

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

2588786_C_EN_2010_US_IM



INSTALLATION MANUAL

Ultrasonic Humidifier
US-Series



WARNING



May present health risk if not maintained as instructed.

Peut présenter un risque pour la santé si l'entretien n'est pas effectué conformément au mode d'emploi.

Riesgo para la salud si no se siguen las instrucciones de mantenimiento.

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

2588786_C_EN_2010_US_IM



INSTALLATION MANUAL

Ultrasonic Humidifier
US-Series

Thank you for choosing Condair

Installation date (DD / MM / YYYY):

Commissioning date (DD / MM / YYYY):

Site:

Model:

Serial number:

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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.

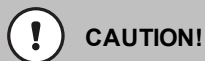
1.2 General

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 **installation** 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_C_EN_2010_US_IM	2588787_B_EN_2010_US_OM	—	2588788_C_EN_2010_US_SPL	—
Ultrasonic Blower Pack UB	—	—	2588705_C_EN_2010_UB_IOM	—	—
Reverse Osmosis System RO-U	—	—	2594385_C_EN_2010_RO_IOM	—	—

1.3 Receiving and Storage

1.3.1 Inspection

After receiving the shipment, inspect the goods as follows:

- Inspect the shipping boxes for damage. Report any shipping box damages to the shipping company without delay.
- Check the goods against the packing slip to ensure that all items have been delivered. Report any shortages to your Condair representative within 48 hours of receipt of the goods. Condair does not assume responsibilities for any shortages beyond this period.
- Unpack the parts/components and check for any damage. If parts/components are damaged, notify the shipping company immediately.
- Verify the model type on the specification label to ensure that it is suitable for your installation. Refer to "[Model Designation](#)" on page 15.

1.3.2 Storage, Packaging, and Transportation

Storage

Store the Ultrasonic Humidifier in its original packaging inside a protected area that meets the following requirements until it is installed, or if it needs to be stored for an extended period of time:

- Room temperature: 41 to 104 °F (5 to 40 °C)
- Room humidity: 10 to 75% RH (non-condensing)

Transportation

For optimum protection always transport the unit and components in their original packaging, and use appropriate lifting/transporting devices (ex. forklift).

Lifting or handling must be carried out by trained and qualified personnel. Ensure that lifting has been fully planned and assessed for possible risks, and that equipment is checked and operated by a skilled operator. It is the customer's responsibility to ensure that operators are fully trained to handle heavy goods and to enforce any applicable lifting regulations.

Packaging

Keep the original packaging of the unit/components for later use.

If the packaging needs to be disposed, observe local regulations on waste disposal. Please recycle packaging where possible.

1.4 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 10](#).

1.5 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 Condaire.

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 Condaire-approved Ultrasonic Blower Packs within specified operating conditions. Refer to "[Technical Data](#)" on page 18 in and "[Site Requirements](#)" on page 27 for details. Any other type of application, without the express written consent of Condaire, 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](#)" in the operation manual. 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 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 Condaire.

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 10](#).

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" on page 28](#) 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 *Ultrasonic Humidifier Operation and Maintenance Manual* for cleaning and maintenance procedures.

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).

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.

4 Product Description

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 18](#) and ["Operating Data" on page 19](#) for more information about capacity, power and water consumption.

4.2 Model Designation

The specification label for the Ultrasonic Humidifier is located on the side and underneath unit. The label contains information about the humidifier model. This includes the unit's model number, serial number, and ratings.

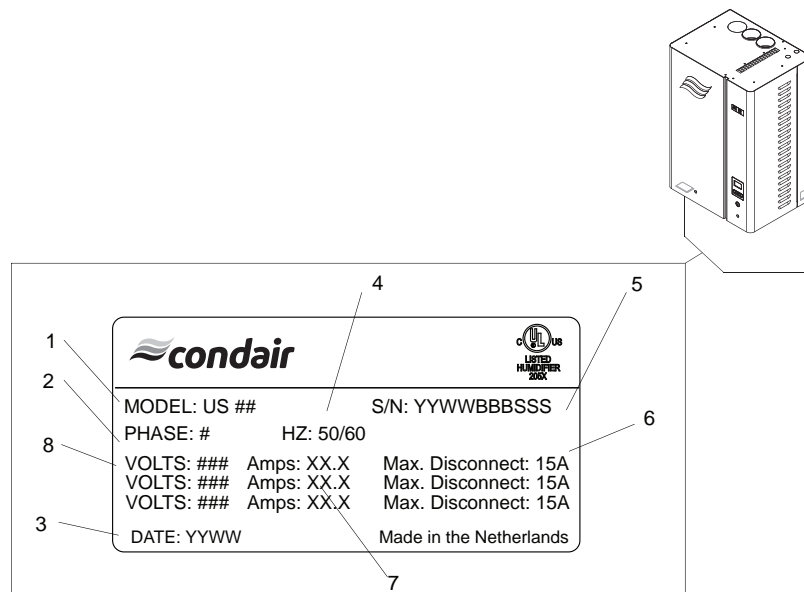


Figure 1 - Specification Label

1. Model
2. Current phase
3. Date of manufacture
4. Frequency rating
5. Serial number
6. Max current
7. Current
8. Voltage rating

4.3 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 the *Ultrasonic Humidifier Operation and Maintenance Manual* (P/N: 2582954) to learn more about maintaining the unit. Refer to "[Hygiene](#)" on page 13.

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.

4.4 Options

Options offered for the Nortec Ultrasonic Humidifier:

Option	Application
Blower pack, direct or remote mount	For direct room humidification or use in conditioned spaces without a built-in air distribution system. The Ultrasonic Blower Pack can be mounted onto the Ultrasonic Humidifier directly (medium humidifiers only), or mounted remotely, away from the humidifier. (PN: 2588747 Ultrasonic Blower Pack 7) (PN: 2588746 Ultrasonic Blower Pack 13) (PN: 2588741 Ultrasonic Blower Pack 20)
Digital or analog control humidistat with either On/Off or modulating operation	Input device that controls the output of the humidifier based on the measured relative humidity. The humidistat can be installed in the conditioned space that is being humidified. (PN: 1510142 Digital Wall Humidistat)
Flexible tubes	Flexible tubes (2.5 m) for mounting the Ultrasonic Blower Pack remotely. (PN: 2594413 flexible tube for remote mount) (PN: 2594409 flexible tube for direct mount)
Reverse Osmosis System	System that contains an RO membrane, filters, and buffer tank that supply the humidifier with water removed of most dissolved solids. (PN: 2594387 Ultrasonic RO-U complete set)

4.5 Accessories

[Table 2 on the facing page](#) shows the list of accessories for the Ultrasonic Humidifier. Contact your representative for details. To install and operate the accessories, refer to the instructions supplied with the accessory.

Table 2: Ultrasonic Humidifier Accessories

Accessory	Application
Disinfection kit	Disinfecting and cleaning kit. (PN: 2594996)
Air filter kit, humidifier	Replacement air intake filter(s) for the humidifier. (PN: 2594401 US 7-20) (PN: 2594995 US 40)
Air filter kit, blower pack	Replacement air filters for the Ultrasonic Blower Pack. (PN: 2588764)
Manuals	(PN: 2588786 Installation Manual) (PN: 2588787 Operation & Maintenance Manual) (PN: 2588788 Spare Parts List)

5 Product Specifications

5.1 Technical Data

5.1.1 Capacity

Table 3: Ultrasonic Humidifier Capacity

Model	Housing Size	Capacity at 120V/208/240V/1	
		Mist Production	Power Rating
US7	Medium	3 kg/h (6.6 lb/h)	250 W
US13		6 kg/h (13.2 lb/h)	250 W
US20		9 kg/h (19.8 lb/h)	650 W
US40*	Large	18 kg/h (39.6 lb/h)	1250 W

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

Note: For mist capacity losses due to flexible tube lengths, refer to ["Condensate Losses" on page 50](#).

5.1.2 Weights

Table 4: Ultrasonic Humidifier Weights (excludes flexible tubes)

Model	Housing	Weight	
US7	Medium	Net weight	40 kg (88 lb)
US13		Operating weight	42 kg (93 lb)
US20			
US40	Large	Net weight	73 kg (161 lb)
		Operating weight	77 kg (170 lb)

Table 5: Ultrasonic Blower Pack Packaged Weight

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

Table 6: Reverse Osmosis System Weight

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

5.1.3 Dimensions

Table 7: Ultrasonic Humidifier Dimensions (excludes flexible tubes)

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

Table 8: 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 9 on the next page](#) 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 9: 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 Specification Drawings

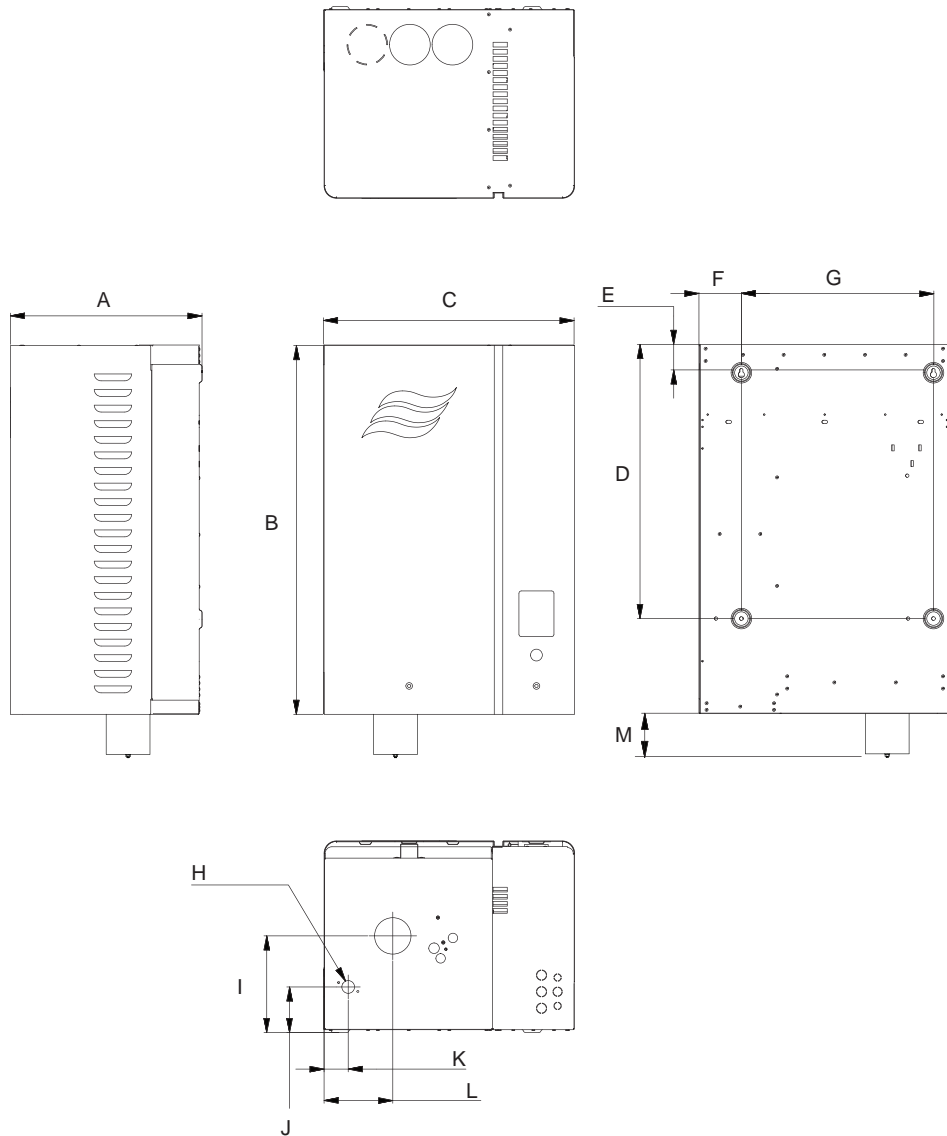


Figure 2 - Specification Drawing Medium Housing (US 07-20)

