

Installation, Operation, Maintenance, and Troubleshooting Guide



IMPORTANT: Read and save these instructions. This guide to be left with equipment owner.

Table Of Contents

INSTALLATION	1
RECEIVING & UNPACKING EQUIPMENT	1
PRE-INSTALLATION CHECKPOINT	1
BASIC HUMIDIFIER CONFIGURATION	1
LOCATION & MOUNTING	2
HUMIDIFIERS	2
BLOWER PACKS	3
STEAM DISTRIBUTORS AND SHORT ABSORPTION MANIFOLD	3
PLUMBING	6
WATER SUPPLY LINE	6
DRAIN LINE	6
STEAM LINE AND CONDENSATE RETURN LINE	7
ELECTRICAL	7
PRIMARY VOLTAGE SUPPLY WIRING TO HUMIDIFIER	7
PRIMARY VOLTAGE SUPPLY WIRING FROM HUMIDIFIER(S) TO BLOWER PACKS	7
LOW VOLTAGE CONTROL WIRING	9
CONTROL INSTALLATION	9
OPTIONAL MODULATION (CONTINUOUS CONTROLS)	10
OPTIONAL MODULATION (CONTINUOUS CONTROL) PACKAGES BY NORTEC	11
OPERATION	11
INTRODUCTION	11
LAYOUT AND FUNCTION	11
LEVEL REGULATION	11
STEAM GENERATION REGULATION	12
FLUSHING	12
SCALE COLLECTOR TANK	12
NHSC/ NHDI OPERATION	12
STARTING OPERATION	12
INTERROGATION OF THE OPERATING STATUS	14
MAINTENANCE	17
NOTES ON MAINTENANCE	17
DISMANTLING AND REASSEMBLY WORK	18
NOTES ON CLEANING	18
FAULT ELIMINATION	19
SCALE TANK SERVICING	20
REPLACING UNIT FUSES	21

RESETTING FAULT INDICATION "ERROR"	21
HEATING ELEMENT REPLACEMENT INSTALLATION INSTRUCTIONS	21
TROUBLESHOOTING	23
CONTROL CIRCUIT TERMINAL BLOCK	25
PRE-START-UP CHECKLIST	26
START-UP CHECKLIST	27
MAINTENANCE CHECKLIST	28
EXPLODED VIEWS	30
WIRING DIAGRAMS	34

INSTALLATION

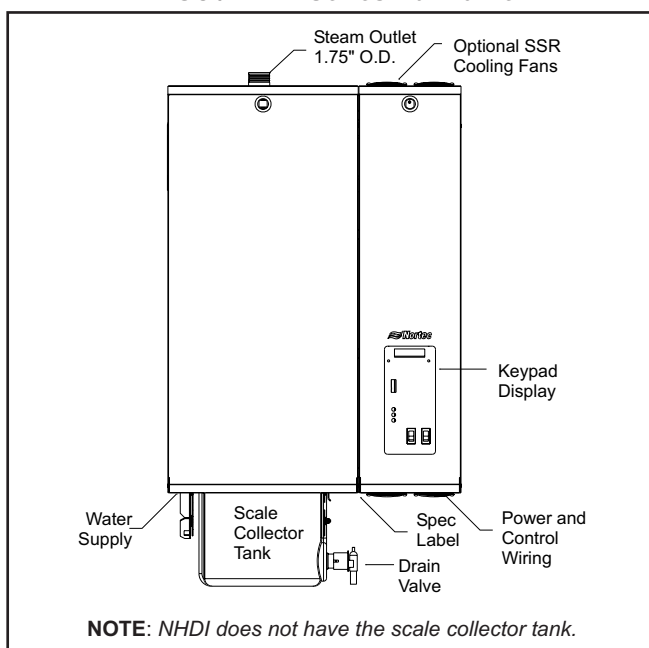
RECEIVING & UNPACKING EQUIPMENT

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 spec label (see Figure #1).
2. Ensure that the dedicated external disconnect is of sufficient size to handle the rated amps

Figure #1
NHSC / NHD Series Humidifier



as indicated on the spec label. Refer to local codes.

3. Report any discrepancy immediately.

BASIC HUMIDIFIER CONFIGURATION

NORTEC NHSC / NHD humidifiers share a modular sheet metal cabinet. Each unit has a right side electrical compartment. Each electrical compartment has a hinge-down front door which is removable from any partially or fully opened position. Each electrical compartment has a screw-mounted right side cover which can open for ease of electrical connection. For safety, the door when closed keeps the side cover from being opened.

Single units have a plumbing compartment attached to the left side of the electrical. Double units have a second plumbing compartment. Each plumbing compartment has a hinge-down front door. For safety, the door must be closed in order to engage the safety interlock. To avoid any danger, never operate the humidifier with a door off.

To open the doors, unlock, lift door up slightly and pull top of door forward. Door will hinge 180 degrees and hang straight down. To remove door, swing door parallel to floor. Then lift up slightly and out. To reinstall door, hold parallel to floor and insert hinge pins at bottom.

Figure #2
Minimum Steam Line Clearance

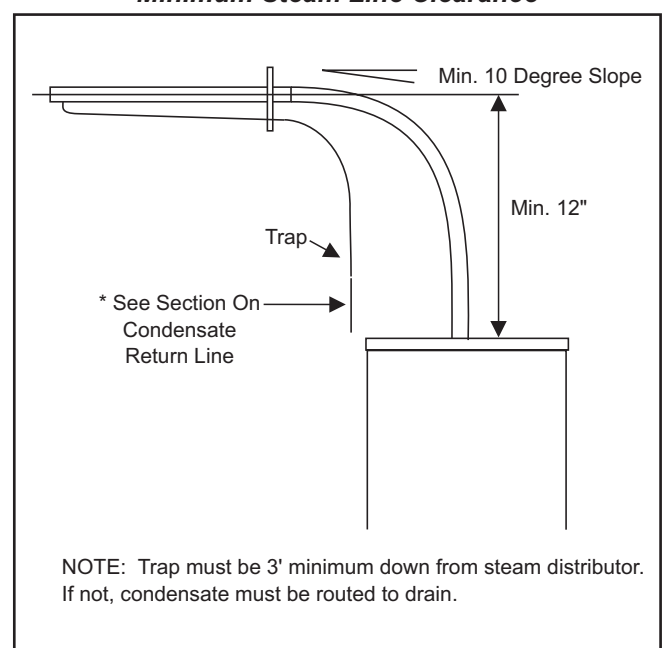
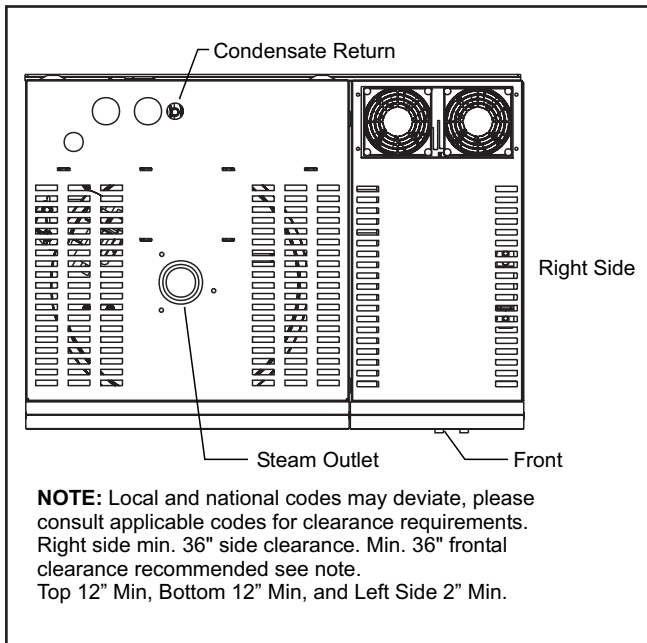


Figure #3
Clearance Required (Top View)

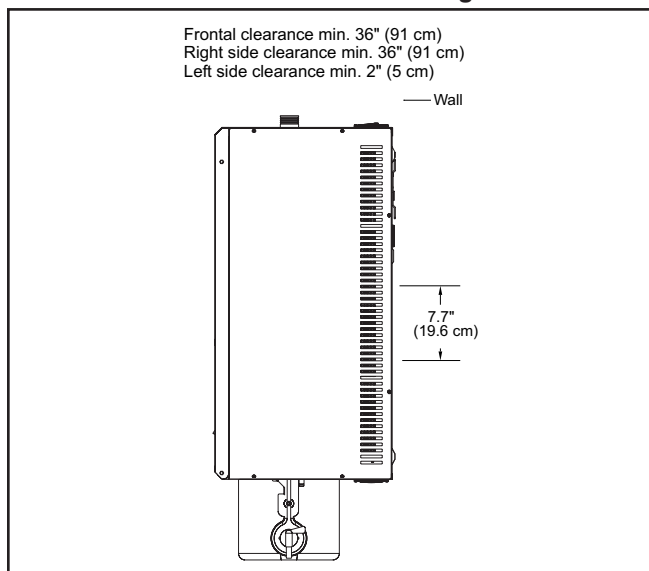


LOCATION & MOUNTING

HUMIDIFIERS

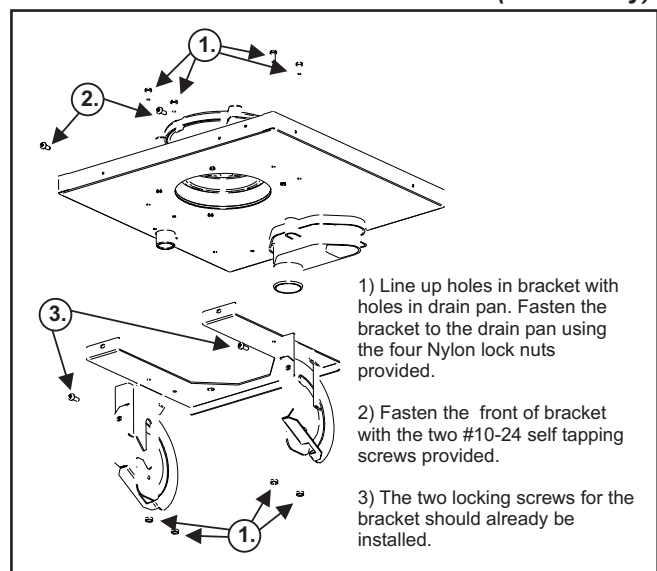
NHSC / NNDI Series humidifiers are designed to mount on a suitable wall or vertical surface. Do not sit the unit on floor due to clearances required for plumbing, electrical, and control entrances. The clearance dimensions shown in this manual are for reference only and are the minimum required for maintenance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

Figure #4
Wall Bracket Mounting



1. Location of the humidifier should be below and as close as possible to the steam distributor location. If possible, DO NOT locate humidifier any further than absolutely necessary from steam distributor location, as controllability and net output will be reduced as a result of heat loss through the steam hose (see Steam Distribution Engineering Manual).
2. Where possible, mount humidifier at a height convenient for servicing.
3. Wall mounting bracket provided should be securely attached horizontally and open edge facing upwards, using field-supplied fasteners. For a single unit, use a minimum of 4 - #12 x 3" long wood screws. For a double unit, use a minimum of 6 - #12 x 3" long wood screws. These screws must be fastened securely on a 2 x 4 wood stud or equivalent support. If any spacer material is used between the bracket and the structural material such as drywall, increase fastener length accordingly. In addition, install a minimum of 2 field supplied fasteners in the holes provided in the back of the unit to prevent the unit from being bumped off the wall bracket. See Figure #4.
4. Mount unit on hanging bracket after ensuring the bracket is properly anchored to the wall. Raise the unit and place it on the hanging bracket ensuring that the flanges in the mounting bracket are properly aligned and centered with the flanges of the unit. Push the unit in towards the wall to properly interlock the two flanges. Note: This will result in the unit shifting slightly down. Ensure that the hanging bracket's flanges are fully engaged

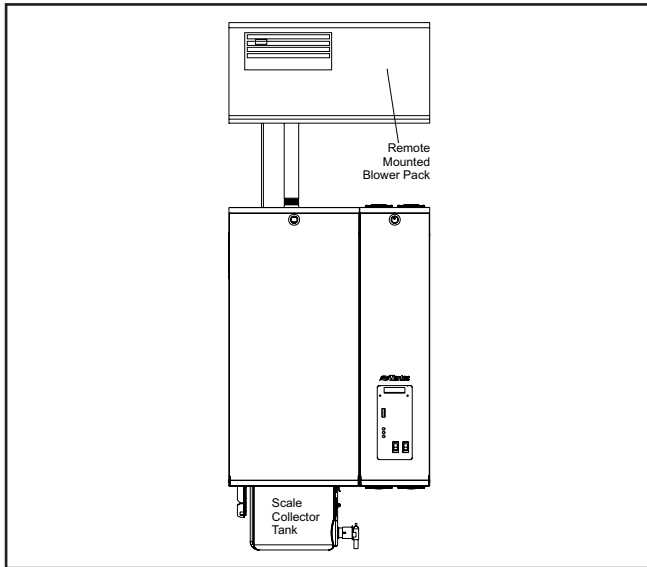
Figure #5
Installation of the Scale Tank Bracket (NHSC only)



and visible from within the plumbing section of the unit, and that the unit's flanges are properly contained within the wall bracket.

