

# GAUMER PROCESS

HEATERS  
SYSTEMS  
CONTROLS

## INSTALLATION, OPERATION, & MAINTENANCE MANUAL FOR HOT OIL SYSTEM

**E-Mail:** [support@gaumer.com](mailto:support@gaumer.com)

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## **DANGER**

**CHECK SYSTEM DRAWINGS TO DETERMINE PROPER OPERATING VOLTAGE.**

**FACILITY LOCKOUT SAFETY PROCEDURES MUST BE FOLLOWED WHEN INSTALLING OR SERVICING THIS EQUIPMENT.**

**ONLY TECHNICALLY PROFICIENT PERSONNEL ARE TO BE ALLOWED TO WORK ON THIS EQUIPMENT.**

**INJURY OR DEATH WILL RESULT IN CONTACTING ANY EXPOSED ELECTRICALLY ENERGIZED PART OR COMPONENT ON THIS EQUIPMENT.**

**DO NOT OPERATE THIS EQUIPMENT WITHOUT THE MOTOR/GEAR BOX & GEAR BOX/PUMP COUPLING GUARDS IN PLACE.**

**REVIEW THIS ENTIRE MANUAL AND ALL ATTACHED DOCUMENTATION BEFORE INSTALLATION AND OPERATION.**

**REFER TO SYSTEM DRAWINGS TO DETERMINE SUITABLE ELECTRICAL AREA CLASSIFICATION.**

## **INSTALLATION INSTRUCTIONS**

1. Secure heating skid in suitable location. Ensure the skid is level. Provisions must be made for controlling any spilled heat transfer fluid.
2. Suitably ground control panel assembly back plate. A grounding lug has been provided for this purpose. Additional skid grounding may be required per facility guidelines.

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3. Electrical wire used for the power feed to the panel should be sized with respect to the circuit protection upstream from the panel and should be terminated at the top of the 3 pole circuit breaker / disconnect switch located within the control panel.
4. Consult the electrical schematic for all control inputs, outputs, status, and alarms connections.
5. Check all electrical connections before proceeding. Ensure all wire terminations in the panel are tight.
6. Connect the hot oil piping to the edge-of-skid connections shown on the system drawings. Piping for the system should be sized for minimum pressure drop and be arranged to minimize air being trapped. Air/Vapor bleed valves **MUST** be installed at high points in the piping to allow for venting of air/vapor. Insulate the piping for both energy conservation and personnel protection. Pressure (bubble) test the piping before loading the system with oil.
7. If the skid has a nitrogen blanket, connect the nitrogen supply to the nozzle shown on the system drawings. The expansion tank backpressure valve must exhaust into a safe area.
8. If provided the expansion tank mounted pressure safety valve must be piped to a safe location to gather any oil/vapors relieved through the valve.
9. Consult the MSDS and technical information supplied by the fluid manufacturer. Verify the maximum allowable film (heater element surface) temperature of the fluid before proceeding.
10. Rotate all required valves to the full open position before filling the skid with the designated heat transfer fluid.
11. Fill the system with heat transfer fluid through the port on the top of the expansion tank unless otherwise directed by the skid mechanical drawings.
12. The nominal start-up fill point for a cold system is at approximately 25% of the expansion tank's capacity. Open and monitor all bleed points and vent air until the entire system is completely free of air.

### **START-UP PROCEDURES**

For technical support **CALL** the Gaumer Customer Care Department for assistance.

1. **DO NOT** rotate the pump until the system is filled with oil.
2. **TURN** all panel OFF/ON switches to the OFF position.
3. If the system contains a nitrogen blanket, adjust the nitrogen blanket pressure. Adjust the backpressure valve to a slightly higher pressure.
4. If a purged control panel has been supplied, see the Purged Panel Control Cabinet Option instructions included with this manual before proceeding.
5. Engage the upstream 480 Volt power supply the skid.
6. Rotate the local primary power disconnect to the ON position.
7. Turn the power OFF/ON switch to the ON position. The switch will illuminate.
8. Momentarily **BUMP** each pump motor. **CHECK PUMP FOR THE CORRECT MOTOR ROTATION.**
9. If pump rotation is correct start the pump.
10. Do not energize the heater at this time

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11. The pump(s) may be noisy during start up due to air or moisture that is still trapped in the system. Pinching back on the outlet isolation valve to reduce flow will help to keep the pump from cavitating during start-up.
12. Check the fluid level in the expansion tank for abnormal rise or drop. If level increases in the tank, a pocket of air is probably trapped in the piping. Turn the pump off. Let the system sit while the bleed valves are open. Restart the system.
13. Check all air bleed valves until the level stabilizes and air stops coming out of the valve.
14. After all air has been evacuated from the system and the discharge pressure gauge readings have stabilized, the heater circuit can be energized.
15. Rotate the heater OFF/ON switch to the ON position. Set the temperature controller to 120° F.
16. Observe all piping for leaks. Correct before proceeding. Check & bleed all high-point vents every 10 minutes during the initial start-up period.
17. At this point set the temperature controller to 250°F operating temperature.
18. Run system at this temperature until all moisture vapor and/or air has been purged out and the fluid level stabilizes in the expansion tank.
19. After the system has been completely free of air and or steam pockets increase the temperature in 50° increments allowing the temperature to stabilize and checking for leaks until you reach the operating temperature.
20. Record all operating pressures and temperatures.

