

READ AND SAVE THESE INSTRUCTIONS

This manual must be left with the owner and should be accessible for reference.

# DRI-STEEM Models GTS<sup>®</sup> and GTS-DI<sup>®</sup> GAS-TO-STEAM HUMIDIFIERS

## User's/Installation Instructions and Maintenance Operations Manual

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

- 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 phone in your building.
- Immediately call your gas supplier from an off-site phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency, or the gas supplier.

**For Toll-Free Technical  
Support, Call: 1-800-328-4447**



**DRI-STEEM<sup>®</sup>**  
HUMIDIFIER COMPANY



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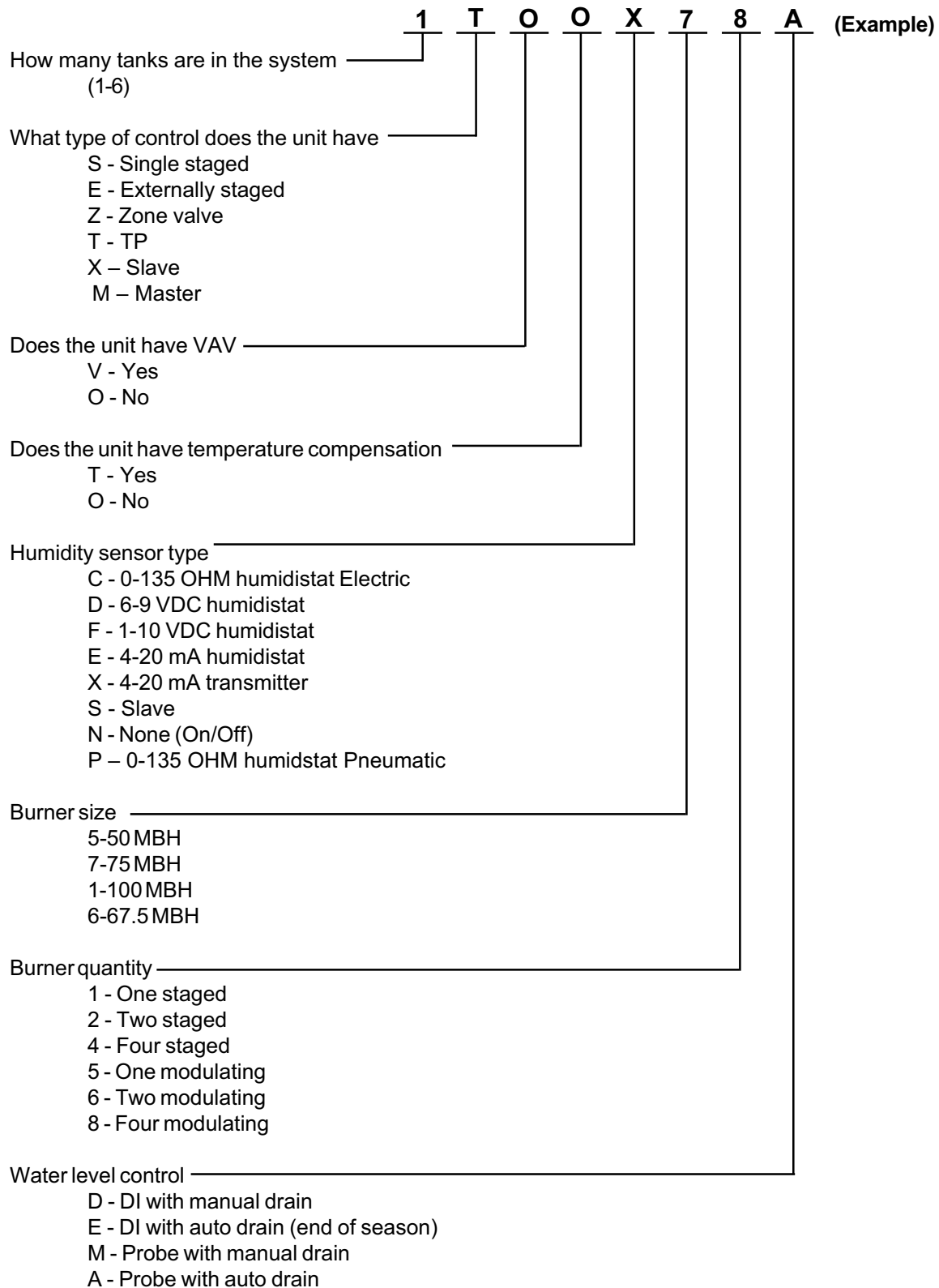
Thank you for purchasing DRI-STEEM Model GTS® equipment. We have designed and built this equipment to give you total satisfaction and many years of trouble-free service. Proper installation and operating practices will assure you of achieving that objective. We therefore urge you to become familiar with the contents of this manual.

DRI-STEEM Humidifier Company

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# GTS PROGRAM CODE NOMENCLATURE

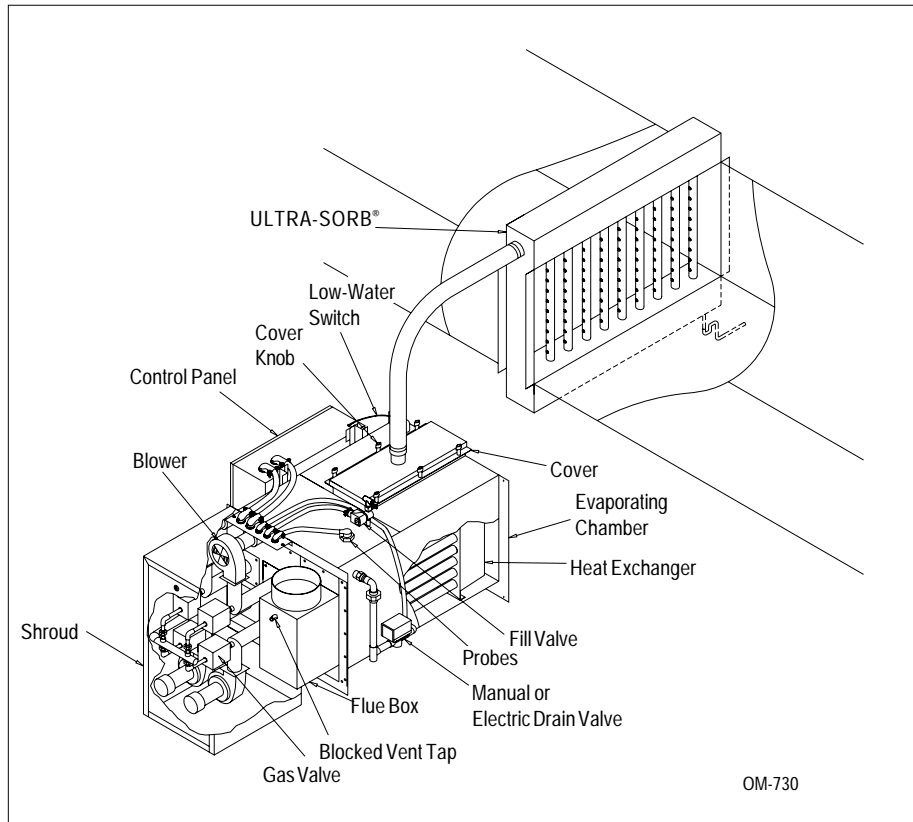
## GTS PROGRAM CODE NOMENCLATURE



# GTS® AND GTS-DI HUMIDIFIERS

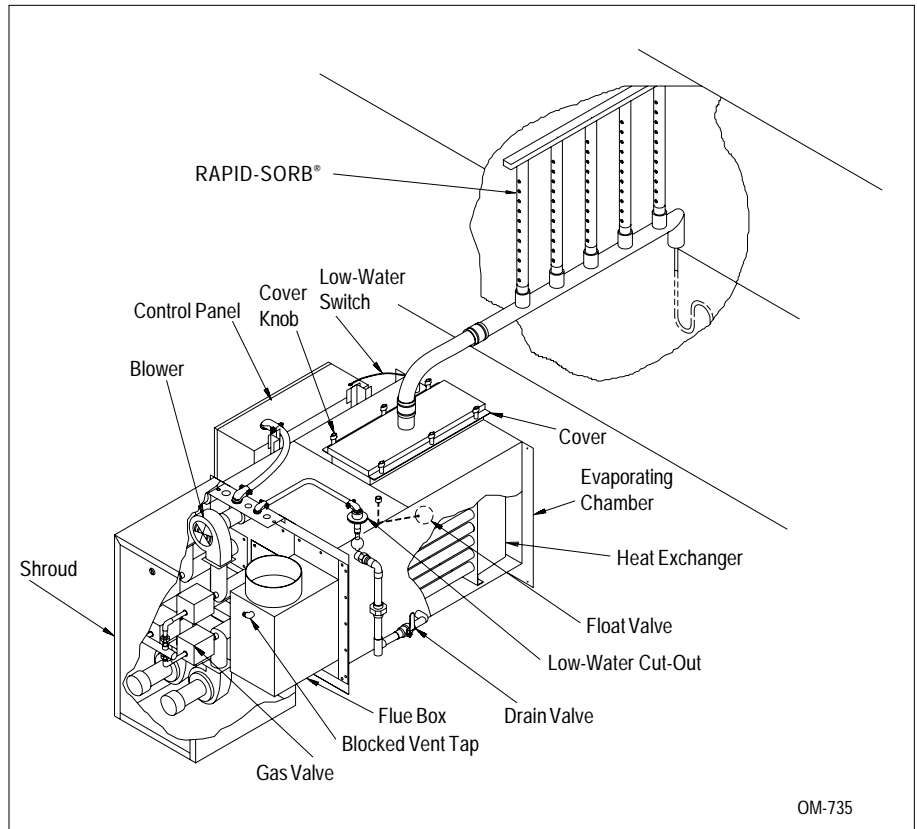
## GTS Gas-to-Steam Humidifier

This humidifier is designed to be used with either softened or unsoftened water. (Softening is recommended to reduce need for cleaning.) The probe-type level control system requires water conductivity of 100 micromhos/cm, this translates to about 2 grains/gal minimum to function, and therefore will not operate on water treated by reverse osmosis or deionization. However, GTS humidifiers are available for use with these water types. The standard humidifier can be converted in the field to a demineralized model. See below.



## GTS-DI Option

For use with deionized or reverse osmosis water. This unit produces chemical-free steam and reliable, accurate humidification control. It is virtually maintenance-free, with no wasted water, heat, or downtime. The DI unit uses a float valve to control water levels.



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## SAFETY PRECAUTIONS

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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.

- Inspect humidifier and accessories upon arrival for damaged, missing, or improper parts. If there is a problem, call DRI-STEEM.
- Application of this humidifier should have special attention given to vent sizing and material, gas input rate, and unit sizing. Improper installation or misapplication of the humidifier can require excessive servicing or cause permanent component failure.
- When working on equipment, observe precautions in this literature, tags, and labels attached to or shipped with the unit and other safety precautions that may apply. Wear safety glasses and work gloves. Have fire extinguisher available during start-up, adjustment procedures, and service calls.
- 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.
- Do not lift humidifier by gas controls, gas manifold, fire box, or control shroud.
- Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

# INSTALLATION

## Precautions

- The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z223.1 (latest edition). In Canada, the installation of this unit must comply with local plumbing or waste water codes and other applicable codes and with the current code CAN/CGS-B149.1 "Installation Code for Natural Gas Burning Appliances and Equipment" or CAN/CGA-B149.2, "Installation Code for Propane Burning Applications and Equipment."

- Do **not** install in potentially explosive or flammable atmospheres laden with grain dust, sawdust, or similar airborne materials.

- Installation of humidifier in high humidity or salt water atmospheres will cause accelerated corrosion, resulting in a reduction of the normal life-span of the unit.

- To prevent premature heat exchanger failure, do **not** locate ANY gas-fired unit in areas where chlorinated, halogenated or acid vapors are present in the atmosphere.

- Locate the humidifier in an area clear of combustible materials, gasoline, and other flammable vapors and liquids.

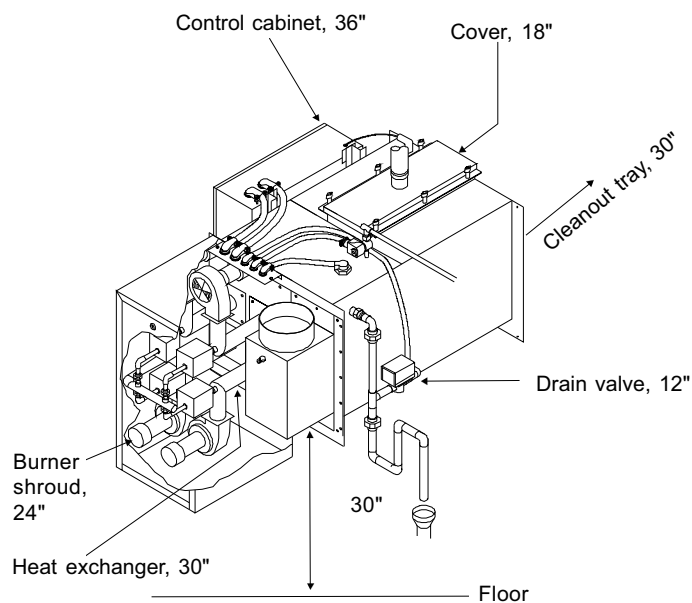
- Do not locate units in tightly sealed rooms or small compartments without provision for adequate combustion air and venting. Combustion air must be supplied to the room through a minimum of two permanent openings in the wall, at least one near the bottom. The openings should provide one square inch of free area per 1000 BTUH input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater. See table 10-1 and information on pages 10 and 11 for additional details.

## Required Clearance:

For recommended service and maintenance purposes the following clearances should be maintained:

- Heat exchanger removal - front, 30"
- Burner shroud removal - front, 24"
- Control cabinet - left side, 36"
- Drain valve - right side, 12"
- Clean-out tray - rear, 30"  
(not applicable with DI/RO systems)
- Cover removal - top, 18"
- Distance from vent box to combustible floor - 30"

## GTS clearance recommendations



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# INSTALLATION

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## Important:

- Remove all shipping brackets and materials before operating the humidifier.
- Humidifier flue gases must be vented to the outside atmosphere.
- Power supply disconnect switch must be in the off position while making wiring connections to prevent electrical shock and equipment damage. All units must be wired in strict accordance with wiring diagram furnished with this unit.
- Turn off all gas while installing the run-out and manual shut-off valve for the humidifier.

## Locating the Humidifier

- Provide a level, solid foundation for the humidifier. Locate the humidifier as near as possible to chimney or outside wall so that the flue pipe from the humidifier is short and direct. The location should also be such that the gas ignition system components are protected from water during humidifier operation and service.
- The humidifier should be installed in a location away from drafts and properly protected. If installed in a separate room, follow the instructions concerning combustion and ventilation air.
- The humidifier should be located in an area where leakage from the tank or its connections will not result in damage to the adjacent structure or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the humidifier. The pan must not restrict combustion air flow.
- The humidifier must not be installed on carpeting, tile, or other combustible material other than wood flooring (indoor application only).
- Install humidifier so electrical components are protected from water.
- The appliance must be kept free and clear of insulating materials when located in an insulated space. Insulating material may be combustible. Inspection of the appliance area must be performed when the appliance is installed, or when insulation is added.

