

READ AND SAVE THESE INSTRUCTIONS

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

DRI-STEEM Models GTS[®] and GTS-DI

EUROPEAN MODEL GAS-TO-STEAM HUMIDIFIERS

Installation, Operation and Maintenance 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.

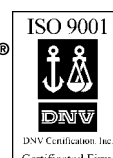
- Do not store or use petrol or other flammable vapors and liquids in the vicinity of this or any other appliance.

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 brigade.
- Installation and service must be performed by a qualified installer, service agency, or the gas supplier.



DRI-STEEM[®]
HUMIDIFIER COMPANY



FOREWORD

To the purchaser and the installer

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 ensure your achieving that objective. We therefore urge you to become familiar with the contents of this manual.

This equipment has been tested by the Canadian Standards Association International to the Low Voltage, Gas Appliance, and EMC directives and has been certified by AFNOR for use in all EU countries.

DRI-STEEM Humidifier Company

Authorized countries of destination

The GTS and GTS-DI humidifiers bearing the CE mark are authorized for use in the European countries listed below.

Austria	AT	Greece	GR
Belgium	BE	Ireland	IE
Switzerland	CH	Iceland	IS
Germany	DE	Italy	IT
Denmark	DK	Luxembourg	LU
Spain	ES	Netherlands	NL
Finland	FI	Norway	NO
France	FR	Portugal	PT
United Kingdom	GB	Sweden	SE

Appliance category

In relation to the country of destination, this humidifier is classified under one of the following boiler categories: category I_{2H}, I_{2L}, I_{2E}, I_{2E+}, I_{2LL}, I_{2ES}, I_{2FI}, I_{2ER}, I_{3B/P}, I_{3P}.

See the unit data plate for the specific category of your appliance.

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GTS® PROGRAM CODE NOMENCLATURE

A 14-digit VAPOR-LOGIC₃ program code appears on the front of the control cabinet and on the wiring diagram inside the control cabinet. The program code specifies the parameters of the VAPOR-LOGIC₃ microprocessor, which controls your humidification system. An explanation of the program code is detailed below.

VAPOR-LOGIC₃ program code

A. Type of units:

E = English
M = Metric

B. VAPOR-LOGIC₃ system type:

G = GTS®
S = STS®
L = LTS®
V = VAPORSTREAM®
M = HUMID-TECH®
C = CRU®V
U = ULTRA-FOG®
N = Steam Injection

C. VAPOR-LOGIC₃ board classification:

1 = One-tank system
2 = Two-tank system
3 = Three-tank system
4 = Four-tank system
5 = Five-tank system
6 = Six-tank system

D. Digital display/keypad features:

1 = Single keypad

E. Type of outputs:

0 = Steam valve/100% SSR
1 = One heat stage
2 = Two heat stages
3 = Three heat stages
4 = Four heat stages

F. System pounds output:

= Output capacity
(e.g., 00285 = output capacity in lbs/hr)

G. Type of water level control:

D = DI w/ manual drain
E = DI w/ end of season drain
M = Standard w/ manual drain
A = Standard w/ autodrain

H. Operating mode:

1 = Single staged
2 = Externally staged
3 = not used
4 = not used
5 = not used
6 = GTS
7 = TP
8 = SSR
9 = Steam valve

I. VAV options:

V = Option present
O = Option not selected
S = SDU option

J. Temperature compensation options:

T = Option present
O = Option not selected

K. Type of humidity sensing device:

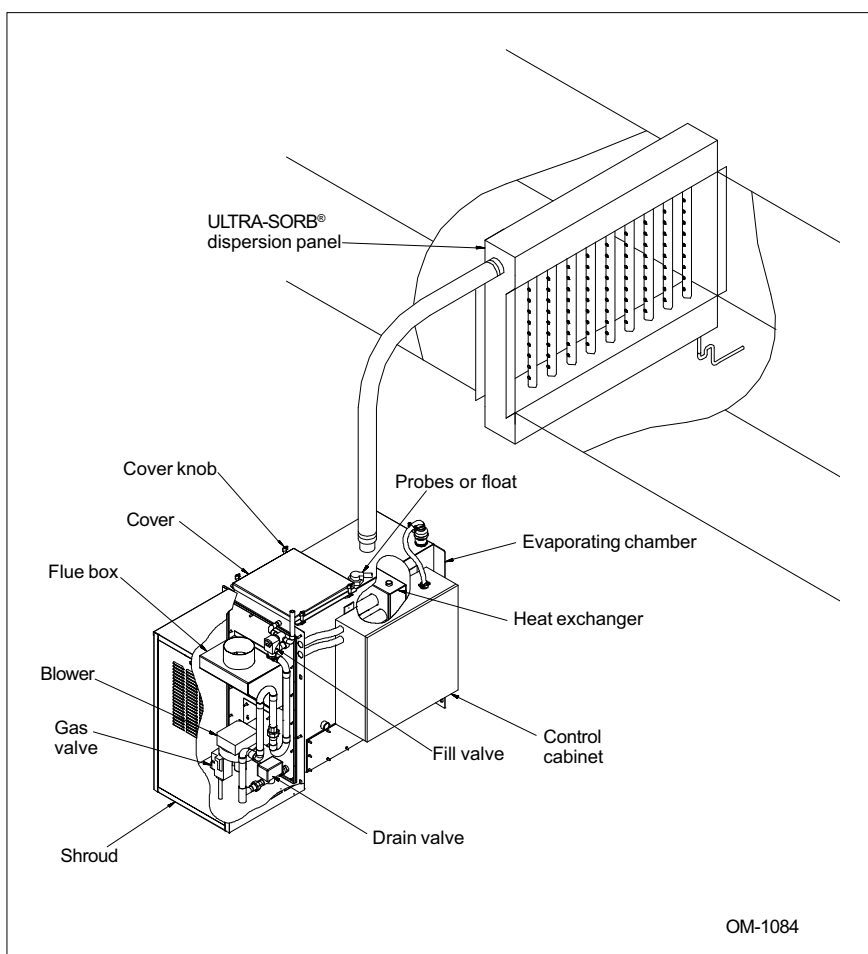
N = None, for on/off
C = 0-135 ohm humidistat
D = 6-9 VDC humidistat
H = 0-10 VDC humidistat
E = 4-20 mA humidistat
X = 4-20 mA transmitter
Q = Dew point transmitter
S = Special

GTS Gas-to-Steam Humidifier

The GTS is a gas-fired humidifier that burns either natural or propane gas to generate steam for humidification. The unit has from one to four burners, which are fired 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 DRI-STEEM's dispersion panels RAPID-SORB® and ULTRA-SORB®.

The GTS humidifier is designed for use with all water types. The standard GTS model supports softened or unsoftened water and uses a probe-type level control system to sense water level. This probe requires water conductivity of 100 $\mu\text{S}/\text{cm}$ minimum to function. Therefore, it will not operate on water treated by reverse osmosis or deionization.

The GTS-DI model is available 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. The standard GTS model can be converted in the field to a GTS-DI.



SAFETY PRECAUTIONS

WARNING:

Improper installation, adjustment, alteration, service, maintenance, or use can cause carbon monoxide poisoning, 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 cause excessive servicing or permanent component failure.
- When working on equipment, observe precautions in literature, tags, and labels attached to or shipped with the unit and observe other safety precautions that may apply. Wear safety glasses and work gloves. Have a 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 that 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.
- This equipment is for use with second family (G20, G25) natural gases; and third family (G30, G31) propane gas.
- Conversion to another group or supply pressure should be carried out by a qualified service technician.

Electrical Warning Label:



Location: Control cover, shroud
Definition: Electrical shock hazard

Conversion Instructions:

- No replacement parts are required for conversion.
- A flat screwdriver will be required to adjust the gas valve throttle screw. A combustion analyzer and pressure gauge will be required to ensure proper adjustment. A gas meter must be installed on the incoming gas supply to ensure proper input. Turning the throttle screw counter-clockwise will increase the gas input, clockwise decreases input. Use the gas meter and analyzer to determine proper combustion at the stated input.
- Throttle screw seal shall be replaced upon completion of adjustment.
- For appliances operating with a pressure couple, any governor shall be made inoperative.
- Contact an authorized DRI-STEEM distributor to receive the proper replacement data plate.

SPECIFICATIONS AND CAPACITIES

Specifications, capacities and weights

Model number	Steam capacity per hour in kg	P = (kW)	Q = (kW)	Steam outlet	Recommended flue size (Class B)	Operating weight in kg	Shipping weight in kg	Full load amps
GTS-100	34*	0-24	0-29	DN50 (2") BSPT or DN50 hose	DN125 (5")	275	135	2.8
GTS-200	68*	0-48	0-59	DN50 (2") BSPT or DN50 hose	DN125 (5")	275	135	2.8
GTS-300	102*	0-72	0-88	DN80 (3") flange	DN180 (7")	350	170	4.0
GTS-400	136*	0-80	0-112	DN80 (3") flange	DN180 (7")	350	170	4.0
GTS-600	204*	0-144	0-176	DN100 (4") flange	DN200 (8")	455	225	5.5
GTS-800	272*	0-192	0-234	DN100 (4") flange	DN250 (10")	580	275	7.0

Capacity notes

- * The maximum steam capacities listed may be as much as 10% lower than the given values due to local variations in the Wobbe index of G20 and G25 gases.
- At sea level, 402 kJ are required to raise the temperature of one kilogram of water from 4 to 100 °C.
- An additional 2257 kJ are required to change the state of one kilogram of 100 °C water to vapor.
- Another factor to consider is condensation steam loss from hoses and tubes. Use the following steam loss guidelines:
 - Vapor hose: 0.22 kg/m/h
 - Insulated pipe: 0.07 kg/m/h
 - Dispersion tubes: 0.7 kg/m/h

LP gas

All models operate at rated kW input.

Operating characteristics

- Unit is capable of operating in ambient conditions of 5 - 40 °C.
- Unit is capable of operating in ambient conditions between 30% RH and 95% RH (noncondensing).
- NO_x class 5

Gas supply pressure

- 20 or 25 mbar for natural gas (depending on gas group), and 30, 37 or 50 mbar for propane gas (depending on gas group)

PMS (all units)

- 7.0 bar

Electric supply

- 230V, 667W-2415W (see data plate)

Max inlet water temperature

- 90 °C

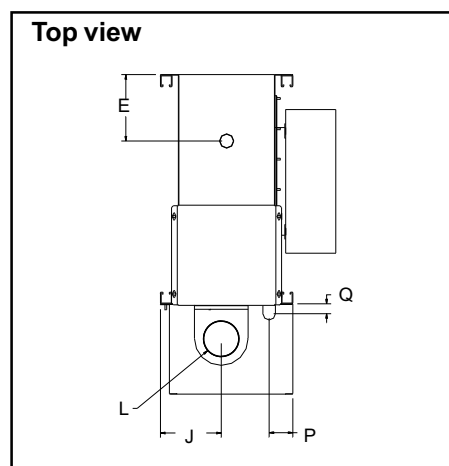
Gas specifications

Humidifier model	Volumetric flow rate by gas category			
	2H-G20-20 mbar 2E-G20-20 mbar 2Es-G20-20 mbar	2L-G25-25 mbar 2LL-G25-20 mbar 2Ei-G25-25 mbar	2E+G20/G25-20/25 mbar 2ER-G20/G25-20/25 mbar	3B-G3 3B-G3
GTS-100	2.31 m³/h	2.82 m³/h	2.31-2.82 m³/h	1.3
GTS-200	4.62 m³/h	5.64 m³/h	4.62-5.64 m³/h	2.6
GTS-300	6.92 m³/h	8.46 m³/h	6.92-8.46 m³/h	3.9
GTS-400	7.62 m³/h	9.31 m³/h	7.62-9.31 m³/h	4.3
GTS-600	13.85 m³/h	16.92 m³/h	13.85-16.92 m³/h	7.8
GTS-800	18.47 m³/h	22.56 m³/h	18.47-22.56 m³/h	10.1

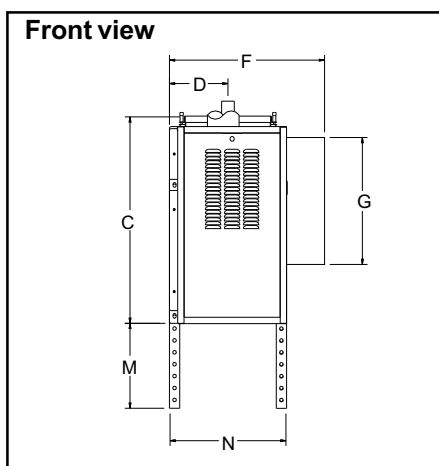
DIMENSIONS

Mechanical dimensions

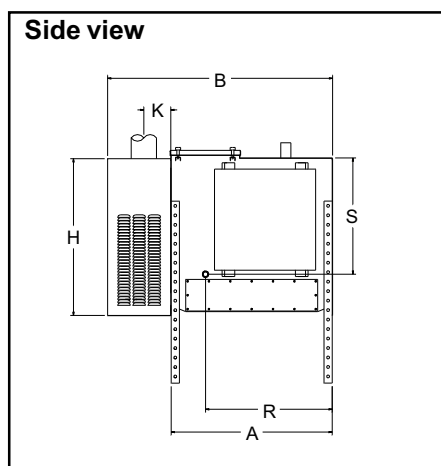
	Description	GTS-100, GTS-200 (mm)	GTS-300, GTS-400 (mm)	GTS-600 (mm)	GTS-800 (mm)
A	Floor stand length	810	810	810	810
B	Overall length	1130	1245	1245	1245
C	Height of evaporating chamber	845	845	845	845
D	Steam outlet position	235	305	438	514
E		235	235	235	235
F	Overall width	635	775	1040	1195
G	Height of control cabinet	510	510	510	510
H	Shroud height	815	815	815	815
J	Flue position	215	305	420	500
K		125	140	140	170
L	Flue diameter	125	180	205	255
M	Leg height (distance from floor)	340	340	340	340
N	Leg width	470	610	875	1030
P	Fill valve connection position	85	85	165	165
Q		35	35	35	35
R	Condensate return plug position	635	635	635	635
S		585	585	585	585



OM-1077



OM-1078-1



OM-1079

Connection sizes

Description	GTS 100-200	GTS 300-400	GTS-600	GTS-800
Gas*	DN15 (1/2" BSPT)	DN25 (1" BSPT)	DN25 (1" BSPT)	DN32 (1-1/4" BSPT)
Water makeup* (fill)	DN10 (3/8" BSPT)	DN10 (3/8" BSPT)	DN10 (3/8" BSPT)	DN10 (3/8" BSPT)
Drain**	DN25	DN25	DN25	DN25

* NPT to BSP flexible adapters are shipped loose with the GTS to meet these gas and water connection specifications.

