INSTALLATION, OPERATION, & MAINTENANCE OF CATALYTIC HEATERS

WARNING: Improper installation adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instruction thoroughly before installing.

INSTALLATION
Mounting Position

It is recommended that heaters be installed so that the face (radiating surface) is in a near-vertical position for peak efficiency.

When it is necessary to install a heater above the item to be heated, it should be mounted at a minimum 15 degree angle from the horizontal position, so that products of combustion can leave the heater face and adequate combustion air will be available.

Heaters used in exterior locations must be mounted in an enclosure of some type for protection from rain, wind and snow.

If a heater is used for equipment heating, efficiency can be improved considerably by painting the equipment with a flat, black paint.

See chart on page 3 for table of minimum clearances as recommended by Factory Mutual and the Canadian Standards Association.

NOTE: Many of these heaters are used in hazardous locations. The gas portion of these heaters is inherently safe but care must be used in planning and executing the electrical installation to achieve a safe finished product. All electrical work and the accessories used must conform to national, state and local codes and generally recognized good practices. In the US that would mean the applicable sections of the National Electrical Code (NFPA 70). In Canada the Canadian Electrical Code (C22.1) would apply.

WARNING
Do not alter or change the heater. Do not alter or change safety controls. Use only specified fuel and specified inlet pressure. Do not operate if any part of heater or control is damaged. Do not attempt to clean heater face. Do not attempt to flame start heater. Do not remove warning labels or instructions labels. Do not for residential or recreational use. Use only in well ventilated areas. Modification by other than Factory Personnel will void warranty & certification. Use only specified voltage. Turn off and disconnect electricity and gas before servicing. Read operational manual before installing or reinstalling. Consult Factory for combustible clearances. Failure to observe these warnings can result in dangerous conditions.

Piping

All piping shall be completed in a neat and workmanlike manner. This piping must comply with national, state and local codes, which may vary by locale. In the US, for natural gas, the National Fuel Gas Code (ANSI Z223.1/NFPA 54) would usually apply. For propane installations, the LP-Gas Code (NFPA 58) would usually apply. In Canada, the piping installation code for Natural Gas and Propane is CAN/CSA-B149.1.

Standard heaters not using a manual or automatic safety valve are not approved by either the Canadian Standards Association or Factory Mutual.

Heaters using automated safety equipment shall be mounted with the same recommendations as heaters using manual safety valves.

**All heaters should be connected with stainless steel tubing or an approved flexible gas appliance connector.

WARNING: Do not attempt to clean catalytic pad. Follow cleaning instructions accompanying heater.

ELECTRICAL PREHEAT

ALL heaters shipped are supplied with the correct jumper strap arrangement for the voltage marked on the tag. DO NOT RECONFIGURE THESE STRAPS. Illustrations are for clarification only and are not intended to be used for field reconfiguration.

Heater models with only two preheat terminals are single voltage heaters. A power supply of the correct voltage would be connected to the two terminals. (See Fig. 2)
Heater models with four electrical elements preheat terminals have two elements and can be FACTORY configured to operate in either a parallel or series fashion, depending on the voltage available and elements used. The parallel hook-up has two jumper straps, as illustrated in Figure 3. Attach the supply conductors to one terminal of each strap.

For series hook-up, the heater junction box will only contain one strap, as illustrated in Figure 4. Connect power to the two terminals not connected to the strap (A&C in illustration).

All explosion proof junction boxes contain a grounding screw, which should be used to complete all AC installations.

NOTE: All electrical connections must conform with National, State, and local Codes. (US: NFPA70, Canada C22.1, Part 1)

Turn off fuel-gas supply valve. (a) When temperature rises (10 minutes) 
(b) Energize electrical preheat supply. CAUTION: Connect to terminals first, then to power supply. 
(c) Wait 20 minutes. 
(d) Depress red button on control valve and release immediately. Button should return to original position. 
(e) If temperature does not rise, wait 5 additional minutes and repeat step (d). 
(f) When temperature rises (10 minutes) turn off electricity.

Shut-Down
Turn off fuel-gas supply valve.

3. USE OF THERMOSTATS
Heater output temperatures can be controlled by installing a factory preset thermostatic control valve between the final fuel-gas pressure regulator and the Brustheater(s).

When the thermostatic set point has been reached, the control valve closes and allows only a minimum of gas to flow through the by-pass orifice inside the valve body. (By-pass must be factory-set for a specific flow.) This allows the heater to operate at a reduced temperature, eliminating the need to re-start electrically.

4. FUEL
The fuel gas orifice supplied with each heater has been properly sized to allow the correct amount of gas to each square foot of heater surface, and should not be changed.

Regulators for LP gas models are preset at 11" W.C. pressure. If regulators are obtained from any other source, it is extremely important that regulator pressures meet the above requirements which are also marked on the heater tag. Take precaution in case of conflicting information.

