



NHU Electrode  
Steam Humidifiers

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# Installation, Operation, Maintenance and Troubleshooting Guide

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| <p><b>IMPORTANT:</b> Read and save these instructions. This guide to be left with equipment owner.</p> |
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# Table Of Contents

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|                                                       |           |
|-------------------------------------------------------|-----------|
| <b>INSTALLATION</b>                                   | <b>1</b>  |
| RECEIVING & UNPACKING EQUIPMENT . . . . .             | 1         |
| PRE-INSTALLATION CHECKPOINT . . . . .                 | 1         |
| HUMIDIFIER CONFIGURATION. . . . .                     | 1         |
| LOCATION & MOUNTING . . . . .                         | 1         |
| HUMIDIFIERS . . . . .                                 | 1         |
| STEAM DISTRIBUTORS FOR DUCTED APPLICATIONS . . . . .  | 2         |
| PLUMBING. . . . .                                     | 3         |
| WATER SUPPLY LINE. . . . .                            | 3         |
| DRAIN LINE . . . . .                                  | 4         |
| STEAM LINE . . . . .                                  | 4         |
| CONDENSATE RETURN LINE . . . . .                      | 5         |
| ELECTRICAL. . . . .                                   | 6         |
| PRIMARY VOLTAGE SUPPLY WIRING TO HUMIDIFIER . . . . . | 6         |
| LOW VOLTAGE CONTROL WIRING . . . . .                  | 6         |
| On-Off Controls. . . . .                              | 6         |
| CONTROL INSTALLATION . . . . .                        | 7         |
| <b>OPERATION</b>                                      | <b>7</b>  |
| INTRODUCTION. . . . .                                 | 7         |
| NHU OPERATION . . . . .                               | 7         |
| END OF CYLINDER LIFE . . . . .                        | 7         |
| MANUAL CAPACITY ADJUSTMENT . . . . .                  | 7         |
| OTHER POTENTIOMETERS . . . . .                        | 8         |
| <b>MAINTENANCE</b>                                    | <b>8</b>  |
| WHEN TO REPLACE THE STEAM CYLINDER . . . . .          | 8         |
| NHU . . . . .                                         | 8         |
| HOW TO REMOVE THE STEAM CYLINDER . . . . .            | 8         |
| MANDATORY CLEANING OF THE DRAIN VALVE . . . . .       | 9         |
| HOW TO INSTALL THE REPLACEMENT CYLINDER . . . . .     | 9         |
| EXTENDED SHUTDOWN . . . . .                           | 9         |
| <b>TROUBLESHOOTING</b>                                | <b>10</b> |
| TERMS USED . . . . .                                  | 10        |
| STARTING POINT . . . . .                              | 10        |
| UNIT WIRING DIAGRAM. . . . .                          | 12        |
| SPARE PARTS . . . . .                                 | 13        |
| EXPLODED VIEW . . . . .                               | 14        |

# INSTALLATION

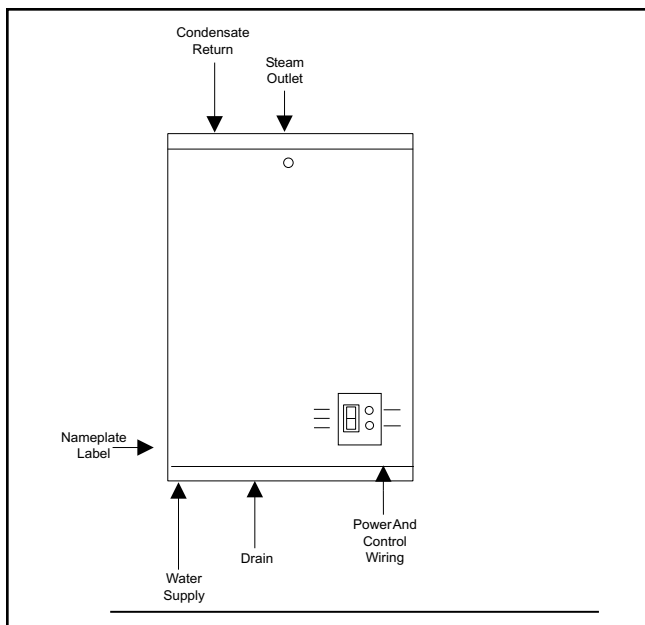
## RECEIVING & UNPACKING EQUIPMENT

1. Check packing slip to ensure ALL material has been delivered.
2. All material shortages are to be reported to NORTEC within 48 hours from receipt of goods. NORTEC assumes no responsibility for any material shortages beyond this period.
3. Inspect shipping boxes for damage and note on shipping waybill accordingly.
4. After unpacking, inspect equipment for damage and if damage is found, notify the shipper promptly.
5. All NORTEC products are shipped on an F.O.B. factory basis. Any and all damage, breakage or loss claims are to be made directly to the shipping company.

## PRE-INSTALLATION CHECKPOINT

1. Ensure that available voltage and phase corresponds with humidifier voltage and phase as indicated on humidifier's nameplate label.
2. Ensure that the dedicated external disconnect is of sufficient size to handle the rated amps as indicated on the nameplate label. Refer to local codes.

**Figure #1**  
**NHU Series Humidifier**



3. Report any discrepancy immediately.

## HUMIDIFIER CONFIGURATION

To avoid any danger, never operate the humidifier with a door off. All switches must be engaged before the unit will operate.

To open the door, unlock door with key, lift door up slightly and pull door forward.

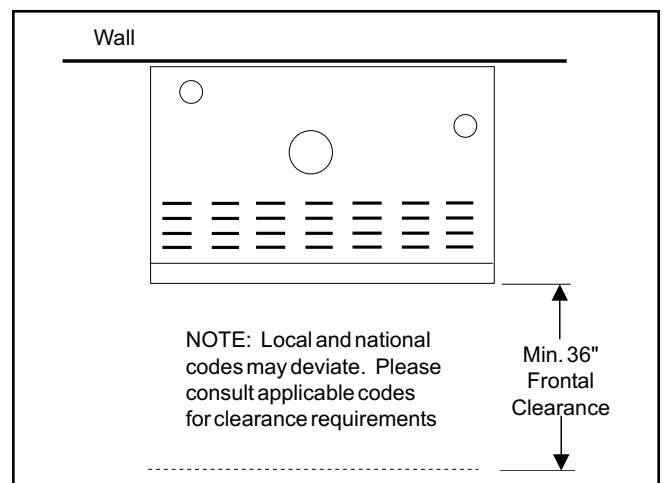
## LOCATION & MOUNTING

### HUMIDIFIERS

NHU Series humidifiers are designed to mount on a suitable wall or vertical surface. Do not sit on floor due to clearances required for plumbing, electrical, and control entrances. The clearance dimensions shown in this manual are for reference only and are the minimum required for maintenance of the humidifier. Local and National Codes should be consulted prior to final location and installation of the humidifier. NORTEC cannot accept responsibility for installation code violations.

1. Location of the humidifier should be below and as close as possible to the steam distributor location.
2. For front clearance requirements (for access during installation, maintenance and troubleshooting), see Figure #2.

