

INSTALLATION, OPERATION, & MAINTENANCE OF CATALYTIC HEATERS



hazardous locations
Class I, Group D
Division 2

FACTORY MUTUAL SYSTEM



1/2 G
1/3 G Propane, Butane, Methane



CANADIAN STANDARDS ASSOCIATION

hazardous locations
Class I, Group D
Division 1 and 2



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.

WARNING

DO NOT ALTER OR CHANGE ORIFICE.
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.
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.

WARNING
Do not use heater if the catalytic pad becomes torn or damaged. Continued use may result in injury or death due to fire, explosion, or carbon monoxide poisoning. The heater must be serviced by a licensed and qualified service person.

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 Part 1) would apply.

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

Piping

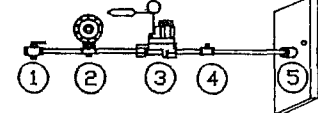
All piping shall be completed in a neat and workmanlike manner. This piping must comply with national, state and local codes, which may vary by locale. In the US, for natural gas, the National Fuel Gas Code (ANSI Z223.1/NFPA 54) would usually apply. For propane installations, the LP-Gas Code (NFPA 58)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

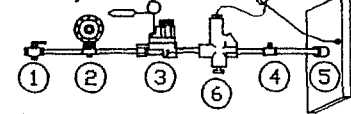
Heaters using automated safety equipment shall be mounted with the same recommendations as heaters using manual safety valves.

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

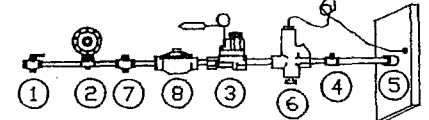
Standard Heaters



Factory Mutual Heaters



Canadian Standards Association Heaters



1. Manual Valve
2. Pressure Regulator (Pounds to Inches W.C.)
3. Thermostatic Gas Valve (Available accessory)
4. Pressure Tap Tee
5. Catalytic Heater
6. Safety Shut-off Valve
7. CSA Approved Service Cock
8. CSA Approved Appliance Regulator (Max 1/2 PSI inlet - Not required for propane fueled heaters)

Items 1, 2, 4, 5 and 6 are the required minimum items for FM and ATEX approved heaters. The other items are recommended as good practice. For CSA installations, items 1, 2, 4, 5, 6 and 8 are the required minimum. These items will be supplied with a CSA marked 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)

"THE BRUEST"
FLAMELESS GAS LOW INTENSITY
INFRARED CATALYTIC HEATER

Conforms to: ANSI Z63.20-2006
CSA 2.34-2006

Mfg by: Catalytic Industrial Group, Inc.
Independence, Kansas 67301
800-835-0557

Model No. _____	Serial No. _____
Voltage _____	Amperage _____
Fuel Type _____	Orifice Size _____

BTUH Input _____ Rated @ 0-4500 Ft. Altitude

Maximum Manifold Pressure _____	Inches W. C.
Minimum Manifold Pressure _____	Inches W. C.
Maximum Permissible Gas Supply Pressure _____	Inches W. C.
Minimum Permissible Gas Supply Pressure for Purpose of Input Adjustment _____	Inches W. C.

FOR INDOOR INDUSTRIAL USE ONLY
MODELS WITH CG SUFFIX APPROVED FOR USE IN
CLASS 1, DIVISIONS 1 AND 2, GROUP D HAZARDOUS AREAS
MUST OPERATE WITH 100% SAFETY SHUTOFF VALVE

See instructions for additional installation,
operation and safety information.

