



READ AND SAVE THESE INSTRUCTIONS

Standard Water

GX Series

Gas Fired Exchanger Humidifier

Installation Instructions

Operation and Maintenance Manual

FOR YOUR SAFETY:

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

WARNING:

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

WARNING:

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

WHAT TO DO IF YOU SMELL GAS:

Do not try to light any appliance.

Do not touch any electrical switch; do not use any telephone in your building.

Immediately call your gas supplier from a neighbor's telephone.

Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

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

ETL/ETLC Listed #43438 To "IAS 12-94 Gas Fired Humidifier"

Our results are comforting

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Form No: GXOM-6-2023



To the User of PURE Humidifier Co.'s GX Series Humidifiers

We at PURE Humidifier Co. thank you for choosing one of our quality products. PURE Humidifier Co. GX Series humidifiers are models of simplicity to install, operate and maintain. However, they must be maintained to provide maximum operating efficiency.

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

The GX Series Humidifier utilizes a Tri-Probe conductive type water control system, which is designed for use with standard (hard or soft) tap water. Use of demineralized, deionized or reverse osmosis water will cause a failure of the water level control system and void the warranty. PURE Humidifier Co.'s GXDDR Series should be installed on applications that require demineralized, deionized or reverse osmosis water.

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty. Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

To ensure proper installation of this product, it must be installed by qualified HVAC and electrical contractors, and must be in compliance with local, state, federal, and governing codes. If installed improperly this product may cause damage to property, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Do not adjust any components inside humidifier control box without consulting the factory.

For indoor installation in conditioned spaces only unless supplied with an outdoor enclosure.



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Warnings

PLEASE READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY. PROPER OPERATION AND HUMIDITY CONTROL IS POSSIBLE ONLY WITH PROPER INSTALLATION AND MAINTENANCE.

Improper installation, adjustment, alterations, service, maintenance, or use can cause carbon monoxide poisoning, an explosion, fire, electrical shock, or other conditions which may cause property damage, personal injury or loss of life. 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 loss of life.



RECEIVING

Inspect humidifier and accessories upon arrival for damaged, missing, or improper parts. If there is a problem, call PURE Humidifier Co.

SERVICING

Disconnect main power before servicing or maintaining humidifier.

The humidifier system including the humidifier tank, steam supply piping, condensate piping and steam distribution grid can be extremely hot and can cause burns if touched.

Do not use hydrochloric acid descalers or bleach to clean the tank. Consult the factory if you are unsure about which chemical descaler to use.

ELECTRICAL

Electrical work should be done by qualified electrical contractors and must be in compliance with local, state, federal, and governing codes.

PLUMBING

Plumbing and pressurized steam work should be done by qualified installers and must be in compliance with local, state, federal, and governing codes.

Drain and overflow water can be 212°F (100°C). If you are not using a DCT-927 Drain Tempering Kit, allow the water to cool before draining tank.

This humidifier produces steam at atmospheric pressure. Do not install any components between humidifier tank and steam distribution grid which can block or restrict steam flow.

LOCATION

Do not mount on hot surfaces.

Do not mount on vibrating surfaces.

MAKEUP WATER

High chloride content in feed water can cause chloride stress cracking and chloride pitting in stainless components. Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

Use of mineralized (hard or soft) tap water will cause fill valve failure and void the warranty. PURE Humidifier Co.'s GX Series should be installed on applications that require tap water.

Do not adjust any components inside humidifier control box without consulting the factory.

For indoor use only unless supplied with an Outdoor Enclosure.



Warnings (Con't)

GAS

Application of this humidifier should have special attention given to vent sizing and material, gas input rate, and unit sizing. Improper installation or misapplication of the humidifier can require excessive servicing or cause permanent component failure.

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

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

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

Humidifier must be located in a conditioned space.

To prevent premature heat exchanger failure, do **not** locate ANY GX 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.

When working on equipment, observe precautions in this literature, tags, and labels attached to or shipped with the unit, and other safety precautions that may apply. **Have fire extinguisher available during startup, adjustment procedures, and service calls.**

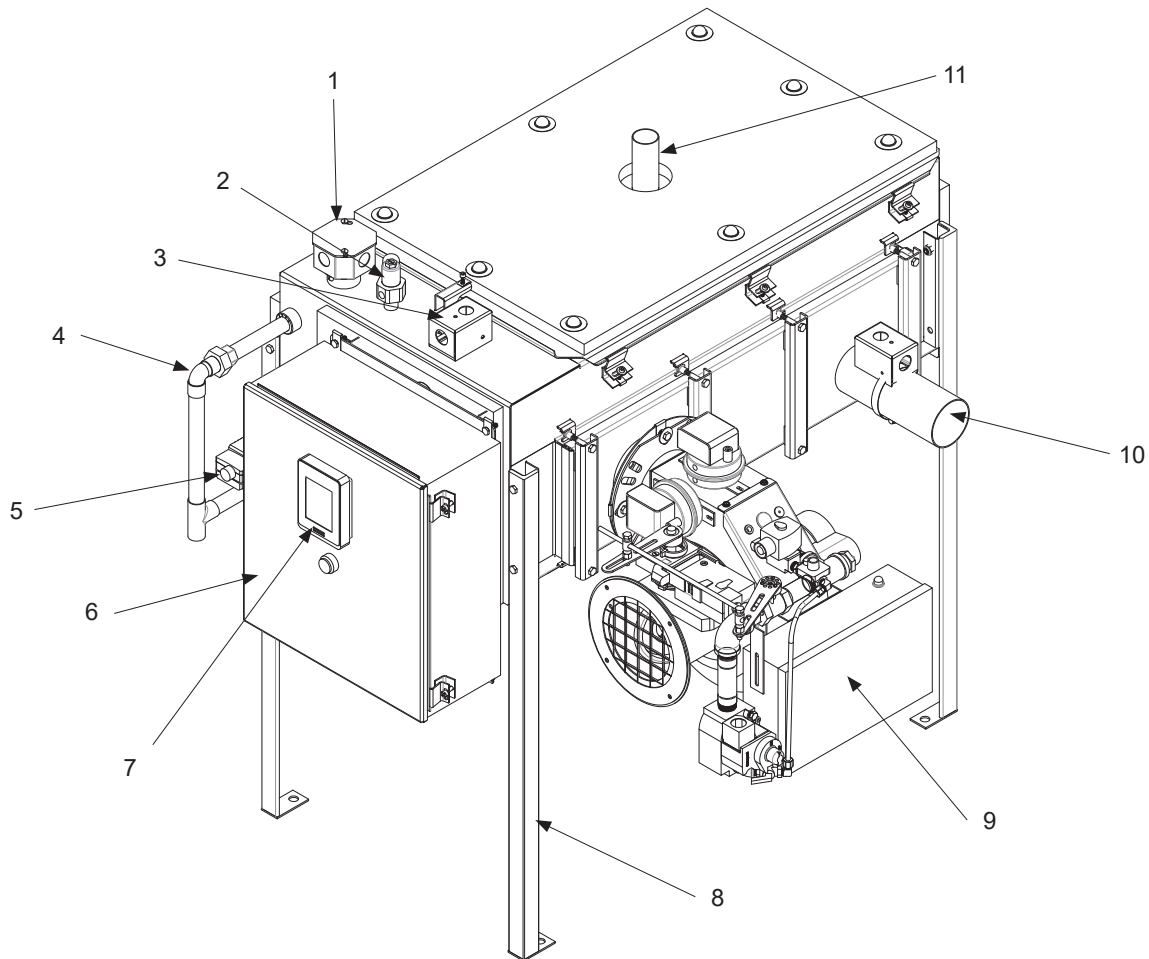
Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Do not lift humidifier by gas controls or gas manifold.

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.

Do not locate units in tightly sealed rooms or small compartments without provision for adequate combustion air and venting. Combustion air must be supplied to the confined space through a minimum of two permanent openings in the enclosure, with at least one near the bottom. They should provide a free area of one square inch per 1000 BTU per hour input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater. Refer to Venting Installation information on pages 8 & 9.

Features



FEATURES

- | | |
|------------------------------------|-----------------------------|
| 1. Tri-Probe Sensor | 7. INTAC® PLC Controller |
| 2. 1/4"-NPT Water Inlet & Strainer | 8. Support Legs |
| 3. Over Temperature Cut-Out Switch | 9. Burner Assembly |
| 4. Flusher & Overflow Piping | 10. Exhaust Connection |
| 5. 3/4" Motorized Drain Valve | 11. Steam Outlet Connection |
| 6. Control Panel | |



Capacities, Electrical & Weights

This humidifier is a forced combustion type that can be used with natural gas or liquid propane. The burner can be easily removed to access the side entry exchanger(s) for cleaning. It is designed to work with low-pressure gas between 5" W.C. up to 14" W.C.

**Unit Capacities in Pounds per Hour (Kg/Hr) †
Weights in lbs (kg) and Electrical Specification**

Standard Water Unit Model No.	Steam Capacity lbs/hr (kg/hr)	No. of Burners	*BTU Input	#Exhaust Manifold Vent Size (cm)	Shipping Weight	Operating Weight (kg)	120 Volt, 60 Hz
							Full Load Amps
GX-3	110 (49.9)	1	150,000	4" (10.2)	201 lbs (91.2)	420 lbs (190.5)	5.0
GX-4	300 (136.1)	1	400,000	4" (10.2)	390 lbs (176.9)	710 lbs (322.1)	5.0
GX-8	600 (272.2)	2	800,000	6" (15.2)	827 lbs (375.1)	1391 lbs (630.9)	10.0
GX-12	900 (408.2)	3	1,200,000	8" (20.3)	1125 lbs (510.3)	2072 lbs (939.9)	15.0

† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity and injection tube system will affect the rate of heat loss from the reservoir.

* Altitude adjustment:

100% up to 2000'

Over 2000', 4% de-rate per 1000'

Vent Size is larger than connection size.

Reservoir Water Volume in Gallons (Liters)

Standard Water Unit Model No.	Water Volume in Gallons (Liters)
GX-3	22 (83.3)
GX-4	48 (181.7)
GX-8	94 (355.8)
GX-12	143 (541.3)



Dimensions GX-3 & GX-4

Required Clearance:

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

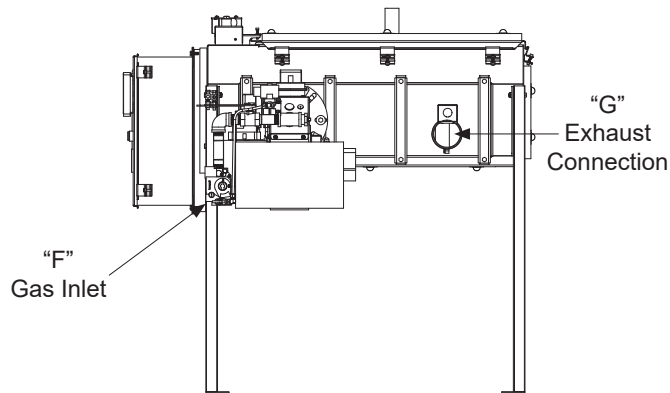
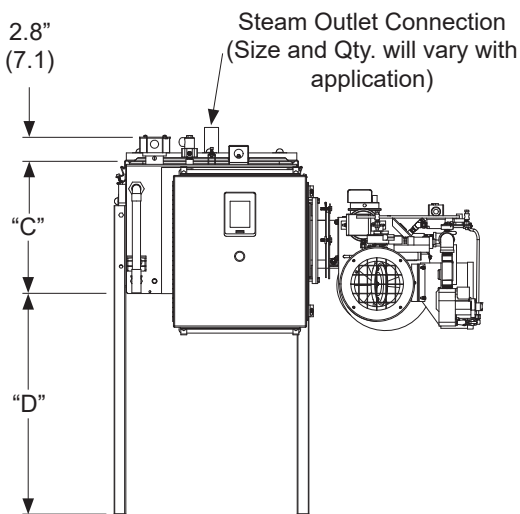
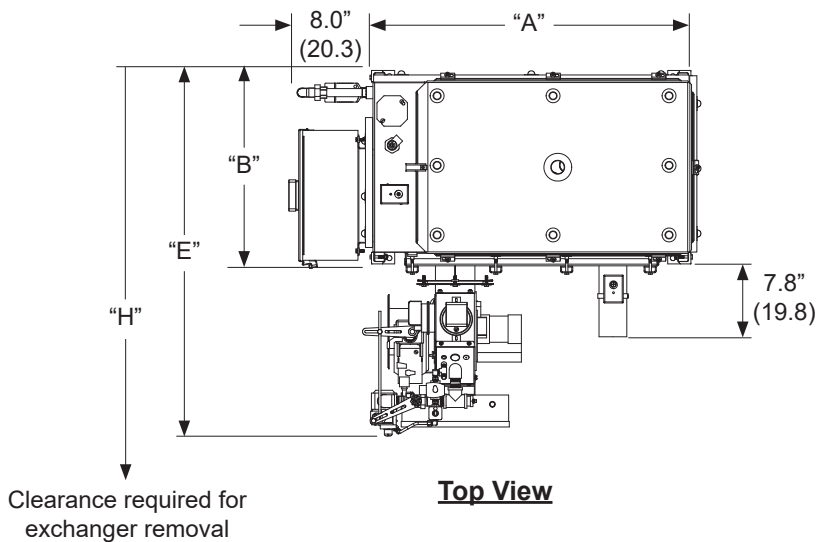
Right side, see Top View for required clearance

Front side, NEC requires 36" clearance to control cabinet

Left side, 6" for access

Rear, 6" for access

Top, 12" for cover and Tri-Probe removal



Unit Dimensions in Inches (cm)

Standard Water Unit Model No.	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	Dim. "H"
GX-3	34.18" (86.8)	20.46" (52.0)	13.84" (35.2)	24.0" (60.9)	45.9" (116.5)	3/4"-NPT	3.0" (7.62)	50.0" (127.0)
GX-4	54.0" (137.2)	30.1" (76.5)	13.84" (35.2)	24.0" (60.9)	54.7" (138.9)	3/4"-NPT	3.0" (7.62)	66" (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.

All dimensions are approximate and subject to change at manufacturer's discretion.



