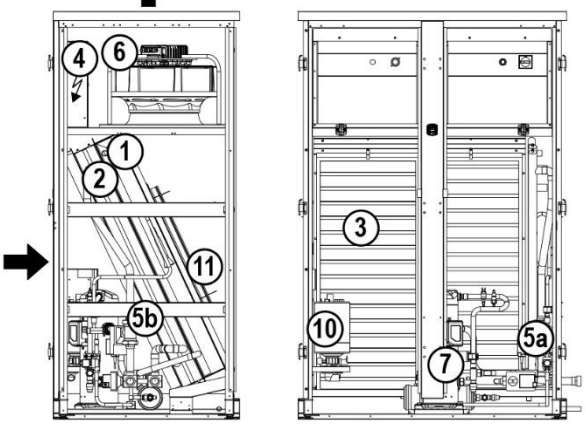


LEGENDA
1. Main cooling coil
2. Additional cooling coil (only DF / FC versions)
3. Air filter
4. Electric panel
5a. Refrigerant circuit
5b. Valve for water flow control in additional hydraulic circuit (only DF / FC version)
6. Plug Fan
7. Compressor
8. Inverter for compressor
9. Water cooled condenser (only DW version)
10. Humidifier (accessory)
11. Electric heater (accessory)

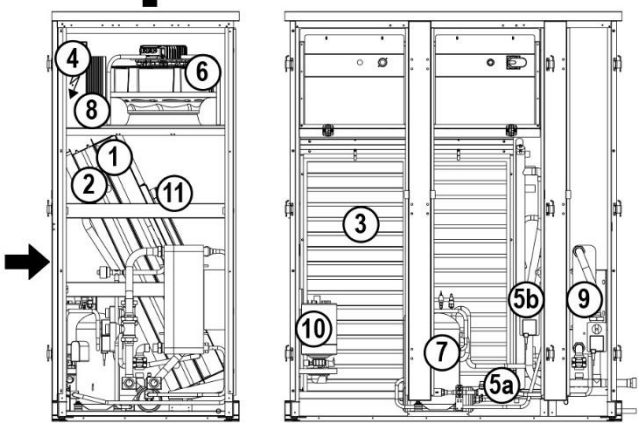
b-NEXT / t-NEXT / i-NEXT DW



b-NEXT / t-NEXT / i-NEXT DX



b-NEXT / t-NEXT / i-NEXT DW



1.5.3.2 Working limits of direct expansion machines

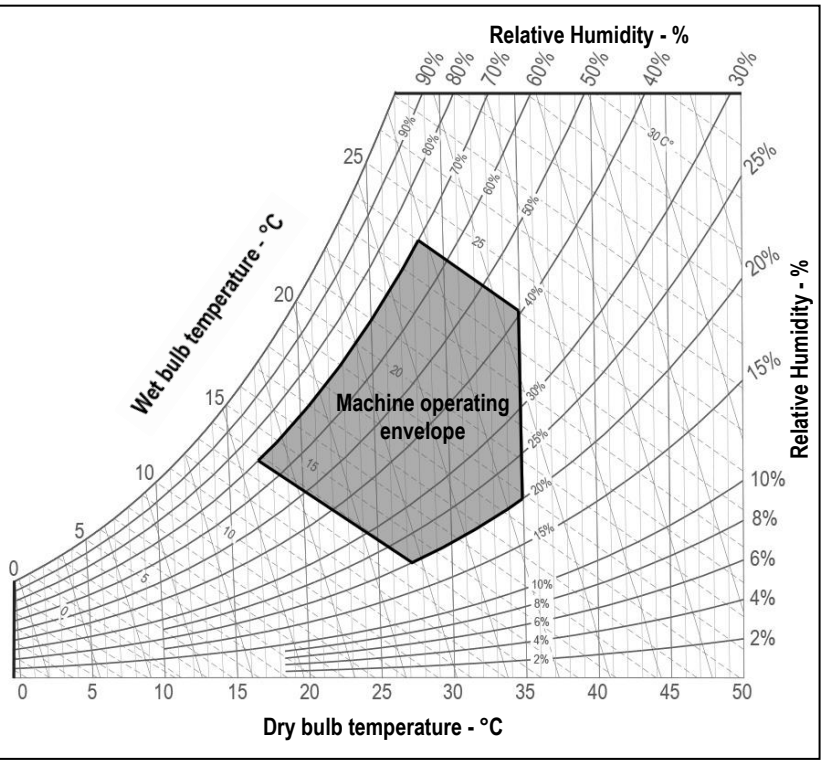
Serie b-NEXT DX / b-NEXT DW

ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
17°C minimum temperature with dry bulb.
35°C maximum temperature with dry bulb.
Room air humidity:
20%UR minimum relative humidity.
70%UR maximum relative humidity.

OUTDOOR TEMPERATURE (DX)
45°C minimum temperature
-15°C maximum temperature
-45°C maximum temperature for LT version

WATER COOLED CONDENSER (DW)
30/50°C Outlet water temperature.

POWER SUPPLY
± 10% Maximum tolerance of the supply voltage (V)



t-NEXT DX-DW / i-NEXT DX-DW / t-NEXT DF DX-DW / i-NEXT DF DX-DW / t-NEXT FC DW / i-NEXT FC DW

ROOM AIR CONDITIONS
Room air temperature:
14°C minimum temperature with wet bulb.
24°C maximum temperature with wet bulb.
18°C minimum temperature with dry bulb.
40°C maximum temperature with dry bulb.
Room air humidity:
20%UR minimum relative humidity.
60%UR maximum relative humidity.

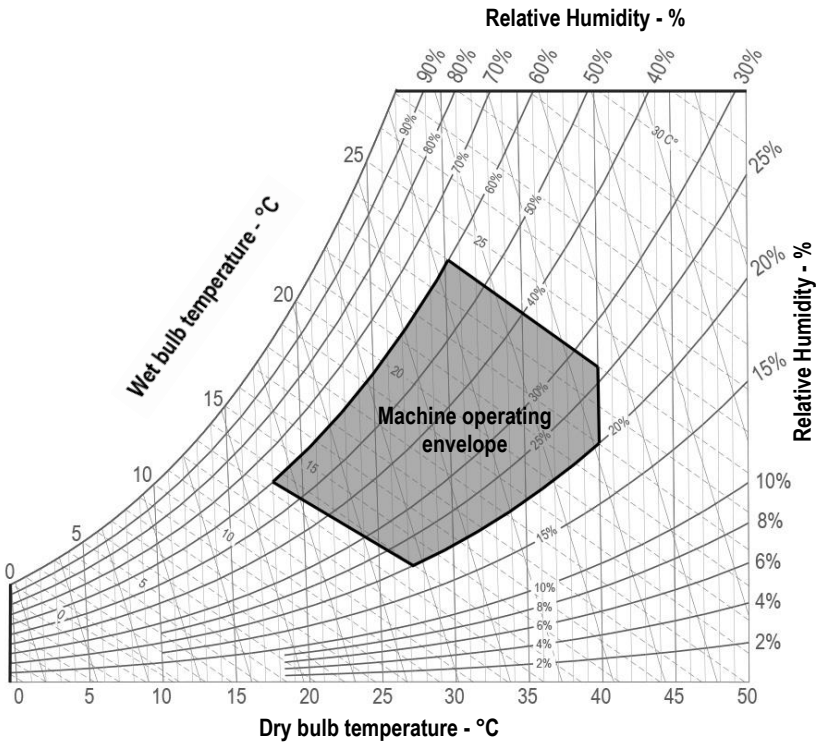
OUTDOOR TEMPERATURE (DX)
4545°C minimum temperature
-15°C maximum temperature
-45°C maximum temperature for LT version

WATER COOLED CONDENSER (DW)
30/50°C Outlet water temperature.

CHILLED WATER TEMPERATURE (DF/FC)
ΔT 6°C Maximum ΔT between inlet and outlet

HYDRAULIC CIRCUIT
10 Bar Maximum working pressures

POWER SUPPLY
± 10% Maximum tolerance of the supply voltage (V)



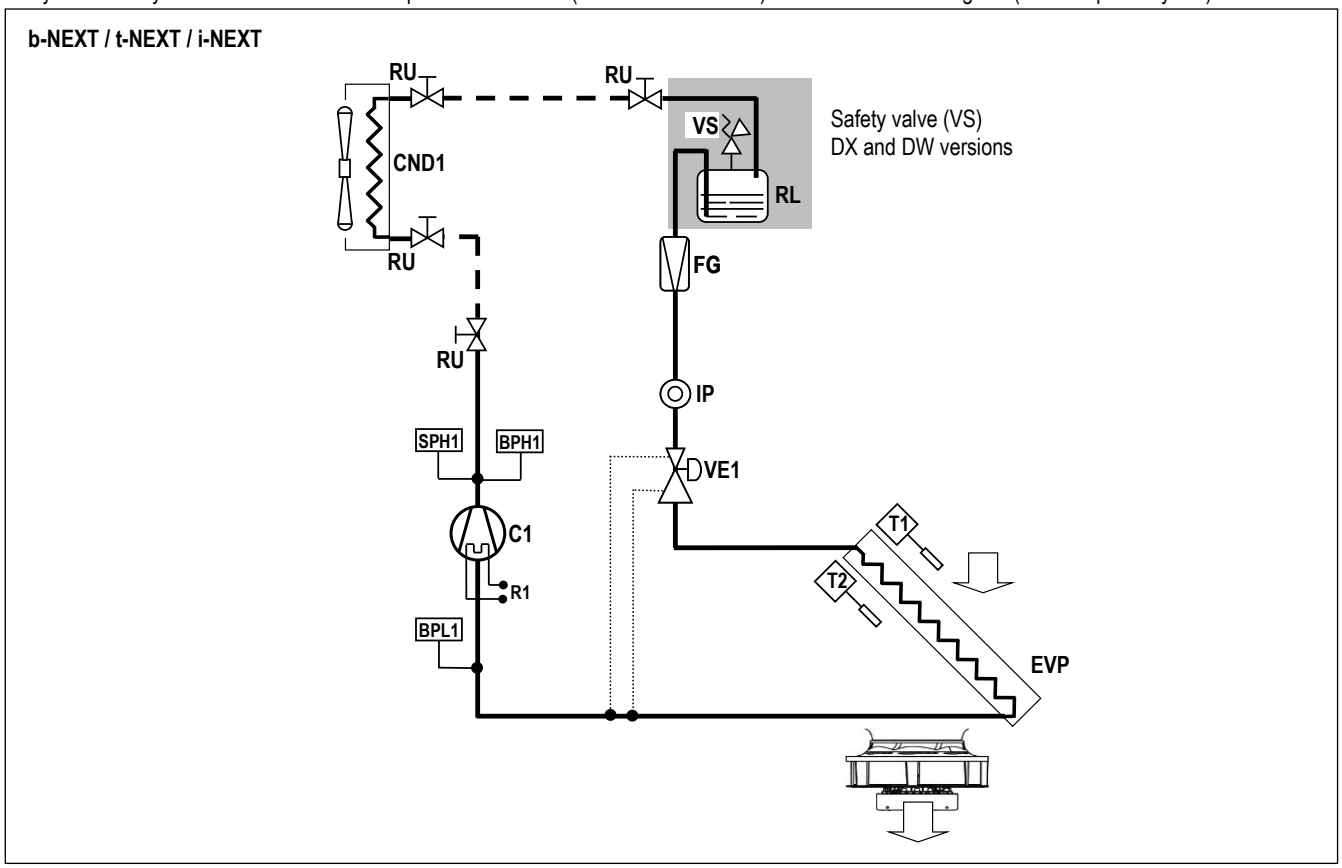
1.5.3.3 Technical characteristic and technical data of the direct expansion machines
For the characteristics and technical data of the machines, refer to the relative technical bulletin.

1.5.3.4 Technical characteristic and technical data of the remote air-cooled condensers
For the characteristics and technical data of the machine, refer to the relative technical bulletin.

1.5.4 SAFETY DEVICES FOR DIRECT EXPANSION MACHINES

Safety valves: they are installed in the direct expansion machines (DX and DW versions) as indicated in the diagram (when required by law)

b-NEXT / t-NEXT / i-NEXT



1.6 MAIN COMPONENTS

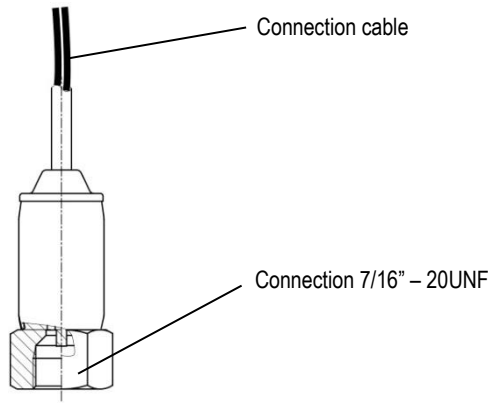
1.6.1 HIGH AND LOW-PRESSURE TRANSDUCERS FOR REFRIGERANT GAS

The pressure transducers are used for the control of the pressure of refrigerant gas.
They are installed on refrigerant discharge line (High pressure transducer) and on suction line (Low pressure transducer) of the compressor.

CHARACTERISTICS

Working pressure:	0-30 bar (for refrigerant R410A) low pressure transducer 0-50 bar (for refrigerant R410A) high pressure transducer
Signal:	4 … 20 mA
Connection:	7/16" – 20UNF female – for Schrader valve
Connection cable:	AWG18 – length 150 cm

THE TRANSDUCER IS NOT REPAIRABLE AND MUST BE REPLACED



The transducers are mounted on Scharder valves and can be removed without causing refrigerant gas leaks.

Sets are shown in the microprocessor control list.

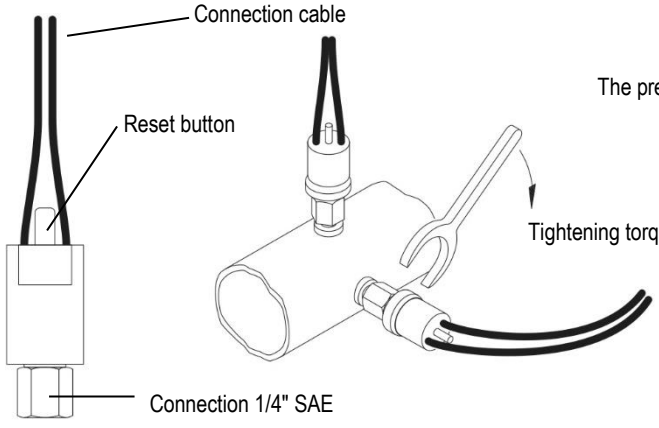
1.6.2 HIGH-PRESSURE SWITCH WITH MANUAL RESET FOR REFRIGERANT GAS

The pressure switch has the safety function on the high-pressure side of the refrigerant circuit.
The intervention of the pressure switch stops the compressor(s) operating on the refrigeration circuit to which the pressure switch is connected.
The pressure switch has manual reset; reset is performed by pressing the red button.
To reset the pressure switch, the refrigerant pressure must have returned to normal operating conditions.

CHARACTERISTICS

Intervention pressure:	45 bars (for refrigerant R410A)
Reset:	Manual
Connection:	1/4" SAE female – for Schrader valve
Connection cable:	AWG18 – length 150 cm
Set:	It is not possible to calibrate or tamper with the pressure switch

THE PRESSURE SWITCH IS NOT REPAIRABLE AND MUST BE REPLACED



The pressure switch can be installed in the positions shown in the figure.

Tightening torque: 13 - 15 Nm

The transducers are mounted on Scharder valves and can be removed without causing refrigerant gas leaks.

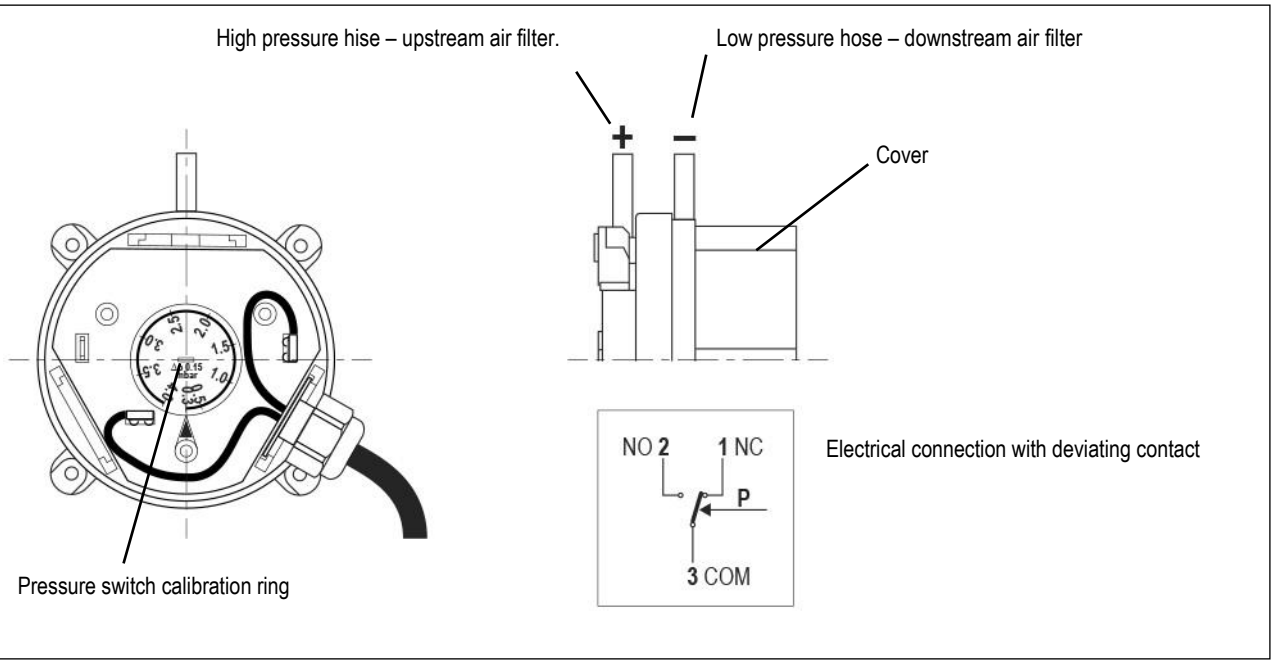
1.6.3 DIFFERENTIAL AIR PRESSURE SWITCH FOR CLOGGED FILTERS SIGNALLING

The system includes the pressure switch installed in the electrical panel or in the front of the machine and the plastic hoses for the relief of the pressure upstream and downstream the air filter.

CHARACTERISTICS:

Electric data:	1.0A max / 250 Vac
Electrical connection:	Faston 6,3 x 0,8 mm
Degree of protection:	IP54
Control range:	0,3 … 4,0 mbar (30 … 400 Pa)
Differential for intervention:	0,15 mbar (15 Pa)
Operating condition:	from -20°C to 85°C

INSTALL THE PRESSURE SWITCH ALWAYS IN VERTICAL POSITION



PRESSURE SWITCH CALIBRATION

With the machine running, progressively cover the surface of the air filter and check that the pressure switch intervenes with a degree of coverage of the filtering surface of approximately 50-60%.

If the pressure switch does not intervene, reduce the calibration value;

In case of premature intervention, increase the calibration value.

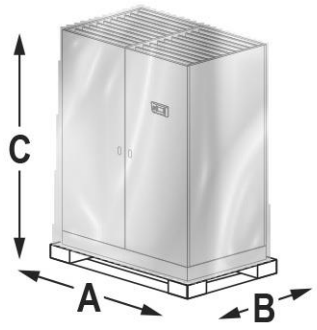
1.7 MACHINE PACKAGING

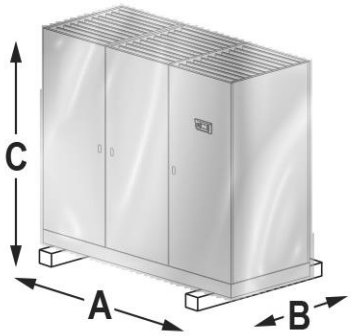
INFORAMTION
Values referred to the standard machine. The presence of some accessories increases the weight of the machine and can increase the dimensions.

Humidity or rain can increase the weight of the wood used for the packaging, in particular for the cage packaging

1.7.1 PACKAGING FOR SHIPMENTS ON THE ITALIAN TERRITORY

The machines are on pallet or wooden stub and covered with cellophane





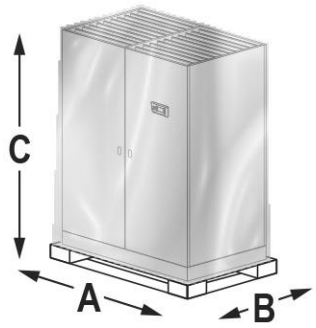
UNDER: DIMENSIONS b-NEXT / t-NEXT / i-NEXT Version: DX / DF DX												
Size		E0	E1	E2	E3	E4	--	E5	E6	E7	E8	E9
A	mm	700	750	900	1180	1400	--	1650	1895	2195	2520	2920
B	mm	500	750	750	910	1050	--	1130	1130	1130	1130	1130
C	mm	1830	2080	2080	2080	2130	--	2100	2100	2100	2100	2100

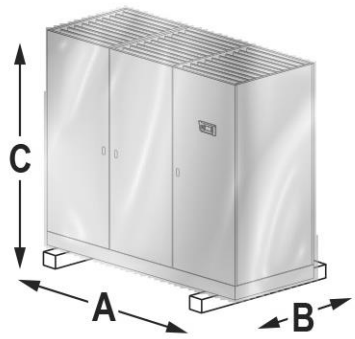
UNDER: WEIGHT (kg) b-NEXT / t-NEXT Version: DX / DF DX												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	170	170	251	283	288	340	345	345	447	452	464
WEIGHT DF DX	kg	--	--	271	306	311	373	378	378	499	504	516
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
WEIGHT DX	kg	462	546	556	637	657	766	771	867	867	1043	1103
WEIGHT DF DX	kg	514	610	620	711	731	855	860	968	968	1173	1173

UNDER: WEIGHT (kg) i-NEXT Version: DX / DF DX											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
WEIGHT DX	kg	233	263	350	467	505,5	590,5	726	887	1008	1033
WEIGHT DF DX	kg	253	286	383	510	557,5	654,5	800	976	1133	1158

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
The machines are on pallet or wooden stub and covered with cellophane





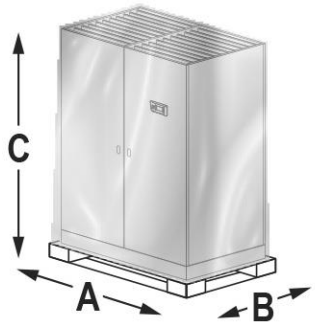
UNDER: dimensions b-NEXT / t-NEXT / i-NEXT Version: DW / DF DW / FC DW											
Size		E1	E2	E3	--	E4L	E5L	E6L	E7L	E8L	E9L
A	mm	750	900	1180	--	1650	1975	2220	2520	2920	3320
B	mm	750	750	910	--	1130	1130	1130	1130	1130	1130
C	mm	2080	2080	2080	--	2100	2100	2100	2100	2100	2100

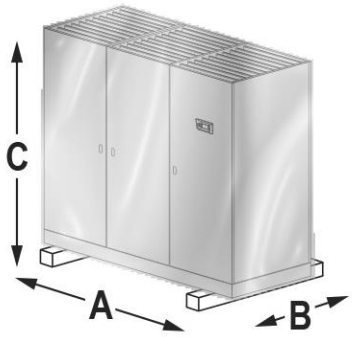
UNDER: WEIGHT (kg) b-NEXT / t-NEXT Version: DW / DF DW / FC DW												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4L	E4L	E4L
WEIGHT DW	kg	258	260	263	298	303	360	365	365	525,5	525,5	530,5
WEIGHT DF DW	kg	278	280	283	321	326	393	398	398	577,5	577,5	582,5
WEIGHT FC DW	kg	278	280	283	321	326	393	398	398	577,5	577,5	582,5
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4L	E5L	E5L	E6L	E6L	E7L	E7L	E8L	E8L	E9L	E9L
WEIGHT DW	kg	530,5	661,5	661,5	731	731	797	797	1013	1013	1164	1214
WEIGHT DF DW	kg	577,5	577,5	582,5	582,5	725,5	725,5	805	805	886	886	1114
WEIGHT FC DW	kg	577,5	577,5	582,5	582,5	725,5	725,5	805	805	886	886	1114

UNDER: WEIGHT (kg) i-NEXT Version: DW / DF DW / FC DW										
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4L	E5L	E5L	E7L	E8L	E9L	E9L
WEIGHT DW	kg	253	303	365	505,5	606,5	636,5	807	983	1124	1149
WEIGHT DF DW	kg	273	326	398	548,5	658,5	700,5	881	1072	1249	1274
WEIGHT FC DW	kg	273	326	398	548,5	658,5	700,5	881	1072	1249	1274

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
The machines are on pallet or wooden stub and covered with cellophane





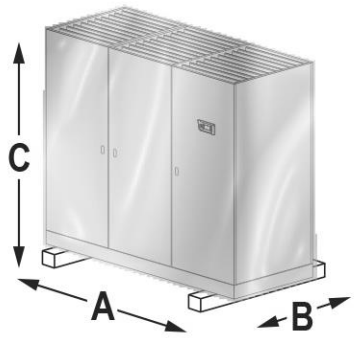
UNDER: DIMENSONS w-NEXT Version: S / DF / HD S / HD K														
SIZE		E0	E1	E2	E3	E3P	E4	--	E5	E6	E7	E8	E9	E10
A	mm	700	750	900	1180	1200	1400	--	1650	1895	2195	2520	2920	3530
B	mm	500	750	750	910	1050	1050	--	1130	1130	1130	1130	1130	1130
C	mm	1830	2080	2080	2080	2080	2130	--	2100	2100	2100	2100	2100	2100

UNDER: WEIGHT (kg) w-NEXT														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
PESO S	kg	160	229	270	345	352	406	488,5	550,5	613	685	779	927	997
PESO DF	kg	---	249	293	378	395	458	552,5	624,5	702	786	905	1079	--

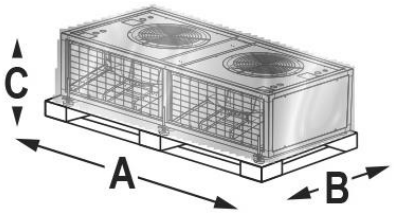
UNDER: WEIGHT (kg) w-NEXT HD												
MODEL		015	024	041	048	060	072	090	110	122	146	170
SIZE		E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
WEIGHT HD S	kg	229	270	345	352	406	488,5	550,5	613	685	779	--
WEIGHT HD K	kg	233	274	352	353	412	496,5	559,5	622	694	790	957

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
The machines are on pallet or wooden stub and covered with cellophane

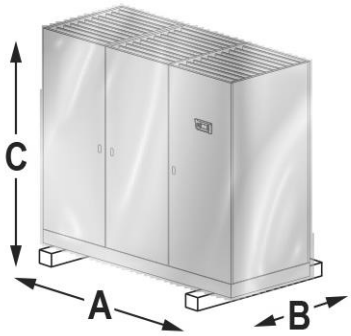


UNDER: w-NEXT2 Version: S / K / DF AIR HANDLING SECTION DIMENSIONS (mm) e WEIGHT (kg)								
Size		E4	E5	E6	E7	E8	E9	E10
A	mm	1325	1650	1895	2195	2520	2920	3530
B	mm	1130	1130	1130	1130	1130	1130	1130
C	mm	2100	2100	2100	2100	2100	2100	2100
WEIGHT S	kg	327	393,5	449,5	519	580	661	782
WEIGHT K	kg	352	458,5	489,5	574	635	726	782
WEIGHT DF	kg	379	457,5	523,5	608	681	787	932

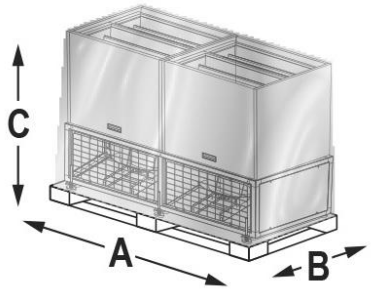


UNDER: w-NEXT2 Version: S / K / DF FANS SECTION DIMENSIONS (mm) e WEIGHT (kg)								
Size		E4	E5	E6	E7	E8	E9	E10
A	mm	1410	1730	1970	2280	2600	3000	3610
B	mm	1100	1100	1100	1100	1100	1100	1100
C	mm	730	730	730	730	730	730	730
WEIGHT	kg	137	179	204	244	292	337	422

INFORMATION
The packaging is completely recyclable



UNDER: NEXT X TYPE AIR HANDLING SECTION DIMENSIONS (mm) e WEIGHT (kg)					
Size		T1	T2	T3	T4
A	mm	1640	2280	2920	3560
B	mm	1130	1130	1130	1130
C	mm	1860	1860	1860	1860
WEIGHT	kg	357	525	703	892



UNDER: NEXT X TYPE FILTERING SECTION + FAN SECTION DIMENSIONS (mm) e WEIGHT (kg)					
Size		T1	T2	T3	T4
A	mm	1720	2360	3000	3640
B	mm	1200	1200	1200	1200
C	mm	1300	1300	1300	1300
WEIGHT	kg	137	240	339	438

INFORMATION
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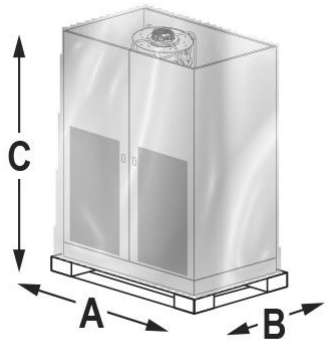
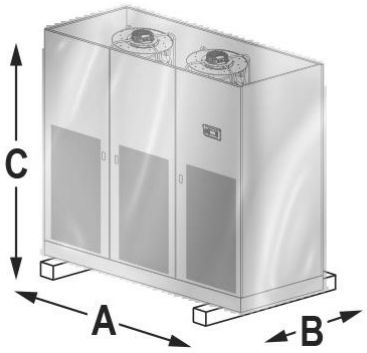




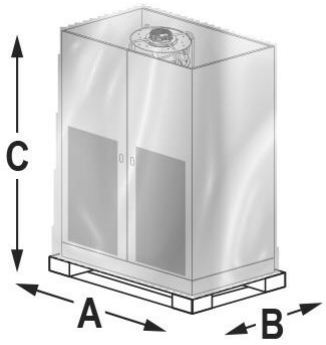
OVER: DIMENSIONS b-NEXT / t-NEXT / i-NEXT Version: DX / DF DX												
Size		E0	E1	E2	E3	E4	--	E5	E6	E7	E8	E9
A	mm	700	750	900	1180	1400	--	1720	1970	2300	2620	---
B	mm	500	750	750	910	1050	--	1130	1130	1130	1130	---
C	mm	1830	2080	2080	2080	2130	--	2100	2100	2100	2100	---

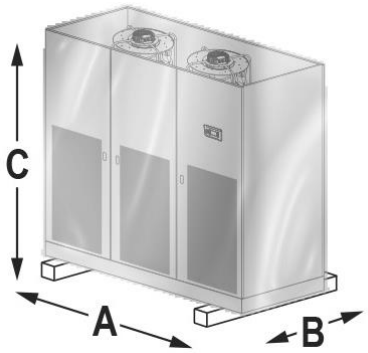
OVER: WEIGHT (kg) b-NEXT / t-NEXT Version: DX / DF DX												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	170	170	241	273	278	320	325	325	437	442	454
WEIGHT DF DX	kg	--	--	261	296	301	353	358	358	489	494	506
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
WEIGHT DX	kg	462	536	546	627	647	709	716	807	807	--	--
WEIGHT DF DX	kg	514	600	610	701	721	798	805	908	908	--	--

OVER: WEIGHT (kg) i-NEXT Version: DX / DF DX											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
WEIGHT DX	kg	223	253	340	457	495,5	580,5	671	827	--	--
WEIGHT DF DX	kg	243	276	373	500	547,5	644,5	745	916	--	--

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
The machines are on pallet or wooden stub and covered with cellophane





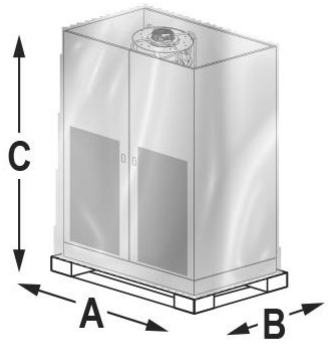
OVER: DIMESIONS: b-NEXT / t-NEXT / i-NEXT Version: DW / DF DW / FC DW												
Size		E0	E1	E2	E3	--	E4L	E5L	E6L	E7L	E8L	E9L
A	mm	700	750	900	1180	--	1720	2050	2290	2620	3020	----
B	mm	500	750	750	910	--	1130	1130	1130	1130	1130	---
C	mm	1830	2080	2080	2080	--	2100	2100	2100	2100	2100	---

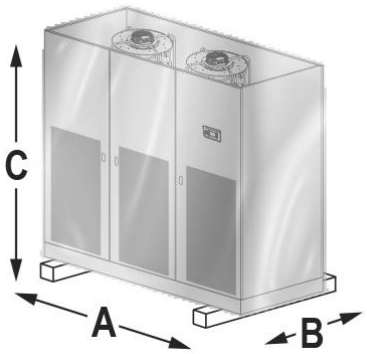
OVER: PEWEIGHTSI (kg) b-NEXT / t-NEXT Version: DW / DF DW / FC DW												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4L	E4L	E4L
WEIGHT DW	kg	248	250	253	288	293	340	345	345	515,5	515,5	520,5
WEIGHT DF DW	kg	268	270	273	311	316	373	378	378	567,5	567,5	572,5
WEIGHT FC DW	kg	268	270	273	311	316	373	378	378	567,5	567,5	572,5
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4L	E5L	E5L	E6L	E6L	E7L	E7L	E8L	E8L	E9L	E9L
WEIGHT DW	kg	520,5	651,5	651,5	711	711	747	747	953	953	--	--
WEIGHT DF DW	kg	572,5	715,5	715,5	785	785	836	836	1054	1054	--	--
WEIGHT FC DW	kg	572,5	715,5	715,5	785	785	836	836	1054	1054	--	--

OVER: PESI (kg) i-NEXT Version: DW / DF DW / FC DW										
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4L	E5L	E5L	E7L	E8L	E9L	E9L
WEIGHT DW	kg	243	293	345	495,5	596,5	626,5	752	923	--	--
WEIGHT DF DW	kg	263	306	378	538,5	648,5	690,5	827	1002	--	--
WEIGHT FC DW	kg	263	306	378	538,5	648,5	690,5	827	1002	--	--

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
The machines are on pallet or wooden stub and covered with cellophane





OVER: DIMENSIONS w-NEXT Version: S / DF														
Size		E0	E1	E2	E3	E3P	E4	--	E5	E6	E7	E8	E9	E10
A	mm	700	750	900	1180	1200	1400	--	1720	1970	2300	2620	3020	---
B	mm	500	750	750	910	1050	1050	--	1130	1130	1130	1130	1130	---
C	mm	1830	2080	2080	2080	2080	2130	--	2100	2100	2100	2100	2100	---

OVER: WEIGHT (kg) w-NEXT Version: S / DF														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
WEIGHT S	kg	160	216	252	322	344	372	446,5	502,5	559	623	705	--	--
WEIGHT DF	kg	--	236	275	355	387	424	510,5	576,5	648	724	831	--	--

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT ON THE ITALIAN TERRITORY
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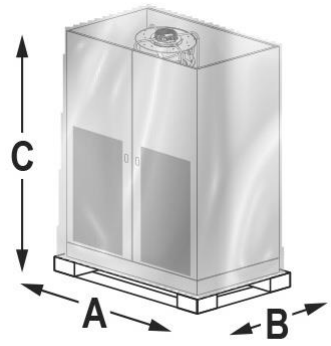
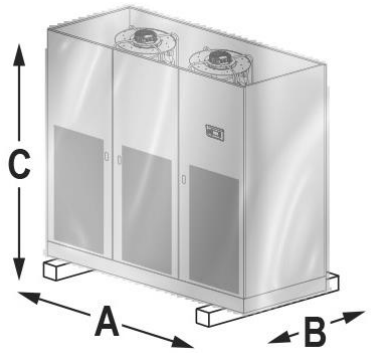




DIMENSIONI: DISPLACEMENT t-NEXT DL / i-NEXT DL Version: DX / CW										
Size		E1	E2	E3	E3P	E4	--	--	--	E5
A	mm	750	900	1180	1200	1400	--	--	--	1650
B	mm	750	750	910	1050	1050	--	--	--	1130
C	mm	2080	2080	2080	2230	2285	--	--	--	2285

DISPLACEMENT: WEIGHT (kg) t-NEXT Version: DX												
MODEL		007 P1	009 P1	011 P1	014 P1	016 P1	020 P1	022 P1	026 P1	032 P1	037 P1	041 P1
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	233	234	238	273	276	340	340	342	447	452	467

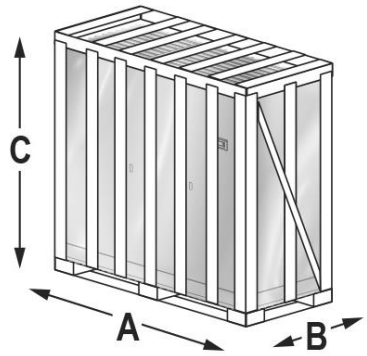
DISPLACEMENT: WEIGHT (kg) i-NEXT DX					
MODEL		018 M1	022 M1	030 M1	047 M1
SIZE		E2	E3	E4	E5
WEIGHT DX	kg	253	340	457	575,5

DISLOCAMENTO: WEIGHT (kg) w-NEXT CW					
MODEL		012	022	030	042
SIZE		F1	F2	F3	F3P
WEIGHT CW	kg	209	243	310	343

INFORMATION
The packaging is completely recyclable

1.7.2 PACKAGING FOR SHIPMENTS OVER THE ITALIAN TERRITORY

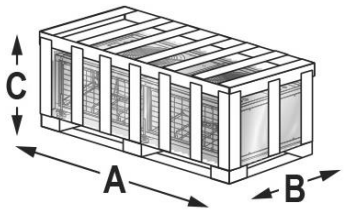
The machines are on wooden pallet, covered with cellophane and packaged in wooden cage.



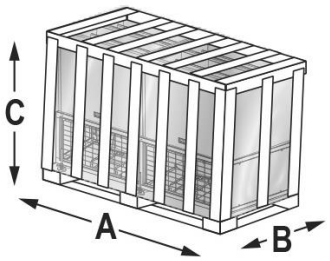
DIMENSIONS: ALL SERIES																
Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	T1	T2	T3	T4
A	mm	780	830	980	1260	1280	1490	1830	2080	2360	2730	3080	3680	1720	2360	3000	3640
B	mm	580	830	830	990	1130	1130	1130	1130	1130	1130	1130	1130	1200	1200	1200	1200
C	mm	1900	2100	2100	2100	2150	2150	2150	2150	2150	2150	2150	2150	1900	1900	1900	1900
C (*)	mm	--	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	---	---	---	---

DIMENSIONS: ALL SERIES							
Size		E4L	E5L	E6L	E7L	E8L	E9L
A	mm	1830	2130	2360	2730	3080	3590
B	mm	1130	1130	1130	1130	1130	1130
C	mm	2150	2150	2150	2150	2150	2150
C (*)	mm	2300	2300	2300	2300	2300	2300

(*) Packaging with high cage to contain accessories installed on the machine



DIMENSIONS: w-NEXT2 UNDER – Fan Section								
Size		E4	E5	E6	E7	E8	E9	E10
A	mm	1490	1810	2050	2360	2680	3080	3690
B	mm	1180	1180	1180	1180	1180	1180	1180
C	mm	750	750	750	750	750	750	750



DIMENSIONS: NEXT X TYPE – Filtering section + Fans					
Size		T1	T2	T3	T4
A	mm	1720	2360	3000	3640
B	mm	1200	1200	1200	1200
C	mm	1400	1400	1400	1400

INFORMATION
The packaging is completely recyclable

PACKAGING FOR SHIPMENT OVER THE ITALIAN TERRITORY

UNDER: WEIGHT (kg) b-NEXT / t-NEXT Version: DX / DF DX												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	193	193	278	312	317	372	377	377	483	488	500
WEIGHT DF DX	kg	--	--	298	335	340	405	410	410	535	540	552
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
WEIGHT DX	kg	498	594	604	703	723	842	847	948	948	1139	1199
WEIGHT DF DX	kg	550	658	668	777	797	931	936	1049	1049	1269	1269

UNDER: WEIGHT (kg) i-NEXT Version: DX / DF DX											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
WEIGHT DX	kg	260	292	382	503	554	639	802	968	1104	1129
WEIGHT DF DX	kg	280	315	415	546	606	703	876	1057	1229	1254

UNDER: WEIGHT (kg) b-NEXT / t-NEXT Version: DW / DF DW / FC DW												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4L	E4L	E4L
WEIGHT DW	kg	285	287	290	327	332	392	397	397	574	574	579
WEIGHT DF DW	kg	305	307	310	350	355	425	430	430	626	626	631
WEIGHT FC DW	kg	305	307	310	350	355	425	430	430	626	626	631
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4L	E5L	E5L	E6L	E6L	E7L	E7L	E8L	E8L	E9L	E9L
WEIGHT DW	kg	579	728	728	807	807	878	878	1109	1109	1270	1320
WEIGHT DF DW	kg	631	792	792	881	881	967	967	1210	1210	1400	1450
WEIGHT FC DW	kg	631	792	792	881	881	967	967	1210	1210	1400	1450

UNDER: PESI (kg) i-NEXT Version: DW / DF DW / FC DW											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4L	E5L	E5L	E7L	E8L	E9L	E9L
WEIGHT DW	kg	280	332	397	554	673	703	888	1079	1230	1255
WEIGHT DF DW	kg	300	355	430	597	725	767	962	1168	1355	1380
WEIGHT FC DW	kg	300	355	430	597	725	767	962	1168	1355	1380

PACKAGING FOR SHIPMENT OVER THE ITALIAN TERRITORY

UNDER: WEIGHT (kg) w-NEXT Version: S / DF														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
WEIGHT S	kg	183	256	299	377	384	442	534	614	686	763	872	1030	1100
WEIGHT DF	kg	--	276	322	410	427	494	598	688	775	864	998	1182	--

UNDER: WEIGHT (kg) w-NEXT HD Version HD S / HD K												
MODEL		015	024	041	048	060	072	090	110	122	146	170
SIZE		E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
WEIGHT HD S	kg	256	299	377	384	442	534	614	686	763	872	--
WEIGHT HD K	kg	260	303	384	385	448	542	623	695	772	883	1060

UNDER: WEIGHT (kg) w-NEXT2 Version: S / K / DF – Air handling section								
Size		E4	E5	E6	E7	E8	E9	E10
WEIGHT S	kg	363	439	513	592	658	754	885
WEIGHT K	kg	388	504	553	647	713	819	885
WEIGHT DF	kg	415	503	587	681	759	880	1035

UNDER: WEIGHT (kg) NEXT2 Version: S / K / DF – Fans section								
Size		E4	E5	E6	E7	E8	E9	E10
WEIGHT	kg	153	189	223	269	313	360	441

UNDER: WEIGHT (kg) NEXT X TYPE – Air handling section					
Size		T1	T2	T3	T4
WEIGHT	kg	433	617	821	1022

UNDER: WEIGHT (kg) NEXT X TYPE – Filtering section + Fans					
Size		T1	T2	T3	T4
WEIGHT	kg	213	332	457	568

PACKAGING FOR SHIPMENT OVER THE ITALIAN TERRITORY

OVER: WEIGHT (kg) b-NEXT / t-NEXT Version: DX / DF DX												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	193	193	268	302	307	352	357	357	473	478	490
WEIGHT DF DX	kg	--	--	288	325	330	385	390	390	525	530	542
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
WEIGHT DX	kg	498	584	594	693	713	785	792	888	888	--	--
WEIGHT DF DX	kg	550	648	658	767	787	874	881	989	989	--	--

OVER: WEIGHT (kg) i-NEXT Version: DX / DF DX											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
WEIGHT DX	kg	250	282	372	493	544	629	747	908	--	--
WEIGHT DF DX	kg	270	305	405	536	596	693	821	997	--	--

OVER: WEIGHT (kg) b-NEXT / t-NEXT Version: DW / DF DW / FC DW												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4L	E4L	E4L
WEIGHT DW	kg	275	277	280	317	322	372	377	377	564	564	569
WEIGHT DF DW	kg	295	297	300	340	345	405	410	410	616	616	621
WEIGHT FC DW	kg	295	297	300	340	345	405	410	410	616	616	621
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4L	E5L	E5L	E6L	E6L	E7L	E7L	E8L	E8L	E9L	E9L
WEIGHT DW	kg	569	718	718	787	787	828	828	1049	1049	--	--
WEIGHT DF DW	kg	621	782	782	861	861	917	917	1150	1150	--	--
WEIGHT FC DW	kg	621	782	782	861	861	917	917	1150	1150	--	--

OVER: WEIGHT (kg) i-NEXT Version: DW / DF DW / FC DW											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4L	E5L	E5L	E7L	E8L	E9L	E9L
WEIGHT DW	kg	270	322	377	544	663	693	833	1019	--	--
WEIGHT DF DW	kg	290	335	410	587	715	757	908	1098	--	--
WEIGHT FC DW	kg	290	335	410	587	715	757	908	1098	--	--

PACKAGING FOR SHIPMENT OVER THE ITALIAN TERRITORY

OVER: WEIGHT (kg) w-NEXT Version: S / DF														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
WEIGHT S	kg	183	243	281	354	376	408	492	566	632	701	798	--	--
WEIGHT DF	kg	--	263	304	387	419	460	556	640	721	802	924	--	--

DISPLACEMENT: WEIGHT (kg) t-NEXT DL Version: DX												
MODEL		007 P1	009 P1	011 P1	014 P1	016 P1	020 P1	022 P1	026 P1	032 P1	037 P1	041 P1
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4	E4	E4
WEIGHT DX	kg	260	261	265	302	305	372	372	374	483	488	503

DISPLACEMENT: WEIGHT (kg) i-NEXT DL Version: DX					
MODEL		018 M1	022 M1	030 M1	047 M1
SIZE		E2	E3	E4	E5
WEIGHT DX	kg	282	372	493	624

DISPLACEMENT: WEIGHT (kg) w-NEXT DL Version: CW					
MODEL		012	022	030	042
SIZE		F1	F2	F3	F3P
WEIGHT CW	kg	236	272	342	375

1.7.3 SPECIAL PACKAGING

On request packing in wooden case.
For shipments by sea, outside a commercial container, specific packaging is required.

1.7.4 INFORMATION ATTACHED ON THE MACHINE AND / OR ON THE PACKAGING

There are several information such as:

Information on the Installation, Use and Maintenance Manual

Carica refrigerante totale
Total refrigerant charge

R410A GWP = 2088 – 1 kg = 2,088 Ton CO2

CO2 equivalente totale
Total CO2 equivalent

Il manuale di Installazione, Uso e Manutenzione di questa apparecchiatura è pubblicato con il seguente codice:
The Installation, Use and Maintenance Manual of this unit is published in Italian language (original language) with the following code:

Before installation and use please read the installation, use and maintenance manual.

Prima di installare questa apparecchiatura leggere le Norme di Sicurezza riportate nel manuale di Installazione, Uso e Manutenzione

The Installation, Use and Maintenance Manual is delivered with the machine. Before installing the machine please contact de Distributor / Agent for local language translation of the Manual.

Il manuale di Installazione, Uso e Manutenzione di questa apparecchiatura è inserito all'interno del Quadro Elettrico. Nel caso in cui non sia presente contattare immediatamente l'Agenzia di zona.

Shipping address

MITSUBISHI ELECTRIC
Changes for the Better

MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

for a greener tomorrow

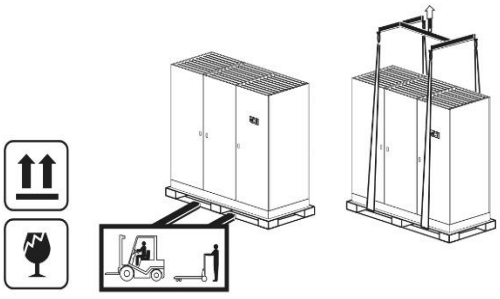
Protocollo: *Order Number:*	XXXXXXXX
Matricola: *Serial Number:*	XXXXXXXX
Cliente: *Customer:*	XXXXXXXX
Riferimento: *Order Ref.:*	XXXXXXXX

Destinazione:
Shipping Address:
XXXXXXXX XXXXXXXXX XXXX
XXXX XXXXX XXXXXXXXX
XXXX XXX

Handling

ISTRUZIONI PER SOLLEVAMENTO E MOVIMENTAZIONE

Mantenere sempre l'apparecchio in posizione verticale.
Il personale che effettua il carico, lo scarico e la movimentazione della macchina, deve possedere capacità ed esperienza acquisita e riconosciuta nel settore specifico e deve avere la padronanza dei mezzi di sollevamento da utilizzare.
Nella parte bassa dell'apparecchiatura sono posti componenti che possono essere danneggiati da una movimentazione impropria, porre particolare attenzione durante l'uso dei dispositivi di movimentazione



Serial Number

MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

ISTRUZIONI PER L'UTENTE

Series		Serial Number	
Model		Year	

MADE IN ITALY

Il Manuale di Installazione, Uso e Manutenzione di questa apparecchiatura è pubblicato con il seguente codice:
XX_XXXX_X

Prima di installare questa apparecchiatura leggere le Norme di Sicurezza riportate nel manuale di Installazione, Uso e Manutenzione.
Il Manuale di Installazione, uso e Manutenzione di questa apparecchiatura è inserito all'interno del Quadro Elettrico. Nel caso in cui non sia presente contattare immediatamente l'Agente di zona.

Il Disegno Costruttivo, lo Schema Elettrico, la Dichiarazione di Conformità CE e la Lista delle principali Parti di Ricambio sono nel quadro elettrico all'interno dell'unità.
La messa in funzione di questa apparecchiatura deve essere effettuata da personale autorizzato da MEHITS secondo le procedure e la documentazione di MEHITS.
Il rispetto di questa procedura è essenziale per l'attivazione della Garanzia di Prodotto che altrimenti risulta automaticamente cancellata.
Ad installazione avvenuta, il film protettivo dei pannelli, se presente, deve essere rimosso.

DANGER
The materials used for packaging id dangerous. Keep them out of reach of children.

2 TRANSPORTATION, STORAGE AND INSTALLATION

2.1 TRANSPORTATION AND HANDLING

2.1.1 INFORMATION FOR TRASPORTATION AND HANDLING

During transport and if the machine is not installed at the reception, do not remove the packaging and place the machine in an enclosed, dry and protected from sunlight site.

2.1.2 STORAGE

Temperature and humidity limits:

		Machine with R134a	Machine with R410A	Machine with R407C	Chilled water machine
Minimum temperature	°C	-10	-10	-10	-5
Maximum temperature	°C	55	46	46	55
Maximum non-condensing humidity	UR %	90	90	90	90

Larger limits of temperature are possible and must be requested when ordering.

