

DRH Series

GEN2

Energy Efficient Ultrasonic Humidifier

Models: DRH 04, 06, 08, 16

Installation, Operation and Maintenance Manual

Notice

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Nomenclature			
DRH-04-S			
DRH	DAH	S	04
Ducted Air Humidifier	Ducted Air Humidifier	Stand Alone	Number of Transducers

Introduction

DRH Ultrasonic Humidifiers are designed and manufactured with the highest quality craftsmanship using the finest materials available in the industry. It will provide years of trouble free service if installed and maintained in accordance with this manual.

Spare parts are available from STULZ to ensure continuous operation. Using substitute parts or bypassing electrical components in order to continue operation is not recommended and will VOID THE WARRANTY. Damage to the unit from improper installation, operation or maintenance is not covered by the warranty.

Due to technological advancements, components are subject to change without notice.

Each unit is designed as a stand-alone direct room humidifier. Any use beyond this is deemed to be not intended. STULZ is not liable for any damage resulting from improper use. The system is designed to be installed indoors unless otherwise noted on the equipment nameplate.



Safety

We use NOTES along with CAUTION and WARNING symbols throughout this manual to draw your attention to important operational and safety information.

A bold text **NOTE** marks a short message in the information to alert you to an important detail.

A bold text **CAUTION** safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A bold text **WARNING** safety alert appears with information that is important for protecting you from harm and the equipment from damage. Pay very close attention to all warnings that apply to your application.

A safety alert symbol  accompanies a general **WARNING** or **CAUTION** safety statement. A safety alert symbol  accompanies an electrical shock hazard **WARNING** or **CAUTION** safety statement.

Safety Summary

The following statements are general safety guidelines. They are followed by warnings and cautions. Prior to performing any installation, operation, maintenance or troubleshooting procedure read and understand all instructions, recommendations and guidelines in this manual.

WARNING

High voltage is used in the operation of this equipment. Death on contact may result if personnel fail to observe safety precautions.

CAUTIONS

This unit must be installed according to local and national electric codes. All maintenance and repairs must be performed by a qualified technician. All person networking on or near equipment should be familiar with hazards associated with electrical maintenance.

Always turn off the main power and unplug the unit before beginning work on the equipment.

NOTES

Wiring terminations may become loose during transit of the equipment therefore, so verify all wiring terminations are secure prior to operation. Do not attempt to make repairs without the proper tools. STULZ offers no warranty protection on humidification systems using controls that are not provided by STULZ.

CAUTIONS

It is essential that Deionized (DI) or Reverse Osmosis (RO) water be used as the supply water source to maintain full warranty coverage. The use of untreated water will VOID THE WARRANTY.

Use only non-corrosive stainless steel or poly tubing rated for use with DI water to supply the humidifier.

Provide a drain with an air gap per local and national plumbing codes.

Never block the mist outlet or the opening of the air inlet. The humidifier may be filled with the condensed mist and electrical shorts may result.

Never attempt to remove the mist guide cover and/or the mist blow tubes while the humidifier is operating, or electrical shorts may result.

If there is a risk of supply water freezing, pipe insulation should be provided.

Never apply power when the humidifier is overturned or upside down. Damage to the ultrasonic nebulizer unit or transducer may result.

Never drop the humidifier or apply hard shock to it. It may damage internal parts.

Drain the water in the tank for sanitary reasons when humidifier is turned off for more than 3 days.

Observe the unit for water leakage. A short circuit could occur if the humidifier is splashed with water while operating.



Figure 1. Ultrasonic Humidifier- Model DRH-06

Specifications

Type	DRH Series Ultrasonic Humidifier			
Model	DRH-04	DRH-06	DRH-08	DRH-16
Nebulizing capacity (lb/h)	4.4	6.6	8.8	17.6
Qty. of Ultrasonic nebulizers/unit	4	6	8	16
Power source	48VDC			
Rated power consumption (W)	134	195	256	505
Weight (lb)	19.8	24.3	30.9	50.7
Electrical Characteristics				
Allowable voltage range	47-51VDC			
Insulation resistance	100 M.Ohms or more (excluding solid-state components).			
Dielectric voltage withstand	Operational when 1500VAC is applied for 1 minute (excluding solid-state components).			
Operating Conditions				
Ambient working conditions	34 to 122°F; 90%RH or less.			
Water supply quality	DI or RO water. Water conductance <5 microsiemens purity.			
Water supply pressure	30 to 75 psi			
Water supply temperature	40°F to 104°F			
These parts must be provided by the user: DI or RO supply water, Water supply valve, Water supply tubing (1/4" stainless steel or poly tubing rated for DI water), power supply wiring and control wiring to the control box.				

1. Calcium, magnesium or other agents that may be contained in the supply water are atomized into the air together with the mist and may form white powders after the water has evaporated. To avoid this, always use DI or RO supply water.
2. The nebulizing capacity of the transducer in the ultrasonic nebulizer unit decreases gradually with

use. It should usually be exchanged after about 10,000 to 15,000 hours of operation, (depending on water quality and suitable voltage), although the unit may continue to run as long as its effective capacity meets the particular requirements.

3. To ensure full warranty coverage, the input voltage to the humidifier must not exceed 51VDC. If the input voltage exceeds 51VDC, damage to the transducers and print plates will result.

General Design

The DRH Ultrasonic Humidifier directly atomizes water, producing a fine mist. The humidifier incorporates high frequency nebulizers to produce ultrasonic waves, a fan to propel the mist out, and an automatic water supply mechanism to maintain the supply water at a constant level. When conducting routine maintenance, it is important to clean the air filter and water tank because it significantly affects the humidifying capacity and life of the ultrasonic nebulizers.

Main Parts

Ultrasonic Nebulizer Unit

This consists of a modular assembly located in the bottom of the water tank incorporating a 1.6 Mhz power oscillator on and a piezoelectric transducer. The transducer vibrates at that frequency, developing ultrasonic columnar waves in the water and producing a fine mist above that column.

Mist Guide

The mist guide carries the mist off the top of the columnar wave and directs it up and out of the humidifier.

High Water Float Switch

For maximum atomization, it is essential the water level in the tank be constantly maintained. The High Water Float Switch is an input to the Level Controller. It is open when the water level is below the optimal level and is closed when the water level reaches the maximum level.

Low Water Float Switch

Operating the humidifier when the water level is below the top of the transducers will damage the Ultrasonic Nebulizer Unit. The Low Water Float Switch is an input to the Level Controller. It is open when the water level is near an unsafe level and is closed when the water level is at a minimal level.

Fan

The 24VDC fan or fans both lightly pressurizes the air above the water to provide a path for the mist to pass through the Mist Tubes and provides a sheet of air to carry the mist away from the humidifier into the room. The fan is controlled by the Level Controller.

Air Filter

The Air Filter removes coarse dust from the air and prevents the humidifier water tank from

becoming dirty which would affect the mist output.

Water Fill Valve Solenoid

The Water Fill Valve Solenoid is a 24VDC solenoid that allows water from the water supply to enter into the tank when energized by the Level Controller. There is an orifice to restrict the flow of water.

Water Supply Valve

NOTE: The user must provide the water supply valve.

A valve must be installed upstream from the humidifier for service and maintenance. The valve must be rated for use with DI water.

Water Supply Tubing

NOTE: The user must provide the water supply tubing.

Water supply tubing must be provided to connect the water supply to the water strainer/flow regulator on the end of the unit. The strainer/flow regulator is equipped with a 90° swiveling, ¼" push-to-connect fitting. Use ¼" stainless steel or poly tubing rated for use with DI water.

Drain and Overflow Assembly

The Drain and Overflow Assembly contains a 24VDC drain solenoid valve, an overflow pipe and a drain outlet. The drain valve solenoid is controlled by the Level Controller to drain water from the tank via the drain outlet.

If the water level in the tank exceeds the height of the overflow pipe, the excess water is diverted to the drain outlet. The drain outlet pipe is 1/8" MPT and ships with a stainless steel cap.

Temperature Sensor

The temperature sensor monitors the temperature of the tank and is read by the Level Controller which prevents overheating and freeze protection. Indication is read at the Level Controller in the humidifier.

Solid State Relay

The 48VDC operating voltage for the Ultrasonic Nebulizer Units is switched on and off by a solid state DC relay controlled by the Level Controller.

