

Operator's Manual

Indirect-Fired Air Heaters

HI400HD D

HI400HD G



| | |
|----------|----------------------|
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| Document | 5000192824 |
| Date | 0419 |
| Revision | 12 |
| Language | EN |



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Manufacturer

Wacker Neuson Production Americas LLC

N92W15000 Anthony Avenue

Menomonee Falls, WI 53051 U.S.A.

Tel: (262) 255-0500 · Fax: (262) 255-0550 · Tel: (800) 770-0957

www.wackerneuson.com

Original instructions

This Operator's Manual presents the original instructions. The original language of this Operator's Manual is American English.

CALIFORNIA Proposition 65 Warning



WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.



WARNING

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.



WARNING

Cancer and Reproductive Harm -
www.P65Warnings.ca.gov.



WARNING

Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

Notes

Foreword



This heater is designed and approved for use as a construction heater in accordance with Standard ANSI Z83.7–CSGA 2.14. CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY IF YOU HAVE QUESTIONS ABOUT APPLICATIONS.

Other standards govern the use of fuel gases and heat producing products in specific applications. Your local authority can advise you about these.

THE INSTALLATION OF THE UNIT SHALL BE IN ACCORDANCE WITH THE REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION.

**WARNING**

Risk of personal injury or machine damage from improper use.

- ▶ Before using the machine, read and understand all instructions and follow them carefully.
- ▶ The manufacturer is not responsible for damages to goods or persons due to improper use of this machine.

**WARNING**

Failure to comply with the precautions and instructions provided with this machine can result in death, serious injury, and property loss or damage from fire, explosion, burns, asphyxiation, carbon monoxide poisoning, and/or electric shock.

- ▶ Before using the machine, read and understand all precautions and instructions that have been provided. Follow them carefully.
- ▶ Only persons who can understand and follow the precautions and instructions should use or service this machine.
- ▶ Contact the manufacturer if you need assistance with operating the machine or need replacement manuals or labels.

**WARNING**

Work site fire, burn, inhalation, and explosion hazards.

- ▶ Keep solid combustibles, such as building materials, paper, or cardboard at a safe distance away from the machine.
- ▶ Never use this machine in spaces which do or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles, or unknown chemicals.



WARNING

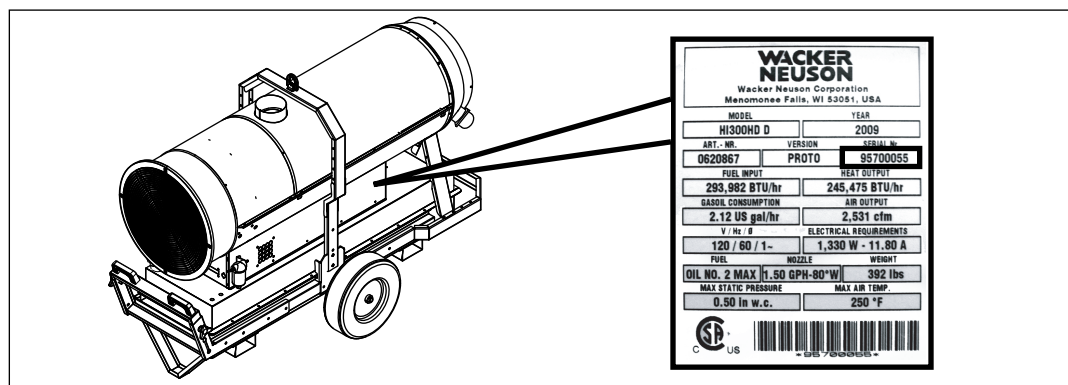
Not for use in homes or recreational vehicles. Installing this machine in a home or RV may result in fire, explosion, property damage, personal injury, or death.

- ▶ Operate the machine only as specified in *Machine Description and Intended Use*.

SAVE THESE INSTRUCTIONS—This manual contains important instructions for the machine models below. These instructions have been written expressly by Wacker Neuson Production Americas LLC and must be followed during installation, operation, and maintenance of the machines.

This manual covers machines with the following item numbers:

| Machine | Item Number | Revisions |
|-----------|-------------|-----------|
| HI400HD D | 5000620868 | 105-999 |
| HI400HD G | 5000620701 | 105-999 |



wc_gr010608

Machine identification

A nameplate listing the model number, item number, revision number, and serial number is attached to this machine. The location of the nameplate is shown above.

Serial number (S/N)

For future reference, record the serial number in the space provided below. You will need the serial number when requesting parts or service for this machine.

Serial Number:

Machine documentation

- From this point forward in this documentation, Wacker Neuson Production Americas LLC will be referred to as Wacker Neuson.
- Keep a copy of the Operator’s Manual with the machine at all times.
- For spare parts information, please see your Wacker Neuson Dealer, or visit the Wacker Neuson website at <http://www.wackerneuson.com/>.
- When ordering parts or requesting service information, be prepared to provide the machine model number, item number, revision number, and serial number.

Expectations for information in this manual

- This manual provides information and procedures to safely operate and maintain the above Wacker Neuson model(s). For your own safety and to reduce the risk of injury, carefully read, understand, and observe all instructions described in this manual.
- Wacker Neuson expressly reserves the right to make technical modifications, even without notice, which improve the performance or safety standards of its machines.
- The information contained in this manual is based on machines manufactured up until the time of publication. Wacker Neuson reserves the right to change any portion of this information without notice.
- The illustrations, parts, and procedures in this manual refer to Wacker Neuson factory-installed components. Your machine may vary depending on the requirements of your specific region.

Manufacturer's approval

This manual contains references to *approved* parts, attachments, and modifications. The following definitions apply:

- **Approved parts or attachments** are those either manufactured or provided by Wacker Neuson.
- **Approved modifications** are those performed by an authorized Wacker Neuson service center according to written instructions published by Wacker Neuson.
- **Unapproved parts, attachments, and modifications** are those that do not meet the approved criteria.

Unapproved parts, attachments, or modifications may have the following consequences:

- Serious injury hazards to the operator and persons in the work area
 - Permanent damage to the machine which will not be covered under warranty
- Contact your Wacker Neuson dealer immediately if you have questions about approved or unapproved parts, attachments, or modifications.



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1 Safety Information

1.1 Signal Words Used 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 that follow this signal word.
-

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.

1.2 Machine Description and Intended Use

Machine description The HI Heater is an indirect-fired air heater. Depending on the model, the machine operates either on diesel fuel (oil) or natural gas / Liquid Propane (LP). The machine consists of the following components:

- Stainless steel combustion chamber and heat exchanger
- Blower
- Two-stage burner (oil model)
- High-temperature shut-down device
- Fuel tank (oil model)
- Gas selector valve (gas model)
- High and low voltage control (gas model)

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 by the blower into the space to be heated. 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 25 ft. lengths).
- Exhaust vents and elbows

Contact your Wacker Neuson dealer for more information.

1.3 Operating Safety

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 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.

Operator qualifications

Only trained personnel are permitted to start, operate, and shut down the machine. They also must meet the following qualifications:

- Have received instruction on how to properly use the machine
- Are familiar with required safety devices

The machine must not be accessed or operated by:

- Children
- People impaired by alcohol or drugs

Application area

Be aware of the application area.

- Keep unauthorized personnel, children, and pets away from the machine.
- Remain aware of changing positions and the movement of other equipment and personnel in the application area/job site.
- Identify whether special hazards exist in the application area, such as toxic gases or unstable ground conditions, and take appropriate action to eliminate the special hazards before using the machine.
- Do not operate the machine in areas that contain flammable objects, fuels, or products that produce flammable vapors.

Safety devices, controls, and attachments

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.

To ensure safe operation of the machine:

- Do not operate the machine if any safety devices or guards are missing or inoperative.
- Do not modify or defeat the safety devices.
- Only use accessories or attachments that are approved by Wacker Neuson.

Safe operating practices

When operating this machine:

- Remain aware of the machine's moving parts. Keep hands, feet, and loose clothing away from the machine's moving parts.

- Do not operate a machine in need of repair.

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 condition

Only operate the machine when:

- The heat exchanger is in proper working order.
- 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.

1.4 Safety Guidelines for Gas-Fired Machines

**WARNING**

Gas leaks can cause explosions or fire. Follow the steps below if you smell gas.

- ▶ Open windows.
- ▶ Do not touch electrical switches.
- ▶ Extinguish open flames.
- ▶ Immediately call your gas supplier.

**WARNING**

Risk of explosion, fire, property damage, asphyxiation, death, or carbon monoxide poisoning.

- ▶ Read and follow the instructions below regarding proper gas supply and preparation of the machine.

Proper gas supply must be provided to the inlet of the machine. Refer to the rating plate for the correct gas supply pressure.

- Gas pressure above the maximum specified on the rating plate can cause fire or explosions, leading to serious injury, death, or property loss.
- Gas pressure below the minimum specified on the rating plate may cause improper combustion, leading to asphyxiation or carbon monoxide poisoning.

Before operating the machine, read and follow all instructions in the *Operation* chapter. Important points to note are:

- Position the machine correctly before each use.
- Provide proper venting for both indoor and outdoor use.
- Do not operate the machine with exterior panels removed.
- Disconnect all electrical power from the machine before opening doors or removing panels.
- Check the gas lines and connections for leaks.

1.5 Safety Guidelines for Operating 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 natural gas or Liquid Petroleum (LP).

When using the machine:



DANGER

Exhaust gas from the burner (and generator, if equipped) 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.

1.6 Service Safety

Service training

Before servicing or maintaining the machine:

- Read and understand the instructions contained in all manuals delivered with the machine.
- Familiarize yourself with the location and proper use of all controls and safety devices.
- Only trained personnel shall troubleshoot or repair problems occurring with the machine.
- Contact Wacker Neuson for additional training if necessary.

When servicing or maintaining this machine:

- Do not allow improperly trained people to service or maintain the machine. Personnel servicing or maintaining the machine must be familiar with the associated potential risks and hazards.

Precautions

Follow the precautions below when servicing or maintaining the machine.

- Read and understand the service procedures before performing any service to the machine.
- All adjustments and repairs must be completed before operation. Do not operate the machine with a known problem or deficiency.
- All repairs and adjustments shall be completed by a qualified technician.
- Turn off the machine before performing maintenance or making repairs.

Machine modifications

When servicing or maintaining the machine:

- Use only accessories/attachments that are approved by Wacker Neuson.
- Do not defeat safety devices.
- Do not modify the machine without the express written approval of Wacker Neuson.

Replacing parts and labels

- Replace worn or damaged components.
- Replace all missing and hard-to-read labels.
- When replacing electrical components, use components that are identical in rating and performance to the original components.
- 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.

Cleaning

When cleaning and servicing the machine:

- Keep machine clean and free of debris such as leaves, paper, cartons, etc.
- Keep labels legible.
- Clean with soapy water only.

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 the machine. Fumes from fuels and solvents can become explosive.

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
- Safety glasses with side shields
- Hearing protection
- Safety-toed footwear

In addition, before servicing or maintaining the machine:

- Tie back long hair.
- Remove all jewelry (including rings).

After use

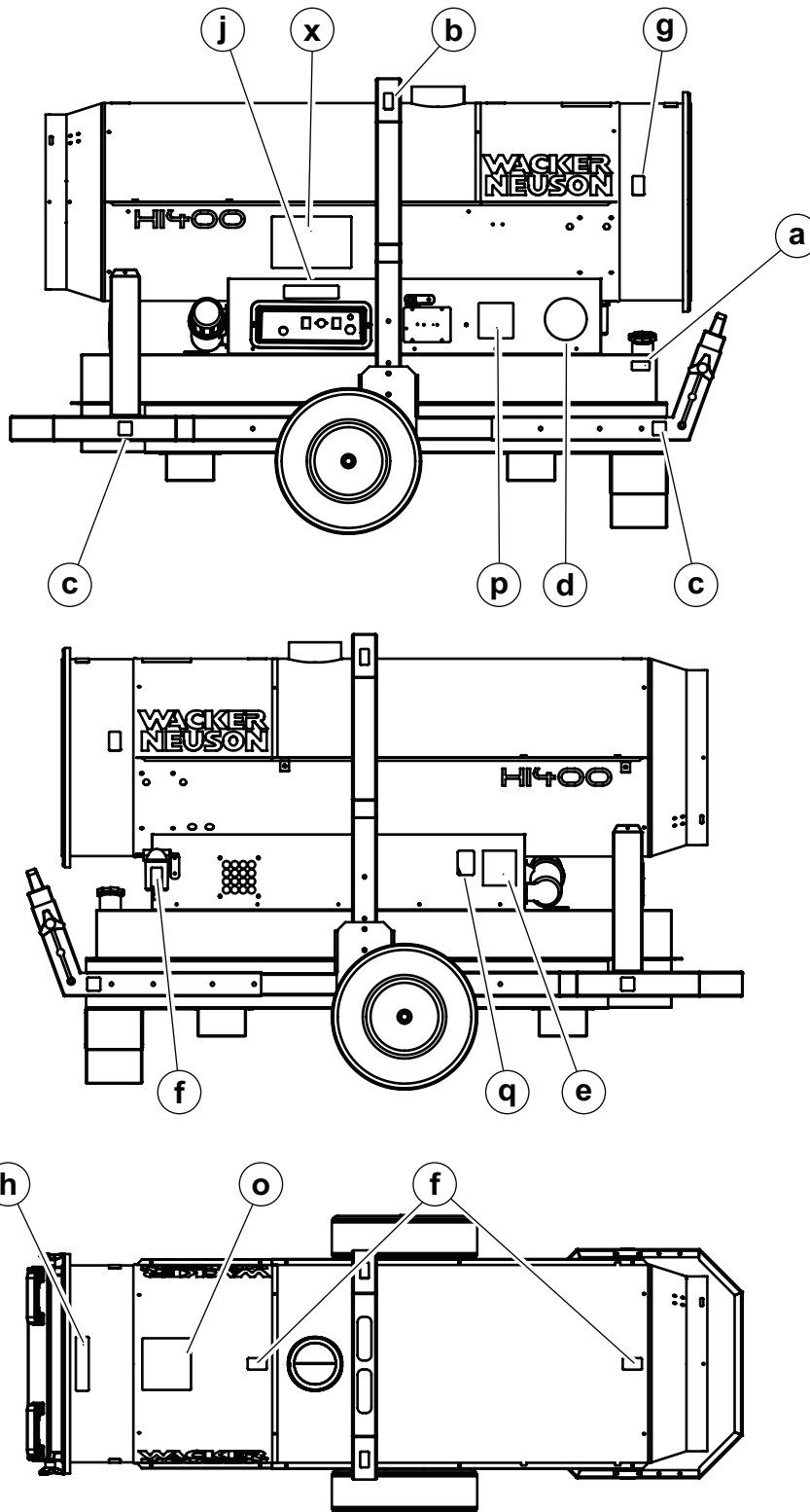
- Stop the engine when the machine is not being operated.
- Close the fuel valve on engines equipped with one when the machine is not being operated.
- Ensure that the machine will not tip over, roll, slide, or fall when not being operated.
- Store the machine properly when it is not being used. The machine should be stored in a clean location out of the reach of children.

Licensing/training

- Only qualified personnel who possess the proper certification or license required by the locality, state, or province in which the machine is being installed are allowed to make connections to natural gas or LP.
- Only trained personnel should troubleshoot or repair electrical problems occurring with the machine.

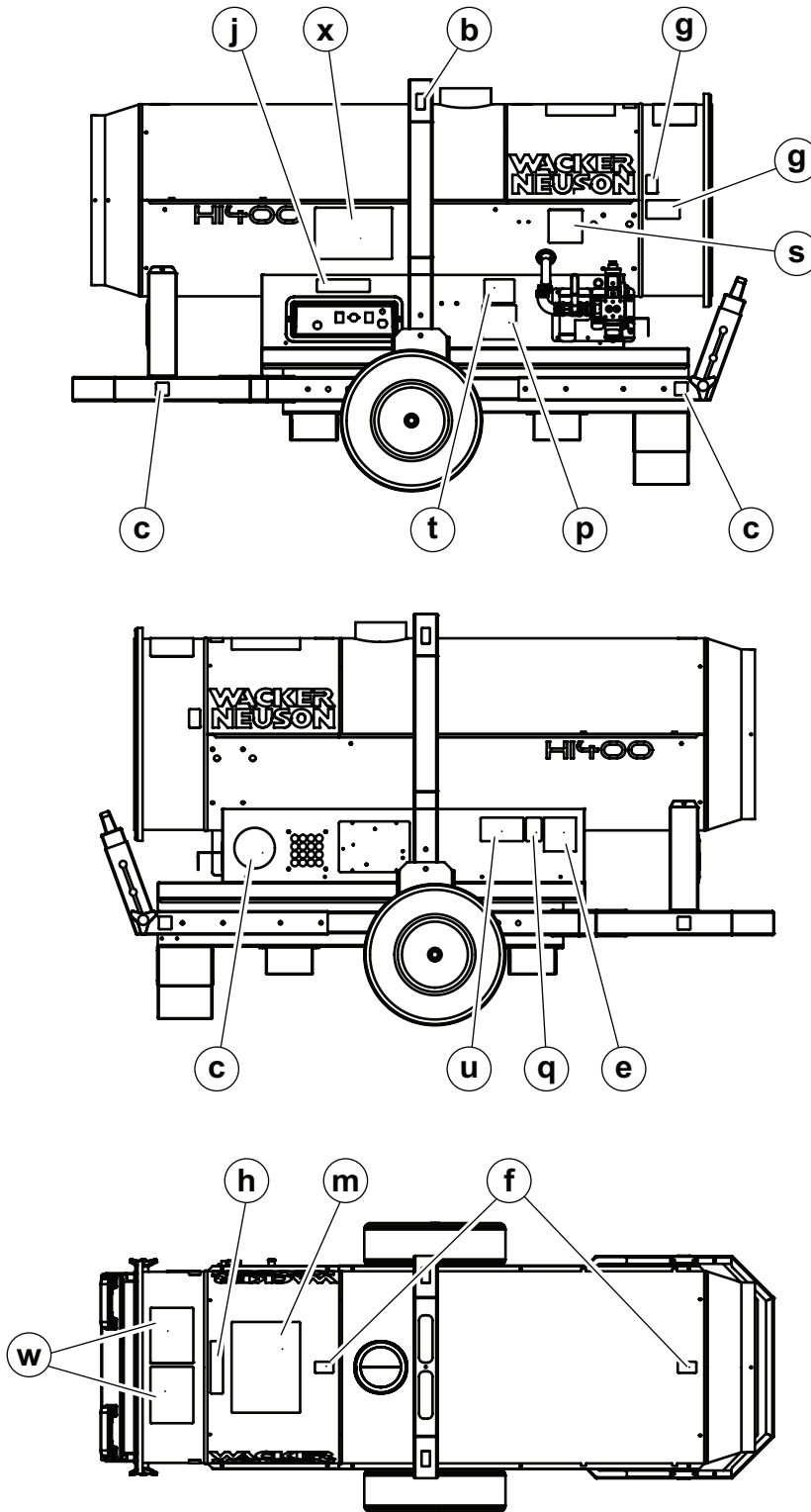
2 Labels

2.1 Label Locations—HI400 HD D




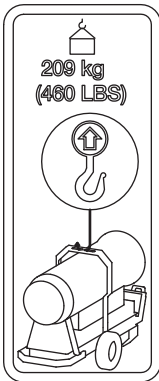
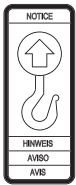



