






OWNER'S MANUAL

EVAPORATOR SYSTEM



Safety Symbols

These symbols will appear throughout this document to indicate information that if ignored, may be a safety hazard. The use of symbols throughout this document is not comprehensive, just because information is not accompanied by a symbol, does not mean no safety concern exists.

Symbol	Meaning
	<u>Danger:</u> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	<u>Warning:</u> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
	<u>Caution:</u> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

Introduction: Read Before Use

The product presented in this brochure is subject to change without notice or obligation. The material in this manual is believed adequate for the intended use of the product.

This product is a water heating tank intended to be used to process water only. Determining suitability of using this product to heat other liquids is solely the responsibility of the user. Your specific uses are unknown to us, the original equipment manufacturer. Manufacturer does not represent to be chemists, metallurgists, electricians, application/process engineers nor any other form of expert to be relied on. This use is your application/process; therefore, you and your advisers are responsible for identifying & managing the hazards as they relate to the product. The manufacturer is not liable for the consequences of your use or the actions of others.

The manufacturer warrants that the supplied materials of construction are the same as what was promised and listed on the product ID plate, but we cannot say those materials are necessarily compatible with your particular application or process.

The warning labels pictured below are prominently mounted on the product. They highlight some of the general parameters detailed in this manual and in the manufacturer's Limited Warranty, but cannot and does not attempt to identify all issues relating to your installation, application, or process.

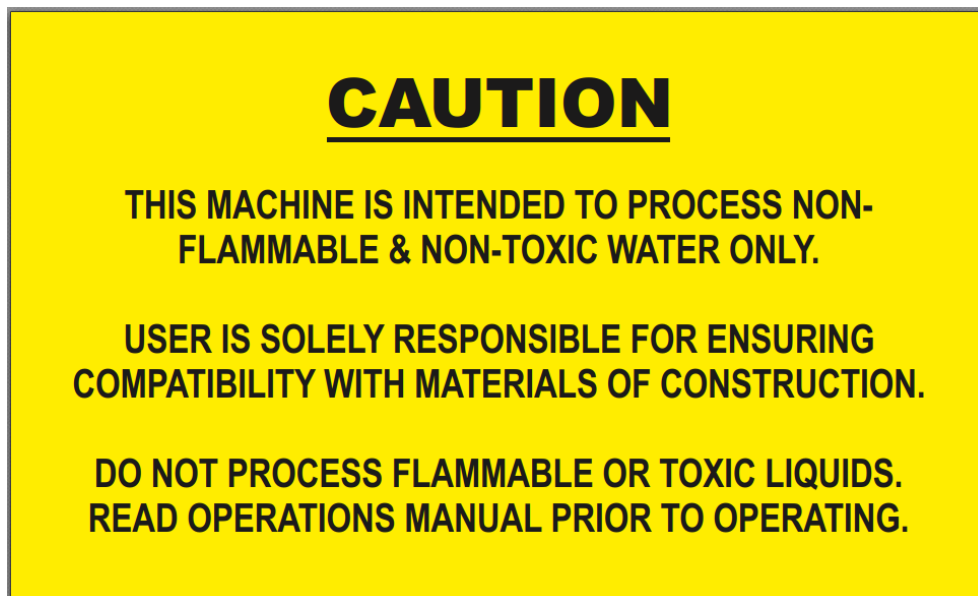


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Receiving Shipment

Inspect product for damage immediately upon arrival and note any damage on the Bill of Lading (BOL) before releasing the truck driver so that a freight claim can be made. Failure to note damage on the BOL will reduce likelihood of a successful freight claim.

The product was shipped from the factory in new, undamaged, and operable condition. Per FOB Factory freight terms, ownership of the product transfers from the manufacturer to the buyer once the shipper loads the freight on the truck. When the carrier delivers the product to the receiving party (consignee), it is the responsibility of the customer receiving the product to make a visual inspection of the items. If damage occurred during shipment, the customer is responsible for filing a claim with the carrier. If there were no visible signs of damage, but when the shipment is opened, damage is found, the customer is responsible for immediately contacting the freight company and submitting a "Concealed Damage" claim. In the event of any damage claim, immediately notify the manufacturer.

The manufacturer will not accept any merchandise back from the customer without a Return Merchandise Authorization (RMA). Contact the manufacturer for authorization. All return shipments must be pre-paid. Collect shipments will be refused.



Safety Precautions/ Instructions

Do not install or operate the evaporator before reading this instruction manual.

Please be aware of the following general precautions.

- Use adequate personal protection, warning and safety equipment necessary to protect against hazards involved in installation and operation of this equipment.
- All evaporator surfaces including attachments such as the auto-fill system may be hot enough to cause burns on contact. Boiling water and steam will cause serious burns.
- Disconnect or isolate all potential energy sources using proper lockout/tagout procedures before doing any work.
- Do not bypass or render inoperative any safety or protective devices.
- Use proper care and good procedures in handling, lifting, installing, operation, and maintaining the equipment.



Residual Safety Risks

The manufacturer designs its equipment with the mitigation of potential safety hazards as high priority, but safe operation is ultimately the responsibility of the user. Described below are residual safety risks incorporated with equipment operation that the user must be aware of:

Fire: Due to elevated heat exchanger surface temperatures, combustible materials inside or in close proximity to the evaporator may be at risk of ignition. Install the evaporator away from all combustible materials and vapors.

Electric Hazard: The evaporator needs a constant electric power supply in order to operate. To prevent electrical shock hazard, the Control Panel door MUST be closed prior to energizing and operating the unit. Any work on electrical wiring should be done when the evaporator is not energized and lockout/tagout procedure is followed for the Panel.

Rotating Blades: The evaporators are equipped with rotating equipment such as blower shafts and impellers that can create safety risks such as cutting of fingers and entanglement of loose clothing. Rotating equipment can be found on the evaporator burners (located at the end of the gas train for hydrocarbon fired evaporators), and the exhaust blower/draft inducer (located near the top of the stack).

Combustion Burners: Some evaporator models are equipped with a natural gas/ propane fired burner. The burners, described herein, are designed to mix fuel with air and burn the resulting mixture. All fuel burning devices are capable of producing fires and explosions if improperly applied, installed, adjusted, controlled or maintained. Do not bypass any safety feature; fire or explosion could result. Never try to light a burner if it shows signs of damage or malfunction.

