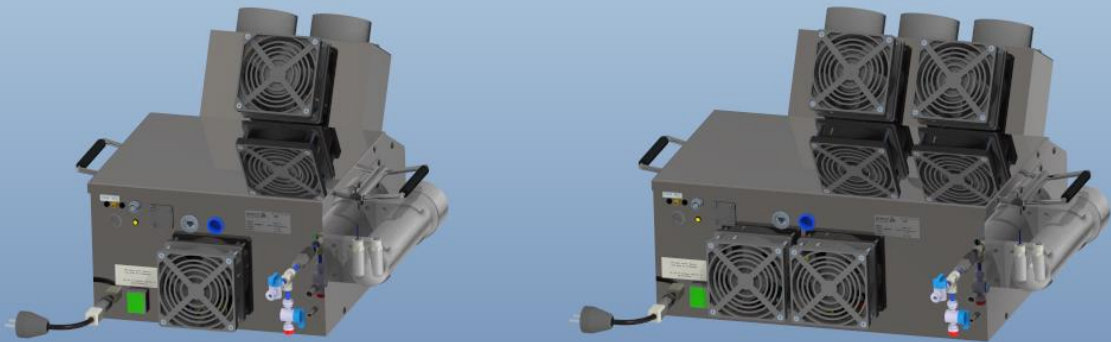


USER MANUAL
HUMIDITY GENERATORS
AR4 V8 / AR6 V8

READ AND REMEMBER THESE INSTRUCTIONS



Versions				
Version	Nature of change	Written by	Checked by	Date
1.0	Initial version	RTA	FRI	05/01/23

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1. SAFETY INSTRUCTIONS



Read and remember these instructions

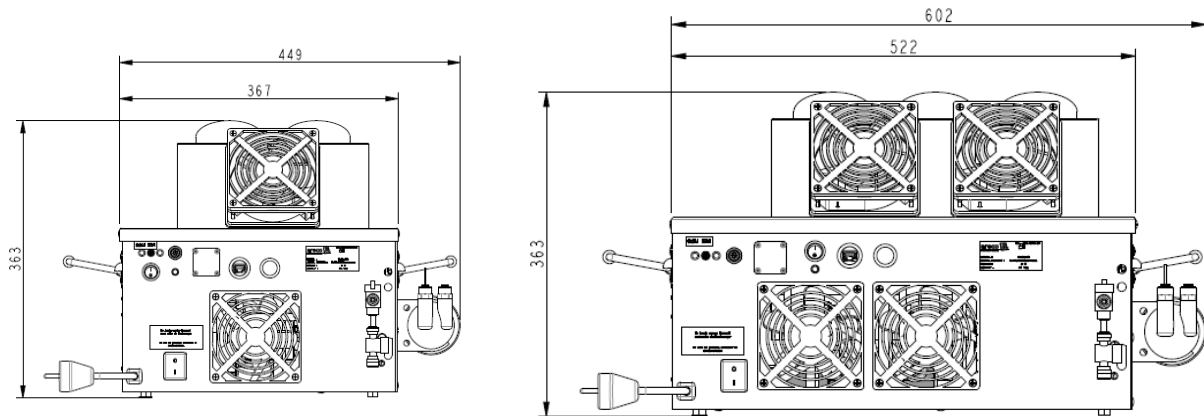
WARNING AND PRECAUTIONS

- The appliance must not be used by persons (including children) with reduced physical, sensory or mental capacities or who lack knowledge and experience unless they are supervised or trained.
- Children must not be allowed to play with the appliance.
- Only use the appliance with the power supply supplied.
- Because there is a risk of fire, electric shock or injury to persons using or in contact with the appliance, the boxes and cables must be placed where they cannot perturb the environment.
- Warning, risk of electric shock. Disconnect the appliance from the electrical power supply before any servicing or cleaning.
- If the appliance is overfilled, if a heating element or electrical components are removed, there is a risk of electric shock if it is cleaned without unplugging the power cord.
- The unit and water filtration must be installed with a suitable backflow prevention device to comply with applicable federal, state and local laws.
- The equipment must be placed so as not to be disturbed by or disturb other equipment
- Fitting and dismantling must be by qualified personnel.
- The equipment must be cleaned by qualified personnel. Cleaning products used must be approved by the manufacturer.

2. TECHNICAL SPECIFICATIONS

2.1. MECHANICAL SPECIFICATIONS

- Materials:
Machine (AR4 & AR6): Stainless steel 304L or 316L according to parts.
- Dimensions: Length x width x height (in inches)
AR4: 17.71 x 16.14 x 14.57
AR6: 24.02 x 16.14 x 14.57
- Weight (lb):
AR4: 50 lb 11.3 oz
AR6: 68 lb 5.5 oz



2.2. HUMIDIFICATION SPECIFICATIONS

- Generation frequency: 1.66 MHz (95% of droplets less than 0.2 mil)
- Running T° (Fahrenheit): +32.9° to 86° (If temperature below 32°F, consult us).
- Flow rate (Gal/h) at 77°F (without outlet tube and external ventilation):
AR4: 1.58
AR6: 2.38
- Maximum water temperature while running (°Fahrenheit):
86° While running
158° during decontamination cycle.
- Water temperature monitoring: In real time by a temperature sensor on the diffusion tank.
- Control and settings: Control unit or application (Accessible by Smartphone/PC/touchpad)
Nebulizing power (mist density)
Duty cycle (Time on / Time off)
Ventilation rate (mist emission)
- Humidity control (2 options)
Mechanical humidity control
PID control with analog humidity sensor

2.3. HYDRAULIC SPECIFICATIONS

- Filling: Automatic by solenoid valve (Normally closed) with 1/4 tube (quick connector).
- Draining: Automatic by solenoid valve (Pinching of tube normally open) with silicone tube.
- Reservoir capacity (Gal):
AR4: 0.21
AR6: 0.32
- Water circuit: Food grade stainless steel or plastic (polypropylene, silicone)
- Areco filtration:
3 filter module (0.98 mil/0.20 mil active charcoal) + UV filter
Reverse osmosis on machine
- Disinfection: Decontamination by thermal shock (once per day) with rinsing (obligatory in France, by the order of 23 June 1978 on fixed installations for water supply in public places).

