



NORTHSTAR FLAMELESS CATALYTIC HEATERS

CARE AND MAINTENANCE OPERATING INSTRUCTIONS



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THOROUGHLY READ AND UNDERSTAND ALL WARNINGS, CAUTIONS AND INSTRUCTIONS IN THIS MANUAL AND ON THE HEATER BEFORE INSTALLING, OPERATING OR HAVING YOUR CATALYTIC HEATER SERVICED. FAILURE TO COMPLY WITH THE WARNINGS, CAUTIONS AND INSTRUCTIONS COULD CREATE CONDITIONS CAUSING FIRE, EXPLOSION, ASPHYXIATION AND/OR BURNS.

I INTRODUCTION

Since 1964, **Northstar Flameless** has manufactured unvented Catalytic Safety Heaters for the North American marketplace. Our heaters are used in recreational, industrial and truck cargo heating applications. Continued emphasis on quality, workmanship, innovation and responsiveness to customer needs make us an industry leader in catalytic radiant heating appliances.

Northstar Flameless utilizes flameless catalytic heating technology in our products. In the applications these heaters are designed for this provides certain distinct advantages over typical "open flame" heaters, such as household furnaces, which most people are familiar with.

This technology involves the use of a catalyst on the surface of the heating element, which causes propane to burn very efficiently at a much-reduced temperature. Heat is transferred to the environment by way of radiant energy, comparable to the way the sun warms the earth. Heat is released when the radiant energy hits an object. All of the heat energy in the propane is transferred to the environment. When operating, the element will glow red but there is no flame. The element temperature is between 750° - 850°F, which is below the flash point of most combustibles. This compares with an open flame temperature that can reach 3600°F.

Combusting propane consumes the oxygen in the environment. Replacement air must be supplied. Without sufficient replacement air, the oxygen supply will be used up. Unburnt propane may be spilled and deadly carbon monoxide may be produced. **AIR MAKE-UP VENTS ARE ESSENTIAL.**

II WARNINGS

• IF YOU SMELL PROPANE OR ANY FOUL OR UNUSUAL ODOUR

Propane (L.P.) gas is heavier than air and may settle in low areas. If any odour is detected, always inspect the entire area thoroughly for presence of unburned fuel to determine if it is safe.

During the lighting process, a modest propane smell may be noticed. If the odour persists or is noticed during heater operation do the following:

- Shut off heater and close propane tank valve(s).
- Open windows and/or ventilate environment/trailer.
- Do not touch electrical outlets, telephones, and appliances or otherwise create a spark of any kind.
- Extinguish open flames, including cigarettes.
- Evacuate the immediate area. Do not allow anyone access to the area. Use a cellular or neighbour's telephone to contact your local gas supplier or fire department for advice.
- DO NOT attempt to relight heater.
- DO NOT use heater until a qualified technician determines that the heater is operating properly and has accounted for the source or cause of the propane/foul/unusual odour.

• OXYGEN REPLACEMENT

The heater consumes oxygen from the space in which it is used. A vent or opening is required to provide fresh air (oxygen) to the heater. Without sufficient oxygen in the space, incomplete fuel combustion will take place. This will result in the production of deadly carbon monoxide gas and danger of asphyxiation. Potentially explosive unburnt propane may be spilled into the space. **Never** operate the heater without adequate ventilation. All trailers using **Northstar Flameless** cargo heaters (Front Mount, Portable, Wall Mount) must have at least two vents. The Northstar 6000 recreational heater requires a minimum six square inch opening.

• EXPLOSIVE HAZARD

Do not use **Northstar Flameless** heaters in a space where there are flammable or explosive materials, liquids or vapours present. The pilot flame, used to light the heater, may trigger a fire or explosion if the heater is used in a hazardous environment.