Dimensions GX-8

Required Clearance:

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

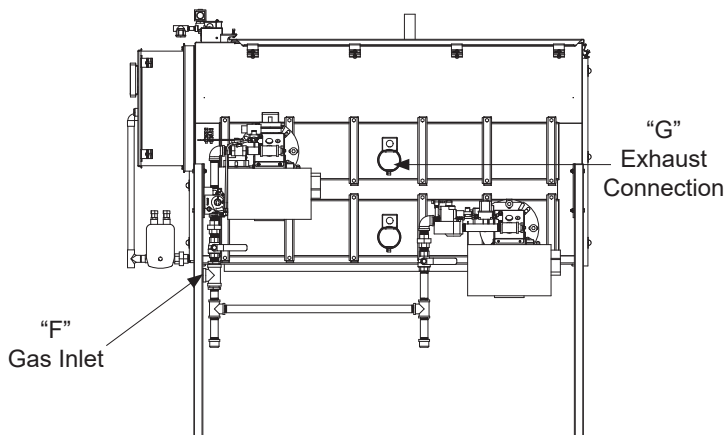
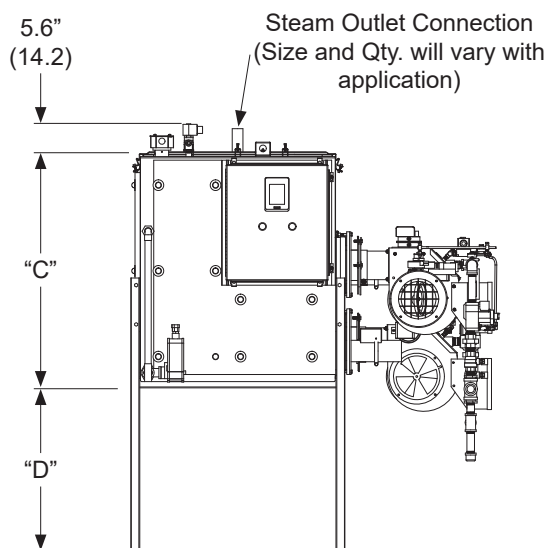
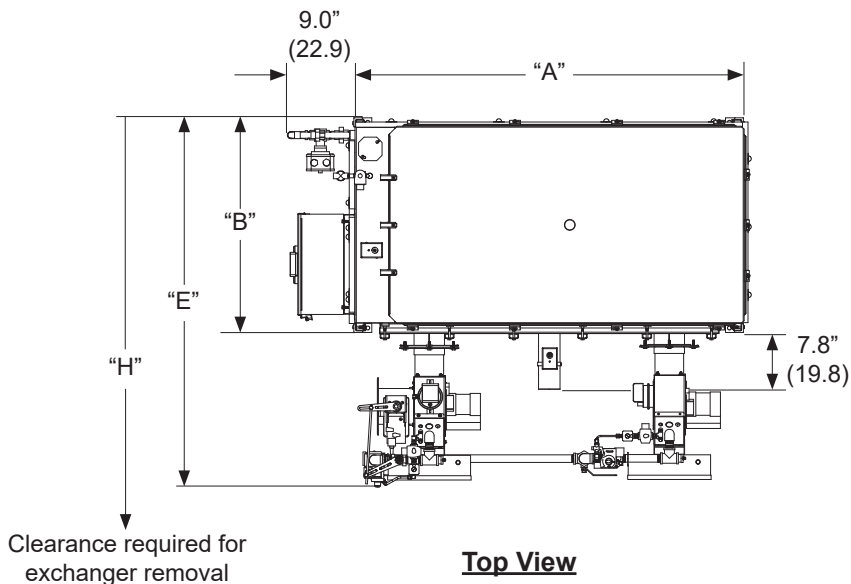
Right side, see Top View for required clearance

Front side, NEC requires 36" clearance to control cabinet

Left side, 6" for access

Rear, 6" for access

Top, 12" for cover and Tri-Probe removal



Unit Dimensions in Inches (cm)

Standard Water Unit Model No.	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	Dim. "H"
GX-8	54.0" (137.2)	30.1" (76.5)	32.5" (82.6)	24.0" (60.9)	54.7" (138.9)	1"-NPT	3.0" (7.6)	66.0" (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.

All dimensions are approximate and subject to change at manufacturer's discretion.



Dimensions GX-12

Required Clearance:

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

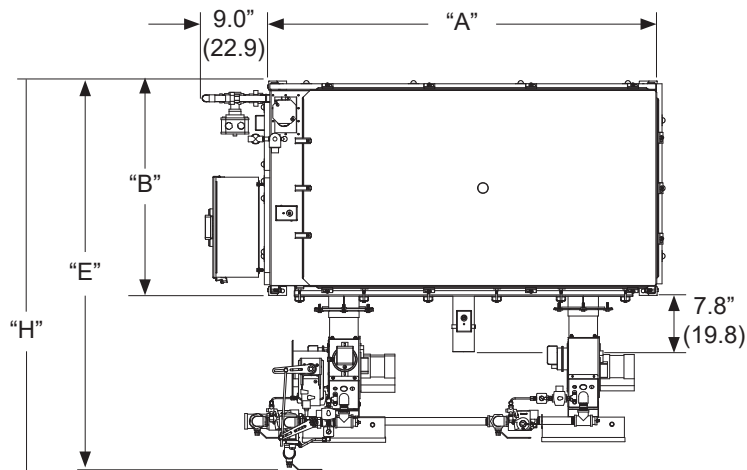
Right side, see Top View for required clearance

Front side, NEC requires 36" clearance to control cabinet

Left side, 6" for access

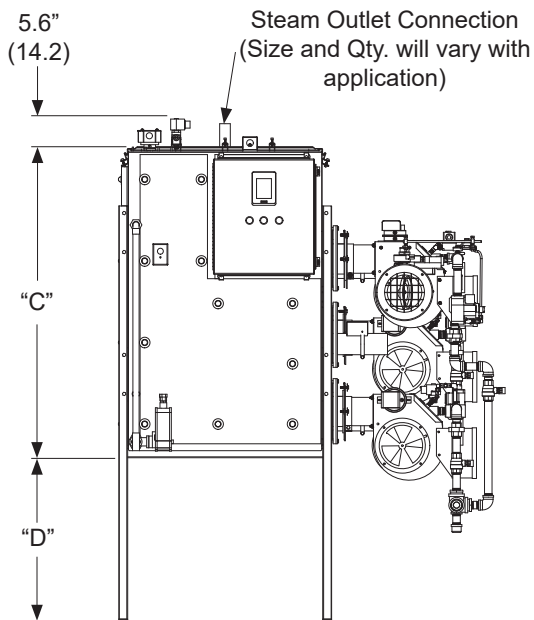
Rear, 6" for access

Top, 12" for cover and Tri-Probe removal

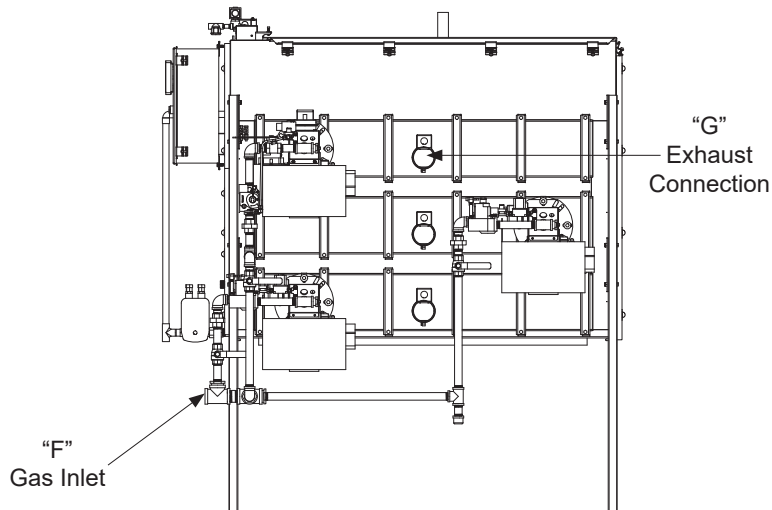


Clearance required for
exchanger removal

Top View



Front View



Right Side View

Unit Dimensions in Inches (cm)

Standard Water Unit Model No.	Dim. "A"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	Dim. "H"
GX-12	54.0" (137.2)	30.1" (76.5)	43.5" (110.5)	24.0" (60.9)	55.8" (141.1)	1-1/4"-NPT	3.0" (7.6)	66.0" (167.6)

Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.

All dimensions are approximate and subject to change at manufacturer's discretion.



Installation & Location

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

Location

The location selected must provide for electrical service, cold or hot water supply, and sanitary drain.

When selecting a location, try to keep the humidifier within 10 feet (305 cm) of the duct to avoid unnecessary heat losses and condensation within the steam supply line.

Visible "fog" will saturate and condense when it contacts objects such as turning vanes, filters, fans, elbows or take-offs. The warmer the air, the more easily it will dissipate the visible steam. The most active and warmest portion of the duct will provide better mixing of the steam and air. The injection tube should be mounted a minimum of 2 feet (61 cm) downstream from an elbow or other turbulent air flow area.

Avoid mounting single style injection tube(s) closer than 8-10 feet (244-305 cm) upstream of objects that could become saturated and condense the steam (reference the paragraph above). If the duct layout does not provide a straight unobstructed run of 8-10 feet (244-305 cm), a multiple injection tube system should be considered to reduce the visible steam travel distance.

For Fast-Pac and Insty-Pac multiple tube assemblies please consult factory for job specific non-wetting distances.

Reference Fast-Pac or Insty-Pac O&Ms for full installation details.

CAUTION: Do not humidify upstream of filters. Consult factory.

CAUTION: Smoke detectors should not be located downstream of injection tube assemblies.

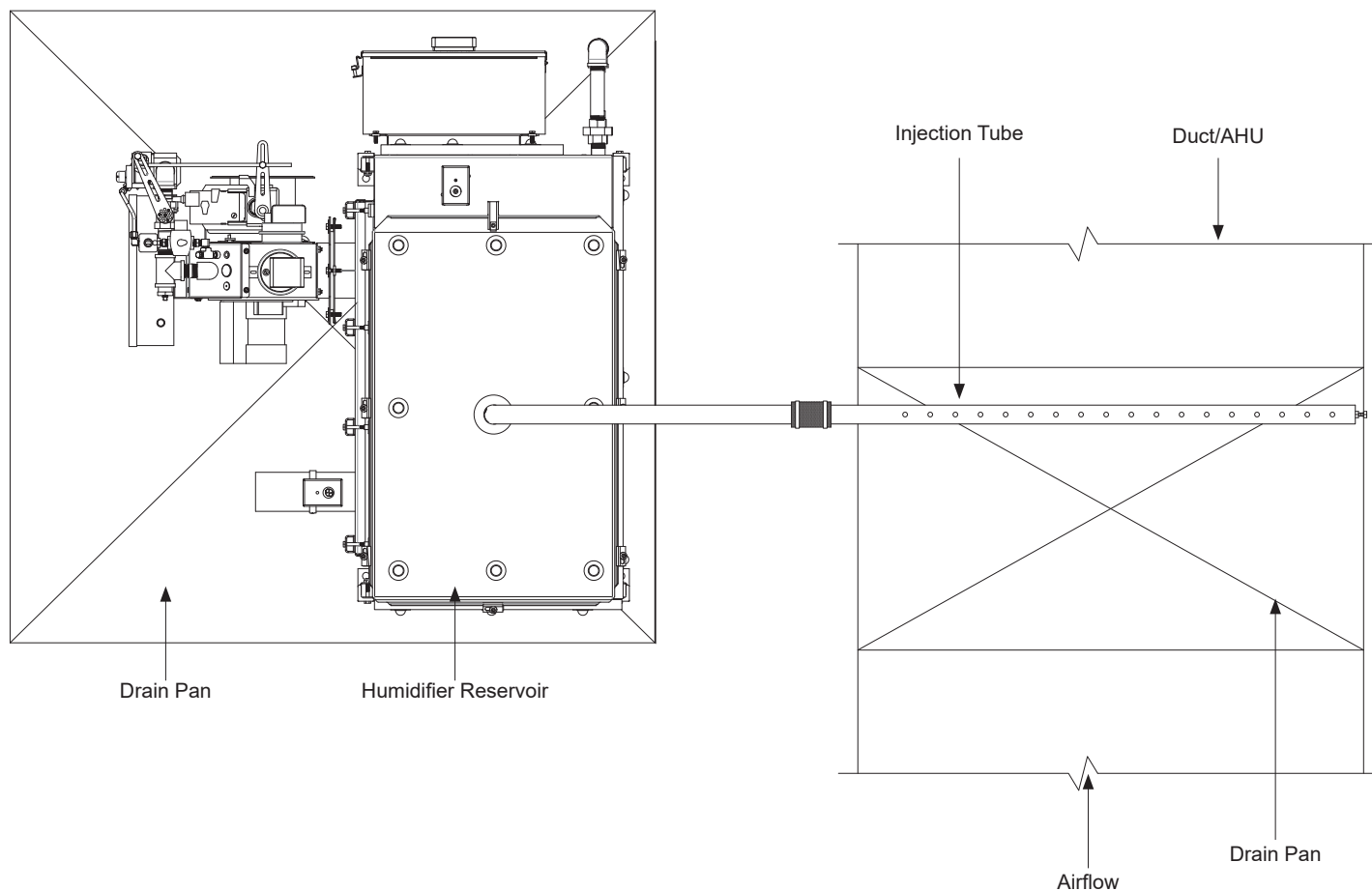
Location of Controls

It is important to avoid mounting any controls within the visible steam. The controls should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the humidifier injection tube. Due to the temperature rise that exists within the visible steam dissipation area, thermostats should not be mounted near the injection tube.

High-limit humidistats should be installed before any duct obstruction to make sure the humidifier is interrupted before saturation can occur on the object. The high-limit should be mounted a minimum of 8-10 feet (244-305 cm) downstream from the injection tube. Installing the high-limit closer than 8 feet (244 cm) from the humidifier may cause erratic control.

Drain Pan Mounting

A drain pan is an additional safety feature which may be required to be supplied in the field. In a proper humidifier installation, a drain pan is not required. However, if the humidifier and injection tube are located in an area that contains valuable equipment or is a water sensitive area, PURE Humidifier Co. recommends the addition of a drain pan under the humidifier and under the injection tube. The drain pan should extend past all edges of the humidifier and if installed in the duct, it should extend a minimum of 3 feet (91 cm) downstream from the injection tube. The pan should be of a size which is capable of draining at a rate of 3 gpm for units with a capacity of up to 200 lbs/hr, and 5 gpm for units with a capacity over 200 lbs/hr. The pan should be drained to a sanitary drain.



Humidifier Reservoir and Injection Tube Plan View



Electrical, Combustion & Ventilation Air

Electrical

WARNING:

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

Connect copper ground wire to cabinet ground lug.

Humidifiers should be supplied with 120-volt AC, 60 Hz, 15-amp separately fused electrical service. The humidifier is equipped with a transformer to step down the voltage to 24 VAC control voltage.

When installed, the humidifier must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA No. 70-1987. The electrical conductors shall be a minimum Type MTW (105°C) AWG #14 wire for line voltage (120V), with BLACK WIRE for HOT; WHITE WIRE for NEUTRAL, GREEN WIRE for GROUND; and minimum #18 gauge for control wiring. All electrical components and wiring must be protected from mechanical damage and water. The control system requires an earth ground for proper operation.

The humidifier is adjusted for correct performance. Do not alter fan or operate motors at reduced speed.

The current characteristics, and capacity requirements should be checked against the nameplates. All wiring must be in accordance with all governing codes, and with wiring diagram located inside the control cabinet.

See separate publication for the INTAC® controller furnished with this humidifier.

Combustion & Ventilation Air

CAUTION:

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

CAUTION:

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

All fuel burning equipment must be supplied with air for combustion of the fuel. Sufficient air **MUST** be provided to ensure there will not be a negative pressure in the equipment room or space.

Provisions for adequate combustion and ventilation air must be provided in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code ANSI Z223.1 1-1988, or applicable provisions of the local building codes. Canadian installations must be installed in accordance with sections 7.2, 7.3, and 7.4 of the CAN/CGA. B149 Installation Codes, and all authorities having jurisdiction.



Gas Piping Installation

CAUTION:

Gas pressure to humidifier controls must never exceed 14" W.C. (1/2 psi).

Contact your local gas service company to ensure that adequate gas service is available, and to review applicable installation codes for your area. All gas piping installations must be in accordance with codes, and ANSI Z233.1, "National Fuel Gas Code," or CAN/CGA-B149 in Canada.

Do not use flexible connectors.

Piping to units should conform with local and national requirements for type, volume, gas handled, and pressure drop allowed in the line. Refer to tables 1 and 2 to determine the cubic feet per hour (cfh) for the type of gas and size of unit to be installed. Using this value and the length of pipe necessary, determine the pipe diameter. Where several units are served by the same main, the total capacity, gas flow (cfh), and length of main must be considered. The figures shown are for straight lengths of pipe at 0.2" w.c. pressure drop, which is considered normal for low-pressure systems. Note that fittings such as elbows and tees will add to the pipe pressure drop.

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

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

Use two wrenches when connecting piping to unit controls.

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

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

Piping subject to wide temperature variations should be insulated.

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

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

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

Install pressure regulator directly upstream of main automatic gas valve(s) and fit drip leg main gas cock upstream of regulator or automatic valve(s).