2.1.3 TRANSPORTATION

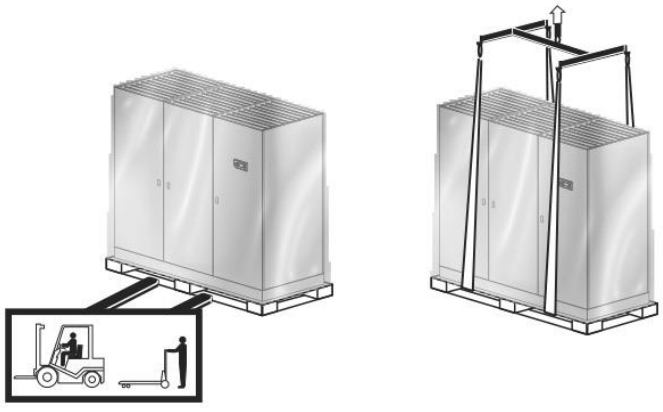
For road transport it is advisable to use a curtained truck or to use a tarp to protect the machines against weather. Use belts with ratchet system to secure the machine during transport.

FIXING THE MACHINE DURING TRANSPORT

INFORMATION
To avoid damaging the panels, we recommend fixing the machine as shown in the figure.
Protect the point of contact between the belt and the machine with a soft thickness.
Avoid excessive tension on the load securing belts.
For more information, contact the Constructor Shipping Office

2.1.4 UNLOAD

Lift and move the machine as indicated on the packaging and / or directly on the machine.
It is advisable NOT TO REMOVE the cellophane protection during the unloading, handling and positioning operations.



MANDATORY
All unloading, handling and positioning operations must be carried out with adequate means and by expert personnel, trained and authorized for this type of manoeuvres.
Keep the machine on the pallet for unloading and handling operations.

2.1.5 RECEIPT AND INSPECTION

Upon receipt verify the integrity and the effective compliance of the machine with the order.

- Check number of packages as per transport document. If not correct inform transporter and the manufacturer
- Visually inspect the packaging

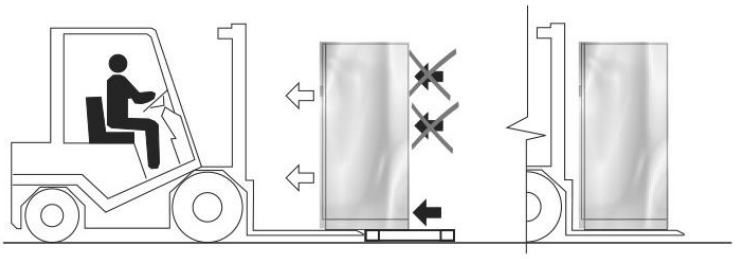
INFORMATION
In case of missing or damaged packages delivered, please contact the sales office of the manufacturer and transporter to agree on the procedures to be adopted

If the machine is not installed on receipt, place it in a protected area as indicated in STORAGE

MANDATORY
Storing the direct expansion machine in an environment that is too hot may cause excessive pressure on the refrigerant fluid and the intervention of the safety valves

2.1.6 HANDLING

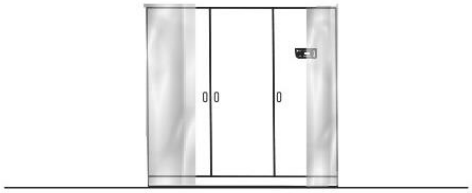
Removing the machine from the pallet.
Use a forklift as shown in the figure.
Avoid pushing the machine on the panelling as it may be damaged.



Transport to the place of installation.
It is possible to use trolleys for pianos
Secure the machine to the trolleys.
The operation must be performed by two people.

Removing the piano trolleys at the place of placement.
To place the machine on the ground, use a crowbar as shown in the figure.

Once the machine is positioned, it is possible to remove the cellophane protection.

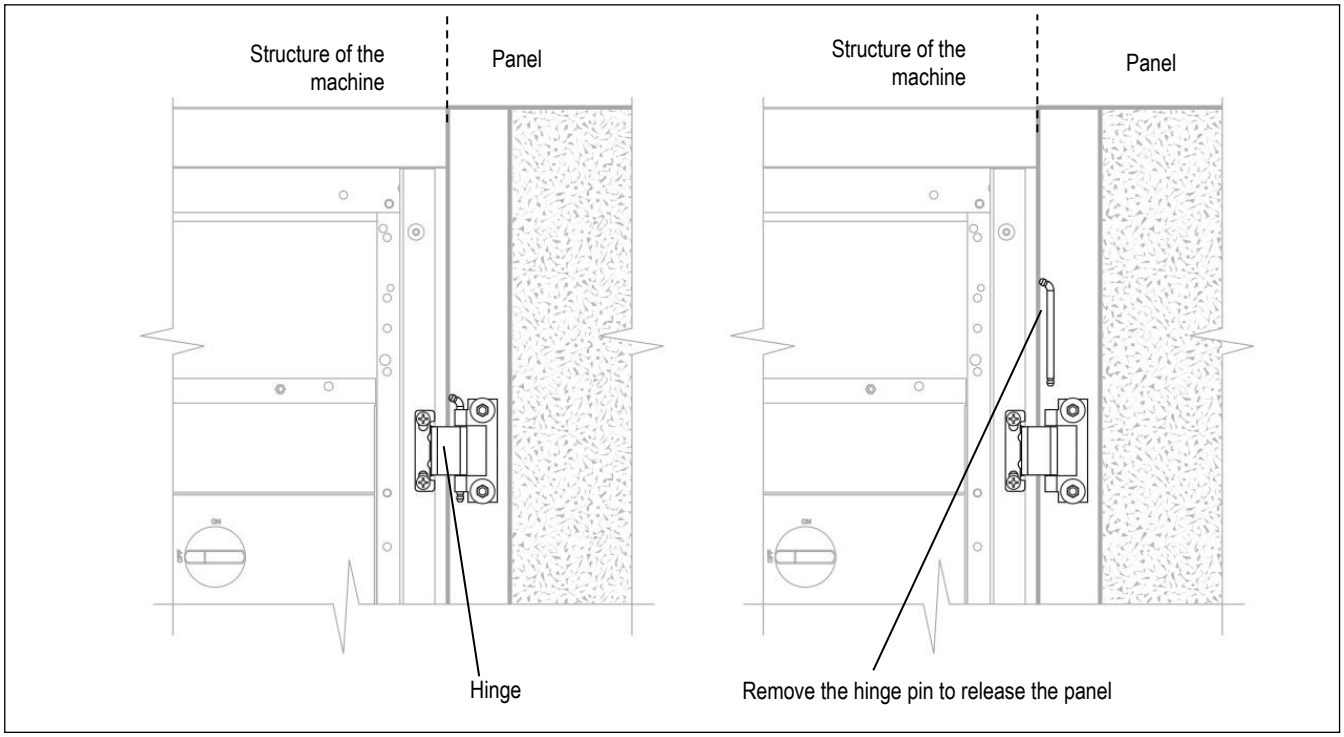


2.2 INSTALLATION

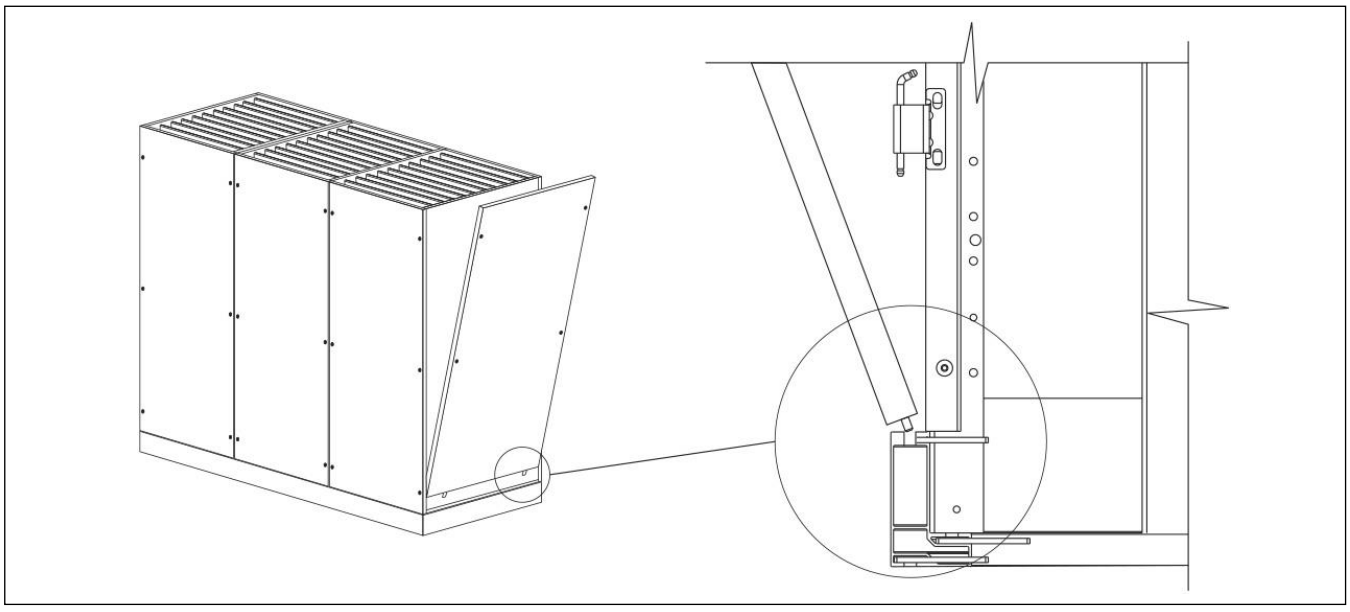
2.2.1 DISASSEMBLY OF THE MACHINE PANELLING

DANGER
The panelling of the machine is made of iron sheet and is heavy.
All dismantling and assembly operations must be carried out with suitable means and by experienced, trained and authorized persons for this type of manoeuvres

HINGED PANELS
The hinged panels can be easily removed to facilitate installation and / or maintenance operations.



SCREWED PANELS
The panels screwed to the machine have at the base two pins to be inserted into the groove of the base as shown in the figure.



2.2.2 INSTALLATION OF THE STANDARD MACHIINE

MANDATORY
All the installation stages must be an integral part of the general project

Before starting these stages, the person authorized to carry out these operations, apart from identifying the technical requirements, must implement a "safety plan", if necessary, to protect the personal safety of the directly involved people and must strictly implement the safety regulations, in particular any laws on mobile yards.

Before installing the machine, be sure that:
- the area must be perfectly flat and must ensure stability over time
- if installed on the floor of a building, this must be of adequate capacity
- it must be easily accessible to all people who must interact with it during its expected useful life
- all maintenance and replacement jobs (either ordinary or extraordinary) must be carried out easily and without any hazard to people, according to the applicable industrial safety laws.
- the volumetric spaces must be adequate to ensure the air flow necessary for the machine's proper operation and ventilation.
- that the minimum spaces required for operation and inspection indicated in this manual are respected.
- that air intake and delivery are never hindered or obstructed, even partially.

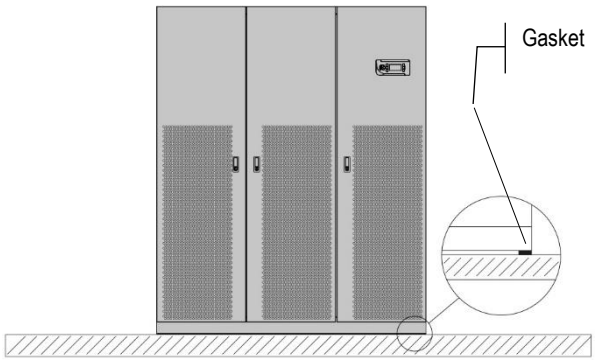
The machine must be installed indoors and in a non-aggressive atmosphere.

MANDATORY
For direct expansion machines (DX and DW), the installation must comply with the requirements of the EN 378-3 standard and the local regulations in force, taking into account the category of occupancy of the premises and the security group defined by EN 378 -1.

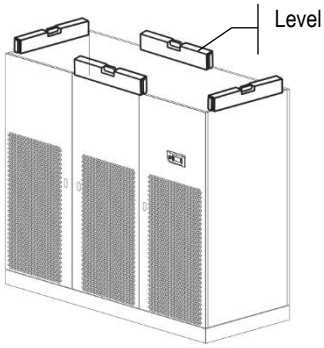
Refrigerant	R134a	R410A	R407C
Security group	A1	A1	A1

MANDATORY
The machine must be placed in an access area only allowed for OPERATORS, MAINTENANCE TECHNICIAN and TECHNICIANS; otherwise it must be surrounded by a fenced perimeter placed at least two meters from the external surfaces of the machine (if possible).
Staff of the INSTALLER or any other visitor must always be accompanied by an OPERATOR. For any unauthorized personal reason, it must be left alone in contact with the machine.
The MAINTENANCE TECHNICIAN must limit itself to intervening on the machine controls; it must not open any panel other than access to the command module. The INSTALLER must limit himself to intervening on the connections between the plant and the machine.
Access the machine equipped with the appropriate personal protective equipment and after having read and understood the documentation and instructions that must always be kept at hand.

2.2.3 POSITIONING THE OVER MACHINE: b-NEXT / t-NEXT / i-NEXT / w-NEXT

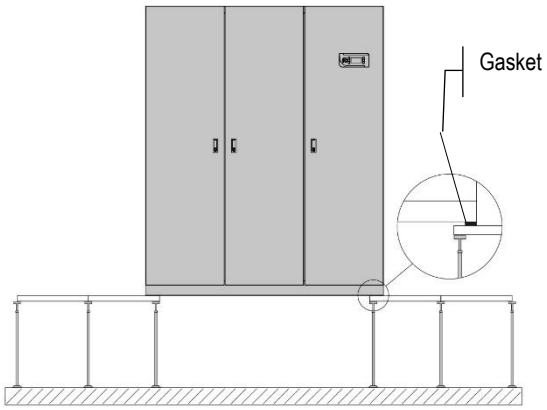


The machine is placed directly on the floor.
It is advisable to place an elastic rubber seal between the base of the machine and the floor for the entire support surface to prevent the transmission of noise and vibrations.

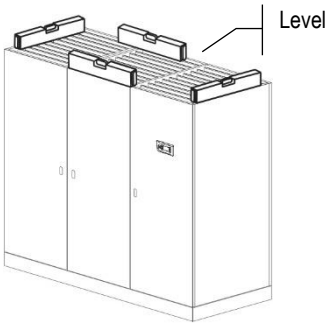


Once the machine has been positioned, the levelling must be checked in the four positions shown in the figure.
A levelling defect of more than 5 mm between the ends of the base may cause the condensate overflow from the collecting tray.

2.2.4 POSITIONING THE UNDER MACHINE: b-NEXT / t-NEXT / i-NEXT / w-NEXT

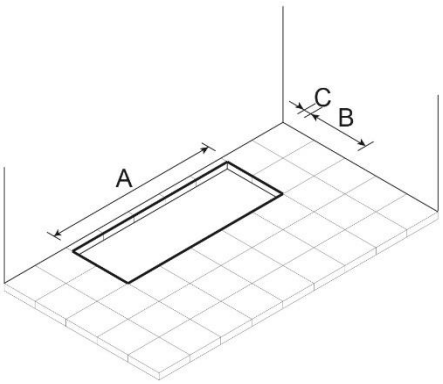


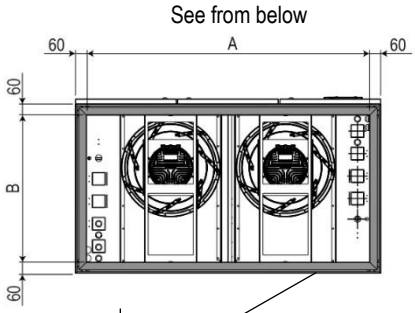
The machine is placed directly on the raised floor.
It is advisable to place an elastic rubber seal between the base of the machine and the floor for the entire support surface to prevent the transmission of noise and vibrations.

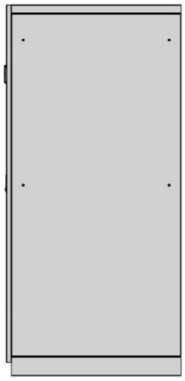


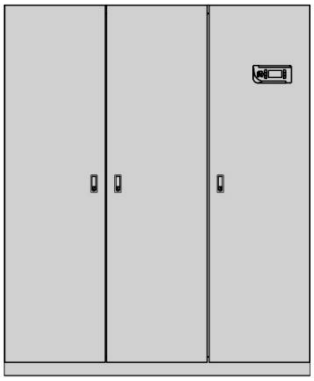
Once the machine has been positioned, the levelling must be checked in the four positions shown in the figure.
A levelling defect of more than 5 mm between the ends of the base may cause the condensate overflow from the collecting tray.

MACHINE UNDER: HOLE IN THE RAISED FLOOR









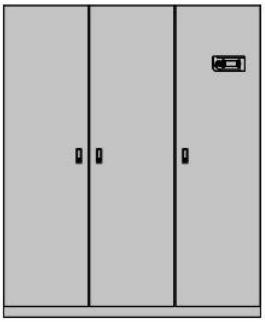
INFORMATION
Respecting the measures shown, a minimum distance of 5cm is guaranteed from the wall behind the machine

UNDER MACHINE DX / CW													
Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	585	560	695	995	995	1185	1510	1755	2055	2380	2780	3390
B	mm	340	560	560	660	815	785	785	785	785	785	785	785
C	mm	90	95	95	95	95	110	110	110	110	110	110	110

UNDER MACHINE DW											
Size		E0	E1	E2	E3	E4L	E5L	E6L	E7L	E8L	E9L
A	mm	585	560	695	995	1510	1835	2080	2400	2780	3180
B	mm	340	560	560	660	785	785	785	785	785	785
C	mm	90	95	95	95	110	110	110	110	110	110

2.2.5 POSITIONING THE UNDER MACHINE: w-NEXT2

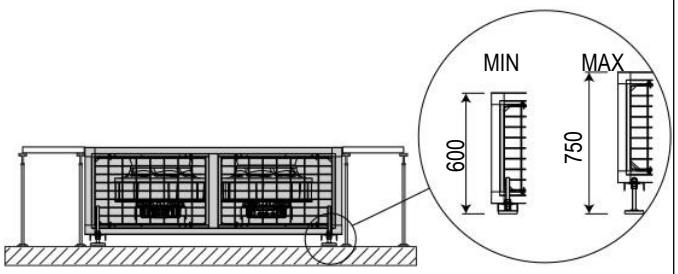
The machine is shipped in two sections to be assembled on site.



The air handling section that includes the air filters and the cooling coil with its 2-way valve.

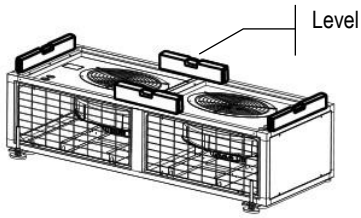
The fans section to install in the raised floor space.

The fans section is equipped with height-adjustable supports to adapt the section to the height of the raised floor.
Minimum height of section 600 mm
Maximum height of section 750 mm

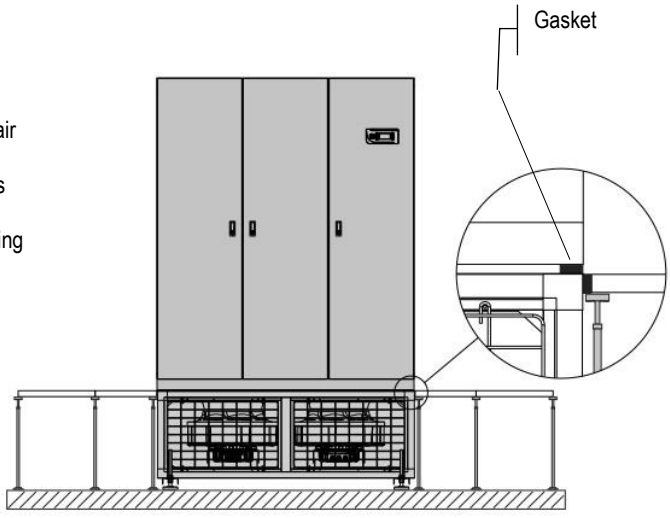


Dimensions in millimetres

Once the fans section has been positioned, the levelling must be checked in the four positions shown in the figure.
A levelling defect of more than 5 mm between the ends of the base may cause the condensate overflow from the collecting tray.



Before installing the air handling section, it is recommended to place an elastic rubber seal between the fans section and the air handling section.
Also make sure to close any remaining space between the fans section and the raised floor with a gasket.
The electric cable to power the fans is contained in the ventilating section with sufficient length to be connected to the electrical panel of the machine.



HOLE IN THE RAISED FLOOR FOR MACHINE w-NEXT2

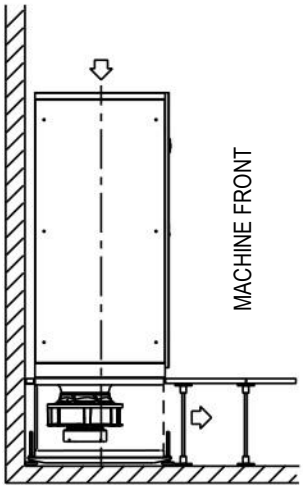
INFORMATION
Respecting the measures shown, a minimum distance of 8cm is guaranteed from the wall behind the machine

Size		E4	E5	E6	E7	E8	E9	E10
A	mm	1325	1650	1895	2195	2520	2920	3530
B	mm	925	925	925	925	925	925	925
C	mm	80	80	80	80	80	80	80

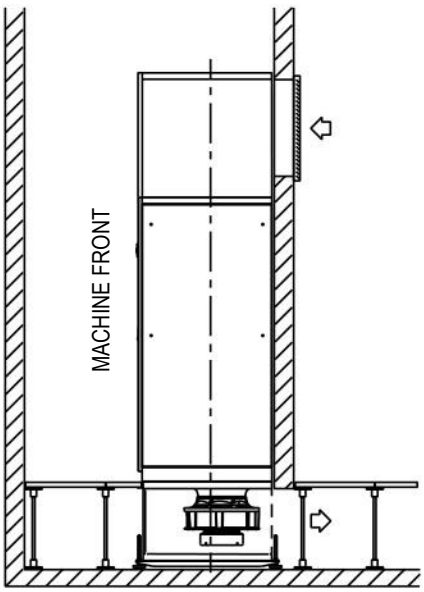
POSITIONING MACHINE w-NEXT2

CORRECT POSITION OF THE FAN SECTION For a correct installation, the fan must be installed as shown in the figure. Side air delivery cannot be obtained.

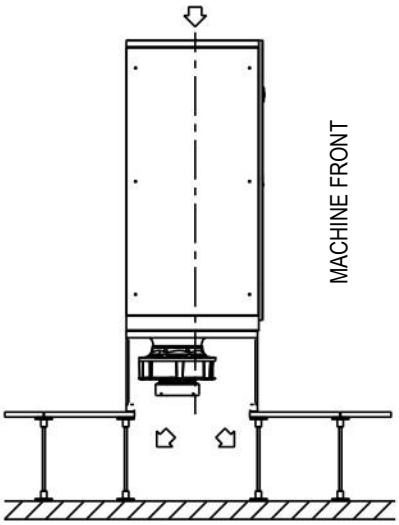
DO NOT INSTALL THE FAN SECTION IN A DIFFERENT WAY THAN AS SPECIFIED



DIRECT INSTALLATION INTO THE ROOM.
Fans section in the raised floor void
Front air delivery



INSTALLATION IN TECHNICAL ROOM.
Fans section in the raised floor void.
Plenum or suction duct with grille
Air delivery from back-side – exchanging the panels with the grids on site



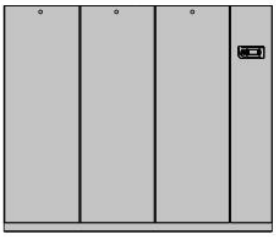
DIRECT POSITIONING ON THE RAISED FLOOR.
Air delivery from the bottom
Special execution, please contact the Manufacturer:
- Fans section without adjustable supports.
- Complete panelling
- Open bottom for air supply downwards

2.2.6 POSITIONING THE UNDER MACHINE: NEXT X TYPE

The machine is shipped in sections to be assembled on site.

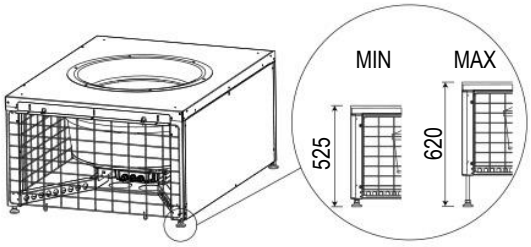
The filter section, which includes the pocket filters, is to be installed above the air handling section.

The air handling section which includes the X cooling coil with its 2-way valve is to be installed above the fans section.



The modular fans section, which includes the fans, is to be installed in the raised floor void.

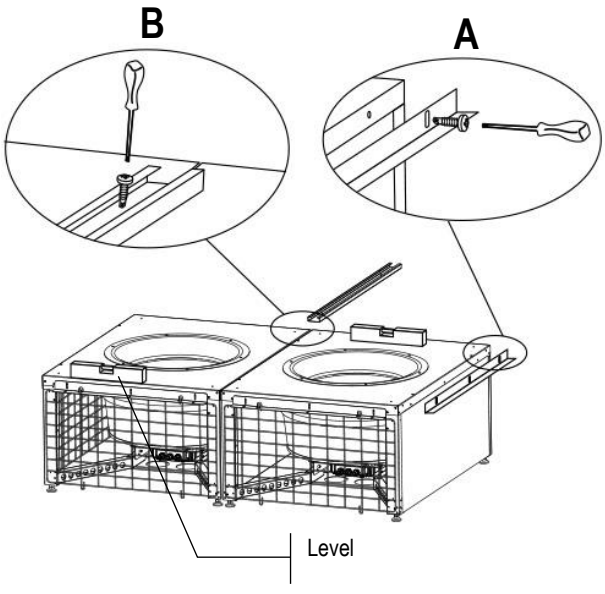
The supply fans section consists of modules that must be assembled on site.
Each module is equipped with height-adjustable supports to adapt the section to the height of the raised floor.
Minimum height of section 525 mm
Maximum height of the section 620 mm



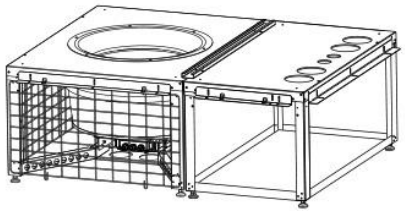
Dimensions in millimetres

Assemble the modules of the fans section by placing them in position.
Install the corner "A" for the support for the raised floor tiles (corner and fixing screws are supplied).
Install the crosspiece "B" for fixing the fans sections (crosspiece and fixing screws are supplied with the kit).

Once the fans section has been positioned, the levelling must be checked in the four positions as shown in the figure.
A levelling defect of more than 5 mm between the ends of the base may cause the condensate overflow from the collecting tray.

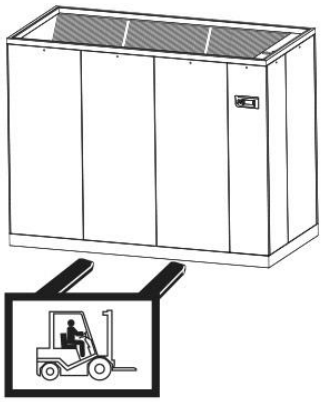


The fan section of the machine size T1 includes only one fan module.
To guarantee stability to the machine, a lateral support is provided to be installed as previously described.



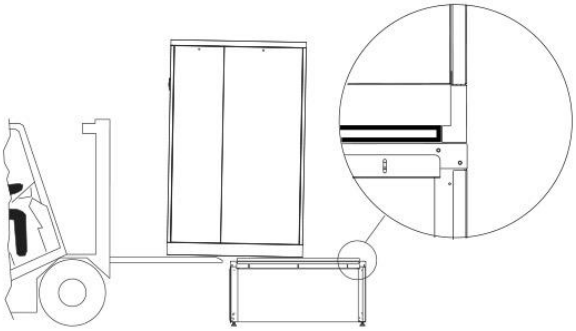
POSITIONING THE UNDER MACHINE: NEXT X TYPE

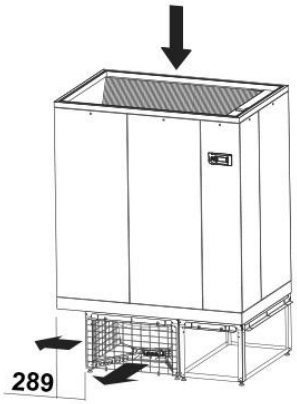
Install the air handling section on the fans section.

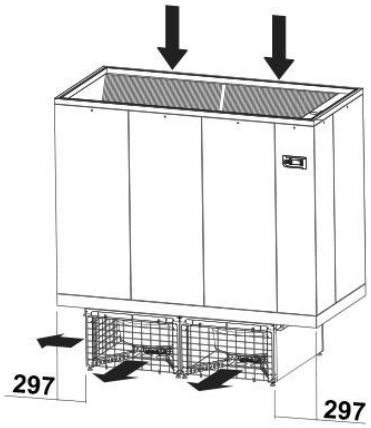


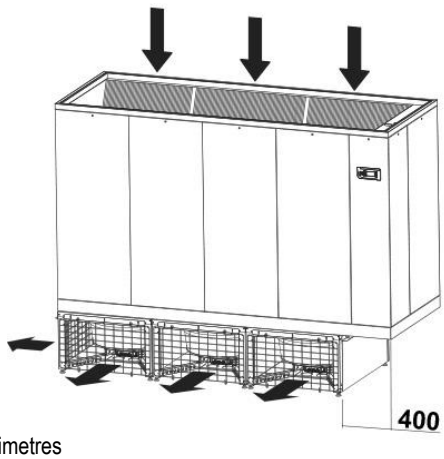
The fixing crosspiece between the fans modules has the function of centring the machine on the fans modules

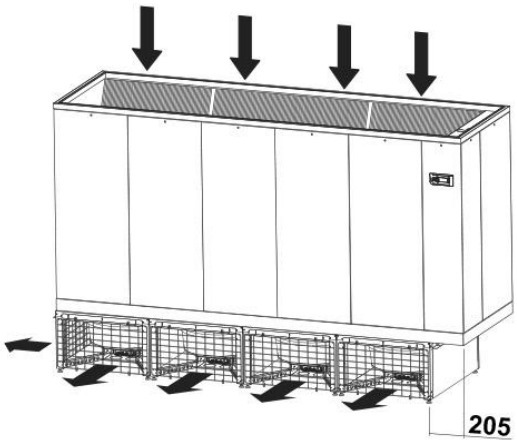
Longitudinal centring of the machine on the fans section.







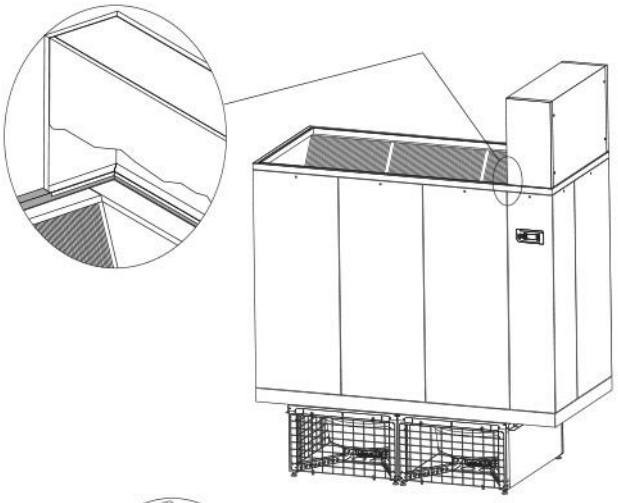




Dimensions in millimetres

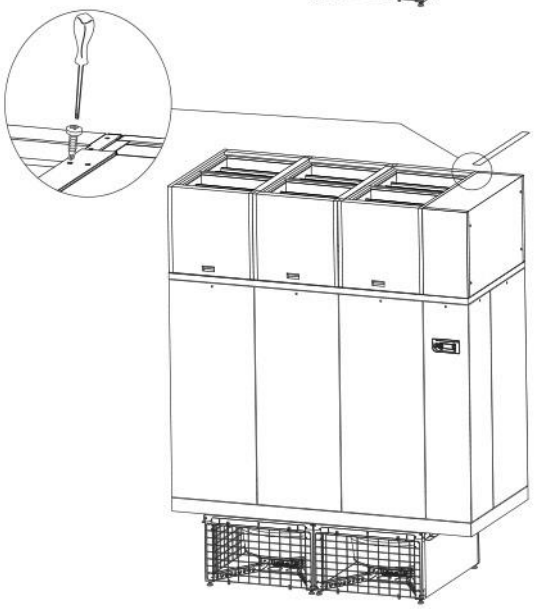
POSITIONING THE UNDER MACHINE: NEXT X TYPE

Install the filter section on top of the air handling section.

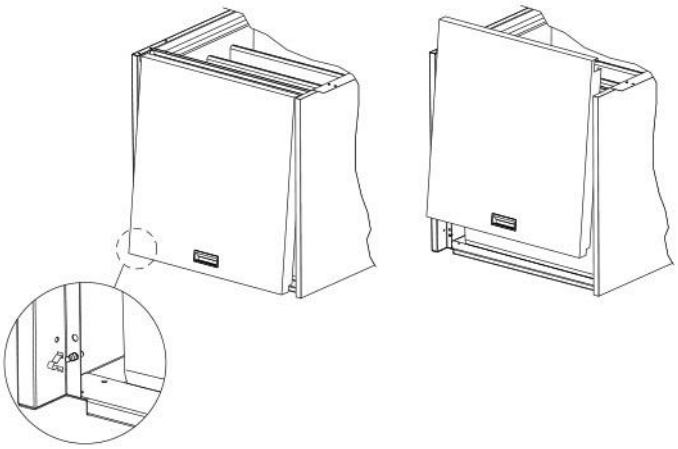


First install the module to be placed above the electrical panel.
The module is designed to fit in the upper frame of the machine and does not need to be fixed.

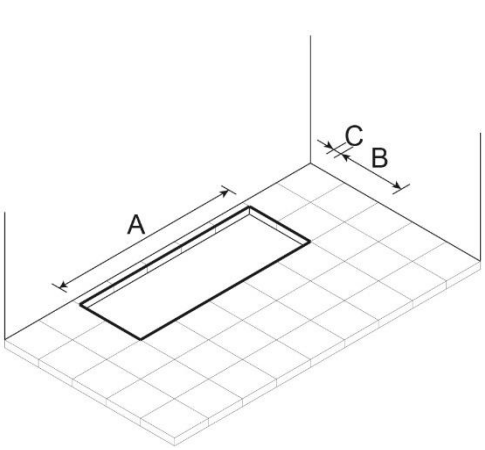
Install the filtering section modules.
The modules of the filtering section are designed to fit in the upper frame of the machine does not need to be fixed.
Fix all the modules together with the crosspiece and the screws supplied.

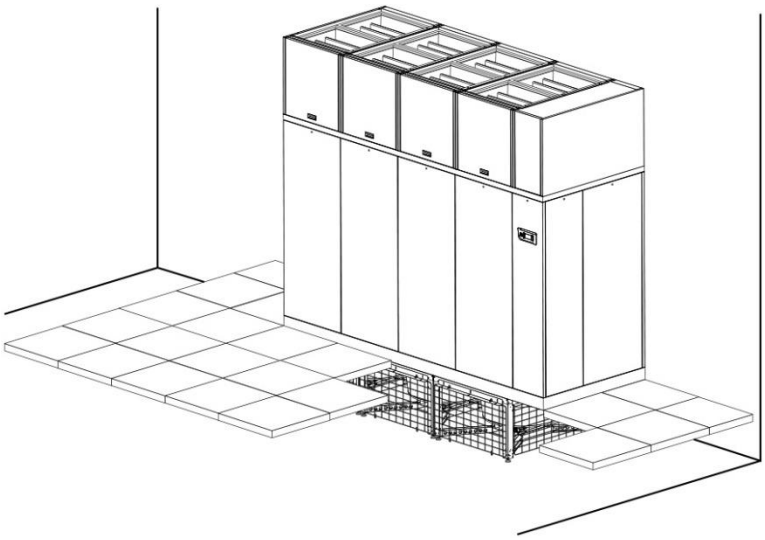


The panels of the filter modules are equipped with pin and spring clip.



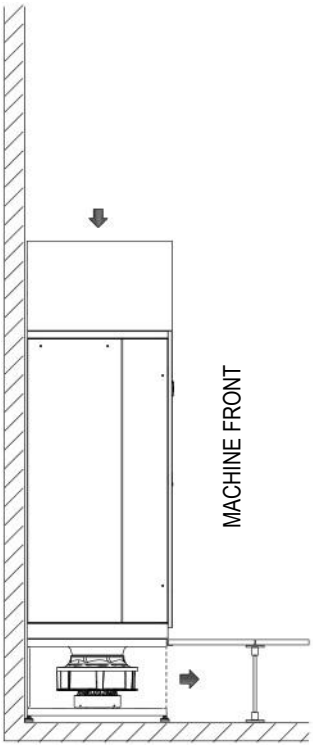
HOLE IN THE RAISED FLOOR FOR MACHINE NEXT X TYPE



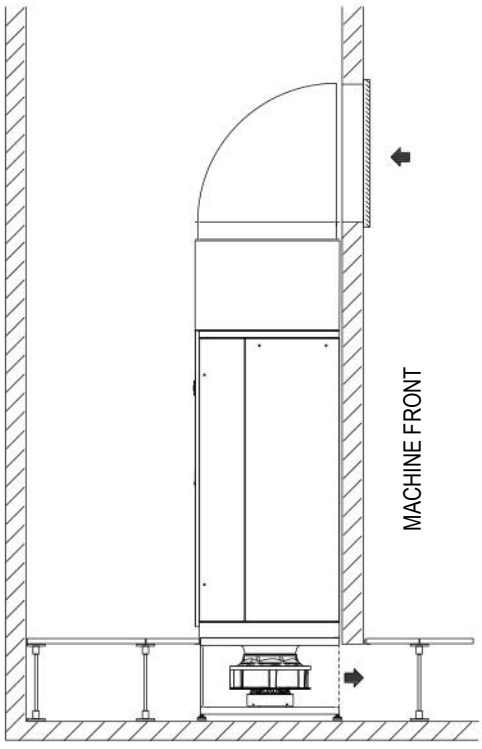


Size		T1	T2	T3	T4
A	mm	1350	1685	2520	3355
B	mm	1120	1120	1120	1120
C	mm	10	10	10	10

POSITIONING FOR NEXT X TYPE



DIRECT INSTALLATION INTO THE ROOM.
Fans section in the raised floor void
Front air delivery



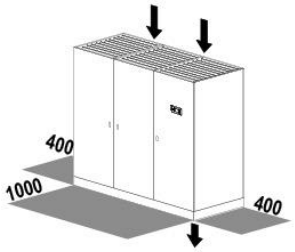
INSTALLATION IN TECHNICAL ROOM.
Fans section in the raised floor void.
Plenum or suction duct with grille
Air delivery from back-side

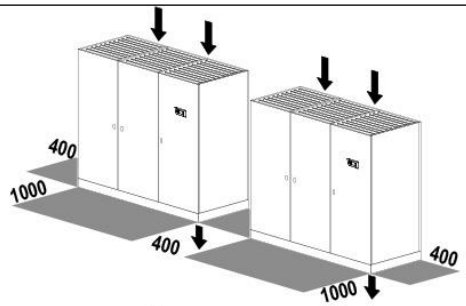
2.2.7 FREE SPACE FOR INSTALLATION

MANDATORY
For a correct installation of the machine is necessary to ensure a free area as shown in the figure.
This allows easy access to the components of the machine for normal inspection and maintenance operations.

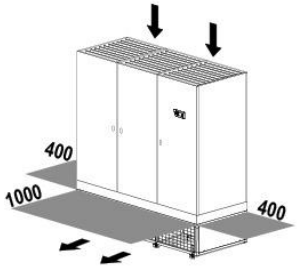
In case of installation of multiple machines side by side, to provide a space between the machines as shown in figure. This allows the inner side access in the event of extraordinary maintenance operations.

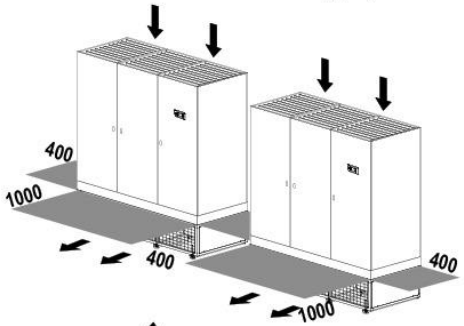
UNDER MACHINE



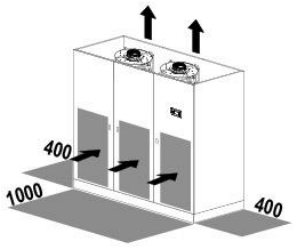


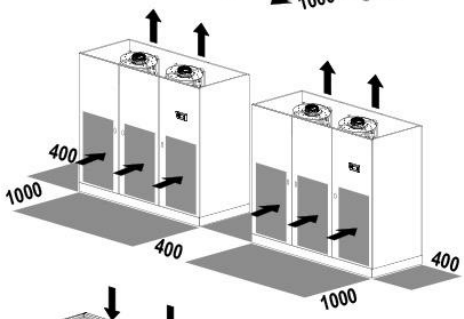
UNDER MACHINE w-NEXT2



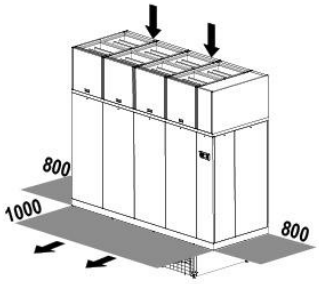


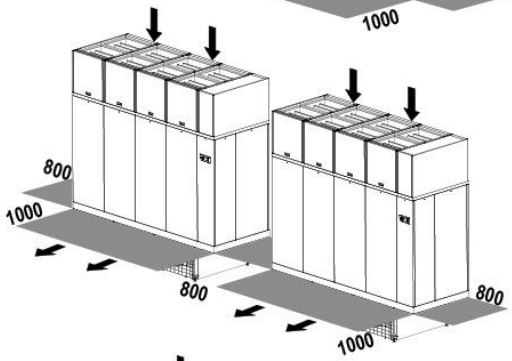
OVER MACHINE



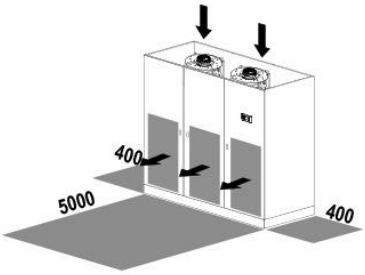


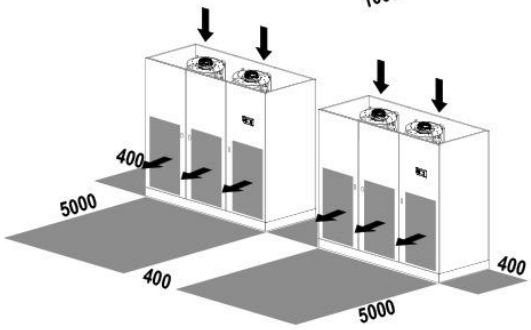
UNDER MACHINE NEXT X TYPE





DISPLACEMENT MACHINE

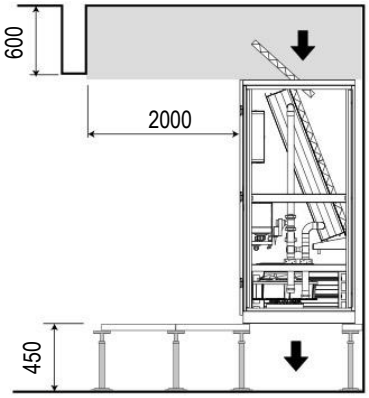




Dimensions in millimetres

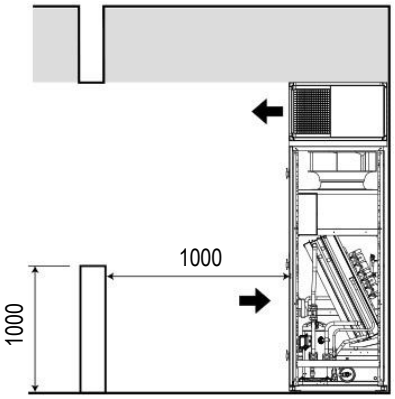
2.2.8 OBSTACLES ON AIR CIRCULATION FOR UNDER / OVER / DISPLACEMENT MACHINES

UNDER



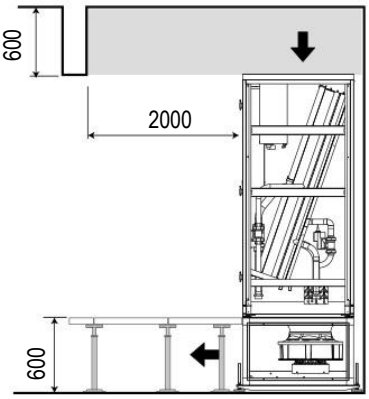
The distance between the machine and the ceiling allows the extraction of the air filters
The minimum height of the raised floor refers to an empty floor with no obstacles.

OVER



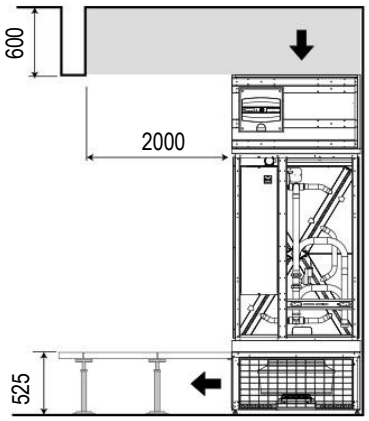
The height of the first obstacle should not exceed the indicated value.
The air delivery with plenum must have no obstacles to allow correct air distribution.

UNDER w-NEXT2



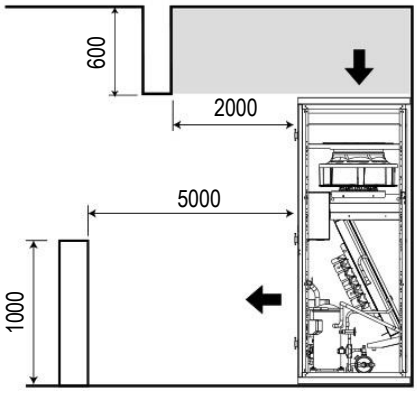
The minimum height of the raised floor is due to the height of the fans section

UNDER NEXT X TYPE



The minimum height of the raised floor is due to the height of the fans section

DISPLACEMENT



The height of the first obstacle should not exceed the indicated value.

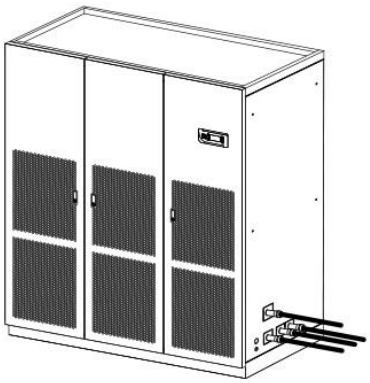
Dimensions in millimetres

2.3 HYDRAULIC CONNECTIONS

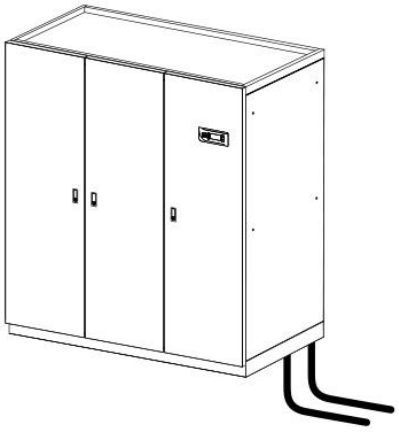
The hydraulic connection to the heat exchangers must be performed as defined in the design phase.

Refer to the dimensional drawing of the machine for the connections lay-out.

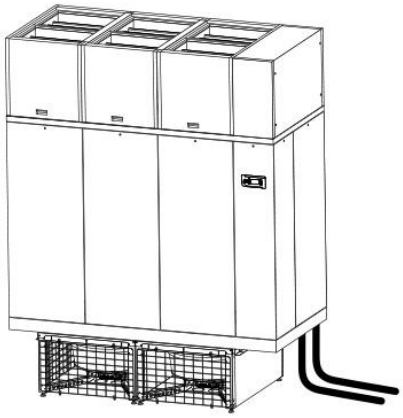
The connections are normally located on the right side of the machine looking at the front.



OVER
Connections are external to the machine



UNDER
Connections are inside to the machine



UNDER – TWO SECTIONS
Connections are inside to the machine

The sense of inlet and outlet is highlighted by circular tags:

OUTLET

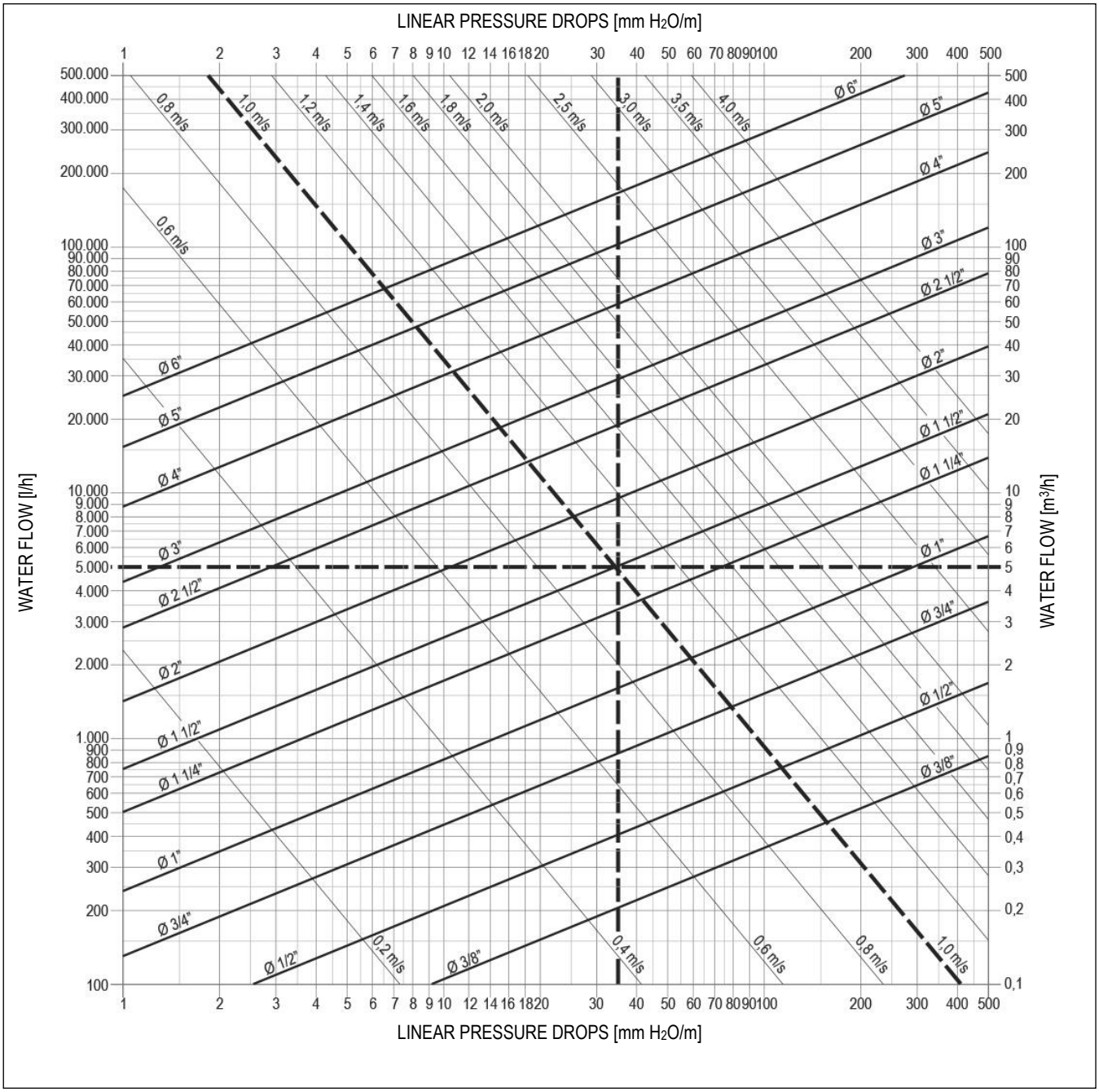
INLET

2.3.1 DETERMINATION OF HYDRAULIC CIRCUIT PRESSURE DROPS

The calculation of the hydraulic circuit pressure drops must be defined during the plant design stage.
Below is a series of information for a simple and quick check of the pressure drops on the hydraulic circuit.