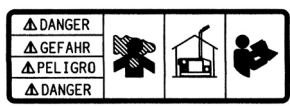
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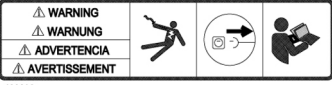


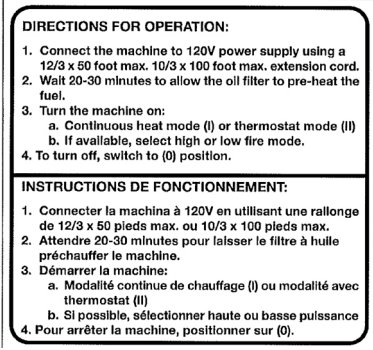

2.2 Label Locations—HI400 HD G

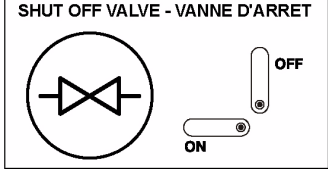
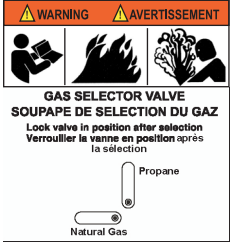
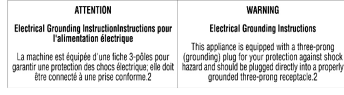
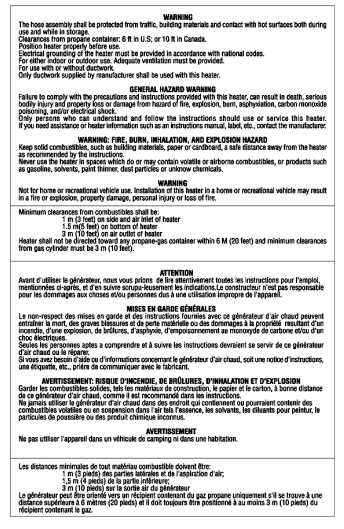


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2.3 Label Meanings

| | | |
|----------|---|---|
| <p>a</p> |  | <p>CAUTION This machine uses diesel fuel.</p> |
| <p>b</p> |   | <p>NOTICE Lifting point</p> |
| <p>c</p> |  <p>113726</p> | <p>Tie-down point.</p> |
| <p>f</p> |  <p>114885</p> | <p>WARNING Hot surface</p> |
| <p>g</p> |  <p>183233</p> | <p>WARNING Entanglement hazard. Rotating machinery. Do not reach inside machine when engine is running.</p> |
| <p>h</p> |  <p>183237</p> | <p>WARNING Using a heater indoors can kill you 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.</p> |

| | | |
|----------|---|---|
| <p>j</p> |  | <p>WARNING Electric shock hazard. Disconnect power before servicing. Read Operator's Manual.</p> |
| <p>m</p> |  | <p>WARNING Licensed gas technician required.</p> <p>Natural gas / liquid propane burner setup and installation, fuel supply connection, test firing, and burner adjustment MUST be performed by a LICENSED professional gas technician and must conform to the requirements of all relevant local, state, provincial, and Federal authorities.</p> <p>Failure to heed this warning may result in an explosion and/or fire causing property damage, personal injury, or death.</p> |
| <p>o</p> |  | <p>Safety instruction label for diesel fuelled heaters</p> |
| <p>p</p> |  | <p>DIRECTIONS FOR OPERATION:</p> <ol style="list-style-type: none"> 1. Connect the machine to 120V power supply using a 12/3 x 50 foot max. extension cord. 2. Wait 20-30 minutes to allow the oil filter to pre-heat the fuel. 3. Turn the machine on: <ol style="list-style-type: none"> a. Continuous heat mode (I) or thermostat mode (II) b. If available, select high or low fire mode. 4. To turn off, switch to (0) position. <p>INSTRUCTIONS DE FONCTIONNEMENT:</p> <ol style="list-style-type: none"> 1. Connecter la machine à 120V en utilisant une rallonge de 12/3 x 50 pieds max. ou 10/3 x 100 pieds max. 2. Attendre 20-30 minutes pour laisser le filtre à huile préchauffer le machine. 3. Démarrer la machine: <ol style="list-style-type: none"> a. Modalité continue de chauffage (I) ou modalité avec thermostat (II) b. Si possible, sélectionner haute ou basse puissance 4. Pour arrêter la machine, positionner sur (0). |
| <p>q</p> |  | <p>CAUTION Hot while in operation. Do not touch. Keep children, clothing, and combustibles away.</p> |

| | | |
|----------|--|---|
| <p>r</p> |  | <p>Gas shut-off valve</p> |
| <p>s</p> |  | <p>Gas selector valve Propane Gas Position Natural Gas Position Lock valve in position after selection.</p> |
| <p>t</p> |  | <p>Electrical grounding instructions.</p> |
| <p>w</p> |  | <p>General usage warnings</p> |

| <p>X</p> | <div style="border: 1px solid black; padding: 5px;"> <p align="center">HI 400 HD QUICK REFERENCE GUIDE / HI 400 HD GUIDE DE RÉFÉRENCE RAPIDE</p> <p>Quick Reference Guide is not intended to replace or supersede the Operator's Manual. Always read and understand the Operator's Manual before operating. Le guide de référence rapide ne vise pas à remplacer ou supplanter le manuel de l'opérateur. Toujours lire et comprendre le manuel de l'opérateur avant l'utilisation.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Machine Start Up / Démarrage de la machine</th> <th style="width: 50%;">Machine Shutdown / Arrêt de la machine</th> </tr> <tr> <td style="vertical-align: top;"> <p>① Check the fuel supply Connect power Brancher l'alimentation 120V 60Hz Lamp will illuminate Le voyant s'allumera</p> <p>Vérification de l'alimentation du carburant 12 ga. / 50 ft. Max (15 m) 10 ga. / 100 ft. Max (30 m)</p> </td> <td style="vertical-align: top;"> <p>① DO NOT DISCONNECT THE ELECTRICAL POWER Always follow proper shutdown procedures to avoid machine damage. NE PAS DÉBRANCHER L'ALIMENTATION ÉLECTRIQUE Toujours suivre les procédures d'arrêt afin d'éviter d'endommager la machine.</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p>② Optional Remote Thermostat. Thermostat à distance en option. Remove the protective cap. Supprimer le bouchon de protection. Connect remote thermostat. Brancher le thermostat à distance.</p> </td> <td style="vertical-align: top;"> <p>② Turn the operation switch to OFF (O). The burner will go out immediately. The fan will shut down after approximately 2 minutes. Placer le commutateur de fonctionnement à « OFF » (O). Le brûleur s'éteindra immédiatement. Le ventilateur s'arrêtera après 2 minutes environ.</p> </td> </tr> <tr> <td style="vertical-align: top;"> <p>③ a) Select firing mode (Diesel models only). a) Sélectionner le mode de déclenchement (modèles Diesel uniquement). High Heat Low Heat Continuous Remote Thermostat</p> <p>b) Select operation mode. b) Sélectionner le mode de fonctionnement.</p> <p>c) Burner fires after 20 seconds. Supply fan is energized at 165°F (74°C). c) Le brûleur se déclenche après 20 secondes. L'alimentation du ventilateur est alimentée à 165°F (74°C).</p> </td> <td style="vertical-align: top;"> <p>③ Disconnect the electrical power. Débrancher l'alimentation électrique.</p> <p>Disconnect remote thermostat. Débrancher le thermostat à distance.</p> <p>Replace the protective cap. Remplacer le bouchon de protection.</p> </td> </tr> </table> <p>TROUBLESHOOTING Lockout Reset: Hold reset for 3 seconds Diagnostic Mode: Hold reset >5 seconds. Unplug to reset. If the burner does not light after 3 attempts, contact Product Support.</p> <p>DÉPANNAGE Réinitialisation du verrouillage : Maintenir enfoncé le bouton réinitialisation pendant 3 secondes. Mode de diagnostic : Maintenir réinitialisation > 5 secondes. Débrancher pour réinitialiser. Si le brûleur ne s'allume pas après 3 tentatives, contacter l'équipe de soutien de produit.</p> <p align="right">S200015734</p> </div> | Machine Start Up / Démarrage de la machine | Machine Shutdown / Arrêt de la machine | <p>① Check the fuel supply Connect power Brancher l'alimentation 120V 60Hz Lamp will illuminate Le voyant s'allumera</p> <p>Vérification de l'alimentation du carburant 12 ga. / 50 ft. Max (15 m) 10 ga. / 100 ft. Max (30 m)</p> | <p>① DO NOT DISCONNECT THE ELECTRICAL POWER Always follow proper shutdown procedures to avoid machine damage. NE PAS DÉBRANCHER L'ALIMENTATION ÉLECTRIQUE Toujours suivre les procédures d'arrêt afin d'éviter d'endommager la machine.</p> | <p>② Optional Remote Thermostat. Thermostat à distance en option. Remove the protective cap. Supprimer le bouchon de protection. Connect remote thermostat. Brancher le thermostat à distance.</p> | <p>② Turn the operation switch to OFF (O). The burner will go out immediately. The fan will shut down after approximately 2 minutes. Placer le commutateur de fonctionnement à « OFF » (O). Le brûleur s'éteindra immédiatement. Le ventilateur s'arrêtera après 2 minutes environ.</p> | <p>③ a) Select firing mode (Diesel models only). a) Sélectionner le mode de déclenchement (modèles Diesel uniquement). High Heat Low Heat Continuous Remote Thermostat</p> <p>b) Select operation mode. b) Sélectionner le mode de fonctionnement.</p> <p>c) Burner fires after 20 seconds. Supply fan is energized at 165°F (74°C). c) Le brûleur se déclenche après 20 secondes. L'alimentation du ventilateur est alimentée à 165°F (74°C).</p> | <p>③ Disconnect the electrical power. Débrancher l'alimentation électrique.</p> <p>Disconnect remote thermostat. Débrancher le thermostat à distance.</p> <p>Replace the protective cap. Remplacer le bouchon de protection.</p> | | | | | | | |
|--|---|--|--|--|---|--|--|---|---|--|--|---|--|--|--|---|
| Machine Start Up / Démarrage de la machine | Machine Shutdown / Arrêt de la machine | | | | | | | | | | | | | | | |
| <p>① Check the fuel supply Connect power Brancher l'alimentation 120V 60Hz Lamp will illuminate Le voyant s'allumera</p> <p>Vérification de l'alimentation du carburant 12 ga. / 50 ft. Max (15 m) 10 ga. / 100 ft. Max (30 m)</p> | <p>① DO NOT DISCONNECT THE ELECTRICAL POWER Always follow proper shutdown procedures to avoid machine damage. NE PAS DÉBRANCHER L'ALIMENTATION ÉLECTRIQUE Toujours suivre les procédures d'arrêt afin d'éviter d'endommager la machine.</p> | | | | | | | | | | | | | | | |
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| <p>—</p> | <div style="border: 1px solid black; padding: 5px;"> <p>When installing heater with hose use only hose assembly code I12C180MP12M12 supplied by:</p> <p>Lors de l'installation du générateur avec tuyau, on doit utiliser l'ensemble tuyau code I12C180MP12M12 fourni par:</p> <p>FAIRVIEW FITTINGS - www.fairviewfittings.com CANADA 449 Attwell Drive - Toronto, Ontario M9W 5C4 - Tel. 800.800-4018 US 377 Commerce Court - Wheatfield, NY 14120 - Tel. 800.688-4088</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p align="center">Hose assembly specification</p> </div> | | | | | | | | | | | | | | | |
| <p>—</p> | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">Natural Gas</td> <td style="width: 50%; text-align: center;">Propane Gas</td> </tr> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p align="center">Gas type label</p> <p align="center">Natural Gas Propane Gas</p> </div> | Natural Gas | Propane Gas | | | | | | | | | | | | | |
| Natural Gas | Propane Gas | | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; text-align: center;"></td> <td style="width: 35%; text-align: center;">⚠ WARNING</td> <td style="width: 35%; text-align: center;">⚠ AVERTISSEMENT</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">Resetting From Restricted or Hard Lockout</td> <td style="text-align: center;">Réinitialisation Après Verrouillage Restreint Ou Complet</td> </tr> <tr> <td style="text-align: center;"></td> <td style="font-size: 8px;">If three consecutive attempts to reset the unit are unsuccessful, then troubleshoot the heating system for the root cause(s) of the lockout.</td> <td style="font-size: 8px;">Si trois tentatives consécutives pour réinitialiser l'appareil ont échoué, alors dépanner le système de chauffage pour les causes profondes du verrouillage.</td> </tr> <tr> <td style="text-align: center;"></td> <td style="font-size: 8px;">Make necessary repairs or adjustment to ensure a safe start condition.</td> <td style="font-size: 8px;">Effectuez des réparations ou des ajustements nécessaires pour assurer une condition de démarrage sûr.</td> </tr> <tr> <td style="text-align: center;"></td> <td style="font-size: 8px;">Ensure that the appliance is free of oil and oil vapors before starting or resetting the burner.</td> <td style="font-size: 8px;">Assurez que l'échangeur de chaleur est libre de pétrole et de vapeurs avant de commencer ou de réinitialiser le brûleur.</td> </tr> </table> </div> | | ⚠ WARNING | ⚠ AVERTISSEMENT | | Resetting From Restricted or Hard Lockout | Réinitialisation Après Verrouillage Restreint Ou Complet | | If three consecutive attempts to reset the unit are unsuccessful, then troubleshoot the heating system for the root cause(s) of the lockout. | Si trois tentatives consécutives pour réinitialiser l'appareil ont échoué, alors dépanner le système de chauffage pour les causes profondes du verrouillage. | | Make necessary repairs or adjustment to ensure a safe start condition. | Effectuez des réparations ou des ajustements nécessaires pour assurer une condition de démarrage sûr. | | Ensure that the appliance is free of oil and oil vapors before starting or resetting the burner. | Assurez que l'échangeur de chaleur est libre de pétrole et de vapeurs avant de commencer ou de réinitialiser le brûleur. | <div style="border: 1px solid black; padding: 5px;"> <p>WARNING Explosion and fire hazard. Read the Operator's Manual for more information. If three consecutive attempts to reset the machine are unsuccessful, then troubleshoot the heating system for the root cause(s) of the lockout.</p> <ul style="list-style-type: none"> ■ Make necessary repairs or adjustments to ensure a safe start condition. ■ Ensure that the heat exchanger is free of oil and oil vapors before starting or resetting the burner. </div> |
| | ⚠ WARNING | ⚠ AVERTISSEMENT | | | | | | | | | | | | | | |
| | Resetting From Restricted or Hard Lockout | Réinitialisation Après Verrouillage Restreint Ou Complet | | | | | | | | | | | | | | |
| | If three consecutive attempts to reset the unit are unsuccessful, then troubleshoot the heating system for the root cause(s) of the lockout. | Si trois tentatives consécutives pour réinitialiser l'appareil ont échoué, alors dépanner le système de chauffage pour les causes profondes du verrouillage. | | | | | | | | | | | | | | |
| | Make necessary repairs or adjustment to ensure a safe start condition. | Effectuez des réparations ou des ajustements nécessaires pour assurer une condition de démarrage sûr. | | | | | | | | | | | | | | |
| | Ensure that the appliance is free of oil and oil vapors before starting or resetting the burner. | Assurez que l'échangeur de chaleur est libre de pétrole et de vapeurs avant de commencer ou de réinitialiser le brûleur. | | | | | | | | | | | | | | |

| | | |
|---|---|------------------|
| — |  183236 | Fork lift pocket |
|---|---|------------------|

3 Lifting and Transporting

- Requirements**
- Transport vehicle capable of carrying 1000 lbs (454 kg)
 - Crane or lift capable of carrying 1000 lbs (454 kg)
-

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.
- When using an aerial lifting rig, use the designated lifting point on top of the machine.
- Use the designated fork pockets when transporting the machine with a fork lift.
- 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.

4 Operation

4.1 Preparing the Machine for First Use

1. Make sure all loose packaging materials have been removed from the machine.
2. Check the machine and its components for damage. If there is visible damage, do not operate the machine. Contact your Wacker Neuson dealer immediately for assistance.
3. Take inventory of all items included with the machine and verify that all loose components and fasteners are accounted for.
4. Attach component parts not already attached.
5. Add fluids as needed and applicable, including fuel, engine oil, and battery acid.
6. Move the machine to its operating location.

4.2 Installing the Axle and Wheels

Overview The axle and wheels are shipped loose with the machine and must be installed by the customer.

Procedure Perform the procedure below to install the axle and wheels.

1. Lift the machine using appropriate lifting gear.

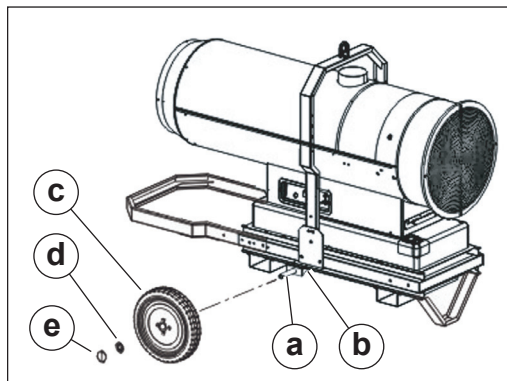


WARNING

Crushing hazard.

- ▶ Refer to chapter *Lifting the Machine* for instructions on proper lifting techniques.

2. Slide the axle (**a**) into the tube (**b**) beneath the trailer.



3. Place a wheel (**c**) and flat washer (**d**) on each end of the axle as shown.
4. Insert hitch pins (**e**) into the holes at each end of the axle to secure the wheels.