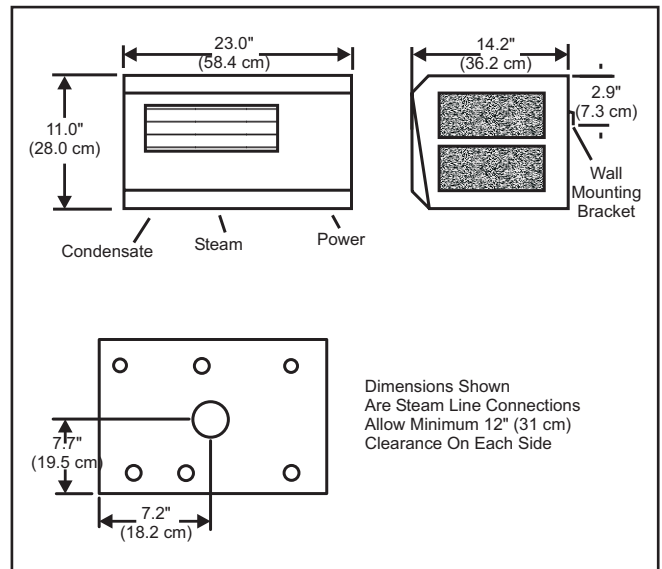
5. Install tank bracket. See Figure #5. (NHSC Version only). Mounting the scale tank. (NHSC Version only).

Figure #6
Remote Mounted Blower Pack



6. Make sure humidifier is level.
7. DO NOT mount humidifier on hot surfaces.
8. If humidifiers are mounted on roof, a thermostatically ventilated weatherproof

Figure #7
Remote Mounted Blower Packs (RMBP)



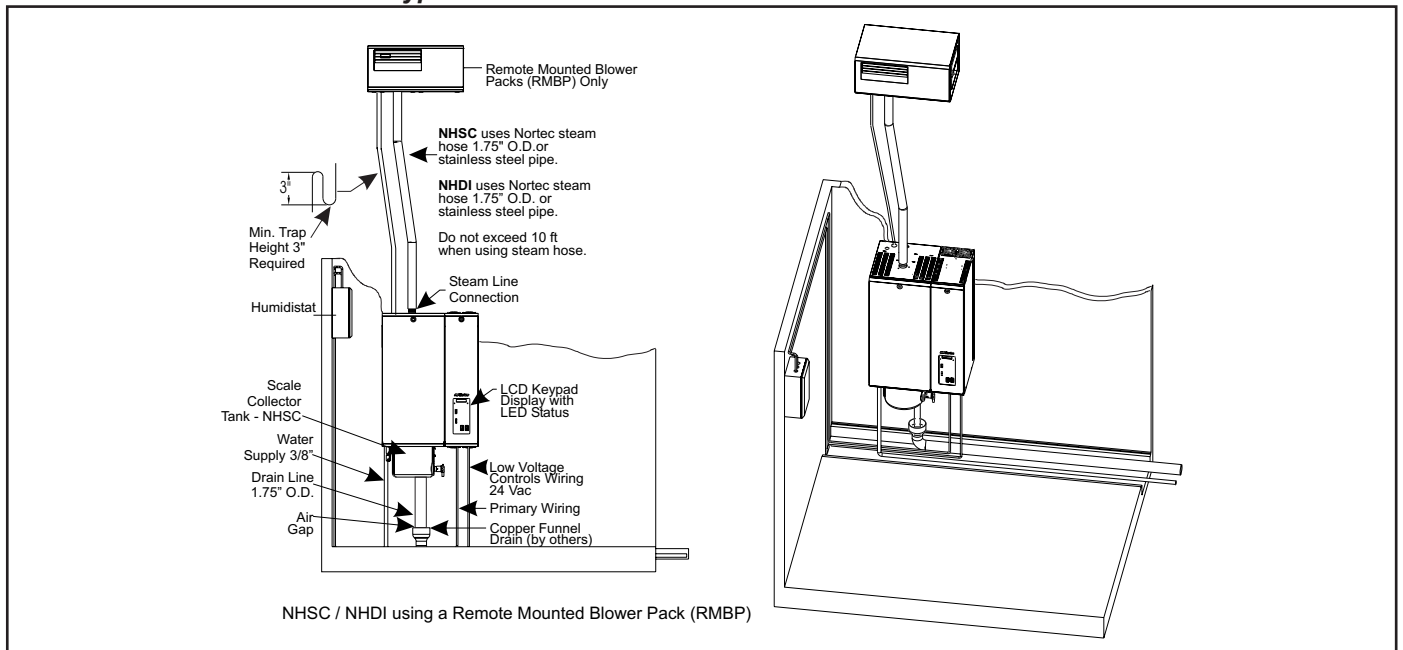
cabinet provided by others should be used. Consult factory.

9. DO NOT mount humidifiers on vibrating surfaces or duct work.

BLOWER PACKS

1. Blower packs are an optional accessory used to directly distribute steam to localized areas (such as computer rooms) or in structures that do not have a built-in air distribution system.

Figure #8
Typical Remote Mounted Blower Pack Installation



NHSC / NHDI using a Remote Mounted Blower Pack (RMBP)

2. All NHSC / NHDl Series blower packs consist of a steel cabinet containing: blower/motor powered by voltage directly from the humidifier, fuse, relay, speed select switch, stainless steel steam distributor, supply air grille with adjustable louvers, and a built-in manual reset safety thermostat to turn off the humidifier if the blower pack gets overheated. Control thermostat, mounted on the steam distributor, starts the fan when steam is generated. When supply voltage differs from voltage required to run blower motor, the blower pack will contain the proper transformer. All blower packs provide intake air filters, if required.
3. For installation details about the blower pack, please refer to the blower pack installation manual located in the blower pack box, Form #XX-277.

STEAM DISTRIBUTORS AND SHORT ABSORPTION MANIFOLD

1. Steam distributors are an optional accessory used to directly distribute steam to localized areas (such as computer rooms) which are served by ducted air. These distributors are made of stainless steel and are mounted level to the duct.
2. The SAM-e optional accessory has the same function, to distribute steam inside a duct. The only difference is that this system is designed to reduce the absorption distance of the steam in the duct by optimizing the steam distributors.
3. **Each cylinder requires its own steam line and at least one distributor (do not join two or more cylinders to one larger steam line).** Any cylinder's steam line may be divided into multiple branches to feed more than one distributor. Steam supply line "tees" are common stainless fittings that are available for this purpose.
4. Steam distributor locations are typically as follows: supply air duct, return air duct, 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.
5. The NHSC / NHDl can overcome 6" of W.C. duct static pressure max. Consult the factory if you exceed 6" of W.C.

6. For installation details, please refer to the installation manual located in the Steam Distributor box, Form #XX-231.
7. For calculating absorption distances, refer to H.E.L.P. Software or the Steam Distribution Engineering Manual, Form #XX-232.

Figure #9
Typical AHU / Duct Application using a SAM-e

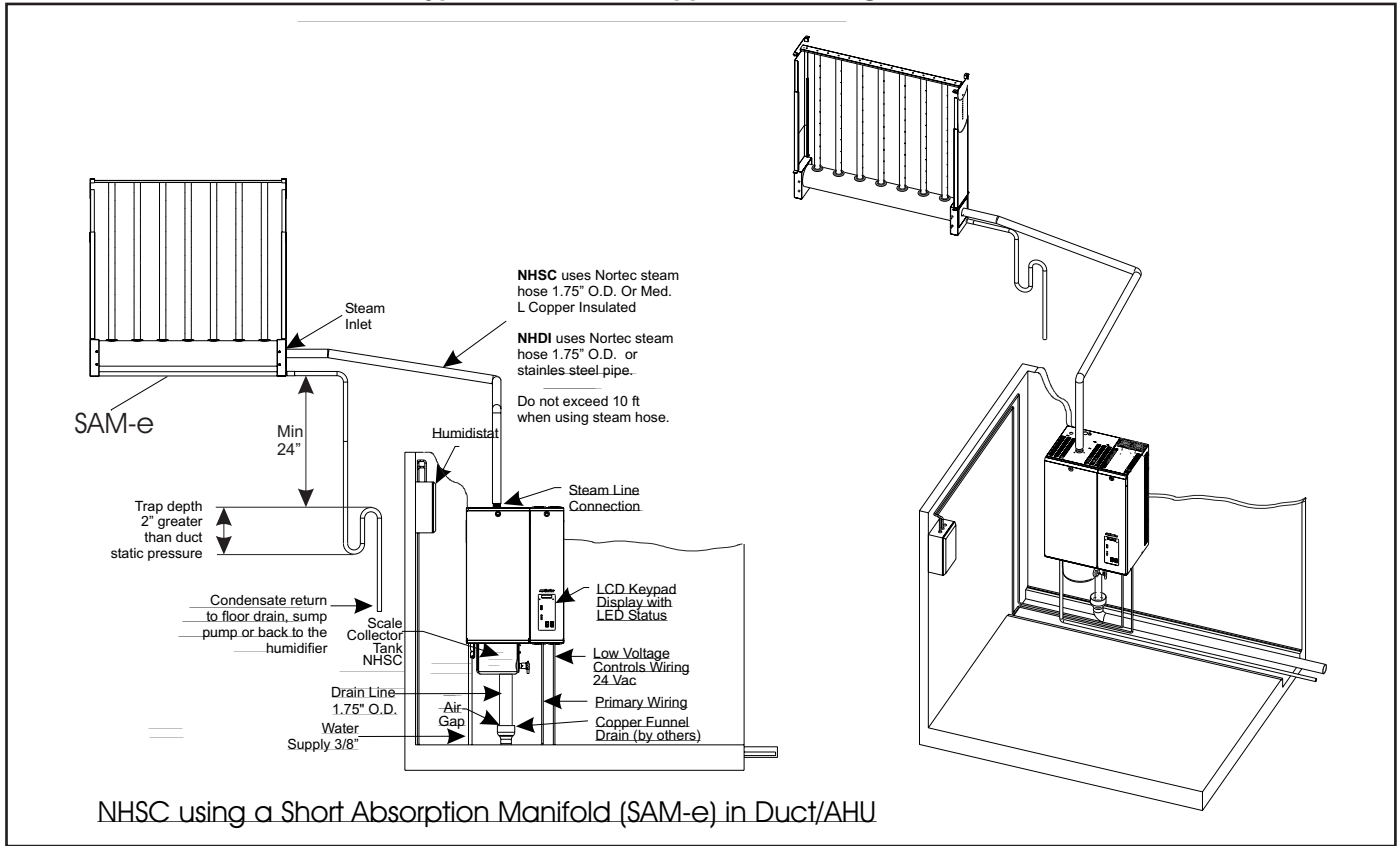
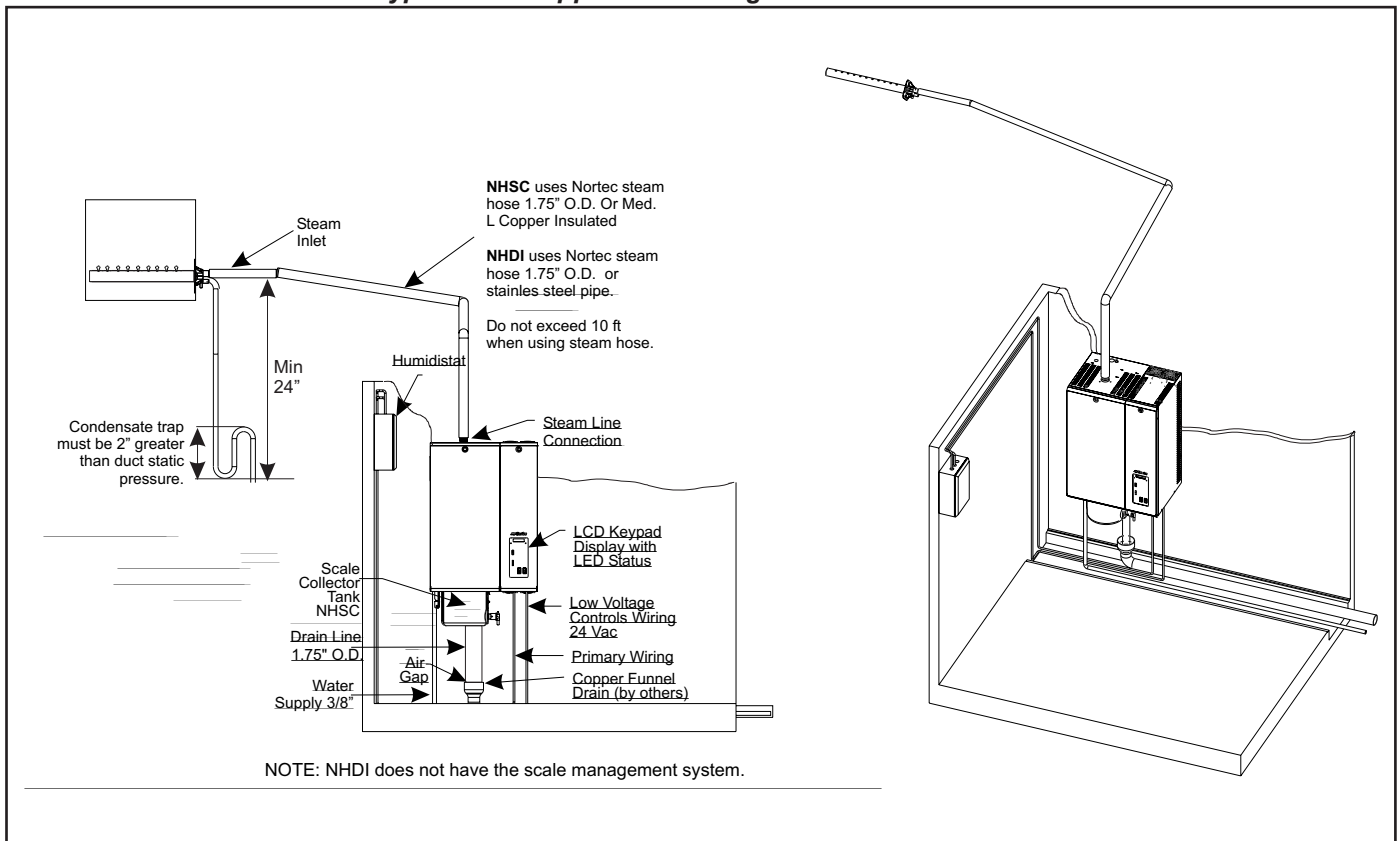


Figure #10
Typical Duct Application using Standard Distributor



PLUMBING

All water supply and drain line connections should be installed in accordance with local plumbing codes and should be copper or other material suitable for potable water at 140°F (60°C).

