



WATER CHILLER Model: CFT

Use and Maintenance Manual

Editions Record

Code	Revision	Edition	Note
7425MUM741	04	09/2020	

Original instructions: **ENGLISH**

Dear Customer,

Thank you for the trust you have placed in us. Please read this manual carefully to obtain the best performance from our product.

In order to avoid incorrect operating conditions and danger for the operators, it is essential that you follow the directions meticulously as well as the current accident-prevention laws in the country of use.

Each **CFT** chiller is rigorously tested before being packed.

This verifies that there are no manufacturing defects and that the machine performs correctly the functions for which it was designed.

This manual must be kept for future reference and is an integral part of the chiller you have purchased.

Due to continuous technical development, we reserve the right to make the necessary modifications without any obligation to give advance notice.

Do not hesitate to contact us if you have any problems or need more information.

The product identification plate, located on the side of the chiller, contains all essential information about the machine.

Warranty conditions:

The warranty is valid for 12 months from the machine being powered-up and no longer than 14 months from the delivery date. Any part which is recognised as being faulty at source shall be repaired or replaced free of charge. This does not include transport costs, travel, room and board for technicians. The warranty excludes any liability for direct or indirect damage to persons, animals and/or property that are caused by incorrect use or inadequate maintenance and is exclusively limited to manufacturing defects.

Repair under warranty is subject to compliance with the installation, use and maintenance instructions contained in the "User manual and maintenance."

The warranty is considered void if the product is modified or tampered with in any way. When making a warranty request, please supply the information available in the product identification label.

CONTENTS

1	SAFETY RULES.....	1
1.1	Definitions of the symbols used	1
1.2	Warnings	2
1.3	Proper use of the chiller	2
1.4	Instructions for using equipment under pressure conforming to PED Directive 2014/68/EU.....	3
2	OPERATION AND MAIN COMPONENTS.....	4
2.1	Refrigerant circuit	4
2.2	Water circuit	4
2.3	Fans.....	5
2.4	Condensation control	5
2.5	Control of the water temperature	5
2.6	Protecting the integrity of the machine	5
2.7	Identification of the main components	5
2.7.1	SINGLE CIRCUIT TP P2 – Pressurized tank with single pump P2.....	5
2.7.2	DOUBLE CIRCUIT VSC – Shut-off compressors valve.....	6
2.8	Spare Parts.....	8
3	INSTALLATION.....	9
3.1	Transport	9
3.1.1	Lifting unit with belts and leveling feet installation.....	9
3.2	Storage	10
3.3	Place of installation	11
3.3.1	Installation spaces.....	11
3.4	Water connections.....	12
3.4.1	Recommended water system	12
3.4.2	Use of ethylene glycol as a winter anti-freeze.....	13
3.4.3	Charging the water circuit	13
3.5	Electrical connections	14
3.5.1	Remote on/off switch and alarm indicators.....	14
4	PRELIMINARY CHECKS AND START-UP.....	15
4.1	Preliminary checks and preparation for the first start-up.....	15
4.2	Start-up.....	15
4.2.1	Start-up under critical conditions	16
4.3	Turning off the unit	16
5	ELECTRONIC CONTROLLER.....	17
5.1	Main functions of the electronic controller buttons and meanings of the icons	17
5.2	Switching on/off.....	18
5.3	Controlling water temperature.....	19
5.4	Changing the cooling set point.....	19
5.5	Electronic thermostatic valve driver	20
5.6	Configuration of inputs and outputs	20
5.7	Alarms	21
5.7.1	Displaying and resetting alarms.....	22
5.7.2	Table of alarm codes.....	22
5.7.3	Displaying alarm history	23
5.8	Low water temperatures (<32°F//0°C).....	23
5.9	Controller menu structure	23

6	SAFETY DEVICES	26
6.1	Calibration of the safety devices and type of rearm	26
6.2	Resetting the high-pressure pressure switch	27
7	OPERATING LIMITS	28
8	SEPR - SEASONAL ENERGY PERFORMANCE RATIO	30
9	MAINTENANCE, INSPECTIONS AND PERIODIC CHECKS	31
10	TROUBLESHOOTING	32
11	DISMANTLING THE CHILLER	36
12	WATER DIAGRAMS	37
13	REFRIGERANT CIRCUIT	39
14	DIMENSIONAL DRAWINGS	41

SAFETY RULES

1.1 DEFINITIONS OF THE SYMBOLS USED



Read this use and maintenance manual carefully before performing any repairs on the chiller.



Warnings of a general character; risk of danger or possibility of damaging the machine, pay particular attention to the phrase following this symbol.



Risk of electrical danger; the phrase highlights conditions that could be fatal. Follow the instructions provided meticulously.



Risk of danger; component or system under pressure.



Risk of danger; component or system that can reach high temperatures during operation.



Risk of danger; it is absolutely forbidden to use water to extinguish fires near or on the chiller.



Risk of danger; it is absolutely forbidden to operate the machine with the panel open.



Service that can be performed by the machine's operator, if qualified (1).



Water input connection point.




Water output connection point.




Dispose of each type of material in accordance with the requirements of the country of use.


NOTE	Phrases to be emphasized that do not contain safety rules.
-------------	--


	<p>This chiller has been carefully designed and constructed to be environmentally friendly:</p> <ul style="list-style-type: none"> • Refrigerants without CFC; • Expanded foam insulation without CFC; • Energy-saving techniques; • Reduced noise; • The chiller and its packing materials are recyclable. <p>In order not to hinder our efforts, the user is required to obey the simple ecological warnings indicated by this symbol.</p>
---	---


(1) These are persons with the experience, technical preparation and knowledge of standards and regulations who are qualified to perform the necessary actions and able to recognize and avoid possible dangers while handling, installing, using and maintaining the machine.

1.2 WARNINGS

	Only qualified persons may use and maintain electrically-powered equipment. Before commencing maintenance operations ensure no parts of the machine are live and it cannot be re-connected to the electrical power supply.
---	--

	These chillers contain R410A refrigerant fluids. Service of the refrigerant circuit must be performed by specialized personnel using proper tools.
---	--

	Any modifications to the machine or related operating parameters not previously verified and authorised by the Manufacturer may be hazardous and will invalidate the guarantee.
---	---

	Do not use water to extinguish fires near or on the chiller.
---	--

1.3 PROPER USE OF THE CHILLER

CFT units are packaged water chillers with air-condensation. They are intended for use in industrial process or air-conditioning systems requiring chilled water.

Any other use is considered improper.

The manufacturer is not liable for damage resulting from inappropriate use; in all cases, the user is liable for any resulting hazards.



Proper use requires conforming to the installation conditions and, in particular:

- Power voltage and frequency;
- Pressure, temperature and flow-capacity of the incoming water;
- Surrounding temperature.

The chiller has been tested and completely assembled. The user must only make the connections to other systems, as described in the chapters that follow.

1.4 INSTRUCTIONS FOR USING EQUIPMENT UNDER PRESSURE CONFORMING TO PED DIRECTIVE 2014/68/EU

The proper use of equipment under pressure is an essential prerequisite for ensuring safety. To this end, the user must proceed as follows:

- Use the equipment properly within the temperature limits shown in the operating limits stated on the manufacturer's name/data plate;
- Do not solder on the exchangers or refrigerant fluid pipes;
- Do not install the equipment in insufficiently ventilated rooms, areas exposed to sources of heat or near inflammable substances;
- During operation, the equipment must not be subjected to vibrations that could cause fatigue failures.
- Keep the documentation attached to the equipment (user manual, declaration of conformity, etc.) for future reference;
- The maximum working pressure stated on the manufacturer's data plate must not be exceeded. Prior to use, the user must fit safety/pressure relief devices.

OPERATION AND MAIN COMPONENTS

2.1 REFRIGERANT CIRCUIT

CFT chillers use a vapour-compression cycle in a Refrigerant circuit that essentially consists of the following components: evaporator, compressor, condenser and thermostatic expansion valve.

Evaporator: this is a braise-welded plate or a shell&tube heat-exchanger that exchanges heat between water and a refrigerant fluid without their coming into contact with each other. It consists of corrugated stainless steel plates braise-welded to each other with copper or of a copper pipe circuit where the refrigerant flows, outside of which (in the iron mantle) the water to be cooled is fluxed. The evaporator is protected against a lack of water by a differential pressure-switch and against the formation of ice by an anti-freeze system managed by the chiller's electronic controller.

Compressor: this compresses the vapours coming from the evaporator and sends them to the condenser at a higher pressure. **CFT** chillers uses scroll compressors; they feature a low level of vibration and noise; they are protected by magnetothermic circuit breakers and a temperature sensor in the motor winding.

Condenser: this is a microchannel heat exchanger made entirely of aluminium that exchanges heat between the refrigerant and the air; it condenses the refrigerant gas (which flows inside the exchanger) transferring its condensation heat to the air (which flows outside); this produces refrigerant liquid under high pressure.

Thermostatic expansion valve: this reduces the pressure of the refrigerant liquid coming from the condenser and sends it to the evaporator. This valve modulates the flow of refrigerant in such a way as to maintain the constancy of the superheating of the gas exiting to the evaporator under its various working conditions and, thus ensures that the flow of gas entering the compressor contains no liquid.

Thanks to these components, **the vapour-compression cycle** works as follows: the refrigerant liquid evaporates in the evaporator, chilling the water; the refrigerant vapours are then aspirated from the compressor, which compresses them and sends them to the condenser under high pressure; here, thanks to a flow of forced air from the fans, the high-pressure refrigerant gas is cooled, making it condensed and sub cooled.

The flow of refrigerant liquid then passes through the lamination valve (thermostatic expansion valve), which drastically reduces its pressure: the refrigerant liquid returns to the evaporator at a reduced pressure where it again evaporates, taking heat from the water.

2.2 WATER CIRCUIT

A general water circuit mainly consists of a chillers with its evaporator, pumps, tank, and expansion vessel.

The water flows into the chiller evaporator, where it is chilled, passes in to the tank; afterwards it is drawn by the pump, which sends it to the user.

A differential pressure switch on the evaporator checks that the flow of water is sufficient and stops the chiller compressors if the flow-is too low.

Automatic vent valves fitted on plumbing remove any air bubbles in the circuit.

A fine mesh metal filter ought to be fitted at the entrance to the chiller in order to catch any solid residues that could damage the evaporator.

A water gauge and safety valve should complete the water circuit.

2.3 FANS

The fans force air through the condenser's fins to remove the heat from the condensation of the refrigerant gas, thus limiting the pressure inside the condenser.

CFT chillers use external-rotor axial fans with thermal protection inside the motor winding.

2.4 CONDENSATION CONTROL

When the temperature of the surrounding air drops, the cooling capacity of the air flow is significantly increased, causing the pressure inside the condenser to drop; in order to keep this drop of the condensation pressure from falling below the tolerable limit for the good functioning of the Refrigerant circuit, the fans slow their rotation, reducing the flow of air.

The speed is controlled by an electronic regulator based on the condensation pressure; this allows the machine to operate properly even when the temperature of the outside air is low (see Chapter 7 **Operating Limits**) and also maintains a low level of noise compared to its nominal operating conditions.

2.5 CONTROL OF THE WATER TEMPERATURE

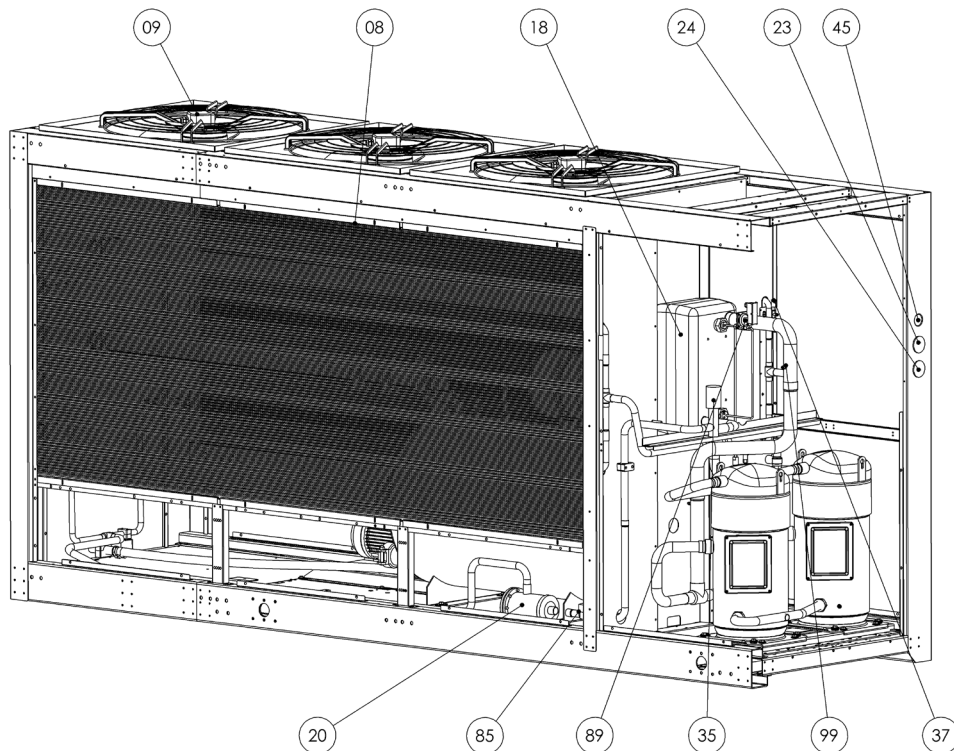
The purpose of the chiller is to maintain the temperature of the water produced within a desired interval as the load on the system varies; this is handled by an electronic controller and a temperature probe that turn the compressors on and off appropriately.