## Supply Water and Drain Overflow Connections

**IMPORTANT:** The humidifier is shipped with the automatic drain valve locked in the manual open position. This position reduces the possibility of damaging the valve seat from the heat of sweating the drain connection during installation. After the drain connection has been completed the "manual open" lever position must be reset to the auto position. Failure to close the drain valve will not allow the tank to fill.

Regardless of the type of water used, the following general instructions must be followed:

- Union connections must be made at the humidifier on the cold water supply and drain/overflow lines.
- A shut-off valve should be provided in the supply water line to isolate the humidifier from the water system while servicing.
- If the water pressure is above 60 psi and/or water hammer would be objectionable, a pressure reducing valve or shock arrester should be installed.
- A 3/4" opening is provided in the humidifier tank to accommodate skim and/or overflow protection. A water seal is required on the drain/overflow connection and a 1" air gap should be provided prior to a building drain. (Note: Follow local code requirements regarding size of drain pipe.) The water seal must be piped to hold steam in the humidifier and also provide a pressure relief if the steam outlet becomes clogged. (See diagram on page 15)
- Insulating unions or bushings must be used to make connections between copper and other dissimilar metal fittings, such as galvanized steel. These insulating fittings are required to minimize electrolytic corrosion, which results from the direct connection of dissimilar metals in a water system.
- Before beginning ignition sequence of the humidifier at a new installation, be sure the humidifier tank is full of water and the water is free to flow into the tank.

# INSTALLATION

## Drain Piping and Material

Drain piping diagrams are provided on page 15. If non-metallic pipe or hose is used, it must be capable of withstanding temperatures up to 212°F.

To prevent steam from escaping out the drain line, a water seal must be provided in the drain line of sufficient height to contain the pressure developed within the humidifier and steam dispersion system. To determine the proper height of the water seal, see table 15-1 on page 15.

## Make-up Water Piping and Material

Make-up water piping diagrams are provided on page 15. Minimum make-up water pressure must be 25 psig. When non-metallic water piping is used, it must be rated to withstand 212°F or greater temperature. If not, the final 3 feet connected to the humidifier should be metallic and should not be insulated.

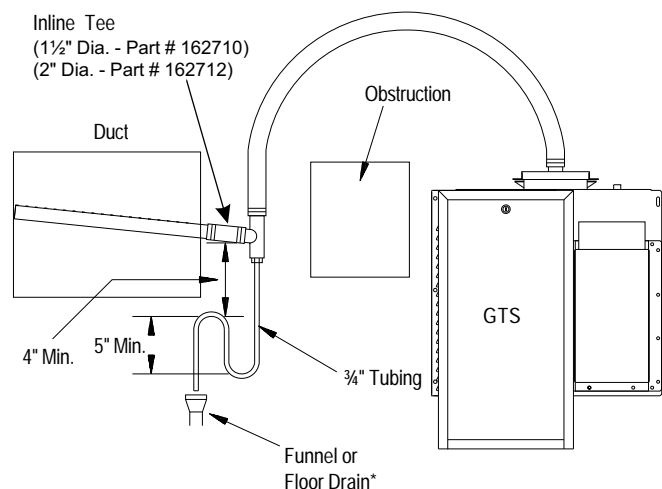
As part of the fill valve assembly, the needle valve restricts the rush of cold water entering the evaporating chamber during the fill cycle. Adjusting the supply water flow with the needle valve will reduce fill cycle noise from the collapsing steam head in the humidifier. Adjusting the needle valve will also reduce the drop in output during a fill cycle. Care must be taken to not reduce the fill rate below the humidifier's capacity, this it will cause a low-water shutdown.

## Vapor Hose Piping

When a vapor hose and stainless steel dispersion tubes are used, they should be pitched back to the humidifier. A minimum slope of 2" per foot (with no "low spots") is recommended. When this is not possible due to duct elevation or an obstruction, alternate arrangements may be used as shown in figures 8-1 and 8-2 below.

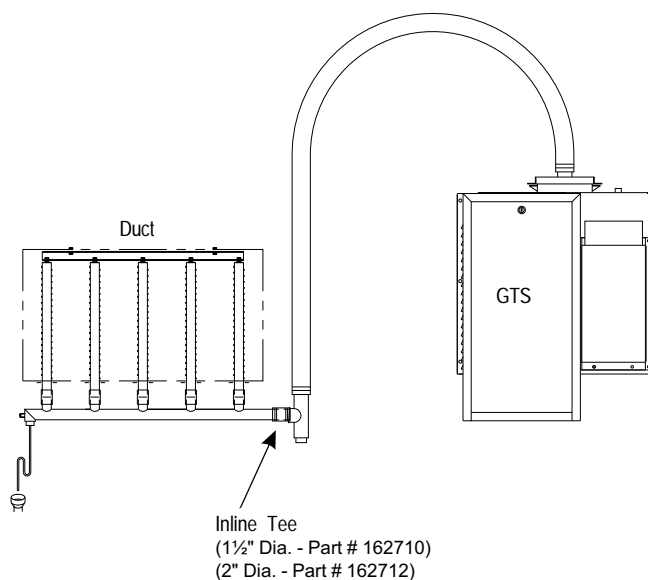
Any condensate that forms in the vapor hose must be removed. Preferably, it should be returned to an open drain with a water seal of sufficient height to contain the duct static pressure, as shown in figure 8-1.

**Figure 8-1: Piping method recommended when obstruction prevents dispersion tube from being continuously pitched back to humidifier**



OM-749

**Figure 8-2: Piping method recommended when humidifier must be mounted higher than the duct**



OM-750

Notes:

- The GTS typically requires multiple dispersion tubes.
- \* Refer to local codes for drain pipe size requirements.



# INSTALLATION

## Gas Piping

(See "Gas Piping" diagram on page 15.)

### CAUTION:

**Gas pressure to humidifier controls must never exceed 14" W.C. (1/2 psi). A 1/8" inch NPT plugged tapping, accessible for test gauge connection, must be installed immediately upstream of the gas supply connection to the appliance.**

- Piping installation must be in accordance with local codes, and ANSI Z233.1, "National Fuel Gas Code," or CAN/CGA-B149 in Canada. Do not use flexible connectors.

- Piping to units should conform with local and national requirements for type and volume and gas handled, and pressure drop allowed in the line. Refer to table 9-1 and 9-2 to determine the cubic feet per hour (cfh) for the type of gas and size of unit to be installed. Using this value and the length of pipe necessary, determine the pipe diameter. Where several units are served by the same main, the total capacity, gas flow (cfh), and length of main must be considered. Avoid pipe sizes smaller than 1/2". Table 9-1 allows for the usual number of fittings with a 0.3" W.C. pressure drop.

- After threading and reaming the ends, inspect piping and remove loose dirt and chips.

- Support piping so that no strains are imposed on unit or controls.

- Use two wrenches when connecting piping to unit controls.

- Provide a drip pocket before each unit and in the line where low spots cannot be avoided.

- Take-off to unit should come from top or side of main to avoid trapping condensate.

- Piping subject to wide temperature variations should be insulated.

- Pitch piping up toward unit at least 1/4" per 15' of horizontal run.

- Compounds used on threaded joints of gas piping must be resistant to the harmful action of liquefied petroleum gases.

- Purge air before lighting unit by disconnecting piping at gas control. **In no case should line be purged into heat exchanger.**

- After installation, check field piping and humidifier gas train for gas leaks.

- Do not use soap solution, or open flame on humidifier gas train. A gas leak detector is recommended.

- Install a ground joint union and a manual shut-off valve immediately upstream of the unit including a 1/8" NPT plugged tapping accessible for test gauge connection. Plugged tappings for test gauges are located on all gas valves.

- Allow at least 5 feet of piping between any high pressure regulator and unit pipe connection.

## Gas Leak Testing

- When leak testing the gas supply piping system, the humidifier and its gas shut-off valve must be disconnected during any pressure testing in excess of 14" W.C. (1/2 psi). The humidifier must be isolated from the gas supply piping system by closing its field-installed manual shut-off valve during any pressure testing equal to or greater than 14" W.C. (1/2 psi).

- Check gas supply pressure with all burners running at inlet pressure tap of combination gas control. (See page 33) The recommended supply pressure should be 7" W.C. on natural gas or 11" W.C. on LP gas. Purging of gas piping should be performed as described in ANSI Z223.1 (latest edition) or, in Canada, in CAN/CGA-B149 codes.

- Minimum supply pressure. Natural - 4 1/2" W.C. LP - 10" W.C.

- Single stage gas valves GTS™-300, 150, and 75 outlet pressure (manifold) should be factory set at 3 1/2" w.c. for natural, 9" w.c. for L.P. This pressure can be checked on the combination gas valve at the out pressure tap (see page 33).

**Table 9-1: Gas Pipe Capacities for Gas Pressures of .5 PSIG or Less**

Length of Pipe Feet	Gas Flow in Piping (Cu. Ft. per Hr.) (At pressure drop of 0.3 in. water. Specific gravity = 0.60)				
	Iron Pipe Size (NPT) Inches				
	1/2	3/4	1	1-1/4	1-1/2
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	890
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

**Table 9-2: Specific Gravity Conversion Factors**

Multiplying factor to be used with table 9-1 when the specific gravity of gas is other than 0.60.

Natural Gas	
Specific Gravity	Factor
0.55	1.04
0.60	1.00
0.65	0.962
Propane Gas	
Specific Gravity	Factor
1.50	0.633
1.53	0.626
1.60	0.612

# INSTALLATION

- Two stage gas valves (used on GTS® 400, 200 and 100) have a 10 second high fire stage and then drop to a normal fire stage. Factory settings for natural gas are 5" w.c. high, 3 1/2" w.c. normal. Factory settings for L.P. gas are 8" w.c. high, 6" w.c. low. These pressures can be checked on the combination gas valve at the out pressure tap (see page 33).

## Electrical

### CAUTION:

**Do not connect aluminum wire between disconnect switch and humidifier. Use only copper wire.**

### WARNING:

The cabinet **must** have an uninterrupted or unbroken ground according to National Electrical Code, ANSI/NFPA 70 and Canadian Electrical Code, CSA C22.1, or local codes to minimize personal injury if an electrical fault should occur. This may consist of electrical wire or conduit approved for electrical ground when installed in accordance with existing electrical codes. Do not use gas piping as an electrical ground.

- GTS Humidifiers should be supplied with 120-volt AC, 60-Hz, 15-amp separately fused electrical service. The GTS humidifier is equipped with a transformer to step down the voltage to 24 VAC control voltage.
- When installed, the GTS humidifier must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA No. 70-1987. The electrical conductors shall be Type MTW (105°C) AWG #14 wire for line voltage (120V), with BLACK WIRE for HOT; WHITE WIRE for NEUTRAL, GREEN WIRE for GROUND; and #18 gauge for control wiring. All electrical components and wiring must be protected from mechanical damage and water. The control system requires an earth ground for proper operation.
- The humidifier is adjusted for correct performance. Do not alter fan or operate motors at reduced speed.
- The current characteristics, and capacity requirements should be checked against the nameplates. All wiring must be in accordance with all governing codes, and with GTS wiring diagram located inside the control cabinet. See table 13-1 for information on the various models.
- See page 14 for recommended knockout locations for the electrical power supply and control wiring connections on the control cabinet.
- See separate publication for the specific controller furnished with this specific GTS humidifier.

## Combustion and Ventilation Air

### CAUTION:

**Air for combustion must not be contaminated by halogen compounds, which include fluoride, chloride, bromide and iodide. These elements are found in aerosol sprays, detergents, bleaches, cleaning solvents, salts, air fresheners, and other household products.**

### CAUTION:

**The operation of exhaust fans, kitchen ventilation fans, clothes dryers, or fireplaces could create a negative pressure condition at the humidifier. Make-up air must be provided for the ventilation devices, in addition to that required by the humidifier.**

- All fuel burning equipment must be supplied with air for combustion of the fuel. Sufficient air **MUST** be provided to ensure there will not be a negative pressure in the equipment room or space.
- Provisions for adequate combustion and ventilation air must be provided in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1-1988, or applicable provisions of the local building codes. Canadian installations must be installed in accordance with sections 7.2, 7.3, and 7.4 of the CAN/CGA.B149 Installation Codes, and all authorities having jurisdiction.

**Table 10-1: Location of Humidifier and Required Air Openings to Confined Space**

Confined Space - All air from inside the building; conventional frame. Brick or stone construction with normal infiltration. (Can only be rarely used with larger input units.)	Two openings, 1 square inch per opening per 1000 BTU/hr. input.*  The minimum free area of opening is 100 square inches.
Confined Space - All air from outside the building through air ducts.	Two openings, 2 ducts, 1 square inch per opening per 2000 BTU/hr. input.*
Confined Space - All air from outside the building, through wall openings only (no ducts.)	Two openings, 1 square inch per opening per 4000 BTU/hr. input.*
Unconfined Space - All air from outside the building.	Same as confined space, all air from outside the building.*

\*Note the minimum dimension of any opening is three inches.

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# INSTALLATION

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- For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.
- DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Four types of locations, and the requirements of each, are outlined in table 10-1, on page 10.

## Vertical and Horizontal Venting Guidelines (Stack Connection)

- The GTS® is a fan assisted category 1 appliance.
- The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.
- When connecting the humidifier to a gas vent or chimney, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.
- Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the same size stack as the vent furnished with the humidifier. Maintain a minimum upward slope of 1/4-inch-per-linear foot on all horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.
- Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.
- Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney. (Local codes apply.)
- Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes. The recommended vent system for the GTS-400, 200 and 100 humidifiers is constructed of Type C single wall vent pipe (UL or CUL listed). Type C vent requires varying levels of insulation when penetrating a combustible wall depending on vent temperatures.
- This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel.
- Never connect this humidifier to a chimney serving a fireplace, unless the fireplace opening is permanently sealed off.
- The recommended vent system for the GTS-300, 150, and 75 humidifier is constructed of Type B double-wall vent pipe (UL or CUL listed). Type B vent is rated for 400°F plus ambient temperature. A minimum 1-inch clearance is required between Type B vent and combustible materials. Field expertise has shown that venting through a properly sized Type B vent significantly reduces the occurrence of vent condensation.
- It may be necessary to add insulation to Type B double-wall vent and to single-wall vent connector, if allowed by local codes, in some applications. When insulation is required, it must be at least 1-inch thick fiberglass with foil backing. Using permanent foil tape, attach insulation to vent pipe. Both the foil tape and fiberglass insulation must be suitable for temperatures up to 450°F.
- Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less, especially any application using single-wall vent pipe as a connector.
- Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).
- Venting into an unlined masonry or concrete chimney is prohibited by code.
- If this humidifier is connected to a lined, masonry chimney, the chimney must be sized and installed according to the provisions of the National Fuel Gas Code, or Canadian CAN/CGA.B149 requirements. Vent connectors from the humidifier to the chimney should be made with insulated Type C single-wall vent pipe or Type B vent pipe for GTS-300, 150, and 75. The GTS-400, 200 and 100 is approved for single wall vent only.
- Installation of the vent pipe should be as directly as possible, with a minimum number of turns or elbows.
- Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement after installation. The humidifier vent box should not be supporting the weight of the vent piping.