WATER SUPPLY LINE - NHSC

1. The humidifier is intended to operate on potable water.
2. Standard fill valves are sized for water pressure ranging from 30 to 80 psig. For other pressures, consult factory. This pressure should be measured at the humidifier if the water pressure is suspect.
3. ALWAYS supply and install a shut off valve in the fill water supply line dedicated to the humidifier to facilitate servicing. Use ½" OD copper to within 4 feet of the humidifier. Reduce to 3/8" OD and connect to the factory-supplied 3/8" olive compression fitting under the humidifier.
4. Same installation as #3, but add Drain Water Cooler instead of fill.

WATER SUPPLY LINE - NHD1

1. Humidifier is intended to operate on Reverse Osmosis (RO) water or De-ionized (DI) water with a water conductivity of less than 20 Microsiemens.
2. Standard fill valves are sized for water pressure ranging from 30 to 80 psig. For other pressures, consult factory. This pressure should be measured at the humidifier if the water pressure is suspect.
3. ALWAYS supply and install a shut-off valve in the fill water supply line dedicated to the humidifier to facilitate servicing. Use ½" OD plastic or stainless steel to within 4 feet of the humidifier. Reduce plastic or stainless steel to 3/8" OD and connect to the factory-supplied 3/8" olive compression fitting under the humidifier.
4. Same installation as #3, but add Drain Water Cooler instead of fill.

DRAIN LINE - NHSC

1. Humidifier is equipped with a 1.5" O.D. unthreaded drain outlet on underside of drain canal on bottom of the humidifier (see Figure

#11). A field-supplied funnel (see Figure #12) is recommended. It will prevent backup in the drain pan and in the cylinder due to partially blocked or badly installed drain lines. This prevents rusting of the drain pan.

2. The NHSC scale collector tank is also equipped with its own drain. It is recommended to pipe, with a flex hose, the scale collector tank to allow drainage, if required while maintaining ease of servicing (DO NOT HARDPIPE).
3. The drain line should not end in a sink used frequently by personnel, or where plumbing codes prohibit it. Route to a floor drain or equivalent for safety reasons, since drain water from humidifier can be very hot.
4. 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 2.0" O.D. copper pipe or larger. Do not use plastic pipe for drain lines. Consult factory.

DRAIN LINE - NHD1

1. Humidifier is equipped with a 1.5" O.D. un-threaded drain outlet on underside of drain canal on bottom of the humidifier (see Figure #6). A field-supplied funnel (see Figure #8) is recommended. It will prevent backup in the drain pan and in the cylinder due to partially blocked or badly installed drain lines. This prevents rusting of the drain pan.
2. The drain line should not end in a sink used frequently by personnel, or where plumbing codes prohibit it. If the Drain Water Cooler is used with potable water then copper may be used. Route to a floor drain or equivalent for safety reasons, since drain water from humidifier can be very hot. Verify with local codes on DI and RO water. Drains should be verified for their suitability for RO or DI water and local codes should be checked.
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 2.0" O.D. S.S. pipe or larger. Do not use plastic pipe for drain lines. Consult factory.

Figure #11
Drain Line Connection

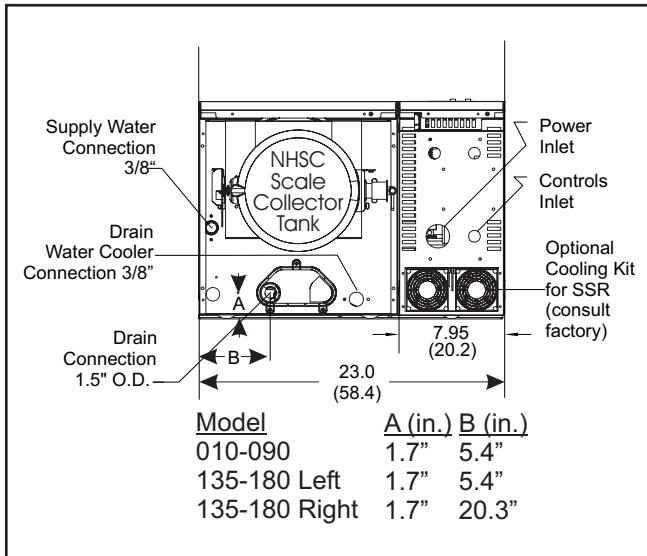


Figure #12
Drain Connection

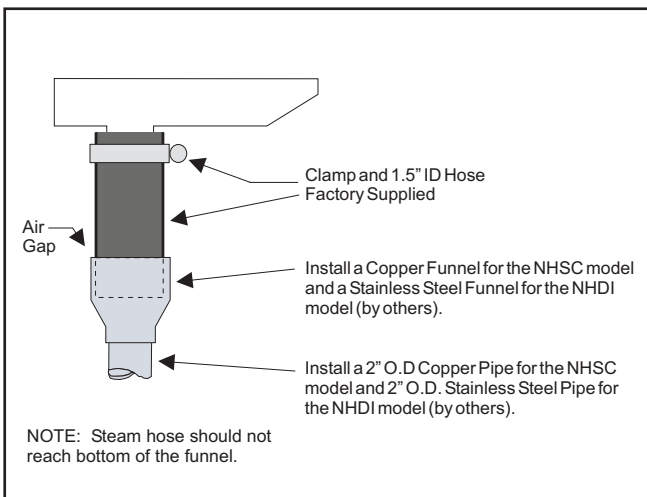
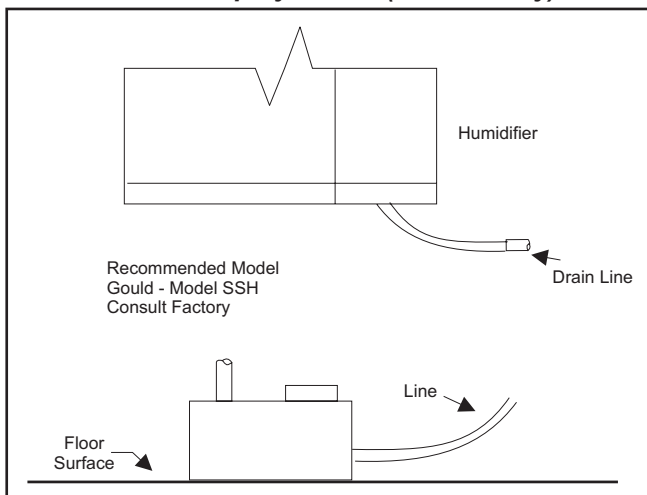


Figure #13
Drain Pump by others (if necessary)



STEAM LINE AND CONDENSATE RETURN LINE

1. Refer to the installation manual of the steam distribution system used in your application. Steam Distributor Form #XX-231, SAM-e Form #XX-249, and Blower Pack Form #XX-277.

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 spec label, see Figure #1.
2. Ensure that an adequate power supply is available to carry full humidifier amperage drawn as specified by rated amps on the humidifier spec label, reference to local codes.
3. A dedicated external disconnect must be installed. Do not exceed the maximum circuit protection amps as 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. Single phase humidifiers may be run on three phase power, but load may unbalance power grid.
6. External wiring sizes must be in accordance with NEC and/or CEC and existing local electrical codes and by-laws.

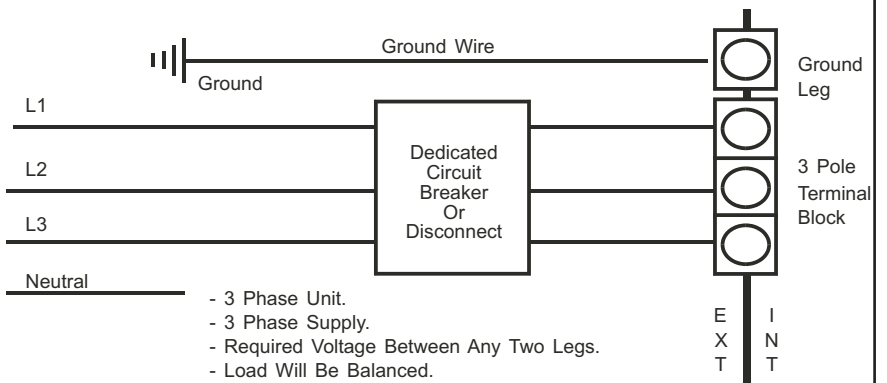
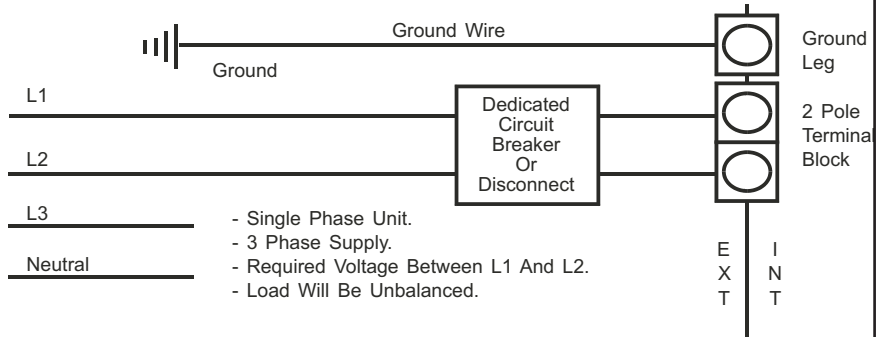
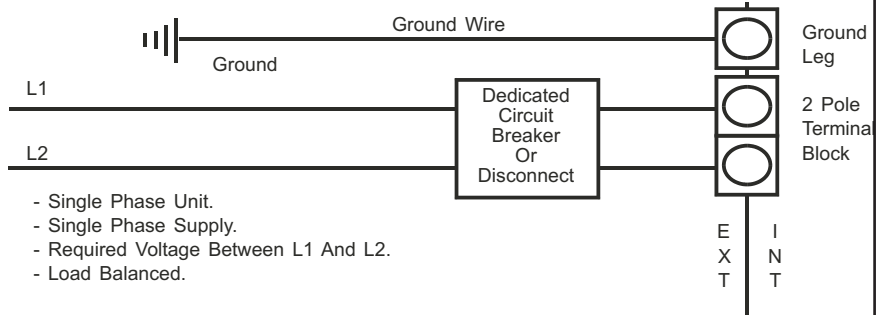
PRIMARY VOLTAGE SUPPLY WIRING FROM HUMIDIFIER(S) TO BLOWER PACKS

1. All blower packs are wired (by others) to be powered from the humidifier.
2. As a safety feature, blower packs come equipped with a manual reset safety thermostat and relay built into the blower pack cabinet. The manual reset thermostat turns off the humidifier if the blower pack gets overheated. The control thermostat, mounted on the steam distributor, starts the fan when steam is generated.
3. All blower packs have high efficiency blowers to minimize the frontal and overhead clearance required to absorb the steam.