• RELIGHTING

If the heater goes out during normal operation, do not attempt to relight until:

- the reason the heater quit operating has been determined. An empty propane supply, gas line blockage, gas leak, lack of sufficient air, regulator failure, heater mechanical failure or catalytic element deterioration are all possible causes. If there is any doubt regarding the cause contact a dealer or qualified service technician.
 - the heater has been allowed time to cool down completely.
 - it has been determined there is no spilled or otherwise unburnt propane present in the atmosphere.
- Remember propane is heavier than air and will settle in low areas. Ventilate for an extended period if there is any suspicion of an unburned propane odour and/or explosive atmosphere. DO NOT attempt to light heater if this condition persists.

• HEATING ELEMENT DAMAGE

The catalyst on the surface of the element can be removed or damaged if treated improperly. This can result in reduced heater performance and increased risk of excess carbon monoxide production and/or spilling of unburnt propane gas.

• WATER DAMAGE

DO NOT use the heater if any part of it has been under water. The heater **must be** inspected and serviced by a qualified technician before any attempt is made to operate the appliance.

• FUEL SOURCE

Northstar Flameless heaters are designed to be used only with HD-5 automotive quality propane (L.P.) gas. This is the grade of fuel available through major reputable suppliers. The use of other kinds of fuel or lower grade propane gas can result in heater malfunction and/or possible dangerous conditions. Propane is provided to the heater through a regulator system and certified U.L. or CSA hose or gas conveying components.

- **REGULATOR SYSTEM(S)**

Propane fuel must be delivered from the source (bottle or tank) to the heater through an approved regulator system. The regulator reduces the relatively high tank pressure to the appropriate operating pressure of the appliance. **Northstar Flameless** heaters are designed to operate at 11" water column pressure (7 oz./sq. in.). This measurement must be taken at the inlet fitting of the heater. The heater should be in operation for at least 10 minutes with the control set on MAX (3) before adjusting the regulator pressure. This adjustment can be made by removing the screw-on cap on the regulator and modestly turning the adjustment screw. The need to turn the adjustment screw a number of complete rotations may indicate other problems in the system and should be inspected by a service technician.

- **HEATER MALFUNCTION**

If the Catalytic element is contaminated or damaged, you may observe:

- reduced heat output.
- uneven heat from the element.
- prolonged flame on the surface of the element.
- bad odour or propane smell.

All of the above indicate that the element needs to be serviced.

One of the more common causes for the heater not remaining lit is a faulty thermocouple or thermocouple placement. Consult a qualified service technician or refer to Northstar's "Parts and Service Manual", Section III; Page 13 for a complete description of this component.

III OPERATING INSTRUCTIONS

Use only your hand to push in and/or turn the gas control knob. **Never** use tools.

- 1 Make sure gas supply is turned on and gas is available at the heater.
- 2 **TURN** Control Knob fully clockwise. Ensure Red dot of heater knob is slightly right of vertical.
- 3 Set Thermostat to 10 (thermostat models).
- 4 **PRESS** Control Knob in fully and continue to hold. This will allow gas flow into gas lines and will remove all air from gas lines. You should hear gas flowing to the pilot and heater element.
- 5 **ROTATE** Control Knob (1/4 turn) left while holding in fully. Resistance should be felt and a snap from Piezo heard. Piezo spark ignites Pilot. Repeat until Pilot is lit. Do not force. **IF PILOT IGNITION DOES NOT OCCUR, REPEAT THIS STEP IMMEDIATELY.** Do not continue to hold Control Knob in priming position for extended period if Pilot does not light. Refer to qualified technician.
- 6 When ignition occurs, you will see a small flame at the Pilot. The flame will ignite the propane on the surface of the element. This starts the catalytic process. Some heat should be felt from the element.
- 7 Continue to depress Control Knob and hold for a minimum of 60 seconds. This allows the safety thermocouple to heat up, which produces electricity to keep the gas valve open. Pilot should remain lit. Increasing heat should be felt.
- 8 **RELEASE** Control Knob. Push Control Knob in slightly (approximately 1/8") and rotate left to MAX (3). This operation may require some practice to get a good "feel" for the control. Done properly, the Control Knob should rotate easily. **Do not force.** Forcing the control may strip the knob and/or damage the control with potentially dangerous results. Pilot will go out. **Operate for at least 15 minutes on Max (3).** Substantial heat should be felt from the element.
- 9 **SET** desired heat by rotating Control Knob to MIN (1), MED (2), MAX (3). There are slight "detents" or set points built in to the control to indicate it has been turned to an operating position. Control will only allow gas to flow when it is positioned at MAX (3), MED (2) or MIN (1).