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- No portion of the vent system shall extend into, or pass through, any circulation air duct or plenum.

- The Type B vent system shall terminate above the roof surface per the National Fuel Gas Code or CAN/CGA.B149 requirements, and shall include a UL or CUL listed vent cap or roof assembly, unless prohibited by local codes.

- This humidifier may be commonly vented with other listed gas-fired appliances. Total input rates of all appliances will determine the vent size.

- All vent pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped according to the National Fuel Gas Code requirements and Canadian Standards CAN/CGA.B149.

- In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required. When connecting the humidifier to a gas vent or chimney, the installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

- For all applications, the horizontal length of the vent and vent connector must not exceed the height of the vent system.

## Special Horizontal Venting Requirements

- Distances from the vent terminal adjacent public walkways, buildings, and openable windows and building openings should be consistent with the National Fuel Gas Code, ANSI Z223.1, and/or CAN/CGA B149 Installation Codes.

- The vent terminal and air intake locations must be at sufficient height above ground level to prevent blocking by expected snowfall.

- Building materials should be protected from degradation by flue gases.

- A minimum horizontal clearance of 4 feet (1.22m) from electric meters, gas meters, regulators, and relief equipment must be maintained.

- 60' maximum, 10' minimum equivalent length of vent pipe.

- A vent box pressure of  $-.01''$  w.c. is specified and set by adjusting power venter and barometric damper, with all burners running.

- Maximum of 4 elbows

GTS™ Model	Equivalent Length of Vent Pipe/Elbow	Vent Terminal Model Number	Power Venter	Barometric Damper
GTS - 400	7'	SWH-1-5 (5")	5" PVO-600	5"
GTS - 300	7'	SWH-1-5 (5")	5" PVO-600	5"
GTS - 75, 100, 150, 200	6'	SWH-1-4 (4")	4" PVO-300	5"

- Vent pipe is single wall or B vent for GTS-300, 150, 75.

- Vent pipe is single wall only on GTS-400, 200, and 100.

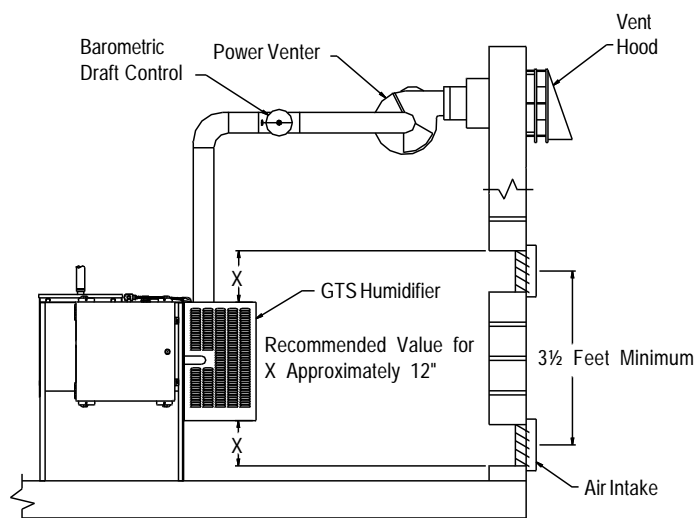
## Equipment Required for Horizontal Venting

- Power Venter: Field controls, see above table for model numbers.

- Barometric Damper: Field controls model # MG-1 (5").

- Vent Terminal: Field controls, see above table for model numbers.

**Figure 12-1: GTS Venting**



Note: Refer to power venter manual for clearance requirements relative to combustion air openings.

# SPECIFICATIONS AND CAPACITIES

**Table 13-1: Specifications**

Model number	Steam capacity per hour in lbs. (kg.)	*MBH input	Heating stages	Vent size in inches (mm)	Operating weight in lbs. (kg.)	Shipping weight in lbs. (kg.)	115 volt, 60 Hz		Performance derate impact			
							Full load amps	Max. fuse size	Vertical vent		Horizontal vent	
									Natural gas	LP gas	Natural gas	LP gas
<b>GTS-75</b>	55 (25)	75	1	5 (130)	400 (180)	230 (105)	2.5	15	0%	10%	10%	10%
<b>GTS-100</b>	75 (34)	100	1	5 (130)	400 (180)	230 (105)	2.5	15	0%	4%	0%	4%
<b>GTS-150</b>	110 (50)	150	2	5 (130)	525 (240)	300 (135)	3.5	15	0%	10%	10%	10%
<b>GTS-200</b>	150 (68)	200	2	5 (130)	525 (240)	300 (135)	3.5	15	0%	4%	0%	4%
<b>GTS-300</b>	225 (102)	300	4	7 (180)	775 (350)	400 (180)	5.0	15	0%	10%	10%	10%
<b>GTS-400</b>	300 (136)	400	4	7 (180)	800 (365)	425 (195)	5.0	15	0%	4%	0%	4%

\* Altitude adjustment note for Canada:

<u>Altitude in feet</u>	<u>Percent of listed input</u>
0-2000	100%
2000-4500	90%

\* Altitude adjustment note for United States:

100% up to 2000'  
4% derate/1000' over 2000'

**Capacity Notes**

• Approximately 172 BTU's are required to raise the temperature of one pound of water from 40° to 212° F.

• An additional 970 BTU's are required to change one pound of water to water vapor.

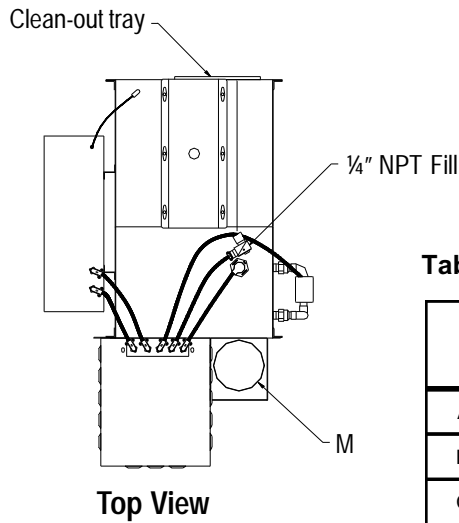
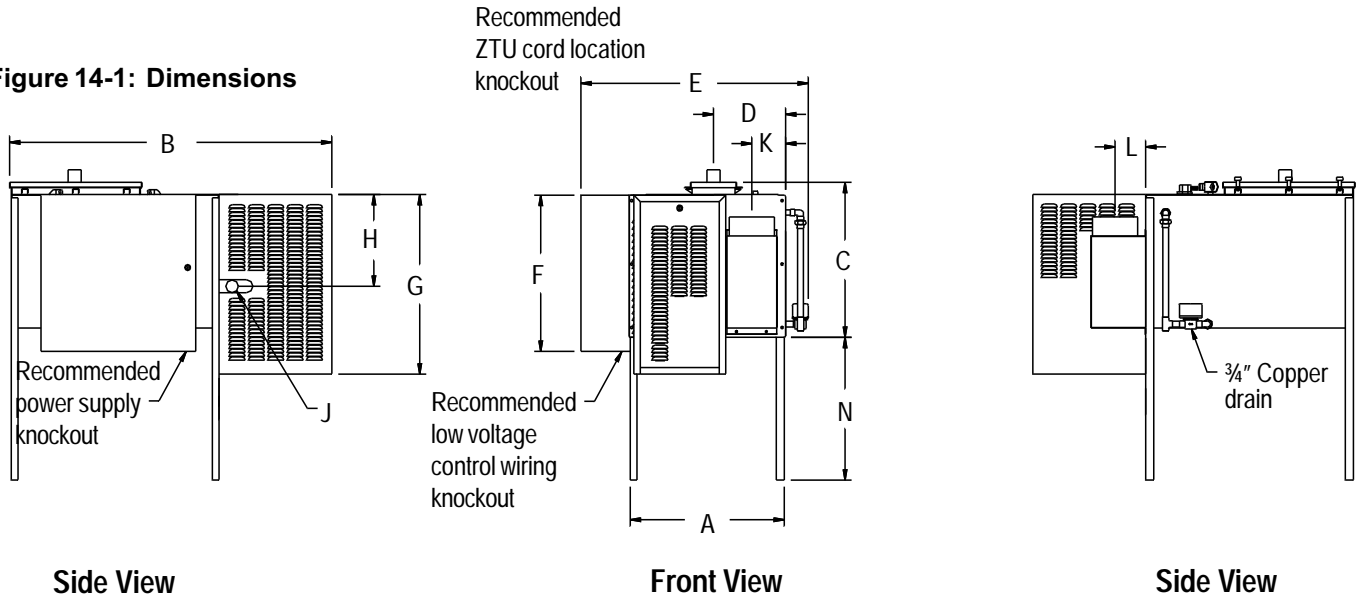
• The ¾" rigid foil faced fiberglass insulation on all surfaces of evaporating chamber increases unit efficiency by approximately 2%.

• Another factor to consider is condensation steam loss from hoses and tubes. Use the following steam loss guidelines:

- vapor hose: 0.15 lbs/ft/hr
- insulated pipe: 0.05 lbs/ft/hr
- dispersion tubes: 0.50 lbs/ft/hr

# DIMENSIONS

**Figure 14-1: Dimensions**

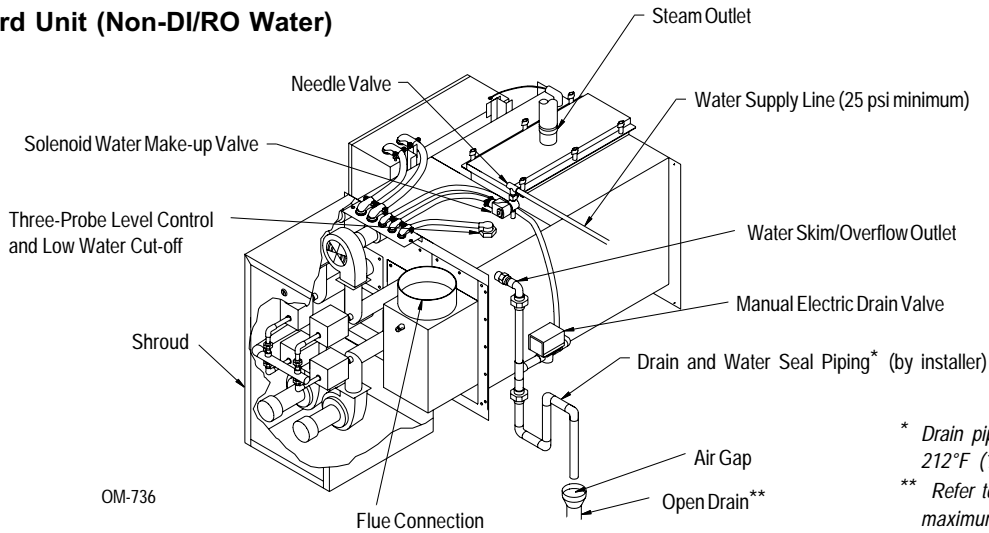


**Table 14-1: Dimensions**

	Description	GTS®-75 GTS-100 (One burner)	GTS-150 GTS-200 (Two burner)	GTS-300 GTS-400 (Four burner)
A	Floor stand width	19"	19"	27½"
B	Overall length	54¼"	54¼"	54¼"
C	Height of evaporating chamber	17¾"	23½"	25¼"
D	Distance from steam outlet to side of unit	9¼"	9¼"	13½"
E	Overall width	27"	27"	37½"
F	Height of control cabinet	20"	20"	24"
G	Shroud height	20"	25¾"	27½"
H	Distance from top of shroud to gas inlet	11¾"	11"	14"
J	Gas inlet	½" NPT	¾" NPT	1" NPT
K	Distance from flue to side of unit	6¼"	6¼"	6½"
L	Distance from flue to front of tank	3¾"	3¾"	4¾"
M	Flue diameter	5"	5"	7"
N	Distance from floor to bottom of tank	28½"	22¾"	21"

# PIPING DIAGRAMS: GAS, WATER, AND DRAIN

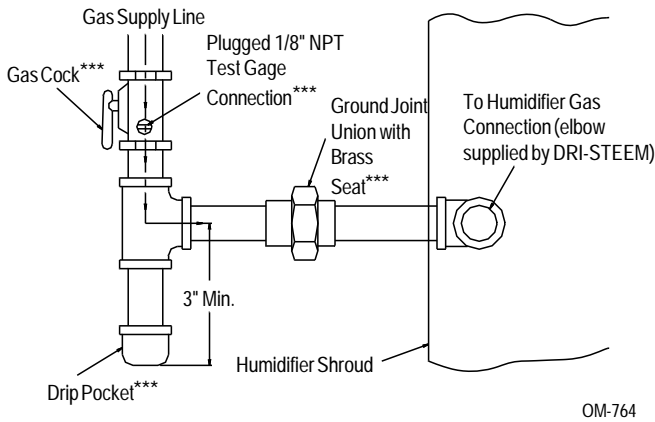
## Standard Unit (Non-DI/RO Water)



\* Drain piping material must be suitable for 212°F (100°C) water.

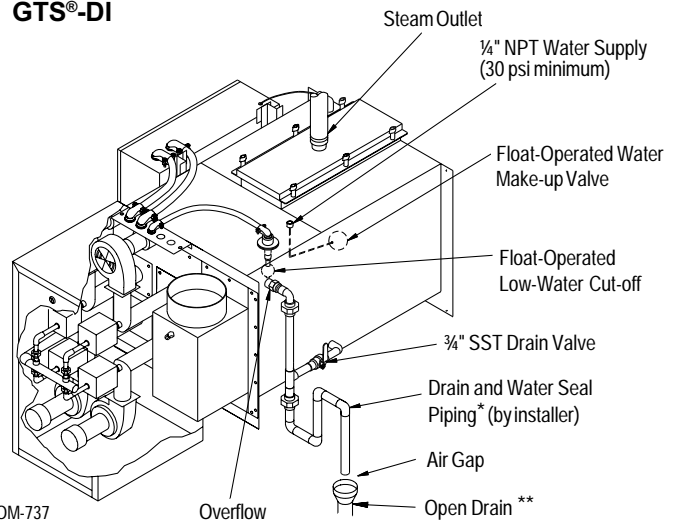
\*\* Refer to local codes for drain pipe sizing and maximum temperature requirements.

## Gas Piping



\*\*\* Supplied by others.

