



SKID MOUNTED HEATER AND CONTROL PANEL INSTALLATION, OPERATIONS AND MAINTENANCE MANUAL

1. General Instructions:

- a. All work should be performed by qualified personnel
- b. Skid assembly must be used only in the service that the heater was designed to heat.
- c. Severe injury or death can result from touching any energized parts in the control panel. Only technically proficient personnel are to be allowed to work on this equipment. **Lock out all power before servicing this equipment.**
- d. Always replace any blown fuses with fuses of the same type and rating. Please see bill of materials on layout drawing for list of replacement parts.
- e. All thermocouple and signal wire must be run in separate conduit away from power conductors.
- f. Refer to control panel schematic and layout drawings for power source requirements and termination points.
- g. Refer to control panel layout drawing for bill of materials.

2. Installation:

- a. Provide adequate space for mounting of the skid. Proper spacing must be provided for removal of heating elements. Skid must be level.
- b. Heater must be mounted in its design orientation per the drawing. If the design orientation is to be changed (vertical design to horizontal mounting, horizontal design to vertical mounting, or reversing the inlet/outlet nozzles), please contact Gaumer Process Heaters to determine suitability. Attach piping connections as shown on the general arrangement drawing.
- c. Mount only in an area compatible with the environmental rating of the control panel and heater housing. Refer to panel layout and general layout drawings for environmental ratings.

3. Electrical connection:

- a. Suitably ground the control panel assembly back plate. Grounding lugs have been provided for this purpose.
- b. Please refer to the electrical schematic and layout drawings for power source requirements and termination points. Electrical wire used for the main power feed should be sized per NEC with respect to the upstream circuit protection. Incoming main power should be terminated at the main disconnect switch located within the control panel. If no main power disconnect switch has been provided in the control panel, terminate as instructed on the control panel drawings.
- c. All thermocouple leads should be run in a separate raceway or conduit from the high voltage and should be terminated as shown on the drawings. It is imperative that the correct polarity is maintained on the thermocouple wiring. Incorrect polarity will result in incorrect temperature readings and possible damage to equipment or injury to personnel.
- d. Any additional wires necessary for optional alarms, auxiliary switches or signal communications should be run in a separate raceway or conduit from high voltage and should be terminated as shown on the drawings.

4. Startup:

- a. Before attempting to energize the equipment, all electrical connections must be checked for loose connections and tightened if necessary. Loose electrical connections will cause heat build up and may possibly result in fire, damage to equipment or personnel. The heater connections should be checked for phase-to-phase resistance. Check the resistance between circuit legs. Note: Resistance readings can be taken in the control panel at the point of heater lead termination. Refer to heater wiring diagram for proper resistance for each leg.
- b. Check the resistance from each heater leg to ground. Do not energize the system if readings are below one Mega-ohm. Contact Gaumer Customer Care for instructions.
- c. If an over temperature controller (OTC) or high temperature switch (TSH/TSHH) has been provided in the control panel, it must be set to the appropriate temperature setting before the system is put into service. **WARNING – WHEN HEATING FLAMMABLE OR COMBUSTIBLE GASES OR LIQUIDS, DO NOT SET THE OTC HIGHER THAN 80% OF THE AUTO-IGNITION POINT OF THE GAS OR LIQUID! IF NO OVER-TEMPERATURE OR HIGH LIMIT DEVICE HAS BEEN PROVIDED, IT IS THE USER'S**

13616 Hempstead Road · Houston, Texas 77040 · (713) 460-5200 · (800) 460-5200
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PRE-WIRED HEATER/CONTROL PANEL SKID INSTALLATION AND OPERATION MANUAL

RESPONSIBILITY TO PROVIDE THIS PROTECTION. Typical analog OTC's will be mounted on the back pan of the control panel and will have an adjustable dial. This dial should be set to the proper temperature before energizing the system. If a digital indicating OTC has been provided, it must be energized before a temperature setting can be set or verified if set at the factory. After the controller is powered up, set the appropriate trip points as per the individual controllers instruction manual. **Please read the following steps before energizing this equipment.**

