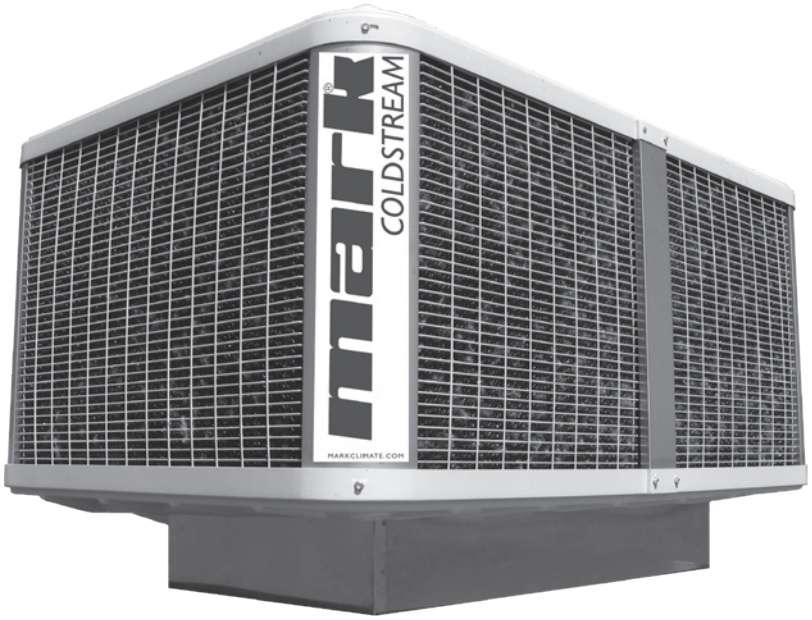
mark®
CLIMATE TECHNOLOGY

Technical manual **EN**

MARK COLDSTREAM

0665020_R05TA123



Read this document before installing the appliance

Warning

Incorrect installation, adjustment, alteration, repair or maintenance work may lead to material damage or injury. All work must be carried out by certified, qualified professionals. If the appliance is not positioned in accordance with the instructions, the warranty shall be rendered void. This appliance is not intended for use by children or persons with a physical, sensory or mental handicap, or who lack the required experience or expertise, unless they are supervised or have been instructed in the use of the appliance by somebody who is responsible for their safety.Children must be supervised to ensure that they do not play with the appliance.

1.0 General

1.1 All rights reserved

The manufacturer has a policy of continuous product improvement and reserves the right to make changes to the specifications without prior notice. The technical details are considered correct but do not form the basis for a contract or warranty. All orders are accepted subject to the standard terms and conditions of sale and delivery (which will be sent to you at your request).

1.2 General warnings

Installation must comply with the relevant local and/or national regulations. You must therefore have the ColdStream installed by a professionally qualified installer in accordance with all applicable national and international regulations. Faulty installation, adjustment, alteration, maintenance activity or repair shall render the warranty void.

The machine is conforming to the following European Community Directives:

2006/42/EEC	Machinery Directive
2006/95/EEC	Low Voltage Directive
2004/108/EEC	Electromagnetic Compatibility Directive

The information in this document is subject to change without notice. The most recent version of this manual is always available at **www.markclimate.com/downloads**.

1.3 Presentation of the ColdStream Evaporative Cooler

To improve the summer microclimate inside a production unit, sales or other area, it is necessary to ventilate the environment with frequent changes of fresh, filtered and possibly cool air. For large areas such as industrial buildings, an air conditioning plant is frequently not adaptable due to the great volume of air to be cooled and the thermal loads of processes to be neutralized, the necessary amount of energy is very high and the cooling effect is reduced by the exhaust air extraction plant and by frequent opening of the doors during normal activity.
Evaporative cooling plants that cool the air using a natural principle represent an optimal solution: the air passes through special wet water filters, loosing part of its heat during the evaporation process of the water and hence lowering the air temperature. The absence of refrigeration plants reduces energy consumption to a minimum and enables great volumes of air to be treated for the many air changes necessary.

1.4 Foreseen use

The ColdStream evaporative cooler can be installed in all environments where it is necessary to improve the microclimate, where the environment must be ventilated with frequent changes of fresh, filtered and possibly cool air, such as:

- production buildings and units;
- sales areas and warehouses;
- sport areas such as gymnasiums.

It is absolutely forbidden to make modifications to the machine and its destination of use.

The supplier declines all responsibility for any damages which may be, directly or indirectly, caused to exposed persons or property, due to improper use or use of the machine for different purposes other than the design purposes, incorrect installation, inappropriate power supply, different or changes to the installation environment from the one declared during order confirmation, grave deficiency of maintenance, unauthorized alterations and modifications, use of non-original spare parts, removal of the protection guards, inobservance of the instructions for use, negligence, etc.. The machine must NOT be used for a different use than its designed use for any reason whatsoever or used in a different way than stated in this manual.
DO NOT install the machine in closed areas; the machine must be installed outside the area to be treated, except by specific approval of the manufacturer.

Do NOT start-up the machine if it is not connected to the relative plant (duct) of air distribution.

When the plant is operating, do not touch the fan – Mechanical danger.
It is forbidden to work on moving parts.

It is absolutely forbidden to install ColdStream evaporative cooling plants in potentially explosive environments.

1.5 Machine identification data

Machine identification data is shown on the warranty sheet supplied to the customer and is enclosed in the documentation and on the machine identification plate.

If Technical Assistance or spare parts are required, always supply the machine model and serial number.

1.6 Electrical boards

Any electrical boards supplied by Mark Climate Technology. are manufactured according to EN 60204/1 regulations.

It is absolutely forbidden to make modifications to the electrical board.

2.0 Transportation, handling, unpacking, storage

2.1 Delivery of the unit

When the unit is delivered, the customer MUST check the state of the goods.

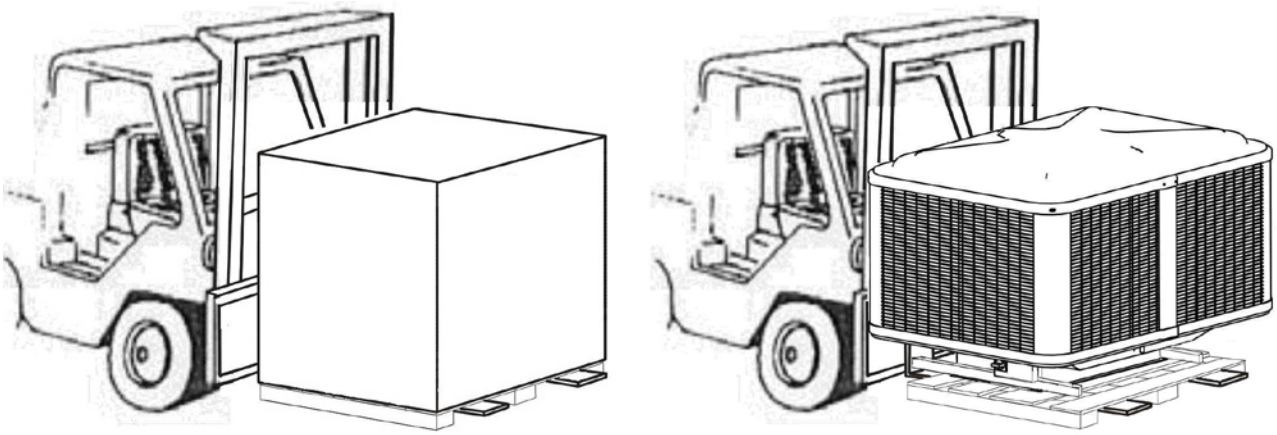
Check the packaging and its contents, if damage due to transportation is found, make a reserve for the damage on the shipping documents to be signed by the shipping agent and send a copy to the supplier.

