

**IMPORTANT!** Read and save these instructions. This manual to be left with the equipment.

2588787\_B\_EN\_2005\_US\_OM



# OPERATION AND MAINTENANCE MANUAL

Ultrasonic Humidifier  
US-Series

# Thank you for choosing Condair

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Installation date (DD / MM / YYYY):

Commissioning date (DD / MM / YYYY):

Site:

Model:

Serial number:

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# Contents

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<b>Contents</b>	<b>3</b>
<b>1 Introduction</b>	<b>7</b>
1.1 Getting Started	7
1.2 General	7
1.2.1 Limitations of the Manual	7
1.2.2 Symbols Used in This Manual	7
1.2.3 Storage of Manual	7
1.2.4 Available Manuals and Languages	8
1.3 Safety Precautions	8
1.4 Compliance	8
<b>2 For Your Safety</b>	<b>9</b>
<b>3 Hygiene</b>	<b>12</b>
3.1 Hygiene Risk Management	12
3.1.1 Guidelines to Keep a Clean System and Prevent Micro-organism Growth	13
3.1.2 Condair Service Offering	13
3.2 Risk Monitoring and Assessment	13
<b>4 Product Description</b>	<b>15</b>
4.1 General Description	15
4.2 Functional Description	16
<b>5 Product Specifications</b>	<b>19</b>
5.1 Technical Data	19
5.1.1 Capacity	19
5.1.2 Water Supply	19
5.1.3 Fill Rate	21
5.1.4 Drain Rate	21
5.1.5 Weights	22
5.1.6 Dimensions	22
5.2 Operating Data	23
5.2.1 Control Signal	23
5.2.2 Ambient Conditions	23
<b>6 User Interface</b>	<b>24</b>
6.1 User Interface Controls	24
6.2 Control Software	24
6.2.1 Home Screen	24
6.2.2 Navigation Elements	25
6.2.3 Operating and Fault Status	26
6.2.4 Maintenance and Service Status	27
6.2.5 Main Menu	27
6.2.6 Configuration Menu	28
6.2.6.1 Features Menu	28
6.2.6.2 Control Settings	29
6.2.6.3 General	31

6.2.7	Service	32
6.2.8	Changing Your Settings	33
6.2.8.1	Change the period between flushing cycles.	33
6.2.8.2	Activate the Ultrasonic Blower Pack.	33
6.2.8.3	Change how the large humidifier reacts to demand.	33
6.2.8.4	Use the humidifier at X% capacity. To set up and configure the manual capacity control type.	33
6.2.8.5	Humidify the space at X% setpoint, based on a control signal.	33
6.2.8.6	Put the humidifier on standby.	33
6.2.8.7	Change the fan speed of the nebulizing module.	34
6.2.8.8	Change the LCD display settings.	34
6.2.8.9	Change the system language.	34
6.2.8.10	Restore factory defaults.	34
6.2.8.11	Reset the service reminder (remove the service warning).	34
<b>7</b>	<b>Operation</b>	<b>35</b>
7.1	General	35
7.2	Inspecting the Unit	36
7.3	Starting Up	36
7.3.1	Restarting the Unit	36
7.4	Shutting Down the Unit	37
7.5	Remote Monitoring	37
7.6	Draining the Unit	37
<b>8</b>	<b>Maintenance</b>	<b>38</b>
8.1	General	38
8.2	Cleaning and Disinfecting	38
8.2.1	Diluting your Disinfecting Solution (H2O2) to 0.1%	39
8.3	Maintenance List	40
8.4	Maintenance Procedures	43
8.4.1	Removing and Installing the Door Panels	44
8.4.2	Cleaning, Removing, and Installing the Water Reservoir	45
8.4.3	Removing and Installing the UV Assembly	47
8.4.4	Replacing the Transducers (Piezoelectric)	48
8.4.5	Removing and Installing the Drain Valve	50
8.4.6	Replacing the Air Intake Filter	52
8.4.7	Replacing Fuses	52
8.4.8	Replacing the Transducer Driver Board	56
8.4.9	Replacing the Battery	57
<b>9</b>	<b>Troubleshooting</b>	<b>59</b>
9.1	Fault Indication	59
9.2	Warning and Fault List	59
9.3	Resetting Fault Status	61

<b>10</b>	<b>Decommissioning</b>	<b>62</b>
10.1	General	62
10.2	Removing Unit from Service	62
10.3	Disposing or Recycling the Unit	62
<b>A</b>	<b>Appendix: Maintenance Checklist</b>	<b>64</b>
<b>B</b>	<b>Appendix: Wiring Diagram Ultrasonic Humidifier - Reservoir</b>	<b>65</b>
<b>C</b>	<b>Appendix: Wiring Diagram Ultrasonic Humidifier - Medium</b>	<b>66</b>
<b>D</b>	<b>Appendix: Wiring Diagram Ultrasonic Humidifier - Large (A-unit)</b>	<b>68</b>
<b>E</b>	<b>Appendix: Wiring Diagram Ultrasonic Humidifier - Large (B-unit)</b>	<b>70</b>

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# 1 Introduction

## 1.1 Getting Started

Thank you for purchasing the Ultrasonic Humidifier.

The Ultrasonic Humidifier incorporates the latest technical advances and meets recognized safety standards. Improper use of the Ultrasonic Humidifier may result in danger to the user or third parties, and/or damage to property.

To ensure safe, proper, and efficient operation of the Ultrasonic Humidifier, please observe and comply with all information and safety instructions contained in this manual, as well as all relevant documentation of components of the installed humidification system.

If you have additional questions, please contact your Condair representative. They will be glad to assist you.

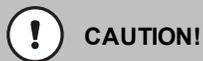
## 1.2 General

### 1.2.1 Limitations of the Manual

The subject of this manual is the Ultrasonic Humidifier in its different versions. The various options and accessories that are described in this manual pertain to the proper operation of the equipment. Additional information and instructions are supplied with the options and accessories.

This manual is restricted to the **operation and maintenance** of the Ultrasonic Humidifier. This manual is intended for **competent personnel** suitably qualified for their respective tasks. The specifications are supplemented by various separate items of documentation (such as the parts list). Where necessary, appropriate cross-references are made to these publications in the specification.

### 1.2.2 Symbols Used in This Manual



The word "CAUTION" in conjunction with the general caution symbol is used to provide safety instructions that, if neglected, may cause damage or malfunction of the unit, or damage to property.



The word "WARNING" in conjunction with the general warning symbol is used to provide safety instructions that, if neglected, may cause injury to personnel. Other specific warning symbols may also be used in place of the general symbol.



The word "DANGER" in conjunction with the general danger symbol is used to provide safety instructions that, if neglected, may cause severe injury to personnel or even death. Other specific danger symbols may also be used in place of the general symbol.

### 1.2.3 Storage of Manual

Keep this manual in a place where it is safe and readily accessible. If the equipment is moved to another location, please ensure that it remains with the equipment.

If the manual is lost or misplaced, please contact Condair for a replacement.

## 1.2.4 Available Manuals and Languages

Table 1: Document (Part) Numbers and Languages of Available Manuals

	Installation Manual	Operation and Maintenance Manual	Installation, Operation, and Maintenance Manual	Spare Parts List	Engineering Manual
Ultrasonic Humidifier US	2588786_B_EN_2005_US_IM	2588787_B_EN_2005_US_OM	—	2588788_B_EN_2005_US_SPL	—
Ultrasonic Blower Pack UB	—	—	2588705_B_EN_2005_UB_IOM	—	—
Reverse Osmosis System RO-U	—	—	2594385_B_EN_2005_RO_IOM	—	—

## 1.3 Safety Precautions

The Ultrasonic Humidifier and Ultrasonic Blower Pack is NOT SUITABLE for humidification in healthcare premises. Due to the nature of ultrasonic humidification, it is NOT recommended to use these units in environments where the occupants or materials in the space are adversely sensitive to airborne bacteria, viruses, dust, and debris. Special care must be observed to properly install, maintain, clean, and disinfect the Ultrasonic Humidifier and Ultrasonic Blower Pack to preserve acceptable levels of hygiene.

Regard all safety precautions described in this manual. Refer to ["For Your Safety" on page 9](#).

## 1.4 Compliance

Follow all local guidelines and regulations regarding the installation and operation of the unit; this includes (and not limited to) mounting, plumbing, water, gas, ventilation, and electrical connections.

Please consult your local Condaire representative to learn more.

## 2 For Your Safety

### General

Every person who is tasked with the installation, operation and/or maintenance of the Ultrasonic Humidifier must read and understand this manual, as well as any respective installation, operation and/or maintenance manuals before performing any work. Knowing and understanding the contents of these manuals is a basic requirement for protecting personnel against any kind of danger, preventing faulty operation, and operating the unit safely and correctly.

All labels, signs and markings applied to unit must be observed, kept in a readable state, and NOT removed or altered.

### Personnel Qualifications

All procedures described in this document must only be performed by personnel who are adequately qualified, familiar with the humidifier unit, well trained, and are authorized by the customer.

For safety and warranty reasons, any activity beyond the scope of this manual must only be performed by qualified personnel authorized by Condair.

The unit may not be used by persons (including children) with reduced physical, sensory, or mental abilities, or persons lacking experience and knowledge — unless they are being supervised by a person responsible for their safety, or have received proper instruction on the operation of the system.

All personnel working with the Ultrasonic Humidifier unit must be familiar with, and comply with the appropriate regulations on workplace safety and prevention of accidents.

### Intended Use

The Ultrasonic Humidifier is intended exclusively for air humidification using Condair-approved Ultrasonic Blower Packs within specified operating conditions. Refer to ["Technical Data" on page 19](#) in for details. Any other type of application, without the express written consent of Condair, is considered to be NOT conforming to its intended purpose, and may lead to dangerous operation and will void the warranty.

In order to operate the equipment in the intended manner all information contained in this manual, in particular the safety instructions, must be observed closely.

### Not Intended Use

- NOT recommended to for humidification in healthcare premises.
- NOT recommended to use these units in environments where the occupants or materials in the space are adversely sensitive to airborne bacteria, viruses, dust, and debris.

Special care must be observed to properly install, maintain, clean, and disinfect the Ultrasonic Humidifier and Ultrasonic Blower Pack to preserve acceptable levels of hygiene.

### Safety Precautions that Must be Observed



**DANGER!**

**Risk of electric shock!**

**The unit is mains powered. Using the On/Off switch on the humidifier to shut down the unit will NOT shut off power to the control cabinet. Live parts may be exposed when the access panels or doors are removed. Touching live parts may cause severe injury or even death.**

**Prevention:** Before performing any work inside the humidifier, shut down the humidifier properly, as described in ["Shutting Down the Unit" on page 37](#). The unit must be connected to the mains only after all mounting, installation, and maintenance work has been completed, checked for correct workmanship, and the access panels/doors are closed and fastened securely. Secure the unit against accidental power-up.

Only qualified personnel should perform maintenance or repairs on the unit.

**CAUTION!****Electrostatic discharge (ESD)!**

The electronic components inside the control cabinet in the humidifier are sensitive to electrostatic discharge (ESD).

**Prevention:** Take appropriate measures to protect the electronic components inside the unit against damage caused by electrostatic discharge (ESD). Refer to ANSI/ESD-S20.20.

**WARNING!****Heavy object. Risk of injury!**

The humidifier is heavy. Injury, damage, or even death may occur if the humidifier falls or tips over.

**Prevention:** Ensure that the humidifier is secured properly. Use an appropriate lifting device, or request assistance to raise the humidifier into position.

**WARNING!****Risk to Hygiene and Health!**

Improper and infrequent maintenance of the unit presents the risk of spreading pathogens (such as bacteria, viruses, and parasites) originating from contaminated water, air, and equipment. Failure to reduce the risks increases the likelihood of causing injuries (requiring medical care), infection, and death.

**Prevention:** Use, regularly clean, and replace the air and water inlet filters. Regularly flush and disinfect the humidifier, the blower pack, and their components (tanks, hoses, reservoirs, etc.). Use potable, treated water (potable, R.O., or D.I.).

Follow regular maintenance routines as described in "[Maintenance List](#)" on page 40 Follow local regulations.

**WARNING!****Do NOT leave the unit without power. Risk of contamination.**

Do NOT leave the unit unpowered for more than 48 hours, or else a total system disinfect will be required. Without power, the system will not flush properly, resulting in standing water and conditions that may promote the growth of micro-organisms.

**Prevention:** Leave your unit powered on. If you do not need humidification during the 48 hours, set the humidifier to standby or set the demand to 0.

## Preventing Unsafe Operation

All personnel working with the Ultrasonic Humidifier must immediately report to the customer any alterations or changes to the unit that may affect safety, and **secure the unit against accidental power-up**.

If it is suspected that the unit cannot be operated safely for any of the reasons listed below, shut it down immediately.

Alterations and changes that may affect safe operation include:

- damage to the unit
- loose or damaged electrical connections
- improper operation
- leaks in the distribution system

## Modifications to the Unit Prohibited

**Modifications are NOT permitted** on the Ultrasonic Humidifier without the express written consent of Condaïr.

## **Safety Labels**

The safety label (hygiene) is found on the right wall inside the plumbing cabinet (on the panel separating the electrical cabinet).

# 3 Hygiene

## 3.1 Hygiene Risk Management

Cold water humidification presents the risk of spreading pathogenic microorganisms into the air. The Ultrasonic Humidifier and Ultrasonic Blower Pack distribute tiny water droplets (mist) that are blown into the space before being absorbed into the air. If the mist was contaminated before leaving the unit and then evaporates, these contaminants are deposited onto surfaces in the space, or are otherwise inhaled or redistributed into the ventilation system.

Pathogens include, and are not limited to, Legionella, E. coli, and viruses, and may originate from contaminated water, air, and equipment.

Regular cleaning and disinfecting is required to optimize humidifier performance and reduce health risks. Follow all safety precautions and local regulations. Refer to ["For Your Safety" on page 9](#).

There are multiple points in the humidification system where a contamination can occur. It is the responsibility of the customer and of Condair to ensure that health hazards due to contamination are reduced to acceptable levels. The use of a hygiene risk assessor is recommended.

Regularly clean and maintain the humidifier and its components, and do NOT miss or ignore the warnings in this manual and service messages displayed on the humidifier.

### Supply Air and Water

Pathogens can originate from the water supply, such as a tank or water line. It is important that standing water in the tank or in the water line is flushed frequently to prevent the buildup of contaminants, and the water is filtered and treated. Refer to ["Water Supply Requirements"](#) for source water recommendations.

Pathogens may also enter the humidification system through the ventilation system or from within the humidifier space.

A fan blows air out of the water reservoir into flexible tubes, and further into a blower pack and into the atmosphere. Contaminated air can join the mist, so it is recommended to use air filters in the ventilation system, in the humidifier, and in the Ultrasonic Blower Pack. Ensure to use the supplied air filters at all times and replace them regularly (as recommended in the Ultrasonic Humidifier Maintenance and Operation Manual).

### Inside the Humidifier

A small risk of contamination may occur during manufacture, testing, delivery, and commissioning. Any water that was present during these processes is considered stagnant. Ensure that all applicable components (i.e. wet surfaces, such as flexible tubes, reservoirs, and hoses) of the humidification system has been cleaned and disinfected before installation. Refer to the maintenance routines as described in ["Maintenance List" on page 40.](#), and ["Maintenance Procedures" on page 43](#).

The humidifier possess a UV assembly that uses ultraviolet radiation to kill microorganisms that enter the unit from the water supply. The UV assembly is powered by the humidifier and must be inspected and replaced regularly.

To prevent standing water inside the unit, the humidifier software activates a flushing cycle that empties the water from hoses and reservoirs into the drain. The humidifier is replenished with new water.

During normal operation and use, standing water may be present in cracks, scratches, and joints within the reservoir, flexible tubes, mist channels, and hoses. To prevent stagnant water from accumulating, flexible tubes and channels, water reservoirs, and hoses must be disassembled regularly and cleaned. Reduce the frequency of microscopic scratches and cracks by using **nonabrasive cleaning materials and agents when cleaning the humidifier** (i.e. do NOT use a hard or metallic brush). Refer to ["Cleaning and Disinfecting" on page 38](#). Follow regular maintenance routines as described in ["Maintenance List" on page 40](#).

**Note:** Stagnant water may also be formed after shutting down the humidifier (and after inactivity). Ensure that the humidifier is air dried for inactivity, and cleaned before restarting.

### 3.1.1 Guidelines to Keep a Clean System and Prevent Micro-organism Growth

- Perform a risk assessment of the water system using a competent person, and implement an appropriate monitoring and control program.
- Connect a RO system to a clean, potable main water supply.
- Ensure that the system is cleaned and/or flushed regularly.
- Ensure that the buffer tank is clean and sterile before use.
- Enter a service contract that suits the needs of the company.
- Stop the system if polluted drinking water is found in the area.
- Avoid water temperatures above 68 °F (20 °C). Temperatures between 20-60 °C (68-140 °F) favor the growth of Legionella.
- Do not stop the system unless it is faulty or leaking (to avoid water stagnation).
- If the power to the system is interrupted (such that the unit fails to flush or drain) for more than 48 hours, complete a total system disinfection.
- Refrain from closing sections of the system, unless there is a leakage or fault (to avoid water stagnation).
- Disinfect at least once per year, and after every maintenance or repair.
- Analyze the water and test for harmful bacteria at least once per year.
- Conduct follow-up measurements until the system is clean if bacteria has been detected in the system.