** Drain requires a soldered connection.

INSTALLATION

Precautions

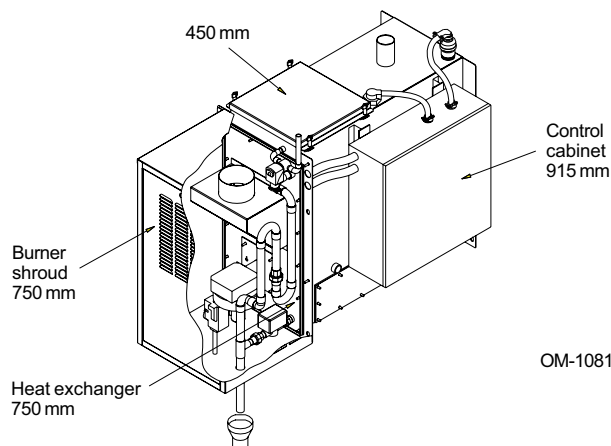
- Installation must conform to the requirements of the authority having jurisdiction.
 - Do **not** install in potentially explosive or flammable atmospheres laden with grain dust, sawdust, or similar airborne materials.
 - Installation of humidifier in high humidity or salt water atmospheres will cause 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.
 - With the exception of sealed combustion units, do not locate units in tightly sealed rooms or small compartments without provision for adequate combustion air and venting. Room air combustion must be supplied through a minimum of two permanent openings in the wall, with at least one near the bottom. The openings should provide 6.50 cm² of free area per 300W input rating of the unit, with a minimum of 650 cm² for each opening. See the table and information on Pages 15 and 16 for additional information.
 - 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 the wiring diagram furnished with this unit.
 - Turn off all gas while installing the gas piping and manual shutoff valve for the humidifier.

Required clearances

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

- Heat exchanger removal - front, 750 mm
- Burner shroud removal - front, 750 mm
- Control cabinet - right side, 915 mm
- Cover removal - top, 450 mm
- Distance from bottom of tank to floor, 335 mm minimum
- Distance from vent box to combustible floor - 750 mm
- A minimum of 25 mm clearance is recommended between hot surfaces and combustible walls

Clearances



Handling instructions

- Keep unit upright during handling
- Do not lift unit by control cabinet or shroud
- Do not bend electrical conduit past 90°

INSTALLATION

Locating the humidifier

- Provide a level, solid foundation for the humidifier. Locate the humidifier as near as possible to a 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 should be 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 that 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.
- Locate the humidifier in an area where operating noise will not be objectionable.
- The VAPOR-LOGIC[®]₃ keypad should be mounted in an easily accessible location for the operator between 0.4 m and 1.6 m above the floor.

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 connections to prevent electrical shock and equipment damage. All units must be wired in strict accordance with wiring diagram furnished with this unit.

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 the valve seat becoming damaged 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:

- A shutoff 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 420 kPa and/or water hammer would be objectionable, a pressure reducing valve or shock arrester should be installed.
- A DN25 (1") opening is provided in the humidifier tank to accommodate skim and/or overflow protection. (Note: Follow local code requirements regarding size of drain pipe.)
- 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

Makeup water piping and material

Minimum makeup water pressure must be 175 kPa. When nonmetallic water piping is used, it must be rated to withstand 100 °C or greater temperature. If not, the final meter of piping connected to the humidifier should be metallic and should not be insulated.

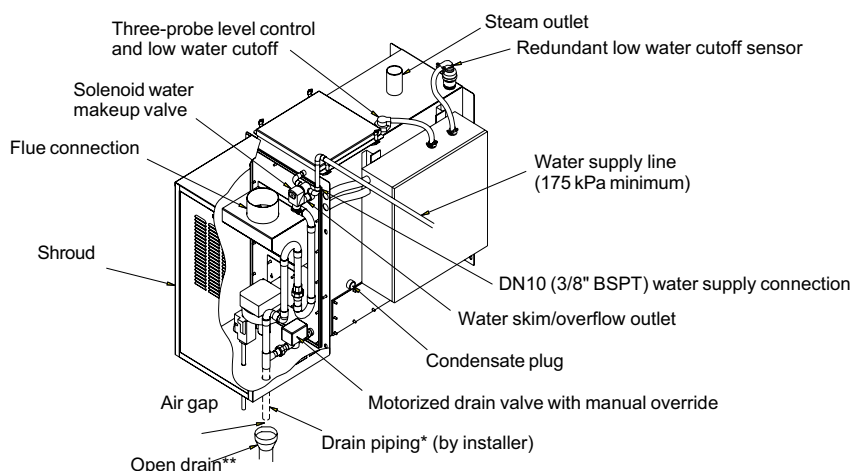
As part of the fill valve assembly, the needle valve restricts the rush of cold water entering the evaporating chamber during the fill cycle. Adjusting the supply water

flow with the needle valve will reduce fill cycle noise generated by collapsing steam 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, as this will cause a low-water shutdown.

Drain piping

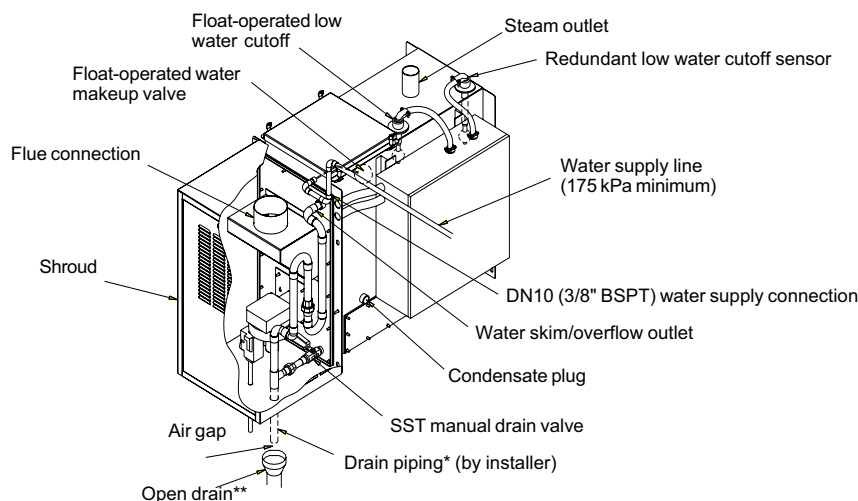
The drain requires a DN25 soldered connection.

Standard water



OM-736N-1

DI water



OM-737N-1

* Drain piping material must be suitable for 100 °C water and must be horizontally offset 300 mm from open drain to prevent steam from rising out of the drain into the humidifier shroud. Drain requires a DN25 soldered connection.

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

INSTALLATION

Gas piping guidelines

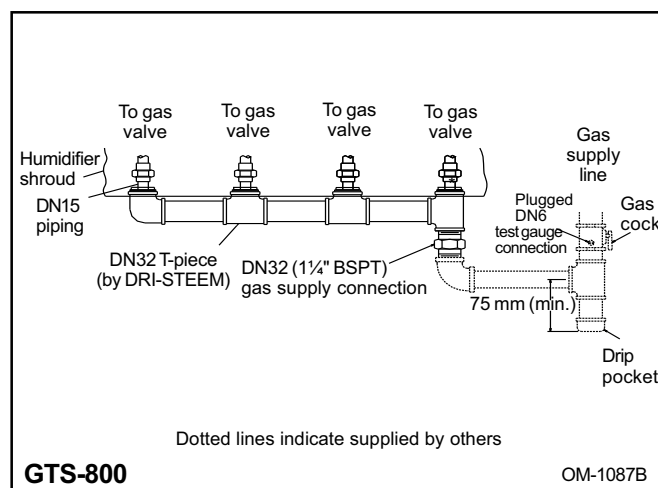
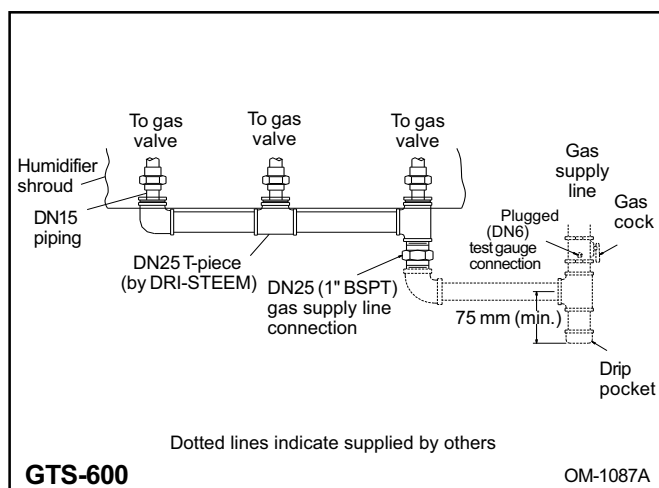
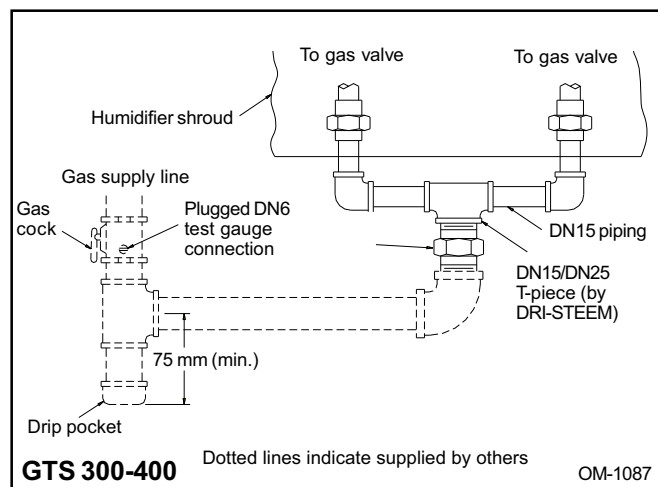
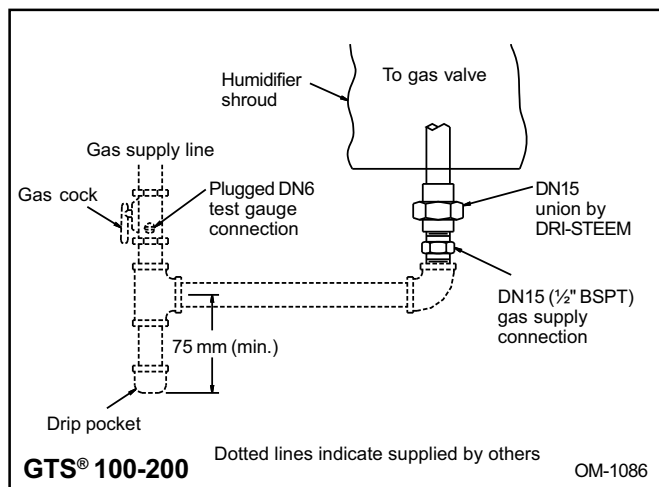
CAUTION:

Gas pressure to humidifier controls must never exceed 60 mbar. A DN6 (1/8") plugged tapping, accessible for test gauge connection, must be installed immediately upstream of the gas supply connection to the appliance.

- After threading and reaming the ends of the pipes, inspect piping and remove loose dirt and chips.
- Support piping so that no strains are imposed on unit or controls.
- Use two spanners when connecting piping to unit or controls.
- Provide a drip pocket before each unit and in the line where low spots cannot be avoided.
- Supply 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 1.5 mm per meter.
- 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 shutoff valve immediately upstream of the unit including a DN6 (1/8") plugged tapping accessible for test gauge connection. Pressure tapings for test gauges are located on all gas valves.
- Allow at least 1.5 m of piping between any high pressure regulator and unit pipe connection.
- Piping installation must be in accordance with local and national codes. Do not use flexible connectors.
- Piping to units should conform with local and national requirements for type, volume and gas handled, and for pressure drop allowed in the line. Refer to the tables on the next page to determine the volumetric flow rate 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, and length of main must be considered. Avoid pipe sizes smaller than DN15 (1/2"). The Gas Pipe Capacities Table on the next page allows for the usual number of fittings at the stated pressure drop.
- The Specific Gravity Conversion Table should be used when the specific gravity of the gas is other than .60 for natural gas or 1.53 for propane.

INSTALLATION

Gas piping



Gas pipe capacities for gas pressures of 35 kbar or less

Length of pipe (m)	Gas flow in piping in m ³ /hr at pressure drop of 8 mm water Specific gravity = 0.60				
	Iron pipe size				
	DN15 (1/2")	DN20 (3/4")	DN25 (1")	DN32 (1-1/4")	DN40 (1-1/2")
m	m ³ /hr	m ³ /hr	m ³ /hr	m ³ /hr	m ³ /hr
3	3.7	7.9	14.7	29.7	45.3
6	2.6	5.4	9.9	20.7	31.1
9	2.1	4.3	8.1	16.7	25.2
12	1.8	3.7	6.9	14.2	21.5
15	1.6	3.3	6.1	12.5	19.0
18	1.4	3.0	5.5	11.3	17.3
21	1.3	2.7	5.1	10.5	15.9
24	1.2	2.5	4.8	9.9	15.0
27	1.1	2.4	4.5	9.1	13.9
30	1.1	2.2	4.2	8.6	13.0

Specific gravity conversion factors

Multiplying factor to be used with table at left when the specific gravity of gas is other than 0.60 (natural gas) or 1.53 (propane)

Natural gas (G20, G25)	
Specific gravity	Factor
0.55	1.04
0.60	1.00
0.65	0.962
Propane gas (G30, G31)	
Specific gravity	Factor
1.50	0.633
1.53	0.626
1.60	0.612

INSTALLATION

Gas leak testing

- When leak-testing the gas supply piping system, the humidifier and its gas shutoff valve must be disconnected during any pressure in excess of 60 mbar. The humidifier must be isolated from the gas supply piping system by closing its field-installed manual shutoff valve during any pressure not equal to 60 mbar.
- Check gas supply pressure, with all burners running, at the inlet pressure tap of the combination gas control valve. The required supply pressure is 20 or 25 mbar for natural gas and 30, 37 or 50 mbar for propane gas.

INSTALLATION

Combustion and ventilation air

The GTS supports both room air and sealed combustion. Requirements and recommendations for each follow.

CAUTION:

Air for combustion must not be contaminated by halogen compounds, which include fluorides, chlorides, bromides and iodides. 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. Makeup air must be provided for the ventilation devices, in addition to that required by the humidifier. Units that may be operated in toxic environments should be equipped with sealed combustion piping.

Room air combustion

- 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.
- 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, openings must be provided to allow outside air to enter the space where 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 the table on Page 16.

Sealed combustion

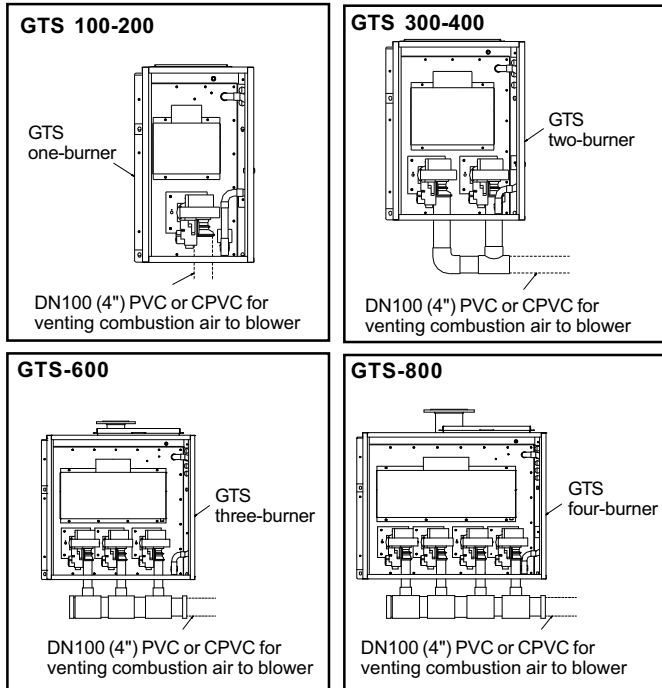
The GTS® will support sealed combustion using DN100 (4") PVC or CPVC piping (see drawings on the next page). On the GTS-100 and GTS-200, there will be a single point connection to the blower. On the GTS-300 through GTS-800, there will be a single point connection to a manifold below the shroud.