Install vent lines from main gas regulator (if used) and diaphragm gas valve where applicable. Vent lines should be run to the outside of the building, terminating clear of windows or fresh air intakes. Outside termination of vent should have a screen to prevent insects from building nests in vent pipe.

Install a ground joint union and a manual gas shut-off valve immediately upstream of the unit including a 1/8" NPT plugged tapping accessible for test gauge connection.

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



Gas Piping Installation (Con't)

Gas Leak Testing

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

Test gas lines for leaks using a soap solution. Your local gas service company may wish to execute or witness this test. CAUTION: Gas pressure above 14" W.C. may damage the standard diaphragm gas shut-off valve. Do not exceed this value when pressure testing lines unless you cap-off line upstream of main gas cock and pilot take-off.

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

Minimum supply pressure. Natural - 5" W.C. LP - 5" W.C.

Gas valves outlet pressure (manifold) shall be factory set. **This pressure can be checked at the 3/4" tee after the orifice.** See humidifier label for correct pressure rating.

Table 1 - Gas Input CFH for GX Series Humidifiers

Model	Max BTU/hr Input	Max CFH (Nat. Gas)	Max CFH (Propane)
GX-3	150,000	150	60
GX-4	400,000	400	160
GX-8	800,000	800	320
GX-12	1,200,000	1,200	480

Table 2 - Gas Piping Pressure Drop Data

EQUIVALENT LENGTH OF STRAIGHT PIPE IN FEET									
	20	30	40	20	60	80	100	150	200
CFH GAS WITH .2" PRESSURE DROP									
Pipe Size in Inches									
3/4"	152	120	105	93	84	73	66	54	45
1"	300	250	210	190	180	150	135	110	75
1 1/4"	520	425	360	325	300	260	230	190	165
1 1/2"	800	690	560	500	480	410	370	300	260
2"	1700	1400	1200	1100	1000	850	750	600	540
2 1/2"	3000	2500	2100	1900	1800	1550	1375	1100	950
EQUIVALENT LENGTHS OF STANDARD PIPE IN FEET FOR LISTED FITTINGS									
Fitting Type	3/4	1	1 1/4	1 1/2	2	2 1/2	Nominal		
Std. Tee	2.4	5.5	7.5	9	12	13.5	Pipe Size		
Std. Elbow	4.4	2.7	3.7	4.5	5.5	6.1	in Inches		



Venting Installation

For proper and safe operation this appliance needs air for combustion and ventilation. DO NOT block or obstruct air openings on the appliance, spaces around the appliance, or air openings communicating with the appliance area.

DO NOT block the flow of combustion and ventilation air. To provide for necessary oxygen for proper combustion, opening must be provided to allow outside air to enter the space in which the heater is located. Enclosed spaces, such as equipment rooms, must be vented at the blower for combustion air. The size of air openings must be based on all gas-burning equipment installed in the space involved. Provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1, or Sections 7.2, 7.3 or 7.4 of the CAN/CGA B149 Installation Codes, or applicable provisions of the local building codes.

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments. Failure to maintain the correct burner settings may result in inefficient gas consumption, premature wear of burner components, or explosion hazard.

Venting

The GX Series Humidifiers are a Category 3 Appliance.

The purpose of venting the gas humidifier is to completely remove all products of combustion and ventilation gases to the outside air, without condensation in the stack.

When connecting the humidifier to a gas vent or chimney, the installation shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1, or Section 7, Venting Systems and Air Supply Appliances, of the CAN/CGA-B149 Installation Codes, the local building codes, and the vent manufacturer's instructions.

Do not reduce the vent diameter, and avoid short turns in the vent piping. Use the exhaust manifold vent size shown on page 15.

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance. Maintain a 1/4-inch-per-foot pitch for horizontal runs. Maintain proper support of vent connections and joints. Observe clearances (in accordance with applicable codes) from all combustible materials, and obtain an approved cap for the stack outlet. The bottom of the cap must be one stack diameter above the top of the stack.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.

Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes.

PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 Appliances (listed to UL Standard 1738 or ULC-S636). Any condensate formed is acidic and could cause corrosion of the vent materials. This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel. If condensation is noticed in the field, a condensate trap should be installed in the venting system.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as direct as possible, with a minimum number of turns or elbows.

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.



Venting Installation (Con't)

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

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

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

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a condensate trap must be installed.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier exhaust termination should not be supporting the weight of the vent piping.

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

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

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

Venting Requirements

100' maximum equivalent length of vent pipe.

90° Elbow = 10'

45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 Appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.

Inspect for proper and tight construction. Any restrictions or obstructions must be removed. An existing chimney may require cleaning.

Chimney or vent must extend at least 3 feet above its passage through a roof and at least 2 feet above any ridge within 10 feet of the chimney (local codes apply).

Minimum clearance from the vent connector to combustible material is 6 inches unless the combustible materials are protected in accordance with applicable codes.

PURE Humidifier requires humidifiers be connected to vent systems sufficient for use with Category 3 Appliances (listed to UL Standard 1738 or ULC-S636). Any condensate formed is acidic and could cause corrosion of the vent materials. This humidifier must not be connected to a chimney flue servicing a separate appliance designed to burn solid fuel. If condensation is noticed in the field, a condensate trap should be installed in the venting system.

Never connect this humidifier to a chimney.

Venting into an unlined masonry or concrete chimney is prohibited by code.

Insulation must be added to any vent connector which will be exposed to ambient temperatures of 30°F or less.

Do not insulate vent pipe exposed to outdoor weather conditions (i.e. above roof lines).

Installation of the vent pipe should be as direct as possible, with a minimum number of turns or elbows.



Venting Installation (Con't)

Rigidly support the vent pipe every 5 feet or less with hangers or straps to ensure that there will be no movement or sagging after installation. The humidifier vent box should not be supporting the weight of the vent piping.

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

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

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

In replacement installation, where an existing vent system may be used, the vent system must be inspected for condition, size, type of vent material, and height to meet the requirements in these instructions. If the existing vent system is too large, condensation could occur, causing corrosion of the vent system. Installing a replacement vent system may be required.

Horizontally Vented Humidifier

Maintain a minimum upward slope of 1/4-inch per linear foot on all horizontal vent pipe runs. If condensate in venting is noticed, a condensate trap must be installed.

Rigidly support the vent pipe at intervals no longer than five feet with hangers or straps to ensure there will be no movement after installation. The humidifier exhaust termination should not be supporting the weight of the vent piping.

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

The vent terminal location must be at sufficient height above ground level to prevent blocking by expected snowfall.

Building materials should be protected from degradation by flue gases.

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

must be maintained.

Venting Requirements

100' maximum equivalent length of vent pipe.

90° Elbow = 10'

45° Elbow = 5'

Maximum of 4 elbows.

Vent pipe is to be rated for Category 3 Appliances listed to UL Standard 1738 or ULC-S636 (AL29 4C).

Allow for removal of air intake and exhaust connections for heat exchanger cleaning and regular maintenance.



Sealed Combustion

Sealed Combustion Air Kit

Consists of a 6" round stainless steel adaptor to connect to field installed combustion air piping. Use of this kit will allow the burner to intake combustion air from outside instead of using room air. When using sealed combustion with multiple burners use separate exhaust pipes or separate makeup air pipes so exhaust gas does not recirculate if one blower malfunctions.

Benefits:

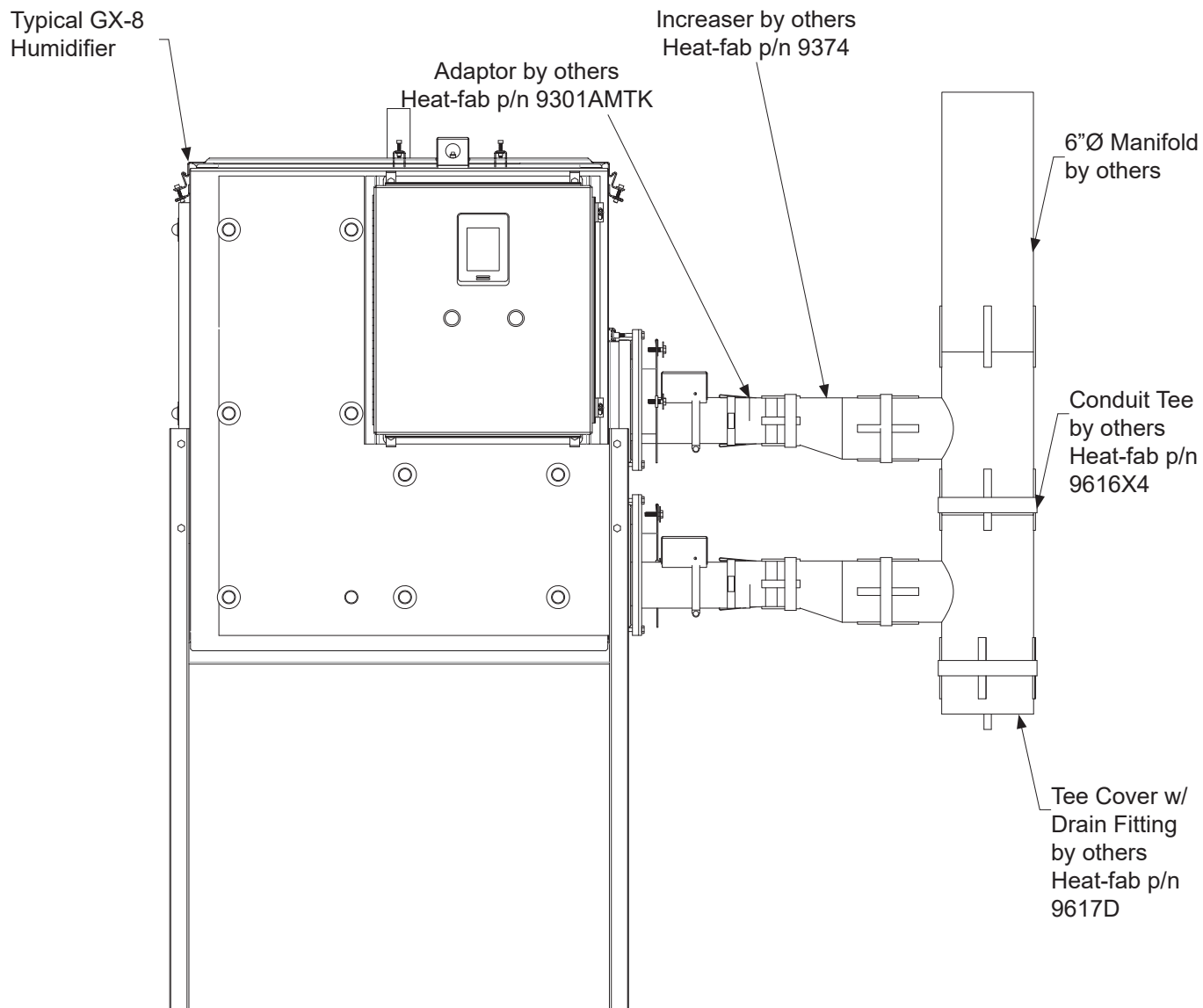
Sealed combustion burners can save energy because they don't steal heated or cooled indoor air.

Sealed combustion burners reduce space heating costs and noise while eliminating problems associated with power-vented combustion.



GX-8 Exhaust Manifold

Reference pages 8 & 9 for venting installation instructions

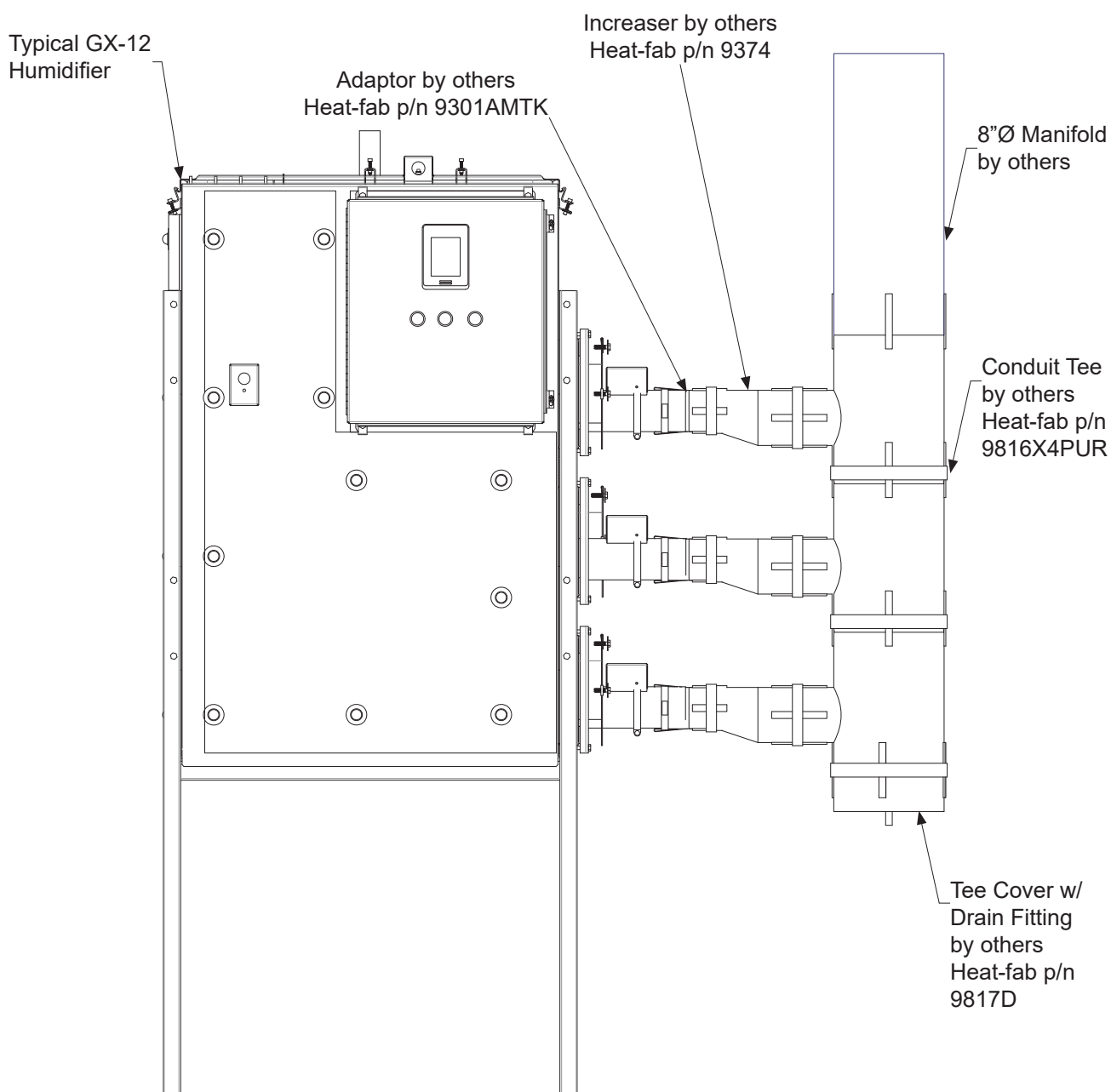


All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636



GX-12 Exhaust Manifold

Reference pages 8 & 9 for venting installation instructions



All exhaust connections and piping to be Category 3 Appliance Listed to UL Standard 1738 or ULC-S636



Water Supply & Drain Piping

Water Supply Piping

This style of humidifier utilizes a Tri-Probe conductive type water control system which is designed for use with standard (hard or softened) tap water. Use of demineralized, deionized or reverse osmosis water will cause failure of the water level control system and void the humidifier warranty.

Cold or hot standard tap water can be supplied to the humidifier. A minimum water pressure of 35 p.s.i. (2.4 Bar) should be maintained to provide the proper water level within the humidifier. DO NOT exceed the maximum acceptable water pressure of 95 psi (6.6 Bar). If the water pressure is above 95 psi (6.6 Bar) a pressure reducing valve should be installed. The humidifier has a factory built-in 1.5" (4 cm) air gap between the water inlet and the overflow. Local codes should be checked to see if the addition of a vacuum-breaking device is required.