EN

2.2 Transportation, handling and lifting

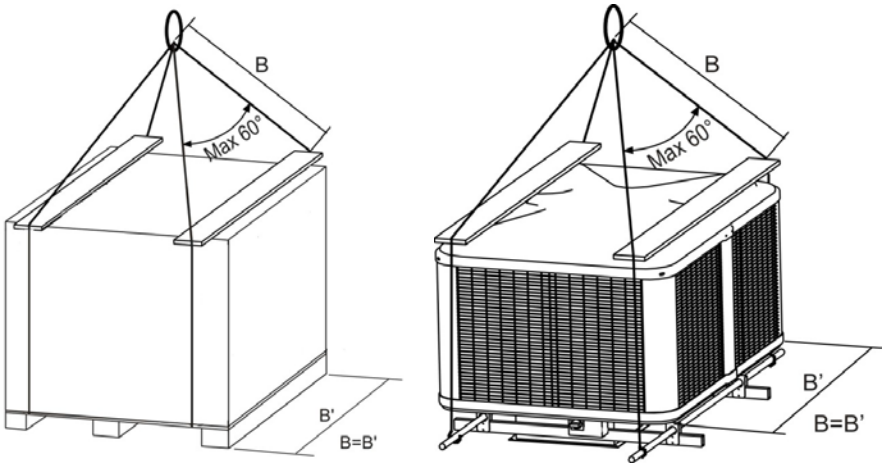
Take care when handling Evaporative Cooling units during unloading from the transportation means, handle and position to avoid damages to the equipment.
Avoid contact with elements, which may damage the equipment.
The supplier declines any responsibility for damage caused during transportation, loading and unloading of the evaporative cooling units.

2.2.1 Lifting with fork lift



Widen the forks as much as possible to balance the load. Dip the ends of the forks to avoid damaging the bottom of the machine.

2.2.1 Lifting with cables



We suggest to attach the cables as shown, inserting spacers of an adequate length to prevent the cables from damaging the casing when tightened.
Because of the heavy weight, TC models, when unpacked, are provided with punched brackets to allow to lift them by using appropriate metal tubes.

Place the goods down with care, avoiding sudden movements or, worse, dropping the goods.

IT IS ABSOLUTELY FORBIDDEN to station under suspended loads and inside the movement area of the lifting equipment.

When handling the units, use suitable means according the weights involved, as envisaged by EC Directive 89/391 and subsequent amendments.
Lifting must only be carried out by qualified personnel.

2.3 Unpacking the equipment

Free items from the packaging material and collect the packaging to avoid potential danger of fire and suffocation of persons or animals.
Leave the machine on its packaging base until the installation to avoid damages.

Disposal of packaging materials must be conform to the regulations in force in the country of destination where the evaporative cooling unit is installed.

2.4 Storage

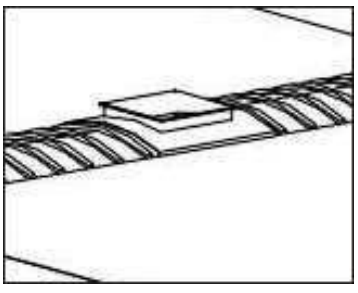
During transportation and storage, make sure that the environmental temperature is between -10 and 50 °C. If the ColdStream evaporative cooling unit must be stored, make sure that the relative humidity in the warehouse is between 5% and 90%.

3.0 Positioning and installation

3.1 General warnings

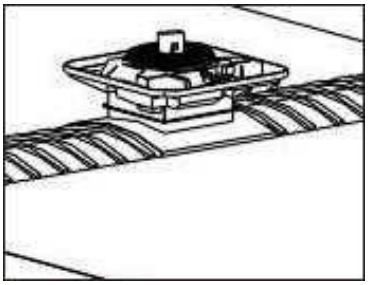
Before proceeding to install, make sure that each evaporative cooling unit has been unpacked and checked for damage.
Positioning and installation of the evaporative cooling units must be carried out by qualified personnel and by observing the laws in force in the country of destination.

3.2 Roof installation

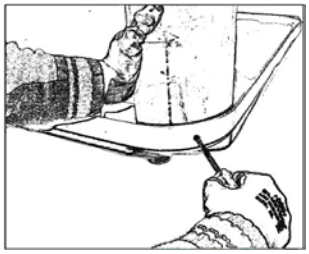


Prepare and fix an air inlet flanged duct. The flange has to be of the same dimension of the unit's trunk duct flange.
The unit is equipped with a trunk of flanged duct that will be fixed to the flange of the inlet duct prepared before.

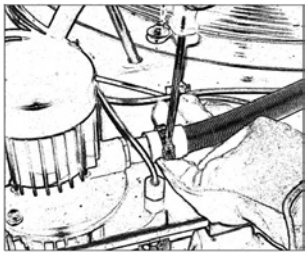
3.2.1 TA Evaporative coolers



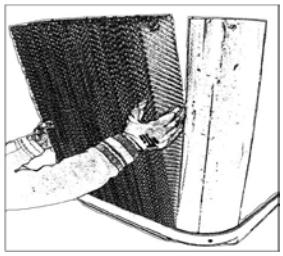
Position the evaporative cooler base to the inlet duct and fix the two flanges (base duct flange-inlet duct flange) together by using provided bolts.
It is recommended to insert some silicon paste between the two flanges to guarantee perfect insulation from external agents.



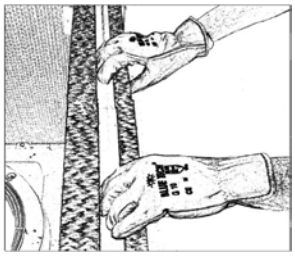
Position and fix the 4 coloumns at the cooling unit base by using provided screws.



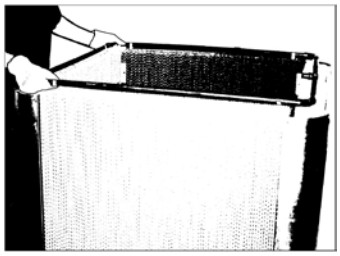
Check the tightness of the pump flexible hose clamp.



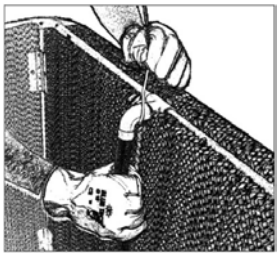
Positioning and applying cooling pads. Maintain the groove (made on one side of the pad) in the upper position and towards the external part of the machine.



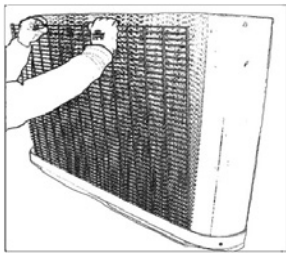
Insert the water distribution stripes into the pad grooves.
Check that stripes are well pressed down to the bottom of their seat.

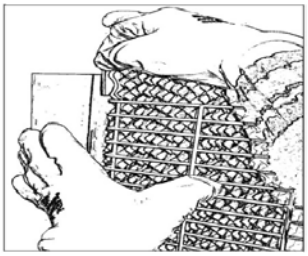


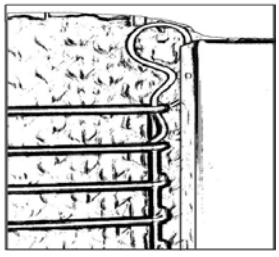
Insert the water distributor into the pad grooves and make sure that the water distributor rests in a uniform manner over the distribution stripes. Maintain the hose-end fitting on the side of the water pump. Make a hole through the pads to allow the passage of the hose-end fitting.



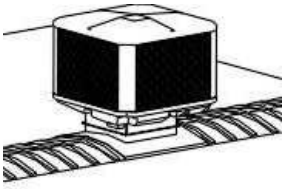
Connect the distributor hose-end fitting to the flexible hose coming from the pump and fix them with an hose clamp.