- | | | |
|------------------------|-----------------------------------|-----------------------|
| A. 405.4 mm (15.96 in) | E. 54 mm (2.13 in) | I. 204.6 mm (8.05 in) |
| B. 780 mm (30.71 in) | F. 89.7 mm (3.53 in) | J. 96.5 mm (3.8 in) |
| C. 530 mm (20.87 in) | G. 406.4 mm (16.00 in) | K. 51.1 mm (2.01 in) |
| D. 580 mm (22.83 in) | H. Water supply inlet, NPT 1/2 in | L. 145.3 mm (5.72 in) |
| | | M. 154 mm (6.06 in) |

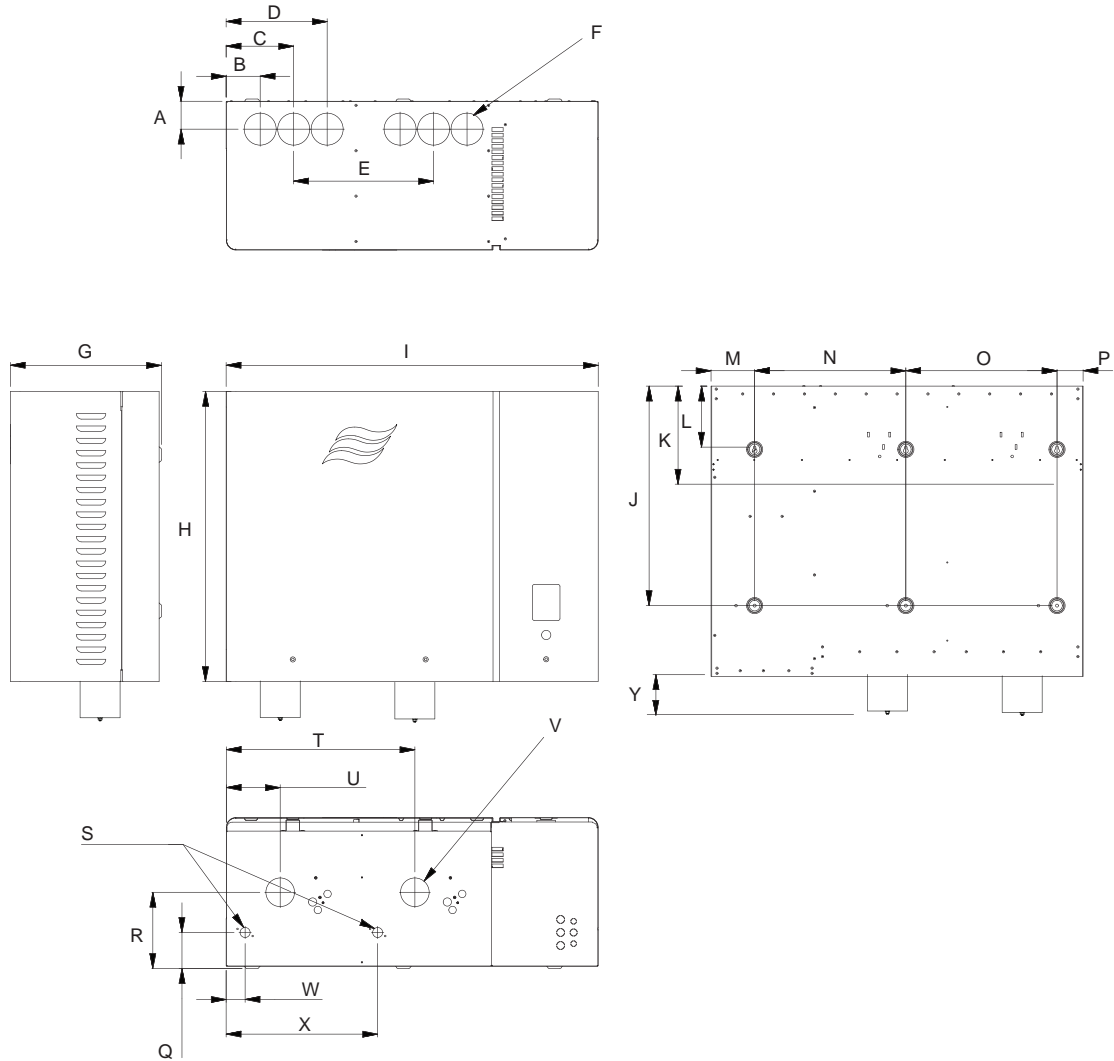


Figure 3 - Specification Drawing Large Housing (US 40)

A. 75 mm (2.95 in)	I. 590 mm (23.23 in)	Q. 97 mm (3.82 in)
B. 91.5 mm (3.60 in)	J. 263.5 mm (10.37 in)	R. 205 mm (8.07 in)
C. 181.5 mm (7.15 in)	K. 164 mm (6.46 in)	S. Water supply inlet (two), NPT 1/2 in
D. 271.5 mm (10.69 in)	L. 117.2 mm (4.61 in)	T. 507 mm (19.96 in)
E. 376 mm (14.8 in)	M. 406.4 mm (16.00 in)	U. 145 mm (5.70 in)
F. 88 mm (3.39 in)	N. 406.4 mm (16.00 in)	V. Drain channel (two), 77 mm (3.03 in)
G. 406 mm (16.00 in)	O. 70 mm (2.76 in)	W. 51 mm (2.01 in)
H. 780 mm (30.71 in)	P. 1000 mm (39.37 in)	X. 407 mm (16.03 in)
		Y. 154 mm (6.06 in)

7 Installation and Planning

7.1 General

Strictly observe and perform all installation tasks including the mounting of the unit and connection of the water and power supplies as described in this manual. Observe and comply with all local and national codes dealing with water and electrical installations. Condaire does not accept any liability for installation of humidification or dehumidification equipment by unqualified personnel, or the use of equipment and parts that are not authorized by Condaire.

Personnel Qualifications

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

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](#)" in the operation manual. 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 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.

7.1.1 Installation Overview

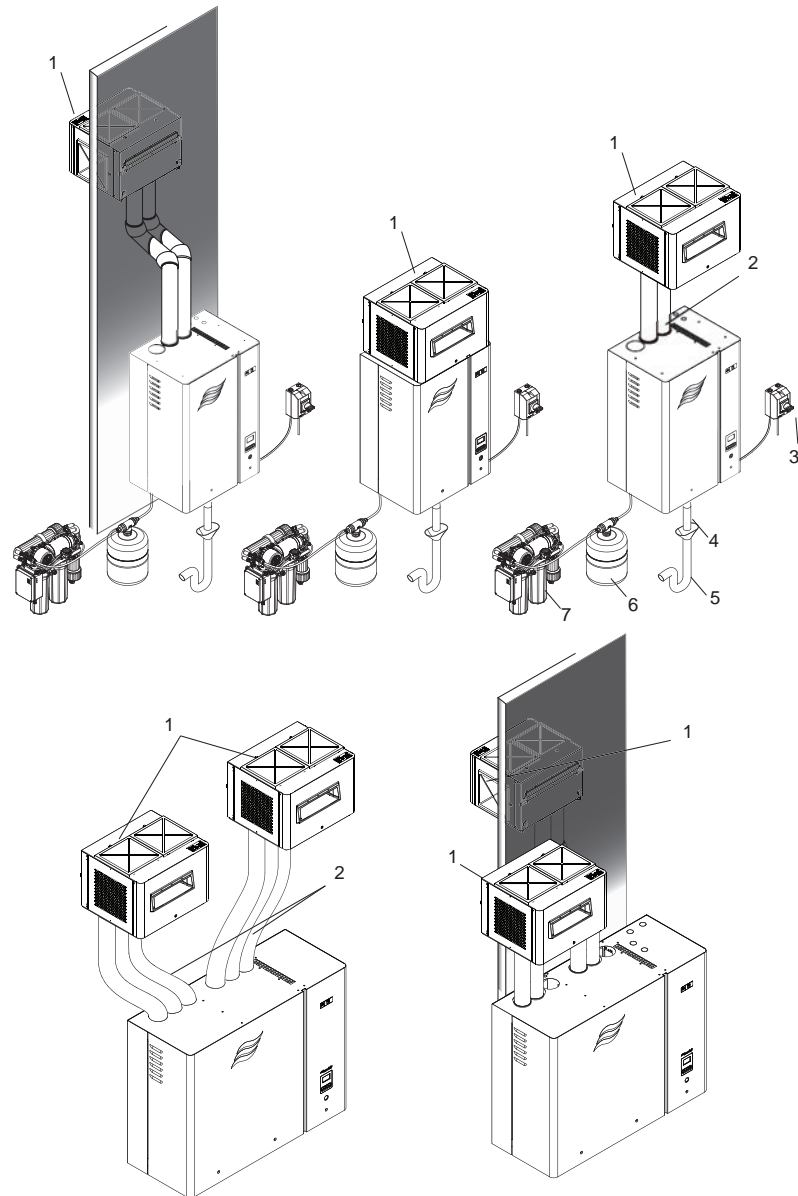
The Ultrasonic Humidifier uses a mist distributor to transport mist directly to the space. This is done with the Ultrasonic Blower Pack. Refer to the *Ultrasonic Blower Pack Installation, Operation, and Maintenance Manual* (P/N: 2588705_C_EN_2010_UB_IOM).

The Ultrasonic Humidifier runs optimally with treated water, such as RO water (recommended) and DI water (see Condair representative). A typical installation will have an RO-U System with buffer tank. Refer to the *Reverse Osmosis System Installation, Operation, and Maintenance Manual* (P/N: 2594385_C_EN_2010_RO_IOM).