Level Controller

The Level Controller is a microprocessor based device located in the electric box that receives inputs from sensors and other inputs and in turn controls the valves, fan and Ultrasonic Nebulizer Units.

It consists of a DC-DC power supply to convert the 48VDC to 24VDC for the fans and solenoids and a further reduction to 5VDC for the microprocessor, sensors, power switches and either a Modbus interface to communicate with the Ultra-Series Control box or a simple standalone input interface depending on which model humidifier was purchased. The 48VDC

must be present at all times to allow the Level Controller microprocessor to monitor the inputs and control the outputs.

The microprocessor monitors the on/off command from either the Modbus or the input dry contact (depending on which model was purchased). If commanded on, the microprocessor checks the Low Water Float Switch and the High Water Float Switch. If the water is too low, the microprocessor turns on the Water Fill Valve Solenoid and monitors the Float Switches.

When the water level is above the low water level, the fan is turned on. When the water level is above the high water level, the Water Fill Valve Solenoid is turned off and the Solid State Relay is turned on. When the water level falls below the high water level, the microprocessor turns the Water Fill Valve Solenoid on again to maintain optimal water level.

When the on/off command is removed, the Solid State Relay is turned off and, after a few seconds time delay to eliminate the remaining mist from the humidifier, the Fan is turned off.

Proportional control is accomplished by the microprocessor monitoring the proportional signal from the Modbus or proportional input (depending on which model was purchased). When the proportional signal is greater than 10% of the maximum input, the microprocessor will turn the Solid State Relay on and off in a pulse-width modulation control.

The period of the pulse width is 1 second. For 10% control, the Solid State Relay is turned on for 0.1 second and off for 0.9 second. The on time increases as the input approaches 100%. At 100%, the Solid State Relay is on continuously.

Safety control is built into the microprocessor. The voltage applied to the transducer affects the amount of mist produced.

WARNING 

Too high or too low a voltage can cause damage to the transducer prevents mist from being formed. The microprocessor monitors the 48VDC to be within a range of voltages. If the voltage is out of range, the microprocessor will not energize the Solid State Relay. If the temperature of the tank rises too high, the microprocessor turns off the Solid State Relay.

If the temperature approaches freezing, the microprocessor turns off the Solid State Relay and the fan, and then drains the tank to prevent damage from freezing water. When the temperature returns to a safe level, normal operation is resumed.

A low level alarm is annunciated when the microprocessor sees the Low Level Float Switch indicate low water after the tank has been filled. A fill alarm is annunciated when the High Water Float Switch does not indicate the water level has been achieved after a predetermined amount of time.

A transducer alarm is annunciated if the transducers have been energized and no water is used in a predetermined time (indicating no transducer is functioning). For the Modbus version of the Level Controller, failure to receive commands on the Modbus within a

predetermined amount of time will annunciate a communications alarm.

The Level Controller has an LED that displays, by blinking, any alarm condition that occurred after power up. Each alarm is associated with a number of blinks, followed by a pause, and then the next alarm is displayed. To view the LED, the Mist Guide Cover and electrical access cover must be removed. The LED blink pattern for each alarm displays by number with a corresponding alarm condition as shown in the table below.

Number of Blinks	Alarm Condition
1	Low Voltage
2	High Voltage
3	Freeze
4	High Temperature
5	Low Water
6	Fill Alarm
7	Communications
8	Transducer

Installation

Receiving the Equipment

Your Ultrasonic Humidifier has been tested and inspected prior to shipment. To ensure that your equipment has been received in excellent condition, make a visual inspection of the equipment immediately upon delivery.

Carefully remove the shipping container and all protective packaging. Open the box and thoroughly inspect the unit for any signs of transit-incurred damage. If there is shipping damage, it must be noted on the freight carrier's delivery forms BEFORE signing for the equipment.

Any freight claims MUST be done through the freight carrier. STULZ ships all equipment FOB factory. STULZ is not liable for any equipment damage while in transit. STULZ can assist in the claim filing process with the freight carrier. Should any such damage be present, notify Product Support prior to attempting any repairs contact STULZ Product Support at (888) 529-1266 or email STULZTechnicalSupport@stulz-ats.com.

Check the equipment against the packing slip to see if the shipment is complete. Report all

discrepancies to the appropriate authority.

Contents of the package:

1. Humidifier
2. Six foot long power cable with moisture-proof, twist-lock connector on one end
3. Installation, Operation and Maintenance manual

Avoid dropping or jarring the unit to prevent damage to the internal parts. Always store the unit in a dry location prior to installation.

A Data Package has been sent with your unit. It contains this manual, system drawings, applicable Manufacturer Safety Data Sheets (MSDS) and other applicable instructions based on the configuration and options selected for your unit. The data package has been placed in your unit in a clear plastic bag. For future reference, keep these documents with the unit.

Site Preparation

Ultrasonic humidifiers are designed for easy service access. Install the unit in a secure location where it cannot be tampered with and the power switch cannot be inadvertently turned off. Allow access to the unit for routine operation, servicing and for necessary maintenance. Position the humidifier in such a way that the unit can be easily removed for future inspection and maintenance. Refer to the installation drawing provided with your unit for the dimensions of the humidifier.

NOTE: Working clearance requirements need to be established prior to mounting the unit.

Refer to local and national electrical codes before installing the unit.

When selecting the installation location, attention should be paid to the air flow in the room so that the atomized mist can be uniformly diffused throughout the room. If any obstacle exists in front of the atomized mist outlet, the mist will be condensed on the obstacle to form water droplets.

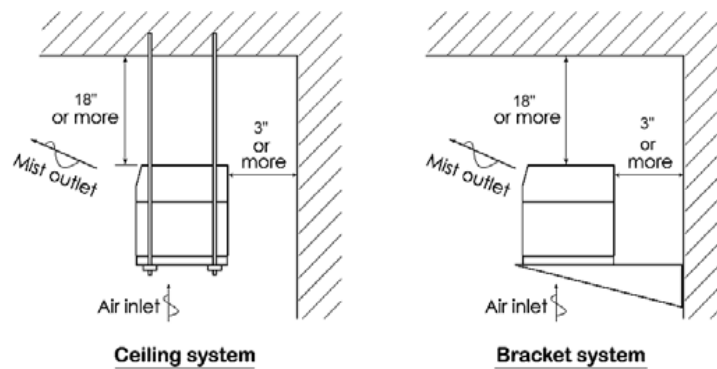


Figure 2. Installation of Humidifier

The unit must be installed horizontally and level to prevent the float switches from giving a false reading. Prepare hanging bolts for installing from the ceiling or brackets for wall mounting (see Figure 1). The distance from the humidifier to the ceiling should be a minimum of 18" and the distance to the wall must be 3" or more. For the installation mounting base dimensions, see the installation drawing provided with your unit.

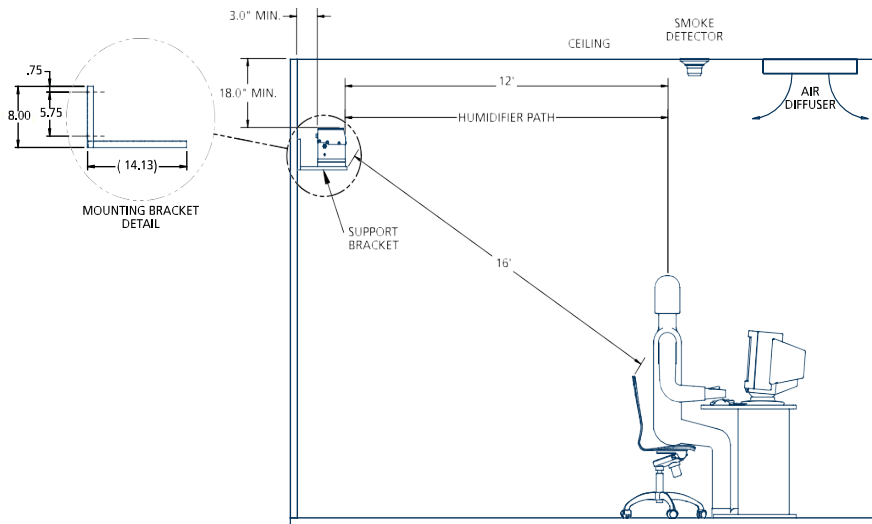


Figure 3. Locating the Humidifier

NOTE: Humidity control can only be achieved in a sealed room or if the room has vapor barriers installed. It is recommended that walls, ceilings and floors be sealed to prevent migration of humidity.