Drain Piping

The GX style humidifier requires one 3/4" SW copper drain piping connection. The drain line should be piped to a water seal as shown in the drain piping illustration.

A water seal as shown in the piping illustration should be installed to prevent steam from escaping through the drain line. The water seal should be of sufficient height to overcome the pressure developed in the humidifier (reference water seal height table) and the duct static pressure.

The drain piping should be copper or stainless steel. The use of PVC piping is not recommended; the humidifier temperature may cause the PVC to soften and fail.

If gravity drain is not possible please use a condensate pump rated for 212°F water or contact a PURE Humidifier Co. Representative to purchase one.

Tri-Probe Sensor Water Requirements

Resistivity (ohms)	Conductivity (G or 1/R)	Dissolved Solids (ppm)
<13K	>77 umhos (min)	approx. >40

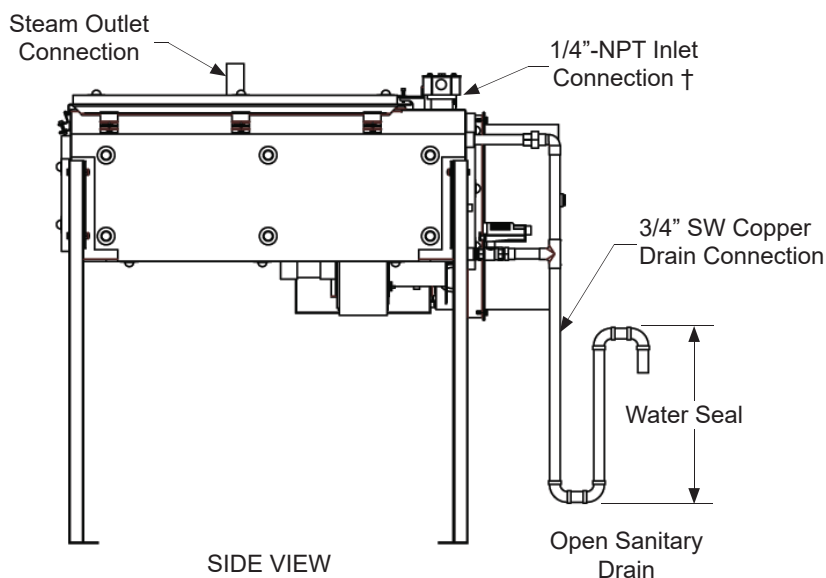
Water Seal Height Δ

Total lbs/hr (kg/hr)	"H"
Up to 60 (27.2)	8" (20 cm)
60 to 99 (44.9)	11" (28 cm)
100 to 150 (68.0)	17" (43 cm)
151 & up	19" (48 cm)

Δ The water seal height may have to be increased if excessive duct static pressure exists

NOTES

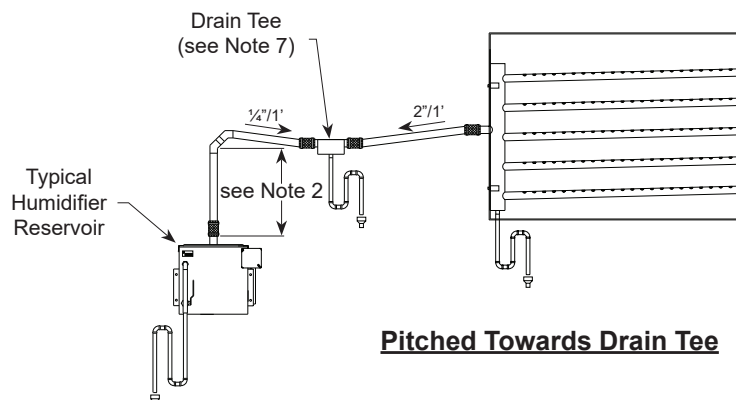
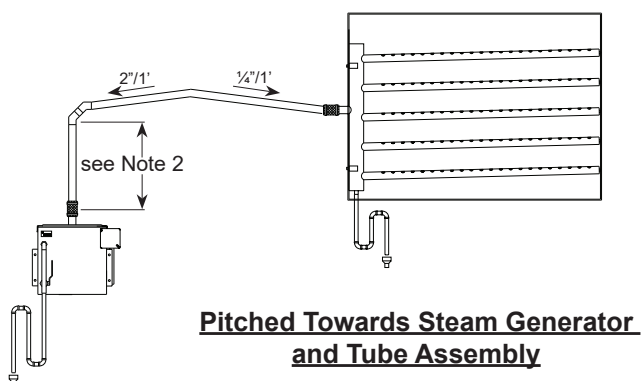
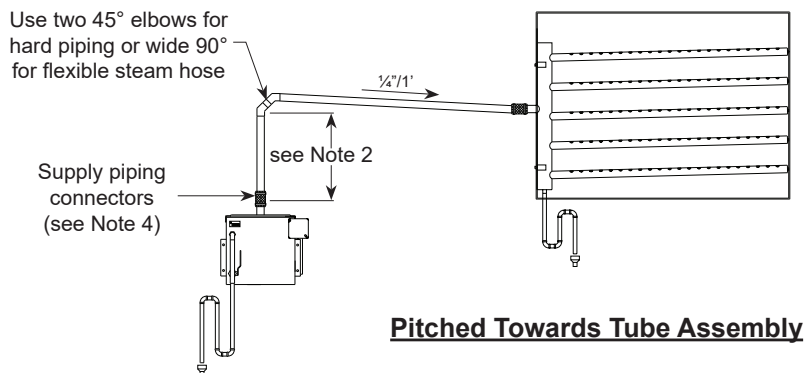
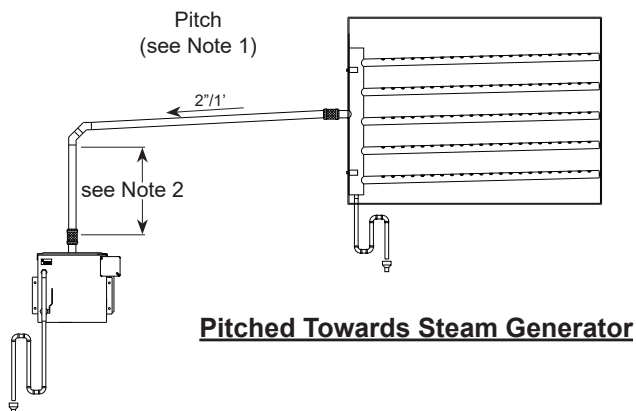
1. All drain piping is by others.
2. Drain and overflow piping are factory piped. One 3/4" SW copper drain connection is required.
3. Do NOT use PVC or other plastic piping that is not rated for 220°F or higher.



† The humidifier has a 1.5" (4 cm) air gap between the water inlet and humidifier water level. Consult the local code to determine if a vacuum braking device is required.



Steam Supply Piping Examples



Notes:

1. Pitch hard piping or flexible hose 2" per foot if steam is flowing uphill, 1/4" per foot if the steam is flowing downhill. Reference piping examples shown.
2. When feasible to do so, install a minimum one-foot riser from the top of the tank to reduce condensate carryover.
3. Use flex connectors or unions to allow for easy removal of cover.
4. Support flexible hose every 18" to avoid sagging.
5. Hard piping or flexible hose must match reservoir outlet size. Do not use supply piping with a smaller inside diameter than the reservoir outlet.
6. Failure to follow the piping recommendation on this page may result in blown water seals, leaking cover gasket, or dispersion tubes spitting.
7. Install a Drain Tee at any low spots in supply piping run where condensate will accumulate. **All horizontal to vertical up transitions require a water-sealed drip leg.**
8. Reference job specific tube assembly O&M included with your order for complete details.



Modulating Control Operation

Overview

The INTAC® PLC controls the humidifier tank functions and up to 3 gas burners. The PLC also provides standard a BACnet MS/TP or IP interface.

Inputs:

- 1 or 2 humidity sensors or a control signal and a humidity signal
- water level sensing
- tank mounted ntc thermistor
- reset button 1, reset button 2, and reset button 3
- burner #1 status, burner #2 status, and burner #3 status
- safety circuit(duct airflow switch and supply humidity safety high limit)
- manual reset over-temp switch
- humidity control disable

Outputs:

- pilot relay
- fill valve on/off or modulating
- burner #1 proportional valve control
- drain output
- burner #1, burner #2, and burner #3 control power enables
- combustion blower 1, blower 2, and blower 3 fan power enables
- burner lockout alarm
- RH alarm (when main input is a sensor)

INTAC® PLC Factory Settings

Setting	Models		
	GX-3 / GXDDR-3 GX-4 / GXDDR-4	GX-8 / GXDDR-8	GX-12 / GXDDR-12
Burner #1 on	5%	5%	5%
Burner #1 off	3%	3%	3%
Burner #2 on	NA	50%	33%
Burner #2 off	NA	47%	30%
Burner #3 on	NA	NA	66%
Burner #3 off	NA	NA	63%



Modulating Control Operation (Con't)

Gas System Sequence

1. When humidifier % power is greater than or equal to Burner #1 on, all combustion blower outputs and the burner #1 control power enable output will turn on.
2. If configured for at least a two-burner system, when % power is greater than or equal to Burner #2 on, the burner #2 control power enable output will turn on.
3. If configured for at three-burner system, when % power is greater than or equal to Burner #3 on, the burner #3 control power enable output will turn on.
4. When % power is less than or equal to Burner #3 off, the burner #3 control power enable output will turn off.
5. When % power is less than or equal to Burner #2 off, the burner #2 control power enable output will turn off.
6. When % power is less than or equal to Burner #1 off, the burner #1 control power enable output will turn off. The blower outputs will remain on for the post purge time of 30 seconds. If the % power increases to a value greater than Burner #1 on during the post purge time, the Blower Output will remain on and the sequence will begin again only after the post purge time has expired.
7. If the % power is equal to zero all burners will turn off.
8. Once a burner is enabled and the burner airflow switch is proven, that burner's flame controller will get power. The flame controller will run its own 30 second pre-purge before attempting to light the pilot and energize its main gas valve.
9. Burner #1 also has an end switch on the modulating motor that will close when the air damper is in the high-fire position. The burner #1 flame controller will initially receive power when burner #1 enable relay is closed, its airflow switch is closed and the end switch on the modulation motor is closed.
10. Burner #1 proportional valve control 0-10 VDC signal will modulate up and down when any of the three burners are on. As the % power increases the modulating signal will go from low to high fire proportionally. When the % power values approaches a burner on set point the modulating signal will reach the maximum 10VDC and the #1 burner will be at high fire. When the next on/off burner turns on the modulating signal will drop back down to 2VDC which will bring the #1 burner down to low fire. As the % power falls and a burner stage turns off the modulation signal will go from low to high fire similarly.



GX Pre-Startup Procedure

Pre-Startup Checklist

Before starting the GX PURE Humidifier Co. Steam Heat Exchanger Humidifier, check the following installation items:

_____ 1. MOUNTING - Verify that the humidifier evaporating chamber is securely supported and that the evaporating chamber is level in both directions. If humidifier is installed above equipment or not located near a floor drain then a drain pan should be installed below the humidifier steam generator.

_____ 2. INJECTION TUBES - If it is an Insty-Pac or Fast Pac refer to the respective O&M to determine if they are mounted properly and have the proper p-trap size.

_____ 3. ELECTRICAL - Verify that all wiring connections have been connected in accordance with the wiring diagram. **CAUTION: Live power may exist in the control cabinet. Turn off the main power at the disconnect switch before verifying the electrical connections!**

_____ 4. SAFETY CONTROLS – The supply air duct RH high-limit should be installed at least 10 feet downstream from the humidifier tube(s). Any other control sensors should be at least 10 feet downstream from the humidifier tube(s). Smoke detectors should not be installed downstream of the humidifier tube(s). If a smoke detector absolutely has to be installed downstream from the humidifier tubes then it should be installed as far from the tubes as possible.

_____ 5. PIPING: Water Supply - Verify that all piping connections have been completed as recommended and that water pressure is available to the humidifier. Verify that the supply water pressure is 35-95 psi. There should be at least 5 ft of metal pipe and check valve between the tank and any plastic pipe.

_____ 6. PIPING: Drain - Make sure a water seal of the proper height (refer to steam generator O&M for height) is provided in the drain line.

_____ 7. PIPING: Gas - Make sure a field installed main shut-off is installed before the humidifier burner/gas train. Make sure a union is installed after the main shut-off. Make sure the supply pressure to the humidifier matches the name plate value.

_____ 8. PIPING: Steam Outlet - Refer to Supply Piping Examples page for proper outlet steam piping from the generator to the tube(s). **Any horizontal to vertical up transition in the outlet steam pipe requires a water-sealed drip leg!** Improper outlet steam piping will cause steam to leak from the steam generator. Runs over 20 feet long may require upsizing of the steam pipe.

_____ 9. EXHAUST VENTING: Make sure the exhaust venting is the correct size and properly installed. See Capacities, Electrical & Weights page for size chart.

Signature: _____ Date: _____



GX Startup Procedure

Introduction

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

Startup Procedure

- _____ 1. Turn the electric power "on" to the humidifier.
- _____ 2. RH Setpoint on the touchscreen should be set to 0.0% RH (no call for humidity). If there is no display of actual humidity on the touchscreen the procedure must be done through the Building Management System.
- _____ 3. Open the water supply on/off control valve (by others) and allow the humidifier evaporating chamber to fill to the proper level.
- _____ 4. Make sure all the optional safety switches are satisfied (airflow proving switch, high-limit humidistat, etc).
- _____ 5. After the humidifier is full of water the touchscreen will read "Water Level FULL".
- _____ 6. Verify the low water safety shutoff by changing the operation mode to "Drain" on the touchscreen. The humidifier should drain to a level where the touchscreen will read Water Level "Low".
- _____ 7. Change the operation mode back to "Normal". Verify that the Control Relay is off/deenergized while the water level reads "Low". The relay should energize when the water level reading changes to "Refill". This indicates that the low water safety shutoff is operational.
- _____ 8. Set The RH Setpoint on the touchscreen above the actual reading to get a call for humidity. If a Building Automation System is controlling the humidifier, set it to call for 100% demand. For Building Automation System verify 0% and 100% demands are displayed as 0% and 100% on the touchscreen or adjust the input high and low values to match accordingly.
- _____ 9. Proceed to "Burner Start Up Procedure".
- _____ 10. Check operation of field installed safety switches (air flow proving switch and the high-limit humidistat) to make sure they turn the power off to the control relay which is the control circuit power. The safety switches should shut off the humidifier burner(s) whenever one or more of the optional safety switches create an open circuit.
- _____ 11. Inspect installation for leaks by operating humidifier at a full, rolling boil. This may take up to 15 minutes from a cold start. Any leaks should be sealed. Just tightening a pressure clamp will not work if the gasket is not properly positioned between the sealing surfaces. If necessary, remove the cover or side-entry plate, reseal gasket and replace cover or side entry plate. A small amount of adhesive to hold the gasket in place while repositioning the cover or side-entry plate will aid in this process.
- _____ 12. After the unit is producing steam, check and retighten all hose clamp connections in the system and make sure they are torqued to 35-40 in-lbs.

Signature: _____ Date: _____



GX Burner Startup Procedure

Burner Startup Procedure:

The following procedure may be used by qualified service personnel to start the GX series gas humidifier. It is assumed that all electrical, gas supply and exhaust systems have been installed by qualified professionals per all applicable codes and regulations and have been tested and accepted.