When running PVC or CPVC piping for sealed combustion, the maximum allowable distance to the outdoor air source is 21.3 m with a 1.5 m equivalent length for elbows. The outside air source may be either a final connection outside the building or a connection to an outdoor air plenum within the building. When the combustion air origination point is outside the building, the opening must be covered with a large mesh screen to prevent the introduction of unwanted materials without restricting airflow. The air intake point must be located at least 3 m from the flue vent on horizontally vented units.

INSTALLATION

Combustion and ventilation air (cont'd.)

Sealed combustion connection



OM-1097, OM-1097A, OM-1097B

Electrical connections

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 to minimize personal injury if an electrical fault should occur. This ground 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 must be supplied with 230-volt AC, 50-Hz, 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. The electrical conductors shall be of the appropriate wire size and rated for at least 105 °C. 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 throttle setting or restrict venturi opening.
- The electric current characteristics and capacity requirements should be checked against the nameplate. All wiring must be in accordance with all governing codes and with the GTS wiring diagram located inside the control cabinet. See the table on Page 7 for information on the various models.
- Refer to the VAPOR-LOGIC® Installation and Operation Manual for additional information on the controller furnished with this GTS humidifier.

Location of humidifier and required air openings

Location description	Required air opening
Confined space with all air from inside the building; conventional frame, brick or stone construction with normal infiltration (Note: This location rarely provides enough air for higher capacity units.)	Two openings, 22 cm ² per opening per kW input* The minimum free area of all openings combined is 650 cm ²
Confined space with all air from outside the building through air ducts	Two openings, 2 ducts, 11 cm ² per opening per kW input*
Confined space with all air from outside the building from through-wall openings only (no ducts)	Two openings, 32.5 cm ² per opening per kW input*
Unconfined space with all air from outside the building	Same as confined space; all air from outside the building

* Note: The minimum dimension of any opening is 75 mm x 75 mm.

INSTALLATION

Venting guidelines (flue connection)

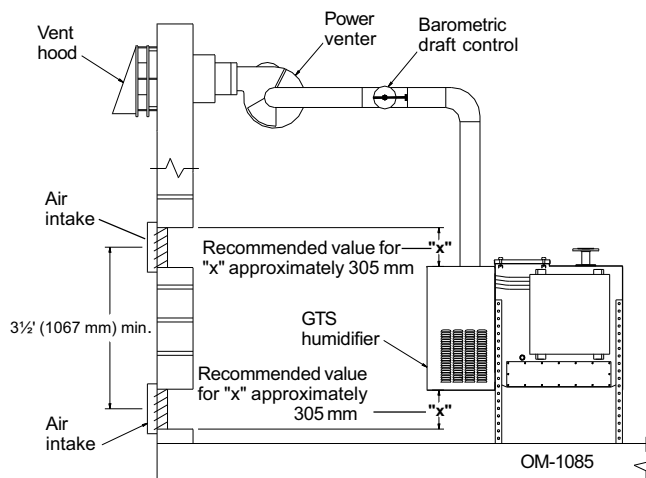
- Maximum flue temperature is 200 °C + ambient.
- Condensate must be removed via a drip T-connection or the condensate plug provided on the flue box.
- The purpose of the gas humidifier flue is to completely remove all products of combustion and ventilation gases to the outside air.
- When connecting the humidifier to a gas flue or chimney, the installation must be in accordance with local and national building codes and the flue manufacturer's instructions.
- Do not reduce the flue diameter, and avoid short turns in the flue piping. Use the same size flue as the flue connection fitted to the humidifier. Maintain a minimum upward slope of 2% 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 flue outlet. The bottom of the cap must be one flue diameter above the top of the flue outlet.
- Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.
- Chimney or flue must extend at least 1 m above its passage through a roof and at least 600 mm above any ridge within 3 m of the chimney (local and national codes apply).
- 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.
- Venting into an unlined masonry or concrete chimney is prohibited.
- If this humidifier is connected to a lined, masonry chimney, the chimney must be sized and installed accordingly.
- Insulation must be added to any roof or wall penetration flue connector that will be exposed to ambient temperatures of 0 °C or less, especially any application using single-wall flue pipe as a connector.
- Do not insulate flue pipe exposed to outdoor weather conditions (e.g., above roof lines).
- Installation of the flue pipe should be as direct as possible, with a minimum number of turns or elbows.
- Rigidly support the flue pipe every 1.5 m or less with hangers or straps to ensure that there will be no movement after installation. The humidifier flue connection should not be supporting the weight of the flue piping.
- No portion of the flue system shall extend into, or pass through, any circulation air duct or plenum.
- The flue system must terminate above the roof surface and must include an approved flue cap or roof assembly, unless prohibited by local or national codes.
- This humidifier may share a common flue with other listed gas-fired appliances. Total input rates of all appliances will determine the vent size.
- All flue pipe passing through floors, ceilings, and walls must be installed with the proper clearances from combustible material, and be fire-stopped accordingly.
- In replacement installation, where an existing flue system may be used, the flue system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. When connecting the humidifier to a gas flue or chimney, the installations must be in accordance with local and national building codes and the flue manufacturer's instructions.
- **For all applications, the horizontal length of the flue and flue connector must not exceed the height of the vent system.**

INSTALLATION

Special horizontal venting requirements

- Horizontal flue venting is an option on all GTS models. Please follow the following guidelines and specifications.
- In areas accessible to the public, the vent terminal shall be at least 2.1 m above ground level to prevent burns from the hot terminal surface.
- The vent terminal and air intake locations must be at sufficient height above ground level to prevent blocking by expected snowfall.
- Building materials must be protected from degradation by flue gases.
- A minimum horizontal clearance of 1.22 m from electric meters, gas meters, regulators, and relief equipment must be maintained.
- Maximum equivalent length of vent pipe is 30 m. Minimum equivalent length of vent pipe is 3 m. Subtract 1.5 m equivalent length per elbow.
- Vent box pressure must be -2.5 Pa. Set by adjusting power venter and barometric damper, with all burners running.

GTS® venting

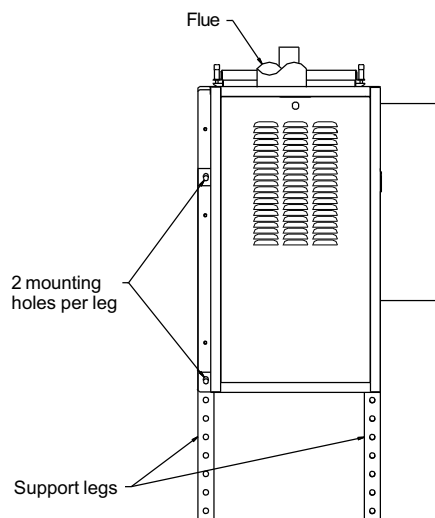


Notes:

- Refer to power venter manual for clearance requirements relative to combustion air openings.
- Power venters, barometric dampers and vent hoods must be ordered from your local distributor. Distributors may consult factory for specifications.

MOUNTING THE HUMIDIFIER

Floor stand mounting

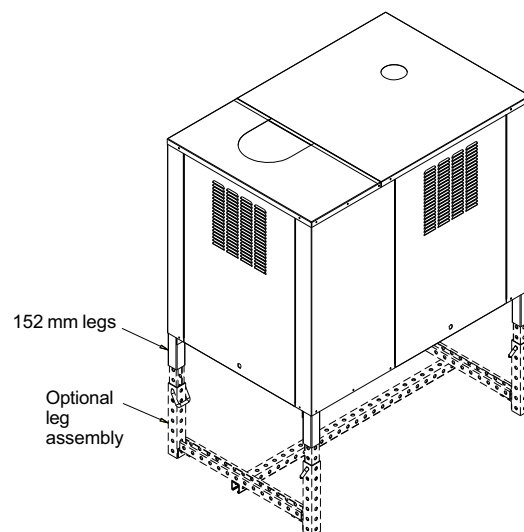


OM-1078

The GTS ships with support legs for floor stand mounting. 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.

A keypad with standard 1.5 m cable ships loose with GTS units. A phone jack mounting plate is available for mounting the keypad on the control cabinet.

Indoor enclosure mounting option



OM-3000

Note: See Page 20 for more drawings of the indoor enclosure.

The GTS® indoor enclosure is shipped with the GTS unit factory mounted within the cover. A keypad with standard 1.5 m cable ships mounted to the subpanel in the GTS indoor enclosure. The unit must only be moved into place by lifting the unit from under its base frame. The indoor enclosure may be mounted as is, or it may be mounted on an optional adjustable leg assembly (see adjustable leg assembly instructions on Page 21). All necessary plumbing and electrical wires are to be run under the enclosure and into the appropriate access locations. There are two clearly marked removable access doors. One of them, on the front of the unit, is to gain access to the water fill connection, drain connection, gas connection, and the flue box outlet. The other, on the side of the unit, is to gain access to the electrical subpanel, cleanout plate, and the steam outlet connection.

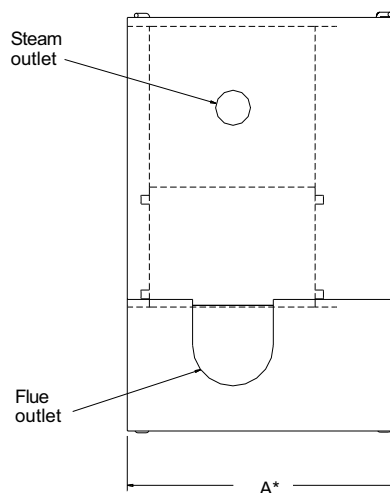
The top of the indoor enclosure consists of two pieces, which are removable. These two pieces may be removed to gain further access to the flue box connection, steam outlet connection, and the inspection cover. The two pieces are removed by backing off the sheet metal screws, which secure it to the sides of the enclosure. To reduce the risk of damage to the enclosure, reattach the two pieces whenever the unit is in operation or when the unit is being moved.

MOUNTING THE HUMIDIFIER

Indoor enclosure mounting (cont'd.)

The optional adjustable leg assembly, if ordered, will be packaged separately from the GTS indoor enclosure. The legs will raise the base of the unit off the floor from 380 mm to 610 mm. To ease installation, the leg assembly should be assembled and the height adjusted prior to mounting the unit on the legs. Hand tighten all nuts and bolts. Do not make any electrical, gas or plumbing connections to the unit, nor fill the tank, prior to setting it on the legs. Place the leg assembly on a solid level surface where the unit is to be mounted, and place the unit on the leg assembly. Once the unit has been placed on the legs, square and level the assembly and then tighten the nuts and bolts securely. Never move the leg assembly with the unit mounted on it.

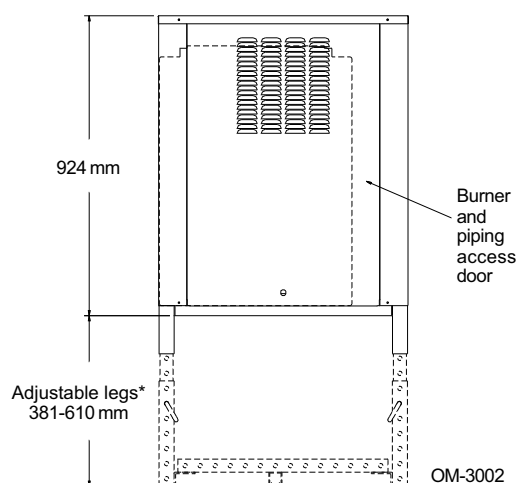
Top view indoor enclosure



OM-3001

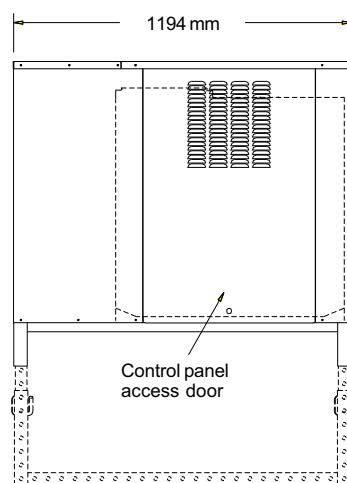
* For GTS 100-400, A = 787 mm.
For GTS 600-800, A = 1207 mm.

Front view indoor enclosure



* Standard legs fit within the optional leg assembly, and so the maximum leg height is 610 mm.

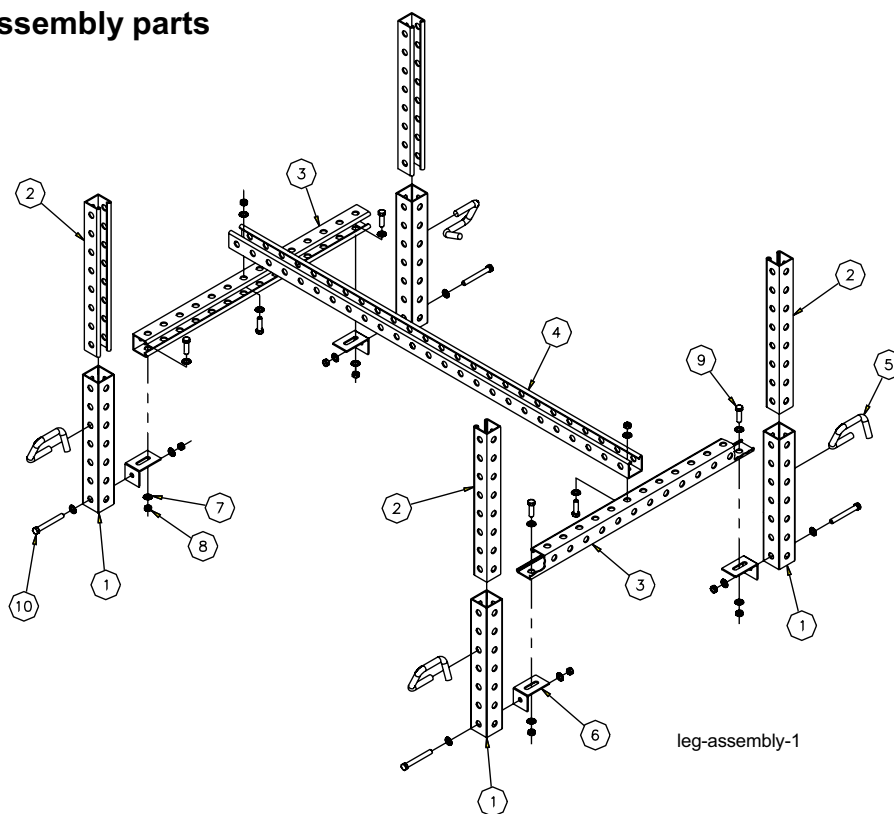
Side view indoor enclosure



OM-3003

MOUNTING THE HUMIDIFIER

Adjustable leg assembly parts



Part #	Description	Quantity
1	33 cm leg	4
2	43 cm leg	4
3	66 cm cross brace (for GTS 100-400)	2
	109 cm cross brace (for GTS 600-800)	2
4	119 cm cross brace	1
5	Gravity pin	4
6	Angle bracket	4
7	3/8" flat washer	20
8	3/8" hex nut	10
9	3/8"-16 x 1-1/4" hex bolt	6
10	3/8"-16 x 3" hex bolt	4

Adjustable leg assembly instructions

(Refer to drawing above.)

