Nortec®
WHEN YOU NEED HUMIDITY

GH Series
Gas Fired Humidifier

Installation, User & Maintenance Guide

FOR YOUR SAFETY:
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:
Do not try to light any appliance.
Do not touch any electrical switch; do not use any telephone in your building.
Immediately call your gas supplier from a neighbor's telephone.
Follow the gas supplier's instructions. If you can not reach your gas supplier, call the fire department.

WARNING:
Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency, or the gas supplier.

WARNING:
If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury of loss of life.

IMPORTANT: Read and save this guide for future reference. This guide to be left with equipment owner.

Form 98-272

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WARNING

- Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, an explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, local gas supplier, or your distributor or branch for information or assistance. The qualified installer or agency must use only factory authorized and listed kits or accessories when modifying this product. A failure to follow this warning can cause electrical shock, fire, personal injury, or death.

- Should overheating occur, or the gas fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

- Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

This installation guide has been designed to provide assistance when installing, mounting, and sizing a GH Series humidifier. Actual on site application may vary. Consult Technical Services or your local NORTEC representative.

RECEIVING & UNPACKING EQUIPMENT

1. Check packing slip to ensure ALL material has been delivered.

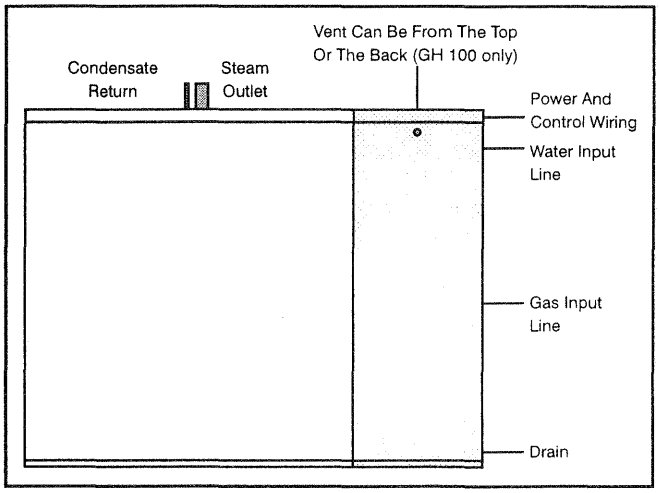
2. All material shortages are to be reported to NORTEC within 48 hours from receipt of goods. NORTEC assumes no responsibility for any material shortages beyond this period.

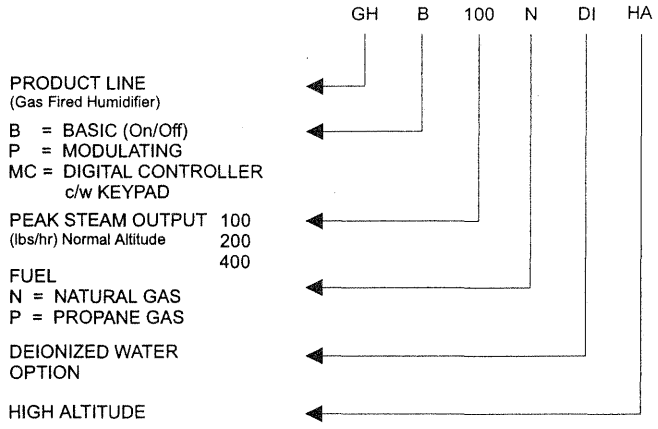
3. Inspect shipping boxes for damage and note on shipping waybill accordingly.

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.

Figure #1





MODEL GH 100 SPECIFICATIONS

ALTITUDE (FT)	FUEL	BLOWER SPEED	INPUT (BTUH)	ORIFICE SIZE (DRILL SIZE)	STEAM CAPACITY (LBS/HR)	MANIFOLD PRESS. IN W.C.	AIR ORIFICE DIAMETER	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)
NORMAL (0-2000)	NATURAL GAS	MAX	119,000	E	100	-0.2	1.062"	300	500
		MIN	65,000	E	50	-0.2	1.062"		
HIGH (2000-4500)	NATURAL GAS	MAX	107,000	E	90	-0.2	1.062"	300	500
		MIN	58,500	E	45	-0.2	1.062"		
NORMAL (0-2000)	PROPANE (LP GAS)	MAX	119,000	9	100	-0.2	1.062"	300	500
		MIN	65,000	9	50	-0.2	1.062"		
HIGH (2000-4500)	PROPANE (LP GAS)	MAX	107,000	9	90	-0.2	1.062"	300	500
		MIN	58,500	9	45	-0.2	1.062"		

MODEL GH 200 SPECIFICATIONS									
ALTITUDE (FT)	FUEL	BLOWER SPEED (MODEL)	INPUT (BTUH)	ORIFICE SIZE (DRILL SIZE)	STEAM CAPACITY (LBS/HR)	MANIFOLD PRESS. IN W.C.	AIR ORIFICE DIAMETER	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)
NORMAL	NATURAL	MAX	238,000	E	200	-0.2	1.062"	350	660
		MIN (B,P)	119,000	E	100	-0.2	1.062"		
(0-2000)	GAS	MIN (MC)	65,000	E	50	-0.2	1.062"		
HIGH	NATURAL	MAX	214,000	E	180	-0.2	1.062"	350	660
		MIN (B,P)	107,000	E	90	-0.2	1.062"		
(2000-4500)	GAS	MIN (MC)	58,500	E	45	-0.2	1.062"		
NORMAL	PROPANE	MAX	238,000	9	200	-0.2	1.062"	350	660
		MIN (B,P)	119,000	9	100	-0.2	1.062"		
(0-2000)	(LP GAS)	MIN (MC)	65,000	9	50	-0.2	1.062"		
HIGH	PROPANE	MAX	214,000	9	180	-0.2	1.062"	350	660
		MIN (B,P)	107,000	9	90	-0.2	1.062"		
(2000-4500)	(LP GAS)	MIN (MC)	58,500	9	45	-0.2	1.062"		

MODEL GH 400 SPECIFICATIONS									
ALTITUDE (FT)	FUEL	BLOWER SPEED (MODEL)	INPUT (BTUH)	ORIFICE SIZE (DRILL SIZE)	STEAM CAPACITY (LBS/HR)	MANIFOLD PRESS. IN W.C.	AIR ORIFICE DIAMETER	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)
NORMAL	NATURAL	MAX	476,000	E	400	-0.2	1.062"	800	1200
		MIN (B,P)	238,000	E	200	-0.2	1.062"		
(0-2000)	GAS	MIN (MC)	65,000	E	50	-0.2	1.062"		
HIGH	NATURAL	MAX	428,000	E	360	-0.2	1.062"	800	1200
		MIN (B,P)	214,000	E	180	-0.2	1.062"		
(2000-4500)	GAS	MIN (MC)	58,500	E	45	-0.2	1.062"		
NORMAL	PROPANE	MAX	476,000	9	400	-0.2	1.062"	800	1200
		MIN (B,P)	238,000	9	200	-0.2	1.062"		
(0-2000)	(LP GAS)	MIN (MC)	65,000	9	50	-0.2	1.062"		
HIGH	PROPANE	MAX	428,000	9	360	-0.2	1.062"	800	1200
		MIN (B,P)	214,000	9	180	-0.2	1.062"		
(2000-4500)	(LP GAS)	MIN (MC)	58,500	9	45	-0.2	1.062"		

GENERAL SPECIFICATIONS

INTRODUCTION

The NORTEC GH Series humidifier is a completely new patented design based on leading edge technology. The GH is designed to provide clean steam humidification at an economical price.

Available for normal altitude (0-2000' elevation) or for high altitude (2000-4500' elevation) applications.

LOCATING AND MOUNTING

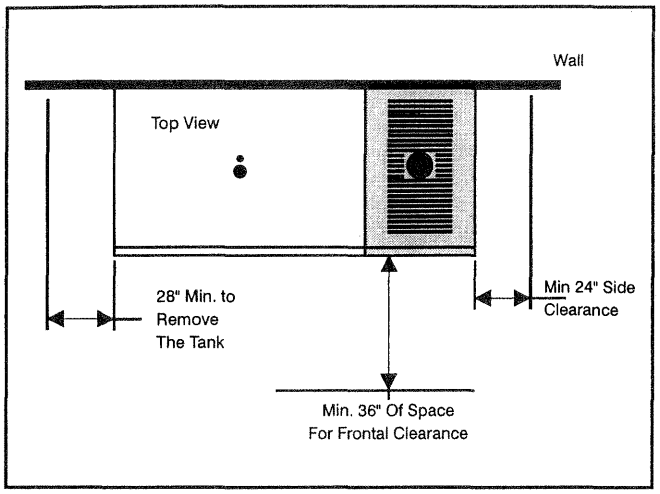
GH Series humidifiers are designed to mount on a suitable wall (GH 100 only), vertical surface, or floor. The clearance dimensions shown in this manual are for reference only and are the minimum required for maintenance of the humidifier. Local and National Codes should be consulted prior to final location 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 and side clearance requirements (for access during installation, maintenance and troubleshooting), see Figure #2.

3. DO NOT locate humidifier any further than absolutely necessary from steam distributor location. Net output will be reduced as a result of heat loss through steam hose (see Engineering Manual, Form # -163D). Also, increased static pressure (over 12" W.C.) may necessitate using a field installed extended water trap.

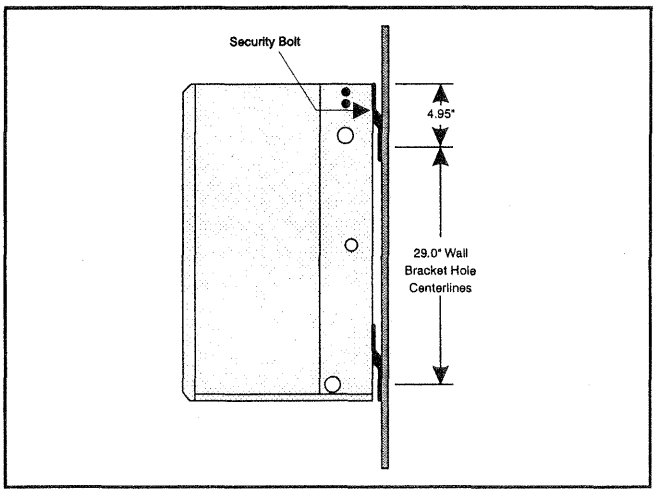
Figure #2



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

5. Wall mounting brackets (provided with GH 100) should be securely attached open edge upwards, horizontal, using field-supplied fasteners (minimum of four 3/8" diameter fasteners in each bracket). Attach to a vertical, solid surface. Put a security bolt through the hole provided in the back of the cabinet so the unit cannot be bumped off the wall bracket. See Figure #3.

Figure #3



6. Make sure humidifier is level. If floor mounted adjust leveling legs.

7. The GH 100 model is equipped with adjustable leveling legs which may be removed for mounting the unit on an optional GH stand.

8. The GH 200 and 400 models are equipped with ½" NPT threaded legs and may be raised off the floor up to 12" (or more with the use of cross-bracing). This is accomplished by inserting 4 lengths of ½" threaded pipe into the sockets located on the base of the unit. The feet that come shipped with the unit are easily removed by using the square end of a 3/8" socket driver inserted into the bottom of the foot.

9. Optional stands are available for all GH Series humidifiers. Refer to Shop Drawing Package, Form # 98-273.

10. DO NOT mount humidifier on hot surfaces.

11. If humidifiers are mounted on roof, a thermostatically ventilated weatherproof cabinet by others should be used. Consult factory.

12. DO NOT mount humidifiers in an area where freezing may occur.

13. DO NOT mount humidifiers on vibrating surface. Consult factory.

14. In earthquake prone areas do not wall mount. Use the existing wall mount brackets to fasten unit to the wall with it sitting on the floor. Maintain spacing for air openings. See **"Installation"** item 9 on page 4 of this guide.

INSTALLATION

1. The installation must conform with local building codes or, in the absence of local codes, with the ANSI Z223.1, National Fuel Gas Code, and/or CAN/CGA B149 Installation Codes.

2. The appliance must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig (3.5 kPa).

3. The humidifier shall not be connected to a chimney flue serving any other appliances.

4. Provide for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

5. The required free area of supply air opening is:

   11 in. sq. (7,000 mm^2), for GH 100
   20 in. sq. (13,000 mm^2), for GH 200
   40 in. Sq. (26,000 mm^2), for GH 400

6. Excessive exposure to contaminated combustion air will result in safety and performance related problems. Known contaminates include halogens, ammonia, and chlorides, excessive dust, lime or dirt. Contact NORTEC Technical Services if you have any questions.