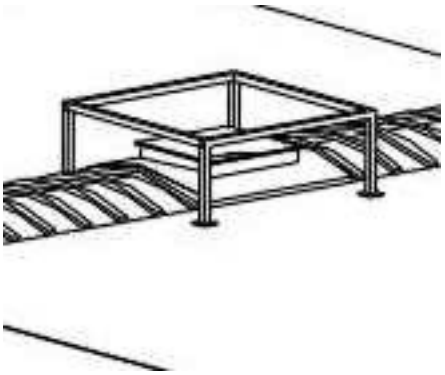


Insert the grates on the sides and rear of the unit and fix them by using the clips provided. Do not assemble the front unit grate (connections/ components side). At first insert the clips till to their first “click” on the two upper corners of the grate. Finally force the clips until they are completely inserted so that they do not protrude from the cooling pads.

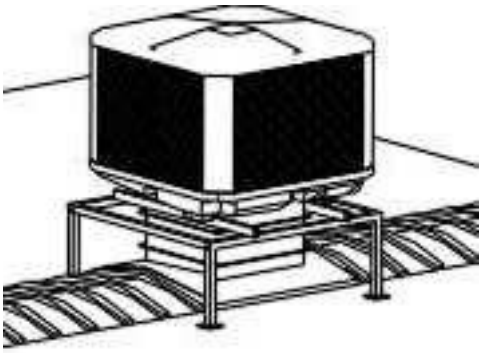


Position the cap without fixing it to allow the front unit grate insertioning. The cap must be lifted so the grate slots into its seat. Do not use clips to fix the front unit grate to facilitate any necessary maintenance operation. Once the protection grates have been positioned, fix the cup by using supplied screws.

3.2.2 TC Evaporative coolers



Prepare and fix an air inlet flanged duct and a frame to hold up the unit. The flange has to be of the same dimension of the unit's trunk duct flange.
The unit is equipped with a trunk of flanged duct that will be fixed to the flange of the inlet duct prepared before and with two side girders bars that will be fixed to the prepared frame.
Verify that the frame is designed to well support the weight of the machine, doesn't cause vibrations and it must be perfectly horizontal. If necessary to insert antivibration dumpers between frame and the bars, this needs to be planned before manufacturing the frame and consider to insert flexible couplings in the hydric connections.



Position the evaporative cooler on the inlet duct.
Fix the two flanges (base duct flange-inlet duct flange) together and the bars at the frame by using provided bolts.
We suggest to insert an outlet flexible connection between the two flanges to avoid vibrations transmitted through the ducts.
We suggest to insert silicone sealant between flanges to guarantee perfect insulation from external agents.

3.3 Notes

Inside the building, prepare the anchor points for the support chains of the air inlet duct. These must be placed in a position to avoid excessive stress to the air inlet duct and make sure they are on the same axis as the machine.
To anchor the unit to the ceiling or to the wall, use chains and accessories having the necessary test certificates, made from zinc-plated steel or stainless steel and having a wire diameter of no less than 3 mm or dimensioned for the weight to be supported, bear in mind safety margins imposed by regulations.

Do not use aluminium alloy or similar components.

The ducts must be sized according to the ratings of the system and the characteristics of the fan. Incorrect calculation of the size of the ducting may lead to a drop or an increase in output, causing the activation of any safety devices in the system.

3.4 Connection to the power supply

Each unit must be connected to the power supply using an Omnipolar switch. The isolator must have a distance between its contacts of at least 3 mm for each pole and must be placed in a position that can be easily reached by the user. The electrical plant must be constructed according to the regulations in force in the country where the machine is installed.

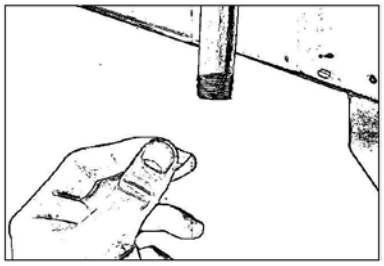
Connection to the power supply MUST be carried out by qualified personnel.
All components used to connect the power supply must be certified.
Before working on the power supply cables, make sure that power has cutted-off.

Provide an efficient earth connection.

The unit is supplied with an electrical switch box for the connections, this is placed on the external part of the unit. It contains a main power inlet switch and a domino for the remote control module connection. The unit is supplied also with a remote control module to be installed inside the building.
For connection to the power supply, use a multipolar cable + T (earth) according to directives in force.
Comfort line: For connection to the remote control device use shielded data cable type 20 AWG - 5 poles with a minimum section of 0,50 sq. mm – Maximum length of 25 meters.
Basic line: For connection to the remote control device use multipolar cables according to directives in force. Perform connections as shown on the wiring diagram enclosed in this manual or inside the on-board electrical box.
It is absolutely necessary to maintain the polarity of the electrical phases and the numbers on the wires/terminals.

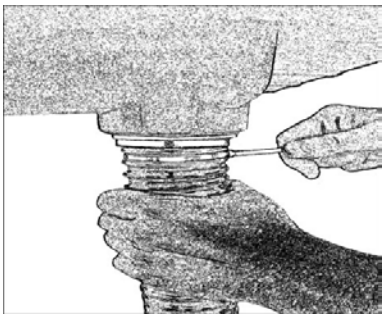
3.5 Connection to the water supply

The ColdStream cooling unit is connected to the water supply by a 3/8" sleeve attachment found on the lower part of the equipment, it is advisable to provide a water tap at the water inlet to run dry the plant before winter.
Insert a sand filter in the water supply plant.
The water piping must guarantee a minimum capacity of 5 -10 Lt/minute at a pressure of 1.5 - 3 bars. (maximum pressure allowed: 6 bars).
It is advisable to install the water piping inside the building, to protect it from freezing during winter, otherwise, insulate it adequately.
It is advisable to use potable water, hardness not more than 27°f and not less than 7°f. If hardness is more than 30°f, insert a water softener system into the water supply plant. Don't use demineralized water.



Proceed to connect the 3/8" connection to the main water supply. DO NOT use excessive force on the sleeve during its connection to the water supply.

The unit is also equipped with a Ø60 mm sleeve to discharge water.



Connect the supplied flexible hose (on request for Basic line) according to the situation found at the installation site as mentioned further on, fix the hose by using a hose clamp.
1st Situation: If a discharge system is present, connect the tube to the dis-charge according to the regulations in force regarding hygiene in the country where the unit is installed.
2nd Situation: If no discharge system is present, place the hose in the best way avoiding any bends.
When connecting the discharge hose, DO NOT use excessive force on the sleeve and make sure that the sleeve does not rotate.

4.0 Protection devices

4.1 Protection devices

To comply with the instructions of the European Community Directives, applicable to the unit referred to in this use and maintenance manual, Mark Climate Technology has designed the safety systems on the unit foreseen by the regulations in force.

4.2 Caution signs applied on the unit

DANGER: Risk of electric shock

MOVING MACHINERY

4.3 Clothing

The equipment is destined for installation in positions which cannot be directly reached by users during normal operations and therefore particular prescriptions regarding clothing are not necessary.

4.4 Residual risks

It is forbidden to use water to clean electro-mechanical components
Electrocution danger

Pay attention to fan movement. Do not introduce arms or limbs.
Mechanical danger

4.5 Emergency situations

In case of emergency immediately turn the machine off and cut off the electrical circuit through the omnipolar isolator switch, identify and solve the problem, contact Mark Climate Technology.

It is absolutely forbidden to use water to put out fires, use exclusively powder or CO2 extinguishers.

5.0 Functioning notes

The functioning of the evaporative cooler is based on an important principle: It introduces big quantities of fresh air into the building and removes hot exhausted air through doors, windows and other openings. If the system is not able to expel the air volume introduced into the building, the efficiency would be compromised. INLET FRESH AIR = OUTLET HOT AIR: a very simple principle. If the system is able to expel all the air introduced into the building, the system operates at the highest efficiency. The ideal condition is when, into the building, the air diffusers are positioned away (better on the opposite side) from the openings (windows, doors, etc.) so the air passes through the building while cooling it. Maximum efficiency can be reached by adjusting the dimensions of the window and door openings. Never close the openings: if they are closed, no changes of air will occur, consequently reducing the cooling effect and increasing the relative humidity level inside the building.