Mounting/Placement

These ultrasonic humidifiers are designed for mounting to a flat surface. Ensure the base is capable of supporting the weight of the unit. Weight estimates can be found on the installation drawing provided with your unit. Secure the unit with fasteners (field supplied by others), so that it will not move during operation. Ensure the front edge of the humidifier is not hanging over the edge of the support bracket.

Supply and Drain Piping

The humidifier will require a field installed water supply line and drain line. Refer to the piping diagram provided with your unit for details. For the water supply, use DI or RO water. The water supply to the humidifier cannot be taken directly from the public water service. Untreated supply water will leave a residue in the conditioned space where white powder is produced after evaporation from the calcium or magnesium which is dissolved in the water.

In cases where water quality, especially residue from evaporation, pH, total hardness and

water conductivity exceeds or is outside the range of standard, routine maintenance intervals to ensure continuous operation will be more frequent than usual. Also, the operating life of the transducers and print plates will be significantly reduced.

CAUTION 

It is essential that DI or RO water be used as the supply water source to maintain warranty coverage. The use of untreated water will VOID THE WARRANTY.

NOTE: The water supply piping must be non-corrosive stainless steel or poly tubing rated for use with deionized water.

Prepare the water supply piping. The water supply piping should be equipped with a water supply valve for maintenance purposes (user provided) at a place as close as possible to the humidifier. The valve must be rated for use with DI water. After the water supply valve is installed, flushing should be done by supplying water (see Section 3.1, Purge the Water Line). This is a necessary step to prevent chips and oil in the piping from entering the humidifier.

The strainer/flow regulator is equipped with a 90° swivel, 1/4" push-to-connect, fitting (see Figure 4). Connect the water supply piping to the humidifier by means of a 1/4" stainless steel or poly tubing (user provided). If there is a risk that the water supply piping could freeze, wrap the piping with insulating material.

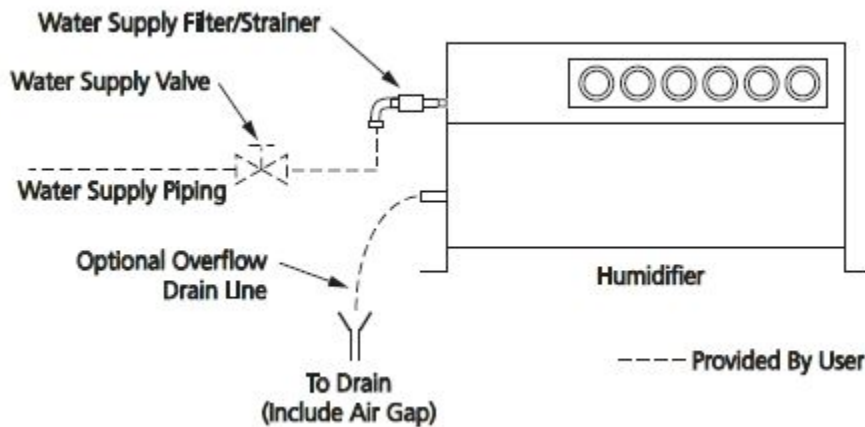


Figure 4. Piping Connections

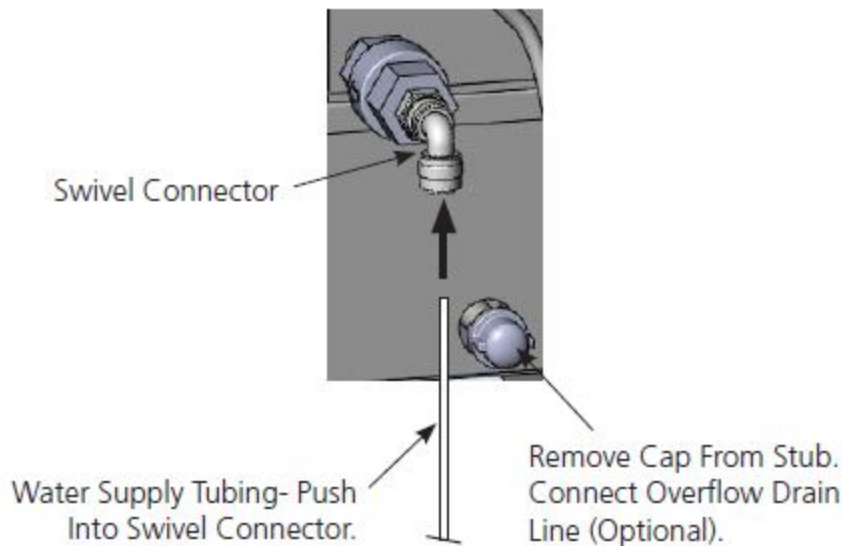


Figure 5. Water Inlet Connector

A drain line rated for use with DI water must be provided from the 1/8" MPT water tank drain stub in the side of the unit. Connect the drain line to the stub so that overflowing water can be directed into a drain pan or an appropriate place such as an open building drain with an air gap per local and national plumbing codes. The drain line must meet local and national plumbing codes, be sloped downward and away from the humidifier, include an air gap, and the end must not be obstructed.

Main Power and Control Wiring

NOTE: For wiring, refer to the electrical drawing supplied with your unit to determine the total number of interconnecting conductors required for your system and for the proper wire terminations. For internal wiring of the humidifier, see the Electrical Circuit Diagrams at the end of this manual.

CAUTIONS

Wiring terminations may become loose during transit of the equipment, therefore, verify all wiring terminations are secure prior to operation.

Verify that the main power supply to the control box coincides with the voltage, phase and frequency information specified on the nameplate. The nameplate also provides the full load amps (FLA), the current that the unit will draw under full design load, the minimum circuit ampacity (MCA) for wire sizing, and the maximum fuse size (MFS) for circuit protection.

For safety, the power source must be provided with a circuit breaker. Ensure a ground is connected to the unit. The humidifier is rated to operate with a nominal input of 48VDC. To maintain warranty coverage, never allow the humidifier input voltage to exceed 51 volts as

damage will occur to the transducers and print plates.

Wire Sizing Control Box to Humidifiers

The table below indicates the correct electrical wire sizing from the control box to the humidifier power cable for three different distances. All wire sizes listed are for stranded, THHN or NTW wire only. Do not use solid conductor wire. For distances over 75 feet consult the factory.

In addition to the above power wires, humidifiers controlled by the Ultra-Series control box use RJ45/ CAT5 data communication cables, daisy chained from the humidifier(s) to the control box.

The data communication cable is not to exceed 1000 feet total length from the control box to the last humidifier. A termination resistor must be installed on the last humidifier as shown in the electrical drawing provided with your unit.

CAUTIONS

The termination resistor is to be placed only on the last unit in the data communication string.

The power supply provided with the equipment is sized and selected based upon the expected load. Do not connect any additional loads to the control power supply.

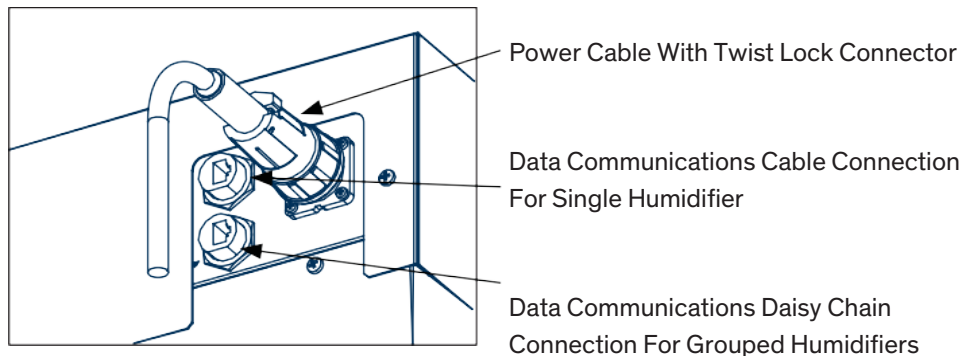


Figure 6. Electrical Connections

Connecting Humidifier(s) to Control Box

As a standard, STULZ GEN2 Ultrasonic humidifiers are equipped with a twist lock power connector and (2) RJ45 ports for data communication. The Ultrasonic Control box will also be equipped with an RJ45 port for data communication. The DRH Series Ultrasonic Humidifiers are designed for stand-alone direct room applications. A 6 foot power cable with a moisture-proof, twist-lock connector on one end is provided with each humidifier.