Hot Surface: The side walls and removable cover of each evaporator have been insulated to prevent large areas from becoming dangerously hot, but will become warm during normal operation and could become dangerously hot in the unlikely event of an abnormal condition. Uninsulated items may become hot enough to cause burns with physical contact. The manufacturer has identified the lid, auto-fill piping and fittings, stack, exhaust blower/draft inducer, decant fitting and valve, burner flange, the heating element access gate, bottom skins, heating element retaining plate. There may be other uninsulated items not identified by the manufacturer and caution should be used at all times.

Pinch Point: Care should be taken to avoid potential pinch points when removing/replacing the removable cover on top of the evaporator, or removing/inserting components such as the burner or heating elements during maintenance the mist pad downstream of the exhaust blower.

Hot Water: The evaporator will boil water in the main basin during operation. Care should be taken to ensure personnel do not come into contact with boiling or near-boiling water during and after evaporator operation.

Steam: Steam will be generated and evacuated from the basin during operation. If a steam leak occurs in the exhaust stack, the unit should be shut down and allowed to cool prior to repairing the leak. Care should be taken when opening the view latch when the unit is hot to prevent potential steam burns.



Lockout/Tagout

Lockout/tagout refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy or material during service or maintenance activities.

The user is responsible for establishing lockout/tagout procedures for the evaporator. Always disconnect power and follow established lockout/tagout procedures prior to maintenance of system.

Installation

Installation must be performed by qualified professionals only. Installation must comply with local and national codes. Access to evaporator should be restricted to qualified personnel only.



Locating the Evaporator

- The evaporator should be positioned on level flooring that is non-combustible and sturdy. Flooring surface must be able to support the filled weight of the evaporator. The evaporator can be slightly shimmed so that any accidental spillage or overflow is directed away from any burner or the control panel. Damage due to spillage or overflow is not covered under the evaporator warranty.
- Provide a minimum of 2 feet of space on each side for adequate access for cleaning/maintenance, and follow local code for clearance guidelines in front of the electrical panels. In the absence of local code, follow national electric code. At time of this writing, at least 3 feet of clear area in front of the electrical/control panel is typically required per local and national code.
- The location should have good access to electric and compressed air utilities (if using an air actuated feed isolation valve or air diaphragm pump) as well as clearance overhead for a straight vertical run for the evaporator stack. Close proximity to the evaporator feed tank and any residue holding vessel should also be considered.
- **CRITICAL WARNING:** The evaporator is not designed for hazardous/classified areas. The evaporator is not ignition protected. It is extremely important that the evaporator be located **AWAY** from any combustible materials or fumes from combustible materials. Toxic, flammable, combustible or otherwise hazardous materials, including their fumes, must be kept out of the general area of evaporator and prevented from flowing or spilling into the evaporator area.
- The installation location must be protected from the elements. The evaporator is not designed for exposure to rain, snow, severe temperatures, severe dust or debris, etc.



CRITICAL WARNING: It is EXTREMELY important that the evaporator be located AWAY from combustible materials such as gasoline or other flammable liquids and vapors. Absolutely do not process any flammable or toxic materials in the evaporator.



CRITICAL WARNING: The evaporator surfaces are hot during operation. Allow liquid and evaporator surfaces to cool prior to handling the evaporator or its contents.

Removing the Evaporator from Wood Skid

- The evaporator systems are mounted on wooden skids for shipment. Carefully lift off the skid using a forklift and lower system onto the floor for installation. Dunnage should be used between the forks and bottom of unit to evenly distribute the weight and prevent damage to bottom of unit skins.
- Do not operate evaporator on the wood skid or with any of the packaging materials (such as shrink wrap) still attached. Operating evaporator on the wood skid is a significant fire hazard.

Securing the Evaporator

After the evaporator has been leveled, mounting bolts should be installed through holes in the evaporator foot pads according to the following table. For a concrete surface, use anchor bolts. For a metal surface, grade 5 CAP screws may be used.

	Foot pad hole diameter	Anchor bolt size (by customer)
Foot pad anchoring	0.64"	0.50"

Evaporator Exhaust Stack

An exhaust stack should be run from the evaporator exhaust pipe through the ceiling of the facility to vent the water vapor and flue gas (for gas fired units) to the outdoors. The stack installation must conform with all local codes and installation should be handled by qualified professionals only.



CAUTION: the exhaust blower on the evaporator is mounted inside a short factory supplied exhaust pipe on the lid of the evaporator. Inside this exhaust pipe is the exposed fan blades of the exhaust blower. Take care not to contact fan blades when the evaporator is powered. To help protect from accidental contact with fan blade during operation, a minimum 4' of customer supplied stack must be installed by customer on top of the factory supplied exhaust pipe.

- Stack material should be corrosion resistant, suitable for high temperatures, have a smooth inner wall, and be non-combustible. The manufacturer recommends a double-walled or insulated stack.

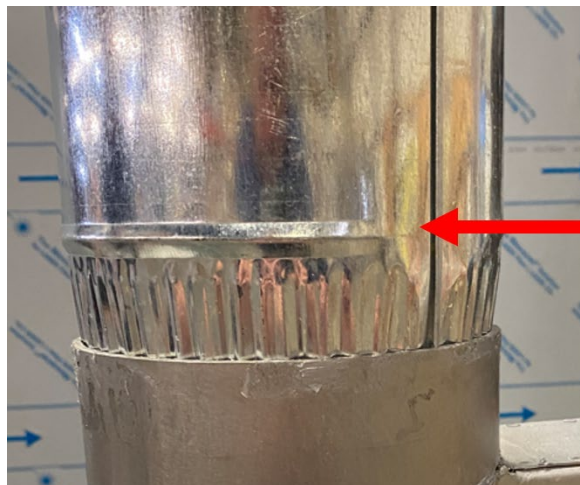
- The customer supplied stack ducting must be sized per the following table.

Model	E4	E12	G15	G25	G40
Ducting size	6"	10"	10"	10"	16"

- The customer supplied ducting must have a male connection inserted inside the outlet of the evaporator exhaust pipe. See illustration below. The evaporator exhaust pipe is designed in this manner to mitigate the risk of condensation escaping the ducting.



WARNING: THE CUSTOMER SUPPLIED DUCTING MUST BE THE MALE PIECE. IF A FEMALE-TO-FEMALE CONNECTION IS ATTEMPTED, THE DUCTING WILL NOT PROPERLY FIT UP AND CONDENSATE MAY DRIP ONTO THE ELECTRICAL ENCLOSURE. THE ENCLOSURE IS NOT WATER TIGHT SO THIS MAY DAMAGE ELECTRICAL COMPONENTS AND IS A FIRE HAZARD.