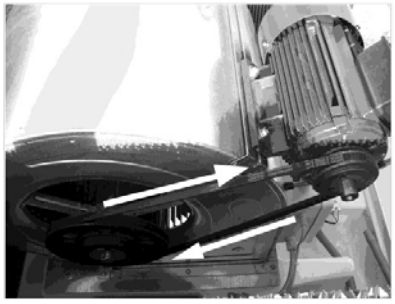
To optimize the system efficiency, consider the following openings for air expulsion:
Guarantee about 0,5 sq.mt of extraction for every 1000 cu.mt. of introduced air (refer to the project data).
The more dry the external air is, the more cooling capacity could be reached by the system. Your evaporative cooling system will not operate at maximum efficiency during high humidity days however it will still reach an efficient cooling level.
In areas with high relative humidity, the evaporative air cooling system must be oversized to guarantee more air changes, or in other words, it must have higher capacity to compensate the smaller temperature difference given. In these areas, the maximum cooling effect will be reached by making sure that there are more air evacuation points than normally used and that the units will be switched on early in the morning to avoid latent heat growing up inside the space to be cooled. Your supplier will design your system considering your climatic conditions. During days when the relative humidity level is near to or more than 70%-75%, it is advisable to switch on the system in ventilation mode only.
The cooling efficiency of a system depends on: the cooling unit efficiency, air ducts design, installation quality, building conditions. Insulated ceilings significantly reduce the internal temperature in comparison with uninsulated ceilings. The same latter concept is applicable to the air duct.
During normal operating conditions in COOLING mode, the evaporation process leaves mineral salts accumulation and solid residue in the discharge water, this water is NOT POTABLE.

6.0 Use of the ColdStream

6.1 First start-up

2.1.1 All models
For optimally using and functioning of the plant/machine it is necessary that, during the first start-up (in cooling mode), the fan runs at minimum speed and keeps it for at least one complete day.
If this procedure is not observed, during the first day of functioning only, malfunctioning of the evaporative pads may occur resulting in water drops coming out of the ducts.
During the first start-up of your cooling system, an unusual odour may be detected.
When the evaporative panels start to get wet, they may emit a particular odour, which may be present for several hours. This odour is a characteristic of the treated cellulose material but it is not harmful.
Even the fan motor may present a "characteristic" odour for a short period, which is caused by initial heating and by any paint on the surface of the motor itself.

2.1.2 TC model series
During first start-up, be sure of the right rotation of the fan (indicated with an arrow (adhesive plate) placed on fan body):
1. Take the machine top off by unscrewing the 4 corners screws.
2. Turn the machine on in ventilation mode
3. Rotation must have the same direction of the arrows as shown:

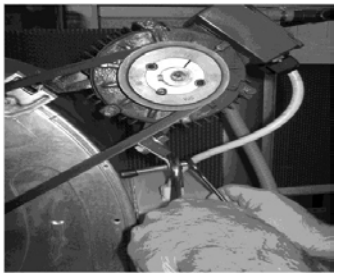


4. If the fan should rotate in the wrong direction, it's necessary change the main switch power supply connections by exchanging L1 and L2 connections
5. Look again... rotation has the same direction of the arrow.
6. Replace and fix the machine top.
If at point 3, the fan should rotate in the right direction, go to point 6 avoiding point 4 and 5.

Check the tightness of the belt

As the latter, after the first few hours of operation, tend to loosen due to the elasticity of the rubber, correct tension must be restored, thus avoiding annoying noises and ensuring long life. To check the belt, proceed as follows:

Place a perfectly straight extruded bar on the two pulleys, by using a finger apply a light force on the middle of the belt and measure the distance between the flexed belt point and the bar. The distance should be between 1cm and 1,5cm.



If the measured distance is higher or lower, it's necessary to tight or to re-lease the belt by using the apposite screw.

Excessive tightness of the belt as well as reducing the life of the belt, may also cause deformations to the fan shaft and overload the bearings

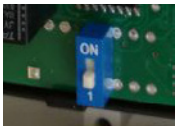
Check, when checking the tightness of the belt, that the fan bearings do not leak liquefied grease: this, together with the excessive temperature of the bearings (>60°C), detectable by touch, is a symptom of defects.
Check that the power input value of the electric motor fall within the operating limits shown on the rating plate. If the value is higher, this is normally the result of overestimating the pressure drop in the system, and must be corrected by adjusting the equalizing dampers and/or the transmission ratio by changing one of the two pulleys.

6.2 Comfort line

6.2.1 Remote Control Unit (display)
The cooling units are equipped with a remote control panel, which enables the user to manage all the functions.
This panel contains a logical unit which enables several functions necessary for good operation of the cooling unit.

At the first installation, it's possible that the display shows Etc blinking. It's necessary to set the current time (see Settings paragraph)

In case the Display of the control unit is off, make sure that the dip switch is set to position "1" and not position "ON". The dip switch is present on the main e-board inside the ColdStream unit.



6.2.1.1 Controller descriptions

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⏻	Keeping pressed more than 1"sec., switches the cooling unit on or off. Pressed once during setting On/Off periods, exits the menu. Pressed once during modifying default parameters, exits the menu. Keeping pressed more than 3"sec., if control unit is locked, makes it temporary unlocked. In the OFF position, the Display shows:" oFF ". The panel is always powered on.
FAN	Pressed once, displays the current fan speed (F1-F2-F3-FA).
PRG	Pressed once, gets into program selection or into On/Off periods setting. Pressed once during On/Off periods setting, it has Enter function.
ON OFF	Keeping pressed more than 1"sec., selects operating mode: Cooling ON (manual), Cooling/Ventilation AUTO (automatic), Ventilation ON (manual).
DAY	If time is displaying, sets the current day. Pressed once during On/Off periods setting, changes days.
TIME	Pressed till the display shows "time", it shows the current time setted.
H	If time is displaying, sets the current hour. Pressed once during On/Off periods setting, changes hours. Pressed once during modifying default parameters, increases the value. Pressed once after pressing FAN command, increases fan speed and/or disables automatic fan speed. Keeping pressed more than 2"sec. togheter with M command, changes the default parameters.
M	If time is displaying, sets the current minutes. Pressed once during On/Off periods setting, changes minutes. Pressed once during modifying default parameters, decreases the value. Pressed once after pressing FAN command, decreases fan speed and/or disables automatic fan speed. Keeping pressed more than 2"sec. togheter with H command, changes default parameters.
°C TEMP	Pressed once, shows the temperature detected. Keeping pressed more than 5"sec., permits to set the temperature requested (set-point).
% H.R.	Pressed once, shows the humidity detected. Keeping pressed more than 5"sec., permits to set the humidity requested (set-point).

6.2.1.2 Signals descriptions and on-screen displays

ON OFF	The led indicates if the timer (Automatic program) is in the On phase (ON) or the Off phase (OFF)
ON	When lit, indicates that the unit is working in manual cooling mode.
AUTO	When lit, indicates that the unit is working in automatic cooling mode.
ON	When lit, indicates that the unit is working in manual ventilation mode.
AUTO	When lit, indicates that the unit is working in automatic ventilation mode.
day 1-7	When lit, indicates the day-of–the-week is shown: 1°= Monday …
	Blinks during modifying values or parameters.
OFF	Unit off. Attention: the panel is always powered-on.
FAN	Ventilation mode only.
P-00	STARTING COOLING - Waits for the drain valve to close and turns the water pump on.
P-01	COOLING
P-02	DRAIN
CIn	SELF CLEANING
STOP	End of program - OFF period
Loc	Control unit locked
--:--	Free space in memory
- -	Temperature and humidity probe disconnected
En	Communication doesn't work properly. It's possible a wrong connection of the wires
EE	Eeprom failure, try to turn off and turn on the unit
EA	TIME OUT filling or draining tank failure. To cancel the event, try to power off and to power on again. If failure is still on display, it is necessary to do maintenance the unit.
Etc	Clock error. The time on the remote controller is not set. The device sets automatically the time to 8.10 am on Monday. Until the time is not set, the display will show the same message. Set the current time.