Single Humidifier

Once the humidifier and control box are installed, the total 48VDC wire length and wire size (AWG) should be determined using the table below. A junction box (not provided) is necessary

to make the connection between the field-installed 48VDC power wiring and the factory provided humidifier power cable.

RJ45/CAT5 cable (not included) should be used in required length(s) to make the data communications connection between the humidifier and the control box. The factory provided end-of-line termination resistor should be installed in the second RJ45 port.

Multiple Humidifiers (Grouped)

Once the humidifiers and control box are installed, the total 48VDC wire length and wire size (AWG) should be determined using the table below for each humidifier. A junction box (not provided) is necessary to make the connection between the field-installed 48VDC power wiring and the factory provided humidifier power cable.in the group. The factory provided end-of-line termination resistor should be installed in the second RJ45 port of the last humidifier.

RJ45/CAT5 cable (not included) should be used in required length(s) to make the data communications connection between the humidifier and the control box. Additional RJ45 cables (not included) should be used in required lengths to make the data communications connections between humidifiers

48VDC Wire Sizing from Control Box to Humidifiers					
MODEL	CURRENT (AMPS)	WIRE SIZE (AWG)			# OF WIRES (Includes 1 Ground)
		25 Ft	50 Ft	75 Ft	
DRH-04	2.8	16	16	14	3
DRH-06	4.0	16	16	14	3
DRH-08	5.3	16	14	12	3
DRH-16	10.5	16	14	12	3

NOTE: Table reflects correct electrical wire sizing from the control box to the humidifiers. **Do not exceed 75 foot maximum distance.**

Operation

Purge the Water Line

Before operating the unit, metal shavings or debris that may form during the installation process must be flushed from the water supply piping. Perform the following steps before allowing water to flow into the humidifier:

1. Ensure the main disconnect switch from the control box is set to Off for safety.
2. With the water supply valve closed, disconnect the supply tubing from the filter strainer in the side of the unit.
3. Open the supply valve and flush the tubing into a bucket or building drain for about 30 seconds.
4. After the water line is purged, close the valve and reconnect the supply line to the inlet strainer/flow regulator.

Initial Operation Checklist

For new installations, ensure the unit is ready to operate by going through the following checklist prior to start-up.

- The humidifier is installed horizontally and level.
- No obstacle is within 15 feet in front of the atomizing direction.
- The electrical wiring is correctly connected.
- De-ionized or reverse osmosis water supply is used.
- The water supply piping and overflow piping are correctly connected and secured.
- All parts are correctly installed.
- After these items have been verified, begin operation.

Procedure for Operation

1. Turn the main power source switch on the control box to the "On" position.
2. Open the water supply valve allowing water to flow to the humidifier.
3. Perform a manual drain cycle to flush any particulates from the tank utilizing the system controller (see STULZ Ultra-Series controller IOM manual #OUU0078, Section 5.5.1.2).
4. Set the humidity setpoint to the desired humidity level.
5. When power is supplied to the humidifier and there is a demand for humidification, water flows into the unit. When the water in the tank reaches the required level, the ultrasonic nebulizers will start producing mist.
6. If the unit does not start operating, increase the humidity setpoint to create a demand for humidification.

7. During operation, the humidifier starts and stops by means of a signal from the control box.
8. The water level in the water tank is maintained by the level controller.
9. If the water level in the tank falls below the safety level for any reason during operation, power to the ultrasonic nebulizers is cut off by the level controller.

After starting operation, check the following items on a regular basis:

1. Atomized mist is visible through all the mist blow tubes.
2. Verify the humidifier parts, overflow pipe and other piping for signs of leaking water.
3. Change the humidity setpoint to ensure the control box is interconnected properly and that it controls the operation of the humidifier.
4. Verify that the mist diffusion is good and that objects in the room or any obstacle are not directly exposed to the mist.

Precautions

Take the following operating precautions.

1. Do not remove the air filter at the bottom of the humidifier during operation.
2. Do not block the outlet of the mist blow tubes; component failure could occur.
3. Drain the water from the water tank for sanitary reasons if the unit is turned off for more than 3 days.

Steps for Long Term Shutdown

If the humidifier is not signaled to turn On for a period of three days, the level control board will automatically signal the humidifier to operate a drain cycle.

When operation is stopped for a long time (one week or longer), the following steps may be performed. Also, refer to Section 4.1, Periodic General Maintenance.

1. Close the water supply valve.
2. Drain the water tank.
3. Turn the main switch on the control box to Off.
4. Inspect and clean the water tank interior and the air filter.
5. To restart operation after a long-term shutdown, see the previous section Procedure for Operation.

Maintenance/Repairs

Periodic General Maintenance

Systematic, preventive maintenance of the humidifier is recommended for optimum system performance. Routine periodic maintenance should include, but is not limited to the following:

- Tightening electrical connections
- Cleaning, inspecting the unit's components visually
- Checking the level of water and ensuring no leaks are present

A system should be established to record any problems, defects or deficiencies noted by operators and discovered during maintenance inspections, together with the actions taken. For assistance, contact Product Support contact STULZ Product Support at (888) 529-1266 or email STULZTechnicalSupport@stulz-ats.com.

Ensure adherence to all safety precautions while performing any type of maintenance.

Before the maintenance inspection and repairs are done, be sure to set the control box power switch to Off and close the water supply valve.

WARNINGS

Turn off power to the unit unless you are performing tests that require power.

With power and controls energized, the unit could begin operating automatically at any time.

Solid scaffolding must be provided for working in high places.

Care must be taken avoid injury by sharp edges of the sheet metal.

CAUTIONS

The transducer is a very delicate part. When the water tank interior is cleaned, special care must be taken to ensure the transducer is not scratched on the surface with a screwdriver, etc.

Do not supply power to the ultrasonic nebulizer units while the transducer lead wires (yellow and orange) are removed.

Proper tools must be used.

Excessive tightening or insufficient tightening may cause failure.

When performing maintenance or repairs, care must be taken to ensure small parts such as screws will not be lost.

Testing insulation resistance and dielectric withstand voltage should be avoided because the humidifier incorporates sensitive electronic parts.

When parts are replaced, genuine STULZ parts must be used. Contact STULZ Product Support for assistance.

Spare and replacement parts requests to STULZ Product Support may be made in three ways:

Fax: (301) 620-2606

Phone: (888) 529-1266

E-mail: parts@stulz-ats.com Maintenance Items and Tools

Item	Cycle	Description	Necessary Tools
Routine Maintenance			
Air filter cleaning.	About once a week depending on the extent of contamination. The interval should be shortened if environmental conditions are particularly dusty.	Section 4.2.1	Phillips screwdriver
Visually inspect water supply strainer/flow regulator.	Inspect/clean every 3 months. Replace as necessary.	Section 4.2.2	Adjustable wrenches (2)
Check water tank interior, mist blow tubes and electrical parts.	Once a month or as required if environment is dusty or water supply quality is poor.	Section 4.2.3	
Replacing Parts			
Replacing temperature sensor.	If damaged or upon failure.	Section 4.4.3	Phillips screwdriver 5.5 mm Nut driver
Replacing transducer.	After about 10,000 to 15,000 hours of operation.	Section 4.4.4	Soft cleaning cloth Small brush Diagonal
Replacing nebulizer print plate.	If damaged or upon failure. Also recommended when replacing transducer.	Section 4.4.5	wire cutter
Replacing water supply solenoid valve.	If damaged or upon failure.	Sect. 4.4.6	
Replacing float switches.			
Replacing printed circuit board.			

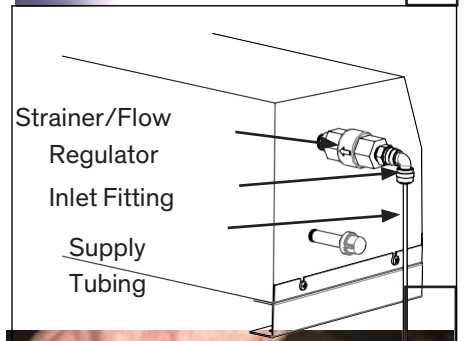
Air Filter

1. Stop the humidifier.
2. Loosen and remove the filter case mounting screws (2 Pieces) at the lower front of the humidifier. (Photo 1)
3. Pull out the filter case. (Photo 2)
4. Wash the filter media with clean water.
5. Lightly shake off excess water and dry it well in the shade.
6. When the filter is dried, put it back in the filter case, install the stopper and install the filter case in the humidifier.
7. If the filter is seriously clogged and cannot be cleaned by washing with water, or if it is seriously deteriorated, it should be replaced with a new one.