Equipment Needed:

1. Gas Analyzer
2. 2 Manometers (Range 0 to 20 inches WC)
3. 3/4" NPT to 1/8" NPT Hex Reducer

Before Starting:

_____ 1. Verify that the "TYPE" of fuel is correct for the specific orifice installed (Natural Gas or LP Gas).

_____ 2. **Verify that the MAIN SUPPLY gas pressure is correct.** This should be taken at the 1/8" NPT pressure tap on the manual shut-off valve immediately upstream of burner gas train. Use one of the the manometers to see that it is **7 inches W.C. for natural gas, or 10 inches W.C. for propane.** If the gas pressure is not correct, adjust the regulator feeding the humidifier. If this cannot be done, the burner regulator and pilot will require adjustments.

_____ 3. Verify that the electrical supply voltage is correct.

_____ 4. Verify that the exhaust system is installed and is not blocked.

_____ 5. Verify that the gas train piping on the burner is plumb and square. Piping may have shifted during shipment, so check to make sure all gas connections are tight.

_____ 6. Check the air damper/gas butterfly valve linkage markings. Make sure all markings are aligned.

_____ 7. Using the 3/4" hex reducer (may already be installed on burner) and **hook up the second manometer to the orifice tee downstream of the combination valve regulator and butterfly modulating valve.** This is where manifold pressure will be measured.

Startup and Adjustments:

_____ 1. The air damper will be fully open if the burner is to be fired at the maximum rate. Otherwise, depending upon the desired output, the air damper will be in an intermediate position during the ignition period.

_____ 2. Turn Gas Combination Valve to "Off" position.

_____ 3. Start burner sequence by changing the RH set point to 100% RH on the touchscreen. The INTAC® controller should call for 100% output on the touchscreen. If the humidifier is being controlled by a building management signal, have the controller call for 100% power.

_____ 4. After an automatic 30-second purge cycle, pilot ignition will begin. You will hear the pilot solenoid "click" open. The pilot is factory set but may need adjustment if anything is changed on the burner.

_____ 5. Typically the pilot regulator will be about 2 full rotations out from the "bottom" fully tightened position. The red button on the front of the humidifier control panel will reset the burner automatically if the pilot fails to light.

_____ 6. With pilot ignited, turn the Combination Regulator Valve to "On" position.

_____ 7. Only if necessary, adjust the main burner combination regulator to give a manifold pressure equal to what is specified on the humidifier nameplate. **Manifold pressure measurement should be made at the 3/4" orifice tee.** After making a pressure adjustment, allow approximately one minute for the system to find a steady value. (NOTE: Excessive gas pressure may cause burner to "rumble" or a slight backfire may result. If this occurs, back off the main burner gas pressure slightly until the rumble is not noticeable).

_____ 8. Allow humidifier to warm up. This may take up to half an hour. After humidifier has warmed up, recheck the manifold pressure while the unit is still calling for 100% power on the touchscreen.

_____ 9. Observe the O₂ (Excess Oxygen) level. Should be approximately 3%-7%.

_____ 10. Observe the CO (Carbon monoxide) level. Should be under 100ppm.



GX Burner Startup Procedure (Con't)

_____ 11. If the unit has a modulating burner, proceed to the "For Modulating Burners" section.

For Modulating Burners

Burners set up for modulation are turned in the factory. However, due to the different conditions that occur with each particular installation, slight adjustments may have to be made with the gas/air linkage.

Consult the factory before making adjustments to the linkage.

Once it has been verified that the burner is operating at acceptable levels at high fire, low fire operation should be checked. Make sure that burners two and three are off, as well as the manual gas valves. To check the burner's combustion at low fire, disconnect the DC + signal wire coming from the INTAC® PLC controller.

Allow the burner to modulate down and let the gas analyzer readings to stabilize. The readings should be as specified in steps 9 and 10 of the "Startup and Adjustments" section. If the readings are acceptable, then reconnect the DC + signal wire. If they are not acceptable or if the burner blows itself out while modulating down, the burner linkage will need adjustment.

For Multiple Burner Humidifiers

For two and three burner models, only the first burner modulates. The additional burner(s) are of the on/off type. The modulating burner should be checked first. Turn off the manual gas valves to the other burner(s). Proceed with the steps above.

Once the first burner is operating properly, proceed with the next burner. Once all burners are operating, recheck the manifold pressures for each of the burners. Also check that the supply pressure has not dropped and is steady.

Return the touchscreen RH setpoint to the desired humidity set-point or return building management signal back to automatic operation mode.

Signature: _____ Date: _____



GX Troubleshooting

Problem	Possible Cause	Recommended Action
Humidifier will not heat	Blown control fuse	Check and replace.
	Control transformer not producing 24 vac control voltage	Check transformer output. Verify voltage across 24VAC Fused and 24VAC Com terminals
	Safety controls open (airflow switch, high-limit, etc.)	Verify that all safety circuit control switches are closed.
	Faulty humidity sensor	Verify voltage to and from humidity sensor.
Humidifier will not fill	No water pressure	Check water supply.
	Drain valve open	Close drain ball valve. If auto drain system is utilized, verify that the manual drain is closed by removing actuator and looking at valve stem position.
	No power to the fill valve	Check the fill relay and see if it is energized.
Humidifier will not stop filling or is short cycling	Fill valve stuck open	Check the fill relay and see if it is energized. If no voltage, check for dirt under valve seat.
	Drain valve open	Close drain ball valve. If auto drain system is utilized, verify that the drain valve is closed by removing the actuator and looking at valve stem position. The stem can be manually turned.
	Probes need cleaning	Remove Tri-Probe sensor and clean probe ends.
	Check Tri-Probe wiring on PLC	Make sure the Tri-Probe wiring matches the wiring diagram.



Burner Troubleshooting & Maintenance

Service/Maintenance Suggestions

The burner should be initially set up and serviced at regular intervals (preferably at the beginning of and mid-way through high use period) by a trained serviceman using the proper test instruments.

There is a red reset button/main gas light on the front of the humidifier control panel for each burner. Depressing the button will restart that particular burner's operation. If the pilot valve opens and the main gas light does not come on, the button must be depressed to reset the burner lockout. During start-up this may have to be repeated several times to purge air from the gas line. If the main gas light turns on briefly, then the burner controller will retry automatically after a short time delay.

Burner Fails to Start:

1. Bad fuse or switch open on incoming power source, or motor overload out.
2. Control circuit has an open control such as operating, limit or low water cut-off.
3. Push the reset button on the motor or open the power circuit on the the primary safety control.
4. Loose or faulty wiring. Tighten all terminal screws. Check wiring against wiring diagram furnished with burner.

Burner Motor Runs, But Pilot Does Not Light:

1. Be sure gas is turned on at meter and pilot cock is open.
2. Place hand on pilot valve to "feel" it open. Check gauge at tee in pilot line for gas pressure and prompt opening of pilot valve.
3. Check visually or by sound for spark arcing.
4. Refer to pilot checking procedures.
5. Check air switch and be sure its circuit closes during start.

Burner Motor Runs, Pilot Lights But Main Gas Valve Does Not Open:

1. Gas Valve in the "Off" Position. Turn to "On".
2. Check flame signal. If signal is low, adjust pilot gas pressure and air settings for improved readings.
3. Check gas valve circuit.
4. Shut-off cock or test cock not open.
5. Defective main valve.

Occasional Lockouts For No Apparent Reason:

1. Look for large gas pressure fluctuations. Stabilize pressure.
2. Re-check micoamp readings. If insufficient, check gas pressure and air damper setting. Check electrode setting. If flame signal is low, flame rod may have to be re-positioned.
3. Check ignition cable and electrode porcelain for damage or breaks, which could cause short.
4. Check for loose or broken wires.
5. Read flame monitor lockout code and follow flame monitor directions.

Burner Will Not Start—Even Though Burner Had Never Failed Before or Had Been Running On Normal Cycling Without Failure:

1. Operating control circuit open.
2. Defective control or loose wiring.
3. Limit circuit open.

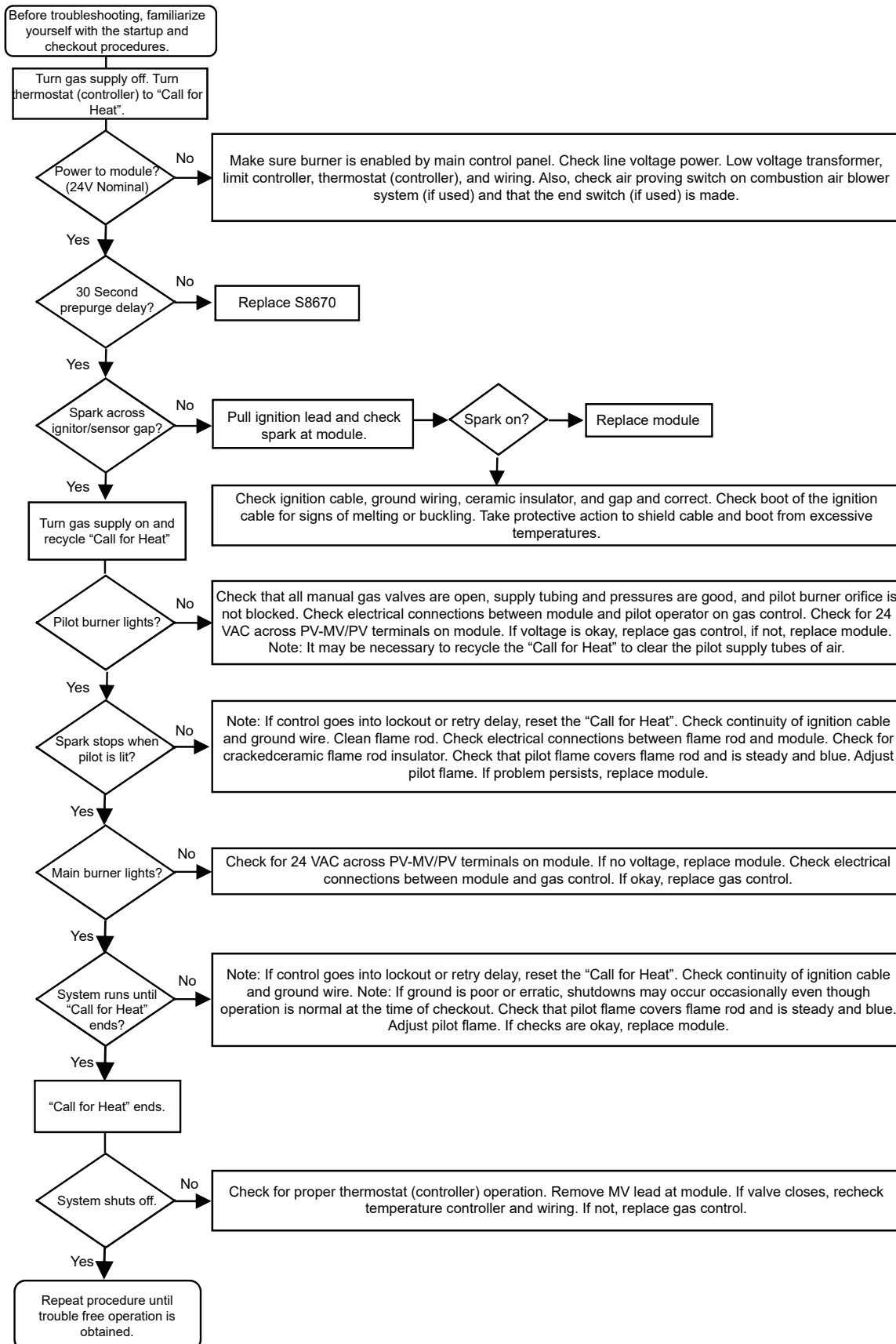
The burner must be periodically inspected to ensure safety and performance. All maintenance must be performed with the main electrical power off and the main gas shut-off valve off.

1. Inspect blower inlet screen and clean any buildup of lint.
2. Inspect blower wheel blades and clean any buildup of dirt.
3. Inspect ignition electrodes and wiring for any cracks that may cause shorting.
4. Oil the blower motor at the manufacturer's recommended intervals.
5. Verify that the pilot and or direct spark electrodes are still within specifications.
6. Verify the proper operation of the Primary Safety Control, airflow switch, and operating controls.
7. Check safety gas shut-off valves for gas tightness.

In the event of extended shutdown, the main power should be turned off and the main manual gas shut-off valve should be closed.

EMERGENCY SHUTDOWN: WARNING: Should over-heating occur: (1) shut-off manual gas valve(s) to the humidifier, (2) allow humidifier to cool, (3) check the heat exchanger(s) and remove excessive mineral build-up, (4) make sure the exhaust vent is not blocked with foreign material. **After the required maintenance has been performed,** the manual over-temp reset button on the exhaust and/or on the tank must be depressed.

An additional source of information relative to troubleshooting can be found in the Flame Safeguard Control Manual supplied with the burner.





Tool Requirements & Torque List

Recommended Maintenance Tool List
7/16" Wrench
3/4" Wrench
Crescent Wrench
11/32" Nut Driver or Socket
3/8" Nut Driver or Socket
5/32" Allen Head
Flat Head Screw Driver
Wire Stripper
Wire Crimper

Torque List	
Cover Bolts	18 inch/pounds MAX
Side Entry Exchanger Bolts	80 inch/pounds MAX
Hose Cuff Screws	35-40 inch/pounds MAX when hot



GX Maintenance

PURE Humidifier Co. GX Maintenance Instructions

The GX Series Humidifier is designed to provide the best possible operation with minimum maintenance. However, the humidifier should be inspected and placed on a dedicated maintenance schedule to ensure continued operation of the humidifier and accessories. **PURE Humidifier Co. recommends that the following items be inspected and/or cleaned on a minimum basis of twice each year.** If excessive mineral build-up occurs, the maintenance schedule should be increased.

Inspect/Maintenance Item	Procedure to Follow
Water Fill Valve	Check to make sure the fill valve is operating properly. If the valve appears to continually fill, check the valve seat and seal (see troubleshooting instructions).
Safety Interlocks (airflow, high-limit)	Check to make sure the safety interlocks (air flow, high-limit, etc.) will shut down the humidifier.
Over-temp Switch	The switch should be inspected for any physical damage.
Combustion Burners	Inspect and clean flame rod. Inspect air intake for obstructions and clean as required. Burner gas valve has an expected life of 200,000 cycles. Replace the valve at the end of the life cycle.
Humidifier Cover/Tank	Inspect for any leaks. Repair as required. Remove the mineral deposits from floor of the humidifier reservoir. If excessive build-up is found, the heat exchanger may need to be removed to facilitate complete cleaning of the humidifier.
Tri-Probe	Remove Tri-Probe sensor from humidifier (set-screw and o-ring seal) and inspect for excessive mineral build-up. Inspect plastic housing for cracks. Probe ends should be cleaned and the probe sensor re-installed.
Drain Valve & Drain Piping	The drain valve seat and seal should be inspected and cleaned as required. The drain line and water seal should be inspected and cleaned to ensure free flow of the overflow and drain line.
Flexible Hose	Inspect for cracks or leaks. It is normal for the hose to become hard and develop a "set". Replace cracked hose.

Cleaning Instructions

Hard Make-up Water

If utilizing hard make-up water, humidifier tanks will likely need to be cleaned manually. This can be done from the side-entry plate or cover. Remove all loose solids from tank and/or exchanger with a wet vacuum or putty knife and bucket. After removal of solids, replace the side-entry plate/cover. At this point you may wish to add a descaling solution. Contact your local representative for our easy to use, non-toxic PURE Clean descaling solution.

Softened Make-up Water

If utilizing softened make-up water, help eliminate build-up in the tank simply by adding a descaling solution. Contact your local representative for our easy to use, non-toxic PURE Clean descaling solution.

DO NOT use Hydrochloric acid-based descalers; this will corrode stainless steel.



Exchanger Gasket Replacement Instructions

WARNING

Disconnect the humidifier power, gas, exhaust system and allow the humidifier to cool prior to servicing. Drain water level below the level of the exchanger being serviced. Heat exchangers have a top and bottom. There is a break (crease) on the bottom side of the heat exchanger. Do not install heat exchanger upside-down.