## GTS®-DI

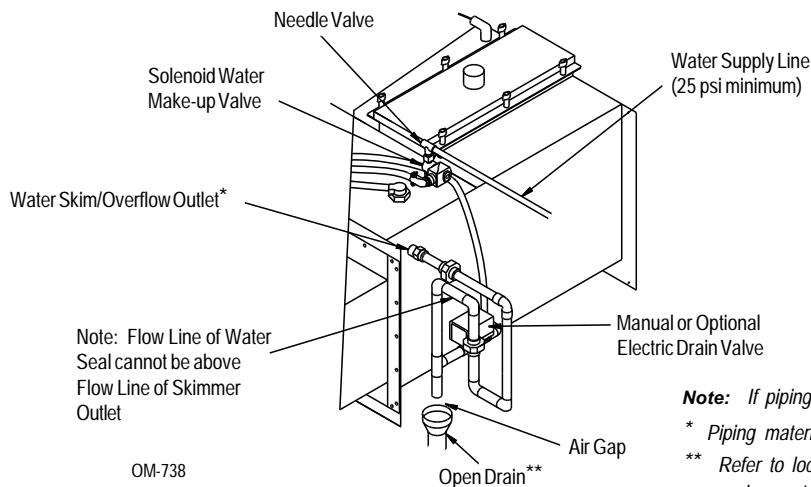


\* Drain piping material must be suitable for 212°F (100°C) water.

\*\* Refer to local codes for drain pipe sizing and maximum temperature requirements.

## Alternate Water Seal and Drain Valve Piping (by installer)

Used when water seal must be elevated above flow line of drain connection (humidifier near floor)



**Note:** If piping to dispersion tube is over 20 feet increase water seal height by 15%.

\* Piping material must be suitable for 212°F (100°C) water.

\*\* Refer to local codes for drain pipe sizing and maximum temperature requirements.

**Table 15-1: Water Seal Height Recommendations**

Humidifier	Lbs/Hr	Height (Inches)	*Overflow Pipe (Inches)
GTS-75	55	12	3/4
GTS-100	75	12	3/4
GTS-150	110	12	3/4
GTS-200	150	12	3/4
GTS-300	225	18	1
GTS-400	300	18	1

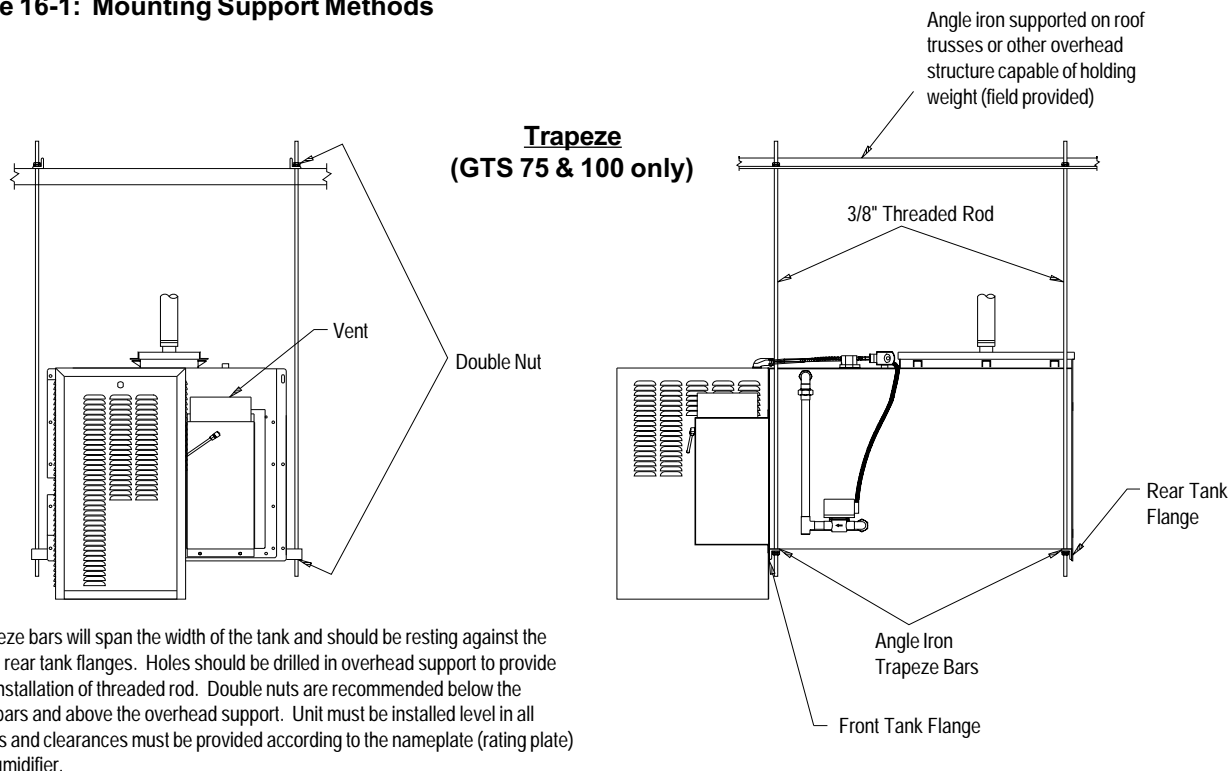
# MOUNTING THE HUMIDIFIER

For proper operation of the electrode-probe, water-level control and the skimmer system, the humidifier must be mounted level left to right and front to rear.

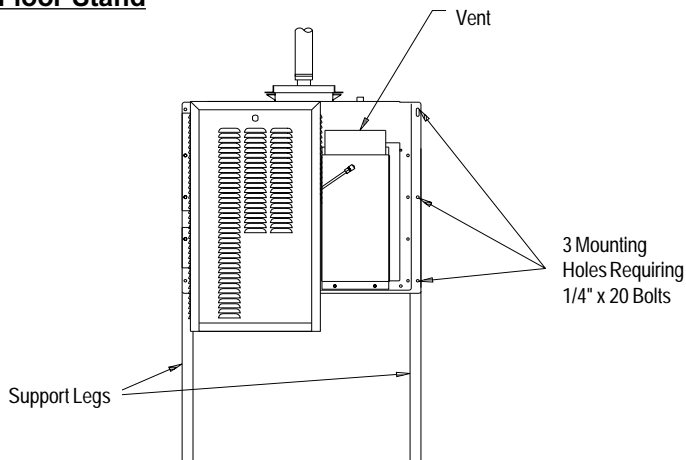
Proper access (18" minimum) for periodic removal of the top cover is recommended. In most cases, scale that

forms on the heat exchanger continuously flakes off as it forms and settles to the bottom. A clean-out tray on the floor of the tank may be removed periodically through the back clean-out opening.

**Figure 16-1: Mounting Support Methods**



## Floor Stand



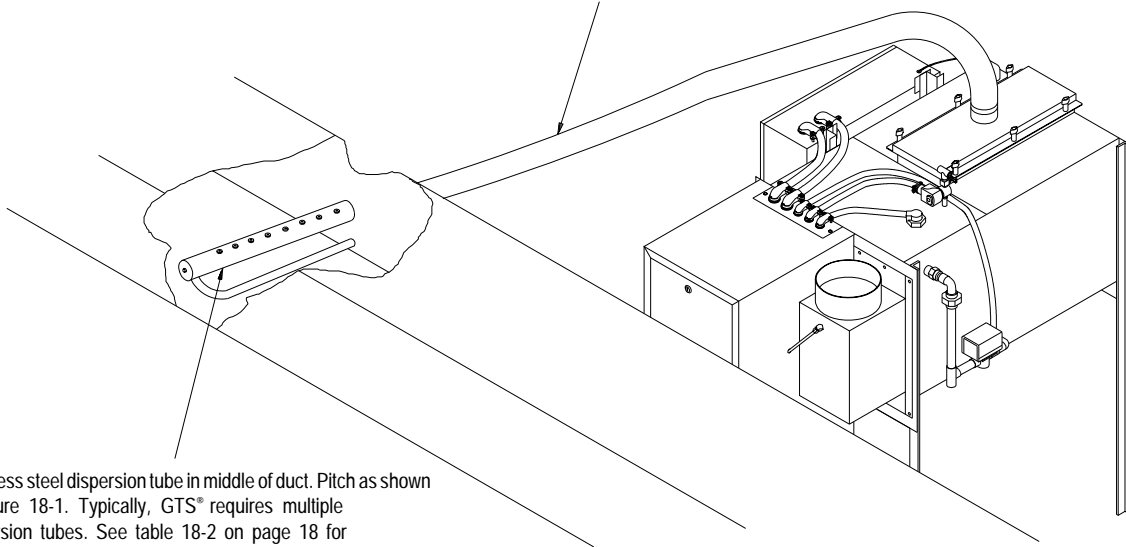
OM-763



# STEAM SUPPLY CONNECTION METHODS

**Figure 17-1: Steam Supply Using Vapor Hose**

Vapor hose. See table 18-2 for sizing. (Pitch back min. 2" per foot to humidifier with supports to prevent sagging.) Maximum length 10'. Humidifier must be mounted level.

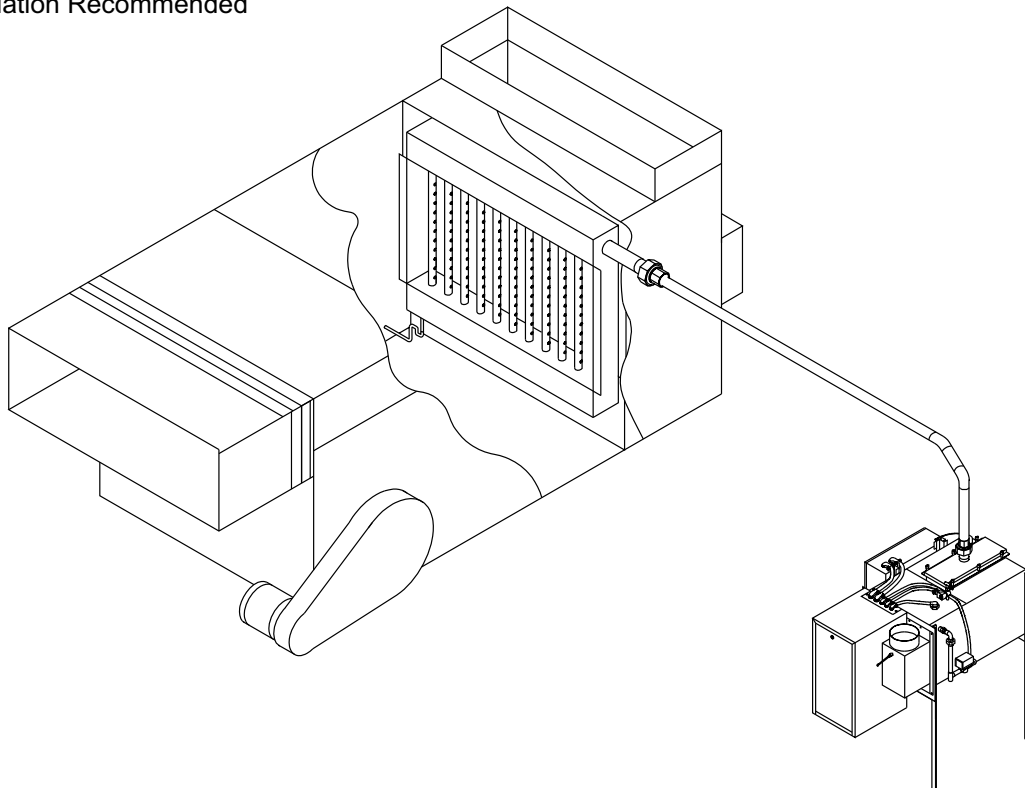


Stainless steel dispersion tube in middle of duct. Pitch as shown in figure 18-1. Typically, GTS® requires multiple dispersion tubes. See table 18-2 on page 18 for capacities.

OM-733

**Figure 17-2: Steam Supply Using Pipe or Tubing  
(Flange option available)**

Pipe Insulation Recommended



OM-743

# DISPERSION TUBE INSTALLATION

## Dispersion Tube Installation with Condensate Drain

(over 28 pph per dispersion tube)

### Vapor Hose

- Vapor hose should be supported to prevent sags or low spots and to maintain a minimum pitch of 2" per foot back to the humidifier.
- For mounting the humidifier above the level of dispersion tube, see figure 8-2 on page 8.

Failure to follow the above recommendation may result in excessive back pressures being imposed on the humidifier. This in turn may lead to dispersion tube(s) spitting, lost water seals or leaking gaskets. When the distance between humidifier and the dispersion tube(s) exceeds 10 feet, consult factory for special recommendations.

### Rigid Piping

- Vapor piping should have a minimum I.D. equal to the cover outlet of the humidifier.
- A minimum pitch of 2" per foot back to the humidifier should be maintained.
- 90° elbows are not recommended, use two 45° elbows one foot apart instead.
- Thin-wall tubing will heat up faster and cause less start-up loss than heavy-wall pipe.
- Insulating the rigid piping will reduce the loss in output caused by condensation.

### Tube Mounting

- Mount dispersion tubes pitched as stated above.
- Tubelets must discharge perpendicular to air flow.

\* Return line piping material must be suitable for 212°F (100°C) water.

### Min. Condensate Drain Line Sizes

- One or two tubes: 3/4" I.D.
- Three or more tubes: 1" I.D.

Figure 18-1: Single Tube

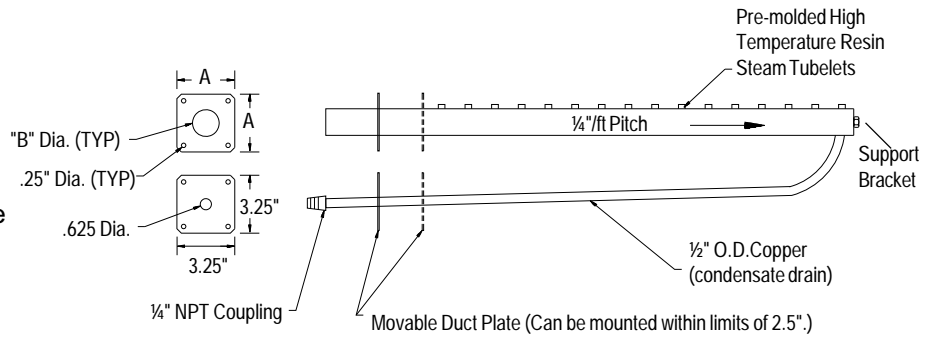
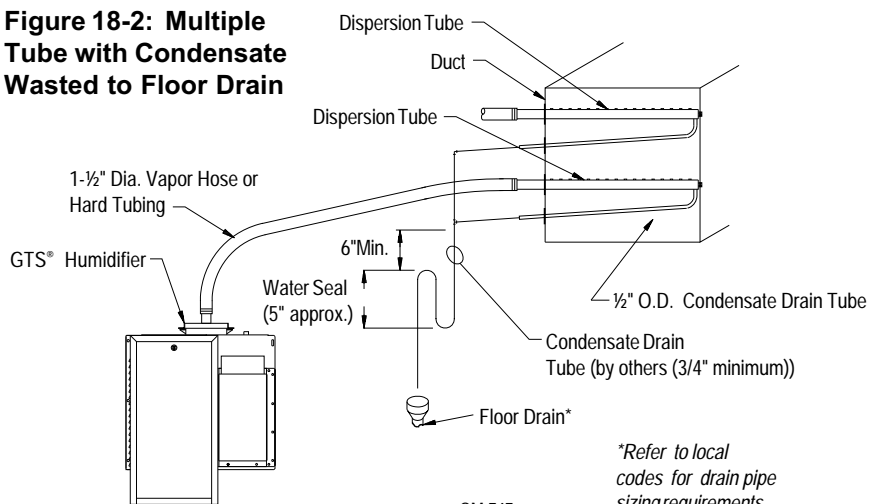


Table 18-1: Dispersion Tube Capacities

OM-351

Tube Diameter	Capacity	A	B
	With Drain		
1 1/2"	57 lbs/hr	3.25"	1.51"
2"	85 lbs/hr	5.00"	2.03"

Figure 18-2: Multiple Tube with Condensate Wasted to Floor Drain



OM-747

## Piping/Hose Sizing from the GTS® to a RAPID-SORB® panel

Table 18-2: Maximum Steam Carrying Capacity\*

Vapor Hose			Copper or Stainless Steel Tubing or Schedule 40 Steel Pipe		
Hose I.D.	10 Feet (**) Developed Length in Feet(**)		Tubing O.D.	20 Feet (**) Developed Length in Feet(**)	
	lbs/hr	kg/hr		lbs/hr	kg/hr
1 1/2"	150	68	1 1/2"	140	64
2"	250	113	2"	210	95
--	--	--	3"	410	186
--	--	--	4"	700	318
--	--	--	5"	1300	590
--	--	--	6"	2100	953

\* Based on total pressure drop in piping/hose of 5" (12.65mm) W.C.  
 \*\* For developed length add 50% to measured length for pipe fittings.  
 Note: To minimize loss of humidifier capacity and efficiency, the tubing/piping should be insulated.