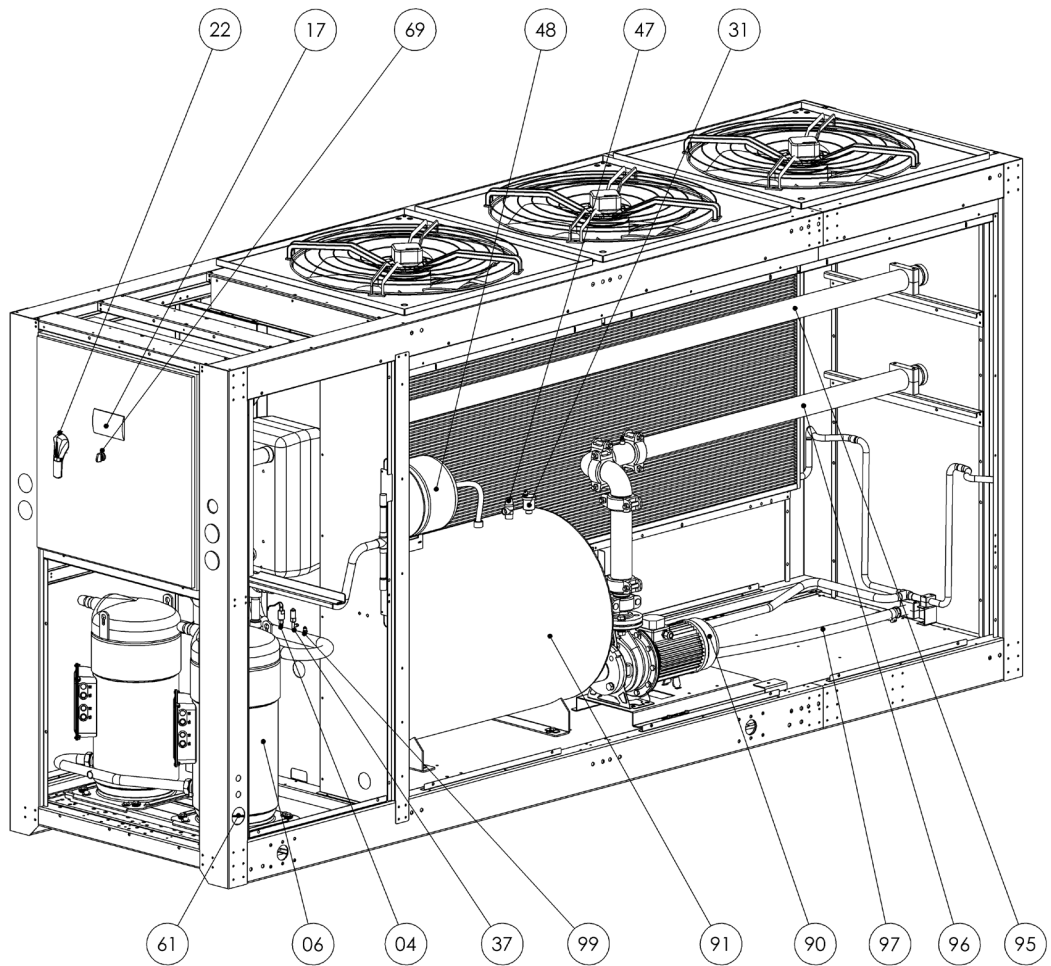
2.6 PROTECTING THE INTEGRITY OF THE MACHINE

In addition to controlling the temperature, the electronic controller uses pressure switches, thermostats and timers to prevent and handle situations that could compromise the integrity of the machine (also see Chapter 6 **Safety Devices**).

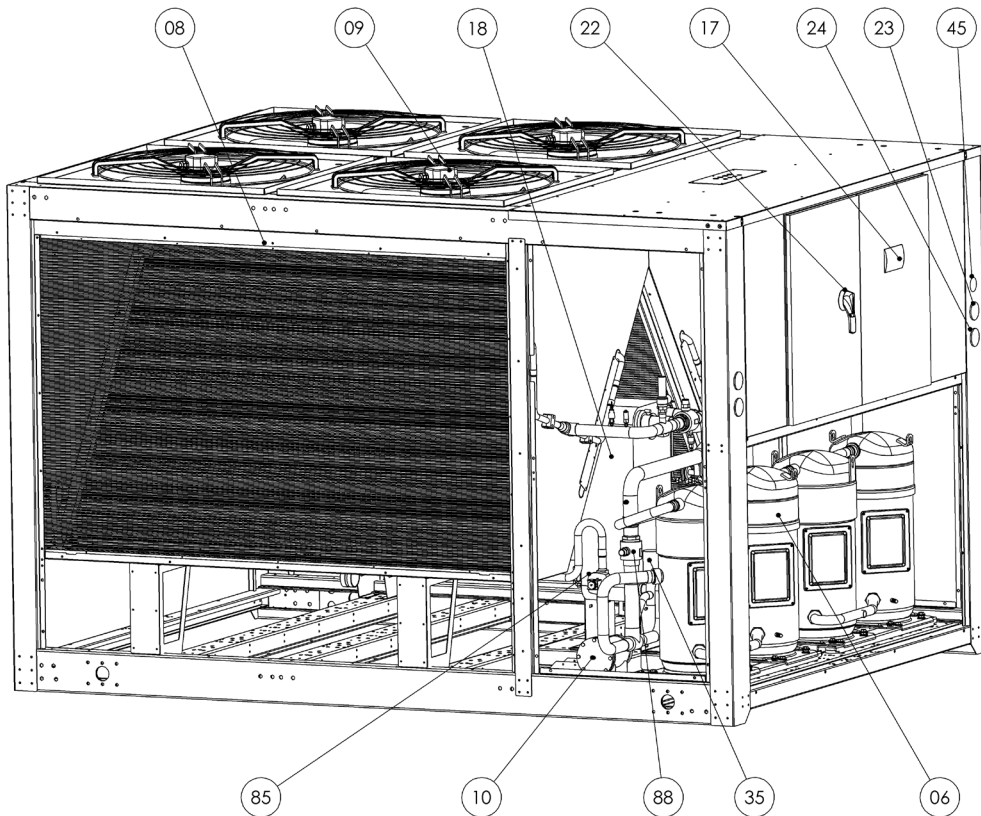
2.7 IDENTIFICATION OF THE MAIN COMPONENTS

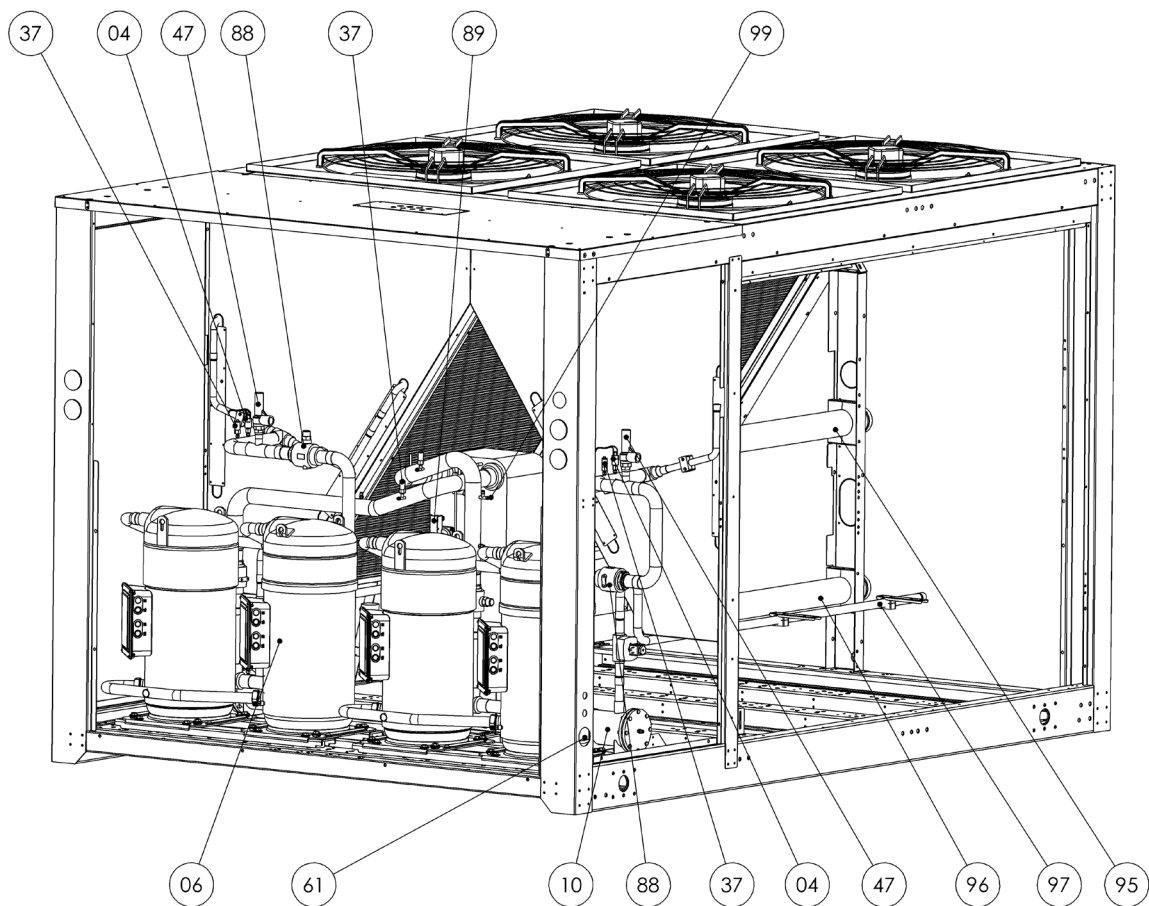
2.7.1 SINGLE CIRCUIT TP P2 – Pressurized tank with single pump P2





2.7.2 DOUBLE CIRCUIT VSC – Shut-off compressors valve





- | | |
|----------------------------------|------------------------------|
| 09 Fans | 69 Selector – Local/0/Remote |
| 08 Condenser | 48 Expansion vessel |
| 18 Evaporator | 47 Safety valve |
| 24 Low pressure gauge | 31 Relief valve |
| 23 High pressure gauge | 95 Inlet water |
| 45 Water manometer | 96 Outlet water |
| 37 Low pressure transducer | 97 Drain |
| 99 Pressure plug | 90 Pump |
| 35 Electronic thermostatic valve | 91 Tank |
| 89 Differential pressure switch | 04 High pressure switch |
| 85 Solenoid valve | 06 Compressor |
| 10 Refrigerant filter | 61 Power input |
| 22 Disconnecter switch | 88 Shut-off compressor valve |
| 17 Electronic control | |

2.8 SPARE PARTS

Spare parts list is printed on a dedicated sticker applied inside the chiller. On this sticker each spare part is identified with its ID Number and related Spare Part Number. Here below the cross reference table between ID Number and exploded drawings Ref. With their description and quantity installed inside chillers.

NOTE To order the suggested spare parts or any other part, it is necessary to quote the data reported on the identification plate.

ID N.	DESCRIPTION	NOTE	PART QUANTITY FOR CFT MODEL														
			100	115	130	160	180	200	230	260	280	300	360	400	440		
1	EVAPORATOR GROUP		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	HIGH PRESSURE SWITCH		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
6	COMPRESSOR	[A]	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4
8	CONDENSER		2	2	2	2	2	2	2	4	4	4	4	4	4	4	4
9	FAN		2	2	2	3	3	3	3	4	4	4	6	6	6	6	6
10	REFRIGERANT FILTER		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
12	TEMPERATURE PROBE		6	6	6	6	6	6	6	9	9	9	9	9	9	9	9
14	WATER FILTER		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	COMPLETE ELECTRONIC CONTROLLER		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	EVAPORATOR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	DISCONNECTOR SWITCH		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	HIGH PRESSURE GAUGE		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
24	LOW PRESSURE GAUGE		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
25	COMPRESSOR CRANKCASE HEATER		2	2	2	2	2	2	2	4	4	4	4	4	4	4	4
35	THERMOSTATIC EXPANSION VALVE		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
37	PRESSURE TRANSDUCER		2	2	2	2	2	2	2	4	4	4	4	4	4	4	4
82	CHECK VALVE	[B]	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
85	LIQUID SOLENOID VALVE		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
85.1	SOLENOID VALVE COIL		1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
89	DIFFERENTIAL PRESSURE SWITCH		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	WATER PUMP	[C]	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½
91	WATER TANK		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

[A]	The smaller progressive code represents the smallest compressor in tandem configuration.
[B]	Only for double pump version (D2/D3/D5).
[C]	1 or 2 depend from configuration. For P2/P3/P5 version you will find one code, for D2/D3/D5 version you will find two codes.

INSTALLATION

3.1 TRANSPORT

The units are supplied on a wooden pallet and wrapped in a plastic film.

After checking that the packing is undamaged, position the unit near the installation site and unpack it.



Always keep the chiller vertical: turning it upside down can irreparably damage several parts of the unit.