2.4. ELECTRICAL SPECIFICATIONS

- Main power supply:
AR4: AC/DC transformer (110/220 AC – 24V DC) / 240w-10A
AR6: AC/DC transformer (110/220 AC – 24V DC) / 480w-20A
Output can be varied between 20 and 24 V DC (Factory 22.5 V DC)
- Electrical protection by fuse
Pump: 2 A
Heating element: 10 A
Electronic board: 2 A
- Heating element:
AR4/AR6: 230 AC / 540 W
- Consumption while running (Wh):
AR4 On standby, outside running time: 30
AR4 Running with power and duty cycle at 100%: 260
AR4 Warming up (Decontamination cycle): 240

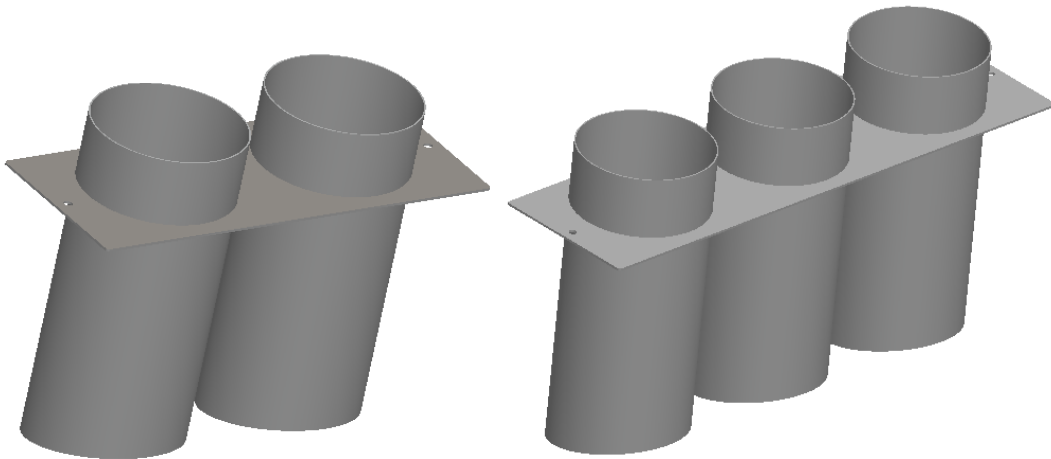
AR6 On standby, outside running time: 30
AR6 Running with power and duty cycle at 100%: 360
AR6 Warming up (Decontamination cycle): 480

2.5. AUTOMATIC CONTROL AND SOFTWARE MANAGEMENT

- Input and output control: Electronic board + Areco onboard software
- Functioning errors (indicated by LED flashing):
Lack of water
Filling
Float
Temperature
Heating
Power board out of order
- Settings/modifications: can be by control box or application

2.6. AERAILIC DATA

- Ventilation: Axial fan 47 in x 47 in
AR4: 1 cooling fan + 1 fan for mist extraction.
AR6 : 2 cooling fans + 2 fans for mist extraction.
Option: A centrifugal fan can be fitted
- Diffusion outlets in stainless steel
AR4: 2x Ø3.54 in
AR6: 3x Ø3.54 in