# RAPID-SORB® ASSEMBLY AND INSTALLATION

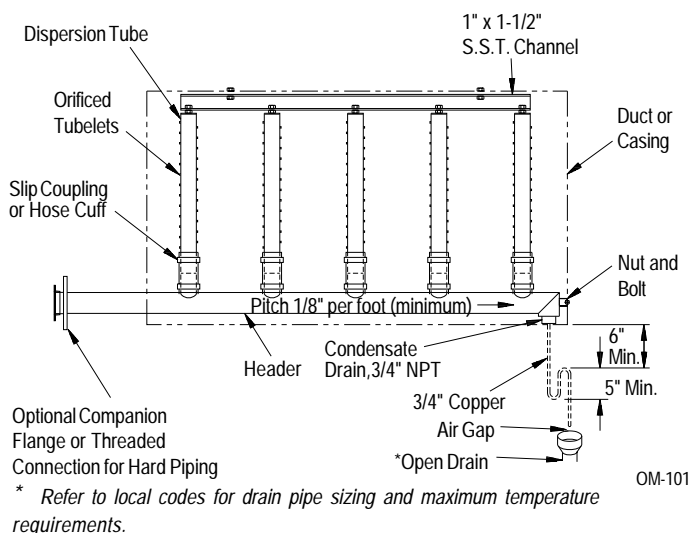
## Horizontal Duct Installation

1. Unpack shipment and verify receipt of all RAPID-SORB® components with packing list. Report any shortages to the DRI-STEEM factory immediately.
2. Provide necessary access in and around duct work.
3. Locate 1" x 1½" stainless steel channel inside the duct. Hang the channel from the top of the duct, centered between duct side walls, with the two mounting holes provided.
4. If hose cuffs are used, slide cuffs over the open end of each tube. Install a pair of hose clamps on each tube.
5. Note direction of air flow within duct, then arrange each dispersion tube so steam will blow perpendicular to the air flow. Use the hex bolts provided to attach tubes to overhead 1" x 1½" channel. Do not secure. If the header is outside the duct punch-out necessary clearance holes in the base of the duct to slide dispersion tubes up from bottom.

### For a Header Inside the Duct (See figure 19-1):

6. Punch or cut out necessary clearance holes for RAPID-SORB header. Slide header into the duct, position header and slide the dispersion tube hose cuffs or slip couplings over the header dispersion tube nipples.
7. Position the header so vertical dispersion tubes are perpendicular to duct and pitch the header to condensate drain. Secure header to the mounting bracket. Use escutcheon plates to secure header where it enters the duct.

**Figure 19-1: RAPID-SORB Unit Header Inside Duct**



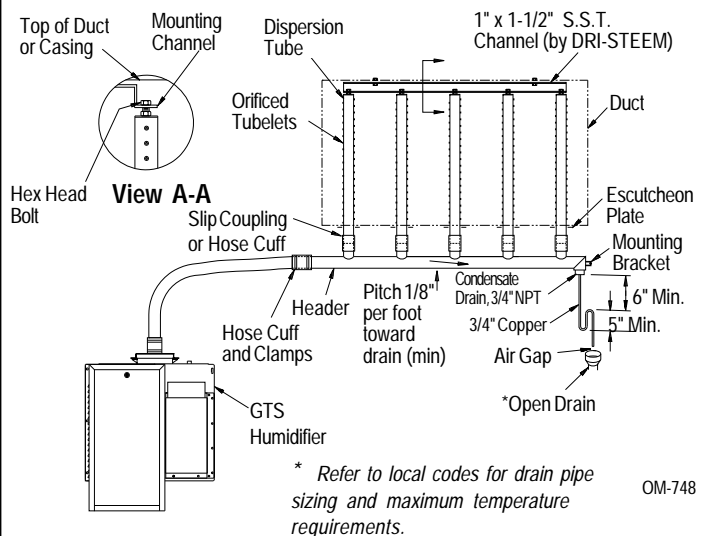
8. Check that the dispersion tubes release steam perpendicular to the air flow. Secure tubes to the overhead channel. Secure the channel to the duct, position hose cuffs or slip couplings over tube and header tube nipples, and secure.

### For a Header Outside the Duct (See figure 19-2):

6. Position header under dispersion tubes, then slide hose cuffs or slip couplings over header dispersion tube nipples.
7. Position the header so dispersion tubes are perpendicular to duct and pitch the header to condensate drain. Secure dispersion tubes in place with the tube escutcheon plates provided.
8. Check the position of the tubes for steam release perpendicular to the air flow. Secure tubes to the overhead channel, and secure channel to the duct. With header pitched to condensate drain, slip hose cuffs or slip couplings over tube nipples and secure.
9. Connect a condensate drain to the header, provide the water trap as shown, and run to open drain, sized according to governing codes.
10. Attach the header steam supply connector to main header using the hose cuff and clamps provided, but do not secure.
11. Route the necessary number of vapor hoses or pipes from the humidifier tank, position connector to accept the hoses or pipes and secure.

**Note:** Refer to page 18 for vapor hose information on routing and for alternate vapor hose installation methods.

**Figure 19-2: RAPID-SORB Unit Header Under Duct**



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# RAPID-SORB® ASSEMBLY AND INSTALLATION

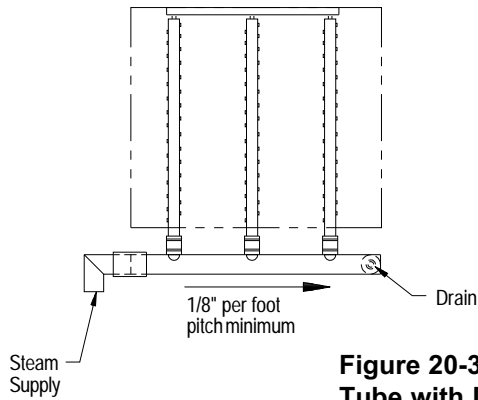
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## Vertical Duct Installation

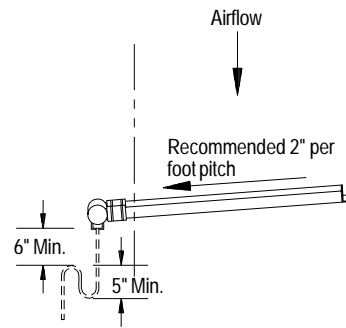
Install the RAPID-SORB with dispersion tubes and header pitched to condensate drain as shown in figures 20-1, 20-2, and 20-3.

See "Instructions for Horizontal Duct" for additional information, as applicable.

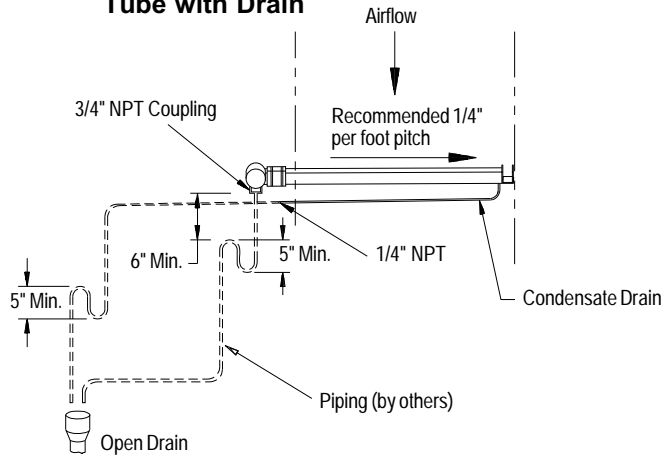
**Figure 20-1: Plan View**



**Figure 20-2: Elevation View Tube without Drain**



**Figure 20-3: Elevation View Tube with Drain**



OM-700

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## ULTRA-SORB® INSTALLATION

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See the *ULTRA-SORB Installation Instructions and Maintenance Operation Manual*.

# GTS® AREA-TYPE HUMIDIFIER

## AREA-TYPE Humidifier Application Information

The operating characteristics of AREA-TYPE steam humidifiers should be considered when selecting humidifier capacities and choosing mounting locations.

Steam discharge from the humidifier quickly cools and turns to visible, warm, microscopic drops or particles of water (fog) which are lighter than air.

Should this fog contact any solid surface (columns, beams, ceiling, pipes, etc.) before it disappears, it may collect and drip, as water.

The greater the space relative humidity, the higher and farther the "fog" will carry and rise in the space before disappearing.

The table at right states the vertical (rise), horizontal (throw), and width (spread) dimensions that can be expected with the Area-Type humidifiers.

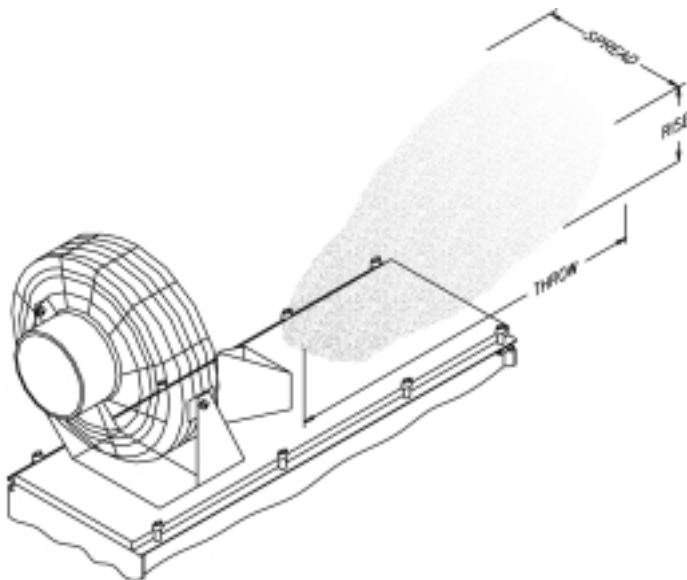
To avoid steam impingement on surrounding areas, these dimensions should be observed.

**Note:** The AREA-TYPE fan and brackets are shipped separately and field installed on the GTS. After mounting the fan, you need to remove the plug from the end of the cord and terminate the wires to terminals #20 and #21 in the control cabinet.

**Table 21-1 Minimum Distance for Rise, Spread and Throw**

Space Temp.	Space R.H.		50 PPH	100 PPH	150 PPH	225 PPH	300 PPH
60°F	30%	Rise	1 ft.	4 ft.	6 ft.	7 ft.	9 ft.
		Spread	2 ft.	4 ft.	5 ft.	7 ft.	9 ft.
		Throw	6 ft.	10 ft.	12 ft.	13 ft.	17 ft.
	40%	Rise	1 ft.	4 ft.	6 ft.	8 ft.	10 ft.
		Spread	2 ft.	4 ft.	5 ft.	7 ft.	10 ft.
		Throw	6 ft.	10 ft.	12 ft.	14 ft.	18 ft.
	50%	Rise	1 ft.	4 ft.	6 ft.	8 ft.	10 ft.
		Spread	2.5 ft.	5 ft.	5 ft.	7 ft.	10 ft.
		Throw	6 ft.	10 ft.	12 ft.	14 ft.	18 ft.
70°F	30%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Spread	1.5 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Throw	4 ft.	8 ft.	10 ft.	11 ft.	14 ft.
	40%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Spread	2 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Throw	4 ft.	8 ft.	11 ft.	12 ft.	15 ft.
	50%	Rise	1 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Spread	2 ft.	3 ft.	4 ft.	5 ft.	7 ft.
		Throw	4 ft.	8 ft.	11 ft.	12 ft.	16 ft.

**Figure 21-1 AREA-TYPE Fan**



### Fan Specifications

Motor ..... 120V, 50/60 Hz (18", 45.7 cm)  
 Blade diameter ..... 18" (45.7 cm)  
 Speeds ..... 3  
 Control ..... Rotary Switch

Speed	High	Medium	Low
CFM	5350	4180	3010
M <sup>3</sup> /s	2.52	1.97	1.42
RPM	1600	1275	950
Amps	1.65	1.27	.95
Watts	194	148	110
dB A	67	58	49

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# START-UP AND OPERATION

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## Introduction

After the system has been properly installed and connected to gas, electrical, water supplies, and controls it may then be started.

## Start-up and Checkout Procedures

### Mounting

Check mounting to see that unit is level and securely supported before filling with water.

### Piping (Gas)

Verify that all field and humidifier gas piping has been tested for leaks. (Soap and water are not recommended near gas valves.)

### Piping (Steam, Drain, Water Supply)

Verify that all piping connections have been completed as recommended and that water pressure is available.

### Electrical

Verify that all wiring connections have been made in accordance with all local codes and the enclosed GTS® wiring diagram.

### Controls

Before proceeding with the start-up and operation, verify that all control wiring has been completed as specified and required for correct and safe operation of the GTS Humidifier.

For your particular control system, refer to the manual that was enclosed with the product shipment.

Also see the separate Installation Instructions and Maintenance Operations Manual for the Controls for the GTS and GTS-DI Gas-to-Steam Humidifiers.

**Caution: Only qualified personnel should perform the start-up procedure.**

## Outline of Operation

The GTS is a gas-fired humidifier that burns either natural or propane gas to generate steam for humidification. The unit consists of one or more burners which are fitted into a heat exchanger. This heat exchanger is, in turn, submerged in a tank of water. When there is a call for humidity, the burners fire and generate steam until the call for humidity ends. The GTS is compatible with all types of DRI-STEEM dispersion devices including RAPID-SORB® and ULTRA-SORB®.