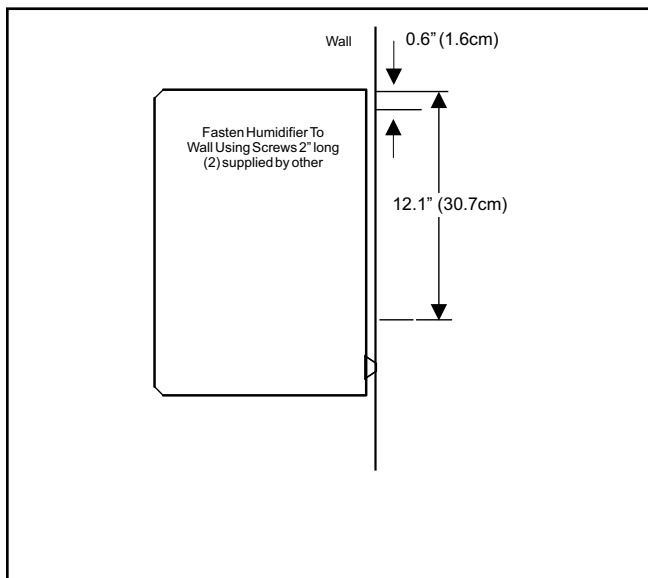
**Figure #2**  
**Clearance Requirements**



3. If possible, DO NOT locate humidifier any further than absolutely necessary from steam distributor location, as net output will be reduced as a result of heat loss through steam hose.

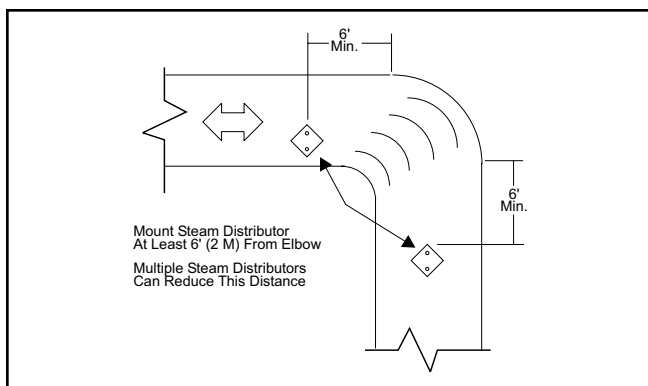
- Where possible, mount humidifier at a height convenient for servicing.

**Figure #3**  
**Wall Mounting Detail**



- Make sure humidifier is level.
- DO NOT mount humidifier on hot surfaces.
- DO NOT mount humidifiers in an area where freezing may occur.
- DO NOT mount humidifiers on vibrating surface. Consult factory.
- To mount the humidifier you must first remove the steam cylinder from the unit (see page 8 - HOW TO REMOVE THE STEAM CYLINDER). With the cylinder removed use two #8 screws (2" long) and secure to a 2x4" stud (or similar). Once the humidifier has been mounted replace the steam cylinder following the procedure outlined on page 9 - HOW TO INSTALL THE REPLACEMENT CYLINDER.

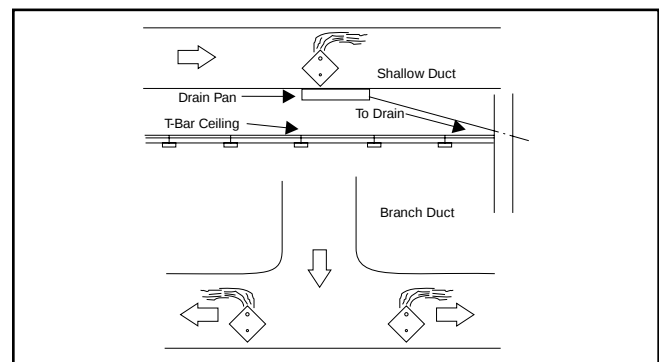
**Figure #4**  
**Steam Distributor Location**



## **STEAM DISTRIBUTORS FOR DUCTED APPLICATIONS**

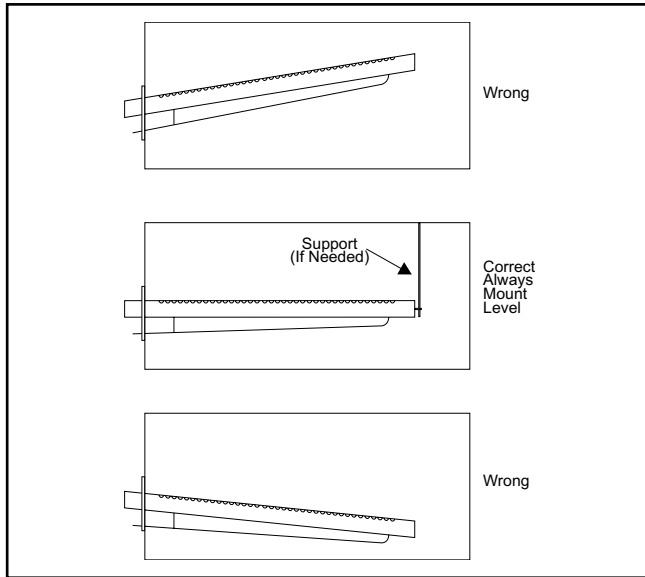
- The steam distributor is typically located in the supply air duct, return air duct and air handling unit. Proper location should consider air temperature, relative humidity before the distributor, air velocity, dimensions of the location, amount of steam being introduced into the duct, downstream obstructions, and surfaces vulnerable to wetting.
- When steam distributors are located in a duct they should be in a straight section of duct at least 6 feet (2 meters) from any elbow or obstruction. If the duct or plenum conditions result in poor absorption distance characteristics, please consult your local representative or the factory.
- Steam distributors should always span the width of the air stream.
- Exercise extreme caution when installing in fiber glass or internally lined ducts. Care must be taken to ensure insulation does not absorb moisture.
- Low temperature ducts below 60°F (15°C), shallow ducts, or branch ducts might require the use of a field supplied condensate drain pan below the steam distributor. See Figure #5.

**Figure #5**  
**Condensate Drain Pan**

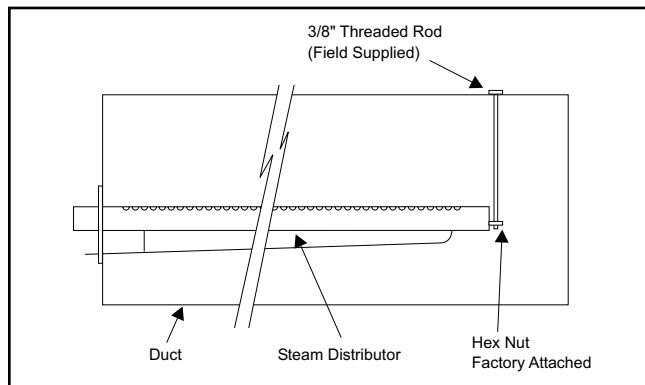


- The steam distributor mounting plate is perpendicular to the steam distributor. When the mounting plate is attached to the side of the duct, the distributor is level. An upward or downward slope to the distributor will result in poor condensate drainage and "spitting" of condensate in duct. See Figure #6.
- It is recommended that distributors be that mounted near the bottom of the duct to ensure the steam is dispersed into the majority of the air flow. See Figure #9.

