

WARNING INDIRECT FIRED AIR HEATER

Any piece of equipment can be dangerous if not operated properly. **YOU** are responsible for the safe operation of this equipment. The operator must carefully read and follow any warnings, safety signs and instructions provided with or located on the equipment. Do not remove, defeat, deface or render inoperable any of the safety devices or warnings on this equipment. **IF** any safety devices or warnings have been removed, defeated, defaced or rendered inoperable, **DO NOT USE THIS EQUIPMENT!!!**

DANGER

Exhaust gas from the burner contains carbon monoxide, a deadly poison. Exposure to carbon monoxide can kill you in minutes. Never run the machine indoors or in an enclosed area unless the machine is vented properly according to local and national codes. This heater consumes large amounts of oxygen. Use only in well ventilated areas. Not for residential heating.

 **WARNING:** The combustion of diesel in this heating systems creates harmful chemicals. These chemicals include carbon monoxide, benzene, formaldehyde, and acetaldehyde - all chemicals known to the State of California to cause cancer and birth defects or other reproductive harm For more information go to www.P65warnings.ca.gov

IMPORTANT SAFETY RULES TO FOLLOW

Signal Words Found in this Manual

This manual contains **DANGER, WARNING, CAUTION, NOTICE, and NOTE** signal words which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service.



This is the safety alert symbol. It is used to alert you to potential personal hazards.

- Obey all safety messages that follow this symbol.



DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

- To avoid death or serious injury from this type of hazard, obey all safety messages that follow this signal word.



WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

- To avoid possible death or serious injury from this type of hazard, obey all safety messages that follow this signal word.



CAUTION!

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

- To avoid possible minor or moderate injury from this type of hazard, obey all safety messages

NOTICE: Used without the safety alert symbol, NOTICE indicates a situation which, if not avoided, could result in property damage.

Note: A Note contains additional information important to a procedure.

Always wear Safety glasses with side shields, Hearing protection, Safety-toed footwear whenever using this heater. In addition, before servicing or maintaining the machine: Tie back long hair. Remove all jewelry (including rings).

Lifting and Transporting the Machine

Requirements Transport vehicle capable of carrying 1000 lbs. Crane or lift capable of carrying 1000 lbs

Background NOTICE: These machines are NOT designed to be towed with any vehicle.



WARNING

Crushing hazard. Only qualified riggers should attempt aerial lifting of this machine.

Guidelines Follow the guidelines below when lifting and transporting this machine.

- Remove all venting from the machine prior to lifting/transporting.
- Cover all openings on the machine to avoid infiltration from road debris and dust.
- Use all four lifting points on the sides of the machine when using an aerial lifting rig.
- Use the manual transport handle when relocating the machine within the job site.
- When tying down the machine, route tie-down straps or chains through the lower frame only.

NOTICE: Do not route tie-down straps or chains over the top of the machine. Doing so will damage the machine. Use only the designated tie-down locations.

If the person receiving this handout will not be the user of the equipment, forward these instructions to the operator. **IF** there is any doubt as to the operation or safety of the equipment, **DO NOT USE!!! CALL A TOOL SHED IMMEDIATELY!!! FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN INJURY OR DEATH**

Safety Information HI 110 / 200 / 300

1.2 Machine Description and Intended Use

Machine description

The HI Heater is an indirect-fired air heater that operates on diesel fuel. The machine consists of the following components:

- Stainless steel combustion chamber and heat exchanger
- Blower
- Single-stage burner
- High-temperature shut-down device
- Fuel tank

Fuel is consumed in a closed combustion chamber. Room air or outside air (depending on the application) is pulled into the machine where it is heated. This clean, dry, hot air is then blown into the space to be heated by the blower. Access to the blower assembly is protected by a guard fitted on the air inlet.

Intended use The HI Heater is intended to provide heat on outdoor or indoor construction sites (if properly vented) and in other rugged applications.