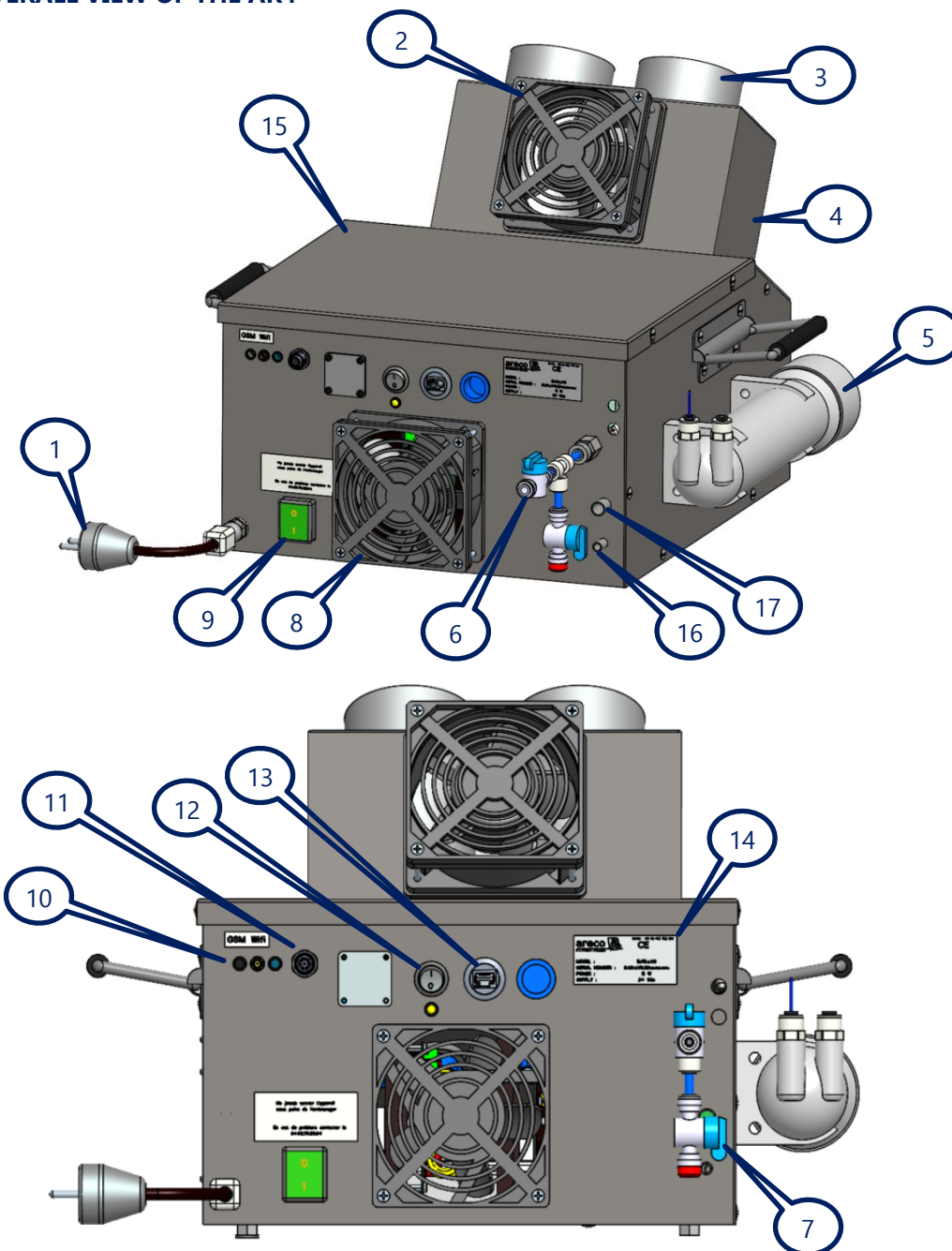


2.7. OTHER CHARACTERISTICS

- Storage conditions:
Temperature: between -4°F and 158°F

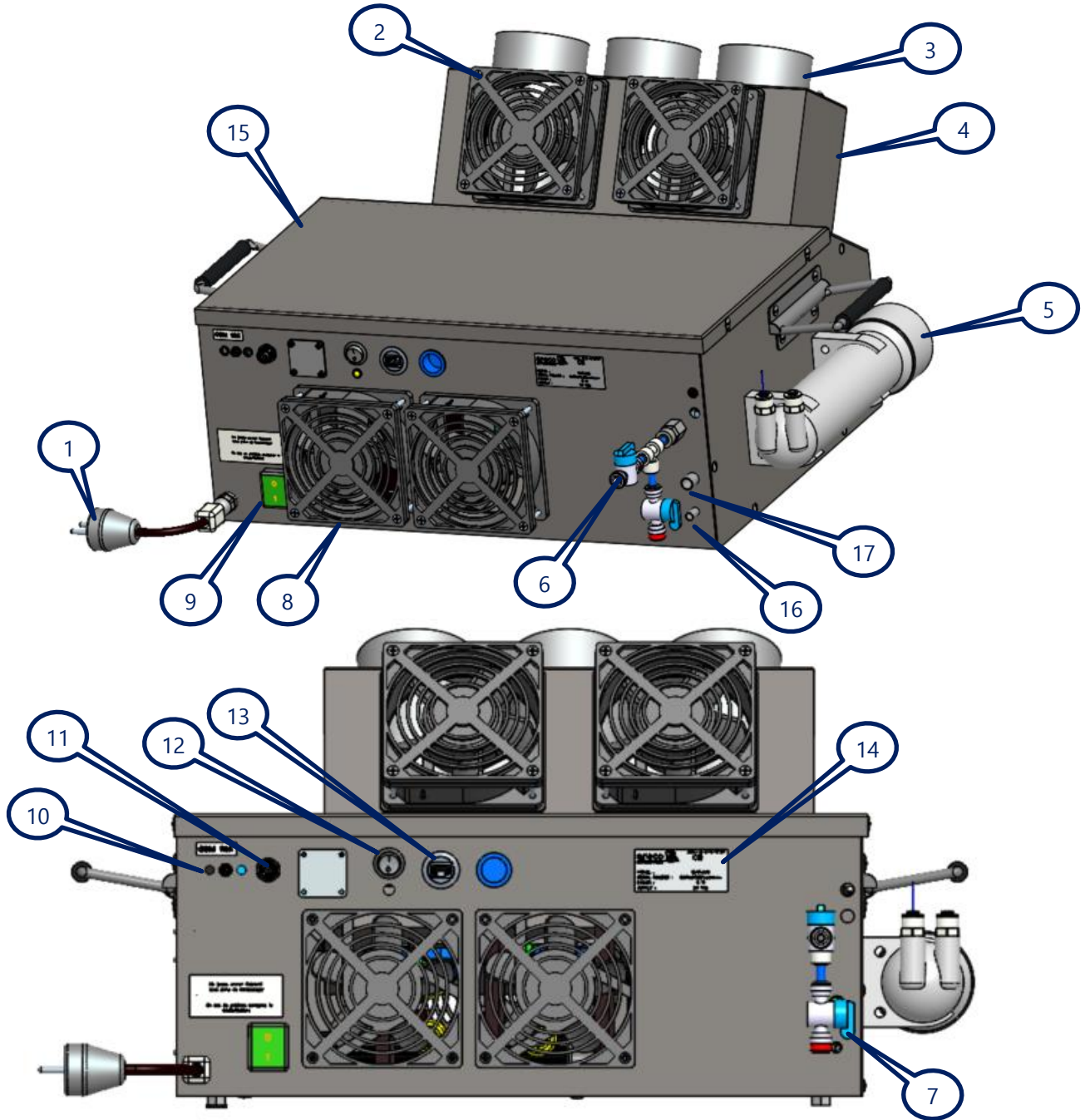
3. DESCRIPTION OF THE EQUIPMENT

3.1. OVERALL VIEW OF THE AR4



No.	Name	No.	Name
1	Power cord (110/220 V AC)	9	Main power switch (110/220 V AC)
2	Diffusion fan	10	Antenna connectors (WiFi, GSM + option)
3	Diffusion outlet	11	Control box connector (8 pin)
4	Diffusion tank	12	Nebulization switch + status LED
5	Osmosis membrane	13	RJ45 connector
6	Water inlet	14	Identification label
7	Sampling valve	15	Lid
C8	Cooling fans	16	Draining nipple
		17	Overflow nipple

3.2. OVERALL VIEW OF THE AR6



No.	Name	No.	Name
1	Power cord (110/220 V AC)	9	Main power switch (110/220 V AC)
2	Diffusion fans	10	Antenna connectors (WiFi, GSM + option)
3	Diffusion outlet	11	Control box connector
4	Diffusion tank	12	Nebulization switch + status LED
5	Osmosis membrane	13	RJ45 connector
6	Water inlet	14	Identification label
7	Sampling valve	15	Lid
8	Cooling fans	16	Draining nipple
		17	Overflow nipple