4.3 Installing the Front Duct Adapter

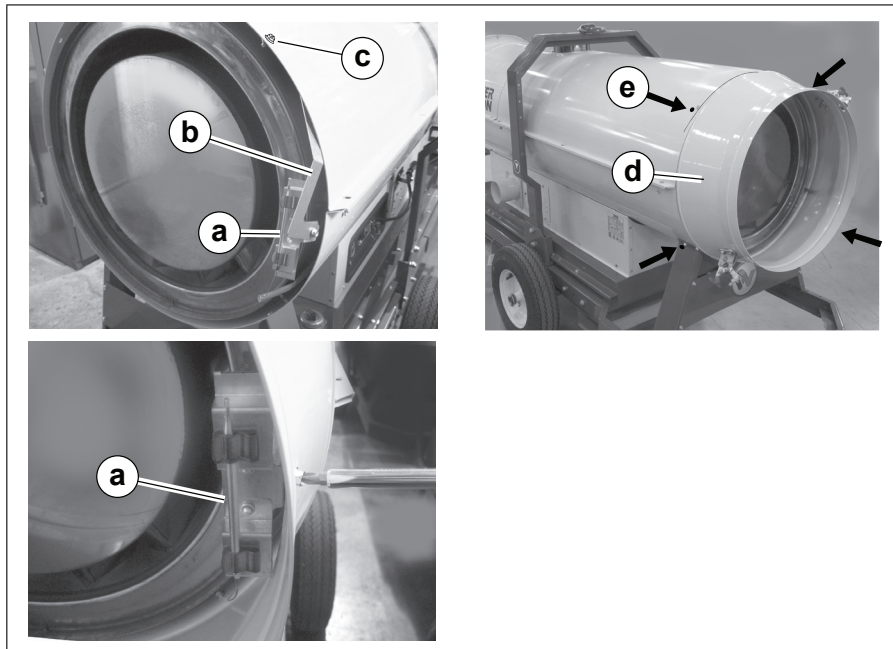
Overview The front duct adapter provided with your machine is shipped loose and must be installed before operating the machine. The thermostat probe must also be installed on the inside of the duct adapter during this procedure.

Duct adapter varieties Your machine is supplied with either a one-way, two-way, or three-way front duct adapter depending on the specific model. The procedure for installing a front duct adapter is basically the same for each variety. A one-way adapter is pictured in the illustrations below.

See topic *Duct Blower Heater Option* for additional information about two-way and three-way duct adapters.

Procedure Perform the procedure below to install the front duct adapter and thermostat probe.

1. The thermostat probe (**a**) is temporarily mounted on a disposable bracket (**b**) inside the machine shell. Remove and set aside the mounting screw (**c**) to disconnect the bracket from the machine shell.



wc_gr007766

2. Remove the screw fastening the thermostat probe to the disposable bracket, and discard the bracket. Temporarily rest the thermostat probe inside the machine shell.
- Note:** *Do not discard the screw. It will be used to mount the thermostat probe.*
3. Slide the edge of the duct adapter (**d**) beneath the edges of the upper and lower machine shell.
 4. Align the four threaded mounting holes (**e**) on the duct adapter with the corresponding holes on the machine shell.
 5. Use the screws (provided) to fasten the duct adapter to the machine shell.
 6. Align the thermostat probe inside the duct adapter as shown. Fasten the thermostat probe in place using the reserved bracket screw.

4.4 Blower Duct Heater Option

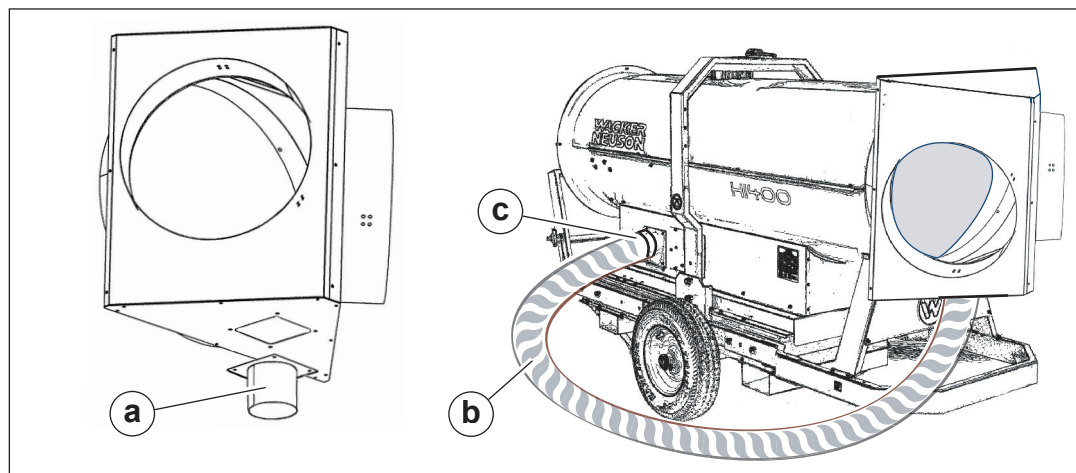
Overview An optional 10 cm (4 in.) duct for preheating air drawn into the combustion blower can be installed. This accessory is recommended for use in extremely cold temperatures.

Note: The installation instructions below are provided for your convenience. Refer to the complete instruction sheet packaged with the blower duct kit.

- Prerequisites**
- Blower duct kit (includes 10 cm (4 in.) snorkel and flexible duct with integral clamps)
 - Phillips screwdriver or nut driver
 - Flat screwdriver

Procedure Perform the procedure below to install the blower duct.

1. Remove the square plate from the bottom of the front duct adapter. Replace the square plate with the 10 cm (4 in.) snorkel (**a**) and tighten the screws securely.



wc_gr008219

2. Install the front duct adapter according to the instructions provided in *Installing the Front Duct Adapter*.
3. Fit one end of the blower duct (**b**) over the 10 cm (4 in.) snorkel and tighten the clamp. In the same manner, connect the other end to the 10 cm (4 in.) supply outlet (**c**) on the side of the machine.

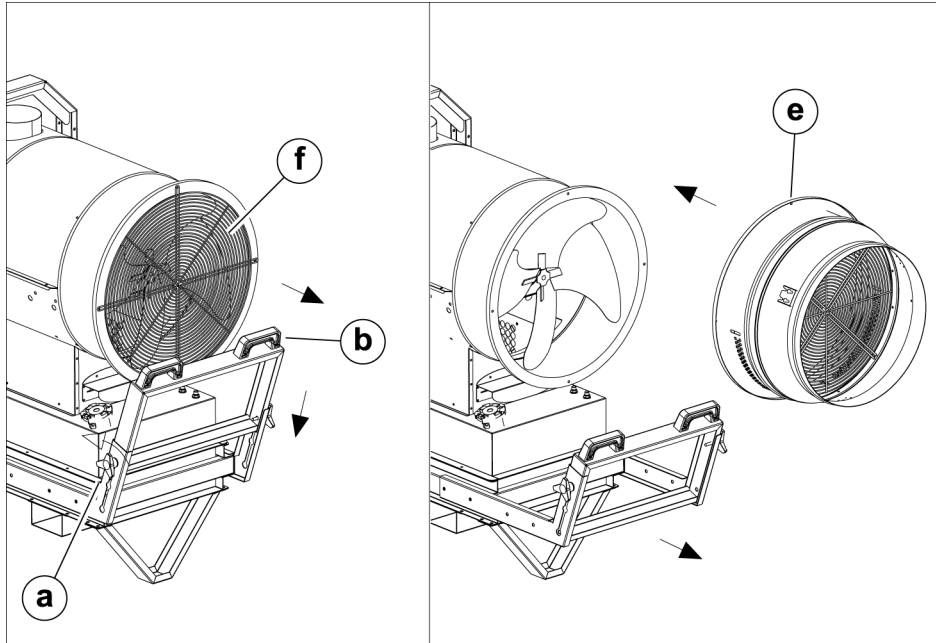
NOTICE: Do not connect a blower duct longer than 4.5 m (15 ft.) to the snorkel.

4.5 Installing the Rear Duct Adapter (Optional)

Overview The optional rear duct adapter is shipped loose and must be installed before operating the machine.

Procedure Perform the procedure below to install the rear duct adapter.

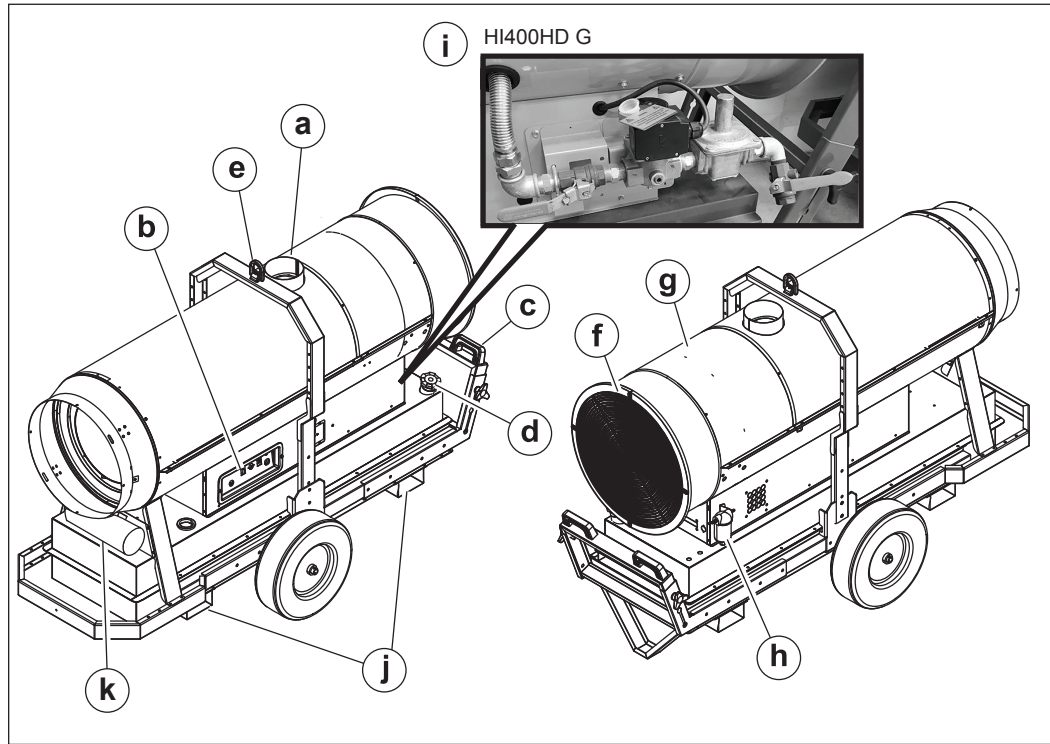
1. Loosen, but do not remove, the two adjusting knobs **(a)** on the handle.



wc_gr008037

2. Grasp the handgrips **(b)** and slide the handle down to the lowest detent position in the handle slots.
3. Pull the handle away from the fan guard **(f)**.
4. Remove the fan guard. There are four screws that secure the fan guard.
5. Align the four threaded mounting holes **(e)** on the duct adapter with the corresponding holes on the machine shell.
6. Use the fan guard screws to fasten the duct adapter to the machine shell.
7. Slide the handle back to its original position and tighten the adjusting knobs.

4.6 Control and Component Locations



wc_gr007232

Machine components

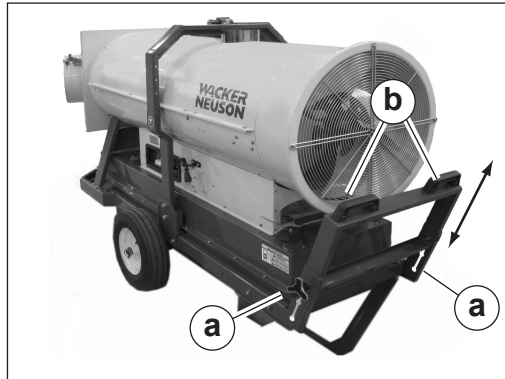
| Ref. | Description | Ref. | Description |
|------|-----------------------------------|------|--------------------------|
| a | Exhaust flue | g | Access cover |
| b | Control panel | h | Fuel filter (D units) |
| c | Manual transport handle | i | Gas train (G units only) |
| d | Fuel fill location (D units only) | j | Fork pockets |
| e | Lift brackets | k | Manual holder |
| f | Air inlet and fan guard | — | — |

4.7 Adjusting the Handle Height

Overview Your machine is equipped with a manual transport handle. The handle height can be adjusted to suit the operator's preference.

Procedure Perform the procedure below to adjust the handle height.

1. Loosen, but do not remove, the two adjusting knobs **(a)** on the handle.



wc_gr007767

2. Grasp the handgrips **(b)** and slide the handle up or down to one of the three detent positions in the handle slots.
3. When the handle is in the desired position, tighten the two adjusting knobs.

4.8 Positioning the Machine



DANGER

Carbon monoxide. 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.



WARNING

Fire hazard. Restricting air flow through the machine during operation can cause a fire due to overheating components.

- ▶ Do not block the air inlet or outlet during machine operation.

NOTICE: Restricting the air flow through the machine during operation can cause the machine and its components to overheat. To avoid damage, provide adequate air flow through the machine while it is operating.

Guidelines

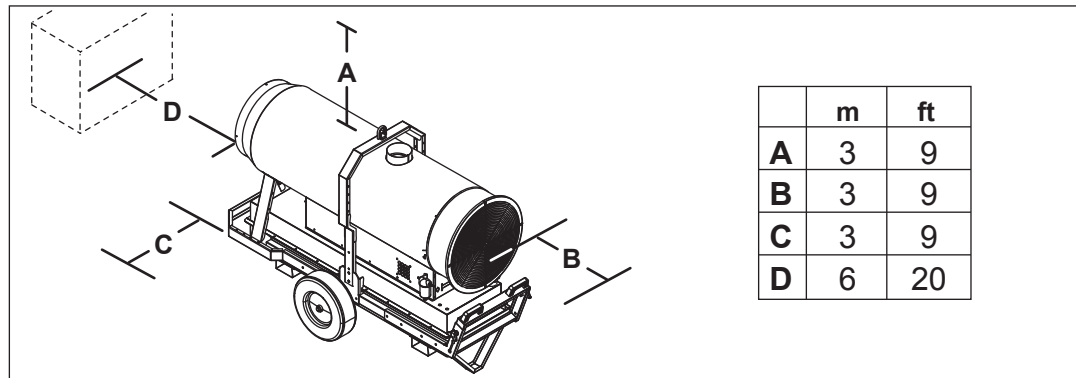
Observe the following guidelines when positioning the machine for operation.

- 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



wc_gr007234

Note: Graphic is representational. Your machine may vary.

4.9 Electrical and Grounding



WARNING

Fire and electric shock hazards. The use of an inappropriate power supply, or undersized extension cords, can lead to fire and electric shock. Fire and electric shock can cause severe injury.

- ▶ Before use, ensure that the machine is properly connected to an appropriate power source and grounded per the requirements provided below.
- ▶ Do not use undersized extension cords.

Electrical requirements

- Ensure that the machine is connected to a reliable, consistent source of electric power.
- The electric power source must be grounded per the requirements below and connected to a freely accessible circuit breaker.
- Ensure that extension cords (if used) are properly sized for the installation. Do not use worn, bare, or frayed 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).

Grounding requirements

- Electrical grounding must comply with the National Electric Code ANSI/NFPA 70 or the CSA C22.1 Canadian Electrical Code, Part 1.



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.

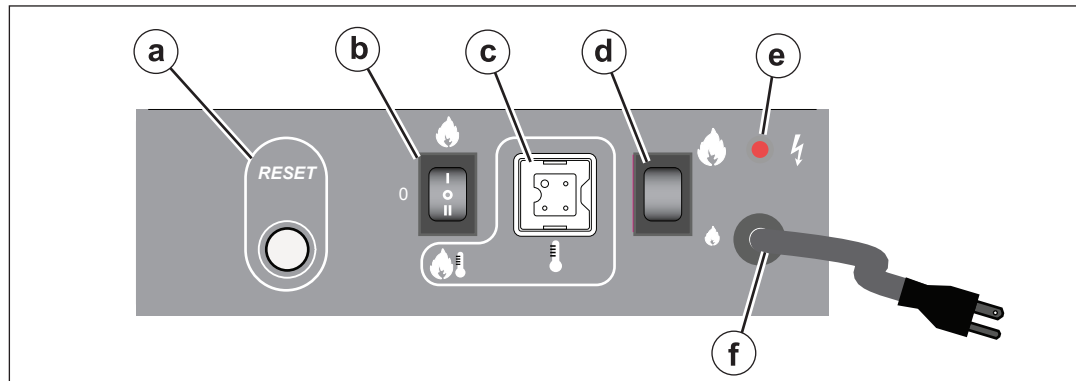
Connecting power

Perform the procedure below to connect power to the machine.

1. Verify that the operation mode switch is in the OFF (0) position.
2. Connect the main power cord to a properly-rated power source.

Note: *If the ambient temperature is below freezing, wait 10–30 minutes before proceeding.*

4.10 Control Panel—Oil Burner (D Models)



wc_gr007254

Control panel components

| Ref. | Description | Ref. | Description |
|------|--|------|--|
| a | Operating status indicator and reset button (dual function) | d | Firing mode switch (High-fire or low-fire) |
| b | Mode switch (on-off-on) See topic <i>Starting the Machine</i> . | e | Power indicator |
| c | Remote thermostat receptacle | f | Power cord |

Symbols and meanings

| Symbol | Meaning/function | Symbol | Meaning/function |
|--------|--|--------|--|
| RESET | Push the button to reset the machine when a burner fault occurs. | | On (Continuous heat mode) See topic <i>Starting the Machine</i> . |
| | On (Remote thermostat mode) See topic <i>Starting the Machine</i> . | | Remote thermostat connection point |
| | Low-fire mode See topic <i>Recommended Fuels</i> . | | High-fire mode See topic <i>Recommended Fuels</i> . |
| | Power indicator | — | — |

4.11 Recommended Fuels and Fuel Blending Guide

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 of #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 | |

NOTICE: Do not use B20 or any other type of biodiesel fuel in this machine.



CAUTION

Fire hazard.

- ▶ Do not use gasoline, crankcase oil, or any oil containing gasoline.

4.12 Inspecting the Fuel Hose

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



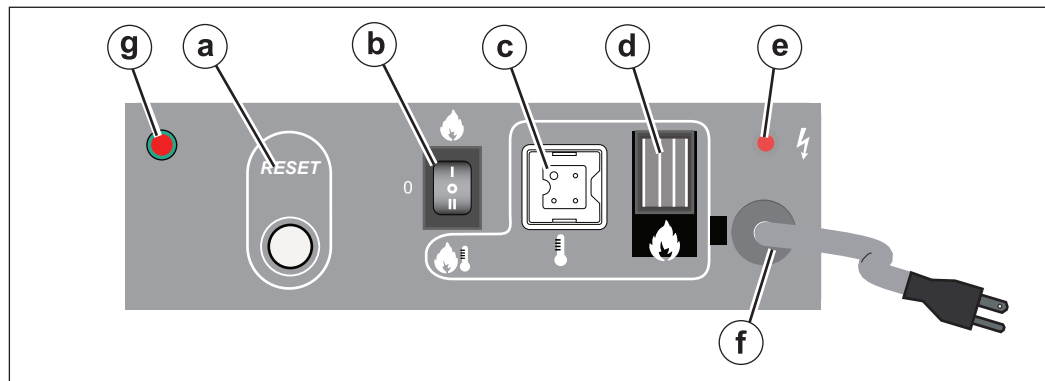
WARNING

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.