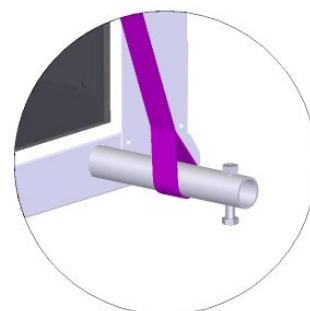
Handle with care. Violent falls can cause irreparable damage. The units can be handled using belts.

3.1.1 Lifting unit with belts and leveling feet installation

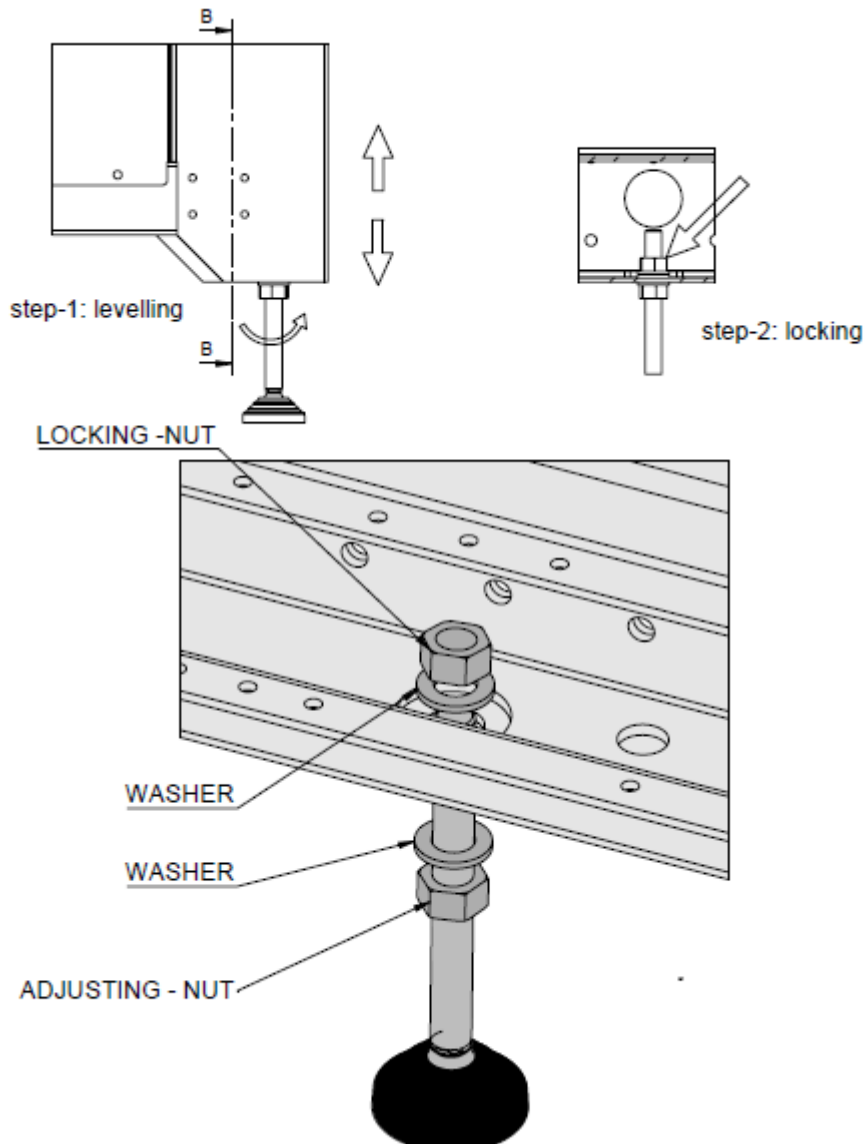
All units have lifting holes in the base.



Lock the belts so that they won't slip off during lifting (see figure).



Install the leveling feet that are supplied with the machine and which are inside the electrical panel. Please follow the assembly instructions. Without doing so, it will avoid the warranty in case of breakages



3.2 STORAGE

Protect the machine from bad weather, even if packed.

Always keep the chiller vertical, even when in storage.

Turning it upside down can irreparably damage several parts of the unit.

If not used, the chiller can be stored packed in an enclosed place, free of dust, with a maximum temperature of 60°C//140°F and specific humidity of no higher than 90%.



The packing material is recyclable.

Dispose of each type of material in accordance with the requirements in the country of use.

3.3 PLACE OF INSTALLATION

The CFT unit can be installed either inside or outside.

To determine the best place to install the unit, it is important to consider the following aspects:

- The dimensions and source of the water pipes;
- The location of the power supply;
- The solidity of the support surface;
- Avoid any obstacles to the flow of the fan which could cause the recirculation of air to the condenser;
- Avoid the possible reflection of sound waves: (do not install in narrow or tight spaces);
- Provide access for maintenance or repair (see paragraph **3.3.1 Installation spaces**);
- The air temperatures in the area selected for installation (see Chapter **7 Operating Limits**).



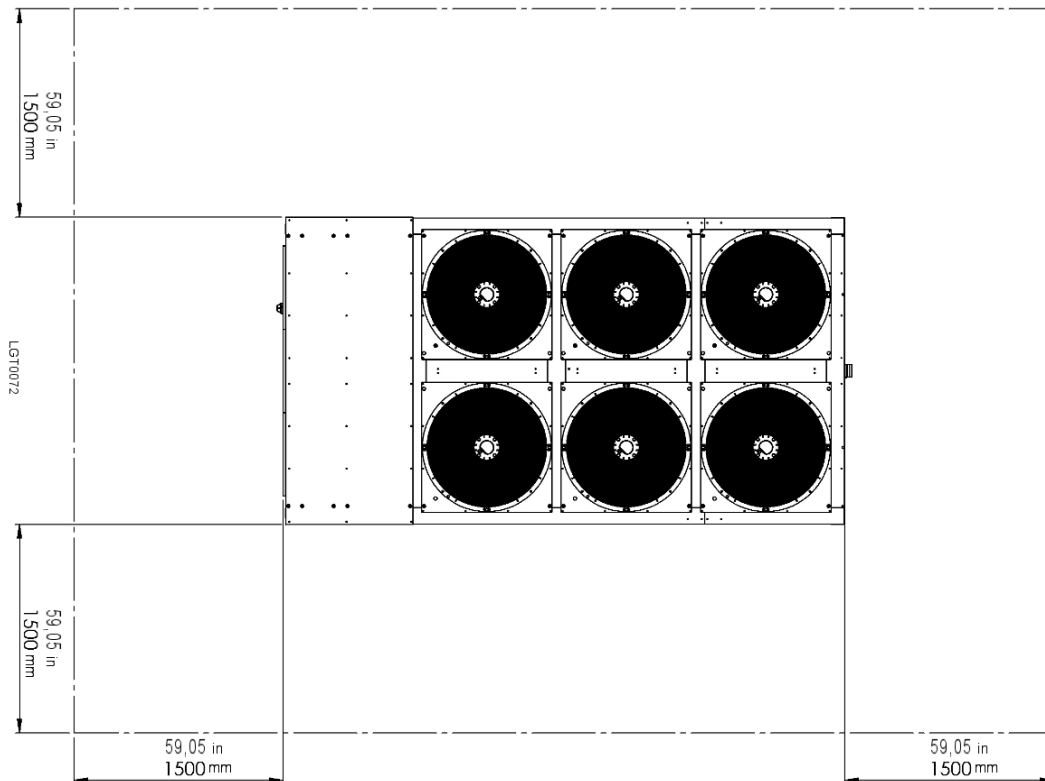
Attention! If the machine is installed outside, it could find itself at a temperature lower than 0°C//32°F , when stopped; the formation of ice could damage the evaporator. If you do not intend to drain the machine during the winter, you must add anti-freeze to the water circuit (see paragraph **5.8 Low water temperatures (<32°F/0°C)**).

3.3.1 Installation spaces

To ensure the good functioning of the unit and access for maintenance, you must respect the minimum installation space shown in the figure in this paragraph [mm]/[in].


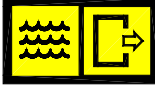
The exit of air from the fans must not be obstructed.

In any case, avoid all situations in which hot air exiting the unit, can be drawn directly to the air intake of the machine.



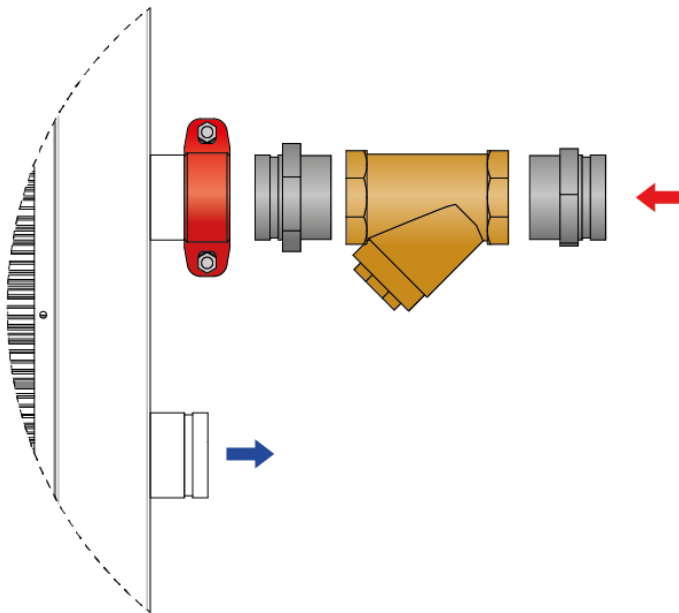
3.4 WATER CONNECTIONS

Connect the machine to the water pipes following the instructions located near its water fittings (see figures).

Water input to the chiller	Water exit from the chiller
	



Important! Install the mechanical water filter, provided with the machine, on its input: scum and impurities can seriously damage the evaporator. Not doing so will void the warranty in case of breakages.



We recommend an extraordinary cleaning of the mechanical water filter after the machine has been running for the first week (also see Chapter **9 Maintenance and periodic inspections**).

3.4.1 Recommended water system

The standard equipment of a water circuit should include tank, pumps, expansion vessel, safety valve, filter, shut-off taps.

In particular, we recommend that the water circuit also be equipped with:

- A mechanical filter and a check valve upstream from the charging tap;
- An air vent at the highest point of the plant;
- A drain tap in the lowest point of the plant;
- Manometers and thermometers at the machine's water input and output to check its functioning;
- Vibration damping joints on the pipes to avoid the transmission of vibration to the plant;
- In the case of water circuits with considerable capacity, we recommend checking whether it is necessary to supplement the expansion vessel already on the unit with another additional one.



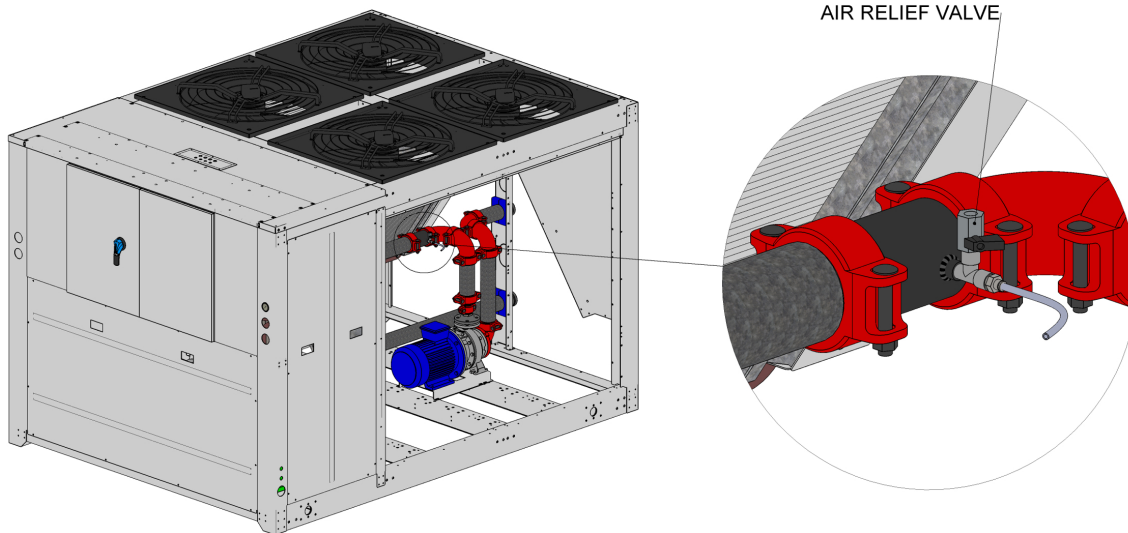
Attention! Never work with an open flame near or inside the unit when making connections to the water system.



Important! If the machine charged with pure water, is stopped during the winter, you drain water from the chiller (see paragraph 3.4.2) to avoid damage due to ice.



Important! At start-up, it is necessary to vent all air from inlet water pipe using the air relief valve (see figure).



3.4.2 Use of ethylene glycol as a winter anti-freeze

Instead of emptying the system in the winter, you can charge the system with a mixture of water and a suitable percentage of ethylene glycol, chosen as a function of the lowest expected temperature of the outside air.

