

PURESTREAM

AMBIENT FLUID COOLER

BY FRIULAIR



ACW Air Cooled Fluid Cooler
User and Maintenance Manual

Dear Customer,

Please read this manual carefully in order to obtain the best performance from our products. In order to avoid improper use and safe conditions for the users, it is essential that you follow the directions carefully while following accident-prevention procedures to ensure safety at all times.

Each ACW cooler is rigorously tested at the factory before being shipped to our customers. This verifies that there are no manufacturing defects and that the products will function properly. This manual must be kept for future reference and is an integral part of the cooler you have purchased. Due to continuous technical development, we reserve the right to make the necessary modifications without advance notice. Do not hesitate to contact us if you have any concerns or need additional information. The product identification label that is located on the side of the cooler contains all essential information. During installation please make note of the serial number for future referencing which can be found on the identification label. The serial number is required if you require information pertaining to this unit for warranty purposes, unit operation and replacement parts, etc., during the warranty period or after the warranty period. Removing or tampering with the identification label will void the warranty.












Warranty conditions:

For 12 months from the commissioning/installation date, and no more than 14 months from the shipping date, any defective parts will be repaired and or replaced at no charge. 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. This unit must be installed and maintained according to the user manual supplied with this unit. The warranty will be voided if the cooler has been modified or tampered with in anyway. The right to service under warranty must be approved by CAG Purification staff. When requesting warranty service, you must provide the data on the product's identification name plate/label that is located on the unit.

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1.1 DEFINITIONS OF THE SYMBOLS USED

	Read user and maintenance manual carefully before performing any work on the Cooler
	Warnings; risk of danger or the possibility of damaging the machine, pay particular attention to this symbol.
	Risk of electrical danger; this symbol highlights conditions that could be fatal to the user/operator. User must follow the instructions in the manual provided meticulously to ensure safe use.
	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 inlet connection point.
	Water outlet 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.

(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.



The ACW coolers contain no refrigerant.



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



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

1.3 PROPER USE OF THE COOLER

ACW units are packaged air cooled liquid coolers.

They are intended for use in industrial process requiring chilled water. Any other use is considered as incorrect. 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 limits of operation (see sections 3.5 and 7). In particular:

- Power voltage and frequency;
- Pressure, temperature of incoming water;
- Water flow rate;
- Surrounding temperature.

The coolers have 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 – GENERAL RULES

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 WATER CIRCUIT

The water circuit mainly consists of a pump, tank and a cooling coil (assembled with a fan). The water flows into the tank first. After the water is suctioned by the pump which sends it to the coil where it is cooled and then the water flows to the system (see **Water diagram** section 11). All ACW units have an open circuit with a tank at atmospheric pressure. See chapter **11 Water diagram**.

2.2 FAN

The fan forces air through the coil to remove the water heat and cooling the water. ACW coolers are equipped with axial fans and have internal heat protection for the motor windings.