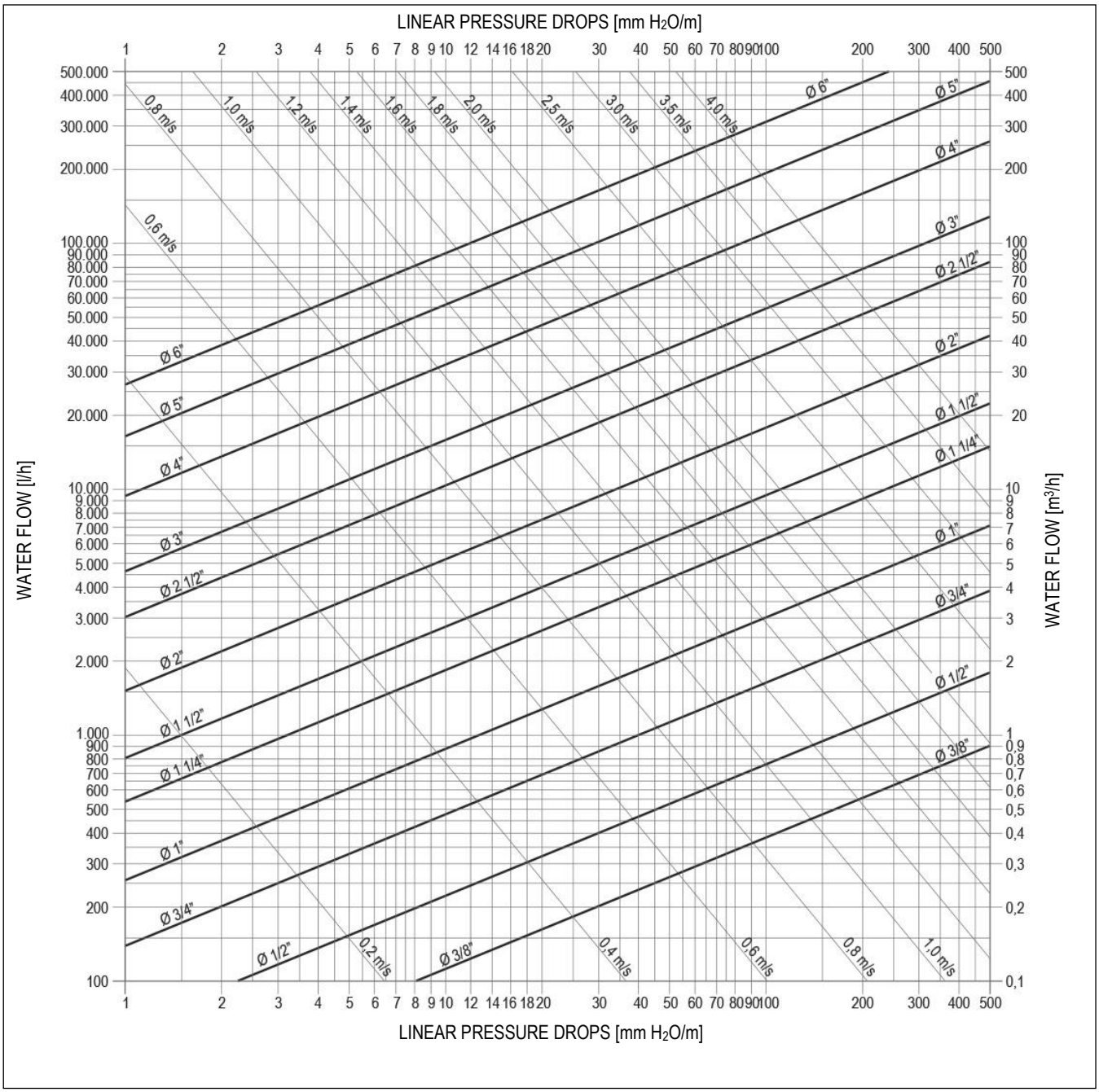
2.3.1.1 Continuous pressure drops

STEEL PIPES
WATER TEMPERATURE 10°C

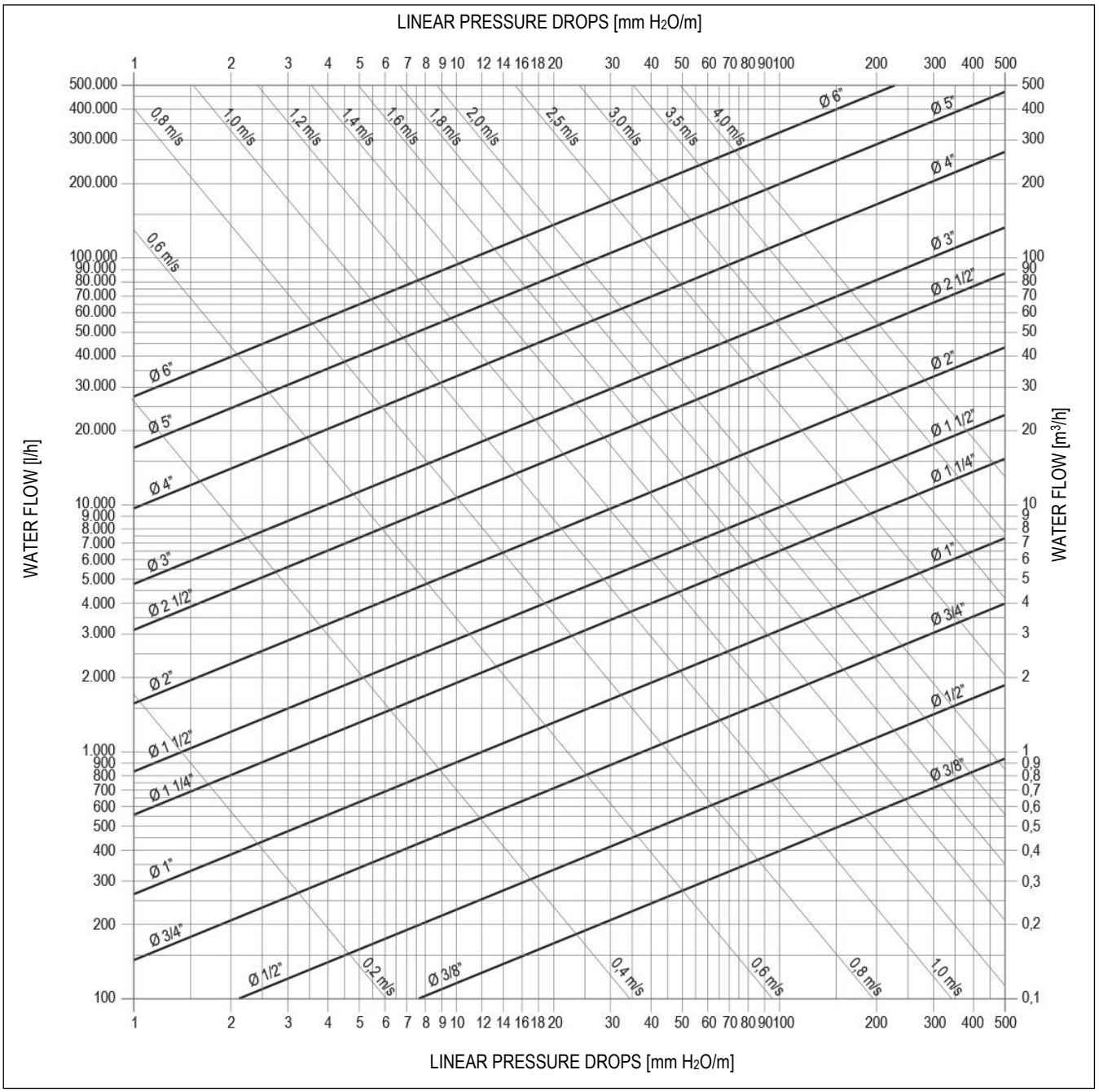


Example:
Fluid speed inside the pipe: 1 m/s
Water flow: 5.000 l/h (5 m³/h)
Cross the lines on the diameter of the selected pipe: Ø 1 1/2”
Pressure drops: 35 mm H_2O/m

STEEL PIPES
WATER TEMPERATURE 50°C

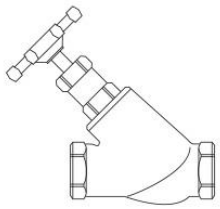
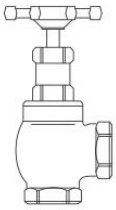
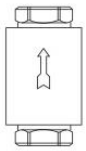


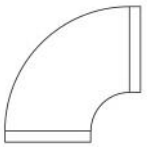
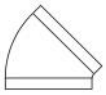
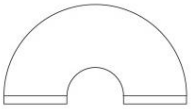
STEEL PIPES
WATER TEMPERATURE 80°C



2.3.1.2 Equivalent lengths (ml) for concentrated pressure drops

Values for completely open valves.

DN (mm)	Ø (inch)	Globe valve	Globe valve 60°	Globe valve 45°	Valve 90°	Check valve
						
10	3/8”	5,1	2,4	1,8	1,8	1,5
15	1/2”	5,4	2,7	2,1	2,1	1,8
20	3/4”	6,6	3,3	2,7	2,7	2,4
25	1”	8,7	4,6	3,6	3,6	3,6
32	1 1/4”	11,4	6,1	4,6	4,6	4,2
40	1 1/2”	12,6	7,3	5,4	5,4	4,8
50	2”	16,5	9,1	7,3	7,3	6,1
65	2 1/2”	20,7	10,7	8,7	8,7	7,6
80	3”	25,2	13,1	10,7	10,7	9,1
90	3 1/2”	30,5	15,2	12,5	12,5	10,7
100	4”	36,8	17,7	14,6	14,6	12,2
125	5”	42,6	21,6	17,7	17,7	15,3
150	6”	52,0	26,8	21,4	21,4	18,3
200	8”	67,1	35,1	26,0	26,0	24,4

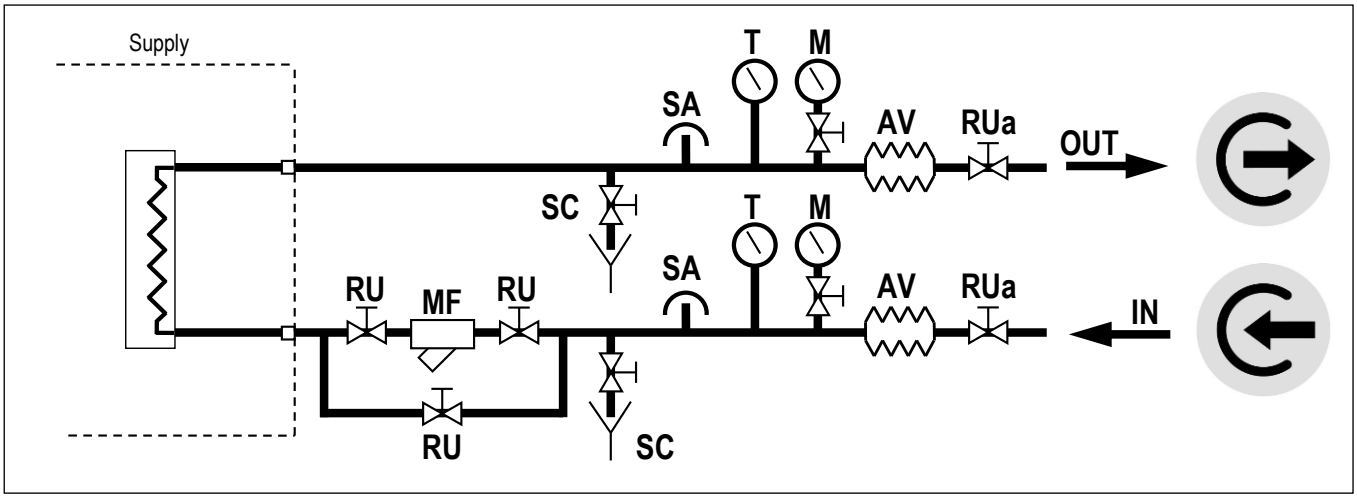
DN (mm)	Ø (inch)	Curve 90°	Curve 90°	Curve 45°	Curve 180°	Tee
						
10	3/8”	0,42	0,27	0,21	0,70	0,82
15	1/2”	0,48	0,30	0,24	0,76	0,91
20	3/4”	0,61	0,42	0,27	0,98	1,2
25	1”	0,79	0,51	0,39	1,2	21,5
32	1 1/4”	1,0	0,70	0,51	1,7	2,1
40	1 1/2”	1,2	0,80	0,64	1,9	2,4
50	2”	1,5	1,0	0,79	2,5	3,0
65	2 1/2”	1,8	1,2	0,98	3,0	3,6
80	3”	2,3	1,5	1,2	3,6	4,6
90	3 1/2”	2,7	1,8	1,4	4,6	5,4
100	4”	3,0	2,0	1,6	5,1	6,4
125	5”	4,0	2,5	2,0	6,4	7,6
150	6”	4,9	3,0	2,4	7,6	9,1
200	8”	6,1	4,0	3,0	10,4	10,7

2.3.2 HYDRAULIC CONNECTION TO FINNED COILS

This diagram is valid for the hydraulic circuit of the following chilled water heat exchangers (finned coils):

- Main coil for chilled water machine
- Additional coil for Dual Fluid machine
- Hot water coil for heating

The water inlet and outlet pipes can be identified by the plates placed directly on the machine.



During the design stage, the installation of the following components in the water inlet line must be contemplated.

- **RUa - Shutoff valve**: for the hydraulic detachment of the heat exchanger from the plant during maintenance.
- **AV - Vibration damper**: dampers the vibration that can transmits to the plant.
- **M - Pressure gauge** (with stop valve): indicates the water pressure in the inlet line.
- **T - Thermometer**: indicates the water temperature in the inlet line.
- **SA - Air vent:** removes the air from the inlet line.
- **SC - Pipe draining valve**: drains the water from the plant. To be used also for connecting an external pump for the chemical wash.
- **MF – Gauze filter:** (with RU valves for filter cleaning): separates the impurities from the water (filtration degree not less than 140 mesh = 105 microns).

Install the following components in the water outlet line.

- **RUa - Shutoff valve**: for the hydraulic detachment of the heat exchanger from the plant during maintenance.
- **AV - Vibration damper**: dampers the vibration that can transmits to the plant.
- **M - Pressure gauge** (with stop valve): indicates the water pressure in the inlet line.
- **T - Thermometer**: indicates the water temperature in the inlet line.
- **SA - Air vent:** removes the air from the inlet line.
- **SC - Pipe draining valve**: drains the water from the plant. To be used also for connecting an external pump for the chemical wash.

Install an expansion tanks with safety valve in the heat exchanger circuit. Its size must be designed and implemented according to the applicable laws.

MANDATORY
MAXIMUM WORKING PRESSURE 10 BAR, INCLUDING THE HYDROSTATIC HEAD – PN 10

2.3.2.1 Diameters of the hydraulic connections and water content (volume) for chilled water cooling coil

w-NEXT S / w-NEXT DF – Main cooling coil and additional Dual Fluid (DF) cooling coil														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
Volume	l	2,2	4,2	5,3	7,8	11,4	13,8	18,1	21,2	24,6	28,5	33,8	44,0	66,0
ISO 7/1 - R	Ø	3/4"	1"	1"	1 1/4"	1 1/4"	1 1/2"	2"	2"	2 1/2"	2 1/2"	3"	3"	3"

w-NEXT2 S / w-NEXT2 DF - Main cooling coil and additional Dual Fluid (DF) cooling coil								
MODEL		065	088	096	127	148	173	226
Volume	l	17,6	23,1	27,1	31,4	36,4	43,2	53,0
ISO 7/1 - R	Ø	2"	2"	2" 1/2	2" 1/2	3"	3"	--
DN – PN10	Ø	--	--	--	--	--	--	80 (1)

w-NEXT2 K - Main cooling coil								
MODEL		080	108	128	154	180	210	280
Volume	l	26,6	34,8	40,7	47,2	54,7	64,8	79,4
ISO 7/1 - R	Ø	2"	2"	2" 1/2	2" 1/2	3"	--	--
DN – PN10	Ø	--	--	--	--	--	80 (1)	80 (1)

NEXT X TYPE - Main cooling coil					
MODEL		T1	T2	T3	T4
Volume	l	40	63	85	110
ISO 7/1 - R	Ø	1+1/2"	2"	2"	2+1/2"

w-NEXT HD S - Main cooling coil											
MODEL		015	024	041	048	060	072	090	110	122	146
Volume	l	4,2	5,3	7,8	11,4	13,8	18,1	21,2	24,6	28,5	33,8
ISO 7/1 - R	Ø	1"	1 1/4"	1 1/2"	1 1/2"	2"	2"	2 1/2"	2 1/2"	3"	3"

w-NEXT HD K - Main cooling coil												
MODELLO		015	024	041	048	060	072	090	110	122	146	170
MODEL	l	6,3	7,9	11,7	17,2	20,8	27,2	31,8	36,8	42,7	50,6	63,0
Volume	Ø	1"	1 1/4"	1 1/2"	1 1/2"	2"	2"	2 1/2"	2 1/2"	3"	3"	---
DN – PN10	Ø	--	--	--	--	--	--	--	--	--	--	80 (1)

t-NEXT DF DX / t-NEXT DF DW - Additional Dual Fluid (DF) cooling coil												
MODELLO		007 P1	009 P1	011 P1	014 P1	016 P1	020 P1	022 P1	026 P1	032 P1	037 P1	041 P1
Volume	l	4,2	4,2	4,2	5,3	5,3	7,8	7,8	7,8	13,8	13,8	13,8
ISO 7/1 - R	Ø	1"	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
MODEL		045 P1	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
Volume	l	13,8	18,1	18,1	18,1	18,1	24,6	24,6	28,5	28,5	33,8	33,8
ISO 7/1 - R	Ø	1 1/2"	2"	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	3"	3"

i-NEXT DF DX / i-NEXT DF DW - Additional Dual Fluid (DF) cooling coil											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
Volume	l	4,2	5,3	7,8	13,8	18,1	18,1	24,6	28,5	33,8	33,8
ISO 7/1 - R	Ø	1"	1"	1 1/4"	1 1/2"	2"	2"	2 1/2"	2 1/2"	3"	3"

(1) Counter-flange not supplied.

MANDATORY
It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers

2.3.2.2 Diameters of the hydraulic connections and water content (volume) for hot water heating coil

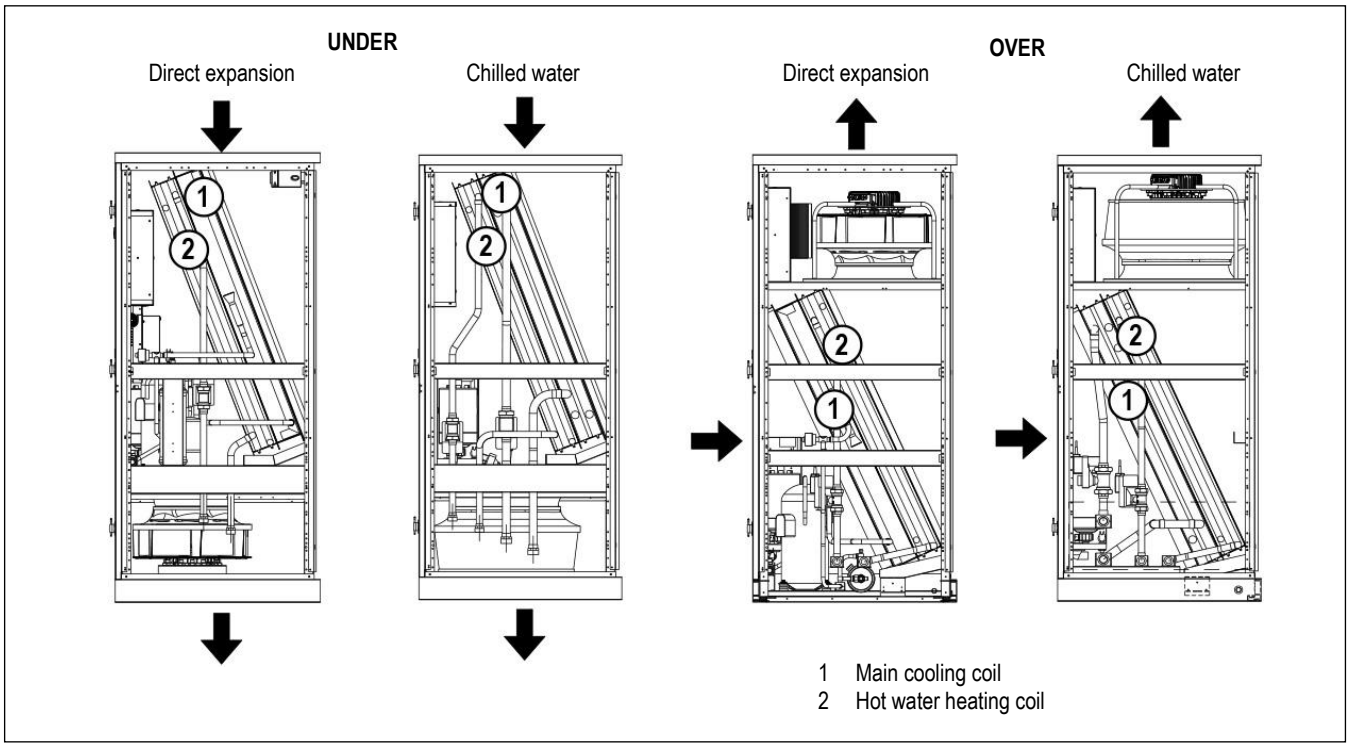
t-NEXT DX												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
Volume	l	---	---	2,1	2,6	2,6	3,9	3,9	3,9	6,9	6,9	6,9
ISO 7/1 - R	Ø	---	---	3/4"	3/4"	3/4"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
Volume	l	6,9	9,1	9,1	10,6	10,6	12,3	12,3	14,2	14,2	16,9	16,9
ISO 7/1 - R	Ø	1 1/4"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	2"	2"	2"	2"	2"

i-NEXT DX											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
Volume	l	2,1	2,6	3,9	6,9	9,1	9,1	12,3	14,2	16,9	16,9
ISO 7/1 - R	Ø	3/4"	3/4"	1"	1 1/4"	1 1/2"	1 1/2"	2"	2 "	2"	2"

w-NEXT S														
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
Volume	l	---	2,1	2,6	3,9	5,7	6,9	9,1	10,6	12,3	14,2	16,9	---	---
ISO 7/1 - R	Ø	---	3/4"	3/4"	1"	1"	1 1/4"	1 1/2"	1 1/2"	2"	2"	2"	----	---

MANDATORY
It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers.

2.3.2.3 Position of the hot water heating coil

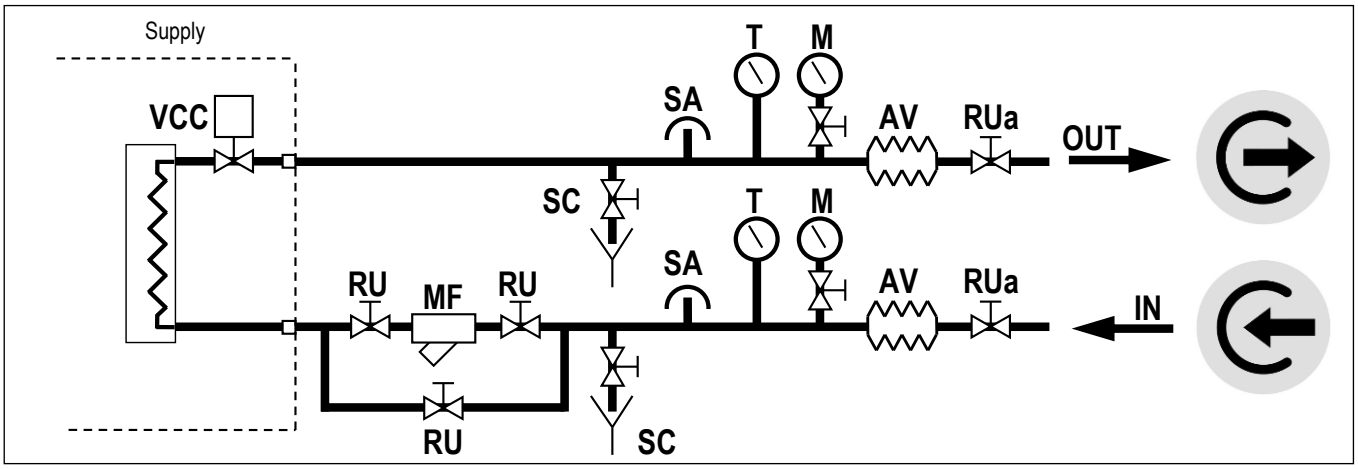


2.3.3 HYDRAULIC CONNECTION TO BUILT-IN WATER-COOLED CONDENSER (DW)

This diagram is valid for the hydraulic circuit of the following heat exchangers:

- Water-cooled condenser. Connect the condenser to the water distribution circuit. The circuit can be:
  - open: cooling tower with water hardness control system / open-to -recycle well system
  - close: with remote dry cooler
- Free-Cooling system with water cooled condenser and additional coil connected to a remote dry cooler

We recommend isolating the hydraulic lines.



VCC = Modulation 2-way valve for condensing control. It is supplied as optional accessory by the Manufacturer.

During the design stage, the installation of the following components in the water inlet line must be contemplated.

- **RUa - Shutoff valve**: for the hydraulic detachment of the heat exchanger from the plant during maintenance.
- **AV - Vibration damper**: dampers the vibration that can transmits to the plant.
- **M - Pressure gauge** (with stop valve): indicates the water pressure in the inlet line.
- **T - Thermometer**: indicates the water temperature in the inlet line.
- **SA - Air vent:** removes the air from the inlet line.
- **SC - Pipe draining valve**: drains the water from the plant. To be used also for connecting an external pump for the chemical wash.
- **MF – Gauze filter:** (with RU valves for filter cleaning): separates the impurities from the water (filtration degree not less than 140 mesh = 105 microns).

Install the following components in the water outlet line.

- **RUa - Shutoff valve**: for the hydraulic detachment of the heat exchanger from the plant during maintenance.
- **AV - Vibration damper**: dampers the vibration that can transmits to the plant.
- **M - Pressure gauge** (with stop valve): indicates the water pressure in the inlet line.
- **T - Thermometer**: indicates the water temperature in the inlet line.
- **SA - Air vent:** removes the air from the inlet line.
- **SC - Pipe draining valve**: drains the water from the plant. To be used also for connecting an external pump for the chemical wash.

Install an expansion tanks with safety valve in the heat exchanger circuit. Its size must be designed and implemented according to the applicable laws.

MANDATORY
MAXIMUM WORKING PRESSURE 10 BAR, INCLUDING THE HYDROSTATIC HEAD – PN 10

2.3.3.1 Diameters of the hydraulic connections and water content (volume) of the built-in water-cooled condenser

b-NEXT DW / t-NEXT DW / t-NEXT DF DW (ON/OFF compressors) – Water-cooled condenser												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
Volume	l	0,5	0,5	0,7	1,1	1,1	1,9	1,9	2,8	2,8	2,8	3,7
ISO 228/1 - G M	Ø	1"	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
Volume	l	3,7	3,0	3,0	4,8	6,4	6,4	6,4	10,4	10,4	12,0	12,0
ISO 228/1 - G M	Ø	1 1/2"	2"	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	3"	3"

t-NEXT FC DW - Free Cooling system (FC) cooling coil and water-cooled condenser												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
Volume	l	4,7	4,7	4,9	6,4	6,4	9,7	9,7	10,6	16,6	16,6	17,5
ISO 7/1 - R	Ø	1"	1"	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
Volume	l	17,5	21,1	21,1	22,9	24,5	31	31	38,9	38,9	45,8	45,8
ISO 7/1 - R	Ø	1 1/2"	2"	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	3"	3"

i-NEXT DW / i-NEXT DF DW – Water-cooled condenser											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
Volume	l	1,1	1,1	1,9	3,7	3,7	3,4	5,6	7,4	12	12
ISO 228/1 - G M	Ø	1"	1"	1 1/2"	2"	2"	2"	2 1/2"	2 1/2"	3"	3"

i-NEXT FC DW - Free Cooling system (FC) cooling coil and water-cooled condenser											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
Volume	l	5,3	6,4	9,7	17,5	21,8	21,5	30,2	35,9	45,8	45,8
ISO 7/1 - R	Ø	1"	1"	1 1/4"	1 1/2"	2"	2"	2 1/2"	2 1/2"	3"	3"

MANDATORY
It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers.

2.3.4 WATER CONTENT FOR LINEAR METER OF PIPE

Pipes diameter	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
Litres	0,2	0,37	0,58	1,02	1,38	2,21	3,85	5,28

2.3.5 TECHNICAL INFORMATION FOR INSTALLATION

- The connection pipes must be properly supported so as not to burden the machine with their weight
- Avoid rigid connections between the machine and pipes and provide vibration dampers.
- For temperature, minimum and maximum water flow rates and water volumes of the water circuit of heat exchangers, refer to the technical bulletin.
- Any heating elements installed to protect the pipes from freezing must be installed far from devices, sensors and materials that can be damaged or alter the operation (for example temperature probes, plastic materials, electric cables).

2.4 CLEANING AND FILLING THE HYDRAULIC CIRCUITS

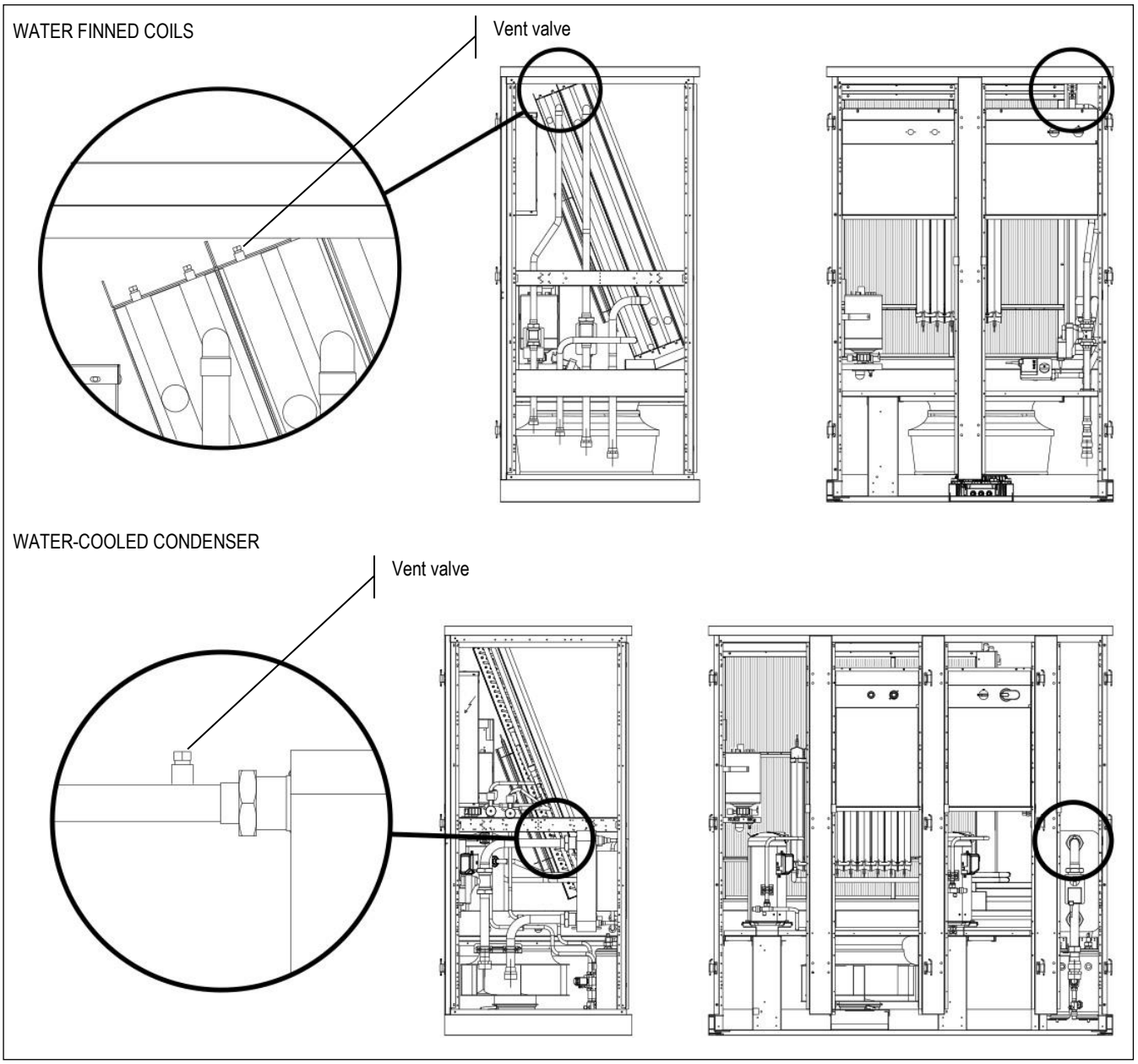
MANDATORY
Clean the pipes of the hydraulic circuits to remove the processing residues and other dirt present inside.
It's imperative that this operation is carried out, so as to prevent any damage to the machine's components.

After cleaning, make sure that the hydraulic circuits are not leaking. To do so, fill the circuits at a pressure higher than the atmospheric pressure, making sure that there are no pressure drops over the time.

INFORMATION
Thermal insulation for the pipes external to the machine, are at INSTALLER care and must only be carried out after checking the absence of leaks

If other products are expected, in addition to mixtures of water and ethylene or propylene glycol, contact the manufacturer's technical office.

The position of the vent valves is shown in the figure below:



2.5 WATER QUALITY

MANDATORY
The values shown in the table must be guaranteed during the entire life cycle of the machine

	Description	Symbol	Range
1	Hydrogen Ions	pH	7.5 ÷ 9
2	Presence of calcium (Ca) and magnesium (Mg)	Hardness	4 ÷ 8.5 °D
3	Chlorine ions	Cl^-	< 150 ppm
4	Iron Ions	Fe^{3+}	< 0.5 ppm
5	Manganese Ions	Mn^{2+}	< 0.05 ppm
6	Carbon dioxide	CO_2	< 10 ppm
7	Hydrogen sulphide	H_2S	< 50 ppb
8	Oxygen	O_2	< 0.1 ppm
9	Chlorine	Cl_2	< 0.5 ppm
10	Ammonia	NH_3	< 0.5 ppm
11	Ratio between carbonates and sulphates	HCO_3-/SO_4^{2-}	> 1
12	Sulphate ions	SO_4^{--}	< 100 ppm
13	Phosphate ions	PO_4^{3-}	< 2.0 ppm

where: 1/1.78°D = 1°Fr with 1°Fr = 10 gr $CaCO_3$ / m^3
ppm = parts for millions
ppb = part for billion
Explanatory notes:

ref.1: A greater concentration of hydrogen ions (pH) than 9 implies a high risk of deposits, whereas a lower pH than 7 implies a high risk of corrosion.
ref.2: The hardness measures the amount of Ca and Mg carbonate dissolved in the water with a temperature lower than 100°C (temporary hardness). A high hardness implies a high risk of deposits.
ref.3: The concentration of chloride ions with higher values than those indicated causes corrosion.
ref. 4 - 5 - 8: The presence of iron and manganese ions and oxygen leads to corrosion.
ref.6 - 7: Carbon dioxide and hydrogen sulphide are impurities that promote corrosion.
ref.9: Usually in water from the waterworks it is a value of between 0.2 and 0.3 ppm. High values cause corrosion.
ref.10: The presence of ammonia reinforces the oxidising power of oxygen
ref.11: Below the value shown in the table, there is a risk of corrosion due to the trigger of galvanic currents between copper and other less noble metals.
ref.12: The presence of sulphates ions triggers corrosion phenomenon.
ref.13: The presence of phosphates ions triggers corrosion phenomenon.

It is necessary to carry out periodic checks, with withdrawals at different points of the hydraulic system.
During the first year of operation, checks are recommended every 4 months which can be reduced every 6 months starting from the second year of operation.

MANDATORY
It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers

- Protect the water circuit with antifreeze mixture when the ambient temperature can drop below zero or when the operating temperature of the fluid is below 5°C.
- even when the machine is off, prevent the fluids in contact with the heat exchangers exceeding the temperature limits or freezing;
- In the hydraulic circuit: do not send fluids other than water or mixtures with ethylene / propylene glycol in the maximum concentration permitted by the components installed and specified below:

Chilled outlet liquid temperature from the machine	°C	4	2	1	-2	-4	-6	-9	-12
PROPYLENE GLYCOL % in weight of the mixture	%	5	10	15	20	25	30	35	40
ETHYLENE GLYCOL % in weight of the mixture	%	5	10	15	20	25	30	35	38

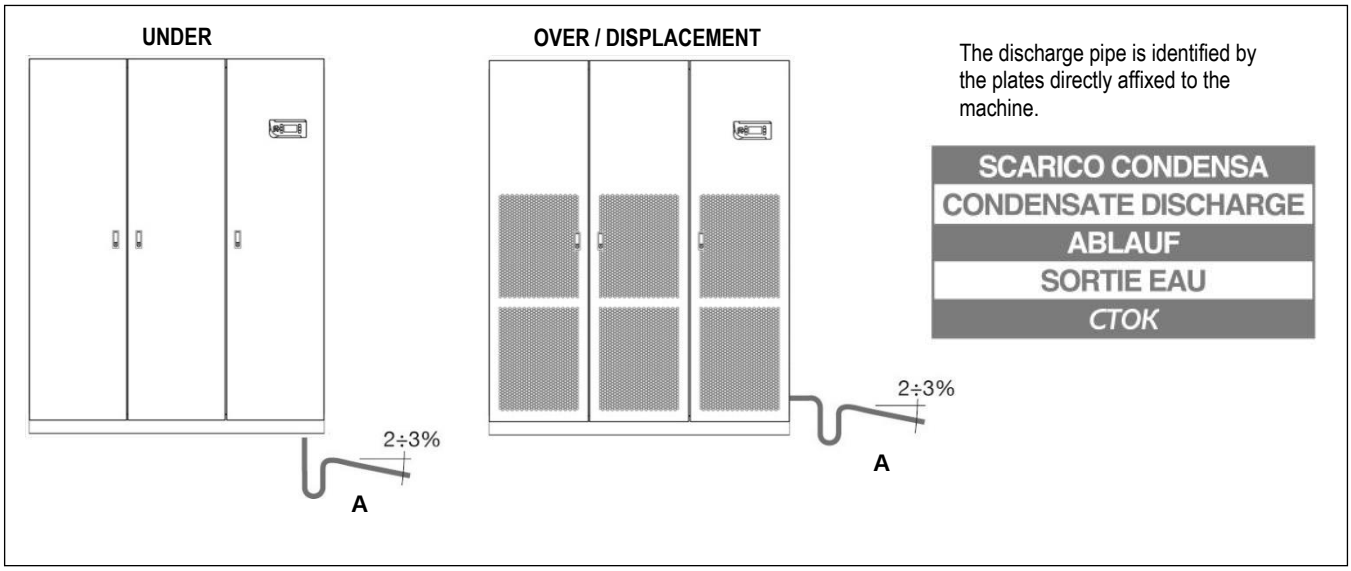
The values are referred to machine working temperature and not to freezing temperature of the used liquid.
If other products are provided, in addition to mixtures of water and ethylene or propylene glycol, contact the manufacturer's technical office to check the compatibility with the machine components.

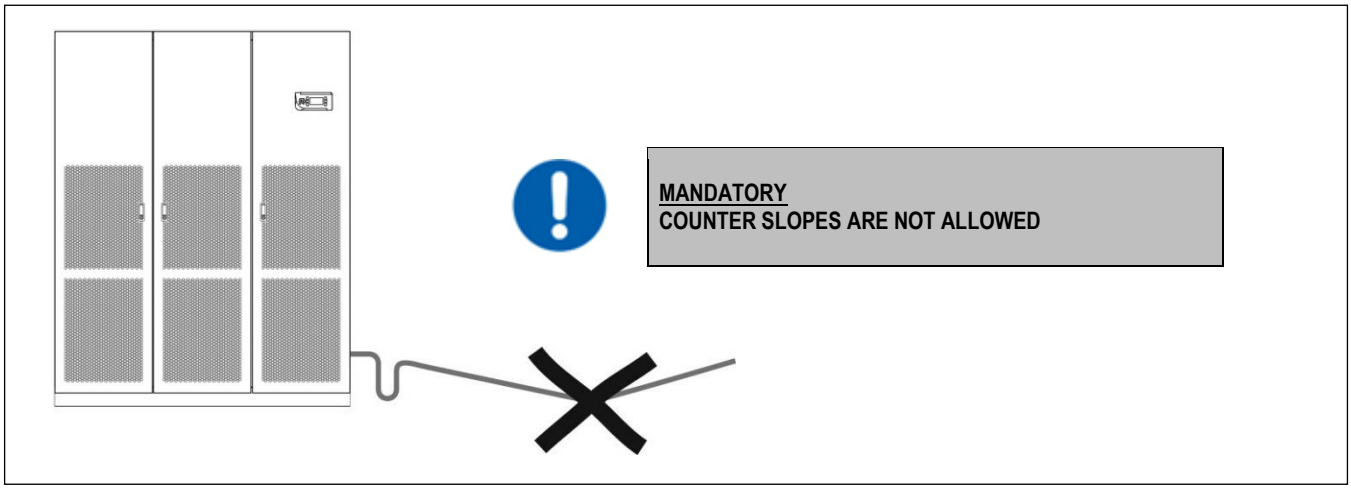
2.6 CONNECTION OF CONDENSATE DISCHARGE

The connection of the condensate drain must be carried out as defined in the planning phase

SUPPLY
The condensate drain pipe is connected to the collection tray.
The pipe is wound on the bottom of the machine.
The length of the piping brings the drain just outside the machine.
The pipe is made of plastic material with an internal diameter of Ø 19 mm.
Condensate discharge occurs by gravity.

BY THE INSTALLER
Close the machine, make a siphon (A) as shown in the figure.
Fill the siphon with water.
Ensure a 2 - 3% pipe slope towards the drain.
Keep the same internal diameter for drain pipes up to 4 - 5 meters. For longer lengths, increase the pipe section.





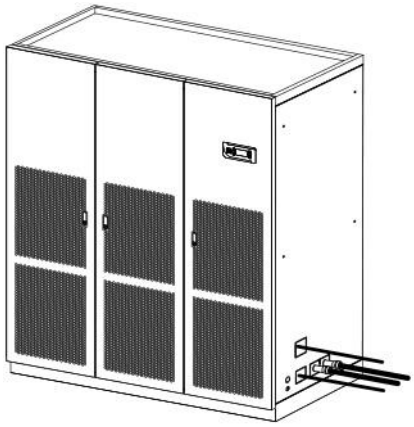
The connecting pipes must be adequately supported so as not to burden their weight on the machine.

2.7 REFRIGERANT CONNECTIONS TO THE REMOTE AR-COOLED CONDENSER

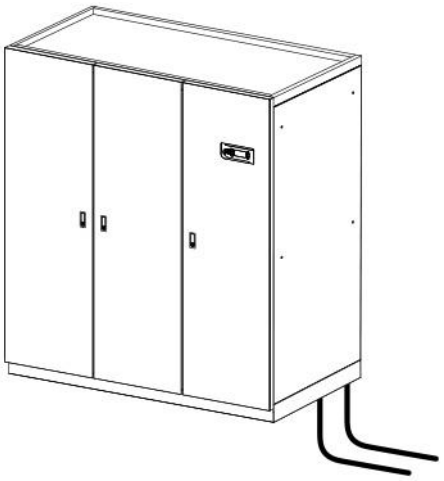
The refrigerant connection must be must be performed as defined in the design phase.

Refer to the dimensional drawing of the machine for the connections lay-out.

The connections are normally located on the right side of the machine looking at the front.



OVER / DISPLACEMENT
Refrigerant connections are inside to the machine
Hydraulic connections are external to the machine



UNDER
Refrigerant and hydraulic connections are inside to the machine

MANDATORY
The execution of the refrigerant connection must be carried out by qualified personnel.
All the works, the choice of the components and the materials used must be carried out in compliance with the "Good Rule", according to the regulations in force in the various countries taking into account the operating conditions and uses to which the plant is intended.
Errors in the design and / or execution of the refrigerant connection can cause irreparable damage to the compressor or malfunctions of the machine

The machine is delivered with a minimum refrigerant charge. The refrigerant charge must be carried out on site by the customer.
Do not open the taps during the realization of the refrigerant line with the remote condenser

2.7.1 TYPE OF COPPER TO BE USED FOR THE REFRIGERANT LINE

SOFT COPPER: It is ductile and malleable and can be shaped or folded to make curves, siphons, etc. Use a bend-tube for bending operations. Avoid repeating bending or shaping several times as the material hardens at the bend point and breaks.

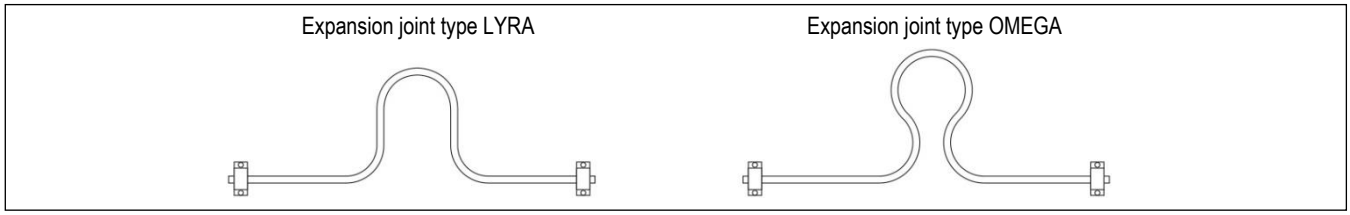
HARD COPPER: It is rigid and not suitable for being folded. To be used only for straight sections. To make curves, siphons, etc. use forged fittings.

2.7.2 GENERAL INFORMATION FOR THE REALIZATION OF THE REFRIGERANT LINE

The refrigerant line must have a rational and practical tracing for:

- limit pressure drops
- reduce the refrigerant content
- facilitate the return of the lubricating oil to the compressor
- facilitate the flow of liquid refrigerant to the expansion valve
- prevent the return of liquid refrigerant with the compressor stopped
- vertical sections must be reduced to the minimum
- always make large curves with a radius at least equal to the diameter of the pipe.
- always use a roller tube cutter to cut the pipes. Do not use the saw that generates internal burrs and shavings.
- fix the pipes both horizontally and vertically with copper or plastic collars every 2m.
- do not use galvanized iron collars since corrosion may occur at the point of contact with the copper pipe.

- for insulated pipes it is advisable to use collars with insulating shells.
- keep a distance between the tubes of at least 20mm.
- keep a distance between the electric cables as they may deteriorate.
- make "expansion joints" on the line to balance the natural stretching / shrinkage of the pipes as shown in the figure:



2.7.3 REFRIGERANT SPEED INSIDE THE PIPES

MANDATORY
Please refer to the system designer for the exact sizing of the pipes in compliance with the fluid speed in the pipe shown below

	Circuit line	Minimum speed (m/s)	Maximum speed (m/s)
Refrigerant R410A	Discharge	5	18
	Liquid	0,5	2,5
	Suction	4	25

It is necessary to consider sufficiently high fluid speed to allow an effective return of the lubricating oil to the compressor.
At the same time, reduced fluid speed must be evaluated to avoid pipe corrosion and water hammering due to electric valve closures.

2.7.4 THICKNESS OF PIPES

The thicknesses of the pipes must be respected otherwise the warranty will be void.

External pipes diameter (Ø mm)	Thickness (mm)
12	1,0
16	1,0
18	1,0
22	1,0
28	1,5
35	1,5
42	2,0

2.7.5 PIPES IDENTIFICATION

The inlet and outlet pipes of the refrigerant can be identified by the plates placed directly on the machine.