### 3.1.2 Condair Service Offering

The Condair service team can help with expert technicians who can provide:

- Bacteriological troubleshooting on-site\*.
- Cleaning and disinfecting.
- Preventative maintenance.
- Repair and fault finding.
- Training and guidance.

**Note:** \* Condair uses a quick method for measuring bacterial activity in the water with the use of BactiQuant (BQ). Once the water sample has been taken, the bacteriological quality of the water is read within 30 minutes, and the Condair service team will disinfect the system if necessary.

Please contact your local Condair representative for further information about our services.

## 3.2 Risk Monitoring and Assessment

Water hygiene assessments must be performed at the site to determine the risk and severity of hygiene hazards that affect the health and safety of the public. Performing a risk assessment with regular monitoring will allow procedures to be adjusted.

Ensure that the person conducting the assessment is qualified.

A typical assessment inspects the following:

- Supply water quality. Refer to ["Water Supply" on page 19](#).
- Environment around the humidifier.
- Maintenance procedures. Refer to ["Maintenance Procedures" on page 43](#).
- Water pre-treatment options (such as using UV light, using reverse osmosis or deionized water, etc.).

Proper maintenance procedures along with recommended site controls will help ensure compliance to local regulations and protect the public.

It is recommended to monitor the humidification system weekly, and then monthly once satisfactory levels are maintained.

Ensure that the results of every assessment is recorded.

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**IMPORTANT! Failure to make adequate provision against the outbreak of disease, such as Legionnaires' disease, may cause fatalities, illness, and liabilities.**

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## 4 Product Description

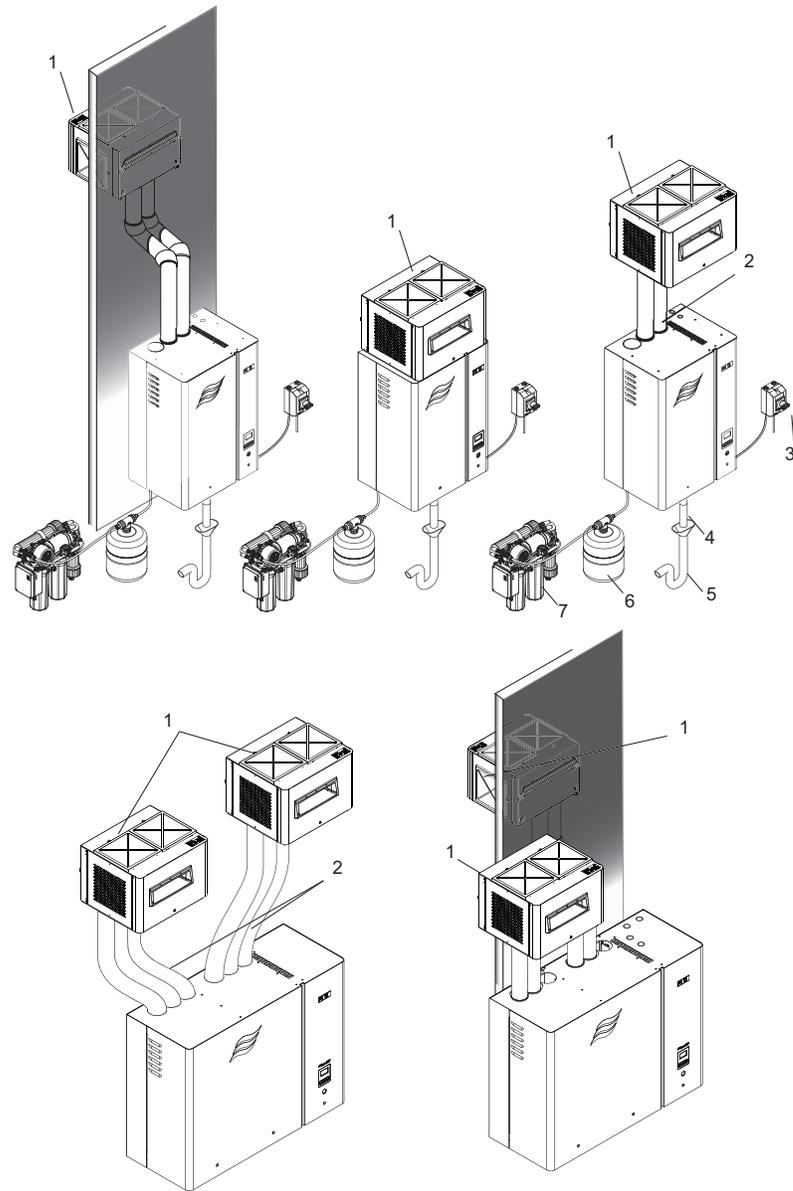
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### 4.1 General Description

The Ultrasonic Humidifier is a steam-less humidifier. To humidify the space, the Ultrasonic Humidifier creates mist using piezoelectric transducers. Mist is expelled from the unit with internal fans, and an Ultrasonic Blower Pack (if installed), into the space. Mist is then absorbed into the air.

The Ultrasonic Blower Pack comes in 4 different output capacities; 3 kg/h (6.6 lb/h); 6 kg/h (13.2 lb/h); 9 kg/h (19.8 lb/h); and 18 kg/h (39.6 lb/h).

There are two housing sizes; medium and large. The medium and large units can supply mist to other rooms or directly into the space using any installed Ultrasonic Blower Packs. The large units require two Ultrasonic Blower Packs. Refer to ["Technical Data" on page 19](#) and ["Operating Data" on page 23](#) for more information about capacity, power and water consumption.



*Figure 1 - Typical Installations\**

1. Installation with the Ultrasonic Blower Pack
2. Flexible tubes
3. Electrical disconnect, high voltage supply
4. Drain line to air gap funnel
5. Trap
6. Expansion tank
7. R.O. system

**Note:** \* Water, electrical, and drain connections not shown for the large model.

## 4.2 Functional Description

The Ultrasonic Humidifier is an adiabatic unit that uses transducers in the humidifier's water reservoir to create a

fine mist using high-frequency vibrations (1.7 MHz).

Treated water enters the humidifier's reservoir from an inlet located at the bottom of the unit. The water that enters the humidifier's reservoir must be treated to remove minerals, bacteria and fungi, and should otherwise be pure to prolong the service cycle of the unit and, above all, safeguard the public. An accumulation of minerals will result in scale, and an accumulation of bacteria and fungi will result in unhygienic conditions in the space. Refer to ["Hygiene" on page 12](#).

Transducers in the reservoir receive a signal for humidification and will activate. The transducers will vibrate in the water to create a mist of fine water particles. The mist rate is controlled through the humidifier's control board, and may be modulated on demand or on humidity signal.

The mist is blown from the reservoir into flexible tubes that exit from the top of the humidifier. The mist is channeled directly into the Ultrasonic Blower Pack. The water particles in the mist are then absorbed into the air and increase the relative humidity of the space.

Condensate formed in the flexible tubes between the blower pack and the humidifier re-enters the reservoir where it can be reused.

Water is drained from the reservoir through an outlet located at the bottom of the unit.

## **Water Supply**

Water enters the humidifier through the fill valve into the fill cup with integral air gap, and then flows down through the UV light into the water reservoir

## **Water Level Monitoring**

The water level in the reservoir is continuously monitored with a level sensor. If the water level drops below the sensor switching point, from normal operation, the sensor supplies a signal to the controller. This opens the inlet valve and the water reservoir is filled. When the water level reaches the operating level the sensor supplies a signal to the controller to close the inlet valve.

## **UV Pre-Treatment**

Water enters the UV reactor, from the inlet, and is disinfected with UV radiation in the UV reactor in the UV assembly. The water exits the UV assembly into the fill cup which monitors the water level.

## **Mist Generation**

When the humidifier receives a signal to supply mist, the unit fan and the piezoelectric transducers start operating. The fine mist is blown out of the humidifier outlets by the unit fan.

## **Air Supply**

Air supplied to the humidifier comes from the space surrounding the humidifier and through the humidifier. The air should be filtered and clean to prevent contaminating the mist with microorganisms and dust.

The use of the supplied air filters (recommended) is advised for the Ultrasonic Humidifier and Ultrasonic Blower Pack.

## **Flushing**

To prevent the growth of bacteria in the unit, a flush cycle is implemented to replace the content of the water reservoir with fresh water. The flushing is carried out at an adjustable time interval.

The production of mist is interrupted during the flushing process. The drain valve will open and the reservoir will be completely discharged through the water discharge (drain) connection. The inlet valve will open and flush out any stagnant water in the water supply line. The drain valve is closed and the inlet valve is closed after the water level inside the reservoir reaches the normal operation level. After a flush cycle the unit resumes normal operation.

## **Control**

Mist production can be controlled using the continuous proportional (P) or the proportional-integral (PI) controller internal to the humidifier, or an external modulation controller, or with an On/Off control signal from an external humidistat.

# 5 Product Specifications

## 5.1 Technical Data

### 5.1.1 Capacity

Table 2: Ultrasonic Humidifier Capacity

Model	Housing Size	Capacity at 120V/208/240V/1	
		Mist Production	Power Rating
US 7	Medium	3 kg/h (6.6 lb/h)	250 W
US 13		6 kg/h (13.2 lb/h)	250 W
US 20		9 kg/h (19.8 lb/h)	650 W
US 40*	Large	18 kg/h (39.6 lb/h)	1250 W

**Note:** \*Equipped with dual stainless steel reservoirs – each with its own dedicated driver board.

### 5.1.2 Water Supply

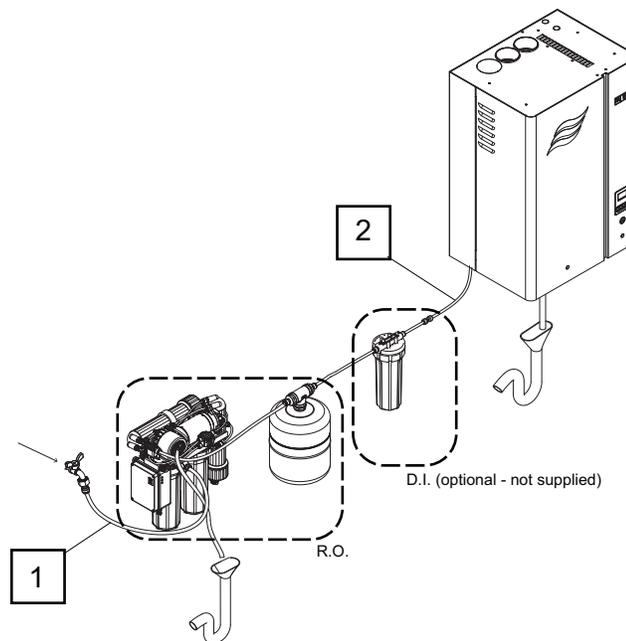


Figure 2 - Water Supply Requirements

1. Water from the source entering the RO-U system
2. Water entering the US

<b>1</b>			
<b>Mains Water Supply to RO-U</b>			
<b>Conditions</b>	<b>Value</b>		
Quality	Potable, drinkable		
Pressure	2.0-5.0 bar (30-75 psi)		
Temperature *	10-20 °C (50-68 °F)		
Turbidity (max)	1.0 NTU		
Max pH without Softener*	8.0		
pH	<b>pH of water supply</b>		
	<b>pH 6.5-7.0</b>	<b>pH 7.1-7.5</b>	<b>pH 7.6-8.0</b>
Max Hardness *	30 °dH	17 °dH	10 °dH
Max US Hardness *	31 gpg	18 gpg	10 gpg
Max Conductivity (at 20 °C / 68 °F)*, **	1300 µS/cm	750 µS/cm	600 µS/cm
Max Total Dissolved Solids (TDS) *	800 mg/l	500 mg/l	375 mg/l
Silt Index (max)	3		
KMnO <sub>4</sub> Potassium permanganate (max)	10 mg/L		
Fe Iron (max)	0.2 mg/L		
Mn Manganese (max)	0.05 mg/L		
Ca Calcium (max)	300 mg/L		
Cu Copper (max)	1 mg/L		
SiO <sub>2</sub> Silica (max)	1 mg/L		
Ammonium (max)	0.5 mg/L		
Chloride (max)	300 mg/L		
Sulphates (max)	250 mg/L		
Colony-forming Unit (CFU) (max)	200 CFU/ml ; no pathogens allowed		
* If the water entering the RO-U system is greater than the values indicated in this table, install a water softener between the water supply and the Reverse Osmosis System.			
** Contact your Condair representative if the conductivity of the supply water is greater than 350 µS/cm.			

<b>2</b>	
<b>Water Supply Requirements to the US (after treatment with RO and/or DI)</b>	
<b>Conditions</b>	<b>Value</b>
Pressure	2-5.5 bar (30-80 psi) spike pressure limited to 8 bar (120 psi)
Temperature	1-25 °C (34-77 °F)
Min-Max Conductivity* , Max Total Dissolved Solids (TDS)	2-15 µS/cm , TDS: 9 mg/L
Quality	RO or DI water refer to the water supply requirements for the RO-U
Colony-forming Unit (CFU)	< 200 CFU/ml for industrial applications** follow applicable regulations
* if the conductivity of the water entering the RO-U system is greater than 350 µS/cm, contact your Condaire representative .	
** CFU leaving the unit via mist should be <1000 CFU/ml for industrial applications. Keep the CFU entering the humidifier as low as possible, such that the CFU leaving the unit is within acceptable guidelines.	

### 5.1.3 Fill Rate

<b>Fill Rate</b>	
US 7-20	Minimum: 3.3 L/min (0.9 gpm) Maximum: 8.7 L/min (2.3 gpm)
US 40*	Minimum: 6.6 L/min (1.8 gpm) Maximum: 17.4 L/min (4.6 gpm) (3.3 L/min (0.9 gpm) per reservoir)

**Note:** \* The US 40 has two reservoirs

### 5.1.4 Drain Rate

<b>Drain Water</b>	
US 7-40	Minimum: 8.7 L/min (2.3 gpm)
US 40*	Minimum: 17.4 L/min (4.6 gpm) (8.7 L/min (2.3 gpm) per reservoir)

**Note:** \* The US 40 has two reservoirs

## 5.1.5 Weights

Table 3: Ultrasonic Humidifier Weights (excludes flexible tubes)

Model	Housing	Weight	
US 7	Medium	Net weight	40 kg (88 lb)
US 13		Operating weight	42 kg (93 lb)
US 20			
US 40	Large	Net weight	73 kg (161 lb)
		Operating weight	77 kg (170 lb)

Table 4: Ultrasonic Blower Pack Packaged Weight

Model	Weight
Ultrasonic Blower Pack (all models)	17.7 kg (39 lb)

Table 5: Reverse Osmosis System Weight

Model	Weight
RO-U	9.7 kg (21 lb)
Buffer Tank	8.7 kg (19 lb)

## 5.1.6 Dimensions

Table 6: Ultrasonic Humidifier Dimensions (excludes flexible tubes)

Model	Housing	Dimensions height x width x depth
US 7	Medium	780 x 530 x 406 mm
US 13		(30.71 x 20.87 x 15.96 in)
US 20		
US 40	Large	780 x 1000 x 406 mm (30.71 x 39.37 x 15.96 in)

Table 7: Ultrasonic Blower Pack Dimensions

Model	Dimensions height x width x depth
Ultrasonic Blower Pack (all models)	371 x 544 x 432 mm (14.6 x 21.4 x 17.0 in)

Model	Dimensions
RO-U	L x W x H: 36 x 23 x 46 cm (14 x 9 x 18 in)
Buffer Tank	H: 30 cm (12 in), 35 cm (14 in) with tee; diameter: 21 cm (8 in)

## 5.2 Operating Data

### 5.2.1 Control Signal

Control Signal Type:	
Active	0-5 VDC, 1-5 VDC, 0-10 VDC, 2-10 VDC, 0-20 VDC, 0-16 VDC, 0-20 mADC, 4-20 mADC
Passive	135-10kΩ ohmic humidity sensor
On/Off Control	< 9.5 VDC Off 15-24 VDC On

### 5.2.2 Ambient Conditions

Ambient Conditions:	
Ambient Temperature	5-40 °C (41-104 °F)
Relative Humidity	5-95% RH non-condensing

Refer to [Table 8 below](#) for the maximum external fusing (single-phase) for the Ultrasonic Humidifier. Refer to [5.2 above](#) for the maximum external fusing (single-phase) for the Ultrasonic Blower Pack.