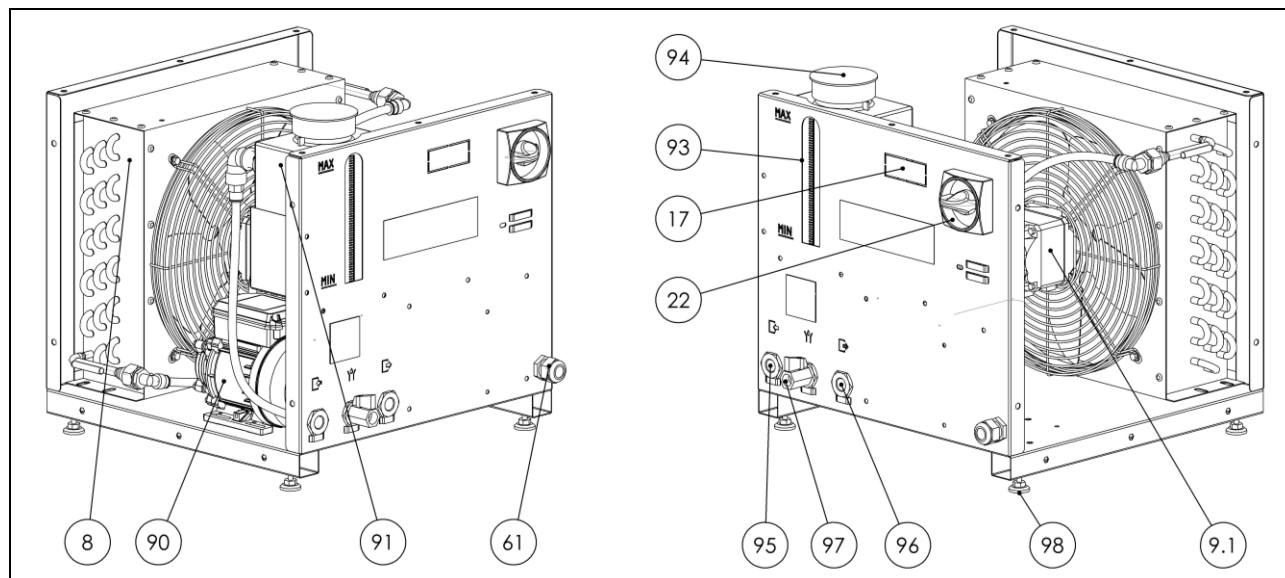
2.3 CONTROL OF THE WATER TEMPERATURE

The purpose of the cooler 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 (see also sections 5. 3).

2.4 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.

2.5 ACW UNITS: IDENTIFICATION OF THE MAIN COMPONENTS



- 08 Cooling coil
- 90 Pump
- 91 Tank
- 61 Power input
- 94 Charging tap
- 93 Level indicator
- 17 Electronic controller (EAA option)

- 22 Disconnecter switch
- 95 Inlet water
- 97 Drain valve
- 96 Outlet water
- 98 Levelling feet
- 9.1 Fan motor

INSTALLATION

3.1 TRANSPORT

The units are supplied packaged in a cardboard box on a wooden skid.

After checking to ensure that the packing is not damaged, position the unit near the installation site for unpacking and preparing for installation.



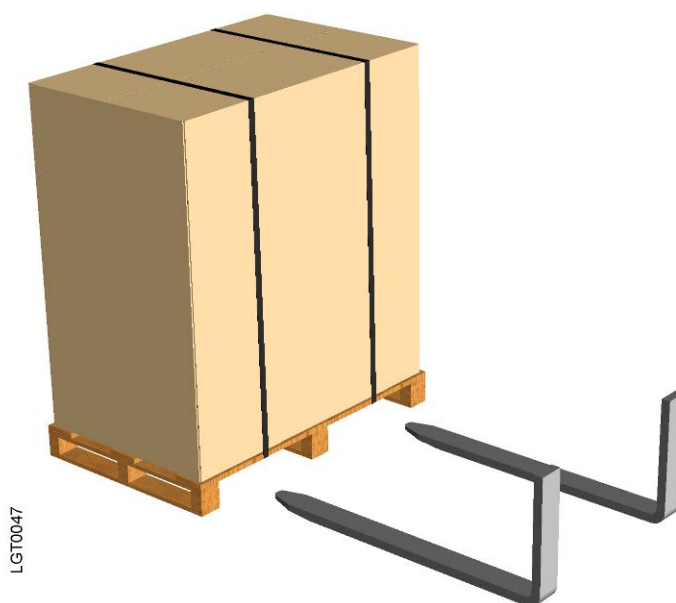
Always keep the cooler vertical: turning it upside down or laying on its side can cause permanent damage to the unit.



Handle with care. Violent handling can cause permanent damage.



The center of the machine is approximately its center of gravity. In any case, when handling the machine with a forklift truck or pallet jack, always check its stability before lifting.



3.2 STORAGE

Protect the machine from bad weather, even if it is packed in its original packaging.

Always keep the cooler vertical: turning it upside down or lying on its side can cause permanent damage to the unit. If not in use, the cooler can be stored packaged in an enclosed place, free of dust, with a maximum temperature of 50 °C//122°F and specific humidity of not 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



Warning! The ACW 001-002 models are suitable for indoor installation only.