Percentages of ethylene glycol recommended as a function of the expected temperature of the outside air							
Outside air temperature [°C]	0	-5	-10	-12	-15	-25	-30
Outside air temperature [°F]	32	23	14	10,2	5	-13	-22
Percentage of ethylene glycol [%]	10	15	20	25	30	40	50



Attention! Maximum concentration of ethylene glycol allowed: **40%**. For glycol concentrations higher than 30%, contact our company's sales offices to make sure that the mechanical seal and the pump motor are suitable for the type and concentration of fluid loaded in the hydraulic system

3.4.3 Charging the water circuit

- Check that the drain taps of the water tank are turned off;
- Open all the system's vent valves;
- Open the system's shut-off devices;
- Ensure that no air is on the pump suction piping and on the pump itself. Use the pump drain tap to grant the complete pump filling (see picture on the previous page);
- Start filling by slowly turning on the system's water-charging tap;
- When water starts coming out of the vent valves, close them and continue charging until the manometer shows at least 1 bar;
- Check for any leaks by looking at the manometer and inspecting the circuit.

3.5 ELECTRICAL CONNECTIONS



The machines must be connected to the electricity following the electrical diagram and conforming to the current laws and regulations in the place of installation.

- The voltage, frequency and number of phases must conform to the data shown on the machine's identification plate;
- The power supply voltage must not vary by more than $\pm 10\%$ from its nominal value;
- The frequency must not vary by more than $\pm 1\%$ from its nominal value ($\pm 2\%$ for brief periods);
- The imbalance between power phases must be $< 2\%$;
- Upstream from the electrical panel, install a differential switch ($ID_n=0,03A$) (main power switch) and slow-blow fuses with the specifications shown on the electrical diagram.

Use wires of the section shown on the electrical diagram of the unit.



Attention! Never change the internal electrical connections, as the warranty will be immediately voided.



Important! Screw the wires solidly to the terminal strip of the cut-off switch and lock the wire with a cable-gland.



Important! Make the cable entering the machine enters the cable-gland from below: this prevents rain from dripping inside the machine



Important! The earth connection is obligatory: connect the earth wire to the terminal provided in the electrical panel.

The ground wire must be longer than the other wires so that it will be the last one to be pulled if the device holding the cable loosens.

3.5.1 Remote on/off switch and alarm indicators

On the **CFT's** terminal block are indicated connections to remote ON/OFF switch and general alarm signal.



Please, refer to wiring diagram.

PRELIMINARY CHECKS AND START-UP

4.1 PRELIMINARY CHECKS AND PREPARATION FOR THE FIRST START-UP



Important! At start-up, it is necessary to give off air from inlet water pipe using the air relief valve (see paragraph **3.4.1 Recommended water system**).

Before starting up the unit, do the following:

- Check that the water shut-off valves are open;
- Check that the pressure shown on water gauge, is at least 1 bar 7/15 PSI;
- Check that the surrounding temperature is in the range for the machine to function (see Chapter **7 Operating Limits**);



Important! Before starting the machine, make sure that all discharge and suction taps (and of any other type) mounted on the refrigeration circuit are properly open.

- Check that the **CFT** chiller's main switch is open (O position);
- Check that the **CFT** chillers' Local/O/Remote switch on the electrical panel door is in the "O" position;
- Check that the mains voltage matches the voltage on the machine's identification plate with a tolerance of $\pm 10\%$;
- Close the main power supply switch;
- Turn on one pump of the plant (if needed);
- Close the main switch on the chiller electrical panel (I position).

This puts the machines under voltage without starting it up.





Attention! Apply voltage to the machine at least two hours before start-up to give the heating elements in the compressor housing time to heat the oil inside.

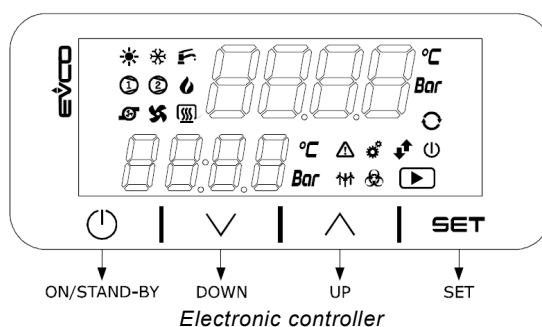
The heating elements limit the quantity of refrigerant dissolved in the oil and prevent the oil from migrating when the compressors start.



Before start-up, check that the temperature of the lower part of the compressors is at least $10 \div 15^\circ\text{C} // 18 \div 28^\circ\text{F}$ higher than the surrounding temperature.


4.2 START-UP

To proceed to start-up:

1. Connect the device power supply. Touch the  for 4 seconds. The led  will flash and turn off, the chiller will switch on.



2. Check that the alarm symbol  does not light up on the electronic controller; if this should happen, press the  key to display the type of alarm triggered;

Attention! At the first start-up there could be an alarm for an incorrect sequence of the R-S-T phases, indicated by the initials **AP21** when you press the  key.
This safety system prevents the compressor from turning in the wrong direction.
Note: the phase sequence relay located inside the electrical panel must have both LEDS lit to confirm the correct electromagnetic field.




In this case, turn on the main power supply switch upstream from the machine and reverse the two phases immediately downstream from the main switch.



Attention! Never reverse the wires downstream from the main switch on the electrical panel because doing so risks changing the correct sequence of other devices, such as, for example, the pump and fans.

Repeat the steps from point 1.

3. Wait for the electronic controller to verify that the water flow is constant through the signal from the differential pressure-switch; if the differential pressure-switch intervenes (alarm code **AL05** when you press the  button), vent the system, check that the shut-off taps and the functioning of the pump are turned on; reset the alarm by holding down the **SET** button for 5 seconds;
4. Wait for the compressors to start.



4.2.1 Start-up under critical conditions

The consequence of starting up under critical conditions could be the intervention of the high-pressure pressure switch (to rearm the high-pressure pressure switch, see paragraph **6.2 Rearming the pressure switch**).

To overcome this problem, you will have to reduce the thermal load on the machine by shutting off some of the uses or, if this is not possible, by reducing the flow of water into the evaporator: partially close the output tap from the chiller and restart the machine.

Operate the chiller under these conditions until the water temperature gradually returns within operating limits; then, you can turn on the tap completely.

4.3 TURNING OFF THE UNIT

To disable, touch the  for 4 seconds. The led  will flash and turn on, the chiller will switch off.



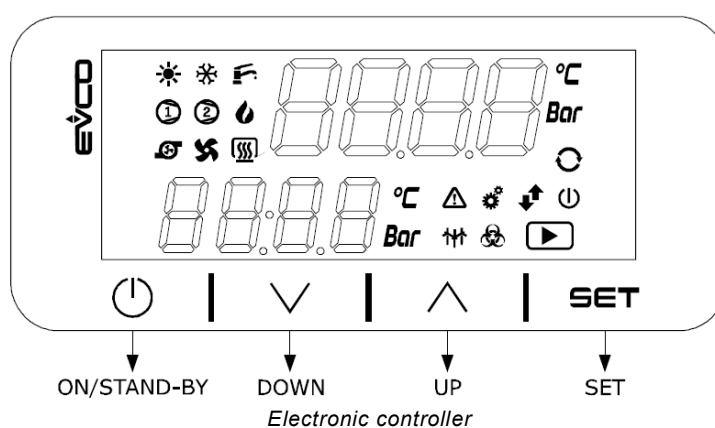
Attention! It is important not to turn the unit off using the main power supply switch or the cut-off on the machine's electrical panel because this would not provide for the delayed power-off of the pump regarding the power-off of the compressors, with the risk of damaging the evaporator; in addition, it would prevent the functioning of the heating element in the compressor housing.

ELECTRONIC CONTROLLER

The electronic controller has two 7-segment displays and a series of icons.

It manages:

- The functioning of the compressor to ensure that the water produced has a constant temperature;
- The prevention of the high-pressure alarm;
- The prevention of the low pressure alarm.



Displays:












- The state of the unit;
- The state of the compressor;
- The outlet water temperature;
- The inlet water temperature;
- All digital and analogue inputs and outputs (navigation between parameters).

Displays the following alarms:

- Water differential pressure switch;
- High-pressure pressure switch;
- Low-pressure pressure transducer;
- Anti-freeze;
- Compressor protection – wrong R-S-T phase sequence;
- Pressure and temperature probe failure.

5.1 MAIN FUNCTIONS OF THE ELECTRONIC CONTROLLER BUTTONS AND MEANINGS OF THE ICONS



Button	Function
	On/off button Exit procedure
SET	Setting setpoint Access the menu
	Down key
	Up key



Display/Led	Function
	Cooling mode active
	Indicates the state of compressors: On: compressor ON Off: compressor OFF Flashing: compressor protection alarm active
	Reverse phase supervision active
	Fan icon On: compressor ON Off: compressor OFF Flashing: fan protection alarm active
	Antifreeze resistors icon
	Alarm active
	Maintenance icon
	Communication icon Flashing if communication RS485 is active
	°Celsius unit
	°Fahrenheit unit
	Indicates the state of the chiller: On: chiller OFF Off: chiller ON

5.2 SWITCHING ON/OFF



Important! Before starting the machine, make sure that all discharge and suction taps (and of any other type) mounted on the refrigeration circuit are properly open.

Connect the device power supply. Touch the  for 4 seconds. The led  will flash and turn off, the chiller will switch on.

To disable, touch the  for 4 seconds. The led  will flash and turn on, the chiller will switch off.

5.3 CONTROLLING WATER TEMPERATURE

This type of control requires definition of a zero energy band (ZEB) around the set point. In the zero energy band, the compressors will not be turned on or turned off.

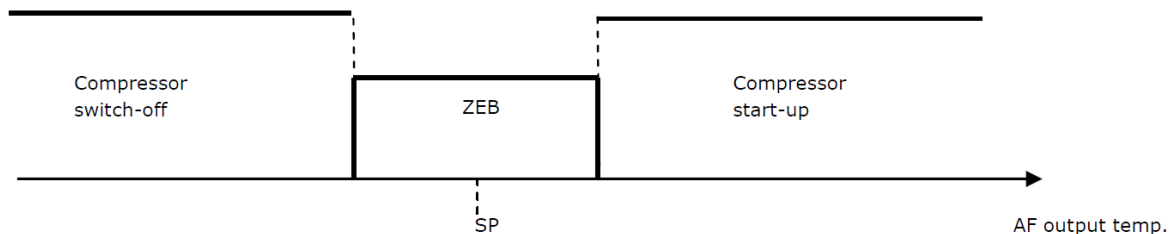
If the output temperature of the AF is outside the zero energy band, the compressors activate/deactivate to bring the output temperature of the AF within the zero energy band.

The switch-on/switch-off requests for the various power steps provided by the compressors in the summer operating mode (chiller) follow this logic:

- Switch-on: when the output temperature of the AF exceeds the zero energy band.
- Switch-off: when the output temperature of the AF falls back within the zero energy band.

Parameter	Description	Factory Setting
SPC1	Cooling setpoint	7°C//44,6°F
	Working temperature probe	outlet water temperature probe
PC11	Type of control	1
PC14	Neutral zone band	2
PC17	Extra time for outside zone request	20
PC21	Lower limit chiller setpoint	6
PC22	Upper limit chiller setpoint	25

The neutral zone regulation is showed in the following picture.



5.4 CHANGING THE COOLING SET POINT



To assign a value lower than to 41°F//5°C, the minimum set point value must be changed. To do this contact the manufacturer.



To achieve temperatures that are negative, or near zero, it is necessary to use anti-freeze (ethylene glycol) in percentages that depend on the desired temperature; it is also necessary to change the calibration of the anti-freeze thermostat.

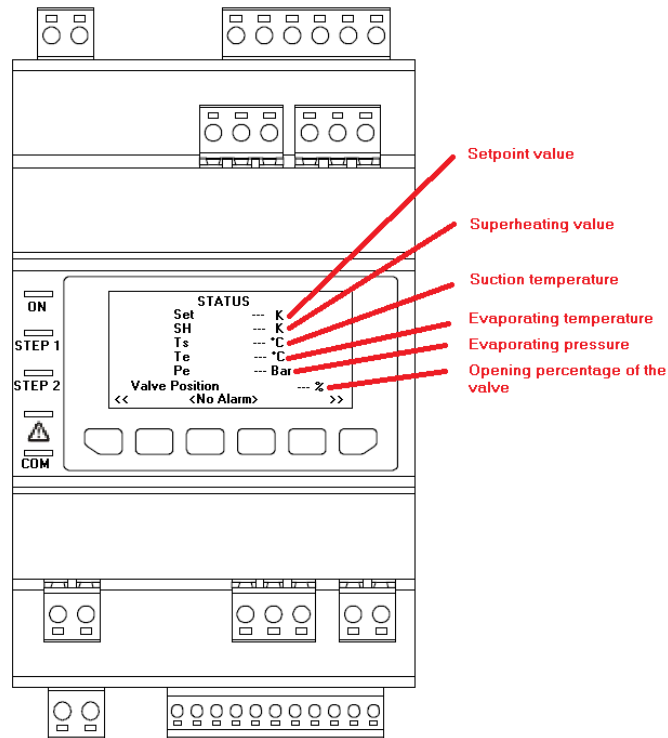
To change the set point of the outgoing water proceed as follows:

- Starting from the main screen press **SET** for 2 seconds
- Use the \wedge key to reach the **User** menu;
- Press **SET**, and use the \vee key to reach the **SPC1** parameter;
- Press **SET** to change the value and use \wedge or \vee keys to set it;
- To confirm press **SET**;
- To exit without saving press \odot .

