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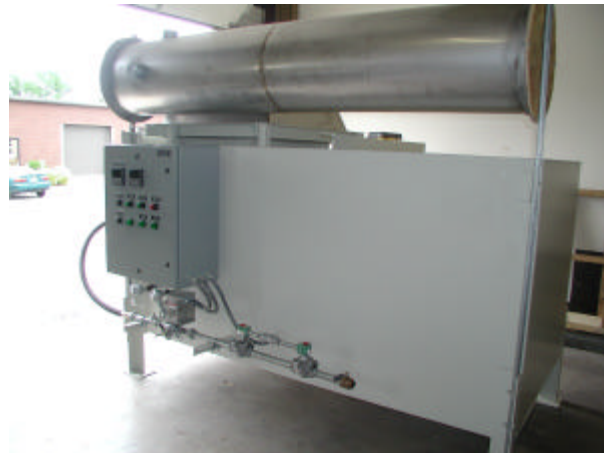
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Field Installation Guide

Installation instructions and field wiring connections

Assume that we have just written 3 pages of introduction telling you how great HTT is and that we will not accept any responsibility for mistakes in installation, operation, etc. and that you are supposed to read all of the manuals for each component. This is the area that I normally skip over when I read these manuals, so I won't bore you with it. Here is the good stuff that you will need to know.

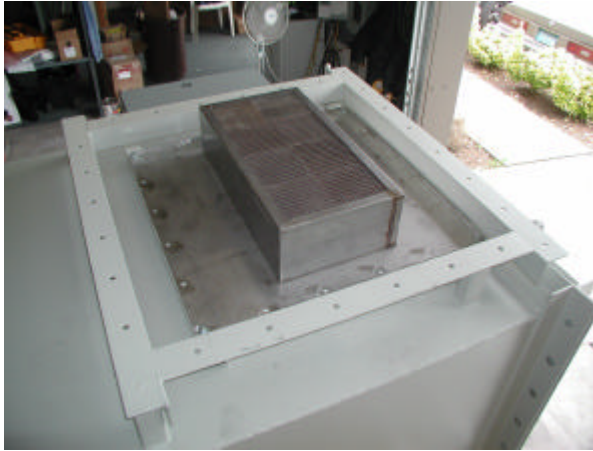


Assembly of the unit

Place the main unit on the cement pad and bolt on the stack. The required fasteners and fittings are in boxes packaged with the control panel, that will be shipped separately. The stack-mounting flange is a stock item and is drilled.

Units that are purchased with the catox option will have the catalyst mounting flange located under the stack transition section. When the system is to be operated with the catalyst, the catalyst is mounted to this flange.

The flanged and hinged burner end plate is for access to the refractory and repairs on the unit in the future. The lining materials are bolted on, and may be removed and replaced easily. The burner is a natural/propane gas burner. The burner consists of the gas line, valve train components, spark rod for spark ignition of the gas, flame rod that detects the flame and sends a signal to the flame safety, and on some of the



systems we will provide the optional combustion/ID air blower. Customer to provide a gas pressure regulator into burner train. Gas pressure is regulated to feed rate requirements. The customers field ducting will be connected directly to the blower inlet. Manual dampers located before and after the blower in the burner inlet and the injector inlet can be field set to proper flow rate.

Mounting and Wiring Panel

The main control panels are available either mounted on the unit, or supplied loose for installation by others. If provided loose, have your electrician mount the panel close to the unit. When provided loose, a local panel is required for the flame safety and the ignition transformer. These must be close to the burner to be effective.

The flame rod and spark rod are removable, they connect to the panel with two high voltage, solid core wires. These look like auto ignition wires. The rods and can be removed and cleaned or changed in just a few minutes. The two wires will be brought to the Flame Safety Panel and connected directly to the flame safety (flame rod) or the ignition transformer (spark rod). The spark rod connects to the top of the ignition transformer with a simple crimp connector. The flame rod connects to the "F" terminal on the flame safety mounting base under the flame safety unit. Make sure to ground the controller and the panel to the shell to complete this circuit.



Note: DO NOT run the spark wire near the flame rod wire. The feedback will upset the sensor. The loose parts and spares are shipped in the panel for protection. The components you should have are:

- (2) Flame Rods, (2) Spark Rods
- 20 ft solid core spark plug wire
- 10 Ft of 1/2" flex tube
- (2) Flex tubing connectors

We do not ship the units with the flame rods and spark rods installed. I will normally install them during startup and this usually takes 30 minutes on site. The connections for the burner are the ignition and the flame sensor. The igniter is the shorter rod with the hook end and the beveled edge near the wiring connection. These can be located in either of the two positions as they are the same.



The hook is to be pointed inward so as to allow the spark to jump to the center ground. The bevel is used to indicate the position of the hook without having to remove the rod. To install, you loosen and then inserted into the clamps and pushed carefully into position, leaving 2-4 inches sticking out. When the rods are fully seated, pull them out $\frac{1}{4}$ inch. This will prevent direct metal contact with the ceramic and lessen the chance of cracking. Tighten the clamp carefully until the rods do not turn. **DO NOT OVER TIGHTEN.** Pretend the rods are worth \$125.00 each.

Because of cross chatter between the flame rod and spark rod, they must be run in separate conduits. The wiring is run the from ignition transformer to the igniter using the high voltage wire. This same wire can be used on the flame sensor line but since this is lower voltage, standard wire can be used. The flame rod connection is the lower left terminal on the mounting base of the flame safety. Crimp type wire terminals) are used to secure both ends.