4.13 Control Panel—Gas Burner (G Models)



wc_gr007770

Control panel components

| Ref. | Description | Ref. | Description |
|------|--|------|--|
| a | Operating status indicator and reset button (dual function) | e | Power indicator |
| b | Mode switch (on-off-on) See topic <i>Starting the Machine</i> . | f | Power cord |
| c | Remote thermostat receptacle | g | Polarity indicator (illuminates when polarity of power supply is incorrect) |
| d | Burner indicator | — | — |

Symbols and meanings

| Symbol | Meaning/function | Symbol | Meaning/function |
|--------|---|--------|---|
| RESET | Push the button to reset the machine when a burner fault occurs. | | On (Continuous heat mode) See topic <i>Starting the Machine</i> . |
| | On (Remote thermostat mode) See topic <i>Starting the Machine</i> . | | Remote thermostat connection point |
| | Power indicator | — | — |

Note: The controller is only capable of running for a 24-hour period. After 24 hours, the controller will shut down.

To restart the machine:

- a. Turn the mode switch to the OFF position.
- b. Disconnect the power cord from the power source.
- c. Reconnect the power cord to the power source.
- d. Run the machine as normal.

4.14 Gas Installation and Setup (G models)

**WARNING**

Extreme explosion and fire hazards.

- ▶ Only a licensed, professional gas technician shall perform installation, fuel supply connection, setup, adjustment, and testing of gas lines.
- ▶ Never use open flames to detect gas leaks.

Natural gas installation requirements

Natural gas installation must conform with local codes. In the absence of local codes, the installation must conform with the National Fuel Gas Code ANSI Z223.1/NFPA 54 and the Natural Gas and Propane Installation Code, CSA B149.1.

Propane installation requirements

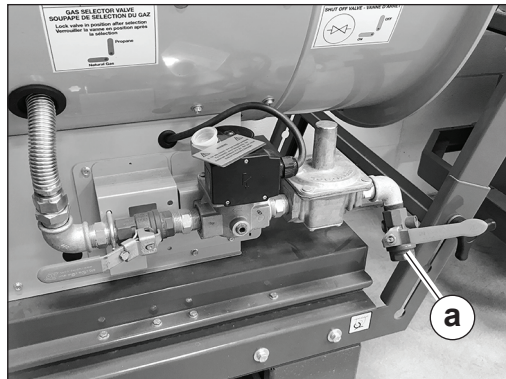
Follow the instructions below if equipping the machine for liquid propane (LP) gas.

- The installation must conform with local codes. In the absence of local codes, the installation must conform with the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and the Natural Gas and Propane Installation Code, CSA B149.1.
- Heated air from the machine shall not be directed toward any propane gas container within 6 m (20 feet)
- Size and capacity of gas cylinders shall be properly dimensioned according to the gas flow in *Technical Data*.
- The cylinder supply system shall be arranged to provide for vapor withdrawal from the operating cylinder.
- After connecting the machine to the gas cylinder, open the supply tap and check the supply pipe and fittings for gas leaks. Only use foam soap or an approved leak detector.
- The gas shall be turned off at the propane supply cylinder(s) when the machine is not in use.
- When the machine is to be stored indoors, the connection between the propane supply cylinder(s) and the machine must be disconnected. Cylinder(s) must be removed from the heater and stored in accordance with Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58 and CSA B149.1, Natural Gas and Propane Installation Code.

4.15 Connecting the Gas Line (G models)

Overview

The HI400HD-G heater includes a 3/4" NPT shutoff valve and inlet **(a)** on the gas safety valve/pressure regulator body. The gas supply line connects to the inlet.



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WARNING

Extreme fire and explosion hazard!

- ▶ Only a licensed, professional gas technician shall perform installation, fuel supply connection, setup, adjustment, and testing of gas lines.
- ▶ All connections and settings must conform to relevant local, state, provincial, and federal requirements.

Gas pressures

The table below lists the minimum and maximum gas supply pressures.

| Fuel | Minimum supply pressure | Maximum supply pressure |
|---------------------|-------------------------|-------------------------|
| Natural gas | 7" w.c. | 10" w.c. |
| Liquid propane (LP) | 8" w.c. | 13" w.c. |

Regulating LP gas pressure

The installation of a secondary pressure regulator is strongly recommended when using LP gas. A secondary pressure regulator ensures a steady flow of LP to the burner. A regulator is especially valuable when the gas supply pressure is inconsistent.

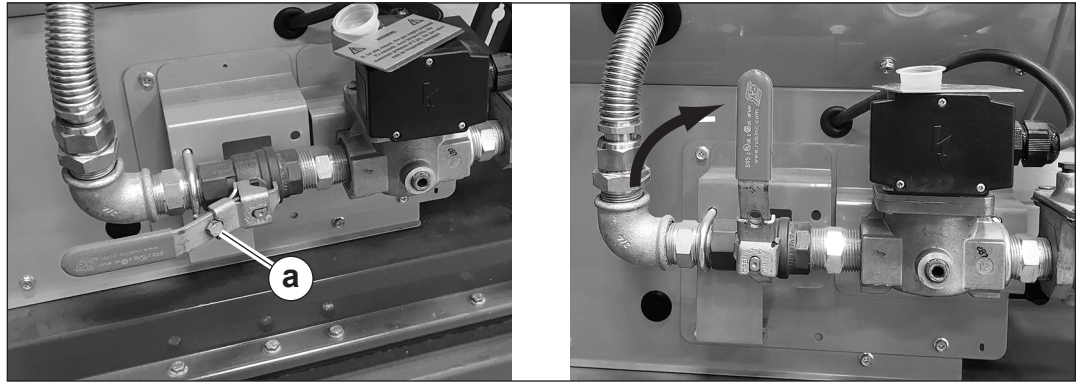
Note: Gas piping, pressure regulators, and fittings are not included with this heater and must be provided by the customer.

4.16 Setting the Gas Selector Valve (G models)

Overview Your machine is configured at the factory to operate on natural gas. The gas selector valve on the gas train allows you to convert the machine from natural gas to LP as job site conditions require.

Procedure Perform the procedure below to change the type of gas.

1. Ensure that the gas shutoff valve is closed.
2. Loosen the screw **(a)** on the gas selector valve.



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3. Turn the handle to the desired position.
4. Tighten the screw.
5. Open the gas shutoff valve.

4.17 Venting 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.

Overview

The exhaust from indirect-fired heaters must be vented to a chimney or an exhaust duct. Exhaust gases must rise in order to maintain a proper draft in the chimney or exhaust duct.

Note: *The information presented below is intended as a general reference guide. Local and national code requirements supersede these suggestions.*

Before installing the machine

- Adhere to all local and national codes.
- Adhere to all fire prevention regulations.
- 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.

Duct requirements

- Do not use B-vent exhaust pipes to vent an oil burning machine. Contact Wacker Neuson Product Support for recommended alternatives.
- Check local codes for appropriate vent piping materials.

Machine setup

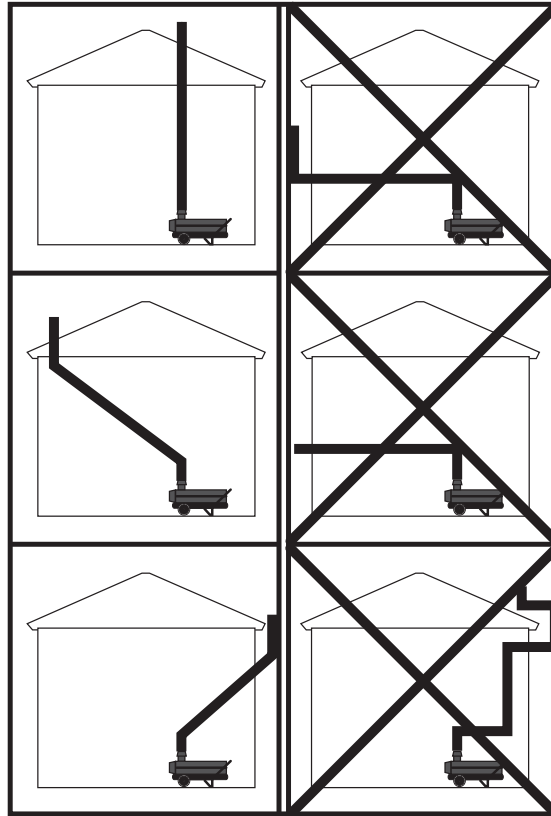
- Position the machine in a manner that avoids excessive vent bends (elbows), and long horizontal runs.
- Keep air inlets and outlets free from obstruction. Ensure that there are no bulky objects or sheets/covers near or on the machine.

Routing the vent piping

- Route the venting pipes in a manner that avoids flammable materials.
- Route the venting pipes in a manner that avoids contact with people.
- Sufficient draft shall be created to assure safe and proper operation of the machine (minimum 0.05 in. w.c.).
- Avoid any 90° elbows or bends in at least the first 10 feet (3m) of exhaust ducts.

Terminating the vent piping

- When the machine is connected to a flue pipe, the flue pipe shall terminate in a vertical section at least two feet (0.6m) long.
- If exhaust is to be vented out the side of a building, as shown in the lower left diagram, the end of the exhaust pipe should be vertical and at least 2 feet (0.6m) long. A rain cap should be installed to avoid any potential downdraft or back pressure on the exhaust system.
- If the heater is being operated in a multi-floor building with the exhaust outlet below the roof line, exhaust gases must not be allowed to re-enter the building.



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

4.18 Flex Ducting Options

Refer to the chart below for the maximum allowable return and supply duct lengths for your machine.

NOTICE: Do not exceed the maximum total lengths specified in the chart. Exceeding these lengths, or blocking any of the duct openings, constricts the air flow through the machine and may cause a high-temperature shut-down fault.

| MODEL | SUPPLY DUCTING | | | | | RETURN DUCTING | | |
|--------------------------|---------------------|----------------------------------|-----------------------------------|--------|---------------------|--------------------------------|---------------------------------------|---------------------|
| | Supply Duct Adapter | Length of each duct section (ft) | Maximum duct sections per opening | | Total length needed | Return Duct Adapter | Typical number of 25 ft duct sections | Total length needed |
| | | | Qty | Length | | | | |
| AB XHD HI770 | 1 x 20 in. | 25 | 8 | 200 ft | 200 ft | 1 x 20 in. | 1 | 25 ft |
| | 1 x 16 in. | 25 | 6 | 150 ft | 150 ft | | | |
| | 2 x 12 in. | 25 | 3 | 75 ft | 150 ft | | | |
| HI110 | 1 x 12 in. | 25 | 1 | 25 ft | 25 ft | Return ductwork not available. | | |
| HI200 | 2 x 12 in. | 25 | 2 | 50 ft | 100 ft | | | |
| | 1 x 14 in. | 25 | 1 | 25 ft | 25 ft | | | |
| HI300 | 1 x 16 in. | 25 | 2 | 50 ft | 50 ft | | | |
| HI300 HD | 2 x 12 in. | 25 | 1 | 25 ft | 50 ft | | | |
| HI400 D/G | 1 x 20 in. | 25 | 4 | 100 ft | 100 ft | 1 x 20 in. | 1 | 25 ft |
| | 2 x 16 in. | 25 | 2 | 50 ft | 100 ft | | | |
| | 3 x 12 in. | 25 | 1 | 25 ft | 75 ft | | | |
| HI750 HI900 HI1000 | 2 x 20 in. | 25 | 6 | 150 ft | 300 ft | 2 x 20 in. | 1 | 50 ft |
| | 3 x 20 in. | 25 | 9 | 225 ft | 675 ft | | | |
| | 3 x 16 in. | 25 | 3 | 75 ft | 225 ft | | | |
| | 4 x 12 in. | 25 | 1 | 25 ft | 100 ft | | | |
| HIF690 | 1 x 20 in. | 25 | 4 | 100 ft | 100 ft | 1 x 20 in. | 1 | 25 ft |
| | 1 x 16 in. | 25 | 2 | 50 ft | 50 ft | | | |
| | 2 x 12 in. | 25 | 1 | 25 ft | 50 ft | | | |
| HIF600 | 1 x 20 in. | 25 | 6 | 150 ft | 150 ft | 1 x 20 in. | 1 | 25 ft |
| | 1 x 16 in. | 25 | 4 | 100 ft | 100 ft | | | |
| | 2 x 12 in. | 25 | 4 | 100 ft | 200 ft | | | |
| HIF1200 | 2 x 20 in. | 25 | 8 | 200 ft | 400 ft | 1 x 20 in. | 1 | 25 ft |
| | 2 x 16 in. | 25 | 2 | 50 ft | 100 ft | | | |
| | 4 x 12 in. | 25 | 1 | 25 ft | 100 ft | | | |

Note: Return ducting information is based on typical work applications. Contact your Wacker Neuson dealer for more information on return ducting configurations.

4.19 Ducting Guidelines

- Duct Types**
- Use appropriate type (Heat range) and length of duct.
 - Use Black or Gray duct for supply air.
 - Use Yellow duct for return air only.

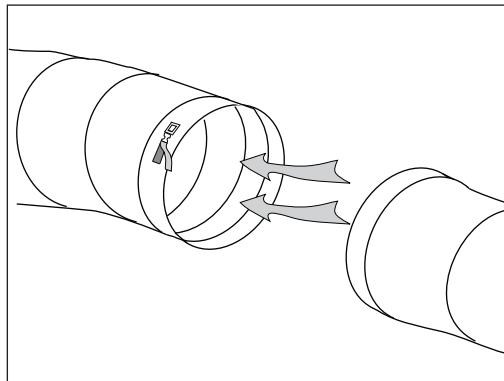


CAUTION

Use of Yellow duct (rated for 200°F MAX) for supply ducting (required rating 280°F) can result in damage to the duct or unplanned shutdown if the ducting fails.

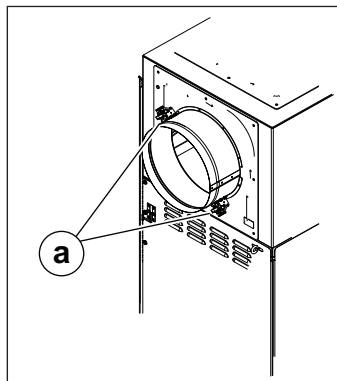
- ▶ Do not use Yellow duct for supply ducting. Yellow duct is for RETURN DUCTING ONLY.

- Belt cuffs should be used to connect duct sections together. For optimum performance, connect ducting with flow arrows pointing in the correct direction so the inner seams lie flat during operation.

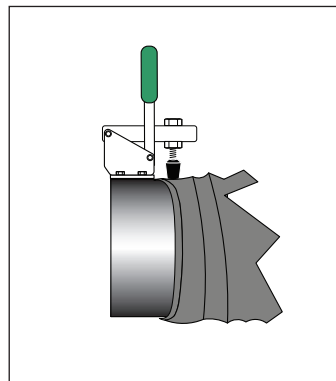


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- Use the screw clamps (a) at the source to connect the air supply duct adapter to the machine.

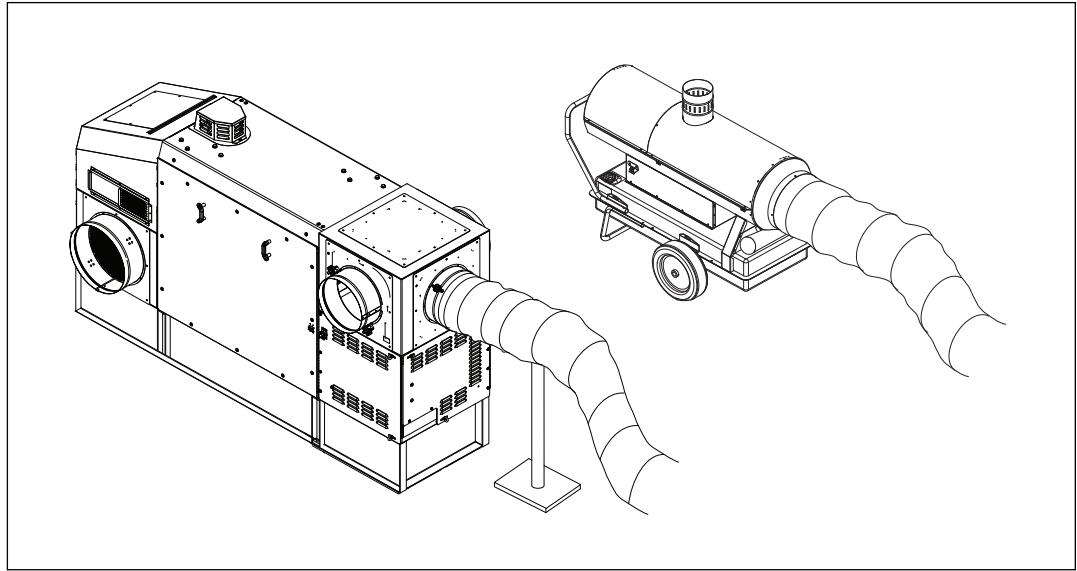


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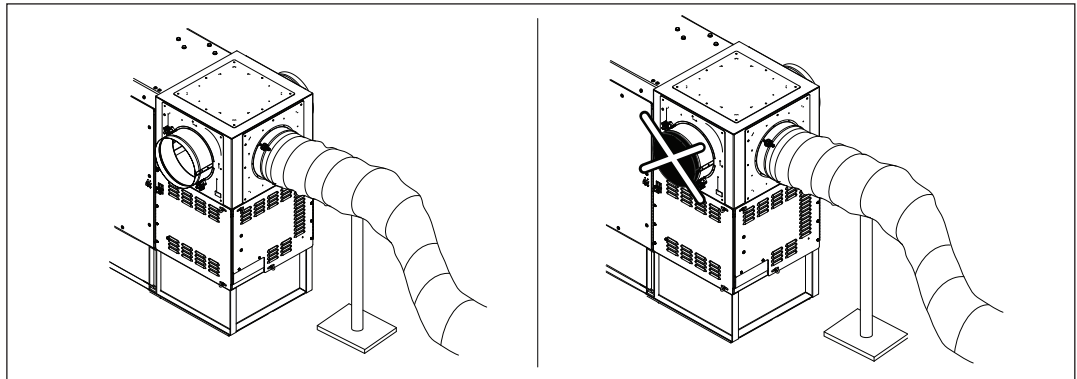
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- Avoid any sharp bends from the supply outlet. Use a stand to keep the duct level for a distance of 3–6 ft away from the machine.



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- If additional ducting for a machine with more than one supply adapter is not available, change the adapter arrangement or use one adapter and leave the other adapters open.