*Table 8: Ultrasonic Humidifier, Maximum External Fusing — Single-Phase*

Model	110-120V/1~			208V/1~			220-240V/1~		
	Maximum Output	Maximum Current	Maximum External Disconnect	Maximum Output	Maximum Current	Maximum External Disconnect	Maximum Output	Maximum Current	Maximum External Disconnect
US 7	744 W	6.2 A	15 A	744 W	3.6 A	15 A	744 W	3.1 A	15 A
US 13	744 W	6.2 A	15 A	744 W	3.6 A	15 A	744 W	3.1 A	15 A
US 20	744 W	6.2 A	15 A	744 W	3.6 A	15 A	744 W	3.1 A	15 A
US 40	1440 W	12.0 A	15 A	1440 W	7.0 A	15 A	1440 W	6.0 A	15 A

# 6 User Interface

## 6.1 User Interface Controls

The user interface of the Ultrasonic Humidifier is located at the front of the unit. It consists of a display screen with four buttons and an On/Off switch. Refer to ["Navigation Elements" on the next page](#).

Ensure that all safety precautions are observed. Refer to ["For Your Safety" on page 9](#).

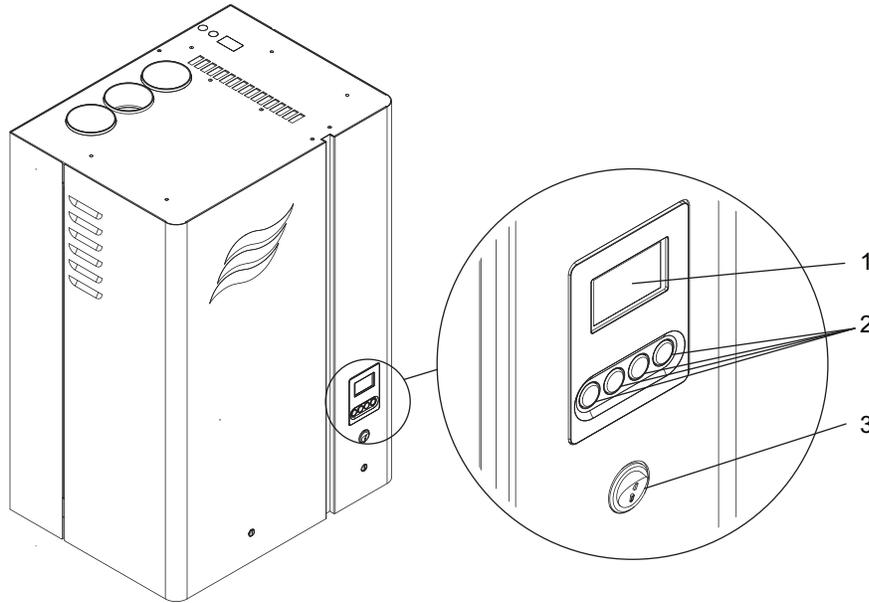


Figure 3 - Ultrasonic Blower Pack Location of Operator Interface

1. Display
2. Navigation buttons (up, down, enter, menu)
3. On/Off button

## 6.2 Control Software

The control software runs in the background and controls all the functions of the Ultrasonic Humidifier. The user interacts with the control software through the screens on the display.

**Note:** The screens shown in this manual are for representation purposes only, and may differ from what is actually displayed on the humidifier.

### 6.2.1 Home Screen

When the Ultrasonic Humidifier is turned on, it will perform system checks to ensure proper functioning of the unit. When initialization and system checks are complete, the unit will enter normal operating mode. The home screen will appear on the display.

The home screen displays the following information:

- Control signal type
- Demand requested
- Operating/Service/Warning/Fault status message
- Graphic indicator of the mist output

**Note:** Status information for dual reservoirs are displayed simultaneously on large models, US 40.



Figure 4 - Ultrasonic Humidifier Home Screen - Single Reservoir

1. Humidity control information - shows the control signal type and requested demand
2. Operating/Service/Warning/Fault status message
3. Visual indication of the current mist output level

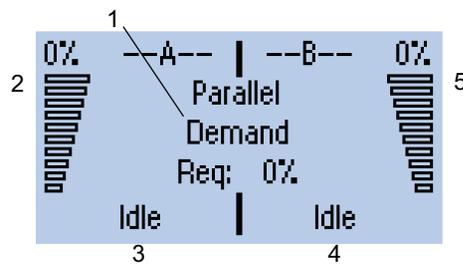


Figure 5 - Ultrasonic Humidifier Home Screen - Dual Reservoir

1. Humidity control information - shows the control signal type and requested demand
2. Humidifier A visual indication of the current mist output level
3. Humidifier A Operating/Service/Warning/Fault status message
4. Humidifier B Operating/Service/Warning/Fault status message
5. Humidifier B Visual indication of the current mist output level

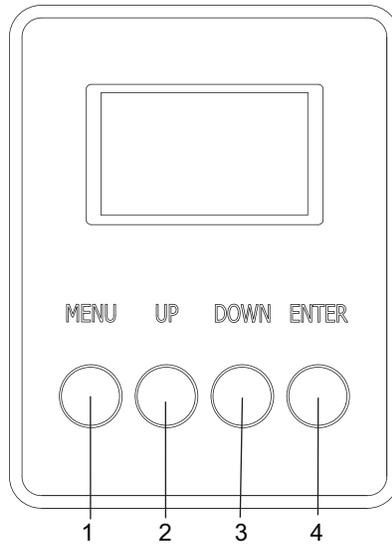
## 6.2.2 Navigation Elements

View humidifier settings by pressing the **menu** button.

Navigate through the menus using the **up** and **down** buttons, and make selections by pressing **enter**.

**Note:** Settings changed are only saved after pressing **enter**. If a timeout occurs (when no user input is detected), or if the **menu** button is pressed before pressing **enter**, the setting will not save.

Refer to [Figure 6 on the next page](#).



*Figure 6 - Navigation Elements*

1. Menu button - press this button to display and hide the menu
2. Up button
3. Down button
4. Enter button - press this button to make a selection in a menu or save a setting

### 6.2.3 Operating and Fault Status

The operating and fault status is shown at the bottom of the home screen (refer to "[Home Screen](#)" on page 24). Refer to [Table 9 on the facing page](#) to see the descriptions of each operating and fault status.

Table 9: Operating and Fault Status Descriptions

Message	Description
Starting	The humidifier is starting up.
Idle	The humidifier is idle and waiting for demand.
Idle Drain	The humidifier is idle and the reservoir is empty.
Filling	The reservoir is filling with water.
Misting	The humidifier is producing mist.
Flushing	The humidifier is flushing the water reservoir.
Ext. Disabled	The humidifier has been stopped via an external enable-contact (remote enable/disable).
Safety Loop Open	The safety loop is interrupted.
Blower Pack Fault	A fault has occurred in one of the blower pack fans. The humidifier stops producing mist.
Service Stop	The humidifier has stopped operation and needs service.
Filling Timeout	The humidifier has exceeded the maximum allowed filling time. It will continue filling after a wait period.
Drain Fault	The humidifier detected a problem with the draining of the reservoir and stops operation.
UV Fault	The humidifier detected a fault with the UV assembly. The humidifier stops operation.
High Temperature	The humidifier has detected a high temperature in the electronics. The humidifier stops operation.
Fan Failure	The interval fan has a malfunction. The humidifier stops operation.

## 6.2.4 Maintenance and Service Status

Service reminders are displayed on the home screen. Generic service reminders are described in .

Table 10: Service Status Descriptions

Message	Description
Service Warning	This warning message appears if the control software has detected that the humidifier has been running for more than 2000 hours. The humidifier will continue to operate for another 500 hours before shutting down for service. The message will then change to "Service Required".
Service Required	This message appears when the control software has detected that the humidifier has been running for more than 2500 hours without service. The humidifier stops operation.
UV Service Required	This message appears when the UV assembly needs to be serviced.

## 6.2.5 Main Menu

Access the Main Menu by pressing the menu button on the humidifier. Refer to ["Navigation Elements" on page 25](#).



Figure 7 - Main Menu Screen

The following menus may be accessed from the Main Menu:

- **Configuration**
  - » **Features Menu** - Set the flush cycle for each reservoir and activate the Ultrasonic Blower Pack. Refer to "[Features Menu](#)" below.
  - » **Control Settings** - Change settings such as, fan speed, manual capacity, setpoint, control mode, signal type, bandwidth, and integral time. Refer to "[Control Settings](#)" on the facing page.
  - » **General** - Change the language settings, LCD settings, restore the settings to the factory default, and view the software version. Refer to "[General](#)" on page 31.
- **Service** - View and reset general service and UV service times.

## 6.2.6 Configuration Menu

Configure the operation of the Ultrasonic Humidifier through the configuration menu.



Figure 8 - Configuration Menu

### 6.2.6.1 Features Menu

Configure the flush cycle of the Ultrasonic Humidifier and connect any installed Ultrasonic Blower Pack units.



Figure 9 - Features Menu

### Flush Cycle A/B

Set the desired interval time (hours) to flush the reservoir. For humidifiers with dual-reservoirs, this setting will allow each reservoir to cycle independently of each other.

Range: 1-24 hours

Factory Setting: 1 hour

### Blower Pack A/B

Activates the Ultrasonic Blower Pack attached to the humidifier. Each Ultrasonic Blower Pack should be connected to its own reservoir. Selecting **Installed** will allow the Ultrasonic Blower Pack to start up.

Options: **Installed** or **Not Installed**

Factory Setting: **Not Installed**

## 6.2.6.2 Control Settings

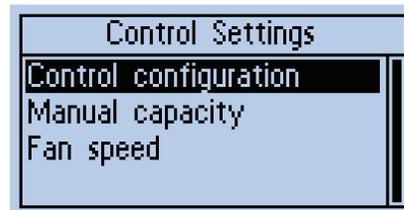
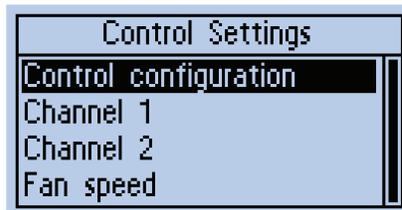


Figure 10 - Control Settings Menu.

## Dual Humidifier Mode

Change this setting to adjust how the dual nebulizing modules (water reservoir assembly with transducers, drivers, and fans) react to humidifier demand. This setting only appears on units possessing dual nebulizing modules.

Options:

- **Parallel** - The modules operate in parallel. This setting lowers the turn-on ratio and creates even wear on both modules.
- **Series** - The modules operate in sequence to meet humidifier demand. Module A operates in a range between 0-50 % demand. Module B operates in a range between 51-100% demand.
- **Independent** - The modules operate independently to meet the demand and are based on control signals from two separate zones.

Factory Setting: **Series**

## Manual Capacity

Set the demand capacity for the humidifier.

Range: **0-100** %

Factory Setting: **0** %

## Control Channel 1/2

Configure options for each control channel. Refer to [Table 11 on the facing page](#).

## Control Configuration

Select a control signal channel for the humidifier.

Changing the Control Configuration to Single or Dual Channel will change the Control Settings menu to display and allow access to Channel settings.

Changing the Control Configuration to Manual Capacity will change the Control Settings menu to display and allow access to the Manual Capacity menu.

Options:

- **Single Channel** - Single control
- **Dual Channel** - Two control signals (typically one control signal and one high-limit signal)
- **Manual Capacity** - The demand of the humidifier is set manually

Factory Setting: **Manual Capacity**

## Fan Speed

Set the blower fan speed inside the unit. Reducing this value will decrease the mist production capacity. This setting does not affect the Ultrasonic Blower Pack fan speed.

Range: **0-100** %

Factory Setting: **100** %

Table 11: Control Channel Options

Setting	Description	Options/Range	Factory Setting
<b>Setpoint</b>	Set the humidifier to operate at a fixed humidity setpoint value.	<b>0-100 %</b>	<b>50 %</b>
<b>Control Mode</b>	Select the general control mode for the incoming control signal.	<b>Demand</b> - Control signal is from an external controller <b>RH P</b> - Control signal uses internal proportional controller to interpret sensed humidity into demand <b>RH PI</b> - Control signal uses the internal proportional-integral controller to interpret sensed humidity into demand <b>On/Off</b> - Control signal is from an external On/Off humidistat	<b>Demand</b>
<b>Signal Type</b>	Select the signal type of the incoming control signal.	<b>0-5 V, 1-5 V, 0-10 V, 2-10 V, 0-20 V, 0-16 V, 3.2-16 V, 0-20 mA, 4-20 mA</b>	<b>0-10 V</b>
<b>Bandwidth</b>	Adjust the proportional range of the internal P/PI controller as a percentage of relative humidity that the humidifier will modulate between 0-100 % output.	<b>2-65 %</b>	<b>10 %</b>
<b>I Time</b>	Set the integral time for error corrections by the internal PI controller.	<b>1-60 minutes</b>	<b>5 minutes</b>

### 6.2.6.3 General

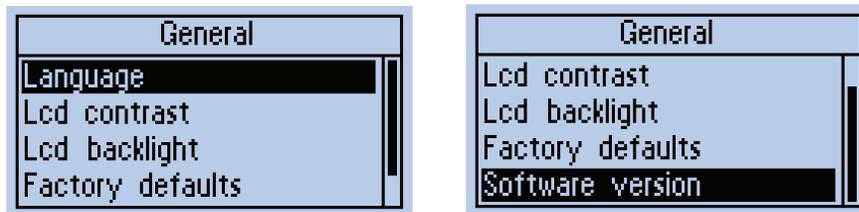


Figure 11 - General Menu

#### Language

Change the system language of the humidifier.

Options: **English**

Factory Setting: **English**

#### LCD Contrast

Adjust the LCD contrast.

Range: **1-10**

Factory Setting: **5**

### LCD Backlight

Set the length of time the LCD screen remains brightened after inactivity from the user.

Range: **0-60** seconds

Factory Setting: **30** seconds

### Factory Defaults

Restore the humidifier settings to the factory settings.

### Software Version

View the software version of the controller and installed driver boards.

## 6.2.7 Service

View and reset the status reminders.



*Figure 12 - Service Menu*

### General Service Info

View the current run time hours and remaining hours until the unit must be serviced.

### General Service Reset

Reset the general service reminder timer. Perform this task after servicing the unit.

### UV A/B Service Info

View the current run time and remaining hours of the UV assembly until the assembly must be serviced.

### UV A/B Service Reset

Reset the UV service reminder after a UV service has been performed. Separate UV Service Reset options are displayed for units with dual reservoirs.

## 6.2.8 Changing Your Settings

This section shows a brief overview of available settings and where to go to change them.

Do not forget to press **enter** to save your change.

I want to...

### 6.2.8.1 Change the period between flushing cycles.

(refer to ["Flush Cycle A/B" on page 29](#))

Main Menu > Configuration > Features > Flush Cycle A/B

### 6.2.8.2 Activate the Ultrasonic Blower Pack.

(refer to ["Blower Pack A/B" on page 29](#))

Main Menu > Configuration > Features > Blower Pack A/B

### 6.2.8.3 Change how the large humidifier reacts to demand.

In parallel, series, or independently (refer to ["Dual Humidifier Mode" on page 30](#)).

Main Menu > Configuration > Control Settings > Dual Humidifier Mode

**Note:** For dual reservoir units only.

### 6.2.8.4 Use the humidifier at X% capacity. To set up and configure the manual capacity control type.

(refer to ["Control Configuration" on page 30](#) and ["Manual Capacity" on page 30](#))

- 1) **Go to** Main Menu > Configuration > Control Settings > Humidifier A/B\* > Control Configuration > Manual Capacity
- 2) **Return to previous menu then,** Control Settings > Humidifier A/B\* > Manual Capacity

**Note:** \*For dual reservoir units only. **Single units:** Configuration > Control Settings > Control Configuration.

### 6.2.8.5 Humidify the space at X% setpoint, based on a control signal.

To set up and configure the humidity control (refer to ["Control Channel 1/2" on page 30](#)).

- 1) **Go to** Main Menu > Configuration > Control Settings > Humidifier A/B\* > Control Configuration > Single Channel (or) Dual Channel
- 2) **Return to previous menu then select a channel,** Control Settings > Humidifier A/B\* > Channel 1 (or) Channel 2
- 3) Input the Setpoint Control Mode, Signal Type, Bandwidth, and I-Time.

**Note:** \*For dual reservoir units only. **Single units:** Configuration > Control Settings > Control Configuration.

### 6.2.8.6 Put the humidifier on standby.

(refer to ["Control Settings" on page 29](#))

Set the demand to 0%.

### 6.2.8.7 Change the fan speed of the nebulizing module. (refer to ["Fan Speed" on page 30](#)).

Main Menu > Configuration > Control Settings > Fan Speed

### 6.2.8.8 Change the LCD display settings. (refer to ["LCD Contrast" on page 31](#) and ["LCD Backlight" on page 32](#)).

Main Menu > Configuration > General

### 6.2.8.9 Change the system language. (refer to ["Language" on page 31](#)).

Main Menu > Configuration > General

### 6.2.8.10 Restore factory defaults. (refer to ["Factory Defaults" on page 32](#)).

Main Menu > Configuration > General

### 6.2.8.11 Reset the service reminder (remove the service warning). **Perform this only after servicing the humidifier (refer to ["Service" on page 32](#)). General service and UV assembly service.**

Main Menu > Service

# 7 Operation

## 7.1 General

### Personnel Qualifications

The Ultrasonic Humidifier must only be operated by personnel who are adequately qualified, competent, and are authorized by the customer.

### Safety

Observe the following safety precautions.