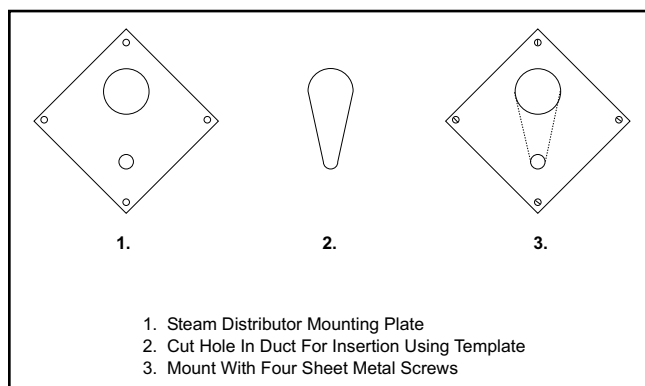
**Figure #6**  
**Leveling Distributor**



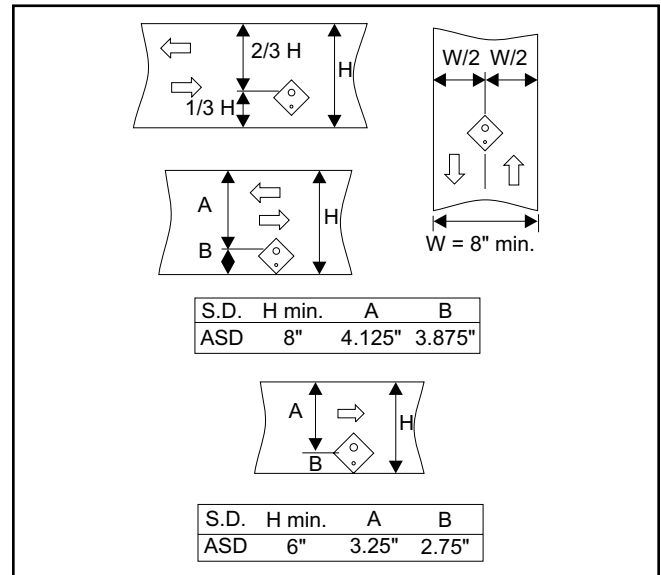
**Figure #7**  
**Distributor Support**



**Figure #8**  
**Cutting Duct For Mounting**



**Figure #9**  
**Single Steam Distributor Installation**



8. Using duct mounting template provided, cut a hole in side of duct just large enough to admit steam manifold and condensate drain pipe assembly. Use four sheet metal screws to attach mounting plate to side of duct. See Figure #8 and #9.

## **PLUMBING**

All water supply and drain line connections should be installed in accordance with local plumbing codes.

## **WATER SUPPLY LINE**

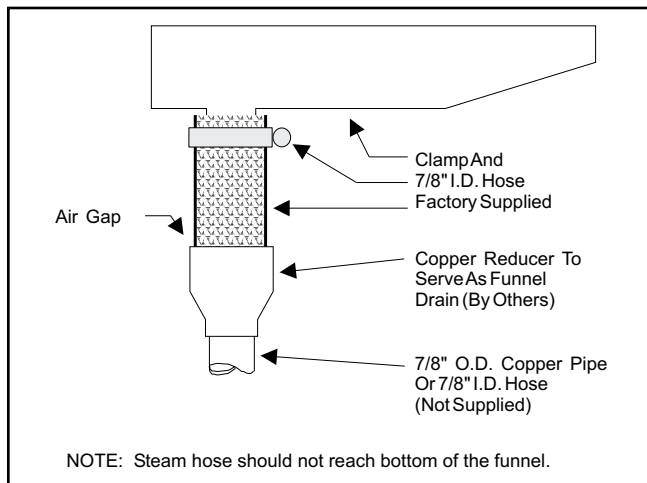
- Humidifier is intended to operate on potable (cold) tap water.
- If the raw water is very hard, NORTEC can provide longer cylinder life on softened water; however, softened water is more conductive and more corrosive. Some hardware changes may be required, at time of order or in the field. Consult factory.
- Reverse osmosis (RO) and Deionized (DI) water can provide very long cylinder life since it is cleaner than softened water. However, it is also more corrosive and it is a poor conductor of electricity. Consult factory. Deionized (DI) water simply does not conduct electricity and it is inappropriate for use with electrode steam humidifiers.
- DO NOT use a hot water supply to humidifier. Minerals will adhere more easily to surfaces and the fill valve's small flow regulating orifice and could become plugged.

5. ALWAYS supply and install a shut off valve in the water supply line dedicated to the humidifier to facilitate servicing. Use 1/2" O.D. copper to within 4 feet of the humidifier. Reduce copper to 3/8" O.D. and connect to the factory-supplied 3/8" olive compression fitting under the humidifier.

## **DRAIN LINE**

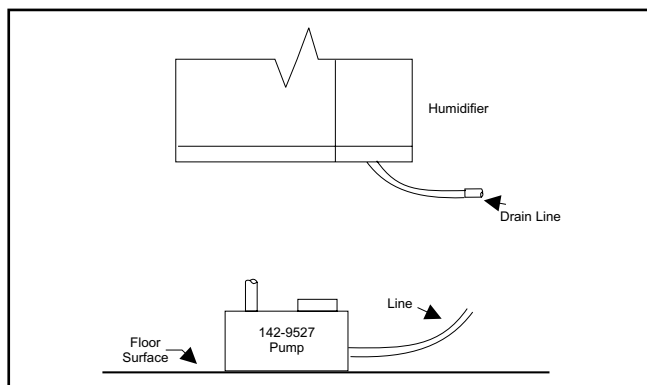
1. Humidifier is equipped with a 7/8" O.D. unthreaded drain outlet on underside of drain canal on bottom of the humidifier. A field-supplied funnel (see Figure #10) is recommended. It will prevent backup in the drain pan and in the cylinder due to partially blocked or poorly installed drain lines. This prevents rusting of the drain pan and arcing due to over-concentration. The drain canal has been designed to prevent backup despite long or gently sloped drain lines but it cannot compensate for flat or uphill runs.

**Figure #10**  
**Drain Connection**



2. The drain line should not end in a sink used frequently by personnel, or where plumbing

**Figure #11**  
**Drain Pump (if necessary)**



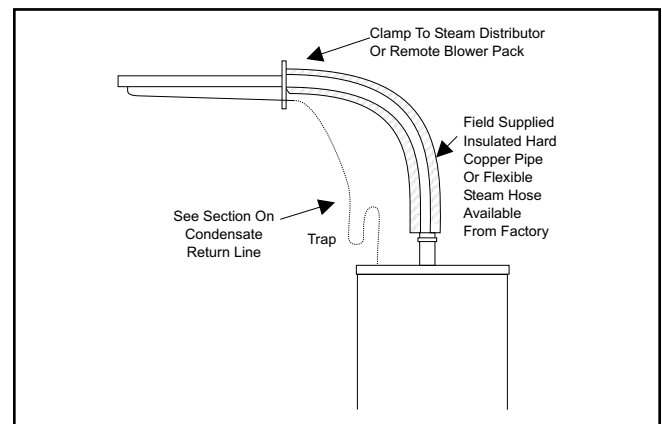
codes prohibit it. Route to a floor drain or equivalent for safety reasons, since drain water from humidifier can be very hot.

3. Keep drain lines as short as possible. Keep drain lines sloped down, not level and not up since low spots in drain lines will accumulate sediment and cause backup. The drain line should be 7/8" O.D. copper pipe or larger. Do not use plastic pipe for drain lines. Consult factory.

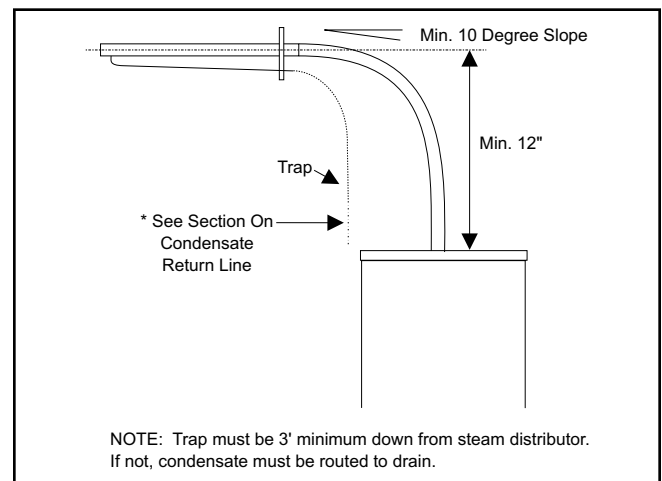
## **STEAM LINE**

1. Field-supplied hard copper with 1/2" thick snap-on insulation is recommended for steam supply, with NORTEC supplied steam hose coupling used to make connection to cylinder. See Figure #12.