Water Supply Strainer/Flow Regulator

4. Stop the humidifier.
5. Set the control box disconnect switch to Off.
6. Close the water supply valve.
7. Remove the water supply tubing from the 90° inlet fitting. (Photo 3)
8. Loosen the strainer/flow regulator assembly and remove it.
9. Inspect the inlet screen and clean with DI water to remove any debris.
10. Reinstall the strainer/flow regulator and water supply tubing.
11. Electrical Parts
12. Stop the humidifier.
13. Set the control box disconnect switch to Off.
14. Close the water supply valve.



WARNING ⚡

Do not splash water on the electrical parts.

15. Drain the water tank.
16. Remove the mist guide cover from the top of the humidifier.
17. Remove the screws (4 Pieces) holding the electrical box access cover. (Photo 4)
18. Remove the electrical box access cover. (Photo 5)
19. Inspect the interior and check the following:

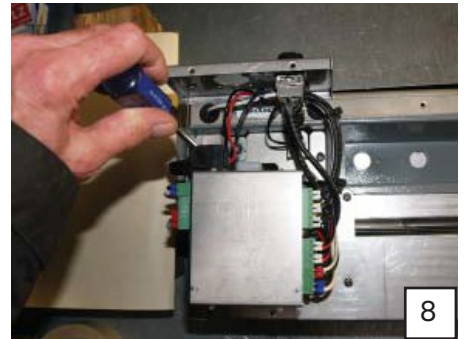
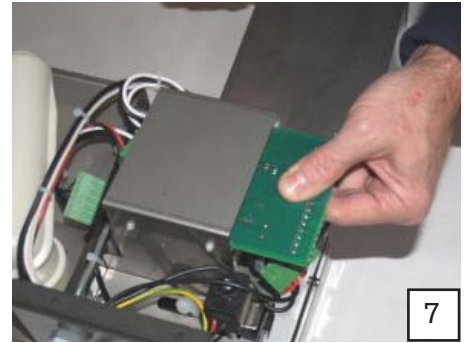


- No water leakage from the solenoid valve joint.
- No damage to electrical wires or cables.

20. No abnormality of parts then Remove the terminal connectors (3 each) from the sides of the level control board. (Photo 6)

21. Slide the board out and ensure there is no discoloration, deformation or deterioration of the printed circuit. (Photo 7)

22. If any defects are found with the electrical parts, take necessary steps referring to Sect. 4.4 Common Repairs/Parts Replacement.



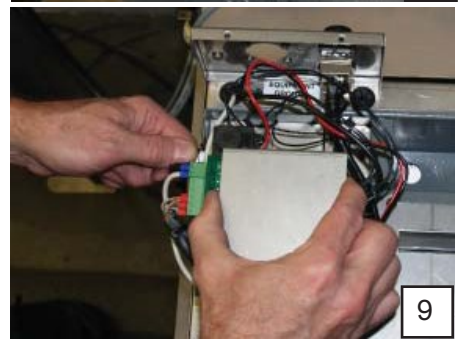
Float Switches

1. Loosen and remove the float panel mounting screws. (2 pieces)
2. (Photo 8)

CAUTIONS

Don't let the screws drop into the tank.

3. Lift the float panel out and turn it over. (Photo 9)
4. Check for contamination. Manually operate the two float switches ensuring they raise and lower smoothly. Clean any build-up from the two float switches with a small brush. (Photo 10)

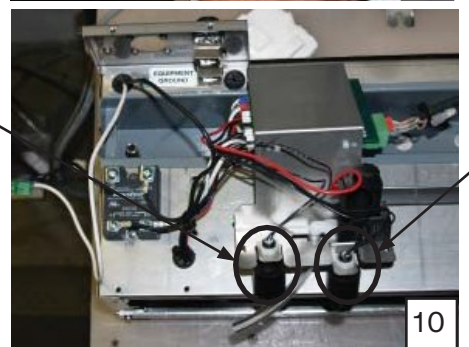


CAUTIONS

Float Switches

5. Do not remove the float portion from the stem.
6. If no defects are found, reassemble by reversing the above procedure.

When assembling, be careful not to pinch the wires between the sheet metal.



Water Tank

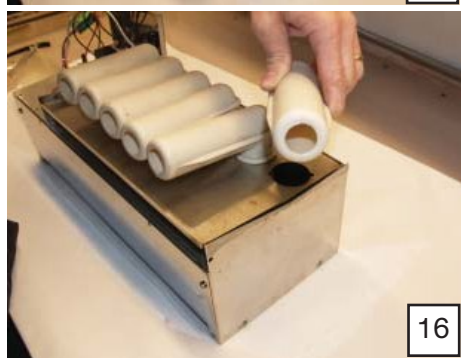
1. Loosen the fan casing mounting screws (4 pieces) on the sides of the humidifier and slide it up from the base. (Photo 11)
2. Turn the fan casing on its side. Remove the screw inside the casing (1 piece) holding the air flow guide (water tank cover).(Photo 12)
3. Return the fan casing to an upright position and remove the screws (2 pieces) holding the airflow guide on top of the humidifier.
4. Remove the air flow guide.(Photo 13)



5. Check the water tank interior for contamination. Wipe and clean the water tank interior and clean the surface of the transducers, etc. in the water tank by wiping with a soft, oil free cleaning cloth. (Photo 14)
NOTE: Be careful not to scratch the surface of the transducers.

Mist Guides

1. Rotate and remove the mist guide tubes from the air flow guide (water tank cover). (Photo 15 and 16)
2. Clean the mist blow tubes with clean water.
NOTE: The mist outlet and its surrounding area must be free of foreign material. Be careful not to damage the rubber ring portion of the mist outlet.
3. Reassemble by reversing the above procedure.



Troubleshooting and Repair

See the troubleshooting table below for the remedy to any issues.

WARNING

Turn off power when undertaking any repairs.

Check the humidifier and the surrounding area.

Issue	Cause		Checking	Remedy
No mist is generated.	Power supply system	Control box switch turned off.	Visually check switch position.	Turn switch on.
		No power to the power supply.	Measure the voltage at power supply input terminals.	Supply power.
		Faulty power supply	Measure the voltage at power supply output terminals.	Replace the power supply.
	Water supply system	Water supply valve is closed.	Check if the valve is opened or closed.	Open the valve
	Other	Temperature sensor detects overheating.	Check if ambient temperature and water temperature are within specified range.	Correct.
Amount of mist is too low.	Power supply system	Supply voltage is low.	Check voltage at power supply output terminals.	Correct the voltage with the adjustment screw on the power supply.
	Water supply control system	Operating water level is high and overflowing.	Visually check.	See table 3) on next page.
	Other	Humidifier is not level.	Visually check.	Correct.
		‡Air filter clogging.	Pull out the filter and visually check.	Clean the filter.
Mist supply is coarse.	Power supply system	Supply voltage is high.	Check voltage at power supply output terminals.	Correct.

If the cause cannot be located, remove the mist guide cover and air flow guide and check the interior of the water tank.

Issue	Cause	Checking	Remedy
No mist is generated.	‡ Dust and foreign material are accumulated in the water tank.	Visually check the interior of the water tank.	Clean the interior of the water tank.
Amount of mist is too low.	‡ Scale deposited on transducer surface.		Clean interior of water tank and replace the transducer.

NOTE: The causes of failures marked ‡ can be prevented through periodic maintenance/inspection. See Periodic General Maintenance.

If the cause cannot be located, parts may be the issue. Check the interior of the humidifier.