For CSA natural gas heaters the minimum supply pressure is 7.0" W.C. The maximum supply pressure is 14.0" W.C. See Figure 6. NOTE: Supply pressure is ahead of appliance regulator and manifold pressure is downstream of the appliance regulator.

IMPORTANT: Should it ever become necessary to change from one fuel to another (NP to natural gas or natural gas to LP), the heater to be converted must be returned to the factory or a factory approved repair facility. Field conversion is NOT approved.

CAUTION: When propane gas is used for fuel, grade "HD5" propane or better must be used.

MAINTENANCE & TROUBLE-SHOOTING
MAINTENANCE
As there are no moving parts in a Brustheater catalytic heater, maintenance is reduced to a minimum.

The face of the heater (the catalyst) should be protected when cleaning in the area, as high-pressure air or water can damage or destroy the catalyst.

When the heater is not in use, it should be stored where dirt and other materials will not collect on the catalyst surface. To prevent contamination or the possibility of insect or rodent damage to the catalyst during the summer or any long period out of service, heaters should be wrapped in plastic film or similar material.

CLEANING
IR Heaters—clean the heater face with a soft bristled brush or lint-free cloth. CAUTION: DO NOT use compressed air, stiff bristled brushes, or high-pressure water. This will cause holes in the catalyst pad and gas leaks through the face of the heater, resulting in an unsafe condition.

The exterior steel and/or metal may be cleaned by using general industrial cleaners such as: Simple Green, 409, Fantastik, or soup and water. Apply with a damp sponge or cloth and then wipe dry. CAUTION: DO NOT use a high pressure washer or steam cleaner. This could penetrate into the heaters and insulated areas of the heater enclosure and create problems.

Trouble-Shooting Check List
Once the catalytic process has begun, it should continue without interruption as long as fuel and fresh air are provided. If a heater will not start or fail to maintain temperatures:

1. With the unit cold and the gas turned off install a tee in the line just ahead of the Safety Valve (the one with the button you push). Install a gauge. "The gauge needs to read 0 to 3 1/2" W.C. or approx. 1 oz., water column (gas) gauge.

2. Install a tee wrap on the Safety valve button holding it down. Turn your gas back on to the unit.

3. If you have a thermostat turn it to the highest setting or wide open. This will open the valve.

4. Check gas supply pressure (between Baso valve and heater) — it should be 3 1/2" W.C. for natural gas, 1 1/2" W.C. for LP gas.

5. Care for saturation of catalyst pad—if saturated with water, it will not function until the moisture is dried out. Drying can be accomplished by placing the heater in a conventional (cooker) oven, faceup at 250°F for about 2 hours.

6. Oil (or any hydrocarbon) spilled on heater face normally will not damage the catalyst. Minor amounts, in most cases, will be absorbed in the combustion process. If oil saturation is heavy, the heater should be returned to the factory for cleaning or renovation.

7. Turn the thermostat down to the lowest setting. You should see a reading of 1 to 1 1/2" W.C. or approx. 1 oz., water column. The thermostatic gas valve is working properly. (3.5" W.C. of gas is giving the unit full capacity, 1" W.C. cuts the unit to half its capacity or 50%. This is the cycle of the thermostatic gas valve.

8. If the gauge goes to zero when the thermostat is turned down to lowest setting the thermostats valves orifice is stopped up or there is something wrong mechanically and it should be replaced.

9. Cut the tie wrap off the Baso safety valve.

10. Check safety shut-off control. Preheat electrically for 20 minutes, then depress red re-set button and release. A pressure gauge or manometer located upstream of the safety valve will lower slightly if the valve is good. (Downstream of the valve, pressure will rise from 0 to 3 1/2" W.C. when open.

11. Check millivolt output of the thermocouple by disconnecting from safety valve and attaching a millivolt meter. Reading should be 10-15 millivolts after 20 minutes of preheat. Be sure contact surfaces are clean of any oil, corrosion or film of any sort. Clean with pencil eraser or other fine abrasive cleaning method.

12. Start your heater up, if it stays running you have solved the problem. If the unit goes out again after a couple days replace the Baso valve.