5.5 ELECTRONIC THERMOSTATIC VALVE DRIVER

All CFT are equipped with electronic thermostatic valve/s. Those valves are regulated by an external driver connected to the electronic control.

The drivers are allocated in the electrical panel. The image below explain the shape of the driver and the display values.



5.6 CONFIGURATION OF INPUTS AND OUTPUTS

The following configuration is the factory setting:

Analog input – Main controller	
1	Evaporator inlet water temperature
2	Evaporator outlet water temperature
3	-----
4	-----
5	-----
6	-----
7	-----
8	-----
9	Reverse phase sequence
Analog input – EVDrive circuit 1	
1	Condensing pressure
2	Compressor discharge temperature
3	Compressor suction temperature
4	Evaporating pressure
Analog input – EVDrive circuit 2	
1	Condensing pressure
2	Compressor discharge temperature

3	Compressor suction temperature
4	Evaporating pressure
Digital input – Main controller	
1	Differential pressure switch
2	Remote On/off
3	Thermal protection fan circ. 1
4	Thermal protection fan circ.2
5	-----
Digital input – EVDrive circuit 1	
1	High pressure switch
2	-----
3	Thermal protection compressor
Digital input – EVDrive circuit 2	
1	High pressure switch
2	-----
3	Thermal protection compressor
Analog output – Main controller	
1	-----
2	-----
3	-----
4	-----
Digital output – Main controller	
1	Compressor 1
2	Compressor 2
3	Compressor 3
4	Compressor 4
5	Fan circuit 1
6	Fan circuit 2
7	General alarm
Digital output – EVDrive circuit 1	
1	-----
Digital output – EVDrive circuit 2	
1	-----


5.7 ALARMS





An alarm condition is signaled by the Alarm icon  .

Some alarms must be rearmed manually while for others, the rearm is automatic or semi-automatic.

- **Manual rearm:** these alarms must be reset, which can only be done when the alarm condition no longer exists; only then can the machine resume operation;
- **Automatic rearm:** the alarm is automatically deactivated as soon as the alarm condition ceases and the machine restarts by itself. However, the signal (Alarm icon) remains on the display until the alarm code is displayed;
- **Semi-automatic rearm:** semi-automatic alarms behave like automatic alarms; but if the same semi-automatic alarm occurs 5 times in 90 minutes, that alarm becomes a manual alarm; therefore to restart the machine, you will have to remove the cause of the alarm and reset it.

5.7.1 Displaying and resetting alarms

The Alarm icon  turns on to indicate an alarm.
To display the code of the alarm that intervened:

- Press the  key;
- Press **SET** at **Alarm** menu;
- Use  or  keys to scroll the list of active alarms;
- Press  again until you return to the main screen.

To reset an alarm, the condition that caused it must no longer exist: for example, if the low-pressure pressure switch has intervened, the alarm can only be reset when the pressure has risen beyond the reset value (see paragraph **6.1 Calibration of the safety devices and type of rearm**).



Then, after displaying the alarm, wait for normal conditions to be restored, press **SET** again, hold it down for 5 seconds and the alarm will be reset.

5.7.2 Table of alarm codes




Code	Alarm description	Type of rearm
AL02	High inlet water temperature	Automatic
AL05	Differential pressure switch	Manual
AL11	High pressure from pressure switch circuit 1	Manual
AL12	High pressure from pressure switch circuit 2	Manual
AL31	High pressure from pressure transducer circuit 1	Manual
AL32	High pressure from pressure transducer circuit 2	Manual
AL41	Low pressure from pressure transducer circuit 1	Semiautomatic
AL42	Low pressure from pressure transducer circuit 2	Semiautomatic
AL61	High temperature refrigerant discharge circuit 1	Automatic
AL62	High temperature refrigerant discharge circuit 2	Automatic
AL81	Antifreeze alarm	Manual
AC21 – AC22	Thermal protection compressors circuit 1	Manual
AC24 – AC25	Thermal protection compressor circuit 2	Manual
AP21	Reverse phase protection	Manual
AF21	Thermal protection fan circuit 1	Manual
AF22	Thermal protection fan circuit 2	Manual
ES04	Inlet water temperature probe alarm	Automatic
ES05	Outlet water temperature probe alarm	Automatic
ES08 [*]	Condensing pressure sensor circuit 1 alarm	Automatic
ES09 – EVM1	Evaporating pressure sensor circuit 1 alarm	Automatic
ES11 [**]	Discharge temperature probe circuit 1 alarm	Automatic
ES12 – EVM1	Suction temperature probe circuit 1 alarm	Automatic
ES16 [*]	Condensing pressure sensor circuit 2 alarm	Automatic
ES17 – EVM2	Evaporating pressure sensor circuit 2 alarm	Automatic
ES19 [**]	Discharge temperature probe circuit 2 alarm	Automatic
ES20 – EVM2	Suction temperature probe circuit 2 alarm	Automatic

[*] ES08 and ES16 alarms force fans to max speed, 100% of ventilation

[**] ES11 and ES19 alarms are only alert, they do not stop compressors

5.7.3 Displaying alarm history

To display the alarm history:

- Press the  key, use  key to scroll until reach **Hi St** label;
- Press **SET** at **Hi St** menu;
- Use **SET** keys to scroll the list of alarms;
- Press  again until you return to the main screen.

5.8 LOW WATER TEMPERATURES (<32°F//0°C)



If it was not anticipated that the chiller unit offered was to produce water at temperatures close to 0°C//32°F, or below, you should contact our company.



To achieve temperatures that are negative, or near zero, it is necessary to use anti-freeze (ethylene glycol) in percentages that depend on the desired temperature; it is also necessary to change the calibration of safety devices.

NOTE The safety devices setting can only be changed at a higher level of programming of the electronic control: please request the password by contacting our company.



CFT units can operate with water and ethylene glycol mixtures up to a concentration of 40%. For glycol concentrations higher than 30%, contact our company's sales offices to make sure that the mechanical seal and the pump motor are suitable for the type and concentration of fluid loaded in the hydraulic system





In case of RH and/or RA1 / RA2 / RA3 (HEATING or ANTI-FREEZE RESISTORS) option installed on the machine, check that the Chiller setpoint does not conflict with the one chosen for this option. Contact our Service Assistance to request instructions

5.9 CONTROLLER MENU STRUCTURE

NOTE The parameters setting can only be changed at a higher level of programming of the electronic control: please request the password by contacting our company.

The controller menu structure is the following.

- Starting from the main screen press **SET** for 2 seconds
- Use  or  keys to reach the following labels:

General menu – First level
USEr
Main
InSt
CoSt
rTC
ALrm
HiSt
StAt

At **InSt** menu you will find the following menu:

InSt menu – Third level
CoMP
rEG
FANs
dEFr
PuMP
A-F
F-C
SAFE
MdbS
Par
MAp
Psd3

The installation operator menu contains all the parameters on configuration of all the functions (alarms, settings, logic, type of rotation, etc.) of the machine.

For the full access to the Installation menu you must insert the password¹.

Please contact our company and follow this procedure:

- Starting from the main screen press **SET** for 2 seconds
- Use \wedge or \vee keys to reach the label **InSt**; press **SET** ;
- Use \wedge or \vee keys to reach the label **Psd3**; press **SET** ;
- Use \wedge or \vee keys to insert the password and press **SET** to confirm.
- Now, you have the access to the total menus.

In the REGULATION (**rEG**) menu you can set the parameters for temperature control of the compressors in the lateral band and in the zero energy band.

In the COMPRESSOR (**CoMP**) menu you can set the parameters for management of the devices:

- Rotation;
- Timing;
- Maximum number of start-ups.

In the FANS (**FANs**) menu you can set the parameters relative to condensation pressure control with the fans.

In the DEFROST (**dEFr**) menu you can set the parameters for activation and duration of heat pump defrost.

In the PUMP (**PuMP**) menu you can set the parameters for operation and protection of the pumps.

In the ANTI-FREEZE (**A-F**) menu you can set the parameters for thermal control of the resistors and control of the anti-freeze alarm.

In the FREE-COOLING (**F-C**) menu you can set the parameters for the free-cooling function and its damper.

The SAFETY DEVICE (**SAFE**) menu contains all the parameters relative to the alarms and management of the safety devices, which protect the refrigerator circuit:

¹ Contact our company.

- Activations;
- Delay reports;
- Type of reset.

In the MODBUS (**MdbS**) menu you can set the parameters for the Modbus.

The MISCELLANEOUS PARAMETERS (**Par**) menu contains other general parameters for management of the Modbus communications, end of scale values of the transducer, and other configurable activations.

From the SAVE/RESTORE (**MAp**) menu you can restore the preset values of all the application's parameters and save them or download them from the programming key or from the controller's internal memory.

SAFETY DEVICES

CFT chillers have a series of safety devices that limit the machine's temperature and pressure values to ensure that it operates within the anticipated limits and to avoid dangerous situations.

Here is a list of dangerous situations, including the relative safety device and its location.

<i>Dangerous situation</i>	<i>Safety device</i>	<i>Location</i>
High condensation pressure	High-pressure pressure switch	Compressor output pipe
High condensation pressure	High-pressure pressure transducer	Compressor output pipe
Low evaporation pressure	Low-pressure pressure transducer	Compressor intake pipe
Low water flow-capacity	Water differential pressure switch	Plate or Shell&Tube evaporator
Low water temperature	Anti-freeze thermostat	Water exit from evaporator
Low water temperature prevention	Outlet water temperature probe	Electronic controller
High inlet water temperature	Inlet water temperature probe	Electronic controller
High discharge refr. temperature	Discharge temperature refr. probe	Electronic controller
High water pressure	Safety valve	Accumulation tank
Frequent compressor start-ups	Anti-circulation timer	Electronic controller

When they reach their set value, most of the security devices trigger an alarm managed by the electronic controller.



For some safety devices, once the cause of the alarm times out, the machine resumes operation automatically as soon as the reset value is reached. Others must be manually reset to restart the machine (also see paragraph **5.11 Alarms**).

The following paragraph lists the characteristics of each safety device.

6.1 CALIBRATION OF THE SAFETY DEVICES AND TYPE OF REARM

<i>Safety device</i>	<i>Intervention value</i>	<i>Reset value</i>	<i>Type of rearm</i>
High pressure switch	41,5 barg // 602 psi	33 barg // 478 psi	Manual
High pressure transducer	40 barg // 435 psi	35 barg // 536 psi	Automatic
Low pressure transducer	5,8 barg // 84 psi	6,8 barg // 99 psi	Semi-Automatic
Water differential pressure switch	85 mbar // 1,23 psi	105 mbar // 1,53 psi	Manual
Anti-freeze thermostat	4°C // 39,2°F	8°C // 46,4°F	Semi-Automatic
Anti-freeze prevention	5°C // 41°F	≥ setpoint*	Automatic
High inlet water temperature	30°C // 86°F	25°C // 77°F	Manual
High discharge refr. temperature	100°C // 212°F	80°C // 176°F	Manual
Water safety valve	6 barg // 87 psi	---	---
Anti-circulation timer **	5 min.	---	---

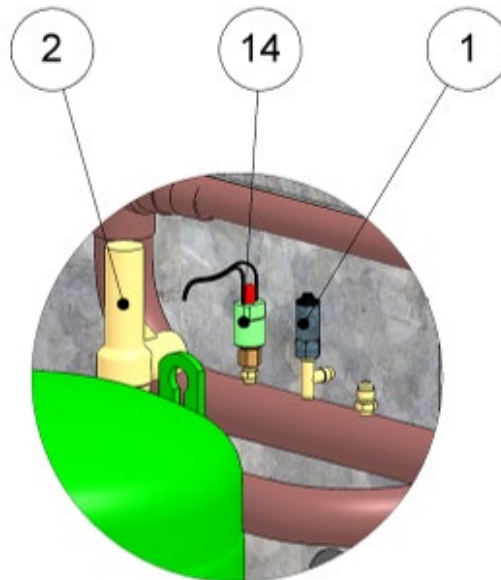
* Setpoint factory setting is 7°C//44,6°F

** This is a function of the electronic controller that prevents the same compressor from stopping and starting too frequently: at least 5 minutes must elapse between one compressor's power up and the next.

6.2 RESETTING THE HIGH-PRESSURE PRESSURE SWITCH

The intervention of the high-pressure pressure switch is the only case in which, in addition to manually rearming the electronic controller, it is also necessary to reset the pressure switch itself.

The high-pressure pressure switch is located in the compressor compartment on the uninsulated copper pipe that goes from the compressors to the condensation coils; there is a manual-rearm button on top of it. This can only be rearmed when the pressure in the circuit has fallen below the reset value (see table **“Calibration of the safety devices and type of rearm”** in paragraph 6.1).



2 – Refrigerant safety valve
14 - High-pressure pressure switch
1 – High pressure transducer

For this reason, when dealing with an intervention of the high-pressure switch, it is necessary to:

- A. Identify the cause of the rise in pressure (fans not working, condensation coils dirty or obstructed, obstacles to the flow of exiting air, operating temperature outside operating limits, etc. – also see Chapter **10 Troubleshooting**) and remove the cause, if possible;
- B. Wait until the high-pressure manometer falls below the reset value (see the table **“Calibration of the safety devices and type of rearm”** in paragraph 6.1);
- C. Rearm the pressure switch by pressing the red button: if you do not hear a click, it is not rearmed;
- D. Then, rearm the electronic controller: press **SET** at least 2 seconds (alarm code **AL11** or **AL12** is displayed).