**Figure #12**  
**Steam Line Connection**



**Figure #13**  
**Sloping The Steam Line**

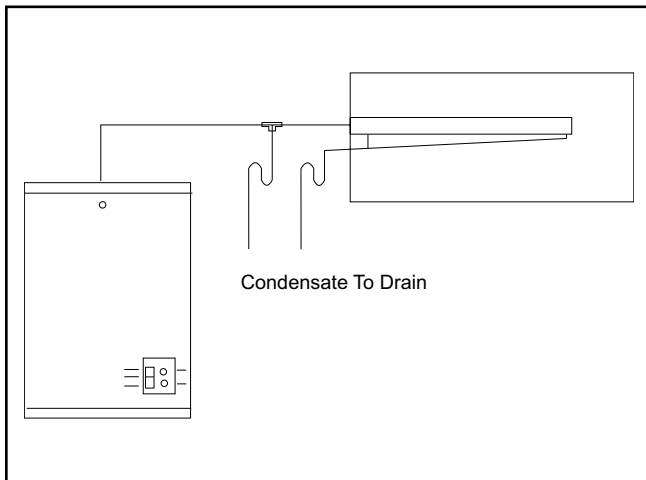


2. NORTEC steam supply hose or field-supplied piping should be sloped downwards from the steam distributors to the humidifier. Slope

should be at least 2" in 12" to promote condensate runback. See Figure #13. If this slope is not possible, condensate must be removed before the distributor. See Figure #14.

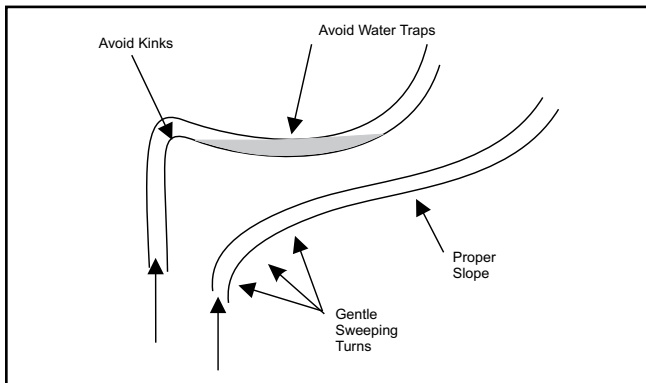
3. Minimize the length of steam line and keep it as straight as possible, minimizing bends. Also, avoid using 90° elbows. Wherever possible, use long radius turns (using tube bender on oversized copper or pairs of 45° elbows). This will reduce the condensate generated by heat loss.

**Figure #14**  
**Long Steam Lines**



4. Ensure that the steam hose does not kink or sag. The steam hose becomes more flexible when hot. The hose should be supported to prevent water traps. Only use steam hose for connections or steam lined runs of 5 feet or less. See Figure #15.

**Figure #15**  
**Steam Hose Routing**

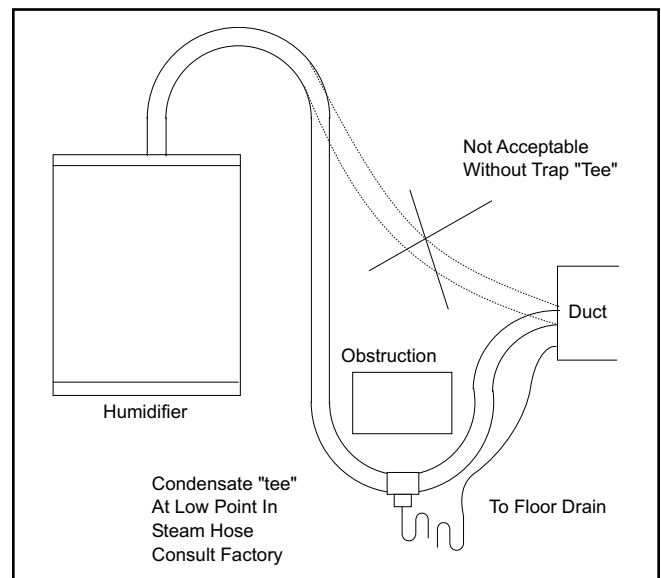


5. To ensure odor-free steam, always use NORTEC steam hose. Check steam hose and hose couplings periodically for cracks, breaks, kinks. Replace as required. DO NOT substitute

hose. NORTEC is not responsible for health effects or damage from substitute hose.

6. Steam lines require a minimum 7/8" O.D. (nominal 3/4") copper pipe. Do not run steam line more than 1 foot per lb/hr output. Example, 10 lbs/hr should not have a steam run longer than 10 feet.
7. Do not use steel or plastic pipe for steam distribution, or hose other than NORTEC supplied. Substitution will void warranty.
8. If steam line is routed below steam distributor or if the steam distributor is lower than the humidifier, a condensate trap 'tee' will be required to remove water at this low point. Run condensate from trap to nearest drain lower than the distributor. See Figure #16.

**Figure #16**  
**Condensate Tee At Any Low Point In Steam Line**



9.

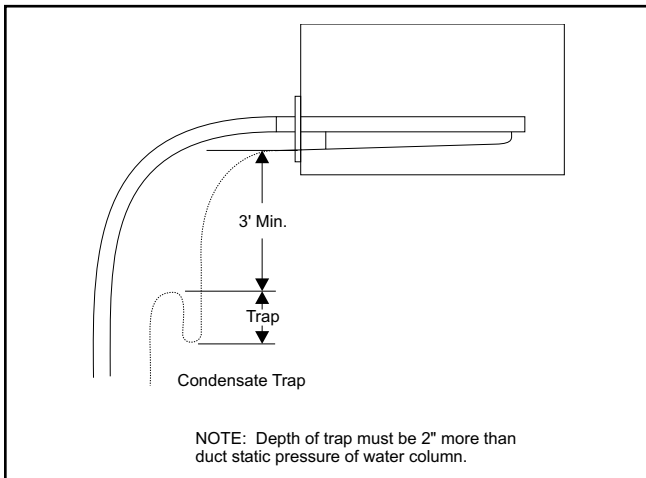
### **CONDENSATE RETURN LINE**

1. Each steam distributor has a built-in condensate return (3/8" O.D. copper tubing). Flexible condensate return hose (3/8" I.D.) available from NORTEC, is recommended for routing condensate back into humidifier's fill cup. Note: A short length of 3/8" O.D. copper tubing is supplied by NORTEC for use when routing condensate hose back to humidifier's fill cup. Similarly, a short length of 3/8" I.D. condensate hose with clamps is supplied with NORTEC's steam distributors to serve as a flexible coupling. DO NOT direct solder field copper condensate line to steam distributors.

2. Always incorporate a trap in routing of condensate return line. Condensate that accumulates in trap will prevent possibility of steam escaping. Depth of trap must exceed duct static pressure 2 inches of water column. See Figure #17.

**Figure #17**

**Trap To Prevent Steam In Condensate Line**



3. Condensate return line cannot be run back to fill cup if humidifier is within 12" of being level with steam distributor. See Figure #13.
4. If steam distributor is mounted level with or below humidifier, condensate line must be routed to nearest floor drain or to a condensate pump (available from NORTEC). See Figure #11.
5. Provide a "U" trap in condensate line even when distributor is located in return air plenum. It stops a suction action from impeding condensate flow when duct pressures are below atmospheric.
6. It is not necessary to return the condensate to the humidifier.
7. Condensate runs should be sloped well, runs over 20 feet should use 1/2" I.D. copper tubing to ensure flow.