6.2.2 Switching ON

Keep  key pressed until the display will shows the time

6.2.3 Switching OFF

To stop the unit functioning, keep  key pressed until the display will show OFF

6.2.4 Starting mode

6.2.4.1 Manual start mode

With the machine switched on, press several times the key until the led goes on the corresponding operation mode required:

Cooling Ventilation

6.2.4.2 Automatic start mode

The unit will operate according to the programme setted. With the machine switched on, press several times the key until the led goes on the corresponding mode required:

Cooling Ventilation

6.2.5 Settings

6.2.5.1 Setting current time

Keep the TIME key pressed until display shows "time"

Release the key, display shows the setted current time. It will be shown for 5"sec. or until the key is pressed. When you are showing/modifying the time, the symbol blinking.

Press the DAY key to set the day of the week, 1 = Monday, 2 = Tuesday . . , 7 = Sunday.

Press the TIME key to insert the current hour.

Press the M key to insert the current minutes.

To get back wait 5"sec. or press the key

6.2.5.2 Setting On/Off periods

Press several times the PRG key until the display shows PR9.

Release the key, the display shows the first memory position, the symbol blinking.

Press several times the PRG key until the display shows the first free memory position "- -:- -".

Press the DAY key to insert the day or the combination of days required.

Press the H and M keys to insert the ON or OFF time.

Press the ON/OFF key to set the event:

on = Cooling on = Ventilation On = unit ON, Off = unit OFF

Then save the programme and go to the next free memory space press the PRG key.

Then exit and show the preview display, press the ⏻ key.

If you want to exit without saving the last program setted, press the ⏻ key or wait 30”sec.

6.2.5.3 Reading a stored program

Press the PRG key and the display will show the first space in memory while the 🔧 symbol blinking.

Press several times the PRG key and select the programme to be changed.

To exit programs reading and go back to the main display, press the ⏻ key or wait 30”sec.

6.2.5.4 Modifying a program

Press the PRG key and the display will show the first space in memory while the 🔧 symbol blinking.

Press several times the PRG key and select the programme to be changed.

By pressing DAY H M ON OFF keys it is possible to change the settings.

To save changes, press the PRG key.

To exit the programming mode press the ⏻ key or wait 30”sec.

6.2.5.5 Deleting a program

Press the PRG key, the display will show the first space in memory while the 🔧 symbol blinking.

Press several times the PRG key and select the programme to be deleted.

To delete the selected program, press and keep pressed the PRG key, until the display will show “- -:- -“

To delete all the programs, press and keep pressed the PRG key, until the display after showing “- -:- -“ will show “EALL”.

To exit and go back to the current time, press the PRG key.

6.2.5.6 Setting temperature and humidity values

Default factory settings: Temperature : 26°C
Relative humidity : 75%

Keep pressed the °C TEMP key until "SP" is displayed (then release the key). The display shows the set point value and the  symbol blinking.

Use the  keys to increase or decrease the value.

To confirm press the  key or wait 10"sec.

Keep pressed the % H.R. key until "SP " is displayed (then release the key). The display shows the set point value and the  symbol blinking.

Use the  keys to increase or decrease the value.

To confirm press the  key or wait 10"sec.

6.2.5.7 Locking/Unlocking remote control unit

It is possible to lock the remote control unit to avoid the control by anyone.
To lock the remote command unit the HL parameter value must be modified from NO to YES.
Modify the HL parameter as follows:

- Keep pressed together the  keys more than 2"sec until the display shows PA.
- Press the  key twice.
- Press the  or  keys to find the parameter to be changed. In this case choose HL.
- Press the  key to see the current setted value.
- Press the  or  keys to change the value.
- Press the  key again to go back.

To save the modification and exit press the  key or wait 30"sec.

When the remote control is locked, display shows Loc when pressing every key. To temporary unlock the remote control, keep the  key pressed until the display shows off. The remote control goes automatically back to locked status after 15"sec. from last key pressing.

6.2.6 Operating mode

6.2.6.1 Cooling

Press 

key to choose the cooling mode desired:

(manual) 

(automatic)

The machine starts cooling function.

If the probe detects, inside the building, a humidity value 5% more than the value setted, the machine goes in ventilation mode (cooling stand-by). If the probe detects, inside the building, a humidity value less than value setted, the machine goes back in cooling mode.

It's possible to set the air flow by choosing the fan speed by using the 

key.

It's also possible to set automatic speed function FA (see next part).
To guarantee pads longer life, the evaporative cooler has the tank's water changes every 4 hours (factory default) and a pads self cleaning cycle when the machine is switched off:
Every 4 hours, the machine goes in cooling stand-by (ventilation mode). It drains water from its tank and re-fills it with fresh water, then goes back in cooling mode. (Elapsing time between the tank's water change can be modified depending on environmental conditions and/or kind of water inlet. To make this change, it's necessary to call Mark Climate Technology). Every time the evaporative cooler is switched off, it starts a pads self clearing cycle 10 minutes long. It drains water from its tank and re-fills it with fresh water, than it starts water recirculation through the pads (ventilation off) to remove residual salts and other kind of dirtiness. At the end of cycle the machine drains the water from the tank.

6.2.6.2 Ventilation

Press 

key to choose the ventilation mode desired:

manual) 

(automatic)

The machine starts ventilation function.

Press the 

key to display the current fan speed.

Press 

or 

keys to set the fan speed desired or the automatic speed function "AUTO"

To save the changes and exit press the 

or 
keys or wait 1"sec.

Air flow during automatic speed function (FA) depends on the setted temperature value and the temperature value detected by the probe. If the probe detects, inside the building, a temperature value higher than the value setted, the fan start on higher speed until it reaches the setted temperature value. When the temperature is reached, the fan goes on lower speed. If the temperature rises up, the fan goes on higher speed. The fan will go on as described before.

6.2.7 Operating faults

If during normal operations of your cooling unit, the "EA" code appears on the control panel, it is most likely that dirtiness has accumulated (e.g.: leafs, etc.) around the discharge valve and it doesn't allow the complete evacuation of the water or it could be the level switch that doesn't work properly. The error signal can be reset by turning off the machine. If, when turning back on the machine, the signal appears again after about 1 minute, a technical problem does persist so it's better to contact the installer or Mark Climate Technology.

If during normal operations of your cooling unit, water drips continuously through overflow holes, it is most likely that the level switch is not working properly. Contact the installer or after sales service.

In both cases it would be best to shutdown the plant, cut-off electrical power, close the water tap, get in touch with the installer who constructed the plant or a licensed technical service center.

6.2.8 Bus System

Comfort line models have on-board printed circuit that allows to have a BUS System connection called CBS or a one command control system called CABS. The CBS system can be controlled by a P.C. and can manage up to 58 units. The CABS System can manage groups of 5 unit controlled by one remote command. It is possible to have these systems implemented even after the cooling system is installed. For further information, please contact Mark Climate Technology.

7.0 Maintenance

We recommend annual service to the system to maintain it in perfect operation conditions. Before the machine start-up the equipment should be checked to make sure it will work properly, so any maintenance or repairs necessary could be carried out before the working season of the unit.

7.1 End of season maintenance

- Cut power inlet off by using the main isolator-switch.
- Close the water supply. Empty the water supply plant to avoid bursts due to icing.
- Take the machine top off.
- Check that waterways are clean and that there are no obstructions in the water supply and distributor in the upper part of the unit. Clean any debris in the water pump.
- Fully clean the tank of the unit. Use a mild detergent, not a solvent cause it may react with plastic materials.
- Replace and fix the machine top using the bolts supplied.
- Apply the protection cover on the machine making sure that it has no holes or damages, if damage is detected, repair the cover or substitute it.

It is very important that the protection cover is applied to the evaporative cooler at the end of the season, this avoids the machine from being damaged by climatic factors during the set-aside period; smog, acid rain, ice, etc.