This machine has been designed and built strictly for the intended use described above. Using the machine for any other purpose could permanently damage the machine or seriously injure the operator or other persons on the work site. Machine damage caused by misuse is not covered under warranty. Do not use this machine indoors without proper exhaust venting designed for indoor use which meets all applicable regulations. This machine has been designed and built in accordance with the latest global safety standards. It has been carefully engineered to eliminate hazards as far as practicable and to increase operator safety through protective guards and labeling. However, some risks may remain even after protective measures have been taken. They are called residual risks. On this machine, they may include exposure to:

- exhaust emissions
- hot surfaces such as exhaust vents and fuel heater
- fuel and fuel fumes when refueling
- high voltages and arc flash

To protect yourself and others, make sure you thoroughly read and understand the safety information presented in this manual before operating the machine.

Optional accessories

Wacker Neuson Corporation offers many optional accessories for the machine.

These accessories include the following:

- Remote thermostat
- Duct adapters (various sizes, available as kits, or individual ducts at lengths of 25 ft. or more).
- Exhaust vents and elbows

Contact your Wacker Neuson dealer for more information.

1.3 Safety Guidelines for Operating the Machine

Operator training

Before operating the machine:

- Read and understand the operating instructions contained in all manuals delivered with the machine.
- Familiarize yourself with the location and proper use of all controls and safety devices.
- Contact Wacker Neuson Corporation for additional training if necessary. When operating this machine:
- Do not allow improperly trained people to operate the machine. People operating the machine must be familiar with the potential risks and hazards associated with it.

Machine condition

Only operate the machine when:

- All safety devices and guards are in place and in working order.
- All controls operate correctly.
- The machine is set up correctly according to the instructions in the Operator's Manual.
- The machine is clean.
- The machine's labels are legible. When operating the machine:
- Do not modify or defeat the safety devices.
- Do not use worn electrical cords.
- Do not use faulty fuel supplies.

Guidelines for operator

When operating the machine:

- Remain aware of the machine's moving parts. Keep hands, feet, and loose clothing away from the machine's moving parts.
- Wear protective clothing appropriate to the job site when operating the machine.
- Wear safety glasses. When operating the machine:
- Do not operate a machine in need of repair.
- Do not smoke near the machine.

Personal Protective Equipment (PPE)

Wear the following Personal Protective Equipment (PPE) while operating this machine:

- Close-fitting work clothes that do not hinder movement
- Safety glasses with side shields
- Hearing protection
- Safety-toed footwear

Machine installation guidelines

As a recommended installation practice, refer to the current issue of CSA B139,

Installation Code for Oil Burning Equipment in Canada and NFPA 31 Standard for the Installation of Oil-Burning Equipment in the USA;

Never operate the machine in immediate proximity to flammable materials. Minimum distances are specified in the *Operation* chapter under *Positioning the Machine*.

A rough estimate of opening required for each gallon (US) of capacity is one square foot for indirect-fired heater

Work space When operating the machine:

- Position the machine on a firm, noncombustible, level surface.
- Keep the area immediately surrounding and underneath the machine clean, neat, and free of debris and combustible materials.
- Keep the area above the machine clear of debris that could fall on the machine.
- Store the machine properly when it is not being used.
- Keep unauthorized personnel, children, and pets away from the machine.

When operating the machine:

- Do not connect ductwork between the exhaust outlet port and the supply air inlet port.
- Never operate the machine in areas that contain flammable objects, fuels, or products that produce flammable vapors.
- Do not position the electrical cords under the machine or over the top of the machine.

1.4 Safety Guidelines While Using Combustion Burners

When using the machine:

- Clean up any spilled fuel immediately.
- Replace the fuel tank cap after refueling the machine.
- Refill the fuel tank in a well-ventilated area.
- Make sure you have proper certification or licensing required by the locality, state, or province in which the machine is being installed to work with Liquid Petroleum (LP).

When using the machine:



DANGER

Exhaust gas from the burner contains carbon monoxide, a deadly poison. Exposure to carbon monoxide can kill you in minutes.

- Never run the machine indoors or in an enclosed area unless the machine is vented properly according to local and national codes.
- Do not fill or drain the fuel tank near an open flame, while smoking, or while the machine is running.
- Do not smoke when refueling the machine.

1.5 Safety Guidelines for Maintaining the Machine Licensing/ training/

- Only trained personnel should troubleshoot or repair electrical problems occurring with the machine.