Figure #14
Primary Voltage Supply Wiring

VOLTAGE
(ACTUAL)

PRIMARY (LINE) VOLTAGE WIRING TO UNIT
(BY OTHERS)



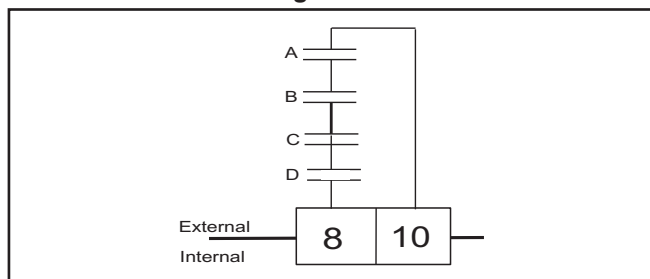
NOTE: Voltage At Terminal Block Must Be In Accordance With Spec. Label.
All Wiring To Be In Accordance With Existing National And Local Electrical Codes.

4. All blower packs require field wiring between two pole primary voltage terminal blocks and two low voltage control (class 1 circuit wiring required) terminal strips; one of each located in the humidifier and the remote blower pack cabinet. To properly access the primary block on the humidifier, it is necessary to open the side pan. To connect the primary and control (class 1 circuit wiring required) wiring, the wiring is fed through the grommet provided in the bottom of the blower pack. The terminal block and strip are accessed by removing the blower pack cover.
5. Field wiring of remote blower packs must conform to national and local electrical codes. Refer to wiring diagram supplied inside the humidifier.
6. Use approved wire for power connection from two pole terminal block of remote blower pack to additional two pole terminal block inside electrical section of humidifier.
7. Use approved wire to connect the ground clamp of remote mounted blower pack to ground clamp provided in the electrical section of humidifier.

LOW VOLTAGE CONTROL WIRING

On-Off Controls

Figure #15
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, C and D (described below) are to be wired in series (only one path for current) across terminals 8 and 10 on the low voltage control terminal strip or replaced with a jumper wire for constant operation. Caution: this is the "hot" wire from the 24V control transformer; it will blow the 3A fuse if any control field wiring touches ground.

A - Wall or Duct Mounted Control On/Off

Humidistat: Wired to make on drop in humidity, break on rise to set-point. 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 set-point. 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 with sensed air flow, break when no air flow. Used as a safety to prevent saturation when there is no airflow.

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 humidistat to humidifier and between devices should be 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.

D - Blower pack safeties

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 a outside wall where temperature fluctuation can affect control response.
2. Mount **duct humidistat** in location representative of overall air humidity, usually in the return duct. Do not mount it directly in front of steam distributor or in turbulent or mixing zone. Mount it where 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

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.
6. Calibration of controls (on/off or modulation) in the field may be necessary due to shipping and handling. Verify humidistat accuracy before commissioning system.

OPTIONAL MODULATION (CONTINUOUS CONTROLS)

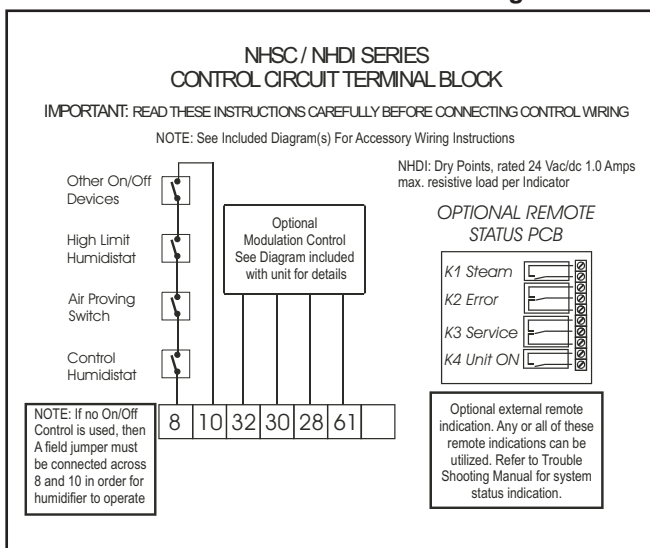
1. Read **on/off controls** section first since it is necessary to all control systems.
2. Virtually any modulation (continuous control) external hardware by others (as long as it has %RH set-point circuitry) may be interfaced with pre-specified factory-configured pc board via the control terminal strip.
3. Modulation (continuous control) by others for use with NHSC / NHDI humidifiers involves

one of several control wiring diagrams. In all cases, modulating signal interfaces through control terminal strip to main pc board inside humidifier.

4. For set-point control at the humidifier an integrated controller can accept a direct transducer signal. The accuracy of the humidifier to changing conditions will be dependant on the accuracy of the signal.
5. The modulation signal must increase from minimum toward maximum as sensed RH (actual RH) drops below desired RH (%RH set-point). In response, humidifier's steam output will increase from minimum toward maximum. When humidifier's steam output (lbs/hr) matches humidification load (lbs/hr), modulation signal will stabilize.
6. Field-wiring connections for modulation control are to be made to external side of terminals 28, 30 and 32 on humidifier's control terminal strip. Always refer to the external control's wiring diagram factory supplied with each NORTEC modulation control option.
7. **Varying dc Voltage Modulation Signal Powered by Others:** NHSC / NHDI humidifiers can be factory configured to accept the following vdc signals: 0-10 vdc, 0-20 vdc, 1-5 vdc or 2-10 vdc. Wire according to NORTEC supplied external wiring diagram that comes with each modulation option. To share the signal with more than one humidifier, wire in parallel to each humidifier. If a different signal is desired consult factory.

Figure #16

Generalized Modulation Wiring



8. **Varying dc milliAmp (mA) Modulation Signal Powered by Others:** NHSC / NHDI humidifiers can be factory-configured to accept a standard dc mA signal, if pre-specified. Wire according to NORTEC supplied external wiring diagram that comes with each modulation option. Choose from 0-20 dc mA or 4-20 dc mA. To share the signal with more than one humidifier consult factory.
9. **Varying Resistance (Ω) Modulation by Others:** NHSC / NHDI humidifiers can be factory configured to power a 3-wire varying resistance modulation humidistat by others, if pre-specified. Wire according to NORTEC supplied external wiring diagram that comes with each modulation option. Choose from 0-500 Ω or up to 0-1000 Ω . To share the signal with more than one humidifier consult factory.

OPTIONAL MODULATION (CONTINUOUS CONTROL) PACKAGES BY NORTEC

1. Modulation (continuous control) "packages" are offered as accessories by NORTEC. Power supply comes from inside NHSC / NHDH humidifiers.
2. NORTEC provides the humidity set point circuitry and sensor(s) for wall or duct mounting or both as pre-selected when ordering the option. NORTEC offers several packages for NHSC / NHDH Series humidifiers. Wire according to NORTEC supplied external wiring that comes with each optional modulation package.
3. Optional modulation packages without modulating safety high limit can use on-off safety high limit. Refer to on-off controls section.
4. All versions can use on-off safety air proving switch. Refer to on-off controls section.

OPERATION

INTRODUCTION

The NORTEC NHSC Series humidifier is a completely new design based on up-to-date technology. The NHSC is designed to provide clean steam humidification at an economical price.

The NHSC uses a micro-computer control system for greater flexibility. The NHSC has a liquid crystal display (LCD) to indicate system messages and display RH.

LAYOUT AND FUNCTION

The NHSC humidifiers consist of a plumbing and an electric compartment. In every case there is at least one steam distributor (SD) for installation in air ducts or blower packs (remote mounted: RMBP) for direct space humidification.

Water enters the steam cylinder through the bottom via the fill cup assembly when the 24 volt fill valve solenoid is energized. The water is heated via electric element and produces sterile steam for distribution into the air.

Primary electric power is applied to the heating elements in the steam cylinder when the on/off switch is pushed on and all control options are calling. A primary to 24 volt step-down transformer provides power to the contactor holding coil(s) via the main

control board. The humidifier's operating status is reported to the user by the green, red and yellow indicator lights on the front of the unit.

The prerequisites for getting power and water into the steam cylinder are as follows:

- On/off switch must be switched on.
- control circuit 8-10 must be made.
- door interlock switch must be made (interlock switch can be pulled out to operate unit).
- Modulating signal must be calling.
- Internal safeties must be made over temperature switch and ground fault.

LEVEL REGULATION

The water level in the steam tank is continuously monitored with the level unit.

The unit pulse fills based on steam production. The pulse filling in the unit varies depending on the water level detected by the float chamber.

One magnetic float monitors five different water levels in the float chamber. The second float ensures the water level is always above the heating elements.

The pressure equalizing pipe between the steam connection and the level unit ensures that the water levels are the same in the steam tank.

STEAM GENERATION REGULATION

The steam is produced in the steam tank by resistive heating element technology. An external or the internal regulator for connection as required control the steam production fully variably from 3 to 100%.

FLUSHING - NHSC ONLY

The evaporation process increases the concentration of minerals in the water of the steam cylinder. A suitable volume of water must be flushed through the steam cylinder from time to time and replaced by fresh water to ensure that this concentration does not exceed a specific value unsuitable for operation. The NHSC / NHDl steam humidifier performs a flush cycle. This consists of the following two forms of flushing.

- Automatic flushing takes place as soon as the water in the steam cylinder exceeds the upper operating level (e.g. By foaming of the water).
- Flushing is a time dependent process at preselected time intervals.

Automatic or time-dependent flushing takes place based on the water quality and the operating data.

SCALE COLLECTOR TANK - NHSC ONLY

The minerals precipitated by the evaporation process accumulate at the bottom of the steam cylinder. Units designed for operation with untreated water are equipped with a scale collector tank located directly underneath the steam cylinder. This way the minerals do not accumulate in the steam cylinder but mainly in the collector tank thus extending the service intervals and reducing the maintenance costs.

NHSC / NHDl OPERATION

STARTING OPERATION

The following procedure should be carried out in order to operate the steam humidifier:

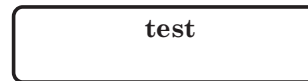
- Examine the steam humidifier and installation to ensure it has been installed properly or for possible damage.

Caution! Damaged units and units with improper installation must not be operated.

- Open the filter valve / shut-off valve in the water feed line.
- Switch on the external disconnect for the main supply (Heating and control voltage).

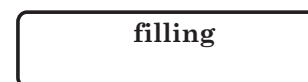
- Ensure the valve on the NHSC mineral tank is closed.
- Switch on the steam humidifier main switch.

The steam humidifier carries out a system test. The display below appears and the three LEDs light for approx. 3 seconds.



If a fault is detected during the system test, a corresponding fault message is triggered.

If the system test is successful, the steam cylinder fills up and a float test is carried out (function check on the level unit). The display below appears.



Note: If a fault is detected during the float test, an appropriate fault message is triggered

If the float test is successful, the NHSC / NHDl will be in normal operating mode. The display below appears and the green LED lights.

The following procedure should be carried out only on the first occasion that the unit is operated:



- Check the function of the steam humidifier:
- Switch on the humidification by raising the set humidity value on the humidity controller / humidistat / NHSC / NHDl Display.
- Switch off the humidification by lowering the set humidity value on the humidity controller / humidistat / NHSC / NHDl Display.
- Check for correct functioning of the monitoring equipment (external safety network).
- Set the desired humidity value on the humidity controller/humidistat.
- Make sure no leaks are present.

The heating current switches on as soon as the humidity controller/humidistat demands humidity. The yellow LED lights and steam is produced after a short delay (approx. 5 minutes).

Operating status display on the unit

The operating status is displayed in the LED on the unit as follows:

- **Green LED lit:** Unit producing steam
- **Yellow LED flashing:** Major or minor servicing due. The relevant notice is shown in the display.
- **Red LED flashing:** There is a problem. The unit is trying to solve the problem. The relevant warning message appears in the display.
- **Red LED lit:** Insoluble problem. The relevant error message appears in the display.

Optional Remote operating and fault indication

If the steam humidifier is equipped with the optional remote operating and fault indication (option "RFS"), the operating status will be shown as follows:

K1	Steam	(N/O) Normally open
K2	Error	(N/O) Normally open Or (N/C) Normally closed
K3	Service	(N/O) Normally open Or (N/C) Normally closed
K4	Unit On	(N/O) Normally open

INTERROGATION OF THE OPERATING STATUS

The NHSC / NNDI operating and display unit has a "display menu" from which various operating parameters can be viewed.

Note: It is not possible to change the values on the display level.

Operation

Call up the display level with <↓> or <↑>.

<↓> next operating parameter.

<↑> previous operating parameter.

Exit the display level with <Menu>

Description of the operating parameters on the display level

The following describes the individual operating parameters that can be selected using the keys <↓> and <↑>, after the display level has been called up.

Steam Productions

steam-prod[%]
ref.=50/act=25

Current actual and nominal value of steam production in percentage of total output.

Nominal value: Unit capacity x input signal value.

Actual value: max. Unit capacity x input signal value x capacity limitation.

Note: If the internal controller is activated only the actual value is shown.

Under the following conditions the actual value may differ from the nominal value: upon activation of the heating power, if capacity limitation is active during the filling cycle of the steam cylinder.

Analog Input (humidity demand)

Analog input [%]
25

Current value of the signal applied to the analog input in % of its max. value.

Note: If the internal controller is active the displayed value corresponds to the current air humidity (%rh).