Issue	Cause	Checking	Remedy	
No mist is generated.	Water supply control system	Water supply float switch (FS1) is faulty.	If there is no continuity, replace the switch.	
		≠ Water supply float switch sticking.	Clean the switch. If operation is not restored, replace switch.	
		Water supply solenoid valve is faulty.	No water supply is provided even if the water tank is drained and voltage between terminals X2-1 & X2-2 on the printed circuit board is 24VDC.	Replace the solenoid valve.
		Float switch for low water level is faulty.	With the water tank filled with water, remove the wire from terminal (X3) on the printed wiring board and check continuity of float switch.	If there is no continuity, replace the switch.
		≠ Float switch for low water level is sticking.		Clean the switch. If operation is not restored, replace switch.
	Other	Fan lead wires are loose or disconnected from the terminals.	Open the electrical section and check the lead wire connecting terminals.	Correct terminations.
Amount of mist is too low.	Water supply system overflowing.	Water supply float switch is faulty.	If there is continuity, replace the switch.	
		≠ Water supply float switch arm sticking.	Clean the switch. If operation is not restored, replace switch.	
		Water supply solenoid valve is faulty.	Overflowing occurs even after power is turned off.	Replace the solenoid valve.

Consumable Parts

Issue	Cause	Checking	Remedy
No mist output, or mist output is too low.	Deterioration of transducer due to aging.	The life is about 10,000 to 15,000 hours of humidifier operation.	Replace the transducer.

If the humidifier is operated for a long time with a deteriorated transducer, the nebulizer print plate may fail. The transducers should be replaced using the estimated lifetime of 10,000 to 15,000 hours as the point of reference.

If the cause cannot be identified, contact STULZ Product Support at (888) 529-1266 or email STULZTechnicalSupport@stulz-ats.com.

If the humidification system is supplied with a water conductivity sensor (optional), ensure the sensor is operating properly and that the supply water is within the recommended guidelines for mineral content.

Common Repairs/Parts Replacement

When parts are replaced, refer to Preparation for Repairs and Re-assembly.

Preparation for Repairs (Removal of Water Tank)

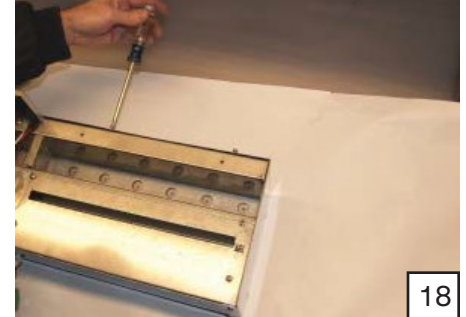
1. Stop the humidifier, set the power supply circuit breaker (main switch) to Off and close the water supply valve.
2. Drain the water tank.
3. Remove the air flow guide (water tank cover) mounting screws from the top of the humidifier and remove the air flow guide. (Photo 17)
4. Remove the water tank mounting screws from the humidifier fan casing. (Photo 18)
5. Lift the water tank from the base and place it on a well-lit work surface for removing/replacing the parts.(Photo 19)
6. The transducers are visible when you rotate the tank to view the bottom. (Photo 20)
7. The nebulizer print plates are on the side of the tank adjacent to the transducers. (Photo 21)

Reassembling

1. Before re-assembling the humidifier, confirm there is no water leakage by pouring water into the tank.
2. When re-assembling after replacing parts, inspect the interior and verify the following points:
 - All the screws must be securely tightened.
 - All the lead wires must be correctly and securely connected, especially the fan lead wires.)
 - All the plates, boards and relays must be free from discoloration, deformation and deterioration.
 - Electrical wires must not be damaged.
3. After re-assembly is completed, supply water and power to the unit and turn it on.
4. Verify that normal nebulizing mist is visible from all the mist blow tubes and that there is no water leakage.



17



18



19



20



21

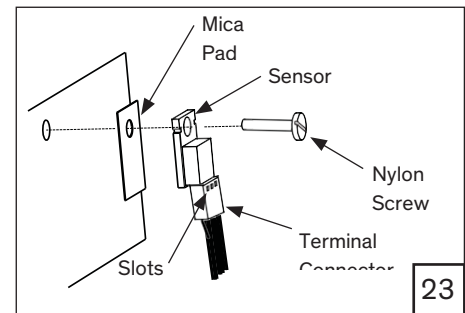
Replacing the Temperature Sensor

The temperature sensor is mounted to the front of the water tank. Referring to Section 4.4.1, Preparation for Repairs steps 1 to 5, place the water tank on a well-lit work surface. Locate the sensor (Photo 22).



Temperature Sensor on Water Tank

1. The temperature sensor is mounted on the front of the tank near the float switches.
2. Carefully cut the wire tie holding the sensor cable and remove the nylon screw holding the sensor in place.
3. Remove the sensor and save the mica pad and nylon screw to mount the new sensor. (Photo 22)
4. Remove the terminal connector from the sensor and connect it to the new sensor. Ensure the three slots in the terminal connector are oriented upwards. (Photo 23)
5. Install the new sensor to the tank together with the saved mica pad. Cable tie the sensor cable restrain it.
6. Referring to Re-assembling, re-assemble the unit by reversing the procedure described.



Replacing a Transducer

1. Referring to Section 4.4.1, Preparation for Repairs, place the water tank on a well-lit work surface.
2. To replace a transducer, remove the two transducer lead wires, (yellow and orange) from the nebulizer print plate. (Photo 4)

NOTE: Grasp the terminals when removing wires. Never pull the lead wires.

3. Using a 5.5 mm nut driver, remove the transducer mounting nuts (2 pieces.)
4. Remove the transducer, spacer and O-ring. Save the nuts to mount the new part. (Photo 25)
5. Clean the spacer, O-ring groove and O-ring.
6. Assemble the new transducer with the spacer and O-ring and install them with the saved mounting screws. (Photo 26)

NOTES

Ensure the O-ring is not damaged.

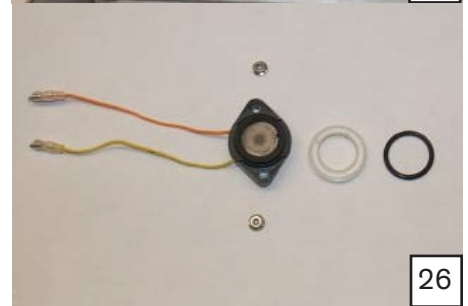
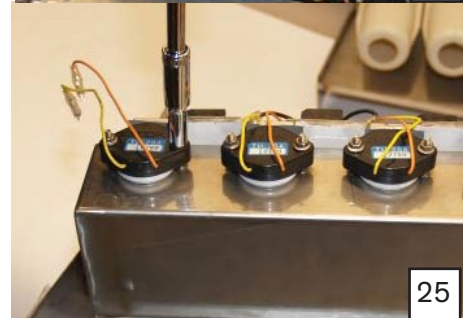
If it is damaged, replace it with a new one.

To prevent leakage, carefully align the transducer's rubber packing in the indent in the bottom of the water tank.

The mounting screws must be evenly tightened.

Do not overtighten.

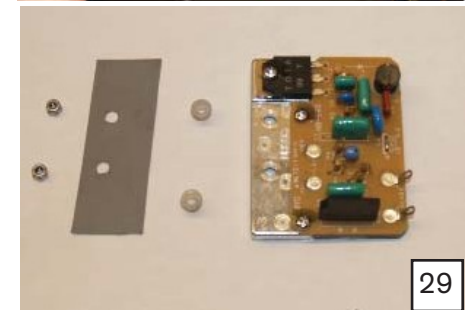
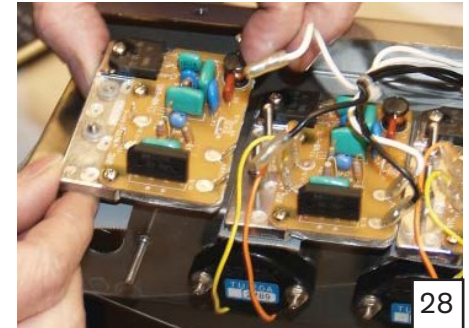
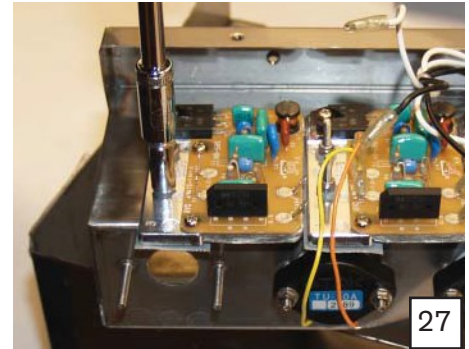
7. Connect the lead wires to the nebulizer print plate. The colored lead wires must be inserted as shown on the plate. (Orange wire to ORG, Yellow wire to YEL)
8. Referring to the Reassembling steps, re-assemble the unit by reversing the procedure.