The humidifier and Reverse Osmosis System is mains powered, while the Ultrasonic Blower Pack is powered through the humidifier. For the power requirements for the Ultrasonic Blower Pack and the Reverse Osmosis System, please refer to their respective manuals.

All connections and installations in the humidification system should comply with local regulations.

Learn how to install the unit in "[Installation](#)" on page 33.



*Figure 4 - Typical Installations**

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

Note: * Water, electrical, and drain connections not shown for the large model. Additionally, two Ultrasonic Blower Packs may also be installed in the same room, or on the same vertical surface.

7.2 Location Requirements

The location of the humidifier depends largely on the mist distribution system. For the required minimum

clearances for an Ultrasonic Humidifier, refer to "Clearance Requirements" below.

- Allow adequate clearance around the humidifier for ease of maintenance.
- Install the Ultrasonic Humidifier: in a space:
 - Indoors
 - That is drip-proof
 - That has a floor drain (in case of leaks or excess water)
 - With ambient temperature between 1-25 °C (34-77 °F)
 - With relative humidity between 5-95% (non-condensing)
 - Provided with clean or filtered air

IMPORTANT! For installations where the humidified space is separate from the humidifier, ensure that there is adequate air flow to the humidifier, and adequate air flow out of the space to be humidified, such that **the atmospheric pressure in these spaces are equal**. For example, if the humidifier is in a separate room from the Ultrasonic Blower Pack, provide air from the humidified space to the air intake of the humidifier.

7.3 Clearance Requirements

The clearances shown in [Figure 5 below](#) are for reference only, and are suggested for ease of maintenance. Consult local installation codes. Condaire does not accept responsibility for violations of installation codes.

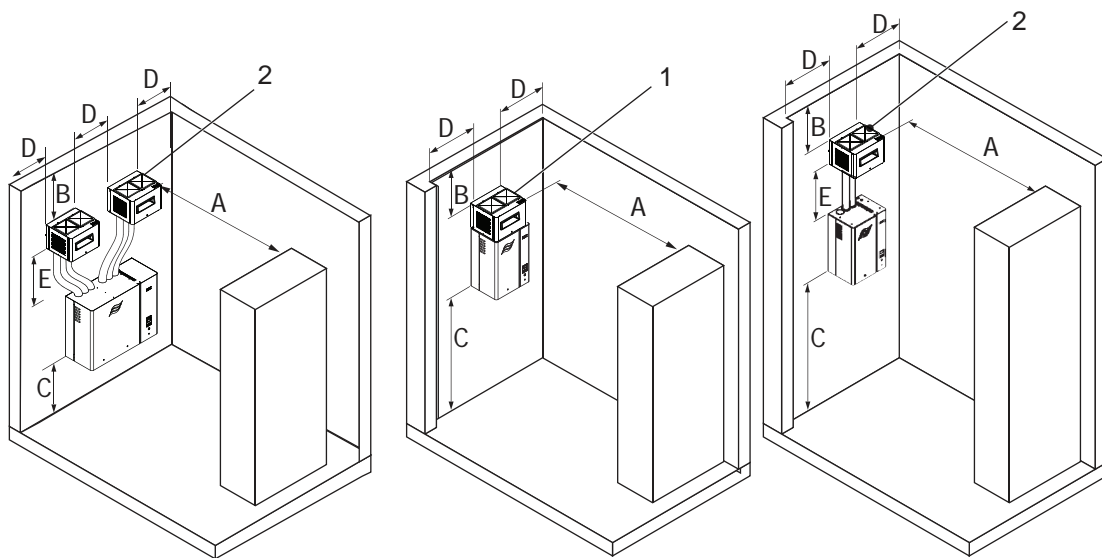


Figure 5 - Suggested Clearances Ultrasonic Humidifier

1. Direct-mount installation
2. Remote-mounted installation

Note: The value E for a direct-mounted installation is zero because the Ultrasonic Blower Pack is mounted directly onto the humidifier.

Table 10: Mounting Clearances for Ultrasonic Humidifier

Dimensions	US 7, 13, 20 (medium housing)	US 40 (large housing)
A	3.7 m (12 ft)	3.7 m (12 ft)
B	0.5 m (1.5 ft)	0.5 m (1.5 ft)

Dimensions	US 7, 13, 20 (medium housing)	US 40 (large housing)
C	1 m (3.3 ft)	1 m (3.3 ft)
D	0.8 m (2.5 ft)	0.8 m (2.5 ft)
E*	2 m (7 ft)	2 m (7 ft)

The minimum clearances are based on nominal conditions of 22 °C (72 °F) at 30% RH, for the US 20 unit.

* Maximum equivalent straight length of flexible tubes.

7.4 Site Requirements

Prepare the Ultrasonic Humidifier for installation by ensuring the following site requirements are satisfied. Report any discrepancies to your Condaire representative.

Ensure that the installation of the Ultrasonic Humidifier is compliant with all applicable local regulations and codes.

7.4.1 Mounting Requirements

- Mount the humidifier on a wall, or on a suitable, reinforced surface to prevent the humidifier from falling or slipping. Refer to ["Weights" on page 18](#).
- Do NOT mount the humidifier on:
 - » on hot surfaces
 - » on surfaces that freeze
 - » on the floor
 - » near vibrating components

7.4.2 Flexible Tube Requirements

- An optional kit is available (see Ultrasonic Humidifier Spare Parts List) that contains a 2 m (78 in) flexible tube.
- The length of flexible tubes must be kept as short as possible. Exceeding an equivalent length of 2 m (3.3 ft) will adversely affect the performance of the unit and void the warranty. Refer to ["Condensate Losses" on page 50](#).
- Maintain a constant inner diameter of 80 mm (3.15 in) within the connection.
- Flexible tubes should allow condensate to flow back to the humidifier (otherwise, use condensate traps for drainage along the connection).
- Connections must be tight.
- Avoid sharp bends in the connection. The suggested **maximum bend should not exceed 30°**.
- Avoid horizontal sections in the connection to reduce standing water and inhibit organic growth in the humidifier and distribution system.
- Avoid merging flexible tubes.

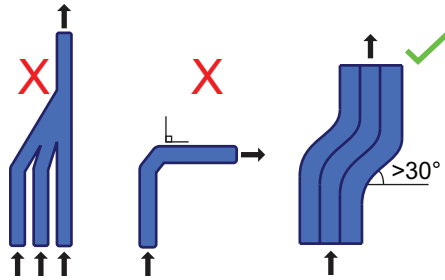


Figure 6 - Avoid horizontal sections and merging flexible tubes

7.4.3 Water Supply Requirements

IMPORTANT! Ensure that the water supply line is flushed out before it is connected.

To prevent the new humidifier from being contaminated with low-quality water, the entire supply line must be flushed out and tested until the water supply quality and the bacteria counts are compliant with local water quality specifications. Ensure this is done before connecting the humidifier to the hydraulic module.

- Water supply connection must be installed to local plumbing codes.
 - Inner diameter of the water supply line should be constant throughout the entire length.
 - Water shutoff valve (not supplied) and union fitting (not supplied) must be installed in the supply line before the humidifier.
 - Water supply piping should have a minimum diameter of 13 mm (1/2 in), with a 1/2 in NPT female end.
 - Water supply piping material made of stainless steel, or plastic (certified for RO or DI water systems).
 - The connection material must be pressure-proof and certified for use with the R.O. system.
 - The R.O system (recommended) must be installed as close as possible to the humidifier.
 - Should a DI system be installed, contact your Condair representative.
 - Upon completion of installation, flush the water supply and drain lines to clear out debris in the lines. Ensure the strainer in the fill valve is clear of debris.
 - The water supply to the humidifier must be treated through reverse osmosis (R.O.) or de-ionization (D.I.), and should be free of additives, such as corrosion inhibitors, and disinfectants, which may affect the performance of the humidifier.
- Note:** If using softened water, contact your Condair representative for assistance.
- The water supply should have a **minimum flow rate of 3.3 L/min (0.9 gpm)**.

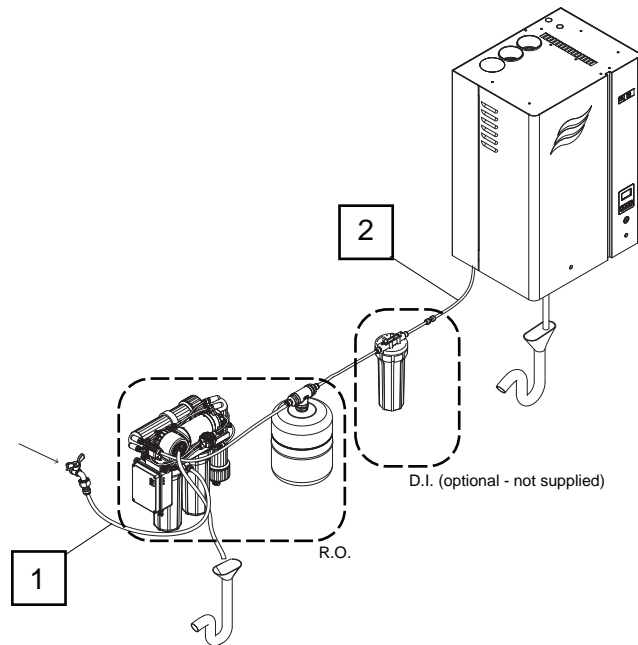


Figure 7 - Water Supply Requirements

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

1			
Mains Water Supply to RO-U			
Conditions	Value		
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	pH of water supply		
	pH 6.5-7.0	pH 7.1-7.5	pH 7.6-8.0
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 ₄ 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 ₂ 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.			

Water Supply Requirements to the US	
Conditions	Value
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.	

7.4.4 Drainage Requirements

- Drain piping material is suitable for RO water and DI water (if used).

IMPORTANT! Avoid copper.

- (Recommended) Floor drains present under the unit in case of leaks or overflowing water.
- Drain line connections must be installed to local plumbing codes.
- Ensure that the drain line is correctly fixed and is easily accessible for service.
- Each drain line must be installed with a constant decline (minimum 1.2 °).
- The drain line should have a minimum internal diameter of 22 mm (7/8 in).
- The drain line should be as short as possible.
- The air gap funnel should have a minimum diameter of 64 mm (2-1/2 in).
- Ensure that the open end of each drain does NOT touch the funnel. The minimum air gap allowed is 20 mm (0.79 in).
- The **air gap funnel and trap located below the humidifier**, offset from the drain channel on the unit by 200 mm (8 in).
- Each drain line must lead to its own separate air gap funnel with trap, before connecting to the drain.
- Each drain line must be secured to prevent the line from:
 - » slipping out of the funnel
 - » or going through, the funnel.
- Upon completion of installation, flush the drain lines to clear out any debris in the lines.