7. All surfaces are zero clearance to combustible construction.

   NOTES:

   - The leveling legs must be left in place when floor mounted on combustible material.

   - The humidifier shall not be installed directly on carpeting, tile or other combustible material other than wood flooring.

8. For recommended clearances for servicing refer to Figure #2.

9. Cabinet back and bottom contain air openings to provide combustion air to the forced draft blower. Either the back or bottom set of openings must have at least 2" (50 mm) clearance to allow for adequate combustion air. For example, if the humidifier is floor mounted, 2" clearance must be maintained to the unit's back surface.

10. During installation it may be necessary to cover the humidifier to prevent any dust or other contaminants from entering the cabinet when activities such as drilling are taking place.

NOTE: Some insulating materials may be combustible. Prior to installing this appliance examine the area for insulating material. If this appliance is installed in an insulated space, it must be kept free and clear of insulating materials. If insulation is added after the appliance is installed, it will be necessary to examine the area again.

GAS PIPING

The gas inlet pipe size to the appliance is:

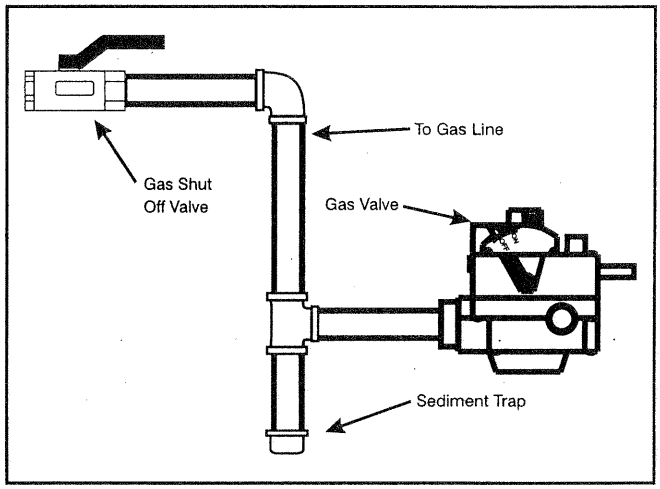
1/2" NPT for GH 100
3/4" NPT for GH 200
3/4" NPT for GH 400

Provide an adequate size gas supply line.

Installation of piping must be in accordance with local codes, and ANSI Z233.1, "National Fuel Gas Code," in the United States or CAN/CGA-B149 Installation Codes in Canada.

When black iron gas pipe is used, a sediment trap must be located ahead of the humidifier gas controls. In all installations, a manual shut off valve, located outside the cabinet, must be installed. See Figure #4.

Figure #4



Leak test all gas connections using a commercial soap solution made to detect leaks. Bubbles indicate gas leakage. Seal all leaks before placing the humidifier in operation.

WARNING: Never use an open flame to check for gas leaks. If a leak does exist, a fire or explosion could occur, resulting in damage, injury or death.

The appliance and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig (3.5 kPa).

Dissipate test pressure from the gas supply line before reconnecting the humidifier and its manual shut off valve to the gas supply line.

NOTES:

1. FAILURE TO FOLLOW THIS PROCEDURE MAY DAMAGE THE GAS VALVE. OVER PRESSURED GAS VALVES ARE NOT COVERED BY WARRANTY.

2. DO NOT use Teflon tape on gas line pipe threads. A flexible sealant suitable for use with Natural Gas and Propane Gas is recommended.

3. Plan gas supply piping so it will not interfere with removal of gas valves or blower assemblies and front or side service doors.

GAS PRESSURE SPECIFICATIONS

	INCHES W.C.	
GAS	MIN.	MAX.
Natural	4.5	14.0
Propane/LP	11.0	14.0

The gas valve is provided with pressure taps to measure gas pressure upstream and downstream, (manifold pressure). The minimum gas pressure shown is for the purpose of input adjustment.

A 1/8" NPT plugged tapping, accessible for test gage connection, must be installed immediately upstream of the gas supply connection to the appliance.

VENTING

The vent pipe must be the same diameter as the vent connector. See following chart for venting system part numbers.

The maximum flue gas temperature at the humidifier vent connector will not exceed 480°F. Use only the special gas vents listed for use with Category III or IV gas burning appliances, such as those listed in the following venting system chart. (Listed to UL Standard 1738 in the USA and ULC-S636 in Canada.)

All venting joints must be positively sealed with high temperature RTV silicone sealant rated for at least 480°F.

When venting a category IV appliance it is necessary to provide for condensate removal in the venting system. This provision may be met by using the special drain tee as listed in the venting system chart.

When a drain tee is used it is necessary to install a trap in the drain to ensure that flue gases do not vent into the drain. Install the trap with a 12" minimum height of standing water column.

Prior to activating the appliance, ensure that the trap is filled with water and that the drain terminates in accordance with local plumbing codes.

For any vent lengths over 20 feet long, use insulated vent.

Venting Systems Approved For Use With GH Series Humidifiers

Model	Category	Manufacturer	Vent Diameter	Rigid	Flex	Vent Sidewall Terminal	Drain Tee
GH 100	III	Flexmaster Z-Flex	3"	02SVEPXX03	22TL294C03	02SVSRTX03	02SVEDPS03
GH 100	III	Magnaflex	3"	NA	03SSPLV	03SSHVT	NA
GH 100	III	Flex L Int'l Inc.	3"	StaR-34 System	StaFlex-294 System	SRTT-03	SRTDH-03
GH 200 GH 400	IV	Flexmaster Z-Flex	4"	02SVEPXX04	22TL294C04	02SVSRTX04	02SVEDPS04
GH 200 GH 400	IV	Magnaflex	4"	NA	04SSPLV	04SSHVT	NA
GH 200 GH 400	IV	Flex L Int'l Inc.	4"	StaR-34 System	StaFlex-294 System	SRTT-04	SRTDH-04

WARNING: Provide a screen or barrier to prevent personal injury in areas where inadvertent personnel contact with vent pipe can occur.

The GH may be vented through the back or through the top of the unit depending upon the model. Choose a venting method based on desired location of the outside vent terminal and knock out the hole in the desired panel of the humidifier.

For sidewall venting, locate the humidifier as close as possible to the wall being used. For GH 100, the minimum vent length is directly through the back of the humidifier, through the wall, and connected to the outside vent terminal.

The maximum recommended vent length is 100 equivalent feet where each 90° elbow equals 10' and each 45° elbow equals 5'.

NORTEC recommends 100' vent length maximum to ensure that output is maintained. For lengths over 100', unit should be assumed to lose 10% output for each additional 50' equivalent length.

All horizontal runs of the vent pipe shall have a minimum rise of 1/4" per foot (21 mm/m) and shall be supported at maximum intervals of 5' (1.5 m) and at each point where an elbow is used.

Periodic cleaning of the screens in the vent terminal is required for proper operation of the humidifier.

ADDITIONAL REQUIREMENTS WHEN VENTING THROUGH A SIDEWALL

The vent terminal must be installed within the same atmospheric pressure zone as the combustion air inlet of the humidifier.

Locate the vent terminal at least three feet above any forced air inlet located within ten feet; or at least four feet below, four feet horizontally from, or one foot above any door, window, or gravity air inlet into any building.

A minimum horizontal clearance of four feet from electric meters, gas meters, regulator and relief equipment is required.

Locate the vent terminal at least seven feet above grade when it is adjacent to public walkways.

Locate the bottom of the vent terminal at least twelve inches above grade or ground, or normally expected snow accumulation level. The snow level may be higher on walls exposed to prevailing winds.

Avoid areas where local experience indicates that condensate drippage may cause problems such as above planters, patios, or over public walkways, or over an area where condensate or vapor could create a nuisance or hazard, or could be detrimental to the operation of regulators, relief valves, or other equipment.

Refer to the vent manufacturer's installation instructions.

ELECTRICAL

PRIMARY WIRING

1. Humidifiers require field wiring to primary voltage terminal blocks. Power requirement is 120 V, 15A fused circuit, single phase. Wiring is fed through a 7/8" hole on upper right hand side of control compartment.

2. When installed, the appliance must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1 Electrical Code, if an external electrical source is utilized.

3. Connect ground wire to cabinet ground clamp.

4. External wiring sizes must be in accordance with NEC and/or CEC and existing local electrical codes and by-laws.

LOW VOLTAGE CONTROL WIRING (See external wiring diagrams in this manual.)

On/Off Controls (B Models)

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 strip, or replaced with a jumper wire for constant operation. **Caution:** Terminal 1 is the "hot" wire from the 24V control transformer; it will blow the 3A breaker on tranformer 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 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.

MODULATION CONTROLS (P Models Only)

For P Models a single 0-10 VDC or 0-20 mA control signal is received at terminals 4 and 5 on the low voltage terminal strip to generate a modulating output from the humidifier. Terminals 1 and 3 are 24 Vac output and ground respectively and may be used to power a remote mounted modulating humidistat. NORTEC recommends that the safety loop across terminal 1 and 2 be utilized for safe operation of the humidifier (see **B** & **C** under on/off controls). For control wiring connections of GHMC models see MC Manual, Form # 98-274.

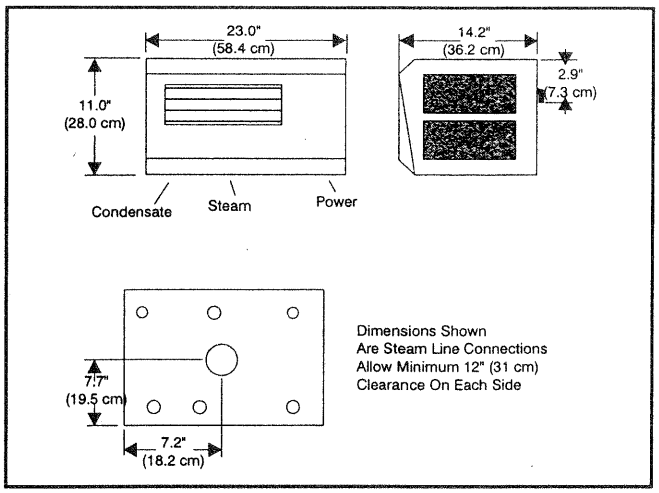
BLOWER PACKS

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.

2. Blower packs are remote mounted (RMBP) see Figure #5.

3. All GH Series blower packs consist of a steel cabinet containing: fan and motor powered by external 208-240 voltage (optional 110-120 V available), fuse, relay, speed select switch, stainless steel steam distributor, supply air grille with adjustable louvers, and built-in resettable safety thermostat which turns off the humidifier if the blower pack gets overheated. Control thermostat, mounted on the steam distributor, starts the fan when steam is generated. All blower packs provide intake air filters.

Figure #5



4. Refer to Figure #6 for overhead and frontal clearances required for blower packs. Minimum clearance for the sides is 12 inches.

5. Mount remote blower pack(s) using factory supplied wall mounting brackets, See Figure #5, with clearance as recommended in Figure #6.

Figure #6
Overhead & Frontal Clearances for Blower Packs

GH Model	Min. No. of Blower Packs	Min. Overhead Clearance inches (cm)	Min. Front Clearance inches (cm)
100	1*	48 (122)	156 (396)
200	2*	48 (122)	156 (396)
400	4*	48 (122)	156 (396)

* Remote mounted only. Two remote mounted blower packs are recommended on the 100 model, three are recommended for the 200 model, six are recommended for the 400 model.

Nominal conditions 72°F, 35% RH.

6. Steam distributors in the remote blower packs have a hot surface that could result in burns if touched. If space allows, we recommend mounting remote blower pack at least 8 feet above the floor.

7. Do not use blower packs as ducted blowers. The air volume from a blower pack is not sufficient to absorb the steam generated.

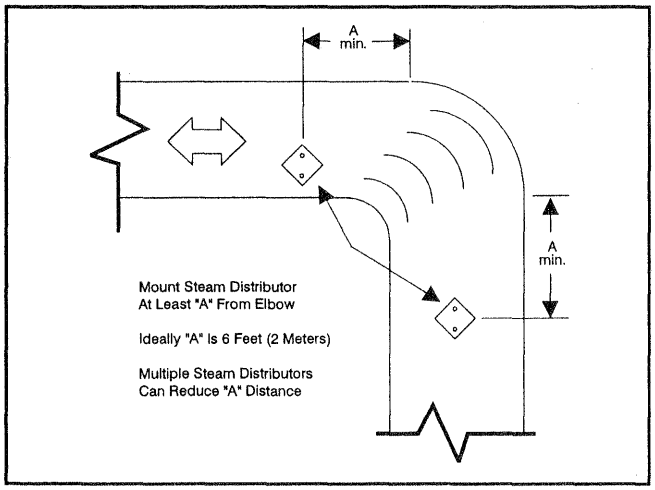
STEAM DISTRIBUTORS FOR DUCTED APPLICATIONS

1. Any humidifier's steam line may be divided into multiple branches to feed more than one distributor. Steam supply line "tees" are common copper fittings that are available for this purpose.