Cleaning When cleaning and servicing the machine:

- Keep the area around the burner free of debris such as leaves, paper, cartons, etc.
- Keep the machine clean and labels legible.

When cleaning the machine:

- Do not clean the machine while it is running.
- Never use gasoline or other types of fuels or flammable solvents to clean parts. Fumes from fuels and solvents can become explosive.

Maintenance guidelines

When maintaining the machine:

- Keep the fuel lines in good condition and properly connected.
- Allow the burner to cool before maintaining the machine.
- Re-install the safety devices and guards after repairs and maintenance.
- Keep all electrical cords away from heat, oil, vibrating surfaces, and sharp edges.
- Inspect all electrical cords before each use and replace damaged cords.

Replacing parts and labels

When maintaining the machine:

When replacement parts are required for this machine, use only Wacker Neuson replacement parts or those parts equivalent to the original in all types of specifications, such as physical dimensions, type, strength, and material.

- Replace worn or damaged components.
- Replace all missing and hard-to-read labels.
- Replace or repair electrical components with components that are identical in rating and performance as the original component.

Accessories, safety devices and modifications

When using the machine:

- Use only accessories/attachments that are recommended by Wacker Neuson Corporation. When using the machine:
- Never operate the machine if any safety devices or guards are missing or inoperative.
- Do not defeat safety devices.
- Do not modify the machine without the express written approval of the manufacturer.

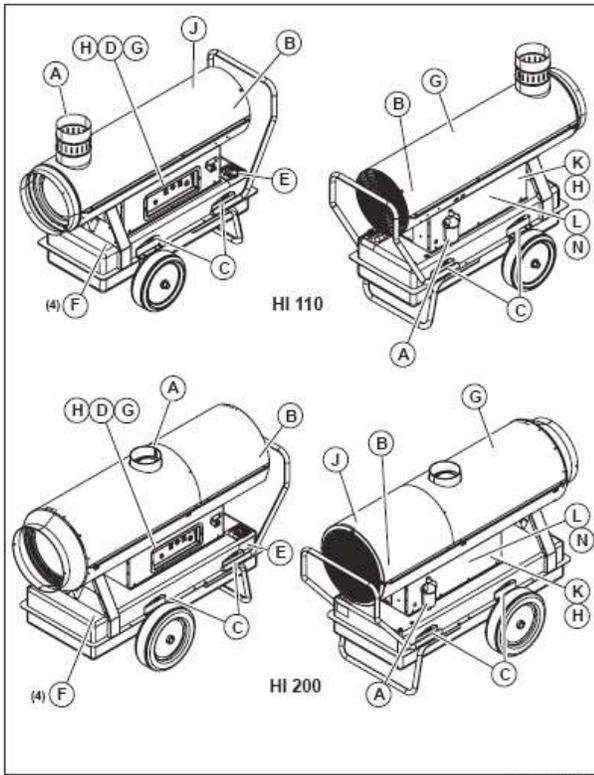
Personal Protective Equipment (PPE)

Wear the following Personal Protective Equipment (PPE) while servicing or maintaining this machine:

- Close-fitting work clothes that do not hinder movement

2 Labels

2.1 Label Locations



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HI 110 / 200 / 300

Labels

2.2 Label Meanings

A		WARNING Hot surface hazard!
B		WARNING Entanglement hazard. Rotating machinery. Do not reach inside machine when engine is running.
C		NOTICE Lifting point.
D		WARNING! Electric shock hazard. Disconnect power before servicing. Read Operator's Manual.
E		CAUTION This machine uses diesel fuel.
F		Tie-down point