Heater models with four electrical element 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)

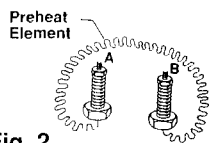
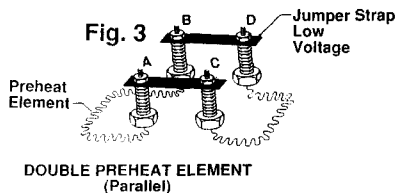
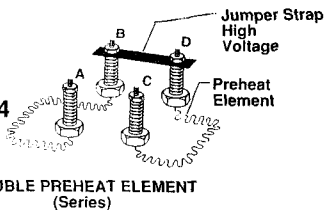


Fig. 2

SINGLE PREHEAT ELEMENT



DOUBLE PREHEAT ELEMENT (Parallel)



DOUBLE PREHEAT ELEMENT (Series)

OPERATION

1. STANDARD HEATERS

Start-Up

- With gas valve off. . .
- Energize electrical preheat supply. CAUTION: Connect to terminals first, then to power supply.
- Wait 20 minutes.
- Turn on gas valve.
- Wait 10 minutes.
- Turn off electricity.
- Repeat if temperature does not rise sufficiently. (In extremely cold weather, allow more time for step c).

Shut-Down

Turn off fuel-gas supply valve.

2. FM, ATEX AND CSA HEATERS

Start-Up

- Turn on gas valve.

- Energize electrical preheat supply. CAUTION: Connect to terminals first, then to power supply.
- Wait 20 minutes.
- Depress red button on control valve and release immediately. Button should return to original position.
- If temperature does not rise, wait 5 additional minutes and repeat step (d).
- 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 Bruest heater(s)

When the thermostat 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 outlet pressures meet the above requirements which are also marked on the heater tag. Tags take precedence 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 (LP 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 Bruest 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, Fantastic, or soap 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 fails to maintain temperatures:

- With the unit cold and the gas turned off install a tee in the line just ahead of the Baso Safety Valve (the one with the button you push). Install a gauge. *The gauge needs to be oz. gauge or w.c. (water columns) gauge.
- Install a tie wrap on the Baso safety valve button holding it down. Turn your gas back on to the unit.
- If you have a thermostat turn it to the highest setting or wide open. This will open the valve.
- Check gas supply pressure (between Baso valve and heater) - it should be 3 1/2" W.C. for natural gas, 11" W.C. for LP gas.
- Check 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 (cookstove) oven, faceup at 250 F for about 2 hours.
- 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.
- 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., this will show 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.
- If the gauge goes to zero when the thermostat is turned down to lowest setting the thermostat valves orifice is stopped up or there is something wrong mechanically and it should be replaced.
- Cut the tie wrap off the Baso safety valve.
- 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.
- 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.
- 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.
- 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.