**CUSTOMER SUPPLIED
DUCTING WITH MALE
CONNECTION**

- The stack shall extend at least 2 feet above the highest point of the roof, or any portion of a building within 10 feet. The stack outlet should also be 5 feet higher than the highest draft hood outlet or flue collar. Avoid terminating the stack in high pressure areas such as below the roofline of a building. Adhere to local code regarding stack terminations.
- The stack should be as vertical as possible and should not exceed 25 vertical feet. If bends in the stack are unavoidable, 45-degree bends are better than 90 degree bends.
- The stack shall be at least 18 inches along its entire length from any combustible material.
- It is important to seal any seams of the stack to prevent water vapor from leaking into the building and to prevent condensate from dripping out of the pipe and onto the

floor or equipment. Any seams should be securely fastened and lined with a high temperature, high moisture sealant (250°F and 100% humidity).

- Some facilities may have limited makeup air, especially those that are heated or cooled. If there is a vacuum condition inside the room where the evaporator will be installed, the negative air pressure may be too much for the included exhaust blower to overcome, causing water to drip from the fan or steam to escape from around the lid. If that is the case, an exhaust booster fan may be required to be added to the stack and/or additional makeup air must be ducted into the room.
- The stack outlet shall not be restricted in any way. Either use a zero restriction rain shield (as described in figure II.2 below) or don't use any cap at all.

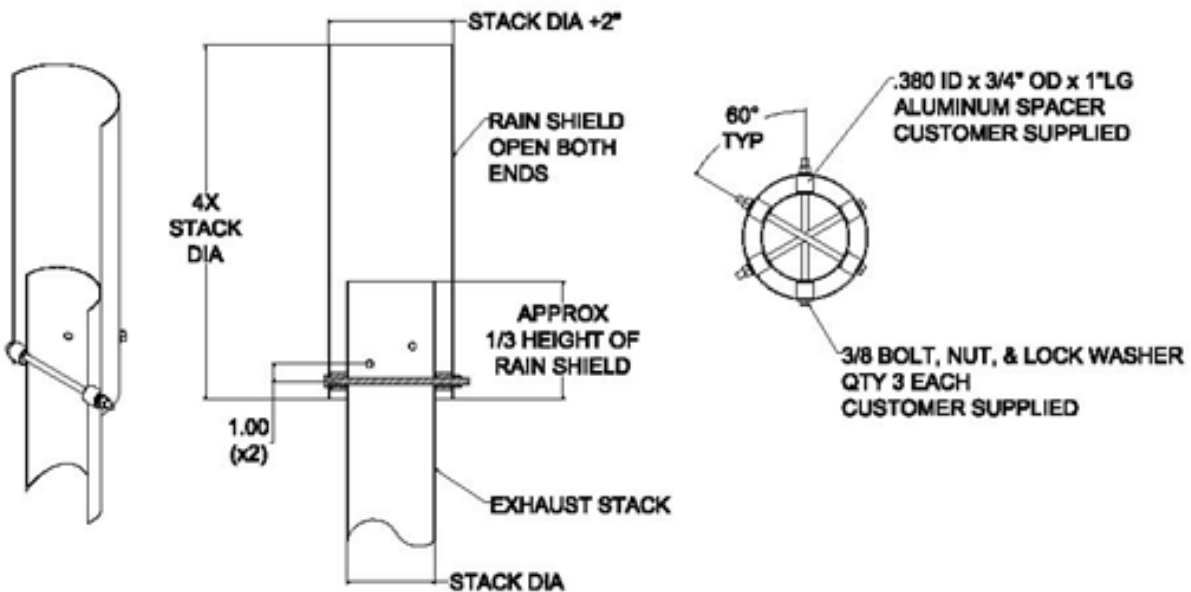


Figure II.2

Rain Shield



Connecting Power

Each evaporator system requires an electrical power supply. The power should be wired by a licensed electrician per local code of the authority having jurisdiction, or in the absence of local code per NFPA-70 National Electric Code in the US.



CAUTION:

- The installation must conform with all local codes and installation should be handled by qualified professionals only.

- Ensure that all controls are in the off position and the evaporator is grounded in accordance with local code/National Electric Code before connecting power. The evaporator must be permanently grounded.
- Ensure that evaporator is connected to a power supply with correct over-current protection. Over-current protection is responsibility of the customer/installer.

WIRING INSTRUCTIONS – Model E4 & E12 (Electrically Heated)

- Locate the ID plate on the evaporator to identify the power supply that this system was built for and locate the corresponding wiring diagram in this manual.
- According to the wiring diagram, connect evaporator to appropriate power supply with correct over-current protection and disconnecting means for the system, in accordance with local codes and building standards. Connect three-phase power matching nameplate information to the “L1”, “L2”, and “L3” terminal blocks within the panel.
- These systems are available in either 240V-1PH, 240V-3PH or 480V-3PH power. The 240V version will run on 208V, but with a reduced heat output.

WIRING INSTRUCTIONS – Model G15, G25, and G40 (Gas Fired)

- Locate the ID plate on the evaporator to identify the power supply that this system was built for and locate the corresponding wiring diagram in this manual.
- According to the wiring diagram, connect evaporator to appropriate power supply with correct over-current protection and disconnecting means for the system, in accordance with local codes and building standards. Connect single-phase power matching nameplate information to the “L1” and “N” terminal blocks within the panel.

Connecting Gas to Models G15, G25, G40



CAUTION: The installation must conform with all local codes and installation should be handled by qualified gas professionals only.

- A qualified gas technician should plumb gas line to the 3/4” NPT inlet on the supplied gas train. Size line and upstream regulator to provide gas pressure to valve between 7-14 inches of water column. Do not exceed 14” WC or you will damage the valve.
- The gas line should be plumbed in a way that does not interfere with removal of the burner enclosure.