## ELECTRICAL

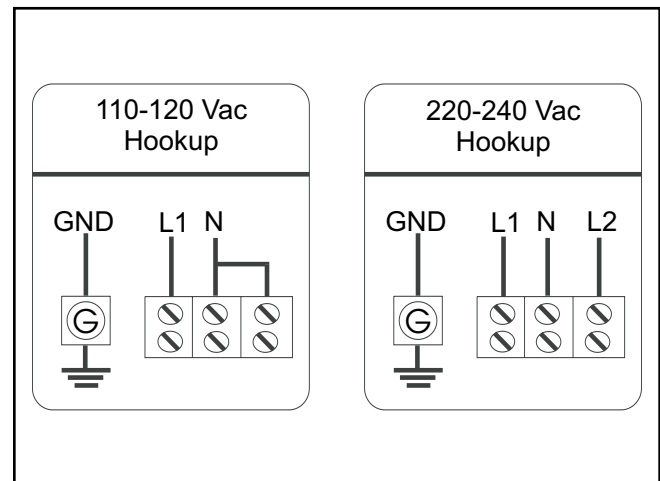
### PRIMARY VOLTAGE SUPPLY WIRING TO HUMIDIFIER

1. Check and ensure that available voltage and phase corresponds with operating voltage and phase of humidifier as indicated on the humidifier nameplate label (see Figure #1).

2. Ensure that an adequate power supply is available to carry full humidifier amperage drawn as specified by the rated amps on the humidifier's nameplate label refer to local codes.
3. A dedicated external disconnect must be installed. Do not exceed the maximum circuit protection amps indicated on the nameplate label.
4. Connect ground wire to cabinet ground clamp. Do not use neutral wire of four wire supply as ground.
5. External wiring sizes must be in accordance with NEC and/or CEC and existing local electrical codes and by-laws.

**Figure #18**

**Primary Voltage Supply Wiring**

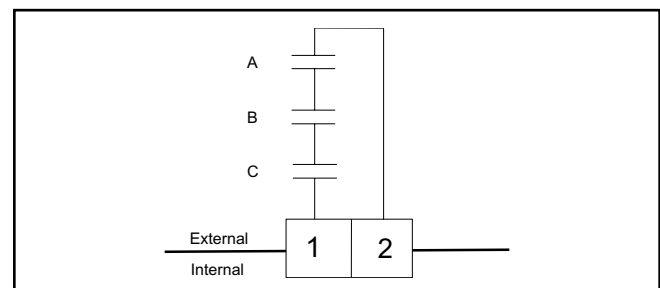


### LOW VOLTAGE CONTROL WIRING

#### On-Off Controls

**Figure #19**

**External Wiring Of On/Off Controls**



Controls are available from NORTEC as accessories. If controls were not ordered with humidifier, they must be supplied by others. The following information is relevant to all controls, factory supplied or otherwise.

A, B and C (described below) are to be wired in series (only one path for current) across terminals 1 and 2 on the low voltage control terminal. Caution: this is the “hot” wire from the 24V control transformer; it will blow the 2A fuse if any control field wiring touches ground metal.

#### A - Wall or Duct Mounted Control On/Off

Humidistat: Wired to make on drop in humidity, break on rise to setpoint. Set to desired % RH. Can be a make/break set of contacts from a Building Automation System.

#### B - Duct Mounted Safety High Limit On/Off

Humidistat (if used): Wired to make on drop in humidity, break on rise to safety setpoint. Set to approximately 85% RH as a safety to help prevent saturation and wetting in the duct.

#### C - Duct Mounted Safety Air-Proving On/Off

Switch (if used): Wired to make when sensing air flow, break when no air flow. Used as a safety to prevent saturation when no air flow.

1. NORTEC offers various versions of A, B and C to suit each application. In general, A is essential, whereas B and C are highly recommended in ducted applications.
2. Field wiring from the humidistat to the humidifier and between devices should be class 1 wiring rated 300 Vac minimum, 18 AWG or heavier and kept as short as possible
3. Low voltage control terminal strips are provided in the electrical compartment. Internal sides are factory wired. External sides are to be field wired.
4. Each humidifier is supplied with a wiring diagram inside.

### CONTROL INSTALLATION

1. Mount any wall humidistat (control or high limit) over standard electrical box at height similar to typical thermostat. Any wall humidistat should be in location representative of overall space being humidified and not in path of blower pack or air supply grille. Do not mount on an outside wall where temperature fluctuation can affect control response.
2. Mount duct humidistat in location representative of overall air humidity, usually return duct. Do not mount it directly in front of steam distributor or in turbulent or mixing zone. Mount it where air's humidity and temperature are uniform and representative of spaces being humidified.

3. Mount duct high limit humidistat downstream of steam distributors far enough that, under normal humidity and air flow conditions, steam will have been fully absorbed (typically at least 10 feet). It must be located to sense high humidity only when uniform and representative air is over-humidified or approaching saturation.
4. Mount duct air-proving switch so that it is able to sense air flow or lack of it. Wire it to make when air flow is sensed and break when air flow fails.
5. Check operation of all on/off controls before starting humidifier.

## OPERATION

### INTRODUCTION

The NORTEC NHU is designed to provide clean steam humidification at an economical price. It utilizes NORTEC's patented electronic Auto-Adaptive internal control system for high efficiency, low waste of water and electricity.

### NHU OPERATION

#### END OF CYLINDER LIFE

When the cylinder is used up and water level can no longer stabilize below full cylinder (due to fully coated electrodes), the red light will come on. The disposable cylinder must be replaced.

Although “red light on” is the same signal at startup as it is at end of cylinder life, the age of the cylinder enables the user to know when “red light on” is indicating end of cylinder life. It is wise to keep a new replacement cylinder on hand to avoid downtime when it becomes time to change the disposable cylinder. (See Maintenance & Troubleshooting section of this Manual.)

#### MANUAL CAPACITY ADJUSTMENT

The NHU humidifier is rated in lbs/hr of steam output capacity. Set to 100%, it will operate at full output until the humidistat has sensed that the humidity has reached setpoint. Then it will stop the humidifier by breaking control circuit 1-2.

If the humidifier is oversized, the humidistat will be quickly satisfied and stop the humidifier. As humidity level drops the humidistat calls again. It is quickly satisfied and stops again. The resultant short-cycling is easily overcome. A manual capacity adjustment potentiometer is provided on the NHU main PC board for that purpose. It is marked “CAPACITY

ADJUSTMENT” and is adjustable from 20 to 100% of rating.

### **OTHER POTENTIOMETERS**

Do not adjust any other potentiometers on the PC board(s). Doing so will affect the units operation and will void warranty.

## **MAINTENANCE**

**WARNING!** The plumbing and electrical compartments contain high voltage components and wiring. The access door is equipped with a lock. Access should be limited to authorized personnel only.

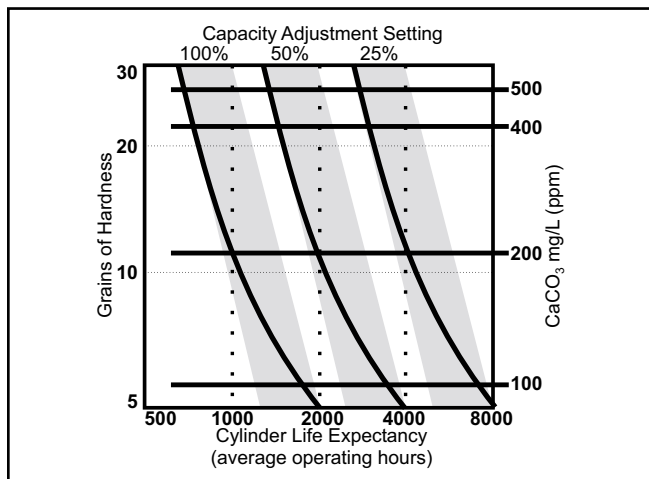
### **WHEN TO REPLACE THE STEAM CYLINDER**

The steam cylinder is disposable and must be replaced at end of cylinder life. Cylinder life is dependent on water supply conditions and humidifier usage. Failure to replace the cylinder at the end of cylinder life may result in unit damage. NORTEC is not responsible for any damages resulting from, or attributable to, the failure to replace a used cylinder (see Manufacturer's Warranty). There are many indications, each of which signifies the end of cylinder life.