Internal Controller

Controller funct
off

Internal controller activated ("on")/deactivated ("off")

Working Hours

elapsed time
623

Total of working hours elapsed since initial commissioning of the steam humidifier.

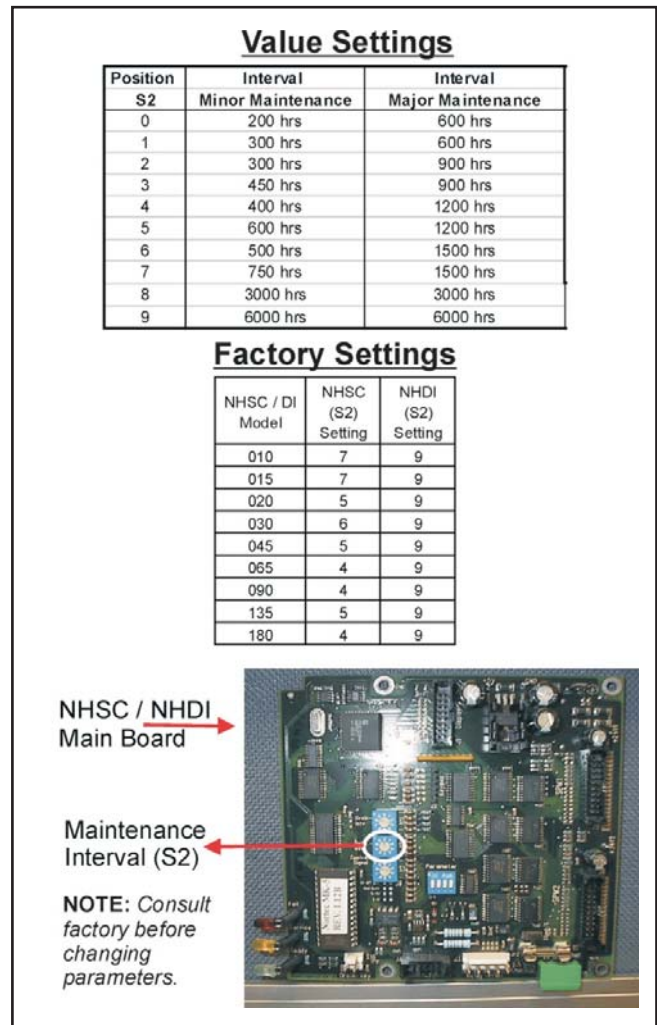
Time Remaining to minor/major service

time to mainten.
600/1200

The time remaining (in hours) before the next minor/major service.

Can be increased for poor water conditions or decreased for good water conditions.

Figure #17
NHSC / NNDI Maintenance Intervals



Note: The stated times are based on 100% steam capacity. If the operation is at a lesser capacity, the time should be extended accordingly. The servicing intervals are set using the rotary switch "S2" on the control board.

Drain Cycle

drain cycle
4: 120

The following indications are provided for the set flushing interval:

Left: Switch setting on rotary switch "S1"

Right: Set flushing interval

Note: The flushing interval is set on switch "S1" on the control board.

Figure #18
NHSC / NNDI Drain Cycle Parameters

Value Settings


Position S1	Drain Interval At 100% Steam Capacity
0	0 Min.
1	720 Min.
2	360 Min.
3	180 Min.
4	120 Min.
5	60 Min.
6	30 Min.
7	20 Min.
8	10 Min.
9	5 Min.

Factory Settings

NHSC - DI Model	NHSC(S1) Setting	NNDI (S1) Setting
010	4	1
015	4	1
020	5	1
030	6	1
045	7	1
065	8	1
090	8	1
135	8	1
180	8	1

NHSC/NNDI
Main Board →

Drain
Interval (S1) ←



Example: 4:120

← LCD
Display

↑
Position

↑
Duration between
drain cycles

NOTE: Approximately 1 liter or 0.26 gallons will drain during these intervals. Drain Water Cooling will be active during these intervals to temper the drain water to 140 degrees F (60 degrees C) or less.

Note: Water quality conditions resulting in component failures are not covered under Nortec's standard warranty.

The factory settings are based on the following water conditions when the unit leaves the factory.

<u>Water Parameters</u>	<u>NHSC</u>	<u>NNDI</u>
Conductivity	0-1500 MicroMhos	0-50 MicroMhos
Hardness	12 grains per gallon (gpg)	0 grains per gallon (gpg)
Silica	12 parts per million (ppm)	0 parts per million (ppm)
PH	6.5-7.5	7
Chlorides	> 50 parts per million (ppm)	> 25 parts per million (ppm)

Note: Should you have water conditions above the stated parameters consult the factory for a new blowdown setting to help improve your scale management.

Chlorides – High levels of chlorides will attack stainless steel. The solution would be to add an in-line carbon filter that will remove up to 99% of the chlorides. Consult the factory for additional information if your water contains high levels of chlorides.

Nortec recommends performing a semi-annual water analysis to ensure optimal performance.

Stand-by Heating

stand-by heating
off

Stand-by heating activated ("on") deactivated ("off").

Note: If stand-by heating is active the water temperature in the steam cylinder is constantly kept at approximately 70°C (158°F) by the control board.

Capacity Limitation

power limit [%]
100

The set capacity limitation as a percentage of the maximum capacity. Press both arrow keys at the same time and a code will appear. Enter 8808 using the arrow keys on the keypad and scroll down to the

power limit screen. To change the power limit, simply press the down arrow key to desired capacity and press enter to save that new value. Press menu key to exit parameter screen.

Inlet Valve Correction

inlet valve cor.
130

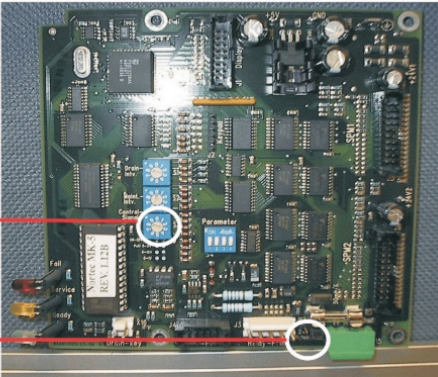
Set inlet valve correction (cycle ratio) in % of standard setting value to balance out water pressure variations.

Figure #19
NHSC / NHDl Control Interval

Value Settings

Position	Signal
S3	
0	No Signal Selected
1	On/Off 24 V (see note)
2	0-5 VDC
3	0-10 VDC
4	0-1 VDC
5	1-5 VDC
6	2-10 VDC
7	0-20 mA
8	4-20 mA
9	Spare

NHSC / NHDl Main Board



Note: To field change the control signal acceptance to **On/off** controls, user must do the following:

- 1). At JP2 bottom of main board - move the pin to 24 volts.
- 2). Move S3 rotary switch to position 1.
- 3). Place a jumper wire on the low voltage terminal strip between 28 & 30.

Soft Start

Soft Start
Off

Soft Start activated (on), consult factory. Deactivated (off) factory set.

Demineral Mode

Demineral Mode
Off

Demineral mode activated (on), consult factory. Deactivated (off) factory set.

Serial Interface

Serial Interface
Off

Serial Interface activated (on), consult factory. Deactivated (off) factory set.

Full Drain Cycle

Full Drain Cycle activated (on), consult factory. Deactivated (off) factory set.

Flush Cycle

Flush Cycle
Off

Flush Cycle activated (on), consult factory. Deactivated (off) factory set.

Control Signal

analog signal
0 - 5v (poti)

Range of the active analog signal in V or mA, respectively.

Note: The range of the analog signal may be adjusted using the rotary switch "S3" on the control board.

Software Version

software version
VX.XX

Current software version for the steam humidifier.

Unit Type

machine type
xxlb/xxxV

Warning: In order to eliminate faults, the steam humidifier must be switched off and secured against unintentional re-connection. Take care that the electricity supply to the main contactor is disconnected (check with voltage meter).

Only allow trained and qualified personnel to repair faults. Faults relating to electrical installation (e.g. change of unit fuse) must only be carried out by authorized personnel.

Repair work and replacement of faulty components must only be carried out by your service technician!


MAINTENANCE

All maintenance work must be performed by adequately qualified and trained personnel familiar with the dangers involved. Ascertaining the qualifications is the customer's responsibility.

Instructions and details concerning the maintenance work must be observed and adhered to without fail.

Only the type of maintenance work outlined in this documentation must be carried out.

Figure #20
Minor Servicing - NHSC ONLY

<p>NHSC Maintenance Mid-season cleaning (between 250 - 750 hours of operation)</p> <ul style="list-style-type: none"> - Unit indicates cleaning is required - Remove and clean scale collector tank - Re-install scale collector tank - Re-start humidifier - This mid-season cleaning ensures long operation time before full cleaning is required. 	
--	---

Use original spare parts exclusively to replace defective parts.

Before maintenance is initiated, the steam humidifier must be taken out of operation in accordance with instructions in the manual and protected against unintentionally switching on the humidifier.

NOTES ON MAINTENANCE

Figure #21
Major Maintenance - NHSC / NHD1

<p>NHSC Maintenance Complete cleaning (between 600 - 6000 hours of operation)</p> <ul style="list-style-type: none"> - Unit indicates cleaning is required. - This cleaning normally occurs once a year (depends on water quality). - The scale collector tank and the stainless steel tank are removed and cleaned. - Check all plumbing and electrical components for any issues. 	
--	---

To safeguard reliable operation, the maintenance of the NHSC should be devised in three stages. A distinction is made here between periodic inspections, minor servicing and major maintenance of the steam-air humidifier.

The intervals required between minor servicing and major maintenance depend on the water quality and the quality of steam generated and can be pre-selected on the rotary switch "S2" on the control board. After expiry of the selected interval, the yellow LED flashed and an appropriate message alternates with the normal operation indication.

The following is an overview of the work that should be undertaken for the three maintenance stages.

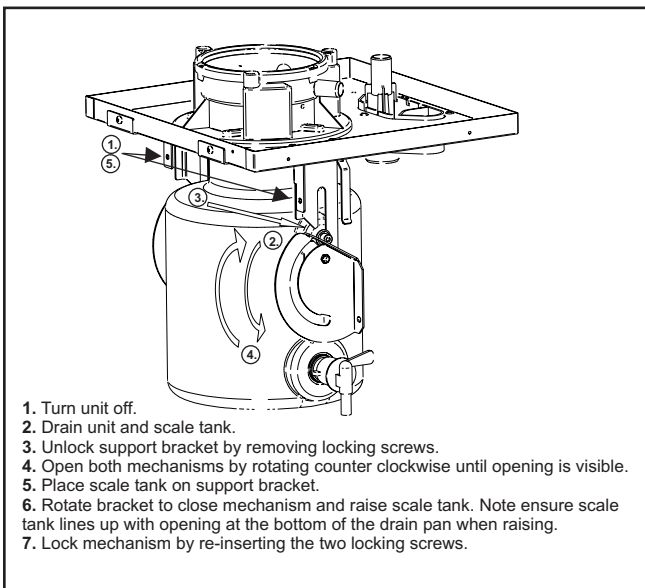
Periodic Inspections

When	Once per week
Work	Inspect the water and steam installations for correct sealing and any possible damage.
	Inspect the drain line for soiling.
	Inspect the electrical installation for loose cables and damaged components.
	Inspect the humidifier for irregularities both external and internal.

Minor Maintenance

When	The yellow LED flashes and the message "minor servicing due" appears, alternating with the normal operation indication.
Work	Carry out the periodic inspection items.
	Empty the steam cylinder and clean the scale collector tank.

Figure #22 Scale Tank Removal



Major Maintenance

When	The yellow LED flashed and the message "major maintenance due" appears, alternating with the normal operation indication.
------	---

Work	Carry out the periodic inspection items.
	Empty the steam tank.
	Clean the scale collector tank (NHSC Only).
	Dismantle and clean the steam cylinder.
	Dismantle and clean the liner (NHSC Only).
	Clean the unit inner chamber.
	Inspect the components inside the unit for damage.

Resetting Minor and Major Maintenance

In order to return the steam humidifier to normal operation after minor or major maintenance is complete, you must press and hold down the drain switch while turning the unit in the OFF position for approximately 10 seconds. Then turn the unit switch back on for 10 seconds and release the drain switch and the LCD message will return to normal.

DISMANTLING AND REASSEMBLY WORK

Removal of the scale collector tank - NHSC Only

Caution! Before commencing any dismantling work, the humidifier is to be **taken out of operation** as previously described.

NOTES ON CLEANING - NHSC Only

Cleaning the steam cylinder, scale collector tank, and steam cylinder liner.

Whenever possible, clean off any mineral coating that has formed.

Wash parts with lukewarm soap suds and then rinse off well. Note: if the components are heavily scaled, place them in 8 percent formic acid until the scale has dissolved. Then treat components as previously described.

Cleaning the heating elements

Immerse cover with heating elements fitted to 1" (2 cm) below the rim of the cover in a container with 8 percent formic acid. Ensure electrical wires do not make contact (do not fully submerge). Allow the acid to take effect until the scale coating has dissolved.

Note: The heating elements do not have to be entirely free from scale.

Then rinse heating elements thoroughly with fresh water.