7.

Replacing a Nebulizer Print Plate

1. Referring to Section 4.4.1, Preparation for Repairs, place the water tank on a well-lit work surface.
2. Using a 5.5 mm nut driver, remove the print plate mounting nuts (2 Pieces) and remove the plate. Save the nuts and insulating parts to mount the new print plate. (Photo 27)
3. Remove the four wires connected to the terminals from the plate to be replaced. (Photo 28)
4. Install the new plate together with the silicon sheet provided using the saved mounting screws. (Photo 29)
5. Connect the nebulizer print plate interconnecting wires (black to H, white to G) and transducer lead wires (orange to ORG, yellow to YEL) **NOTE:** When the nebulizer print plate is replaced, it is
6. recommended that the transducer be replaced also.
7. Referring to Sect. 4.4.2, Re-assembling, re-assemble the unit by reversing the procedure described in Section 4.4.1.



Water Solenoid Valves, Float Switches and Level

Control Board

8. Refer to Electrical Part and Float Switches sections to remove the electrical access cover and lift the float panel out. (Photo 30)
9. Cut the wire ties bundling the solenoid valve and float switch lead wires. **NOTE:** Be careful not to damage the lead wires.
10. Unscrew the connecting wires of the parts to be replaced from the terminal connectors on the level control board.

Fill Solenoid Valve

1. Remove the pipe fitting from the inlet side of the solenoid valve.
2. Turn the float panel over and remove the solenoid valve mounting screws (2 pieces). (Photo 31)
3. Remove the elbow on the outlet side and install the new solenoid valve on the outlet side. Be sure to seal the fitting with Teflon tape.
4. **NOTE:** Ensure the elbow is facing the correct direction.
5. Install the new solenoid valve to the float panel. and re-install the pipe fitting. **NOTE:** Ensure the O-ring is not damaged. If it is damaged, replace it with a new one.



Float Switch

1. Remove the lock nut on the float switch.
2. Replace the switch with a new one (Photo 10).

Level Control Board

1. To replace the level control board, remove the lead wire terminal connectors (3 pieces) from the board (see Photos 6 and 7).

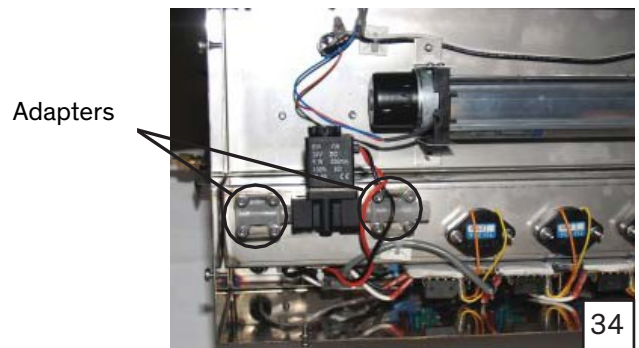
NOTE: Grasp the connectors when removing.

Never pull the lead wires.

2. Slide the level control board out along the guides.
3. Remove it and install a new one.(Photo 32)

Drain Solenoid Valve

1. To replace the drain solenoid valve remove the humidifier fan casing as described in Section 4.2.5 and lay it on its side. (Photo 33).
2. Using a 5.5 mm nut driver, remove the nuts holding the two valve outlet adapters.
3. Unscrew the adapters from the solenoid valve.
4. Screw the adapters into the replacement part. (Photo 34)
5. Referring to Reassembling, assemble the unit by reversing the procedure.



Product Support

We provide Product Support that not only provides technical support and parts but the following additional services:

- Performance Evaluations
- Start-up Assistance
- Training

We highly recommend using the services of our Field Service Department to perform start-up and commissioning. They will ensure your equipment is correctly installed and operating properly. This will help ensure your unit provides years of trouble free service while operating at its highest efficiency.

Technical Support

The STULZ Technical Support Department is dedicated to the prompt reply and solution to any problem encountered with a unit. Should a problem develop that cannot be resolved using this manual, you may call (888) 529-1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. If a problem occurs after business hours, provide your name and telephone number. One of our service technicians will return your call.

When calling to obtain support, it is important to have the following information readily available, (information is found on the unit's nameplate):

- Unit Model Number (DRH-XX)
- STULZ Sales Order Number
- Unit Serial Number
- Description of Problem

Obtaining Warranty Parts

Warranty inquiries are to be made through the Technical Support Department at (888) 529-1266 Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. A service technician at STULZ will troubleshoot the system over the telephone with a field service technician to determine the defect of the part.

If it is determined that the part may be an issue a replacement part will be sent via UPS ground. If the customer requests that warranty part(s) be sent by any other method than UPS ground the customer is responsible for the shipping charges. If you do not have established credit with STULZ you must give a freight carrier account number.

A written (or faxed) purchase order is required on warranty parts and must be received prior to 12:00 p.m. for same day shipment. The purchase order must contain the following items:

- Purchase Order Number

- Date of Order
- STULZ Stated Part Price
- Customer Billing Address
- Shipping Address
- Customer's Telephone and Fax Numbers
- Contact Name
- Unit Model Number
- Serial Number
- STULZ Item Number

The customer is responsible for the shipping cost incurred for returning the defective part(s) back to STULZ. Return of defective part(s) must be within 30 days at which time an evaluation of the part(s) is conducted and if the part is found to have an issue a credit will be issued.

When returning defective part(s) complete the Return Material Authorization Tag and the address label received with the replacement part.

Obtaining Spare/Replacement Parts

Spare and replacement parts requests to STULZ Product Support may be made in three ways:

Fax: (301) 620-2606

Phone: (888) 529-1266

E-mail: parts@stulz-ats.com

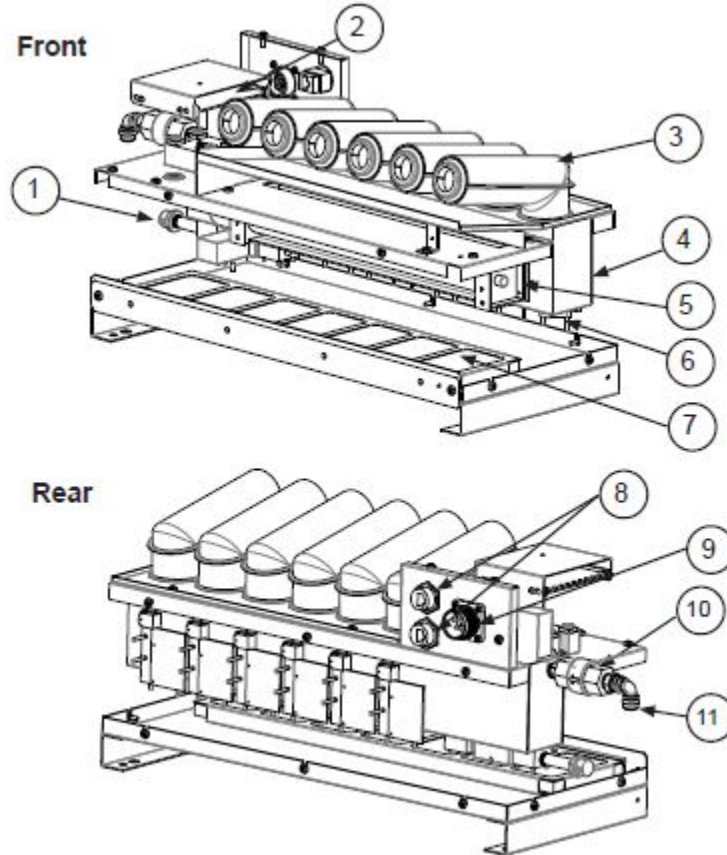
STULZ accepts Visa and MasterCard. STULZ may extend credit to its customers; a credit application must be prepared and approved (this process could take one week).

A 25% minimum restocking charge will be applied on returned stocked parts that were sold as spare or replacement parts. If the returned part is not a stocked item, a 50% restocking charge may be applied. Return Material Authorization Number is required when returning parts.

To receive credit for returned repair/replacement parts, the parts must be returned to STULZ within 30 days of the purchase date. Spare part sales over 30 days old will be considered final and the parts will remain the sole property of the ordering party.