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CAUTION

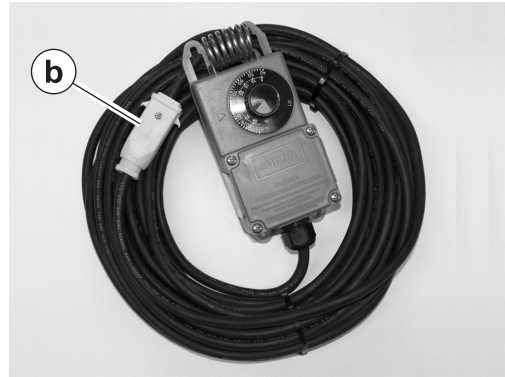
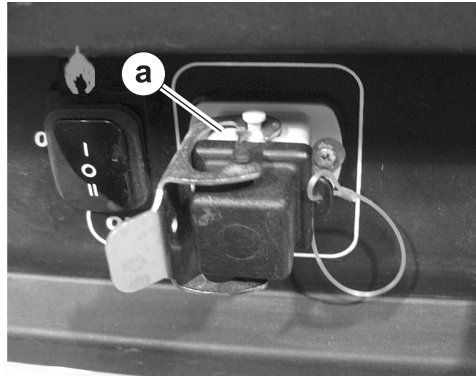
Blocking a duct adapter reduces air flow over the heat exchanger, which can cause the high temperature alarm to fault and shut the machine down. This can result in damage to the machine or unplanned shutdown.

- ▶ Do not block supply air adapters. They must remain open or ducting must be used.
- ▶ Do not block an open adapter.

4.20 Installing the Remote Thermostat or Receptacle Cap

- Requirements**
- Remote thermostat, or
 - Thermostat receptacle cap

Background The control panel includes a receptacle for an optional remote thermostat (b). The receptacle is protected by an attached cap (a) when not in use.



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NOTICE: To avoid damaging or contaminating the receptacle, make sure the cover is securely locked in place when a remote thermostat is not installed.

To install the remote thermostat, remove the cap, insert the plug into the receptacle, and lock the plug in place.

- Operational notes**
- When the mode switch is set to the upper (continuous heat) position, the heater will operate without a remote thermostat.
 - When the mode switch is set to the lower (remote thermostat) position, the heater will not operate unless a remote thermostat is plugged into the receptacle and the signal is read by the controller.

Thermostat adapter An adapter is available to convert the proprietary thermostat connection to an Edison plug-style connection for use with commonly available thermostats. This adapter can be purchased using Wacker Neuson part #5200007098.

NOTICE: The thermostat adapter is designed for use ONLY with a thermostat. To avoid damaging the machine, do not plug any other equipment into the thermostat adapter.

4.21 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.

1. Verify that the operation mode switch is in the OFF (0) position.
2. Connect the main power cord to a properly-rated power source.

Note: *If the ambient temperature is below freezing, wait 10–30 minutes before proceeding.*

4.22 Before Starting

- 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. |
| Gas supply (if equipped) | Check that the gas supply lines (if applicable) have been properly installed. Check that all valves are in the proper operating position. |
| 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.

4.23 Cold Weather Start-Up

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.

Your machine is 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

Perform the procedure below to preheat the fuel.

1. Connect power to the machine. See topic *Connecting Power to the Machine*.
2. Wait 20-30 minutes—longer for colder temperatures.
3. 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

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

Nozzle heater

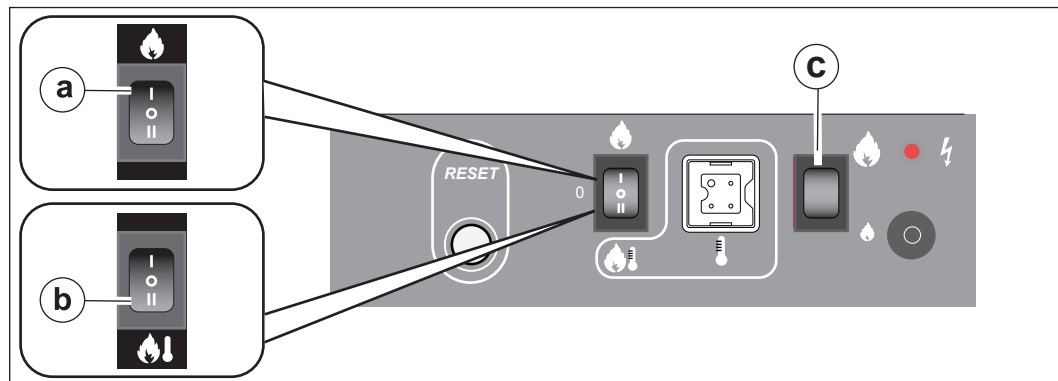
The burner may not fire immediately on startup if the nozzle is cold. An additional heater warms the nozzle to the required operating temperature.

4.24 Starting the Machine (D models)

- Requirements**
- Machine properly positioned
 - Power connected
 - Pre-starting checks completed

Procedure Perform the procedure below to start the machine.

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



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2. Select a firing mode (c).
 - a. If the need for heat is low, choose the LOW fire mode. Low fire mode allows the heater to run at a lower fuel pressure with a lower burner firing rate. Less heat is generated and the machine runs more economically as a result.
 - b. If the need for heat is high, choose the HIGH fire mode. High fire mode allows the machine to operate at full capacity, generating maximum heat.

Operational sequence

The following sequence of events will occur.

1. The burner blower will start.

Note: *An additional heater warms the nozzle to the required operating temperature.*

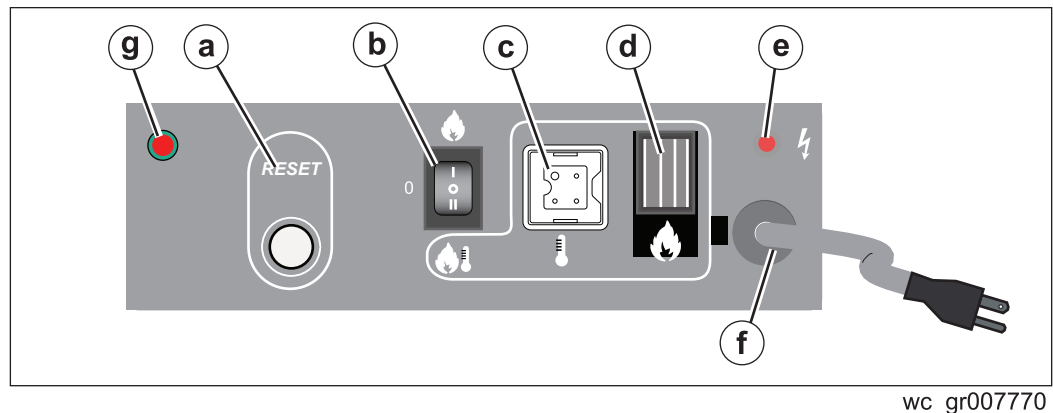
2. The burner will start firing.
 - In applications in which the remote thermostat is not being used (I), the burner will fire continuously.
 - In applications in which the remote thermostat is being used (II), the burner will fire until the air temperature of the application area reaches the target 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 refire. The process continues as long as there is fuel for the burner.
3. The main blower will start.

4.25 Starting the Machine (G models)

- Requirements**
- Machine properly positioned
 - Power connected
 - Pre-starting checks completed

Procedure Perform the procedure below to start the machine.

1. Select an operation mode **(b)**.
 - a. Continuous heat mode (I)
 - b. thermostat mode (II)



Operational sequence

The following sequence of events will occur.

1. The blue light on the gas regulator will illuminate, indicating that gas is flowing.
2. The burner blower will start.
3. The burner will start firing.
 - In applications in which the remote thermostat is not being used (I), the burner will fire continuously.
 - In applications in which the remote thermostat is being used (II), 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 refire. The process continues as long as there is fuel for the burner.
4. The main blower will begin blowing warm air when the combustion chamber is hot.

4.26 High and Low Voltage Protection (G Models)

Serial Number Range 20105810 and higher

Introduction Your machine is equipped with a control board that offers high and low voltage protection. This enhanced control board controls burner operation when the voltage drops or spikes for prolonged periods. If you wish to install this enhanced control board on a machine outside the serial number range listed above, contact Wacker Neuson.

Operation During high and low voltage conditions, machines equipped with this feature operate as shown in the table below.

| If the Voltage: | Duration | Action |
|---------------------|------------|--|
| Drops below 90 VAC | 10 seconds | Shuts down machine and initiates a blinking orange operating status indicator. |
| Rises above 90 VAC | 2 minutes | Restarts machine. |
| Rises above 147 VAC | — | Shuts down machine immediately. |
| Drops below 147 VAC | — | Restarts the machine immediately. |

Note: *The machine can not be reset while the operating status indicator is blinking orange.*

Overriding restart delay To override the 2 minute delay for restarting the machine after the voltage rises above 90 VAC, remove the plug from the power receptacle and immediately plug it back in. If the problem persists, contact Wacker Neuson.

4.27 Stopping

Procedure Perform the procedure below to stop the machine.

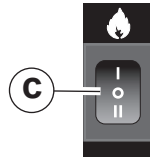


WARNING

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.

1. 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.

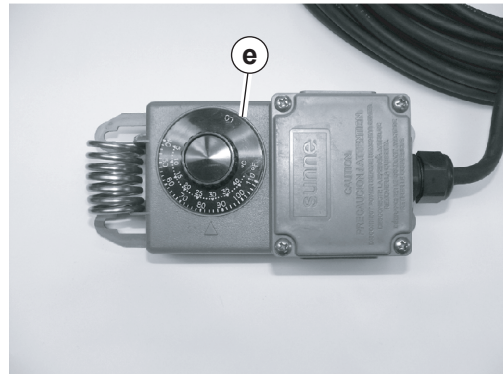
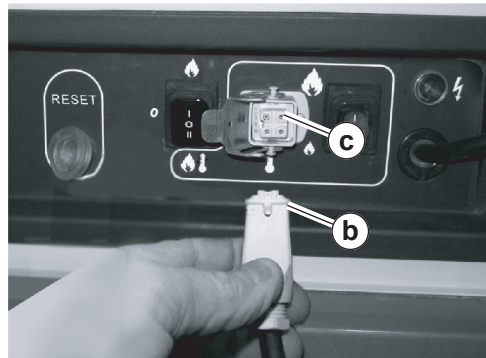
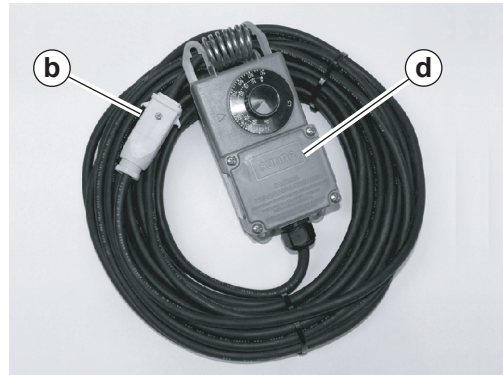
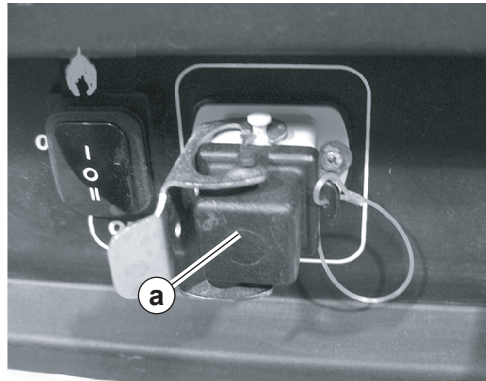
1. The burner will shut down.
2. The blower will stop when the machine is sufficiently cool.

4.28 Installing and Using the Remote Thermostat

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

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

1. Remove the thermostat receptacle plug (a) from the control panel receptacle.
2. Connect the remote thermostat (b) to the control panel receptacle (c).
3. Set the sensor end (d) within the area to be heated.
4. Adjust the target temperature with the dial (e).



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Thermostat adapter

An adapter is available to convert the proprietary thermostat connection to an Edison plug-style connection for use with commonly available thermostats. This adapter can be purchased using Wacker Neuson part #5200007098.

NOTICE: The thermostat adapter is designed for use ONLY with a thermostat. To avoid damaging the machine, do not plug any other equipment into the thermostat adapter.

4.29 Operating at High Elevations (D models)

Background If using the machine at or above elevations of 1524 m (5000 ft) asl (above sea level), a high elevation kit, periodic monitoring, and additional maintenance are necessary to preserve the machine’s systems. The following procedures will ensure that the machine runs smoothly and that premature soot build-up will be reduced.

Guidelines Use the guidelines below to ensure efficient operation of the machine. Refer to the specific topic for details.

| Task | When | See Topic |
|--|--|-----------|
| 1. Install a high elevation kit. Item number 5200008502 | Before operation | — |
| 2. Adjust the air damper. | Before operation | 6.7 |
| 3. Replace the burner nozzle. | Before operation | 6.6 |
| 4. Conduct a combustion analysis and smoke spot test. | After installing the kit and making any adjustments and/or Every 1000 hours | 6.3 |



WARNING

Fire hazard. The use of incorrect nozzles could cause fire or impaired combustion. Impaired combustion may cause under-firing, over-firing, sooting, sudden expulsion of hot gases, and smoke.

- ▶ Use only the factory-installed or recommended nozzles.

5 Accessories

5.1 Available Accessories

Introduction Wacker Neuson Corporation offers many optional accessories for this machine. These accessories are described below. Contact your local Wacker Neuson dealer or visit www.wackerneuson.com for ordering information.

Note: *Depending on the specific machine model, your heater is equipped with one of three available outlet adapters. All three outlet adapters are compatible with your machine and can be purchased and installed as needed.*

| Item | Description/Purpose |
|------------------------------|---|
| Remote thermostat | Allows the user to remotely control the target temperature |
| Exhaust pipe | An insulated exhaust pipe that offers a method of directing exhaust away from the application area |
| Inlet and outlet covers | Vinyl covers that protect the interior of the machine from the elements during transport or storage |
| Duct adapters—various sizes | Various sizes of detachable inlet and outlet adapters |
| Flexible ducts—various sizes | Vinyl ducts that offer a method of directing inlet and outlet air |
| Exhaust support bracket | Bracket to support exhaust vents |
| Exhaust vent rain cap | Metal cap to protect exhaust pipes from the elements |

6 Setting up the Burner

6.1 Removing the Access Cover

- 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.

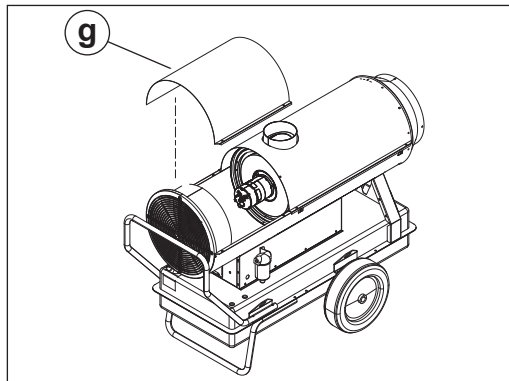
Overview

Your machine is equipped with a removable access cover. The access cover must be removed in order to maintain and repair certain machine components such as the burner, electric motor, and fuel pump.

Procedure

Perform the procedure below to remove the access cover.

1. Shut down the machine and allow it to cool.
2. Disconnect the power cord from the power source.
3. Remove the four screws that fasten the access cover (**g**).



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4. Remove the access cover and set it aside.
5. Perform the required maintenance.
6. When maintenance is complete, re-install the access cover and fasten it with the screws.

6.2 Removing and Installing the Burner

Note: Although an oil-burning machine (D model) is shown in the photos below, the procedure for removing the burner assembly on a gas-burning machine (G model) is similar.

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



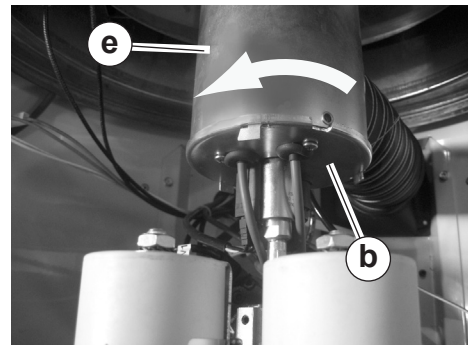
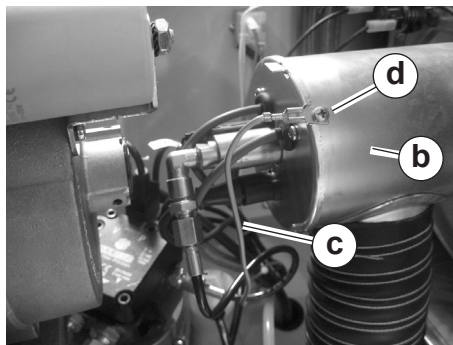
CAUTION

Hot surface hazard. The machine surfaces may be hot.

- ▶ Allow the machine to cool for a minimum of ten minutes before touching it.

Procedure Before performing any maintenance on the burner assembly, it must be removed from the machine. Perform the procedure below to remove or install the burner assembly.

- Removal**
1. Shut down the machine and allow it to cool.
 2. Disconnect the power cord from the power source.
 3. Remove the access cover.
 4. Remove the screw (**d**) to disconnect the ground wire (**c**) from the burner assembly (**b**).



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5. Rotate the burner assembly counterclockwise and remove it from the flame head and air tube assembly (**e**).
6. Perform the required maintenance.
Note: Refer to the maintenance procedures in this manual.
7. Re-install the burner assembly. Refer to the steps below to install the burner assembly.

- Installation**
1. Place the burner assembly into the flame head and air tube assembly.
 2. Rotate the burner assembly clockwise to lock it into place.
 3. Install the ground wire using the screw (**d**).
 4. Re-install the access cover.

6.3 Setting up the Burner

Factory settings

| Machine | Nozzle size | Fuel pressure | | Burner pressure in WC | | Air damper setting |
|------------|----------------------------|-------------------------------|-----------------------------|-----------------------|----------------|--------------------|
| | | psi | bar | NG | LP | |
| HI400 HD D | 2.00 (80W) gph | Stage I: 160 Stage II: 217 | Stage I: 11 Stage II: 15 | — | | 1.5 |
| HI400 HD G | 3 x 2.8 mm (12 X 0.11 in.) | — | — | 6.40 (1600 Pa) | 6.52 (1630 Pa) | 3 |

Background The burner consists of several different components and subsystems. Each of these components or subsystems must be operating correctly for the burner to function properly.

Tools required The following tools are required to adjust the burner:

- High-quality combustion analyzer
- Smoke spot tester
- Fuel pressure test gauge
- General hand tools

Mandates

- Adjustments made shall be done so that the machine conforms to the requirements of local, state, and federal codes and authorities.
- Adjustments shall be made at the job site.