#### **DANGER!**

**Risk of electric shock!**

**The unit is mains powered. Using the On/Off switch on the humidifier to shut down the unit will NOT shut off power to the control cabinet. Live parts may be exposed when the access panels or doors are removed. Touching live parts may cause severe injury or even death.**

**Prevention:** Before performing any work inside the humidifier, shut down the humidifier properly, as described in "[Shutting Down the Unit](#)" on page 37. The unit must be connected to the mains only after all mounting, installation, and maintenance work has been completed, checked for correct workmanship, and the access panels/doors are closed and fastened securely. Secure the unit against accidental power-up.

Only qualified personnel should perform maintenance or repairs on the unit.



#### **CAUTION!**

**Electrostatic discharge (ESD)!**

**The electronic components inside the control cabinet in the humidifier are sensitive to electrostatic discharge (ESD).**

**Prevention:** Take appropriate measures to protect the electronic components inside the unit against damage caused by electrostatic discharge (ESD). Refer to ANSI/ESD-S20.20.



#### **WARNING!**

**Heavy object. Risk of injury!**

**The humidifier is heavy. Injury, damage, or even death may occur if the humidifier falls or tips over.**

**Prevention:** Ensure that the humidifier is secured properly. Use an appropriate lifting device, or request assistance to raise the humidifier into position.



#### **WARNING!**

**Risk to Hygiene and Health!**

**Improper and infrequent maintenance of the unit presents the risk of spreading pathogens (such as bacteria, viruses, and parasites) originating from contaminated water, air, and equipment. Failure to reduce the risks increases the likelihood of causing injuries (requiring medical care), infection, and death.**

**Prevention:** Use, regularly clean, and replace the air and water inlet filters. Regularly flush and disinfect the humidifier, the blower pack, and their components (tanks, hoses, reservoirs, etc.). Use potable, treated water (potable, R.O., or D.I.).

Follow regular maintenance routines as described in "[Maintenance List](#)" on page 40. Follow local regulations.

**WARNING!****Do NOT leave the unit without power. Risk of contamination.**

**Do NOT leave the unit unpowered for more than 48 hours, or else a total system disinfect will be required. Without power, the system will not flush properly, resulting in standing water and conditions that may promote the growth of micro-organisms.**

**Prevention:** Leave your unit powered on. If you do not need humidification during the 48 hours, set the humidifier to standby or set the demand to 0.

## 7.2 Inspecting the Unit

Perform regulation inspections of the Ultrasonic Humidifier and the humidification system when it is in operation.

Regularly inspect the following when the unit is in operation:

- Inspect the water and mist connections
- Ensure that the drain lines are not blocked or kinked, and empty into the air gap funnel.
- Check that the unit and other system components have not shifted from their mountings, and are fastened securely.
- Visually check the electrical wiring for any damage.
- Check the Home screen on the unit for messages.
- Check that the doors on the unit are closed and fastened securely.

If any irregularities, such as leakages, fault messages, or damaged components, are found, shut down the unit before servicing. Refer to "[Shutting Down the Unit](#)" on the facing page. If assistance is required, please contact your Condaire representative.

## 7.3 Starting Up

**IMPORTANT!** Clean and disinfect the unit if the unit has been unpowered for an extended period of time (over 48 hours). Refer to "[Cleaning and Disinfecting](#)" on page 38.

To start the Ultrasonic Humidifier, press the On/Off button at the front of the humidifier. Refer to "[User Interface Controls](#)" on page 24.

Once the humidifier is turned on, the control software will perform a system check. When the system check is completed, the Home screen is displayed on the LCD screen. Refer to "[Navigation Elements](#)" on page 25 and the humidifier enters normal operating mode.

Before the humidifier begins to create mist, the unit will flush itself to remove water from the water lines and reservoir(s). Once flushed, the humidifier will fill the reservoir(s) (this process can take several minutes, depending on water pressure). After filling the reservoir, the humidifier will remain idle until a demand for humidification is received.

**Note:** The humidifier will check the operation of the water level sensor on start-up, and after a flushing cycle.

### 7.3.1 Restarting the Unit

The Ultrasonic Humidifier can be restarted after performing maintenance on the unit. Ensure the unit is secure and undamaged before restarting the unit.

**IMPORTANT!** Clean and disinfect the unit if the unit has been unpowered for an extended period of time (over 48 hours). Refer to "[Cleaning and Disinfecting](#)" on page 38.

To restart the unit:

1. Examine the humidifier and other system components for damage. Check for loose or damaged electrical connections, and ensure that the humidifier and its components have not shifted from their mountings, and are securely fastened.
2. Turn on the water supply to the humidifier and check for leaks.
3. Reinstall and secure any removed door panels.
4. Remove the lock and tag from the external disconnect switch, and restore power to the humidifier.
5. Press the On/Off button to the On position.

The humidifier will power up and remain idle until a humidity demand signal is received.

## 7.4 Shutting Down the Unit

Strictly observe all safety precautions and perform only the tasks described in this manual. Refer to ["For Your Safety" on page 9](#).

---

**IMPORTANT!** Avoid unpowering your unit. To stop humidification, set your demand to 0. This will leave your unit powered and in 'standby' mode to allow your unit to flush regularly and prevent microbial growth.

---

To shut down the Ultrasonic Humidifier:

1. Shut off the water supply to the humidifier.
2. Make a note of the fault code, if any, displayed on the Home screen.
3. Set the On/Off button to the Off position.
4. Wait for the humidifier to drain the reservoir and shut down. The drain valve will remain open for 70 seconds to drain the unit. After this period, the drain valve will close.
5. Disconnect the power supply to the humidifier at the external disconnect switch. To prevent accidental power-up, lock out and tag out.

## 7.5 Remote Monitoring

The Ultrasonic Humidifier can be monitored remotely by connecting the fault relay to a remote monitoring system.

## 7.6 Draining the Unit

To drain the reservoir:

1. Turn off the humidifier by pressing the On/Off button at the front of the unit. Refer to ["User Interface Controls" on page 24](#). The drain valve will open and remain energized for 70 seconds to fully drain the reservoir (independent of the current water level in the unit).

During a flushing cycle, the unit will drain from full. If the water level sensor indicates a full tank after 70 seconds has passed, the unit will enter a Drain Fault and stop operating.

**Note:** There is no manual drain valve. The drain valve is operated with electricity and is normally closed. In addition to its main power source, it is also powered by the back-up battery (when the mains power is not available). **Ensure that the back-up battery is installed and fully functional** or the unit will not drain during an outage, and will create stagnant water.

# 8 Maintenance

## 8.1 General

Strictly observe all safety precautions, and perform only those maintenance tasks described in this manual. Refer to ["For Your Safety" on page 9](#).

Use only original Condaire replacement parts.

All maintenance work must be performed only by licensed personnel authorized by the customer. It is the customer's responsibility to verify qualifications of the personnel.

The maintenance work may require removal of the cover on the unit. Refer to ["Removing and Installing the Door Panels" on page 44](#).

The Ultrasonic Humidifier may need to be unplugged to safely maintain and operate on the unit. Refrain from unpowering the unit (for more than 48 hours) unless it is deemed necessary, as unpowered units will not flush.

## 8.2 Cleaning and Disinfecting

Cleaning and disinfecting should be performed by authorized persons. Contact your Condaire representative for more details.

Refer to ["Maintenance List" on page 40](#) for the general procedure and frequency of maintenance.

**Disinfectants are mandatory, and must NOT produce toxic residue.** Observe all safety precautions labeled on the disinfectants and cleaner.



### CAUTION!

**Risk of damage to the humidifier components!**

**Do NOT use solvents, aromatized, or halogenized hydrocarbons, or other harsh chemicals for cleaning.**

**Do NOT use cleaning materials that could leave scratches on wet, plastic and metal surfaces of the unit.**

**Do NOT use hard or metallic brushes to clean the unit.**

Condaire recommends the following:

- Avoid recontaminating the components. Use clean gloves (that are safe to use with the agents listed below) when handling components and cleaning agents.
- For cleaning: dish washing soap
- For descaling: citric acid solution

**Note:** pH 2, or 20g citric acid in 1 L water, or 0.18 lbs for every 1 gallon

- For disinfecting: 0.1% hydrogen peroxide, H<sub>2</sub>O<sub>2</sub>
- At the end of each cleaning, allow the humidifier to fill and create mist for 2-3 minutes, then perform a full drain cycle. This should be performed manually or through changing the demand signal (full demand to mist; zero stop mist and allow to drain).

Condaire provides a cleaning and disinfecting kit for the Ultrasonic Humidifier (P/N: 2594996)

**IMPORTANT!** Avoid cleaning with hard or rough materials, such as steel wool, or metal brushes. Abrasions on the surface of any components may prevent micro-organisms from being cleaned easily. Instead use a clean cloth or soft brush.

**Avoid materials that will leave particles behind.**

**Avoid using a hard, or metal (or otherwise abrasive) brush.**

To disinfect a component:

1. Review the maintenance instructions for the component that will be cleaned and disinfected. Specific considerations must be taken into account for some components.
2. Ensure UV assembly is shut down before disinfection.
3. Clean the component with hot water and soap, and rinse with water. Remove biofilms and any surface impurities. Avoid using hard or metallic brushes (to avoid surface abrasions) to clean and disinfect.
4. Descale components using citric acid\* (pH 2), then rinse with water.
  - \*Let the component soak for 20 minutes and avoid scrubbing. Do NOT agitate the piezoelectric transducers because they are very fragile.
5. Apply disinfecting agent (0.1% hydrogen peroxide) to the component and allow to air dry (this allows the agent to penetrate and kill pathogens).
6. Rinse thoroughly with **clean** water (RO or DI water) to remove residue.

To disinfect hoses:

1. Clean and disinfect hose connections, as described above.
2. Remove any residue or particles from the hoses.
3. Flush the hoses with hot water.
4. Flush the hoses with disinfecting liquid and allow to air dry.
5. Rinse the hoses with **clean** water (RO or DI water) to remove residue from disinfectant.

## 8.2.1 Diluting your Disinfecting Solution (H<sub>2</sub>O<sub>2</sub>) to 0.1%

A 0.1% hydrogen peroxide solution is recommended to disinfect the unit. If a 0.1% solution is not readily available, you may need to dilute your current solution.

### General Formula

Before mixing your solutions, you should know the following:

- The desired concentration of disinfectant (Hydrogen Peroxide) in the mixture (0.1%).
- The current concentration of the disinfectant (Halomist is 5% Hydrogen Peroxide).

#### If the total volume of the required final mixture is known:

1. Calculate the required volume of concentrated disinfectant

$$\text{Required Volume of Concentrated Disinfectant} = [\text{Desired Volume of Mixture}] \times \frac{[\text{Desired Concentration of Mixture}]\%}{[\text{Concentration of Disinfectant}]\%}$$

2. Calculate the required volume of fresh water

$$\text{Required Volume of Fresh Water} = [\text{Desired Volume of Mixture}] - [\text{Required Volume of Concentrated Disinfectant}]$$

It may be easier to submerge some components of the unit into the disinfecting solution, or the volume of the diluted solution may not be known (i.e. fresh water has already been secured).

**If the total volume of the required final mixture is NOT known, but volume of fresh water is known:**

1. Calculate the required volume of concentrated disinfectant

$$\text{Required Volume of Concentrated Disinfectant} = \frac{\text{[Volume of Fresh Water]} \times \text{[Desired Concentration of Mixture]\%}}{\text{[Concentration of Disinfectant]\%} - \text{[Desired Concentration of Mixture]\%}}$$

Table 12: Volume of water and H<sub>2</sub>O<sub>2</sub> required for 0.1% hydrogen peroxide solution.

Desired concentration of Hydrogen Peroxide: 0.1%				
Desired volume of diluted solution (0.1% hydrogen peroxide)	Volume Units to Mix to Produce 0.1% Hydrogen Peroxide			
	Water	Halomist, H <sub>2</sub> O <sub>2</sub> (5%)	Water	H <sub>2</sub> O <sub>2</sub> (3%)
1 unit	0.98	0.02	0.967	0.033
2 units	1.96	0.04	1.933	0.067
3 units	2.94	0.06	2.900	0.100
4 units	3.92	0.08	3.867	0.133
5 units	4.90	0.10	4.833	0.167
6 units	5.88	0.12	5.8	0.2
7 units	6.86	0.14	6.767	0.233
10 units	9.80	0.20	9.667	0.333
30 units	29.40	0.60	29.00	1.00
50 units	49.00	1.00	48.333	1.667

### 8.3 Maintenance List

Regular maintenance should be performed on the Ultrasonic Humidifier. Refer to [Table 13 on the facing page](#). For replacement procedures, refer to ["Maintenance Procedures" on page 43](#).

Following cleaning and disinfecting procedures. Refer to ["Cleaning and Disinfecting" on page 38](#).

Ensure that the humidifier and its components are shut down. Refer to ["Shutting Down the Unit" on page 37](#).

Equipment that may be needed for cleaning:

- Screwdriver (cleaned and disinfected).
- Hot water and room-temperature or warm water.
- Cleaning agent (ex. dish soap).
- Descaling agent (ex. citric acid: part number 2589797). **Avoid bleach.**
- Disinfecting agent (ex. hydrogen peroxide).
- Compressed air.
- Cleaning material (ex. soft bristle brush, cloth).
- Rubber mallet.

Table 13: Maintenance and Cleaning List

Component	Frequency	Description
Drain valve	Annually	Inspect and clean the drain valve of any scale and debris. Refer to <a href="#">"Removing and Installing the Drain Valve"</a> on page 50.
Drain cup	Annually	Inspect and clean the drain valve of any scale and debris. Wash with soap and warm water. Rinse thoroughly. Refer to <a href="#">Figure 13 on the next page</a> .
Fill valve	Annually	Clean the fill valve strainer with a soft-bristled brush to remove any scale and debris. Rinse thoroughly. Refer to <a href="#">Figure 13 on the next page</a> .
Fill cup	Monthly	Remove the cover from the fill cup and clean the inside of the fill cup to remove any scale and debris. Disinfect and rinse the fill cup before reattaching the cover. Refer to <a href="#">Figure 13 on the next page</a> .
Flexible tubes	Weekly - Monthly	Rinse thoroughly with hot water. In some cases scale buildup forms inside the hoses. Use a rubber mallet to knock out the scale. Refer to <a href="#">Figure 13 on the next page</a> .
Flexible tubes and outlets	Weekly - Monthly	Clean and disinfect weekly. If the results from inspections are satisfactory (as per your risk assessor), flexible tubes and outlets may be cleaned monthly.
Water reservoir	Weekly - Monthly	<p>Clean and disinfect weekly. Refer to <a href="#">Figure 14 on page 43</a>. If results from inspections are satisfactory (as per your risk assessor), reservoir and flexible tubes may be cleaned monthly. Refer to <a href="#">"Cleaning, Removing, and Installing the Water Reservoir"</a> on page 45.</p> <p>Remove the fan assembly and mist outlet flange from the reservoir to access the inside of the reservoir, the heat sink, mist outlet flange, and fan. Clean the mist outlet flange and inside the reservoir with hot water and soap. Remove any scale and then disinfect. Rinse the mist outlet flange and reservoir with clean water.</p> <p>Clean the fan by using an object (ex. screwdriver) to secure the fan in place and blow compressed air into the fan assembly to remove dust. Clean the heat sink by blowing compressed air through the ridges.</p>
Electrical wires	Annually	Inspect all cables for damage and insulation breakdown. Replace any damaged cables and ensure that all cables are secured properly.
Fuses	Annually	Inspect fuses located on the driver board (315 mA), the battery backup board (4 A), and on the piezo-boards (3.15 A). Replace the fuses if necessary. Refer to <a href="#">"Replacing Fuses"</a> on page 52.
Piezoelectric transducers	Annually	Inspect the piezoelectric transducers on the reservoir. Replace annually, or as necessary before 10,000 hours of use. Refer to <a href="#">"Replacing the Transducers (Piezoelectric)"</a> on page 48.
Transducer driver board	Annually	Inspect the cables, wires, transistors, and the thermal paste on each transducer driver board. Replace if necessary. Refer to <a href="#">"Replacing the Transducer Driver Board"</a> on page 56.
Backup Battery	Annually	Inspect the battery and ensure it has a charge. Check the cables from the battery. Replace the cables or battery as necessary. Refer to <a href="#">"Replacing the Battery"</a> on page 57. <b>Do NOT short circuit the battery.</b>

Component	Frequency	Description
UV assembly	Weekly - Monthly	Inspect for any damage. Replace annually, or as necessary before 10,000 hours of use. Refer to <a href="#">"Removing and Installing the UV Assembly" on page 47</a> .
Ultrasonic Blower Pack	Weekly - Monthly	Clean and disinfect the flexible tubes and mist channel weekly. If results from inspections are satisfactory (as per your risk assessor), flexible tubes and channels may be cleaned monthly. Refer to the Ultrasonic Blower Pack Installation, Operation, and Maintenance Manual.
Reverse Osmosis System	Monthly - Annually	Replace membranes and filters as necessary. Refer to the Reverse Osmosis System Installation, Operation, and Maintenance Manual.
Air filters	Weekly - Monthly	Replace all air filters for air leading to the humidifier and Ultrasonic Blower Pack. If the air quality is bad, replace the air filters weekly, and if the air quality is good, replace the air filter monthly. Depending on performance and air quality, this may be extended — contact your Condaire representative.