THERMOSTAT MODELS - On thermostatically controlled models, leave control on MAX (3) and adjust thermostat to desired setting LOW (1), HIGH (10).

- 10 To turn the heater off, first **TURN OFF** the propane supply at tank. Allow 15 seconds for heater to consume propane in fuel lines. **TURN** the Control Knob to the "OFF" position. Turn thermostat to HIGH (10).

IV HEATER AND CATALYTIC ELEMENT CARE AND MAINTENANCE

Northstar Flameless heaters are designed and built to provide years of trouble-free service but can be damaged if abused. Particular attention should be paid to protecting and maintaining the catalytic element to ensure its' longevity. Risk of damage to the heater and element can be greatly reduced by following some basic guidelines.

• GENERAL

- Locate or use the heater where it is least likely to be subject to impact, exposure to adverse weather or direct contact with cooking products or cleaning agents.
- The exterior of the heater can be cleaned with a damp cloth. Avoid the direct use of any aerosol or spray-on cleaners. Do not use abrasive material or cleaners on the decals or control knob. Take care not to get moisture, cleaners or solvents on the Catalytic Element surface. **Do Not Use**, an air hose, vacuum or solvents to clean the element.
- If the heater is typically used on an intermittent basis or left uncovered when not in use, it may collect dust or other airborne residue. On first use of the season, operate the heater on MAX (3) for a minimum of one hour in a well-ventilated area. This will help burn away any contaminants on the element surface. A slight odour may be noticed initially, but should not be detectable at the end of a one-hour time period. Turn heater off and let it cool completely. Relight heater. It should operate normally without an odour. If it does not, have the heater inspected and serviced.
- The best way to preserve the appearance and performance of the heater is to keep it protected when not in use. A durable, easy to use custom-fit dust cover is available for all recreational heaters. Wall Mount and Portable Heaters should be covered when stored or not in service.

• CATALYTIC ELEMENT

The catalyst on the surface of the element, in contact with propane and oxygen, causes the combustion process to take place without flame at a reduced safe temperature. The catalyst on the pad can be removed or neutralized by a number of factors.

- Low grade propane gas. The heater is designed for use only with HD-5 automotive quality propane (L.P.) gas. Use of any other grade of gas or type of fuel may contaminate the catalyst on the element.
- Gas or sludge from old propane tank(s) may neutralize the catalyst. Avoid letting tank(s) run completely empty. Periodic purging of the tank(s) by a qualified technician is recommended. This process cleans the inside of the tank(s).
- Vacuuming or using an air hose to clean the element can remove the catalyst and cause poor or "spotty" heat production.
- Use of aerosol sprays (cooking oil, lubricants, and cleaners) or other spray-on type cleaning agents directly on the heater/element. Air borne contaminants such as lead from motor fuel, sulphur from industrial processes, agricultural chemicals, etc. can all neutralize the catalyst.
- Excessive moisture or mechanical damage to element (poking holes, cutting, etc.) will result in decreased heat production and spilling of unburnt propane gas.

• SIGNS OF CATALYTIC ELEMENT NEUTRALIZATION

- Reduced heat output.
- Only part of the element glows and is hot.
- Propane odour when heater is operating.
- Foul or unusual odour coming off of the heater.
- Holes in element. Can see white or other colour through the element surface material.

If any of the above occur, take the heater out of service. Refer it to the factory or a factory authorized service centre. The element can be rebuilt and the heater can be put back into service.

Over a period of years, even under ideal operating conditions, the element will gradually deteriorate because there are trace contaminants in the air. Proper use, care and maintenance of the heater will help to slow this process, thus extending the life span and optimum performance of the element.