2. 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.

3. 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. (See Engineering Manual, Form # -163D for information on absorption distances.) See Figure #7.

Figure #7



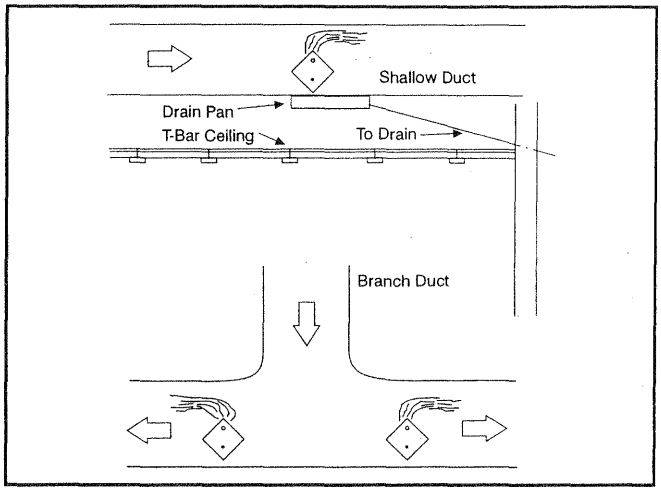
4. Steam distributors should always span the width of the air stream. Multiple steam distributors, arranged in a bank, can minimize absorption distance.

5. Exercise extreme caution when installing in fiberglass or internally lined ducts. If necessary, remove 4-6 feet of the lining where the steam is being introduced.

6. High positive or negative static pressure ducts or plenums have special requirements. High positive static pressure ducts may require the unit to be fitted with an extended external water trap.

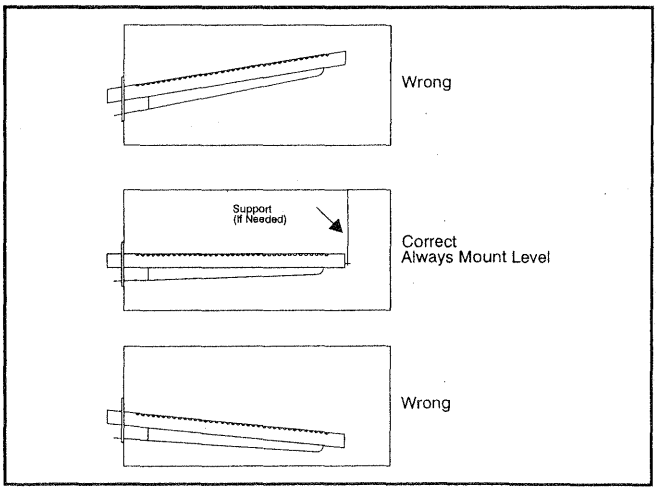
7. Low temperature ducts below 60°F (15°C), shallow ducts, or branch ducts might require the use of a field supplied condensate drain pan below the steam distributor. See Figure #8.

Figure #8



8. 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 #9.

Figure #9



9. Any distributor longer than 3 feet (1 meter) should be supported at its end with a threaded rod through top or bottom of duct. See Figure #10.

Figure #10

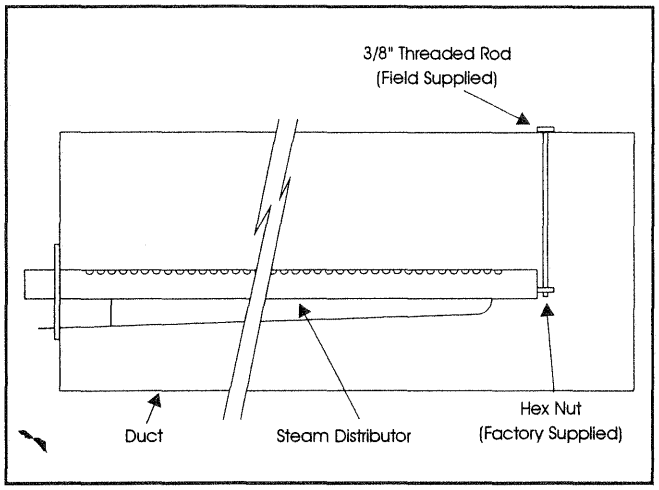
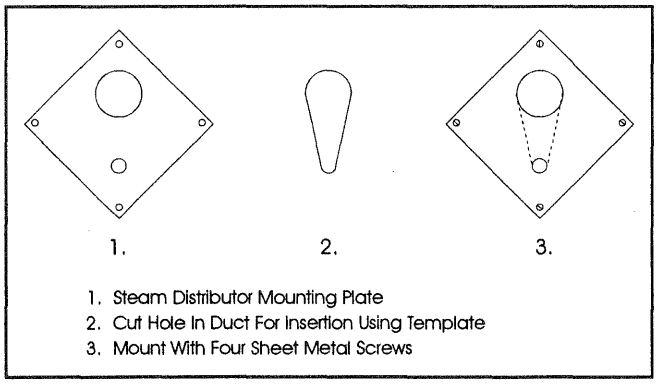
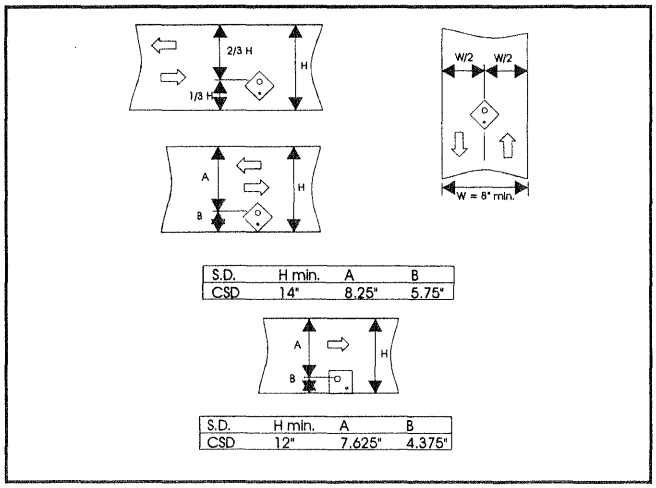


Figure #11



10. It is recommended that single distributors are mounted near the bottom of the duct to ensure the steam is dispersed into the majority of the air flow. See Figure #12.

Figure #12

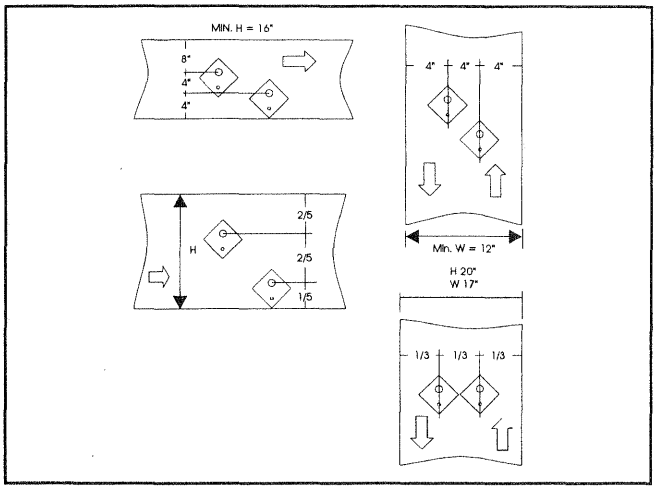


S.D.	H min.	A	B
CSD	14"	8.25"	5.75"

S.D.	H min.	A	B
CSD	12"	7.625"	4.375"

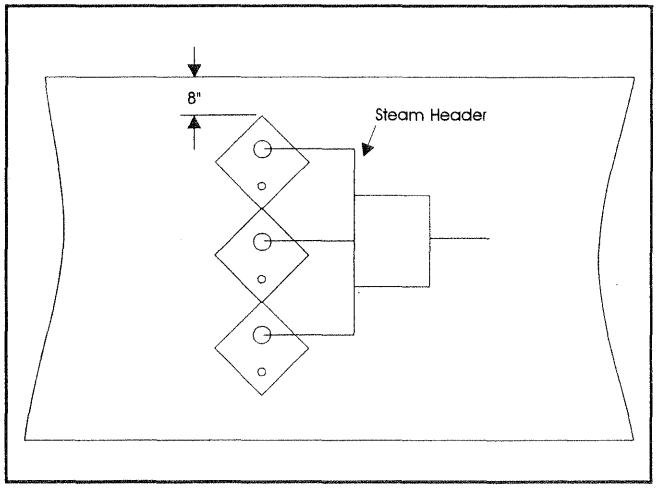
11. Using duct mounting template provided, cut a hole in side of duct just large enough to admit steam manifold and condensate drain pipe assembly. Use four sheet metal screws to attach mounting plate to side of duct. See Figure #11 and #12.

Figure #13



12. With multiple steam distributors, the top steam distributor should be at least 8" below top of duct to avoid possible condensation on surface of duct. The remainder of space below is proportioned accordingly. See Figure #13. For short steam absorption systems see Figure #14.

Figure #14



PLUMBING

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

WATER SUPPLY LINE

1. The humidifier is intended to operate on cold potable tap water.

2. If the potable tap water is very hard, longer operating times between tank cleaning will be reached on softened water.

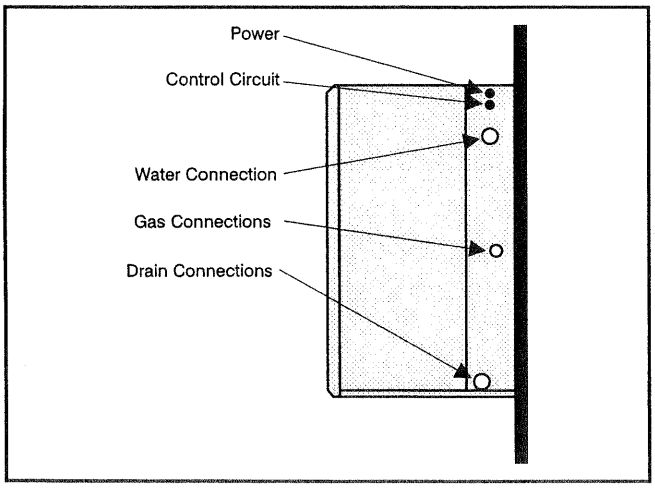
3. Reverse osmosis (RO) water can provide very long times before cleaning is required since it is cleaner than softened water. However, it is also more corrosive. Consult factory. Deionized (DI) water may be used with specific models. Consult NORTEC representative.

4. 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 could become plugged.

5. Standard fill valves are sized for water pressure ranging from 30 to 80 psig (ideally 55 to 60 psig). For other pressures, consult factory. This pressure should be measured at the humidifier if the water pressure is suspect.

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

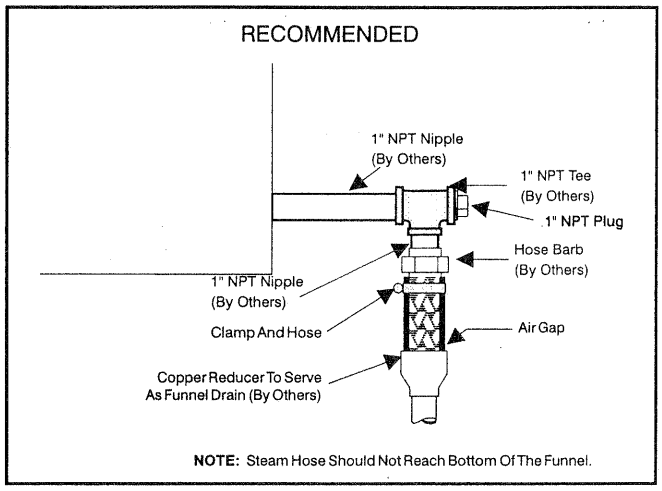
Figure #15



DRAIN LINE

1. Humidifier is equipped with a 1" NPT drain outlet connection on the side of the humidifier. See Figure #15. A field-supplied funnel is recommended. See Figure #16. It will prevent backup due to partially blocked or badly installed drain lines.

Figure #16



2. 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.