- The burner was factory tuned for conditions at the factory. Burner combustion is impacted by local conditions. A qualified gas technician should tune the burner at your facility to achieve efficient combustion at the specified BTU input (see table below). A gas volume meter (P/N 2000364) dedicated to the evaporator (i.e., not shared with other equipment) is recommended to ensure evaporator is tuned to fire at nameplate BTU input. The gas fired evaporators come with combustion flue gas test ports on the exhaust pipe. Use a digital combustion analyzer (P/N 2001793) to ensure you are getting appropriate combustion metrics. Do not tune burners until the evaporator is at a boil on tap water for at least 30 minutes. Must be an active boil while making a combustion check.
 - **For natural gas applications**, best performance will be achieved with a CO₂ setting of 8% to 10% (3% to 6.5% O₂) and CO should be minimized with a goal of 100 ppm or less. **In no case should CO be above 400 ppm Air Free.**
 - **For LP gas applications**, best performance will be achieved with a CO₂ setting of 9.5% to 11.8% (3% to 6.5% O₂) and CO should be minimized with a goal of 100 ppm or less. **In no case should CO be above 400 ppm Air Free.**

WARNING: Inefficient combustion can result in sooting, reduced or inefficient heating of evaporator, and other issues such as backfires which may damage equipment or be a hazard to personnel.

Evaporator Burner Firing Rates			
Model	G15	G25	G40
BTU/hr.	205,000 BTU/hr.	295,000 BTU/hr.	400,000 BTU/hr.

Operation



WARNING: Absolutely do not process any flammable or toxic materials in the evaporator. It is EXTREMELY important that the evaporator be located AWAY from combustibles materials such as gasoline or other flammable liquids and vapors.



WARNING: The evaporator surfaces are hot during operation. Allow liquid and evaporator surfaces to cool prior to handling the evaporator or its contents.



WARNING: All power and other utilities such as gas or compressed air must be disconnected prior to servicing evaporator.

System Startup Procedure

Prior to starting up your evaporator, it is important to confirm that you have completed the installation in accordance with this manual and local code.

1. Start by powering on the system and becoming familiar with the control panel.
2. The evaporator should first be started up with tap water. Fill the evaporator with tap water to at least cover the low-level float switch, but **DO NOT OVERFILL**. *The float switch is a small white tube about the size of a 12 oz beverage can hanging from a cable inside the evaporator tank near the control panel end of the tank.* The initial fill should be no more than 50% of the freeboard volume which is the volume between the top of the heat exchanger and the lid.
3. Turn the thermostat dial clockwise to its maximum setting. This will activate the exhaust fan. If the exhaust blower doesn't turn on, do not continue with start-up. Troubleshoot the issue until the exhaust fan turns on when the thermostat is set to max setting.
4. Next, you'll be energizing the heat source. Find the momentary toggle switch on the control panel labeled "HEATERS". Flip the switch up. This will energize the heaters (for electric systems) or start the burner (for gas fired systems) by engaging the heater/burner start contactor.
5. On gas fired systems, the burner will go through a 2 minute purge cycle prior to sparking the igniter and opening the gas valve to light the burner. After this 2-minute purge cycle, the gas valve will open and the igniter will energize. If the burner does not ignite, the burner will attempt to restart one more time before locking out. If it doesn't ignite after the second try, you may need to manually reset the system 1-2 times in order to purge any air from the gas line. To reset the system, turn the thermostat dial to the OFF position, wait 10 seconds, and then turn it back all the way on to the maximum temperature position, and then flip the heater toggle switch on again.
6. On gas fired systems, once the tap water is up to a boil, proceed with burner tuning to ensure efficient combustion. See tuning instructions in previous section titled "Connecting Gas to Models G15, G25, G40".
7. Note: initial cold water heat up will typically take more than an hour.

Normal Operation

Once you have performed the initial startup on tap water and tuned the burners (gas or propane fired units only), you may fill the evaporator with wastewater and continue operating normally.

1. Follow the start-up steps 1-5 in the System Startup Procedure above, but fill with wastewater instead of tap water.
2. The evaporator will heat the water up to a boil and begin evaporating water which will cause the water level to drop inside the evaporator. Once the water level drops enough to expose the low-level float, it is time to refill the evaporator. If you have the auto-fill system, the evaporator will refill automatically. If the evaporator is not refilled,

the liquid will eventually heat to a temperature above the thermostat setpoint and the thermostat will turn the heater/burners off. The exhaust blower will turn off for a few minutes when the thermostat trips and de-energizes the heaters/burners, but it will turn back on after a few minutes of cooling. **Never turn the exhaust blower off when the system is hot or still in the process of cooling.**

3. To shut down the system including the exhaust blower, turn the thermostat dial to the OFF position. **Never turn the exhaust blower off when the system is hot or still in the process of cooling.**
4. It is important to understand the purpose of thermostat and why it might turn off. The water temperature inside the evaporator is limited to the maximum temperature setting of the thermostat. This prevents over-heating of the liquid beyond the boiling point of the water. The thermostat does not cycle the burners/heaters off and on to maintain temperature, it is only used to turn the burners/heaters off when the high temperature limit is reached. If the thermostat trips, some likely causes include the following:
 - a. Something in the water has raised the water's boiling point beyond the maximum temperature setpoint of the thermostat. *If this happens, empty evaporator, clean the heat exchanger, and start over with a fresh batch of wastewater. Never recirculate concentrated wastewater back to the evaporator or evaporator feed tank.*
 - b. Something in the water is coating the heat exchange surface and preventing heat from dissipating into the water. *If this happens, empty evaporator, clean the heat exchanger, and start over with a fresh batch of wastewater.*
 - c. Floating materials on surface of water are insulating the liquid and preventing evaporation. *This is a potentially dangerous condition. Do not operate the evaporator with excessive buildup of floating oil (more than 1" is excessive) or other materials.*
 - d. The evaporator is low on water but did not trip the low-level switch so something may be wrong with the low-level float system. *If this happens, inspect low-level switch to determine if it has failed. If so, replace switch.*
 - e. Check to make sure thermostat is set to max setpoint

System Maintenance

The type and frequency of system maintenance will vary widely depending on the type of waste stream that is being introduced to the evaporator. Waste streams that are heavily loaded with solids will require more frequent inspection to ensure that solids are not encroaching on or coating the heat exchanger and/or level probes. Clean rinse water applications will require less frequent inspections.



WARNING: The evaporator surfaces are hot during operation. Allow liquid and evaporator surfaces to cool prior to handling the evaporator or its contents.



WARNING: All power and other utilities such as gas or compressed air must be disconnected prior to servicing evaporator.