ATTACCO GAS CALDO
HOT GAS CONNECTION
HEISSGASLEITUNG
RACCORDEMENT GAZ
ЛИНИЯ ЖИДКОСТИ

ATTACCO LIQUIDO
LIQUID CONNECTION
FLUSSIGKEITSLEITUNG
RACCORDEMENT LIQUIDE
ЛИНИЯ ГОРЯЧЕГО ГАЗА

2.7.6 DIAMETERS OF THE REFRIGERANT CONNECTIONS OF THE MACHINE

The tables show the diameters of the cooling connections of the machine.

b-NEXT DX / t-NEXT DX / t-NEXT DF DX (ON/OFF compressors)												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
Gas delivery	ODS Ø	12	12	12	16	16	16	16	22	22	22	22
Liquid return	ODS Ø	12	12	12	12	12	16	16	16	16	16	22
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
Gas delivery	ODS Ø	22	2x16	2x16	2x22	2x22	2x22	2x22	2x22	2x22	2x28	2x28
Liquid return	ODS Ø	22	2x16	2x16	2x16	2x16	2x22	2x22	2x22	2x22	2x22	2x22

i-NEXT DX / i-NEXT DF DX (INVERTER compressors)											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
Gas delivery	ODS Ø	12	16	16	18	22	2x16	2x18	2x22	2x28	2x28
Liquid return	ODS Ø	12	12	16	16	22	2x16	2x16	2x22	2x22	2x22

2.7.7 VALUES OF EQUIVALENT LENGTH (ML) FOR THE FITTINGS:

Suggested values. Since they can vary from model to model, it is advisable to contact the Manufacturer for a more precise check

	External pipes diameter [mm]						
FITTINGS	Ø 12	Ø 16	Ø 18	Ø 22	Ø 28	Ø 35	Ø 42
Standard curve 90°	0,4	0,48	0,5	0,6	0,8	1,0	1,2
Wide radius curve 90°	0,3	0,3	0,3	0,4	0,5	0,7	0,8
Elbow 90°	0,7	0,76	0,8	1	1,2	1,7	1,9
Curve 45°	0,2	0,24	0,28	0,3	0,4	0,5	0,6
Elbow 45°	0,3	0,4	0,4	0,5	0,6	0,9	1
Curve 180°	0,7	0,76	0,8	1,0	1,2	1,7	1,9
Syphon	2,8	3,0	3,2	4	4,8	6,8	7,6
Y	0,8	0,91	1	1,2	1,5	2,1	2,4
Tee	0,3	0,3	0,3	0,4	0,5	0,7	0,8
Reducing Tee ¼	0,4	0,43	0,5	0,6	0,7	0,9	1,1
Reducing Tee ½	0,4	0,48	0,5	0,6	0,8	1	1,2
Tap (1)	5,1	5,4	5,8	6,6	8,7	11,4	12,6
Inclined tap (1)	2,4	2,7	2,9	3,3	4,6	6,1	7,3
Square tap (1)	1,8	2	2,3	2,7	3,6	4,6	5,4
Gate valve (1)	0,18	0,21	0,23	0,27	0,3	0,5	0,54
Check valve (2)	1,5	1,8	2,0	2,4	3,6	4,2	4,8
Muffler	4,2	5,5	6,0	8,4	9,7	14,0	17,0
Oil separator	3,2	4,4	4,8	6,4	7,6	11,6	14,0

(1) Values referred to completely open valves.
(2) Values referred to straight ball valves

2.7.8 RECOMMENDED REFRIGERANT LINES

Value referred to “EQUIVALENT LENGHT”.

You are kindly requested to always refer to the **“INSTALLATION DIAGRAM”** to properly select all necessary components

ON/OFF COMPRESSORS – UNDER/OVER

					EQUIVALENT LENGHT [m]									
MODEL	SIZE	Nominal capacity of each circuit [kW]	Line	Ø nominal [mm]	5	10	15	20	25	30	35	40	45	50
007 P1 S	E0	7	Gas	12	12 mm									16 mm
			Liquid	12	12 mm									
009 P1 S	E0	9	Gas	12	12 mm						16 mm			
			Liquid	12	12 mm									16 mm
011 P1 S	E1	11	Gas	12	12 mm				16 mm					
			Liquid	12	12 mm						16 mm			
014 P1 S	E2	14	Gas	16	16 mm									
			Liquid	12	12 mm				16 mm					
016 P1 S	E2	16	Gas	16	16 mm									
			Liquid	12	12 mm			16 mm						
020 P1 S	E3	20	Gas	16	16 mm							18 mm		
			Liquid	16	16 mm									
022 P1 S	E3	22	Gas	16	16 mm						18 mm			
			Liquid	16	16 mm									18 mm
026 P1 S	E3	26	Gas	22	22 mm									
			Liquid	16	16 mm							18 mm		
032 P1 S	E3	32	Gas	22	22 mm									
			Liquid	16	16 mm				18 mm				22 mm	
037 P1 S	E4	37	Gas	22	22 mm									
			Liquid	16	16 mm			18 mm			22 mm			
041 P1 S	E4	41	Gas	22	22 mm									
			Liquid	22	22 mm									
045 P1 S	E4	45	Gas	22	22 mm									28 mm
			Liquid	22	22 mm									
039 P2 D	E5	19,5	Gas	16	16 mm							18 mm		
			Liquid	16	16 mm									
048 P2 D	E5	24	Gas	16	16 mm						18 mm			
			Liquid	16	16 mm								18 mm	
055 P2 D	E6	27,5	Gas	22	22 mm									
			Liquid	16	16 mm						18 mm			
062 P2 D	E6	31	Gas	22	22 mm									
			Liquid	16	16 mm				18 mm				22 mm	
075 P2 D	E7	37,5	Gas	22	22 mm									
			Liquid	22	22 mm									
082 P2 D	E7	41	Gas	22	22 mm									
			Liquid	22	22 mm									
092 P2 D	E8	46	Gas	22	22 mm									28 mm
			Liquid	22	22 mm									
102 P2 D	E8	51	Gas	22	22 mm							28 mm		
			Liquid	22	22 mm									
117 P4 D	E9	58,5	Gas	28	28 mm									
			Liquid	22	22 mm							28 mm		
146 P4 D	E9	73	Gas	28	28 mm									
			Liquid	22	22 mm					28 mm				

For equivalent lengths over 50m, please contact the Manufacturer's Sales Office.

INVERTER COMPRESSORS – UNDER/OVER

					EQUIVALENT LENGHT [m]									
MODEL	SIZE	Nominal capacity of each circuit [kW]		Ø Nominal [mm]	5	10	15	20	25	30	35	40	45	50
012 M1 S	E1	12	Gas	12	12 mm									
			Liquid	12	12 mm									
018 M1 S	E2	18	Gas	16	16 mm									
			Liquid	12	12 mm		16 mm							
022 M1 S	E3	22	Gas	16	16 mm									
			Liquid	16	16 mm									
030 M1 S	E4	30	Gas	18	18 mm									
			Liquid	16	16 mm					18 mm				
047 M1 S	E5	47	Gas	22	22 mm									
			Liquid	22	22 mm									
042 M2 D	E5	21	Gas	16	16 mm									
			Liquid	16	16 mm									
068 M2 D	E7	34	Gas	18	18 mm									
			Liquid	16	16 mm				18 mm					
094 M2 D	E8	47	Gas	22	22 mm									
			Liquid	22	22 mm									
120 M4 D	E9	60	Gas	28	28 mm									
			Liquid	22	22 mm								28 mm	
150 M4 D	E9	75	Gas	28	28 mm									
			Liquid	22	22 mm					28 mm				

Equivalent length unreachable

For equivalent lengths over 50m, please contact the Manufacturer's Sales Office.

ON/OFF COMPRESSORS - DISPLACEMENT

					EQUIVALENT LENGHT [m]									
MODEL	SIZE	Nominal capacity of each circuit [kW]	Line	Ø nominal [mm]	5	10	15	20	25	30	35	40	45	50
007 P1 S	E1	7	Gas	12	12 mm									16 mm
			Liquid	12	12 mm									
009 P1 S	E1	9	Gas	12	12 mm						16 mm			
			Liquid	12	12 mm									16 mm
011 P1 S	E1	11	Gas	12	12 mm				16 mm					
			Liquid	12	12 mm						16 mm			
014 P1 S	E2	14	Gas	16	16 mm									
			Liquid	12	12 mm				16 mm					
016 P1 S	E2	16	Gas	16	16 mm									
			Liquid	12	12 mm			16 mm						
020 P1 S	E3	20	Gas	16	16 mm							18 mm		
			Liquid	16	16 mm									
022 P1 S	E3	22	Gas	16	16 mm						18 mm			
			Liquid	16	16 mm									18 mm
026 P1 S	E3	26	Gas	22	22 mm									
			Liquid	16	16 mm							18 mm		
032 P1 S	E4	32	Gas	22	22 mm									
			Liquid	16	16 mm				18 mm				22 mm	
037 P1 S	E4	37	Gas	22	22 mm									
			Liquid	16	16 mm			18 mm			22 mm			
041 P1 S	E4	41	Gas	22	22 mm									
			Liquid	22	22 mm									

For equivalent lengths over 50m, please contact the Manufacturer's Sales Office.

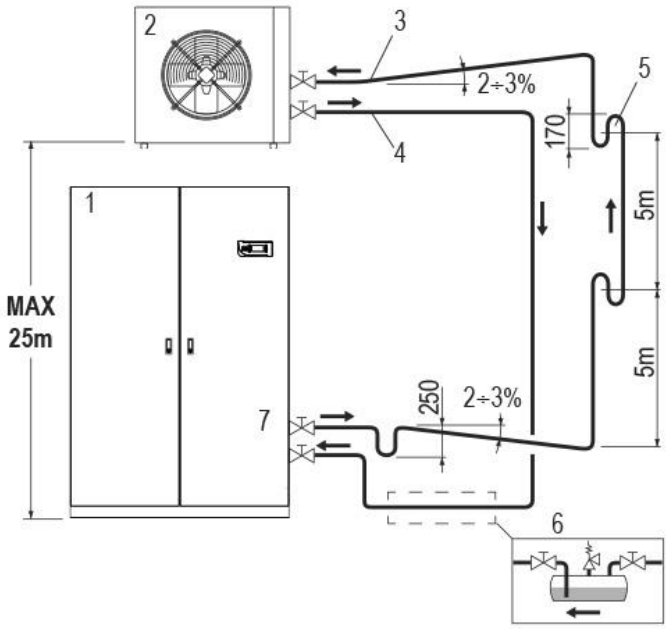
INVERTER COMPRESSORS - DISPLACEMENT

					EQUIVALENT LENGHT [m]									
MODEL	SIZE	Nominal capacity of each circuit [kW]		Ø Nominal [mm]	5	10	15	20	25	30	35	40	45	50
018 M1 S	E2	18	Gas	16	16 mm									
			Liquid	12	12 mm		16 mm							
022 M1 S	E3	22	Gas	16	16 mm									
			Liquid	16	16 mm									
030 M1 S	E4	30	Gas	18	18 mm									
			Liquid	16	16 mm					18 mm				
047 M1 S	E5	47	Gas	22	22 mm									
			Liquid	22	22 mm									

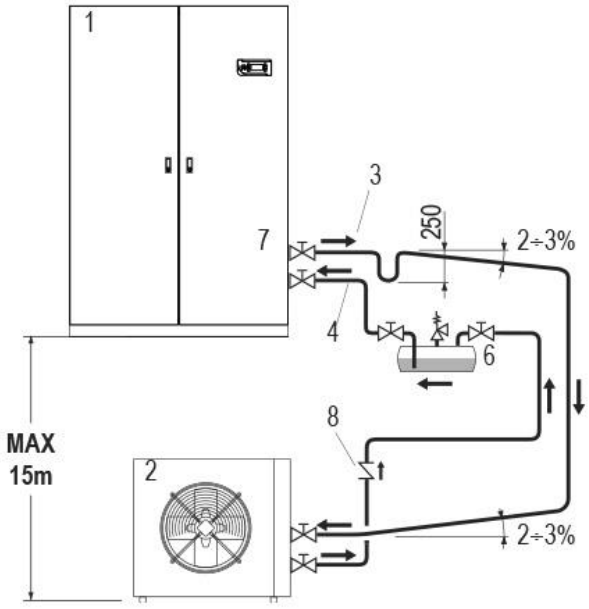
Equivalent length unreachable

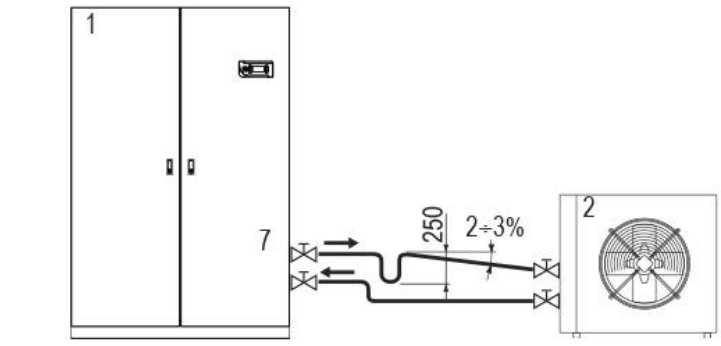
For equivalent lengths over 50m, please contact the Manufacturer's Sales Office.

2.7.9 INSTALLATION DIAGRAM



MANDATORY
CARRY OUT PIPING WITH SLOPES INDICATED TO FAVOR THE RETURN OF THE LUBRICANT OIL TO THE COMPRESSOR





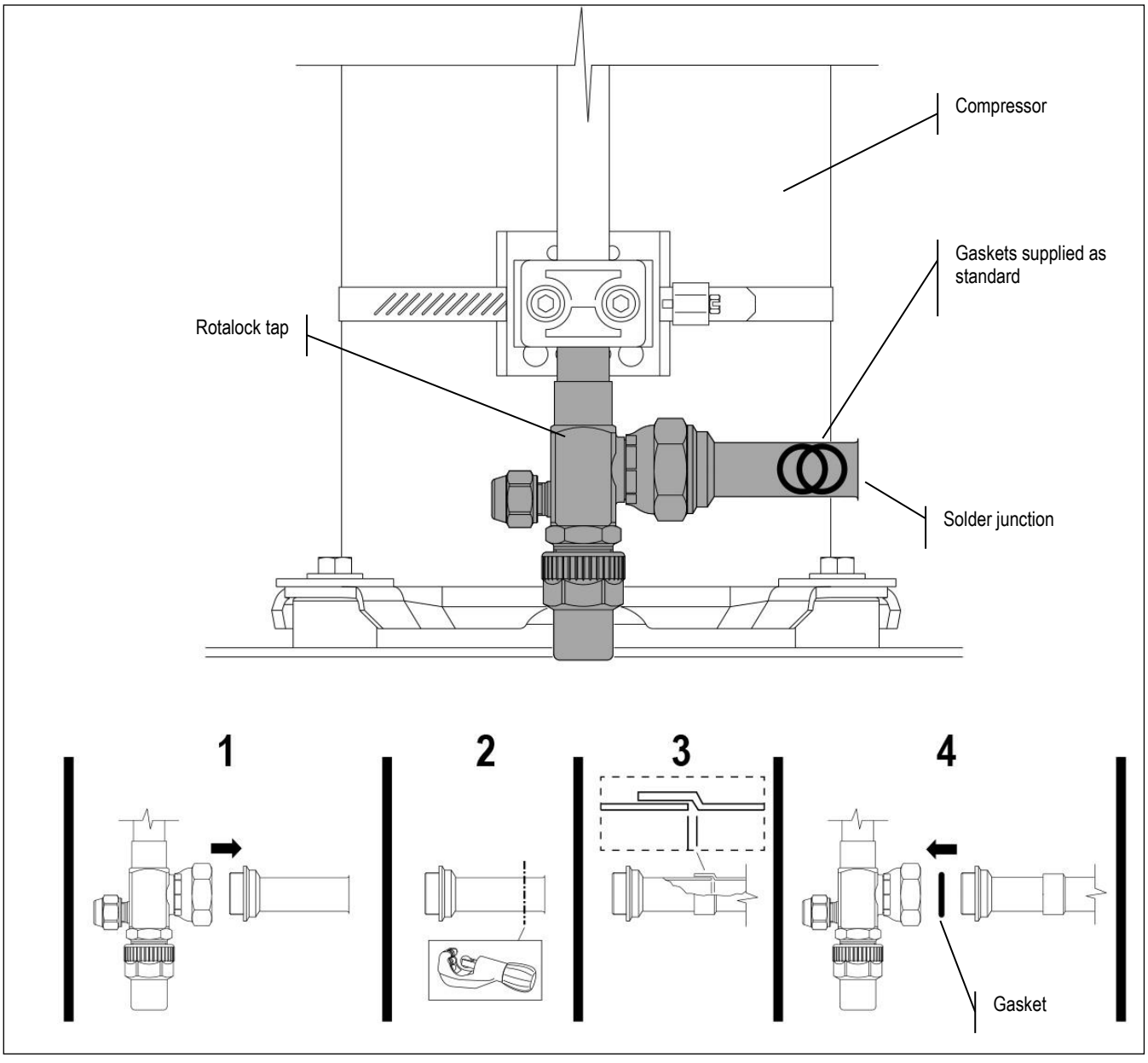
LEGENDA

1. Air conditioner
2. Remote air-cooled condenser
3. Gas discharge line
4. Liquid return line
5. Trap. Foresee a trap every 5m of the rising pipe
6. Additional liquid receiver, external to the machine – By the Installer.
   It is suggested for:
   - plants with refrigerant lines with an equivalent length of more than 25 meters
   - systems with refrigerant lines of any length and operating at outdoor temperatures below 0°C.
7. Solenoid valve for liquid line. Optional accessory of the machine for plants with refrigerant pipe longer than 10m.
8. Check valve – By the Installer. The valve must be installed on the liquid line close the condenser. The valve prevents the return of liquid in the condenser, particularly in the case of plant shutdown during the winter season.

2.7.10 CONNECTION OF THE REFRIGERANT PIPES TO THE MACHINE

On the gas delivery and the liquid return of the machine there are the Rotalock taps with copper pipe connection to make the junction.

MANDATORY
DO NOT OPEN THE REFRIGERANT TAPS OF THE MACHINE



Perform the junction as follows:

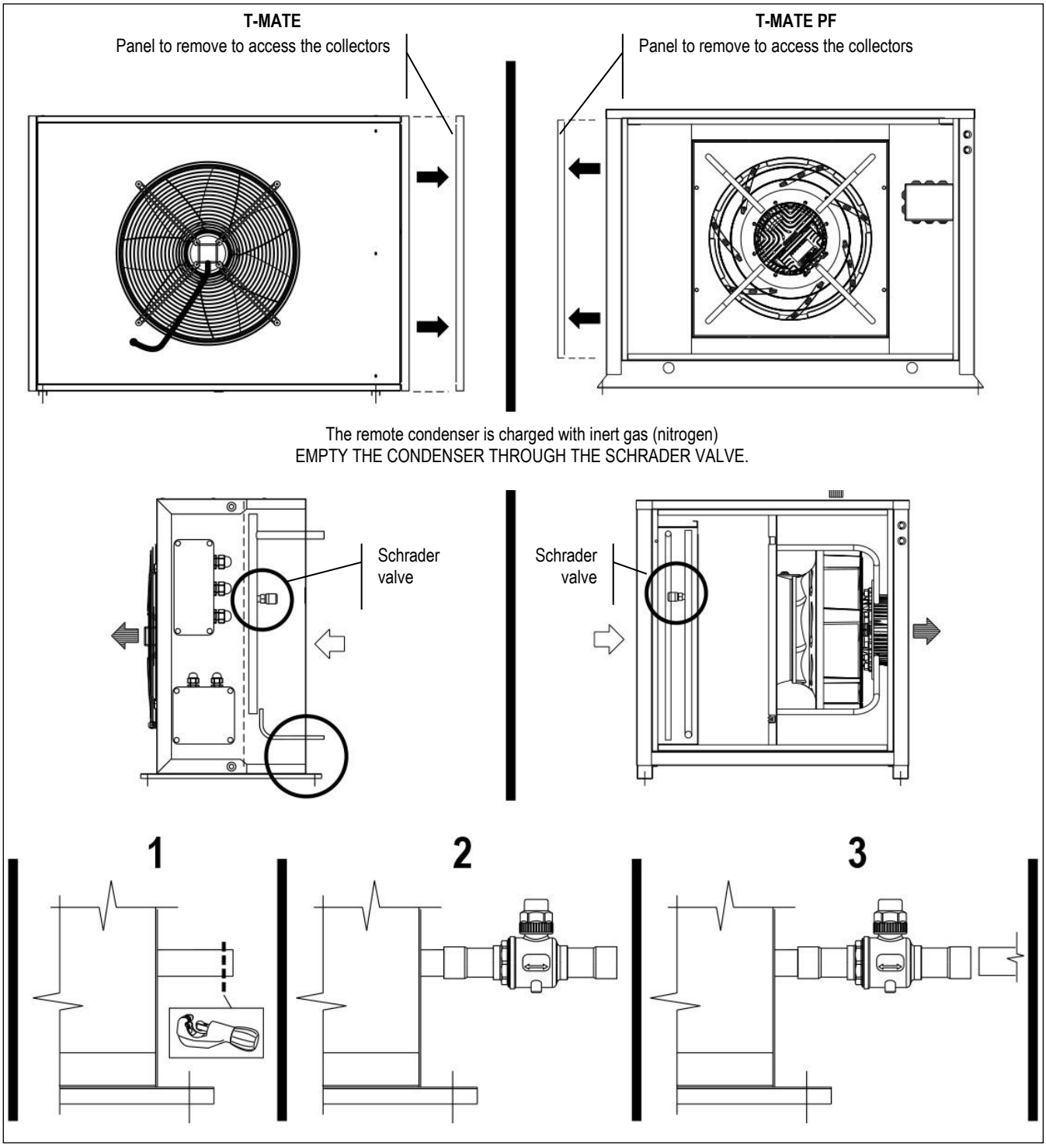
1 disconnect the solder junction from the straight fitting.
2 cut the end piece of the solder junction using a roller tube cutter – DO NOT USE A SAW TO AVOID BURRS AND CHIPS
3 make a cup joint on refrigerant pipe and carry out the brazing with the solder junction
4 connect to the straight fitting of the tap taking care to REPLACE THE GASKET.

PERFORM THE OPERATION ON THE GAS DISCHARGE TAP AND LIQUID RETURN TAP.
The gaskets supplied for the straight fitting of the tap are present on the solder junction.

IF POSSIBLE, AVOID BRAZING INSIDE THE MACHINE.

2.7.11 CONNECTION OF THE REFRIGERANT PIPES TO THE REMOTE CONDENSER

It is necessary to install the ball valves on the remote condenser. The ball valves are included in the supply.

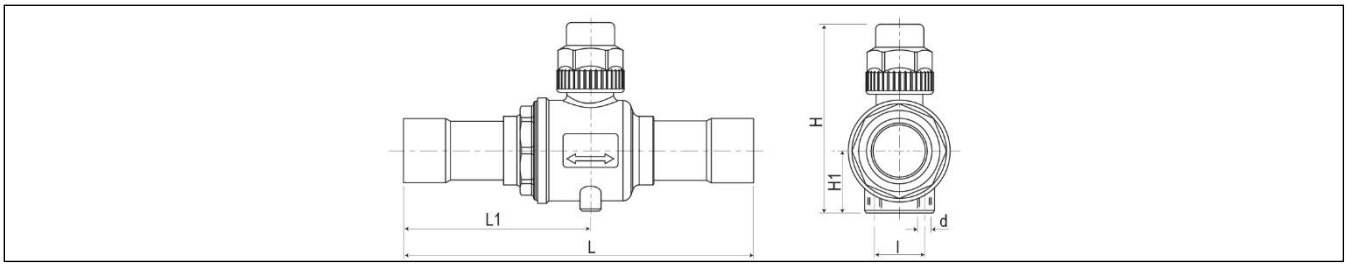


Once the condenser has been emptied, perform the joint as follows:

1. cut the end piece of the pipe using a roller tube cutter – DO NOT USE A SAW TO AVOID BURRS AND CHIPS
2. connect the supplied ball valve and perform brazing. The ball valves are in the refrigerant collector's compartment.
3. connect the refrigerant piping to the tap and perform brazing.

PERFORM THE OPERATION ON THE DISCHARGE GAS AND LIQUID RETURN TAPS.

2.7.11.1 Ball valves supplied with the remote condenser



Nr.		diameters ODS		Kv factor [m³/h]	PS [bar]	dimensions [mm]					Weight [g]
Without charge connector	With charge connector	Ø [in.]	Ø [mm]			H	H_1	L	l	d	
6590/M6	—	---	6	0,8	45	73	20	121	18	M5	260
6590/2		1/4"	---								
6590/3	6590/3A	3/8"	—	3							300
6590/M10	6590/M10A	—	10								
6590/M12	6590/M12A	—	12	5							
6590/4	6590/4A	1/2"	—								
6591/5	—	5/8"	16					138			290
6590/M15	6590/M15A	—	15	14,5		80	24	141			410
6590/5	6590/5A	5/8"	16								
6590/M18	6590/M18A	—	18								
6590/6	6590/6A	3/4"	—								
6591/7	—	7/8"	22					177			450
6590/7	6590/7A	7/8"	22	24		95,5	27,5	175			760
6591/M28	—	—	28				---	206			800
6591/9		1.1/8"	—								
6590/M28	6590/M28A	---	28	40		101,5	30	206	30	M6	1050
6590/9	6590/9A	1.1/8"	—								
6591/11	—	1.3/8"	35					248			
6590/11	6590/11A	1.3/8"	35	68		117	37	210			1518
6591/13	—	1.5/8"	—								
6591/M42		–	42								
6590/13	6590/13A	1.5/8"	—	100		127	44	239			2470
6590/M42	6590/M42A	—	42								
6591/17	—	2.1/8"	54					253			2520
6590/17	6590/17A	2.1/8"	54	178		148	54	275			4360
6591/M64	6591/M64A	—	64								4400
6591/21	6591/21A	2.5/8"	—								

2.7.12 JUNCTION OF THE LINE PIPES AND FITTINGS

- The joint is for strong brazing with silver-based alloy (we recommend an alloy with medium-high silver content and low melting temperature)
- Use appropriate equipment
- Clean the pieces from oil, grease, oxides, crust and dirt before brazing
- Use an appropriate solvent to remove the oxides formed at high temperature during heating and brazing.

MANDATORY

The oxide formed inside the pipe during the brazing phases is dissolved by the HFC fluids and causes the refrigerant filter obstruction. During brazing it is advisable to introduce nitrogen into the pipeline. If this is not possible, clean the pipes with solder solvent

2.7.13 CLEANING THE REFRIGERANT PIPE

Refer to the previous paragraph.

2.7.14 REFRIGERANT CONTENT

Values to be used for calculating the refrigerant charge of the system.

2.7.14.1 Machine with remote air-cooled condenser (DX machine)

The machines are supplied with a minimum refrigerant charge (a few hectograms). The values indicated in the table refer to the charge to be performed for each refrigerant circuit of the machine.

b-NEXT DX / t-NEXT DX / t-NEXT DF DX (ON/OFF compressors)												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E0	E0	E1	E2	E2	E3	E3	E3	E4	E4	E4
R410A	kg	2,3	2,3	3,2	3,4	3,4	4	4	4	5,7	5,7	8,6
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4	E5	E5	E6	E6	E7	E7	E8	E8	E9	E9
R410A	kg	8,6	2x4,5	2x4,5	2x4,9	2x4,9	2x8,1	2x8,1	2x8,7	2x8,7	2x10,8	2x10,8

i-NEXT DX / i-NEXT DF DX (INVERTER compressors)											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4	E5	E5	E7	E8	E9	E9
R410A	kg	3,2	3,6	4,3	6,1	9,2	2x4,3	2x6,1	2x9,2	2x10,4	2x10,4

2.7.14.2 Remote condenser

The remote condensers are supplied with a sealing charge. In the table the charge values for each condenser.

T-MATE – Axial fans																				
MOD.		M 11	M 14	M 17	M 20	M 25	M 30	M 35	M 45	M 50	M 60	M 70	M 95	M 110	M 130	M 140	T 185	T 210	T 250	T 280
R410A	kg	0,8	1,2	1,7	1,7	2,0	3,0	4,0	4,7	4,1	5,5	7,7	8,7	11,6	11,6	15,4	20,8	27,7	27,7	37,0

T-MATE PF–Plug Fans														
MOD.		T 11	T 14	T 17	T 21	T 24	T 33	T 38	T 44	T 58	T 69	T 86	T 108	T 114	T 144
R410A	kg	0,8	1,2	1,7	2,6	2,5	3,8	4,3	6,4	5,9	8,8	10,2	9,4	10,3	14,0

2.7.14.3 Linear meter of piping

Quantity to be added for each linear meter both on the liquid line and on the discharge line.

External pipe diameter		10	12	14	16	18	22	28	35
Liquid	gr/m	59	90	118	160	209	327	---	---
Discharge	gr/m	---	17	23	29	39	64	105	160

2.7.15 REFRIGERANT CHARGE FOR DX MACHINE

MANDATORY
Refrigerant charge operations must be carried out by qualified personnel in compliance with local regulations in force. Below information of "GOOD RULE" for the execution of the charge in case of absence of specific local regulations

1. Connect the high efficiency vacuum pump to the Schrader port on the remote condenser manifold (previously used to discharge the remote condenser from the inert gas charge)
2. Open taps on the remote condenser and any other taps placed on the refrigeration line.
3. DO NOT OPEN THE TAPS ON THE INDOOR MACHINE.
4. Make the vacuum slowly in the connection line and in the condenser up to an absolute pressure of 0.3 mbar.
5. Once the value of 0.3 mbar is reached, stop the vacuum pump and wait 3 hours to check the tightness of the circuit. It is normal for a slight rise in pressure which must not exceed 0.5 - 1 mbar. If the vacuum is not reached, there are leaks in the circuit.
6. In the case of very large refrigerant lines or heavily polluted by humidity, it is necessary to break the vacuum by charging the circuit with anhydrous nitrogen (without oxygen) and then repeating the vacuum operation as previously described.
7. Disconnect the high efficiency vacuum pump.
8. THE CHARGE MUST BE MADE WITH REFRIGERANT TO THE LIQUID STATE
   Connect the refrigerant gas bottle to the Schrader valve on the indoor machine, between the expansion valve and the evaporator, to charge the refrigerant. Place the gas bottle on a scale to check and quantify the weight of refrigerant injected.
9. Open taps on gas delivery and liquid return on the indoor machine
10. Perform a refrigerant charge up to reaching a pressure of 1 bar.
11. Check with a leak detector all the joints and components installed on the line. In the event of a leak, recover the gas from the system, carry out the repair and repeat all the charging operations described above.
12. Complete the refrigerant charge
13. Start the machine and start the compressors - if necessary, enable manual control of the compressor on the controller. ALL MACHINE COMPRESSORS MUST BE IN USE, IF INVERTER CONTROLLED, MUST BE AT MAXIMUM SPEED.
14. Check the following operating conditions:
    a. Condensing temperature 45°C. If necessary, partially occlude the condenser coil or limit its ventilation.
    b. Subcooling of the liquid at the inlet of the expansion valve: between 3 and 5K
    c. Overheating of the vapour at the evaporator outlet: between 5 and 8K.
    d. In the sight glass there must be no vapour or foam bubbles but a continuous and constant flow of the liquid

MANDATORY
It is advisable to carry out the charge with caution by introducing small-dose of refrigerant into the circuit until the subcooling and superheating values indicated above are reached.

2.7.16 TOPPING UP COMPRESSOR LUBRICATING OIL FOR DX MACHINE

The compressors are charged with Emkarate RL32 3MAF polyester lubricating oil (POE) or other lubricating oil indicated on the compressor plate.
The litres of oil loaded at the factory are shown on the compressor plate.
The POE lubricating oil has the particularity of being very hygroscopic and absorbs high quantities of moisture if exposed to the air even for short periods.
AVOID EXPOSURE TO AIR: Oil residues not used for topping up must be disposed of and not re-used.
The quantity of lubricating oil to be topped up in the circuit must be in the proportion of 10% of the refrigerant injected.

2.7.16.1 Refrigerant content for machine with built-in water-cooled condenser (DW)

The machines with built-in water condenser are supplied with refrigerant charge and have a closed refrigerant circuit and do not require the addition of refrigerant fluid or lubricating oil.
The factory refrigerant charges are as follows.

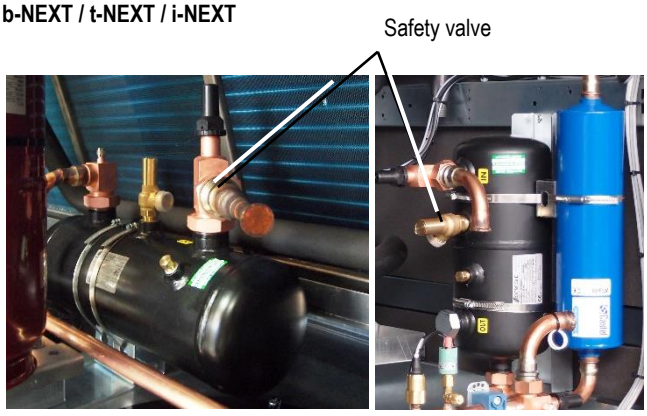
b-NEXT DW / t-NEXT DW / t-NEXT DF DW / t-NEXT FC DW (ON/OFF compressor)												
MODEL		007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
SIZE		E1	E1	E1	E2	E2	E3	E3	E3	E4L	E4L	E4L
R410A	kg	3,3	3,3	3,3	3,6	3,6	4,4	4,4	4,5	6,2	6,2	9,3
MODEL		045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
SIZE		E4L	E5L	E5L	E6L	E6L	E7L	E7L	E8L	E8L	E9L	E9L
R410A	kg	9,3	2x4,9	2x4,9	2x5,5	2x5,7	2x8,9	2x8,9	2x9,6	2x9,6	2x10,8	2x10,8

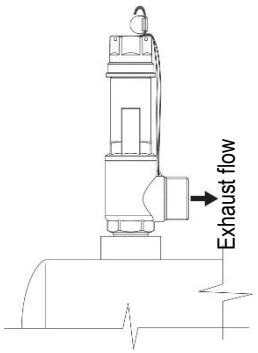
i-NEXT DW / i-NEXT DF DW / i-NEXT FC DW (INVERTER compressor)											
MODEL		012 M1 S	018 M1 S	022 M1 S	030 M1 S	047 M1 S	042 M2 D	068 M2 D	094 M2 D	120 M4 D	150 M4 D
SIZE		E1	E2	E3	E4L	E5L	E5L	E7L	E8L	E9	E9
R410A	kg	3,2	3,8	4,6	6,8	9,9	2x4,7	2x6,9	2x10,1	2x10,8	2x10,8

2.7.17 SAFETY VALVE VOR DIRECT EXPANSION MACHINE (DX AND DW)

The safety valve of the refrigerant circuit is installed in the direct expansion machines (DX and DW versions), when required by Directive 2014/68 / EU (ex Directive 97/23 / EC).
The valve is installed on the liquid receiver of each refrigerant circuit of the machine and has the aim to protect the circuit against overpressure.

b-NEXT / t-NEXT / i-NEXT





CONNECTION Ø 3/4" G – M

DX and DW machines equipped with safety valve:

ON/OFF Compressor	Inverter Compressor
041 P1 S	047 M1 S
045 P1 S	094 M2 D
075 P2 D	120 M4 D
082 P2 D	150 M4 D
092 P2 D	---
102 P2 D	---
117 P4 D	---
146 P4 D	---

DANGER
The intervention of the valve implies the discharge of refrigerant fluid under pressure and, eventually, at high temperature. It is necessary to provide an exhaust pipe, appropriately sized according to the regulations in force, to convey the refrigerant fluid to the outside

The safety valves guarantee the repeatability of intervention, this means that after the valve has intervened, the initial calibration conditions are restored (recommended to check with equipment for leaks).
However, it is advisable to replace the valves after an intervention because, during the discharge, it is possible to accumulate working residues of the components and of the pipes on the valve gasket. This can cause a valve re-closure faulty.

2.8 ELECTRICAL CONNECTIONS

The electrical connections of the machine must be defined during the planning of the system.

DANGER
The electrical connection must be designed and carried out only by operators who have specific technical expertise or particular skills in this sector.
Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again.

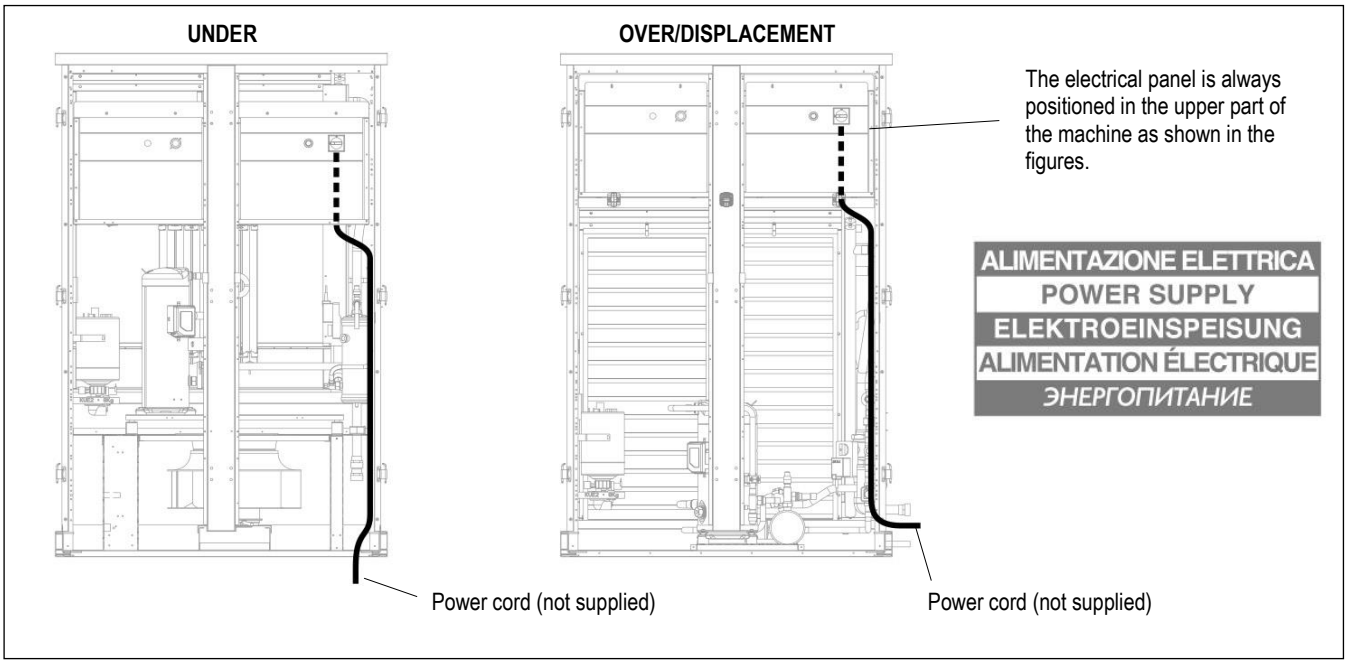
- The characteristics of the power supply network must comply with the IEC 60204-1 standards and the local standards in force and be adequate to the absorption of the machine shown in the wiring diagram and data plate.
- The machine must be connected to a three-phase power supply type TN (S). If the differential switch is installed, it must be of type A or B.
- Refer to local regulations. Power electrically the machine only if the refrigerant / water circuit is charged.

MANDATORY
The power supply line must be equipped with a general disconnector in order to isolate the machine from the energy source

As prescribed by the EN 60204-1 standard, the disconnector handle must be easily accessible and positioned at a height between 0.6 and 1.9 meters from the service level.
The power supply must never be excluded, except during maintenance operations, to guarantee the operation of the electric heater of the compressor crankcase and antifreeze heaters.

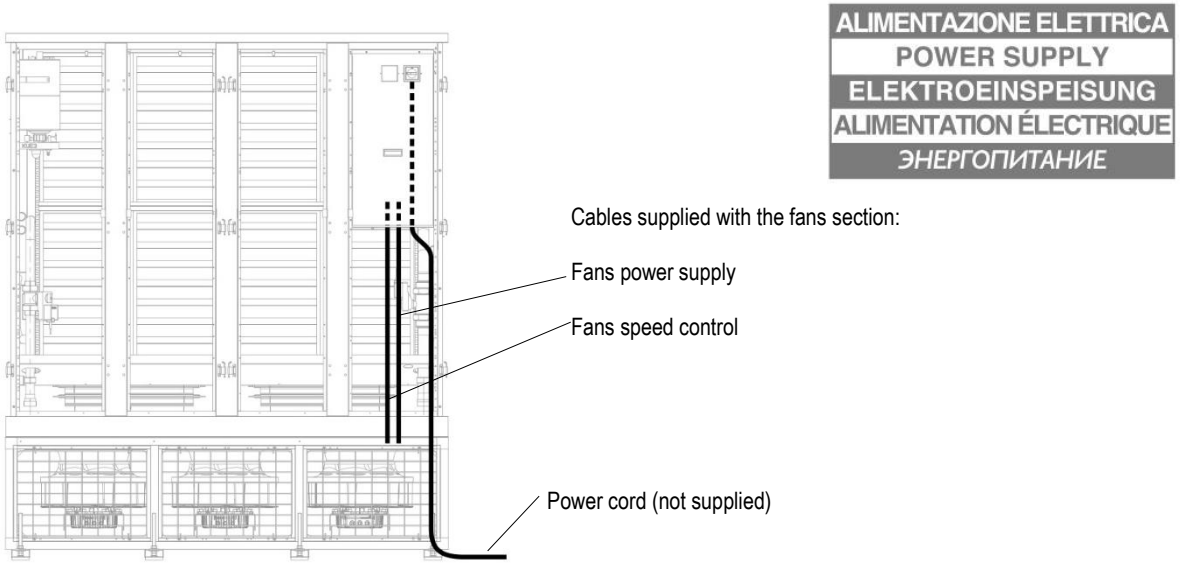
2.8.1 POWER SUPPLY FOR PACKAGED MACHINE

Use a multipolar cable with a protective sheath. The power cord section depends on the maximum absorbed current of the machine (A) as shown in the dedicated wiring diagram, in the technical bulletin and in the identification label.
For the input of the power cord in the machine, use the holes provided by the Manufacturer in the base (UNDER version) or in the side panel (OVER version / DISPLACEMENT).
Use the internal upright of the machine frame to fix the cable with cable ties. Avoid direct contact with hot or sharp surfaces.
Connect the power cord to the terminals of the door lock disconnector and to the ground terminal.
The power cord must not be placed into the machine's cable ducts.



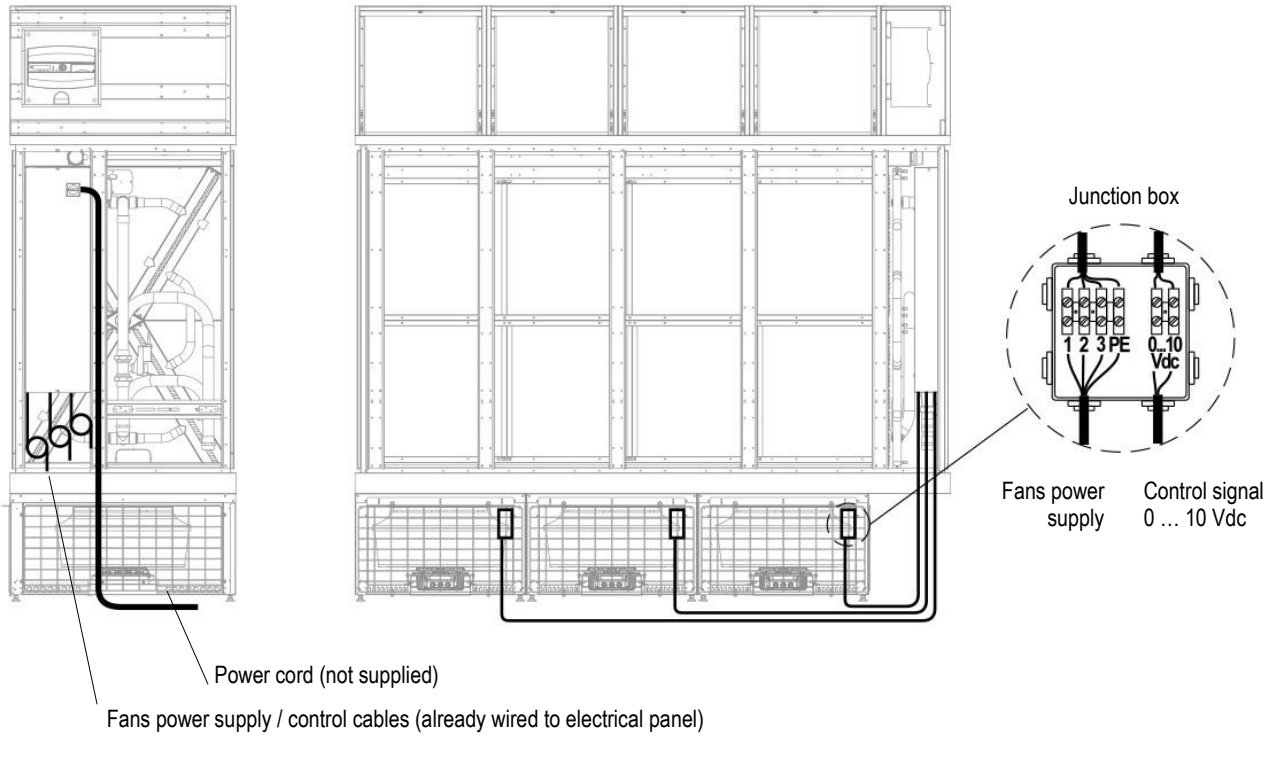
2.8.2 POWER SUPPLY FOR UNDER MACHINE w-NEXT2

Proceed as indicated above for the power supply line.
The fans section is already wired and equipped with 2 cables for connection to the electrical panel.
Cable 1: Multi-polar cable for fans power supply
Cable 2: Cable for fans speed control



2.8.3 POWER SUPPLY FOR UNDER MACHINE NEXT X TYPE

Proceed as indicated above for the power supply line.
Each fan module is equipped with a junction box where the fan is wired.
The fan power supply /speed control cables are already wired in the electrical panel of the air handling section.
Connect each cable to the junction box of each fan module as indicated.



2.8.4 AUXILIARY ELECTRICAL CONNECTIONS

The command and control circuit is derived inside the electrical panel, from the power circuit.
The auxiliary connections are present in the terminal board contained in the electrical panel of the machine
Connection to be made:

- 0-10Vdc signal to be connected to the remote air condenser for condensing control (DX series)
- Remote on/off (for all series – live contact)
- General alarm (for all series – voltage free deviating contact)
- Clogged filters (for all series – accessory for b-NEXT – voltage free contact)
- Water presence on the floor (for all series – accessory for b-NEXT – voltage free contact)

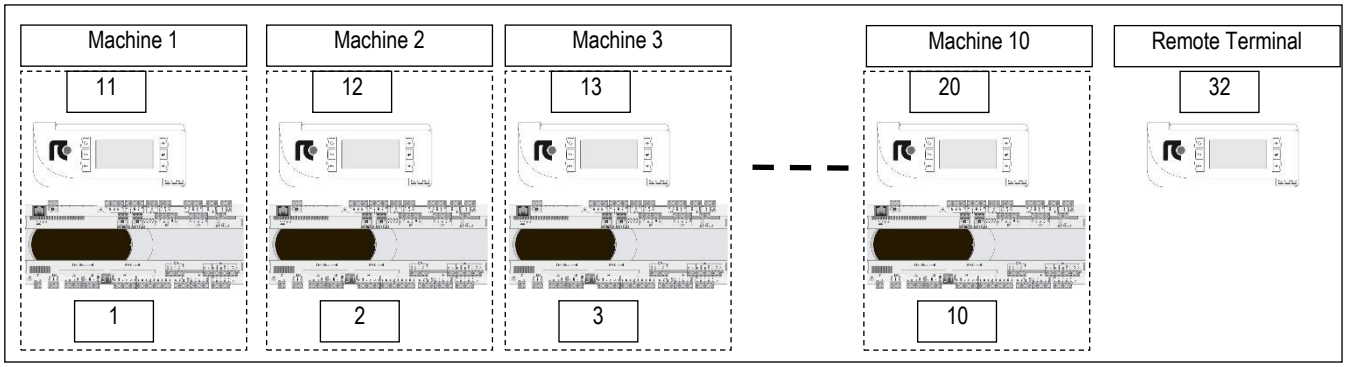
It is recommended that the laying of the auxiliary connection cables is separate from any power cables. Otherwise use shielded cables.

2.8.5 LAN NETWORK CONNECTION

Max 10 machines connected in LAN.

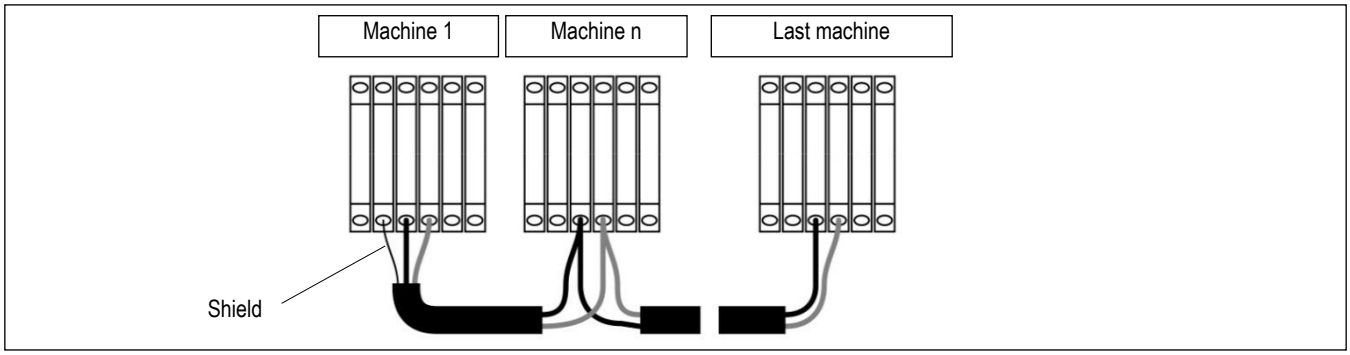
Machines addressing:
Each machine in the LAN network (programmable controller or machine terminal) is identified by a unique address.
The Remote Terminal has address 32.

Machine #	1	2	3	4	5	6	7	8	9	10	--
Motherboard address	1	2	3	4	5	6	7	8	9	10	--
Terminal address	11	12	13	14	15	16	17	18	19	20	32



Connection between the machines:
LAN connection is performed using only a twisted pair AWG24 shielded cable.
Maximum LAN network length: 500m.