13. If all your regulators are set, your thermostatic gas valve, thermocouple and Baso safety valves are operating the only thing left is "You have a bad pad." This means it needs replaced. Replace Heater or return to factory for repair.
## OPERATIONAL SPECIFICATIONS

### Operational Specification with the exception of CSA Approved "S" Heaters for L.P. gas.

<table>
<thead>
<tr>
<th>HEATER MODELS</th>
<th>BTUH INPUT</th>
<th>CFIT/ HR. NG.</th>
<th>CFIT/ HR. LP GAS</th>
<th>SHIPPING WEIGHT</th>
<th>INLET FITTING</th>
<th>WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR8</td>
<td>2,500</td>
<td>2.5</td>
<td>1</td>
<td>6 lbs</td>
<td>1/4&quot; NPT</td>
<td>150</td>
</tr>
<tr>
<td>SR12</td>
<td>5,000</td>
<td>5</td>
<td>2.2</td>
<td>6 lbs</td>
<td>1/8&quot; NPT</td>
<td>180</td>
</tr>
<tr>
<td>S6X6</td>
<td>1,500</td>
<td>1.5</td>
<td>0.6</td>
<td>6 lbs</td>
<td>1/4&quot; NPT</td>
<td>160</td>
</tr>
<tr>
<td>S6X12</td>
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<td>1</td>
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<td>1/8&quot; NPT</td>
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<tr>
<td>S6X24</td>
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<td>2.4</td>
<td>12 lbs</td>
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<td>225</td>
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<td>SX6</td>
<td>2,600</td>
<td>2.7</td>
<td>1.04</td>
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<td>160</td>
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<tr>
<td>S10X22</td>
<td>9,000</td>
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<td>11 lbs</td>
<td>1/4&quot; NPT</td>
<td>400</td>
</tr>
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</tr>
<tr>
<td>S12X12</td>
<td>6,000</td>
<td>6</td>
<td>2.4</td>
<td>12 lbs</td>
<td>1/8&quot; NPT</td>
<td>180</td>
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<tr>
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<td>17 lbs</td>
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<tr>
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<td>7.2</td>
<td>23 lbs</td>
<td>1/2&quot; NPT</td>
<td>450</td>
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<tr>
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<td>38 lbs</td>
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<td>1000</td>
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<td>30,000</td>
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<td>12</td>
<td>42 lbs</td>
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<td>1250</td>
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<tr>
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<td>14.4</td>
<td>46 lbs</td>
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<td>1500</td>
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<td>37,000</td>
<td>37</td>
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<td>50 lbs</td>
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<td>1500</td>
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<tr>
<td>S12X100</td>
<td>45,000</td>
<td>45</td>
<td>18.3</td>
<td>55 lbs</td>
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<td>68 lbs</td>
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<td>28.8</td>
<td>74 lbs</td>
<td>1/2&quot; NPT</td>
<td>3000</td>
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</table>

### Operational Specification (For the use of LP Gas For CSA Approved "S" Heaters)

- Wattage may vary some. Most common value listed.

**INSTALLATION:** Refer to CSA C22.1 Standards for CSA approved heaters.

Minimum clearance # (inches) from combustibles. Applies only to space heating.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>POSITION</th>
<th>RADIANT SURFACE</th>
<th>SIDES</th>
<th>TOP</th>
<th>BELOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-12-6,8-8</td>
<td>Vertical</td>
<td>24&quot; (609.6 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
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<tr>
<td>10-12,24,10-22</td>
<td>Vertical</td>
<td>20&quot; (508 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
</tr>
<tr>
<td>12-36,12-48,18-60</td>
<td>Vertical</td>
<td>48&quot; (1219.2 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
</tr>
<tr>
<td>12-18,18-6,36-18-48</td>
<td>Vertical</td>
<td>60&quot; (1524 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
</tr>
<tr>
<td>18-60,24,24,24-36</td>
<td>Vertical</td>
<td>45&quot; (1168.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>35&quot; (1157.6 mm)</td>
<td>12&quot; (304.8 mm)</td>
</tr>
<tr>
<td>24-48,48-60,72-24</td>
<td>Vertical</td>
<td>45&quot; (1168.8 mm)</td>
<td>12&quot; (304.8 mm)</td>
<td>35&quot; (1157.6 mm)</td>
<td>36&quot; (1154.4 mm)</td>
</tr>
</tbody>
</table>

**NOTES:**
- Clearances for sides, tops, and below are given from nearest part of units.
- Installation of overhead heaters in garages or hangars must be 6 ft. floor of hangar and public garages and approved for use in Class 1, Division 3, Group D, hazardous areas.
- An overhead heater should be installed so that the minimum clearances marked on the heater will be maintained from vehicles parked below the heater.
- Locations used for the storage of combustible materials must have signs posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles, and these signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats near the heater.
- The stated clearance to combustibles represents a surface temperature of 90 F (32 C) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-plex, etc.) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation or ignition.

**EX:** See ATEX instruction supplement sheet for additional information specific to ATEX installation, operation and maintenance requirements.

**WARRANTY:**
All products manufactured by Catalytic Industrial Group, Inc. will be guaranteed against defects in material and workmanship for a period of two years from date of purchase. Repairs or replacements within this guarantee will be made without charge if transportation costs are prepaid to Catalytic Industrial Group, Inc., in Independence, Kansas.