### **NHU**

1. After a period of operation (not on initial startup), the water level will approach the top of the cylinder. (Life varies from 500 to 2000 operating hours, as illustrated in Figure #20.)

**Figure #20**  
**Water Conditions vs. Cylinder Life**



2. There will be reduced output in spite of a 100% capacity setting and/or an unsatisfied call from the on/off humidistat for more humidity.
3. When the red status lamp is on, the water level is detected as being at the top of the cylinder. This is normal on startup, but as the contained water concentrates, the water will stabilize at a lower water level and the red lamp will be off.
4. When the cylinder is fully used, the water level will have returned to the top of the cylinder. Since there is no longer any clean electrode surface available at end-of-cylinder-life, the required steam output rate can no longer be maintained.

### **HOW TO REMOVE THE STEAM CYLINDER**

It is advisable to keep a spare cylinder in stock throughout the humidification season. When ordering a replacement steam cylinder, always quote the three or five digit model number on the label applied to the cylinder or quote the unit's serial number, model and voltage located on the spec label (nameplate). To remove the cylinder:

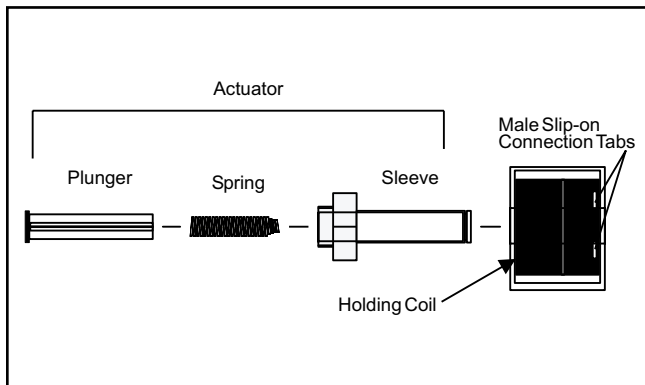
1. Turn off water supply to unit.
2. The used cylinder must be drained completely before removal. If the water has just been boiling, allow it to cool before draining. Push the ON/OFF/DRAIN switch to the MANUAL DRAIN position. Leave it in this position just long enough to drain the cylinder (usually less than 10 minutes).
3. When completely drained, push the main ON/OFF/DRAIN switch back to the OFF position.
4. Once drained, turn off the main electrical disconnect to the humidifier during the entire cylinder change operation.
5. Open front cover door.
6. Cylinder plugs are attached to the primary voltage cylinder wires. (The plugs remain attached to the wires unless they have to be replaced due to damage.) The plugs are press-fitted over the electrode pins protruding from the top of the cylinder. Remove cylinder plugs from cylinder by pulling vertically.
7. Using slot screwdriver, loosen the steam hose clamp(s) and pull steam hose off the cylinder vertically.

- Cylinder is now ready to be lifted out of the unit.  
**CAUTION:** Cylinder and any undrained water might still be HOT.

## MANDATORY CLEANING OF THE DRAIN VALVE

Always clean the drain valve before installing a new cylinder since the valve port may be as dirty as the used cylinder.

**Figure #21**  
**Reassembly Of The Drain Valve And Fill Valve**

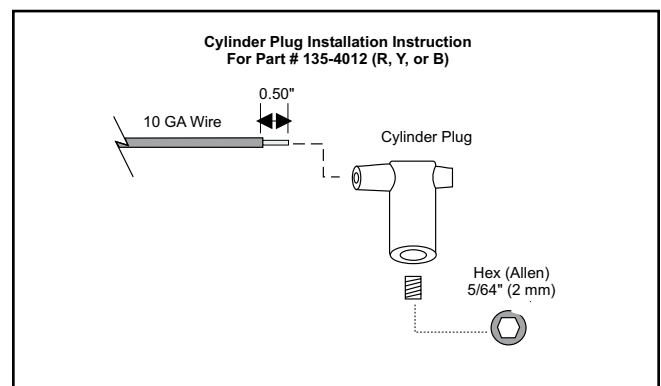


- Remove used cylinder as previously described. NORTEC does not recommend the use of any acid solutions to clean the used cylinder. Always replace a used cylinder.
- Note that ring terminal for drain valve green ground wire is sandwiched between drain valve body and drain pan.
- Remove two screws securing drain valve body to drain pan. Disconnect the two slip-on terminals from the two tabs on the (24 Vac) drain valve coil.
- Remove hose clip and hose connection from drain valve body.
- Drain valve assembly is now free to be taken to a sink for disassembly and cleaning.
- Remove snap-fit red cap from coil assembly and slide coil off the actuator.
- Loosen actuator with wrench and unscrew from plastic valve body.
- Clean the exposed core and spring and plastic drain valve port.
- Important: Tapered end of spring must be installed toward the solenoid. Reassemble, tighten actuator 1/4 turn past hand-tight.
- Clean out the end of the hose, then reconnect it to the drain valve body with the clamp.
- Fit mounting screws through drain valve body, one through ring terminal on green ground wire.
- WARNING:** To prevent the possibility of electrical shock the green ground wire must be reinstalled before power is restored.
- Push the two slip-on terminals back onto the two tabs on the coil. The terminals, although not identical, are reversible.

## HOW TO INSTALL THE REPLACEMENT CYLINDER

- Reverse procedure should be followed to install a new cylinder. Main disconnect is to be left open until cylinder is completely installed and reconnected.
- The cylinder plug wires are color-coded in accordance with colored dots beside the electrode pins on top of the cylinder.
- This color-coding must be adhered to when replacing cylinder plugs on pins.
- The white cylinder plug on all units is for the sensor electrode which always goes on the single pin surrounded by a plastic shoulder.
- Ensure that cylinder plugs fit snugly on the pins.
- If cylinder plugs become loose, it is best to obtain a new replacement plug. Consult factory.

**Figure #22**  
**Cylinder Plug Installation Instruction**



## EXTENDED SHUTDOWN

Before disconnecting power to the humidifier for a period of extended shutdown, **ALWAYS DRAIN** the cylinder first. Otherwise, the electrodes are subject to

harmful corrosion which drastically shortens cylinder life. Do NOT leave the switch in the DRAIN position indefinitely as the drain coil could burn out. Leave the switch in the OFF position and "open" the main external fused disconnect to stop power to the humidifier. Close the shut off valve in the water supply line feeding the humidifier. Lock the cabinet door(s) to prevent unauthorized tampering. All doors are factory supplied with keyed locks. DO NOT LEAVE KEY IN LOCK. ACCESS SHOULD BE LIMITED TO AUTHORIZED PERSONNEL ONLY.

## TROUBLESHOOTING

PLEASE READ THIS SECTION BEFORE  
REFERENCING SPECIFIC DIAGNOSTIC  
MESSAGES.

1. Ensure the installation detail conforms with the recommendations contained in the Installation section of this manual.
2. Understanding the Principle of Operation is an asset when troubleshooting. This information is readily available from your local representative.
3. When contacting your local representative or NORTEC, for troubleshooting assistance, please ensure the serial number has been obtained for reference purposes.
4. Whenever the troubleshooting steps indicate a problem with the main PCB, first check all connections at the main control board.

## TERMS USED

**RATED AMPS:** Refers to amps listed on the humidifier specification label.

**SHORT CYCLING:** When the 'on time' of the humidifier is less than ten minutes upon a call for humidity. To correct short cycling, all humidifiers have a capacity adjustment which allows the output of the humidifier to be reduced to as low as 20% of rated output, thus extending the 'on time' required to maintain output.