4. INSTALLATION

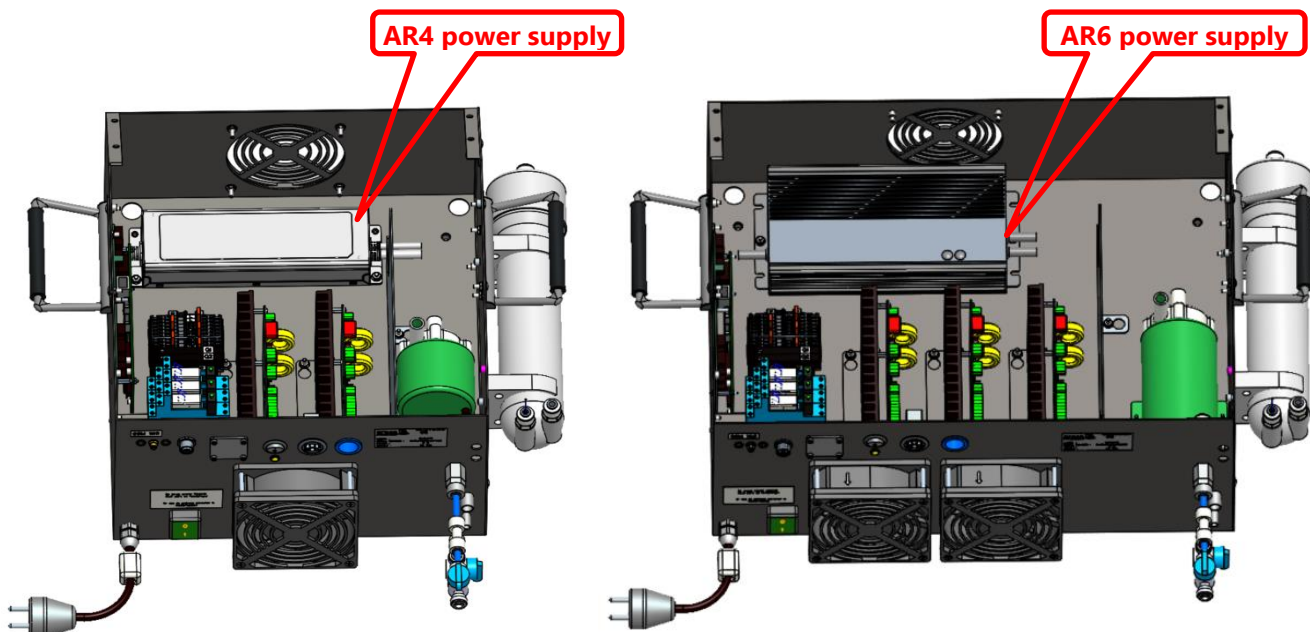
Important: Use demineralized water. The total hardness of the water must be lower than 7×10^{-4} mol per liter (corresponding to 28 mg Ca or 17 mg Mg = 1.64 grains per gallon Ca or 0.90 grains per gallon Mg). ARFITEC provides high performance filtration (see section on filtration).

4.1. RESERVES

- Electrical: 2 outlets 110/220 V AC – 50/60 Hz (Machine + UV filter power)
Possible options:
Water pump: 1 x 110/220 V AC – 50/60 Hz
Evaporation tank: 1 x 110/220 V AC – 50/60 Hz
Lift pump: 1 x 110/220 V AC – 50/60 Hz
- Hydraulics
Cold water inlet ($T^{\circ} < 64^{\circ}$)
Pressure: Between 4 and 6 bars (If the pressure is lower than 4 bars, a pump with Areco filtration can be added).
- Discharge
PVC Ø 1.57 inch with siphon.
(If evacuation is not available, you have 2 options with the lift pump or evaporation tank).

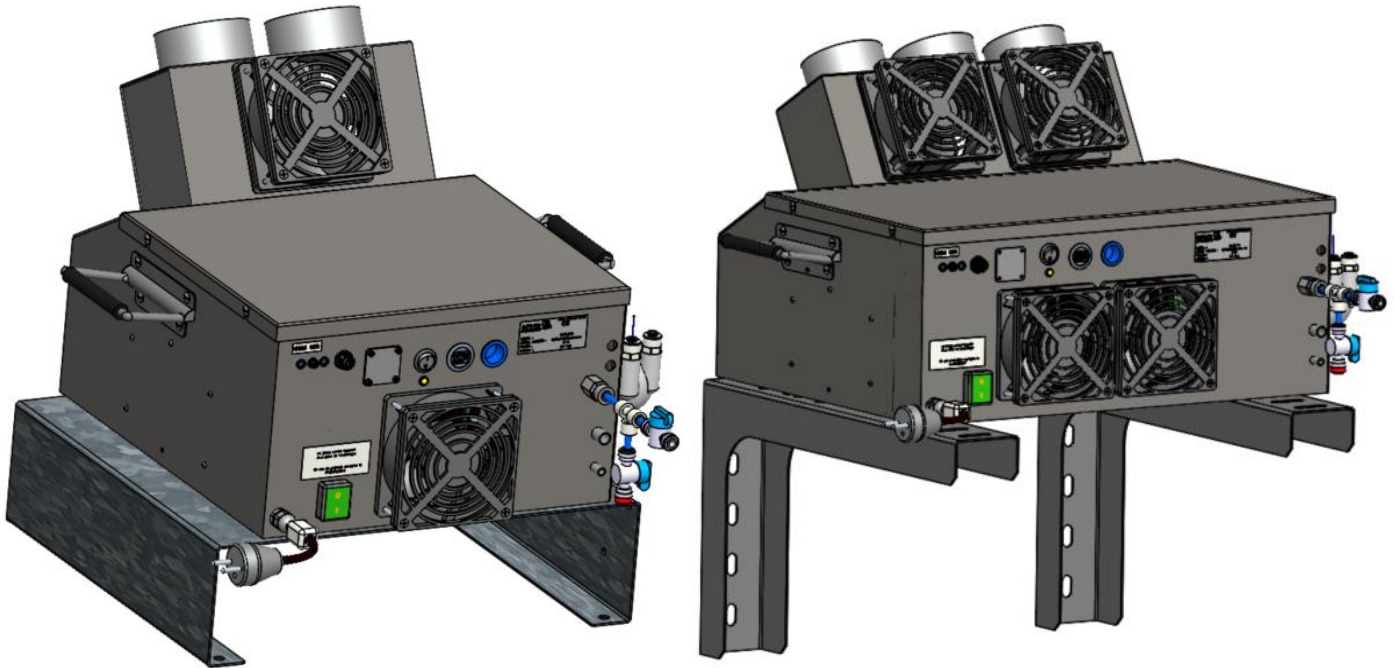
4.2. POWER SUPPLY

- AC/DC transformer integrated in the machine.
Input: 110/220 V AC – 50/60 Hz
Output: Adjustable between 20 V and 24 V DC (Factory setting 22.5 V DC)
Max. supply power (W)
AR4: 240
AR6: 480