V TAKING HEATERS OUT OF SERVICE FOR SUMMER OR STORAGE

- Control turned to "OFF" position.
- Thermostat (on applicable models) turned to HIGH (10).
- Propane (L.P. Gas) tank(s) – 20 lb. – removed.
- POL valves [adapter that screws into propane (L.P. Gas) tank(s)] covered.
- If 100-lb. tank is in service, turn tank off. The gauge will stand up better if the tank is at least 50% full.
- Portable heaters should be covered in plastic and stored in a clean, dry place.
- If Wall Mount heater is removed, gas line and fittings in trailers should be covered and protected from damage.
- Wall Mount heater should be covered with plastic and stored in a clean, dry place.
- Hinge on cylinder carrier oiled.

VI MAINTENANCE REQUIRED WHEN PUTTING HEATER BACK IN SERVICE

- Heater should be serviced by a qualified technician prior to each heating season.
- Check propane tank(s):
 - Is it outdated? Propane tanks are certified for ten years.
 - No excessive rust.
 - No dents.
 - No damage to protective guard.
- Clean POL valve(s) and check rubber "O" rings before connecting to tank(s) (20 lb. tank configuration).
- Check to be sure control is in "OFF" position and thermostat is at HIGH (10).
- Turn propane tank(s) ON.
- Leak detect all fittings between tank(s) and control panel with commercial leak detecting solution or soapy solution
- Visually inspect all hoses and connections for signs of wear. Replace fittings and hoses with approved Canadian Standards Association (CSA) or U.L. fittings.

LIGHTING HEATER

- See page 4 General
- Should light easily.
- Operate on MAX (3) setting prior to putting into service.
- Check regulator pressure to 11" W.C. (7oz./sq. in.). Measurement taken at the heater inlet.
- Test element pad temperatures for minimum of 500°F.
- Thermocouple reading: A minimum of 5 millivolts when control set on LOW.
- No foul odours.
- No propane smell.
- No "ghost flame" on element when operating. (No visible surface burning or "flashing" of fuel).
- No reduced heat output.

THE ABOVE IS NOT AN EXHAUSTIVE LIST. REFER TO SERVICE MANUAL AND QUALIFIED TECHNICIAN FOR COMPLETE SERVICE INFORMATION.

VII FRONT MOUNT CARGO HEATER CHECKLIST

- When you take charge of the trailer do a "heater walk around". Check:
 - vents - open and free of snow, ice and other obstructions
 - hoses - firm and not cut or abraded
 - bulkhead - secure
 - propane tank(s) – not overfilled (100 lb. tank is full when the gauge reads 80%)
 - no foul or unusual odours
 - no propane odours
- ALWAYS LIGHT HEATER WITH TRAILER DOORS OPEN.
- ALWAYS LIGHT HEATER PRIOR TO LOADING TRAILER.
- Trailer must have at least **TWO VENTS** to supply make-up air. The heater consumes oxygen and the oxygen **MUST BE** replenished. Are vents clear and open?
- Cargo must be **SKID LOADED** and **NOT LOADED** above the bottom of the Hot Air Discharge Duct Grill. Adequate air circulation is required to allow heater to function properly.
- Skids **MUST NOT** be pushed under the Cold Wall Bulkhead.
- Z-bars should extend to the floor below the Cold Wall Bulkhead to prevent cargo from sliding under.
- Do not attempt to **RELIGHT** heater until trailer had been properly ventilated (trailer doors open at least five minutes). There should be no foul odours or propane odours present.
- **NEVER** smoke near or in a trailer with a propane heater in it.
- When changing one or both of 20-lb. tanks, **CLOSE** hand valves on both tanks and turn **OFF** "Main Control Valve" of heater.
- Always turn "Main Control Valve" of heater and propane tanks off when heater is not in service.
- Do not attempt to relight heater if:
 - Heater won't light as per operating instructions on heater.
 - Heater won't stay lit.
 - You smell gas.
 - You see flame (after lighting and pilot has gone out).
 - You smell a foul odour.