Attention! The high-pressure switch stops the compressors while it keeps the condenser fans running to lower the pressure in the condensers.

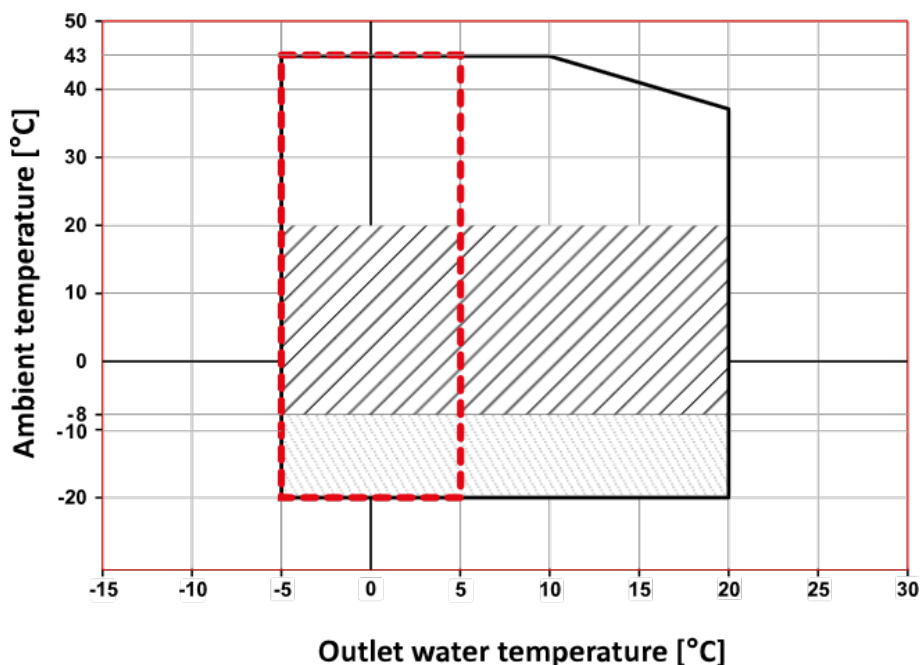
OPERATING LIMITS

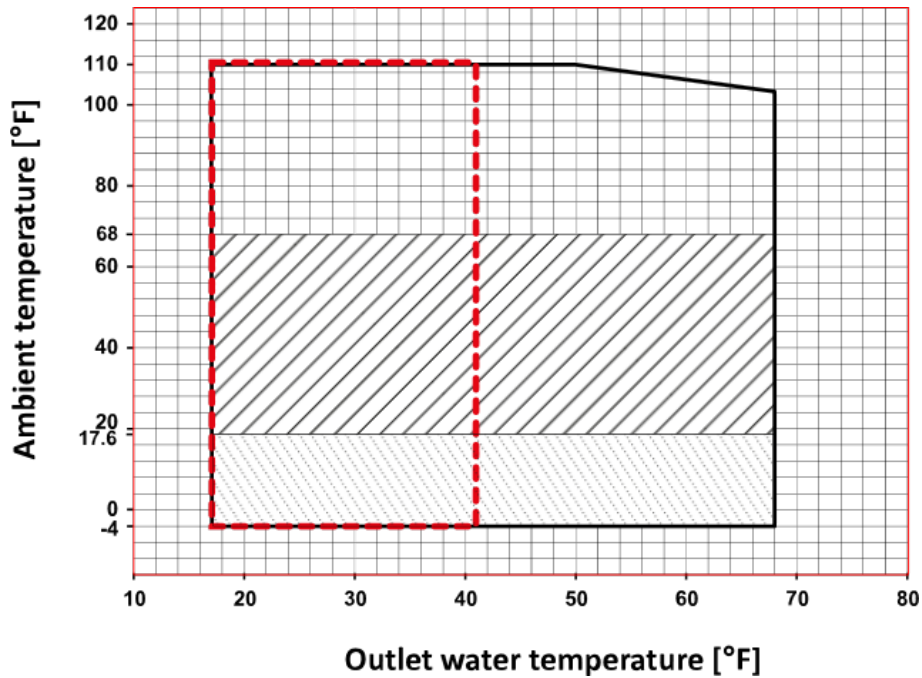
CFT series units feature broad operating limits in relation to the temperature of the outside air, thanks to the condensation control (also see paragraph 2.4); they are also prepared to produce water at low temperature: in this case, it is necessary to contact our company (see paragraph **5.8 Low water temperatures (<32°F//0°C)**).

The graphs show the continuous operating limits of CFT units in relation to the temperature of the water exiting the machine and the temperature of the outside air.

Legend

- **Mandatory ethylene glycol - please contact our company**
- // // // // // **Mandatory continuous fan(s) speed control - phase cut type (CA)**
- **Mandatory Low ambient temperature kit (CL)**





Warning! Produced water temperatures less than 5°C//41°F require the use of glycolate mixtures and the setting of suitable electronic controller parameters. Contact the company.



Warning! External air temperatures lower than +20°C//68°F can only be achieved with condensation control and continuous fan speed control.



Warning! According to the condensation control chosen and applied on the machinery, verify the real operating limit of the ambient temperature sustainable by the unit.

8

SEPR - SEASONAL ENERGY PERFORMANCE RATIO ACCORDING TO COMMISSION REGULATION (EU) 2016/2281

The data that responded positively to the European Regulation (EU) 2016/2281 for the eco-compatible design of cooling products and high-temperature process chillers.
Valid for 50 Hz units.


400V/3Ph/50Hz										
Model CFT	100	115	130	160	180	200	230	260	280	300
SEPR	5,02	5,03	4,96	4,8	4,96	4,85	4,71	4,87	4,89	4,76

400V/3Ph/50Hz – with condensation control										
Model CFT	100	115	130	160	180	200	230	260	280	300
SEPR	5,04	5,05	5,15	4,98	5,15	5,03	4,89	5,11	5,13	5,04

MAINTENANCE, INSPECTIONS AND PERIODIC CHECKS



To keep the machine running properly and providing the guaranteed performance required, it is necessary to make some periodic checks.

Operation	Frequency	Execution
Check that the temperature of the water produced is in the required range	Daily	User
Check for the presence of any alarm signals	Daily	
Check the functioning of the fans	Monthly	
Check the pressure of the water circuit with the pump stopped (verify that it is about 1 bar // 15 psi)	Monthly	
Check that the temperature of the air is compatible with the operating limits of the machine	Monthly	
Clean the air filters	Monthly(1)	
Clean the condensation coils with a jet of compressed air.	Yearly (1)	
Clean the water filter	Monthly(2)	Specialised personnel 
Check that the refrigerant liquid sight glass is clear or, at most, with a few bubbles (check with the compressor running)	Every 6 months	
Check that the undercooling and superheating values are, respectively between 3÷5K // 5,4÷9°F and 5÷7K // 9÷12,6°F	Every 6 months	
Check for traces of oil on the pipes of the refrigerant circuit (symptom of refrigerant leaks)	Every 6 months	
Check the tightness of the electrical terminals both inside the electrical panel and on the compressors terminals.	Yearly	
Check the contacts of the contactors; if they show signs of deterioration, replace them	Yearly	
Check that the current absorbed by the machine is within the values on the identification plate	Every 6 months	
If the unit will not be used for a long time, drain the water from the pipes and the machine to avoid the formation of ice during the winter (3)	Extraordinary	

- (1) It may be necessary to carry this out more frequently in the case of particularly dirty environments.
 (2) We recommend an extraordinary cleaning of the filter after the machine has been operating for the first week.
 (3) It is not necessary to do this if the system has been charged with an anti-freeze solution (water and a suitable percentage of glycol) (see paragraph **3.4.2 Use of ethylene glycol as a winter anti-freeze**).















Attention! Before carrying out any maintenance on the unit or accessing internal parts, make sure you have cut-off the electricity.










Attention! The upper part of the compressor housing and the output pipe are hot. Be especially careful when working near them.

TROUBLESHOOTING

Cause	Alarm signal or symptom	Solution	Execution
1. The unit does not start			
Contacts of the main differential switch open.	Electronic controller off	Close the contacts	User 
Unit's electrical panel cut-off switch open.	Electronic controller off	Close the contacts	User 
Local/O/REM switch in the O or REM position	Electronic controller on	Move the switch to I	User
No consent from the water differential switch	AL05 <i>Differential pressure switch</i>	Check the functioning of the pump, vent the plumbings	User
Compressor timer active	The compressor icon on the display of the electronic controller is flashing	Wait 5 minutes	User
No consent from the service thermostat	Plant water at temperature (see display A)	Apply a thermal load to the machine or lower the set point	User
No consent from the anti-freeze thermostat	AL81 <i>Antifreeze alarm</i>	Reset a temperature of the water (set point) compatible with the calibration of the anti-freeze thermostat (see table in paragraph 6.2)	User
Service and anti-freeze probe defective	ES05 <i>Outlet water temperature probe alarm</i>	Check contacts and replace, if necessary	Specialised personnel 
Entering water temperature probe defective	ES04 <i>Inlet water temperature probe alarm</i>	Check contacts and replace, if necessary	Specialised personnel 
Intervention of the main differential switch	Electronic controller off	Look for current dispersion inside the machine	Specialised personnel 
2. The compressor does not start			
Intervention of the thermal protection inside the compressor 1, 2	The contactor of the compressor is on but the compressor is stopped	Wait for cooling: check that the compressor is working under normal conditions. Check for insufficient refrigerant in the circuit (see point 8).	Specialised personnel 
Intervention of the thermal protection inside the compressor 3 or 4	AC21, AC22, AC24, AC25 <i>Thermal protection compressor 1, 2, 4, 5</i>		

Cause	Alarm signal or symptom	Solution	Execution
2. (continue) The compressor does not start			
Magnetothermic protection of the compressors open (QC1, QC2)	AC21, AC22, AC24, AC25 <i>Thermal protection compressor 1, 2, 3, 4</i>	Look for short circuits in the motor windings of the compressor. Check for possible over-absorption of current due to too low voltage; combined with operating conditions near the limits: check the power supply voltage and operating conditions	Specialised personnel 
Intervention of the phase-sequence relay	AP21 <i>Reverse phase protection</i>	Reverse the two phases upstream from the cut-off switch of the unit's electrical panel (see paragraph 4.2)	Specialised personnel 
Contactors of the compressor open	The compressor icon is on but the compressor is stopped	Check the voltage at the coil of the contactor of the compressor and the continuity of the coil itself	Specialised personnel 
3. Intervention of the high pressure switch			
Condenser obstructed or insufficient air flow-capacity	AL11, AL12 <i>High pressure from pressure switch circuit 1, 2</i>	Remove dirt from the condenser and any obstacles to the flow of air. Wait for the refrigerant pressure to drop below the reset value (33 bar g), then rearm the high-pressure switch by pressing the button on top of it (see figure in paragraph 6.2)	User
The unit has operated outside its operating limits (such as air or water too hot)	AL11, AL12 <i>High pressure from pressure switch circuit 1, 2</i>	If possible, restore conditions that are compatible with the operating limits. Rearm the pressure switch (paragraph 6.2).	User
Fan not working	AL11, AL12 <i>High pressure from pressure switch circuit 1, 2</i>	See point 6	
Excessive refrigerant charge	High subcooling (greater than 18°F//10K)	Drain excess refrigerant	Specialised personnel 
Presence of incondensable gas or air in the refrigerant circuit	Presence of bubbles on the refrigerant sight glass, also with subcooling values greater than 9°F//5K	Drain the refrigerant circuit, create vacuum and recharge	Specialised personnel 
Refrigerant filter clogged or thermostatic valve stuck	Pipe downstream from the component covered with frost.	Check and replace.	Specialised personnel 

Cause	Alarm signal or symptom	Solution	Execution
4. Intervention of the water differential pressure switch			
Taps of the machine are turned off	AL05 <i>Differential pressure switch</i>	Open the taps	User
Water circulation pump blocked or defective	AL05 <i>Differential pressure switch</i>	Unlock or replace the pump	Specialised personnel 
Water pump stopped	AL05 <i>Differential pressure switch</i> Pump icon lit.	Check the voltage at the coil of the contactors of the pump and the continuity of the coil itself	Specialised personnel 
5. Intervention of the low pressure transducer			
Refrigerant filter clogged or thermostatic valve stuck	Pipe downstream from the component covered with frost. AL21-AL41 <i>Low pressure from pressure transducer circuit 1</i> AL22-AL42 <i>Low pressure from pressure transducer circuit 2</i>	Check and replace	Specialised personnel 
Insufficient refrigerant charge	AL21-AL41 <i>Low pressure from pressure transducer circuit 1</i> AL22-AL42 <i>Low pressure from pressure transducer circuit 2</i>	See point 8	
6. Fans do not start			
Very low outside air temperatures and consequent intervention of the condensation control	Fan icon off. Condensation pressure normal	The machine is working anyway	
No voltage output from the fan-speed regulator	Fan icon on and fans stopped	Check the voltage output from the regulator and replace, if necessary	Specialised personnel 
Intervention of the magnetothermic protection inside the fan	AF21, AF22 <i>Thermal protection fan circuit 1, 2</i>	Check that the working conditions of the machine (outside air temperature) are compatible with the operating limits. Wait for the fan motor to cool.	User
Fan fuse blown	Fan icon on and fans stopped	Look for short circuits in the motor windings of the fans. Check the fan roller bearings.	Specialised personnel 
Electrical connections of the fans loose	Fan icon on and fans stopped	Check and tighten	Specialised personnel
Intervention of fans 1, 2 or 3 internal thermal protection	AF21 <i>Thermal protection fan circuit 1</i>	Check that the working conditions of the machine (outside air temperature) are compatible with the operating limits. Wait for the fan motor to cool.	User
Intervention of fans 4, 5 or 6 internal thermal protection	AF22 <i>Thermal protection fan circuit 2</i>		

Cause	Alarm signal or symptom	Solution	Execution
7. The unit is working without ever stopping			
Excessive thermal load		Reduce the thermal load. Reduce the temperature of the incoming water and/or the flow-capacity of the water by closing the exit tap of the unit a little.	User
No refrigerant		See point 8	
8. Compressor suction pipe covered with frost			
No refrigerant	High superheating, low subcooling and high discharge temperature of the compressor. Traces of oil on the refrigerant circuit.	Check the refrigerant circuit with a leak detector. Repair any ruptures and recharge the circuit.	Specialised personnel 
9. The unit starts and stops alternatively; The outlet water temperature varies greatly			
Low water flow		Verify the water flow. Open the water shut-off valves of the plant. If it is possible, reduce the pressure drop of the water circuit. If it is possible, add a pump with proper available pressure.	Specialised personnel 

DISMANTLING THE CHILLER



If the chiller is being dismantled, you must separate it into parts of homogeneous material.