7.4.5 Power Supply Requirements

- The power supply to the humidifier should be adequate to match the full voltage and current draw shown on the specification label on the humidifier. Refer to "[Model Designation](#)" on page 15.
- The power supply must have an external dedicated fused disconnect switch (supplied by others). The fusing must not exceed the maximum circuit protection indicated on the specification label. Refer to "[Model Designation](#)" on page 15.

7.5 Humidity Control Systems

7.5.1 Control Device Locations

The following schematic describes a potential system set-up with respect to control devices. Refer to [Figure 8 below](#).

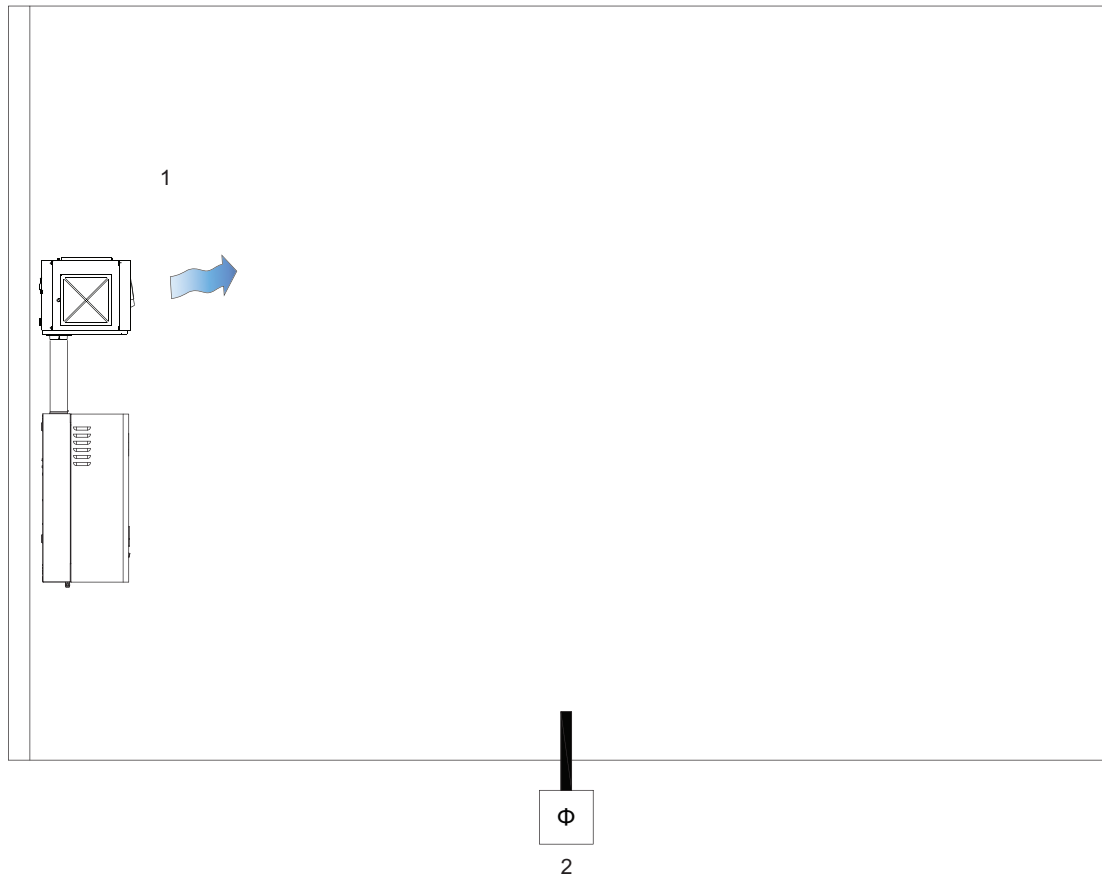


Figure 8 - Control Device System Set-up Schematic

1. Space to humidify
2. On/Off Humidistat or Modulating Humidistat and Sensor

Note 7-1 Humidity sensors and humidistats can be modulating or On/Off. Avoid placing them near the mist outlet, near doorways, in sunlight, or in airflow "dead-zones".

7.5.2 Permissible Control Signal Inputs

Refer to [Table 11 on the facing page](#) for the permissible control signal inputs for the Ultrasonic Humidifier.

Table 11: Permissible Control Signal Inputs

Humidity Control with External Controller Control Signals	Humidity Control with Internal PI Controller Humidity Sensor Signals
0-5 VDC	0-5 VDC
1-5 VDC (potentiometer 140 Ω-10 kΩ)	1-5 VDC (potentiometer 140 Ω-10 kΩ)
0-10 VDC	0-10 VDC
2-10 VDC	2-10 VDC
0-20 VDC	0-20 VDC
0-16 VDC	0-16 VDC
3.2-16 VDC	3.2-16 VDC
0-20 mA	0-20 mA
4-20 mA	4-20 mA
Humidistat (24 V On/Off)	—

7.6 Best Practices

7.6.1 Remote Ultrasonic Blower Pack Installation

- Use Condaire flexible tubes that are provided by your Condaire representative. Mist connection materials from another manufacturer may adversely affect the operation of the unit.
- The length of the mist line should be kept as short as possible. It should not exceed the maximum equivalent length of 2 m (6.56 ft). Exceeding the maximum length can affect performance of the unit and will void the warranty. Refer to "[Condensate Losses](#)" on page 50 to see mist losses due to connection length.
- Flexible tube connections must be tight. Use clamps to tighten the flexible tubes to the Ultrasonic Blower Pack.
- Avoid bends in the flexible tube connections. The max allowable bend is 30° above the horizontal.

IMPORTANT! Horizontal sections of the connection causes water to pool and promote fungal and bacterial growth.

- Avoid merging flexible tubes.

7.7 Installation

7.7.1 Safety

Observe all safety precautions and comply with local installation codes. Refer to "[For Your Safety](#)" on page 10.

7.7.2 Cleaning

Ensure that the unit is cleaned before installation. Cleaning should be performed with a cleaning agent and a disinfectant. Failure to do so may result in the growth of pathogens inside the humidifier and reduced performance.

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

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.

Condair 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, H₂O₂
- 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).

Condair 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.

7.7.3 Diluting your Disinfecting Solution (H₂O₂) 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 H₂O₂ 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 ₂ O ₂ (5%)	Water	H ₂ O ₂ (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

7.7.4 Mounting the Humidifier

Refer to "[Mounting Requirements](#)" on page 27 for mounting requirements.

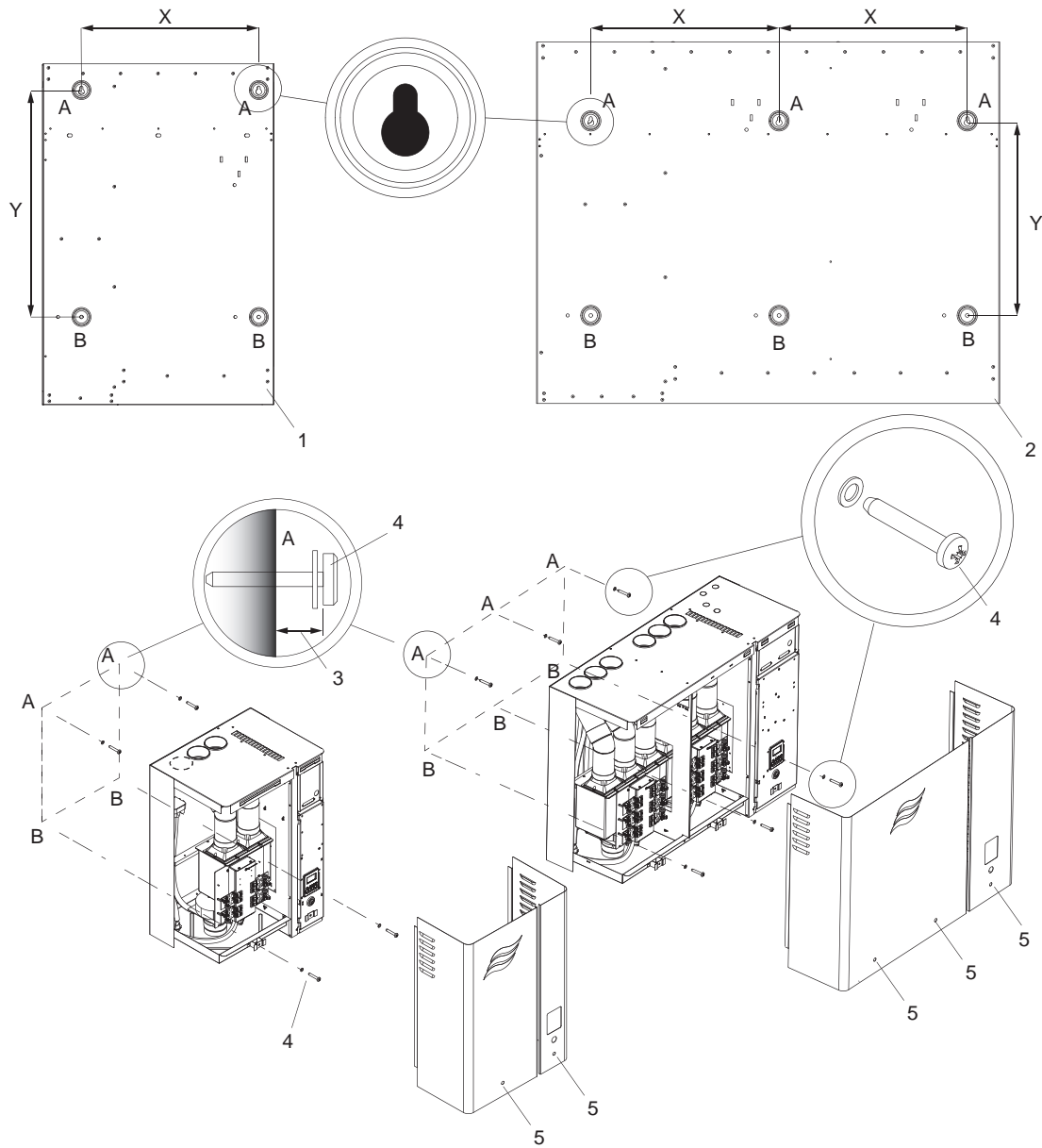


Figure 9 - Lag Bolt Hole Locations for Medium and Large Condair US

1. Rear view of medium Ultrasonic Humidifier
2. Rear view of large Ultrasonic Humidifier
3. Clearance from the mounting surface at point A, 5 mm (0.25 in)
4. Screw (not supplied)

Table 13: Mounting Screw Spacing X and Y

	X	Y
Medium US 7-20	407 mm (16 in)	526 mm (20.7 in)
Large US 40	407 mm (16 in)	426 mm (16.8 in)

1. Locate 2x4 wooden studs or equivalent support on the mounting surface.
2. Use a level and mark points A and B for the lag bolts. Refer to [Figure 9 on the previous page](#).
3. Install the lag bolts (supplied by others) at the marked points A. Allow the heads of the screws to extend 5 mm (0.25 in) from the mounting surface so that the humidifier can be installed on bolts.