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 1" 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 (min.) insulation is recommended for steam supply, with NORTEC supplied steam hose coupling used to make connection to humidifier. See Figure #17.

Figure #17

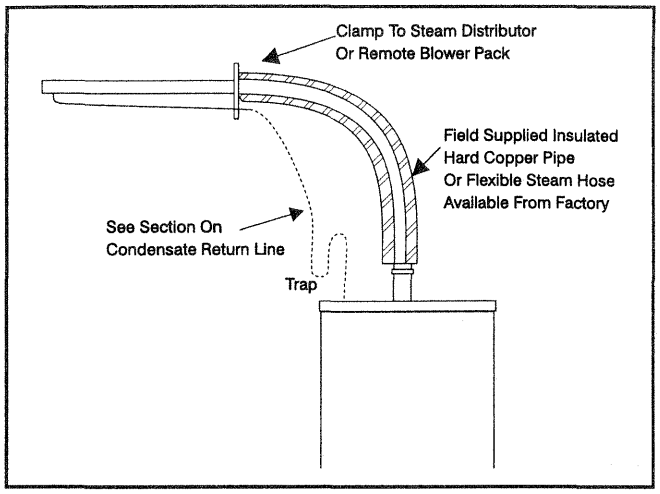


Figure #18

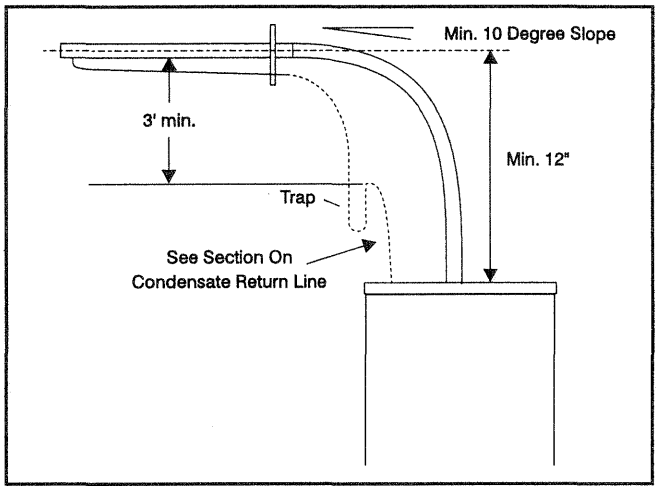
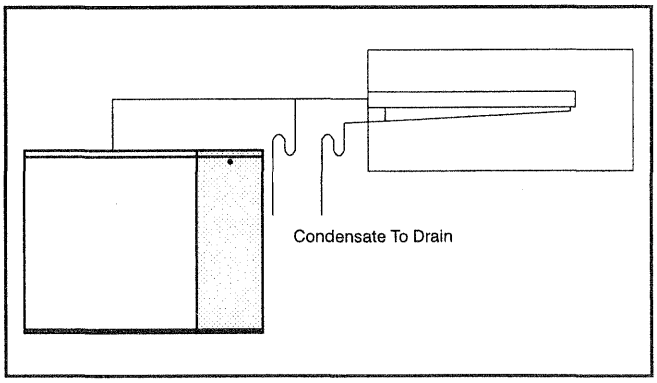


Figure #19

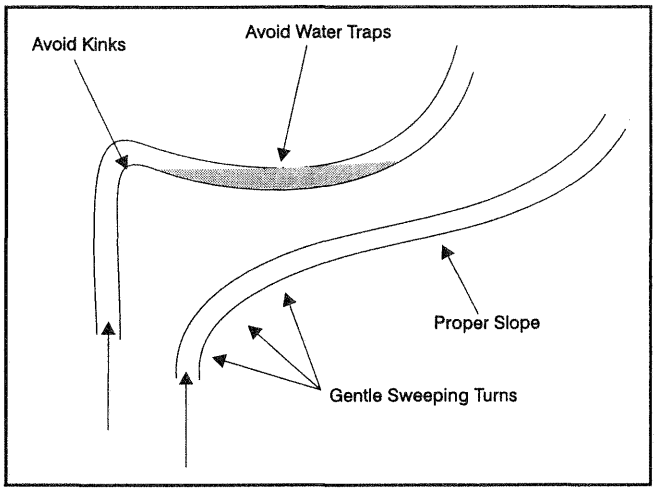


2. NORTEC steam supply hose or field-supplied piping should be sloped downwards from the steam distributors to the humidifier. Slope should be at least 2" in 12" to promote condensate runback. See Figure #18. If this slope is not possible, condensate must be removed before the distributor. See Figure #19.

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. This will also reduce the back pressure and avoid the need to install an extended water trap.

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 line runs of 5 feet or less. See Figure #20.

Figure #20

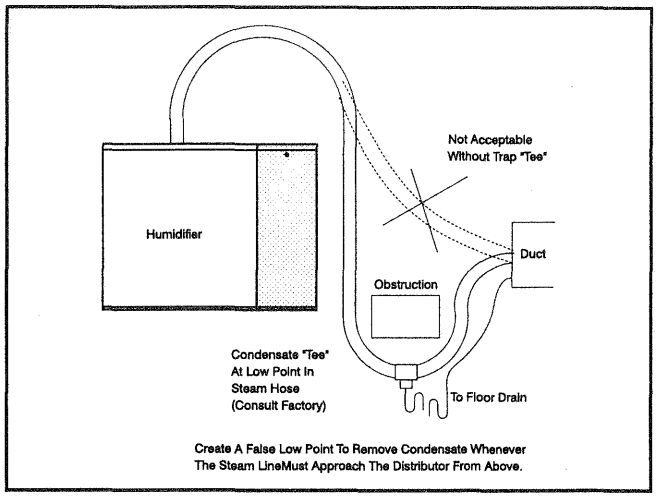


5. To ensure odor-free steam, always use NORTEC steam hose. Check steam hose and hose couplings periodically for cracks, breaks, kinks. Replace as required. DO NOT substitute hose. NORTEC is not responsible for health effects or damage from substitute hose.

6. Steam lines require 1-5/8" O.D. (nominal 1-1/2") copper pipe. For steam runs longer than 40 feet use insulated nominal 2" copper to ensure the draining of condensate.

7. Do not use steel or plastic pipe for steam distribution or hose other than NORTEC supplied. Substitution will void warranty.

Figure #21



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 #21.

9. 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. If long runs are unavoidable, the humidifier should be sized larger to compensate for condensate losses and insulated copper should definitely be used.

WATER TRAP

1. The GH Series humidifier produces steam at atmospheric pressure. Pressure head must develop to push steam through supply line and into air duct.

2. Combined resistance of duct positive static pressure and steam line resistance creates a small pressure head in water tank. Total amount of positive static pressure head is reflected directly by water column differential that develops in the built in water trap.

3. The built in water trap allows a maximum of 12" W.C. pressure before steam escapes through drain.

4. To increase allowable water column (allowable positive static pressure) an extended field installed water trap may be used.

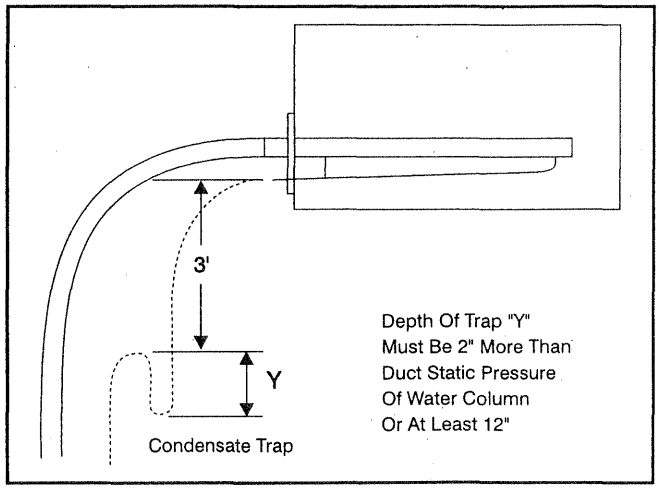
5. Static pressure is usually higher when distributor's steam outlets are faced into downflow duct applications.

CONDENSATE RETURN LINES FOR STEAM DISTRIBUTORS

1. Each steam distributor has a built-in condensate return (3/8" O.D. copper tubing). Flexible condensate hose (3/8" I.D for GH 100, ½" I.D. For GH 200, ¾" I.D. for GH 400) available from NORTEC, is recommended for routing condensate back into humidifier's condensate return connection for short runs. A short length of condensate hose with clamps is supplied with NORTEC's GH Series to serve as a flexible coupling. DO NOT direct solder field copper condensate line to steam distributors. Use 3/8" I.D. copper for runs up to 20 feet and ½" I.D. for longer runs on GH 100. Use ½" I.D. copper for runs up to 20 feet and ¾" I.D. for longer runs on GH 200 and 400.

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 in inches of water column. See Figure #22.

Figure #22



3. If the top of the condensate line trap is less than 3' above the steam distributor, connect condensate line to drain below humidifier.

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).

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 with duct pressures below atmosphere.

6. It is not necessary to return the condensate to the humidifier; however, routing condensate to drain wastes energy.

7. All condensate return runs must be well sloped towards the humidifier to ensure adequate flow.

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.

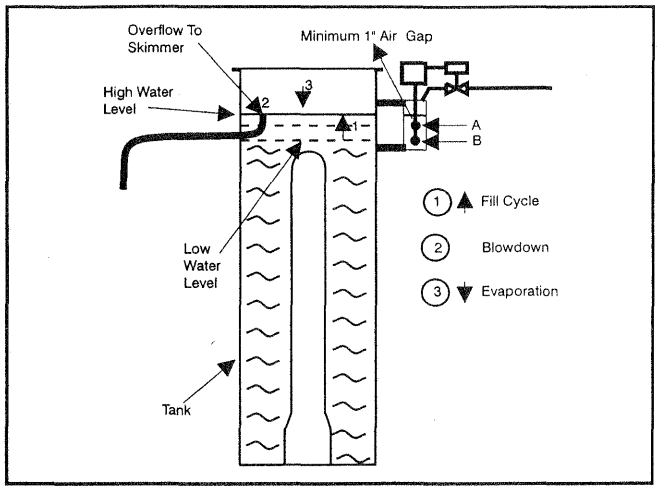
6. Calibration of controls (on/off or modulation) in the field may be necessary due to shipping and handling. Verify humidistat accuracy before commissioning system.

OPERATION

WATER LEVEL CONTROL

A two float switch probe located in a separate float chamber maintains water level and controls the fill cycles through a solenoid operated valve. Cold fill water is routed into the water tank, which incorporates a 1" minimum air gap, to meet plumbing codes.

Figure #23



On initial startup, the solenoid operated water fill valve opens and fills the water tank. When the water level reaches float "B", see Figure #23, a call for humidity will initiate the firing sequence. The water fill continues until float "A" is reached. Float "A" will initiate a variable time delay relay which maintains water flow for a preset amount of time. During a portion of this time the water level in the tank will exceed the level of the blowdown/skimmer and water will flow down the drain until the timed cycle is complete.

During operation, the water level in the tank will lower by evaporation until float "A" initiates the fill and overflow cycle again.

If the water level ever falls below float "B" the unit will shut down to prevent any damage to the unit.

SEQUENCE OF OPERATION

Provided the necessary power, water, gas and vent connections are completed, the unit is started by the activation of the on/off switch located on the front panel.

When the operating humidistat and safety controls are closed, the ignition module will energize the igniter. The hot surface igniter then heats up, and after about seven seconds, the gas valve is energized. The

burner will then be lit and the igniter will stop glowing. If the burner flame is not sensed by the flame sensor within 4 seconds, the gas valve will shut off and this cycle will be repeated a maximum of three times. To recycle the burner, momentarily turn the power switch to the off position and then to the on position. When the humidity in the space matches the setting of the operating controller, the system will shut down until the next call for humidity.

START UP PROCEDURE

Prior to filling the unit, it is necessary to ensure that no dirt or dust has accumulated in the control compartment. If necessary, clean this area to prevent contaminants from being drawn into the combustion blower.

FILLING THE SYSTEM

Before the GH unit can be put into operation it must be filled with water to the low level setting of the water level controller.

To fill with water, turn the gas valve off and switch the unit on at the power switch after all plumbing, venting and wiring have been completed. The unit will fill automatically until the low water level is reached and then trial for ignition will begin. After three tries the ignition module will lock-out. Leave the unit switched on until the fill sequence is complete. Then switch off the power and proceed with the ignition safety shut-off test.