Note: Hold the retaining nut on the rods with pliers when tightening. Over tightening will break the insulators. Make sure the metal rods in the middle are loose and not tight when you are finished. When heated, the expansion may crack the rods if they are tight.

The flexible conduit is not conductive and is sized to fit over the $\frac{1}{2}$ " rods and over the wiring connections. Electrical tape is then used to seal the conduit to the rods. I have attached pics showing some similar installations.



Burner Valve Train - A pipe nipple with an orifice plate is to be installed at the burner inlet. This will control the flow of gas to the burner. Pipe the valve train to this main gas connection on the front of

the burner. The burner valve train may be mounted near the unit or indoors at your discretion. The arrangement of the valves and components are shown in the attached drawings. All of the valves, including the (3) main valves, which are wired in parallel. the modulating gas valve actuator, the burner blower damper are all wired from the main panel. Note: Run the 120 v separately. The 4-20 ma (-, +), the burner ignition wire, and thermocouple wires are run in separate conduits to prevent cross chatter. Check the wiring list below.



Wiring the Panel - The main panel may be mounted on the unit or in a remote location. Follow the wiring guide below. The 4-20 ma signal wires should be connected to the output signal connections on the terminal strip. Low fire is pilot mode.

Ducting for the system is directly to the burner blower inlet. This is a flanged connection.

HTT will supply free startup service. Make arrangements 2 weeks prior to facilitate scheduling. DO NOT startup the system until the installation has been checked and approved by HTT and proper operator training has been given.

Typical Startup

Turn main switch to "ON", wait 30 seconds for the temperature controllers to complete their diagnostics. Push the second switch "HIGH TEMP RESET", the light should stay on if the chamber temperature is below set point. Push the third switch (CUSTOMER REMOTE SAFETIES", light should stay on if all local and remote safeties are made. The blower pressure switch may be wired across this contact or started from customers source. Blower must be on for system burner to light. A spare contact on the customers starter, or duct pressure switch should be used and wired across safety limits. Blower should be energized long enough to purge all ducting prior to burner start.



Burner Startup - If the "FLAME FAILURE" light is on, the flame failure safety has tripped out. To reset, press the button, and the light should go off. Turn the burner

"ON" switch, (first switch in second row) to the right to "ON", this will set the startup circuit light and 10-15 seconds later the burner will attempt to start. Once lit the "BURNER ON" light will turn on.

If the "FLAME FAILURE" light turns on, the burner is not operating and diagnostic steps should be followed. After inspection and repairs, press the reset button and the light should go off and 10-20 seconds later the flame safety will attempt to light again. When the flame ignites, the "BURNER ON" light will be lit.

If the burner fails to light, open the panel and check the Flame Safety. Press the reset and watch the LED indicators. The Power light should be lit indicating power from the panel. 5-10 seconds later the pilot light should light, 2-10 seconds later the main flame LED should light, indicating main flame is on. The modulating gas valve is kept at "low fire hold" until the main flame is established. This closes CR6 and allows the burner to run up to high fire.



Failure to start the burner

For a gas burner to operate you need gas, air, and spark. 90% of the time the problem will be spark. Periodic inspection and cleaning of the spark igniter will prevent failures. Solutions to component problems are described in the specific literature in the operating manuals. Call HTT anytime with questions. 908-788-6999.

Changing flame rods and spark plugs

To replace the flame rod or the spark rod, you must adjust the retainer screw on the new rod the same length as the old rod. The flame rod can be rotated in any position. The Spark rod must be placed so that the tip points toward the center of the burner. Each rod is then inserted into the clamps and pushed carefully into position, leaving 2-4 inches sticking out. When the rods are fully seated, pull them out ¼ inch. This will

prevent direct metal contact with the ceramic and lessen the chance of cracking. Tighten the clamp carefully until the rods do not turn. DO NOT OVER TIGHTEN. Pretend the rods are worth \$125.00 each.

FIELD WIRING INFO

Power to HTT Main Panel

L1 120/1/60 10 Amp

L2 Common (Neutral)

Note: Optional 3 phase step-down transformer must be wired and tested before wiring to the main 120 volt panel connections.

Optional Customer Interface to Main Panel

The panel is designed to operate as a relay logic system with the capability to interface with most PLC systems. Using standard I/O logic, interface connections can be made as follows. The jumpers are removed with contacts are made.

Remote Limits Input	4	-- ---- --	5
Remote Burner Start Input	1	----- -----	7
Remote Burner Stop Input	8	--- (NC) ---	9
Burner Status	11	-- (CR6) --	12
At Temp Interlock (Open below 1300F)	13	-- (CR4) --	14
Remote Flame Failure Reset	1	-- (RFS1) --	15

Blower motor field Wiring – Customer starter to combustion blower with interlock to spare contact or from pressure switch for remote limit.

Thermocouple Field Wiring

Duplex "K" Thermocouple - pull 1 set from each T/C connected directly to each controller or chart recorders. Note: Red is (-) (Low voltage Conduit)

Gas Valve Train Field Wiring

L2 Common

G Ground

Main gas Valves, (2) Solenoid, (1) N.O. Vent Valve

Remote indication of burner on status. (Optional)

Burner Ignition and Flame sensors

Main panel to burner

Spark Plug Wiring (Right) – To Ignition transformer

Flame Rod Wiring (Left) – To "F" Terminal in Flame Safety Base

Note: Flame safety must be grounded to unit. Use the high voltage wire supplied with unit. Use crimp connectors. Cover spark/flame rod connections with clear plastic tubing if outdoor installation.