Note: Longer screws may be necessary for drywall, or other structural materials. Use appropriate screws to prevent the unit from falling. Refer to ["Weights" on page 18](#).

4. Open the front cover of the humidifier to access the back of the unit from the inside for step 6 and step 7.
 - a. Unscrew the captive screws located at the bottom of the front covers of the humidifier.
 - b. Lift the front covers slightly and pull the covers away from the unit.
5. Carefully raise the humidifier onto the installed lag bolts.

IMPORTANT! The unit is heavy. Please use a crane or forklift, or ask for assistance.

6. Ensure that the humidifier is level and from the inside of the humidifier, tighten the lag bolts.
7. Install lag bolts at marked points B. Tighten the lag bolts.
8. Reinstall the front cover.

7.7.4.1 Mounting Checklist

- Unit installed in a suitable location? Refer to ["Location Requirements" on page 25](#).
- Unit installed with suitable clearances? Refer to ["Clearance Requirements" on page 26](#).
- Mounting surface is stable and capable of supporting the full operating weight of the unit? Refer to ["Weights" on page 18](#).
- Unit is level?
- Unit is fastened securely?

7.7.5 Connecting the Water Supply

Refer to ["Water Supply Requirements" on page 28](#) for water supply requirements.

RO-U and Ultrasonic Humidifier

Connect the water supply as recommended in [Figure 10 on the facing page](#).

IMPORTANT! The threads on the water inlet valve are made of plastic. Hand-tighten the NPT adapter (supplied) to the inlet valve.

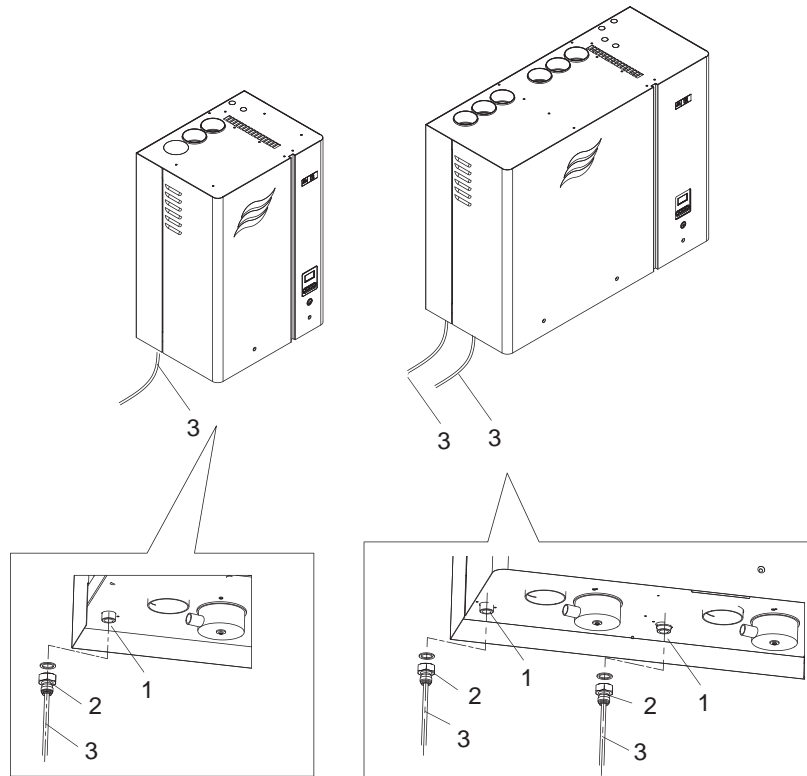


Figure 10 - Water Supply Connections

1. Water supply inlet
2. Adapter*, 3/4 in BSPP to 1/2 in NPT (supplied)
3. Water supply line

* Hand-tighten the adapter to the inlet valve.

7.7.5.1 Water Supply Connections Checklist

Water Supply Connection

- Has an R.O. or D.I. system been installed?
- Shutoff valve and union fitting installed in supply line?
- Is the minimum inside diameter of the water supply line constant throughout the entire length?
- Water supply temperature 1-25 °C (34-77 °F)?
- Water supply surge-free and pressure regulated to 207-550 kPa (30-80 psig)?
- Are all components and tubes and hoses secured and are all threaded connections securely tightened?
- Leak-free water supply line?
- Water supply line flushed?

7.7.6 Connecting the Flexible Tubes

IMPORTANT! For proper installation of the flexible tubes, ensure that the ["Flexible Tube Requirements"](#) on [page 27](#) are met.

IMPORTANT! Use gloves and keep the system clean during installation.

1. Open the humidifier cabinet.
2. Remove the clamp from the flexible tube. This will allow the flexible tube to pass through the top of the humidifier cabinet.
3. Route the 'connector' end (item 3) of the flexible tube to the top of the water reservoir. Secure the connection by gently inserting the connector and tube into the reservoir, as seen in [Figure 11 below](#).

If the Ultrasonic Blower Pack is directly mounted on the humidifier, the mist channel connection extends through the top of the humidifier, into the plumbing cabinet.

4. Route the 'clamp' end (item 1) of the flexible tube through the top of the humidifier.
5. Place the 'clamp' end (item 1) of the flexible tube over the base of the mist channel in the Ultrasonic Blower Pack. Ensure that there are no horizontal sections in the tube, then secure the connection by using clamps.
6. Test the unit and check for leaks once installation is complete.

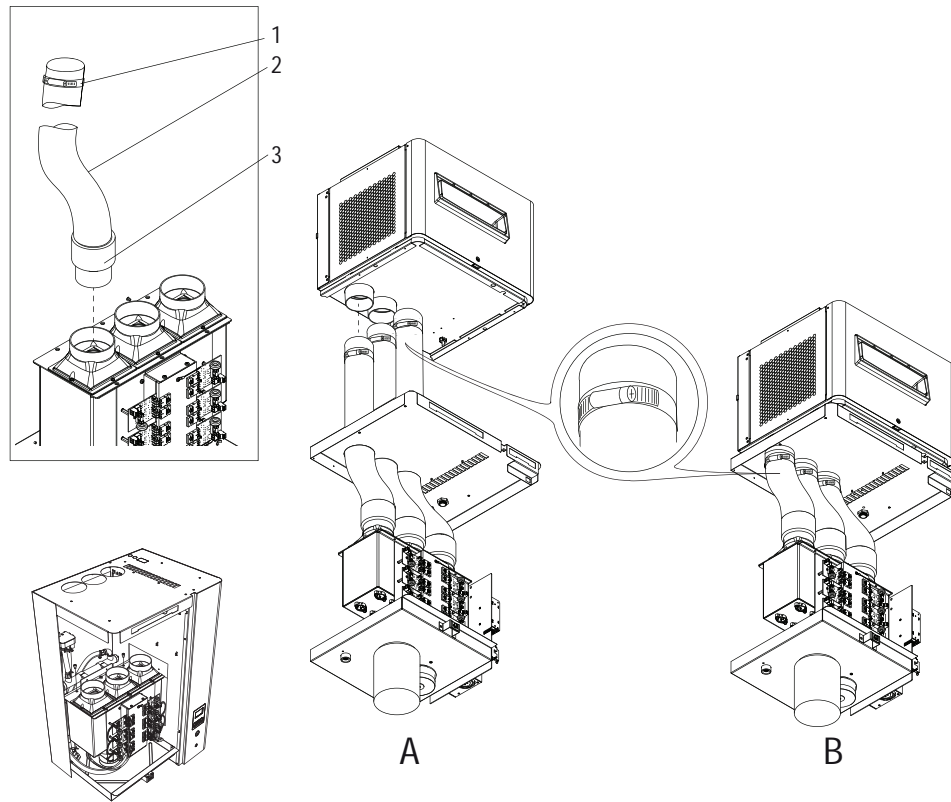


Figure 11 - Flexible Tubes. (A) Remote-Mount Installation. (B) Direct-Mount Installation.

1. Clamp
2. Flexible tube
3. Connector

7.7.6.1 Flexible Tube Connections Checklist

- Flexible tubes cleaned?
- The length of flexible tubes must be kept as short as possible
- Flexible tubes should allow condensate to flow back to the humidifier (otherwise, use condensate traps for drainage along the connection)

7.7.6.2 Connecting the Drain Line

Refer to "[Drainage Requirements](#)" on page 31 for drain line requirements.

Connect the drain line as recommended in [Figure 12](#) below.

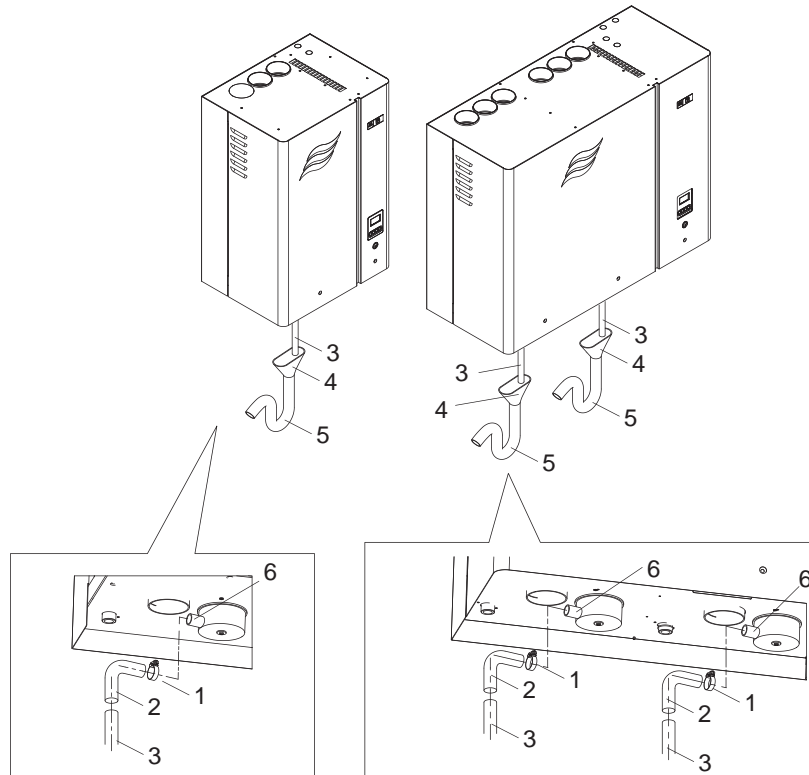


Figure 12 - Drain Line Connections

1. Hose clamp (supplied)
2. Flexible bent hose (supplied)
3. Drain line, minimum inner diameter 22 mm (7/8 in) (not supplied)
4. Air gap funnel, minimum 64 mm (2-1/2 in) (not supplied)
5. Trap, minimum diameter 40 mm (1.57 in) (recommended, not supplied)
6. Drain channel (outlet not threaded), outer diameter 30 mm (1-3/16 in)

Drain Line Connections Checklist

Drain Line Connection

- Are all components and pipes secured and are all threaded connections securely tightened?
- Leak-free drain line?
- Air gap funnel has a minimum diameter of 64 mm (2-1/2 in)?
- Drain lines has a minimum internal diameter of 22 mm (7/8 in)?
- Each drain line must lead to its own separate air gap funnel with trap, before connecting to the drain?
- The air gap funnel and trap located below the humidifier, offset from the drain channel on the unit by 200 mm (8 in)?
- Open end of each drain does NOT touch the funnel? The minimum air gap allowed is 20 mm (0.79 in).
- Drain line has a constant minimum decline of (1.2°) to funnel ?
- Drain lines flushed?
- Drain piping suitable for RO water (piping is not copper)

7.7.7 Connecting the Ultrasonic Blower Pack

The Ultrasonic Blower Pack can be installed remotely, or directly on the Ultrasonic Humidifier (medium humidifier only). See the installation manual for the Ultrasonic Blower Pack (P/N: 2588705_C_EN_2010_UB_IOM).