## Safety Systems

The GTS humidifier has a number of systems and safeguards to ensure proper operation:

- First, when there is a call for humidity, all of the combustion blowers must start. Each combustion blower contains a centrifugal switch that closes when the motor reaches a certain speed. If any one of the switches fails to close, the GTS will not operate.
- Once the blowers are running, there is a normally closed pressure switch that senses the back pressure on the blowers. This pressure switch tests for a blocked flue condition. If the flue becomes obstructed, this pressure switch will open, shutting down the humidifier.
- During operation, the water level in the tank is monitored by a probe system for standard water units and a low water float for DI/RO units. These water monitors tie into the microcontroller in the control cabinet. If the water level ever drops below a safe point, the humidifier is shut down.
- The water level in the tank is also monitored by a redundant low water system that runs independent of the microcontroller. This system is tied directly into the power source for the burners. If this system detects a low water condition, the humidifier is shut down.
- In addition to monitoring the water level, there is a temperature sensor located above one of the top burners. If the water level drops too low and both the main and redundant low water sensors fail to detect it, the temperature sensor will shut the humidifier down before an unsafe condition arises.
- For standard water systems, an additional low water safety system exists. The microcontroller keeps track of approximately how much water has left the tank in the form of steam. If this total amount exceeds a preset limit without the fill valve being energized, a low water condition is assumed and the humidifier is shut down. Each time the fill valve is energized, the total is reset to zero. (This system is not implemented on a DI/RO humidifier because the fill valve is not of the electric-solenoid type. On a DI/RO tank, a mechanical fill valve maintains the proper water level. This fill valve runs independent of the microcontroller. Therefore, there is no way to reset the steam total to zero as the tank fills.)

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## MAINTENANCE

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For high performance, and to minimize possible equipment failure, it is essential that periodic maintenance and inspections be performed on this appliance.

### **GTS® Standard Model Only**

Using softened water will significantly reduce mineral build-up in the humidifier. When softened water is not available, the GTS is designed to deal with water hardness in one of two ways depending on the degree of hardness. For light to moderate hardness (up to 10 grains per gallon), using the surface water skim time feature with annual cleaning is recommended. For high mineral content water (above 10 grains per gallon), a periodic drain and flush through the motorized drain valve, in addition to the surface water skim time feature, is recommended. The frequency of cleaning will depend on water condition and evaporation load.

The humidifier and piping should be inspected for water and gas leaks at least annually, all safety devices in the control circuit should be cycled on and off to verify that they are functioning.

**CAUTION: When performing maintenance on the GTS, always place main electrical power disconnect switch in the off position and close manual water and gas valves.**

### **Seasonally or as Required**

**Cleaning Evaporating Chamber** - Slide the clean-out tray out and dispose of any loose scale that has collected in the tray. This should be done before the build-up reaches the underside of the heat exchanger.

**Cleaning Water Level Probes** - Disconnect the plug and cable assembly and unscrew the probe holder from the GTS unit. The scale will easily flake off from the sensing portion. The sensing portion (bottom 3/8") of the probe should be brushed clean with stainless steel wool.

### **Cleaning Low Water Cut-Out Probe**

Remove the humidifier cover and inspect the probe rod for mineral accumulation. The rod comes from the top of the tank near the back. The probe should be brushed clean with stainless steel wool.

**Cleaning Skim Overflow Fitting** - Loosen deposits with a long tool, such as a screwdriver. Proper skimmer drainage should be verified by a weekly visual inspection. Water should drain from skimmer drain pipe after each fill cycle. (For cleaning piping, disconnect and flush out. If mineral deposits have restricted the flow, replace piping.)

**Blower Motor** - Lubrication port is not provided, therefore lubrication is not recommended.

**Remove Dust** - Using a vacuum, remove all dust from the areas around the motor and vent fan (s) and the louvers that provide air to the shrouded area.

### **Summer Maintenance**

After the humidification season, a complete inspection and cleaning of the probe control, skimmer, and water chamber is recommended. After cleaning, the unit should remain empty until humidification is required.

### **Adjusting the Surface Skim Bleed-Off Quantity**

The skim time determines the quantity of water skimmed with each fill cycle. The skim time is field adjustable using the microprocessor.

Each time the GTS refills, it fills to an elevation near the lip of the skim overflow fitting. A portion of the refill water then flows to drain carrying the minerals floating on the water with it. This reduces the mineral concentration, thereby reducing the frequency of cleaning needed.

The heated water that flows to drain is a cost of operation. Cleaning the humidifier is also an operational cost. Therefore, it is recommended that the user observe and adjust the skimming quantity. By doing so, a balance between minimizing mineral build-up and conserving hot water can be achieved.

### **GTS-DI Model Only**

The humidifier and piping should be inspected for water and gas leaks at least annually. Also, all safety devices in the control cabinet should be cycled on and off to verify that they are functioning.

### **Make-up Water Piping**

Use cold or hot makeup water. Even though the GTS has an internal 1" air gap, some local codes may require a vacuum breaker.

**Caution:** Minimum water supply pressure is 25 psi.

### **Cleaning Evaporating Chamber**

As long as mineral-free water is used in the GTS, no cleaning or flushing of the evaporating chamber should be necessary.

**Blower Motor** - Lubrication port is not provided, therefore lubrication is not recommended.

**Remove Dust** - Using a vacuum, remove all dust from the areas around the motor and vent fan (s) and the louvers that provide air to the shrouded area.

### **Summer Maintenance**

After the humidification season, inspect floats and water chamber, drain and rinse. Empty unit.

**Caution:** Label all areas prior to disconnection when servicing controls, wiring errors can cause improper and dangerous operation.

# MAINTENANCE

When servicing or repairing this equipment, use only DRI-STEEM approved service replacement parts. A complete replacement parts list are on pages 26 and 27. Refer to the rating plate on the unit for complete unit model number, serial number and company address. Any substitution of parts or controls not approved by DRI-STEEM will be at owner's risk and will void the warranty.

## Both GTS® and GTS-DI Inspecting the Burner Assemblies and Heat Exchanger Tubes

1. **Note:** Soot and carbon deposits may indicate a combustion problem that needs to be corrected. Consult the factory.

This is not regular maintenance, but if the heat exchanger tubes contain carbon deposits, soot or other residue, clean as follows:

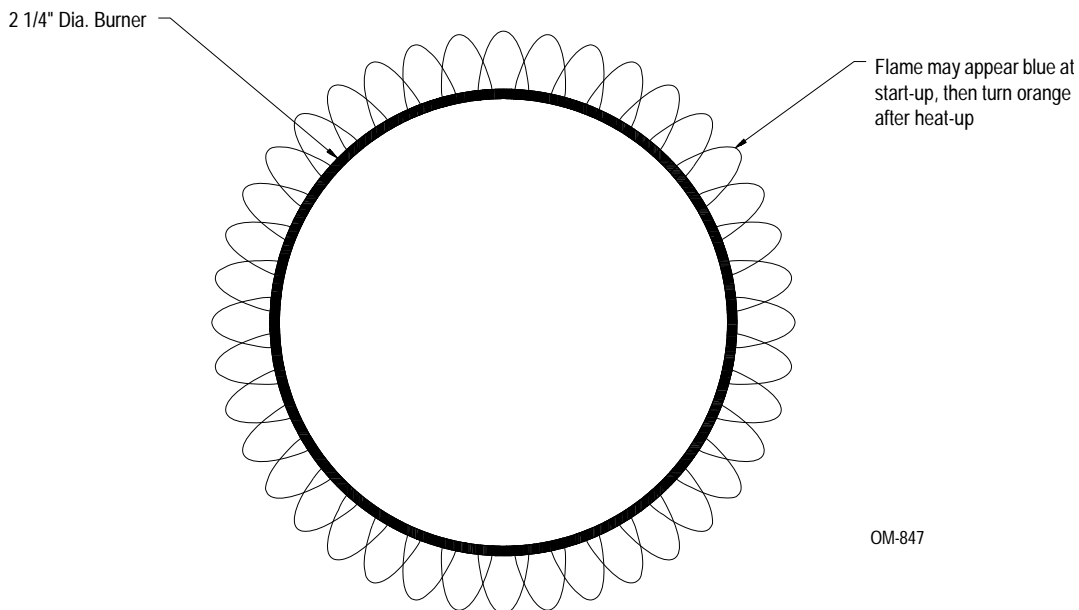
- Turn off gas, electrical power, and water supply.
- Remove gas train shroud.
- Disconnect wiring to blowers, flame sensors, gas valves, and ignition controllers.
- Remove burner assemblies (each assembly is mounted with four bolts).
- Remove vent box.
- Use a four-inch flue brush with a 28" extension and reversible drill. Work brush in and out of all four fire tubes.

- Remove loose deposits and residue that falls into rear header with a vacuum cleaner and hose extension.
- Inspect 2" return tubes and clean if necessary.
- Run thin brush between turbulator and tube wall on all four sides.
- Reinstall burner assemblies and gaskets; vent box and gasket; all electrical wiring; gas train shroud; and pressure switch connections.

2. **Burner:** The burner surface is a self cleaning ceramic fabric which does not require cleaning or maintenance.

3. **INSPECTION RECOMMENDATIONS** by user every 30 days. Appliance system should be inspected once a year by a qualified service person.
  - Flue passageways external to the appliance such as vent connector and chimney to be clear and free of obstructions.
  - Vent connector is in place, sloping upward and is physically sound without holes or excessive corrosion.
  - Physical support of the appliance is sound without sagging cracks, gaps...between floor stand legs and tank flanges, or between trapeze bars and tank bottom.
  - Verify there are no obvious signs of deterioration of the appliance.
  - Burner flame will operate blue or orange in color - up to a 1/4" from the surface of the burner. See figure 24-1.
  - See "Cleaning Water Level Probes" and "Cleaning Low Water Cut-Out Probe" on page 23.

Figure 24-1: Burner Assembly Flame



OM-847



# MAINTENANCE

## Air Shutter Adjustment Procedure

It is very important that each burner assembly ignite and burn with an orange (infrared) flame within 2 minutes of ignition. The air shutters have been factory set, but no ignition or a blue flame indicates that an air shutter adjustment is necessary per this procedure.\*

If, during regular maintenance or at any other time, it is found that a burner does not ignite or the burner flame is not orange, the following procedure must be used.

1. Remove electrical power from the GTS and manually close off the gas valves by turning the gas valve knob to "OFF" as shown in figure 33-1.
2. Open the gas valve for the burner needing adjustment by turning the gas valve knob to "ON" and restore electrical power.
3. Generate a call for humidity. If your GTS® has a humidity transmitter, adjust the desired humidity on the Zone Terminal Control Unit keypad (Set % RH) to be 10% higher than the actual humidity (Actual % RH). If your GTS is equipped with a humidistat, adjust the humidistat setpoint to 10% above the actual humidity level. If your GTS is being controlled by an energy management system, use it to generate a call for humidity.
4. The burner will try to fire in about 30 to 60 seconds. Ignition will be tried three times, if ignition is not achieved, remove the call for humidity, slightly close the air shutter on the respective blower and reinstate the call for humidity. Repeat this process until ignition occurs. (An alternative to removing and reinstating the call for humidity is to remove and reinstate the 24VAC power to the respective G750 ignition controller for the burner being adjusted. To do this, disconnect the wire at the terminal marked "THS" for about 5 seconds and then reconnect it. See figure 25-1. The burner will then repeat the ignition sequence. The layout of the G750 ignition controllers is the same as the layout of the burners, that is, upper left burner is upper left G750 ignition controller, etc.)

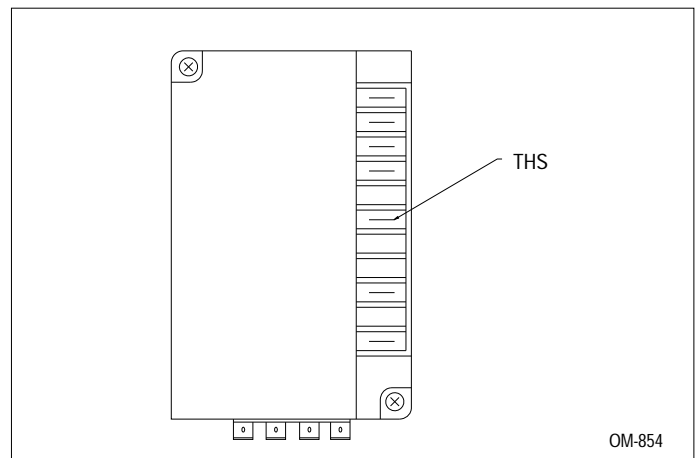
5. After ignition is achieved, open the air shutter in 1/16" to 1/8" perimeter increments until the orange glow disappears and only the blue flame remains.  
NOTE: Always allow at least two minutes between adjustments to allow burner color to stabilize.
6. Once the orange glow has stopped and only the blue flame remains, the air should be reset to the last air shutter setting prior to the burner turning blue. Observe this setting for a minimum of two minutes to verify that the orange glow returns to the burner.
7. Remove and reinstate the call for humidity. Verify the burner ignition.
8. Repeat this sequence of steps on all the burners that will not light or fail to glow orange.
9. Turn all gas valves to the "ON" position.

### NOTE:

- When the infrared burner glows orange, it is said to have "gone infrared." This is the burner's most efficient mode of operation.
- The time it takes for the burner to glow orange may be longer than 2 minutes if the water in the tank is cold.
- The lock nut at the center of the blower air shutter should be tightened after each shutter adjustment.
- Closing the air shutter too far will result in improper burner operation.

\* If no ignition occurs, first verify the hot surface ignitor is glowing during an ignition cycle. If a glow is not seen through the sight glass prior to the gas valve opening then the hot surface ignitor needs to be replaced.