### **NOTE:**

ABNORMALLY LOW READINGS ON THE SUCTION GAUGE USUALLY INDICATE THAT THE STRAINER IS DIRTY AND SHOULD BE CLEANED

## **OPERATION OF SYSTEM**

### **MOTOR CIRCUITS**

The motor circuits are controller by a “START” and a “STOP” push button switch. The green MOTOR RUN light will be illuminated when the motor is running.

### **HEATER CIRCUIT**

Turning the HEATER selector switch to the ON position enables the heater circuit. The HEATER ON pilot light will be on when the heater circuit is energized. The main process temperature controller (TIC) drives the SCR power controller. The Controller signal drives the SCR either through a firing card via 4-20mA or 1-5 Vdc or directly for the controller via DC volt pulse. (See panel schematics).

### **OVER TEMPERATURE CIRCUIT**

An over-temperature controller (OTC) has been provided for the heater sheath over temperature protection. When the heater sheath exceeds the set point of the OTC, the amber over-temperature light will illuminate and the heater will be de-energized. The system will have to be manually reset by pressing the lens of the over-temperature light. SET THE OVER-TEMPERATURE CONTROLLER 50° ABOVE THE MAXIMUM

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OPERATING TEMPERATURE OF THE SYSTEM. UNDER NO CIRCUMSTANCES SHOULD THE OVER-TEMPERATURE CONTROLLER BE SET AT MORE THAN 80% OF THE AUTO-IGNITION TEMPERATURE OF THE OIL.

### **TROUBLE SHOOTING**

Consult the electrical drawing for this equipment before proceeding.  
ONLY technically proficient personnel will be allowed to work on this equipment.  
Contact with any high voltage circuit may cause severe injury or death.

**Contact the Gaumer Customer Care Department for assistance with technical support on the equipment.**

#### **If motor circuit does not latch when START switch is pressed:**

1. Check power supply (upstream by others).
2. Check control circuit fuses mounted on the control transformer within the enclosure. Refer to schematic drawing and check for control power.
3. Check the electrical schematic for any external switches, contacts, or interlocks that could interfere with the system.
4. Check the motor over-load relay for a possible trip.
5. Check the fuses mounted on the Motor Starter Contactor.
6. Check the contact blocks located on back of the START switch.
7. Check the MS-A1 auxiliary contact on the motor contactor.

#### **If the heater fails to heat or keep on temperature :**

1. Check all temperature controllers for proper set point and possible configuration. Refer to controller instruction manual for instructions.
2. Perform a current check on the heater circuit.
3. Check all the heater circuit fuses.
4. Check to ensure voltage is present to the heater.
5. Check for an open thermocouple to the temperature controllers. The controllers will not allow operation of the heater on loss of input sensor signal.

### **PERIODIC MAINTENANCE**

**The following maintenance must be performed on this hot oil system. If you need assistance or need someone to perform this maintenance for you, contact the Gaumer Customer Care Department.**

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Any fluid leaks on this equipment could constitute a potential fire hazard. Do not allow fluid to accumulate on the floor. Check the entire system for leaks and tighten connections if necessary.

The pump, gear reducer, if provided, and motor are the primary mechanical equipment with moving parts on the skid. Check the pump seal for leaks. Replace if necessary. If pump does not have a mechanical seal, check for leaks and adjust the packing. Check the gear reducer oil level. Service the motor in accordance with the manufacturer's recommendations.

The heat transfer fluid should be sampled and tested every six months. Degraded fluid should be replaced before it affects the performance of the system.

Heater maintenance should be performed periodically.

### Semi-Annually

1. Open terminal housing and ensure it is dry and clean.
2. Check the resistance between each circuit leg and ground. If the reading is less than one megohm, contact the Customer Care Department at Gaumer Process Heaters for assistance.
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. If any problems are found with the items above, contact the Customer Care Department at Gaumer Process Heaters for assistance.
5. Check enclosure gasket and replace if damaged.

### Annually

1. Open the terminal housing. 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. This 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 bundle for any sign of buildup of foreign materials. If buildup is noted, clean the elements. Check over-temp thermocouple to ensure it is properly secured to 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. Re-install heater bundle using new gasket and taking care not to damage the elements. Note position of over-temp thermocouple. Heater bundle **MUST** be re-installed 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 re-starting the heater, monitor for leaks.

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If the system has been provided with a liquid-to-liquid heat exchanger, the exchanger must be pulled for inspection at least once a year. Acidize the tubes to remove any accumulation of mineral deposits per the manufacturers instructions.

### Control Panel Maintenance

Semi-Annually – The following procedures should be performed on a semi-annual basis. If you require assistance in performing these checks, contact the Gaumer Customer Care Department. 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 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 Safety Shutdown System should be checked for proper operation. 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. 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.
6. 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.

### **Purged Control Cabinet Option**

If the control panel has been provided with a purge system for hazardous location service, service as described below as well as following all instructions posted on the purges system and the control panel drawings.

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The Z purge inert or instrument air supply must be connected to the pipe connection on the side of the control panel. Only a dry (-40°C dew point) instrument grade air supply or nitrogen can be used. Allowing condensation to form inside the control panel will adversely impact any warranty claims. The supply pressure must be no less than 60 psig to meet the requirement of Rapid Exchange. The supply pressure cannot exceed 120 psig due to equipment limitations.

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