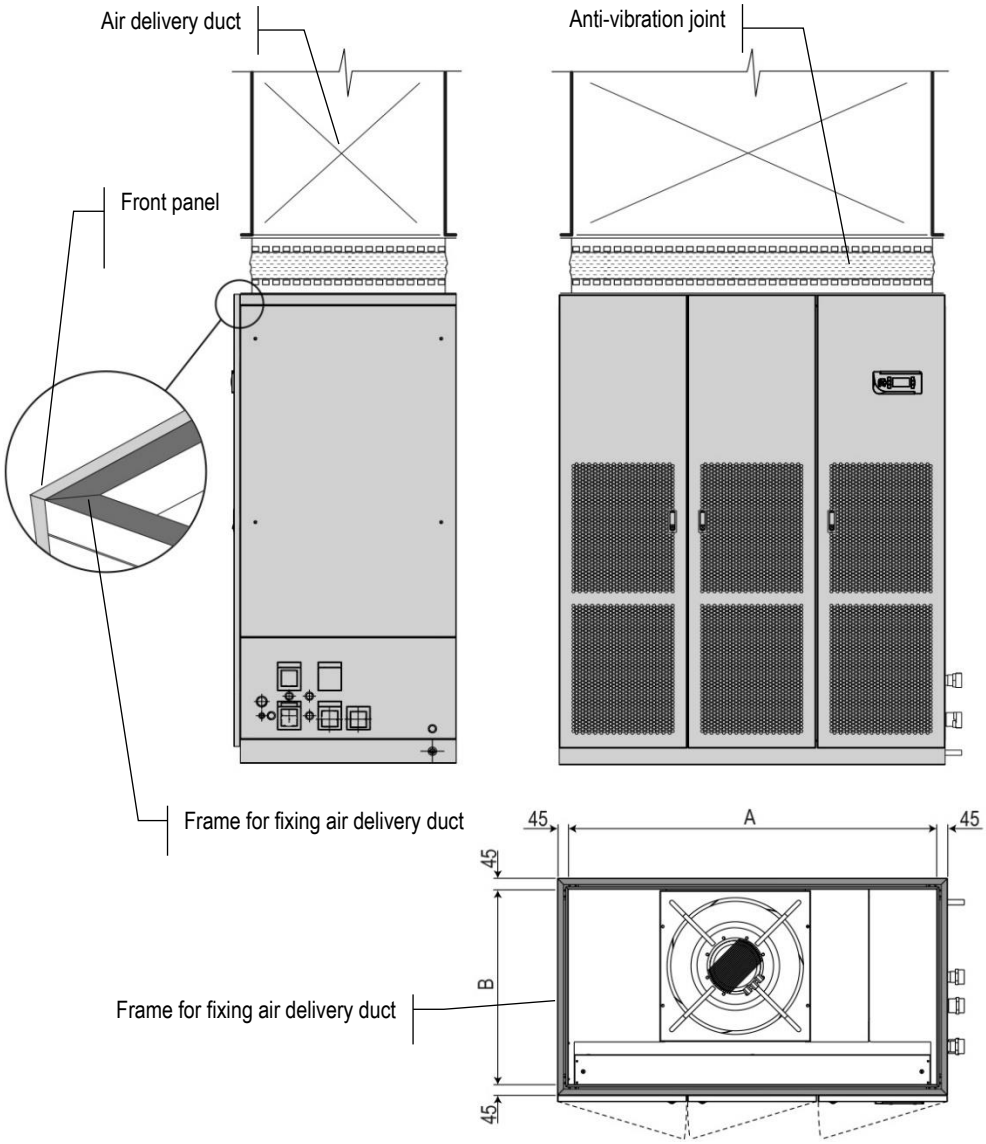
Respect the network polarity RX/TX+, RX/TX- and GND
The electrical connections are on the machine's terminal board.



2.9 AERAULIC CONNECTIONS

The dimensioning of the ducts must be defined during the planning of the system.

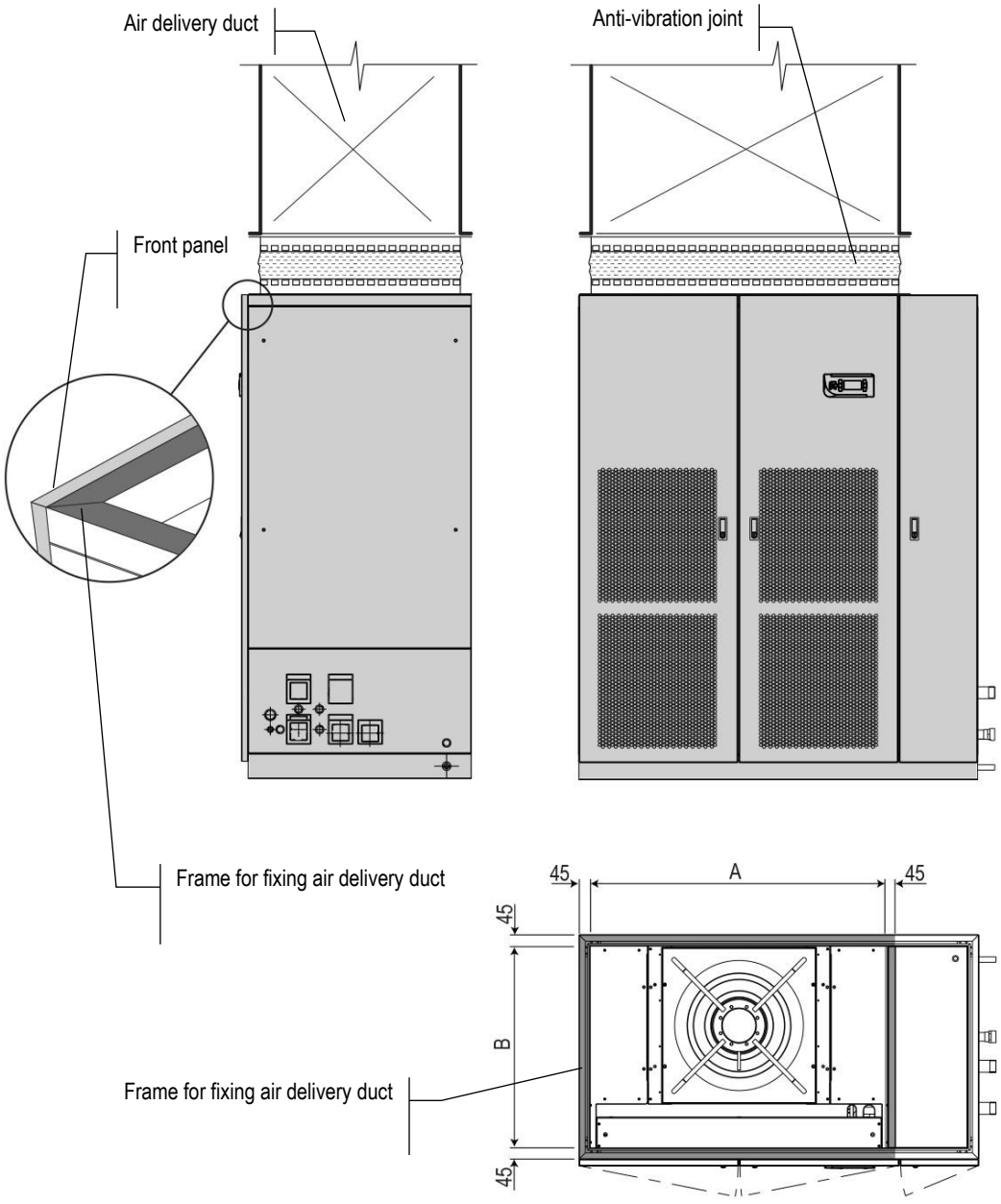
DUCTING OF AIR DELIVERY FOR DX / CW OVER MACHINES
DUCTING OF AIR SUCTION FOR DX / CW DISPLACEMENT MACHINES



Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9
A	mm	565	560	695	995	995	1215	1540	1783	2085	2409	2809
B	mm	330	560	560	660	815	815	815	815	815	815	815

MANDATORY
The ducts must be properly supported so as not to burden the machine with their weight

DUCTING OF AIR DELIVERY FOR DX / CW OVER MACHINES DW



Size		E1	E2	E3	E4L	E5L	E6L	E7L	E8L
A	mm	560	695	995	1215	1539	1780	2085	2415
B	mm	560	560	660	815	815	815	815	815

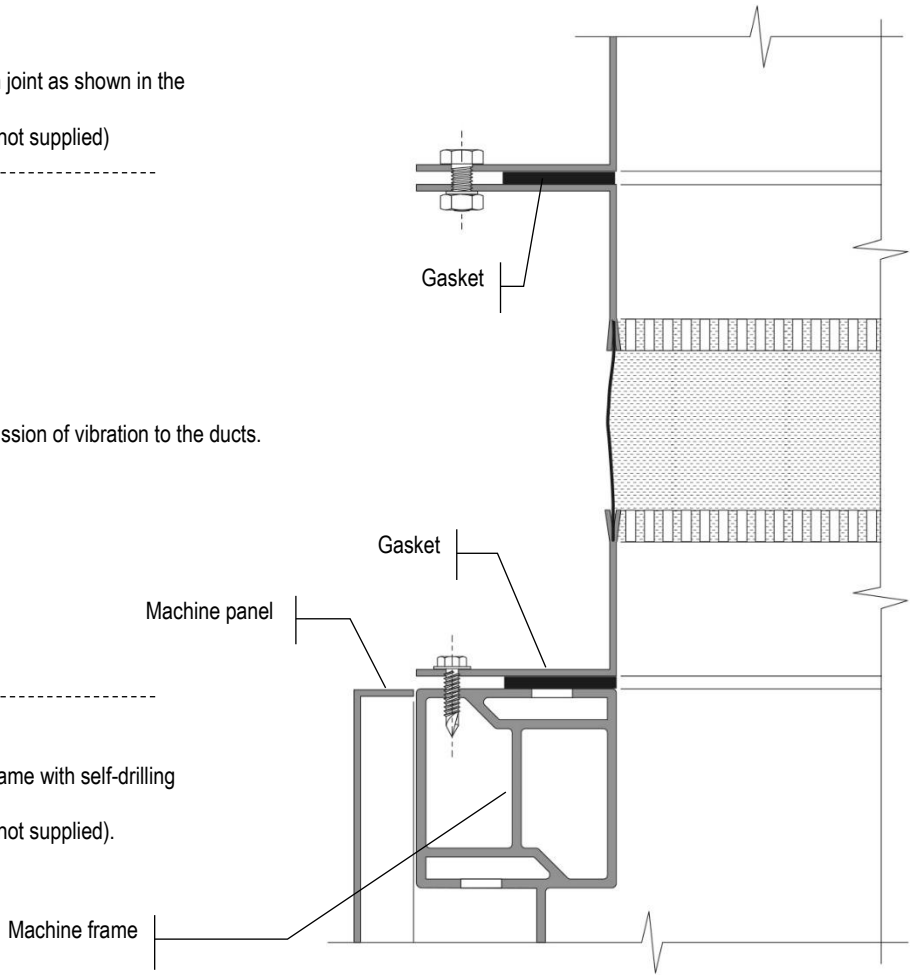
MANDATORY
The ducts must be properly supported so as not to burden the machine with their weight

2.9.1 DUCT FIXING

Air delivery duct (not supplied).
Fix the air delivery duct to the anti-vibration joint as shown in the figure (fixing system not supplied).
Interpose a gasket as shown in the figure (not supplied)

Anti-vibration joint (not supplied).
The anti-vibration jungle avoids the transmission of vibration to the ducts.

Upper frame of the machine.
Fix the anti-vibration joint to the machine frame with self-drilling screws as shown in the figure.
Interpose a gasket as shown in the figure (not supplied).



MANDATORY
The ducts must be properly supported so as not to burden the machine with their weight

2.9.2 AIR SIDE PRESSURE DROPS IN THE DUCT

The values of nominal and maximum static pressure of the machine are indicated in the relative Technical Bulletin.
The air pressure drops in the ducts must be minimal; high values result in an increase in the electrical energy consumption of the fans.

2.9.3 AIR DELIVERY FOR UNDER MACHINE

The arrangement of the air delivery system in the raised floor must be defined during the planning of the system.

MANDATORY
Avoid the presence of obstacles of any kind in the raised floor as they prevent proper air circulation by increasing the air side pressure drops

The air outlet grilles of the raised floor must be suitably calibrated, if possible, to guarantee the correct air flow defined in the design phase

The values of nominal and maximum static pressure of the machine are indicated in the relative Technical Bulletin.
The air pressure drops in the raised floor must be minimal; high values result in an increase in the electrical energy consumption of the fans.

2.10 BMS CONNECTION

CARDS for interfacing with external supervision and control systems:
Card provided as standard:

- RS485 Modbus/Carel

Accessory cards on request:

- pCOnet for BACnet MS/TP (standard EIA-485)
- pCO Web for network SNMP, BACnet Ethernet, BACnet /IP and other local networks or Internet
- LonWorks

2.11 COMPONENTS OF THE MACHINE

MANDATORY
All assembly, positioning and maintenance operations must be carried out with adequate means and by skilled personnel, trained and authorized for this type of manoeuvres.

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.

Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again.

For electrical connections, refer to the electrical diagram of the machine

MANDATORY
Any maintenance and / or replacement operations on the refrigerant circuit must be carried out by qualified personnel.

All work must be carried out in accordance with the "GOOD RULE", according to the current regulations in force in the various countries, taking into account the operating conditions and the uses to which the plant is destined.

INFORMATION
Design errors and / or errors in the cooling circuit can cause irreparable compressor failure or malfunctions

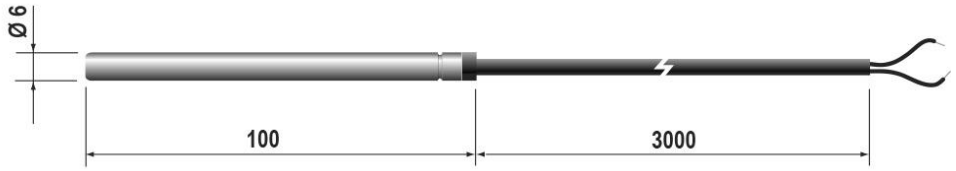
2.11.1 SERIAL PROBES FOR TEMPERATURE AND HUMIDITY

2.11.1.1 Temperature serial probes for air / water

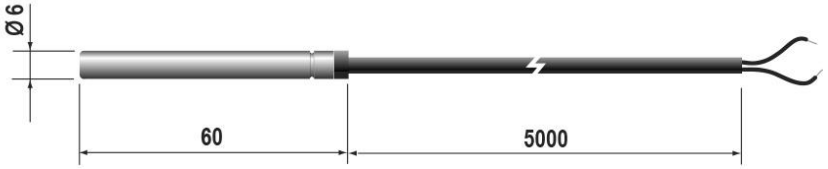
AIR TEMPERATURE PROBE
The probe is installed on the air intake of all the machines.
For machines with air flow control (variable air flow) a second probe is installed on the air supply, on the air intake of the supply fan.

WATER TEMPERATURE PROBE
The probes are installed on the chilled water inlet and outlet pipe of the cooling coil.
The probes are contained in a copper well welded on the pipe.

AIR TEMPERATURE PROBE



WATER TEMPERATURE PROBE



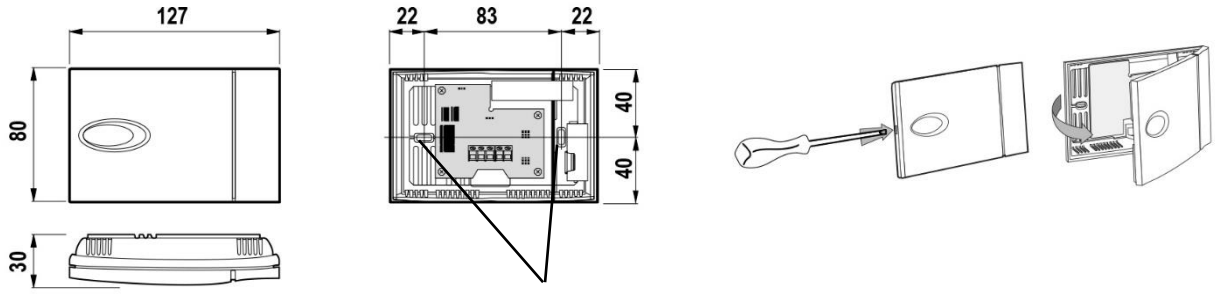
Dimensions in millimetres

SENSOR
The sensor is active type NTC - 10 kΩ @ 25°C
Degree of protection IP67

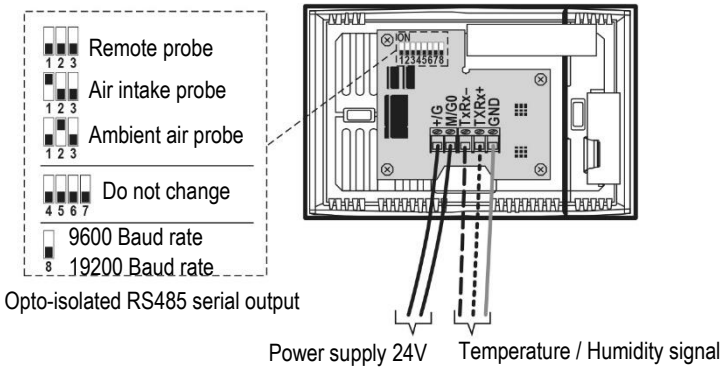
2.11.1.2 Air temperature / humidity serial probe

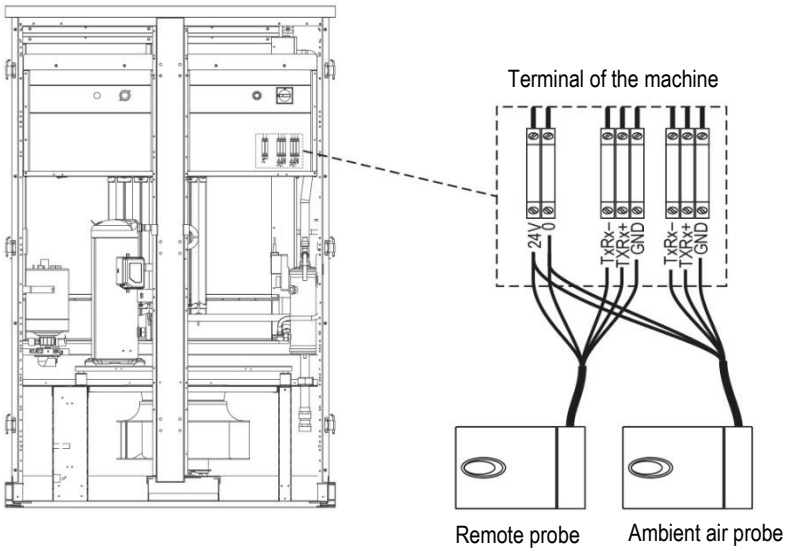
MENDATORY
THE PROBE MUST BE INSTALLED PROTECTED BY ATMOSPHERIC AGENTS

For installation use the fixing holes as shown in the figure
The connection cable must be connected to the machine's terminal board
Avoid direct contact of the connection cable with hot or sharp surfaces.
If the connecting cable is not supplied, use a twisted pair AWG 20 cable with shielding.

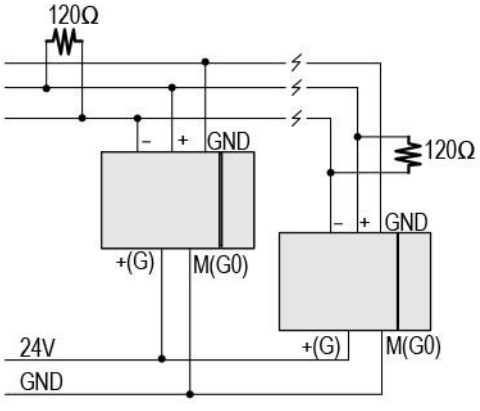


Dimensions in millimetres





MANDATORY
For electrical connections with a connection cable longer than 100 m, install a 120 Ω resistor as shown in the figure



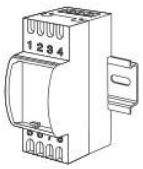
2.11.2 WATER PRESENCE SENSOR ON THE FLOOR

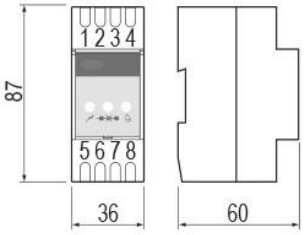
The system includes an electronic relay installed in the electrical panel of the machine.
The electrical connections for the probe and the alarm contact are present in the machine's terminal board. Refer to the wiring diagram of the machine for the numbering of the cables and terminals.
Install the water presence probe at the point defined in the project phase and connect it to the machine's terminal board.

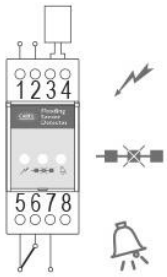
TECHNICAL CHARACTERISTICS

Power supply:	24V ~ 50/60Hz
Alarm relay circuit:	250 Vac; 2A resistive / inductive
Degree of protection:	IP40
Probe cable section:	2 x 1,5mm2 (cable not supplied)
Max cable length:	500m
Working conditions:	from -10°C to 60°C with 95%UR non- condensing

ELECTRONIC RELAY







Signalling LEDs:

Green: Power on

Yellow: Probe not connected or line not closed with 10KΩ resistor

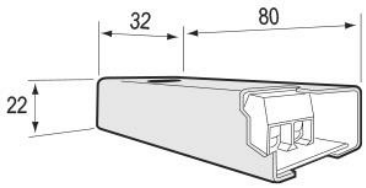
Red: Alarm – water presence

Terminals of the relay:

1-2: power supply 24Vac – 50/60Hz
3-4: probe connection
5-6: alarm contact N.C.
6-7: alarm contact N.O.

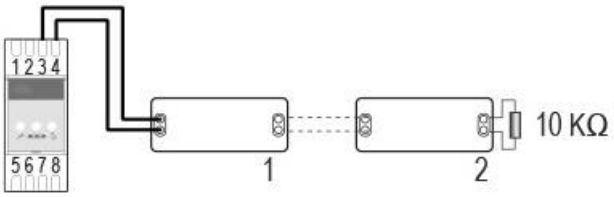
WATER PROBE

Probe



Canister to install on the ground.
The probe includes the terminals for electrical connections.
The sensitive element is present in the part to install on the ground

ADDITIONAL PROBE



The additional probe must be connected in series to the previous one.
Total cable length max. 500m.
Close the probe circuit with the 10KΩ resistor supplied with the probe.

Dimensions in millimetres

2.11.3 SERVOMOTORS FOR WATER FLOW CONTROL VALVES

The servomotor takes a position proportional to the driving voltage between 0 and 10 Vdc.

The servomotor stops:

- Automatically at the end stop;
- in the position corresponding to the driving voltage;
- in the position in which it is found interrupting the power supply.

TYPE OF VALVES
The servomotors control 2-way water valves.

ROTATION SENSE
All servomotors have the rotation direction selectable by means of the special button, except for the TR model which has RIGHT rotation

LIMIT
The servomotor stops automatically and is not equipped with limit switches.

OVERLOAD
The servomotor is protected against overload.

MANUAL EMERGENCY
The valve can be operated manually, in the event of a servomotor or control system failure, by pressing the appropriate button.

REPAIR
The servomotor cannot be repaired and must be replaced.

APPLICATION
The servomotors series:

- GR
- TR
- NR
- LR
- SR

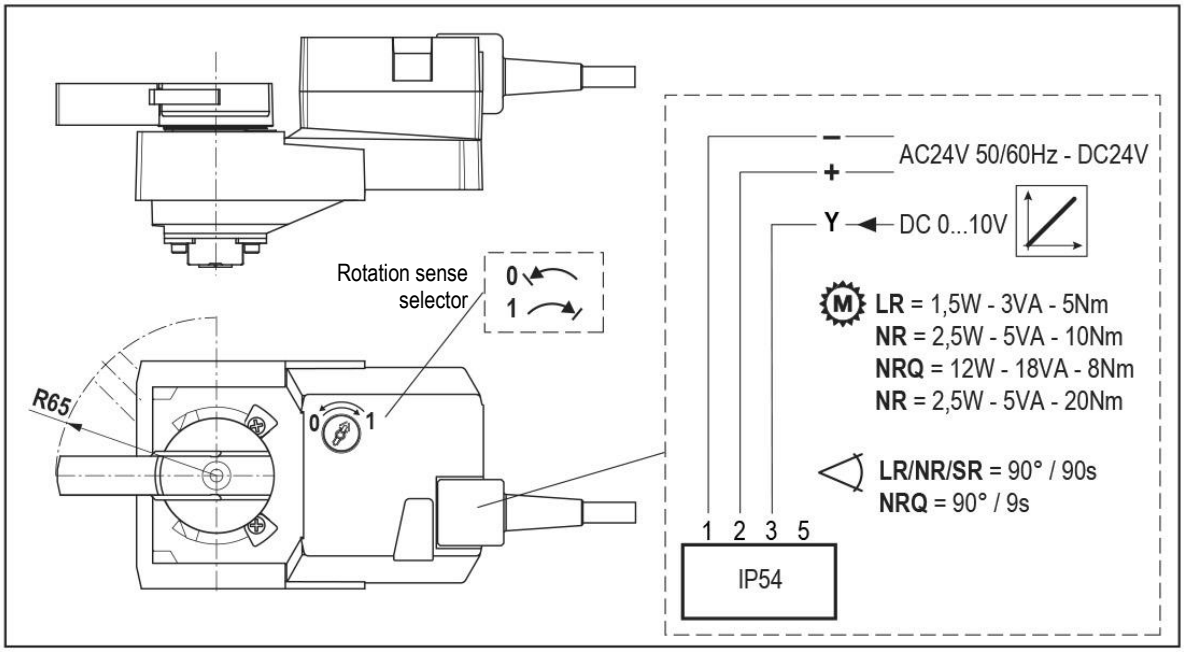
are designed for the control of 2-way valves for water flow regulation of the heat exchangers for air treatment.

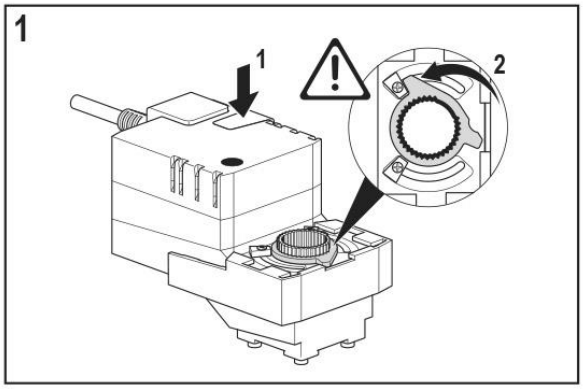
The servomotors series:

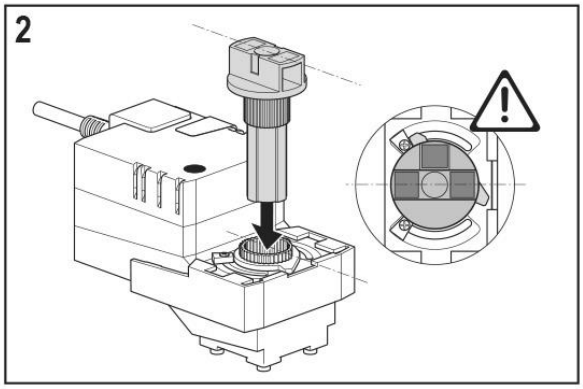
- NRQ

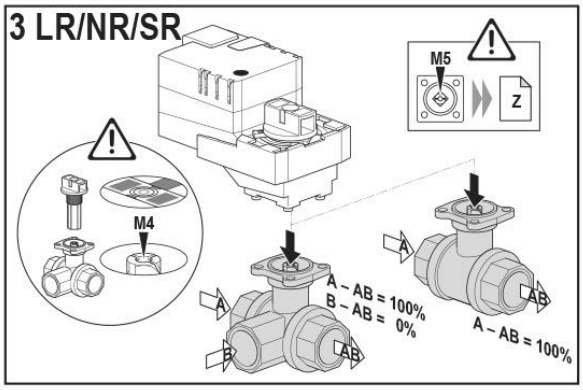
They are designed to control the 2-way valves for regulating the water flow of the water condenser. These servomotors are characterized by a fast opening / closing time - 9 seconds.

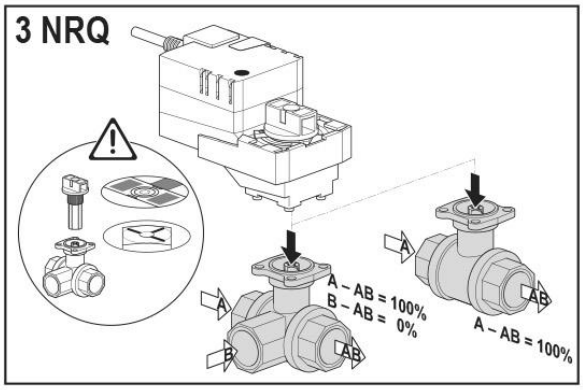
LR / NR / SR / NRQ SERVOMOTOR FOR WATER FLOW CONTROL VALVE

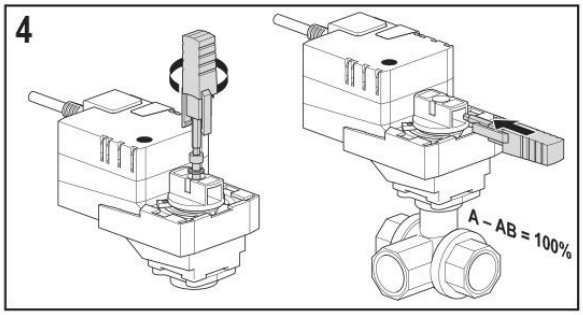


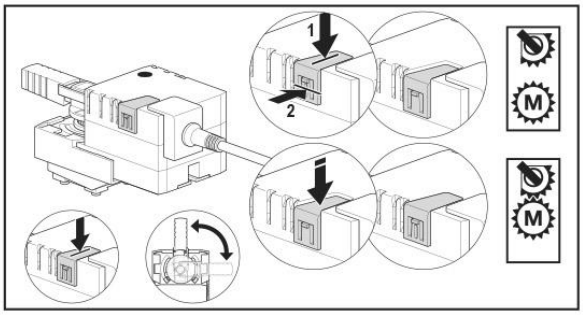




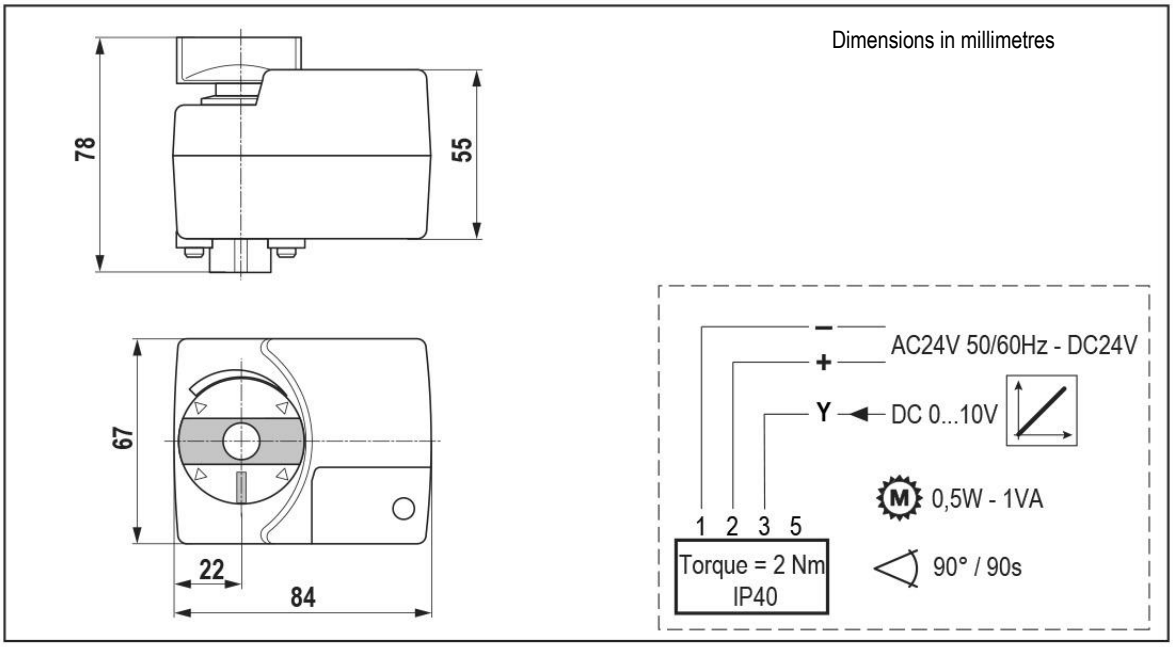


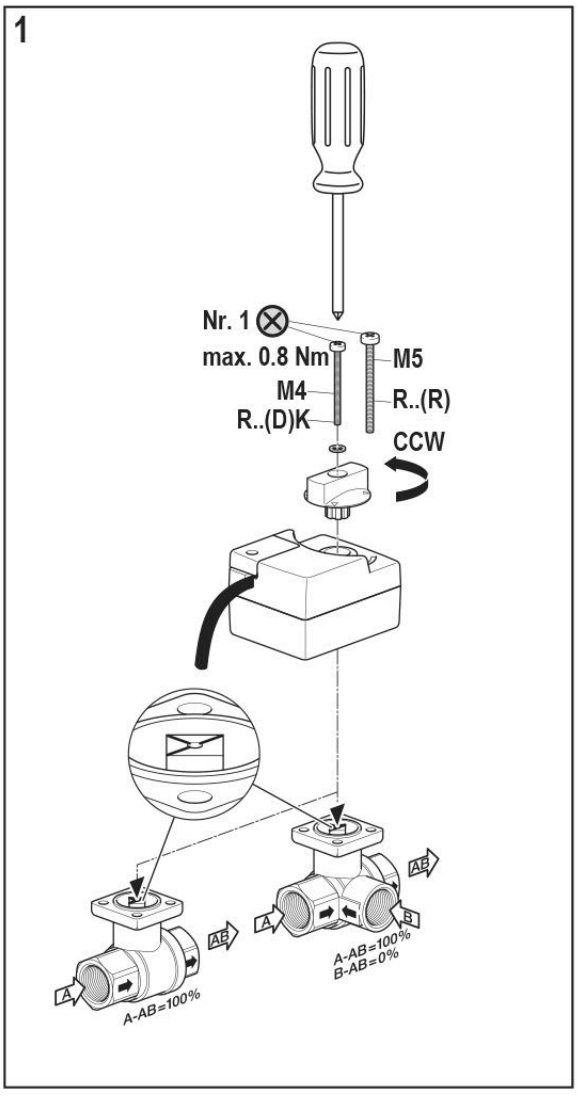


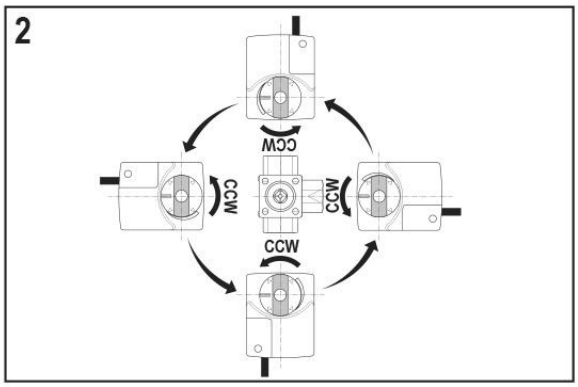


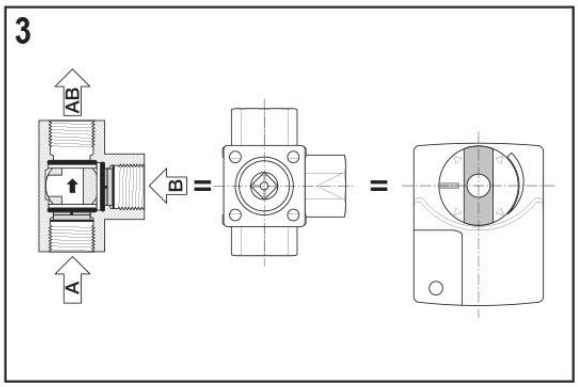


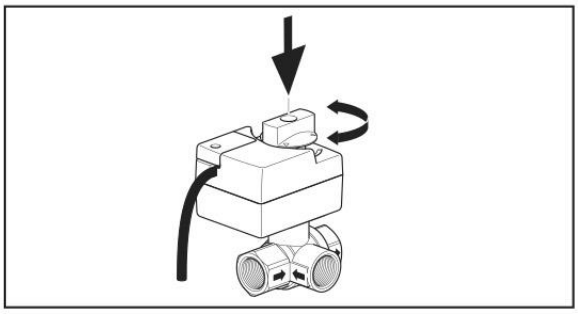
TR SERVOMOTOR FOR WATER FLOW CONTROL VALVE



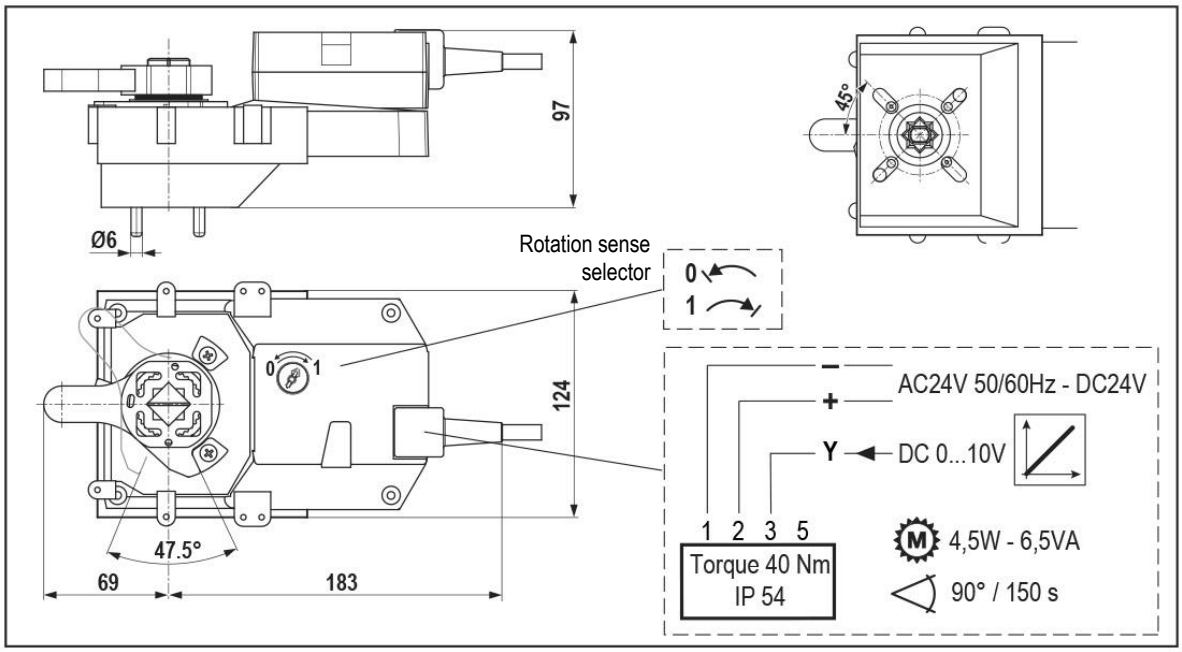


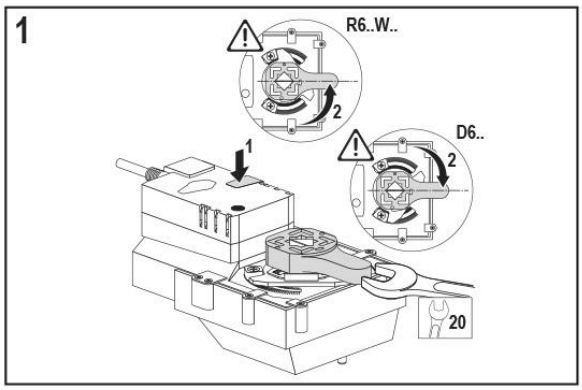


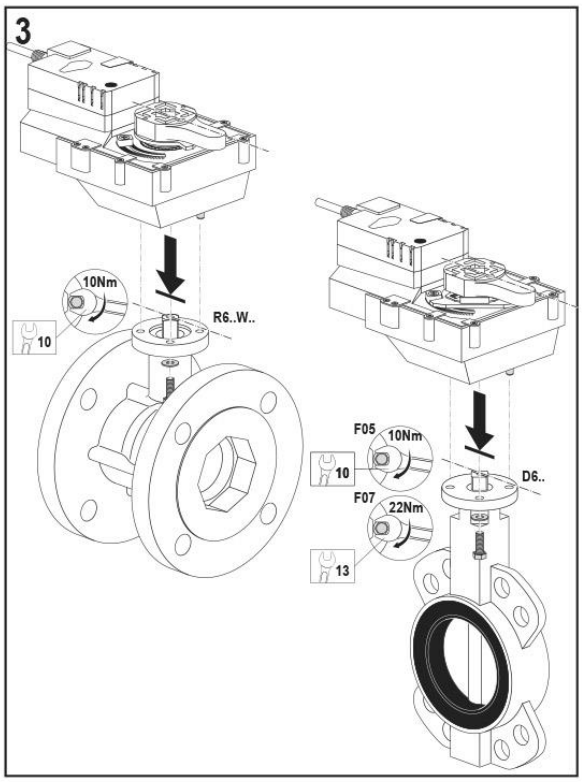


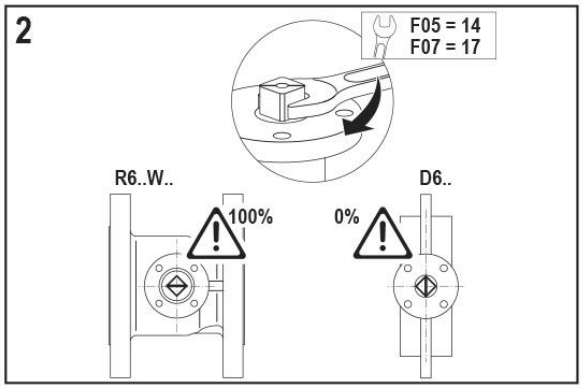


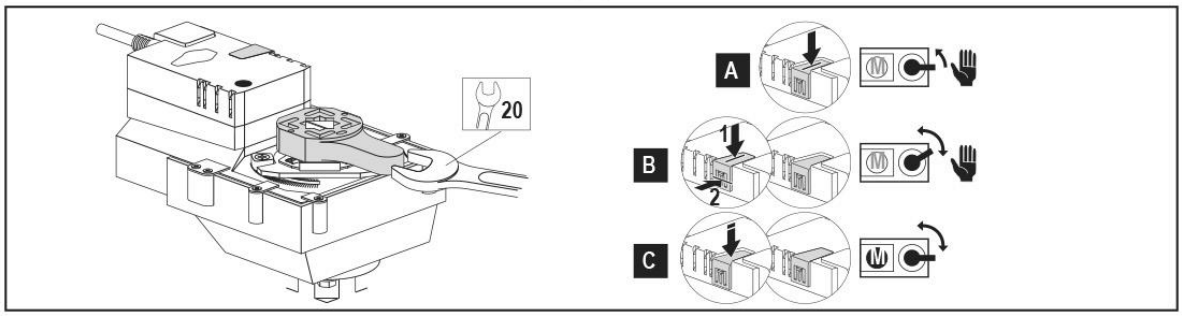
GR SERVOMOTOR FOR WATER FLOW CONTROL VALVE











Dimensions in millimetres

2.11.4 WATER FLOW CONTROL VALVE

2-way ball valves for the water flow control in the following hydraulic circuit:

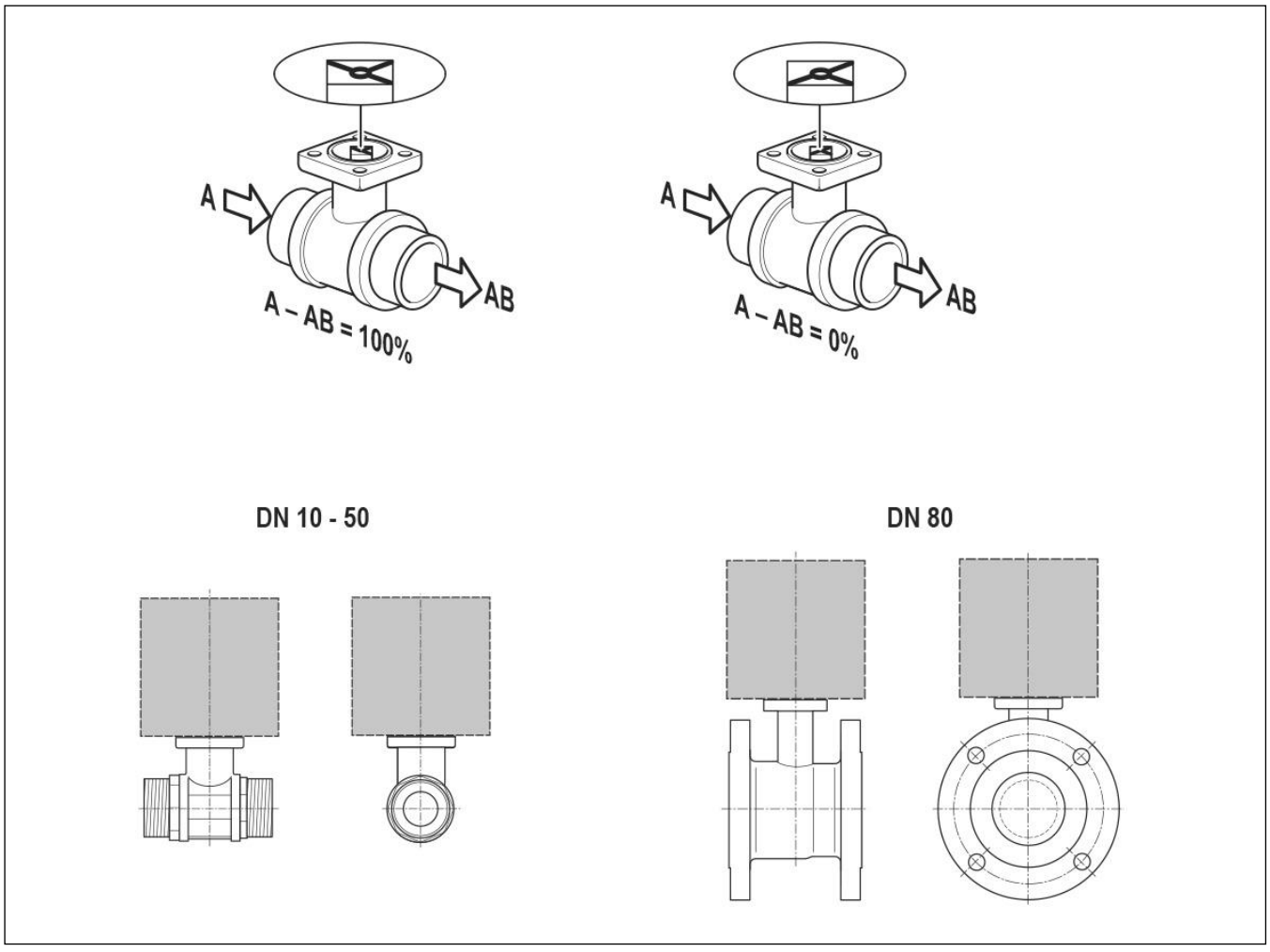
- Chilled water circuit for cooling
- Hot water circuit for heating
- Condensing water circuit for machine series DW

CHARACTERISTICS

The valve opens by rotating counter clockwise and closes by turning clockwise.
Characterizing disk with an equal-percentage flow characteristic.
Leakage rate Class A
Self-cleaning
Maintenance free

FLOW DIRECTION

Follow the flow direction indicated by the arrow on the body, otherwise the ball valve may be damaged. Make sure the ball is in the correct position.



INFORMATION
Turn off the pumps in the circuit and close the valves (allow to cool if necessary and reduce the pressure in the system to the atmospheric one).

2.11.5 PRESSURE INDEPENDENT WATER FLOW CONTROL VALVE WITH WATYER FLOW METER

The system includes:

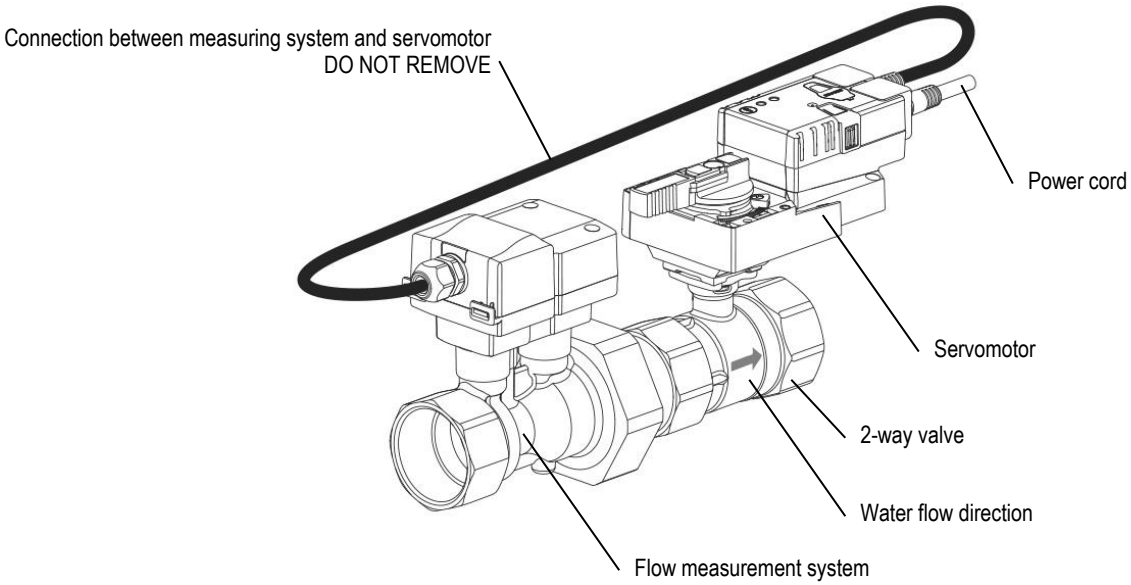
- Pressure independent 2-way ball valve
- Servomotor for valve control
  Flow measurement system with infrared volumetric sensor

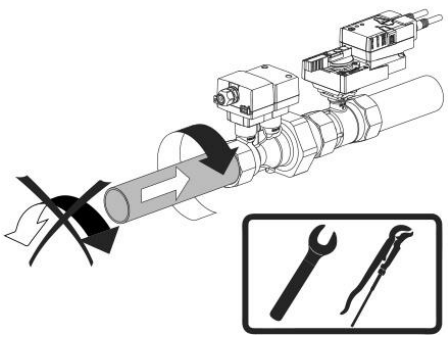
CHARACTERISTICS
The valve opens by rotating counter clockwise and closes by turning clockwise.
Characterizing disk with an equal-percentage flow characteristic.
Leakage rate Class A
Self-cleaning
Maintenance free

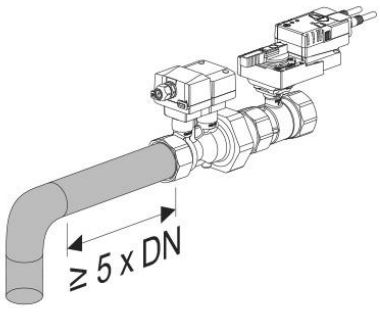
FLOW DIRECTION
Follow the flow direction indicated by the arrow on the body, otherwise the ball valve may be damaged. Make sure the ball is in the correct position.

The valve is an accessory and replaces the normal 2-way valve installed on the machine.

MANDATORY
Do not disconnect the connection between the servomotor and the flow measurement system.
The system cannot be repaired and may need to be completely replaced.