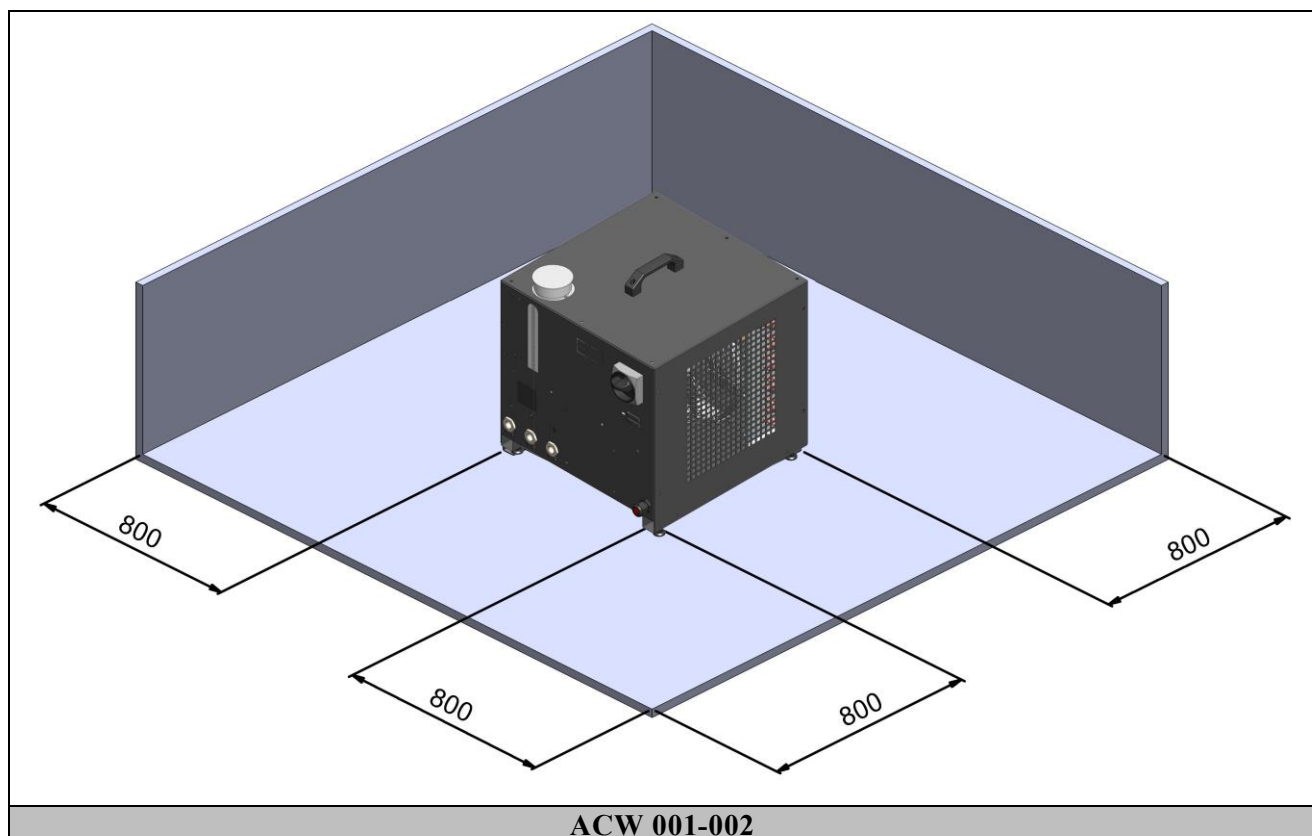
To determine the best place to install the unit, it is important to consider the following aspects:

- The dimensions and source of the water pipes
- The location of the power supply
- The solidity of the support surface area where it will be installed

- 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*);
- Average air temperature in the chosen installation area (see Section 7 *Operating limits*).

3.3.1 Installation spaces

To ensure proper functioning of the unit and access for maintenance, you must respect the minimum installation space shown in the figure in this paragraph. The exit of air from the fan must not be obstructed. In any case, avoid all situations in which hot air can circulate between the output of the fan and the intake of the machine. Contact our office to verify feasibility in all cases where one of the preceding conditions cannot be met.



ACW 001-002

- 800mm/31inches on each side

3.4 WATER CONNECTIONS

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

The installation of outlet and inlet taps on the machine is recommended, which will enable machine maintenance without emptying the entire system, and emptying of the machine only during winter downtime.



Important! Install the mechanical water filter on its input: scum and impurities can seriously damage the heat exchanger.