**ALL OF THE ABOVE INDICATE HEATER MALFUNCTIONS.
DO NOT USE UNTIL SERVICED BY A QUALIFIED TECHNICIAN.**

- **ALWAYS REPORT ANY TYPE OF HEATER MALFUNCTION.**
- **HEATERS SHOULD BE SERVICED PROIR TO EACH HEATING SEASON.**

VIII PORTABLE CARGO HEATER CHECKLIST

- When you take charge of the trailer do a "heater walk around. Check:
 - vents – open and free of snow, ice and other obstructions
 - hoses – firm and not cut or abraded
 - propane tank(s) – not overfilled
 - no foul or unusual odours
 - no propane odours
- **ALWAYS LIGHT HEATER OUTSIDE OF TRAILER AND THEN MOVE INTO TRAILER. LIGHT AT LEAST 10 MINUTES BEFORE PUTTING INTO SERVICE.**
- Trailer must have at least **TWO VENTS** to supply make-up air. The heater consumes oxygen and the oxygen **MUST BE** replenished. Are vents clear and open?
- Cargo must be **SKID LOADED** and **NOT LOADED** to top of trailer. Adequate air circulation is required to allow heater to function properly.
- Heater must be upright and secure. **DO NOT** use cargo to secure heater position.
- Heater **MUST NOT** be operated in an enclosure formed by cargo.
- **DO NOT** stack freight on top of heater or in a fashion that could result in it falling on the heater.
- Do not attempt to **RELIGHT** heater until trailer has been properly ventilated (trailer doors open at least five minutes).
- **NEVER** smoke near or in a trailer with a propane heater in it.
- When changing one or both of 20-lb. tanks **CLOSE** hand valves on both tanks and turn **OFF** "Main Control Valve" of heater.
- Always turn "Main Control Valve" of heater and propane tank(s) off when heater is not in service.
- Do not attempt to relight heater if:
 - Heater won't light as per operating instructions on heater.
 - Heater won't stay lit.
 - You smell gas.
 - You see flame (after lighting and pilot has gone out).
 - You smell a foul odour.

**ALL OF THE ABOVE INDICATE HEATER MALFUNCTIONS.
DO NOT USE UNTIL SERVICED BY A QUALIFIED TECHNICIAN.**

- **ALWAYS REPORT ANY TYPE OF HEATER MALFUNCTION.**
- **HEATERS SHOULD BE SERVICED PROIR TO EACH HEATING SEASON.**

IX WARRANTY, SERVICE AND OPTIONS

Northstar Flameless has a 1-year against manufacturer's defects. This manufacturer's warranty is void for any one or more of the following circumstances:

- Warranty card has not been filled out and mailed within 30 days of purchase.
- Catalytic Element has been damaged mechanically, with water or solvents or catalyst has been removed by either vacuum or air hose. (The Catalytic Element is delicate and can be easily damaged.)
- If the heater has been used in a harsh or inappropriate environment such as rain, salt water or contaminated atmosphere whereby the application has caused the heater to deteriorate prematurely.
- If unapproved fuel is used. The heater is designed for HD-5 automotive quality propane (L.P.) gas. The use of other propane or fuel contaminates the heater and causes it to malfunction.
- If the heater has been tampered with or modified by the owner or unauthorized service personnel. The heater should only be serviced under instruction from **Northstar Flameless** or by authorized Factory Service Centres.
- If heater has not been installed in accordance with the Installation Instructions.

This manual is intended for use as a general reference and instruction guide only. For more detailed explanations, descriptions and service related issues refer to **Northstar Flameless** "Parts and Service Manual" or contact a local dealer, qualified service technician or the manufacturer.

For warranty work or product information, contact your local dealer or **Northstar Flameless** parts department at:

For warranty work, please have heater model, serial number, date of purchase and the nature of the problem available to discuss with the service representative.

If you have any questions or would like more information about our complete line of products we invite you to visit us at:

Website: www.northstarflameless.com

Email: info@northstarflameless.com.

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