When Adjust the burner:

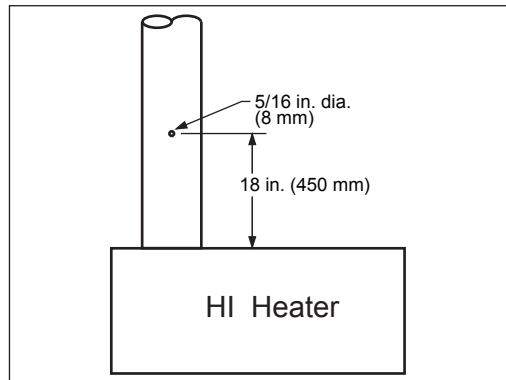
- Before operating the machine at elevations 305 m (1,000 ft) above or below the location of where the last adjustments were made
- Before starting at a new job site
- After any burner maintenance or repair has been performed
- If burner performance is in question

Procedure Perform the procedure below to set up the burner.

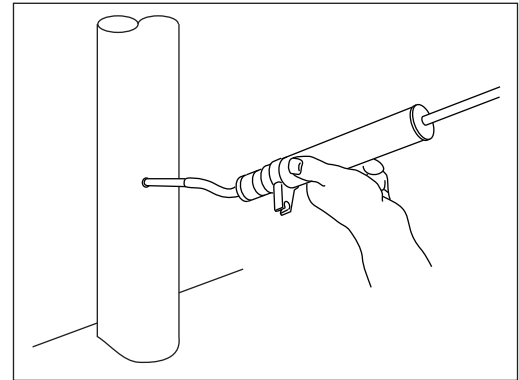
1. Shut down the machine.
2. Set the burner electrodes.
(See topic *Inspecting/Adjusting the Oil Burner Electrodes.*)
3. Check the burner nozzle.
(See topic *Checking/Changing the Burner Nozzle.*)
4. Check and adjust the burner air damper if necessary.
(See topic *Checking and Adjusting the Air Damper.*)
5. Start the machine and the burner.
6. On D models only, check/set the fuel pressure.
(See topic *Checking/Adjusting the Fuel Pressure.*)
7. On G models only, check/set the gas pressure.

(See topic *Checking/Adjusting the Gas Pressure.*)

8. Conduct a smoke spot test. Follow the smoke spot tester manufacturer's instructions and the general guidelines below.



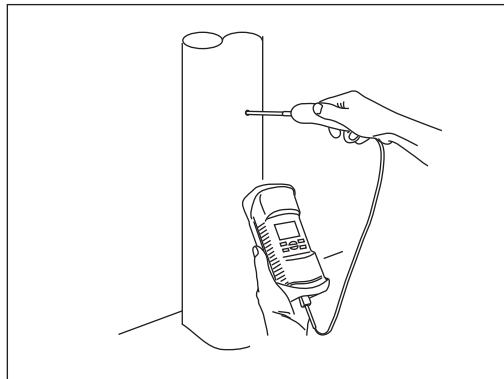
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ghi_gr006969

- Use the access hole in the exhaust stack.
- Several samples should be taken as the heater warms.
- The final sample should be taken just before the heater reaches 71°C (160°F).

9. Analyze the combustion. Follow the combustion analyzer manufacturer's instructions and the general guidelines below.



ghi_gr006970

- Use the access hole in the exhaust stack.
- Take several samples as the heater warms.
- Take the final sample just before the heater reaches 71°C (160°F).

10. Re-adjust the air band, if necessary, until the smoke spot test and combustion analysis are within the following parameters:

- O₂ content: 3–5%
- Smoke spot: less than 1

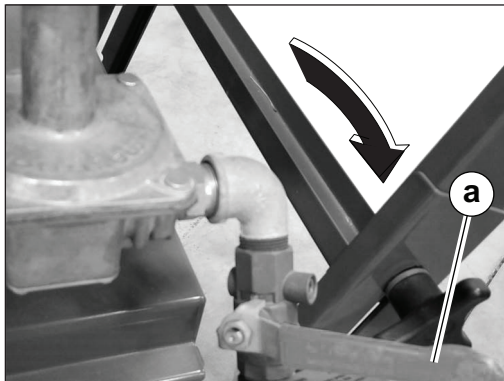
Result

The burner has now been set.

6.4 Adjusting the Gas Pressure (G Models)

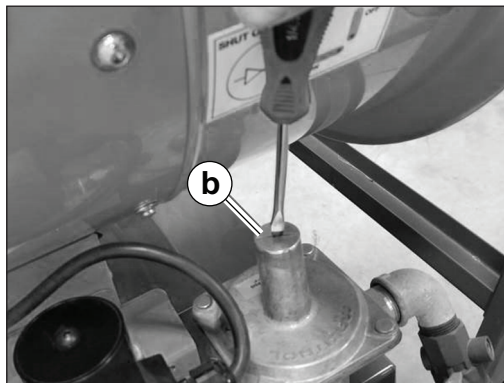
- Prerequisites**
- Machine is stopped
 - Hex key set
 - Yellow Jacket® gas pressure test kit (0–15 in. w.c. manometer)
 - Flat-head screwdriver
 - Phillips-head screwdriver
 - Small adjustable wrench

- Procedure**
1. Verify that the machine is shut down, stopped, and connected to electrical power (115V 60 Hz).
 2. Close the gas valve **(a)** on the inlet to the gas train.



wc_gr015323

3. Connect the manometer to the machine.
4. Verify that the supply gas pressure is 15 in. w.c. maximum. Exceeding the maximum inlet gas pressure may result in gas train component damage.
5. Remove the dust cap **(b)** on the Maxitrol® gas regulator stem.

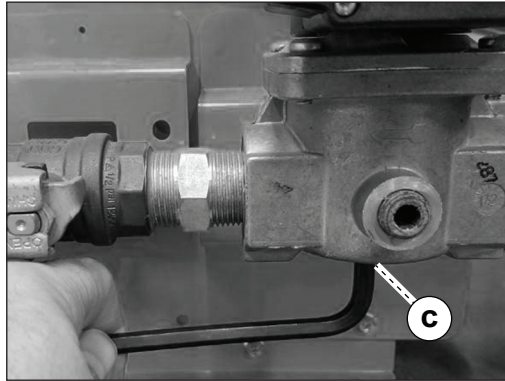


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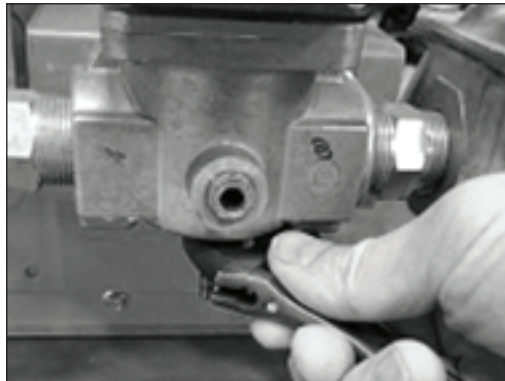
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6. Remove the pressure test port plug (**c**) located on the bottom of the gas valve.



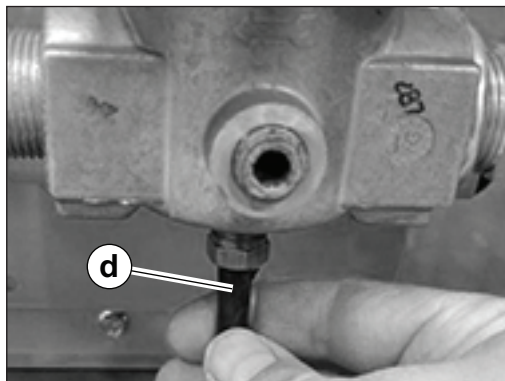
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7. Thread the manometer barbed adapter fitting into the test port plug location.



wc_gr015326

8. Connect the manometer (**d**) to the barbed adapter fitting.



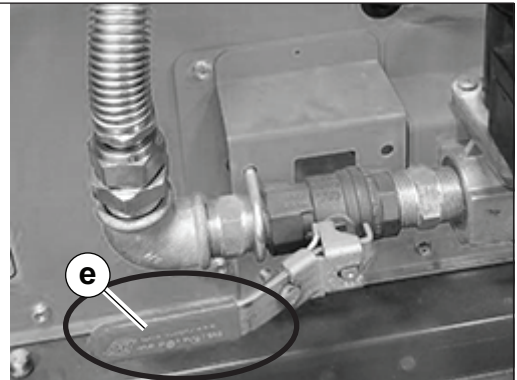
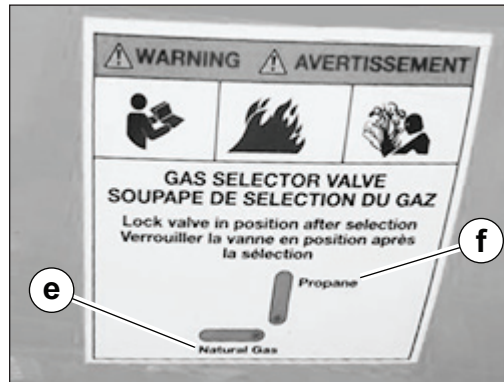
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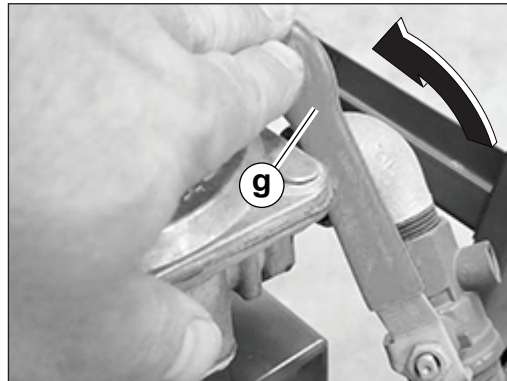
9. Position the gas selector valve for the fuel being used:

- In line for natural gas **(e)**
- 90° for liquid propane (LP) **(f)**



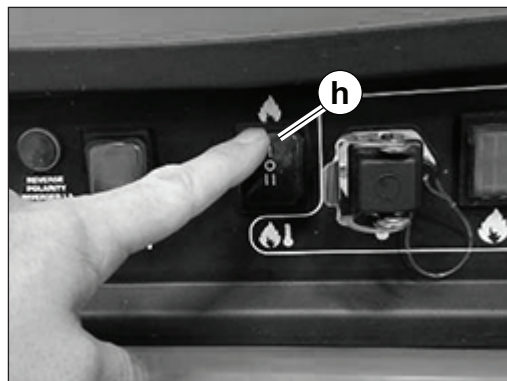
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10. Open the gas supply valve **(g)**.



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11. Start the machine **(h)**.



wc_gr015331

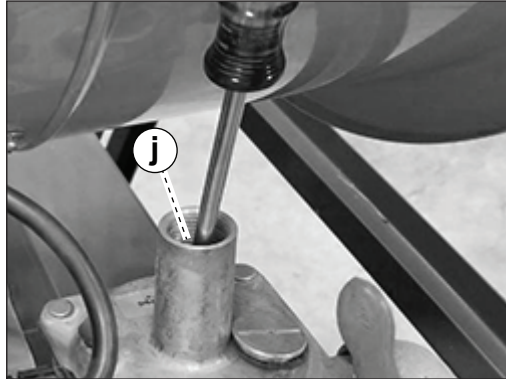
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12. When the gas valve opens, adjust the gas pressure to:

- 6.4 in. w.c. for natural gas
- 6.52 in. w.c. for liquid propane (LP)

Note: *Turning the Maxitrol regulator (j) adjusting screw clockwise increases the pressure. Turning the Maxitrol regulator adjusting screw counterclockwise reduces the pressure.*



wc_gr015330

13. Observe a few burner cycles to ensure the gas pressure is set properly.

14. After the pressure is set:

- a. Shut down the machine.
- b. Close the gas supply valve.
- c. Remove the manometer and the manometer barbed adapter fitting.
- d. Replace the gas valve pressure test plug.
- e. Replace the Maxitrol regulator stem dust plug.

6.5 Inspecting the Oil Burner Electrodes (D models)




- Requirements**
- Machine shut down
 - Power disconnected
 - Burner cool

When to inspect Inspect the electrodes on your machine every two weeks or after every 50 hours of operation. The condition of the electrodes will drastically affect your machine’s ability to fire efficiently.

Procedure Remove the burner assembly and inspect the condition of the electrode tips (**a**). Refer to the table below to determine the condition of the electrode tips.



wc_gr007619

| Condition | Task |
|---|----------------|
|  | None; ok as-is |
|  | None; ok as-is |
|  | Replace |

The electrodes should be replaced if they are worn or damaged. Contact your Wacker Neuson dealer for replacement electrodes.

6.6 Checking and Changing the Burner Nozzle (D models)

- Requirements**
- Machine shut down and cool to the touch
 - 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.

When Replace the burner nozzle annually, or if it is damaged.

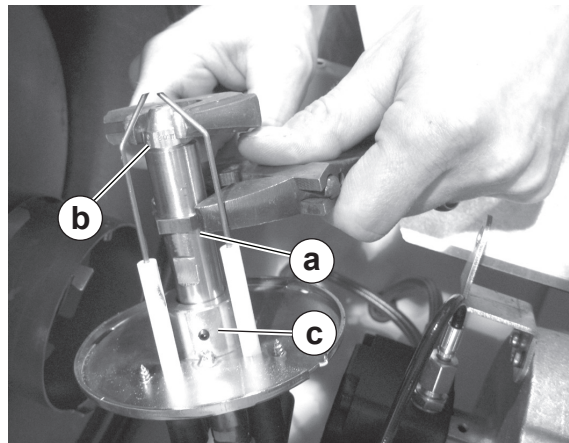
Removing the nozzle

Perform the procedure below to replace the burner nozzle.

1. Remove the burner. See topic *Removing and Installing the Burner*.
2. Place an adjustable wrench on the large fitting **(a)** on the nozzle base **(c)**.
3. Place another adjustable wrench on the nozzle **(b)**.
4. Rotate the nozzle counter-clockwise and remove it from the assembly.

Installing the nozzle

5. Install the new nozzle **(b)** onto the nozzle base **(c)**.
6. Tighten the nozzle **(b)** using an adjustable wrench. Rotate the wrench clockwise.
7. Re-install the burner assembly. See topic *Removing and Installing the Burner*.



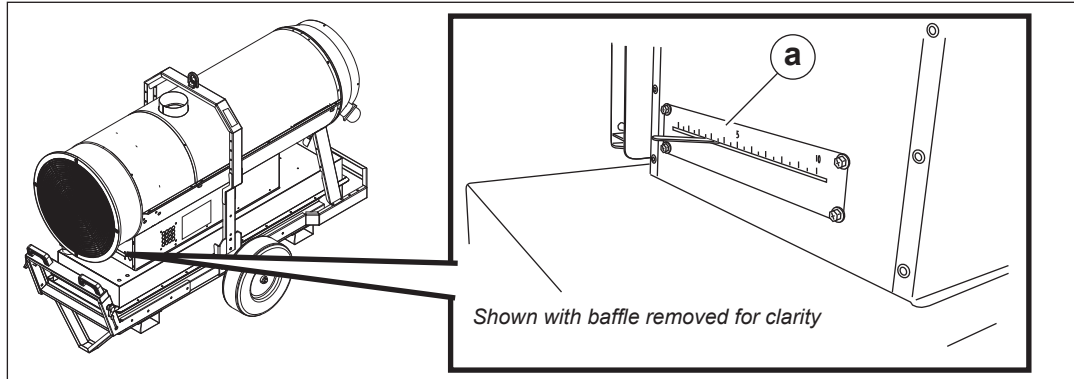
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6.7 Checking and Adjusting the Air Damper

Background The air damper setting can affect burner performance especially at high altitudes. Check and adjust the air damper when the burner performance is poor.

Procedure Perform the procedure below to check and adjust the air damper setting.

1. The air damper (a) is located beneath the fan guard.



wc_gr011997

2. To adjust the air damper, move the lever left to close (O). Move the lever right to open (10).

Result The air damper has now been adjusted.

6.8 Checking and Adjusting the Fuel Pressure

- Requirements**
- 300-psi (20 bar) fuel pressure gauge with long tube
 - G 1/8-in. threaded adapter (British Standard Pipe)

Background Incorrect fuel pressure will result in poor heater performance.

Note: *The fuel pressure differs between the low fire mode (stage I) and the high fire mode (stage II). Therefore, the fuel pressure must be checked in both low fire mode and the high fire mode.*

Procedure Perform the procedure below to check and adjust the fuel pressure.



WARNING

Electric shock hazard. High voltage exists inside the machine. High voltage can cause severe injury or death.

- ▶ Use extreme care when working inside the machine.
- ▶ Disconnect the power source before continuing this procedure.



WARNING

Cutting hazard. The blower motor may run if the power source is connected.

- ▶ Disconnect the power source before continuing this procedure.

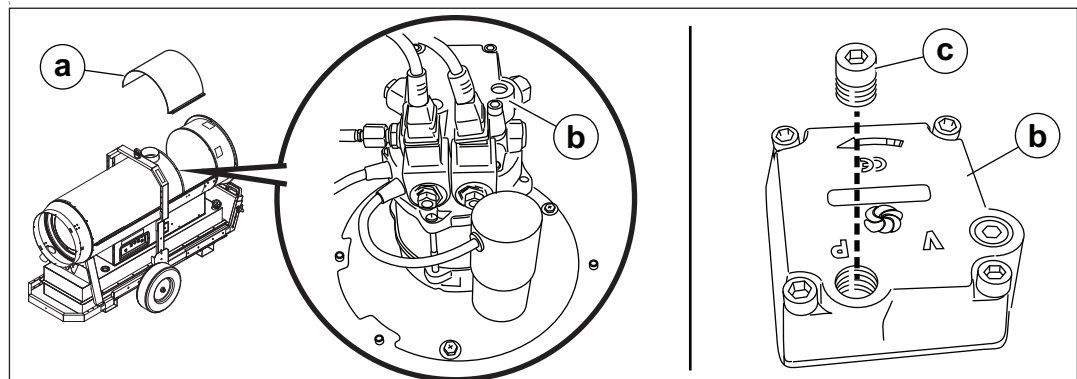


WARNING

Burn hazard. The burner is hot while operating and for a period of time after it has been shut down.

- ▶ Wear protective clothing and hand protection when performing this procedure.

1. Remove the access cover (a).



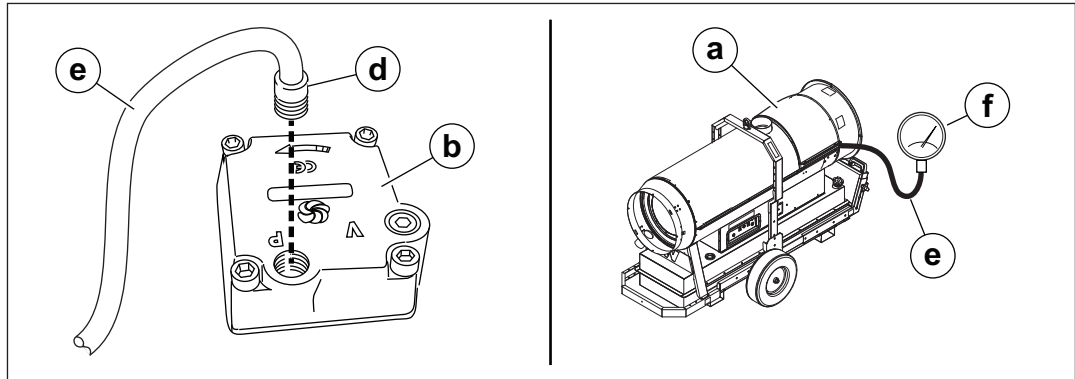
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2. Locate the fuel pump (b). Remove the threaded plug (c) from the pressure port. Set the plug in a safe location to be re-installed later.