Step 1: Assemble cross braces

- Place a washer (no. 7) on a 1 1/4" bolt (no. 9) and place the bolt through a hole near the center of the no. 3 cross brace.
- Run the same bolt through a hole at the end of the 119 cm-long cross brace (no. 4).
- Add a washer (no. 7) and a nut (no. 8).
- Tighten the nut and bolt.
- Repeat procedures on the other end of the 119 cm-long cross brace.

Step 2: Assemble cross braces to the legs

- Attach the angle brackets (no. 6) to the four 33 cm-long legs (no. 1) using a 75 mm-long bolt (no. 10), two washers (no. 7) and a nut (no. 8) for each leg.
- Run the bolts through hole at the end of each leg.
- Attach the cross brace assembly (Step 1) to the angle braces.
- Run a 1 1/4" bolt (no. 9) with a washer down through the slot in the brace and through the hole on the end of the no. 3 cross brace.
- Secure with a washer and nut but do not overtighten – final adjustments may be necessary when attaching the unit to the leg assembly.
- Repeat for all four legs.

Step 3: Final assembly

- Slide the 43 cm-long legs (no. 2) into the 33 cm-long legs (no. 1).
- Align the holes at the desired height and place a gravity pin (no. 5) through the aligned holes.
- Repeat for all four legs.
- Place the assembly in the proper location.
- Place the humidifier unit on the leg assembly by inserting the tops of the four legs into the tubes on the base of the unit.
- Square and level assembly.
- Tighten all bolts.

After completing all of the above steps the unit is ready to be wired and plumbed.

STEAM SUPPLY CONNECTION METHODS

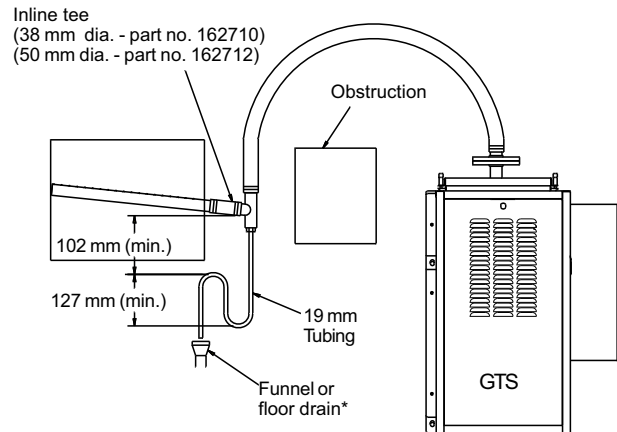
Vapor hose piping

When a vapor hose and stainless steel dispersion tubes are used, they should be pitched back to the humidifier. A minimum slope of 15% 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 the figures at right.

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 the top right figure.

Condensate also can be returned to the GTS®, as shown in the figure on the next page, with an air vent. This method requires a water seal and an air gap to prevent back pressure from the GTS chamber. Excessive back pressures imposed on the humidifier may lead to dispersion tube(s) spitting, lost water seals, or leaking gaskets. When the distance between the humidifier and the dispersion device exceeds 3 m, consult factory for special recommendations.

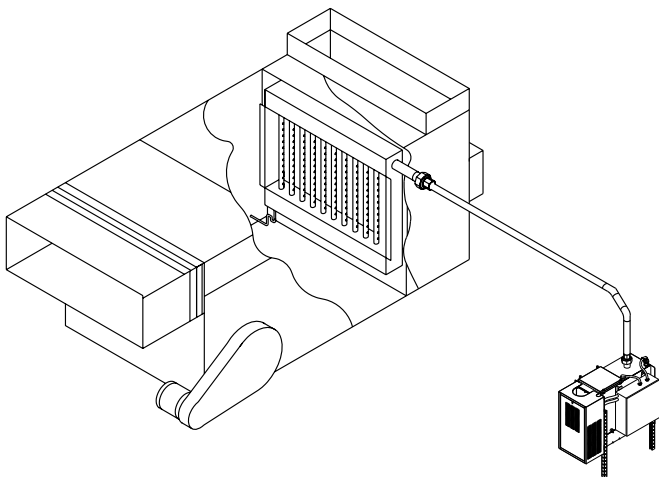
Piping method recommended when obstruction prevents dispersion tube from being continuously pitched back to humidifier



Notes:

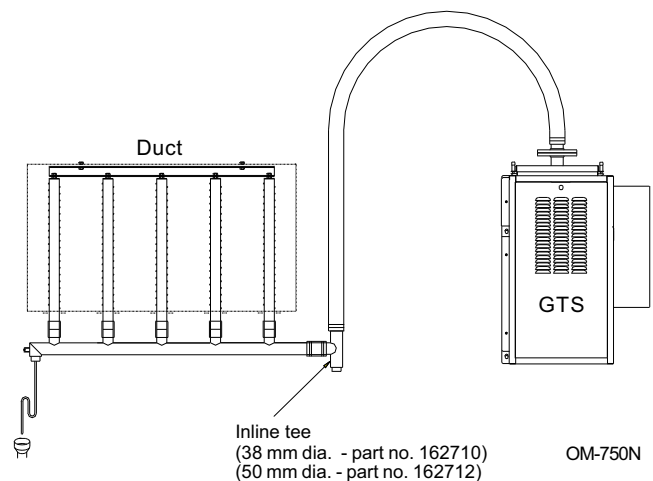
- The GTS typically requires multiple dispersion tubes.
- * Refer to local codes for drain pipe size requirements.

Steam supply using pipe or tubing (flange option available) Pipe insulation recommended



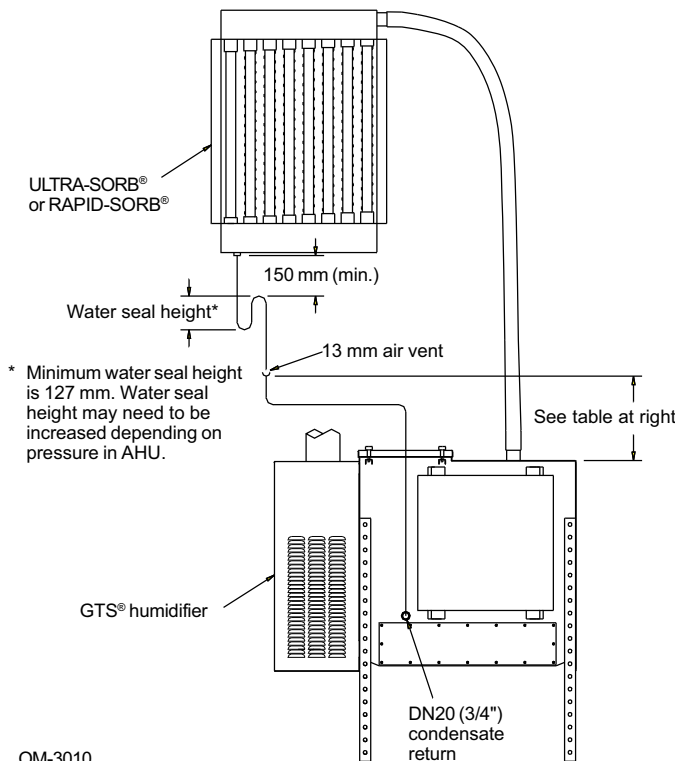
OM-743N

Piping method recommended when humidifier must be mounted higher than the duct



CONDENSATE RETURN PIPING

Condensate return to humidifier



OM-3010

Height required to overcome humidifier internal pressure

Humidifier model	Height * required to overcome humidifier internal pressure (mm)
GTS-100	305
GTS-200	305
GTS-300	455
GTS-400	455
GTS-600	455
GTS-800	455

* Minimum height may need to be increased depending on pressure in AHU.

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 25 mm x 38 mm stainless steel channel inside the duct. Hang the channel from the top of the duct, centered between duct side walls, using 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 25 mm x 38 mm 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.
6. Choose header location and refer to appropriate section:

a. For a header inside the duct (see figure on the next page):

1. 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.
2. 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.
3. 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.

RAPID-SORB® ASSEMBLY AND INSTALLATION

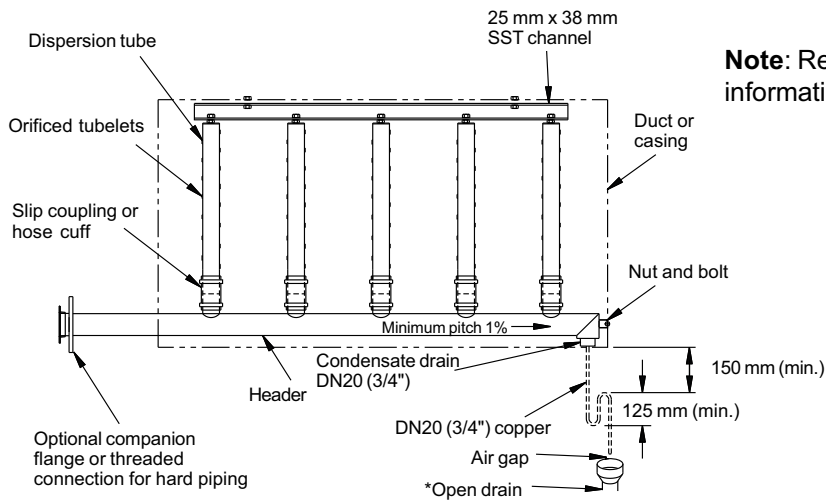
Horizontal duct installation (cont'd.)

b. For a header outside the duct (see figure below):

1. Position header under dispersion tubes, then slide hose cuffs or slip couplings over header dispersion tube nipples.
2. 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.

3. 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.
4. Connect a condensate drain to the header, provide the water trap as shown, and run to open drain, sized according to governing codes.
5. Attach the header steam supply connector to main header using the hose cuff and clamps provided, but do not secure.
6. Route the necessary number of vapor hoses or pipes from the humidifier tank, position connector to accept the hoses or pipes and secure.

RAPID-SORB unit: Header inside duct

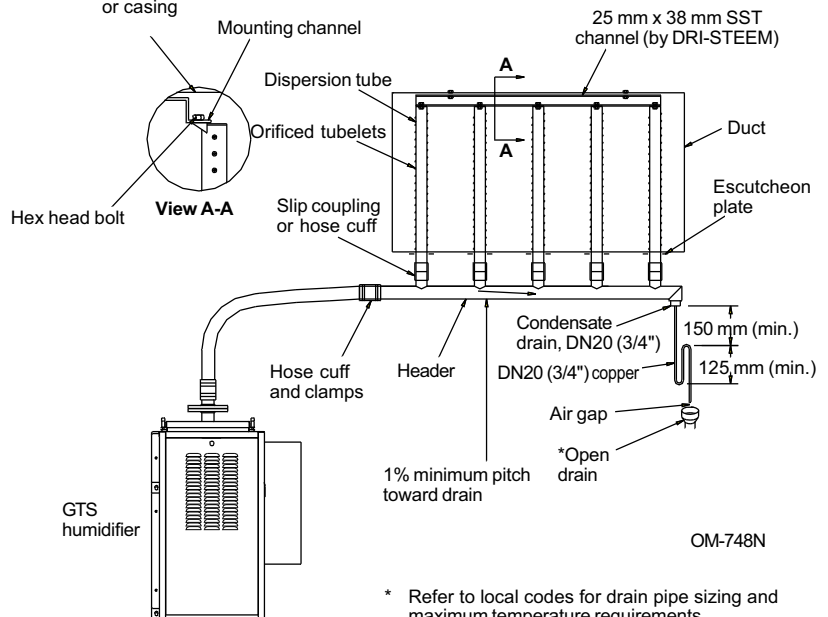


Note: Refer to Page 22 for vapor hose installation information.

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

OM-101

RAPID-SORB unit: Header outside the duct



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

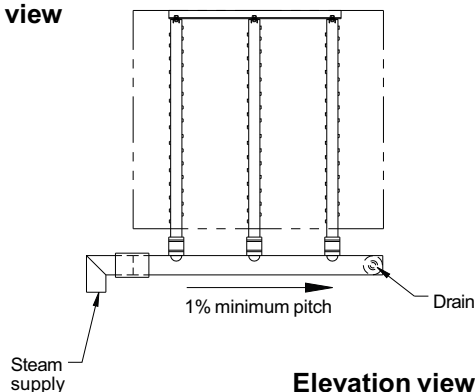
OM-748N

RAPID-SORB® ASSEMBLY AND INSTALLATION

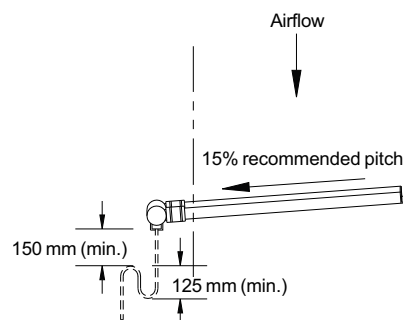
Vertical duct installation

Install the RAPID-SORB with dispersion tubes and header pitched to condensate drain as shown in the figures below. See “Horizontal duct installation” on the previous pages for additional information, as applicable.

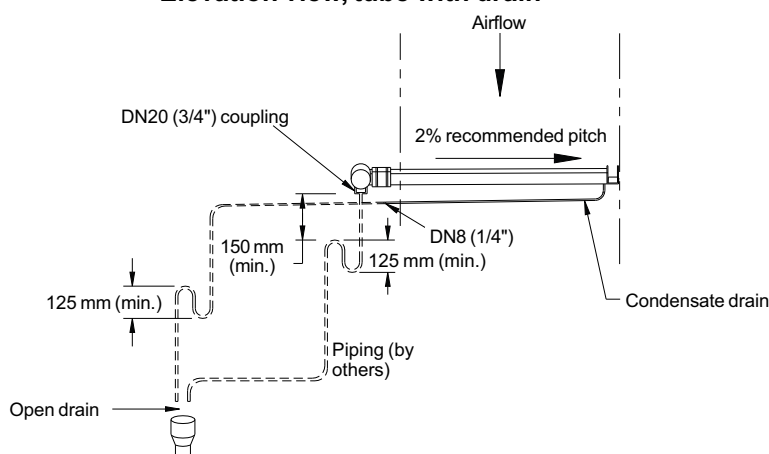
Top view



Elevation view, tube without drain



Elevation view, tube with drain



OM-700

Piping/hose sizing from the GTS® to a RAPID-SORB panel, and maximum steam carrying capacity*

Vapor hose			Copper or stainless steel tubing		
Hose I.D.		3 m** developed length	Tubing O.D.		6 m** developed length
DN	in.	kg/hr	DN	in.	kg/hr
40	1½	68	40	1½	64
50	2	113	50	2	95
	--	--	80	3	186
	--	--	100	4	318
	--	--	125	5	590
	--	--	150	6	953

* Based on total pressure drop in piping/hose of 1.25 kPa.

** 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.

ULTRA-SORB® INSTALLATION

For ULTRA-SORB installation, see the ULTRA-SORB Installation Instructions and Maintenance Operation manual.