Labels

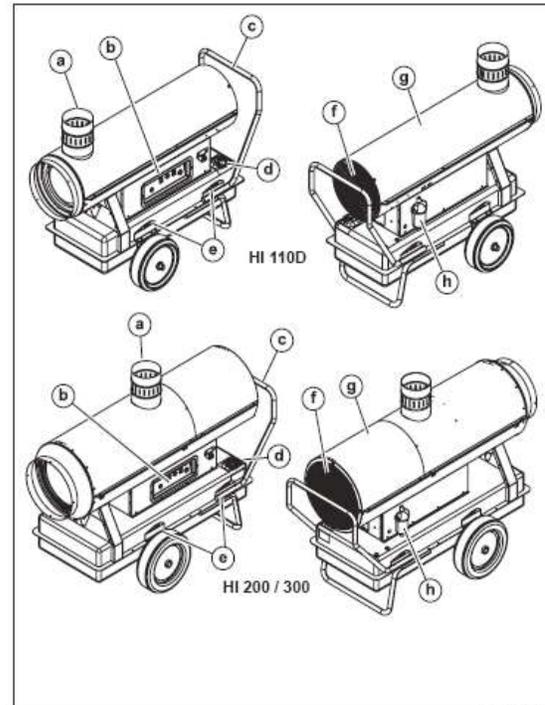
HI 110 / 200 / 300

G		DANGER Using a heater indoors can kill in minutes. Heater exhaust contains carbon monoxide. This is a poison you cannot see or smell. During indoor operation, vent exhaust gas outdoors. Refer to Operator's Manual.
H		CAUTION Hot while in operation. Do not touch. Keep children, clothing, and combustibles away.
J		Safety instruction label for diesel fuelled heaters
K		A nameplate listing the model number, item number, revision number, and serial number is attached to each unit. Please record the information found on this plate so it will be available should the nameplate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model number, item number, revision number, and serial number of the unit.
L		Heater rating plate

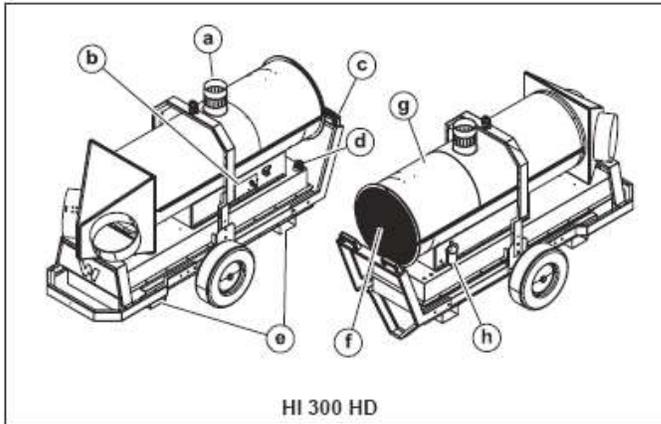
HI 110 / 200 / 300

Operation

4.3 Controls and Service Locations



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Machine components

Ref	Description	Ref	Description
a	Exhaust flue	e	Lift brackets (if equipped)
b	Control panel	f	Air inlet and fan guard
c	Manual transport handle	g	Access panel
d	Fuel fill location	h	Fuel filter

4.5 Recommended Fuels

Low ambient temperatures cause diesel fuels to gel. Gelled fuels will cause burner ignition failure and/or burner fuel pump damage. Always use the proper fuel for the conditions.

Fuel Blend Guide		
Lowest expected ambient temperature °F (°C)	Generator powered	Shore powered
Below 5 (-15)	50-50 blend of #2 diesel and #1 diesel, plus additives OR 50-50 blend #2 diesel and K1 kerosene, plus additives	100% #1 diesel plus additives OR 100% K1 kerosene, plus additives
5 to 25 (-15 to -4)	70-30 blend of #2 diesel and #1 diesel, plus additives OR 70-30 blend of #2 diesel and K1 kerosene, plus additives	
Above 25 (-4)	Winter-blend diesel	

4.6 Inspecting the Fuel Hose

When Visually inspect the fuel hose assembly each time before operating the heater.

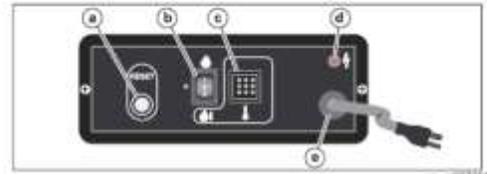


WARNING

Fire and explosion hazards. A damaged hose may leak flammable fuel.
▶ Do not operate the heater if the hose has excessive abrasions, wear, or cuts.