TESTING THE IGNITION SAFETY SHUT-OFF

The ignition system safety shut-off must be tested by conducting the following method of test:

1. With the gas supply off, turn power on.
2. Blower prepurges for 30 seconds. NOTE: On multi-blower models, it is necessary to wait for all blowers to cycle.
3. After seven seconds the gas valve is energized for four seconds, then de-energized. After three trials for ignition (complete with preperge) the unit goes into a safety lockout.
4. Manually re-open the gas supply. No gas should flow to the main burner. End of test.
5. To reset the system, momentarily shut off power switch, then turn it back on again. Igniter will start to heat up and normal operating cycle will occur as described in the sequence of operation.

BLOWER PACK OPERATION

Blower packs are equipped with a control thermostat mounted on the steam distributor. As soon as humidifier generates steam, the contact is closed and the fan is started. When steam is no longer being generated, the fan cuts out with a delay.

If blower packs get overheated (malfunction of the air circulation), the resettable safety thermostat interrupts steam generation. To reset, switch off the humidifier and wait until the steam distributor cools down. For manual reset, remove left-hand side intake air filter and, using a screwdriver, press the reset button (marked with a red dot) inside the blower packs.

All units are equipped with a speed select switch. The switch is located on the right-hand side of the blower, inside the blower pack. To access the switch, remove right-hand side intake air filter.

To avoid condensation on the cabinet parts, run blower pack on high speed when humidifier delivers more than 75 lbs/hr of steam per blower pack.

When two blower packs are connected to a GH 100 (100 lbs/hr of steam) they may be operated on low speed.

SAFETY INSTRUCTIONS

Refer to front cover and page 1 of this guide.

MAINTENANCE

DRAINING THE TANK

During extended periods of inactivity such as off season or periods of very low demand, it is advisable to drain the water from the tank. This is accomplished by switching the power off and opening the 1" manual drain valve at the bottom of the tank in the control cabinet area. On models shipped with electric drain valves, simply switch the unit to "Drain".

Ensure that valve is closed and power is switched on again during periods of demand.

CLEANING THE STAINLESS STEEL TANK

CAUTION: Water and scale may be hot enough to cause burns. Turn off humidifier and allow it to cool before cleaning.

The combustion chamber walls are usually self cleaning. The mineral buildup flakes off, due to the expansion and contraction and violent boiling action

during on/off cycles, and settles to the bottom of the tank. A scale accumulation of up to 2" thick on each side of the bottom of the tank will not affect operation of the GH unit.

It is recommended that the tank and float chamber be cleaned at least once every season to maintain optimum operation. It may be necessary for more frequent "flushes" in areas of hard water or prolonged annual usage. To "flush" the unit, see "Draining The Tank" section of this manual.

To clean tank, remove steam and condensate lines and remove lid. Lid is held down by keyed lock at rear lip. Remove tank lid by removing hold down knobs or nuts being careful to not damage the insulation or gasket.

To remove loose scale, simply scoop it out or flush to drain. Scale adhering to the tank or combustion chamber walls can be removed with a scraper such as a plastic windshield scraper. Do not use a metal scraper or scoop that will scratch the stainless steel surfaces of the tank.

Flush remaining scale from reservoir with clean water. Be careful not to allow scale to clog the drain line and traps.

Reassemble in reverse order, making sure tank cover gasket is intact. Do not over-tighten cover bolts.

Cleaning the float chamber is accomplished by removing the hold down screws to access the floats and using a small brush to gently clean the scale from the floats, stem and chamber. Ensure that float operation is smooth and gasket is properly seated before tightening screws on float chamber.

COMBUSTION BLOWER

The combustion air blower motors are permanently lubricated and require no other maintenance.

BURNER

The burners are made of ceramic fabric material and operate in the infrared mode. Depending on the environment, the burner(s) may require removal of lint or grease-laden dust periodically. This may be achieved by removing the burner and applying pressurized air to the external surface of the material. Refer to the Servicing Section related to burner removal.

BURNER REMOVAL/INSPECTION

1. Shut off electrical power and gas supply to the appliance.
2. Disconnect wiring to hot surface igniter and flame sensor and remove. See section on removal of these components.
3. Remove blower. See Blower Removal Section.
4. Remove (5) burner flange mounting bolts.
5. Gently remove the burner assembly from the appliance being careful not to damage the burner material.
6. To reinstall, reverse above procedure and ensure that flange gasket is not damaged and a good seal is maintained. If necessary replace the gaskets.
7. **Always test for leaks after any service has been performed on the gas train** as there is an explosive gas mixture present downstream of the combustion blower.

ADJUSTMENTS/REPLACEMENTS OF COMPONENTS

DANGER - SHOCK HAZARD - Make sure electrical power to the appliance is disconnected to avoid potential serious injury or damage to components.

Gas Valve Replacement

1. Shut off electrical power and gas supply to the appliance.
2. Remove gas piping to gas valve inlet.
3. Remove front door and right side panel.
4. Disconnect wiring connections to gas valve.
5. Unthread gas valve from outlet.
6. Reverse above procedure to re-install.

Hot Surface Igniter Replacement

NOTE: Replacement igniters must be supplied by NORTEC or damage to the unit may occur.

1. Shut off electrical power and gas supply to the appliance.
2. Disconnect wiring leads to the igniter.

3. Remove nut holding igniter cylinder to burner flange and carefully remove igniter.

4. Reverse above procedure to re-install.

CAUTION: Silicon carbide igniter is fragile and brittle. Exercise extreme care in handling the assembly to avoid damage.

Ignition Module Replacement

1. Shut off electrical power to the appliance.

2. Remove access door.

3. Disconnect wiring connections to the module labeling as required.

4. Remove screws (2) holding module.

5. Reverse above procedure to re-install.

Transformer Replacement

1. Shut off electrical power to the appliance.

2. Remove access door.

3. Disconnect wiring connections from transformer leads labeling as required.

4. Remove screws (2) holding transformer.

5. Reverse above procedure to re-install.

Air Switch Replacement

1. Shut off electrical power to the appliance.

2. Remove front panel.

3. Remove wiring connections to switch.

4. Remove screws (2) holding the switch.

5. Remove pressure hose(s) from switch noting proper location.

6. Reverse above procedure to re-install.

Combustion Air Blower Replacement

1. Shut off electrical power to the appliance.

2. Remove front panel.

3. Disconnect plug connection to motor.

4. Remove bolts on air intake assembly.

5. Remove nuts on discharge outlet of blower.

6. Remove blower assembly.

7. Reverse above procedure to re-install ensuring that O-ring is properly seated.

Tank Replacement

1. Drain water from unit. See section "Draining The Tank".

2. Switch off power to the unit and open right front door and removable right panel.

3. Disconnect steam and condensate lines.

4. Remove top door/panel with lock key and lift the door out of the overlapped edge.

5. Remove tank lid by unscrewing the knobs.

6. Remove left door/panel.

7. Disconnect float chamber by uncoupling the union and releasing the hose clamp.

8. Disconnect the blowdown/skimmer line (3/4" copper) utilizing the union.

9. Remove the nuts on the accessory panel.

10. Disconnect the left end tank brackets from the frame.

11. Carefully slide tank out the left end of the casing.

12. Reverse procedure to replace tank and replace fiber gasket on accessory panel before bolting together.

BLOWDOWN CALIBRATION

The humidifier is equipped with an adjustable timer that is factory set for average water conditions. However, in areas of extreme water conditions, it may be necessary to increase the blowdown time to compensate for these conditions.

To increase the blowdown time, rotate the small dial labeled "Blowdown", located on the electrical panel behind the locked door, in a clockwise direction. This will result in more skimming time and therefore reduce the concentration of total dissolved solids. It may be necessary to test the tank water periodically to determine the optimum blowdown setting.

MANUAL STEAM OUTPUT ADJUSTMENT (B Models)

Manual rate adjustment for GH Series units is accomplished by rotating the output adjustment selector that is located on the switch panel behind the locked door panel. Rotate the knob labeled "Output" clockwise to increase output and counter clockwise to decrease output. See specifications for output values.

SERVICING THE UNIT

Caution: Disconnect power before servicing this appliance.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

The combustion chamber, heat exchanger and flue baffles are all fabricated from stainless steel and do not require cleaning.

This appliance is equipped with a self diagnostic ignition module which identifies the fault code with a flashing LED. The LED's are located at the switch panel and correspond to their respective ignition modules from left to right looking from the burner entry side. Most problems can be identified with this code. Refer to Fault Conditions on page 17 and Troubleshooting Guide on page 18.

Should the main burner fail to light, or flame is not detected during the first trial for ignition period, the gas valve is de-energized and the control goes through an interpurge delay before another ignition attempt. The control will attempt two additional ignition trials before going into lockout. The valve relay will be de-energized immediately, and the combustion blower will be turned off.

Recovery from lockout requires a manual reset by either resetting the humidistat or removing 24 volts for a period of 5 seconds.

FAULT CONDITIONS

Error Mode	LED Indication
Internal Control Failure	Steady on
Air Flow Fault	1 Flash
Flame With No Call For Heat	2 Flashes
Ignition Lockout	3 Flashes

The LED will flash on for 1/4 second, then off for 1/4 second during a fault condition. The pause between fault codes is 3 seconds.

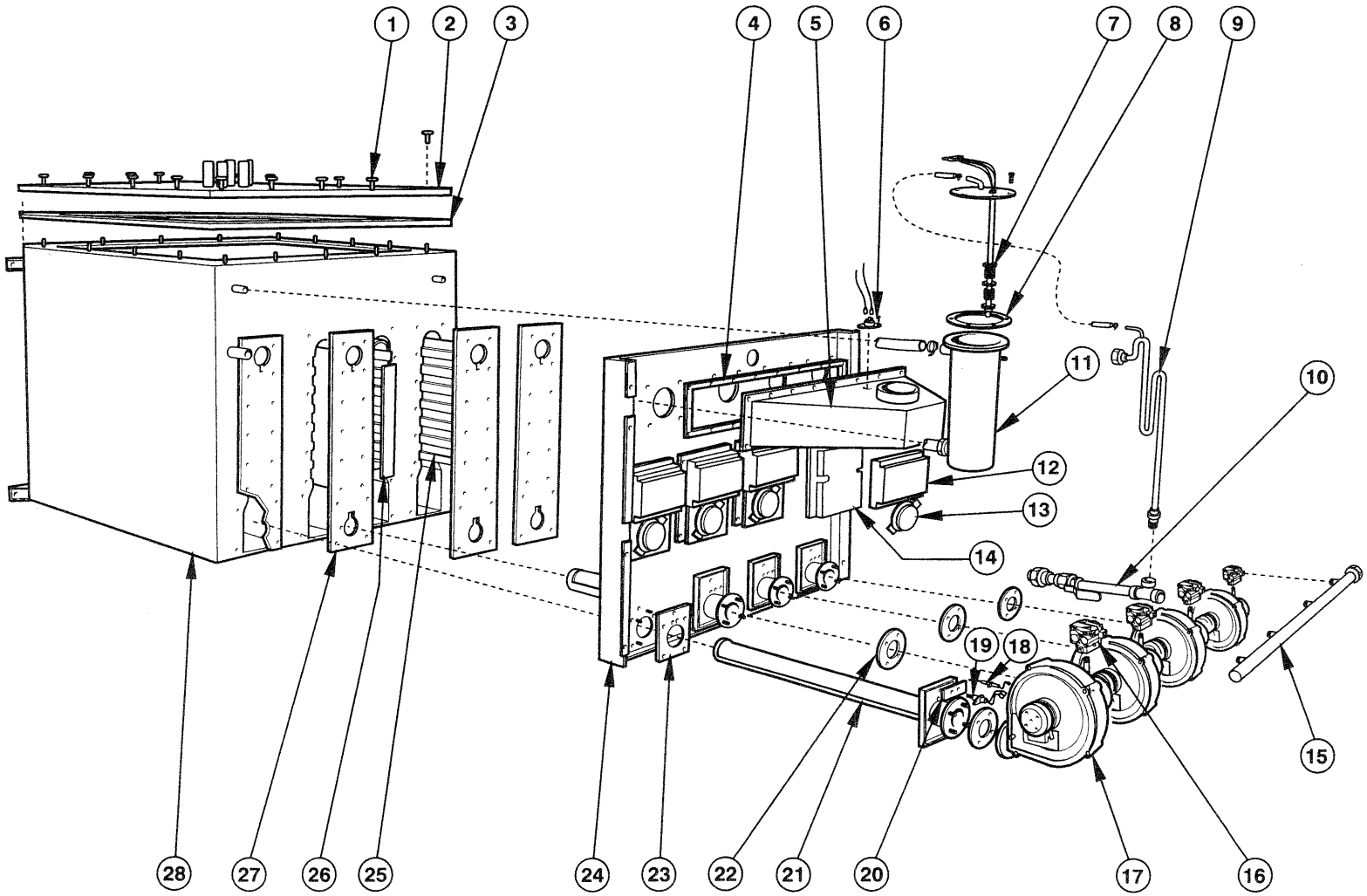
SERVICE CHECKS

Flame current is the current which passes through the flame from the sensor to ground. The minimum flame current necessary to keep the system from lockout is 0.7 microamps. To measure flame current, connect an analog DC microammeter to the FC- FC+ terminals on the module. Meter should read 0.7 uA or higher. If meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

NOTE: Proper polarity of supply voltage to the unit is necessary for flame sensing to occur.