4.3. INSTRUCTIONS

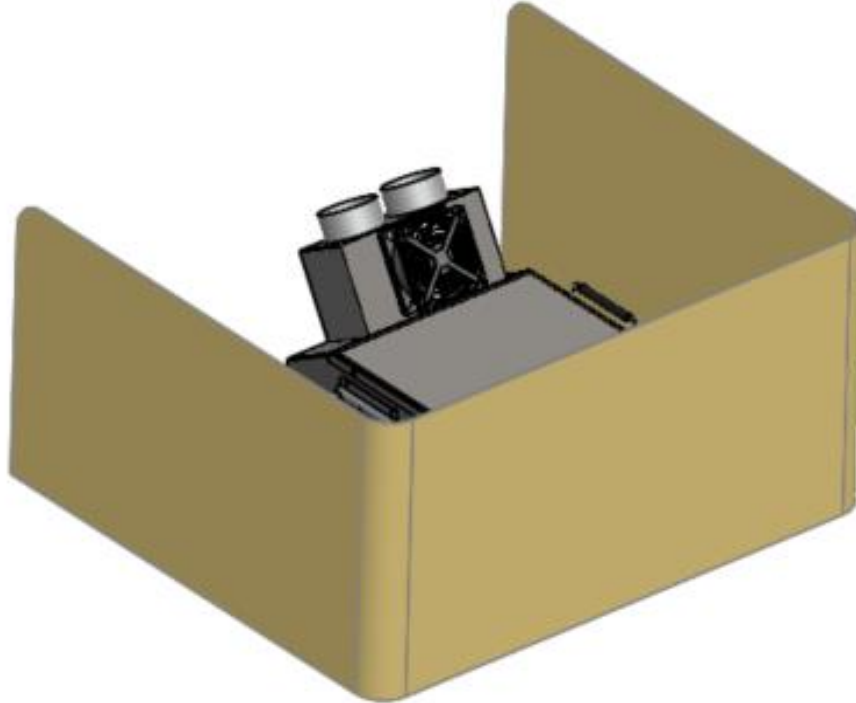
- The machine must be placed on a support with a maximum inclination of +/-1° horizontally and vertically. There are 2 supports (floor and wall)



- The control box must be placed where users have easy access.
- The unit drains by gravity; we recommend a minimum height of 2 inches between the drain outlet and the siphon inlet. The overflow must also be connected to the drain.
According to the installation configuration, water may be drained by an evaporation tank or a lift pump (On option).
- When a water circuit not dedicated specifically to the appliance is used, a non-return valve must be used to prevent any contamination of the appliance.
- Do not place any obstacle less than 3.3 feet from the mist outlets.
- Do not place the machine over electrical conductors or equipment.
- Do not use oxidizable materials in the area where the appliance may nebulize.
- Use an elbow after the diffusion outlet to guide the mist.
A flexible hose may be a solution, but there will be a loss of flow according to the length, diameter and surface state of the hose (a smooth surface without tight bends is to be preferred).
For information, the flow rate does not increase with the fan speed.
- A longer tube can be connected to take the mist to a greater distance (loss of flow 5% per yard). To limit these losses, smooth hoses are preferable.
- Provide a downward slope on all tubing to prevent loss water flowing through the diffusion holes (for hygiene reasons, it is preferable to provide for return water discharge by a siphon system).

4.4. PROTECTIVE COVER

- Floor cover to hide the appliance.



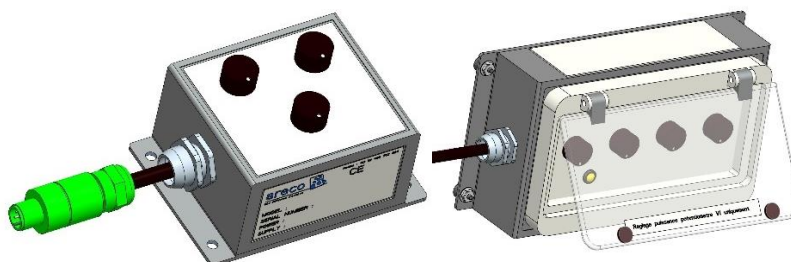
5. CONTROL METHODS

- There are 2 methods of control for the machines: Control box or application.

5.1. CONTROL BOX

The control box is connected to the 8 pin connector on the front of the machine.

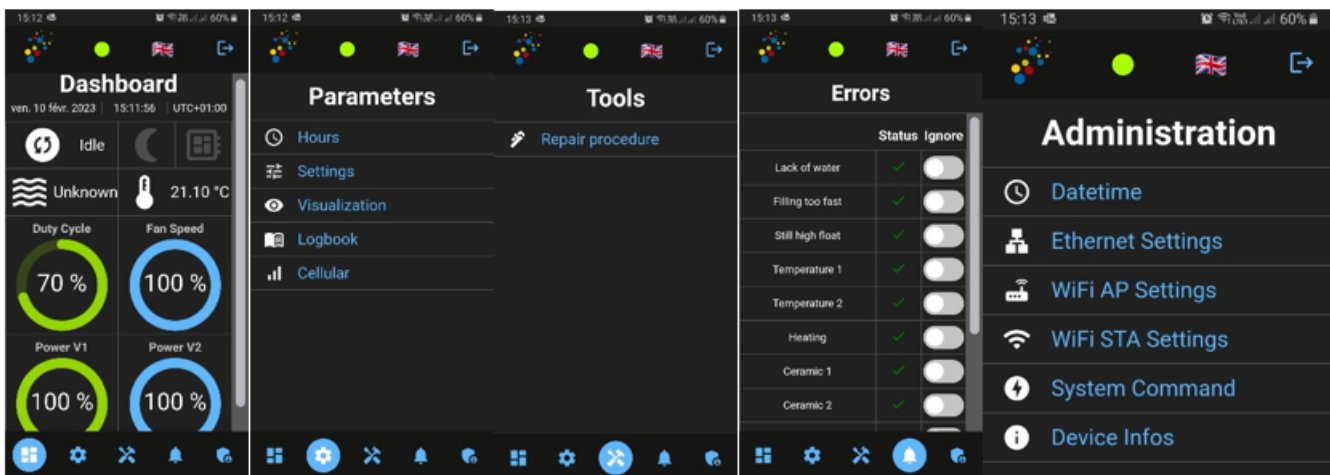
- **Option 1:** Fixed box
Cable length: 31.5 inches
3 settings (nebulizing power, Duty cycle, fan speed)
No protective cover
LED (functioning and faults)
- **Option 2:** Remote box
Cable length: 79 inches
3 settings (nebulizing power, Duty cycle, fan speed)
Protective cover
LED (functioning and faults)



5.2. BY APPLICATION

The application can be accessed on a smartphone, a touchpad or a PC.