We recommend an extraordinary cleaning of the mechanical water filter after the machine has been running for the first week (also see Chapter 8 *Maintenance, inspections and periodic checks*).



We recommend a cleaning of the mechanical water filter after the machine has been running for the first week (also see Chapter 8 *Maintenance, inspections and periodic checks*).



Warning! No flames should be used during water connection installation, in the vicinity of or inside the unit.

NOTE

It is recommended that the pipe diameter at the inlet and outlet pipe connections be not less than the inlet and outlet water connections.

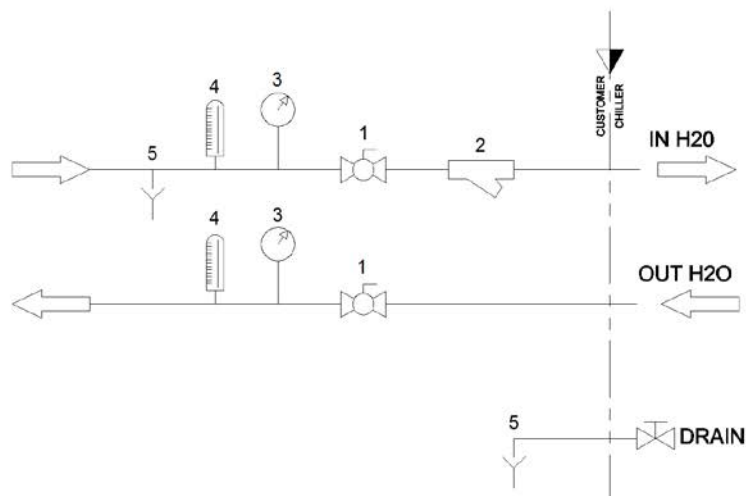
ACW 001-002	60 Hz
Diameter of the in/out water fittings	3/8" NPT FF

3.4.1 Recommended water system for ACW 001- 002

ACW 001-002 units come standard with a tank at atmospheric pressure, pump and a bypass; it is advisable to also provide the water circuit with:

- A mechanical water filter for the machine inlet pipes, with mesh no greater than 1mm
- Machine inlet and outlet valves
- Inlet and outlet pressure gauges from the machine in order to help monitor its operation.

Diagram of recommended water circuit for ACW 001-002 models





Water level Indicator

3.5 ELECTRICAL CONNECTIONS



The machine 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 and in the following table.



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 mandatory: 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.

- **Note:** North American units are supplied with power cord and plug already installed.
- When necessary use wires as shown on the electrical diagram and in the following table.



Attention! Never change the internal electrical connections, as the warranty will be become void.



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 ground/earth connection is mandatory: 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.

ACW WITH EAA OPTION – AUTOADAPTIVE CONTROLLER

As an option



The ACW 001-002 electronic controller:

- Displays the temperature of the water exiting the water cooler;
- Enables the required temperature of the chilled water to be set (set point);
- Signals any faults in the temperature probe.

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

Button	Function
	Setting setpoint
	Down key Access the menu
	Up key



Display/Led	Function
	Indicates the state of the fans: On: fan ON Off: fan OFF Flashing: fan stopping
	°Celsius unit
	°Fahrenheit unit
	Indicates the presence of alarms

5.2 TURNING ON AND OFF

Connect the device power supply. To turn on the instrument you have to supply it by the cut-off switch. To turn it off it is enough to cut off the power supply by closing the cut-off switch. The display will shows the outlet water temperature.

5.7 LOCKING/UNLOCKING THE KEYBOARD

Make sure the keyboard is not locked and no procedure is running.



- Press  and  2 seconds: the display will show "Loc" 1 second.

If the keyboard is locked, you will not be allowed to:

- Show the temperature read by probe 1 and probe 2;
- Modify the working setpoint.

This operations provoke the visualization of the label "Loc" 1 second.

To unlock the keyboard:

- Press  and  2 seconds: the display will show "UnL" 1 second.















5.8 ALARMS

The display will show the following code of alarm.