Replacement hose Replace a damaged hose assembly with an equivalent as specified on the machine label.

4.4 Control Panel



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Control panel components

Ref	Description	Ref	Description
a	Burner fault lamp and reset button (dual function)	d	Power indicator
b	Mode switch (on-off-on) See topic Starting the Machine	e	Power cord
c	Thermostat receptacle	—	—

Symbols and meanings

Symbol	Meaning/function	Symbol	Meaning/function
	RESET Press and hold the button to reset the machine when a burner fault has occurred.		Thermostat connection point
	On (Remote thermostat mode) See topic Starting the Machine		On (Continuous heat mode) See topic Starting the Machine
	Power indicator Illuminates when power is connected to the machine and the fuse is intact.		

4.7 Positioning the Machine



DANGER
Exhaust gas from the burner contains carbon monoxide, a deadly poison. Exposure to carbon monoxide can kill you in minutes.
▶ Never run the machine indoors or in an enclosed area unless the machine is vented properly according to local and national codes.

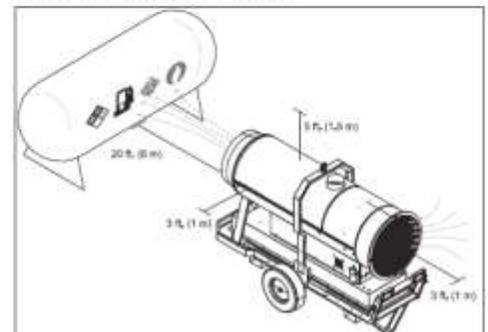
Guidelines

- Observe the following guidelines when positioning the machine for operation.
- Installer must be familiar with all applicable laws, codes, regulations, or other restrictions regarding installation of indirect-fired (IDF) heaters.
 - Machine must be on flat, firm surface.
 - Installation must adhere to proximity restrictions.
 - Install wedge blocks under the wheels to prevent movement.

Proximity restrictions

The machine must be located a safe distance from any other structures, vehicles, materials or other combustible surfaces. The following proximity restrictions apply for all machine installations.

- 20 ft. (6 m) to air outlet
- 3 ft. (1 m) to air inlet and sides
- 5 ft. (1.5 m) to top
- 20 ft (6 m) from outlet to external fuel container



Note: Graphic is representative only. Your machine may vary.

4.8 Suggested Venting

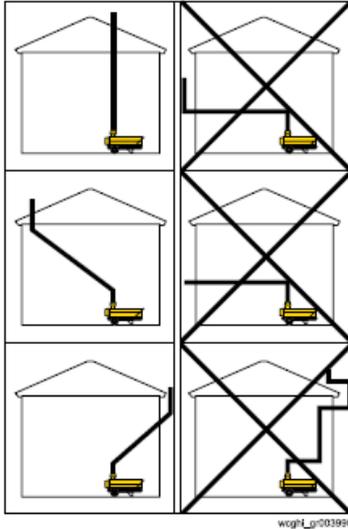
When installing vents:

- Do not use B-vent exhaust pipes to vent an oil burning machine. Contact Wacker Neuson Product Support for recommended alternatives.
- Adhere to all local and national codes.
- Consult all appropriate governing bodies or local contractor for venting and fresh air requirements. Make sure that the room or building to be heated has sufficient ventilation to ensure that the machine has enough air to function properly.
- Position the machine in a manner that avoids excessive vent bends (elbows), and long horizontal runs.
- Keep air inlets and outlets free from obstruction. Ensure that there are no bulky objects or sheets/covers near or on the machine.
- Route the venting pipes in a manner that avoids flammable materials.
- Route the venting pipes in a manner that avoids contact with people.
- When the machine is connected to a flue pipe, the flue pipe shall terminate in a vertical section at least two feet long. Sufficient draft shall be created to assure safe and proper operation of the machine.

DANGER

Asphyxiation hazard. Exhaust gas from the burner contains carbon monoxide, a deadly poison. Exposure to carbon monoxide can kill you in minutes.

- Never run the machine indoors or in an enclosed area unless the machine is vented properly according to local and national codes.