- Connect your device to the WiFi network of the appliance (the name of the WiFi network is the serial No. of the appliance).
- To access the application, enter the address of the Internet browser (The address of the 1st machine in the installation is always the same, it will be different for the others).
1st machine: 192.168.2.254
2nd machine: 192.168.2.253
3rd machine: 192.168.2.252
- To log in, if you are a customer or other department, you should request Areco for access to the application.
- Description of tabs



Dashboard:

Time zone, date and time
State
Display of machine settings
Water temperature

Parameters:

Running and decontamination cycle times
Power, fan speed and duty cycle settings
Component counters and technical parameters (tech. access only)

Tools:

Repair procedures

Errors:

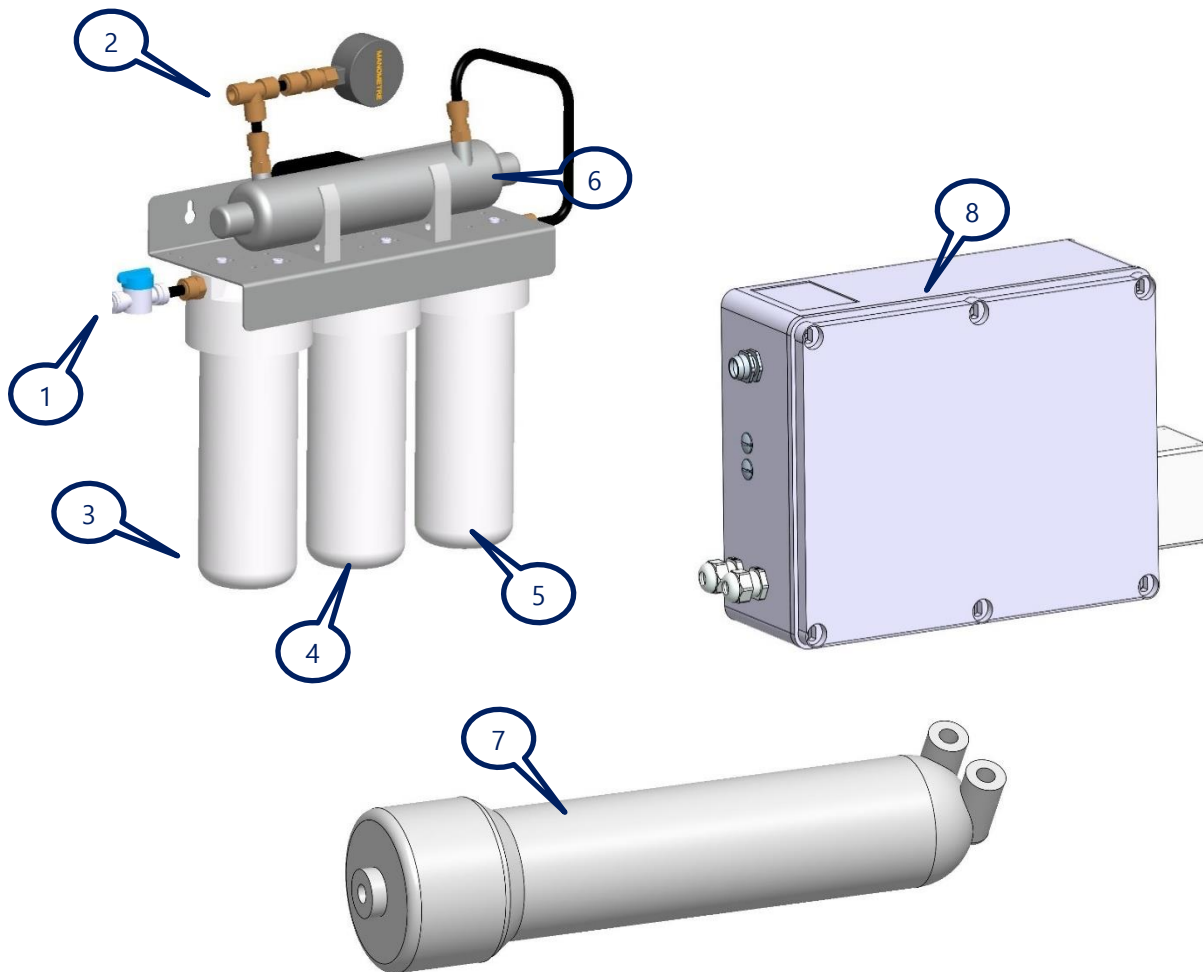
Display of errors

Administration :

Time zone setting
Date and time setting
Serial number modification
Information on the appliance
Information on the networks

6. FILTRATION

- Areco filtration has 3 filters (1 mil, 0.2 mil and active charcoal) and a UV filter. The osmosis membrane is integrated in the machine.
If insufficient pressure is detected after commissioning, a pressurizer and pressure switch kit can be added.
According to filtration version, the water supply may be on the other side; in that case, the position of the filters is also inverted to follow the order 1 mil, 0.2 mil, active charcoal.



Article	Name
1	Water inlet valve
2	Pressure gauge
3	1 mil filter
4	0.2 mil filter
5	Active charcoal filter
6	UV filter
7	Osmosis membrane (on machine)
8	Pump/pressure switch kit

7. **CLEANING AND MAINTENANCE**

- Clean the machine surroundings regularly (floors, seats, furniture etc.).
- Check that the UV lamp on the filtration is working correctly.
- Check that the nebulization settings are correct.
- Make a visual inspection every week.

➤ The following checks and operations must be carried out by persons familiar with the chemical risks.

In the event of an incident, ARECO declines all responsibility.

If the equipment is damaged, ARECO will not be responsible for repairs.

This maintenance is undertaken if you subscribe to a maintenance contract.