TROUBLESHOOTING GUIDE

Service Checks	
Symptom	**Cause/Cure**
On-off Switch Energized, Humidistat calling for operation. Unit does not operate.	- No power to appliance. Check circuit breaker. Check disconnect switch. - Defective Transformer. Check secondary voltage. If no 24 volts, replace transformer if breaker is not blown. - Low voltage breaker blown. Check breaker (located on side of transformer). If breaker blown, reset breaker. - Ignition module locked out. Check LED diagnostic light for failure identification. See Fault Conditions for identification of fault codes.
Unit energized/Ignition module okay. Blower NOT running.	- Loose wire(s). Check wiring connection(s). - Defective blower. Replace blower.
Power to unit on, humidistat on, indicator lights on except humidity demand.	- Miswired. - Low float switch stuck or defective. Check continuity of float switch and inspect floats. Clean floats if scaled up; replace if defective. - Fuse/Circuit breaker bad. - Bad control. Check LED for steady on.
Humidistat on. No blower output	- Miswired. - 24VDC power supply defective or fuse blown. Check fuse on power supply.
Pressure switch input okay but no trial for ignition after purge delay.	- Miswired. Check PSW terminal voltage. - Bad control. Check LED for steady on.
Valve activates. No ignition. LED displays 3 flashes.	- Defective hot surface igniter. - Miswired. - Bad Control.
Igniter on. No valve operation. LED displays 3 flashes	- Valve coil open. - Open valve wire. - Bad control. Check voltage between MV1 & ground.
Flame okay during TFI. No flame sense (after TFI). LED displays 3 flashes.	- Defective flame sensor. - Bad S2 wire. - Poor ground at burner. - L1 and neutral wires to unit reversed. - Poor flame. Check flame current.
Flame with no call for heat.	- Stuck valve. Check LED for 2 flashes.



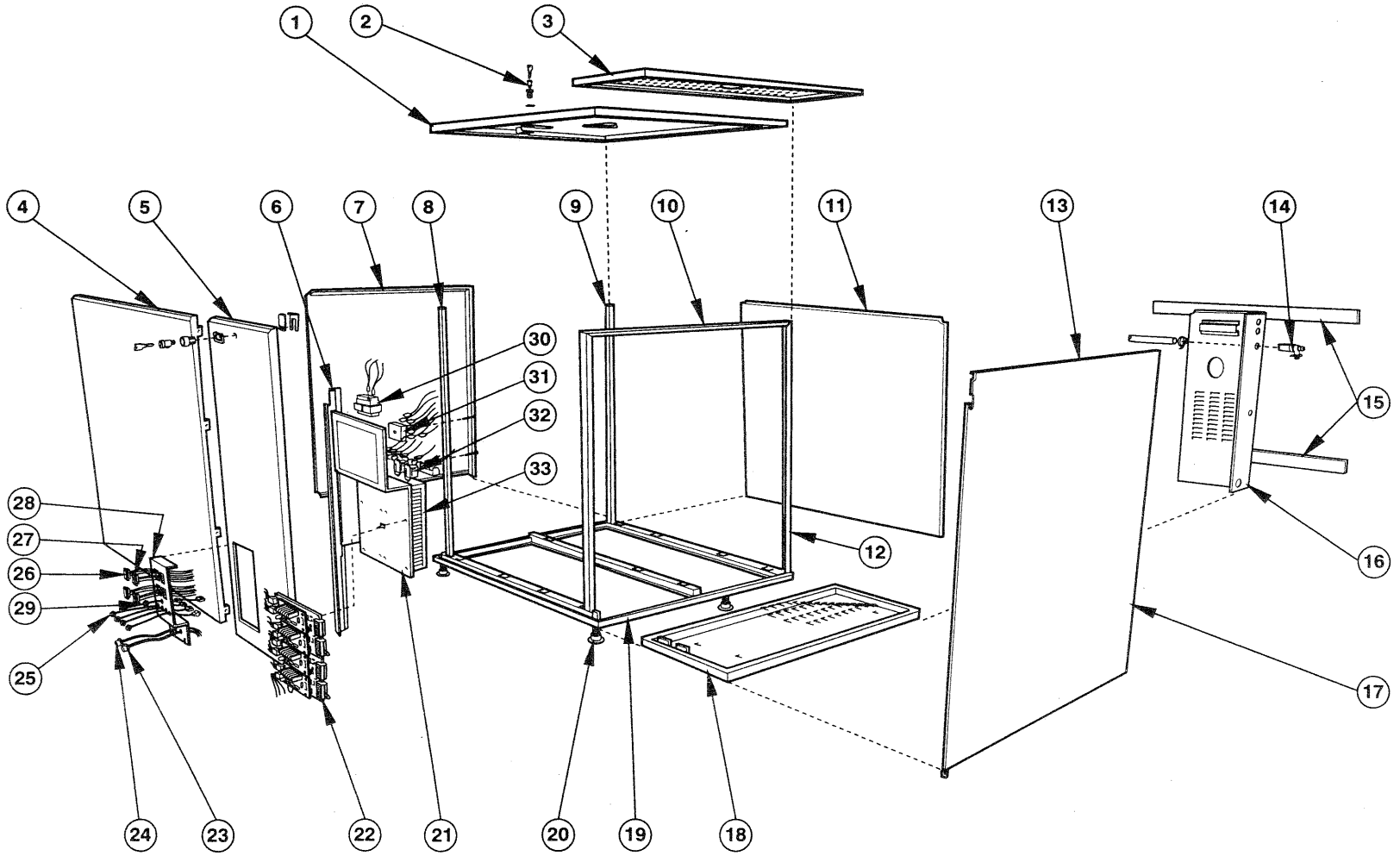
Nortec®
WHEN YOU NEED HUMIDITY

Replacement Parts

GH Series

GH Series Replacement Parts

Item #	Description	GH 100	GH 200	GH 400
1	Knob, Tank lid -Hold down	170-8828	170-8828	170-8828
2	Tank Lid Assembly	170-5010	170-5012	170-5014
3	Gasket, Tank Lid	170-8201	170-8210	170-8214
4	Gasket, Exhaust manifold	n/a	170-8212	170-8216
5	Exhaust Manifold	n/a	170-5025	170-5026
6	Sensor, Stack Hi-Limit Manual Reset	170-3202	170-3202	170-3202
7	Float Replacement Assembly	170-9602	170-9602	170-9602
8	Gasket, Float Chamber	170-8207	170-8207	170-8207
9a	Blowdown Assembly	170-1820	170-1822	170-1822
9b	Blowdown Assembly DI	170-1821	170-1823	170-1823
10a	Plumbing Drain Assembly	170-1801	170-1801	170-1801
10b	Plumbing Drain Assembly DI	170-1802	170-1802	170-1802
11	Float Chamber Body	170-5074	170-5074	170-5074
12a	Ignition Module, Main 2466H	170-2501	170-2501	170-2501
12b	Ignition Module, Auxiliary 2465H	n/a	170-2502	170-2502
13	Switch, Air Proving single can	170-3702	170-3702	170-3702
14	Bracket, Ignition Control	170-5860	170-5860	170-5860
15	Manifold, Gas Intake	n/a	170-1292	170-1293
16a	Valve, Gas Neg-Reg	170-2201	170-2201	170-2201
16b	Valve, Gas Neg-Reg High Alt.	170-2203	170-2203	170-2203
17	Blower 24V dc	170-2104	170-2104	170-2104
18	Sensor, Flame Proving	170-2450	170-2450	170-2450
19a	Igniter, Hot Surface Unshielded	170-2401	170-2401	170-2401
19b	Igniter, Hot Surface Shielded	170-2402	170-2402	170-2402
20a	Gasket, Igniter (Unshielded)	170-8218	170-8218	170-8218
20b	Gasket, Igniter (Shielded)	170-8218	170-8218	170-8218
21	Burner Assembly, 24V Blower	170-5082	170-5082	170-5082
22	Gasket, burner-blower 24V	170-8208	170-8208	170-8208
23	Gasket, Burner plate	170-8206	170-8206	170-8206
24	Accessory Panel Assembly	170-5020	170-5022	170-5024
25	Baffle, Heat Exchanger	170-5030	170-5030	170-5030
26	Insulation, Baffle	170-8107	170-8107	170-8107
27	Gasket, Accessory Panel	170-8202	170-8202	170-8202
28	Tank Weld Assembly	170-5000	170-5002	170-5004



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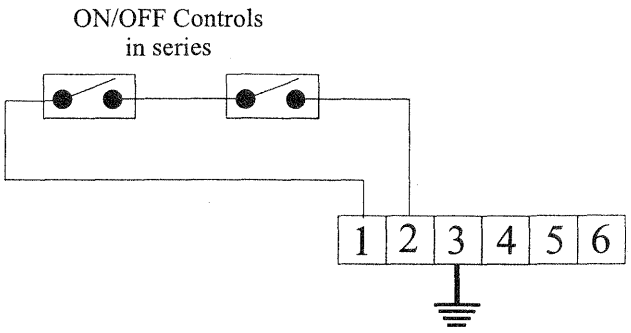
Replacement Parts