The following table lists the main materials of the various components of the machine.

Part	Material
Refrigerant fluid	R410A, Oil
Panelling and supports	Carbon steel, Epoxy paint
Chiller compressor	Steel, Copper, Aluminium, Oil
Heat-exchanger (evaporator)	Steel, Copper
Condenser	Aluminium, Carbon Steel
Pipes	Copper
Fan	Aluminium, Copper, Steel
Valves	Steel, Bronze
Insulation	Synthetic rubber without CFC, EPS, Polyurethane
Electrical wires	Copper, PVC
Electrical parts	PVC, Copper, Bronze












We recommend that you follow current safety norms for the disposal of each single material. The refrigerant contains particles of lubrication oil from the chiller compressor.



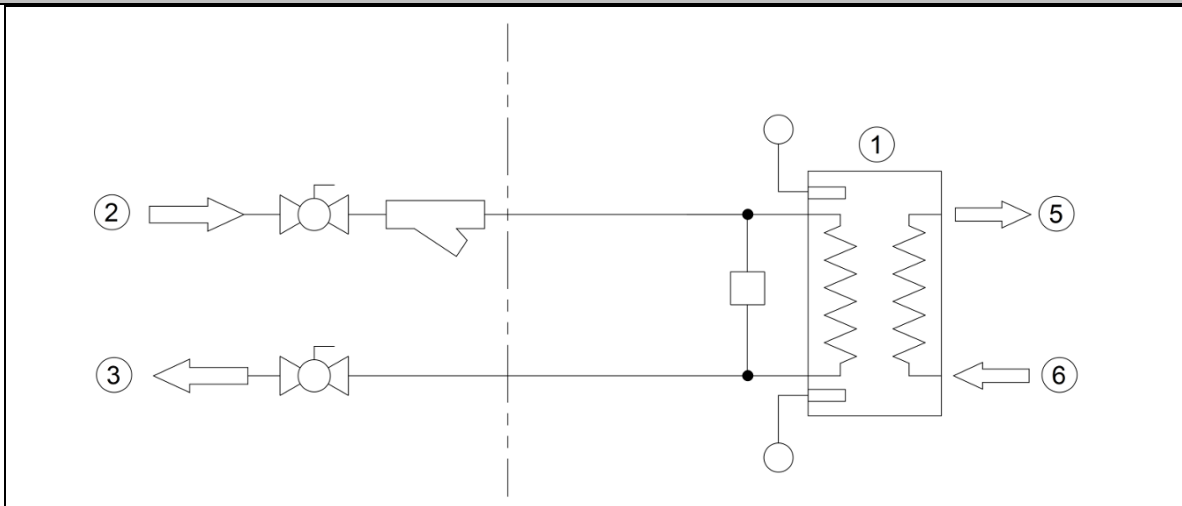
Dispose of refrigerant properly. Remove it from the chiller with suitable tools and deliver it to authorized collection centres that will treat it and make it reusable.

WATER DIAGRAMS

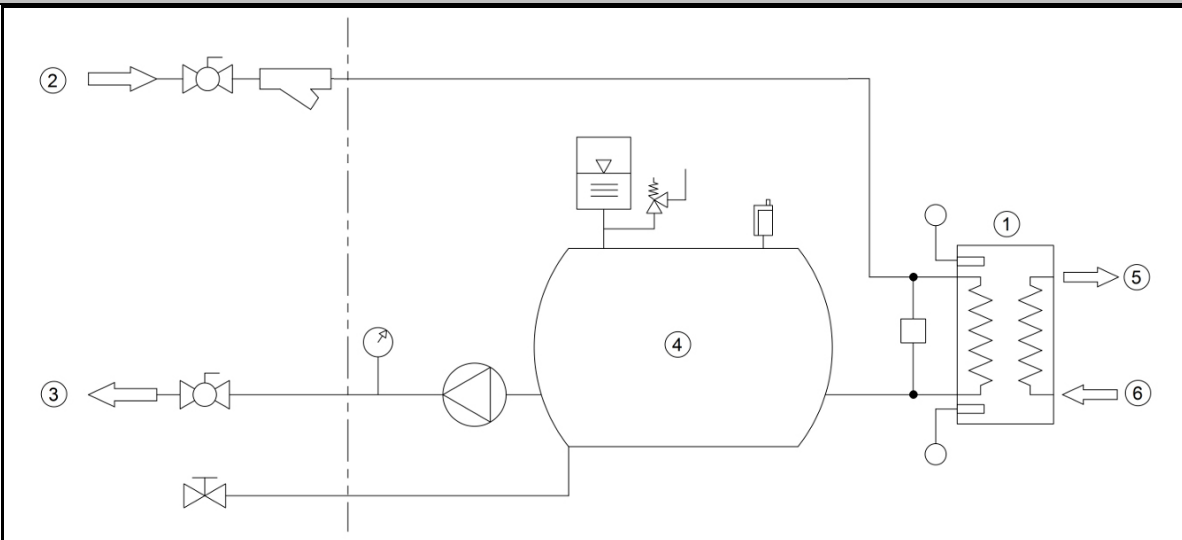
LEGEND

	EXPANSION VESSEL		TEMPERATURE PROBE	①	EVAPORATOR
	DRAIN TAP		DIFFERENTIAL PRESSURE SWITCH	②	WATER INLET
	SHUT OFF VALVE		PUMP	③	WATER OUTLET
	GAUGE		RELIEF VALVE	④	TANK
	FILTER		SAFETY VALVE	⑤	REFRIGERANT OUTLET
				⑥	REFRIGERANT INLET
					CHECK VALVE