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3. Install the G 1/8-in. adapter (d) into the pressure port. Install a tube onto the adapter. The tube (e) must be long enough to reach outside of the heater. Install a 300-psig (20 bar) pressure gauge (f) onto the tube.



wc_gr012098

4. Close the access cover (a).



WARNING

High voltage, cutting, and hot surface hazards exist inside the machine. High voltage can cause severe injury or death.

- ▶ Use extreme care when working inside the machine.
- ▶ Only start/run the machine when the pressure gauge is outside of the machine.
- ▶ Only start/run the machine when the cover is in place.

Checking fuel pressure

5. Reconnect the power source.
6. Set the low fire/high fire switch to the low fire position.
7. Set the mode switch to the ON (I) position. The burner will start. With the machine running, record the value on the gauge. This is the low fire reading.
8. Set the low fire/high fire switch to the high fire position. Wait approximately 30–40 seconds to allow the burner to switch from low fire to high fire.
9. With the machine running, record the value on the gauge. This is the high fire reading.
10. Set the mode switch to the OFF (I) position.
11. Compare your readings with the recommended pressures.

Recommended fuel pressures:

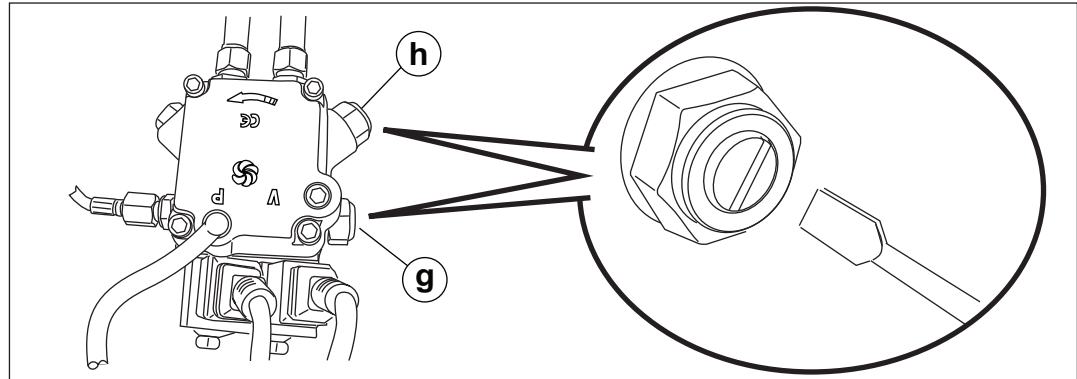
Low fire (stage I) = 181 psi (12.5 bar); High fire (stage II) = 217 psi (15 bar)

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Adjusting fuel pressure

The pump has two adjustment screws; one for low fuel pressure (**g**) and one for high fuel pressure (**h**). If the fuel pressure does not equal the recommended pressure, it will need to be adjusted.



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NOTICE: Do not adjust the fuel pressure to a setting outside the safe operational parameters.



WARNING

Cutting hazard.

► Disconnect the power source before adjusting the fuel pressure.

1. Disconnect the power source.
2. Turn the adjusting screws clockwise to increase the pressure; counterclockwise to decrease the pressure. Turn the adjusting screws in small increments.
3. Restart the machine and recheck the fuel pressures. Repeat the process until the fuel pressures are adjusted to the recommended pressures.
4. Remove the pressure gauge from the pressure test port.
5. Re-install the threaded plug into the pressure test port.
6. Re-install the access cover.

Result

The fuel pressure has now been checked and adjusted.

7 Maintenance

7.1 Periodic Maintenance Schedule

| Task | Interval* (hours of service) | | | |
|--|---|-----------------|--------------------|------------------|
| | Daily --- | 2 Weeks (50) | 6 Months (1000) | Yearly (1200) |
| Inspect the heater. | ■ | | | ■ |
| Inspect the hose assembly. | ■ | | | |
| Check fuel level and pressure. | ■ | | | |
| Clean the machine. | ■ | | | |
| Clean the fuel filter. | | ■ | | |
| Clean the fan and the interior shell. | | ■ | | |
| Clean and check/adjust burner electrode settings. | | ■ | | |
| Inspect the heat exchanger. | | | ■ | |
| Inspect electrical components. | | | ■ | |
| Inspect the blower motor and belts. Replace the belt if necessary. | | | ■ | |
| Replace the burner nozzle. | | | | ■ |
| Replace the fuel heater filter. | | | | ■ |
| Maintain the heater weldment. | | | | ■ |
| Inspect and test the burner. | As needed or upon changing job sites; see chapter <i>Burner Setup</i> . | | | |
| Inspect burner electrodes; replace if necessary. | As needed or upon changing job sites; see chapter <i>Burner Setup</i> . | | | |
| * Use whichever comes first, calendar time or service hours. | | | | |

7.2 Inspecting the Heat Exchanger

Introduction The heat exchanger consists of the combustion chamber and an outer shell. As intake air flows over the hot combustion chamber, it collects heat. The heated intake air is then blown out of the supply ducts.

Reasons for inspection A cracked or damaged heat exchanger is hazardous! Poisonous carbon monoxide gas can escape from the heat exchanger and enter the clean air stream. Combustible gases may also ignite the surrounding insulation material, causing a fire. To ensure a safe operating condition, the heat exchanger must be inspected regularly for damage.



DANGER

Asphyxiation hazard. Gases escaping from a cracked or damaged heat exchanger contain carbon monoxide (CO). This is a poison you cannot see or smell. CO can kill you in minutes!

- ▶ Do not operate the machine if it has a cracked or damaged heat exchanger.
-

When Inspect the heat exchanger at least twice a year as part of the regularly scheduled maintenance program.

Inspect the heat exchanger more often if any of the following conditions exist:

- The machine has been transported over extremely rough roads or terrain.
- The machine/transport vehicle has been involved in an accident.
- The machine has been dropped.
- There is visible damage to the heater shell.
- The burner has been improperly adjusted and is over-firing.
- There is doubt about whether regularly scheduled maintenance has been performed.
- The safety systems have been bypassed by improper or modified wiring.

NOTICE: If the machine wiring has been altered, correct the wiring before operating the machine.

- Requirements**
- Power disconnected from the machine.
 - Machine cool. **Do not inspect a hot heat exchanger.**
 - Assistant to aid in the inspection
 - Lifting equipment
 - Shop light or flash light
 - Inspection mirror
-

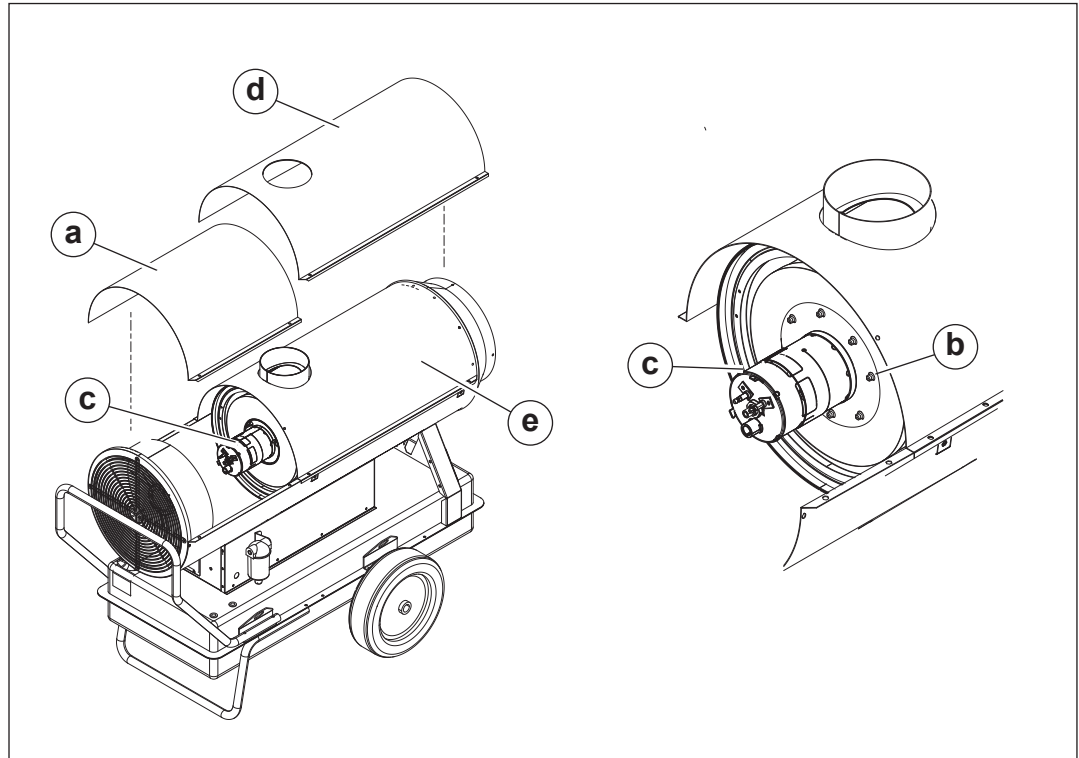
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Access procedure

Perform the procedure below to access the heat exchanger.

1. Remove the access cover (a).



wc_gr008462

2. Remove the cover (d). (See topic *Cleaning the Interior Shell*.)
3. Remove the screws (b) securing the burner tube assembly (c), and remove the burner tube assembly from the heat exchanger.
4. Remove the bolts that secure the heat exchanger (e) to the lower shell.
5. Lift the heat exchanger out for visual inspection by either of the following methods:
 - Use a hoist with non-marring straps and approved rigging devices
 - Use a team of four people to lift the heat exchanger by hand, using safe lifting practices and techniques.

The heat exchanger can now be inspected.

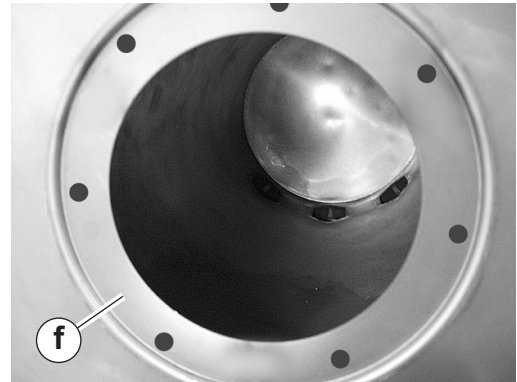
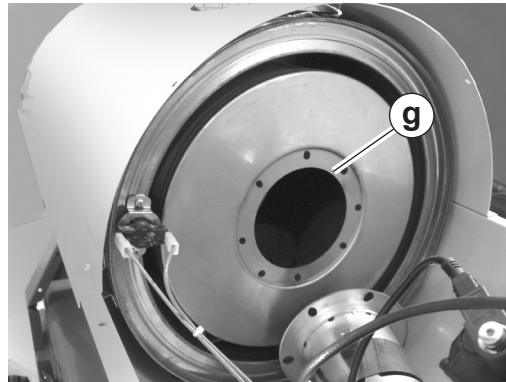
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Inspection procedure

Perform the procedure below to inspect the heat exchanger.

1. Using a strong light and inspection mirror, inspect the outer shell of the combustion chamber for cracks or separations.
2. Inspect welded areas.
3. Use the light and mirror to examine the interior of the combustion chamber for cracks or separations. Also, inspect the burner tube assembly mounting surface (f) for damage.



wc_gr008463

4. Have an assistant shine the light over the exterior shell of the combustion chamber while you peer through the burner mounting hole (g). Look for signs of light inside the combustion chamber.

Results

Do not use the machine if any of the following conditions exist. Contact Wacker Neuson Product Support for assistance.

- Cracks or separations are discovered in the heat exchanger
- Soot is visible on the exterior (air side) of the heat exchanger
- There are cracks or damage to the burner tube assembly mounting surface.

Note: *Light surface rust is normal.*

Reassembly

Perform the procedure below to reassemble the machine after inspecting the heat exchanger.

1. Re-install the heat exchanger.
2. Re-install the cover.
3. Re-install the burner tube assembly.
4. Re-install the access cover.

The machine has now been reassembled.

7.3 Changing the Fuel Heater Filter (D models)

- Prerequisites**
- Machine shut down
 - Burner cool



CAUTION

Hot surface hazard. The external surface of the fuel filter canister may be hot.

- ▶ Allow the machine to cool before servicing.



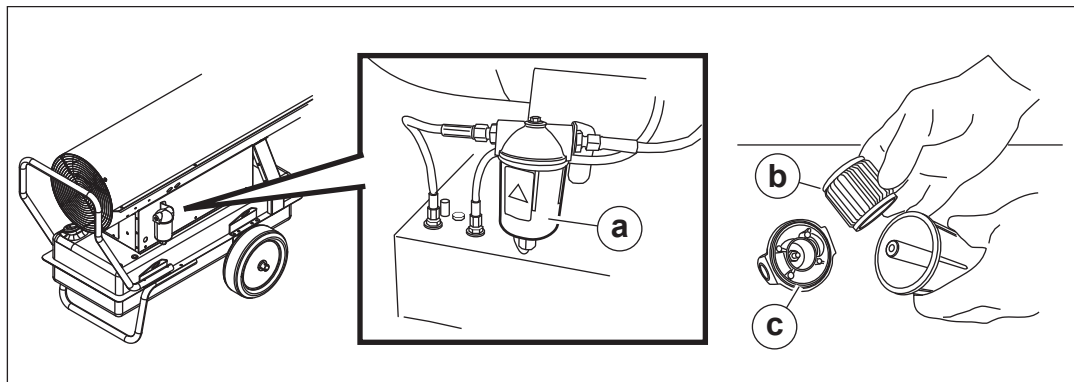
WARNING

Hot fluids. The fuel inside the fuel filter canister may be hot.

- ▶ Wear hand and eye protection when doing this procedure.

Procedure Perform the procedure below to change the fuel heater filter.

1. Shut down the machine and allow it to cool.
2. Remove the screw that secures the cover to the housing **(a)**.



wc_gr007774

3. Remove the filter **(b)**.
4. Inspect the O-ring **(c)**. Replace it if it is cracked, damaged, or deformed.
5. Install the new filter.
6. Re-install the cover.

Result The procedure to replace the fuel heater filter is now complete.

7.4 Inspecting and Cleaning the Cadmium (CAD) Cell

- Requirements**
- Machine shut down and cool to the touch
 - Machine properly positioned



CAUTION

Hot surface hazard. The machine surfaces may be hot.

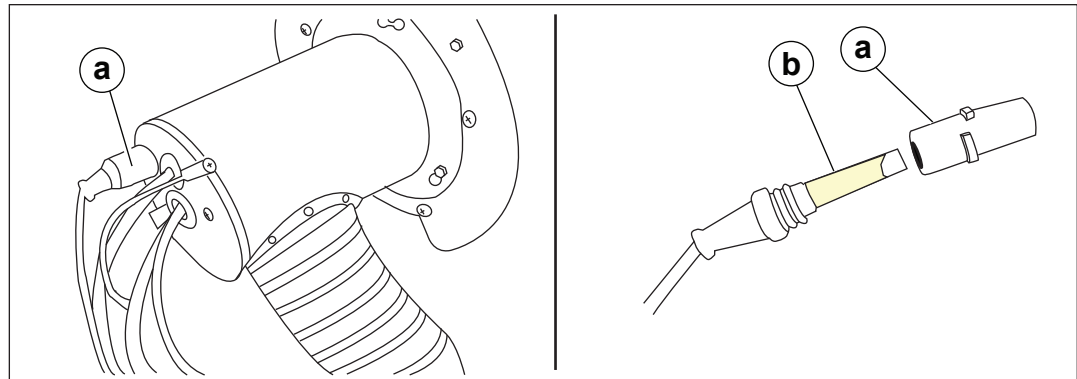
- ▶ Allow the machine to cool for a minimum of ten minutes before touching it.

When

Inspect and clean the CAD cell as needed, or while performing other scheduled maintenance procedures.

Perform the procedure below to inspect and clean the CAD cell.

1. Remove the access cover.
2. Twist and pull out the plastic protective holder **(1)** off the base of the burner assembly. The CAD cell **(2)** is inside this plastic holder.



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3. Inspect the CAD cell for cleanliness. Be sure the cell is free of debris or soot.
4. Clean the CAD cell if necessary.

NOTICE: Do NOT use solvents or liquids to clean the CAD cell. Use a soft dry cloth to clean the CAD cell.

5. Re-install the plastic protective holder onto the base of the burner assembly.

7.5 Cleaning the Fan Blades and Motor

- Prerequisites**
- Machine shut down and cool to the touch
 - Power source disconnected



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 performing this procedure.



CAUTION

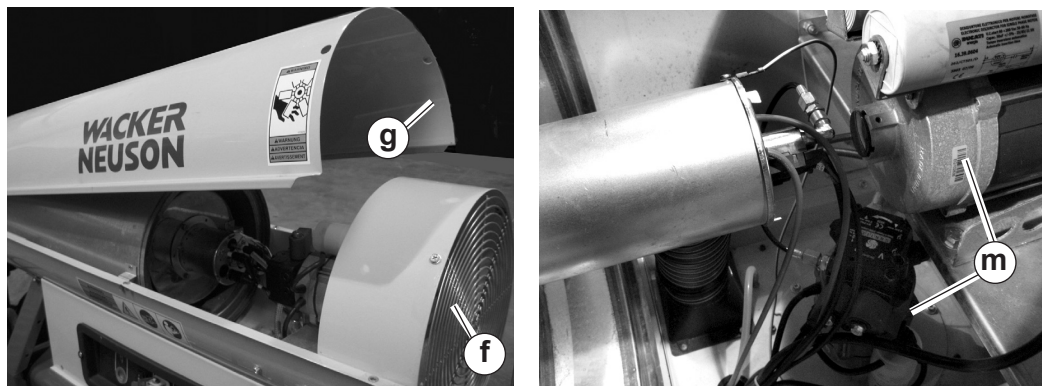
Hot surface hazard. The machine surfaces may be hot.

- ▶ Allow the machine to cool for a minimum of ten minutes before touching it.

When Clean the fan blades and motors prior to the first seasonal use, every 1200 hours or annually, or as needed.

Procedure Perform the procedure below to clean the fan blades and motors.

1. Remove the fan guard (**f**). There are four screws that secure the fan guard.



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2. Remove the access panel (**g**). See topic *Removing the Access Panel*.
3. Inspect and, if necessary, clean the motors (**m**) using compressed air.
4. Clean the fan blades using a stiff brush.
5. Re-install the internal access panel.
6. Re-install the fan guard.