Drawings

Layout Drawing of Humidifier (Covers Removed to Show Parts)

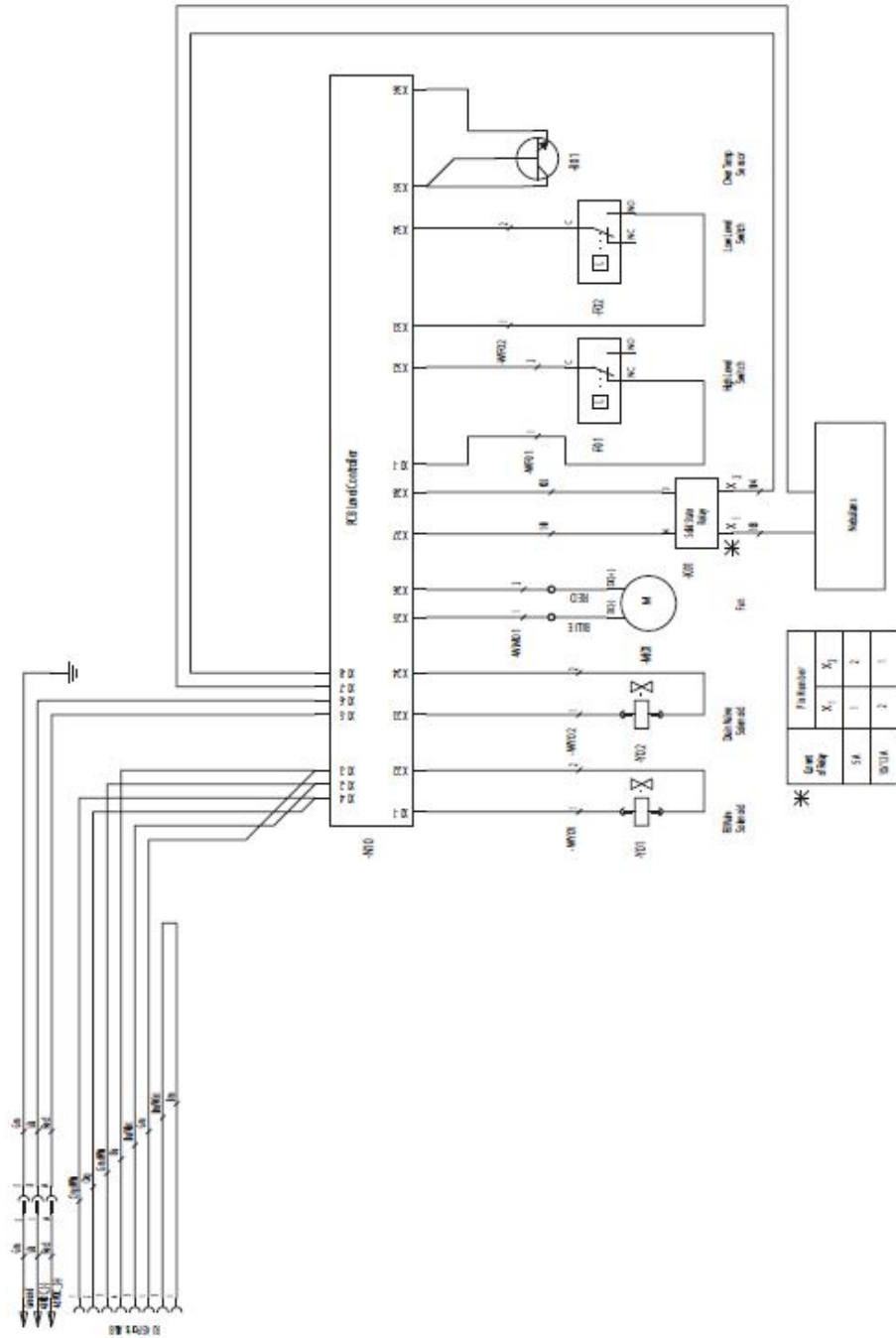


The numbers called out in the drawings above coincide with the unit component item numbers described below:

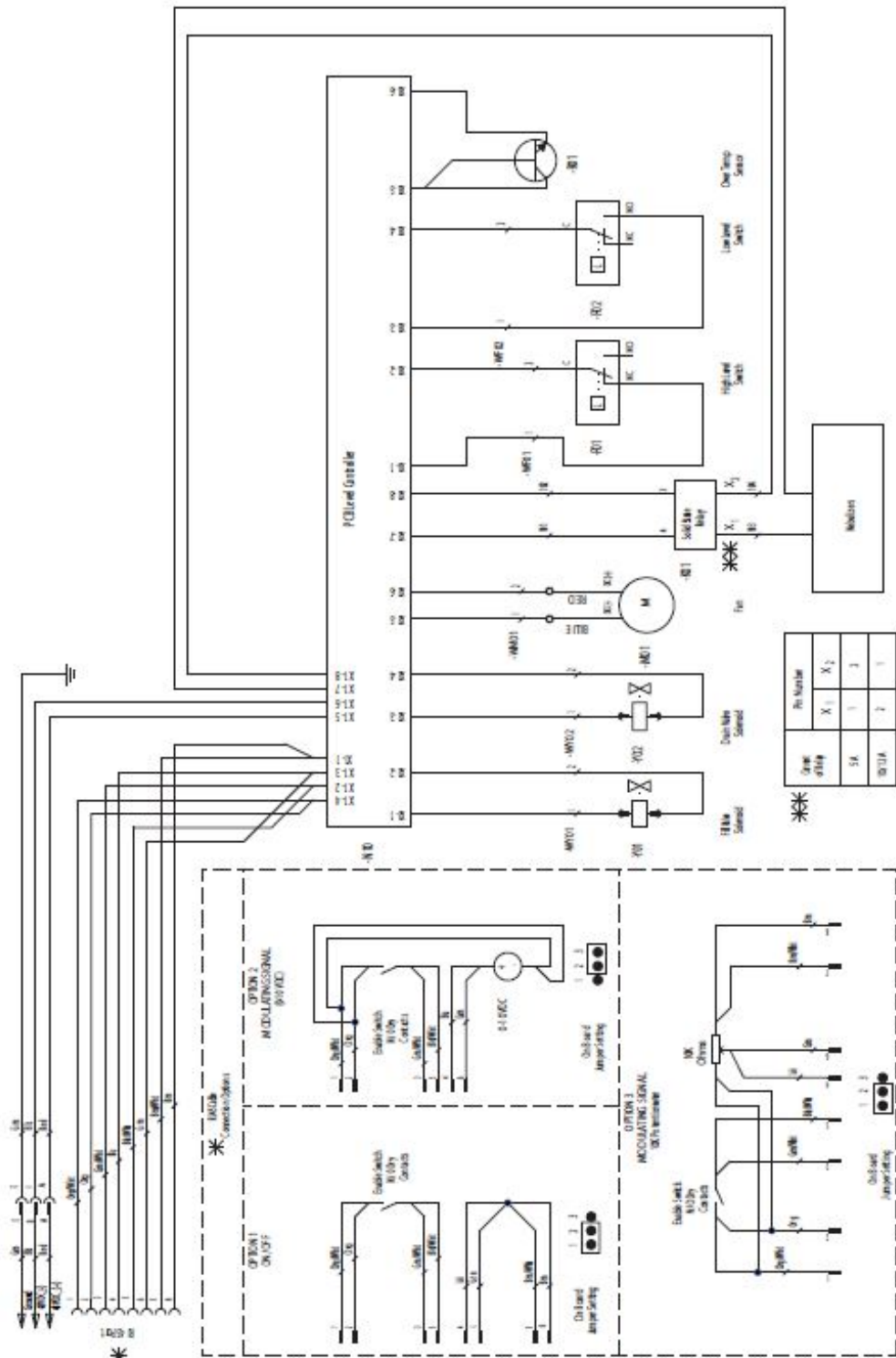
#	Description
1	Drain Stub- 1/8" MPT With SS Cap
2	Level Control Board
3	Mist Guide Tube
4	Water Tank
5	Blower
6	Transducer
7	Filter
8	Data Communications Connections
9	Power Connection
10	Water Supply Strainer/flow regulator
11	Water Inlet Fitting

Electrical Circuit Diagrams

Typical Wiring Diagram for Modbus Version



Typical Wiring Diagram for Stand-Alone Version





North American Headquarters

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