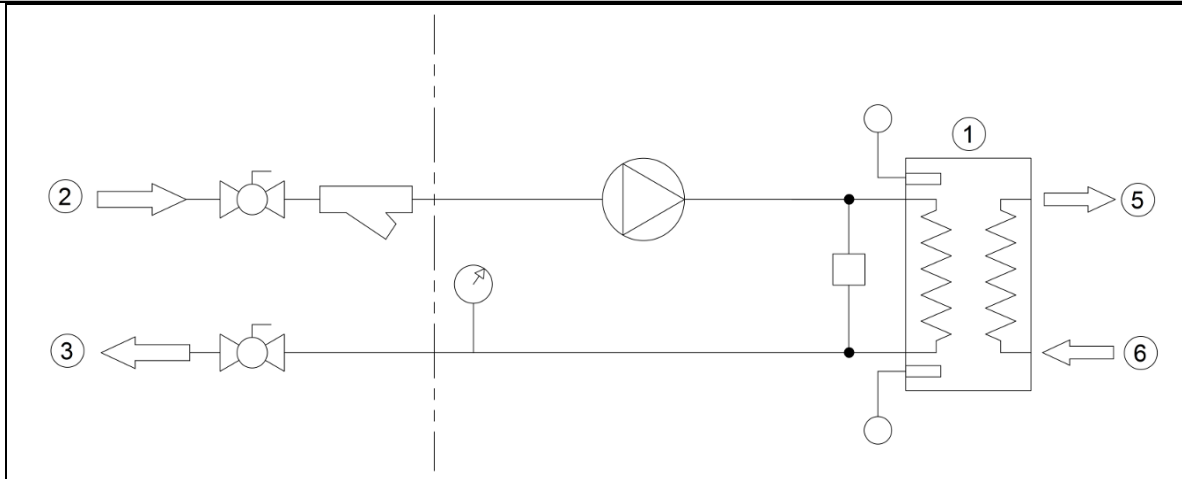
STANDARD



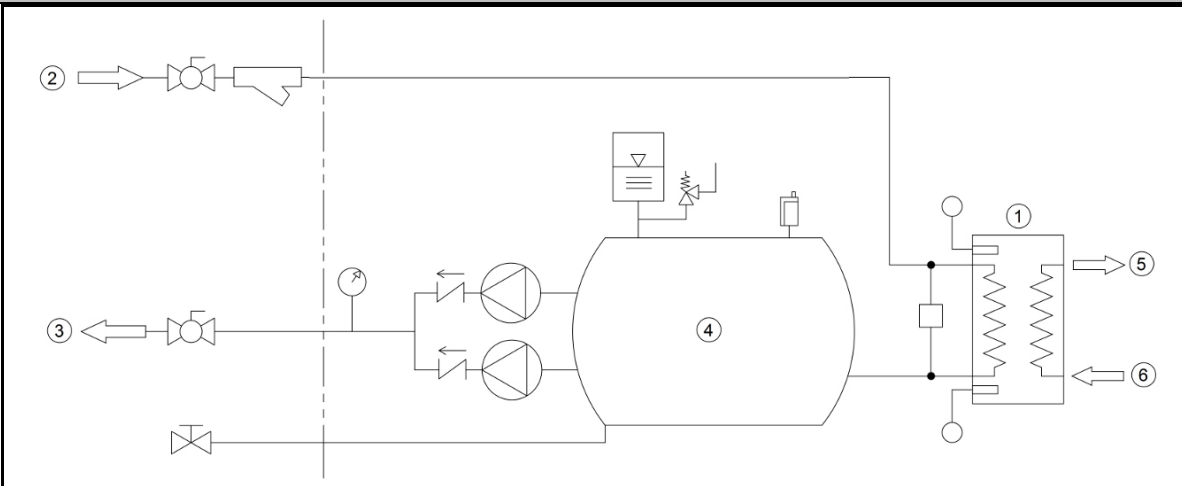
SINGLE PUMP WITH TANK



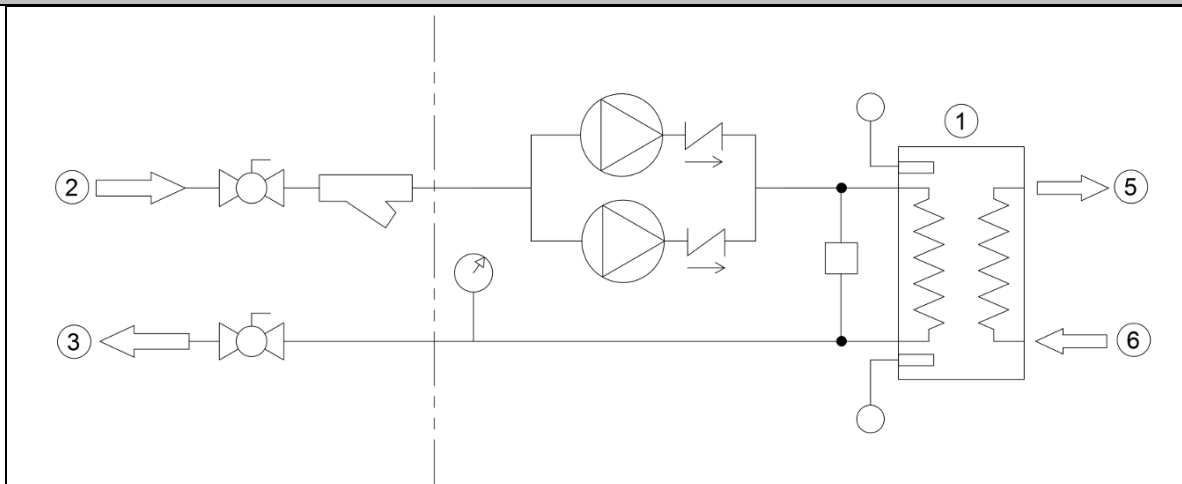
SINGLE PUMP NO TANK



DOUBLE PUMP WITH TANK














DOUBLE PUMP NO TANK



REFRIGERANT CIRCUIT

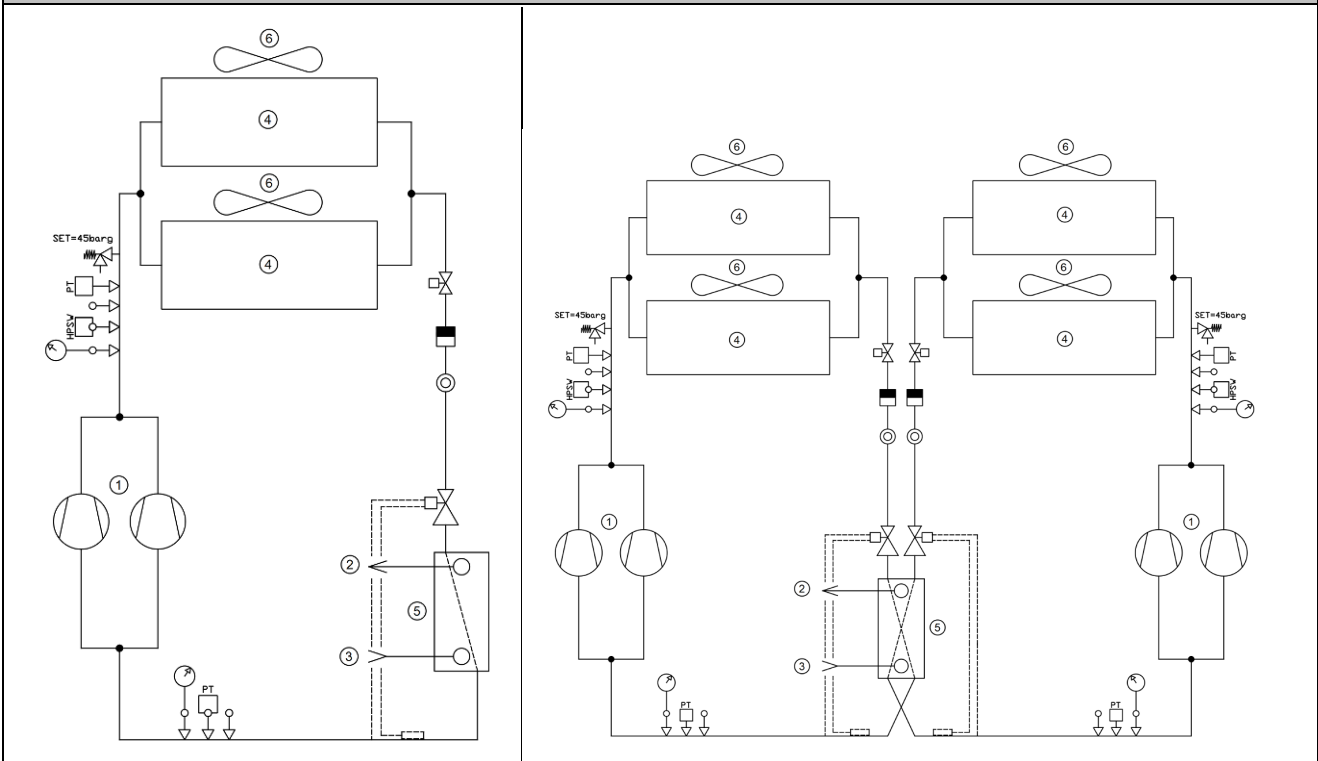
LEGEND

 PT	PRESSURE TRANSDUCER	 SIGHT GLASS	① COMPRESSORS
 HPSW	HIGH PRESSURE SWITCH	 FILTER DRYER	② WATER OUTLET
 OUTLET PRESSURE		 CHECK VALVE	③ WATER INLET
 GAUGE		 SAFETY VALVE	④ CONDENSER
 TERMOSTATIC EXPANSION VALVE		 SOLENOID VALVE	⑤ EVAPORATOR
		 SHUT-OFF COMPRESSOR VALVE	⑥ FAN

STANDARD VERSION

SINGLE CIRCUIT

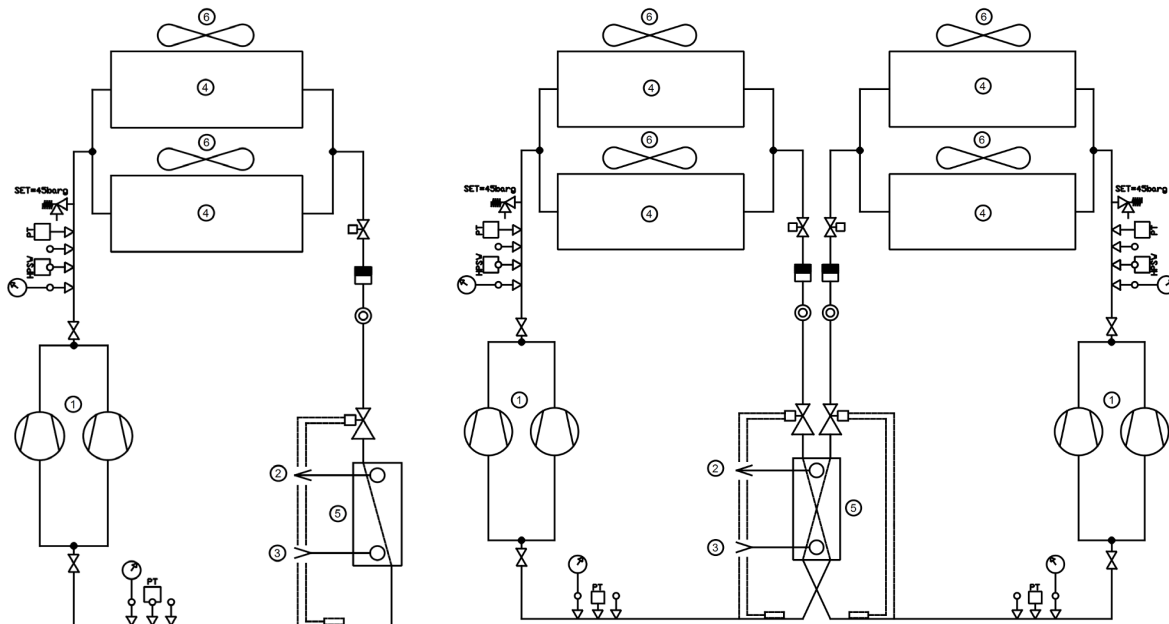
DOUBLE CIRCUIT



VSC VERSION

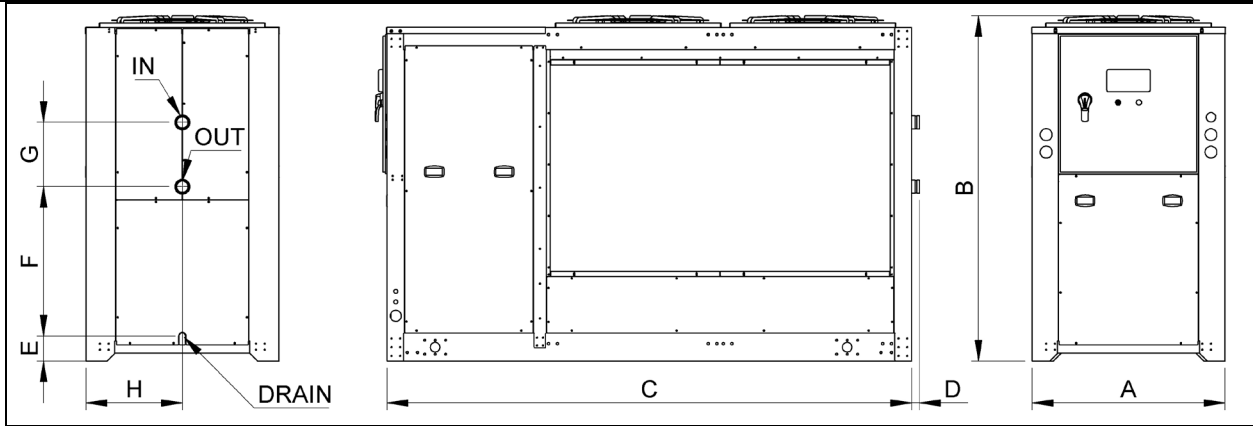
SINGLE CIRCUIT

DOUBLE CIRCUIT



DIMENSIONAL DRAWINGS

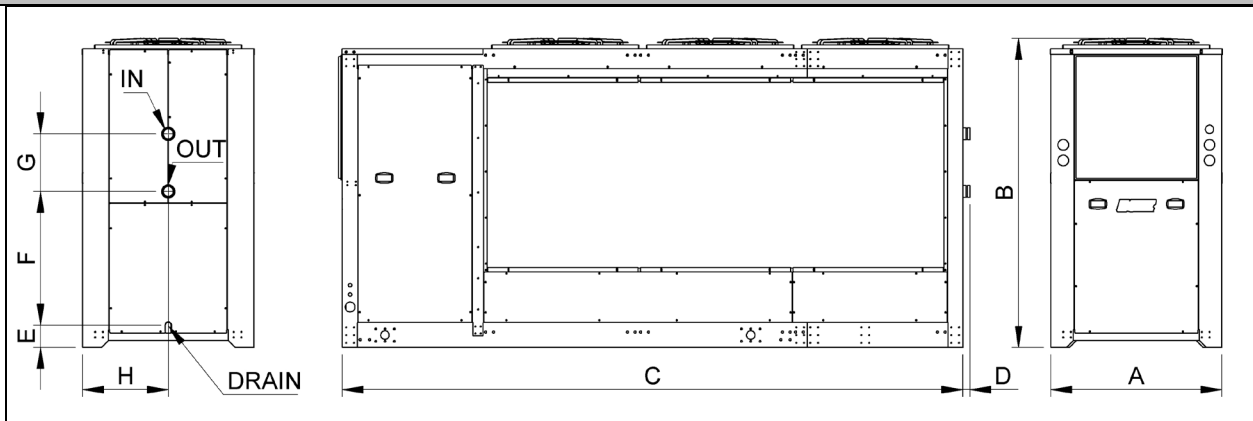
CFT 100-115-130



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	IN	OUT	Drain*
CFT100	1104	1982	3004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT115	1104	1982	3004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT130	1104	1982	3004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM

	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	H [in]	IN	OUT	Drain*
CFT100	43.46	78.03	118.27	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT115	43.46	78.03	118.27	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT130	43.46	78.03	118.27	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM

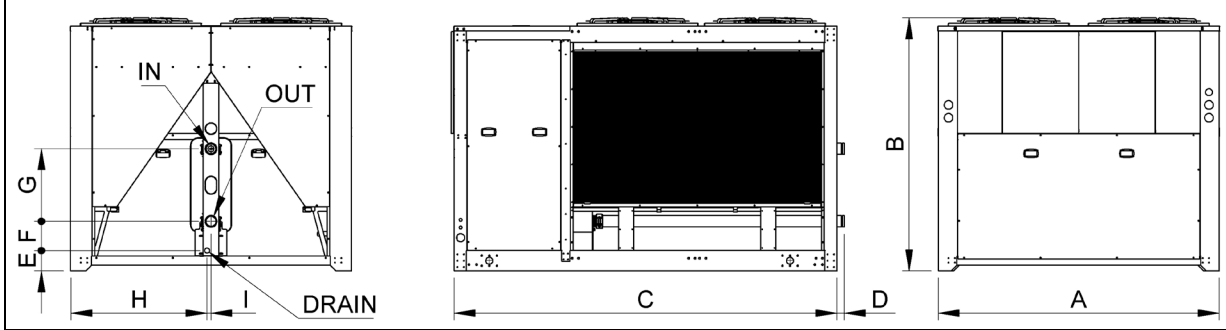
CFT 160-180-200



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	IN	OUT	Drain*
CFT160	1104	1982	4004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT180	1104	1982	4004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT200	1104	1982	4004	46	144	875.5	369	552	2"1/2 VIC	2"1/2 VIC	1" GAS FM

	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	H [in]	IN	OUT	Drain*
CFT160	43.46	78.03	157.64	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT180	43.46	78.03	157.64	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM
CFT200	43.46	78.03	157.64	1.81	5.67	34.47	14.53	21.73	2"1/2 VIC	2"1/2 VIC	1" GAS FM

CFT 230-260-280-300



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	IN	OUT	Drain*
CFT230	2204	1982	3004	53	159	229.5	568	1071	31	3" VIC	3" VIC	1" GAS FM
CFT260	2204	1982	3004	53	159	229.5	568	1071	31	3" VIC	3" VIC	1" GAS FM
CFT280	2204	1982	3004	53	159	229.5	568	1071	31	3" VIC	3" VIC	1" GAS FM
CFT300	2204	1982	3004	53	159	229.5	568	1071	31	3" VIC	3" VIC	1" GAS FM

	A [in]	B [in]	C [in]	D [in]	E [in]	F [in]	G [in]	H [in]	I [in]	IN	OUT	Drain*
CFT230	86.77	78.03	118.27	2.09	6.26	9.04	22.36	42.17	86.77	3" VIC	3" VIC	1" GAS FM
CFT260	86.77	78.03	118.27	2.09	6.26	9.04	22.36	42.17	86.77	3" VIC	3" VIC	1" GAS FM
CFT280	86.77	78.03	118.27	2.09	6.26	9.04	22.36	42.17	86.77	3" VIC	3" VIC	1" GAS FM
CFT300	86.77	78.03	118.27	2.09	6.26	9.04	22.36	42.17	86.77	3" VIC	3" VIC	1" GAS FM

Note: For 60 Hz version water fittings are NPT FF type



CAG PURIFICATION INC. Unit 2, 3770B Laird Road, Mississauga ON. L5L 0A7
Toll 1-800-951-0777 Fax 905-820-3490 www.cagcooling.com email: chillers@cagcooling.com