Warning! Ensure that the electrical connections remain dry.

Warning! Do not remove scale coating on the heating elements with tools (screwdriver, scraper, etc.) or by striking. This could damage the heating elements.

Cleaning the interior of the unit

Wipe down components inside the unit with a damp cloth (clean water). Severely scaled components, e.g. the inlet funnel and the blow-off pump, should be cleaned using commercially available cleaning and descaling agents.

Warning! The electrical connections and electronic components must remain dry.

Notes on Cleaning Agents

Warning! Formic acid is harmless to the skin but it attacks the mucous membranes. Protect the eyes and respiratory tracts from contact with the acid and its vapor (wear goggles and work in a well ventilated room or outside).

The use of disinfectants is only permitted if they leave no toxic residues. The components must be rinsed thoroughly with water after cleaning in all cases.

Caution! Do not use any solvents, aromatized or halogenized hydrocarbons, or other aggressive substances for cleaning purposes.

The information and instructions regarding cleaning agents are to be strictly observed and implemented. In particular: Information relating to the protection of personnel, environmental conservation and restrictions regarding usage should be adhered to.

In all cases, local regulations relating to environmental protection must be implemented.

To reset the maintenance indication

When maintenance work has been completed, the maintenance display can be reset as follows:

Turn on the service switches in the main supply line.

With the unit switched off depress and hold the drain switch.

Turn on the humidifier with the unit switch.

Continue to depress the blow-off pushbutton until the system test has finished (approx. 10 seconds).

FAULT ELIMINATION

Fault indication

In case of malfunction during operation, the humidifier control checks whether there is a temporary problem (e.g. water supply interrupted for a short time) or whether it can resolve the problem by taking necessary measures. Such malfunctions set the unit into the “**Alarm**” status (fault elimination). The **red LED flashes** and an **alarm message** appears in the display alternating with the notice “**recovering - please wait**”.

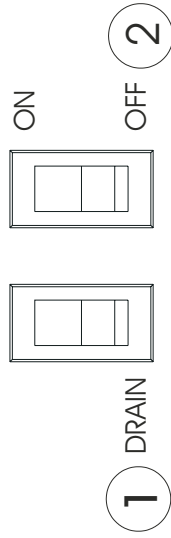
Note: If the cause of the malfunction disappears of its own accord or if the controls can repair the malfunction, the alarm message will automatically switch off.

Note: If the unit is in display or setting level the alarm message in the display will be suppressed.

If the controller, after several attempts, fails to solve the problem (number of attempts depends on the type of malfunction) or if the problem obstructs further operation, the heating voltage is interrupted via the main contactor. The **red LED stays lit** and an **error message** appears in the display alternating with the notice “**Please turn off unit**”.

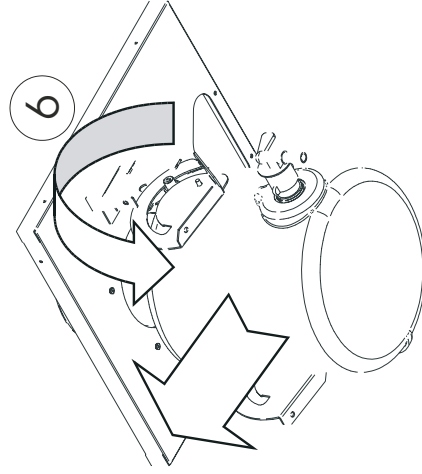
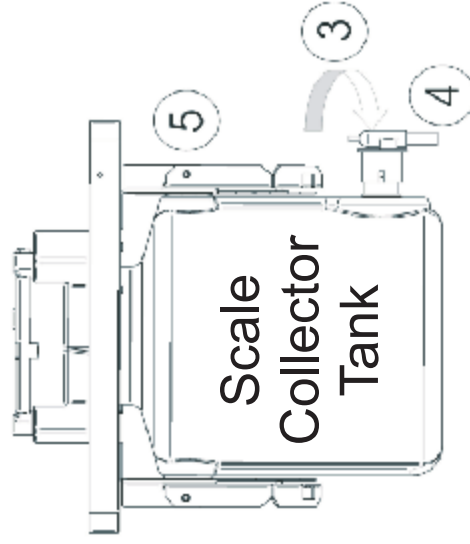
Note: If the unit is in the display or setting level the error message in the display will be suppressed.

SCALE COLLECTOR TANK SERVICING



1. Drain Cylinder.
2. Turn off the unit.
3. Open manual drain valve on Scale Tank to drain remaining water
4. Disconnect hose connection on scale tank.
5. Remove locking screws on the front of the Scale Tank support mechanism.
6. Lower and remove Scale Tank.
7. Visually inspect cylinder, heating elements and o-ring. Clean or replace if necessary.

Note: Scale collector tank has to be removed after 5000 hours or 3 years, whichever comes first.



Scale tank last replaced on:

PN: 150-5913 Rev. A

REPLACING UNIT FUSES

Warning! Before replacing the unit fuse the steam humidifier must be switched off and secured against unintentional re-connection. Take care that the electricity supply to the main contactor is disconnected (check with voltage tester).

Warning! Electronic components are very sensitive to electrostatic discharge. To protect these components, measures must be taken against damage from electrostatic discharge when replacing the unit fuse (ESD protection).

The unit fuses may only be replaced by trained and qualified personnel.

Important! If the unit fuse blows this is generally due to a faulty unit component. Therefore you should check these components before replacing the fuse (see table below).

Only use the correct type of fuse according to the following table.

Warning! It is not permitted to use repaired fuses.

Fuse	Specification	Before replacing, check
F1 on supply module	6.3 A, slow-acting	Drain pump (blocked or coil faulty)
F2 on supply module	1 A, quick-acting	Inlet valve (blocked or coil faulty)
F5 on control board	50mA, quick-acting	Control signal

RESETTING FAULT INDICATION "ERROR"

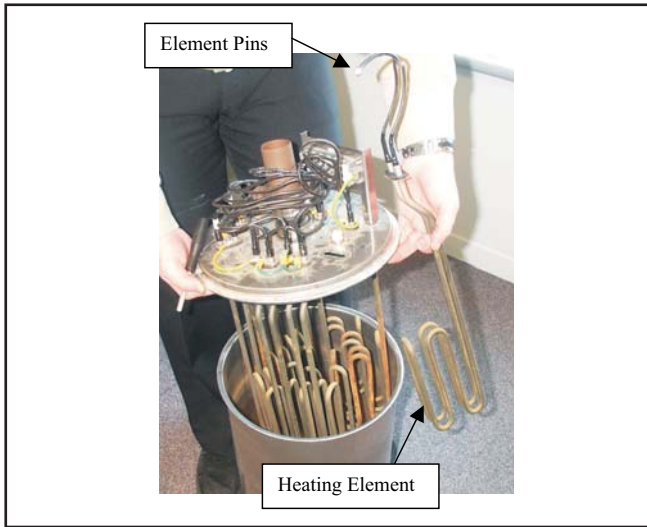
In order to return the steam humidifier to operation after fault indication error, you must press and hold down the drain switch while turning the unit in the off position for approximately 10 seconds. Then turn the unit switch back on and release the drain switch after a 10 second interval.

HEATING ELEMENT REPLACEMENT INSTALLATION INSTRUCTIONS

1. Drain unit.
2. Turn off the unit, and disconnect primary power to the unit.

3. Open the plumbing door.
4. Let unit tank cool down if needed.
5. Remove steam hose by loosening gear clamp.
6. Disconnect temperature switch. Note there is no polarity with this cable.
7. Remove gear clamp and remove tank from the unit
8. Undo cylinder tank strap and remove tank from unit.
9. Remove lid clamp, open lid and identify heating elements to be replaced.
10. Remove the nut, washer, plug and gasket from the top of heating element you are replacing. Note: Save the hardware for installing the new heating element.
11. Note the heating element orientations, and remove heating element by pulling it down through the lid.
12. Place gasket from step 15 on new heating element and install new heating element by inserting it into the lid from the bottom ensuring orientation matches previous heating element.
13. Re-install gasket, plug, washer, and nut. Tighten assembly
14. Connect element pins into the male connector by pushing in the pins and they should lock into place, pull to ensure.
15. Ensure all heating element fastening nuts are tight.
16. Re-install cylinder tank lid, clamp on cylinder and re-install the tank in the unit. Take care to ensure that the tank is level in the base and that the connecting components are aligned.
17. Fasten the cylinder into position using the cylinder strap.
18. Re-connect steam hose and clamp to steam output coupling.
19. Connect female connector to the male connector.

Figure #23



20. Connect temperature switch cable. Note: This cable is not polarity sensitive.
21. Double-check all the connections.
22. Turn the unit on.
23. Allow unit to fill.
24. Inspect unit operation and check for leaks.
25. Close and lock plumbing door.

TROUBLE-SHOOTING

Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregard for planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system. Often, the steam hose connection has not been properly executed or the fault lies with the humidity control system. The following table gives a list of possible malfunctions, the appropriate alarm or error message, details of their cause, and notes on how to deal with each problem.

Malfunction / Indication	Cause	Remedy
Min. Filling time too short Error code: 1A/1B <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Alarm 1A filling time</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Error 1B filling time</div>	Water feed to steam cylinder heavily calcified. Level in steam cylinder and level unit do not match.	Carry out major servicing.
Internal safety chain interrupted Error code: 2A/2B <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Alarm 2A safety chain int</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Error 2B safety chain int</div>	Connection to over-temperature switch on steam cylinder broken or over-temperature switch faulty. Steam cylinder overheating, over-temperature switch has responded. Flat-band cable between control and power board interrupted or not connected.	Check connections or replace over-temperature switch. Inspect steam cylinder, clean if necessary. Replace over-temperature switch. Inspect connections, connect or replace flatband cable.
Max. Filling time exceeded (alarm message only) Error code: 3A/3B <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Alarm 3A water supply</div>	Water feed blocked (main water tap closed, filter valve closed or blocked). Water pressure too low. Inlet valve does not open, filter sieve in Inlet valve blocked or inlet valve faulty. Feed hoses into the steam humidifier not connected or kinked. Level unit not connected. Float in the level unit sticking or level unit faulty.	Check water feed, open main water tap, open or clean filter valve. Raise water pressure (range 1-10 bar). Inspect electrical connections and fuse F2 on supply module. Clean filter sieve or replace Inlet valve. Inspect hoses into unit and connect if necessary. Replace faulty hoses. Connect level unit. Clean or replace level unit.
Max. Boil down rate too long Error code: 4A/4B <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Alarm 4A steam time</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Error 4B steam time</div>	Individual heating elements faulty. Main voltage too low or failure of a phase (L1, L2 or L3). Steam line too long or not insulated.	Replace faulty heating elements. Replace fuses on power board. Check main voltage and connections. Maintain maximum line lengths (max. 15'). Insulate steam lines.
Max. Drain time exceeded Error code: 5A/5B <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Alarm 5A drain</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Error 5B drain</div>	Drain pump not connected or faulty. Outlet line from unit kinked or blocked. Water outlet blocked (external outlet line or siphon blocked). Hose to level unit blocked.	Connect or replace drain pump. Inspect outlet line from unit, replace if necessary. Clean water outlet line and siphon. Clean or replace hose.

Malfunction / Indication	Cause	Remedy
Invalid level Error code: 6A/6B <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Alarm 6A level indicat</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Error 6B level indicat</div>	Level unit faulty. Magnetic field in vicinity of level unit.	Replace level unit. Eliminate magnetic field.
Steam pressure (error only) Error code: 7A/7B <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Alarm 7A communication</div>	Steam hose blocked or restricted (water trap). Pressure balance adapter into steam connection fitting blocked. Duct pressure too high (>1500 Pa).	Inspect steam hose, clean if necessary and install correctly. Remove adapter and clean opening with a needle. Inspect ventilation settings.
External safety chain interrupted Error code: none <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">safety chain external A</div>	Ventilator lock open. Automatic flow control has responded. Safties are open.	Switch on ventilator/ventilation system. Inspect ventilator/filter of ventilation system. Servicing, inspect system if necessary.
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">mains failure B</div>	Main failure on Unit B.	Inspect voltage supply to Unit B.