Important Maintenance Notices

1. **IMPORTANT:** Do not allow solids to buildup on the heat exchanger. Buildup on the heat exchanger will prevent heat from transferring to the water resulting in overheating of the heat exchanger and eventually failure of the heat exchanger.
2. Feed wastewater to evaporator from below floating oil or solids and above settled solids to minimize solids and oil in evaporator tank.
3. Do not allow floating oil to build up on surface of water inside evaporator. If greater than a 1" layer of oil is allowed to build, this can cause operational or safety issues.
4. Periodically inspect for corrosion of wetted materials such as internal tank and heat exchanger, repair or replace corroded evaporator before it leaks.
5. Periodically inspect evaporator for loose fittings and fasteners and tighten if found loose. For electric units (E4 and E12) follow heater plate bolt tightening instructions below.
6. Periodically inspect the gas line, gas line fittings, feed line plumbing fittings, and electrical connections to ensure tight connection. Tighten loose fittings.
7. Periodically inspect the low-level float, including the cable, toggle plate, and plunger switch to ensure it is not restricted and able to move freely.
8. Periodically inspect exhaust stack visually to ensure that there are no blockages or leaks. Remove blockages and repair leaks as necessary.
9. On gas/propane fired units, periodically do a combustion check with the combustion analyzer (P/N 2001793) to ensure the CO and O₂ are within the ranges initially achieved when the burners were first tuned. If not, the burners should be re-tuned by a qualified professional. This is one of the most important maintenance checks to keep the evaporator running well.
10. Similar to a home heating system, the burner for an evaporator should be inspected and cleaned every year by a certified burner technician to ensure safe and efficient operation of the system. The burner should be removed and the inside of the heat exchangers should be inspected for any soot buildup or buildup of other material. If soot exists, it should be blown out using pressurized air and any other material should be cleaned out prior to operating burners. Operating burners with material inside the heat exchanger is a fire risk.

Evaporator Optional Accessories

Feed Pump

If you ordered the feed pump with your evaporator, it will come pre-mounted, plumbed, and wired to the evaporator. A momentary toggle switch is located on the control panel for operator to control the on/off of the pump.

1. Inlet/outlet: 1" NPT (outlet is pre-plumbed to evaporator if pump ordered with evaporator)
2. This pump is self-priming to several feet below grade, but must be pre-primed before first use and after extended periods of non-use. To prime, unscrew the plug on top of the pump and fill with roughly 2 liters of tap water. Replace the plug prior to use.
3. If your pump has a 3-phase motor, prior to energizing the pump, confirm clockwise rotation of the motor by viewing through the slot at the end of the motor shaft. If rotation is counter-clockwise, rewire the pump according to the pump wiring diagram to achieve clockwise rotation.
4. The pump assembly comes with a 3-way valve down-stream of the pump but up-stream of the evaporator inlet. This allows the operator to select where to pump to. Either pump to the evaporator or bypass the evaporator and pump to a holding tank/alternate process. If the bypass outlet end of the valve is not in use, it must be plugged to prevent accidental discharge. Most customers use the bypass outlet to pump the concentrated evaporator residue to a holding tank.
5. CAUTION: if your feed water tank is higher in elevation than the top of the evaporator, you may need to address siphoning issues using an air actuated feed isolation valve (see below). *If your pump appears to "keeps pumping" even when it is off, you have a siphoning issue that needs to be addressed or you may overflow the evaporator.*
- 6.

Air Actuated Feed Isolation Valve

All evaporator systems that are purchased with a feed pump or auto-fill kit are designed to accommodate use of an air actuated feed isolation valve to prevent siphoning. The manufacturer *strongly recommends use of an air-actuated valve over an electrically actuated valve because electric valves (without battery backup) will fail in the open position which could lead to an overflow of the evaporator.*

1. For manufacturer supplied air actuated (electrically piloted) feed isolation valves, the air supply to the valve should be 80-100 PSIG.

2. Connect the air line to port "P" on the valve. Ports "EA" and "EB" are exhaust ports and should have air mufflers installed or be left open.
3. Wire the solenoid to the appropriate contactor in the evaporator control panel.
4. If the feed isolation valve is installed, when the control panel energizes the feed pump, it will simultaneously open the feed isolation valve

Auto-Fill System

If you ordered the auto-fill system with your evaporator, it will come pre-mounted, plumbed, and wired to the evaporator. A toggle switch is located on the control panel for operator to enable or disable the auto-fill functionality.

1. Comes with the fill pump option referenced above, 3-way valve, high level safety float, and electrical components to accommodate auto-fill control logic.
2. The auto-fill control logic is as follows:
 - a. After auto-fill is enabled, if the water level in the evaporator drops to the low-level point (triggers the low-level float switch), a countdown timer begins and the feed pump is energized (and the feed isolation valve is opened if installed).
 - b. If water is not added back above the low-level prior to expiration of the countdown timer, the heat source is de-energized and the feed pump is turned off. The exhaust blower will remain on until the operator turns off the evaporator.
 - c. If the water level exceeds the appropriate fill level before the countdown timer expires, the water will trigger the high-level float switch and turn off the pump.
3. During the first auto-fill cycle, the operator must ensure that the countdown timer is set to the correct interval such that the water level never reaches the high-level float. If water is allowed to reach that high-level float before the countdown timer expires, reduce the timer. **See #6 below for instructions on setting the countdown timer and the heater shutdown delay timer. Operator must set both.**
4. Note that auto-fill cannot be used to initiate the first tank fill from empty. Prior to enabling auto-fill, fill the evaporator manually.
5. When the auto-fill system is disabled, the fill pump can still be operated manually via the pump toggle switch.