- d. Typically the OTC should be set to a point 100°F above the process temperature setting (keeping the above warning in consideration). Although some processes, depending on the flow rate and/or heat transfer rate, may require that the OTC is set to a higher trip setting. Before setting the OTC, several factors must be considered including process conditions of the fluid/gas being heated and design conditions (pressure/temperature) of the vessel or tank that the heater is inserted into. It is possible that the fluid or gas being heated and the vessel or tank will experience the temperature that is set on the OTC. The OTC should NEVER be set above 1200° F without contacting the Gaumer Customer Care Department.
- e. When the temperature exceeds the OTC setting, the heater will be shut off. The system or controller must be manually reset. This is normally done by depressing the illuminated over-temp/reset button on the door of the control panel. In the event of nuisance tripping of the OTC, please contact the Customer Care Department at Gaumer Process Heaters for setting instructions.
- f. Be certain that the enclosure door is closed before energizing the system
- g. Verify proper flow of gas or liquid through the heater assembly before energizing the system. In the event that you have a liquid tank or sump heating system, make sure that the heater is fully submerged before starting. Liquid heaters should never be exposed to air or gas pockets while in operation.
- h. Ensure that the control thermostat, thermocouple, RTD, etc. is properly connected and set prior to energizing the heater. If a manual cutout device is installed in the heater housing, ensure the power is disconnected and locked out before opening the heater housing.
- i. DO NOT install heater in any system where the operating temperature and/or pressure may exceed the rating of the flange or body of the heater.
- j. Energize the system by turning the main disconnect handle on the front of the control panel to the on position.
- k. Turn the off/on control power switch to the on position if included on control panel.
- l. If the panel uses a temperature indicating controller (TIC), verify the process set-point and change to the desired process temperature if necessary. See the temperature controller's instruction manual provided with the control panel for operating details.
- m. Some systems require the use of external customer supplied switches such as emergency shutdown, flow switch, level switch or other enabling contacts. Make sure that all of these types of devices are satisfied and correctly installed for operation.
- n. If the temperature controller and OTC are set to the correct set-points and external switches that are connected are closed, the system will heat up and control the process to the to the desired temperature without operator involvement.
- o. If the temperature indicating controller (TIC) that is provided in the control panel includes an "Autotune" feature, this feature can greatly enhance the controller's ability to stabilize the process temperature. It is not always necessary to activate this feature. However, if the system will heat up but fails to maintain tight enough control to satisfy the process, autotuning will improve the control. Please refer to the Autotune setup instructions in the controller's instruction manual for details on this feature.
- p. If for any reason the control system does not operate satisfactorily, contact the Gaumer Customer Care Department for assistance.
- q. During initial startup, the over-temperature controller safety shutdown should be checked for proper operation. It is imperative that this system operates properly for the protection of the equipment and personnel. This should be checked before the process is allowed to run unattended. Typically a check of this over-temperature controller safety shutdown system can be accomplished by momentarily lowering the set point of the OTC to the point at which it trips and shuts down power to the heater by opening the safety contactor(s). If the safety shutdown system fails to operate properly or you have any question or concerns about the safety shut down system, please contact the Gaumer Customer Care Department for assistance.

5. Heater Maintenance:

In order to extend the life of your heater, the following maintenance functions should be performed. Gaumer Process Heaters can assist and/or provide this maintenance work for you. Contact the Gaumer Customer Care Department for details.

When performing any maintenance on the heater, all safety regulation must be followed. Approved safety lockout procedures must be followed before opening the heater or heater electrical housing.

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- a. **Monthly:**
 - 1. Inspect equipment for leaks or visible damage
- b. **Semi-Annually:**
 - 1. Open terminal housing and ensure it is dry and clean.
 - 2. Check the resistance between each circuit leg and ground. See Section 4.b.
 - 3. Check all terminals for damage and to ensure that all terminals are tight and secure. Care should be taken not to over-tighten terminals.
 - 4. Check resistance between circuit legs. See Section 4.a.
 - 5. If any problems are found with the items above, contact the Customer Care Department at Gaumer Process Heaters for assistance.
 - 6. Check enclosure gasket if provided and replace if damaged
- c. **Annually:**
 - 1. Open terminal housing and mark and disconnect all incoming wiring. Disconnect conduit. Check the housing to ensure it is clean and dry.
 - 2. Note the position of the over-temp thermocouple, which is marked on the heater flange. Remove bolts from heater and pull heater bundle. Care must be taken in removing the bundle not to damage the elements.
 - 3. Check heater elements for any sign of buildup of foreign materials. If buildup is noted, clean elements. Check over-temp thermocouple to ensure it is properly secured to the element. If the thermocouple is removed for any reason, it must be re-attached to the same element in the same location.
 - 4. Perform items 2 through 5 of Semi-Annual maintenance shown above.
 - 5. Reinstall heater bundle using a new gasket and taking care not to damage the elements. Note the position of the over-temp thermocouple. Heater **MUST** be reinstalled in the same orientation as when it was removed.
 - 6. When bolting the heater into place, proper tightening procedures and torque must be used to ensure proper seating of the gasket.
 - 7. Reconnect conduit and wires using care to reconnect to the proper terminals.
 - 8. Close housing cover using new gasket if necessary.
 - 9. When restarting the heater, monitor for leaks.

6. Control Panel Maintenance

In order to extend the life of your control panel, the following maintenance functions should be performed. Gaumer Process Heaters can assist and/or provide this maintenance work for you. Contact the Gaumer Customer Care Department for details.

- a. Semi-Annually – The following procedures should be performed on a semi-annual basis. **Note: DO NOT OPEN THE CONTROL PANEL UNTIL THE POWER HAS BEEN PROPERLY LOCKED OUT.**
 - 1. Check for loose connections. Loose connections, especially on the high voltage terminals will cause heat build up. If any signs of heat are noticed at any termination point, that connection should be disconnected, inspected and replaced, if necessary, before resuming operation
 - 2. Enclosure door gasket should be checked for proper placement and for possible leakage if the control panel is installed in an area where it is subject to liquids or dust.
 - 3. Signs of heat: One of the main reasons of failure for any electrical components is heat. All of the components in the control panel should be visually inspected for signs of heat. If evidence of excessive heat is found on a component, it should be thoroughly inspected and replaced if necessary. SCR's are particularly susceptible to heat fatigue. If your control panel contains SCR's, always make sure that the fasteners that secure the SCR to its heat sink are securely tightened to insure proper heat dissipation.
 - 4. Indicator Lights: All of the door mounted indicator lights should be checked and bulbs changed if necessary.
 - 5. Over Temperature Controller should be checked for proper operation. See section 4-q above for this procedure.
 - 6. Fuses: All fuses, both control and power fuses, should be checked. In the event that any fuse is found to be blown, that circuit should be investigated for cause and corrective action should be taken before the fuse is replaced and operation resumed.
 - 7. Wiring: All wiring should be checked for signs of insulation breakdown or brittleness. If any wire is found to be damaged in any manner, the cause should be investigated and remedied before the wire is replaced and operation is resumed.

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