3 PRE-COMMISSIONING

3.1 PRE-COMMISSIOING OF THE MACHINE

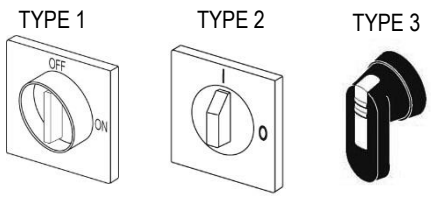
Before contacting the specialized Engineer, who will execute the commissioning for testing, the Installer must carefully check that the installation conforms to the requirements and specifications laid-down during the design stage, making sure:

- that the electrical connection is correct and that it is designed to guarantee compliance with the current Electromagnetic Compatibility Directive.
- that the refrigerant connection to the remote condenser is ended correctly (DX machine);
- that there are no leaks in the refrigerant circuit;
- that the hydraulic connection to the heat exchangers is ended correctly;
- that the hydraulic plant is filled with liquid under pressure
- that the pumping systems are functioning;
- that all shutoff valves are open.

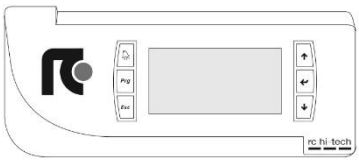
For DX and DW direct expansion machines: at least 2 hours before the arrival of the specialized Engineer, turn on the compressor oil preheater, as follows.

1. Check that the system's master switch is in the ON position.
2. Open the switchboard external door and turn the door locking switch to OFF and open the switchboard internal door.
3. Turn the magnetic switches of supply fans, compressors, electric heaters and humidifier OFF.
4. Turn the magnetic switch that supplies the auxiliary circuits ON. To identify this switch, consult the "Wiring Diagram".
5. Close the internal door and turn the door locking switch ON.
6. If these operations have been carried out properly, the microprocessor's display must be ON.
7. Close the external door.

DOOR LOCK MAIN SWITCH



MICROPROCESSOR DISPLAY



INFORMATION
Microprocessor displays alarms (supply fans thermal relay, humidifier, air flow loss etc, etc) because the automatic switches are off and related components are not active

8. Press Alarm key to disable the sound signal.

4 COMMISSIONING

4.1 COMMISSIONING OF THE MACHINE

The commissioning must be carried out by a specialized Engineer, in the presence of the Installer and the expert Operator.
The specialized Engineer will test the plant, carrying out checks, calibrations and the commissioning according to the applicable procedures and his competence.
The expert Operator must address questions to the specialized Engineer to obtain adequate notions, so as to carry out the checks and applications pertaining to him.
After the first days of operation, please check the hydraulic circuit's gauze filters and clean them, if necessary.

4.2 CALIBRATION AND TUNE-UP PROCEDURES

Upon the commissioning of the machine, after any failure or replacement, upon any ordinary or extraordinary maintenance jobs, the operation checking devices could need a re-calibration or tune-up:

- Expansion valve calibration (DX and DW machines);
- Air flow calibration;
- Water flow calibration (CW machine);
- Refrigerant circuit calibration (DX and DW machines);
- Humidifier calibration (accessory);
- Microprocessor calibration.

4.3 COMMISSIONING DX MACHINES

1. Verify free spaces for maintenance and safety distances.
2. Check air flow.
3. Measurement of electrical absorption of the fans and comparing the value with what is reported in the technical bulletin.
4. Switching on the 1st compressor.
5. Check SUPPLY VOLTAGE: Check that the mains voltage is +/- 10% of the machine nominal value.
6. POWER FACTOR correction: The power factor (cosφ) must be compatible with the recommendations of the main manufacturers of electric motors for compressors (between 0.9 and 0.93). It is necessary to avoid over-compensation.
7. Check the ROTATION SENSE OF THREE-PHASE MOTORS: Check the direction of rotation of the three-phase motors. If it is wrong, reverse two phases on the general door lock switch. Reverse rotation is identifiable by an abnormal compressor noise and may cause the breaking of the compression system.
8. Check of PHASE BALANCING: Check the balance between the phases that must not exceed 2%. In the case contact the electricity distribution company to solve the problem.
9. Measurement of the electrical absorption of the compressors by comparing the value with the information reported in the technical bulletin.
10. Switch on the next compressor and repeat the procedure as in step 5.
11. With the machine at full power, measure evaporation pressure values, condensation pressure, compressor suction temperature, discharge temperature, overheating, subcooling.
12. Check the compressor oil level.
13. Check for refrigerant leaks.
14. Check pressure drop on filter drier.

4.4 COMMISSIONING CW MACHINES

1. Verify free spaces for maintenance and safety distances.
2. Check air flow.
3. Measurement of electrical absorption of the fans and comparing the value with what is reported in the technical bulletin.
4. Check SUPPLY VOLTAGE: Check that the mains voltage is +/- 10% of the machine nominal value.
5. POWER FACTOR correction: The power factor (cosφ) must be compatible with the recommendations of the main manufacturers of electric motors for compressors (between 0.9 and 0.93). It is necessary to avoid over-compensation.
6. Check of PHASE BALANCING: Check the balance between the phases that must not exceed 2%. In the case contact the electricity distribution company to solve the problem.

4.5 CALIBRATION AND TUNE-UP

4.5.1 EXPANSION VALVE CALIBRATION (DX AND DW MACHINES);

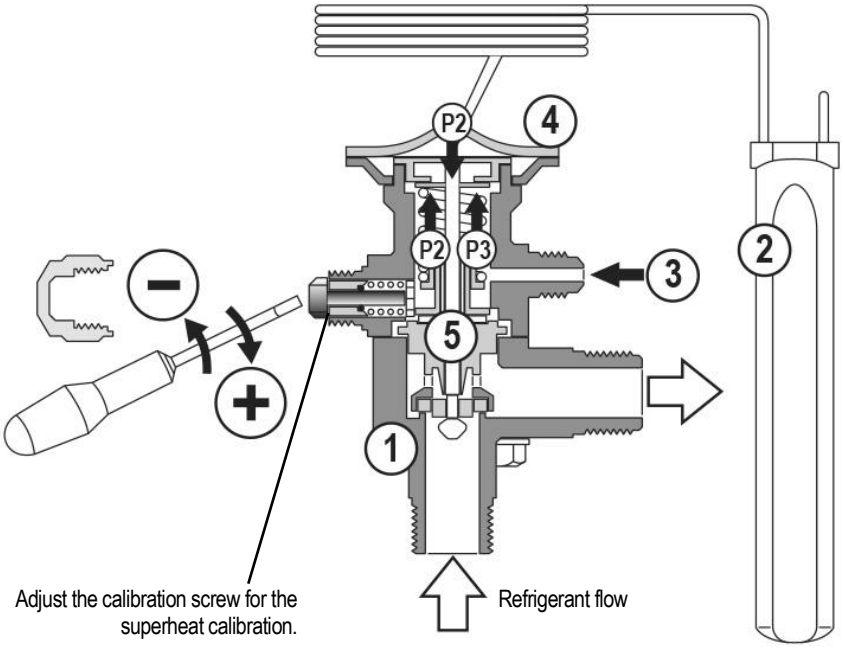
The purpose of the tune-up is to calibrate the refrigerant flow through the valve to ensure that the evaporation process is completed in the evaporator and there is no liquid.
The parameter on which the adjustment is performed is overheating.

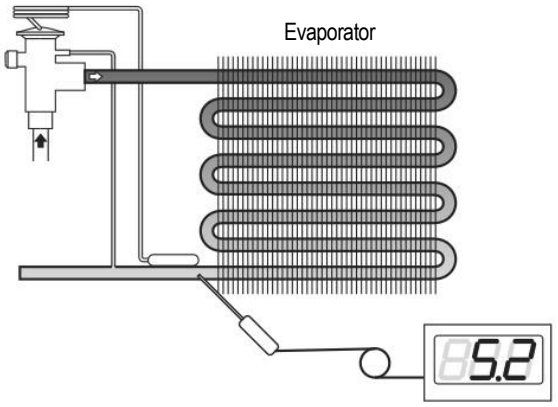
- High overheating: evaporation ends before the end of the evaporator and the refrigerant flow through the valve is insufficient. This causes a reduction in cooling capacity: increase the opening of the valve.
- Reduced overheating: evaporation does not end at the end of the evaporator and a certain amount of liquid is still present at the evaporator outlet: decrease the valve opening.

The calibration of the expansion valve must guarantee a superheat value between 5 and 8K.

MECHANICAL EXPANSION VALVE CALIBRATION

1 Valve body
2 Bulb on suction line on the outlet of the evaporator
3 Evaporation pressure inlet on suction line on the outlet of the evaporator
4 Power element
5 Valve orifice
P1 Pressure of the bulb (2) open the valve
P2 Evaporating pressure (3) close the valve
P3 Pressure of the spring - close the valve





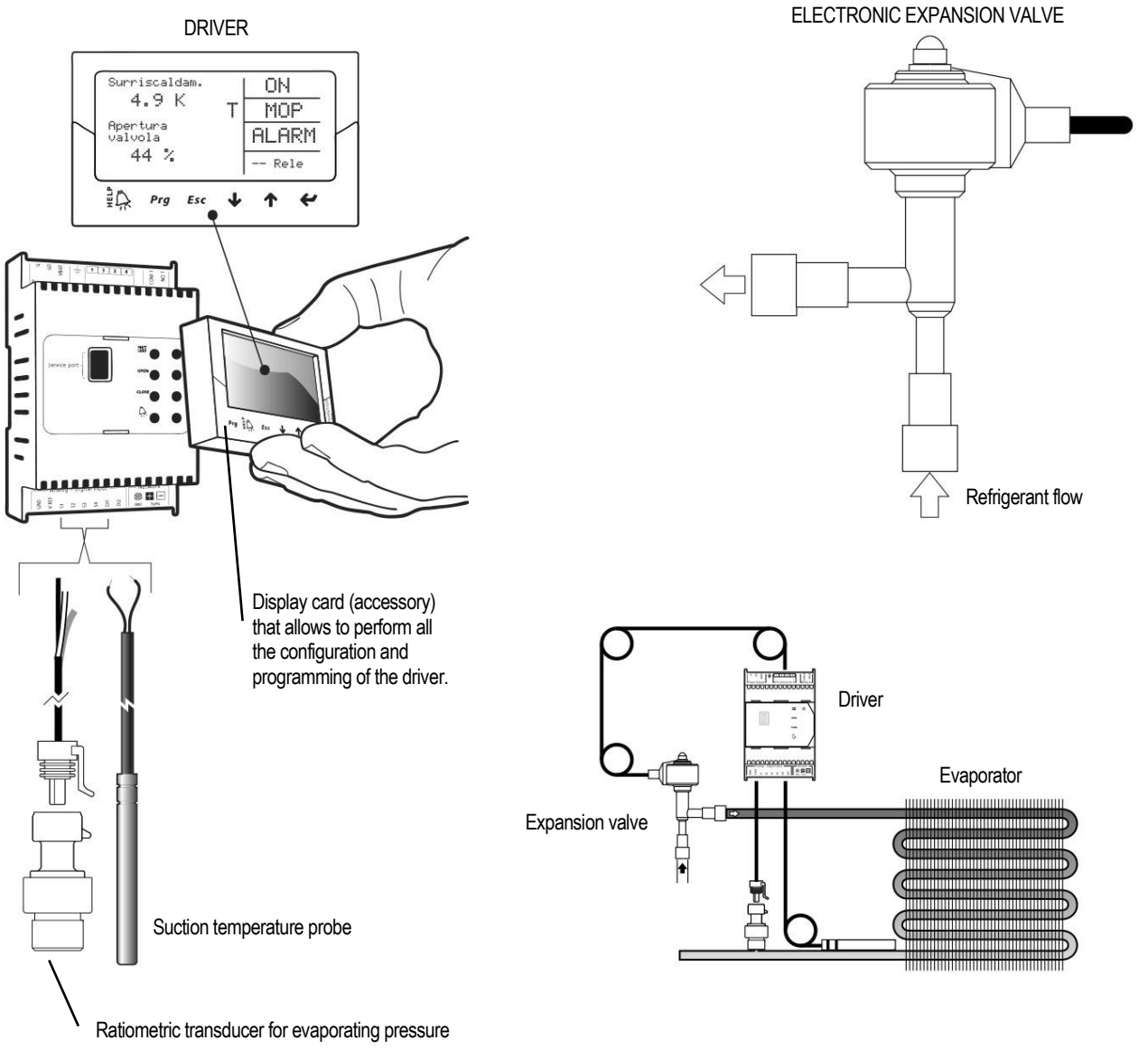
Overheating is measured on the pipe at the outlet of the evaporator as shown in the figure.
A digital contact thermometer can be used.
Overheating is measured in degrees Kelvin (K).

MANDATORY
An incorrect calibration can cause a return of liquid to the compressor and consequent breaking of the compression system.
The calibration must be carried out by qualified personnel and with the machine running at full power

ELECTRONIC EXPANSION VALVE CALIBRATION
The calibration of the electronic expansion valve takes place via software through the display board (accessory) to be applied to the valve driver.
The control is of PID type (Proportional, Integral, Derivative):

- Proportional: controls the reaction speed of the valve
- Integral: controls the time and drive the valve in proportion to the distance of the superheat value from the set point.
- Derivative: counteracts sudden changes in overheating temperature.

The nominal data and operating values are shown on the display board.
It is possible to access the calibration parameters only by entering the MANUFACTURER password.



MANDATORY
An incorrect calibration can cause a return of liquid to the compressor and consequent breaking of the compression system.
The calibration must be carried out by qualified personnel and with the machine running at full power

4.5.2 AIR FLOW CALIBRATION

Calibration of the air flow can be carried out using a dedicated software by the fan manufacturer. To be requested to SERVICE.

4.5.3 WATER FLOW CALIBRATION FOR CHILLED WATER MACHINES (SERIES w-NEXT, w-NEXT2 AND NEXT X TYPE)

The water flow can be calibrated by installing a calibration / balancing valve in the hydraulic circuit.

5 HOW TO USE

5.1 INFORMATION TO USE

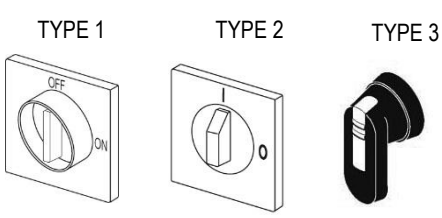
The day-to-day use of the plant does not require the Operator's presence: he must intervene to conduct periodical checks, in an emergency or to carry out the foreseen start-up and stop stages.
The regular and constant execution of these jobs will allow the machine and the plant to deliver proper performance over the time.

INFORMATION
Failure to comply with the procedures may cause malfunction of the machine/plant, and consequent deterioration.

5.2 CONTROLS DESCRIPTION

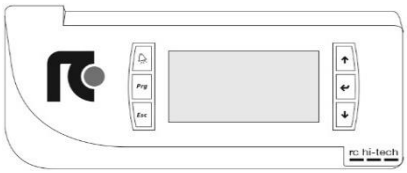
The various controls are shown below, as well as their description and function. These controls are positioned on the switchboard.

DOOR LOCK MAIN SWITCH



Door lock main switch: opens and closes the power circuit.
- OFF (0) position: the machine is not powered.
- ON (I) position: the machine is powered.

MICROPROCESSOR DISPLAY



Microprocessor: controls the working process and allows the parameter setting and the monitoring the working conditions.

For the details of operation of the machine and interfaces, the User Manual is available

5.3 EMERGENCY STOP

Considering that there are no directly accessible moving parts in the machine, there is no need to install an emergency stop device.
In any case, this device, if installed, would not reduce the risk since the emergency stop would be identical to the normal stop using the main switch.

5.4 PROLONGED SHUTDOWNS OF THE MACHINE

If the machine must remain off-duty for a long time (e.g. seasonal shutdown), the specialized Engineer must:
- check the pressure vessels' state of preservation
- conduct the leak test on the system
- open the line isolator
- close the chilled water shutoff valves
- drain the chilled water from the piping of the hydraulic circuits.

MANDATORY
RISK OF FREEZING FOR DRY COOLER
In the event of downtime during the winter season, take precautions to avoid the icing of the plants water

5.5 START-UP AFTER PROLONGED SHUTDOWN

Before starting the machine, carry out all the maintenance jobs.
Moreover, the specialized Engineer must carry out adequate checks, calibrations and the start-up procedure.

6 MAINTENANCE

6.1 MAINTENANCE INFORMATION

MANDATORY
Maintenance, both ordinary and extraordinary, must be performed by AUTHORIZED AND COMPETENT PEOPLE equipped with all the necessary personal protective equipment.
The site where the machines are installed will have to meet all the safety requirements
It is also necessary to follow the procedures indicated by the Manufacturer

Before carrying out any maintenance operation it must be done:

- isolate the machine from the electrical network by acting on the yellow / red switch located on the electrical panel door, prepared for the insertion of padlocks, for blocking in the "open" position;
- place a sign saying, "Do not operate - maintenance in progress" on the disconnecting switch open;
- use appropriate personal protective equipment (for example: helmet, insulating gloves, protective goggles, safety shoes, etc.);
- equip yourself with tools in good condition and make sure you fully understand the instructions before using them;

If controls or checks are required with the machine in operation, it is necessary:

- make sure that any remote-control systems are disconnected; keep in mind, however, that the PLC on board the machine controls its functions and can activate and deactivate the components, creating dangerous situations (such as for example powering fans and their mechanical drive systems);
- operate as little time as possible with the electrical panel open;
- close the electrical panel as soon as the individual measurement or control is carried out;

The following precautions must always be taken:

- the refrigerant circuit contains pressurized refrigerant gas: any operation must be carried out by competent personnel with the authorizations or qualifications required by the laws in force;
- never disperse the fluids contained in the refrigeration circuit to the environment;
- never keep the refrigerant circuit open, as the oil absorbs moisture and degrades;
- during venting operations, protect against possible fluid leaks at dangerous temperatures and / or pressures;
- when replacing electronic boards, always use suitable equipment (extractor, antistatic bracelet, etc.);
- in case of replacement of a motor, compressor, coils or any other heavy element, make sure that the lifting elements are compatible with the weight of the device;
- do not access the fan compartment without first having isolated the machine by means of the disconnecting switch on the panel board and having placed a sign saying, "Do not operate - maintenance in progress"";
- always use only original spare parts purchased directly from the Manufacturer or from official dealers;
- before closing the machine and restarting it, make sure to remove all tools or foreign bodies.

The list of scheduled maintenance operations is shown in the next paragraph of this manual.
For each intervention, both ordinary and extraordinary maintenance, a special form must be drawn up to be kept by the user.
If the Scheduled Ordinary Maintenance notebook is present on board the machine, all operations must also be noted in it.

6.2 SCHEDULED MAINTENANCE

Carry out all the scheduled maintenance jobs at the indicated intervals.

INFORMATION
Failure to perform scheduled maintenance will void the warranty rights and any manufacturer's responsibility in the field of safety

The schedules for the ordinary maintenance are indicated in the tables on the following pages
To “read” the hours of operation, they are to be displayed on the microprocessor’s display.

6.3 TABLE OF GENERAL MAINTENANCE JOBS

		INTERVAL		
	OPERATIONS TO BE DONE	Every day	Beginning of season every 500 hours every 2 months	Beginning of season Every 1000 hours every 3 months
Expert Operator	Checking of any alarms	●		
	External visual checking for any leak	●		
	Checking the outlet water temperature	●		
	Checking the hydraulic circuit filters		● (1)	
	Visual/lacks checking of pressure vessels – water side		●	
Engineer	Cleaning of the machine coil			Once a year
	Cleaning of the remote condenser coil.			Once a year
	Checking antifreeze heaters for heat exchangers / pipes (if present)			●
	Checking the wear status of contactors (compressor, fans, etc)			●
	Checking electrical connections			●
	Checking and eventually replacing worn or damaged cables			●
	Checking noise of the fan bearings			●
	Checking the nuts and bolts, moving parts and / or subject to vibrations (egg anti-vibration system for compressors)			●
	Checking for any leak in the refrigerating circuit.			●(3)
	Checking the presence of oxidized areas on the refrigerant circuit paying particular attention to the pressure vessels			●
	Verification of the integrity and validity date of the safety valves			●
	Checking condition of flexible pipes and capillaries			●
	Control and possible replacement of the filter driers on the liquid line			Once a year

Engineer	**Checking the operating parameters of the refrigeration circuits.** In each circuit check the following:			
	Condensing pressure compared to outdoor temperature (DX) Or built-in condenser water outlet temperature (DW)			●
	Evaporation pressure compared with supply air temperature			●
	Suction gas temperature The suction superheated gas temperature Discharge gas temperature The subcooled gas temperature Liquid temperature			●
	Ambient air temperature			●
	Overheating Subcoolig			●
	Electric absorption of the compressors 3phases (L1-L2-L3)			●
	Electric absorption of the fans 3phases (L1-L2-L3)			●
	Air delivery and return temperature			●
	Operation and calibration of pressure switches for minimum and maximum safety (if present)			●
	The line voltage on the three phases The supply voltage of the compressors The supply voltage of the fans Insulation resistance The absorbed current at full load and in partialization			●
	The working hours of the components The numbers of starts of components			●
	Check compressor status as specified in the next chapter			●

		INTERVAL		
	OPERATIONS TO BE DONE	Every day	Beginning of season every 500 hours every 2 months	Beginning of season Every 1000 hours every 3 months
Engineer	**Checking the operating parameters of the hydraulic circuits.** In each circuit check the following			
	The calibration and correct functioning of the flow switch (if present)			●
	Water flow control and exchanger cleaning status. See next chapter			●
	Water quality control for condensation with well water or tower water			●(2)
	Control of the concentration of glycol solution (if present)			●

(1) Every 50 hours in the first month of operation.
(2) During the first year of operation, checks are recommended every 4 months, which can be reduced every six months starting from the second year of operation.
(3) Unless otherwise required by applicable laws

The frequency of the operations described in the table above is to be considered indicative. In fact, it can undergo variations depending on the mode of use of the machine and the system in which the latter is required to operate.

6.4 TABLE OF MAINTENANCE JOBS ON FULLY-HERMETIC SCROLL COMPRESSORS

Every 1000 h or 3 months
Check the oil level (if the gauge glass is present)
Checking for any vibration and noise
Checking of the motor insulation
Checking of regulations and safety devices
Checking for leaks

MANDATORY
At each refrigerant substitution also change the oil. At each refill of refrigerant or intervention on the refrigerant circuit, verify the oil and motor insulation

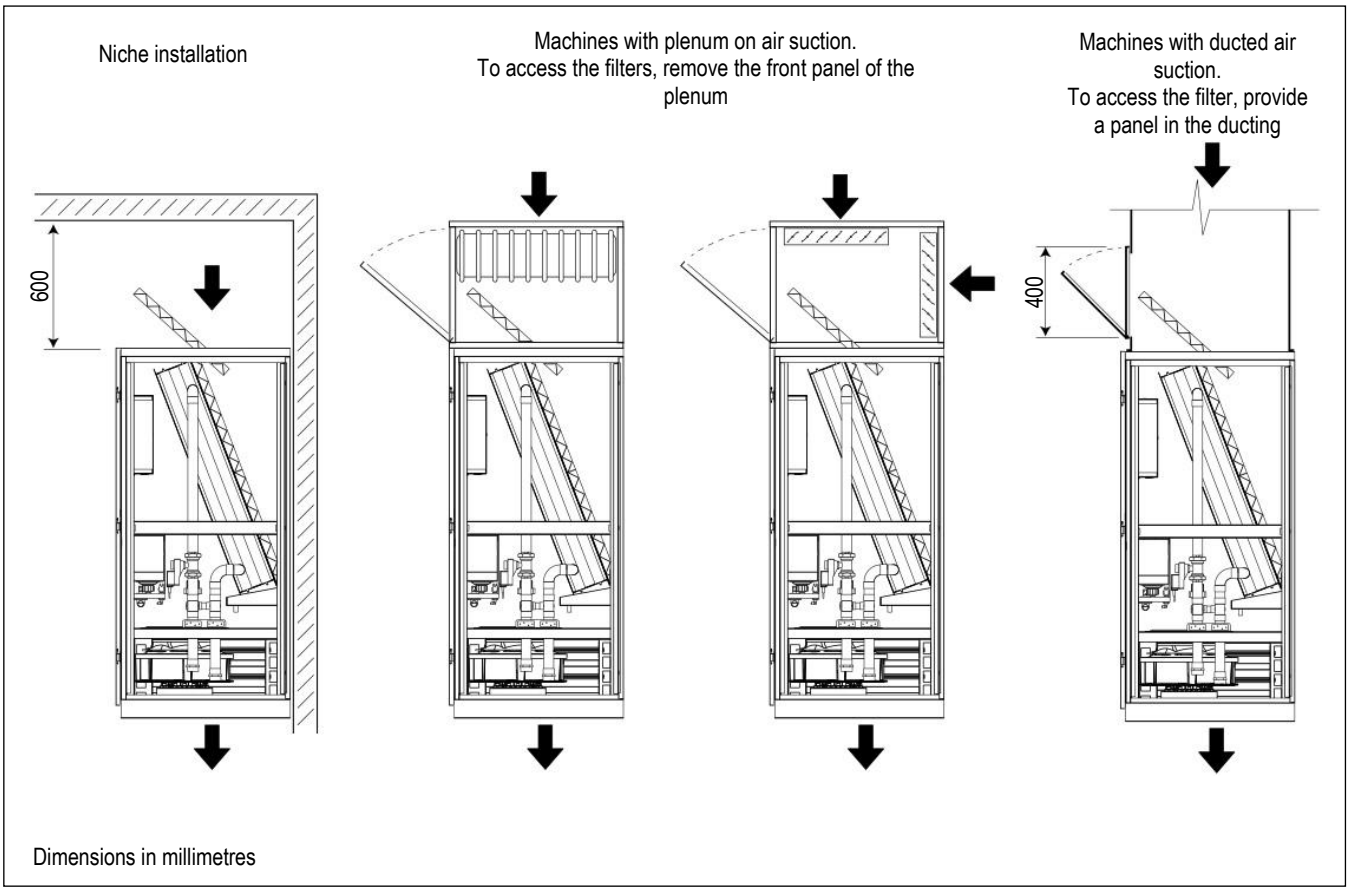
6.5 CHECKING OF THE WATER FLOW AND CLEANING OF THE EXCHANGERS

The variation in the flow rate in the exchangers can be caused by the presence of dirt in filters, by pump wear or wrong manoeuvres, as well as by the presence of fouling inside the exchangers.
In this case, a chemical wash with suitable products must be carried out.

6.6 CLEANING AND / OR REPLACING THE AIR FILTERS

Air filters access:

- version w-NEXT OVER: front access for all machines
- version w-NEXT DL: front access for all machines
- version w-NEXT 2: front access for all machines
- version NEXT X TYPE: front access for all machines
- version w-NEXT UNDER: front access for machines E0, E1, E2, E3;
  access from the top side for the remaining machine size, as shown in the figure.



6.7 EXTRAORDINARY MAINTENANCE

If any extraordinary maintenance jobs are necessary, contact an After-Sales Service authorized by the manufacturer.

INFORMATION
Failure to comply with the foregoing will void the warranty rights and any responsibility of the Manufacturer in the field of safety

MANDATORY
If necessary, use only original spare parts (see "List of recommended spare parts")

7 OPTIONAL

MANDATORY
All assembly, positioning and maintenance operations must be carried out with adequate means and by skilled personnel, trained and authorized for this type of manoeuvres.

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.

Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again.

For electrical connections, refer to the electrical diagram of the machine

MANDATORY
Any maintenance and / or replacement operations on the refrigerant circuit must be carried out by qualified personnel.

All work must be carried out in accordance with the "GOOD RULE", according to the current regulations in force in the various countries, taking into account the operating conditions and the uses to which the plant is destined.

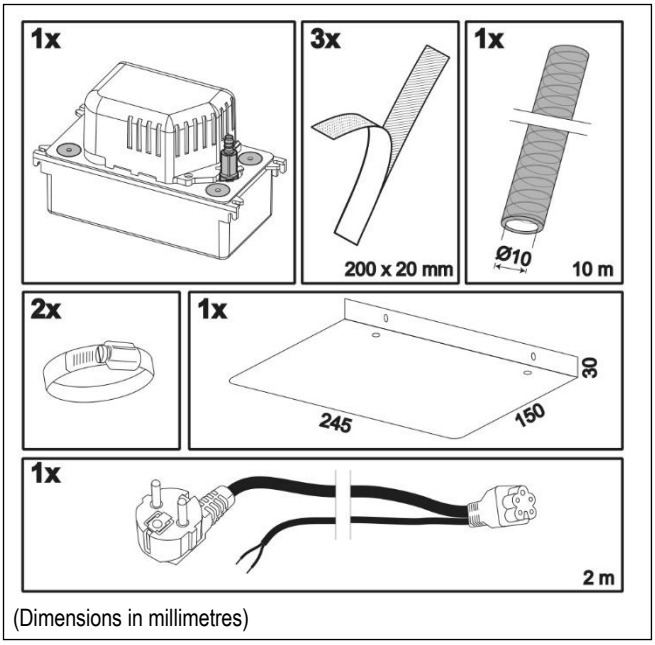
INFORMATION
Design errors and / or errors in the cooling circuit can cause irreparable compressor failure or malfunctions

7.1 CONDENSATE DISCHARGE PUMP KIT

The pump if supplied in mounting kit.

The kit includes:

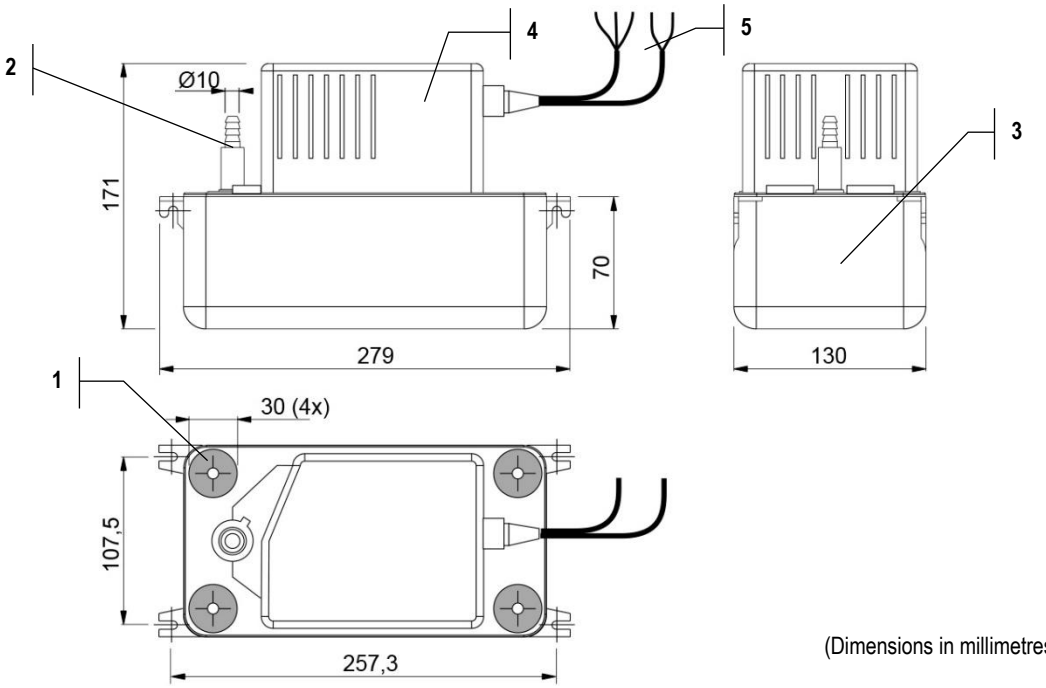
- Centrifugal pump with check valve on water discharge
- Adhesive Velcro strip for fixing
- Anti-crushing spiral hose – internal diameter Ø 10 mm
- Hose clamps in stainless steel
- Metallic support
- Electrical connection with European plug (Schuko) for electric power supply and bipolar cable for alarm signalling.
- Plug-in plug for quick connection to the pump



(Dimensions in millimetres)

The pump must only be used with water.
Pump operation is only intended for indoor environments.
The pump must not be immersed and / or placed in humid environments and must be protected from frost.
In case of faults, in particular if the power cord is damaged, any intervention must be carried out by suitably qualified persons, in order to avoid any risk.

TECHNICAL DATA



(Dimensions in millimetres)

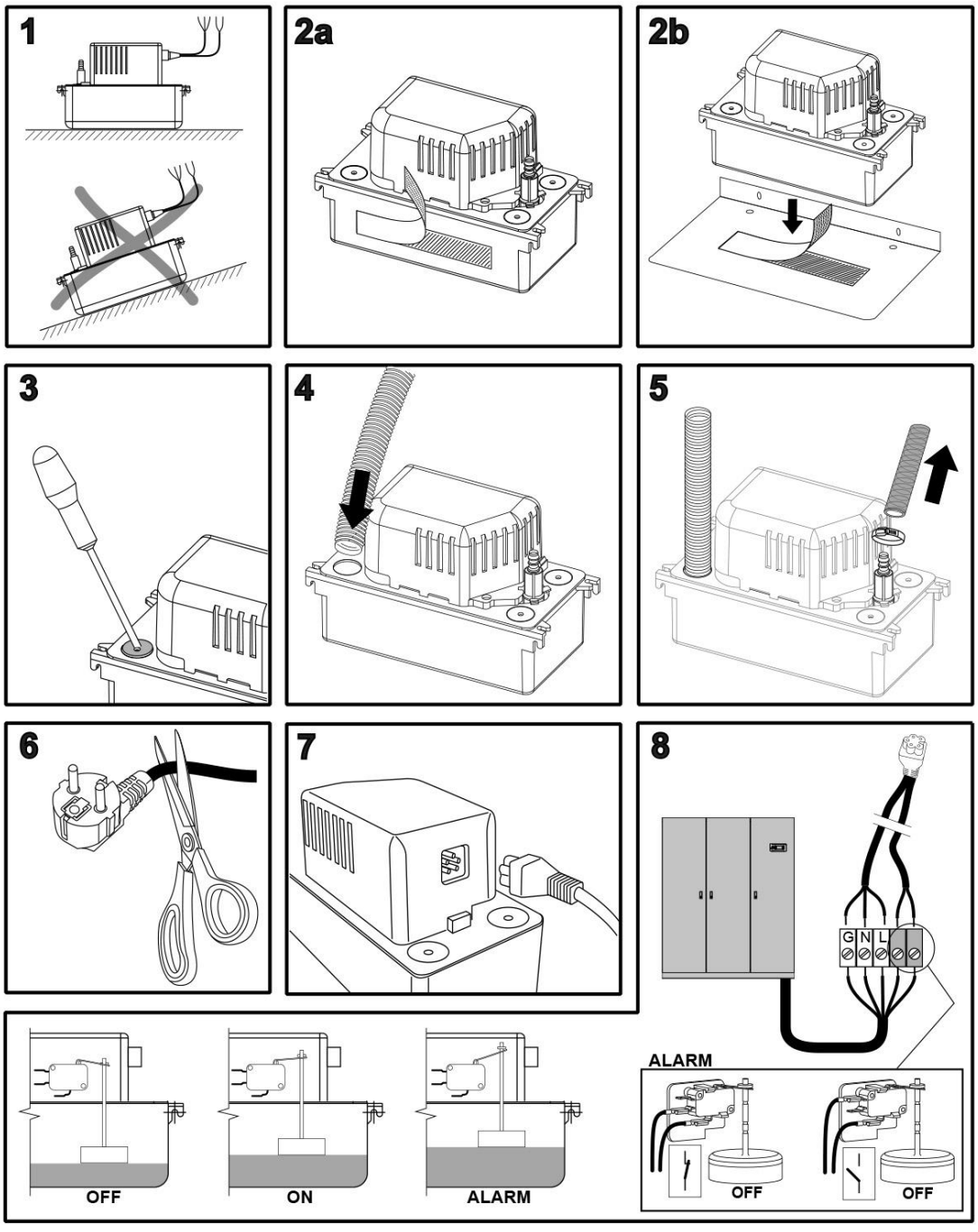
Power supply: 230V~ 50Hz
Electrical data: 70W – 0,67A
Safety contact: NC 8A resistive - 250V
Max water flow: 500 l/h
Maximum head: 5.0 m
Sound level: 45dBA a 1 m
Max water temperature: 70°C
Water acidity: pH>2.5
Pan volume: 2.0 l
Degree of protection IP 20
Safety norms: CE - EAC
Complies with Directives: RoHS – RAEE

1 n. 4 holes Ø 30 mm for condensate inlet.
2 Check valve on condensate discharge.
3 Pan
4 Pump motor and alarm switch
5 Electrical connection cables

INSTALLATION

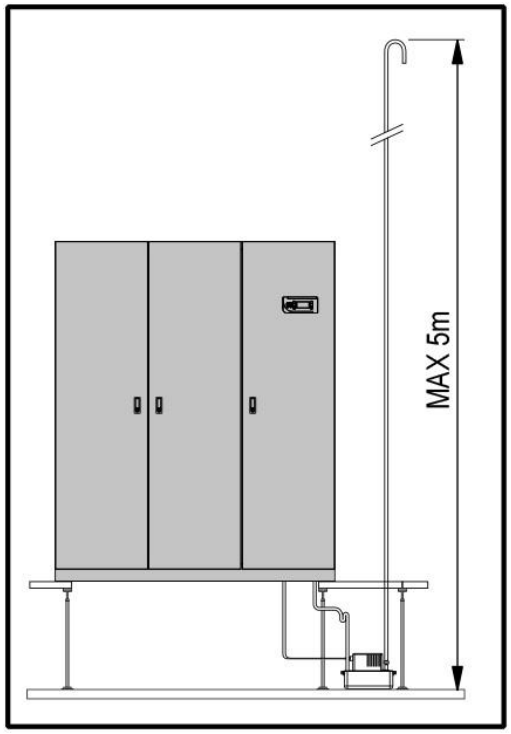
1 Be sure to install the pump horizontally to prevent condensation overflow
2 Use the supplied Velcro or metal support for attachment
3 Use the condensation inlet hole best suited to the installation
4 Insert the condensate drain pipe of the machine
5 Connect the spiral hose to the check valve and secure it with the supplied clamp. The check valve prevents the return of condensation into the pan
6 Prepare the electric connection.
7 Connect the plug-in plug to the pump
8 The machine is equipped with a 5x0.75mm2 cable already connected to the terminal board for the connection to the pump.
The GNL + ALARM terminals for the connection between the machine cable and the pump cable are not provided.

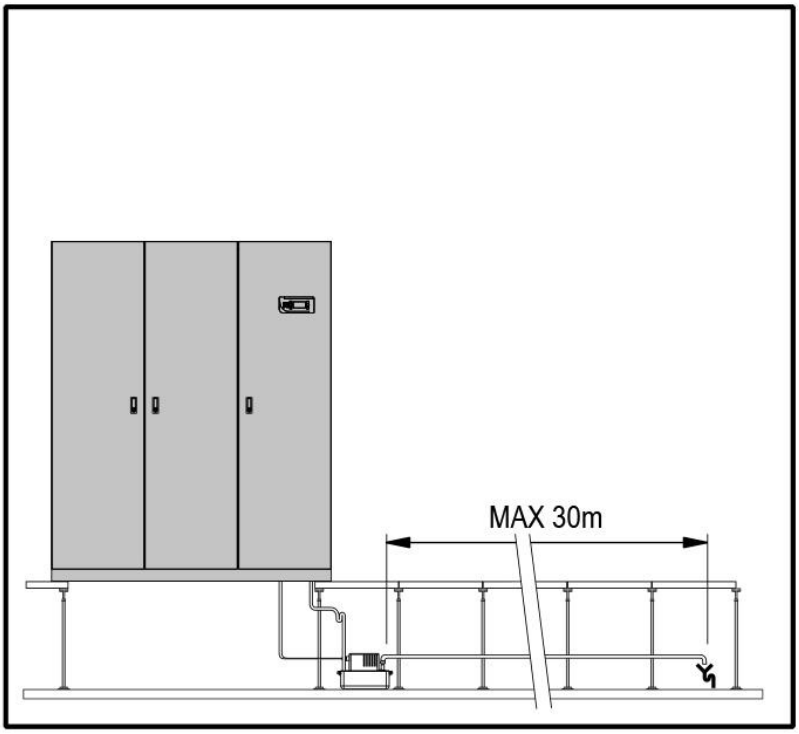
Check if the alarm contact meets the system needs; the contact is supplied NC (Normally Closed). The microswitch is contained inside the pump.

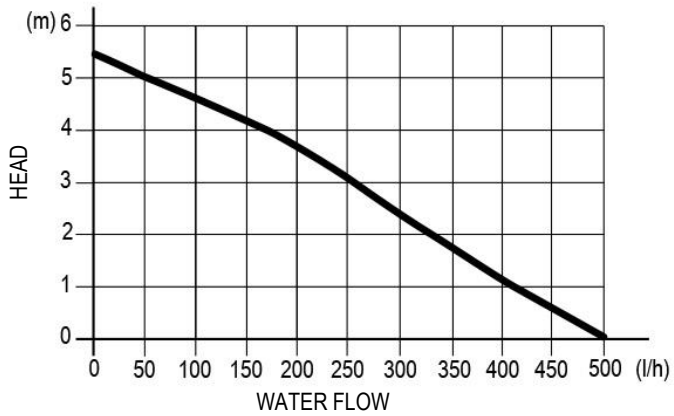


OFF: Pump stopped
ON: Pump running and condensate drain
ALARM: Alarm condition for overflow

WORKING LIMITS







Real water flow l/h

	Max length of discharge pipe (Ø 10 mm)			
Head	5m	10m	20m	30m
1m	380	300	240	190
2m	310	260	200	150
3m	240	200	145	110
4m	150	130	80	60
5m	30	20	0	0

FUNCTIONAL CHECKS

Pour water into the condensate collection try of the machine and check that the pump activates and stops when the water level has been lowered.
To verify the operation of the safety contact, continue to pour water until the alarm is triggered.

CLEANING

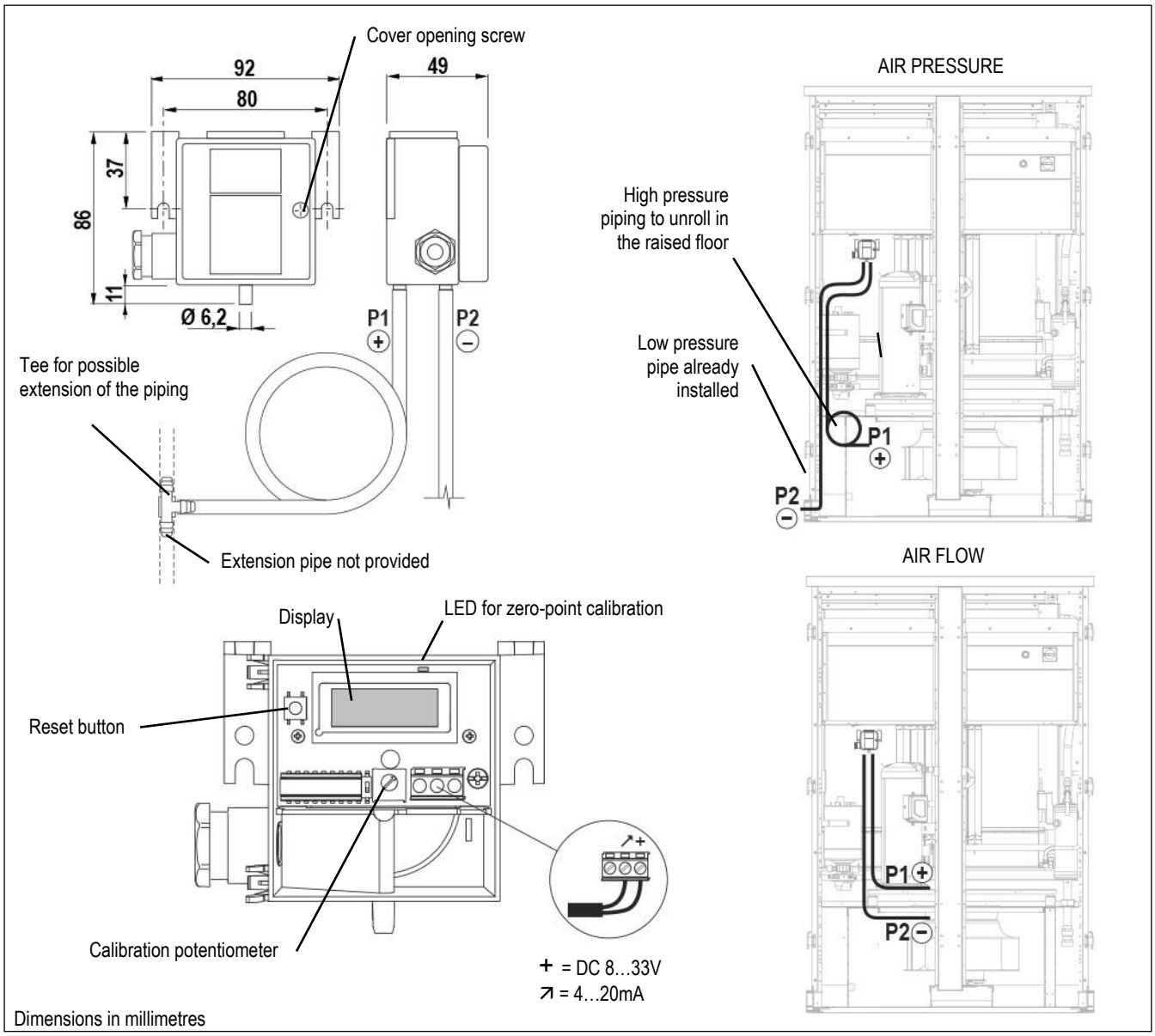
DANGER: before any intervention make sure that the pump is not electrically connected.
The pump must be cleaned regularly.
Remove the pump pan and clean it with a detergent.
Check that the float remains clean.
Reposition the pan and check again the correct operation of the pump and of the safety contact.

7.2 CONTROL OF THE AIR PRESSURE OR AIR FLOW

The accessory is installed in the front of the machine. The system controls the fan rotation speed so as to maintain constant air pressure or air flow. Only one control, or pressure or flow rate, can be performed.

CHARACTERISTICS	
Power supply	DC 8...33V
Power cord	max 1,5 mm2
Output signal	4 … 20 mA
Measurement range:	
minimum = 4 mA:	0 Pa – With root extraction 100 Pa
maximum = 20 mA:	100 Pa – air pressure 1000 Pa – Air flow
Degree of protection	IP 54
Operating temperature	0 … 70°C
Max humidity	< 90% UR non- condensing

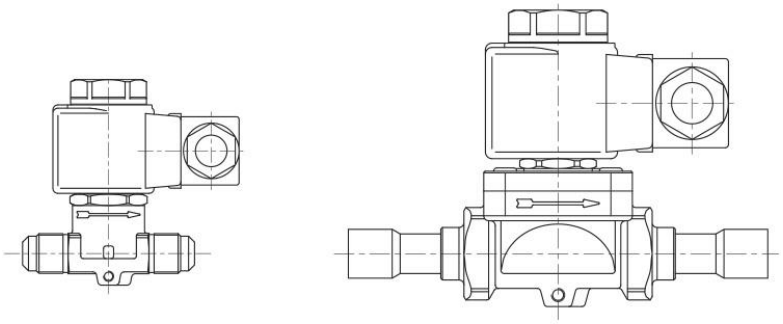
- Install the sensor in a vertical position.
- If the pressure connection fittings are pointing upwards or are lower than the pressure relief piping, condensation can accumulate inside the sensor causing damage to the device.
- Do not crush the pressure relief plastic hoses
- Plastic hoses must have large curves to facilitate pressure relief
- The device can be installed horizontally. In this case it is necessary to reset the device using the appropriate button for more than 2 seconds until the LED lights up.



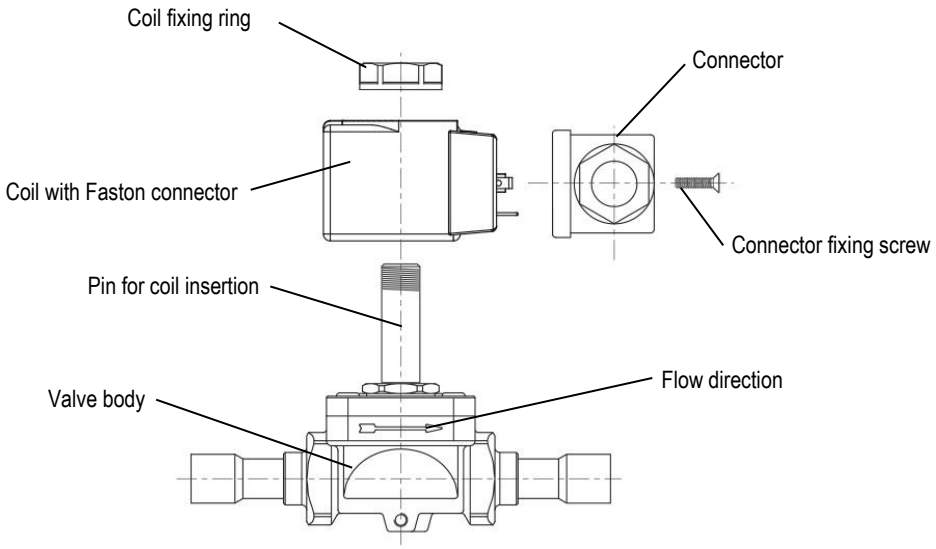
7.3 SOLENOID VALVE FOR LIQUID LINE

The valve is normally closed and when energized the valve opens by connecting input with output.

The valves can have the connections type SAE or ODS (solder).

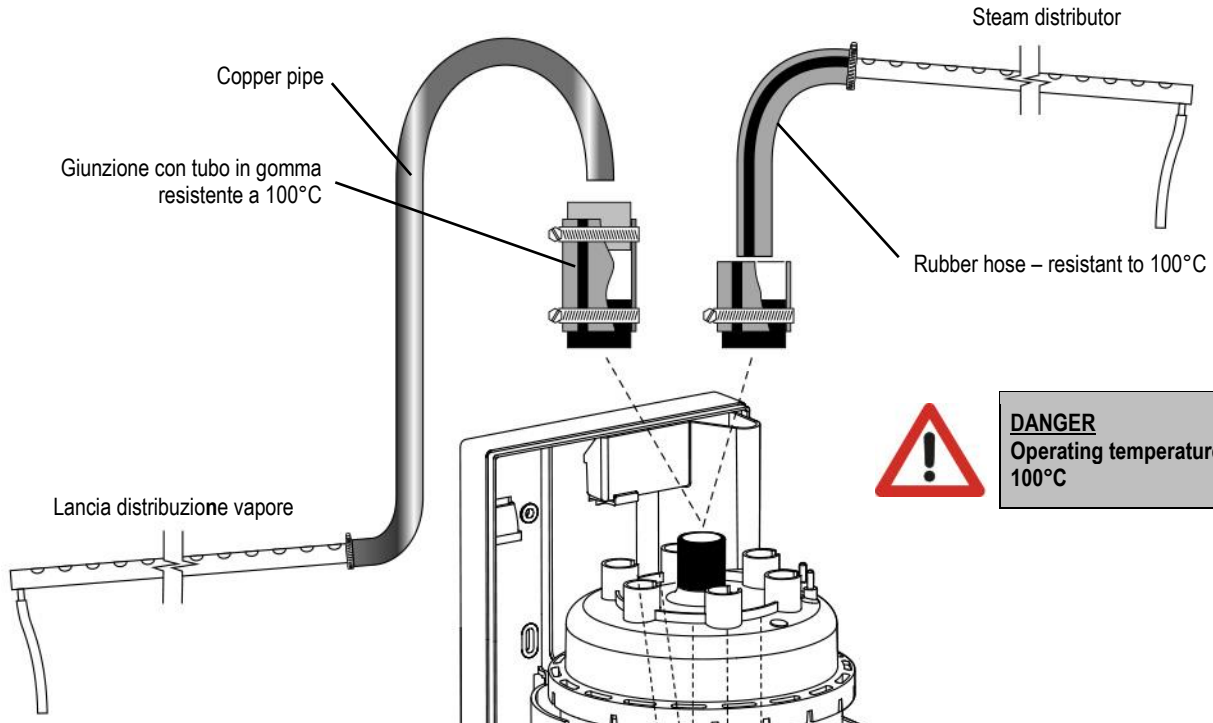


SAE connection ODS connection



7.4 PROPORTIONAL STEAM HUMIDIFIER

The accessory includes the combined air temperature / humidity probe and the system management control.
The accessory is mounted at the factory and requires only hydraulic connection for water loading.