7.7.8 Installing the Electrical Connections

Refer to "[Model Designation](#)" on page 15 and "[Power Supply Requirements](#)" on page 31 for the electrical requirements. All wiring must be in accordance with local electrical codes.

Safety

The electrical installation work requires removal of the door panels in the humidifier. 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](#)" in the operation manual. 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.

- All electrical installation work must be performed only by a licensed electrician authorized by the customer. It is the customer's responsibility to verify qualifications of the personnel.
- The electrical installation must be performed according to the wiring diagrams in this manual, the instructions in this section, as well as applicable national and local codes.
- All cables must lead into the unit, via appropriate cable glands or grommets, and be properly supported.
- Make sure the cables are secured, and do not rub on any components or become a tripping hazard.
- Observe national and local codes for maximum cable length and required wire sizes for cables.

Install the electrical connections for the Ultrasonic Humidifier as per the wiring diagrams. Refer to the wiring diagrams in the appendix:

- [Appendix: "Wiring Diagram Ultrasonic Humidifier - Reservoir" on page 55](#)
- [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium" on page 56](#)
- [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)" on page 58](#)

7.7.8.1 Installing External Electrical Connections

The different external connections to the Ultrasonic Humidifier are:

- "Power Supply Connection " below
- "External Safety Chain " on the facing page
- "Modulating Demand or Humidity Signal" on the facing page
- "Ohmic Humidity Controller (Passive)" on page 46
- "VDC On/Off Humidistat" on page 47
- "External On/Off Input" on page 48

Power Supply Connection

IMPORTANT! Only connect the unit to the power supply if the local mains voltage meets the voltage specified on the specification label (name plate).

Refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium"](#) on page 56 and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)"](#) on page 58.

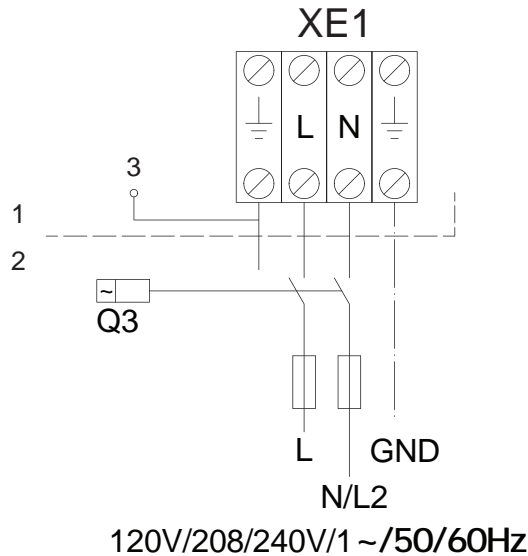


Figure 13 - Single-Phase Power Supply Connection

1. Control cabinet
 2. External
 3. Cabinet
1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
 2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
 3. Feed the power supply wires into the humidifier through the cable gland or grommet located at the bottom of the unit.
 4. Install the fault current protection switch (ground-fault circuit interrupter) in the mains supply line.
 5. Connect the power supply (L1, N/L2, and GND) to the XE1 terminal block in the control cabinet. Refer to [Figure 13](#) above.
 6. Reinstall and secure the door panels once the electrical connections are complete.

External Safety Chain

The potential-free contacts of external monitoring devices (ventilation interlock, safety high limit humidistat, airflow monitor, etc.) are connected to safety chain, K2, of the XE2 terminal block. Refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium" on page 56](#) and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)" on page 58](#).

IMPORTANT! Do **NOT** apply extraneous voltage to contacts 1 and 2 of the terminal block XE2 using external monitoring devices.

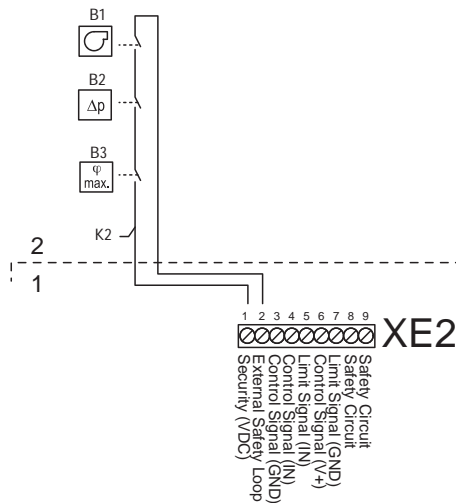


Figure 14 - External Safety Chain Connection

1. Control cabinet
 2. External
-
1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
 2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
 3. Feed the external cables through a cable gland or grommet located at the bottom of the unit, into the control cabinet.
 4. Connect the devices in series to terminals 1 (24 VDC) and 2 (external safety loop) of the control terminal block, XE2. Refer to [Figure 14 above](#).

IMPORTANT! If no external devices are installed, connect terminals 1 and 2 with a jumper.

5. Reinstall and secure the door panels once the electrical connections are complete.

Modulating Demand or Humidity Signal

The signal cable of an external controller or of a humidity sensor (if the internal P/PI controller is used) can be connected to the Ultrasonic Humidifier. When installing an external controller or humidity sensor, refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium" on page 56](#) and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)" on page 58](#).

The admissible humidity control signal values are in ["Permissible Control Signal Inputs" on page 32](#).

For ohmic humidity controllers, refer to ["Ohmic Humidity Controller \(Passive\)" on the next page](#).

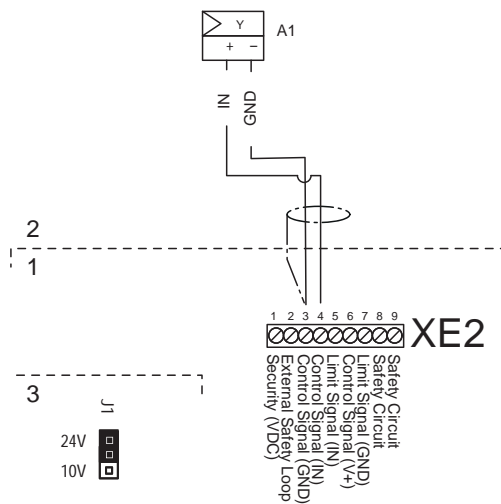


Figure 15 - Modulating Demand or Humidity Signal Connection

1. Control cabinet
 2. External
 3. Driver board
1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
 2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
 3. Feed the external controller or humidity sensor cables through a cable gland or grommet located at the bottom of the unit, into the control cabinet.
 4. Connect the wires in to terminals 3 (GND) and 4 (IN) of the control terminal block, XE2. Refer to [Figure 15 above](#). If a shielded signal cable is used, connect the shielding to terminal "3" (GND).
 5. On the set J1 to 24 V on the driver board.
 6. In the control software, set the control signal type. Refer to ["Permissible Control Signal Inputs" on page 32](#).
 7. Reinstall and secure the door panels once the electrical connections are complete.

Ohmic Humidity Controller (Passive)

Passive ohmic humidity controllers (140 Ω - 10k Ω) can be installed on the Ultrasonic Humidifier. When installing the ohmic humidity controller, refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium" on page 56](#) and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)" on page 58](#).

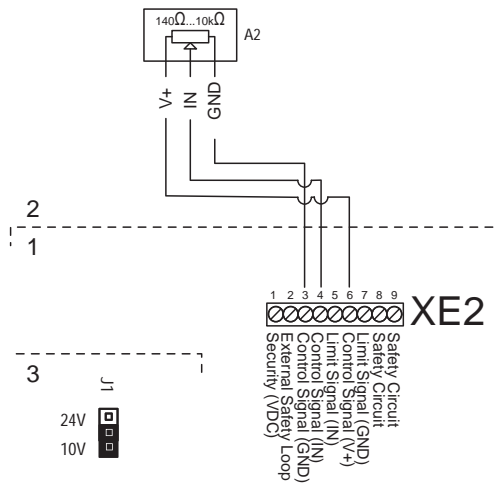


Figure 16 - Ohmic Humidity Controller Connection

1. Control cabinet
 2. External
 3. Driver board
1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
 2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
 3. Feed the external cables through a cable gland or grommet located at the bottom of the unit, into the control cabinet.
 4. Connect the signal cables of the ohmic humidity controller to terminals 3 (GND), 4 (IN), and 6 (V+) of the control terminal block, XE2. Refer to [Figure 16 above](#).
 5. Set J1 to 10 V on the driver board.
 6. In the control software, set the control signal type to 0-10 V. Refer to ["Permissible Control Signal Inputs"](#) on page 32.
 7. Reinstall and secure the door panels once the electrical connections are complete.

VDC On/Off Humidistat

24 VDC On/Off humidistats can be installed on the Ultrasonic Humidifier. When installing the On/Off humidistat, refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium"](#) on page 56 and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)"](#) on page 58.

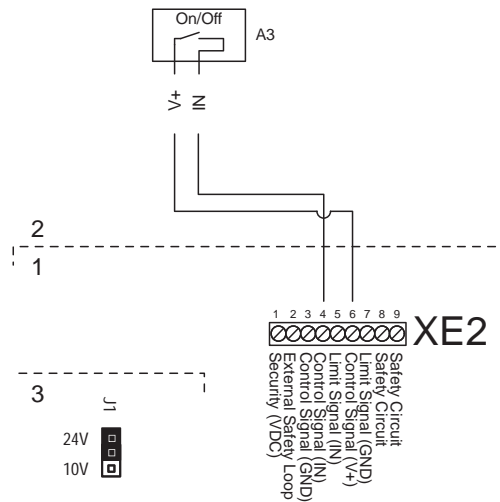


Figure 17 - On/Off Humidistat Connection

1. Control cabinet
 2. External
 3. Driver board
1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
 2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
 3. Feed the external cables through a cable gland or grommet located at the bottom of the unit, into the control cabinet.
 4. Connect the signal cables of the humidistat to terminals 4 (IN) and 6 (V+) of the control terminal block, XE2. Refer to [Figure 17 above](#).
 5. Set J1 to 24 V on the control board.
 6. In the control software, set the control signal type. Refer to ["Permissible Control Signal Inputs" on page 32](#).
 7. Reinstall and secure the door panels once the electrical connections are complete.