6. How to set the auto-fill system timers. *Reference TABLE 001 below: Auto Fill Timers Default Settings.*

a. Setting the Countdown Pump Timer (TMR-01):

- i. This sets the amount of time that the fill pump will run for once the low-level switch is uncovered. This time should be equal to the duration it takes to fill from the low-level point to the operating level.
- ii. Set the top dial (#1) to the time range that you need.
 - 1s = 0.02 - 1 sec
 - 6s = 0.06 - 6 sec
 - 30s = 0.3 - 30 sec
 - 3m = 0.03 - 3 min
 - 30m = 0.3 - 30 min
 - 300m = 3 - 300 min
 - 30h = 0.3 - 30 hr.
 - 300h = 3 - 300 hr.
- iii. Set the middle dial (#2) to the duration needed in relation to the time range you selected.
- iv. **The bottom dial (#3) should always be set to 2.**
- v. Note: a fill cycle of the pump should always add several inches of water above the bottom of the low level shutoff point, but well below the high level float



b. Setting the Heater Shutdown Delay Timer (TMR-02):

- i. This sets the amount of time allowed for the fill pump to recover the low-level switch and still let the heaters run. If the low-level isn't recovered in this time, the heaters & pump are shut off.
- ii. Set the top dial (#1) to the time range that you need.
 - 1s = 0.02 - 1 sec
 - 6s = 0.06 - 6 sec
 - 30s = 0.3 - 30 sec
 - 3m = 0.03 - 3 min
 - 30m = 0.3 - 30 min
 - 300m = 3 - 300 min

- 30h = 0.3 - 30 hr.
 - 300h = 3 - 300 hr.
- iii. Set the middle dial (#2) to the duration needed in relation to the time range you selected.
 - iv. The bottom dial (#3) should always be set to 5.

TABLE 001: Auto Fill Timers Default Settings

Unit Size	TMR-01 Dial #1	TMR-01 Dial #2	TMR-02 Dial #1	TMR-02 Dial #2
E4	3m	.5	30s	1
E12	3m	.5	3m	.2
G15	3m	.5	3m	.2
G25	3m	.6	3m	.3
G40	3m	.7	3m	.3

The default time settings shown above are based on a 50GPM feed pump. If your system has a different feed rate, please use the following equations based on your specific model size to find the time durations required.

E4: TMR-01 (Minutes) = 42 / GPM

E4: TMR-02 (Seconds) = (540 / GPM) + 20

E12: TMR-01 (Minutes) = 42 / GPM

E12: TMR-02 (Seconds) = (708 / GPM) + 20

G15: TMR-01 (Minutes) = 42 / GPM

G15: TMR-02 (Seconds) = (715 / GPM) + 20

G25: TMR-01 (Minutes) = 85 / GPM

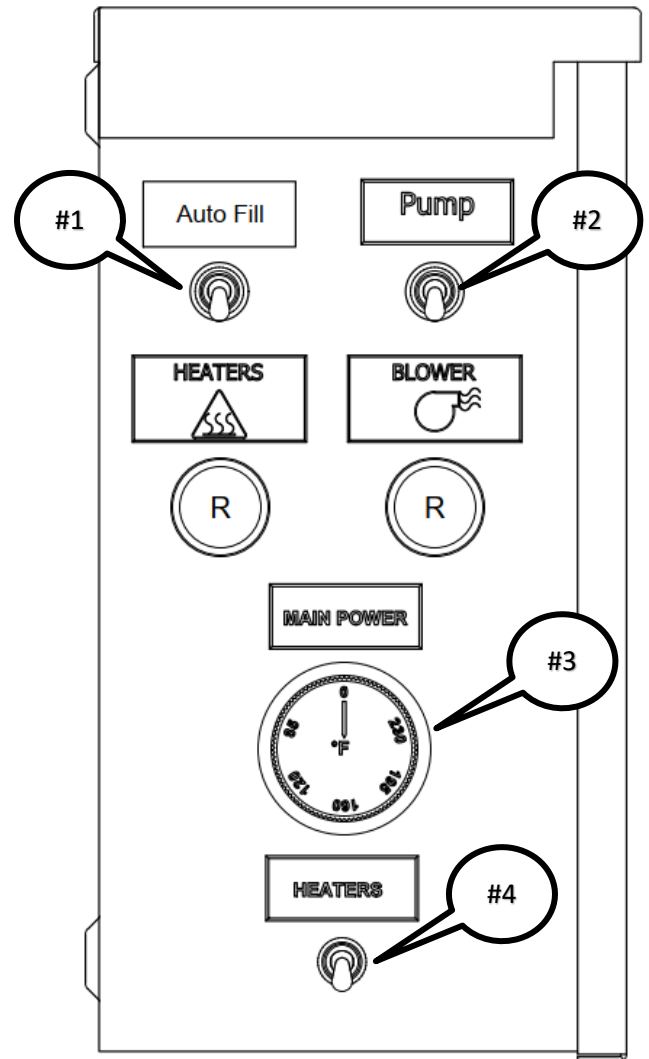
G25: TMR-02 (Seconds) = (1,456 / GPM) + 20

G40: TMR-01 (Minutes) = 101 / GPM

G40: TMR-02 (Seconds) = (1,456 / GPM) + 20

7. The stainless-steel high-level float supplied with the auto-fill system should be inspected and cleaned regularly. It is located just under the evaporator lid inside the evaporator tank on the control panel end.
 - a. The float must be free to slide up and down on the shaft as the water level changes.
 - b. When replacing the float after cleaning or part replacement, install the float with the marked side (look for a stamped "O") positioned towards the retaining clip. **If the feed pump runs when the float is up, it was re-installed incorrectly.**
8. Operating the Auto-Fill System

1. Rotate Thermostat (#3) Clockwise to Maximum setting. The exhaust blower will activate, and the system will energize.
2. Hold the Manual Pump Switch (#2) ON and fill the unit to the desired operating level.
3. Turn ON the Auto Fill Switch (#1).
4. Activate the heaters by toggling the Heater Start Switch (#4). (*On Gas Units, the burner will fire after a 30 second purge cycle has completed.*)



Fill Pump will activate once the system boils down past the low-level float switch.

Fill Pump will run for the allotted time that the Pump Auto Run (TMR-01) is set to.

Heaters will continue to run unless the low-level float switch is not recovered by the time the Heater Shutdown Delay (TMR-02) has expired.

The Auto Fill System has a High-Level Float Switch located inside the water heater tank. Periodically inspect and clean the float and stem assembly.

The pump will only run when this High-Level Float Switch is in the down position.

Suction Wand/Hose Assembly

The suction wand/hose assembly serves two purposes. It can be used to fill the evaporator or it can be used to empty the evaporator.

1. The suction hose is a 1" dia x 20' long vacuum rated hose. On the inlet end of the hose, it is attached to a rigid wand. On the inlet end of the wand, there is a strainer and foot valve.
2. The discharge end of the hose has a cam and groove fitting to quick-connect to the inlet of the feed pump.
3. The wand/hose assembly can be used to fill the evaporator by placing the suction end of the wand in the wastewater source tank/drum/tote.
4. The wand/hose assembly can be used to empty the evaporator by placing the suction end of the wand into the evaporator after the liquid has cooled below the operating temperature of the hose (130F). Turn the 3-way valve to bypass the evaporator and discharge to a residue holding tank prior to energizing the pump to empty the evaporator.