Code	Description	Type of rearm
AL1	Minimum temperature probe 1 (ambient temperature)	Automatic
AL2	Maximum temperature probe 2 (outlet water temperature)	Automatic
Pr1	Probe 1 error	Automatic
Pr2	Probe 2 error	Automatic
Loc	Keyboard and/or setpoint are locked	---
----	The quantity to show is not available	---

5.9 SETTING CONFIGURATION PARAMETERS

To gain access the procedure:

- Press  and  4 seconds and the display will show "PA";
- Press ;
- Press  or  in 15 seconds to set the password²;
- Press  or do not operate 15 seconds;
- Press  and  4 seconds and the display will show "SP", the first available parameter.
- Press  or  to scroll the parameter list;
- To select a parameter, press  and use  or  in 15 seconds to modify the setting value;
- Press  to confirm the value or do not operate 15 seconds.

² Contact our company.

5.10 TABLE OF STANDARD PARAMETERS CONFIGURATION

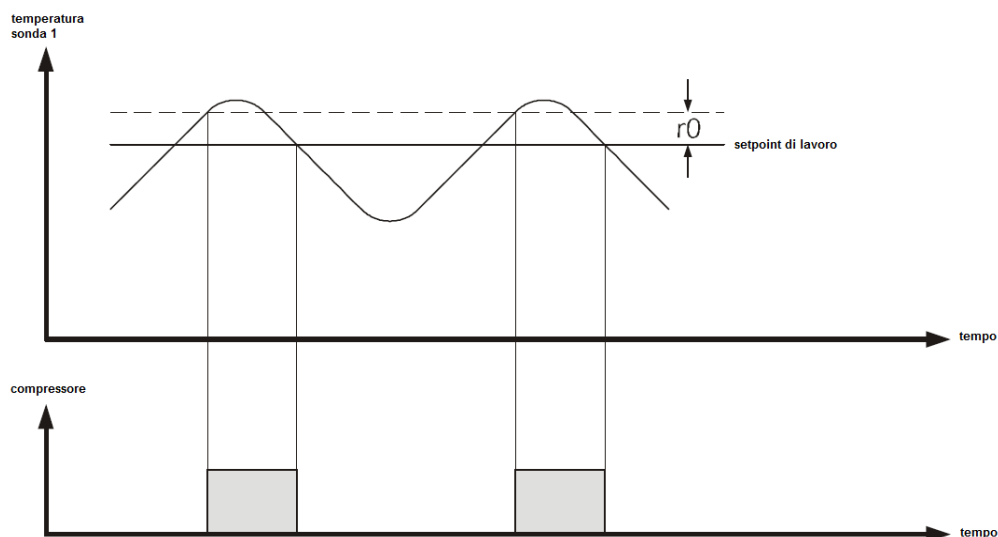
Below there is a table of most important parameters and their factory setting. To modify the parameter contact our company.

Parameter	Function	Factory setting
SP	Working setpoint	0°C//32°F
r0	Working setpoint differential	5K
r1	Minimum working setpoint	0°C//32°F
r2	Maximum working setpoint	25°C//77°F
r6	Type of working setpoint: • Absolute setpoint r6=0 • Relative setpoint r6=1: temp. read by probe 1 – working setpoint	1
r7	Forced off of compressors	4°C//39,2°F
r8	Differential of parameter r7 <i>[At r7+r8 value the compressor could be switched on]</i>	2K
A1	Temperature the alarm of low temperature is activated AL1	4°C//39,2°F
A4	Temperature the alarm of high temperature is activated AL2	50°C//122°F
A10	Differential of parameter A1 <i>[At A1+A10 value the alarm AL1 will be deactivated]</i>	2K
A11	Differential of parameter A4 <i>[At A4-A11 value the alarm AL2 will be deactivated]</i>	5K

5.11 ALTERNATIVE METHOD OF TEMPERATURE REGULATION

The electronic controller allows to regulate the outlet working temperature with an absolute logic in function of the temperature read by probe 1.

In that way, the SP value is the absolute regulation setpoint like in the following image.