LEGEND

A = Circuit 1

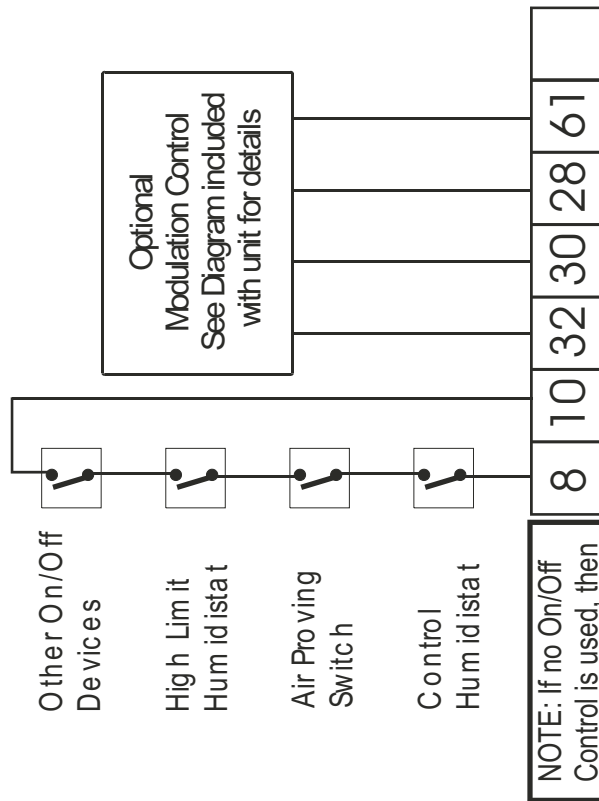
B= Circuit 2 (double unit 2nd cylinder)

NHSC / NHDI SERIES CONTROL CIRCUIT TERMINAL BLOCK

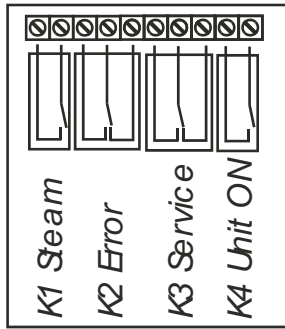
IMPORTANT: READ THESE INSTRUCTIONS CAREFULLY BEFORE CONNECTING CONTROL WIRING

NOTE: See Included Diagram(s) For Accessory Wiring Instructions

NHDI: Dry Points, rated 24 Vac/dc 1.0 Amps
max. resistive load per Indicator



OPTIONAL REMOTE STATUS PCB



Optional external remote indication. Any or all of these remote indications can be utilized. Refer to Trouble Shooting Manual for system status indication.



INSTALLATION INSTRUCTIONS
ACCESSORY
DIAGRAM No. 1508104 Rev. A Nov. 21, 2003



NHSC / NNDI Electric Steam Humidifier

Humidifier Mandatory Pre-Start-up Checklist (p.1 of 2)

Unit Serial #: _____ # of humidifiers: _____ Tag: _____
 Unit type: NHSC / NNDI Voltage: _____V/____ph Steam output: _____lbs./hr
 Customer/Job: _____ Address: _____
 Inspected by: _____ Date of inspection: ____/____/____

WATER QUALITY:

- Well water -City water -Softened water
- Conductivity: _____mhmos - Hardness: _____gr. -Silica _____ppm

HUMIDIFIER MOUNTING:

- | | | |
|--|----------------------------------|-------------|
| Clearances around the unit | Acceptable | Obstruction |
| - Front (door opens freely?) | 3ft min <input type="checkbox"/> | _____ |
| - Top (steam lines) | 1ft min <input type="checkbox"/> | _____ |
| - Bottom (fill, drain, controls) | 1ft min <input type="checkbox"/> | _____ |
| - Right (main pwr) | 3ft min <input type="checkbox"/> | _____ |
| - Left (main pwr) | 2" min <input type="checkbox"/> | _____ |
| - Ensure the scale tank bracket is locked in place | <input type="checkbox"/> | |

STEAM LINES:

- Slope up 2" per 12"
- Slope down 1/2" per 12"
- Traps
- Insulated
- Length/Size _____
- 90 deg. elbows qty: _____
- Can condensate be trapped anywhere in the steam line? Yes no

CONDENSATE LINES:

- Sloped back to drain
- Trapped 2" more than static duct pressure
- Size _____
- 45 deg. Elbows qty: _____

WATER LINES:

- 1/2" at max 4ft from the unit
- 3/8" connection at fill
- water pressure: 30-80psig

DRAIN LINES:

- Air gap located within 3ft of the unit
- Sloped to drain
- Size: _____

WIRING:

No loose wires around the unit or on the PC board? Yes no

CONTROLS:

	Installed	Location / Wiring /Setting
- High limit:	<input type="checkbox"/>	_____
- Air proving:	<input type="checkbox"/>	_____
- Mod controller:	<input type="checkbox"/>	_____
- Other:	<input type="checkbox"/>	_____

POWER

- Voltage, amperage rating and fuse corresponds to Spec Label
- Disconnect switch located close to humidifier

Field contact: _____ Signature: _____



NHSC / NHDl Electric Steam Humidifier

Humidifier Mandatory Start-up Checklist (p. 2 of 2)

Unit Serial #: _____ # of humidifiers: _____ Tag: _____

Unit type: NHSC / NHDl Voltage: _____V/ _____ph Steam output: _____lbs./hr

Customer/Job: _____ Address: _____

Start-up by: _____ Date of start-up: ____/____/____

1. PRELIMINARY:

- Pre-start-up checklist completed? yes no
- If no, return to Pre-Start-up Checklist before going on with start-up procedure.

2. START-UP PROCEDURE:

- The prerequisites for getting power and water into the steam cylinder are as follows:
- check that main breaker is on and power is at the unit
 - check that main water shut-off valve is open
 - on/off/drain switch must be switched on
 - control circuit 8-10 must be made
 - modulation humidistat, if present, must be calling
 - door interlock switch must be made (interlock switch can be pulled out to operate unit)

The unit will undergo a **System Test** to ensure integrity of all the components. If the test is successful, the unit will fill and the float test will be carried out. If everything ok, the green light will come on and the display will show NHDl or NHSC **Ready**.

3. OPERATIONAL CHECK:

- Switch on the humidification by raising the humidity set point on the humidistat/controller.
- Switch off the humidification by lowering the humidity set point on the humidistat/controller.
- Check for correct functioning of the external monitoring safeties such as air proving and high limit.
- When check complete: Set the desired humidity level.

Remarks: _____

NHSC / NNDI Electric Steam Humidifier

Maintenance Checklist (p.1 of 2)

Unit Serial #: _____ # of humidifiers: _____ Tag: _____
Unit type: NHSC / NNDI Voltage: _____V/____ph Steam output: _____lbs./hr
Customer/Job: _____ Address: _____
Maintenance by: _____ Date of maintenance: ____/____/____

Type of maintenance:

Periodic maintenance, once per week:

- Inspect water and steam installation lines for leaks
- Inspect drain lines for clogging
- Inspect electrical installation for loose cables and damaged components.
- Inspect the humidifier for damage.

Minor servicing, when the yellow LED flashes and display indicates minor maintenance due:

- Carry out periodic inspection items
- Empty the steam cylinder and clean the mineral collector.

Major servicing, when the yellow LED flashes and display indicates major maintenance due:

- Carry out periodic inspection items
- Empty the steam cylinder and clean the mineral collector.
- Dismantle and clean the steam cylinder
- Clean the unit inner chamber
- Inspect the inside components for damage.

Note: Time interval between minor and major are set through rotary switch #2 on the control board.

Cleaning recommendations for the Steam cylinder, mineral collector tank (NHSC Only) and steam cylinder (NHSC Only) insert:

- Drain unit completely including mineral collector tank drain
- Remove lime collector tank, remove steam cylinder
- Whenever possible, chip off or scrape off any scale coating
- Wash and rinse parts with lukewarm soap water (If components are heavily scaled, place them in 8% formic acid until the scale has dissolved. Then treat components as previously described.)

Cleaning recommendations for heating elements:

- Wash and rinse heating with lukewarm soap water (If components are heavily scaled, place them in 8% formic acid until the scale has dissolved. Then treat components as previously described.)

Warning: On no account remove scale coating on the heating element with tools or by striking. This could damage the heating element.

Cleaning recommendations for internal plumbing components:

- Wipe down components inside the unit with a damp cloth (clean water).
- Severely scaled components should be cleaned using commercially available cleaning and de-scaling agents.

Warning: Ensure electrical connections remain dry!!!

For more information on cleaning agents and formic acid, review notes in the installation manual.

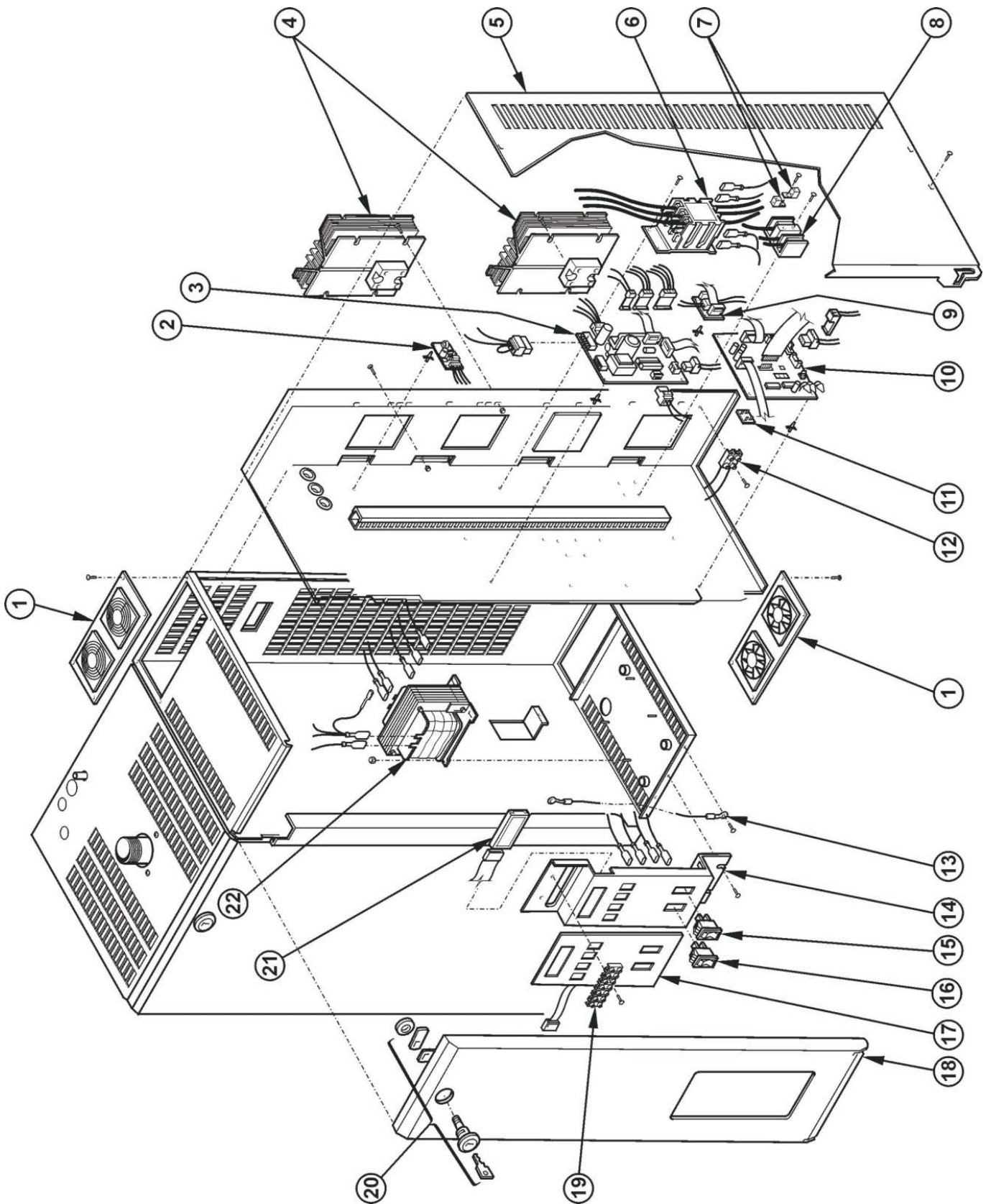
Maintenance Checklist (p.2 of 2)

Note: In all cases, local regulations relating to environmental protection must be implemented.