GH Series

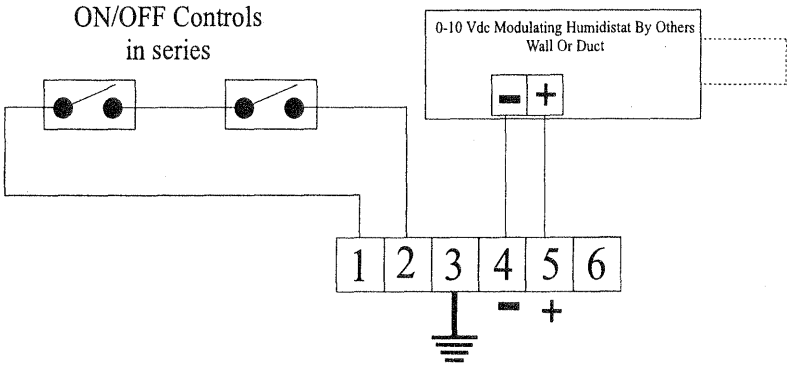
GH Series Replacement Parts

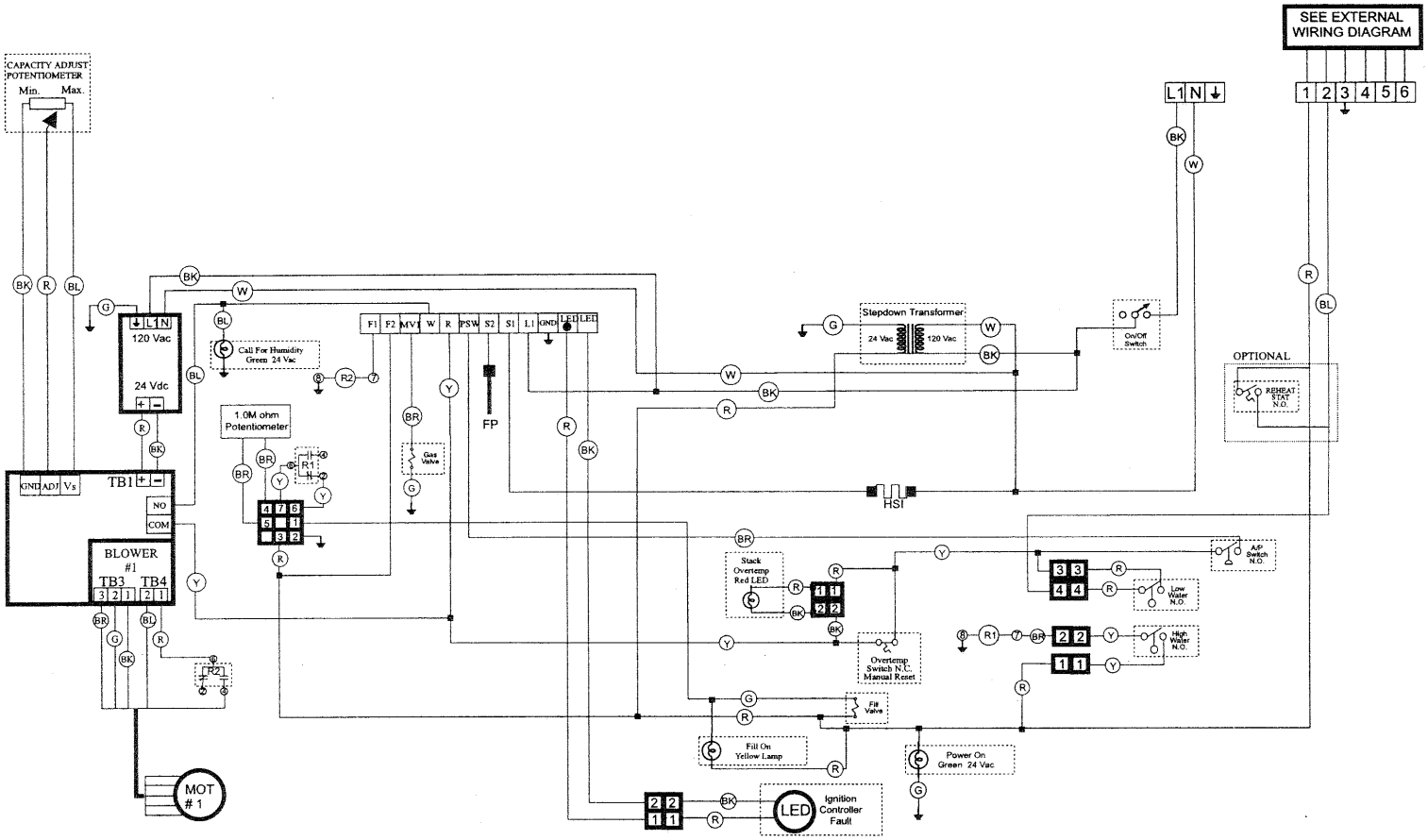
Item #	Description	GH 100	GH 200	GH 400
1	Cabinet top door	170-7122	170-7222	170-7422
2	Lock, c/w Keys	185-3104	185-3104	185-3104
3	Cabinet top panel	170-7104	170-7204	170-7404
4	Cabinet front panel	170-7101	170-7101	170-7101
5	Cabinet front door	170-7124	170-7124	170-7124
6	Cabinet door bracket front	170-7131	170-7131	170-7131
7	Cabinet left door	170-7121	170-7221	170-7421
8	Frame left front	170-7141	170-7141	170-7141
9	Frame left rear	170-7143	170-7143	170-7143
10	Frame right front	170-7142	170-7242	170-7442
11	Cabinet left rear panel	170-7102	170-7102	170-7102
12	Frame right rear	170-7144	170-7144	170-7144
13	Cabinet right door	170-7123	170-7223	170-7423
14	Valve fill	135-3032	135-3037	170-4202
15a	Bracket, Stiffening/Mounting	170-7133	170-7233	170-7233
15b	Bracket, Wall (not shown)	170-7134	n/a	n/a
16	Cabinet right rear panel	170-7105	170-7205	170-7205
17	Cabinet door right	170-7123	170-7223	170-7423
18	Cabinet right base	170-7106	170-7206	170-7406
19	Cabinet left base	170-7103	170-7203	170-7403
20	Leg-Foot Assembly	170-8890	170-1001	170-1001
21	Electrical Component panel	170-7996	170-7996	170-7996
22	Blower Controller	170-3040	170-3055	170-3080
23	Potentiometer 10.0 K ohm (for Output)	170-3952	170-3952	170-3952
24	Potentiometer 1.0 M ohm (for Blowdown)	170-3950	170-3950	170-3950
25	LED (Burner) Replacement Assembly	170-9604	170-9604	170-9604
26a	Lamp green	132-3096	132-3096	132-3096
26a	Lamp amber	132-3098	132-3098	132-3098
27	Switch rocker SPDT	132-3097	132-3097	132-3097
28	Electrical Interface panel	170-7990	170-7991	170-7992
29	LED (Stack) Replacement Assembly	170-9605	170-9605	170-9605
30	Transformer 120/24 40VA	170-3120	170-3120	170-3120
31	Timer 0.5-10 min D.on break	170-3102	170-3102	170-3102
32a	Relay DPDT 24V	145-3020	145-3020	145-3020
32b	Relay 4PDT 24V latch	n/a	n/a	149-3005
33	Power Supply 24VDC	170-3602	170-3650	170-3655

Field wiring for GHB ON/OFF By others



Field wiring for GHP 0-10 Vdc Modulation By Others





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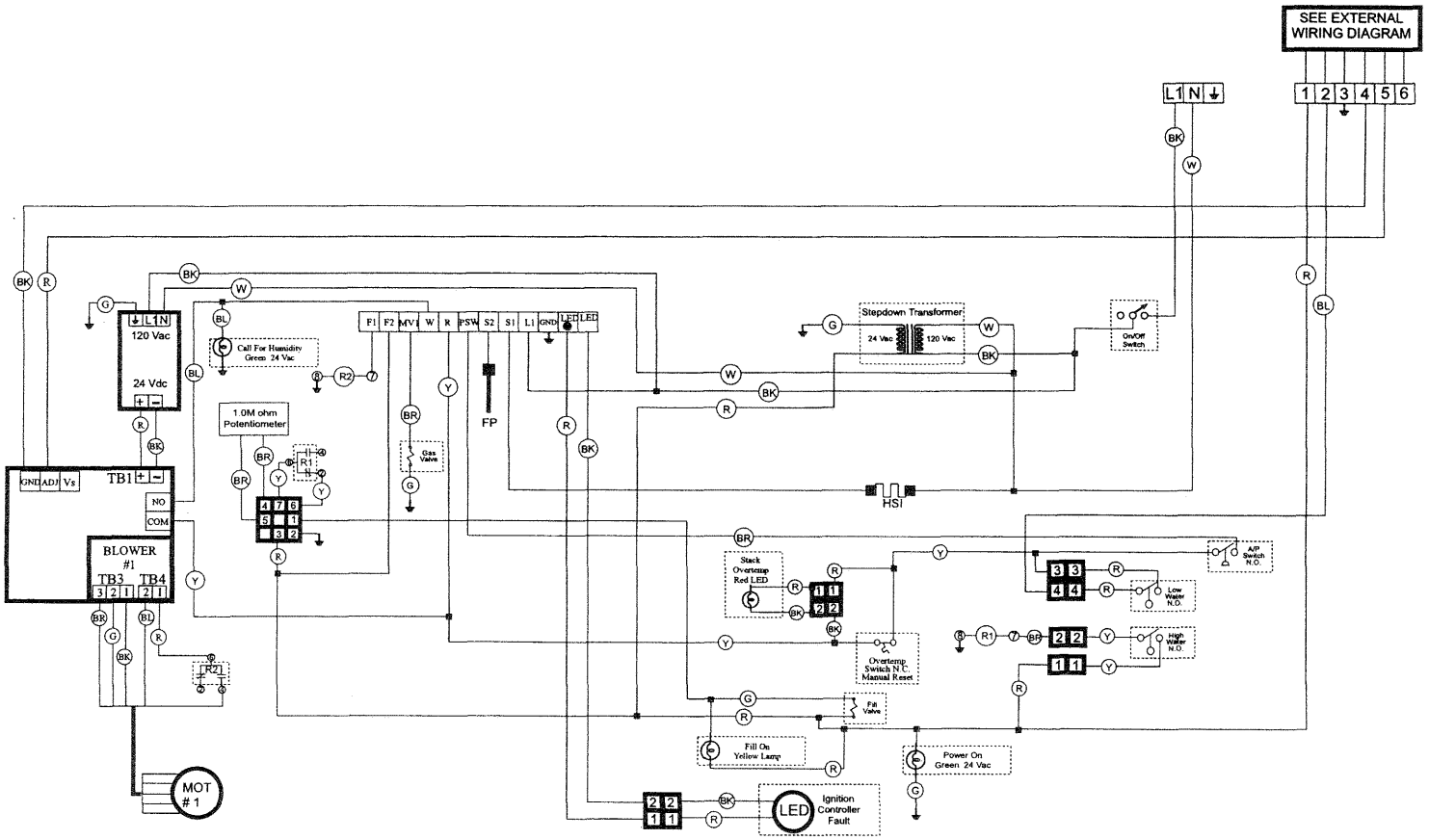
GHB 100 Gas Fired Humidifier

WIRING DIAGRAM NO. GHB0001 rev. A



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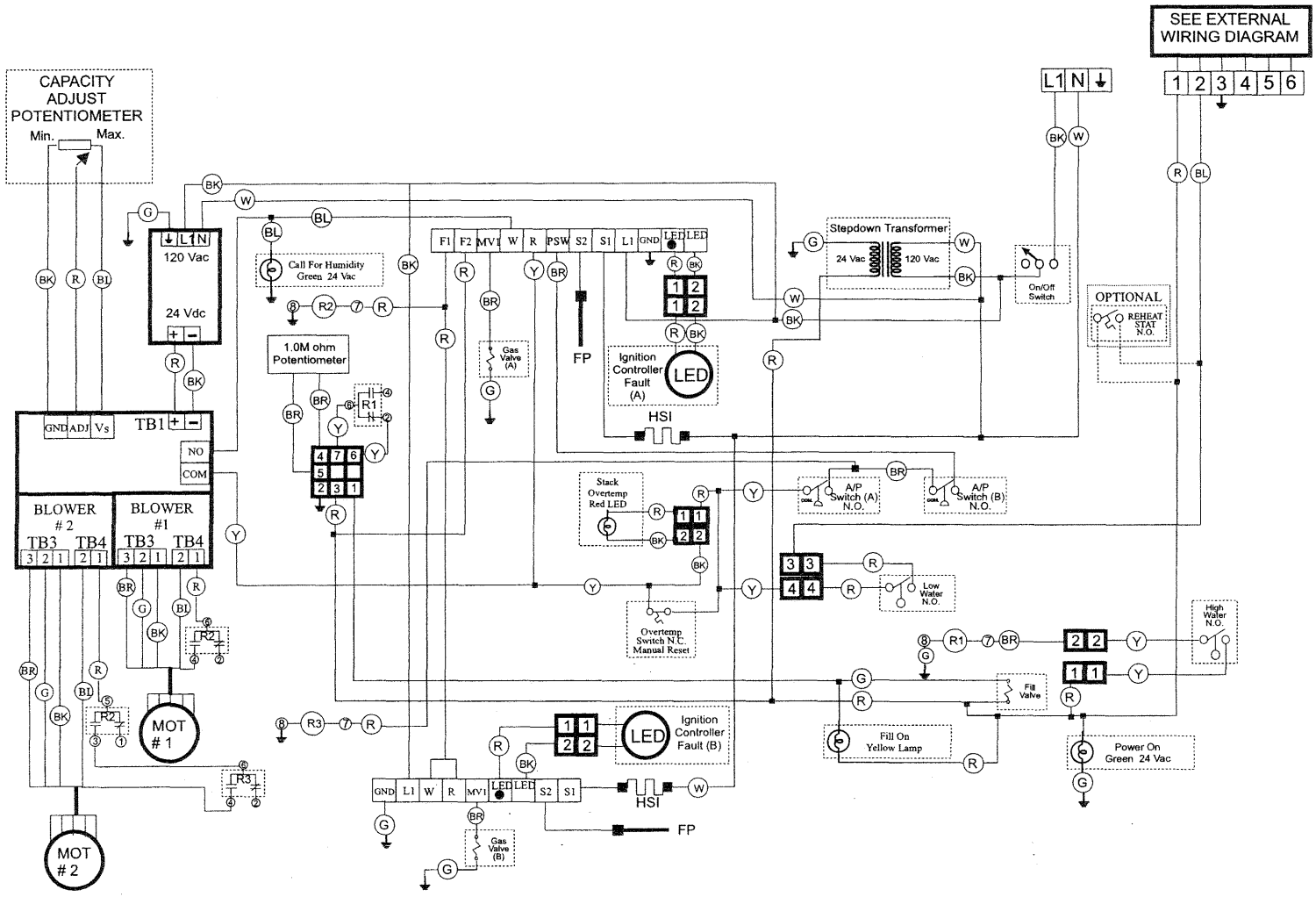
GHP 100 Gas Fired Humidifier