1. Loosen the exchanger cover clamp screws with a 7/16" socket wrench until the locknuts can be slid out from the mounting clamps. Repeat this step for all clamps. Remove exchanger.
2. Remove the old gasket and adhesive left of the heat exchanger. Make sure this surface is clean, dry, and free of oil, grease or water. Turpentine may be used to clean the surface areas.
3. Spray contact adhesive such as 3M product Super 77 on one side of the new gasket and on the exchanger surface where the gasket is to be applied. Allow both surfaces to dry a minimum of one minute or until the surfaces become tacky to assure proper bonding.
4. Square one end of the new gasket on one end of the exchanger and set by applying light to moderate pressure to the gasket. Square the other end of the gasket on the other end of the exchanger. It is common for the gasket to appear too long. Now slowly start setting the gasket from the ends towards the middle of the exchanger. A slight compression of the gasket will occur ensuring proper fit on the ends.
5. Apply moderate to heavy pressure on the newly installed gasket all the way around ensuring proper fit. A properly installed gasket will lay flat with no raised areas.
6. Reinstall the heat exchanger into the humidifier.
7. Loosely install all of the exchanger cover clamps.
8. Using a 7/16" torque wrench set at 60 inch/pounds tighten all clamp screws.
9. In a reverse manner, reconnect all gas, exhaust and electrical connections. Fill humidifier with water and check for leaks.
10. Observe for leaks and tighten slightly if a leak area is found. DO NOT EXCEED 120 inch/pounds.



Cover Gasket Replacement Instructions

Remove the reservoir cover. While looking at the top of the unit, reference Figure A and B to determine which humidifier tank style you have.

Figure A Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket $\frac{1}{8}$ " longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter, and seal the ends together with a small amount of silicone.

Figure B Installation

Fit the gasket around the entire lip of the tank opening. Cut the gasket $\frac{1}{8}$ " longer than required, this will ensure proper fit when the cover is clamped back on. Slide the gasket onto lip of tank around the entire perimeter. Notch only the bottom flap of the gasket (reference Fig. C) in the corners of the tank. Seal the ends together with a small amount of silicone.

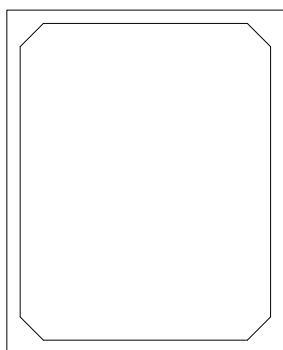


Fig. A
Plan View of Humidifier

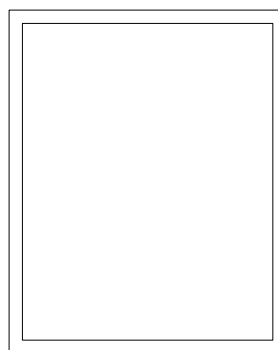
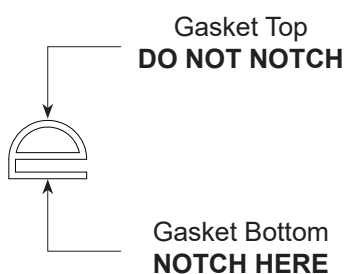
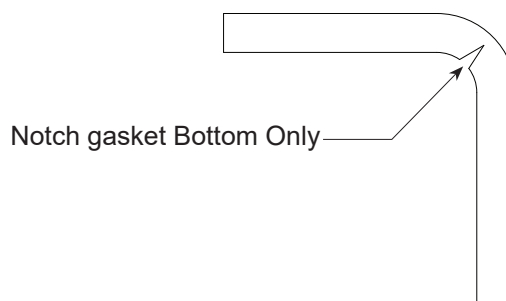


Fig. B
Plan View of Humidifier



Section View of Gasket



Bottom View of Gasket



Maintenance Notes

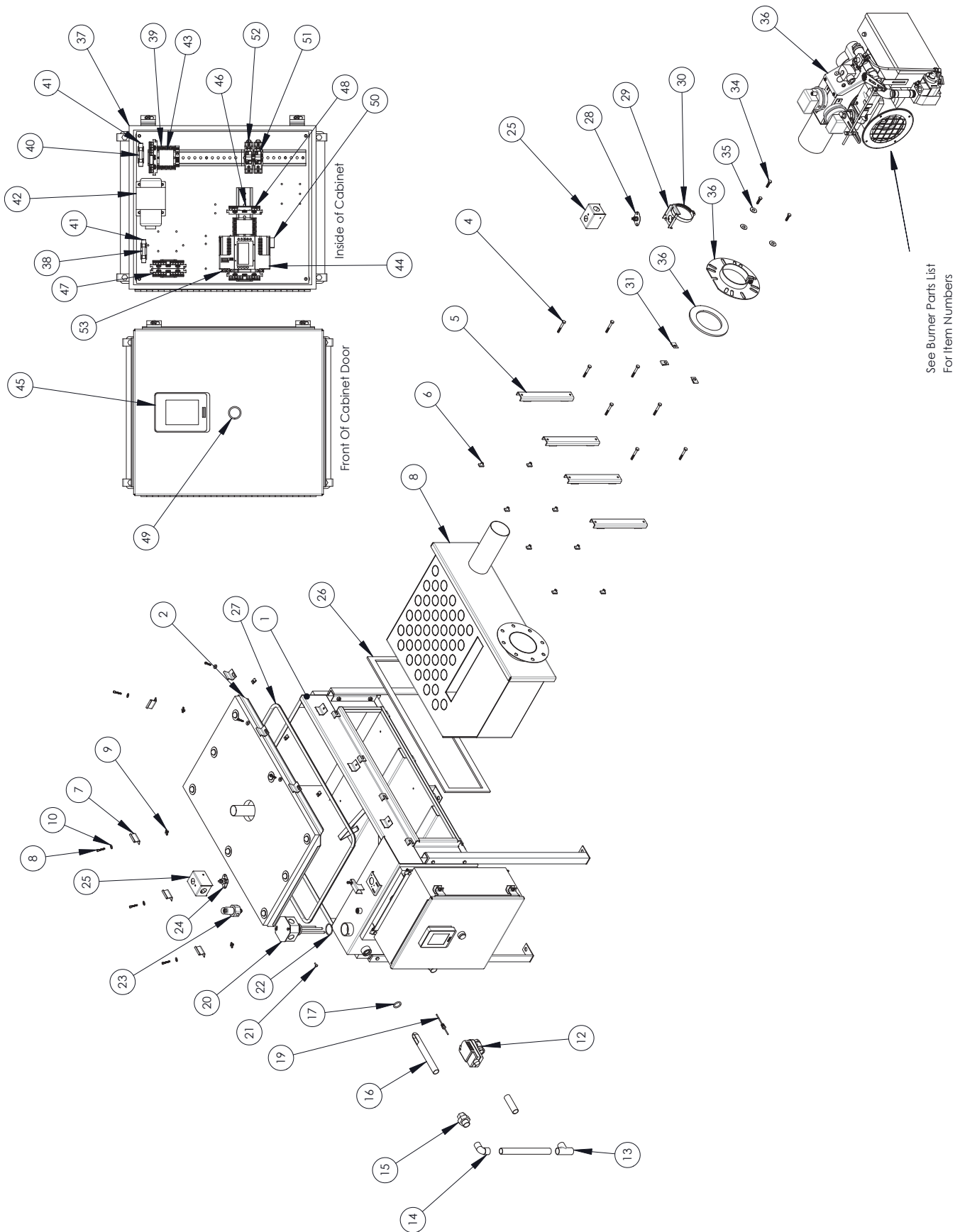
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Maintenance Notes

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Exploded Parts Drawing GX-3 & GX-4





PURE™
Humidifier

PURE Humidifier Co. GX-3 & GX-4 Parts List & Two Year Recommended Spare Parts

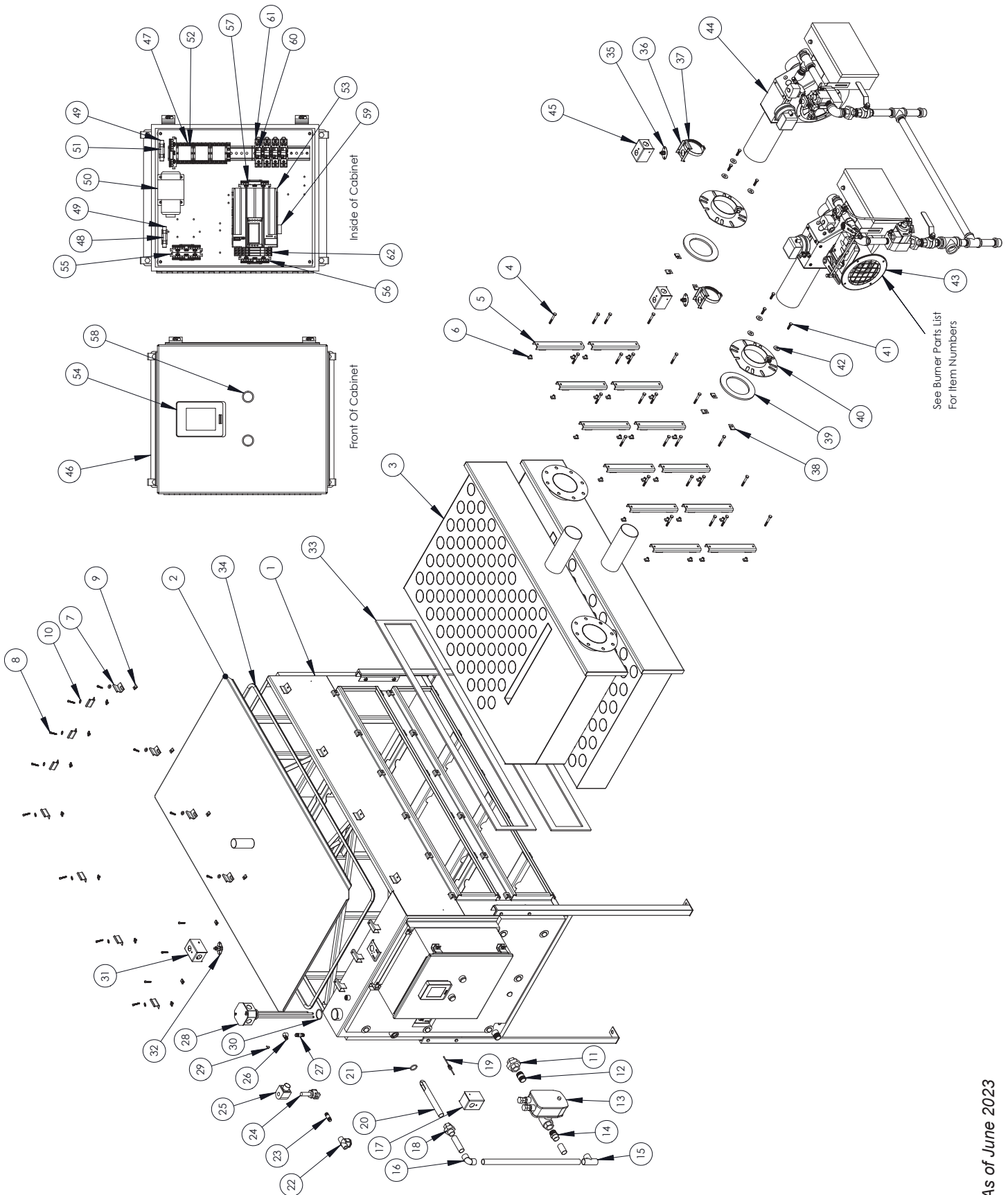
Item No.	Description	Part No.	Qty Per Unit
1	GX Tank (includes insulation)	A	1
2	GX Top Cover	A	1
3	GX Heat Exchanger	A	1
4	Clamp Bar Bolt (1/4"-20 x 2" Hex)	15841	A
5	Clamp Bar	99136	A
6	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	A
7	Cover Clamp	15930	A
8	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	A
9	Cover Clamp Nut (10-24 U-Nut)	15524	A
10	#12 SAE Zinc Washer	15184	A
11	3/4" Copper Male Adaptor	08013	1
12	Motorized Drain Valve	A	1
13	3/4" Copper Sweat Tee	08014	1
14	3/4" 90 Degree Copper Elbow	08011	1
15	3/4" Sweat Union	08015	1
16	Copper Flusher	01113	1
17	Flusher O-Ring	15164	1
18	Overtemp Switch Housing 450°F	15072A	1
19	Tank Temp Sensor	A	1
20	GX Tri-Probe	A	1
21	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
22	Tri-Probe O-Ring	15166	1
23	1/4" Solenoid Fill Valve w/ Internal Strainer	A	1
24	Overtemp Protection Switch	15047	1
25	Overtemp Switch Housing 250°F	15072	1
26	GX Heat Exchanger Gasket	A	1
27	Cover Gasket	15520	1
28	Exhaust Over Temp. Switch 450°F Manual Reset	21022	1
29	Overtemp Switch Plate	99170	1
30	3" Hose Clamp	15606	1
31	Burner Flange Nut (3/8-16 J Style Clip On)	15850	3
32	Burner Flange Gasket	05901	1
33	Burner Flange	21072	1
34	Burner Flange Bolt (3/8-16 x 1" Hex)	15943	3
35	3/8 Stainless Steel Washer	15945	3
36	Gas Fired Burner	A	1
37	Control Enclosure	Consult Factory	
38	4 Amp Fuse	12065	1
39	Relay Base	12020	2
40	2 Amp Fuse	12063	1
41	Fuse Holder	12085	2
42	Step-Down Transformer	12245	1
43	Finder Relay	12018	2
44	INTAC® PLC 18I/O	16129	1
45	Touchscreen	16131	1
46	Wago 221-500 Splice Terminal Carrier	12382	5
47	Wago 221-415 Lever Splice Terminal (5 Position)	12381	7
48	Wago 221-413 Lever Splice Terminal (3 Position)	12380	3
49	Push Button Light with NC Relay	21021	1
50	PLC Terminal Blocks	A	A
51	781-1C- 24A Relay	16117	2
52	781-1C-SCT Base	16118	2
53	Slim Relay 24VAC/DC	16133	1

NOTES/CODES:

A = Part Number, quantity and price vary with model number.

* = Optional feature that may not be on all equipment.