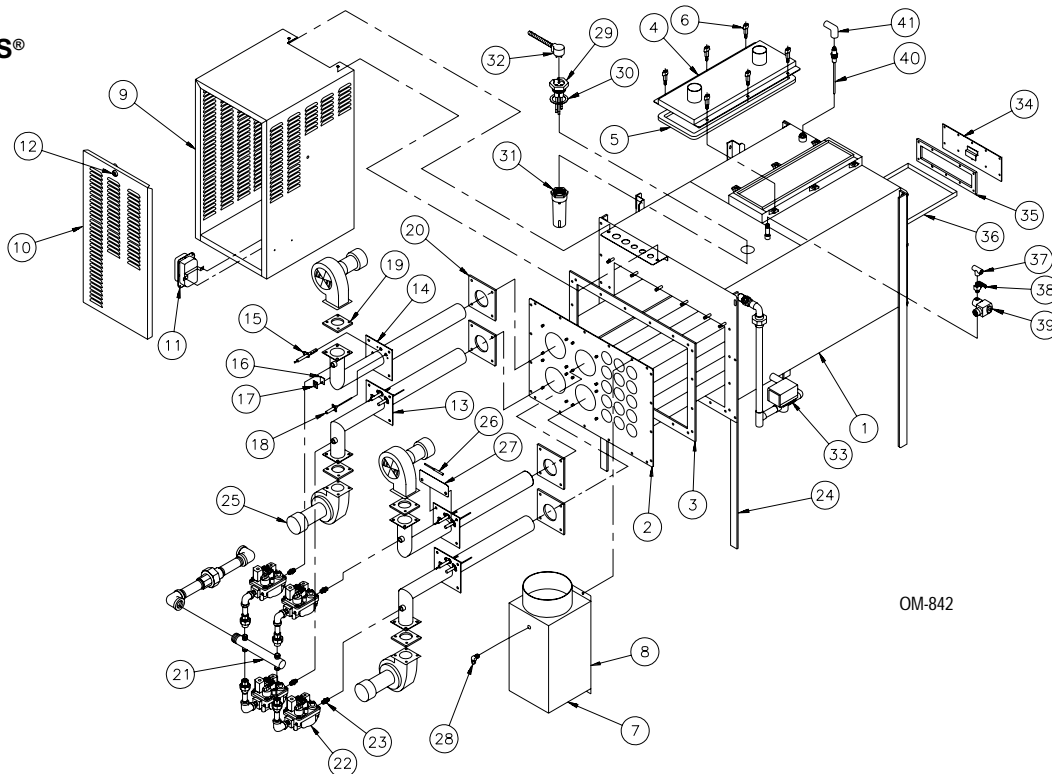
Figure 25-1: Typical Ignition Controller



OM-854

# REPLACEMENT PARTS

Standard GTS®



OM-842

**Table 26-1: GTS Replacement Parts (STD)**

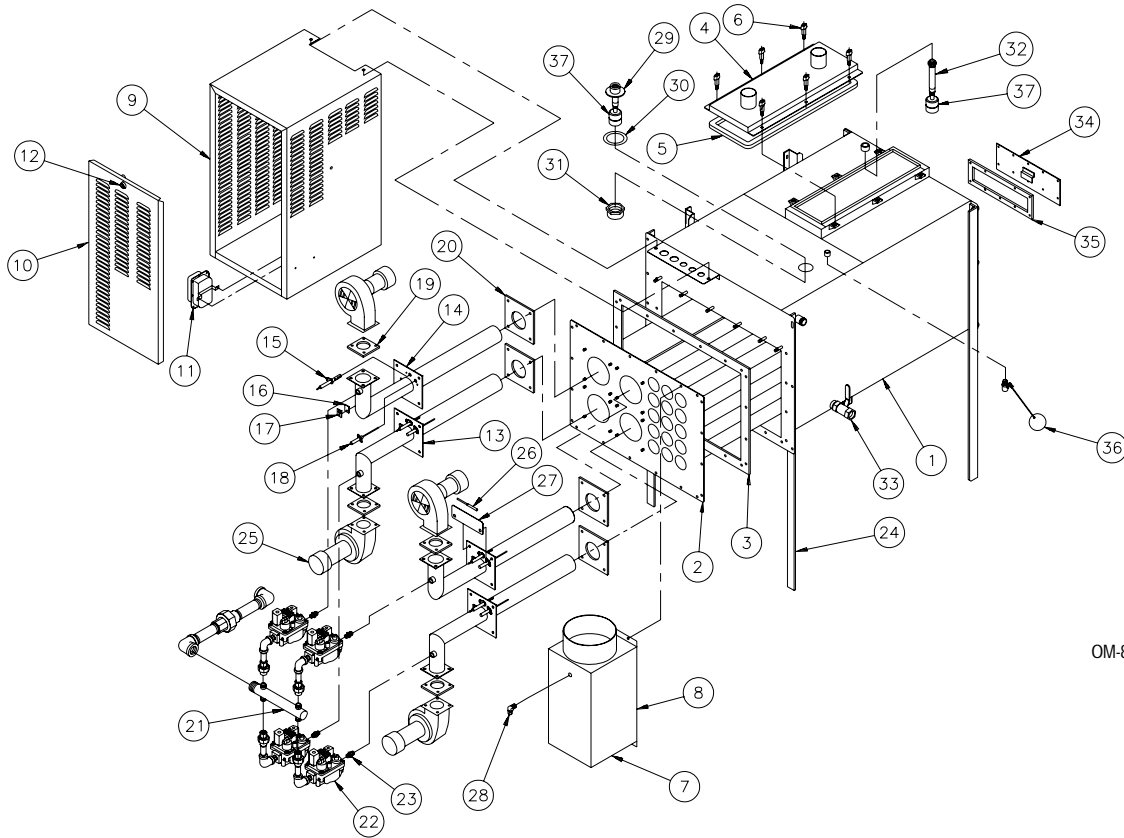
ITEM	DESCRIPTION	PART NUMBER
1	Tank	168000-TAB
2	Heat Exchanger	168001-TAB
3	Gasket, Heat Exchanger	308012-TAB
4	Cover	167720-TAB
5	Gasket, Cover	160691-006
6	Knob, Cover	700725
7	Flue Box	168005-TAB
8	High Temp RTV 650° Continuous	320001
9	Shroud	168002-TAB
10	Shroud Door	128622-TAB
11	Air Flow Proving Switch	406190
12	Door Lock with Key	700700
13	Burner/Mixing Tube Assembly, Lower	405701
14	Burner/Mixing Tube Assembly, Upper	405702
15	Ignitor, Mini	405714
16	Sight Glass	128661
17	Sight Glass Bracket	405720
18	Electrode, Flame Rod	405725
19	Gasket, Blower Mtg. Plate	308011
20	Gasket, Burner Mtg. Plate	308010
21	Gas, Manifold (GTS-300 and 400)	168006-300
22	Natural Gas Valve (GTS-300, 150 and 75)	405705
22	Natural Gas Valve (GTS-400, 200 and 100)	405705-002

ITEM	DESCRIPTION	PART NUMBER
23	Orifice, 1/4" NPT	160225-TAB
24	Legs	165440-001
25	Blower, GTS-75, 100, 150, 300, 200, 400	400086
26	Temperature Sensor	405760
27	Plate, GTS-300 and 400 Sensor Support	128663
27	Plate, GTS-75,100,150 and 200 Sensor Support	128665
28	Elbow, 1/4" NPT x 1/4" Compression	405723
29	Probe Assembly (blue dot )	406210
30	Gasket, Probe	309750-003
31	Probe Housing, Nylon	308500
32	Probe Plug Wire Assembly	406050-002
33	Valve, 3/4" HW Drain	505400
34	Clean Out Plate	165472
35	Gasket, Clean Out Plate	308225
36	Tray, GTS-300 and 400 Clean Out	167770-009
36	Tray, GTS-75,100, 150 and 200 Clean Out	167770-150
37	Strainer, 1/4" NPT Sediment	300050
38	Valve, 1/4" NPT Needle	505070-001
39	Valve, 1/4" Brass Fill	505084
40	Low Level Control Electrode (7" long)	405726-001
41	Boot for Low Level Control Electrode	405726-002

TAB = Refer to your specific model number for correct part.  
A four burner assembly is shown above.

# REPLACEMENT PARTS

GTS®-DI



OM-843

**Table 27-1: GTS Replacement Parts (DI)**

ITEM	DESCRIPTION	PART NUMBER
1	Tank	16800-TAB
2	Heat Exchanger	168001-TAB
3	Gasket, Heat Exchanger	308012-TAB
4	Cover	167720-TAB
5	Gasket, Cover	160691-006
6	Knob, Cover	700725
7	Flue Box	168005-TAB
8	High Temp RTV 650° Continuous	320001
9	Shroud	168002-TAB
10	Shroud Door	128622-TAB
11	Air Flow Proving Switch	406190
12	Door Lock with Key	700700
13	Burner/Mixing Tube Assembly, Lower	405701
14	Burner/Mixing Tube Assembly, Upper	405702
15	Ignitor, Mini	405714
16	Sight Glass	128661
17	Sight Glass Bracket	405720
18	Electrode, Flame Rod	405725
19	Gasket, Blower Mtg. Plate	308011

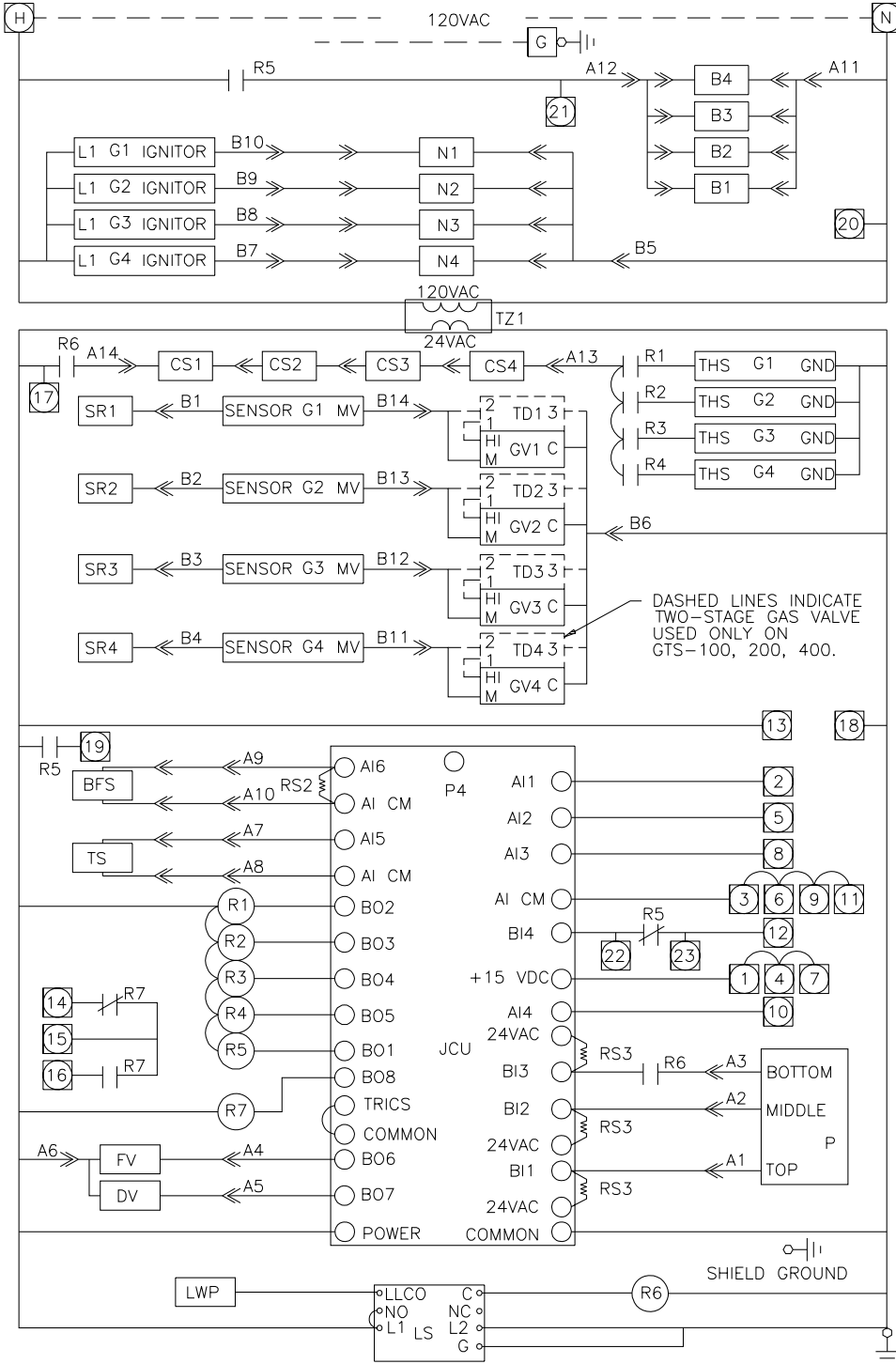
ITEM	DESCRIPTION	PART NUMBER
20	Gasket, Burner Mtg. Plate	308010
21	Gas, Manifold (GTS-300 and 400 only)	168006-300
22	Natural Gas Valve (GTS-300, 150, and 75)	405705
22	Natural Gas Valve (GTS-400, 200, and 100)	405705-002
23	Orifice, 1/4" NPT	160225-TAB
24	Legs	165440-001
25	Blower, GTS-75, 100, 150, 200, 300, and 400	400086
26	Temperature Sensor	405760
27	Plate, GTS-300 and 400 Sensor Support	128663
27	Plate, GTS-75,100, 150, and 200 Sensor Support	128665
28	Elbow, 1/4" NPT x 1/4" Compression	405723
29	Low Water Tube	167785
30	Gasket, Low Water Tube	309750-003
31	DI Housing, Nylon	167780
32	Low Water Assembly, Redundant	180997
33	Valve, 3/4" Sweat Brass	505011
34	Clean Out Plate	165470
35	Gasket, Clean Out Plate	308225
36	Float Valve Assembly, GTS-DI	505250
37	Low Water Float Switch	408420-001

TAB = Refer to your specific model number for correct part.  
A four burner assembly is shown above.

# WIRING DIAGRAM

(Refer to as built diagram in the control cabinet)

## GTS® Wiring Schematic



### LEGEND

SYMBOL	DESCRIPTION
B1/4	BLOWER
BFS	SENSOR-BLOCKED FLUE
CS1/4	SWITCH-CENTRIFUGAL
DV	VALVE-DRAIN
FV	VALVE-FILL
G1/4	CONTROLLER-G750
GV1/4	VALVE-GAS
JCU	CONTROLLER-JOHNSON
N1/4	IGNITOR
LS	CONTROL-LWCS2683A0
LWP	PROBE-LOW WATER
P	PROBES
R1/4	RELAY-CONTROL
R5	RELAY-BLOWER
R6	RELAY-SAFETY
R7	RELAY-REMOTE FAULT
RS2	RESISTOR-1K ohm
RS3	RESISTOR-16.5K ohm
SR1/4	SENSOR-ROD
TZ1	TRANSFORMER CLASS 2