**FOAMING:** The phenomenon which can occur in water when the impurities, already in the water, reach an excess concentration as a result of froth forming on the water. The humidifier electronics are designed to prevent this occurrence although in extreme cases water will foam with little concentration, making it necessary to have the drain time of the water, contained in the cylinder, increased. Foaming is normally caused by short cycling, a restricted drain, or back pressure. The foam, generated in these

instances, is conductive and may lead to a false full cylinder indication if the level of the foam approaches the top of the cylinder.

**BACK PRESSURE:** Restriction of steam flow caused by long steam runs, improperly sloped steam lines, elbows changing the direction of the steam flow from horizontal to vertical without a drain leg, any plumbing detail allowing the accumulation of condensate, undersized steam line, improper steam distributor installation and downward air flow onto the distributor creating excess static pressure at the steam outlets or high static pressure ducts (not probable). To overcome excess static pressure in the duct, a fill cup extension kit should be used. In downflow applications, a downflow distributor should be used but in some cases the fill cup extension will also be required in all other cases fix installation.

**MONITORED LEG:** Refers to the primary wire, to the cylinder, which loops through the current sensing device on the main PCB. This wire is terminated at the red cylinder plug at the cylinder.

## STARTING POINT

If nothing is working, check for 24 Vac output from the stepdown transformer (see wiring diagram). If there is no 24 Vac output, the transformer might have been damaged if external controls were installed and/or connected with the field-supplied fused disconnect on. If this is the case, the transformer fuse must be checked.

The conductivity of the water within the cylinder must be controlled in order for the humidifier to function properly. The fill and drain rates must be maintained. Filling too quickly can cause over-amping and automatic shutdown or blown fuses. Filling too slowly can cause insufficient steam output and humidity levels. Water supply pressure should be between 30 and 80 psig, ideally 55 to 60 psig. Draining too slowly can cause over-concentration and malfunction due to foaming. These are just some examples of what can go wrong if the fill and drain rates are not maintained.

To verify the fill rate of suspect units - Open the disconnect to cut off all power in the humidifier before reaching inside. One of the 24 Vac wires to each primary voltage contactor holding coil should be temporarily disconnected for this test. This way, no boiling occurs during the test so as not to detract from the fill rate. Turn power pack on to ensure call for humidity to ensure fill valve activation. Fill rates should measure nominally at 1" to 1-1/2" of vertical rise in water level in the cylinder in one minute.

Manual drain rates of suspect units should be checked using Figure #23 as reference times.

**Figure #23**  
**Manual Drain Times**

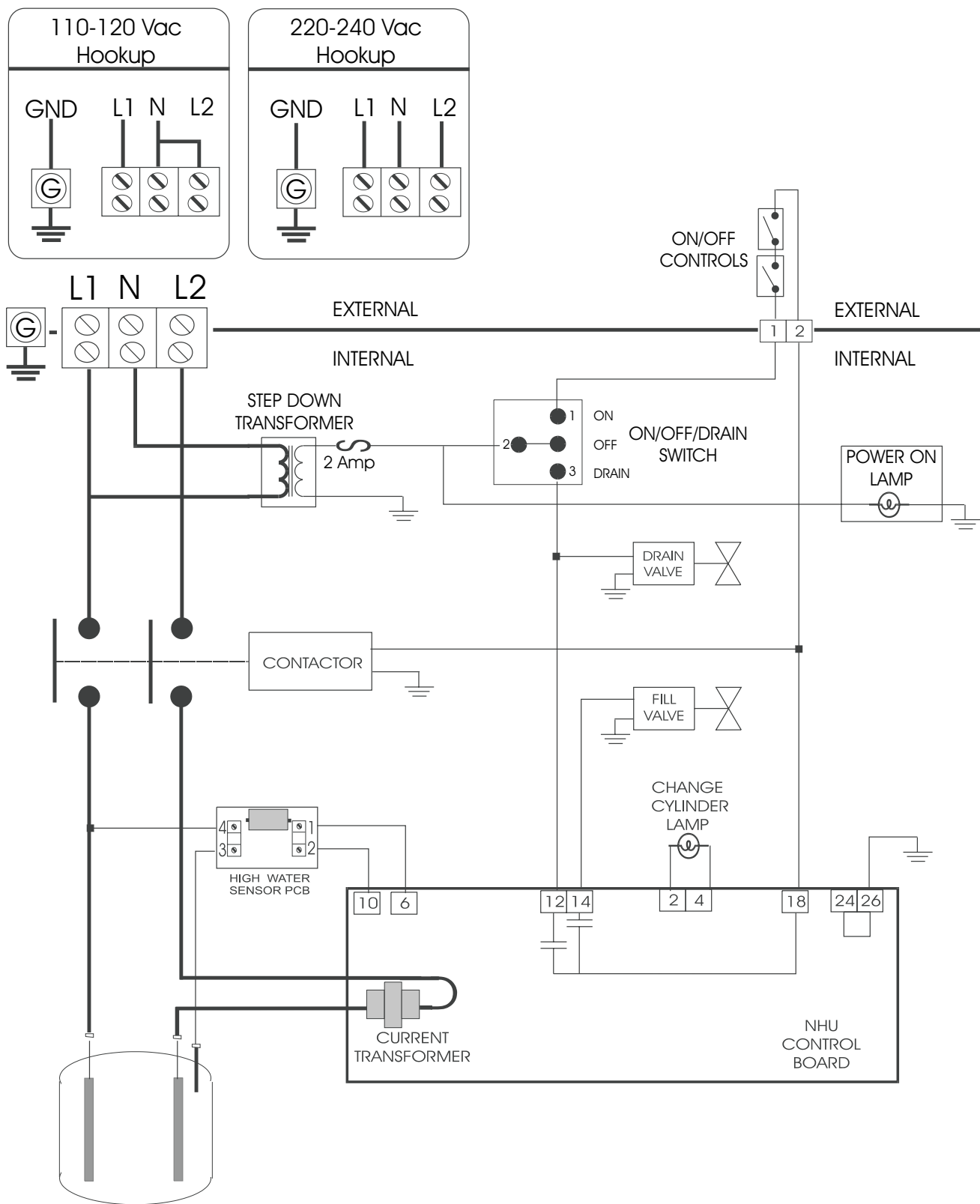
| <b>CYL. SIZE<br/>(SERIES)</b> | <b>PROPER TIME (sec) TO DRAIN MANU-<br/>ALLY FROM SEAM TO EMPTY<br/>BEIGE BODY DRAIN VALVE</b> |
|-------------------------------|------------------------------------------------------------------------------------------------|
| 200                           | 25 seconds $\pm$ 1 second                                                                      |

If time measurements are longer, repeat with external drain disconnected (and draining into a pail) to know if external drain is impeding flow.

Drain can also be restricted by a clogged strainer and/or clogged drain valve which would result in shortened cylinder life. Clean and determine what caused the strainer and/or drain valve to clog in the first place.

Do not assume that if strainer and/or drain valve are clogged that they are to blame. If the external drain has been impeding flow then waste accumulates resulting in a clogged strainer and/or clogged drain which, in turn, results in shortened cylinder life.