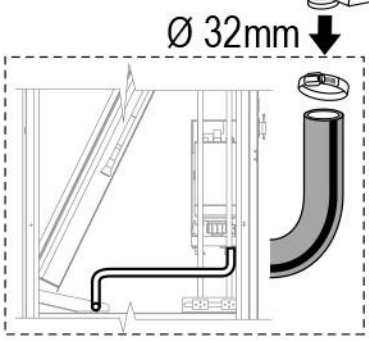


DANGER
Operating temperature up to 100°C

This humidifier produces unpressurised steam by means of electrodes immersed in the water contained in the cylinder.

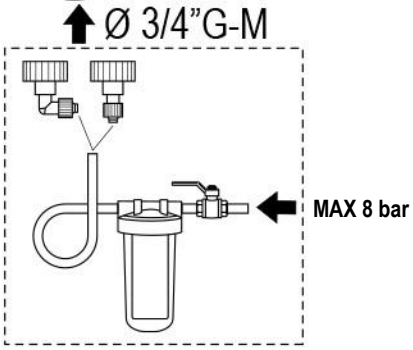
Wastewater is not toxic and can be drained into the white-water collection system.

For joints and drainage use a rubber hose resistant to temperatures of 100°C



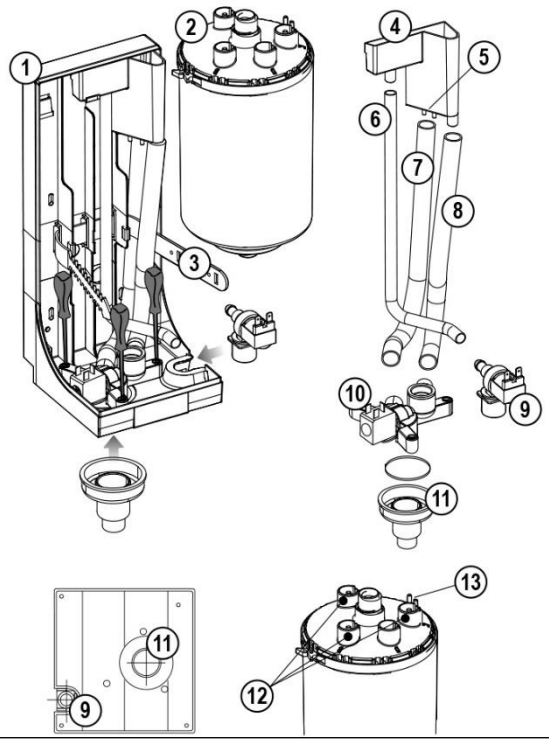
NOT SUPPLIED:
- Drainage rubber hose Ø 32 mm
- Hose clamp

Direct the waste water into the condensate collection tray of the machine



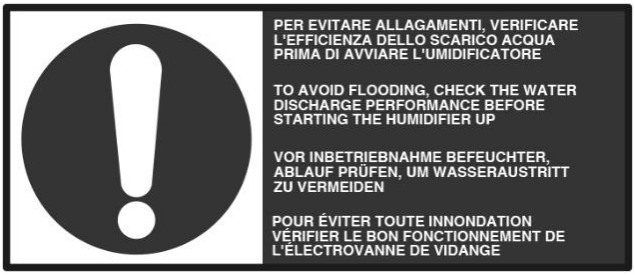
NOT SUPPLIED
- Water supply:
  - Humidifier Ø 3/4" G-M
  - Water filter Ø 6/8mm
- Water supply hose - Ø 6mm internal / Ø 8 mm external
- Mechanical water filter for impurities.
- Tap

7.4.1 HUMIDIFIER



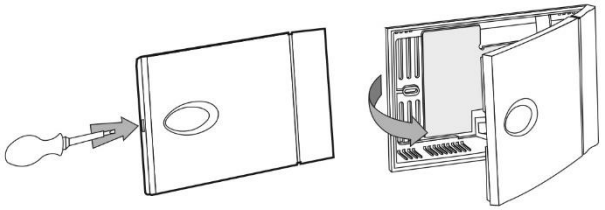
1. Load-bearing frame
2. Steam cylinder
3. Cylinder strap
4. Supply tank and overflow
5. Water conductivity meter
6. Fill hose
7. Overflow pipe
8. Cylinder fill hose
9. Fill solenoid valve – Ø 3/4" GM
10. Drain solenoid valve and supply / drain assembly
11. Drain connector Ø 32mm
12. Electrode electrical connection
13. Overflow and foam sensor

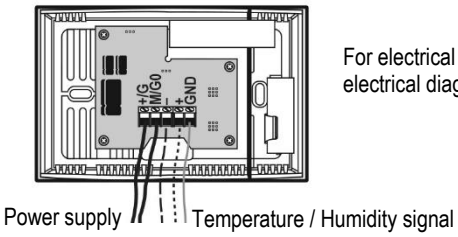
Caution sticker on the steam cylinder.



7.4.2 TEMPERATURE / HUMIDITY COMBINED PROBE

The probe is installed on the air intake of the machine and is connected to the main controller.





For electrical connections, refer to the electrical diagram of the machine

7.4.3 HUMIDIFIER CONTROL BOARD

The control board is connected to the main controller and is contained in the electrical panel of the machine.
All the electrical components of the humidifier are connected to the board.
The device is equipped with signalling LEDs:
RED: alarm
YELLOW: Steam production
GREEN: Voltage presence

For electrical connections, refer to the electrical diagram of the machine

7.4.3.1 Characteristics of the water

The quality of the water used affects the evaporation process for which the humidifier must be supplied with untreated water, drinkable and not demineralized.

	CONDUCTIVITY		MEDIUM-HIGH		MEDIUM-LOW	
			Min	Max	Min	Max
Hydrogen ions	pH		7	8,5	7	8,5
Specific conductivity at 20°C	$\sigma_{R,\ 20\ °C}$	µS/cm	300	1250	125	500
Total dissolved solids	TDS	mg/l	(1)	(1)	(1)	(1)
Dry residue at 180°C	R_{180}	mg/l	(1)	(1)	(1)	(1)
Total hardness	TH	mg/l $CaCO_3$	100 (2)	400	50 (2)	250
Temporary hardness		mg/l $CaCO_3$	60 (3)	300	30 (3)	150
Iron + Manganese		mg/l Fe + Mn	0	0,2	0	0,2
Chlorides		ppm Cl	0	30	0	20
Silica		mg/l SiO_2	0	20	0	20
Residual chlorine		mg/l Cl^-	0	0,2	0	0,2
Calcium sulphate		mg/l $CaSO_4$	0	100	0	60
Metallic impurities		mg/l	0	0	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0	0	0

1. Values depending on specific conductivity;
   in general: TDS ≅ 0,93 * σR, 20 °C; R180 ≅ 0,65 * σR
2. Not lower than 200% of the chloride content in mg/l di Cl-
3. Not lower than 300% of the chloride content in mg/l di Cl-

DANGER

- **USE ONLY WITH DRINKING WATER.**
- **IT IS STRICTLY FORBIDDEN TO USE WATER FROM WELL, INDUSTRIAL OR COMING FROM COOLING CIRCUITS AND, IN GENERAL, WATER POTENTIALLY POLLUTED (CHEMICALLY OR BACTERIOLOGICALLY).**
- **DO NOT ADD DISINFECTANT SUBSTANCES OR ANTI-CORROSIVE COMPOUNDS IN WATER, AS POSSIBLE IRRITANT;**
- **There is no reliable relationship between hardness and water conductivity.**
- **Do not carry out water treatments with water softeners! This can cause corrosion of the electrodes and lead to foaming, with potential problems of service irregularities.**

7.4.3.2 Preliminary checks before start-up

Before starting the humidifier, check that:

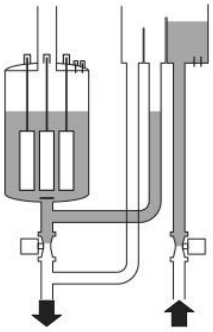
- the humidifier is in perfect conditions, that there are no water leaks and that the electrical parts are dry. Do not apply voltage if the humidifier is damaged or even partially wet!
- the water and electrical connections and the steam distribution system have been completed according to the instructions contained in this manual;
- the water shut-off tap to the humidifier is open;
- the line fuses are installed and intact / the magnetothermic protection switch is in the ON position.
- Jump on terminals AB of the CP control board.
- the steam outlet pipe is not choked.

7.4.3.3 Starting

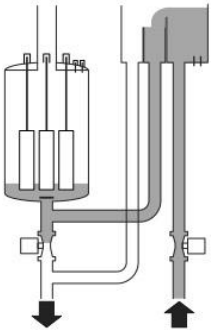
Starting with empty cylinder: This phase will be performed automatically when the unit is started: the rated production will be reached after a certain time (this time depends considerably on the conductivity of the supply water and may last even a few hours).

After one hour of operation: Both for disposable cylinders and for openable cylinders, check for the absence of significant water leaks.

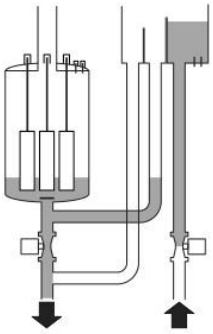
7.4.3.4 Working logic



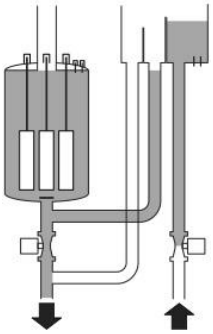
STEAM PRODUCTION
The filling / draining solenoid valves are closed.
The electrodes are electrically powered and steam is produced.
Steam production is controlled by adjusting the water level in the boiler.



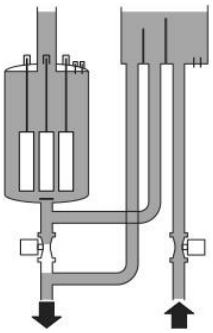
WATER FILLING
The water filling is automatic and is deducted by the operating current of the electrodes.
The fill solenoid valve opens by filling the water loading tank.
The conductivity of the water is measured in the load compartment.
The water enters the cylinder through the loading hose.
The electrodes are electrically powered during the water loading phase.



WATER DRAIN
The water drain is automatic and is activated cyclically by the system.
The drain solenoid valve opens by emptying the cylinder.
The electrodes are electrically powered during the water discharge phase to check the water level.
Once the drain cycle has been completed, the filling cycle described above is activated.



DRAIN DUE TO OVERFLOW
The activation of the overflow drain is deduced from the system via the tank level sensors.
The electrodes are electrically powered during the water drain phase to check the water level.
Once the drain cycle has been completed, the filling cycle described above is activated.



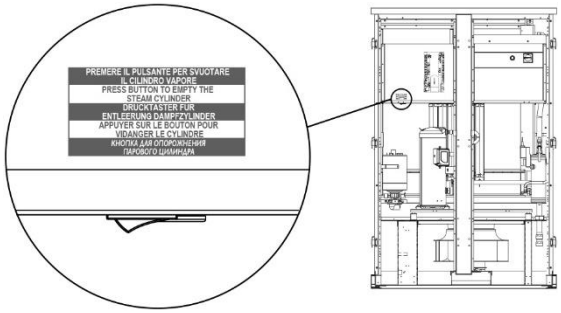
FAILURE OF THE FILLING SOLENOID VALVE
In the event of failure of the water filling solenoid valve (continuous water load), the system provides a safety drain as shown in the figure.

7.4.3.5 Button for manual water drain

To access the drain button, open the front panels of the machine.

The manual drain button is located under the electrical panel of the machine as shown in the figure.

The button directly controls the drain solenoid valve.



7.4.3.6 Replacing the cylinder

DANGER
The cylinder could be hot. Let it cool before touching it or use protective gloves

To replace the cylinder:

- stop the machine using the on / off switch on the keypad with display.
- completely drain the water contained in the cylinder using the drain button located under the electrical panel of the machine.
- disconnect the machine from the mains by opening the power supply line disconnector (safety procedure);
- remove the steam tube from the cylinder;
- disconnect the electrical connections from the cylinder;
- release the cylinder from the fixing and lift for extraction;
- mount the new cylinder on the humidifier by performing the previous operations in reverse.

7.4.3.7 Cylinder maintenance

The life of the cylinder depends on a number of factors, including: the complete filling with lime scale and/or the partial or complete corrosion of the electrodes, the correct use and sizing of the humidifier, the output, and the quality of the water, as well as careful and regular maintenance. Due to the aging of the plastic and the consumption of the electrodes, even an openable steam cylinder has a limited life, and it is therefore recommended to replace it after 5 years or 10,000 operating hours.

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.
Before proceeding, the personnel must disconnect the power supply sources, making sure that no one inadvertently re-connects the power supply.
In case of leaks, switch off the humidifier before touching the cylinder as the water may be under tension.
Before working on the cylinder, make sure that the humidifier is isolated from the mains. Remove the cylinder from the humidifier only after it has been emptied completely.
Make sure that the model and the supply voltage of the replacement cylinder match the damaged one

7.4.3.8 Periodical check

Every fifteen days or no more than 300 operating hours

For both disposable and openable cylinders check operation, that there are no significant water leaks and the general condition of the container. Check that during operation there are no arcs or sparks between the electrodes.

Every three months or no more than 1000 operating hours

For disposable cylinders, check operation, that there are no significant water leaks and, if necessary, replace the cylinder; for openable cylinders, check that there are no markedly blackened parts of the container: if this is the case, check the condition of the electrodes, and if necessary replace them together with the O-rings and the cover gasket.

Annually or no more than 2500 operating hours

For disposable cylinders, replace the cylinder; for openable cylinders check operation, that there are no significant water leaks, the general conditions of the container, check that there are no markedly blackened parts of the container: if this is the case, check the condition of the electrodes, and if necessary replace them together with the O-rings and the cover gasket.

After five years or no more than 10,000 operating hours

For both disposable and openable cylinders, replace the cylinder.

After extended use or alternatively when using water with a high salt content, the solid deposits that naturally form on the electrodes may reach the stage where they also stick to the inside wall of the cylinder; in the event of especially conductive deposits, the consequent heat produced may overheat the plastic and melt it, and, in more severe cases, puncture the cylinder, allowing water to leak back into the tank.

As a precaution, check, at the frequency recommended further on, the deposits and the blackening of the wall of the cylinder, and replace the cylinder if necessary.

MAINTENANCE OF THE OTHER COMPONENTS IN THE WATER CIRCUIT

MANDATORY

- **when cleaning the plastic components do not use detergents or solvents;**
- **scale can have removed using a solution of 20% acetic acid and then rinsing with water.**
- **The steam humidifier has just one part that requires periodical replacement: the steam production cylinder. This operation is necessary when the lime scale deposits that form inside the cylinder prevent the sufficient passage of current. This situation is displayed on the controller by an alarm signal. The frequency of this operation depends on the supply water: the higher the content of salts or impurities, the more frequently the cylinder will need replacing**

Fill solenoid valve
After having disconnected the cables and the pipe, remove the solenoid valve and check the condition of the inlet filter; clean if necessary using water and a soft brush.
Supply and drain manifold
Check that there are no solid residues in the cylinder attachment, remove any impurities.
Check that the seal (O-ring) not is damaged or cracked; if necessary, replace it.
Drain solenoid valve / drain pump
Disconnect the power supply, remove the coil, unscrew the fastening screws and remove the valve body; remove any impurities and rinse.
Supply tank + conductivity meter
Check that there are no obstructions or solid particles and that the electrodes for measuring the conductivity are clean, remove any impurities and rinse.
Supply, fill, overflow pipes
Check that these are free and do not contain impurities; remove any impurities and rinse.

INFORMATION
After having replaced or checked the parts in the water circuit, check that the connections have been carried out correctly and the corresponding seals have been used. Re-start the unit and perform a number of fill and drain cycles (from 2 to 4), then, applying the safety procedure, check for any water leaks.

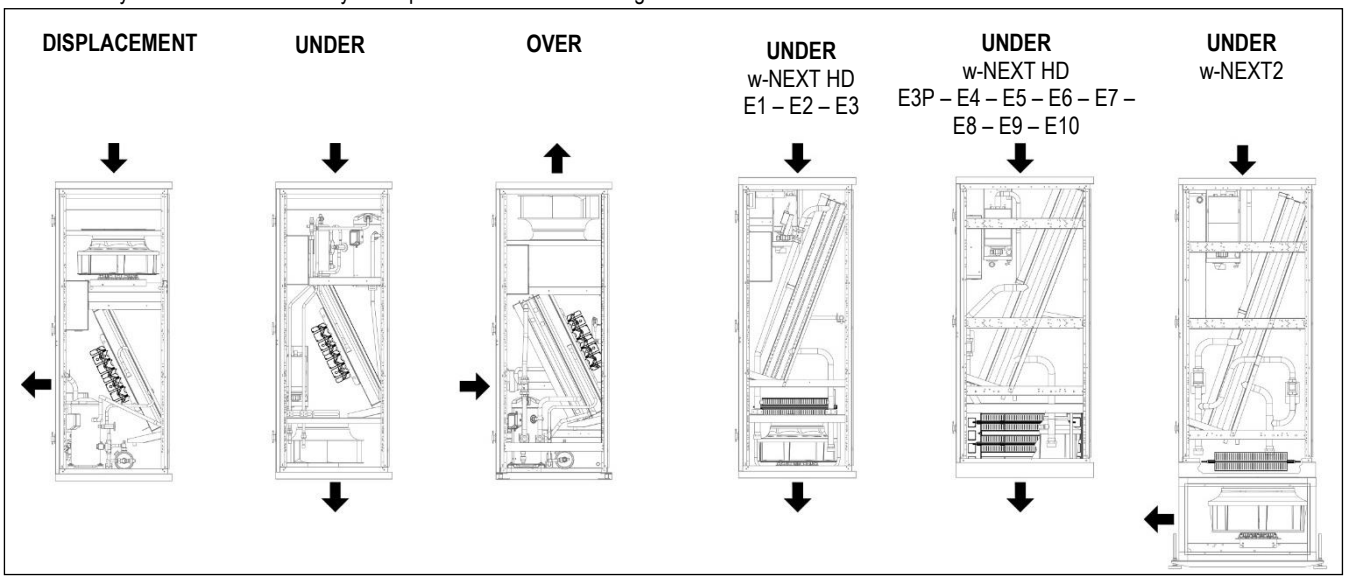
7.4.3.9 Troubleshooting …

PROBLEM	CAUSES	SOLUTION
The humidifier does not turn on	1. no electrical power supply; 2. controller connectors inserted incorrectly; 3. fuses blown; 4. transformer fault	1. check the protection device upstream of the humidifier and that the power supply is present; 2. check that the connectors are properly inserted in terminal block; 3. check fuses F1/F2/F3; 4. check that the voltage at the transformer secondary is 24Vac
The humidifier does not start operation	1. remote ON/OFF contact open (relay/terminals AB – AB) on CP controller 2. control signal not compatible with the type set	1. close the ON/OFF contacts (relay/terminals AB – AB) on CPY controller 2. check that the external signal is 0 to 10 V
The humidifier fills with water without producing steam	1. excessive backpressure in steam outlet; 2. cylinder inlet filter blocked; 3. lime scale in the supply tank; 4. drain solenoid valve fault	1. check that the steam outlet hose is not bent or choked; 2. clean the filter; 3. clean the supply tank; 4. check for abnormal voltage (24 Vac) at drain solenoid valve and/or replace the drain solenoid valve
The line thermal overload switch is activated	1. the thermal overload switch is undersized 2. excess current to the electrodes	1. check that the thermal overload switch is rated for a current equal to at least 1.5 times the rated current of the humidifier 2. check the operation of the drain solenoid valve, the seal of the fill solenoid valve when not energised, drain some of the water and re-start
The humidifier wets the coil	1. the steam distributor is not installed correctly; 2. the condensate return is blocked; 3. the system is oversized; 4. humidifier on when the fan is off	1. check that the steam distributor has been installed correctly; 2. decrease the steam production set on the controller; 3. check the connection of terminals AB - AB on the CPY controller
The humidifier wets the floor below	1. the supply or overflow circuit has leaks; 2. the steam outlet hose is not properly secured to the cylinder	1. check the entire water circuit; 2. check that the clamp on the steam outlet is tight

7.5 ELECTRIC HEATER

The accessory is installed downstream of the cooling coil.

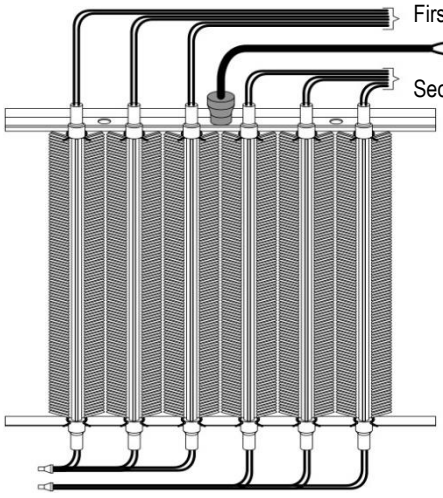
The accessory is mounted at the factory in the position as shown in the figure.



The electric heating system can be multi-stage depending on the size of the machine, as indicated below:

- ONE-stage heating – one set of heaters
- TWO-stages heating – two set of heaters
- THREE-stages heating – two set of heaters with binary activation

The safety thermostat interrupts the operation of the resistors for too high temperature. Intervention at 60°C



For the heating capacity of the system and the relative operating stages, refer to the technical bulletin of the machine.

7.5.1 ELECTRIC HEATER REPLACEMENT

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.
Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again

For electric heater replacement:

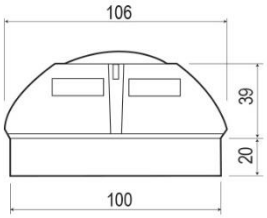
- stop the machine using the on / off switch on the keypad with display.
- switch off the machine by opening the power line disconnector;
- disconnect the electrical connections;
- Make sure that the model and the supply voltage of the new heater correspond to the damaged one.
- mount the new heater by performing the previous operations in reverse.

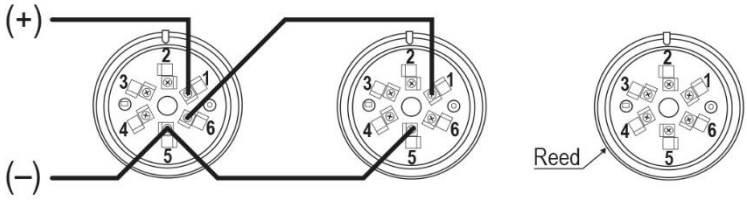
7.6 HOT WATER HEATING COIL (SEE CHAPTER HYDRAULIC CONNECTIONS)

7.7 SMOKE DETECTOR

The detector is supplied as an assembly kit.

The optical smoke detector reacts to the presence of products caused by combustion (visible fumes).
The operating principle is based on the light scattering technique (Tyndall effect).
The device complies with EN 54-7 regulations.





Dimensions in millimetres

PERIODIC TEST
Verify the correct functioning of the detector by means of a smoke generator (be careful not to damage or dirty the sensor).
An alarm simulation can be performed by activating the internal REED with a magnet, stimulating the base at the point indicated "REED" on the connection diagram.
WARNING: the REED test does not verify the correct functioning of the sensor but only the functionality of the alarm contact.

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.
Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again

TECHNICAL CHARACTERISTICS

Plastic body	ABS
Power supply	12...28 Vdc
Electric absorption - average	50µA - 24 Vdc
Electric absorption in alarm	25mA - 24 Vdc
LEDs visibility	360° (double LED)
Storing temperature	-10…+70°C
Operating temperature	-10…+70°C
Max air speed	0,2 m/s

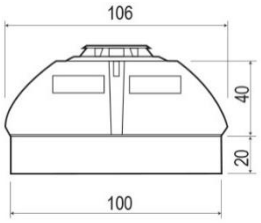
Relative humidity	<93% non-condensing
Degree of protection	IP 20
Magnetic test	Yes
Relay	max. 1A 30 Vdc
Signal relay	14mA - 24 Vdc
Controlled area:	40m^2 max
Shielded cable	min 0.5 mm^2
Colour	White

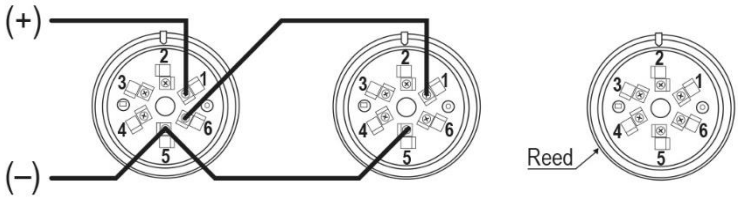
CLEANING
Clean the detector periodically with a blown compressed air jet inside the detection chamber.
Remove the detector by unscrewing the two screws and open the detection chamber.
After cleaning, re-assemble paying attention to the assembly of the bottom disc (match the inner REED with the number 4 stamped on the bottom).
Close the detector with the two screws without tightening excessively.

7.8 FIRE DETECTOR

The detector is supplied as an assembly kit.

The thermal detector reacts to the temperature that develops in a fire principle.
When the temperature exceeds the set threshold or when there is a rapid temperature change, an alarm is activated. The device complies with the EN 54-5 standard.





Dimensions in millimetres

PERIODIC TEST
Verify the correct operation of the detector by means of a heat generator (be careful not to damage or soil the sensor).
An alarm simulation can be performed by activating the internal REED with a magnet, stimulating the base at the point indicated "REED" on the connection diagram.
WARNING: the REED test does not verify the correct functioning of the sensor but only the functionality of the alarm contact.

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.
Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again

TECHNICAL CHARACTERISTICS

Plastic body	ABS
Power supply	12...28 Vdc
Electric absorption - average	50µA a 24 Vdc
Electric absorption in alarm	25mA a 24 Vdc
LEDs visibility	360° (double LED)
Storing temperature	-10…+70°C
Operating temperature	-10…+70°C
Relative humidity	<93% non-condensing

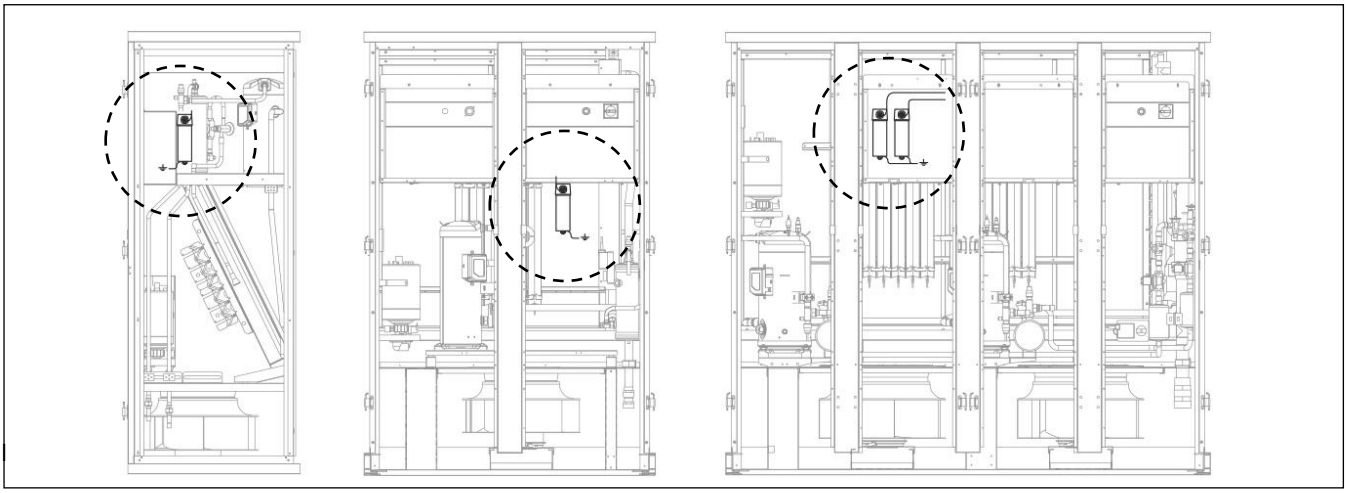
Degree of protection	IP 20
Magnetic test	Yes
Relay	max. 1A 30 Vdc
Signal relay	14mA a 24 Vdc
Alarm threshold	62°C
Controlled area:	40m^2 max
Shielded cable	min 0.5 mm^2
Colour	White

7.9 POWER FACTOR CORRECTION CAPACITOR FOR COMPRESSOR MOTORS

DANGER
WAIT 3 MINUTES WHEN THE POWER SUPPLY TO THE MACHINE IS REMOVED BEFORE ACCESSING WITHIN THE ELECTRIC PANEL AND THE POWER FACTOR CAPACITORS.

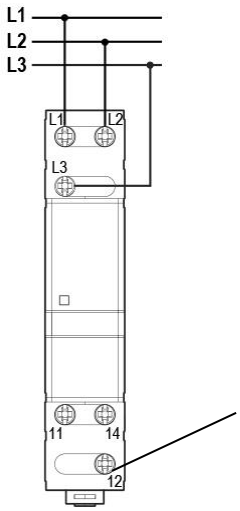
Power factor capacitors											
MODEL	007 P1 S	009 P1 S	011 P1 S	014 P1 S	016 P1 S	020 P1 S	022 P1 S	026 P1 S	032 P1 S	037 P1 S	041 P1 S
Qty x KVAR	–	–	–	–	–	1 x 1,5	1 x 1,5	1 x 2,5	1 x 5,0	1 x 5,0	1 x 5,0
MODEL	045 P1 S	039 P2 D	048 P2 D	055 P2 D	062 P2 D	075 P2 D	082 P2 D	092 P2 D	102 P2 D	117 P4 D	146 P4 D
Qty x KVAR	1 x 5,0	2 x 1,5	2 x 1,5	2 x 2,5	2 x 5,0	2 x 5,0	2 x 5,0	2 x 5,0	2 x 5,0	4 x 2,5	4 x 5,0

The capacitors are installed in the electrical panel of the machine or in the immediate vicinity as shown in the figure.
The power factor correction capacitors are sized to obtain a minimum cosφ value of 0.95.



7.10 PHASES SEQUENCE CONTROLLER

The accessory is installed in the electrical panel downstream of the door-lock main switch.
The relay checks that the sequence of the power supply phases is correct.
In case of incorrect phase sequence, the relay sends an alarm signal to the microprocessor control which prevents the machine from starting.



TECHNICAL CHARACTERISTICS

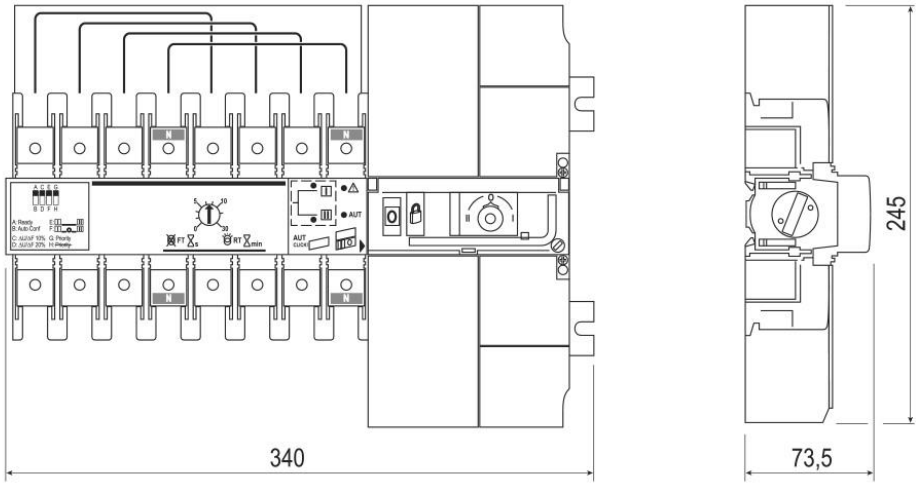
Power supply:	208 … 480 VAC – 50/60 Hz
Intervention delay:	0,5 s
Restore delay:	0,5 s
Activation time:	< 2 s
Operation conditions:	from -20°C to 60°C
Degree of protection:	IP 20
Security logic:	Positive. The output relay opens in the event of a error.

7.11 DOUBLE POWER SUPPLY WITH AUTOMATIC TRANSFER SWITCH

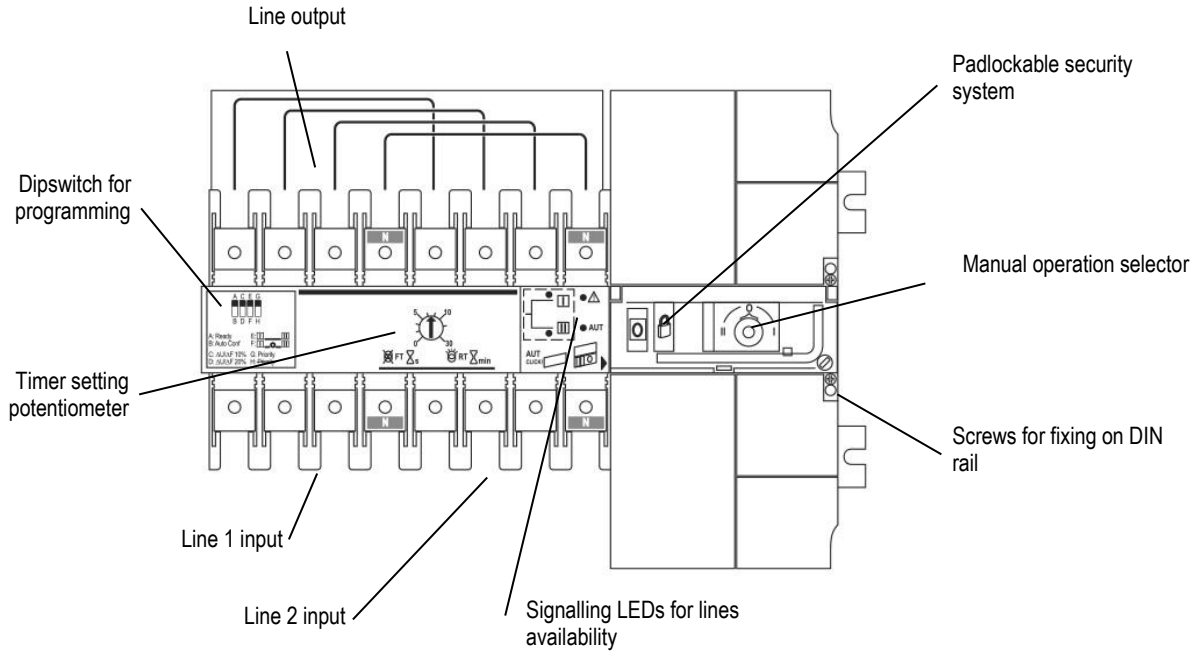
Switching is automatic. In emergency situations, switching can be performed manually.

INFORMATION
SWITCHING IS OPEN TRANSITION WITH A MINIMUM INTERRUPTION OF VOLTAGE DURING TRANSFER

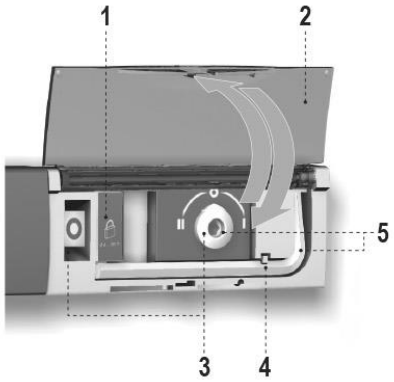
ANY REMOTE CONDENSER MUST BE POWERED BY THE INDOOR MACHINE



Dimensions in millimetres

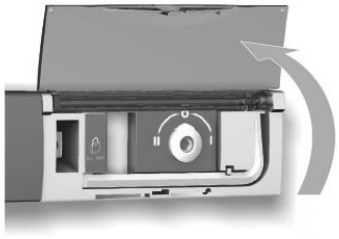


7.11.1 FEATURE



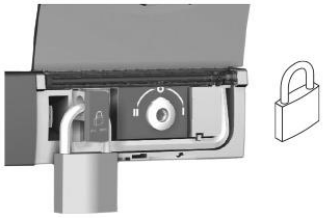
1 Locking
Use padlock 1 x 8 mm max
2 Cover AUT / MAN
- Open the cover to switch to manual mode
- Close the cover to return to automatic mode
- Open and close the cover to clear faults

3 Auto / Manual mode sensor AUT / MAN
4 Switch position indicator I O II
5 Manual switching
Insert the Allen key provided and turn to switch manually
Manual operation is not possible when padlocked

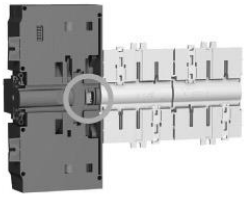


MANUAL MODE
Open the cover to activate manual mode
Now is possible to lock the changeover switch
To operate use the Allen key
In manual mode the remote commands are inhibited

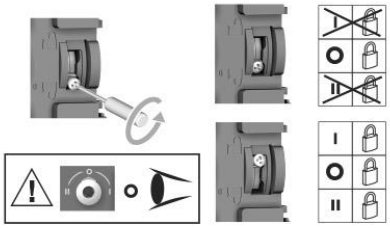
MANUAL SWITCHING
Use the Allen key to operate
Check the position of the indicator before carrying out the operation
From position “I” turn anti-clockwise to get to position “O”
From position “O” turn anti-clockwise to get to position “II”
From position “II” turn clockwise to get to position “O”
From position “O” turn clockwise to get to position “I”
Do not force the device (Max 8Nm)



PADLOCKING
Factory configuration in “O” position
To allow locking in other positions it is necessary to act on the back of the device
Locking is only possible in the Manual position with the cover open
Pull-out the locking system (lock symbol) and insert the lock

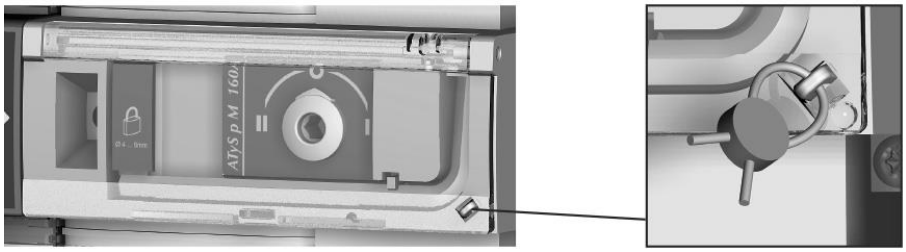


On the back of the device there is a screw to select the locking configuration.



Unscrew the screw and translate it upwards to activate the locking configuration for all positions.
Tighten the screw again

A seal can be applied to the cover of the device.



7.11.1.1 Programming

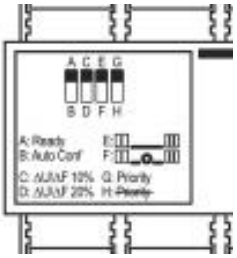
WARNING
The device must be put into service by qualified and certified personnel

- Check the electrical connections and installation. If it is correct, the device can be powered up
- The signal LED lights up when the device is powered
- The Dipswitches can only be set with the AUT / MAN cover open
- At least one signal LED must be light to activate the device

WARNING
Every action on the potentiometer modifies the settings even with the cover closed

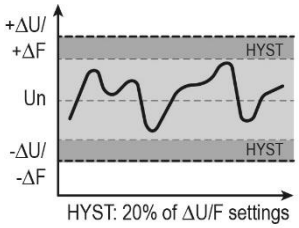
7.11.1.2 Dipswitches setting

Open AUT / MAN cover



Mode A-B setting
A: Ready
B: Auto Conf. (Autoconfiguration)

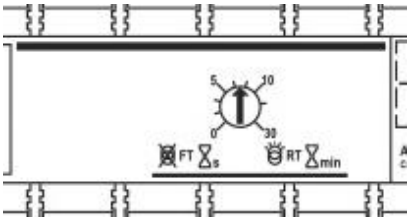
Threshold C-D
C: ΔU 10% / ΔF 5%
D: ΔU 20% / ΔF 10%

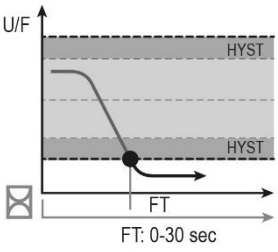


Stop in 0 position
E: No stop in 0 position
F: stop for 2s in 0 position

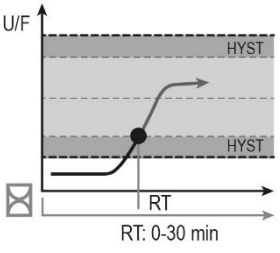
Type of application
G: With priority
H: Without priority

7.11.1.3 Timers setting



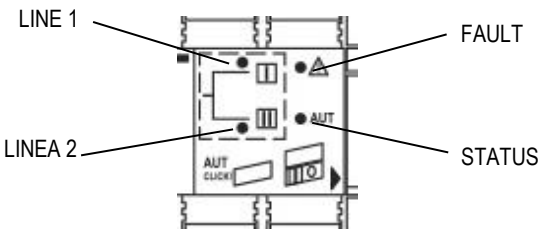


Line loss delay



Line recovery delay

7.11.1.4 LEDs information

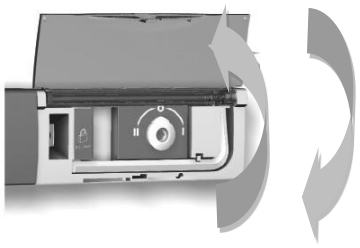


LEDs Line 1 – 2
- LED ON: Line available
- LED OFF: Line not available or out of range
- LED flashing: Timer in action or device in functional test

LED Fault
- LED ON: Fault
- LED OFF: Device OK
- LED flashing: stand-by

LED Status
- LED ON: Automatic mode
- LED OFF: Manual mode
- LED flashing: Manual transfer

7.11.2 FAULT RESET



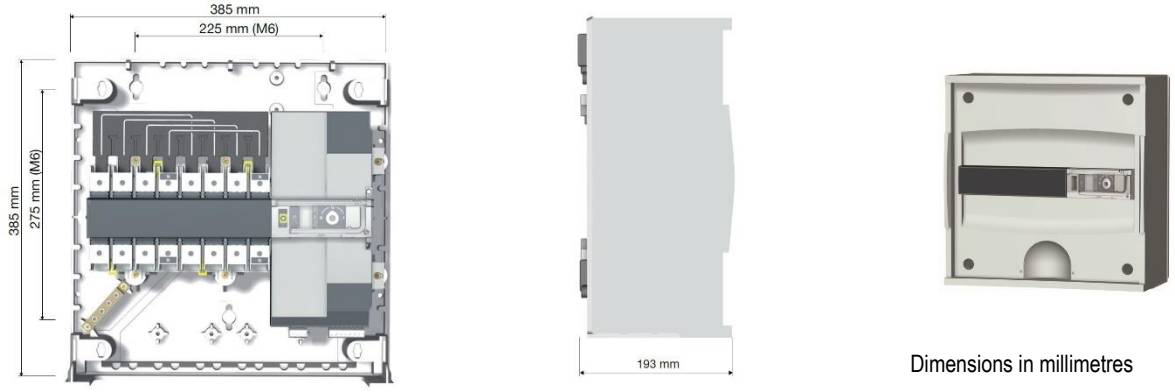
Open and close the AUT / MAN cover to reset faults and alarms.

7.11.2.1 Technical data

Power supply: 400/3/50 + N
Frequency: 50 / 60 Hz
Duration of the electric black-out: 90 ms – does not consider any timings and any processing time
Degree of protection: Class 1
Protection: IP 2X standard
IP 41 device contained in a box
Operating conditions:
Temperature: from -20 to +40°C
over 40°C with derating
Humidity: 80% RH non- condensing up to 55°C
95% UR non- condensing up to 40°C
Altitude: Max 2000 m without derating
From 2000 to 3000 m – UE 0,95 / Ie 0,85
From 3000 to 4000 m – UE 0,80 / Ie 0,85

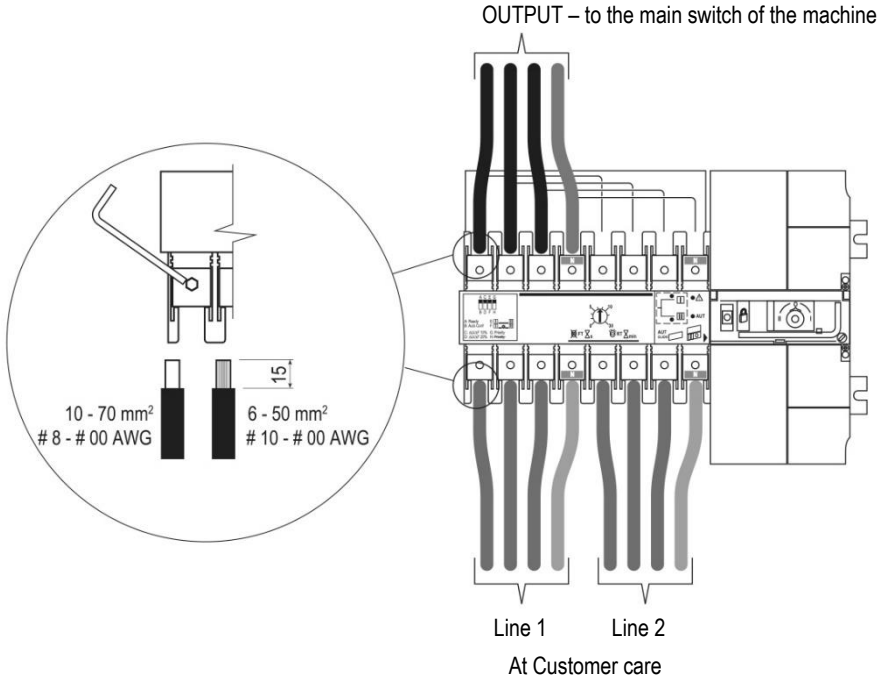
7.11.2.2 Installation in containment box

For small machines the device is supplied in a containment box for installation outside the machine. The electrical connection to the machine's main switch is at Customer care.



Dimensions in millimetres

7.11.2.3 Electrical connection



The installation of the device in a containment box foresee the connection with the machine's main disconnector (Customer care).
The electrical connection cable is not supplied.

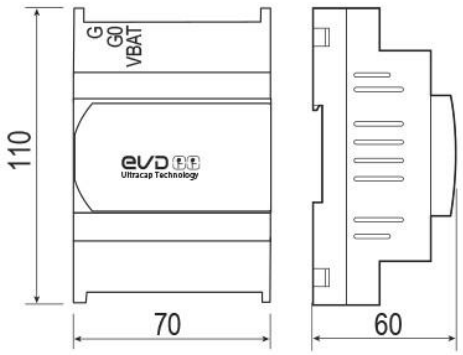
THE SECTION OF THE ELECTRIC CABLES MUST BE ADAPTED TO THE VALUES OF MAXIMUM ELECTRIC ABSORPTION OF THE MACHINE AS SHOWN ON THE ELECTRICAL DIAGRAM.

INSTALL A DISCONNECTOR FOR EVERY POWER LINE CLOSE THE MACHINE TO DISCONNECT THE MACHINE FROM THE ENERGY SOURCE.

INFORMATION
TO MAINTAIN THE MICROPROCESSOR ELECTRICALLY POWERED AND AVOID THE REBOOT, IT IS NECESSARY TO FORESEE THE INSTALLATION OF THE "UPS FOR MICROPROCESSOR POWER SUPPLY" ACCESSORY.
THE SYSTEM SUPPLIES THE MICROPROCESSOR FOR SOME MINUTES IN CASE OF LACK OF NETWORK VOLTAGE.

7.12 UPS FOR MIRCOPROCESSOR POWER SUPPLY

UPS for temporary power supply to the controller in case of power supply failure.
The accessory has sufficient charge to allow the electronic expansion valves to close.



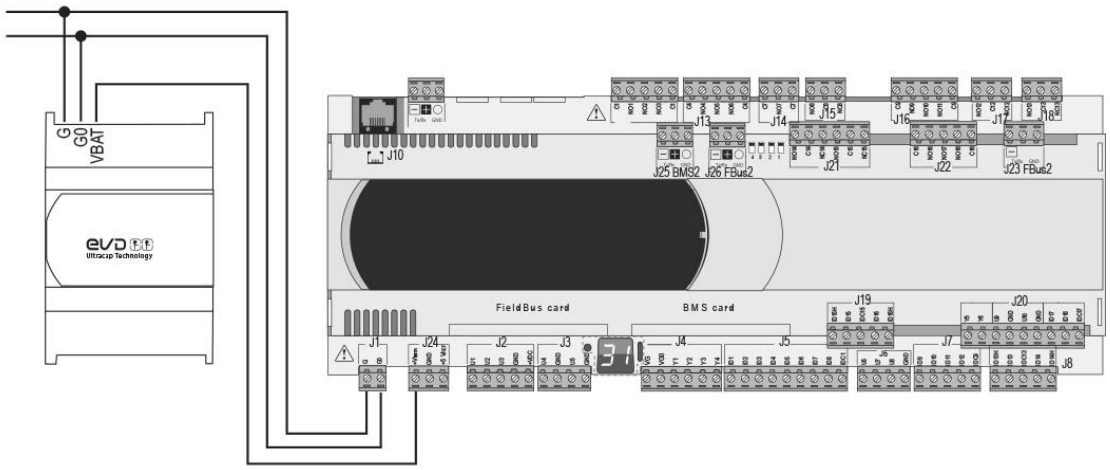
Dimensions in millimetres

TECHNICAL CHARACTERISTICS

Power supply:	24Vac / 24Vdc ±15%
Output voltage Vbat:	18,4 Vdc
Charging time:	4 minutes
Operating temperature:	-25°C a 60°C
Humidity:	< 90% C non- condensing
Degree of protection:	IP20

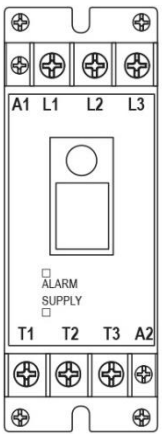
The module is made by Ultracap capacitors (EDLC = Electric Double Layer Capacitor), Recharge is managed independently by the module.