AREA-TYPE humidifier application information

AREA-TYPE dispersion is an option on GTS 100-400 models. It is not available as an option on GTS 600-800 models. AREA-TYPE fans and brackets are not available from the DRI-STEEM factory and must be ordered from your DRI-STEEM distributor. In order to achieve the distances listed in the table below, the fan specifications should be as follows:

- Motor: 230V, 50 Hz
- Blade dia: 457 mm
- Flow rate: 2.52 m³/s at zero steam pressure

After mounting the fan, terminate the wires as shown in the fan wiring diagram.

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

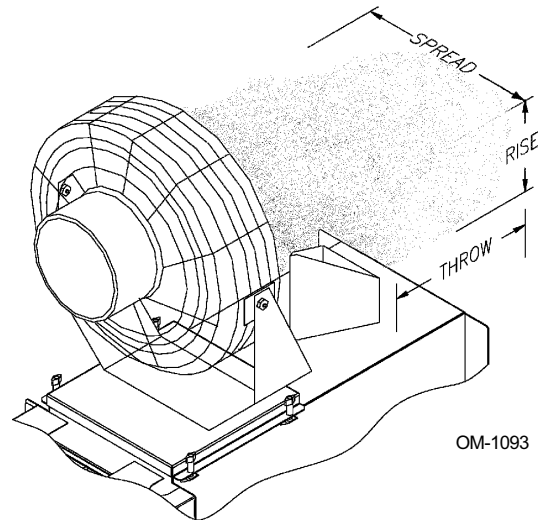
Steam discharge from the humidifier quickly cools and turns to visible, warm, microscopic drops or particles of water (fog), which are lighter than air.

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), width (spread) and horizontal (throw) dimensions that can be expected with AREA-TYPE humidifiers. To avoid steam impingement on surrounding areas, these dimensions should be observed.

AREA-TYPE fan



Minimum distance for rise, spread and throw (in meters)

Space Temp.	Space RH		GTS 100	GTS 200	GTS 300	GTS 400
			37 kg/h	73 kg/h	110 kg/h	120 kg/h
16°C	30%	Rise	0.9	1.8	2.1	2.4
		Spread	0.9	1.5	2.1	2.4
		Throw	2.4	3.7	4.0	4.6
	40%	Rise	0.9	1.8	2.4	2.7
		Spread	0.9	1.5	2.1	2.4
		Throw	2.4	3.7	4.3	4.9
	50%	Rise	0.9	1.8	2.4	2.7
		Spread	1.2	1.5	2.1	2.4
		Throw	2.4	3.7	4.3	4.9
21°C	30%	Rise	0.6	1.2	1.5	1.8
		Spread	0.6	1.2	1.5	1.8
		Throw	1.8	3.0	3.4	3.7
	40%	Rise	0.6	1.2	1.5	1.8
		Spread	0.7	1.2	1.5	1.8
		Throw	1.8	3.4	3.7	4.0
	50%	Rise	0.6	1.2	1.5	1.8
		Spread	0.7	1.2	1.5	1.8
		Throw	1.8	3.4	3.7	3.7

START-UP AND OPERATION

Introduction

After the system has been properly installed and connected to gas, electrical, water supplies and controls, it may 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 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. Refer to the VAPOR-LOGIC₃ manual that was enclosed with the product shipment.

Do not place keypad in control cabinet due to electrical shock hazard. A bushing will be shipped loose to allow the VAPOR-LOGIC₃ keypad cable to easily and safely pass through the control cabinet.

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

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 sends a signal to the microprocessor relaying its current speed. If this actual speed is different from the demand speed, the GTS will not operate.

- The negative pressure gas valves used on the GTS are designed to keep a constant ratio of air and gas throughout the operating range of the blower. If the flue becomes blocked or the blower fails to run, the gas valve will not pass any gas to the burner and will shut down the humidifier.
- During operation, the water level in the tank is monitored by a probe system for standard water units and by a low water float for DI/RO units. These water monitors tie into the microprocessor in the control cabinet. If the water level ever drops below a safe point, the humidifier is shut down.
- In standard water applications, the water level in the tank is also monitored by a redundant low-water system that runs independently of the microprocessor. 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 near the top of the heat exchanger. 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 occurs.
- For standard water systems, an additional low water safety system exists. The microprocessor 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 amount is reset to zero. (This system is not implemented on a DI/RO humidifier because the float valve is not of the electric-solenoid type. On a DI/RO humidifier, a mechanical fill valve maintains the proper water level. This fill valve runs independently of the microprocessor. Therefore, there is no way to reset the steam total to zero as the tank fills.)

START-UP AND OPERATION

Start-up/commissioning check sheet for a GTS® with a VAPOR-LOGIC₃® controller

Visit date _____

Job site representation: _____

Model No. _____

Serial No. _____

Tag No. _____

Job name _____

Program code _____

DRI-STEEM distributor _____

Supply water

- ☐ DI
- ☐ RO
- ☐ Soft
- ☐ Potable

Grains hardness _____

- ☐ Hot
- ☐ Cold

Water pressure _____ psi
(must be between 175 and 620 kPa)

- ☐ Water supply piping is DN8 (1/4") minimum

Float adjustments (DI system) _____

Gas supply

- ☐ Natural
- ☐ LP

Manifold pressure _____ mbar

Gas valve outlet pressure _____ mbar

Supply shutoff valve distance _____

Supply line size _____

Flue piping

Class _____

Size _____

Rise _____

Run _____

- ☐ Slight pitch toward drip tee
- ☐ Termination point capped and covered

Power venter location _____

Barometric damper location _____

Required clearances

- ☐ Heat exchanger removal 914 mm
- ☐ Control cabinet 914 mm
- ☐ Top cover removal 457 mm
- ☐ Distance vent box to combustible 762 mm
- ☐ Cleanout plate area 914 mm

Wiring

- ☐ Control transmitter
Gauge _____
 - ☐ Shield
- ☐ High limit duct humidistat
Gauge _____
 - ☐ Shield
- ☐ Air flow proving switch
- ☐ Power vent
- ☐ Combustion air damper
- ☐ Area-Type fan
- ☐ External fault contact
- ☐ Twisted pair connection between boards
(for multiple units only)

Steam pipe

Outlet size _____

- ☐ Flange
- ☐ Hard pipe
- ☐ Insulated

Rise _____

Run _____

- ☐ Pitched back to humidifier
- ☐ 45° angles used in piping

More checklist on next page ...

START-UP AND OPERATION

Start-up/commissioning check sheet for a GTS[®] with a VAPOR-LOGIC[®]₃ controller (cont.)

Dispersion

- ☐ ULTRA-SORB[®]
- ☐ RAPID-SORB[®]
- ☐ Single-Tube
- ☐ Single-Tube with drain

Safety testing to verify function

Low water test _____
High humidity limit test _____
Air flow test _____
Aquastat test _____

Condensate/drain piping

Water seal height of dispersion system _____

- ☐ Air gap
- ☐ Condensate return to tank
- ☐ DraneKooler

Additional comments

Cold-start burner ignition

Burner 1 lights after: ☐ First try
☐ Second try
☐ Third try

Burner 1 colour after 15 minutes:
☐ Blue
☐ Orange
☐ Red-orange

Burner 2 lights after: ☐ First try
☐ Second try
☐ Third try

Burner 2 colour after 15 minutes:
☐ Blue
☐ Orange
☐ Red-orange

Burner 3 lights after: ☐ First try
☐ Second try
☐ Third try

Burner 3 colour after 15 minutes:
☐ Blue
☐ Orange
☐ Red-orange

Burner 4 lights after: ☐ First try
☐ Second try
☐ Third try

Burner 4 colour after 15 minutes:
☐ Blue
☐ Orange
☐ Red-orange

MAINTENANCE

For high performance, and to minimize possible equipment failure, it is essential that periodic maintenance and inspections be performed on this appliance. Unless otherwise noted, we recommend that the following maintenance be performed at least once every 2000 hours of operation.

GTS® standard water model only

Using softened water will significantly reduce mineral buildup in the humidifier. When softened water is not available, the GTS is designed to accommodate water hardness in one of two ways depending on the degree of hardness: For light to moderate hardness using the surface water skim time feature with annual cleaning is recommended. For high mineral content water 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.

Makeup water piping - Use cold or hot makeup water. Even though the GTS has an internal 25 mm air gap, some local codes may require a vacuum breaker.

Caution: Minimum water supply pressure is 175 kPa.

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

Seasonally or as required

- **Clean evaporating chamber** - Remove the cleanout plate and dispose of any loose scale that has collected in the bottom of the tank. This should be done before the buildup reaches the underside of the heat exchanger.
- **Clean 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 10 mm) of the probe should be brushed clean with stainless steel wool.
- **Clean low water cutout probe** - Remove the humidifier cover and inspect the probe rod for mineral accumulation. The rod is located on the top of the tank near the back. The probe should be brushed clean with stainless steel wool.
- **Clean 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** - A lubrication port is not provided, therefore lubrication is not recommended.
- **Remove dust** - Using a vacuum, remove all dust from the areas around the motor, vent fan(s) and louvers that allow air to the shrouded area.

Off-season 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.

(There are more maintenance instructions on the next page.)

MAINTENANCE

GTS® standard water model only (cont.)

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 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 buildup and conserving hot water can be achieved.

GTS-DI water 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.

Makeup water piping - Use cold or hot makeup water. Even though the GTS has an internal 25 mm air gap, some local codes may require a vacuum breaker.

Caution: Minimum water supply pressure is 175 kPa.

Seasonally or as required

- **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** - A lubrication port is not provided, therefore lubrication is not recommended.
- **Remove dust** - Using a vacuum, remove all dust from the areas around the motor, vent fan(s) and louvers that allow air to the shrouded area.

Off-season maintenance

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

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

Both GTS® and GTS-DI models

Inspection recommendations:

- Inspect by user every 30 days.
- **Appliance system should be inspected once a year by a qualified service person.**

During inspection, verify the following:

- Proper field operation of burner. To verify, measure carbon monoxide (CO) level in the flue. If CO level is greater than 400 ppm, immediately shut down the GTS unit and consult the factory.
- Flue passageways external to the appliance, such as vent connector and chimney, are 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 or gaps between floor stand legs or tank flanges.
- There are no obvious signs of deterioration of the appliance.
- Burner flame is blue or orange in color - up to a 6 mm from the surface of the burner.
- See "Cleaning water level probes" and "Cleaning low water cutout probe" on Page 30.

(There are more maintenance instructions on the next page.)

Both GTS® and GTS-DI models (cont.)

Inspecting the burner assemblies and heat exchanger tubes

This is not a regular maintenance item, 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 and remove burner assemblies (each assembly is mounted with four bolts).
- Remove vent box.
- Use a 15 cm flue brush with a 60 cm extension and reversible drill. Work brush in and out of all combustion chambers. **Note:** Disconnecting components from one burner assembly at a time and then cleaning the corresponding combustion chamber and burner will ease reassembly.
- Remove loose deposits and residue that falls into rear header with a vacuum cleaner and hose extension.
- Inspect 50 mm 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.

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

Burner maintenance

Under normal use conditions, the burner(s) should not need cleaning for a minimum of five years. However, depending on the operating environment, the burner(s) may require periodic cleaning to remove accumulated materials. Failure to clean burners may result in reduced unit capacity or unacceptable CO levels in the flue. See burner maintenance instructions below.

Burner maintenance instructions

To service the burner system, clean both the blower and the burner. Remove the blower(s) from the system, and clean dust from the wheel. Remove the burner(s) for cleaning. Removing and cleaning one burner at a time will ease reassembly. Dislodge particulate matter from the burner surface matrix by using **compressed air** (700 kPa maximum). Keep the air nozzle about 50 mm from the burner's surface blowing air perpendicular to the burner surface while moving the nozzle back and forth lengthwise. This dislodges particles trapped in the matrix pushing them back inside the burner. Avoid blowing air across the surface since this tends to have a destructive effect to the burner surface. **WARNING: Personnel performing this maintenance should wear appropriate respiratory protection.** Allow particulate matter to fall from the burner through the air/gas inlet. A vacuum may be used at the burner's air/gas inlet to assist in removing the particulate matter.

Replacement parts

When servicing or repairing this equipment, use only DRI-STEEM approved service replacement parts. Complete replacement part lists are on Pages 48-54. 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.

When troubleshooting, check the VAPOR-LOGIC₃ Alarm Log first

The Alarm Log, accessed from the Main Menu of the VAPOR-LOGIC₃ keypad, contains a record of the previous 10 faults that have occurred on the humidifier. Once the user accesses the Alarm Log, alarms may be acknowledged, which may allow humidifier operation to continue, and/or alarms may be cleared to remove them from the Alarm Log. Pressing the Enter key while an alarm is highlighted will reveal the date and time the alarm occurred and a brief description of the fault shown.

While you will still probably need to review this troubleshooting guide to help you determine the source of a problem, the Alarm Log is a good place to start when diagnosing a problem.

The following is a list of Alarm Log faults. The bold headings next to the bullet points are what will appear on the VAPOR-LOGIC₃ screen.

Sensor faults

- **RH Trans Fault:** Humidity transmitter fault.
The humidity sensor is incorrectly wired or defective.
- **DP Trans Fault:** Dew point transmitter fault.
The dew point sensor is incorrectly wired or defective.
- **VAV Tran Fault:** VAV humidity transmitter fault. The duct humidity sensor is incorrectly wired or defective.
- **Temp Trans FIt:** Temperature compensation transmitter fault. The temperature compensation sensor is incorrectly wired or defective.

Fill and drain faults (standard water systems)

- **Fill Fault:** The fill valve has been energized for more than 40 minutes without the water reaching the top probe.
- **Drain Fault:** The drain valve has been energized for more than 20 minutes and water is still touching the bottom probe.
- **Fill Time FIt:** Low water timer fault. The unit has run too long without the fill valve opening.
- **LL Probe Fault:** Low-level probe fault. The water in the tank has reached the middle or upper probe without first reaching the lower probe.
- **ML Probe Fault:** Mid-level probe fault. The water in the tank has reached the upper probe without reaching the middle probe.
- **Probe Assy FIt:** Probe assembly fault. The system has detected the deterioration of the probe assembly to a point that replacement is necessary.

(There are more troubleshooting instructions on the next page.)

TROUBLESHOOTING

When troubleshooting, check the VAPOR-LOGIC₃ Alarm Log first (cont.)

Humidifier faults

- **Tank Temp Flt:** Water temperature sensor fault. The temperature sensor on the humidifier tank is incorrectly wired or defective.
- **Thermal Trip:** Thermal trip fault. The tank temperature has exceeded 113 °C.
- **Boil Time Flt:** Boil time fault. The water in the tank failed to boil within the maximum boil time.
- **EEPROM Fault:** The controller has detected a checksum fault in the EEPROM memory causing humidifier to not operate properly. Contact DRI-STEEM.
- **Flue Fault:** The air damper switch and/or the power vent pressure switch failed to close and, as a result, VAPOR-LOGIC₃ has shut down the humidifier.
- **Burner No. Fault:** The burner failed to light after three ignition attempts.
- **Ignitor No. fault:** The ignition module failed to energize the gas valve.
- **Blower No. fault:** The blower was unable to reach the desired speed.
- **Slave No. fault:** One of the humidifiers in a multiple tank system is not responding to communication requests.