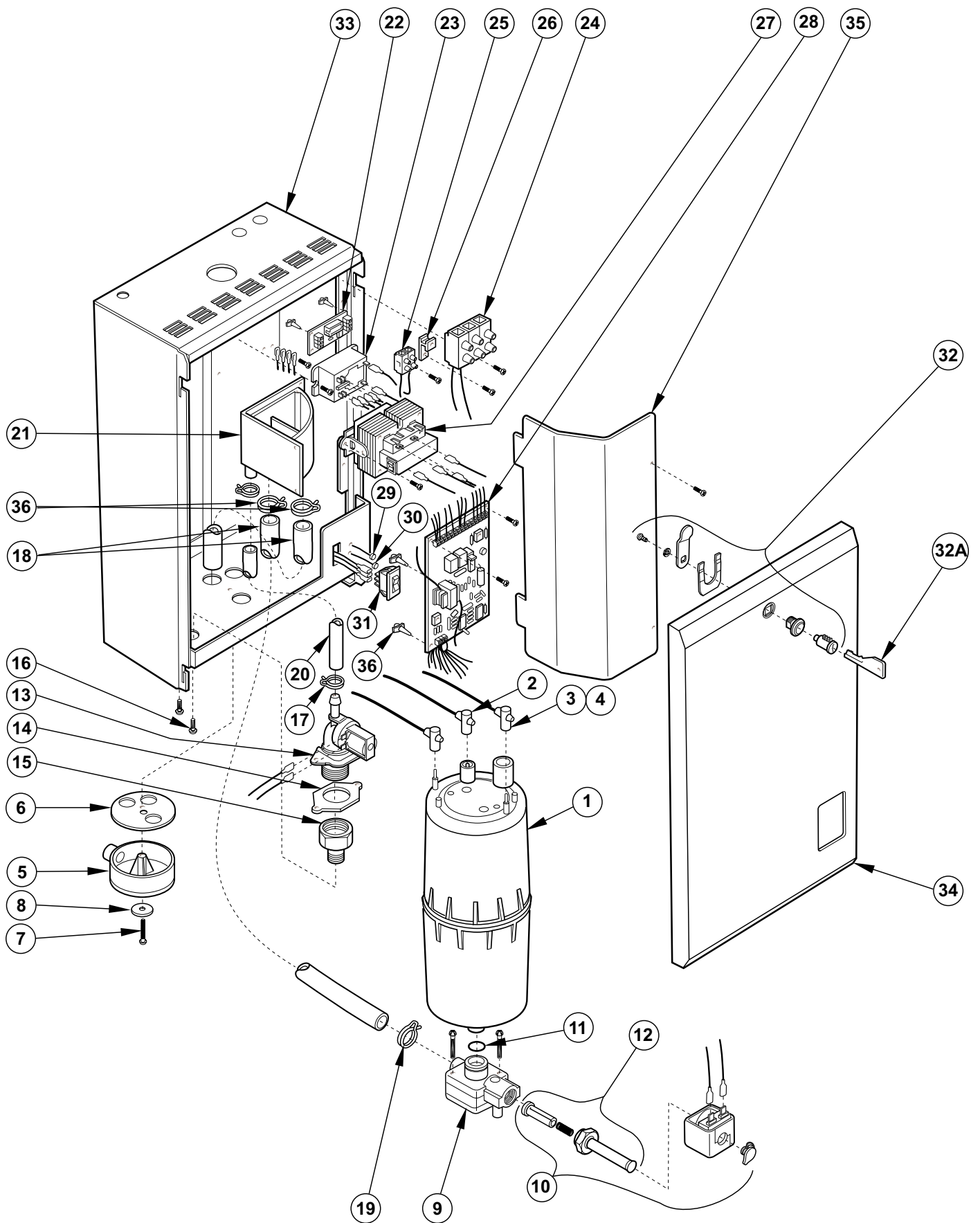
Clean the drain valve and install a fresh cylinder. Then measure the manual drain time with and without the external drain connected. Is the external drain impeding flow? NORTEC recommends an open external drain line. See Installation section of this manual.



## NHU HUMIDIFIER

WIRING DIAGRAM No. NHU0001E Rev. E October 23, 1998

| Item Number | Part Number | Description                           | Quantity       |
|-------------|-------------|---------------------------------------|----------------|
| 1           | 151-9002    | Cylinder Type 202                     | 1              |
| 2           | 132-4047    | Sensor Plug                           | 1              |
| 3           | 135-4012R   | Spring Loaded Cylinder Plug - Red     | 1              |
| 4           | 135-4012B   | Spring Loaded Cylinder Plug - Black   | 1              |
| 5           | 132-1216    | Drain Canal                           | 1              |
| 6           | 163-1026    | Gasket For Round Drain Canal          | 1              |
| 7           | 132-5064    | Support Screw For Drain Canal         | 1              |
| 8           | 132-0546    | Washer For Round Drain Canal          | 1              |
| 9           | 132-6003    | Drain Valve 3 Piece Assembly          | 1              |
| 10          | 132-6002    | Drain Valve Coil Assembly             | 1              |
| 11          | 132-6004    | Drain Valve O-Ring                    | 1              |
| 12          | 132-6002K1  | Drain Valve Plunger Assembly          | 1              |
| 13          | 131-3244    | Fill Valve Assembly                   | 1              |
| 14          | 145-5000    | Fill Valve Gasket                     | 1              |
| 15          | 149-5072    | Brass Fitting And Washer              | 1              |
| 16          | 145-5004    | Screws For Fill Valve                 | 2              |
| 17          | 132-5023    | Spring Clip For Fill Hose             | 2              |
| 18          | 132-8860    | Fill Cup Drain Hose                   | Specify Length |
|             |             | Fill Cup Overflow Hose                | Specify Length |
| 19          | 132-5035    | Spring Clip For Drain/Overflow Hose   | 4              |
| 20          | 132-8850    | Fill Cup Fill Hose                    | Specify Length |
| 21          | 142-1050    | Fill Cup (Wedge)                      | 1              |
| 22          | 147-4993    | High Water Sensor Board               | 1              |
| 23          | 158-3001    | Contactor Relay                       | 1              |
| 24          | 163-1050    | Three Pole Terminal Block             | 1              |
| 25          | 158-3002    | Two Pole Low Voltage Terminal Strip   | 1              |
| 26          | 132-3020    | Ground Connector                      | 1              |
| 27          | 170-3120    | Transformer 120/24 Vac                | 1              |
| 28          | 158-1340    | NHU Control Board                     | 1              |
| 29          | 158-3005    | Green Unit On Lamp c/w Lens (24 Vac)  | 1              |
| 30          | 132-3099    | Red High Water Lamp c/w Lens (14 Vdc) | 1              |
| 31          | 132-3097    | On/Off/Drain Switch                   | 1              |
| 32          | 185-3101    | Key Lock Assembly                     | 1              |
| 32A         | 185-3102    | Key For Lock Assembly                 | 1              |
| 33          | 158-7101    | NHU Cabinet                           | 1              |
| 34          | 158-7102    | NHU Door                              | 1              |
| 35          | 158-7103    | High Voltage Compartment Cover        | 1              |
| 36          | 158-3010    | P.C. Board Nylon Standoffs            | 1              |
| Not Shown   | 132-8810    | Steam Hose                            | Specify Length |



# LIMITED WARRANTY

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NORTEC INDUSTRIES INCORPORATED and/or NORTEC AIR CONDITIONING INDUSTRIES LIMITED (hereinafter collectively referred to as THE COMPANY), warrant for a period of two years from date of shipment, that THE COMPANY's manufactured and assembled products, not otherwise expressly warranted (with the exception of the cylinder) 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.

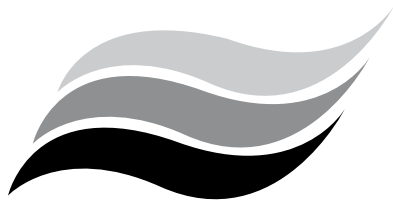
THE COMPANY's limited warranty on accessories, not of NORTEC's manufacture, such as controls, humidistats, pumps, etc. is limited to the warranty of the original equipment manufacturer from date of original shipment of humidifier.

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

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# **Nortec<sup>®</sup>**

WHEN YOU NEED HUMIDITY

Model #: \_\_\_\_\_

Serial #: \_\_\_\_\_

Cylinder #: \_\_\_\_\_

Cylinder Last Replaced:



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