Note: The above venting diagram shows suggested venting layouts only. Consult all appropriate governing bodies or local contractor for venting and fresh air requirements.

4.10 Connecting Power to the Machine

- Requirements**
- Power source (115VAC)
 - Machine properly positioned
 - Operation mode switch in the OFF (0) position



WARNING
Fire hazard and electric shock hazard. The use of under-sized extension cords can lead to fire and electric shock. Fire and electric shock can cause severe injury.
Do not use under-sized extension cords.

- Extension cords**
- Restrictions for extension cords:
- Use only 3-wire type extension cords with heavy-duty plugs.
 - The maximum length of extension cord usage per circuit is 30 m (100 ft).
 - Use 12-gauge extension cords for lengths up to 15 m (50 ft).
 - Use 10-gauge extension cords for lengths up to 30 m (100 ft).



CAUTION
Burn hazard. The self-regulating fuel heater, located inside the fuel filter canister, will initiate when power is connected to the machine. The surface of the fuel filter canister may become very hot.
Use caution when working with the fuel filter canister.

- Procedure**
- Perform the procedure below to connect power to the machine.
- Verify that the operation mode switch is in the OFF (0) position.
 - Connect the main power cord cord to a properly-rated power source.
- Note: If the ambient temperature is below freezing, wait 10–30 minutes before proceeding.

Result Power has now been connected. The machine is ready for pre-starting checks.

4.9 Installing the Heater Duct

Overview Optional ducts can be connected to the air outlet. This allows warm air to be evenly distributed throughout the heating area.

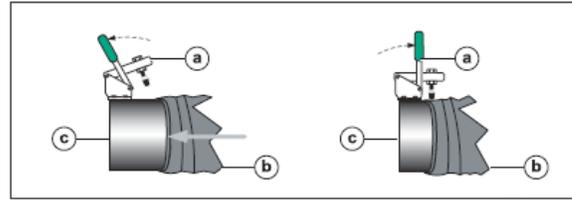
NOTICE: When using ducts, observe the static air pressure limits specified in *Technical Data*.

- Requirements**
- Machine shut down and cooled
 - Machine properly positioned



CAUTION
Hot surface hazard. The machine surfaces may be hot.
Allow the machine to cool for a minimum of ten minutes before touching it.

- Procedure** To install the ducts, carry out the following procedure.
- Open the clamps (a).
 - Slide the duct (b) onto the duct adapter (c).
 - Close the clamp to secure the duct in place.



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4.11 Pre-Starting Checks

- Requirements**
- Machine properly positioned
 - Power connected to the machine

Checks Before starting the machine, check the following items:

Item	Task
Fuel sight gauge (if equipped)	Check that the fuel tank is full (if applicable).
Fuel tank cap	Check that the fuel tank cap (if applicable) is secure.
Operation mode switch	Check that the operation mode switch is in the OFF position.
Main control panel	Check that proper power supplies have been connected at the main control panel. See topic <i>Connecting Power to the Machine</i> .
Remote thermostat (if installed)	Check that the remote thermostat has been correctly installed. See topic <i>Installing the Remote Thermostat or Thermostat Receptacle Plug</i> .
Ducts and duct adapters	Check that all ducts and duct adapters have been properly installed. See topic <i>Installing the Heater Duct</i> .

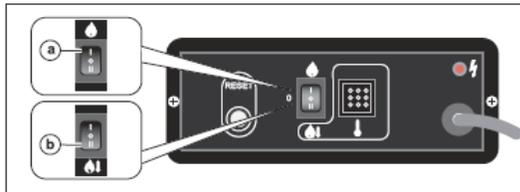
Result The machine is ready to turn on.

4.12 Starting the Machine

- Requirements**
- Machine properly positioned
 - Power connected
 - Pre-Starting Checks completed

Procedure To start the machine, follow the procedure below.

- Select an operation mode.
 - Continuous heat mode (I)
 - thermostat mode (II)



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Operational sequence The following sequence of events will occur.

- The blower will start.