How to reset the maintenance indication:

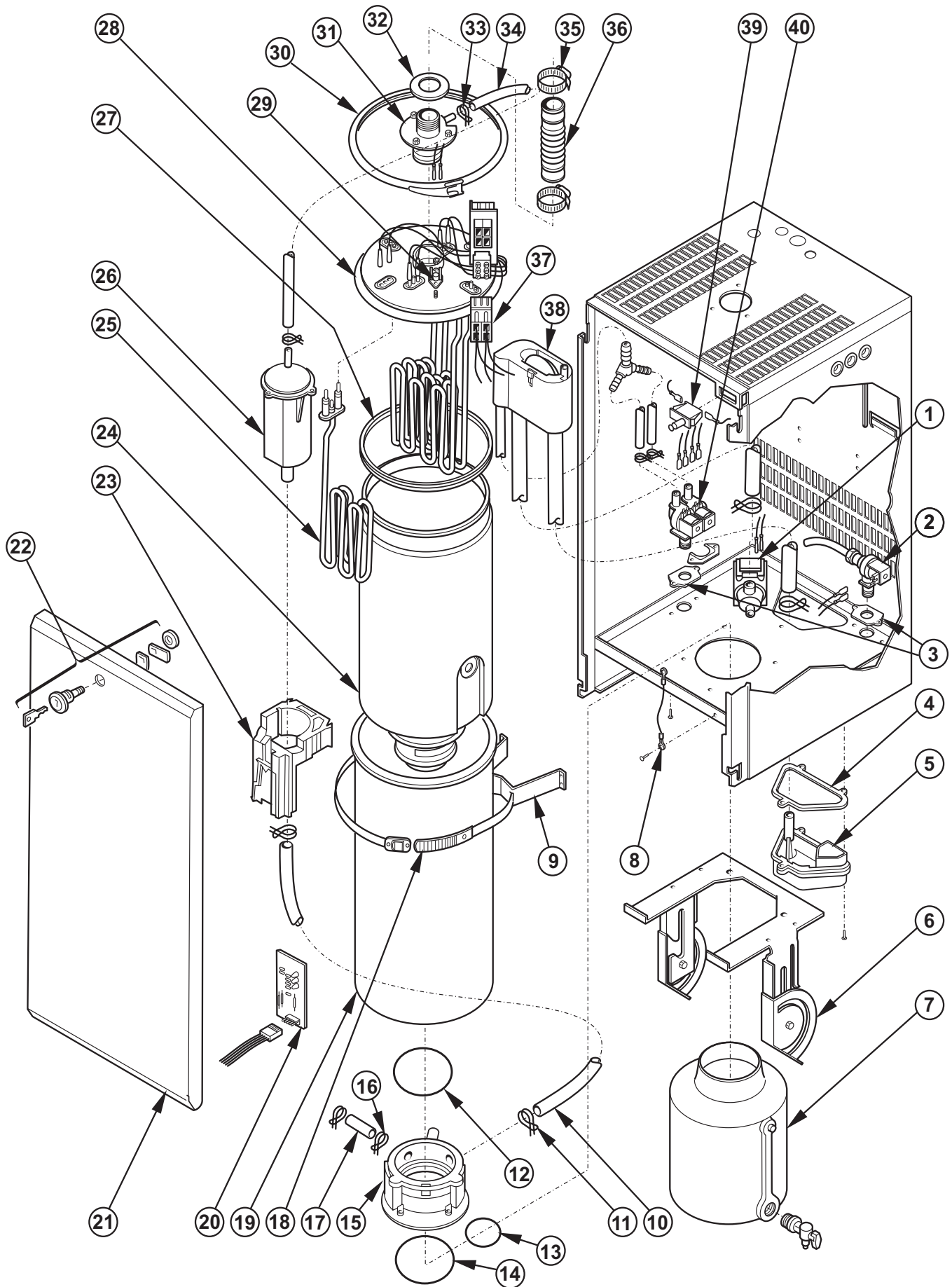
- Switch on the services in the main supply lines.
- With the unit switch off, depress and hold the drain switch.
- Switch on the steam humidifier with the unit switch
- Continue to depress the drain button until the system test has finished (approx 10 sec.)

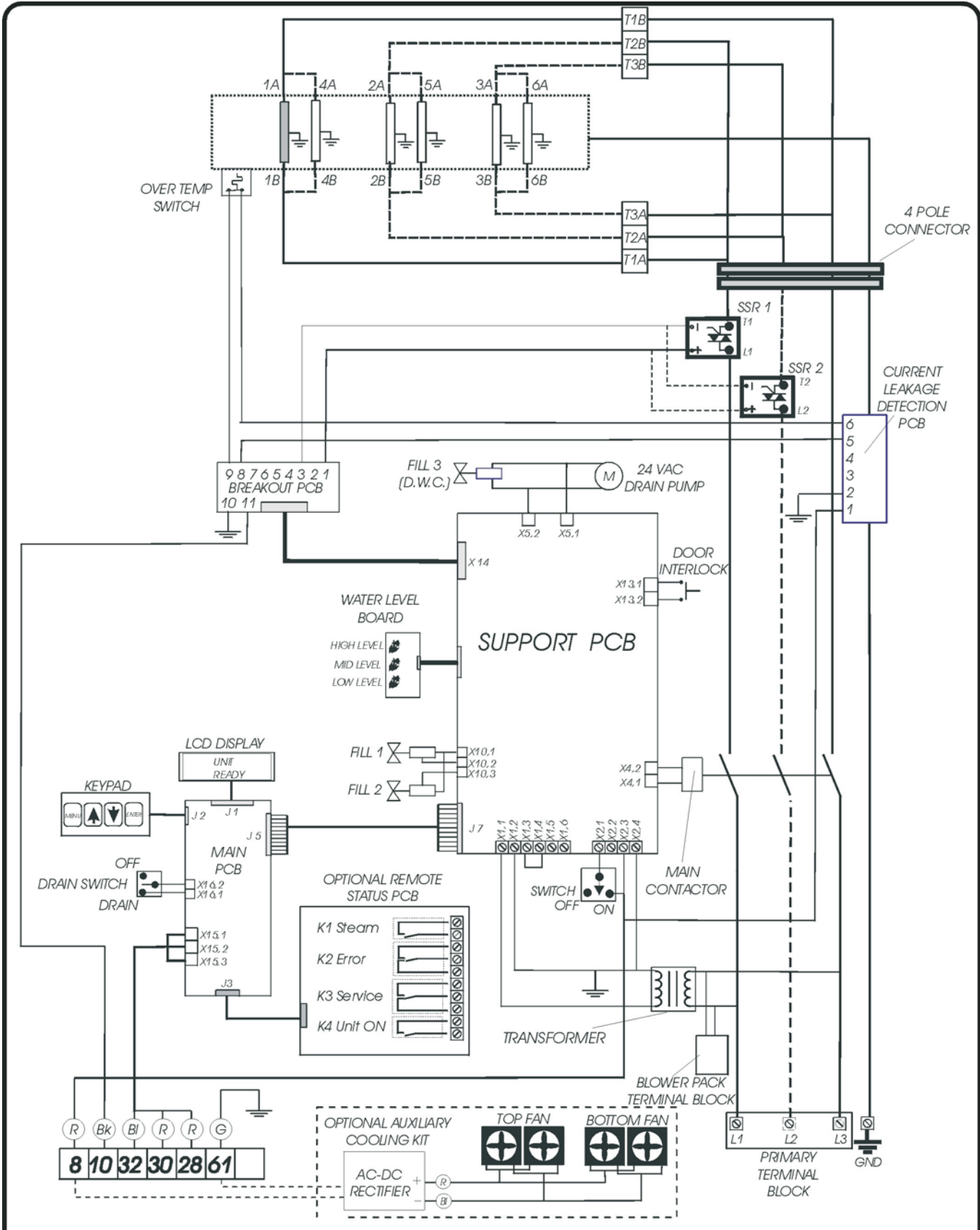
Comments:



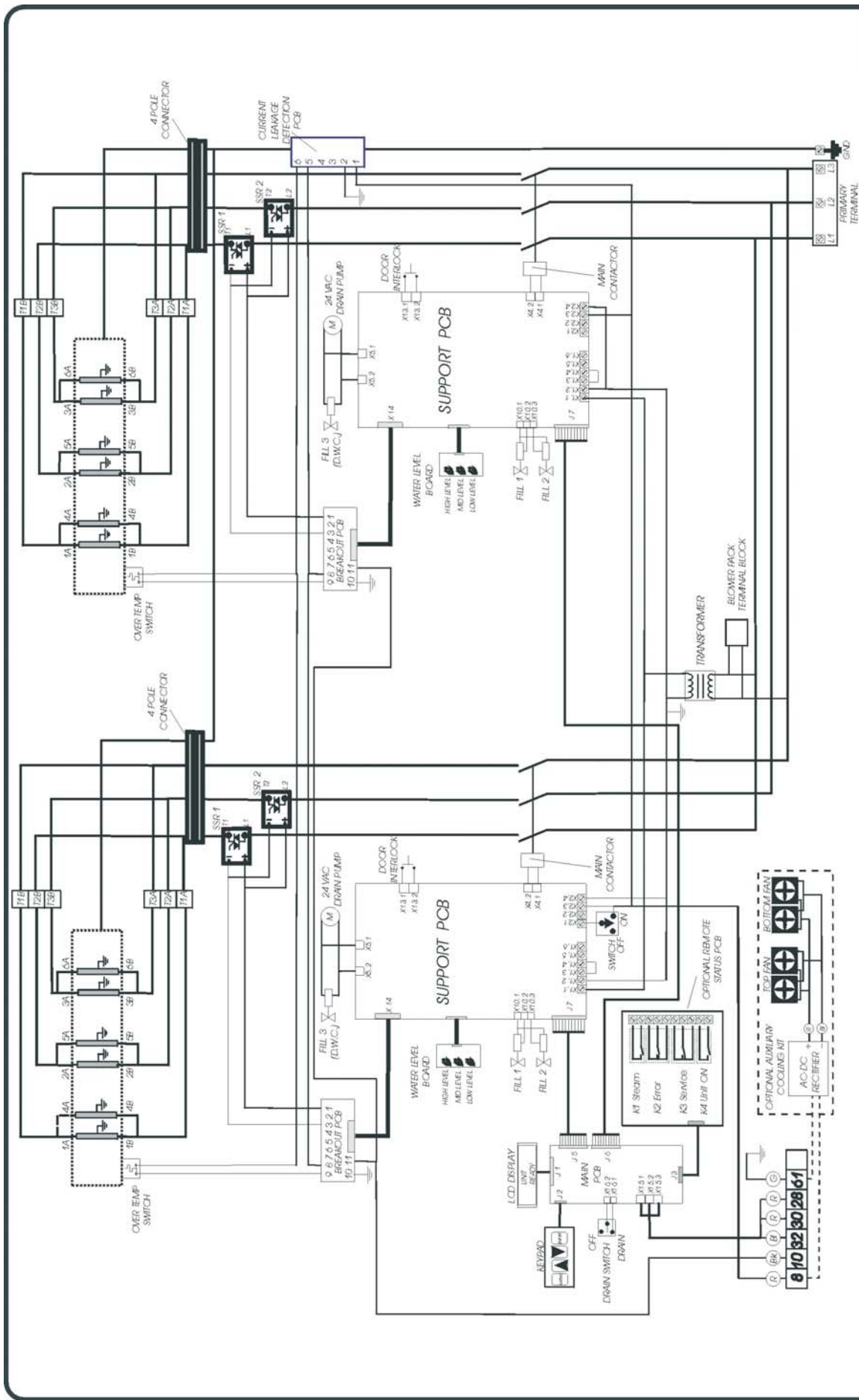
Electrical Exploded View

	Nortec PN	Description	Capacity															
			208V	230V	460V	575V	208V	230V	460V	575V	015'/1	020'/1	030'/1	045'/3	065'/3	090'/3	135'/3	180'/3
		Voltage																
1	1508072	Set Fan Kit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1506329	PCB, Gorund Leakage Detection Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1502656	PCB, Support Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1502606	SSR & Heat Sink 45 A Single	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
5	1507815	SSR & Heat Sink 75 A Single							1	1								
6	1507841	CAB, Electrical Side Panel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1508068	Contacto 50 AMP 3PH	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1323015	Contacto 62 AMP 3PH																
7	1323020	Ground Clamp	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
8	1323001	Terminal Block 2 Pole 95 AMP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1323027	Terminal Block 3 Pole 95 AMP																
9	1503141	PCB, Breakout Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1502655	PCB, Main NHDI	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1504389	Silicon Bridge Rectifier	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1473002	Two Pole Terminal Block for RMBP	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1508023	Ground Wire Door to Cabinet	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1507842	Keypad Display Bracket	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1473010	SWITCH SPDT 208-240V ON/OFF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1503880	Momentary Drain Switch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1502650	Keypad Display	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1507839	CAB, NHDI Electrical door	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1453907	Terminal Strip	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1853104	Lock assembly	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	1502657	LCD Display	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1502610	Transformer 208/240/480/600 V-24V 250VA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not Shown	1508142	CABLE, LOGIC TO POWER BOARD, SINGLE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not Shown	1508141	CABLE BREAK OUT BOARD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not Shown	1502662	CABLE - Float, DOUBLE UNIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not Shown	1508143	CABLE, LOGIC TO POWER BOARD, DOUBLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not Shown	1505014	Wire Green 10 AWG	ORDER BY THE INCH															
Not Shown	1508389	50 mA Fuse Main Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not Shown	1508393	6.3 A Fuse Support Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1





Wiring Diagram
 NHDI / NHSC 010-090 -B HUMIDIFIER.
 No.1508103 Rev. A Nov. 21, 2003



Wiring diagram
 NHD1 / NHSC 135 / 180 - B HUMIDIFIER
 No. 1508102 Rev. A Nov. 21, 2003



LIMITED WARRANTY

AxAir Nortec Inc. and/or **AxAir Nortec Ltd.** (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 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.

AxAir Nortec

a WMH Company

Model # : _____

Serial # : _____

Cylinder # : _____

Cylinder Last Replaced:

MTH/DAY/YR

MTH/DAY/YR

MTH/DAY/YR



Listed Humidifier
E65185



ISO 9001:2000

Certificate No. 002419

AxAir Nortec Inc.
826 Proctor Avenue
Ogdensburg, NY 13669

AxAir Nortec Inc.
2740 Fenton Road
Ottawa, ON K1T 3T7

A WMH COMPANY



Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>