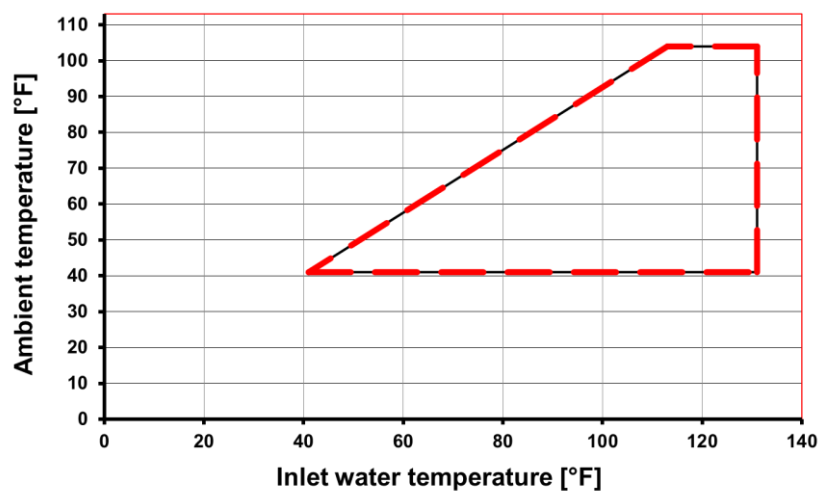
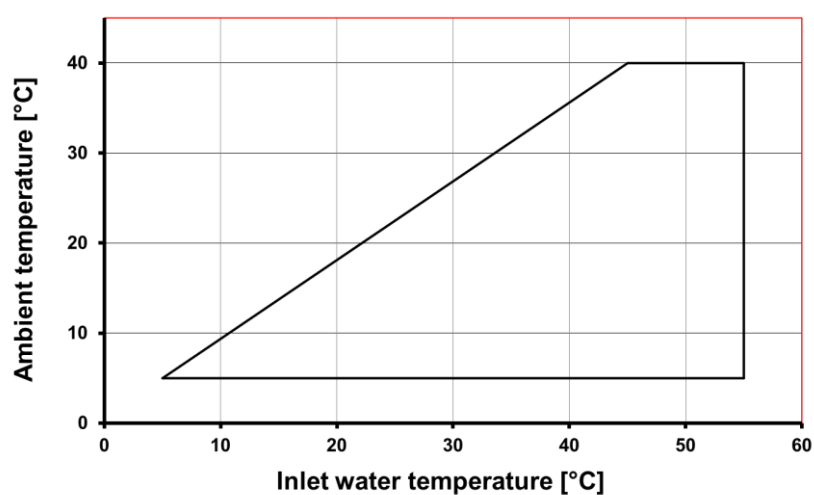
To set this kind of working mode, please set the following values in that way (see paragraph 5.9 *Setting configuration parameters*).

Parameter	Function	Suggested value
r1	Minimum working setpoint (off compressors – antifreeze function)	6°C//42,8°F
r6	Type of working setpoint: • Absolute setpoint r6=0 • Relative setpoint r6=1: temp. read by probe 1 – working setpoint	0

OPERATING LIMITS

The graphs show the limits for continuous operation of the ACW units, in relation to the temperature of the water entering the machine and the temperature of the external air.


ACW 001-002



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 interval	Daily	User
Check tank water level using level indicator – see section 3.4 - (only units with open water circuit)	Daily	
Check for the presence of any alarm signals	Daily	
Check the functioning of the fans	Monthly	
Check that the temperature of the air is compatible with the operating limits of the machine	Monthly	
Clean the cooling coil with a jet of compressed air	Annual (1)	Specialized personnel 
Clean the water filter	Monthly (2)	
Check the tightness of the electrical terminals both inside the electrical panel	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	

- (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.








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 cooler and near the pump are hot. Be especially careful when working near them.

TROUBLESHOOTING

Cause	Alarm or symptom	Solution	Execution
1. The unit does not start			
Contacts of the main differential switch are open	Electronic controller off	Close the contacts	User 
Unit's electrical panel cut-off switch is open	Electronic controller off	Close the contacts	User 
No consent from the service thermostat (EAA option)	System water at temperature (see display)	Apply a thermal load to the machine or lower the set point	User
Temperature probe failure	Pr1/Pr2	Check the contacts and replace if necessary	Specialized personnel 
The water pump is not able to suck water	Electronic controller display hot water temperature	Look for current water leakage inside the machine or insufficient water level in the tank or release out the air in to the pump's impeller	Specialized personnel 
2. Fan does not start			
Fault of output of electronic controller or failure of the fan	Fan icon off	The machine can working anyway	
3. 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 exit tap of the unit a little. The machine can working anyway	User
4. The unit stops and starts repeatedly; water temperature changes suddenly			
Insufficient water flow rate		Check water flow rate. Open the system tap fully. If possible reduce system feed leaks. If possible add a pump in series with suitable head.	Specialized personnel 