- Nozzle heater**
- Note:** The burner may not fire immediately on startup if the nozzle is cold. HI 200 HD and HI 300 HD machines are equipped with an additional heater that warms the nozzle to the required operating temperature. After you select the ON (heat) mode, the nozzle preheating sequence may cause a delay of up to 6 minutes before the burner fires.
- The burner will start firing.
 - If a remote thermostat is not being used, the burner will fire continuously.
 - In applications in which the remote thermostat is being used, the burner will fire until the air temperature of the application area reaches the target temperature set by the remote thermostat. At that time, the burner will shut off, but the blower will continue to operate. When the air temperature of the application area falls below the target temperature set by the remote thermostat, the burner will re-fire. The process continues as long as there is fuel for the burner.

4.13 Starting the Machine in Extremely Cold Weather

Background In temperatures below 32°F (0°C), it may be necessary to preheat the fuel inside the fuel filter canister. The fuel filter canister is equipped with a low-wattage heating element specially designed for this purpose.

HI 200 HD and HI 300 HD machines are also equipped with a thermostatically controlled nozzle heater as described below.



WARNING

Burn hazard. The external surface of the fuel filter may be hot.
► Wear safety gloves when handling the fuel filter.

Note: Excess heating may increase the need for maintenance. See topics "Replacing the Fuel Filter" and "Replacing the Burner Nozzle".

Preheating the fuel

To preheat the fuel, carry out the following procedure.

- Connect power to the machine. See topic *Connecting Power to the Machine*.
- Wait 20-30 minutes—longer for colder temperatures.
- Start the machine. See topic *Starting the Machine*.

Note: In extreme wind, the machine may need to be temporarily blocked from the wind in order to start.

Troubleshooting

- If the burner does not start on the first attempt, allow the power-on sequence to cycle again.
- If, after the second power-on sequence completes, the machine will not fire, move the power switch to the OFF position.
- Wait another 20-30 minutes and attempt to start the machine again.

Nozzle heater

The burner may not fire immediately on startup if the nozzle is cold. HI 200 HD and HI 300 HD machines are equipped with an additional heater that warms the nozzle to the required operating temperature.

Note: After you select the ON (heat) mode, the nozzle preheating sequence may cause a delay of up to 6 minutes before the burner fires.

4.14 Stopping the Machine

Procedure Follow the procedure below to stop the machine.



WARNING

Electric shock hazard. Electric power is still active at the blower even when the machine is turned OFF.

- Remove all electric power to the machine before servicing the machine.

- Turn the operation mode switch to the OFF (O) position (c).



Shutdown sequence The following sequence of events will occur after turning the machine off.

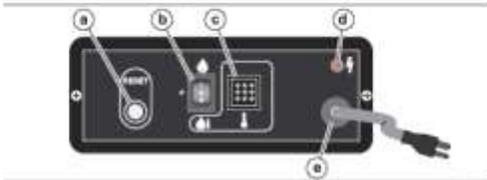
- The burner will shut down.
- The blower will stop when the machine is sufficiently cool.

4.15 Burner Fault

The burner fault lamp / reset button (a) is illuminated while the machine is operating. The lamp is green during normal operation.

Burner fault A burner fault occurs if the burner does not fire upon startup. The lamp will turn red. The lamp will also turn red if the burner goes out while the machine is operating.

- To clear a burner fault, press and hold the burner fault lamp / reset button for 2–3 seconds until the lamp goes out.
- Re-start the machine.
- If the burner fault re-occurs, see *Basic Troubleshooting*.



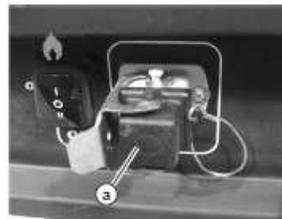
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4.16 Installing and Using the Remote Thermostat

- Requirements**
- Remote thermostat
 - Pre-starting checks complete

Procedure Follow the procedure below to install and use the remote thermostat.

- Remove the protective cap (a) from the control panel receptacle.
- Connect the remote thermostat (b) to the control panel receptacle (c).
- Set the sensor end (d) within the area to be heated.
- Adjust the target temperature with the dial (e).



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Result

The machine will now be controlled by the remote thermostat.