7.12.1 ELECTRICAL CONNECTION



7.13 SOFT-STARTER FOR COMPRESSOR MOTORS

The starter is installed in the electrical panel.
The accessory temporarily reduces the load in the power supply circuit and the starting current of the motor during the start.
The starter does not need any settings and does not perform other types of checks.



TECHNICAL CHARACTERISTICS

Power supply:	400 V +10% -15%
Acceleration ramp:	< 600 ms
Max starts per hour:	12
Minimum time between start and stop:	60 s
Minimum time between starts:	300 s
Operating temperature:	-20°C a 50°C
Humidity:	< 95% a 40°C non- condensing
Altitude:	1000 m

7.14 POWER SUPPLY OF REMOTE CONDENSER OR DRY COOLER FROM INDOOR MACHINE

DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention

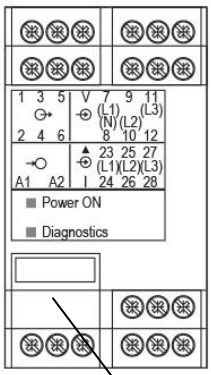
In the electrical panel of the machine there is a magnetothermic switch to protect the power supply line for each remote condenser.
The power supply can be single-phase or three-phase according to the condenser model.
Refer to the installation manual for use and maintenance of remote condensers or dry coolers for all the necessary information.

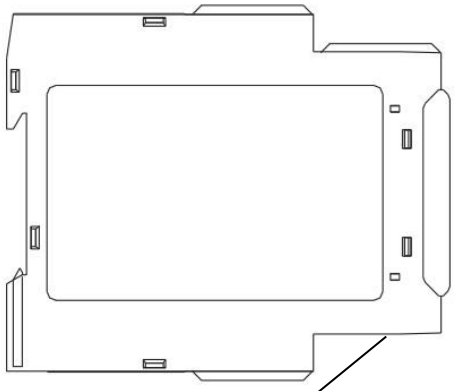
7.15 VOLTAGE FREE CONTACTS FOR REMOTE STATUS INDICATION

Contacts can be made available by relay or additional auxiliary contact to the contactor.
For electrical connections, refer to the electrical diagram of the machine.

7.16 COMPACT POWER TRASDUCER – ENERGY MANAGEMENT

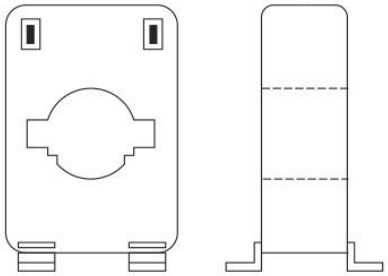
COMPACT POWER TRANSDUCER



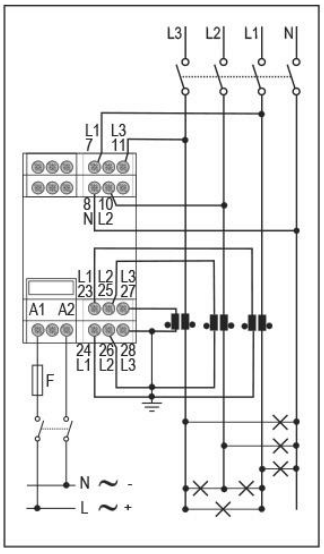


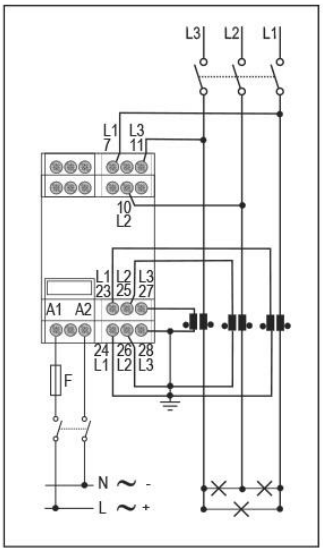
RJ12 connector for programming

AMPEROMETRIC TRANSFORMER

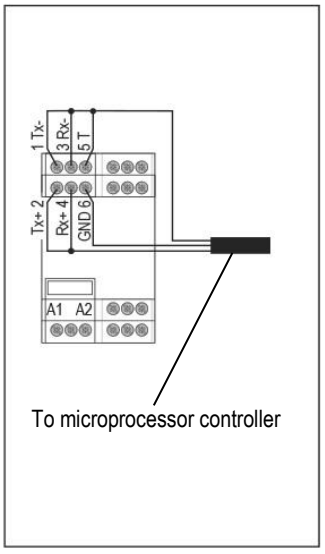


CONNECTIONS DIAGRAM





RS485 CONNECTION



The device cannot be calibrated. It can only be programmed from a PC via the RJ12 connector.
The readable data on the display of the microprocessor control are:

- Delta voltage (phase - phase) for three-phases machine
- Star voltage (phase – neutral)
- Phase current
- Neutral current for three-phases machine
- Active power (phase) for three-phases machine
- Active power (total)
- Energy
- Hour-meter.

7.17 BY-PASS FOR CHILLED / HOT WATER FINNED COILS

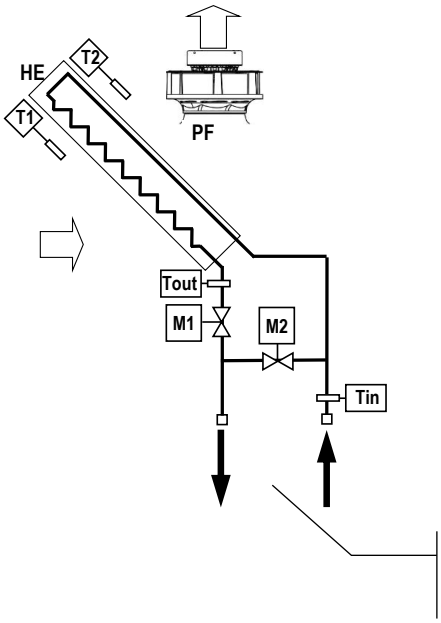
The accessory transforms the hydraulic circuit with a 2-way water flow control valve in a circuit with by-pass.

The by-pass is controlled by a second 2-way valve which works in opposition to the main valve.
Each heat exchanger installed in the machine can be equipped with its own 2-way by-pass valve:

- Chilled water circuit for cooling
- Hot water circuit for heating

MANDATORY
Before carrying out any maintenance on the valve it is necessary to isolate the machine from the power supply.

EXAMPLE OVER



LEGENDA

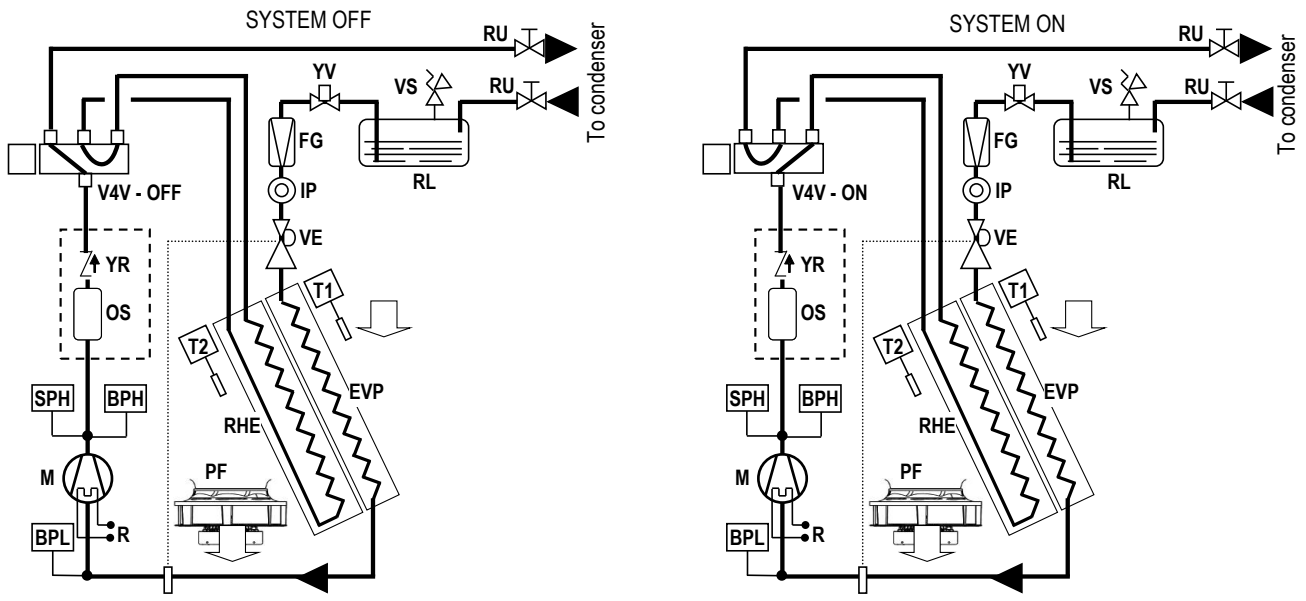
M1	Main 2-way motorized valve
M2	By-pass 2-way motorized valve
HE	Hot water heating coil
PF	Plug Fan.
T1	Air return temperature probe
T2	Air delivery temperature probe
Tin	Hot water inlet temperature probe
Tout	Hot water outlet temperature probe

7.18 HOT GAS RE-HEATING SYSTEM

In machines with a double refrigerant circuit, the accessory is installed on one refrigerant circuit.

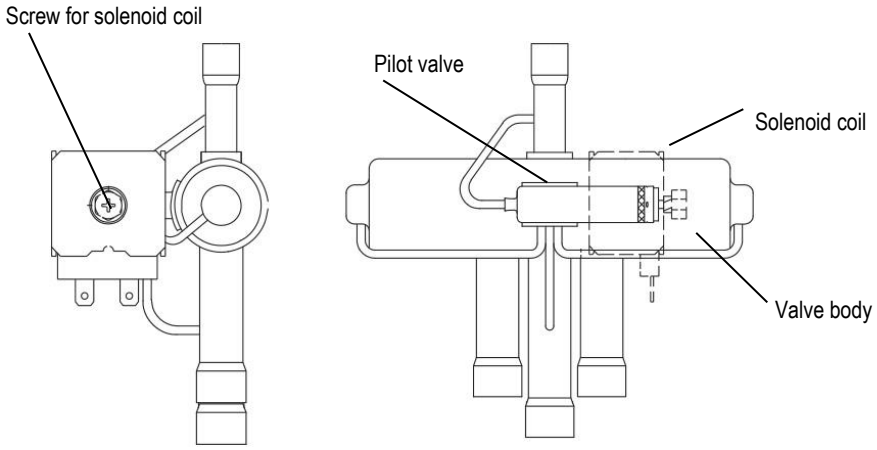
In the event of failure of the 4-way valve, this is automatically set in the rest position, completely excluding the post-heating system.

EXAMPLE FOR RE-HEATING SYSTEM



LEGENDA:

C	Compressor
R	Crankcase heater
EVP	Evaporator
RHE	Re-heating coil
BPH	High pressure transducer
BPL	Low pressure transducer
SPH	High pressure safety switch
V4V	4-way valve for re-heating system
VS	Safety valve
FG	Drier filter
OS	Oil separator (only inverter)
YR	Check valve (only inverter)
PF	Plug Fan
YV	Solenoid valve (accessory)
IP	Sight glass
VE	Electronic expansion valve with temperature probe (for b-NEXT series mechanical expansion valve)
T	Temperature probe
RU	Taps
RL	Liquid receiver



7.18.1 REMOVING THE VALVE

MANDATORY
The valve components are very delicate. The separation and welding operations must be carried out as quickly as possible.

Remove the refrigerant gas in the circuit

DANGER
Before carrying out any maintenance on the valve it is necessary to isolate the machine from the power supply.

Pay attention to any traces of lubricating oil contained in the pipes that could ignite

- Protect the valve against excessive heat. A temperature of 110°C can already cause damage to the internal parts of the valve
- During operations protect the valve with a wet cloth to contain the heat in the valve body.
- Use only an oxyacetylene torch to de-solder the connections. This allows the operation to be carried out as quickly as possible, avoiding overheating of the valve.
- After removing the valve check the pipes to make sure they are round and do not have large welding blocks that would interfere with the mechanical adaptation of the new joints.
- Protect pipes from moisture, foreign substances, metallic filings, dust or dirt

7.18.2 INSTALLING THE VALVE

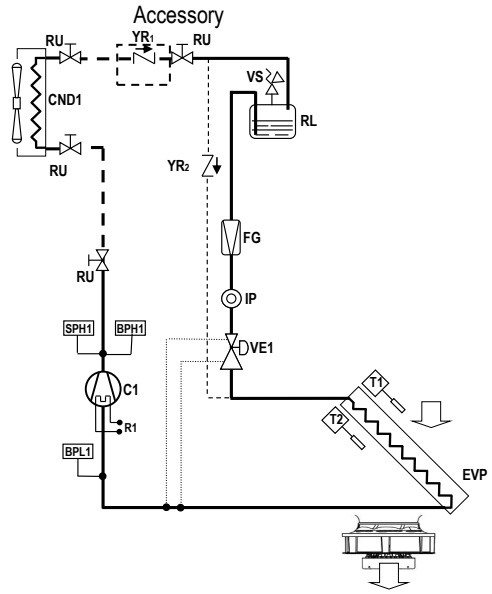
- The valve must be installed in a horizontal position.
- Handle the valve carefully to avoid damaging the internal components of the valve body.
- Check that the junction points of the pipes are clean.
- Make the connection through low temperature brazing using a silver solder with externally applied flow and inert gas to prevent the formation of oxide inside the pipes.
- Preferably use a phosphorus-based silver alloy.

7.19 KIT FOR LOW AMBIENT TEMPERATURE (LT VERSION)

Kit for machines with remote condenser in STD version and equipped with fans with AC motors for operation with external temperature from -15°C to -45°C. Not available for condensers in LNO or ELN versions.
Kit for machines with remote condenser in STD version and equipped with fans with EC motors for operation with external temperature from -15°C to -30°C. Not available for condensers in LNO or ELN versions.

COMPONENTS SUPPLIED IN KIT
Check valve (YR1): one valve for each refrigerant circuit (installation by the Customer)

FACTORY INSTALLED COMPONENTS
Power supply of the remote condenser from the indoor machine with magnetothermic switch.
Check valve (YR2): Installed on a by-pass capillary on the liquid line of the machine.
Modification of electrical connection for condenser equipped with fan speed regulator.

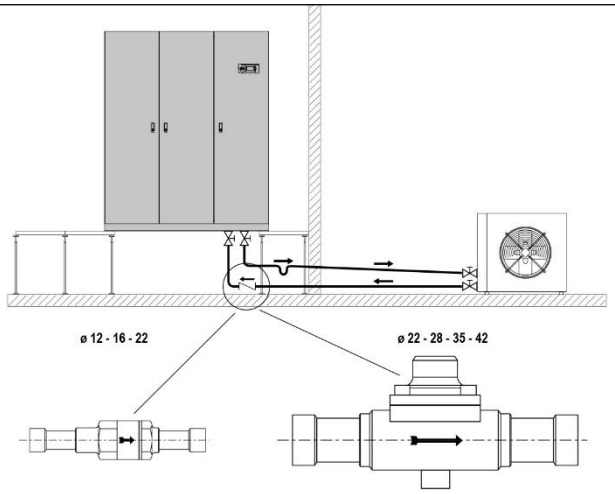


LEGENDA

C1	Compressor
R1	Crankcase heater
CND	Condenser
EVP	Evaporator
BPH	High pressure transducer
BPL	Low pressure transducer
SPH	High pressure safety switch
VS	Safety valve
FG	Drier filter
IP	Sight glass
VE	Expansion valve
T	Temperature probe
RU	Taps.
RL	Liquid receiver
YR1	Check valves to be installed on the liquid line close the machine inside the room
YR2	Unidirectional check valve with controlled opening that limits pressure rising on the liquid line

7.19.1 INSTALLATION OF THE CHECK VALVE ON THE LIQUID LINE

The valve must be installed on the return liquid line from the condenser as shown in the figure.
The valve must have the same diameter as the liquid line pipe.
Place the valve near the machine and inside the room.
Pay attention to the arrow on the valve body for flow direction.
The valve must be properly supported so as not to burden the machine with their weight



- The joint is for strong brazing with silver-based alloy (we recommend an alloy with medium-high silver content and low melting temperature)
- Use appropriate equipment
- Clean the pieces from oil, grease, oxides, crust and dirt before brazing
- Use an appropriate solvent to remove the oxides formed at high temperature during heating and brazing.

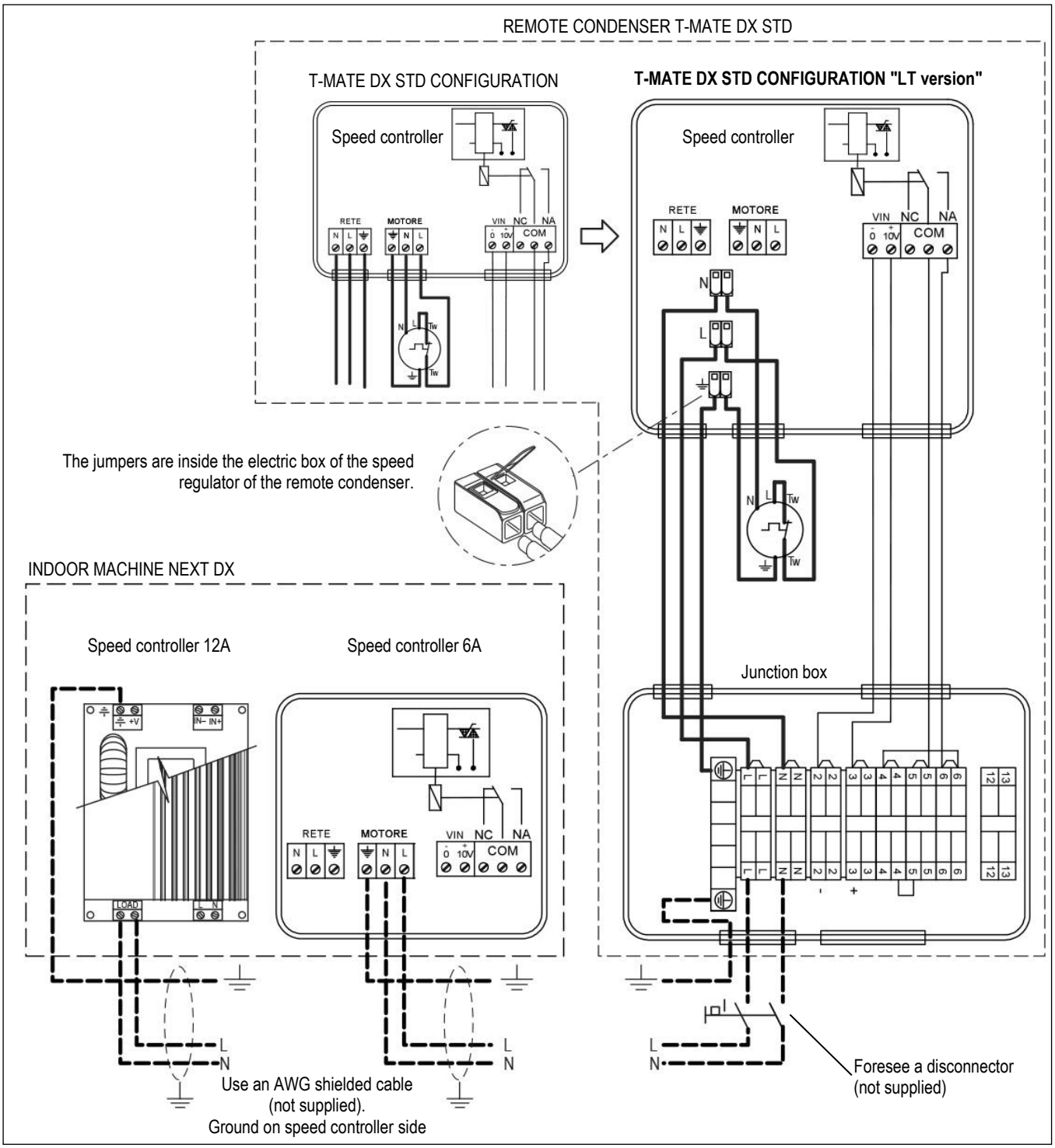
INFORMATION
The oxide formed inside the pipe during the brazing phases is dissolved by the HFC fluids and causes the refrigerant filter obstruction. During brazing it is advisable to introduce nitrogen into the pipeline. If this is not possible, clean the pipes with solder solvent

7.19.2 ELECTRICAL CONNECTION FACTORY MODIFICATION ON THE REMOTE CONDENSER T-MATE DX STD EQUIPPED WITH AC MOTOR

The modification of the electrical connection for the condensers equipped with fan speed regulator is made in the factory.

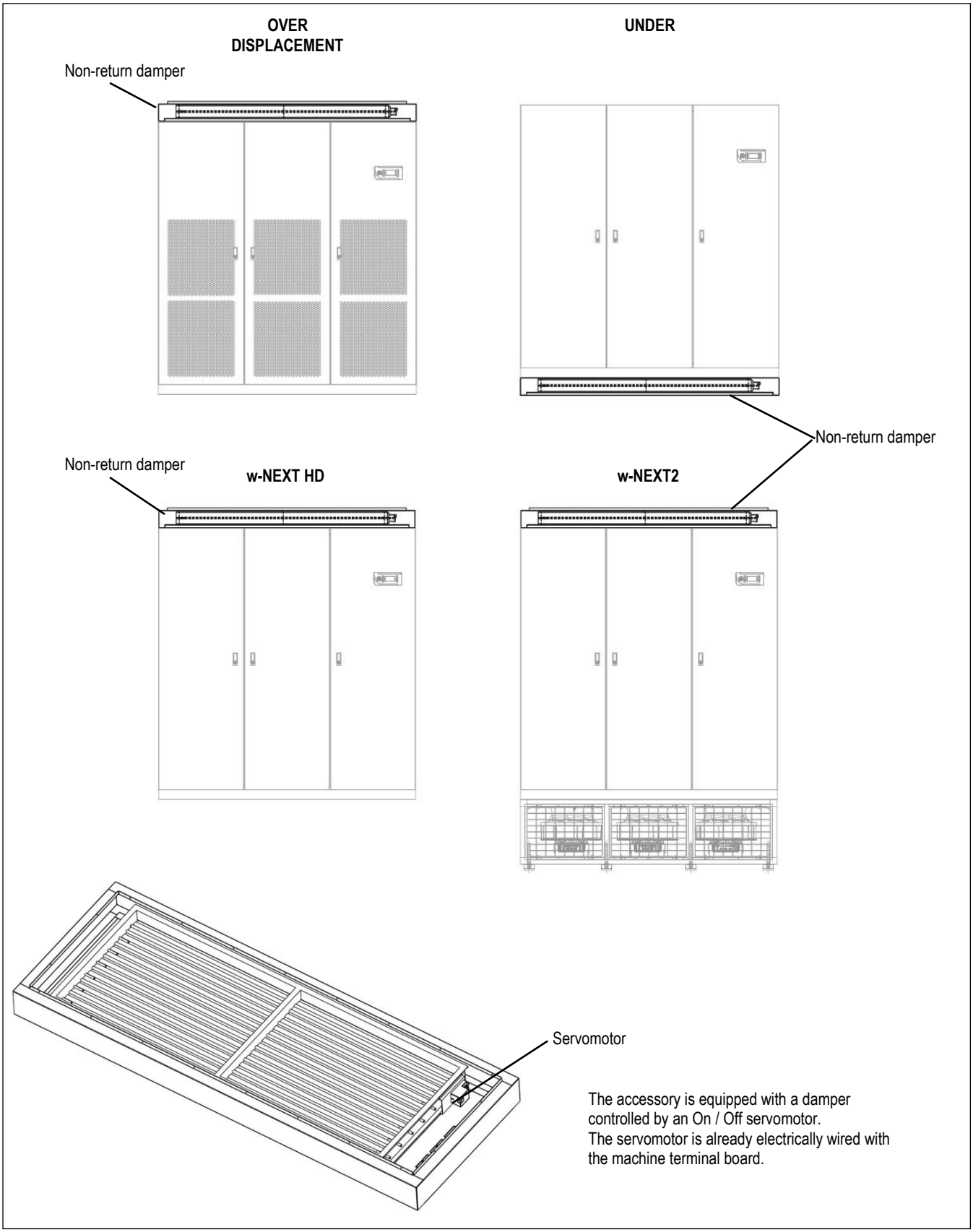
DANGER
The electrical connections must be designed and carried out exclusively by personnel with precise technical competence or special skills in the field of intervention.
Before proceeding, operators must disconnect the electricity supply, making sure that nobody connects it again

For electrical connections, refer to the electrical diagram of the machine.
The remote condenser is electrically powered by the indoor machine. The speed controller output on the indoor machine is connected to the remote condenser junction box. The fan motor thermal protection alarm is no longer available. The electrical connections of the speed regulator on the condenser are jumpered as indicated in the diagram below.

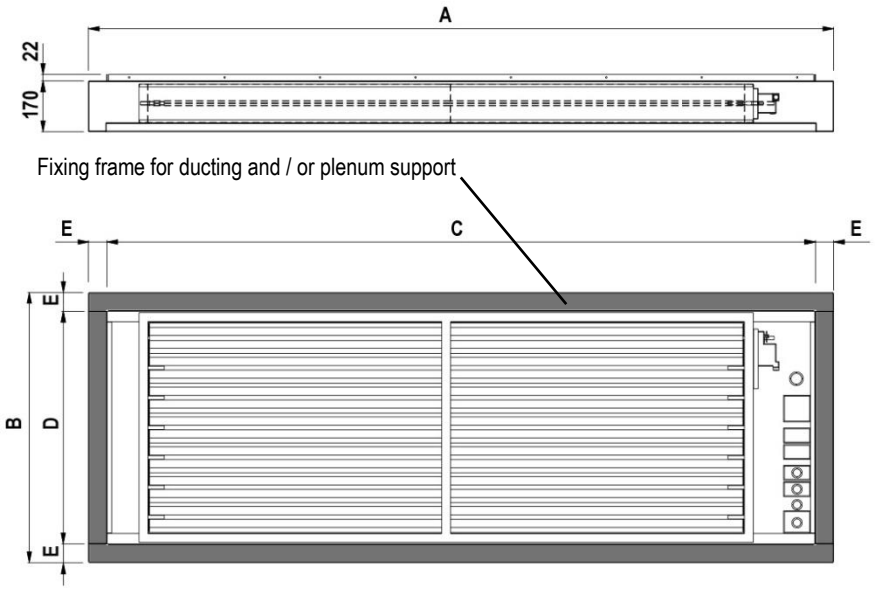


7.20 NON-RETURN AIR MOTORIZED DAMPER

The accessory is mounted at the factory in the position as shown in the figure.



DIMENSIONS AND WEIGHT



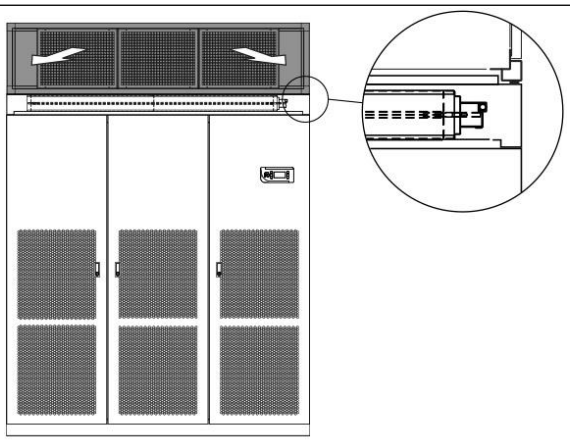
Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	655	650	785	1085	1085	1305	1630	1873	2175	2499	2899	3510
B	mm	420	650	650	750	905	905	905	905	905	905	905	905
C	mm	563	558	693	993	963	1183	1508	1751	2053	2377	2777	3388
D	mm	328	558	558	658	783	783	783	783	783	783	783	783
E	mm	46	46	46	46	61	61	61	61	61	61	61	61
Weight	kg	13	20	23	30	35	40	50	58	65	75	90	115

Size		E4L	E5L	E6L	E7L	E8L	E9L
A	mm	1630	1955	2198	2499	2899	3299
B	mm	905	905	905	905	905	905
C	mm	1508	1833	2076	2377	2777	3177
D	mm	783	783	783	783	783	783
E	mm	61	61	61	61	61	61
Weight	kg	45	55	63	70	80	90

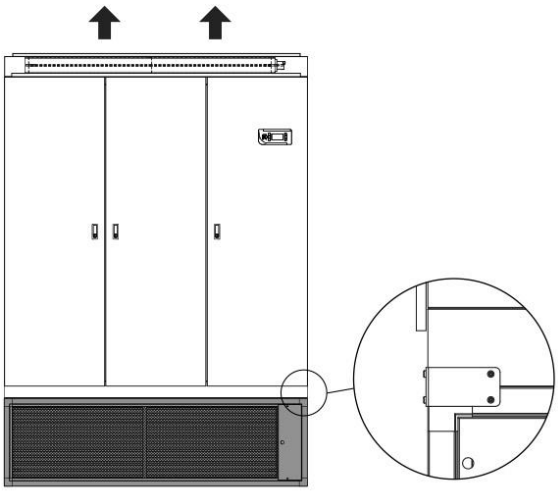
PLENUM AND DUCTING WITH NON-RETURN AIR DAMPER

MANDATORY
For stability reasons, only one plenum can be installed on the machines

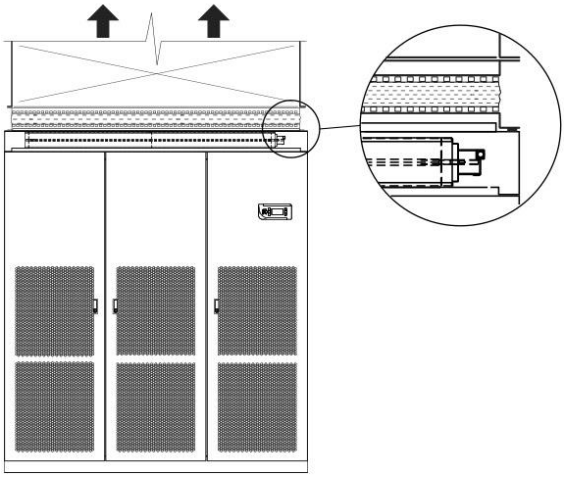
OVER MACHINE



The damper is equipped with a flange for housing the plenum.
It is not required to fix the plenum
Lay a seal for the air tightness between the damper and the plenum.



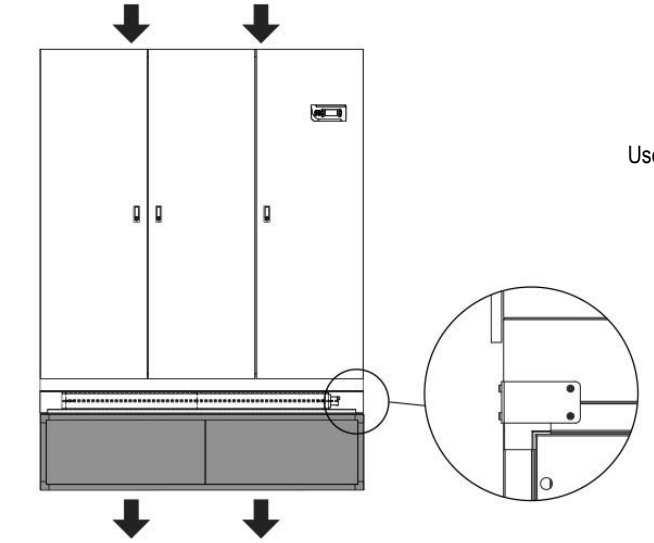
Use the brackets provided to fix the plenum to the machine.



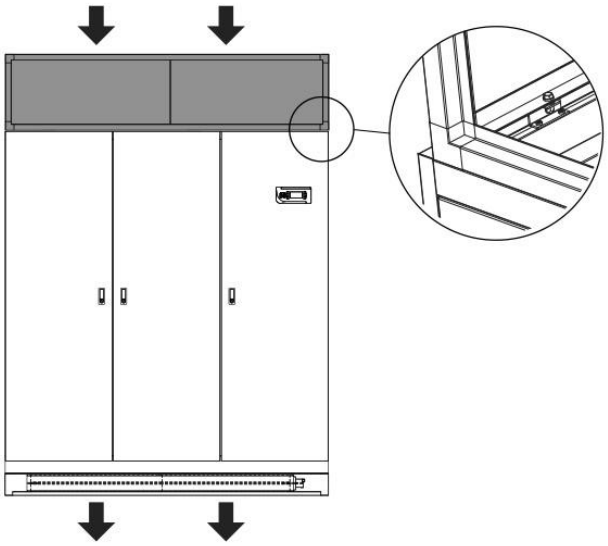
Install an anti-vibration joint between the damper and the air supply duct

For the installation of the plenums see the ACCESSORIES NEXT manual

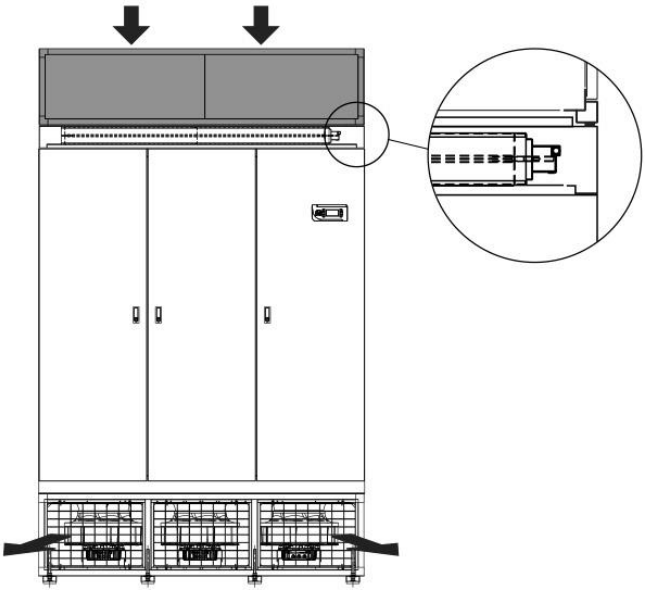
UNDER MACHINE



Use the brackets provided to fix the plenum to the machine.



Use the brackets installed on the top frame of the machine to fix the plenum.

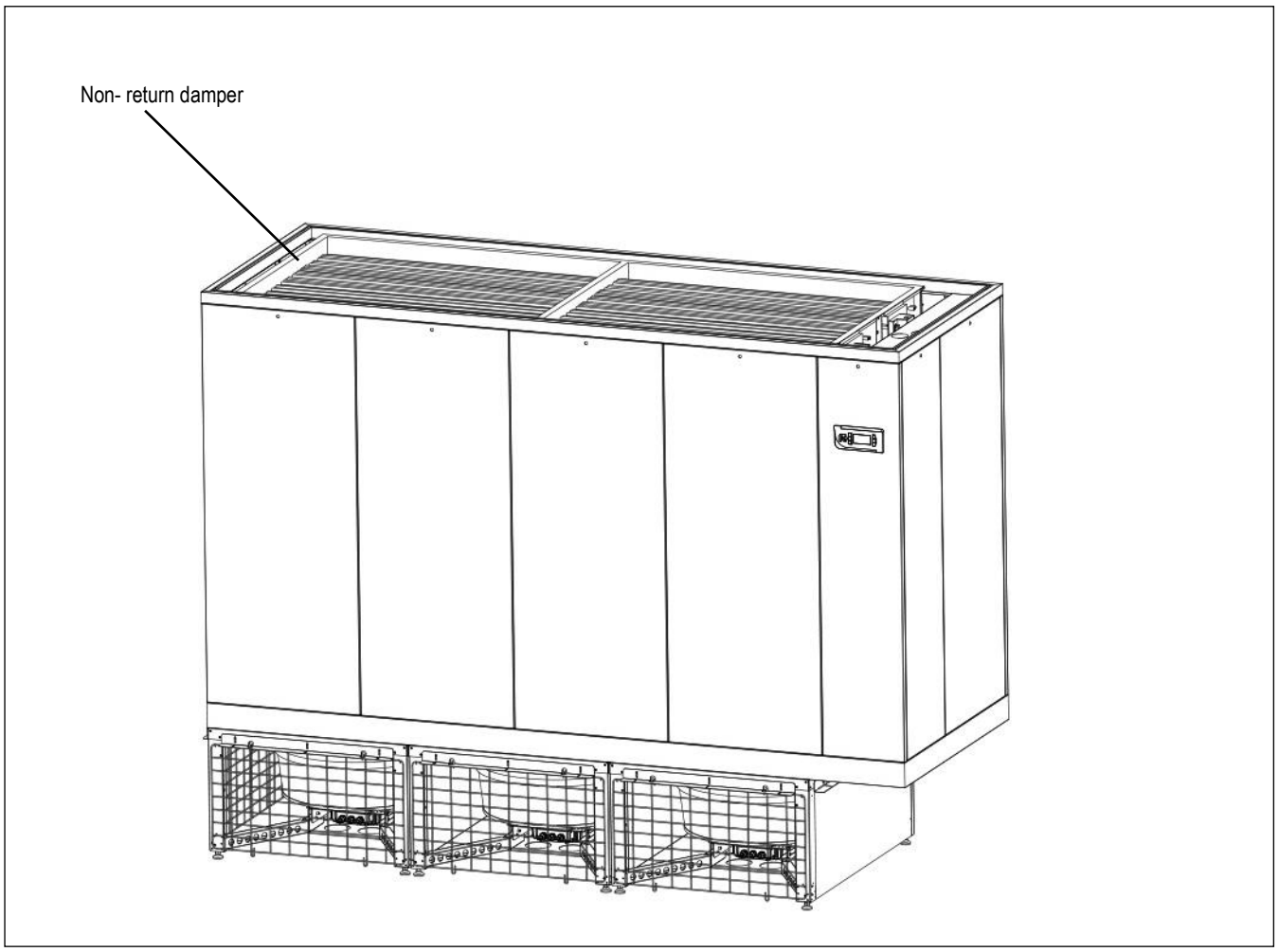


The damper is equipped with a flange for housing the plenum.
It is not required to fix the plenum
Lay a seal for the air tightness between the damper and the plenum.

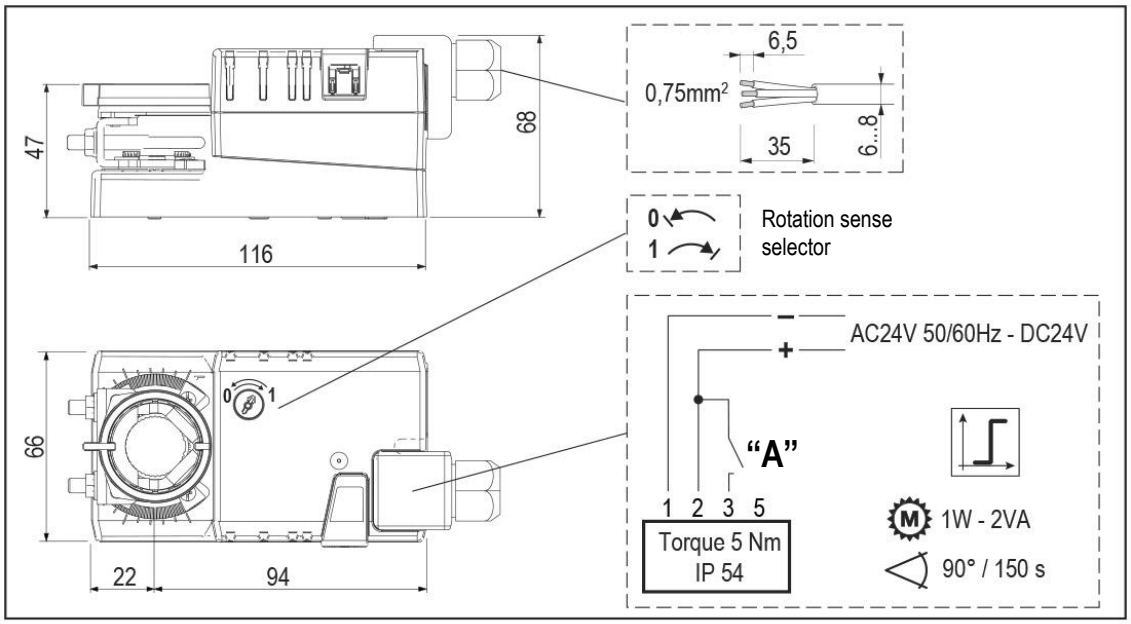
For the installation of the plenums see the ACCESSORIES NEXT manual

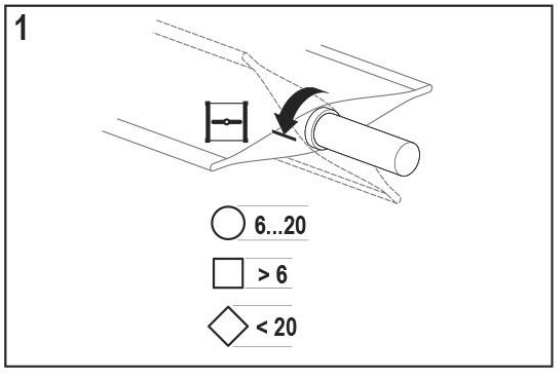
7.20.1 NEXT X TYPE SERIES

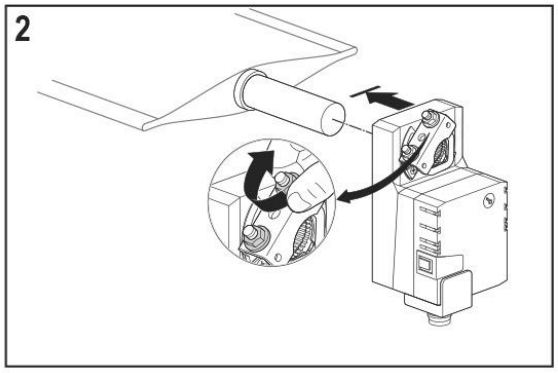
The accessory is mounted at the factory inside the machine in the air handling section and does not change its external dimensions.
The accessory is equipped with a damper controlled by an On / Off servomotor.
The servomotor is already electrically wired with the machine terminal board.

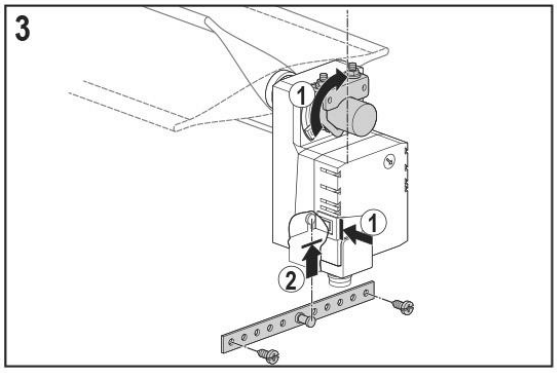


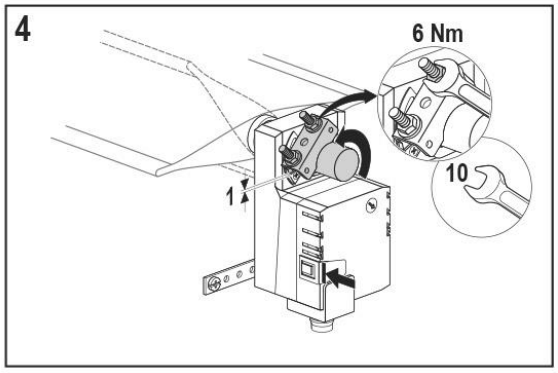
7.20.2 NON-RETURN AIR DAMPER SERVOMOTOR FOR ALL SERIES

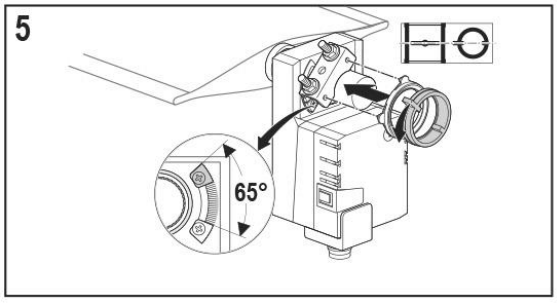


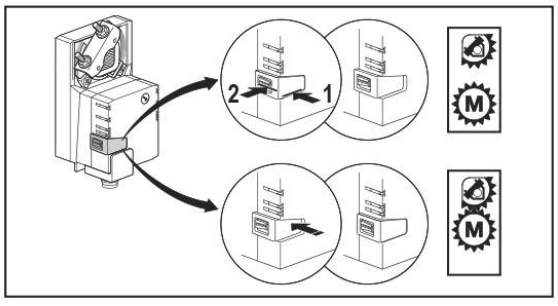












Contact "A" close: the damper opens
Contact "A" open: the damper closes

8 DISPOSAL OF THE MACHINE

In the event of disposal of the machine, contact a Service Centre authorized by the Manufacturer beforehand.

MANDATORY
The machine contains fluorinated greenhouse gases governed by the Kyoto protocol. The law prohibits the dispersion in the environment and obliges the recovery and delivery to the dealer or collection centre.

When components are removed to be replaced or when the entire machine reaches the end of its life and it is necessary to remove it from the installation, to minimize the environmental impact, comply with the following disposal regulations:

- **the refrigerant gas must be fully recovered by specialized personnel and equipped with the necessary qualifications and be transferred to the collection centres;**
- **the lubricating oil contained in the compressors and in the refrigerant circuit must be recovered and transferred to the collection centres;**
- **the structure, the electrical and electronic equipment and the components must be subdivided according to their product type and type of material and given to the collection centres;**
- **if the water circuit contains mixtures with antifreezes, the contents must be collected and transferred to the collection centres**
- **comply with the national laws in force**

MANDATORY
THE MACHINE CONTAINS ELECTRIC AND ELECTRONIC EQUIPMENT WHICH MAY IN TURN CONTAIN SUBSTANCES THAT ARE HARMFUL TO THE ENVIRONMENT AND HUMAN HEALTH, AND CANNOT BE DISPOSED OF IN MIXED URBAN WASTE.

The following symbol is affixed to the machine

to indicate disposal of the machine as separate waste.

Buyers play an important role in the reuse, recycling and other forms of recovery of the machine.

The machine is classified as PROFESSIONAL for the purposes of the WEEE Directive 2012/19/EU. When it is disposed of, the User must manage it as waste and may contact the dealer to have it collected, or take it to a collection centre.

9 FIRST DIAGNOSTICS

9.1 WHAT TO DO IF …

List of actions to be taken in case of machine malfunction.

Malfunction	Causes	Remedy	Intervention
High discharge pressure	Remote condenser	Check if the fan is running	User
		Check fan rotation direction	User
		Check the condensation controller signal	Service
		Check the condensing coil cleaning	User
		Check recirculation of hot air	User
		Check remote condenser sizing	Service
	Condensing control valve	Check the condensation controller signal	Service
		Check the water inlet temperature	User
	Refrigerant circuit	Check refrigerant charge	Service
		Check for incondensable	Service
		Check that the expansion valve is not blocked closed	Service
		Check the refrigerant circuit's taps	Service
Low discharge pressure	Remote condenser	Check the condensation controller signal	Service
	Refrigerant circuit	Check that the suction pressure is not too low (see low suction pressure)	Service
Low suction pressure	Remote condenser	Check that the condensation is not too low (fan speed too high in relation to the outside temperature)	Service
	Condensing control valve	Check the condensation controller signal	Service
		Check the water inlet temperature	User
	Fan	Check if the fan is running	User
		Check speed reference signal	Service
		Check that the airflow is correct	Service
		Check cleaning filters	User
		Check cleaning coil	User
		Check recirculation of cold air from nearby units	User
		Check pulley belt transmission	Service
	Refrigerant circuit	Check that the expansion valve is not blocked closed	Service
		Check that there are no blocked / crushed capillaries	Service
		Check that the dryer filter is not blocked	Service
		Check that the liquid line is not too small	Service
		Check for leaks	Service
		Check the quality of refrigerant	Service
		Check valves / taps closed	Service
	Setting	Increase cold set point	User
		Increase ventilation setpoint	User
Room temperature too high	Setting	Reduce setpoint	User
	Unit selection incorrect	Check that the machine is not under-dimensioned due to thermal load or for volume of air	Service
	Malfunction	Check probe reading	Service
		Check alarm presence	User
Room temperature too low	Setting	Reduce heating setpoint	User
	Unit selection incorrect	Check that the machine is not under-dimensioned due to thermal load or for volume of air	Service
	Malfunction	Check probe reading	User
		Check alarm presence	User
	Heating resource	Check electric heaters supply	Service
		Check electric heater safety thermostat	Service
		Check solenoid valve for hot gas bypass	Service
		Check the hot water coil inlet temperature	User
	Cooling resource	Check the operation of any free-cooling dampers	User
Room humidity too high	Setting	Reduce humidity setpoint	User
	Unit selection incorrect	Verify that the machine is not undersized for latent load	Service
	Malfunction	Check humidity probe reading	User
	Humidifier	Check humidifier operation (see humidifier)	Service
	Refrigerant circuit	Verify correct operation of the expansion valve (if available)	Service
		Check solenoid valve on the coil capillary	Service

Malfunction	Causes	Remedy	Intervention
Room humidity too low	Setting	Increase humidity setpoint	User
	Unit selection incorrect	Verify that the machine is not oversized for latent load	Service
	Malfunction	Check humidity probe reading	User
	Humidifier	Check humidifier operation (see humidifier)	Service
Low air flow	Setting	Check fan speed setting	Service
		Check air flow or delta P Setpoint for variable adjustments	User
	Fan	Check fan supply	Service
		Check the analogue output of the speed reference from the controller	Service
		Check the differential pressure transducer for reading and positioning in case of variable adjustments	Service
		Check plant pressure drops	Service
		Check filter cleaning	User
Compressor does not start	Controller	Check for machine, circuit or inverter alarms (if available)	User
	Compressor	Check compressor power supply	Service
		Verify thermal protection intervention	User
Noisy compressor	Compressor	Check for oil presence (if available with DANGER indicator)	Service
	Refrigerant circuit	Check expansion valve operation by measuring overheating	Service
		Check operation inside the envelope	Service
Compressor with lack of oil	Refrigerant circuit	Check refrigeration circuit (sections, curves, lifts, siphons, distances, differences in height)	Service
		Check if necessary to add oil as documentation	Service
	Unit selection	Check that the machine is not oversized compared to the minimum load required	Service
Intervention magnetothermic protections	Compressor	Check windings and continuity to ground	Service
Overheating too high or too low	Setting	Check expansion valve driver parameters	Service
	Driver	Check the compressor suction temperature probe reading	Service
		Check suction pressure transducer reading	Service
	Expansion valve	Verify that the valve is not blocked	Service

ALARMS LIST available in the USER MANUAL.

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