Index to troubleshooting guide

The following is an index to the troubleshooting guide on the pages that follow:

Problem number	Problem	Page
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2	System will not energize	35
3	Tank will not fill with water	36
4	Tank will not stop filling	37
5	Tank will not drain	38
6	Tank will not heat up	39
7	Reduced or no steam output (or low humidity)	40
8	Humidity is above desired level	42
9	Fluctuations in output or hunting	43
10	Noisy operation	45
11	Steam is coming from drain	45
12	Tank interior is dirty	46
13	Water leaks	47
14	Tank or cover is deformed	47
15	Humidifier appearance problems	47

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
1	Alarm light on VAPOR-LOGIC ₃ keypad	The controller has identified a system malfunction.	On the VAF from either the VAF or the VAF. Go to the VAPOR information. Refer to the guide. Acknowledge the alarm.
2	System will not energize. (The tank is quiet and no lights are on.)	Nonexistent power supply to the unit	Check the power supply to the unit. Check the power supply to the unit. Check the power supply to the unit.
		Nonexistent control voltage	Check the control voltage. Verify the power supply to the unit. Verify the power supply to the unit. Check the power supply to the unit. Check the power supply to the unit. Check the power supply to the unit.
		Field-installed external interlocks	Verify the power supply to the unit. -- Cabir -- Comt -- Powe

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
3	Tank will not fill with water.	No water supply through the fill valve	Check if water supply line strainer is plugged. Check fill valve for sediment. Verify that manual water line shut-off valve is open and that pressure exists (minimum 175 kPa, maximum 620 kPa).
		Inlet water needle valve is closed or plugged	Check to make sure needle valve is open and/or free of sediment. Replace if needed.
		Malfunctioning fill valve	Verify voltage to fill valve (24 VAC). Verify that valve stem moves freely. If "water hammer" exists, inspect fill valve for damage and replace if needed. Install a shock arrester.
		Unit is not in Auto Mode.	Go to the Control Modes screen on keypad and select Auto Mode.
		Unit is in End of Season (EOS) drain mode	Go to the Set Up screen on the VAPOR-LOGIC ₃ keypad (accessed from the Main Menu screen) and review ADS (automatic drain sequence) screens and Inactivity until EOS screen. In End of Season (EOS) Mode, the tank will be empty and will not fill again until the controller senses that humidity has dropped below the defined set point.
		Malfunctioning level control system	Check if probe head is fully plugged in. If needed, clean probe rod tips (standard water systems only). A foaming agent in the tank may be causing false probe readings (standard water systems only). Clean tank. A mineral-laden tank may be causing a violent boil, causing false probe readings (standard water systems only). Clean tank. Verify probe voltages (standard water systems only). To do this, go to the Diagnostics screen on the VAPOR-LOGIC₃ keypad (accessed from the Main Menu screen). Remove the probe plug and have all three legs of the probe plug come in contact with tank metal. In the probe diagnostic screens, high, mid and low probe voltages should show 0.0 VAC when the probe legs are touching metal. With the probe plug in contact with air only, the probe diagnostic screens should show 2.2 - 2.5 VAC. Verify that fill valve wiring is correct. Check date code on top of probe rod assembly (standard water systems only). If probe is more than three years old, replace probe. Verify that input signals are matched to the program code configuration string (refer to the Set Up screens accessed from the Main Menu), and that all control board outputs operate as per the program code configuration string. See the "Program code nomenclature" section of the VAPOR-LOGIC₃ manual. Run "Test" function using VAPOR-LOGIC₃ keypad.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
4	Tank will not stop filling (or fill valve cycles on and off frequently).	Drain valve is open.	If unit has an automatic drain valve, it may be locked in the manual open position. Reset to auto. If tank has a manual drain valve, make sure it is closed. Clean or replace drain valve if there is an obstruction in the valve that will not allow complete closure. Replace drain valve if faulty.
		Fill valve does not close (standard water systems and DI systems with end of season drain).	Check if fill valve is plumbed backwards. Note valve inlet markings. Check internal spring or diaphragm in the fill valve. If faulty, replace valve. Check if there is an obstruction that will not allow valve to seat properly. Clean or replace valve as needed. Make sure there is a strainer in the water supply line. Check for control voltage across the fill valve coil. If control voltage is not present, replace valve (standard water systems only). If "water hammer" exists, inspect fill valve for damage and replace if needed. Install a shock arrester. Reduce water pressure to less than 90 psi (621 kPa).
		Fill valve does not close (DI water systems).	If there is water consistently overflowing, check float valve assembly. Adjust arm for shutoff 6 mm below the overflow port. Reduce water pressure to less than 620 kPa.
		Fill valve cycles on and off frequently (standard water systems).	Verify level control system (see below).
		Malfunctioning level control system	Check if probe head is fully plugged in. If needed, clean probe rod tips (standard water systems only). Verify probe voltages (standard water systems only). To do this, go to the Diagnostics screen on the VAPOR-LOGIC₃ keypad (accessed from the Main Menu screen). Remove the probe plug and have all three legs of the probe plug come in contact with tank metal. In the probe diagnostic screens, high, mid and low probe voltages should show 0.0 VAC when the probe legs are touching metal. With the probe plug in contact with air only, the probe diagnostic screens should show 2.2 - 2.5 VAC. Verify that water conductivity is at least 100 • S/cm. Or, add a handful of salt to the tank. If this solves the problem, consult DRI-STEEM for advice (standard water systems only). Verify that fill valve wiring is correct. Check date code on top of probe rod assembly. If probe is more than three years old, replace probe Verify that input signals are matched to the program code configuration string (refer to the Set Up screens accessed from the Main Menu), and that all control board outputs operate as per the program code configuration string. See the "Program code nomenclature" section of the VAPOR-LOGIC₃ manual. Run "Test" function using VAPOR-LOGIC₃ keypad.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
5	Tank will not drain.	Drain valve, outlet or drain lines are plugged with minerals.	Clean.
		Manual drain valve is closed.	Open valve.
		Electric drain valve malfunction	Check for 24 VAC across valve; if not present, replace valve. Verify that drain valve is wired correctly to the control system by checking the wiring diagram.
		Drain lines are backing up with water.	Check to make sure that drain line pitch is at least 2% and that drain pipe is sized correctly. We recommend DN25 (1") drain piping for a single tank, and DN32 (1-1/4") for multiple tanks. Due to increased friction, drain pipe lengths over 3 m will have reduced flow (especially with limited fall) requiring an increase in drain pipe size.
		Malfunctioning autodrain sequence	Go to Set Up screens (accessed from the Main Menu) and verify ADS (autodrain sequence) screens and Inactivity until EOS (end of season drain) screen. Run "Test" function using VAPOR-LOGIC ₃ keypad.
		No power to automatic drain valve	Verify voltage to drain valve (24 VAC). Verify that drain valve is wired correctly to the control system by checking the wiring diagram.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
6	Tank will not heat up.	There is no water in the tank.	See Problem No. 3 in this troubleshooting guide.
		Tank fills continuously.	See Problem No. 4 in this troubleshooting guide.
		Control malfunction	Go to the Diagnostics screen on VAPOR-LOGIC ₃ keypad, (accessed from the Main Menu) and refer to the VAPOR-LOGIC ₃ manual for instructions.
		Auxiliary limit control malfunction	Verify proper operation of duct humidistats, air flow proving switches, etc. Reset, replace or calibrate as needed. Note: Air flow switch measures 24 VAC if open; on-off high limit measures 21 VDC if open.
		Burner(s) not operating	Verify that ignitor energizes. Verify gas supply pressure. With all burners running, at the inlet pressure tap of the combination gas control valve the required supply pressure is 20 or 25 mbar for natural gas. The required supply pressure is 30, 37 or 50 mbar for LP gas. Burner assembly(s) and/or heat exchanger tubes may need cleaning. See maintenance section of this manual for cleaning instructions. Check for control voltage if limit controls (air flow proving switch, high limit, etc.) are not allowing unit to operate.
		Incorrect polarity or grounding of power wiring	Verify and correct if needed.
		System is not energized.	See Problem No. 2 in this troubleshooting guide.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
7	Reduced or no steam output (or low humidity)	Controller has shut system down.	Go to the keypad VAPOR No. 1 in
		System is not energized.	See Proc
		Malfunctioning control system	Verify proving needed on-off h Go to the (access Verify the Verify the configuration access outputs string. & the VAF
		Burner(s) not operating properly	Verify the Verify the inlet pressure required The required gas. Burner

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
7 (cont'd.)	Reduced or no steam output (or low humidity)	No or low-strength signal from humidistat, high limit humidity transmitter, or signal by others	Check for proper wiring of controls per the wiring diagrams. Check humidity transmitter output (4-20 mA). Increase set point if set point is below actual environmental conditions. Consult DRI-STEEM regarding possible incompatibility between control signal and program.
		Unit is undersized.	If unit is operating properly but fails to meet required output, replace with a larger unit or add an additional humidifier.
		Skimmer rate is set too high.	Reduce skim rate. See VAPOR-LOGIC ₃ manual for instructions.
		Drain valve is not closed.	Go to Control Mode screen on VAPOR-LOGIC₃ keypad and verify the system is in Auto Mode, not Manual Drain. If unit has an automatic drain valve, it may be locked in the manual open position. Reset to automatic. If tank has a manual drain valve, make sure it is closed. Clean or replace drain valve if there is an obstruction in the valve that will not allow complete closure. Replace drain valve if faulty.
		No water in p-trap	If steam is going down the drain the p-trap may not have filled at start-up. To fill p-trap, increase skim time (standard water systems) or manually hold float valve open (DI water systems). Readjust skim time or float after p-trap fills. Excessive back pressure may have blown water out of p-trap. Possible causes of back pressure include high duct static pressure, undersized orifices in dispersion tubes, crushed vapor hose, or a low point in the steam line to the dispersion unit(s) that may be causing condensate to back up and block the steam line. Repair or replace as required.
		Leaking gasket or vapor hose	Repair/replace as needed
		Controls are out of calibration.	Recalibrate controls.
		Tank fills continuously.	See Problem No. 4 in this troubleshooting guide.
		HVAC system	Temperature and air changes affect relative humidity levels. Verify proper operation of fans, dampers, VAV systems, etc. Check to make sure there is not excessive exhausting of air or excessive cooling.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
8	Humidity is above desired level	Humidity control input type is different than what was originally specified.	Verify that input signals are matched to the program code configuration string (refer to the Set Up screens accessed from the Main Menu), and that all control board outputs operate as per the program code configuration string. See the "Program code nomenclature" section of the VAPOR-LOGIC ₃ manual.
		Improperly located humidistat or humidity transmitters	Replace poorly located sensing devices. See "Placement of sensing devices" in the VAPOR-LOGIC ₃ manual.
		Reduced air flow	Check fans, dampers, VAV systems, etc.
		High entering relative humidity	Dehumidify.
		RH offset adjustment	Recalibrate.
		Malfunctioning control system	Verify proper operation of duct humidistats, air flow proving switches, etc. Reset, replace or calibrate as needed. Note: Air flow switch measures 24 VAC if open; on-off high limit measures 21 VDC if open. Go to the Reports section on the VAPOR-LOGIC₃ keypad (accessed from the Main Menu) to verify demand signal. Verify that control signal wiring is correct. Verify that input signals are matched to the program code configuration string (refer to the Set Up screens accessed from the Main Menu), and that all control board outputs operate as per the program code configuration string. See the "Program code nomenclature" section of the VAPOR-LOGIC₃ manual. Verify that all humidistats and transmitters are wired with shielded cable, with shield grounded at the control source end ONLY.
		Unit oversized	Consult DRI-STEEM.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
9	Fluctuations in output (or "hunting")	Cold water entering tank during refilling reduces output (standard water systems only).	Reduce water pressure (minimum 175 kPa) so that the tank fills slower, thereby introducing cold water at a slower rate. Use heated makeup water. Set automatic drain and flush times to occur when humidity control requirements are not critical (e.g., during a time when the building is not in use). Consult DRI-STEEM about retrofitting a standard water system to a DI water system. (DI systems do not require skimming, or regular draining and flushing, because there are no minerals to remove from the tank.)
		An aggressive demand signal	Tune PID loop to slow the controller's rate of change, and then gradually increase demand.
		Other system components, such as heating or cooling coils	Maintain a steady dry-bulb temperature. Relative humidity is the amount of moisture present in the air at a given temperature. If the air temperature fluctuates, so will the RH level.
		Room dynamics and HVAC	Temperature and air changes affect relative humidity levels. Verify proper operation of fans, dampers, VAV systems, etc. Keep air changes per hour constant. If the number of air changes per hour fluctuates (often due to doors or windows opening) the relative humidity level will fluctuate.
	<i>More on next page.</i>		

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action																
9 (cont'd.)	Fluctuations in output (or "hunting")	Hunting	"Hunting" describes cyclical humidity swings above and below the desired set point. Possible causes and actions include: <table><tr><th>Cause</th><th>Action</th></tr><tr><td>Air temperature varying rapidly</td><td>Stabilize air temperature to +/- 1 .</td></tr><tr><td>Air volume varying rapidly</td><td>Stabilize.</td></tr><tr><td>Saturated air</td><td>Move duct high limit farther downstream, or change set point.</td></tr><tr><td>Signal by others not wired correctly</td><td>Rewire.</td></tr><tr><td>Wiring not properly shielded or grounded</td><td>Verify that all humidistats and transmitters are wired with shielded cable, with shield grounded at the control source end ONLY.</td></tr><tr><td>Electrical interference</td><td>Route control wiring separately from high voltage wiring.</td></tr><tr><td>Malfunctioning control system</td><td>Verify operation of humidity controllers or transmitters. Repair or replace as needed. Verify RH set point and PID settings. Replace poorly located sensing devices. See "Placement of sensing devices" in the VAPOR-LOGIC₃ manual. Verify that correct control components are being used.</td></tr></table>	Cause	Action	Air temperature varying rapidly	Stabilize air temperature to +/- 1 .	Air volume varying rapidly	Stabilize.	Saturated air	Move duct high limit farther downstream, or change set point.	Signal by others not wired correctly	Rewire.	Wiring not properly shielded or grounded	Verify that all humidistats and transmitters are wired with shielded cable, with shield grounded at the control source end ONLY.	Electrical interference	Route control wiring separately from high voltage wiring.	Malfunctioning control system	Verify operation of humidity controllers or transmitters. Repair or replace as needed. Verify RH set point and PID settings. Replace poorly located sensing devices. See "Placement of sensing devices" in the VAPOR-LOGIC ₃ manual. Verify that correct control components are being used.
Cause	Action																		
Air temperature varying rapidly	Stabilize air temperature to +/- 1 .																		
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Wiring not properly shielded or grounded	Verify that all humidistats and transmitters are wired with shielded cable, with shield grounded at the control source end ONLY.																		
Electrical interference	Route control wiring separately from high voltage wiring.																		
Malfunctioning control system	Verify operation of humidity controllers or transmitters. Repair or replace as needed. Verify RH set point and PID settings. Replace poorly located sensing devices. See "Placement of sensing devices" in the VAPOR-LOGIC ₃ manual. Verify that correct control components are being used.																		