DISMANTLING THE COOLER

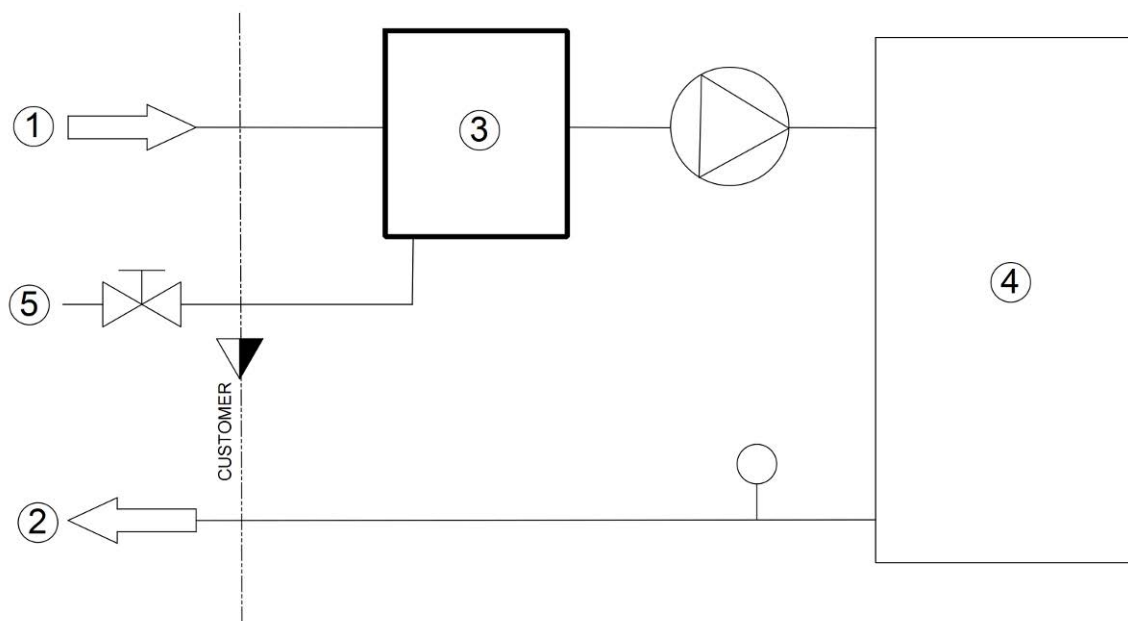
If the cooler is being dismantled, you must separate it into parts of homogeneous material. The following table lists the main materials of the various components of the machine.

Part	Material
Panelling and supports	Carbon steel, epoxy paint
Cooling coil	Copper
Pipes	Copper, EPDM
Fan	Aluminium, Copper, Steel
Valves	Steel, Bronze
Insulation	Synthetic rubber without CFC, EPS, Polyurethane
Pump	Steel, Copper
Tank	PVC
Electrical wires	Copper, PVC
Electrical parts	PVC, Copper, Bronze

We recommend that you follow current safety norms for the disposal of each material.