WIRING DIAGRAM NO. GHP0001 rev. B



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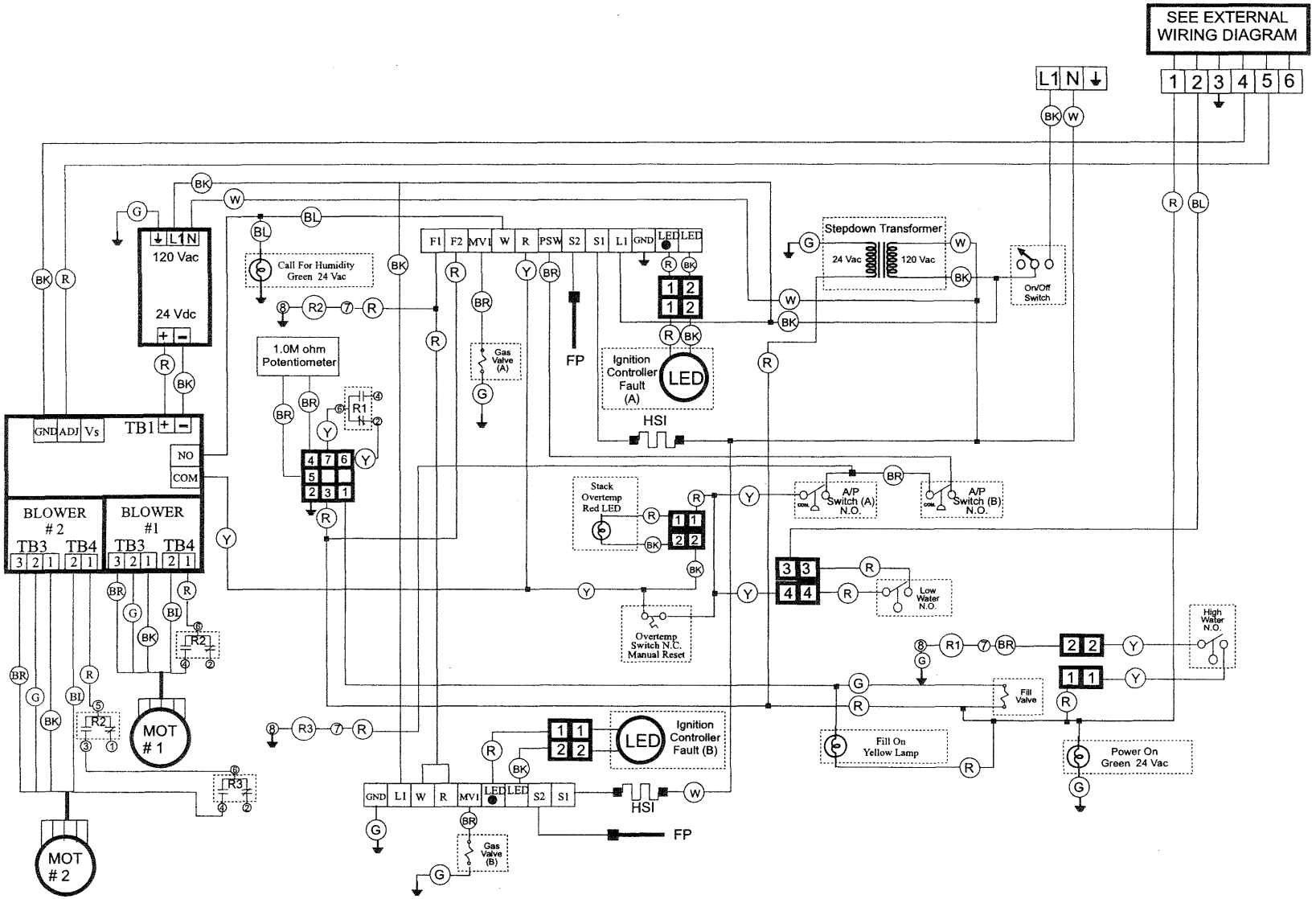
GHB 200 Gas Fired Humidifier

WIRING DIAGRAM NO. GHB0002 rev. C



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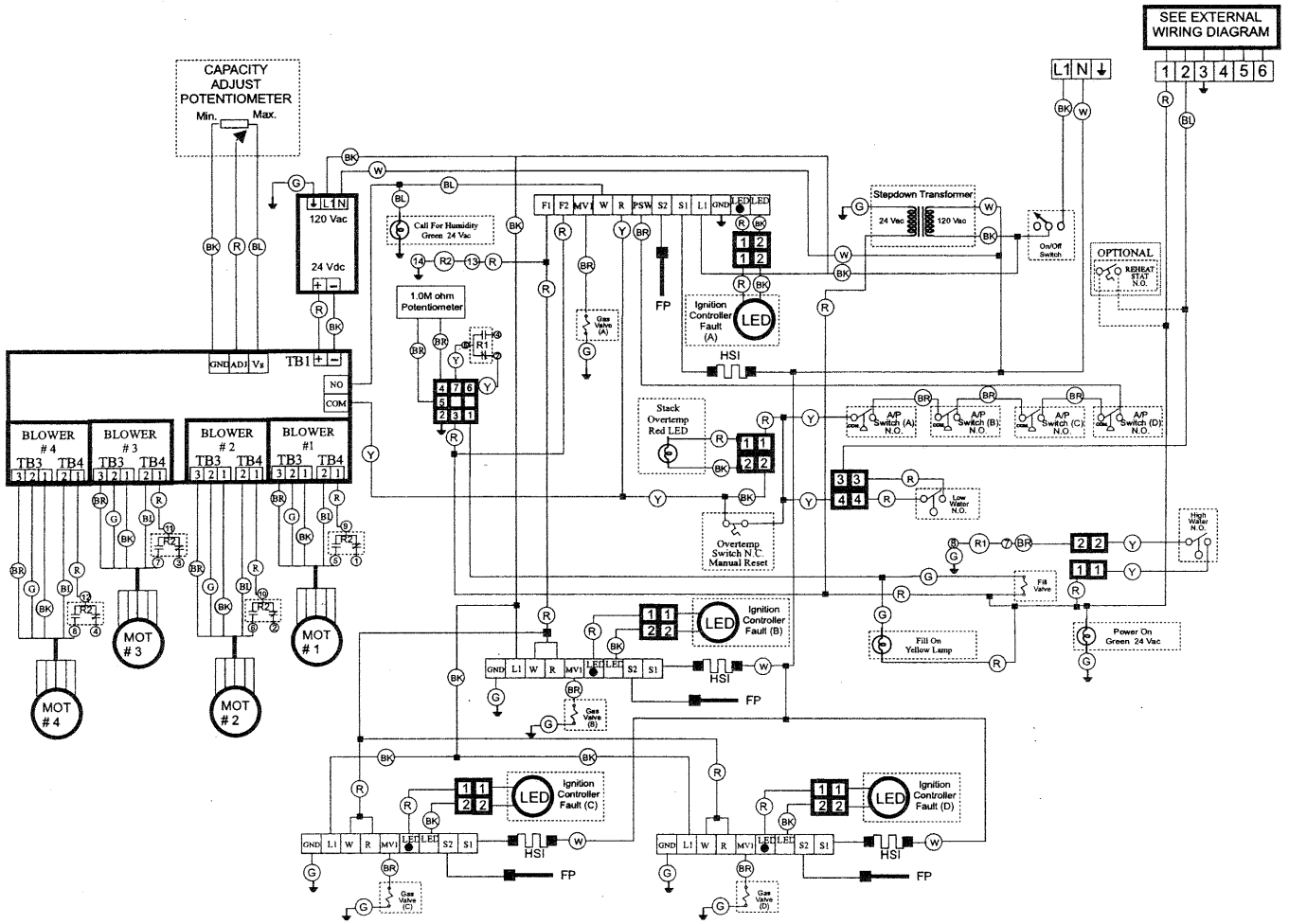
GHP 200 Gas Fired Humidifier

WIRING DIAGRAM NO. GHP0002 rev. C



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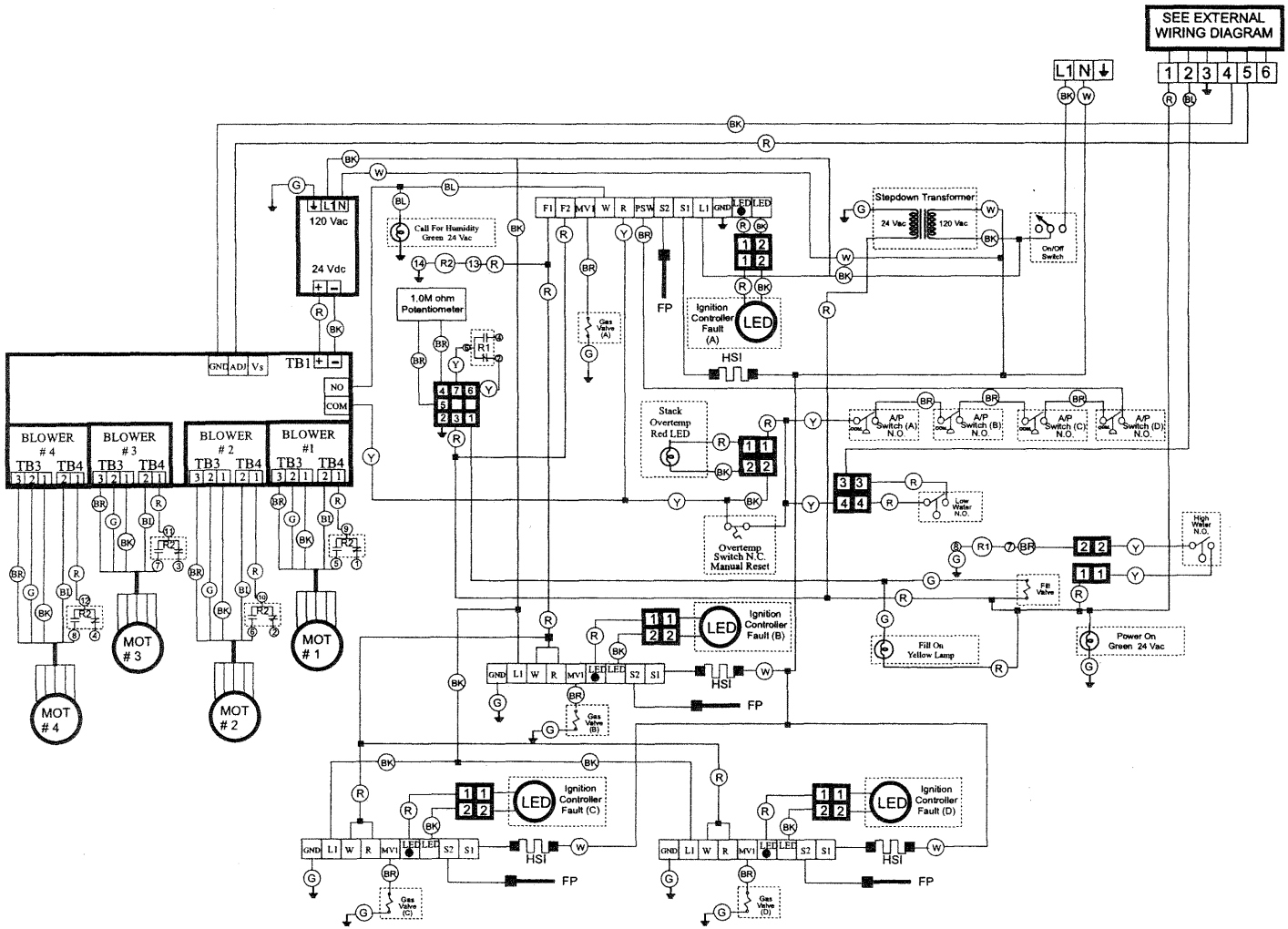
GHB 400 Gas Fired Humidifier

WIRING DIAGRAM NO. GHB0003 rev. A



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GHP 400 Gas Fired Humidifier

WIRING DIAGRAM NO. GHP0003 rev. A

LIMITED WARRANTY

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, 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.

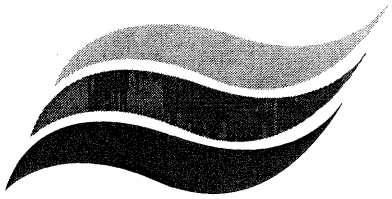
The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to THE COMPANY until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further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