7.2 Pre-season maintenance

- Cut power inlet off by using the main isolator-switch.
- Remove the protection cover and check for any damage that may have occurred. Clean the cover well with mild detergent and store it in a place where it is protected from bad weather.
- Remove the machine top.
- If necessary clean the tank.
- TC models: check the tightness of the belt (*) – (see par. 2.6.2). When damaged it must be changed.
- Check the evaporative pads and clean them from any dirtiness using water. If they have too much incrustation, it is necessary to change them.
- Check that waterways are clean and that there are no obstructions in the water supply and distributor in the upper part of the unit. Clean any debris in the water pump.
- Turn the machine on by using the main isolator-switch.
- Open the water supply. Start the system in COOLING mode and check that the discharge valve is closed and that the water fills the tank up until the water inlet valve stops.
- Check that the water is distributed evenly on all evaporative pads.
- Check that the discharge valve is working properly; make sure that it opens within 5 minutes after having pressed the OFF key.
- Check if there are losses of water.
- Check cables conditions.
- Replace and fix well the machine top using the bolts supplied.

(*) During working season, it is advisable to check it monthly.

The manufacturer does not assume any responsibility or is liable for any guarantee due to damage caused by non-observance of prescriptions, any non-conform installations and, in the case of improper use, of the equipment by the final user.

7.3 Maintenance safety regulations

7.3.1 Clothing

The personnel charged to machine maintenance must not wear clothing with large sleeves, laces or belts, which may cause danger. The personnel must also wear individual protection devices conforming to the laws and regulations in force.

The maintenance personnel must be professionally qualified.
Before carrying out any maintenance operations, read this section of the manual carefully. Mark Climate Technology is not responsible for any damage or malfunctions due to lack of respect of the indications contained in the present section of this manual.

During maintenance operations, place clearly and easily visible a sign stating “Work in Progress” on all access areas to the department. Record all maintenance operations carried out on an appropriate register, making sure to state: date, time, type of intervention performed and the name of the person.

The personnel charged to maintenance that use any solvents must be equipped with individual protection devices (safety glasses, filter masks, gloves) suitable for contact with the solvent used. When using solvents it is strictly forbidden to smoke and use open flames. After use, ventilate the building to help any residual vapours to leave.

It is forbidden to:
Leave any flammable materials near to electrical panels.
Operate on the electrical equipment before cutting power supply off.
Operate on any part of the unit before the plant did stop.
Operate with safety systems deactivated or removed from the equipment.
Deactivate or evade the alarm signals.

7.3.2 On board signs

DANGER: Risk of electric shock

MOVING MACHINERY

7.3.3 Residual risks

Pay attention to fan movement. Do not introduce arms or limbs. Mechanical danger

It is forbidden to use water to clean electro-mechanical components – Electrocution danger

It is absolutely forbidden to use water to put out fires.
Use exclusively powder or CO2 extinguishers

Once maintenance is terminated, before switching back the equipment on and starting-up the plant, perform a complete check for any tools and/or materials of any nature left near to or inside the unit and above all near to any moving mechanisms.

7.3.4 Technical assistance request
For any technical assistance intervention, contact the installer.

8.0 Dismantling

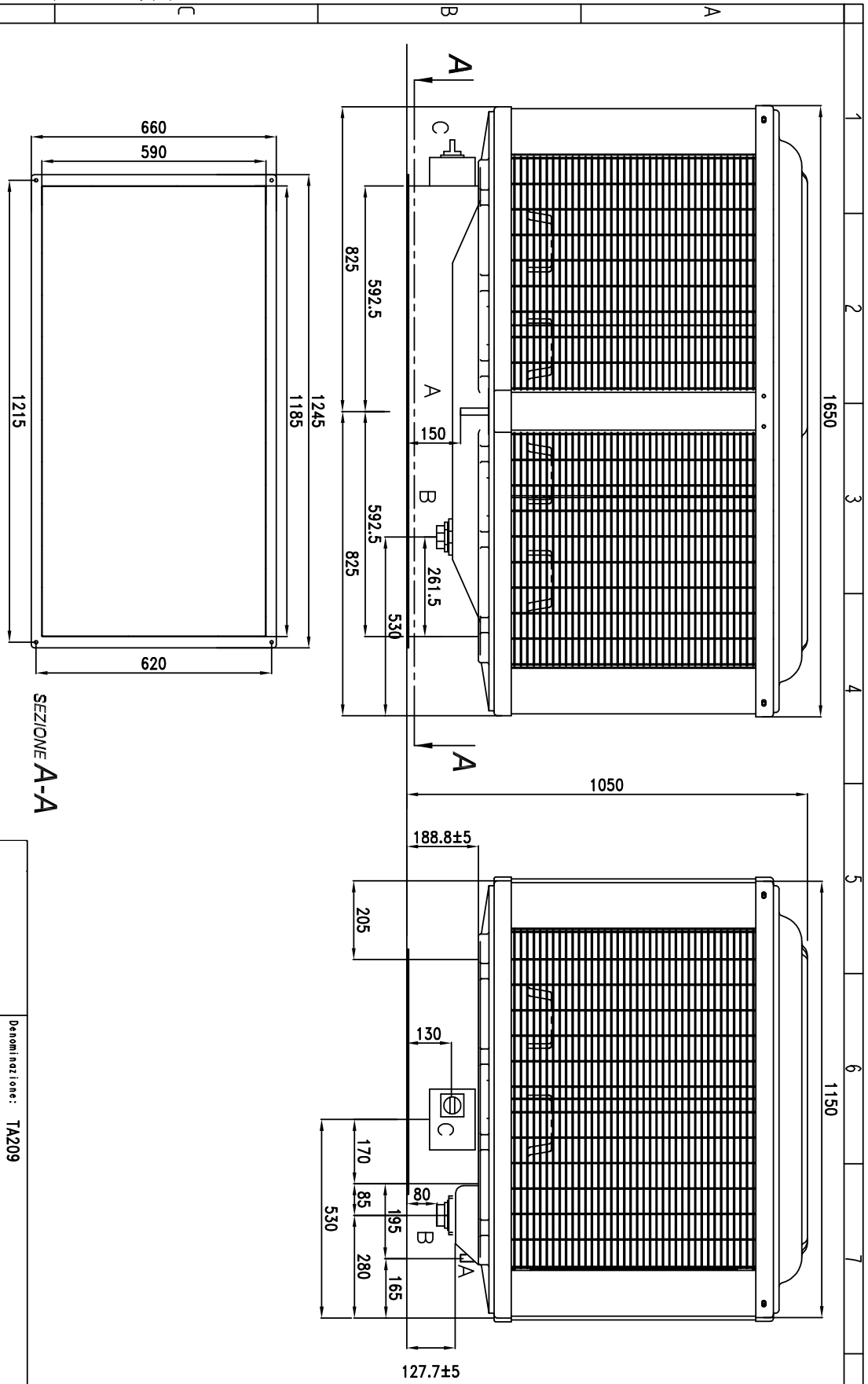
In case of dismantling and disposal of the plant, all material concerning the plant must be collected and sent to the appropriate collection and disposal centres of companies specialized in the disposal sector.

Dismantling of the plant must be carried out by specialized personnel, equipped with suitable equipment and personal individual protection devices.
Do not smoke and do not use open flames.