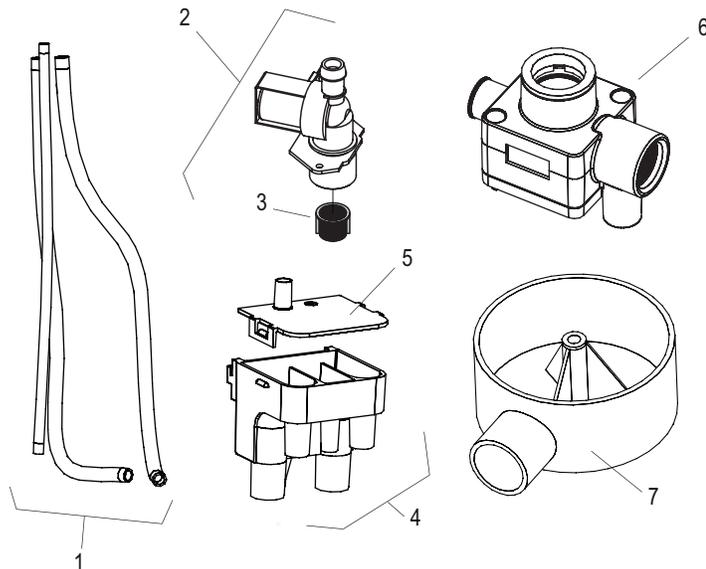


Figure 13 - Components to clean in the Ultrasonic Humidifier

1. Hoses
2. Fill valve
3. Strainer
4. Fill cup
5. Fill cup cover
6. Drain valve
7. Drain cup

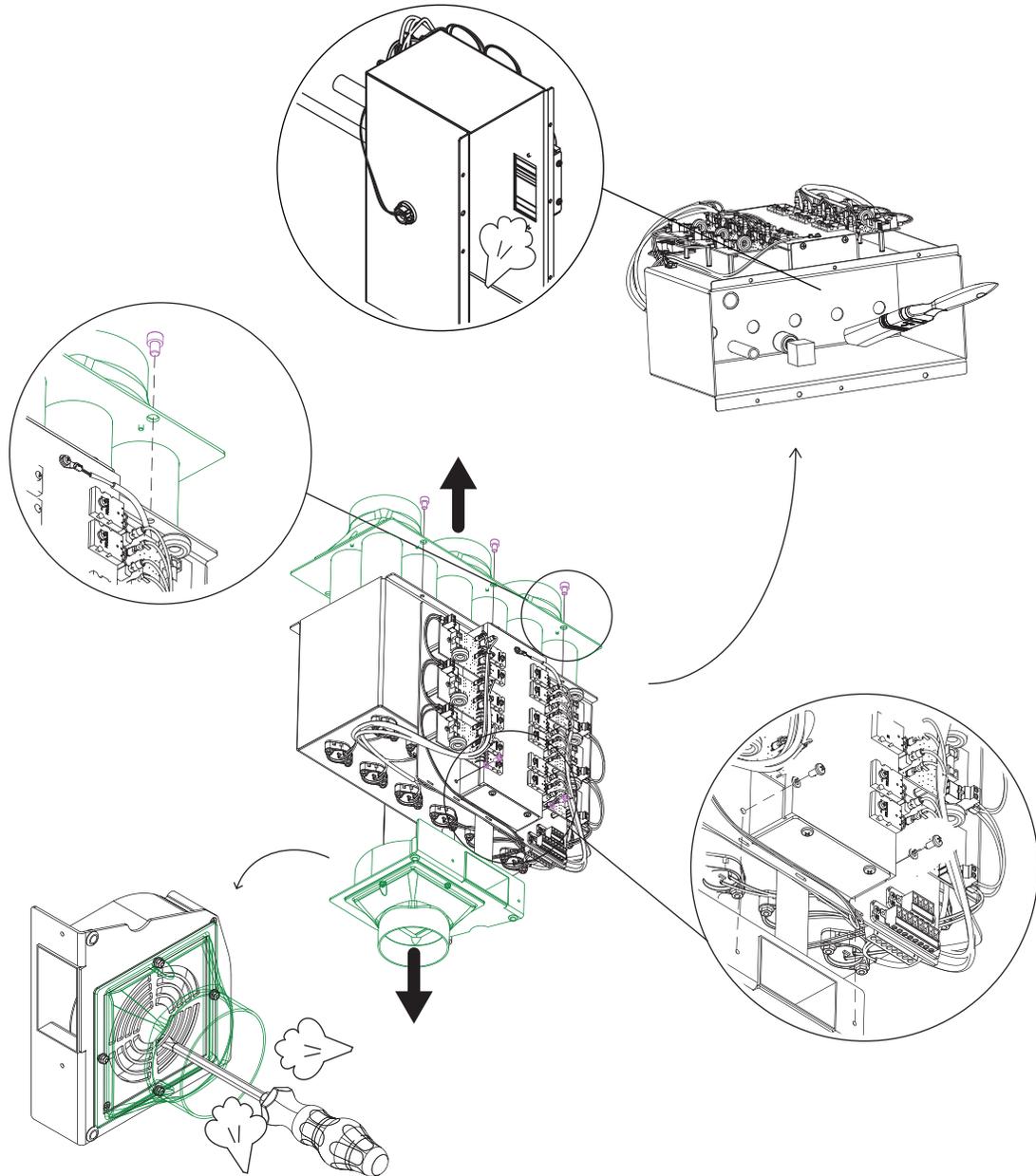


Figure 14 - Cleaning the Water Reservoir

## 8.4 Maintenance Procedures

Ensure that the humidifier is shut down properly and observe all safety precautions described in this manual. Refer to ["Shutting Down the Unit" on page 37](#) and ["For Your Safety" on page 9](#).

## 8.4.1 Removing and Installing the Door Panels

### Removing the Door Panels

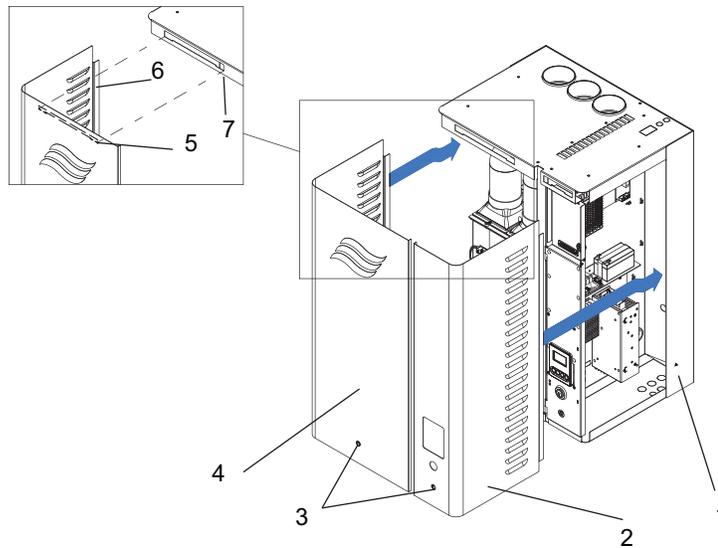
Remove the two door panels in the humidifier as follows. Refer to [Figure 15 below](#).

1. Turn the captive screw in each door panel counter-clockwise with a screwdriver.
2. Lift up the door panel slightly so that the tabs clear the notches in the cabinet, then carefully remove the panel.

### Installing the Door Panels

Install the two door panels in the humidifier as follows. Refer to [Figure 15 below](#).

1. Position each door panel so that the two tabs in the top rear of the panel align with the notches in the cabinet.
2. Lower the door panel to seat the tabs in the notches, while ensuring that the long tab on the side of the panel slides behind the stationary panel.
3. Make sure that the door panel fits flush on the front and the side. Turn the captive screw in the door panel clockwise with a screwdriver to secure the door panel. Check that it is fastened securely.



*Figure 15 - Door Panel Removal and Installation*

1. Stationary panel
2. Door panel, control cabinet
3. Captive screw
4. Door panel, plumbing cabinet
5. Top tab, door panel
6. Long tab, door panel
7. Notch, cabinet

## 8.4.2 Cleaning, Removing, and Installing the Water Reservoir

### Cleaning and Disinfecting Considerations: Water Reservoir

The water reservoir houses very delicate piezoelectric transducers that may break during cleaning/removal/installation. To avoid damaging the transducers, avoid removing the water reservoir from the unit unless it is necessary. This may impact cleaning/disinfecting procedures, so care must be taken:

- Gently spray the reservoir with clean water to rinse away residue, or allow the reservoir to fill and drain several times to rinse it out.
- Clean with a soft cloth.
- After cleaning with soap, instead of scrubbing off scale, soak the water reservoir in citric acid (pH 2) for 15-20 min. Approximately 3 L (0.8 gal) is necessary to fill the reservoir without it overflowing through the fan opening.
- To disinfect, spray the water reservoir (drained) with hydrogen peroxide (0.1% solution) and allow to air dry. The unit may be wiped with disinfectant, however, care must be taken that the sensitive piezoelectric transducers are not damaged.

If the reservoir should be removed from the humidifier, refer to the steps in ["Removal"](#) below.

Citric acid can be ordered from Condair (PN: 2589797).

The following instructions can only be performed while the water reservoir is removed from the unit. It is suggested to also inspect and perform maintenance on the UV assembly and transducers before the water reservoir is reinstalled into the humidifier.

- ["Removing and Installing the UV Assembly" on page 47](#)
- ["Replacing the Transducers \(Piezoelectric\)" on page 48](#)
- ["Removing and Installing the Drain Valve" on page 50](#)

### Removal

Remove the water reservoir as follows. Refer to [Figure 16 on the next page](#).

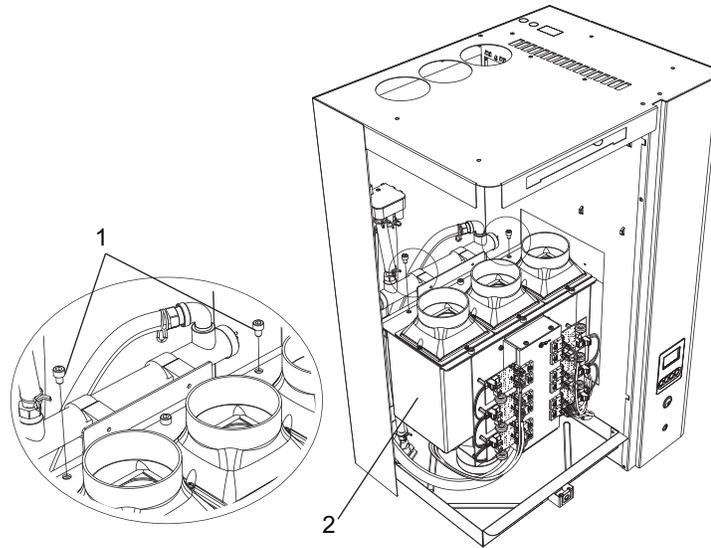
1. Shut down the humidifier as described in ["Shutting Down the Unit" on page 37](#).
2. Remove the door panels. Refer to ["Removing and Installing the Door Panels" on the previous page](#).
3. Remove the flexible tubes on top of the water reservoir.
4. Disconnect the two electrical connectors on the water reservoir. Refer to [Figure 17 on the next page](#).
5. Disconnect the earth connector from the earth tab. Refer to [Figure 17 on the next page](#).
6. Unscrew fastening bolt on the top of the water reservoir. Refer to [Figure 16 on the next page](#).
7. Lift the water reservoir out of the drain valve by wiggling the reservoir.
8. Discard the O-ring in the drain valve. The O-ring must be replaced when reinstalling a reservoir.

### Installation

Install the water reservoir as follows. Refer to [Figure 17 on the next page](#).

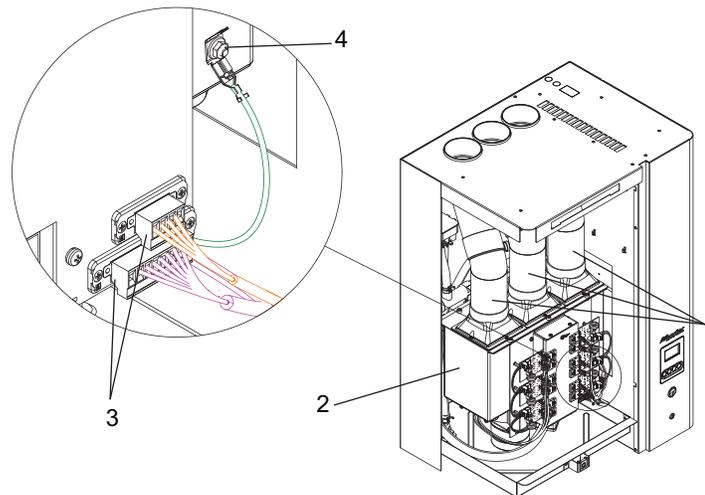
1. Lubricate a new O-ring with water – do NOT use grease, oil, or any other lubricant. For safety reasons, always install a new O-ring in the drain valve.
2. Make sure the new reservoir is of the same model as the one removed. This can be determined by the size of the reservoir or the number of piezoelectric transducers.
3. Position the water reservoir above the drain valve. Carefully slide the drain connection of the reservoir into the drain valve.
4. Insert and tighten the two fastening bolts on top of the reservoir to secure the reservoir in place. Refer to [Figure 16 on the next page](#).

5. Connect the earth connection on the earth tab. Refer to [Figure 17 below](#).
6. Connect the two electrical connectors on the water reservoir. Refer to [Figure 17 below](#).
7. Install the flexible tubes on top of the water reservoir.
8. Restart the humidifier as described in "[Restarting the Unit](#)" on page 36.



**Figure 16 - Water Reservoir Mounting**

1. Screw (x2)
2. Water reservoir



**Figure 17 - Water Reservoir Connections**

1. Flexible tubes
2. Water reservoir
3. Electrical connections
4. Ground connection

## 8.4.3 Removing and Installing the UV Assembly

### Removal

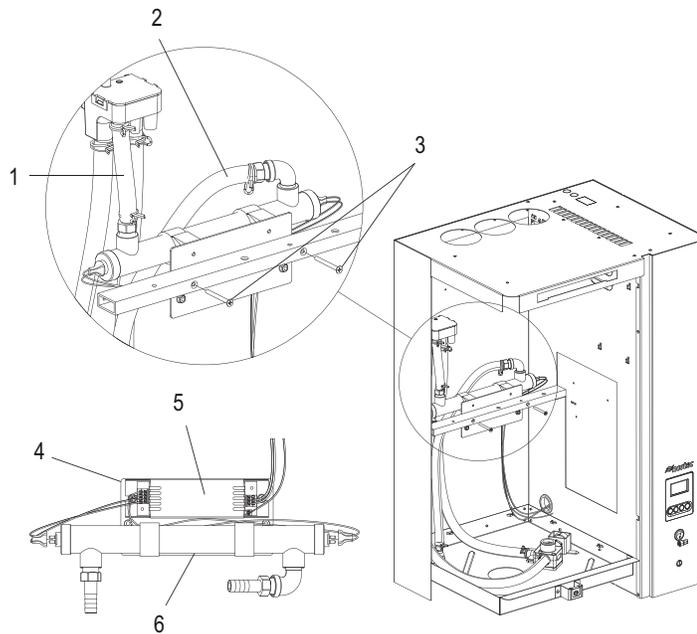
Remove the UV assembly as follows. Refer to [Figure 18 below](#).

1. Remove the water reservoir from the humidifier . Refer to "[Cleaning, Removing, and Installing the Water Reservoir](#)" on page 45.
2. Disconnect both water hoses.
3. Remove the two screws that secure the UV assembly to the cabinet.
4. Disconnect the electrical connectors from the ballast if necessary.

### Installation

Install the UV assembly as follows. Refer to [Figure 18 below](#).

1. Connect the electrical connectors to the ballast.
2. Install the UV assembly and secure it to the cabinet with the two screws.
3. Connect both water hoses.
4. Install the water reservoir. Refer to "[Cleaning, Removing, and Installing the Water Reservoir](#)" on page 45.