Exploded Parts Drawing GX-8





PURE Humidifier Co. GX-8 Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	GX SIZE 8 Tank (includes insulation)	A	1
2	GX SIZE 8 Top Cover	99087	1
3	GX-4 Heat Exchanger (Burner on Left)	05346	1
3	GX-4 Heat Exchanger (Burner on Right)	05354	1
4	Clamp Bar Bolt (1/4-20 x 2" Hex)	15841	24
5	Clamp Bar	99136	12
6	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	24
7	Cover Clamp	15930	11
8	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	14
9	Cover Clamp Nut (10-24 U-Nut)	15524	14
10	#12 SAE Zinc Washer	15184	11
11	3/4" Stainless Steel Union	07114	1
12	3/4" Stainless Steel Close Nipple	07081	1
13	Motorized Drain Valve	A	1
14	3/4" Copper Male Adaptor	08013	1
15	3/4" x 3/4" x 3/4" Copper Sweat Tee	08014	1
16	3/4" 90 Degree Copper Elbow	08011	1
17	Overtemp/Thermocouple Housing	16071	1
18	3/4" Sweat Union Copper	08015	1
19	Tank Temp Sensor	A	1
20	Copper Flusher	01113	1
21	Flusher O-Ring	15164	1
22	Fill Valve Strainer	15139	1
23	1/4" x 1 1/2" Brass Nipple	08021	1
24	1/4" Fill Valve	09075	1
25	Fill Valve Solenoid	09078	1
26	1/4" Brass Street Elbow	08020	1
27	1/4" x 1 1/2" Stainless Steel Nipple	07043	1
28	GX-8/12 Tri-Probe	05349	1
29	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
30	Tri-Probe O-Ring	15166	1
31	Overtemp Switch Housing 250°F	15072	1
32	Overtemp Protection Switch	15047	1
33	GX SIZE 4 Heat Exchanger Gasket	05386	2
34	Cover Gasket	15520	1
35	Exhaust Over Temperature Switch 450° Manual Reset	21022	2
36	Overtemp Switch Plate	99170	2
37	3" Hose Clamp	15606	2
38	Burner Flange Nut (3/8-16 J Style Clip On)	15850	6
39	Burner Flange Gasket	05901	2
40	Burner Flange	21072	2
41	Burner Flange Bolt (3/8-16 x 1" Hex)	15943	6
42	3/8 Stainless Steel Washer	15945	6
43	Modulating Gas Fired Burner	21017	1
44	On/Off Gas Fired Burner	21016	1
45	Overtemp Switch Housing 450°F	15072A	2
46	Control Enclosure - Complete with all parts	Consult Factory	
47	Relay Base	12020	3
48	4 amp Fuse	12065	1
49	Fuse Holder	12085	2
50	Step-Down Transformer	12245	1
51	2 amp Fuse	12063	1
52	Finder Relay	12018	3
53	INTAC® PLC 28I/O	16130	1
54	Touchscreen	16131	1
55	Wago 221-500 Splice Terminal Carrier	12382	5
56	Wago 221-415 Lever Splice Terminal (5 Position)	12381	7
57	Wago 221-413 Lever Splice Terminal (3 Position)	12380	3
58	Push Button Light with NC Relay	21021	2
59	PLC Terminal Blocks	A	A
60	781-1C- 24A Relay	16117	4
61	781-1C-SCT Base	16118	4
62	Slim Relay 12VAC/DC	16132	3

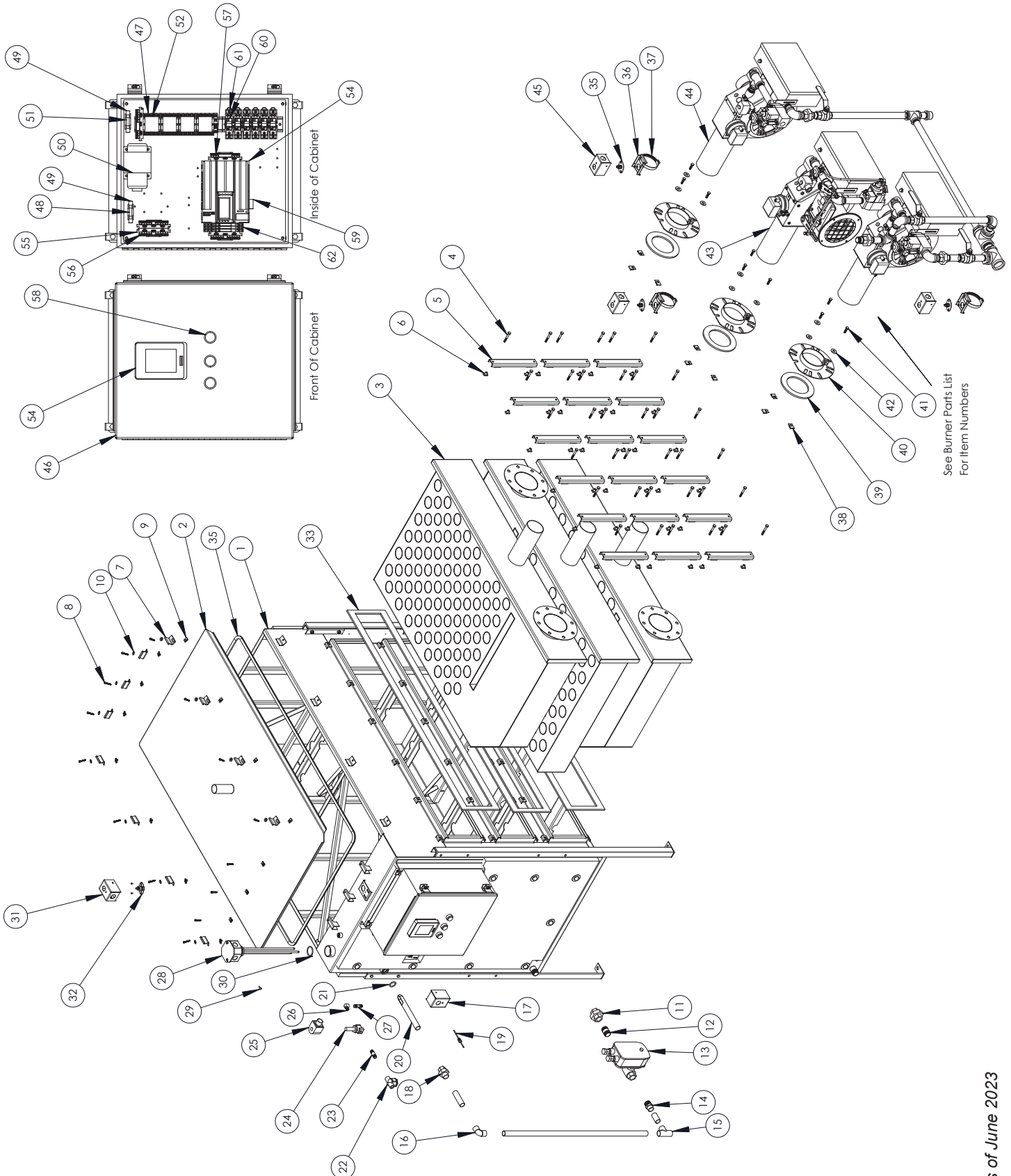
NOTES/CODES:

A = Part Number, quantity and price vary with model number.

* = Optional feature that may not be on all equipment.

As of June 2023

Exploded Parts Drawing GX-12





PURE Humidifier Co. GX-12 Parts List & Two Year Recommended Spare Parts

Item No.	Description	Part No.	Qty Per Unit
1	GX SIZE 12 Tank (includes insulation)	A	1
2	GX SIZE 12 Top Cover	99087	1
3	GX-4 Heat Exchanger (Burner on Left)	05346	2
3	GX-4 Heat Exchanger (Burner on Right)	05354	1
4	Clamp Bar Bolt (1/4-20 x 2" Hex)	15841	36
5	Clamp Bar	99136	18
6	Clamp Bar Nut (1/4"-20 Weld Nut)	15702	36
7	Cover Clamp	15930	11
8	Cover Clamp Screw (10-24 x 1" Hex Socket)	15522	14
9	Cover Clamp Nut (10-24 U-Nut)	15524	14
10	#12 SAE Zinc Washer	15184	11
11	3/4" Stainless Steel Union	07114	1
12	3/4" Stainless Steel Close Nipple	07081	1
13	Motorized Drain Valve	A	1
14	3/4" Copper Male Adaptor	08013	1
15	3/4" x 3/4" x 3/4" Copper Sweat Tee	08014	1
16	3/4" 90 Degree Copper Elbow	08011	1
17	Overtemp/Thermocouple Housing	16071	1
18	3/4" Sweat Union Copper	08015	1
19	Tank Temp Sensor	A	1
20	Copper Flusher	01113	1
21	Flusher O-Ring	15164	1
22	Fill Valve Strainer	15139	1
23	1/4" x 1 1/2" Brass Nipple	08021	1
24	1/4" Fill Valve	09075	1
25	Fill Valve Solenoid	09078	1
26	1/4" Brass Street Elbow	08020	1
27	1/4" x 1 1/2" Stainless Steel Nipple	07043	1
28	GX-8/12 Tri-Probe	05349	1
29	Tri-Probe Set Screw (10-32 x 3/8" SST)	15525	1
30	Tri-Probe O-Ring	15166	1
31	Overtemp Switch Housing 250°F	15072	1
32	Overtemp Protection Switch	15047	1
33	GX SIZE 4 Heat Exchanger Gasket	05386	3
34	Cover Gasket	15520	1
35	Exhaust Over Temperature Switch 450° Manual Reset	21022	3
36	Overtemp Switch Plate	99170	3
37	3" Hose Clamp	15606	3
38	Burner Flange Nut (3/8-16 J Style Clip On)	15850	9
39	Burner Flange Gasket	05901	3
40	Burner Flange	21072	3
41	Burner Flange Bolt (3/8-16 x 1" Hex)	15943	9
42	3/8 Stainless Steel Washer	15945	9
43	Modulating Gas Fired Burner	21017	1
44	On/Off Gas Fired Burner	21016	2
45	Overtemp Switch Housing 450°F	15072A	3
46	Control Enclosure - Complete with all parts	Consult Factory	
47	Relay Base	12020	4
48	4 amp Fuse	12065	1
49	Fuse Holder	12085	2
50	Step-Down Transformer	12245	1
51	2 amp Fuse	12063	1
52	Finder Relay	12018	4
53	INTAC® PLC 28I/O	16130	1
54	Touchscreen	16131	1
55	Wago 221-500 Splice Terminal Carrier	12382	5
56	Wago 221-415 Lever Splice Terminal (5 Position)	12381	7
57	Wago 221-413 Lever Splice Terminal (3 Position)	12380	3
58	Push Button Light with NC Relay	21021	3
59	PLC Terminal Blocks	A	A
60	781-1C- 24A Relay	16117	6
61	781-1C-SCT Base	16118	6
62	Slim Relay 12VAC/DC	16132	3

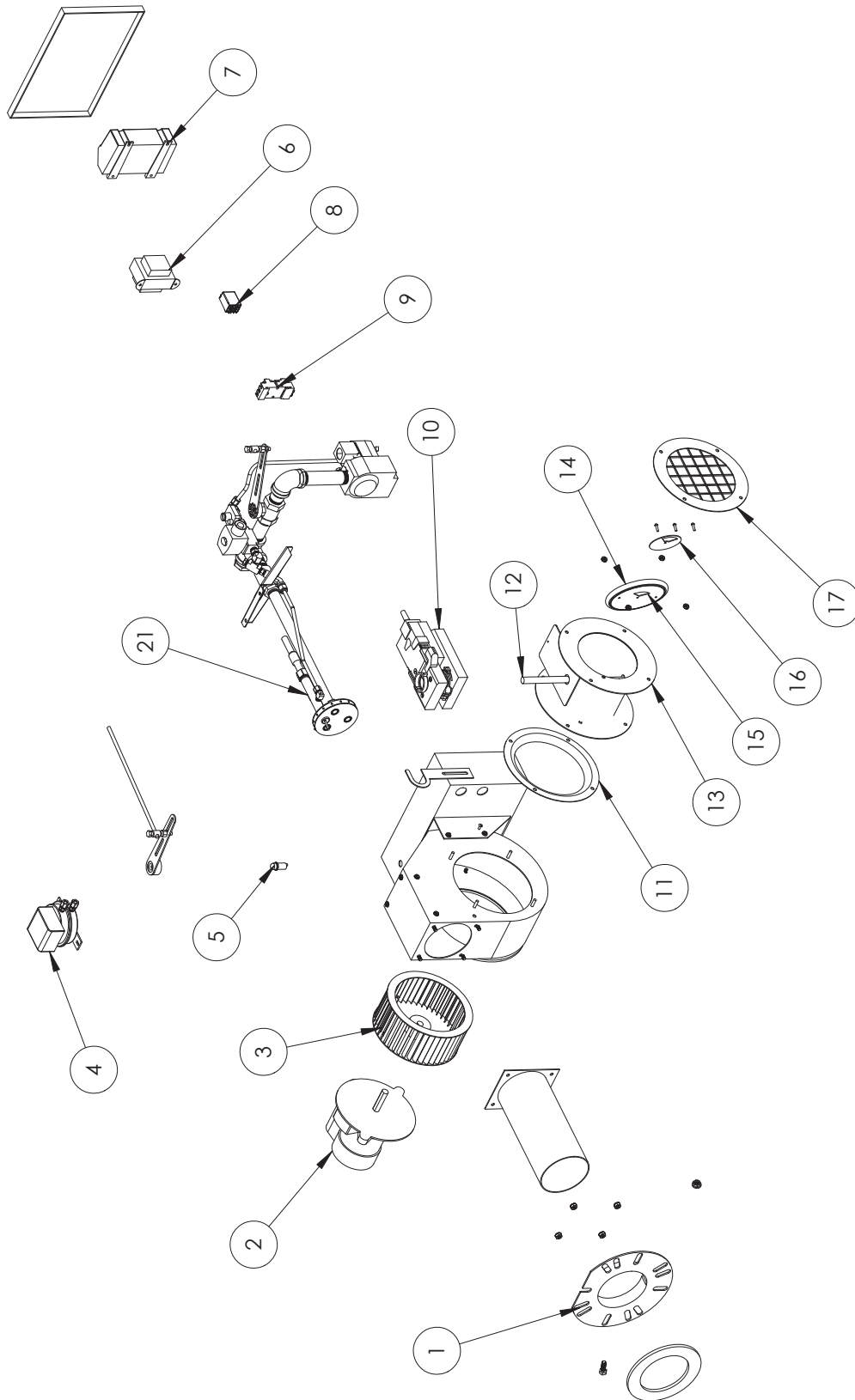
NOTES/CODES:

A = Part Number, quantity and price vary with model number.

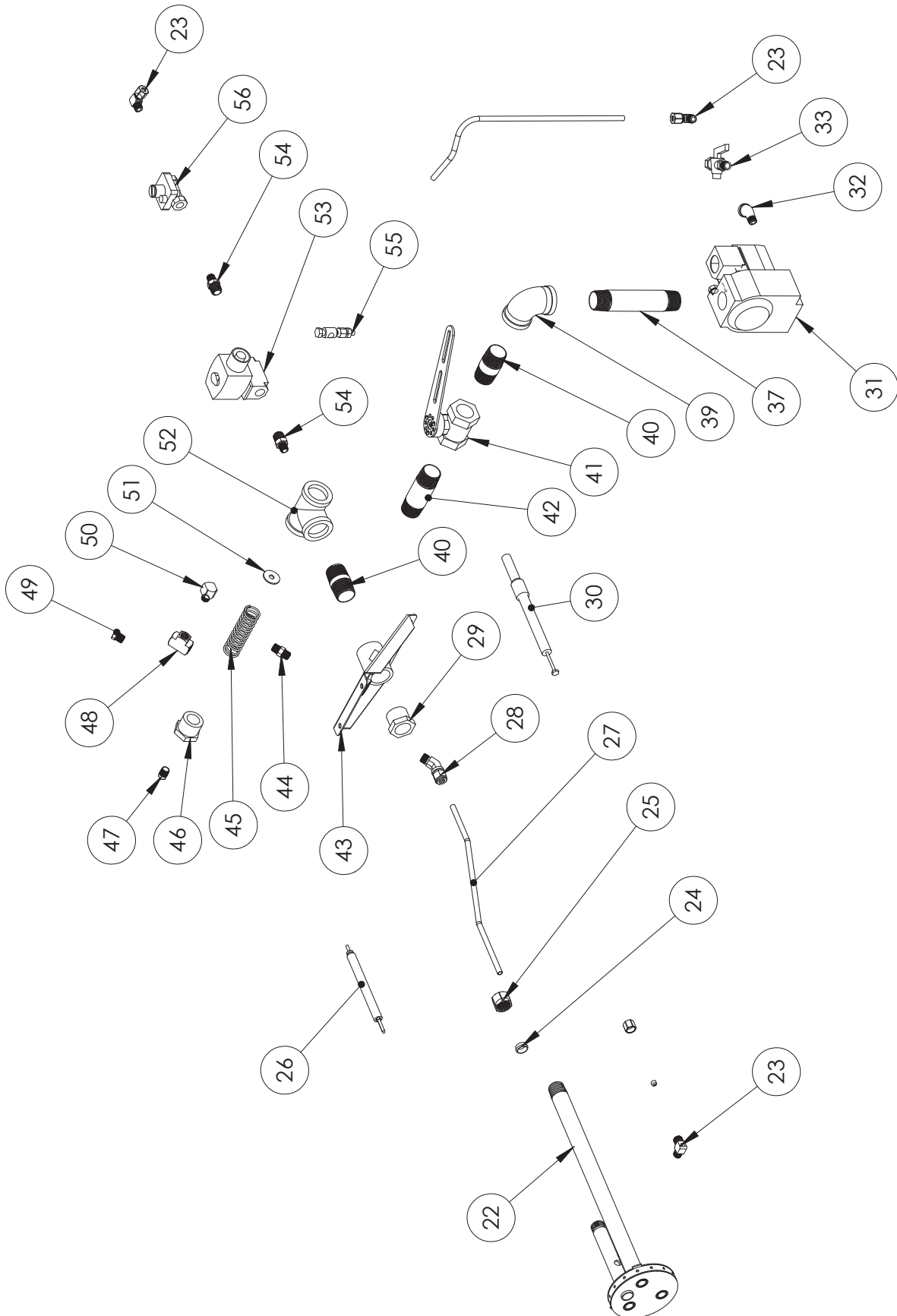
* = Optional feature that may not be on all equipment.