External On/Off Input

External On/Off inputs can be installed on the Ultrasonic Humidifier. When installing the external On/Off input, refer to [Appendix: "Wiring Diagram Ultrasonic Humidifier - Medium" on page 56](#) and [Appendix: "Wiring Diagram Ultrasonic Humidifier - Large \(A-unit\)" on page 58](#).

1. Open the door panels to access the control cabinet of the Ultrasonic Humidifier.
2. Ensure that the main power cable is properly grounded through the ground lug inside the control cabinet.
3. Feed the external cables through a cable gland or grommet located at the bottom of the unit, into the control cabinet.
4. On the driver board, connect the signal cables of the external On/Off input through the connector CN 23.
5. In the control software, set the control signal type to ON. Refer to the *Ultrasonic Humidifier Operation and Maintenance Manual* (P/N: 2582954).
6. Reinstall and secure the door panels once the electrical connections are complete.

7.7.8.2 Electrical Connections Checklist

- Power supply meet the voltage and current requirements shown on the specification label? Refer to ["Model Designation" on page 15](#).
- Power supply have an external dedicated fused disconnect?
- Unit is using the correct external fusing? Refer to ["Maximum External Fusing"](#).
- All wiring done according to the wiring diagram?
- All wiring done according to instructions in this manual?
- All cables fastened securely?
- All cables free of tension and pass through any applicable cable glands or grommets?
- All electrical connections meet applicable codes?
- Electrical installation meet the applicable national and local codes?
- All door panels closed and fastened securely

8 Humidification Load Calculations

8.1 Condensate Losses

Mist in the mist channel will condense to a liquid state due to cooling, which reduces the total mist output by the Ultrasonic Humidifier. An estimate of the condensate losses through the distribution system should be determined to ensure the total humidifier capacity will satisfy the humidification load requirements.

8.1.1 Condensate Losses in Remote Installations

Longer distances between the humidifier and the Ultrasonic Blower Pack will reduce the mist output of the humidification system.

For a straight, vertical flexible tube of length 2 m (6.6 ft), expect a 20% reduction in output capacity.

The addition of angles in the flexible tube connection will decrease the output further. Please contact your Condaire representative for more information on calculating mist losses.

9 Commissioning

9.1 General

The Ultrasonic Humidifier must be commissioned and operated only by personnel who are adequately qualified and familiar with the Ultrasonic Humidifier. It is the customer's responsibility to verify the qualifications of personnel.

9.2 First-time Commissioning

The unit must always be commissioned for the first time by a service technician from your Condaire representative, or by personnel who are well trained and authorized by the customer. For this reason, this manual only provides an outline, and not the details of the commissioning protocol.

Outline:

1. Inspect the mounting of the unit.
2. Inspect the mist, water, and drain line installation.
3. Inspect the electrical installation.
4. Configure the Ultrasonic Humidifier through the humidifier controls.
5. Conduct any applicable performance tests, including controls.
6. Fill out the commissioning protocol documents.

APPENDIX

A Appendix:

Installation Checklist

Mounting

- Unit installed in a suitable location? Refer to "[Location Requirements](#)" on page 25.
- Unit installed with suitable clearances? Refer to "[Clearance Requirements](#)" on page 26.
- Mounting surface is stable and capable of supporting the full operating weight of the unit? Refer to "[Weights](#)" on page 18.
- Unit is level?
- Unit is fastened securely?

Flexible Tubes Connection

- Flexible tubes cleaned?
- The length of flexible tubes must be kept as short as possible
- Flexible tubes should allow condensate to flow back to the humidifier (otherwise, use condensate traps for drainage along the connection)

Water Supply Connection

- Has an R.O. or D.I. system been installed?
- Shutoff valve and union fitting installed in supply line?
- Is the minimum inside diameter of the water supply line constant throughout the entire length?
- Water supply temperature 1-25 °C (34-77 °F)?
- Water supply surge-free and pressure regulated to 207-550 kPa (30-80 psig)?
- Are all components and tubes and hoses secured and are all threaded connections securely tightened?
- Leak-free water supply line?
- Water supply line flushed?

Drain Line Connection

- Are all components and pipes secured and are all threaded connections securely tightened?
- Leak-free drain line?
- Air gap funnel has a minimum diameter of 64 mm (2-1/2 in)?
- Drain lines has a minimum internal diameter of 22 mm (7/8 in)?
- Each drain line must lead to its own separate air gap funnel with trap, before connecting to the drain?
- The air gap funnel and trap located below the humidifier, offset from the drain channel on the unit by 200 mm (8 in)?
- Open end of each drain does NOT touch the funnel? The minimum air gap allowed is 20 mm (0.79 in).
- Drain line has a constant minimum decline of (1.2°) to funnel ?
- Drain lines flushed?
- Drain piping suitable for RO water (piping is not copper)

Electrical Connection

- Power supply meet the voltage and current requirements shown on the specification label? Refer to "[Model Designation](#)" on page 15.
- Power supply have an external dedicated fused disconnect?
- Unit is using the correct external fusing? Refer to "[Maximum External Fusing](#)".
- All wiring done according to the wiring diagram?
- All wiring done according to instructions in this manual?
- All cables fastened securely?
- All cables free of tension and pass through any applicable cable glands or grommets?
- All electrical connections meet applicable codes?
- Electrical installation meet the applicable national and local codes?
- All door panels closed and fastened securely