*Figure 18 - Removal and Installation of the UV Assembly*

1. Water connection to fill cup
2. Water connection from fill valve
3. Screws (x2)
4. UV assembly
5. Electronic ballast
6. UV reactor

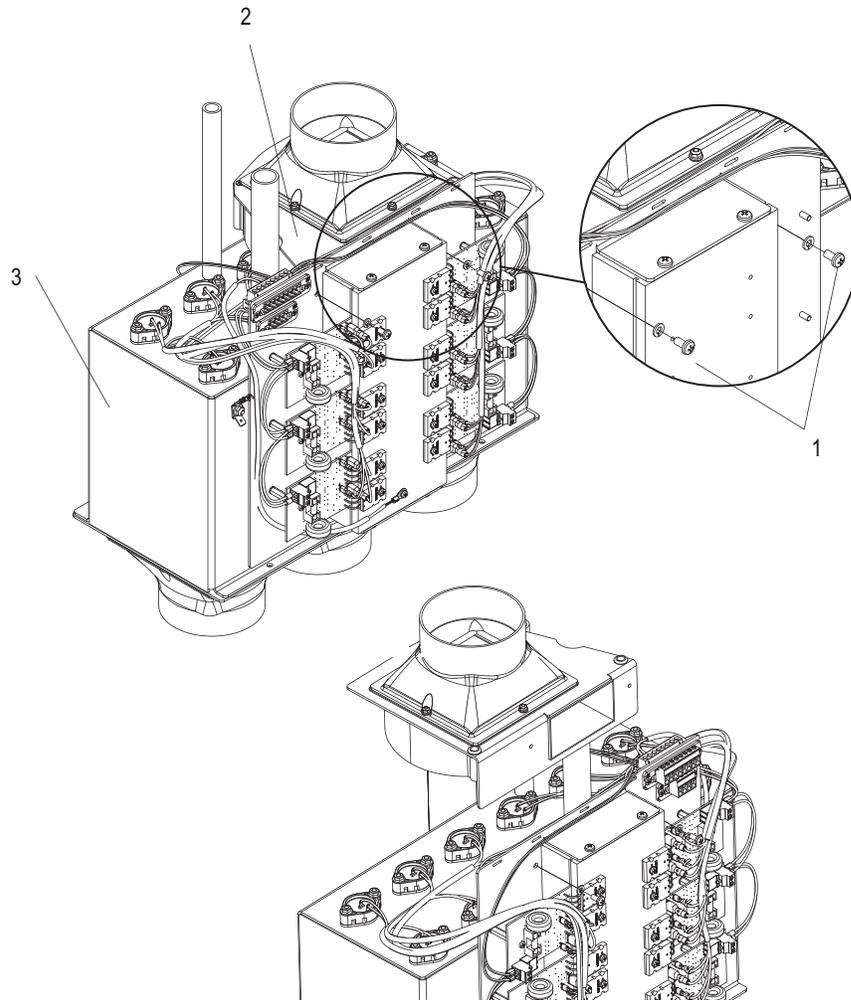
## 8.4.4 Replacing the Transducers (Piezoelectric)

### Removal

1. Remove the water reservoir from the humidifier as described in ["Replacing the Transducers \(Piezoelectric\)" above](#).
2. Position the reservoir upside down on a flat surface to access the piezo transducers.
3. Remove the two screws that secure the fan assembly to the water reservoir. Refer to [Figure 19 on the facing page](#).
4. Remove the two nuts that secure the transducer holder to the water reservoir. Lift the transducer holder upward to remove it from the reservoir. Refer to [Figure 20 on page 50](#).
5. Disconnect the two transducer wires from the transducer driver board.

### Installation

1. Position the new transducer over the threaded studs and slide it downward. Make sure the transducer is mounted in the right direction. The contacts on the transducer holder should point to the center of the water tank. Refer to [Figure 20 on page 50](#).
2. Secure the transducer holder with the two nuts to the water reservoir.
3. Connect the two wires of the transducer to the transducer driver board.
4. Install the fan assembly and secure it to the water reservoir with the two screws. Refer to [Figure 19 on the facing page](#).
5. Install the water reservoir into the humidifier as described in ["Cleaning, Removing, and Installing the Water Reservoir" on page 45](#).



*Figure 19 - Removal of Fan Assembly*

1. Screw (x2)
2. Fan assembly
3. Water reservoir

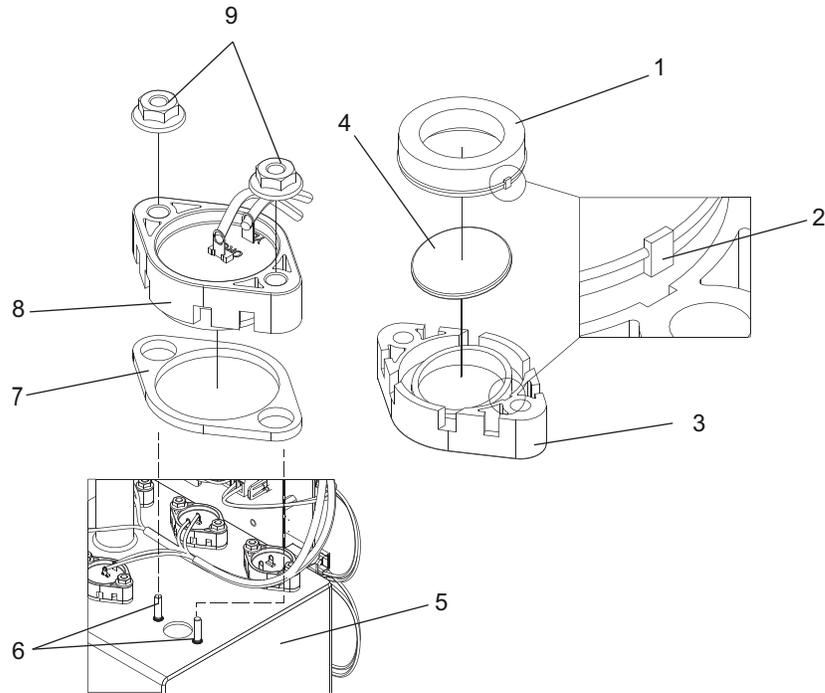


Figure 20 - Replacing Piezoelectric Transducers

1. Rubber seal
2. Notch position
3. Empty holder
4. Piezoelectric transducer
5. Water reservoir
6. Threaded studs
7. Transducer spacer
8. Transducer with holder
9. Nut (x2)

## 8.4.5 Removing and Installing the Drain Valve

### Removal

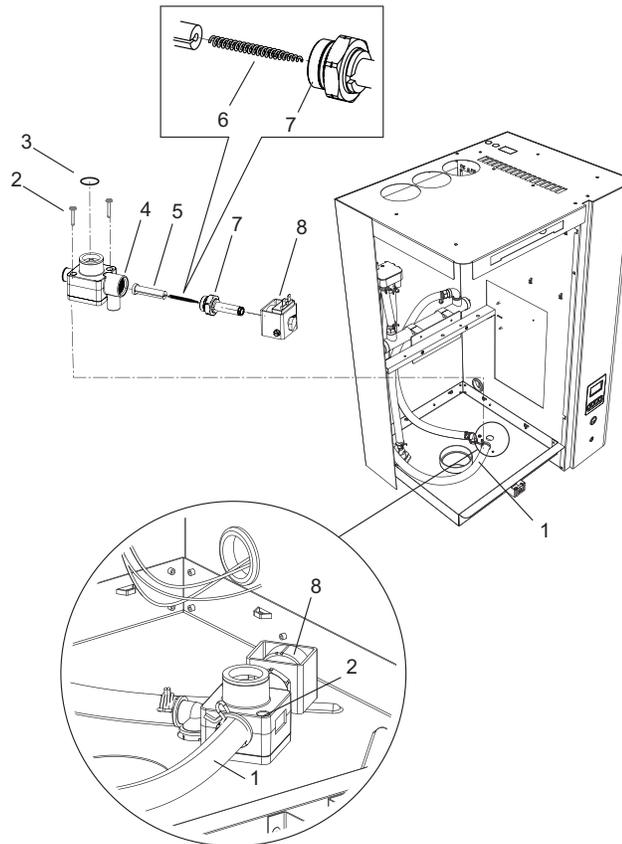
Remove the drain valve as follows. Refer to [Figure 21 on the facing page](#).

1. Remove the water reservoir. Refer to "[Cleaning, Removing, and Installing the Water Reservoir](#)" on [page 45](#).
2. Release the hose clamp, and disconnect the fill hose (fill cup to cylinder) from the drain valve.
3. Disconnect the electrical connectors and the ground wire from the drain valve.
4. Remove the two screws that secure the drain valve to the cabinet.
5. Remove and discard the O-ring in the drain valve. This will be replaced with a new O-ring when reinstalling.
6. To disassemble the valve, loosen the brass nut and remove the solenoid assembly from the valve body. Note the orientation of the spring.
7. Disassemble the solenoid assembly, and clean all components.

## Installation

Install the drain valve as follows. Refer to [Figure 21 below](#).

1. Install a new O-ring in the drain valve.
2. Assemble the solenoid assembly. Orient the tapered end of the spring towards the nut and solenoid.
3. Assemble the solenoid assembly to the valve body, and hand-tighten. Then turn an additional quarter turn.
4. Install the drain valve and secure it to the cabinet with the two screws.
5. Connect the fill hose to the drain valve and secure it with the hose clamp.
6. Connect the electrical connectors to the drain valve.
7. Install the water reservoir. Refer to "[Cleaning, Removing, and Installing the Water Reservoir](#)" on page 45.



*Figure 21 - Drain Valve Removal and Installation*

1. Fill hose (fill cup to cylinder)
2. Screw (x2)
3. O-ring
4. Drain valve
5. Plunger
6. Spring (note orientation)
7. Brass nut and solenoid
8. Solenoid

## 8.4.6 Replacing the Air Intake Filter

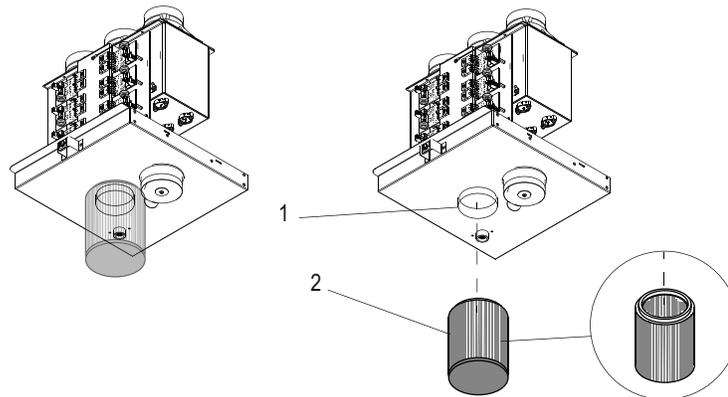


Figure 22 - Air Intake Filter Replacement

1. Air intake port
2. Filter

The air intake filter should be replaced regularly to minimize the intake of airborne contaminants.

To replace the air intake filter:

1. (Recommended) Shut down the humidifier as described in ["Shutting Down the Unit" on page 37](#). If the humidifier is not turned off, the air drawn into the humidifier will be unfiltered and it is possible that the humidifier will become contaminated.
2. Pull the air intake filter down from the humidifier, then replace the air intake filter.

## 8.4.7 Replacing Fuses

Only a qualified service technician authorized by the customer should replace the internal fuse.

Replace the internal fuse in the control cabinet as follows. Refer to [Figure 23 on the facing page](#).

1. Shut down the unit as described in ["Shutting Down the Unit" on page 37](#).
2. Remove the door panel on the control cabinet and swing the front panel open.
3. Replace the fuse with a 10 A slow-acting fuse.
4. Close the front panel and install the door panel. Ensure the panels are fastened securely.
5. Remove the lock and tag from the external disconnect switch and restore power to the humidifier.

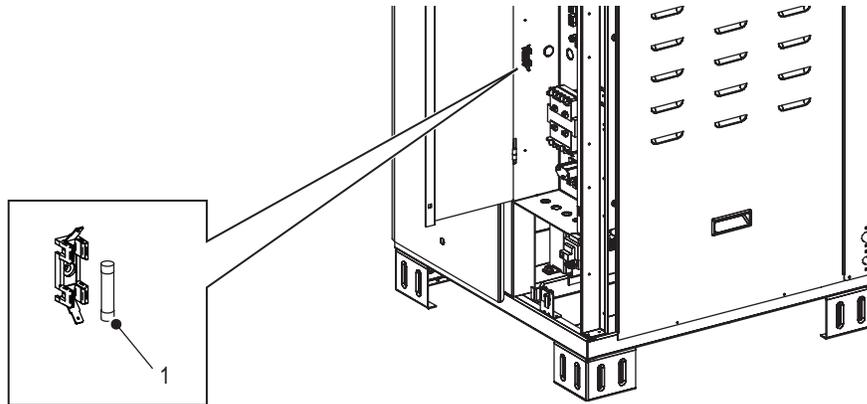


Figure 23 - Internal Fuse Replacement

1. Fuse, slow-acting (10 A)



**DANGER!**

**Risk of electric shock!**

The unit is mains powered. Using the On/Off switch on the humidifier to shut down the unit will NOT shut off power to the control cabinet. Live parts may be exposed when the access panels or doors are removed. Touching live parts may cause severe injury or even death.

**Prevention:** Before performing any work inside the humidifier, shut down the humidifier properly, as described in ["Shutting Down the Unit" on page 37](#). The unit must be connected to the mains only after all mounting, installation, and maintenance work has been completed, checked for correct workmanship, and the access panels/doors are closed and fastened securely. Secure the unit against accidental power-up.

Only qualified personnel should perform maintenance or repairs on the unit.



**CAUTION!**

**Electrostatic discharge (ESD)!**

The electronic components inside the control cabinet in the humidifier are sensitive to electrostatic discharge (ESD).

**Prevention:** Take appropriate measures to protect the electronic components inside the unit against damage caused by electrostatic discharge (ESD). Refer to ANSI/ESD-S20.20.

Only a qualified service technician authorized by the customer should replace the fuses in the humidifier.

Always replace defective fuses that match the specifications given in the procedure.

**NEVER** short-circuit and bypass the fuses.

There are three locations where fuses should be replaced:

- ["Fuses on the Backup Battery Board and Driver Board" on the next page](#)
- ["Fuses on the Transducer Driver Board" on the next page](#)

## **Fuses on the Backup Battery Board and Driver Board**

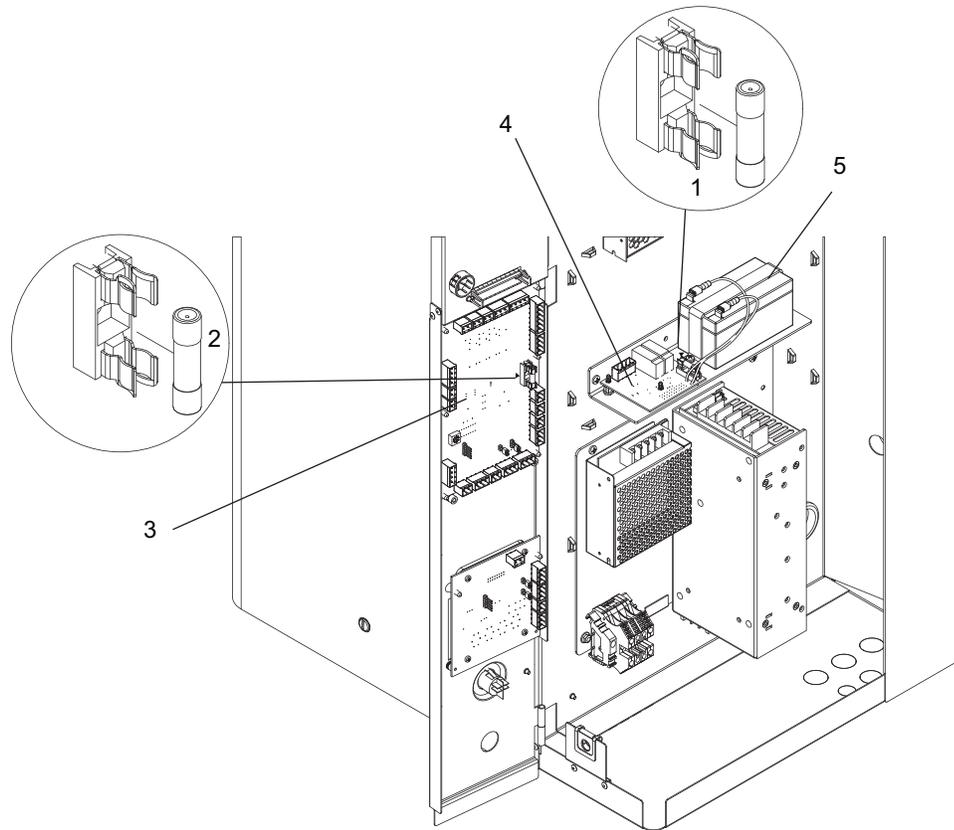
Replace the backup battery fuse and the driver board fuse as follows. Refer to [Figure 24 on the facing page](#).

1. Remove the door panel on the control cabinet. Remove the locking screw and swing the front panel open.
2. Replace the fuse "F1", located on the driver board, with a new slow-acting 315 mA fuse.
3. Replace the fuse "F1", located on the battery backup board with a new slow-acting 4 A fuse
4. Close the front panel and install the locking screw to secure it.
5. Install the door panel, making sure that it is fastened securely.

## **Fuses on the Transducer Driver Board**

Replace the fuse on the transducer driver board as follows. Refer to [Figure 25 on page 56](#).

1. Remove the door panel on the plumbing cabinet. Remove the locking screw and swing the front panel open.
2. Replace the fuse "F1", located on the Piezo driver board, with a new 3.15 A slow-acting fuse.
3. Close the front panel and install the locking screw to secure it.
4. Install the door panel, making sure that it is fastened securely.