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
10	Noisy operation	"Thunder" type noise coming from tank during refill	This noise is caused by cold fill inlet water. No action is required.
		Fill valve noise	A clicking or hissing sound as the fill valve opens. This is normal. To minimize noise, reduce the supply pressure to 175 kPa (2.5 psi). A loud noise may occur when the fill valve is closed.
		Noise coming from blower of Area-Type fan unit	Verify the fan unit is properly installed.
		Noise coming from burner blowers	Check the burner blower assembly manual for proper installation.
11	Steam is coming from drain	Flash steam	During normal operation, steam is released from the drain when the tank is full.
		Incorrectly installed vapor hose or hard pipe to dispersion unit	If more steam is released, verify the vapor hose or hard pipe is properly installed to the tank mist backup unit.

TROUBLESHOOTING

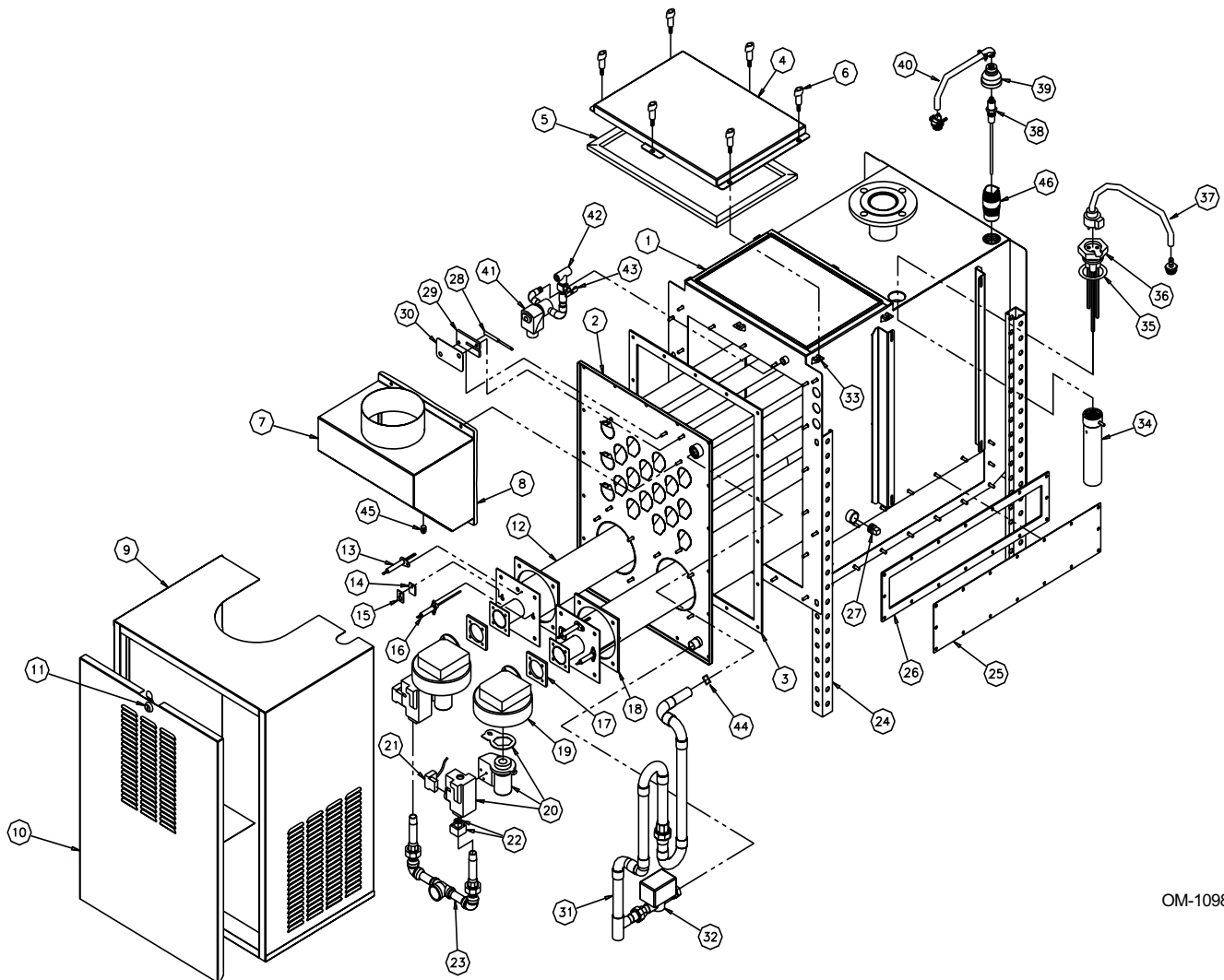
Problem number	Problem	Possible cause	Action
12	Tank interior is dirty.	Inadequate maintenance	Water type and usage will determine how often you need to clean your humidifier tank(s). The best way to determine how often your particular system will need cleaning is to remove the cover and inspect it after its first three months of duty, and then inspect it regularly thereafter. A hard water system with a high humidity demand will require cleaning more often than a system with low demand using softened water. Systems using DI/RO water will need little or no cleaning because of the low mineral content of the water. Increasing skim time and decreasing the drain/flush interval will help maintain a cleaner tank. See the VAPOR-LOGIC₃ manual for instructions on how to change these settings.
		High mineral content in water (over 700 µs/cm)	Use softened makeup water. Increase skim rate; adjust drain and flush frequency intervals and duration. These settings will vary depending on the mineral content of your water. See the VAPOR-LOGIC₃ manual for instructions on how to change these settings.

TROUBLESHOOTING

Problem number	Problem	Possible cause	Action
13	Water leaks	Leak in solder joint or fitting	Repair/replace fitting or joint.
		Cover gasket leaks	Tighten thumb screws on cover gasket. Make sure gasket is seated properly. Replace gasket if worn or crimped.
		Hole in tank wall	If using DI/RO water, you may have a high chloride content in your water (usually due to improperly maintained DI/RO processing equipment). Consult DRI-STEEM.
		Water leaking from burner blower	Find source of water, correct problem, drain water from burner blower, and replace blower and gas valve. Possible sources of water include a leak in the heat exchanger, moisture from incorrectly adjusted burner operation, or water present in gas supply.
14	Tank or cover is deformed	Steam supply piping is not properly supported	Refer to design drawings for locations of elbows or swing arms. Provide support from structure where needed. Replace cover if permanently deformed.
15	Humidifier appearance problem	A leaking cover gasket has caused sagging or discolored tank insulation	Reseat or replace cover gasket and replace insulation.
		A leaking cover gasket or cleanout plate gasket has caused mineral streaking on exterior tank walls	Reseat or replace cover gasket and/or cleanout plate gasket.

REPLACEMENT PARTS

Standard GTS® replacement parts



OM-1098

Notes

- Two-burner unit is shown above.
- Parts are consistent across all models.
- See tables on next page for parts listing.

REPLACEMENT PARTS

Standard GTS® replacement parts (see illustration on previous page)

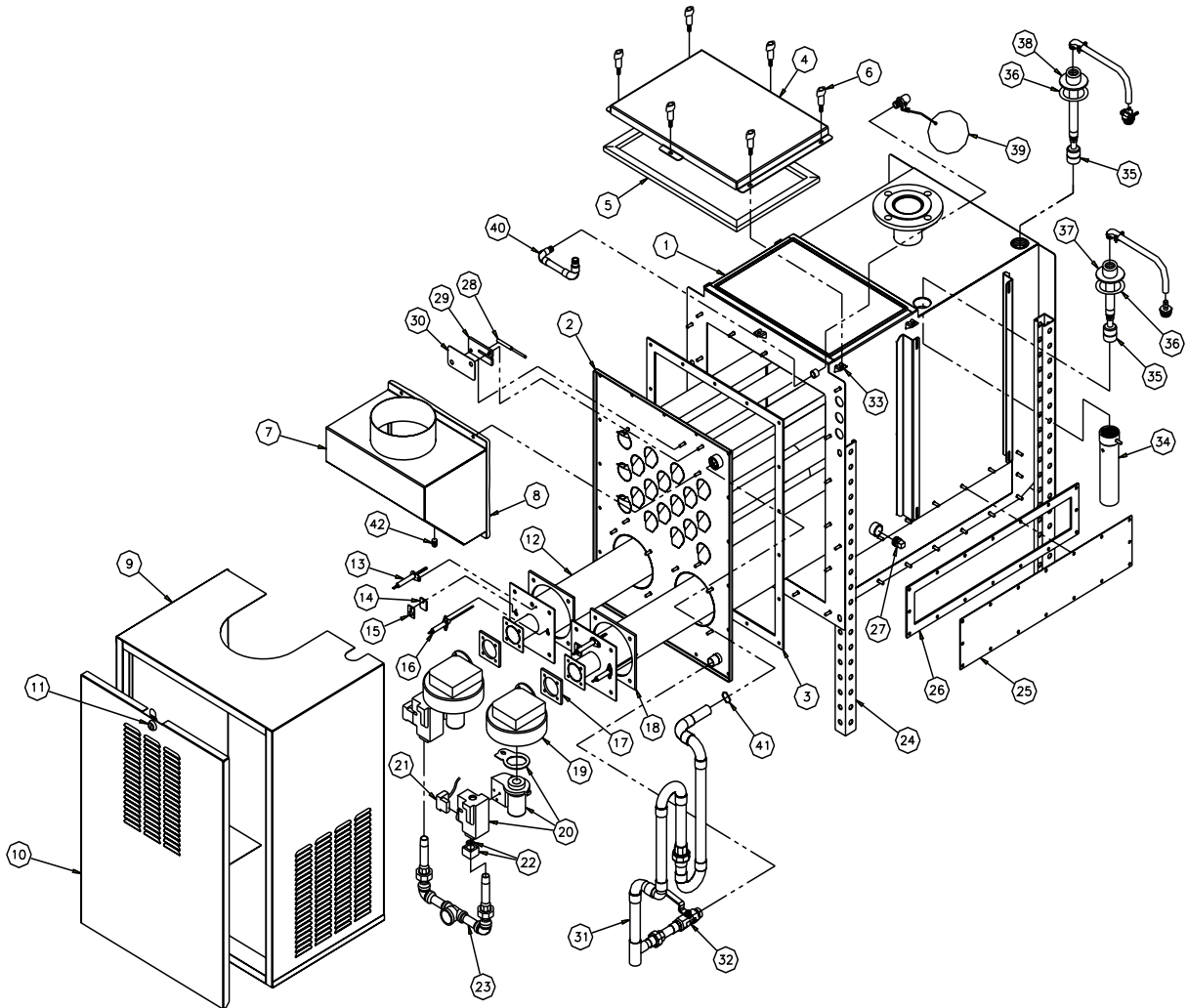
ITEM	DESCRIPTION	PART NUMBER
1	Tank	168000-TAB
2	Heat exchanger	168001-TAB
3	Gasket, heat exchanger	308230-TAB
4	Cover	167742-TAB
5	Gasket, cover	308230-TAB
6	Cover knob	700725
7	Flue box	168005-TAB
8	Silicone, high temp	320001
9	Shroud	168008-TAB
10	Shroud door	128622-TAB
11	Door lock with key	700700
12	200K burner	405788-001
13	Ignitor	405715
14	Sight glass	405720
15	Bracket, sight glass	128661
16	Flame rod	405725
17	Gasket, blower mounting	308230-007
18	Gasket, burner mountng	308230-006
19	Blower	405800-TAB
20	Gas valve/venturi	405800-007
21	Cable, gas valve	405800-010
22	Flange, gas valve	405800-009

ITEM	DESCRIPTION	PART NUMBER
25	Clean out plate	165479
26	Gasket, clean out plate	308230-005
27	Plug, 3/4" SST	250192-075
28	Temperature sensor	405760
29	Insulation, temp sensor	308230-008
30	Mounting plate, temp sensor	128666
31	Drain assembly	*
32	Valve, electric drain	505400-001
33	Nut retainer clip	700650
34	Probe housing	165301-001
35	Gasket, probe assembly	309750-004
36	Probe assembly	406280
37	Probe plug assembly	406050-004
38	Sensor, redundant low water	405726-001
39	Bell reducer, 1-1/2" x 1/2"	205930-002
40	Cable assembly, redundant low water	*
41	Valve, solenoid fill	505084
42	Strainer, 1/4" brass sediment	30050
43	Needle valve, 1/4" NPT brass	505070-001
44	O-ring, 1-1/8"	300400-010
45	Plug, 1/4" NPT stainless steel	250650-001

* These items are an assembly of multiple parts. Contact DRI-STEEM customer service to order.
 TAB = Refer to your specific model number for correct part.

REPLACEMENT PARTS

GTS®-DI replacement parts



OM-1099

Notes

- Two-burner unit is shown above.
- Parts are consistent across all models.
- See tables on next page for parts listing.

REPLACEMENT PARTS

GTS®-DI replacement parts (see figure on previous page)

ITEM	DESCRIPTION	PART NO.	ITEM	DESCRIPTION	PART NO.
1	Tank	168000-TAB	24	Leg, floor stand	405800-013
2	Heat exchanger	168001-TAB	25	Clean out plate	165479
3	Gasket, heat exchanger	308230-TAB	26	Gasket, clean out plate	308230-005
4	Cover	167742-TAB	27	Plug, 3/4" SST	250192-075
5	Gasket, cover	308230-TAB	28	Temperature sensor	405760
6	Cover, knob	700725	29	Insulation, temp sensor	308230-008
7	Flue box	168005-TAB	30	Mounting plate, temp sensor	128666
8	Silicone, high temp	320001	31	Drain assembly	*
9	Shroud	168008-TAB		Drain assembly, end of season**	*
10	Shroud door	128622-TAB	32	Valve, manual drain	505000-001
11	Door lock with key	700700		Actuator assy, Belimo 24V**	193768-001
12	200K burner	405788-001	33	Nut retainer clip	700650
13	Ignitor	405715	34	Probe housing	165301-001
14	Sight glass	405720	35	Float switch, 1/8" NPT	408420-002
15	Bracket, sight glass	128661	36	Gasket, float switch	309750-004
16	Flame rod	405725	37	Tube weld, low water	167789
17	Gasket, blower mounting	308230-007	38	Tube weld, redundant float	167789-001
18	Gasket, burner mounting	308230-006	39	Float valve	505320
19	Blower	405800-TAB	40	Fill assy, DI	*
20	Gas valve/venturi	405800-007		Fill assy, DI, end of season**	*
21	Cable, gas valve	405800-010	41	O-ring, 1-1/8"	300400-010
			42	Plug, 1/4" NPT stainless steel	250650-001