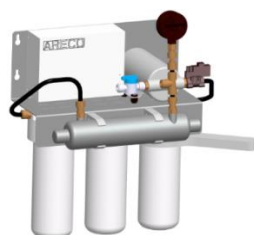
- In addition to checks every 6 months, clean the appliance:
 - Turn of nebulization (set the power knob to 0% or Nebul switch to O).
 - Circulate a cleaning solution followed by a disinfectant solution, the product diluted to 1% (phospho-nitric acid, acetic acid, hydrochloric acid, bleach, hydrogen peroxide).
 - Use the amount required for mist to be diffused.
 - Allow the appliance to stand for 10 minutes without nebulization.
 - Rinse by successive shut-offs and draining. Draining is by stopping the appliance via the O/I button. Wait 3 minutes for draining to be complete before restarting the appliance. Repeat the operation 3 or 4 times to ensure no disinfectant remains.
 - Restart nebulization, adjusting the nebulization power.
- If there is insufficient rinsing, the appliance will not immediately resume optimal flow.
- Visually check the nebulization level. If one hour after cleaning, performance has still not returned to normal, stop the appliance and have the ceramics replaced.

7.1. **FILTRATION MAINTENANCE**

The filters must be checked every 6 months. They must be replaced when they have a yellowish appearance.

- Turn the inlet valve off.
- Wait a few moments for the water pressure to decrease, check on the pressure gauge.
- Unscrew the jar containing the 1 mil filter using the wrench provided.
- Drain the water and discard the used filter.
- Clean the jar with a clean sponge, including the top of the jar and O-ring.
- Thoroughly rinse the various parts then wash your hands.
- Remove the protective plastic from the new filter, fit it and check that the O-ring is correctly positioned.
- Screw the filter jar (there is a special wrench). Proceed in the same way for the other filters.
- Turn on the inlet valve and check that there are no leaks.

➤ Only by regular maintenance of the filtration can optimal functioning and good machine hygiene be assured.



7.2. ANNUAL MAINTENANCE



The following checks and operations must be carried out by qualified electricians.
In the event of an incident, ARECO cannot be held responsible.
If the equipment is damaged, ARECO has no obligation to undertake repairs.
This maintenance is carried out if you subscribe to a maintenance contract.

- In addition to the checks previously mentioned, remove the protective cover and check the state of the internal tubing. Check that there are no deposits or that the tubes are not clogged. If they are, replace them by new tubes.
- Check the functioning of the fan; it should be clean and run noiselessly. Its lifetime (MTBF) is 70,000 hours, i.e. about 8 years, but very humid conditions or air saturated with humidity can deteriorate it faster.
- Check the general state of the interior, test the electrical connections, tighten them (appliance switched off), check the state of the electrical insulation and the fuses. Look for any source of corrosion, especially around the fan and the DIN rail. In normal use, these components should not corrode, but if the appliance has been stored in a cellar or a damp place, these components can corrode rapidly. If this is the case, remind the user of the conditions of use.
- If the appliance has run for more than 5,000 hours, change the piezoelectric elements. These gradually deteriorate and in general it is possible to predict their failure by observing a gradual reduction in flow rate. However, under intensive use, in industrial processes, it is often preferable to change them preventively once a year.
- Take samples of water and carry out a potability analysis twice a year and each time a problem is suspected.

Don't hesitate to contact ARECO services in case of doubt or for information.



If the power cord is damaged, it must be replaced by the manufacturer, after-sales service or personnel with similar qualifications to avoid any danger.

8. OPERATION

8.1. CHECKS BEFORE STARTING

- Check the connections of the following items:
 - Electrical utility connection.
 - Connection of control box to the machine (8-pin connector).
 - Presence of WiFi and GSM antennas.
 - Connection of UV filter to a power outlet.
 - Hydraulic connection of water supply to filtration.
 - Hydraulic connection between filtration and the machine.
 - Connection of the draining solenoid valve tube to the drain.
 - Connection of the overflow tube to the drain.
 - Connection of the diffusion tubes to the diffusion outlet.

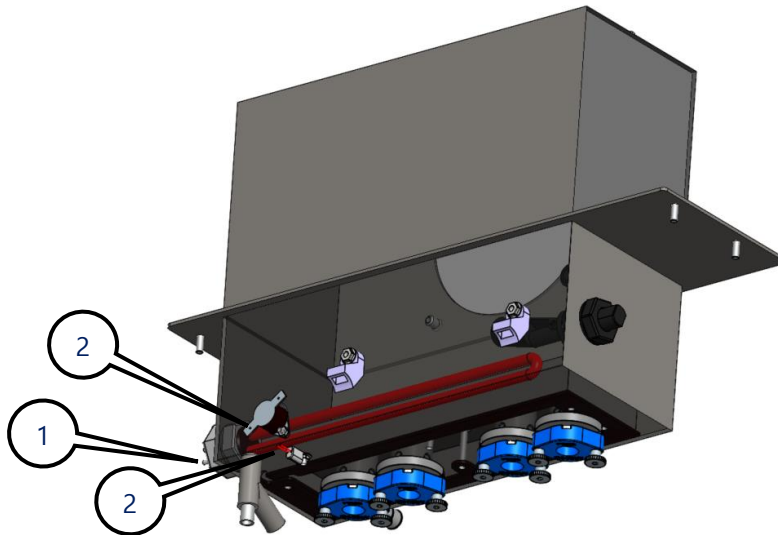
8.2. STARTING

- Settings:
 - Nebulization power: Mist quantity/density.
 - Running cycle: Nebulization time setting.
 - Fan speed. : Fan rotation speed setting (acting on the mist speed).
- Turn the main switch on the machine to On.
- Each time on starting, if the float detects a level of water, the machine drains.
- Wait for the diffusion tank to fill, nebulization will start in accordance with the settings.
If nebulization does not start, check the running times.
- Check the whole installation for leaks (Filtration / Machine / Diffusion).