### PLUG A & B FEMALE (WIRE SIDE)

5	4	3	2	1
10	9	8	7	6
	14	13	12	11

### PLUG A & B MALE (WIRE SIDE)

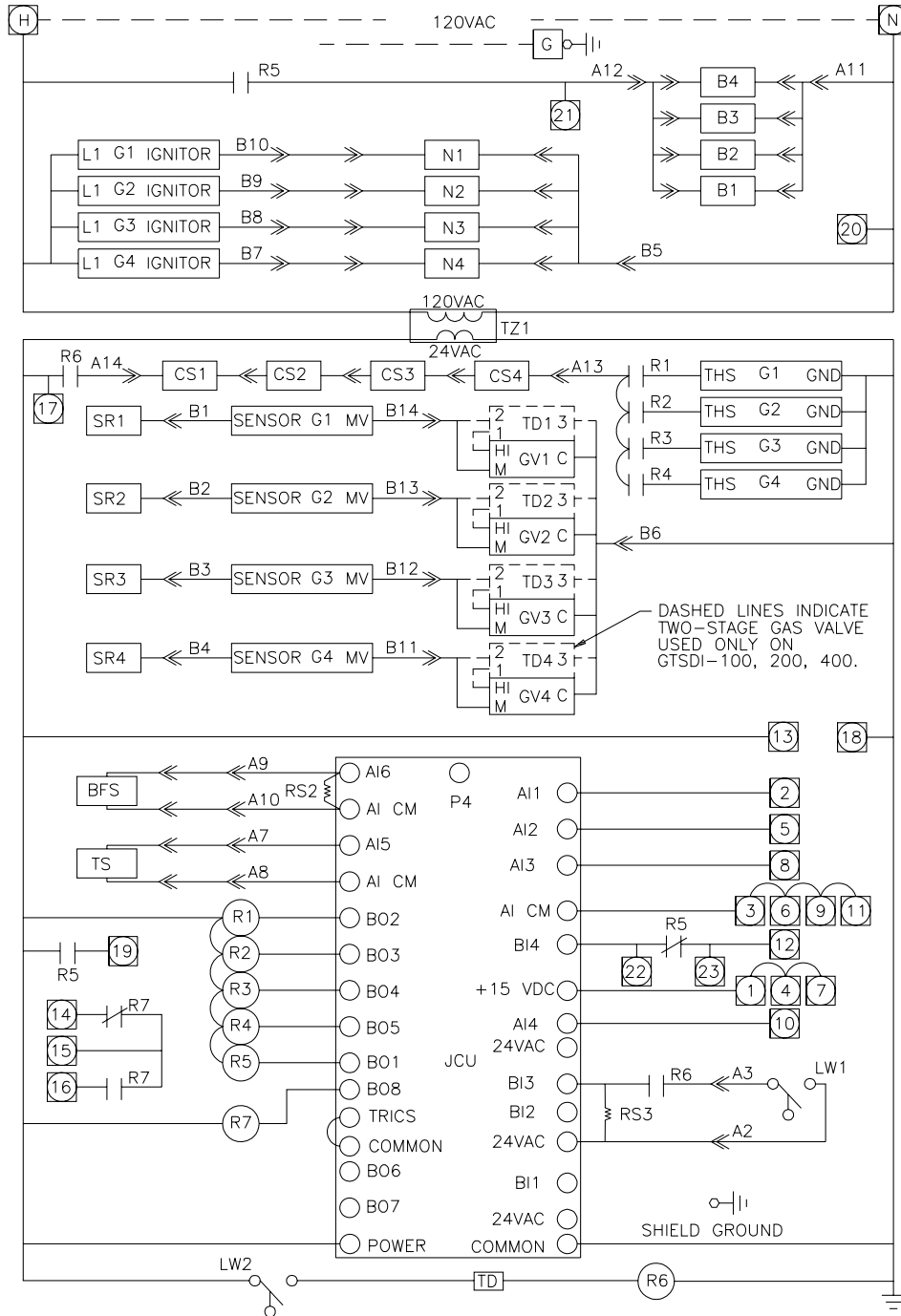
1	2	3	4	5
6	7	8	9	10
11	12	13	14	

- - - - - FIELD WIRING  
 - - - - - OPTIONAL WIRING  
 \_\_\_\_\_ FACTORY WIRING

# WIRING DIAGRAM

(Refer to as built diagram in the control cabinet)

## GTS® Wiring Schematic



### LEGEND

SYMBOL	DESCRIPTION
B1/4	BLOWER
BFS	SENSOR-BLOCKED FLUE
CS1/4	SWITCH-CENTRIFUGAL
G1/4	CONTROLLER-G750
GV1/4	VALVE-GAS
JCU	CONTROLLER-JOHNSON
N1/4	IGNITOR
LW1/2	SWITCH-LOW WATER
R1/4	RELAY-CONTROL
R5	RELAY-BLOWER
R6	RELAY-SAFETY
R7	RELAY-REMOTE FAULT
RS3	RESISTOR-16.5K ohm
RS2	RESISTOR-1K ohm
SR1/4	SENSOR-ROD
TZ1	TRANSFORMER CLASS 2
TD	TIME DELAY

### PLUG A & B FEMALE (WIRE SIDE)

5	4	3	2	1
10	9	8	7	6
14	13	12	11	

### PLUG A & B MALE (WIRE SIDE)

1	2	3	4	5
6	7	8	9	10
11	12	13	14	

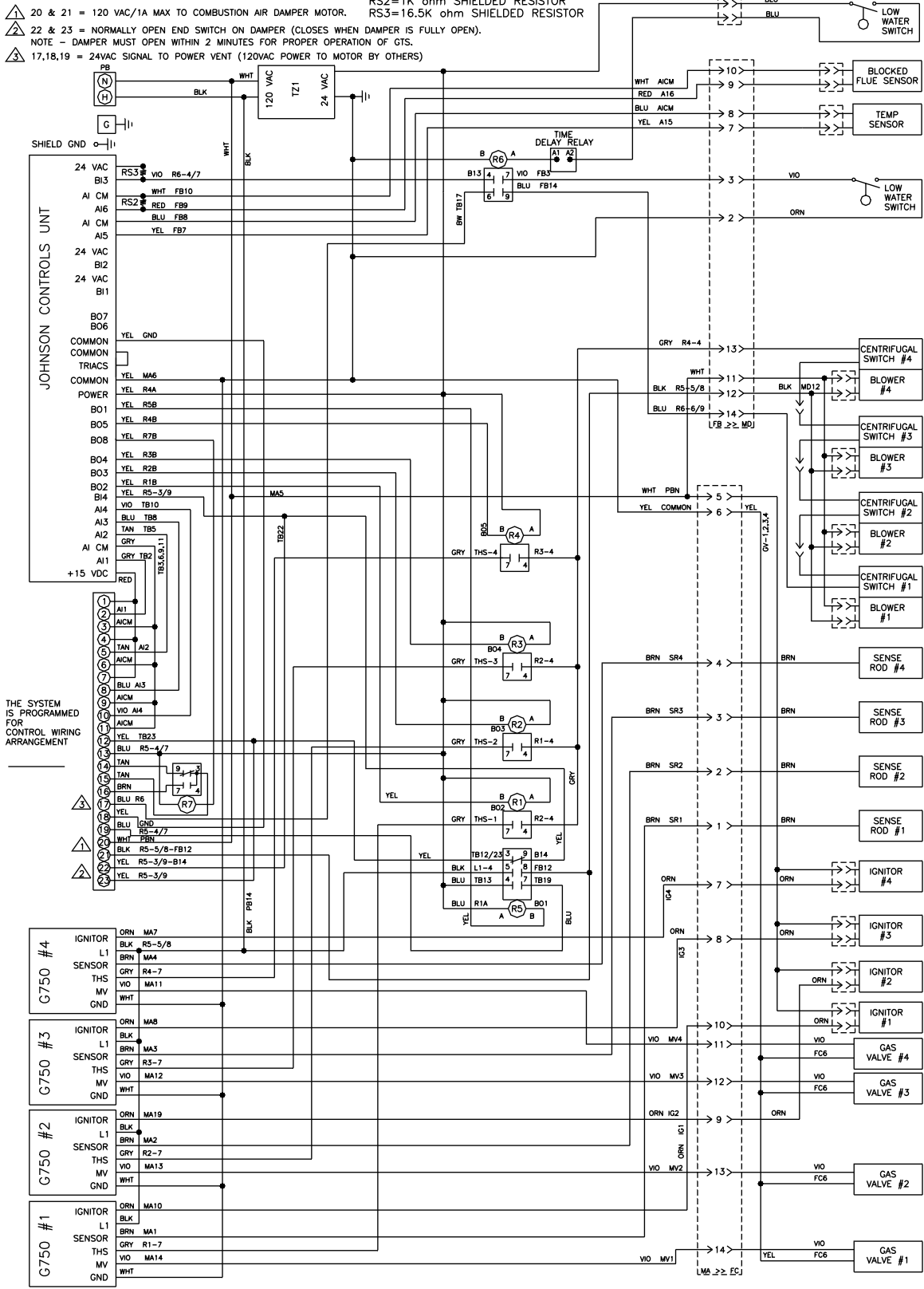
- - - - - FIELD WIRING  
 - - - - - OPTIONAL WIRING  
 \_\_\_\_\_ FACTORY WIRING

# WIRING DIAGRAM

(Refer to as built diagram in the control cabinet)

## GTS®-DI WIRE DIAGRAM

### 4 BURNER/MANUAL DRAIN/AREA-TYPE/POWER VENT/AIR DAMPER



THE SYSTEM IS PROGRAMMED FOR CONTROL WIRING ARRANGEMENT

ORDER NO.: \_\_\_\_\_ MODEL NO.: \_\_\_\_\_ PROGRAM CODE: \_\_\_\_\_



## FOR YOUR SAFETY READ BEFORE OPERATING

### **⚠ WARNING**



If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **not** try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

### **FOR YOUR SAFETY** **“WHAT TO DO IF YOU SMELL GAS”**

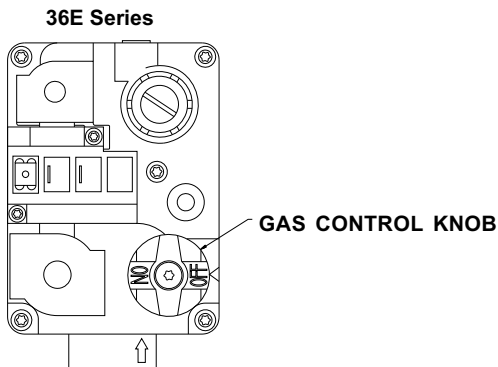
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's

phone. Follow the gas supplier's instructions.





- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to turn the gas control knob. **Never use tools.** If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. 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.

## OPERATING INSTRUCTIONS


1. **STOP!** Read the safety information above on this label.
2. Set the humidistat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do **not** try to light the burner by hand.



5. Remove control access panel.

6. Turn clockwise to  "OFF". If knob is in "ON"  turn clockwise  to "OFF."
7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
8. Turn gas control knob  clockwise to "ON."
9. Replace control access panel.
10. Turn on all electric power to the appliance.
11. Set humidistat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

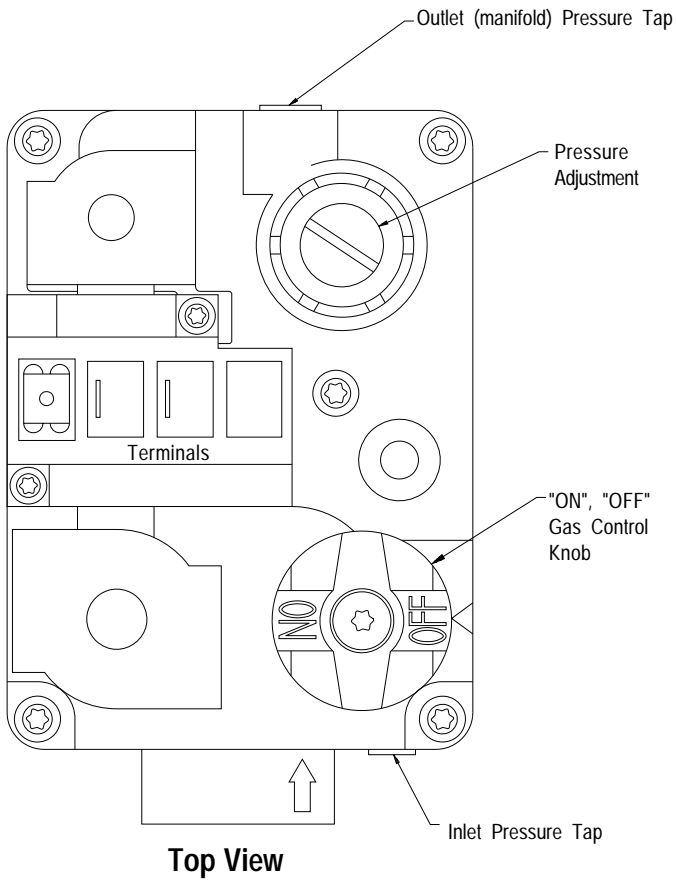
## TO TURN OFF GAS TO APPLIANCE

1. Set the humidistat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove control access panel.
4. Turn gas control knob counterclockwise  to "OFF."
5. Replace control access panel.



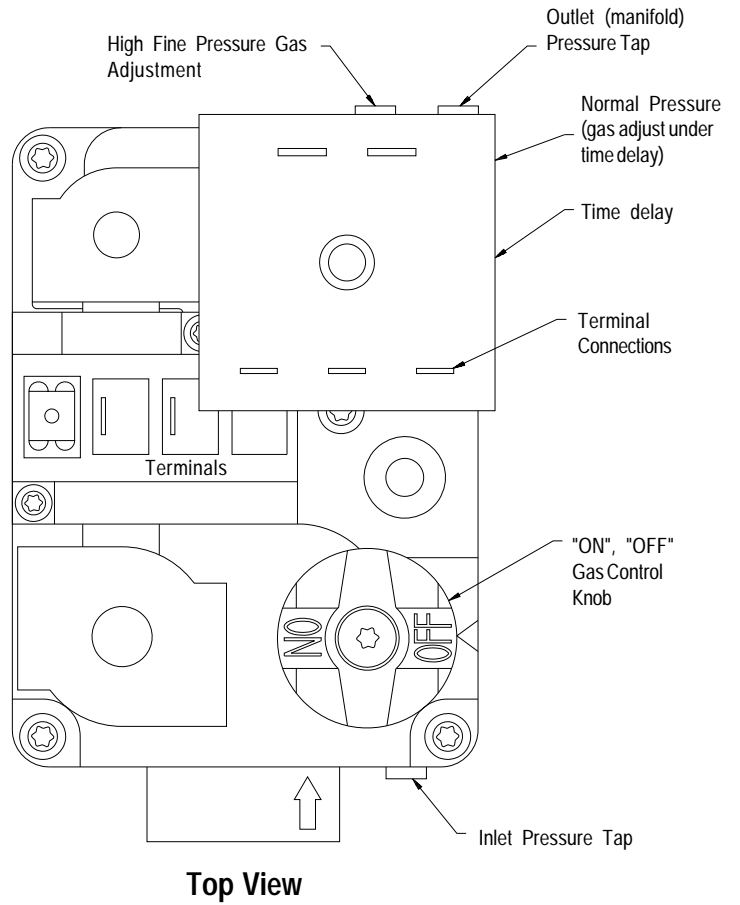
# GAS CONTROL VALVE

**Figure 33-1: Gas Control Valve for GTS® 300, 150 and 75**



OM-836

**Figure 33-2: Gas Control Valve for GTS® 400, 200 and 100**



OM-836A





## TWO-YEAR LIMITED WARRANTY

DRI-STEEM Humidifier Company ("DRI-STEEM") warrants to the original user that its products will be free from defects in materials and workmanship for a period of two (2) years after installation or twenty-seven (27) months from the date DRI-STEEM ships such product, whichever date is the earlier.

If any DRI-STEEM product is found to be defective in material or workmanship during the applicable warranty period, DRI-STEEM's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DRI-STEEM's election. DRI-STEEM shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product.

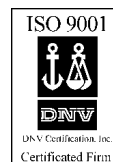
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DRI-STEEM's limited warranty is made in lieu of, and DRI-STEEM disclaims all other warranties, whether express or implied, including but not limited to any IMPLIED WARRANTY OF MERCHANTABILITY, ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

DRI-STEEM SHALL NOT, UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, REVENUE OR BUSINESS) OR DAMAGE OR INJURY TO PERSONS OR PROPERTY IN ANY WAY RELATED TO THE MANUFACTURE OR THE USE OF ITS PRODUCTS. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if DRI-STEEM has notice of the possibility of such damages.

By purchasing DRI-STEEM's products, the purchaser agrees to the terms and conditions of this limited warranty.

**DRI-STEEM**<sup>®</sup>  
HUMIDIFIER COMPANY



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