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

HEATER MODELS	BTUH INPUT	CU.FT/HR. NG	CU.FT/HR. LP GAS	SHIPPING WEIGHT	INLET FITTING	WATTAGE	HEATER MODELS	BTUH INPUT	CU.FT/HR. LP GAS	SHIPPING WEIGHT	INLET FITTING
SR8	2,500	2.5	1	6 lbs.	1/4" NPT	150	SR8	1,745	0.7	6 lbs.	1/4" NPT
SR12	5,000	5	2.9	8 lbs.	1/4" NPT	180	SR12	3,920	1.6	8 lbs.	1/4" NPT
S6X6	1,500	1.5	0.6	6 lbs.	1/4" NPT	150	S6X6	1,250	0.5	6 lbs.	1/4" NPT
S6X12	3,000	3	1.2	8 lbs.	1/4" NPT	160	S6X12	2,500	1	8 lbs.	1/4" NPT
S6X24	6,000	6	2.4	12 lbs.	1/4" NPT	225	S6X24	5,000	2	12 lbs.	1/4" NPT
S8X8	2,600	2.7	1.04	8 lbs.	1/4" NPT	150	S8X8	2,200	0.9	8 lbs.	1/4" NPT
S10X22	9,000	9	3.6	11 lbs.	1/4" NPT	400	S10X22	7,500	3	11 lbs.	1/4" NPT
S12X10	5,000	5	2	11 lbs.	1/4" NPT	180	S12X10	4,150	1.7	11 lbs.	1/4" NPT
S12X12	6,000	6	2.4	12 lbs.	1/4" NPT	180	S12X12	5,000	2	12 lbs.	1/4" NPT
S12X24	12,000	12	4.8	17 lbs.	1/4" NPT	450	S12X24	10,000	4	17 lbs.	1/4" NPT
S12X36	18,000	18	7.2	23 lbs.	1/2" NPT	450	S12X36	15,000	6	23 lbs.	1/2" NPT
S12X48	24,000	24	9.6	38 lbs.	1/2" NPT	1000	S12X48	20,000	8	38 lbs.	1/2" NPT
S12X60	30,000	30	12	42 lbs.	1/2" NPT	1250	S12X60	25,000	10	42 lbs.	1/2" NPT
S12X72	36,000	36	14.4	46 lbs.	1/2" NPT	1500	S12X72	30,000	12	46 lbs.	1/2" NPT
S18X36	28,000	28	11.2	40 lbs.	1/2" NPT	1200	S18X36	22,500	9	40 lbs.	1/2" NPT
S18X48	37,000	37	14.8	50 lbs.	1/2" NPT	1500	S18X48	30,000	12	50 lbs.	1/2" NPT
S18X60	45,000	45	18.3	55 lbs.	1/2" NPT	1900	S18X60	37,500	15	55 lbs.	1/2" NPT
S18X72	54,000	54	21.6	62 lbs.	1/2" NPT	2300	S18X72	45,000	18	62 lbs.	1/2" NPT
S24X24	24,000	24	9.6	28 lbs.	1/2" NPT	1000	S24X24	20,000	8	28 lbs.	1/2" NPT
S24X48	50,000	50	20.6	62 lbs.	1/2" NPT	2000	S24X48	40,000	16	62 lbs.	1/2" NPT
S24X60	60,000	60	24.4	68 lbs.	1/2" NPT	2500	S24X60	50,000	20	68 lbs.	1/2" NPT
S24X72	72,000	72	28.8	74 lbs.	1/2" NPT	3000	S24X72	60,000	24	74 lbs.	1/2" NPT

Factory Mutual Heaters are approved for use with natural gas or LP gas in Class 1, Div. 2, Group D hazardous areas. Canadian Standards Association heaters are approved for use with natural gas or LP gas in Class 1, Div. 1 and 2, Group D hazardous areas. Tabulated inputs are for heaters installed at elevations of 4500 feet or less.

*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.

MODEL	POSITION	RADIANT SURFACE	SIDES	TOP	BELOW
8,12,6-6,8-8	Vertical	24" (609.6 mm)	12" (304.8 mm)	12" (304.8 mm)	12" (304.8 mm)
6-12,6-24,10-22	45 up	24" (609.6 mm)	12" (304.8 mm)	24" (609.6 mm)	12" (304.8 mm)
12-10,12-12,12-24	45 down	20" (508 mm)	12" (304.8 mm)	12" (304.8 mm)	18" (457.2 mm)
	Vertical	48" (1219.2 mm)	12" (304.8 mm)	12" (304.8 mm)	12" (304.8 mm)
12-36,12-48,12-60	45 up	36" (914.4 mm)	12" (304.8 mm)	36" (914.4 mm)	12" (304.8 mm)
12-72,18-36,18-48	45 down	20" (508 mm)	12" (304.8 mm)	12" (304.8 mm)	28" (711.2 mm)
	Vertical	60" (1524 mm)	12" (304.8 mm)	36" (914.4 mm)	12" (304.8 mm)
18-60,24-24,24-36	45 up	42" (1066.8 mm)	12" (304.8 mm)	54" (1371.6 mm)	12" (304.8 mm)
24-48,24-60,24-72	45 down	36" (914.4 mm)	12" (304.8 mm)	12" (304.8 mm)	36" (914.4 mm)

NOTES:

- +Clearances for sides, tops, and below are given from nearest part of units.
- +Installation of overhead heaters in garages or hangars must be 8 ft. floor of hangar and public garages and approved for use in Class 1, Division 1 and 2, 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 in a conspicuous location, 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-ply, 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.

 +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.



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