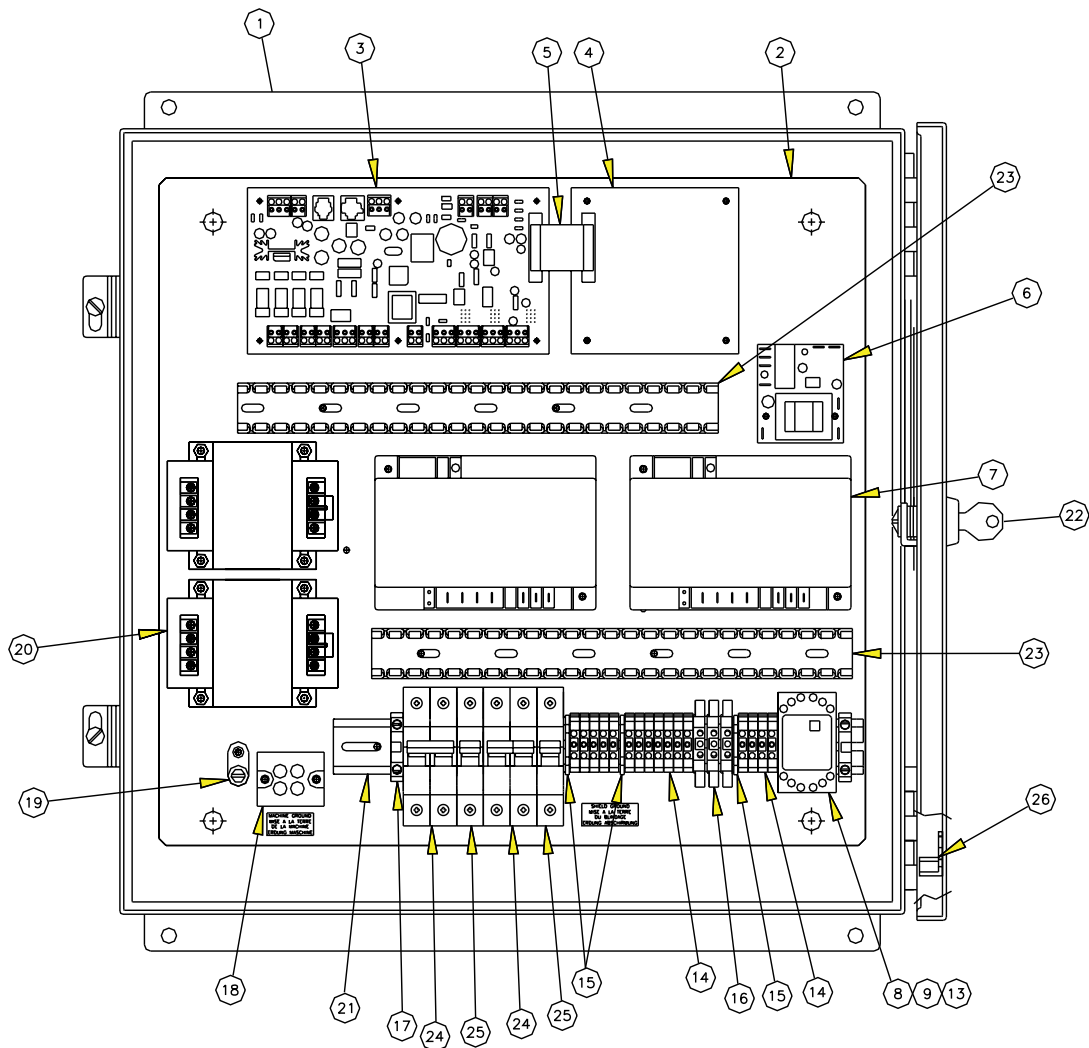
* These items are an assembly of multiple parts. Contact DRI-STEEM customer service to order.

** End of season drain option only.

TAB = Refer to your specific model number for correct part.

REPLACEMENT PARTS

GTS® electrical replacement parts for GTS 100-400 models



DM-4101

ITEM	DESCRIPTION	PART NO.
1	Control cabinet, 20X20X7	405800-028
2	Subpanel, VAPOR-LOGIC3	165722-004
3	Main board, VAPOR-LOGIC3	408490-001
4	GTS expansion board, VAPOR-LOGIC3	408490-004
5	Ribbon cable, GTS expansion board	408490-016
6	Control, low level cut-out**	405726
7	Ignition control, 24 VAC	405800-005
8	Relay, 24V DPDT	407900-016
9	Relay, 24V 3PDT (GTS 300-400)	407900-017
10	Relay socket, 3PDT without time delay** (GTS 300-400)	407900-009
11	Relay socket, 3PDT with time delay* (GTS 300-400)	407900-008
12	Relay socket, DPDT without time delay	407900-011
13	Time delay*	407900-018
14	Terminal, 20AMP DIN rail	408252-001

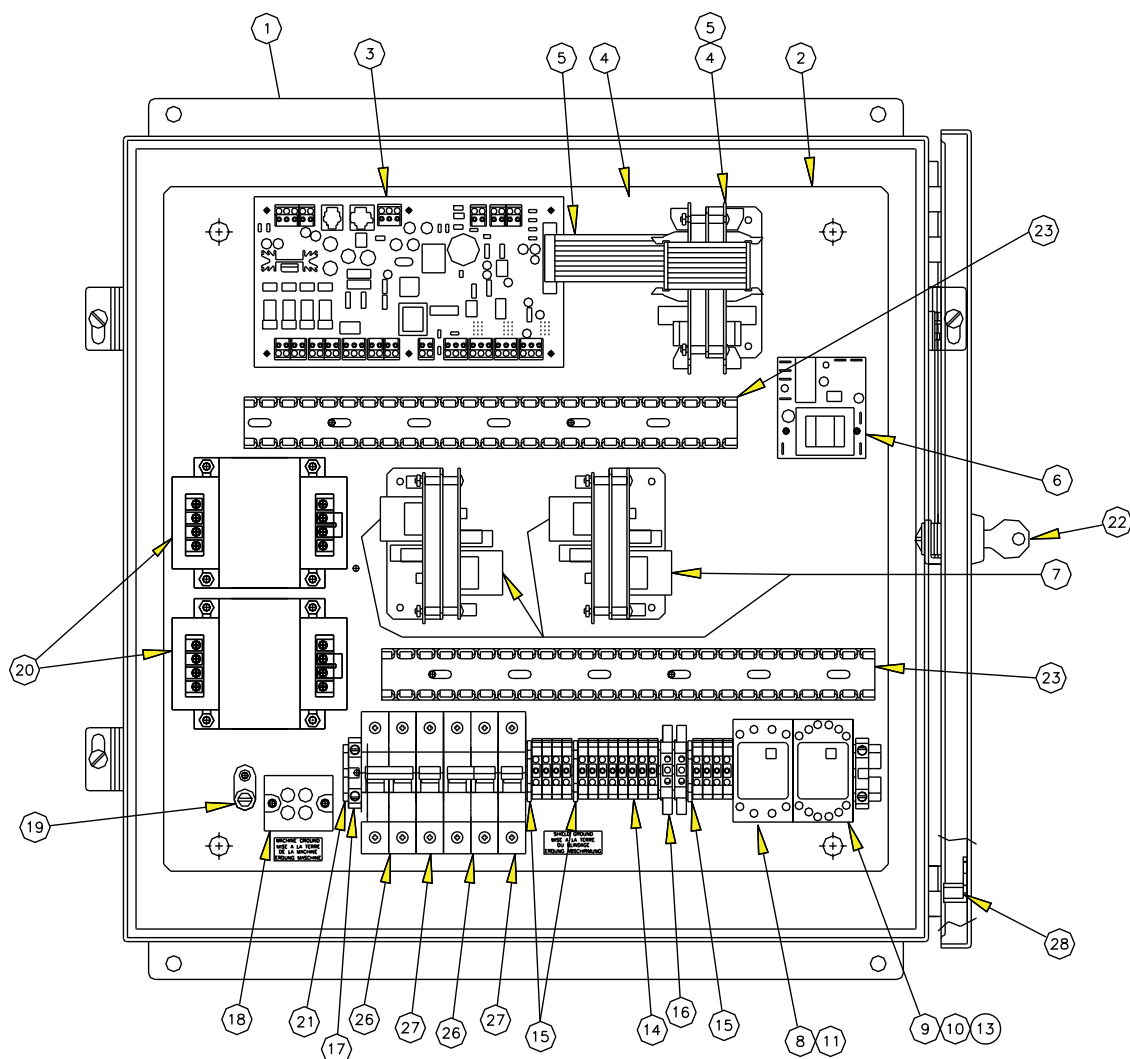
ITEM	DESCRIPTION	PART NO.
15	End cap, DIN rail	408252-005
16	Terminal, ground	408252-010
17	End bracket, DIN rail	408252-006
18	Terminal block, 2-pole	408300-001
19	Ground lug	409250-017
20	Transformer, 230V Pri, 24V Sec, 75 VA	408996-007
21	DIN rail, 10.75" long	167765-0135
22	Door lock with key	700700
23	Wire channel, 12" long	408999-001
	Wire channel cover	408999-002
24	Circuit breaker, 2-pole, 4A	406775-004
25	Circuit breaker, 1-pole, 4A	405775-002
26	Ground lug, L70, 6-8 GA, CP-4	409250-018

* DI water models only

** Standard water models only

REPLACEMENT PARTS

GTS® electrical replacement parts for GTS 600-800 models



DM-4102

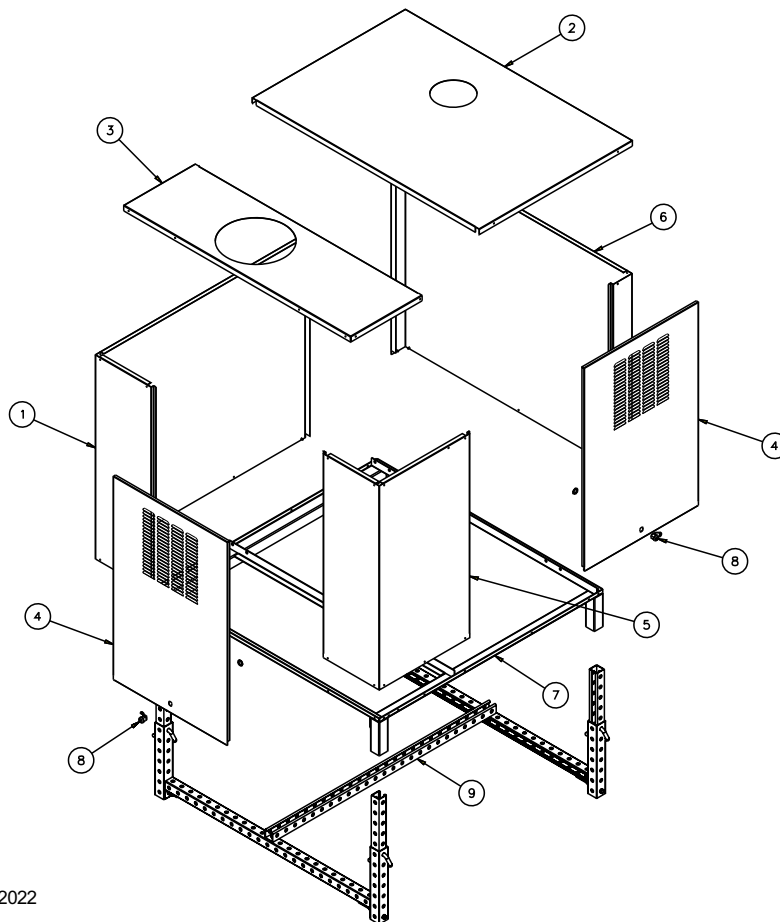
ITEM	DESCRIPTION	PART NO.
1	Control cabinet, 20x20x7	405800-028
2	Subpanel, VAPOR-LOGIC3	165722-004
3	Main board, VAPOR-LOGIC3	408490-001
4	GTS expansion board, VAPOR-LOGIC3	408490-004
5	Ribbon cable, GTS expansion board	408490-016
6	Control, low level cut-out**	405726
7	Ignition control, 24 VAC	405800-005
8	Relay, 24V DPDT	407900-016
9	Relay, 24V 3PDT (GTS-800**, GTS 600-800*)	407900-017
10	Relay socket, 3PDT without time delay (GTS-800)	407900-009
11	Relay socket, 3PDT with time delay*	407900-008
12	Relay socket, DPDT without time delay	407900-011
13	Time delay*	407900-018
14	Terminal, 20AMP DIN rail	408252-001
15	End cap, DIN rail	408252-005

ITEM	DESCRIPTION	PART NO.
16	Terminal, ground	408252-010
17	End bracket, DIN rail	408252-006
18	Terminal block, 2-pole	408300-001
19	Ground lug	409250-017
20	Transformer, 230V Pri, 24V Sec, 75 VA	408996-007
21	DIN rail, 13.5" long	167765-0135
22	Door lock with key	700700
23	Wire channel, 12" long	408999-003
	Wire channel cover	408999-002
24	Bracket, ignition control	165611-001
25	Bracket, expansion board	165611-002
26	Circuit breaker, 2-pole, 4A	406775-004
27	Circuit breaker, 1-pole, 4A	405775-002
28	Ground lug, L70, 6-8 GA, CP-4	409250-018

* DI water models only
 ** Standard water models only

REPLACEMENT PARTS

GTS® indoor enclosure replacement parts



OM-2022

ITEM	DESCRIPTION	GTS-100, GTS-200, GTS-300, GTS-400 PART NUMBER	G G PART
1	Side wrap	165702-006	165703-
2	Access cover	165702-002	165703-
3	Flue top	165702-003	165703-
4	Door	165702-004	165702-
5	Corner wrap	165702-005	165703-
6	Back wrap	165702-001	165703-
7	Base	165511-001	165511-
8	Door lock with key	700700	700700
9	Leg assembly (optional)	*	

* These items are an assembly of multiple parts.
Contact DRI-STEEM customer service to order.

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.

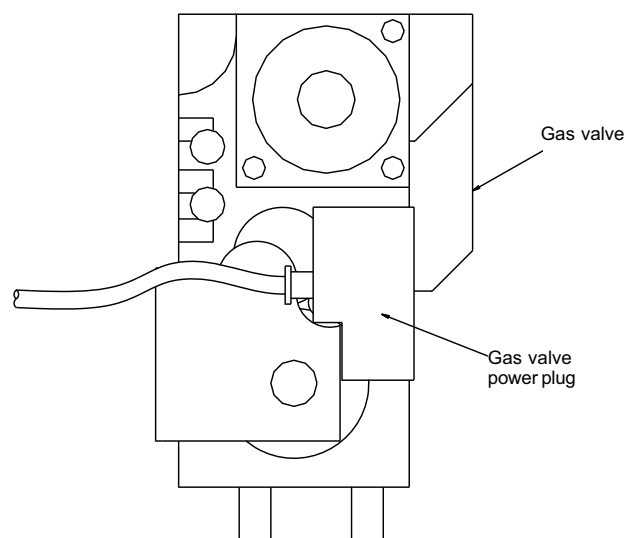
- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **not** try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- C. Do not use this appliance if any part has been under water. Immediately call a qualified gas appliance service technician to inspect the appliance and to replace any part of the control system and any gas control that has been under water.

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.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above.
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 that automatically lights the burner. Do not try to light the burner by hand.
5. Remove control access panel.
6. Unplug the black power plug on the gas valve.
7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Follow “B” in the safety information above. If you don’t smell gas, go to the next step.
8. Plug the black power plug back into the gas valve.
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. Unplug the black power plug on the gas valve.
5. Replace control access panel.

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.

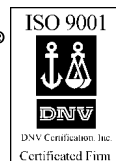
If any DRI-STEEM product is found to be defective in material or workmanship during the applicable warranty period, DRI-STEEM's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DRI-STEEM's 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.

DRI-STEEM's limited warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DRI-STEEM, or if the products have been modified or altered without the written consent of DRI-STEEM, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DRI-STEEM in writing within the stated warranty period.

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.



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