Technical features

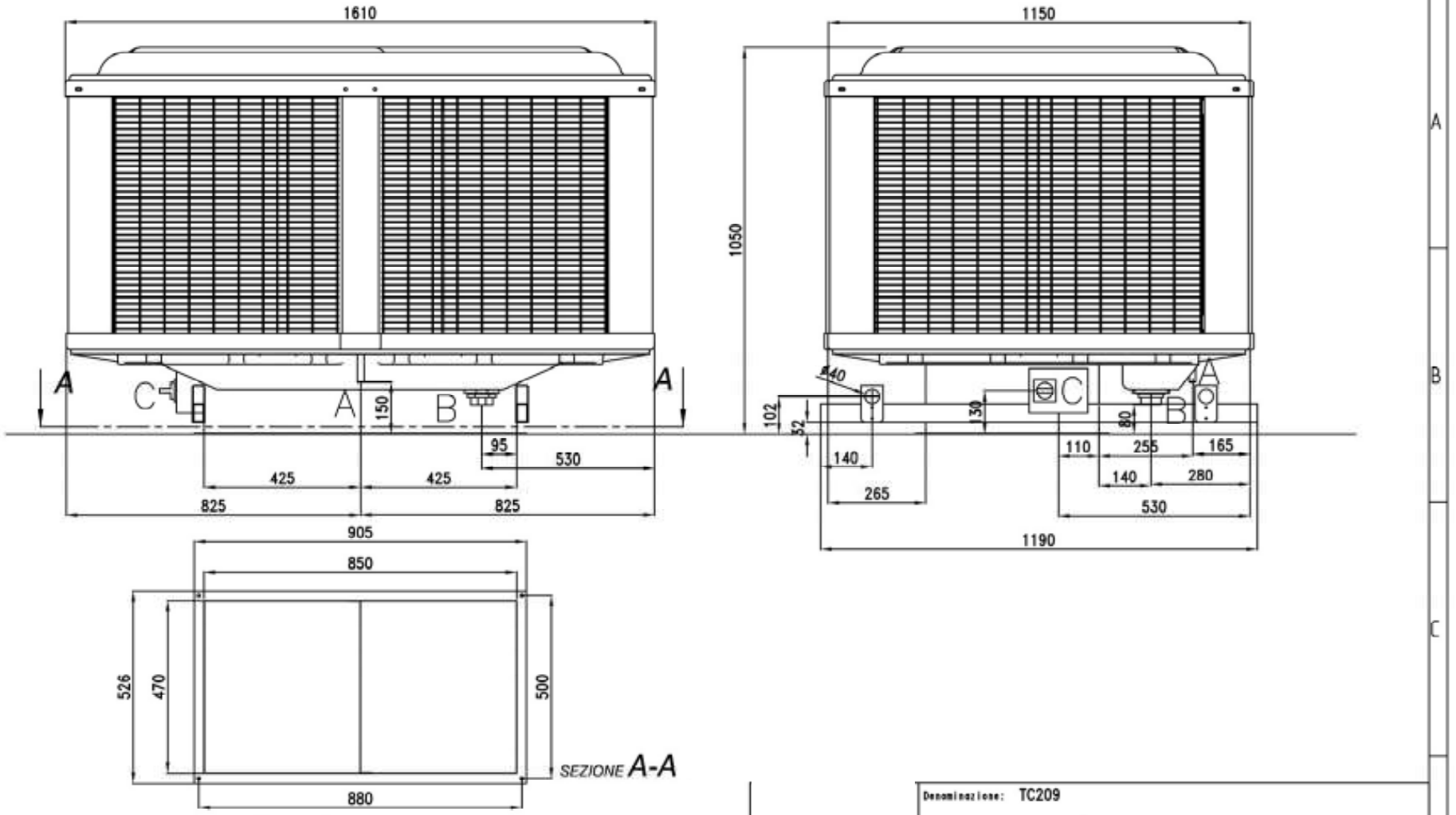
		TA123	TC123 HP	TA223	TC223	TC223 HP
Air flow	m^3/h (max)	13000	10000	20000	20000	20000
	m^3/h (med)	9700		15000		
	m^3/h (min)	6600	6500	10000	10000	6000
Power supply	V	230V/~50Hz	400V/3N~50Hz	230V/~50Hz	400V/3N~50Hz	400V/3N~50Hz
Current	A	4,8	3,5	7	7	7
Power consumption	kW	1,2	1,6	1,8	3,2	3,2
Water consumption*	lt/h	43	43	64	64	64
Water inlet	Ø			3/8	3/8	3/8
	Ø mm			60	60	60
Air outlet duct	mm	600x600	465x395	1185x590	850x470	850x470
Max lenght of ducts	m			5x1mt.+1curve	5x1mt.+1curve	5x1mt.+1curve
Evaporative pad: Thickness Area Saturation efficiency	 mm m^2 %	 100 2,7 88	 100 2,7 88	 100 3,4 88	 100 3,4 88	 100 3,4 88
Dimensions (WxDxH)	mm	1150x1150x1050	1150x1150x1050	1650x1150x1050	1650x1150x1050	1650x1150x1050
Weight (empty-full)	kg	67-88	110-130	120-146	200-220	200-220
Fan type		Axial	Centrifugal	Axial	Centrifugal	Centrifugal

* ***Test conditions:***
External tempature: 33°C
External humidity: 60%



Ind.M.	Descrizione Modifica	Data	Sigla
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Denominazione: TA209
Materiale:
Trattamenti: -
Scala
Data 15/06/17
Firma A.P.
Massa pezzo kg.
Lavorazione generale
N.CODICE
I_C018-Rev1
A3



A	CARICO ACQUA WATER INLET	3/8"
B	SCARICO ACQUA WATER OUTLET (DRAIN)	M60
C	ALLACCIAMENTO ELETTRICO	ALIMENTAZIONE : CAVO 5x1,5mmq MOD.DISPLAY : CAVO SCHERMATO 5x0,5mmq
	WIRING CONNECTIONS	POWER INLET : CABLE 5x1,5mmq DISPLAY : SCREENED CABLE 5x0,5mmq

Denominazione: TC209

Scala 0.1 | Materiale: | Massa pezzo kg.

Data 21/02/11 | Lavorazione generale

Firma O.Pastori | Trattamenti: -

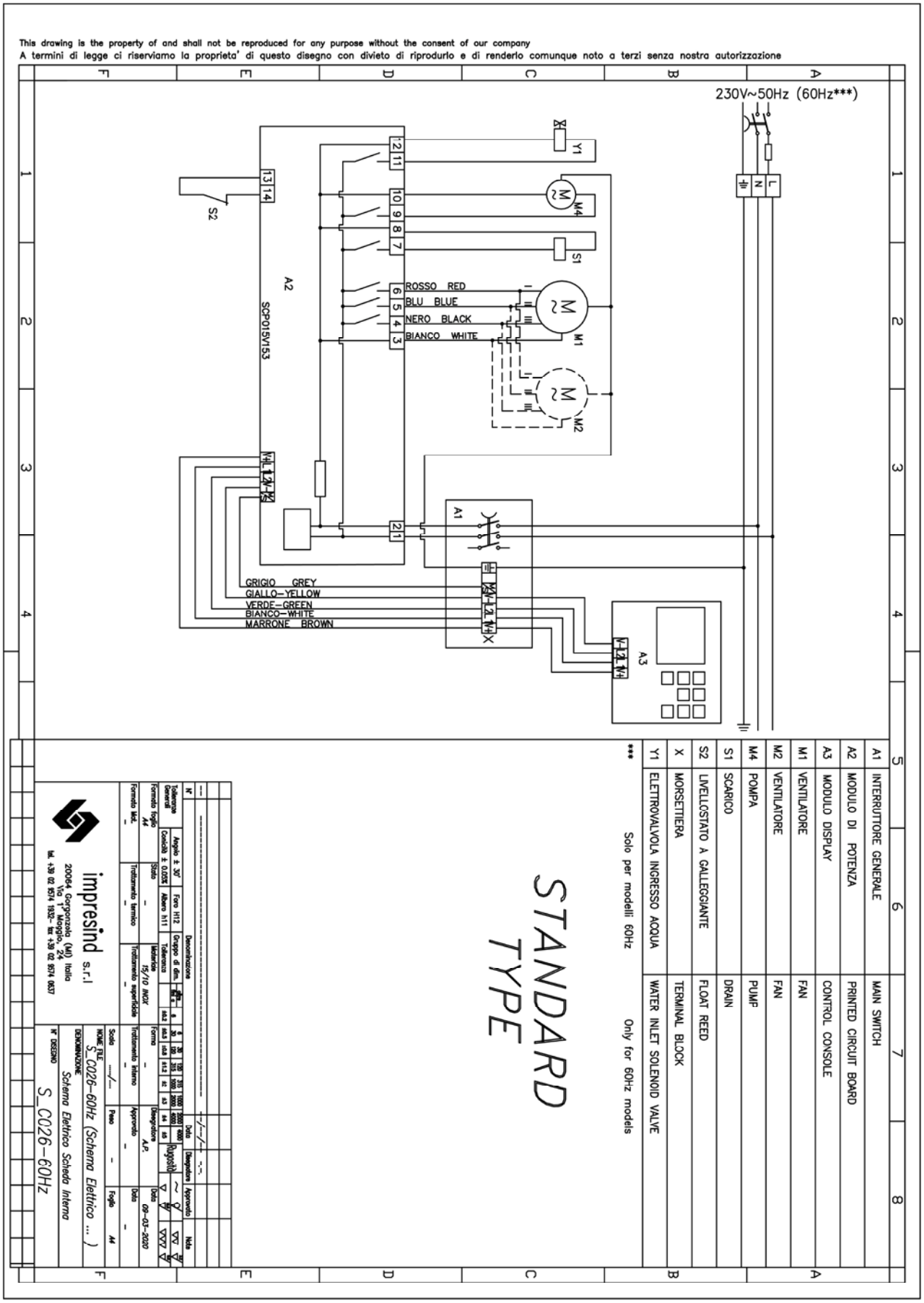
Ind.M.	Descrizione Modifica	Data	Sigla
01	Misura cappello da 1650 a 1610	09/21	A.P.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