WATER DIAGRAMS

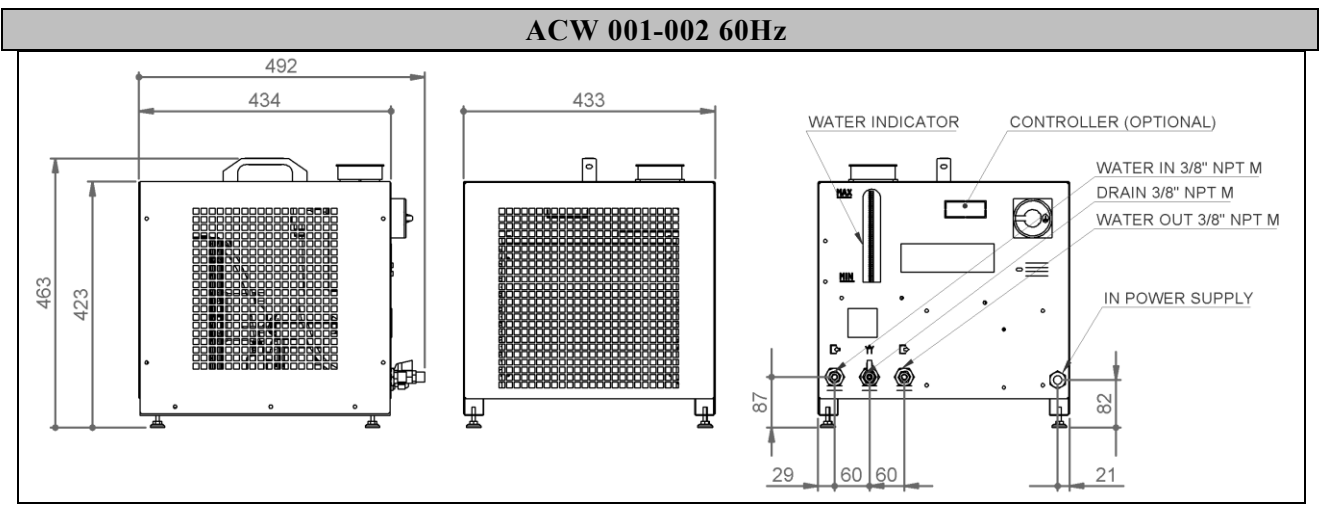
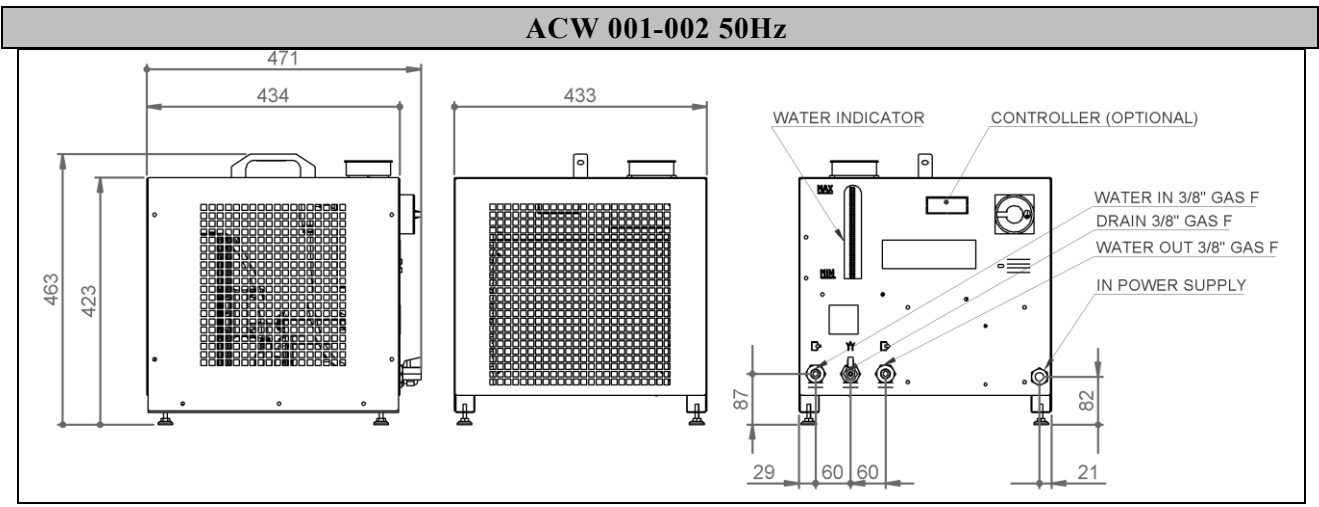
ACW 001-002



LEGEND

	SONDA DI TEMPERATURA TEMPERATURE PROBE	①	INGRESSO ACQUA WATER INLET
	RUBINETTO DI SCARICO DRAIN TAP	②	USCITA ACQUA WATER OUTLET
	POMPA PUMP	③	SERBATOIO STORAGE TANK
		④	BATTERIA RAFFREDDANTE COOLING COIL
		⑤	SCARICO DRAIN

DIMENSIONAL DRAWINGS [MM]





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