B Appendix: Wiring Diagram Ultrasonic Humidifier - Reservoir

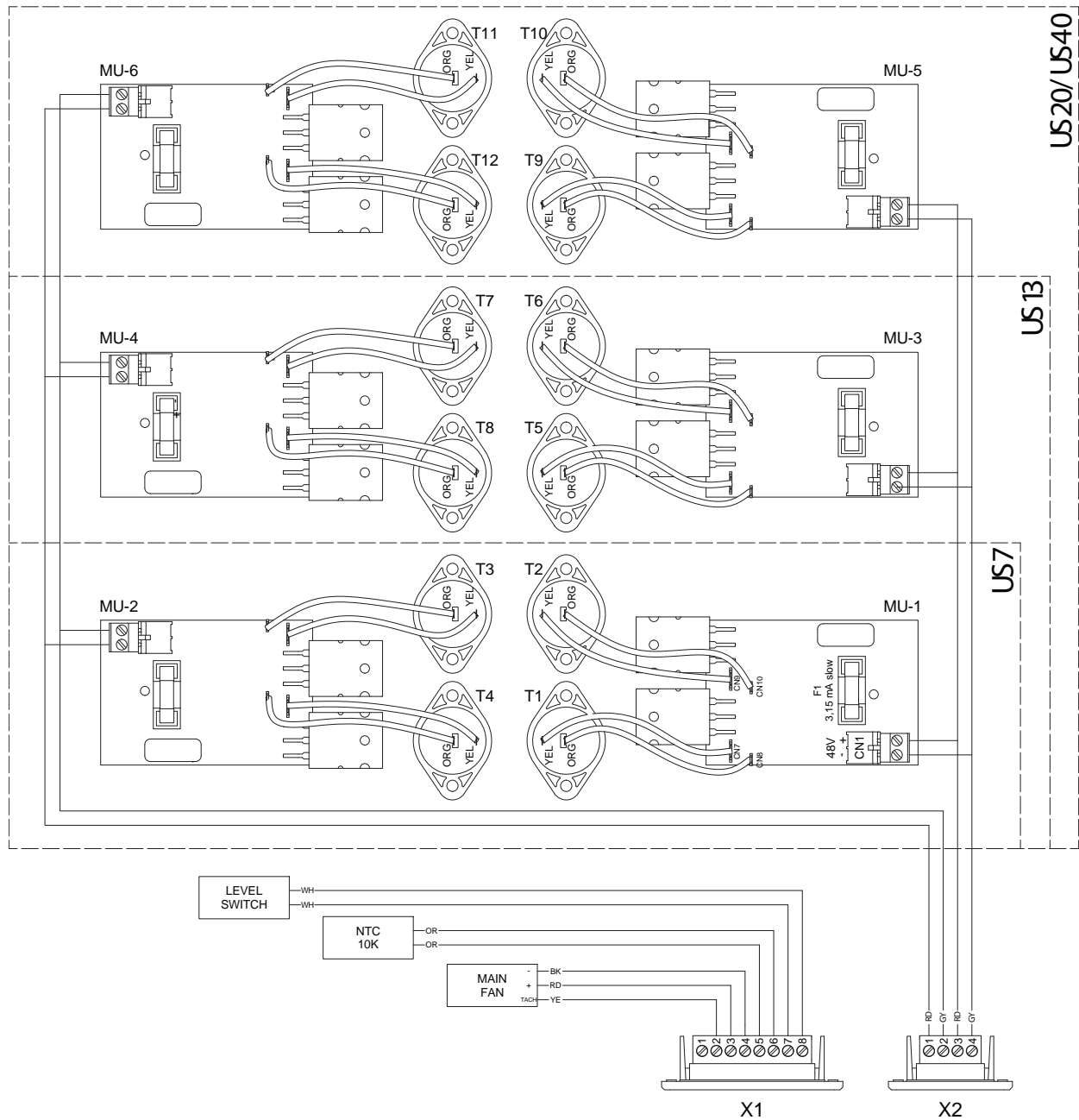


Figure 18 - Wiring Diagram of the Ultrasonic Humidifier Reservoir

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

Appendix: Wiring Diagram Ultrasonic Humidifier - Medium

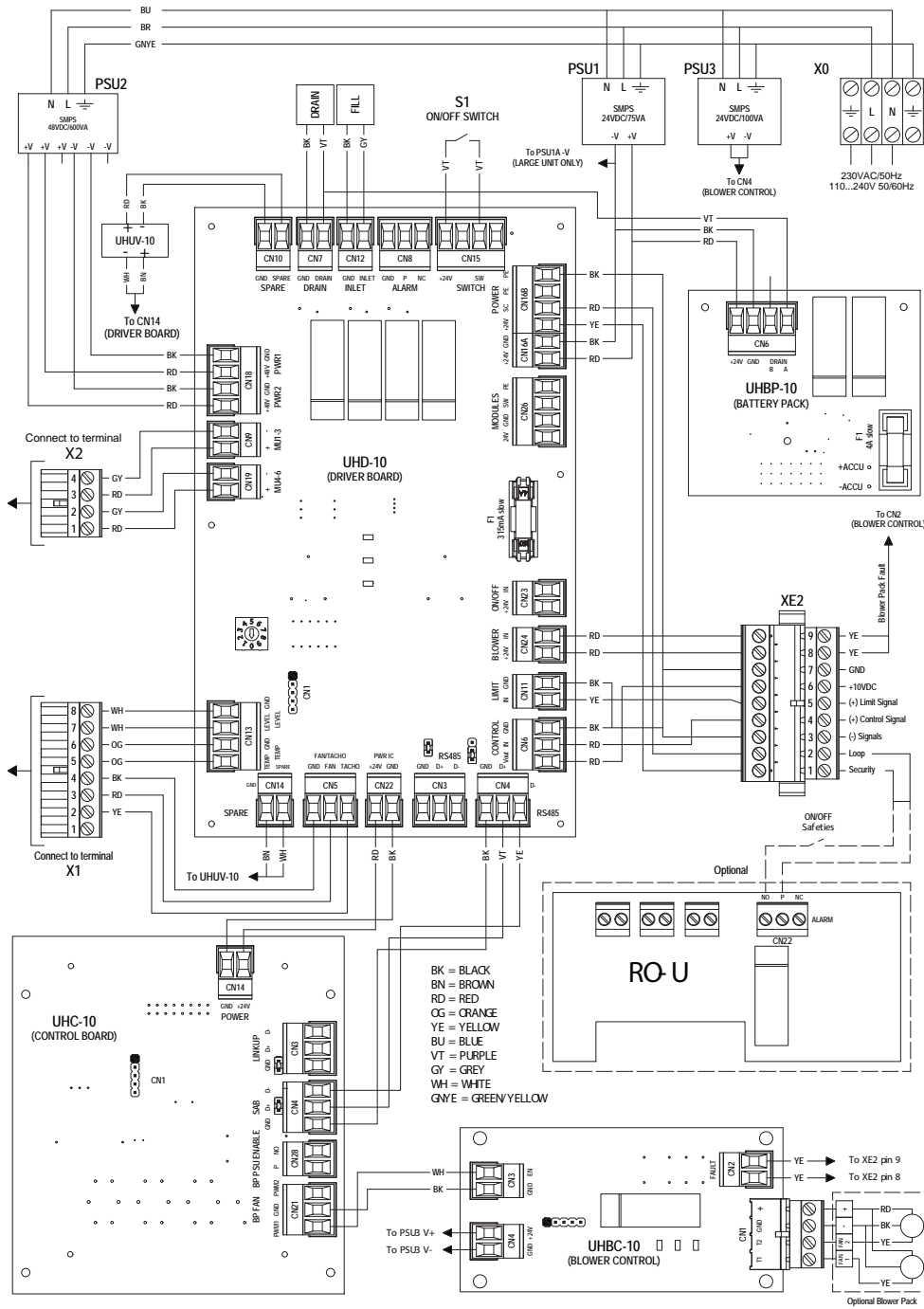


Figure 19 - Wiring Diagram of the Medium Ultrasonic Humidifier US 7-20

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

D

Appendix: Wiring Diagram Ultrasonic Humidifier - Large (A-unit)

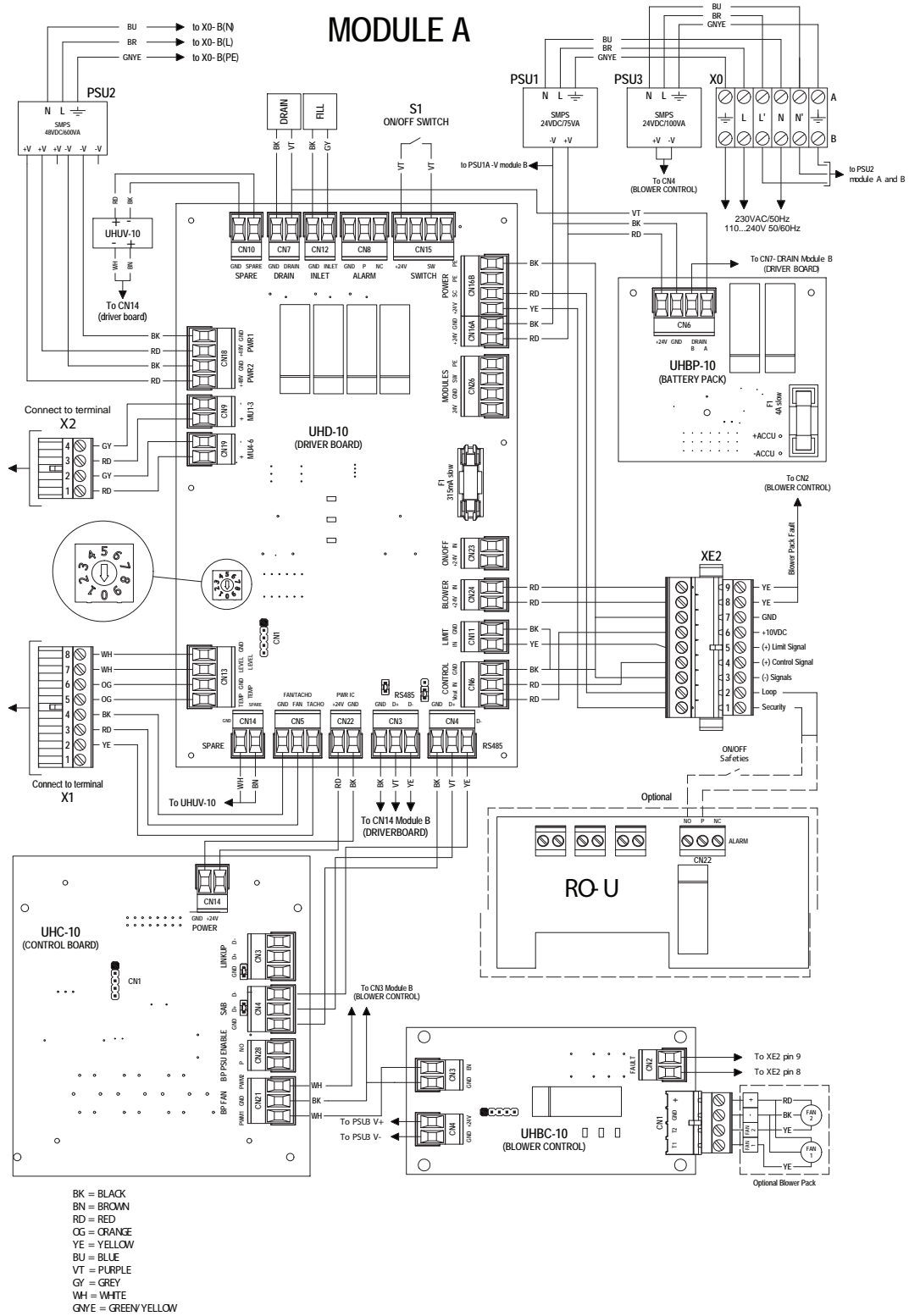


Figure 20 - Wiring Diagram of the Large Ultrasonic Humidifier

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)

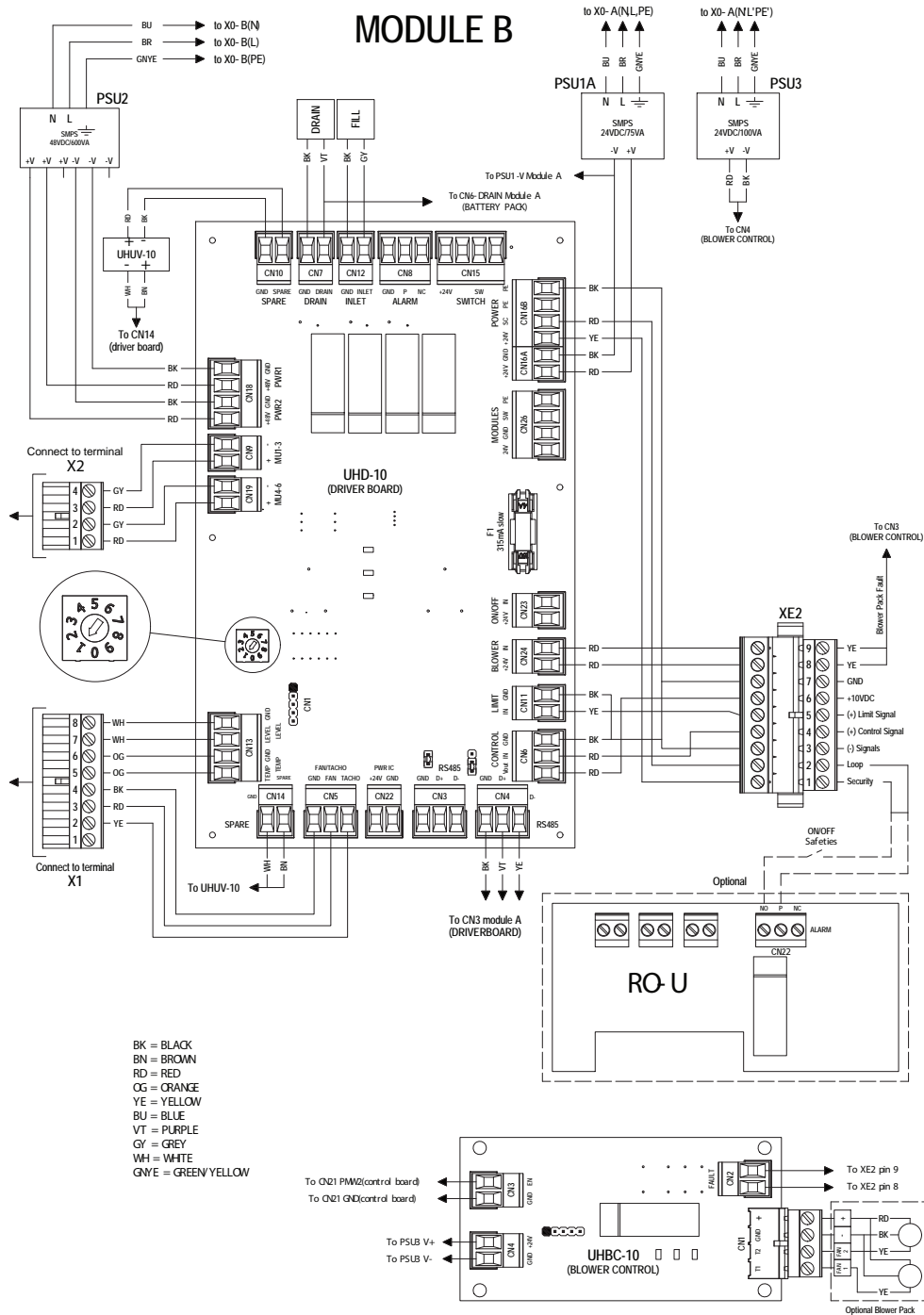


Figure 21 - Wiring Diagram of the Large Ultrasonic Humidifier

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.



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