N.CODICE

I_C020

A3

TA209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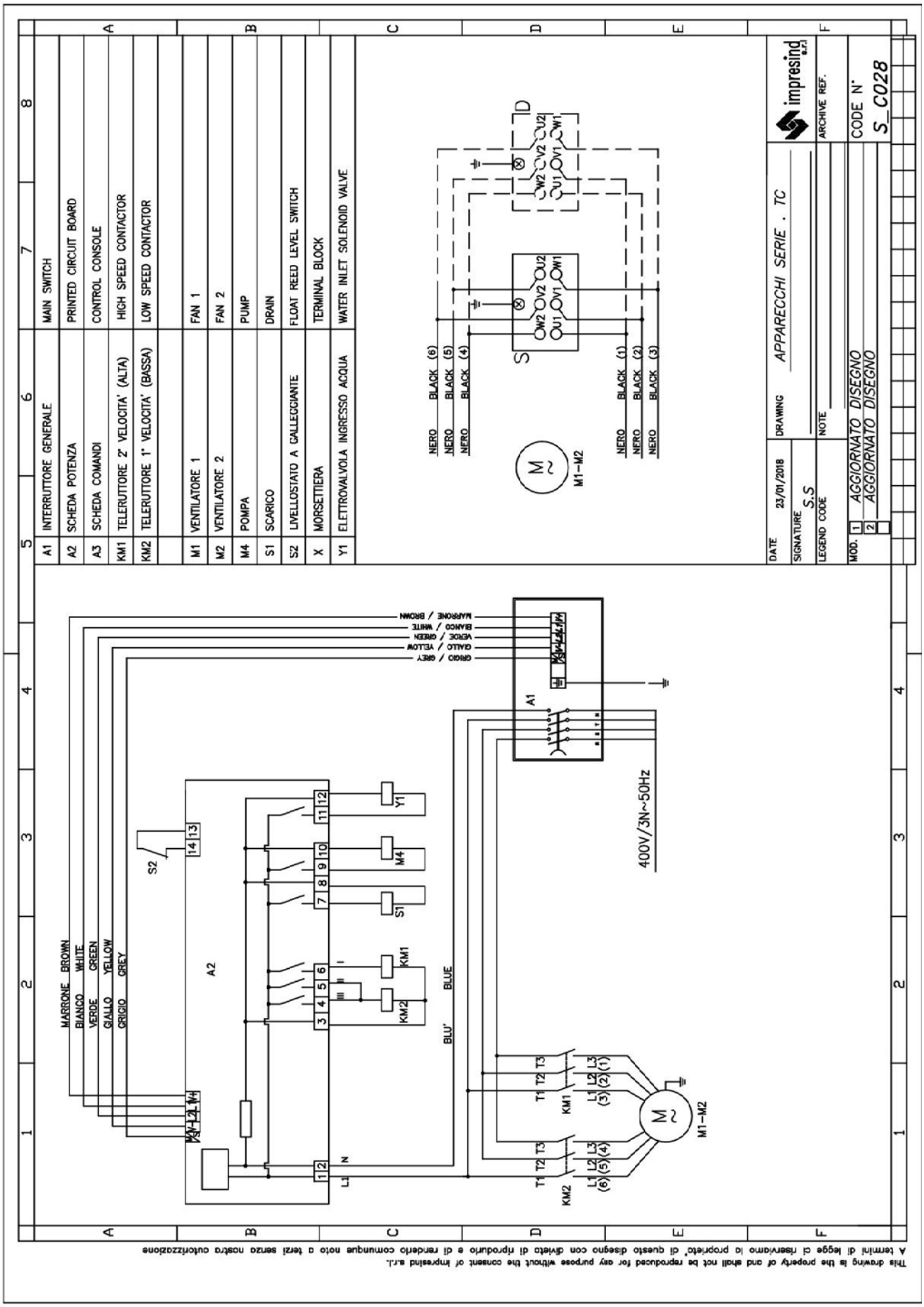
230V~50Hz (60Hz***)
A1 INTERRUTTORE GENERALE MAIN SWITCH
A2 MODULO DI POTENZA PRINTED CIRCUIT BOARD
A3 MODULO DISPLAY CONTROL CONSOLE
M1 VENTILATORE FAN
M2 VENTILATORE FAN
M4 POMPA PUMP
S1 SCARICO DRAIN
S2 LIVELLOSTATO A GALLEGGIANTE FLOAT REED
X MORSETTIERA TERMINAL BLOCK
Y1 ELETTROVALVOLA INGRESSO ACQUA WATER INLET SOLENOID VALVE
*** Solo per modelli 60Hz Only for 60Hz models
STANDARD TYPE
ROSSO RED
BLU BLUE
NERO BLACK
BIANCO WHITE
GRIGIO GREY
GIALLO-YELLOW
VERDE-GREEN
BIANCO-WHITE
MARRONE BROWN
SCP015V153
impresind s.r.l
S_C026-60Hz (Schema Elettrico ...)
Schema Elettrico Scheda Interna
S_C026-60Hz
09-03-2020

TC209


A1 INTERRUTTORE GENERALE
A2 SCHEDA POTENZA
A3 SCHEDA COMANDI
KM1 TELERUTTORE 2° VELOCITA' (ALTA)
KM2 TELERUTTORE 1° VELOCITA' (BASSA)
M1 VENTILATORE 1
M2 VENTILATORE 2
M4 POMPA
S1 SCARICO
S2 LIVELLOSTATO A GALLEGGIANTE
X MORSETTIERA
Y1 ELETTROVALVOLA INGRESSO ACQUA
MAIN SWITCH
PRINTED CIRCUIT BOARD
CONTROL CONSOLE
HIGH SPEED CONTACTOR
LOW SPEED CONTACTOR
FAN 1
FAN 2
PUMP
DRAIN
FLOAT REED LEVEL SWITCH
TERMINAL BLOCK
WATER INLET SOLENOID VALVE
APPARECCHI SERIE . TC
impresind s.r.l.
DATE 23/01/2018
SIGNATURE S.S
LEGEND CODE
NOTE
ARCHIVE REF.
CODE N° S_C028
MOD. 1 AGGIORNATO DISEGNO
2 AGGIORNATO DISEGNO
MARRONE BROWN
BIANCO WHITE
VERDE GREEN
GIALLO YELLOW
GRIGIO GREY
BLU' BLUE
400V/3N~50Hz
M1-M2
NERO BLACK (6)
NERO BLACK (5)
NERO BLACK (4)
NERO BLACK (1)
NERO BLACK (2)
NERO BLACK (3)
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