*Figure 24 - Driver Board and Backup Battery Fuse Replacement*

1. Fuse, 4 A slow-acting
2. Fuse, 315 mA slow-acting
3. Driver board
4. Battery backup board
5. Battery

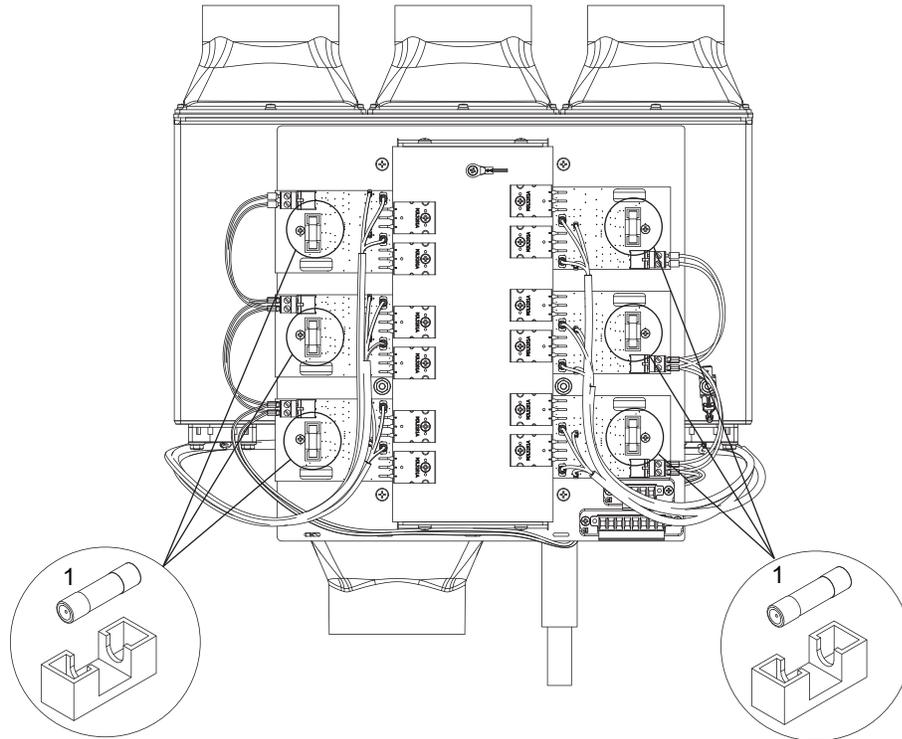


Figure 25 - Fuse Replacement on Transducer Driver Board

1. Fuse, 3.15 A slow-acting

## 8.4.8 Replacing the Transducer Driver Board

### Removal

Remove the transducer driver board as follows. Refer to [Figure 26 on the facing page](#).

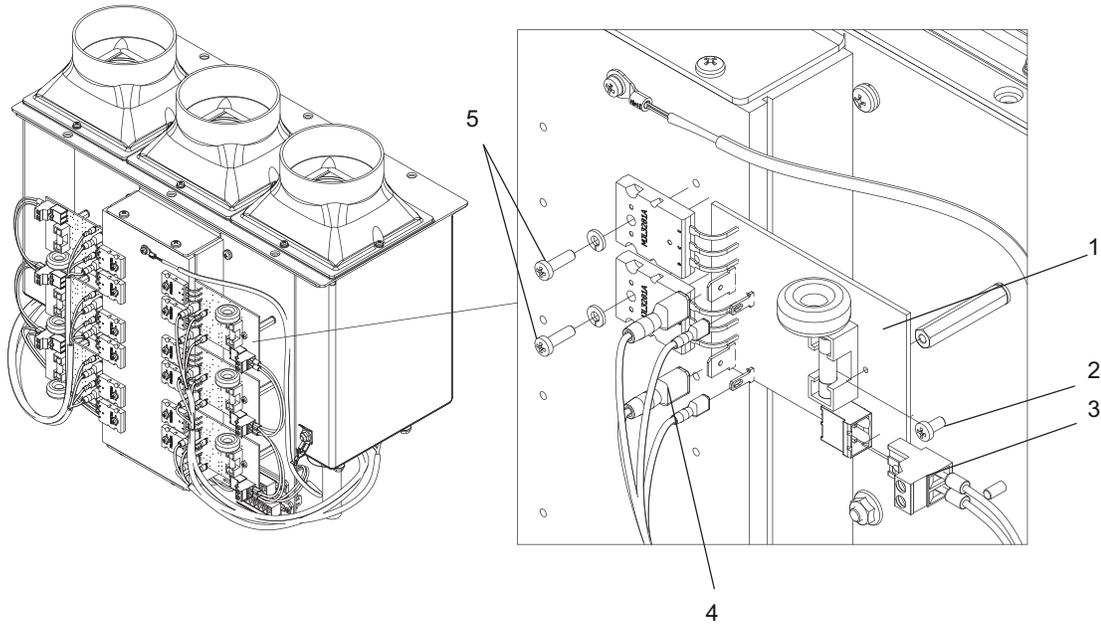
1. Unplug the power connector
2. Unplug the transducer connections
3. Remove the 3 screws, that secure the driver board to the water reservoir
4. Remove the driver board

### Installation

Install the transducer driver board as follows. Refer to [Figure 26 on the facing page](#) and [Figure 27 on the facing page](#).

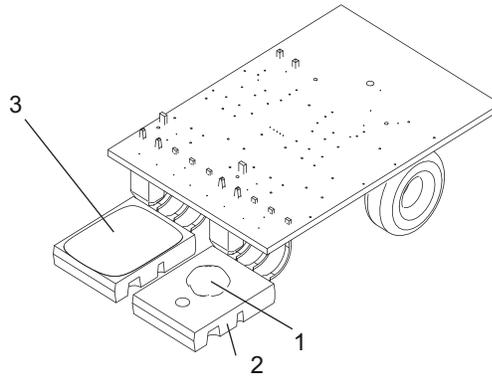
1. Apply thermal paste on the transistors. Start with a dot of thermal paste and evenly spread the paste on the transistors. Refer to [Figure 27 on the facing page](#).
2. Secure the transistors to the water reservoir with two screws.
3. Secure the board to the water reservoir with one screw.

4. Connect the transducer wires (2 orange and 2 yellow) to the driver board.
5. Connect the power wire to the board.



*Figure 26 - Replacing the Transducer Driver Board*

1. Transducer driver board
2. Screw
3. Power connector
4. Transducer wires
5. Screw (x2)



*Figure 27 - Applying Thermal Paste to the Driver Board*

1. Dot of thermal paste
2. Transistor
3. Thin layer of thermal paste

### 8.4.9 Replacing the Battery

The battery on the Ultrasonic Humidifier helps prevent stagnant water by energizing the drain valve to allow water

to flow out of the unit when power is shut off.



**DANGER!**

**Risk of electric shock!**

**The unit is mains powered. Using the On/Off switch on the humidifier to shut down the unit will NOT shut off power to the control cabinet. Live parts may be exposed when the access panels or doors are removed. Touching live parts may cause severe injury or even death.**

**Prevention:** Before performing any work inside the humidifier, shut down the humidifier properly, as described in "[Shutting Down the Unit](#)" on page 37. The unit must be connected to the mains only after all mounting, installation, and maintenance work has been completed, checked for correct workmanship, and the access panels/doors are closed and fastened securely. Secure the unit against accidental power-up.

Only qualified personnel should perform maintenance or repairs on the unit.



**CAUTION!**

**Electrostatic discharge (ESD)!**

**The electronic components inside the control cabinet in the humidifier are sensitive to electrostatic discharge (ESD).**

**Prevention:** Take appropriate measures to protect the electronic components inside the unit against damage caused by electrostatic discharge (ESD). Refer to ANSI/ESD-S20.20.

Only a qualified service technician authorized by the customer should replace the battery in the humidifier.

Always replace defective batteries that match the specifications given in the procedure.

**IMPORTANT! NEVER** short-circuit and bypass the battery.

## Replacement

1. Remove the door panel on the control cabinet. Remove the locking screw and swing the front panel open.
2. Disconnect the battery board cables from the battery.
3. Replace the battery located on the backup board with a new one. Refer to [Figure 24 on page 55](#).
4. Connect the cables to the new battery.
5. Close the front panel and install the locking screw to secure it.
6. Install the door panel, making sure that it is fastened securely.

# 9 Troubleshooting

Troubleshooting of the Ultrasonic Humidifier must only be performed by qualified and competent personnel. Electrical repairs must only be performed by a licensed electrician authorized by the customer, or by Condaire service technicians.

Troubleshooting the Ultrasonic Humidifier may require the user to access the inside of the unit, to the control and plumbing cabinets, which may expose the user and equipment to hazards described in ["For Your Safety" on page 9](#).

Warning and Fault Messages:

- ["Filling timeout" below](#)
- ["Drain fault" on the next page](#)
- ["Blower pack fault" on the next page](#)
- ["High temperature" on the next page](#)
- ["Fan failure" on the next page](#)
- ["UV fault" on page 61](#)
- ["Service stop" on page 61](#)
- ["Driver board \(A/B\) disconnected" on page 61](#)

## 9.1 Fault Indication

When a condition that is not normally expected occurs, it is detected by the control software and a warning or fault message is displayed on the Home screen. Refer to ["Home Screen" on page 24](#).

## 9.2 Warning and Fault List

Warnings and faults are displayed on the Home screen of the humidifier. The warning and fault messages can be reset, however, if the cause of the warning or fault persists, the message will return. Refer to ["Resetting Fault Status" on page 61](#). Refer to ["Maintenance List" on page 40](#) for cleaning instructions and ["Maintenance Procedures" on page 43](#).

### Filling timeout

<u>Probable Cause</u>	<u>Corrective Action</u>
<b>Permissible filling time exceeded</b>	■ Wait 3 minutes and the unit will attempt to fill the unit again.
<b>Water supply line or water filter is clogged, shutoff valve closed</b>	■ Check the supply line, shutoff valve, filter, and water pressure.
<b>Leak in the water supply</b>	■ Clean the strainer in the inlet valve. Replace the inlet valve if necessary.
<b>Pressure in the buffer tank is too high</b>	■ High buffer tank pressure may cause leaks in the water line. Lower the air pressure in the buffer tank. Refer to <a href="#">"Adjusting the Buffer Tank Pressure"</a> .

## Drain fault

### Probable Cause

"Drain fault" appears when the permissible draining time has been exceeded and the sensors still detect a water in the reservoir.

**Drain line clogged**

**Clogged or defective drain valve**

**Water level sensor stuck**

### Corrective Action

- Clean the drain line.
- Clean the drain valve. Replace the drain valve if necessary.
- Clean the water level sensor inside the reservoir.

## Blower pack fault

### Probable Cause

**Blower pack not connected or installed**

**Blower pack defective**

### Corrective Action

- Disable the Ultrasonic Blower Pack. Refer to "[Blower Pack A/B](#)" on page 29.
- Consult the Ultrasonic Blower Pack manual.

## High temperature

### Probable Cause

**Ambient temperature too high**

### Corrective Action

- Check if the ambient temperature is within operating range. Refer to "[Operating Data](#)" on page 23.

## Fan failure

### Probable Cause

**Blower fan blocked**

**Blower fan defective**

### Corrective Action

- Clean the fan. Refer to [Figure 14 on page 43](#).
- Replace the blower fan inside the reservoir.

## UV fault

### Probable Cause

- UV tube (reactor) defective**
- UV ballast defective**

### Corrective Action

- Check connections on the UV tube and replace if necessary.
- Check connections on the UV ballast. Replace the UV ballast or assembly if necessary.

## Service stop

### Probable Cause

- A service interval is overdue**

### Corrective Action

- Perform the needed service on the humidifier and reset the service interval. Refer to "[Service](#)" on page 32.

## Driver board (A/B) disconnected

### Probable Cause

This message appears when there is no communication between the controller and the driver board.

**Communication cable between the driver board and the control board is not connected properly**

**S2 switch on the driver board incorrectly set**

**Unexpected driver board fault**

### Corrective Action

- Reconnect the RS485 cable is connected to the RS485 port on the driver board, and is connected to the SAB on the control board.
- Set the S2 switch to "0" on driver board A and "1" on driver board B. Power cycle the humidifier.
- Contact your Condaire representative.

## 9.3 Resetting Fault Status

If the cause of the fault is not resolved, the fault message will return on the Home screen.

Reset a condition in the humidifier with a fault status as follows:

1. Press the On/Off button at the front of the humidifier to Off and wait for 5 seconds.
2. Press the On/Off button to On.

# 10 Decommissioning

## 10.1 General

If the Ultrasonic Humidifier needs to be replaced or removed from service for disposal, strictly follow the instructions in this section.

### Personnel Qualifications

All decommissioning work must be performed only by a qualified service technician authorized by the customer. It is the customer's responsibility to verify proper qualifications of the personnel.

### Safety

The decommissioning work will require removal of the covers/door panels on the Ultrasonic Humidifier.

Refer to ["For Your Safety" on page 9](#).

## 10.2 Removing Unit from Service

Remove the unit from service for disposal, or long-term storage, as follows. Use a qualified service technician.

1. Drain the reservoir in the humidifier, and shut down the humidifier. Follow all safety precautions.
2. Disconnect the humidifier from the power source.
3. Disconnect the control signal inputs (including any power and security loop connections) from the terminal strips in the humidifier.
4. Disconnect the water and drain connections to the humidifier. Empty out all fluids.
5. Remove the Ultrasonic Humidifier from its mounting surface.
6. If the unit is to be put in long-term storage, store the unit in its original packaging inside a protected area. Refer to ["Receiving and Storage"](#).
7. If the unit is to be disposed, refer to ["Disposing or Recycling the Unit" below](#).

## 10.3 Disposing or Recycling the Unit

The Ultrasonic Humidifier and its components must NOT be disposed in domestic waste, and should be brought to an authorized collection point. If required, dispose in accordance with local regulations at authorized collection facilities.

If you have any questions, please contact the appropriate local authorities, or your local Condaire representative.

# APPENDIX

# A Appendix: Maintenance Checklist

Follow all safety precautions. Refer to "For Your Safety" on page 9. Shut down the unit before performing maintenance procedures. Refer to "Shutting Down the Unit" on page 37. **Do NOT ignore service, warning and fault messages** that appear on the Home screen. Refer to "Troubleshooting" on page 59. For information on cleaning procedures and cleaning agents, refer to "Cleaning and Disinfecting" on page 38. Refer to "Maintenance List" on page 40 and "Maintenance Procedures" on page 43 for descriptions on maintenance procedures.

Table 14: Maintenance Log

Component	Frequency	Dates Last Performed (DD/MM/YY) and Initials											
Drain valve	12 months												
Drain cup	12 months												
RO-U/DI system	see Condair representative												
Fill valve	12 months												
Fill cup	12 months												
Flexible tubes and outlets	Weekly-Monthly*												
Water reservoir	Weekly-Monthly*												
Electrical wires	12 months												
Fuses	12 months												
Backup battery	12 months												
Piezoelectric transducers	12 months												
Transducer driver board	12 months												
UV assembly	12 months												
Ultrasonic Blower Pack	6 months												
Air filters (replace)	Weekly-Monthly see Condair representative												

\* Period may be extended based on water and air quality assessments.  
Comments:

## B Appendix: Wiring Diagram Ultrasonic Humidifier - Reservoir

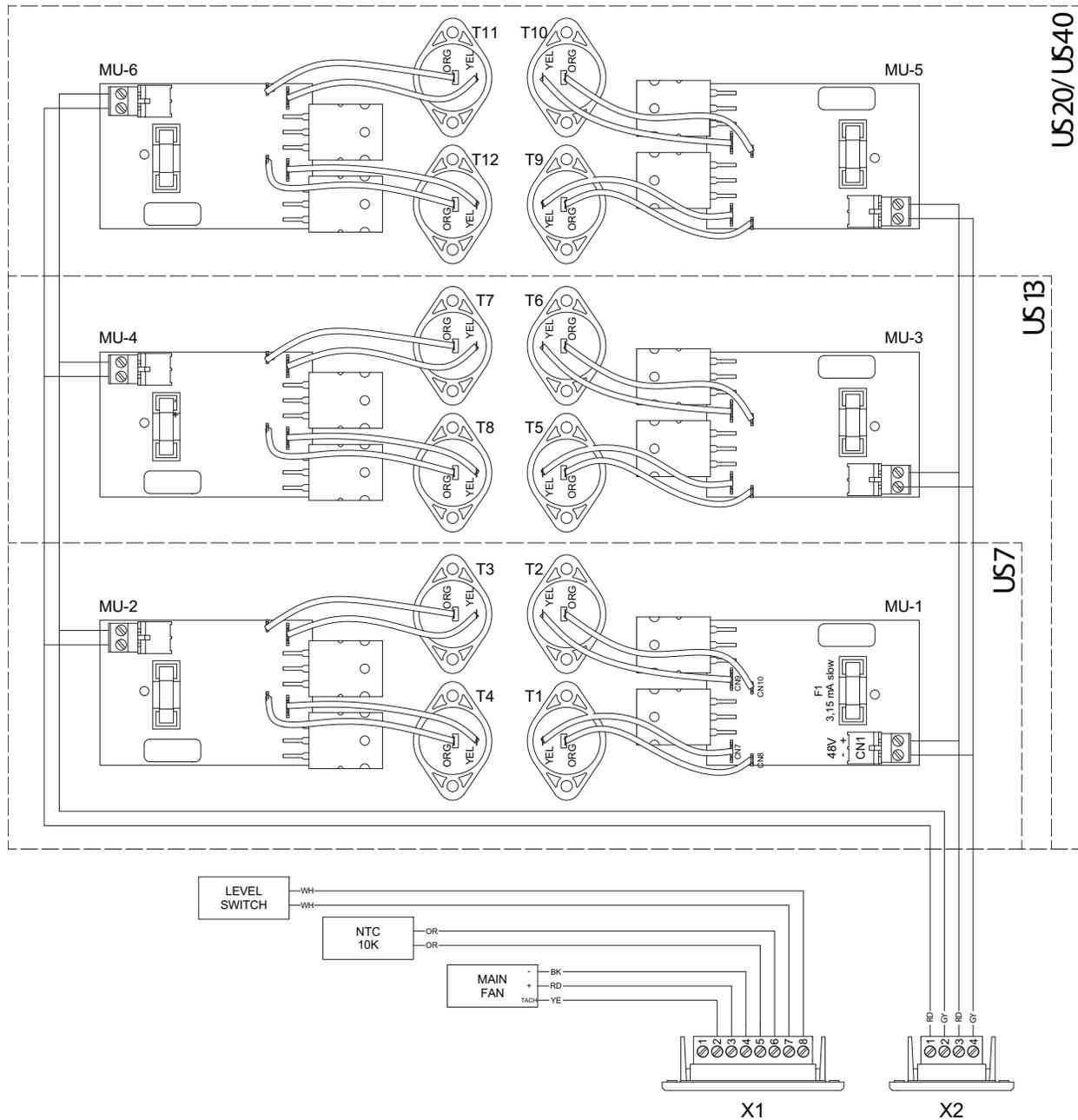


Figure 28 - Wiring Diagram of the Ultrasonic Humidifier Reservoir

### Legend

CN1:	Misting unit power input	T1-T12:	Transducers
F1:	Internal fuse 48V (3.15mA, slow acting)	X1:	Level, temperature and fan connection
MU1-MU6:	Misting unit boards	X2:	Misting units power connection

# C Appendix: Wiring Diagram Ultrasonic Humidifier - Medium

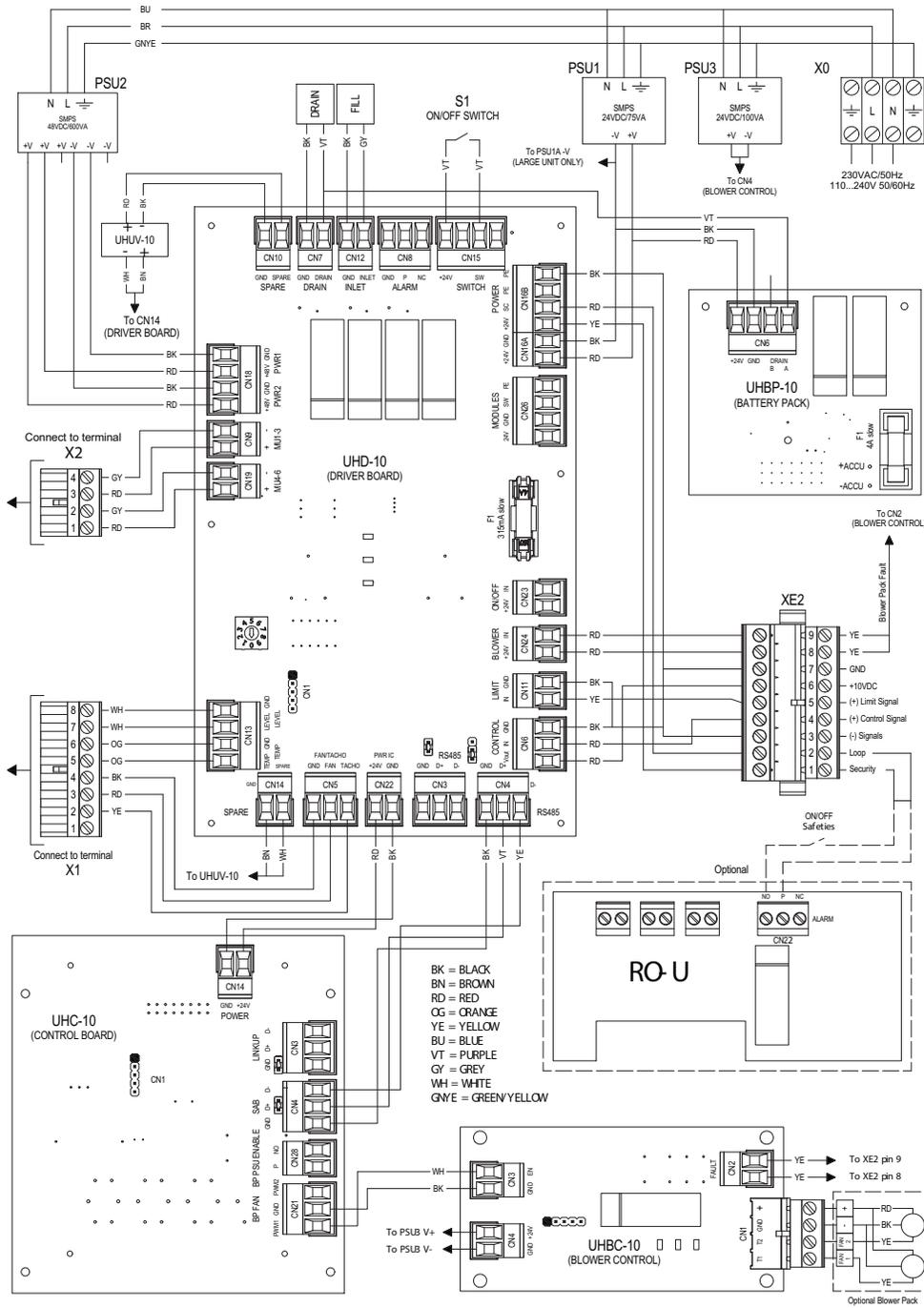


Figure 29 - Wiring Diagram of the Medium Ultrasonic Humidifier US 7-20

## Legend

F1:	Internal fuse 24 V supply (315 mA, slow acting)
J1:	Jumper, do not remove
J2:	Jumper, do not remove
PSU1:	Power supply 24 VDC 50 VA
PSU2:	Power supply 48 VDC 600 VA
S1:	On/Off switch
S2:	Rotary switch module identification: 0
X1:	Level, temperature and fan connection
X2:	Missing units power connection
XE1:	Supply voltage terminal block
XE2:	Control terminal block



*Figure 30 - Wiring Diagram of the Large Ultrasonic Humidifier*

**Legend**

F1:	Internal fuse 24 V supply (315 mA, slow acting)
J1:	Jumper, do not remove
J2:	Jumper, removed on driver board A, installed on driver board B
PSU1:	Power supply 24 VDC 50 VA
PSU2-PSU3:	Power supply 48 VDC 600 VA
S1:	On/Off switch
S2:	Rotary switch module identification: 0
X1:	Level, temperature and fan connection
X2:	Missing units power connection
XE1:	Supply voltage terminal block
XE2:	Control terminal block

# E Appendix: Wiring Diagram Ultrasonic Humidifier - Large (B-unit)

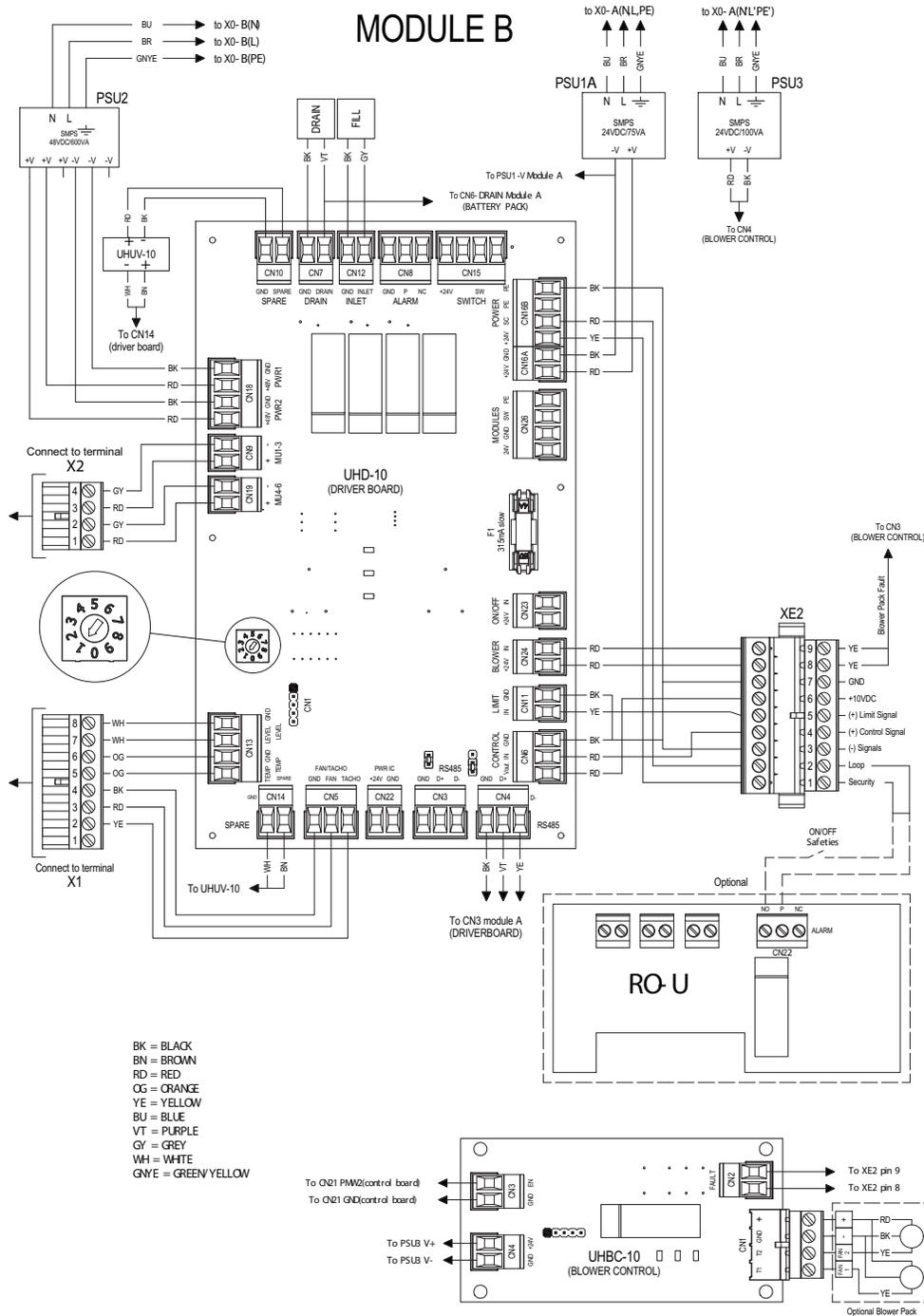
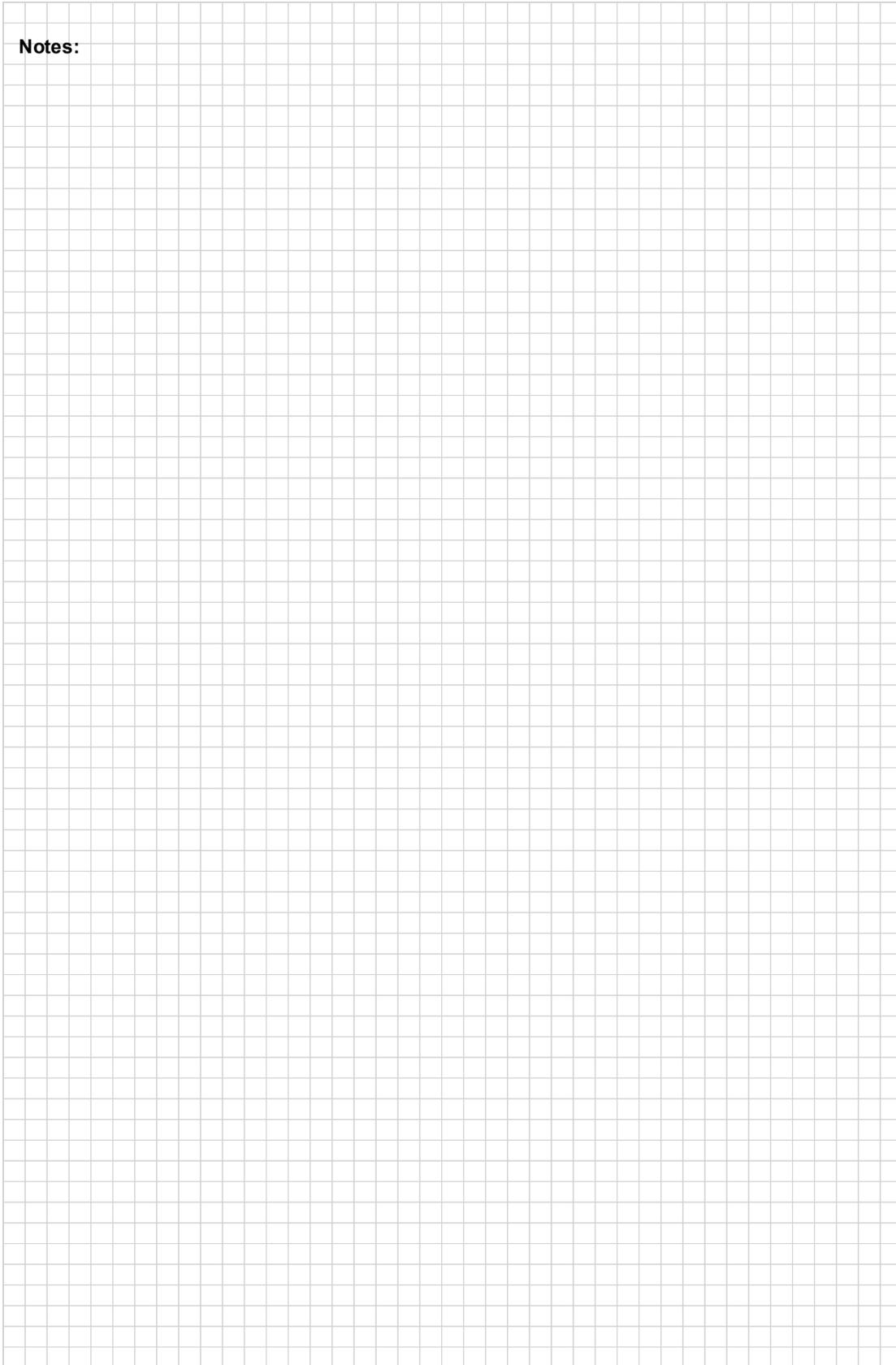


Figure 31 - Wiring Diagram of the Large Ultrasonic Humidifier

## Legend

F1:	Internal fuse 24 V supply (315 mA, slow acting)
J1:	Jumper, do not remove
J2:	Jumper, removed on driver board A, installed on driver board B
PSU1:	Power supply 24 VDC 50 VA
PSU2-PSU3:	Power supply 48 VDC 600 VA
S1:	On/Off switch
S2:	Rotary switch module identification: 0
X1:	Level, temperature and fan connection
X2:	Missing units power connection
XE1:	Supply voltage terminal block
XE2:	Control terminal block

**Notes:**



# Warranty

Condair Inc. and/or Condair Ltd. (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years after installation or 30 months from manufacturer's ship date, whichever date is earlier, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted, are free from defects in material and workmanship. No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

THE COMPANY's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. THE COMPANY's factory, providing the defective part(s) is returned freight prepaid by the customer. Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty must be in writing, signed by an officer of THE COMPANY.

THE COMPANY's parts or materials that are considered consumables, including but not limited to: cylinders, filters, nozzles, membranes, media, gaskets, O-rings, etc. are NOT covered by the warranty.

THE COMPANY makes no warranty and assumes no liability unless the equipment is installed in strict accordance with a copy of the catalog and installation manual in effect at the date of purchase and by a contractor approved by THE COMPANY to install such equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing or lack of proper maintenance of the equipment.

THE COMPANY makes no warranty and assumes no liability whatsoever for damage resulting from freezing of the humidifier, supply lines, drain lines, or quality of the water used.

THE COMPANY retains the right to change the design, specification and performance criteria of its products without notice or obligation.

THE COMPANY's limited warranty on accessories, not of the companies manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

## Extended Warranty

Extended warranties are available to purchase under the conditions listed above.



CONSULTING, SALES, AND SERVICE:

**CANADA**

2740 Fenton Road  
Ottawa, ON, K1T 3T7

**U.S.A.**

826 Proctor Avenue  
Ogdensburg, NY 13669

Tel: 1.866.667.8321  
Fax: 613.822.7964  
[na.info@condair.com](mailto:na.info@condair.com)  
[www.condair.com](http://www.condair.com)