Manual Decant Plumbing

All evaporator systems come with a 1" oil skimmer valve to facilitate removal of floating oil from the evaporator tank, but it is not a requirement to use it for all applications. If you need to use the oil skimmer, please note the following.

1. A 90-degree elbow and extension nipple should be installed downstream of the supplied ball valve and piped into an oil decant pump or gravity fed into a waste oil drum where the decanted oil can be stored.
2. All plumbing materials must be resistant to temperatures up to 250F.
3. To decant oil, first turn off the evaporator and allow the oil to float to the surface and form a layer to be decanted. Partially crack open the ball valve and energize the feed pump to fill the evaporator with water below the surface and push the oil layer up to the oil decant pipe. As oil starts to decant, you may slowly open the valve to allow faster flow of oil. Once the oil is removed, turn off the feed pump and close the decant valve. Resume the evaporation process.

Anti-Foam System

For waste streams that tend to foam, the manufacturer recommends using a small dose of anti-foam chemistry to control the foaming. Anti-foam chemistry can be added manually to the evaporator or automatically dosed to the evaporator feed line using the anti-foam injection system.

1. The anti-foam injection system consists of a metering pump and essential mechanical installation items.
2. Once installed and properly set up, the anti-foam system will automatically dose anti-foam chemistry into the evaporator feed line any time the feed pump is energized.
3. For installation and operating instructions, please see the anti-foam system installation, operation, and troubleshooting manual included with your anti-foam system.

G12, G25, G40 (120V) Electrical Schematic

LEGEND:
 FIELD WIRING - - - - -
 CONTROL WIRING _____

AWG	COLOR	INS	P/N
8	BK	600V	2007270
8	WH	600V	2007992
8	GN/YW	600V	1000606
10	BK	600V	2007268
10	WH	600V	2007708
10	GN/YW	600V	2011064
12	BK	600V	2007189
12	WH	600V	2007190
12	GN/YW	600V	1000390
14	BK	600V	2007262
14	WH	600V	2007263
14	GN/YW	600V	1000878
16	BK	600V	2007994
16	RD	600V	2007996
16	WH	600V	2007997
16	BU	600V	2009161
16	WH/BU	600V	2009160
16	GN/YW	600V	1000697
18	BU	600V	1000521
18	WH/BU	600V	1000432
18	GN/YW	600V	1000877

MODEL SCHEDULE

UNIT	VOLTAGE	PH	FREQ. (Hz)	FLA (A)	MCA (A)	MOC (A)	LARGEST MOTOR (HP)	SCCR
G12 - BASE	120	1	60	18.5	23.1	25	1/4	5kA
G25 - BASE	120	1	60	18.5	23.1	25	1/4	5kA
G40 - BASE	120	1	60	25	31.25	35	3/4	5kA
G12 W/ FILL PUMP	120	1	60	29.3	36.6	40	1/2	5kA
G25 W/ FILL PUMP	120	1	60	29.3	36.6	40	1/2	5kA
G40 W/ FILL PUMP	120	1	60	34.8	43.5	50	3/4	5kA

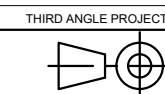
CIRCUIT BREAKER SCHEDULE

UNIT	CB-01 (A)	CB-02 (A)	CB-03 (A)
G12	10	15	20
G25	10	15	20
G40	25	15	20

NOTES:

A) N/A

REVISION HISTORY					
REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
0	INITIAL RELEASE	1/12/23	KAL	PJF	ERN00745

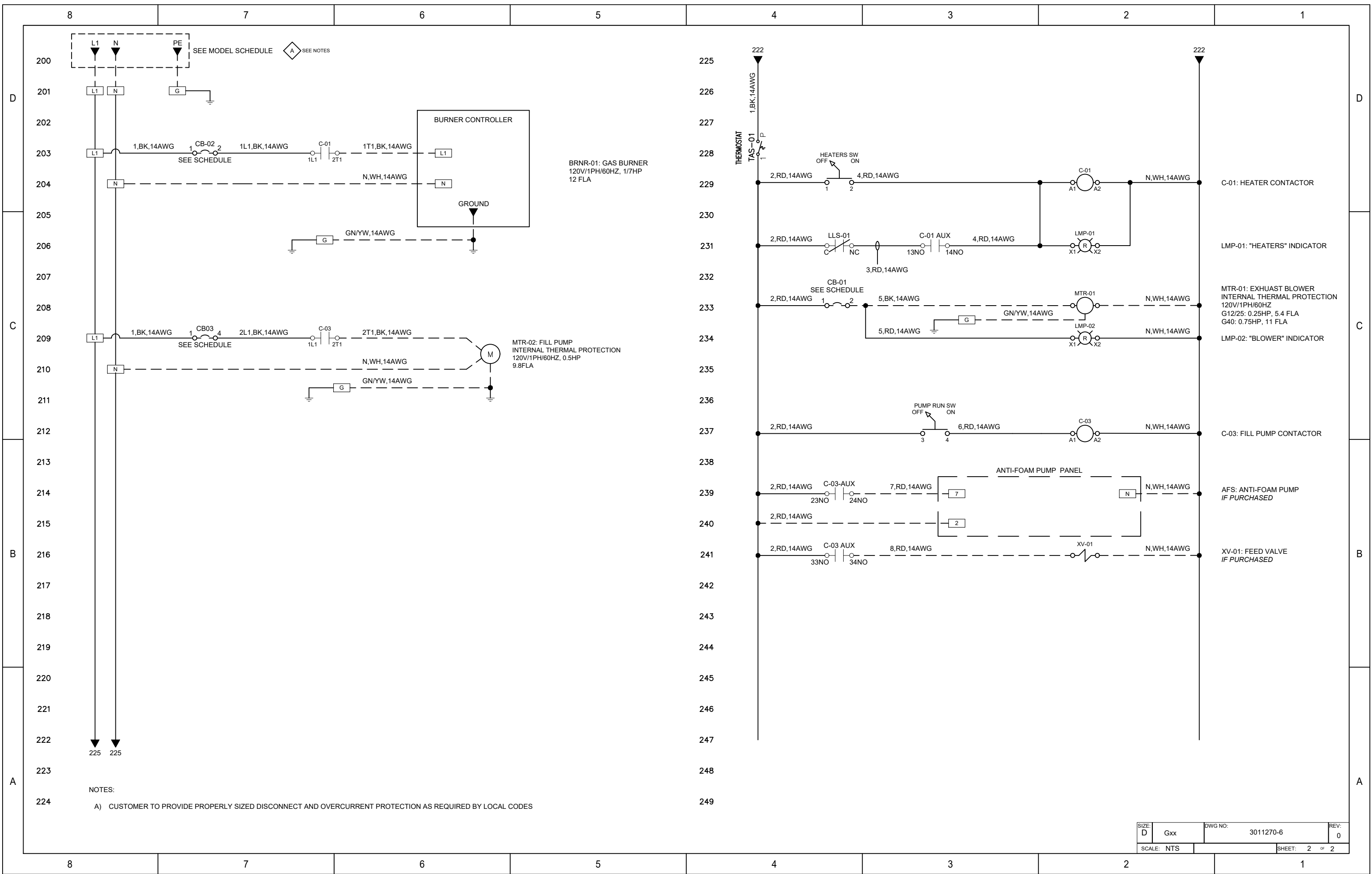


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UNLESS OTHERWISE SPECIFIED:
 ALL DIMENSIONS IN INCHES
 MACHINED FEATURES:
 X.XXX = ±.005"
 X.XX = ±.010"
 X.X = ±.030"
 MACHINED FINISHES = 250
 FORMED SHEET METAL: ✓
 X.XX = ±0.020" (SINGLE BEND)
 ADD 0.010" FOR EACH ADDITIONAL BEND
 WELDED PIPING:
 Ø < 12" X.XX = ±0.125" (LINEAR)
 Ø > 12" X.XX = ±0.188" (LINEAR)
 X.XX = ± 1/2" (ANGULAR)

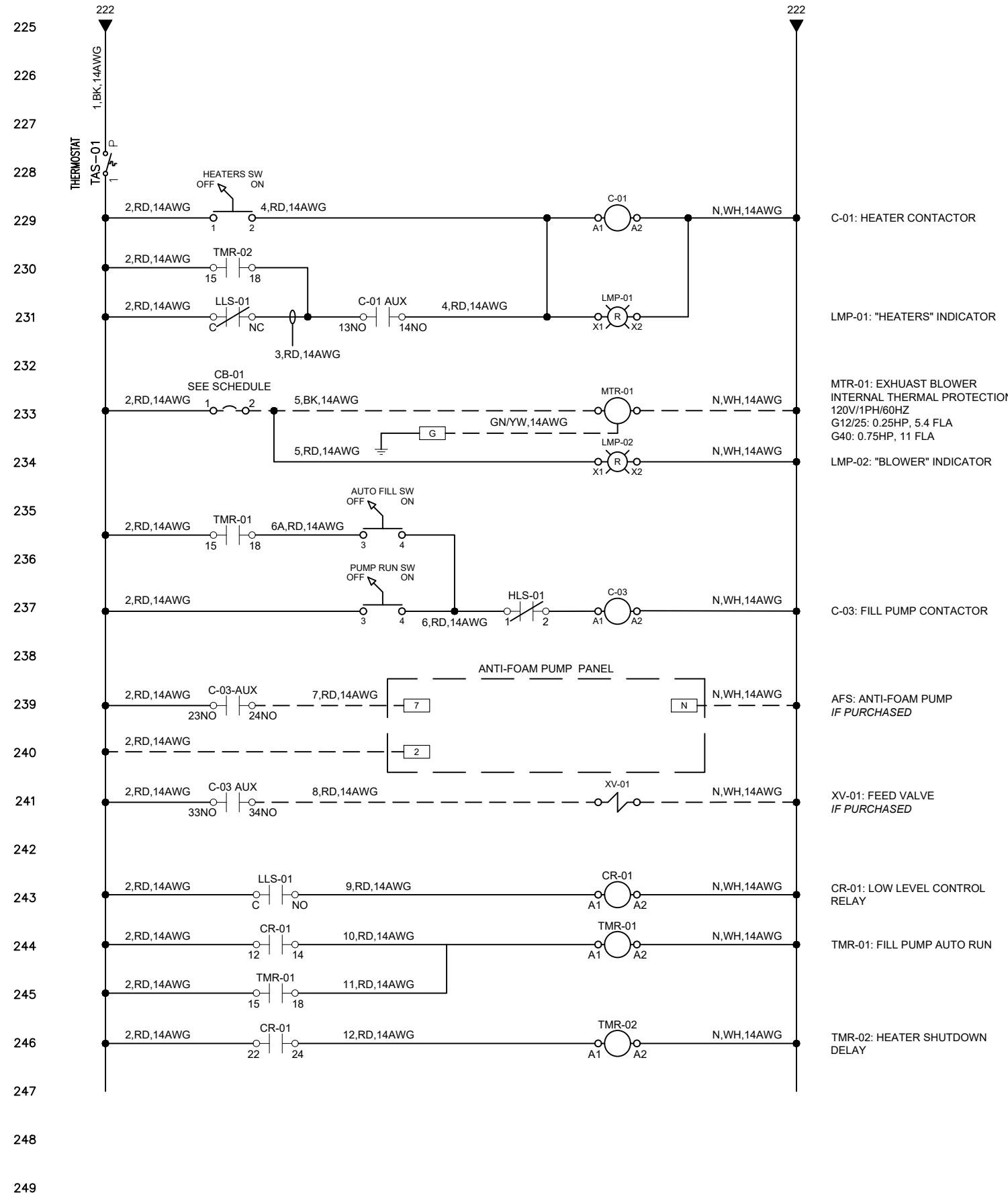
TITLE: SCHEMATIC, ELECTRICAL, FILL PUMP, 120V			
SIZE: D	Gxx	DWG NO: 3011270-6	REV: 0
SCALE: NTS		SHEET: 1 of 2	



NOTES:
 A) CUSTOMER TO PROVIDE PROPERLY SIZED DISCONNECT AND OVERCURRENT PROTECTION AS REQUIRED BY LOCAL CODES

SIZE: D	Gxx	DWG NO: 3011270-6	REV: 0
SCALE: NTS		SHEET: 2 of 2	

Auto-Fill Assembly - Electrical Schematic



SIZE D	DWG NO: 3011270-9	REV: 0
SCALE: NTS	SHEET: 2 of 2	



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