8.3. THERMAL SHOCK

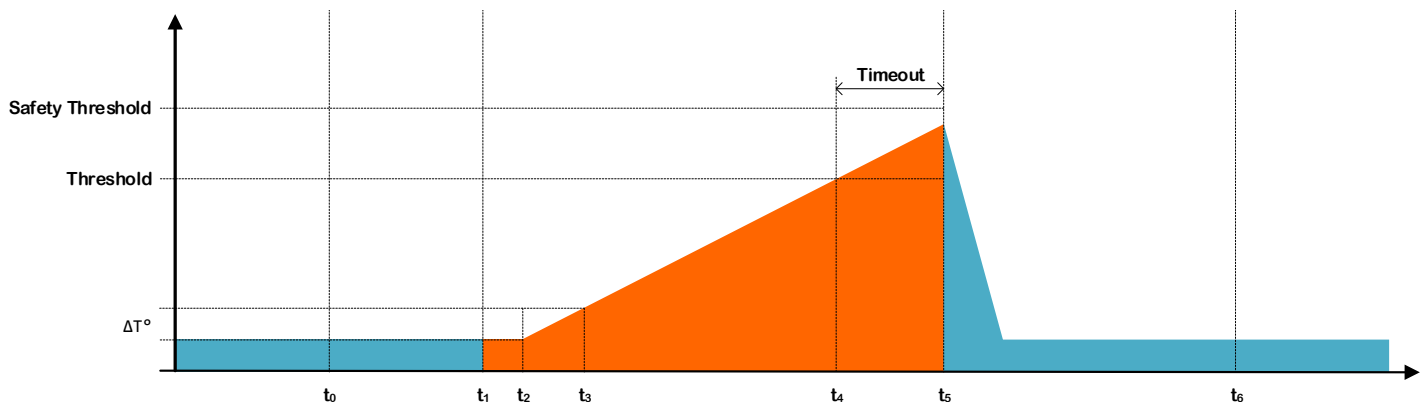
- Thermal shock is provided by a heating element in the diffusion tank. During the heating cycle, the water is brought to a minimum temperature of 149° for 5 min. Temperature is measured in real time by a sensor on the diffusion tank.

In the event of malfunction, there is a safety thermostat to switch off the heating element supply.



Article	Name
1	Heating element (red)
2	Safety thermostat
3	Temperature sensor

- Operation:



- t0: Current time \geq Heating start time (00:00)
- t0 to t1: Initial draining
- t1 to t2: Filling, the heating element starts to heat when the water level is "OK".
- t2 to t3: Check of ΔT°
- t3 to t4: Threshold $T^\circ > 149^\circ\text{F}$ (HEATING_THRESHOLD)
- t4 to t5: Start of 5 min. timing (HEATING_TIMEOUT) to validate the heating cycle (HEATING_DONE)
- t5: HEATING_DONE or Current time \geq End of heating time (01:00)
- t5 to t6: Final draining then 30 min. wait (HEATING_COOLING_TIME): cooling of the tank.

8.4. CHECKS IN THE EVENT OF MALFUNCTION

➤ To ensure the safety of personnel and equipment, the machine detects any functioning errors. This section gives the procedure to follow in case of malfunction.

Checklist:

- The green LED of the power switch on the machine must be on. If not, check that the power cord is correctly connected, that it is working and not damaged. If it is, ask for it to be replaced.
- The filtration inlet water supply valve of the machine must be open.
- The water inlet valve between filtration and the machine is open.
- The draining tube is connected to the drain.
- The nebulization settings are not at 0%.

List of detectable errors: (Number of flashes of the LED)

- **Lack of water: (1 flash)**

Filling too long: Water supply problem.



- **Filling: (2 flashes)**

Filling too fast

- Filters clogged and allowing everything to pass.
- Pressure too high.



- **Float jammed: (3 flashes)**

The system is no longer able to perform the following operations:

- Correctly determine the water level (float functioning problem).
- Draining (Outlet clogged, solenoid valve fault).



- **Temperature error: (4 and 5 flashes)**

Safety measure for machine hygiene.

- Switch the machine off and on, and if the problem persists call after-sales service.
- Water T° between 77°F and 86°F, the appliance drains itself every hour (time: 5 minutes).
- Water T° greater than 86°F, the appliance stops. The appliance will only restart once the temperature has dropped below 86°F.



- **Heating: (6 flashes)**

Problem with the decontamination cycle, call after-sales service.

- **Power board malfunction (Continuous flashing)**

Call after-sales service.



Other possible malfunctions.

- **Float:**

- Check that the machine is supplied with water (inlet supply valve of the machine).
- Check the state of the water filters and change them if necessary.
- After stopping for 5 minutes, restart the machine. If the error persists, call after-sales service.

- **Draining:**

- Check that the discharge tubes are not pinched. After stopping for 5 minutes, restart the machine. If the error persists, call after-sales service.

Important: When an error code is displayed, call after-sales service for more advice.

9. STANDARDS AND CERTIFICATES

9.1. **RoHS DECLARATION OF CONFORMITY**



European directive 2002/95/EC restricts the use of 6 substances (see list below) for the manufacture of certain types of electrical and electronic equipment.

RoHS conformity means that the product contains none of the substances listed below at concentrations greater than the maximum authorized by the directive.

Substances:

- Lead: Concentration 0.1 %
- Mercury: concentration 0.1 %
- Hexavalent chromium: Concentration 0.1%
- Polybromobiphenyls (PBB): Concentration 0.1%
- Polybromodiphenyl ethers (PPDE): Concentration 0.1%
- Cadmium: Concentration 0.01%

ARECO machines comply with the RoHS directive.

9.2. **DISPOSAL OF USED PRODUCTS (WEEE)**

The European legislation, applied in all Member states, requires that electrical and electronic products bearing the mark (right) be disposed of separately from household waste.

When disposing of these products, please follow the recommendations of the local authorities.

Once they have been disposed of, they are recycled as appropriate.

This effort will help reduce waste and its negative consequences.

The mark on electrical and electronic products only applies to current Member states of the European Union.



9.3. **STANDARDS**

- Complies with standard EN 60335-2-98: Household and similar electrical appliances – Safety – Part 2-98: Particular requirements for humidifiers.
- Complies with the Ministry of health directive for the prevention of legionella in water tanks. Order of 11/30/2005 of the French Health and Solidarity ministry.
- Complies with the low voltage directive 2006/95.
- Complies with standards NF EN 61000-6-1 and NF EN 61000-6-3 Immunity and emissions for residential environments.
- Complies with the low voltage directive 2006/95.
- Complies with French decree 2017-657 and the decree of 08/07/2017.

9.4. **PATENTS**

- FP 94 08 204, 96 00 048
- EP 95 401 602, 8 97 400008.5 , 98 400152.9.
- United States and CANADA 5 624 608, 08 778 632 and 2 153 087
- JP 189707,356725
- 0102618 PCT-WP and 0602687 PCT-WP
- 378377-004 and 06: 1323