As of June 2023

Exploded Parts Drawing Modulating Burner



Exploded Parts Drawing *Modulating Burner Gun Assembly*

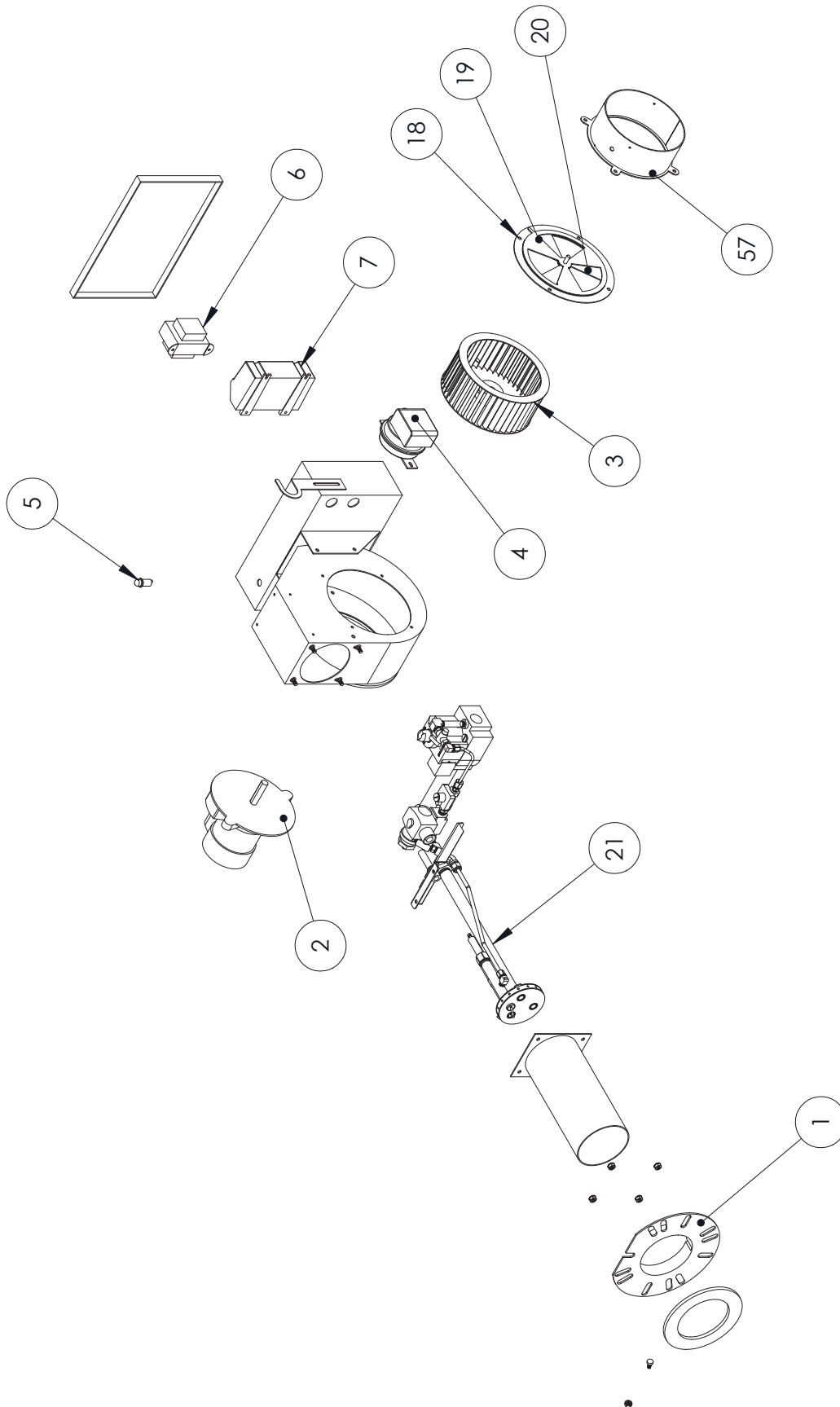




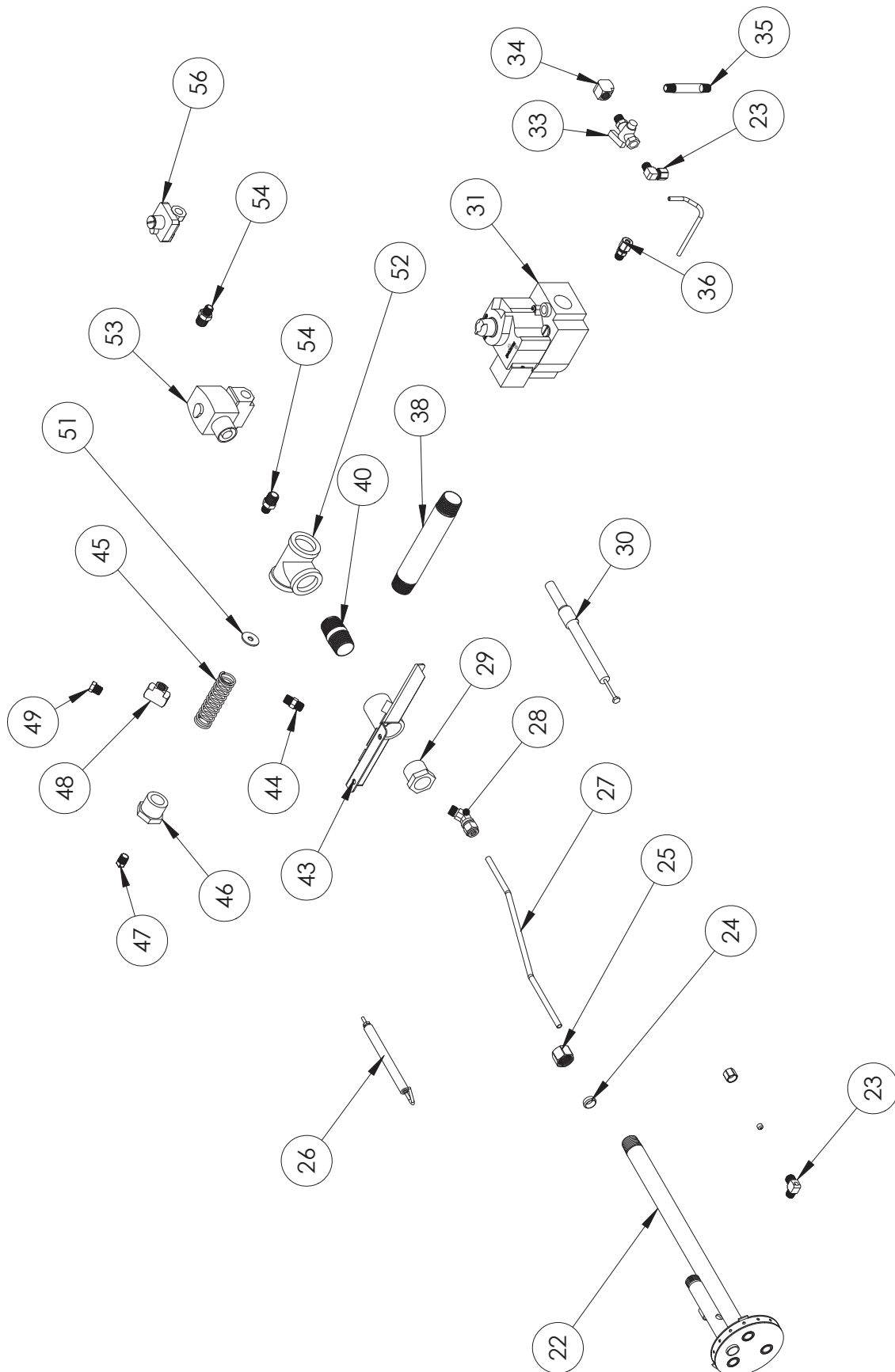
Modulating Burner Parts List

Burner Item No.	Description	Part No.
1	Burner Flange: L20050	21072
2	Burner Motor: 050050	21049
3	Blower Wheel	A
4	Air Switch: 171110	21058
5	Orange Light: X01468	21052
6	Transformer: 332231	21101
7	Flame Monitor: 396251	21057
8	Relay	21038
9	Relay Base	21037
10	Modulating Damper Motor	A
11	Inlet Ring: X08653	21081
12	Full Mod Axle: X01470	21083
13	Damper Body	21082
14	Air Damper Gasket:	21085
15	Air Damper Butterfly: L11001	21086
16	Air Damper Disc: L11000	21087
17	Air Damper Screen: L10200	21088
18	Parts of On/Off Burner	
19		
20		
21	Gun Assembly	A
22	Burner Head	A
23	1/4" x 1/8" Brass 90deg Elbow: X02676	08046
24	1/2" Compression Nut: X01454	08041
25	1/2" Delrin Sleeve: X01455	08049
26	Flame Rod: X04251	21062
27	1/4" Aluminum Tubing: 910750	01140
28	1/4" x 1/8" 45deg Compression Fitting: X02669	08045
29	3/4" x 1/2" Black Iron Hex Reducer Bushing: 871450	06035
30	Ignition Electrode: X01452	21059
31	Honeywell Combination Gas Valve/Regulator: X01463	21036
32	1/8" 45 deg Brass Street Elbow: 831050	08048
33	1/8" FP-MP Shut off Cock: X02786	21098
34	Parts of On/Off Burner	
35		
36		
37	3/4" x 5" Sched 40 Black Pipe: 864150	06028
38	Parts of On/Off Burner	
39		
40		
41	Butterfly Valve: M90010	21051
42	3/4" x 3" Sched 40 Black Pipe: 863950	06024
43	Back Plate Assy Gas Pilot: L20012	21096
44	1/8" Brass Hex Nipple: X02620	08042
45	3/4" Side Orifice Spring: X01406	21061
46	3/4" x 1/8" Black Iron Hex Reducer Bushing: 871300	06124
47	1/8" Black Pipe Plug: X02694	06125
48	1/8" Brass Tee: X02625	08043
49	1/8" Brass Hex Plug: X02699	08045
50	1/8" 90deg Brass Street Elbow: X02095	08050
51	Orifice Kit: 020001	21060
52	3/4" Side Orifice Tee: 873200	06074
53	Pilot Solenoid Valve: X01433	21071
54	1/4" x 1/8" Brass Reducer: X02640	08044
55	Damper control Swivel: 911000	21097
56	Pilot Regulator: X01419	21070
57	Sealed Combustion Adaptor: L20061 - (Optional Feature)	21077

Exploded Parts Drawing On/Off Burner



Exploded Parts Drawing On/Off Burner Gun Assembly





On/Off Burner Parts List

Burner Item No.	Description	Part No.
1	Burner Flange: L20050	21072
2	Burner Motor: 050050	21049
3	Blower Wheel: 7x3 X01401	21056
4	Air Switch: 171110	21058
5	Orange Light: X01468	21052
6	Transformer: 332231	21101
7	Flame Monitor: 396251	21057
8	Parts on Mod Burner	
9		
10		
11		
12		
13		
14		
15		
16		
17		
18	Damper Inner Plate: L10201	21093
19	Damper Middle Plate: L10202	21094
20	Damper Outer Plate: L10204	21095
21	On/Off Gun Assembly: L30037	21073
22	Burner Head: L20006	21055
23	1/4" x 1/8" Brass 90deg Elbow: X02676	08046
24	1/2" Compression Nut: X01454	08041
25	1/2" Delrin Sleeve: X01455	08049
26	Flame Rod: X04251	21062
27	1/4" Aluminum Tubing: 910750	01140
28	1/4" x 1/8" 45deg Compression Fitting: X02669	08045
29	3/4" x 1/2" Black Iron Hex Reducer Bushing: 871450	06035
30	Ignition Electrode: X01452	21059
31	Honeywell Combination Gas Valve/Regulator: X01463	21036
32	Parts on Mod Burner	
33	1/8" FP-MP Shut off Cock: X02786	21098
34	1/8" Brass 90deg Elbow 100-2: X02690	08051
35	1/8" x 2-1/2" SPS Brass Nipple: 843600	08052
36	1/4" x 1/8" Tubing to Male Straight Connector: 834000	08053
37	Parts on Mod Burner	
38	3/4" x 6" Sched 40 Black Pipe: 864150	06030
39	Parts on Mod Burner	
40	3/4" x 2" Black Iron Nipple: X02183	06022
41	Parts on Mod Burner	
42		
43	Back Plate Assy Gas Pilot: L20012	21096
44	1/8" Brass Hex Nipple: X02620	08042
45	3/4" Side Orifice Spring: X01406	21061
46	3/4" x 1/8" Black Iron Hex Reducer Bushing: 871300	06124
47	1/8" Black Pipe Plug: X02694	06125
48	1/8" Brass Tee: X02625	08043
49	1/8" Brass Hex Plug: X02699	08045
50	Parts on Mod Burner	
51	Orifice Kit: 020001	21060
52	3/4" Side Orifice Tee: 873200	06074
53	Pilot Solenoid Valve: X01433	21071
54	1/4" x 1/8" Brass Reducer: X02640	08044
55	Parts on Mod Burner	
56	Pilot Regulator: X01419	21070
57	Sealed Combustion Adaptor: L20061 - (Optional Feature)	21077



The PURE Humidifier Co. Warranty

PURE Humidifier Co. guarantees its products to be free from defects in material and workmanship for a period of two years from the date of shipment; provided the product is properly installed, serviced, and put into the service for which it was intended.

Chloride stress corrosion cracking (CSCC) and chloride pitting of stainless steel components is not covered by warranty.

PURE Humidifier Co. is obligated under the terms of this warranty to the repair or replacement of the defective part(s), excluding any labor charges, or to refund the purchase price at our option. PURE Humidifier Co. assumes no obligation for incidental or consequential damages. The above provisions are in lieu of all other guarantees, obligations, liabilities or warranties, expressed or implied.

DISCLAIMER

Product Changes: Changes in products may be required from time to time due to the need for continuing improvement of products and due to factors beyond PURE Humidifier Co.'s control. PURE Humidifier Co. reserves the right to make reasonable changes in products, specifications and performance of any kind without notice or liability. PURE Humidifier Co. also reserves the right to deliver revised designs or models of products against any order, unless this right is specifically waived in writing by PURE Humidifier Co. PURE Humidifier Co. shall have no responsibility whatsoever with respect to changes made by the manufacturer in products sold but not manufactured by PURE Humidifier Co.



141 N Jonathan Boulevard
Chaska, MN 55318
Tel: (952) 368-9335
www.purehumidifier.com