7.6 Cleaning the Interior Shell

- Prerequisites**
- Machine shut down and cool to the touch
 - Power source disconnected



CAUTION

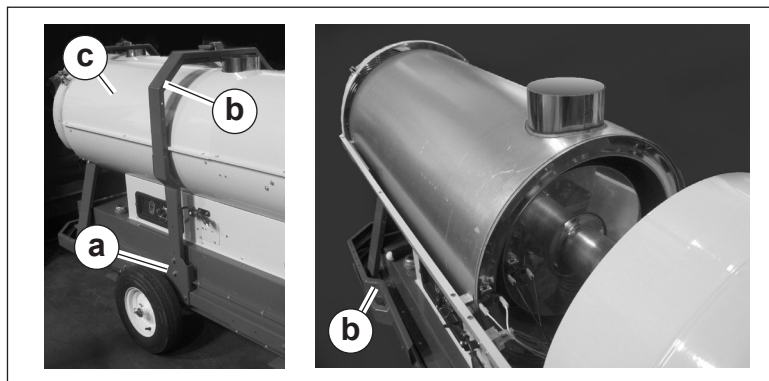
Hot surface hazard. The machine surfaces may be hot.

- ▶ Allow the machine to cool for a minimum of ten minutes before touching it.

When Clean the interior shell prior to the first seasonal use, every 1200 hours or annually, or as needed.

Procedure Perform the procedure below to clean the interior shell.

1. Remove the fan guard. See topic *Cleaning the Fan Blades and Motor*.
2. Remove the access panel. See topic *Removing the Access Panel*.
3. Unscrew and remove the four lift bracket screws (**a**). Carefully raise and maneuver the lift bracket (**b**) away from the machine shell cover (**c**), resting it on the rear frame as shown.



wc_gr007776

4. Remove the six mounting screws and lift the machine shell cover off the machine.
5. Inspect and clean the interior shell using compressed air.
6. Re-install the machine shell cover.
7. Re-install the lift bracket.
8. Re-install the access cover.
9. Re-install the fan guard.

7.7

7.8 Inspecting the Flame Head

- Prerequisites**
- Machine shut down and cool to the touch
 - Machine properly positioned



CAUTION

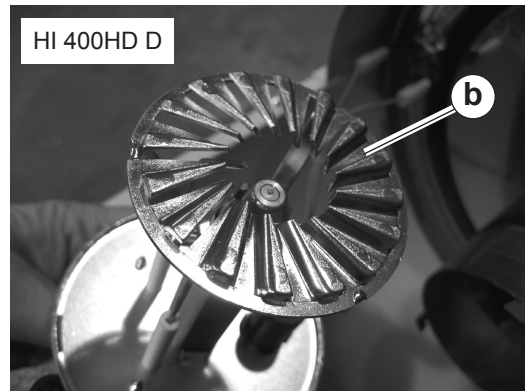
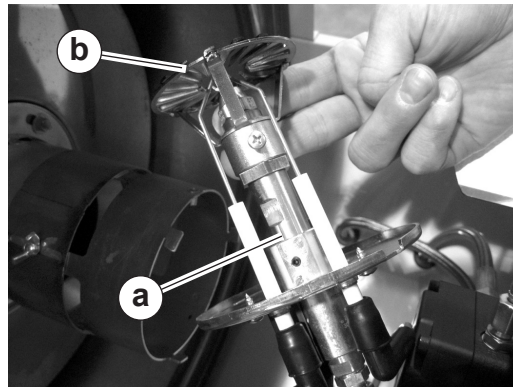
Hot surface hazard. The machine surfaces may be hot.

- ▶ Allow the machine to cool for a minimum of ten minutes before touching it.

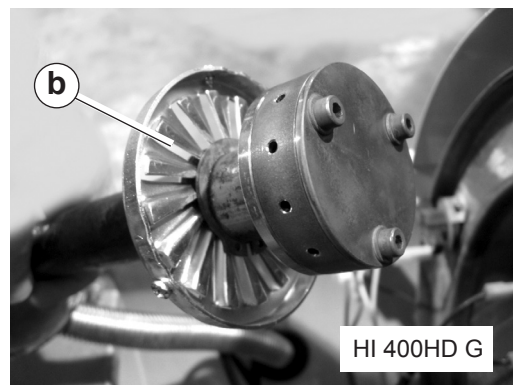
When Inspect the flame head prior to the first seasonal use, during regular maintenance, and as needed.

Procedure Perform the procedure below to inspect the flame head **(b)**.

1. Remove the access panel. See topic *Removing the Access Panel*.
2. Remove the burner assembly **(a)**. See topic *Removing and Installing the Burner Assembly*.



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3. The flame head is attached to the burner assembly. Inspect the flame head for the following:
 - Wear. Replace if necessary.
 - Cleanliness. Clean the flame head if necessary.
 - Thermal stress. Replace if necessary.
4. Re-install the burner assembly. See topic *Removing and Installing the Burner Assembly*.

7.9 Inspecting the Electrical Connections

After disconnecting the power cord, check all electrical connections for the following:

- Proper connections. Be sure that all connections are complete and tight.
- Corrosion. Clean or replace if necessary.
- Damaged wires/connectors. Replace if necessary.
- Proper ground.

7.10 Cleaning the Machine

- Requirements**
- Machine shut down
 - Machine cool

General cleaning

Clean the following areas to ensure proper operation.

| Item | Method/task |
|----------------------------------|--|
| Burner | Remove all dirt and debris. Ensure that the air intake area is unobstructed. |
| Hoses, connectors, and couplings | Wipe clean with cloth. |
| Trailer (if equipped) | Clean with compressed air: 50 psi maximum. |
| Covers/machine exterior | Wipe clean with cloth. |
| Air inlets/ouputs | Remove all dirt and debris. Ensure that the air intake area is unobstructed. |

7.11

8 Basic Troubleshooting

8.1 Basic Troubleshooting

| Problem | Cause | Remedy |
|--|--|---|
| The burner does not start | <ul style="list-style-type: none"> ■ The remote thermostat or thermostat plug is not inserted correctly. ■ Faulty cable or power supply ■ The over temperature limit has tripped ■ The burner is in lock-out mode. | <ul style="list-style-type: none"> ■ Insert the remote thermostat or thermostat plug. ■ Check cable and power supply ■ Press the reset button. |
| The burner starts, the flame does not ignite, the unit locks out | <ul style="list-style-type: none"> ■ No fuel ■ Worn burner nozzle ■ Faulty electrodes ■ Cad cell detecting external light. ■ Cad cell defective ■ Burner control defective | <ul style="list-style-type: none"> ■ Fill fuel tank ■ Replace burner nozzle ■ Replace electrodes ■ Check the Cad cell enclosure |
| The burner starts, flame ignites, but the unit locks out | <ul style="list-style-type: none"> ■ Incorrect fuel pressure ■ Worn burner nozzle ■ Incorrect air lock setting ■ Cad cell defective ■ Burner control defective | <ul style="list-style-type: none"> ■ Increase fuel pressure ■ Replace burner nozzle ■ Re-adjust air lock setting |
| The burner ignites but the performance is poor | <ul style="list-style-type: none"> ■ Worn burner nozzle ■ Clogged fuel filter ■ Air leaks in the fuel lines ■ Insufficient oil pressure | <ul style="list-style-type: none"> ■ Replace burner nozzle ■ Replace the fuel filter ■ Inspect the lines for leaks; replace if necessary |
| Black smoke from vent pipe | <ul style="list-style-type: none"> ■ Insufficient combustion air ■ Insufficient ventilation air | Remove any obstructions from the air inlet and outlet areas. |
| The machine stops due to pressure switch fault | <ul style="list-style-type: none"> ■ Overheat condition ■ Faulty pressure switch ■ Incorrect nozzle ■ Wrong fuel pressure | Contact Wacker Neuson Product Support |

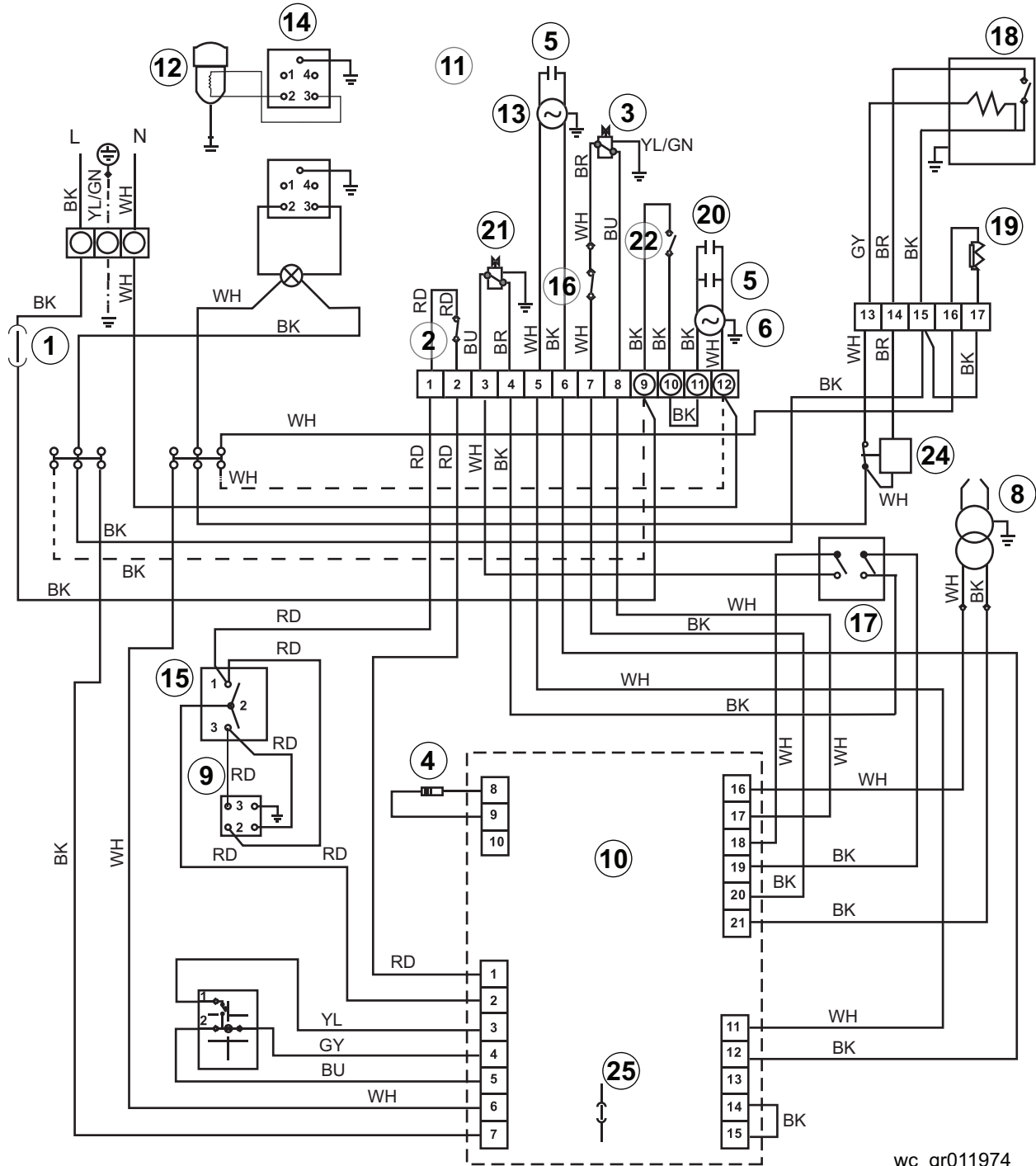
9 Technical Data
9.1 Machine

| Model | | HI400HD D | HI400HD G |
|---|--|---|--|
| Units | | | |
| Gross burner heat input | BTU/hr (kW) | 412,682 (120.8) | NG: 380,548 (111.4) LP: 334,700 (98) |
| Net heat output | BTU/hr (kW) | 341,288 (99.9) | NG: 329,174 (96.4) LP: 289,515 (84.8) |
| Air flow | cfm | 3015 | 3015 |
| Fuel consumption | L/hr (gph) | 11.2 (2.97) | — |
| Fuel consumption —Natural gas (NG) —Liquid propane (LP) | m ³ /hr (cfh) L/hr (gph) | — | 10.1 (355.97) 13.8 (3.65) |
| Fuel nozzle size | L/hr (gph) | 7.6 (2.0) (80W) | — |
| Fuel nozzle size | mm (in.) | — | 3 x 2.8 (12 x 0.11) |
| Efficiency | % | 82.7 | 82.8 |
| Noise level at 1 m | dB (A) | 76 | 74 |
| Power requirement | VAC/Hz | 120/60 | 120/60 |
| Electrical current (@15°C) | Ampere | 13 | 11.8 |
| Weight (no fuel) | kg (lb) | 206.8 (456) | 225.4 (497) |
| Height | mm (in.) | 1308 (51.5) | 1105 (43.5) |
| Length | mm (in.) | 2134 (84) | 2134 (84) |
| Width | mm (in.) | 838 (33) | 838 (33) |
| Flue diameter | mm (in.) | 152.4 (6) | 152.4 (6) |
| Fuel tank capacity | L (gal) | 216.1 (57.1) | — |
| Fuel pressure | psi (bar) | Stage I: 181 (12.5) Stage II: 217 (15) | — |
| Fuel supply pressure —Natural gas —Liquid propane (LP) | WC (Pa) | — | Min 7, Max 10 Min 8, Max 13 |
| Burner pressure —Natural gas —Liquid propane (LP) | WC (Pa) | — | 6.40 (1600) 6.52 (1630) |
| Air damper setting | number | 1.5 | 3 |
| Static air pressure limit | WC (Pa) | 0.60 (150) | |

Notes

10 Schematics

10.1 HI400HD D



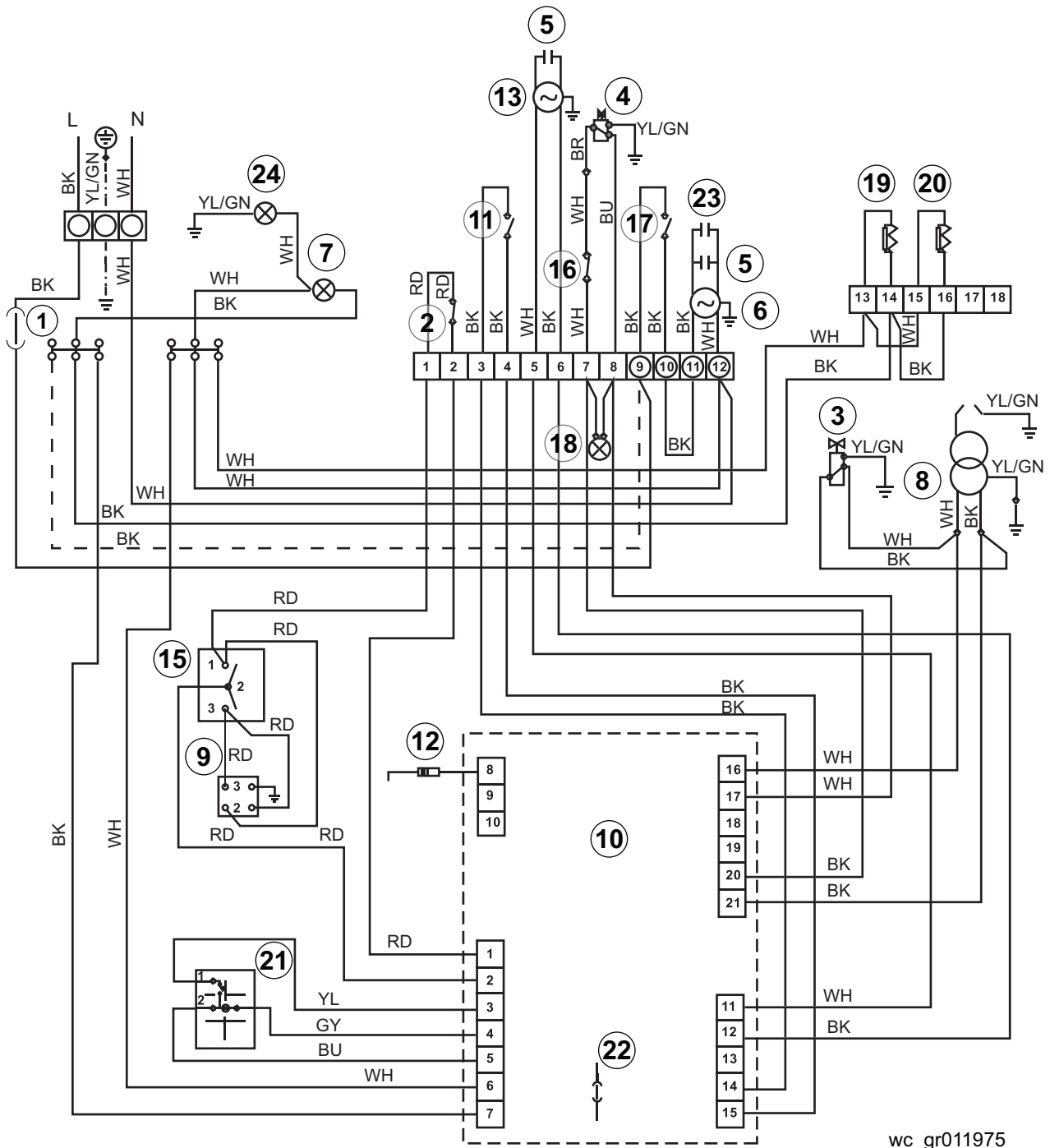
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10.2 Components

| No. | Description | No. | Description |
|-----|----------------------|-----|---------------------------------|
| 1 | Line fuse | 14 | Pre-heated filter plug |
| 2 | Overheat thermostat | 15 | Summer/winter switch |
| 3 | Solenoid valve | 16 | Overheat safety thermostat |
| 4 | CAD cell | 17 | Low fire/high fire power switch |
| 5 | Capacitor | 18 | Preheated nozzle |
| 6 | Fan motor | 19 | Control board heater |
| 7 | Electric pilot lamp | 20 | Starter capacitor |
| 8 | Transformer H.V. | 21 | Solenoid valve |
| 9 | Room thermostat plug | 22 | Fan thermostat |
| 10 | Control box | 23 | Pressure switch heater |
| 11 | Air pressure switch | 24 | Heater nozzle relay |
| 12 | Heated fuel filter | 25 | Controller fuse |
| 13 | Burner motor | — | — |

| Wire Colors | | | | | | | |
|-------------|-------|-----|--------|----|--------|----|----------|
| BK | Black | RD | Red | YL | Yellow | OR | Orange |
| GN | Green | TN | Tan | BR | Brown | PU | Purple |
| BU | Blue | VIO | Violet | CL | Clear | SH | Shield |
| PK | Pink | WH | White | GY | Gray | LB | Lt. blue |

10.3 HI400HD G (2014)



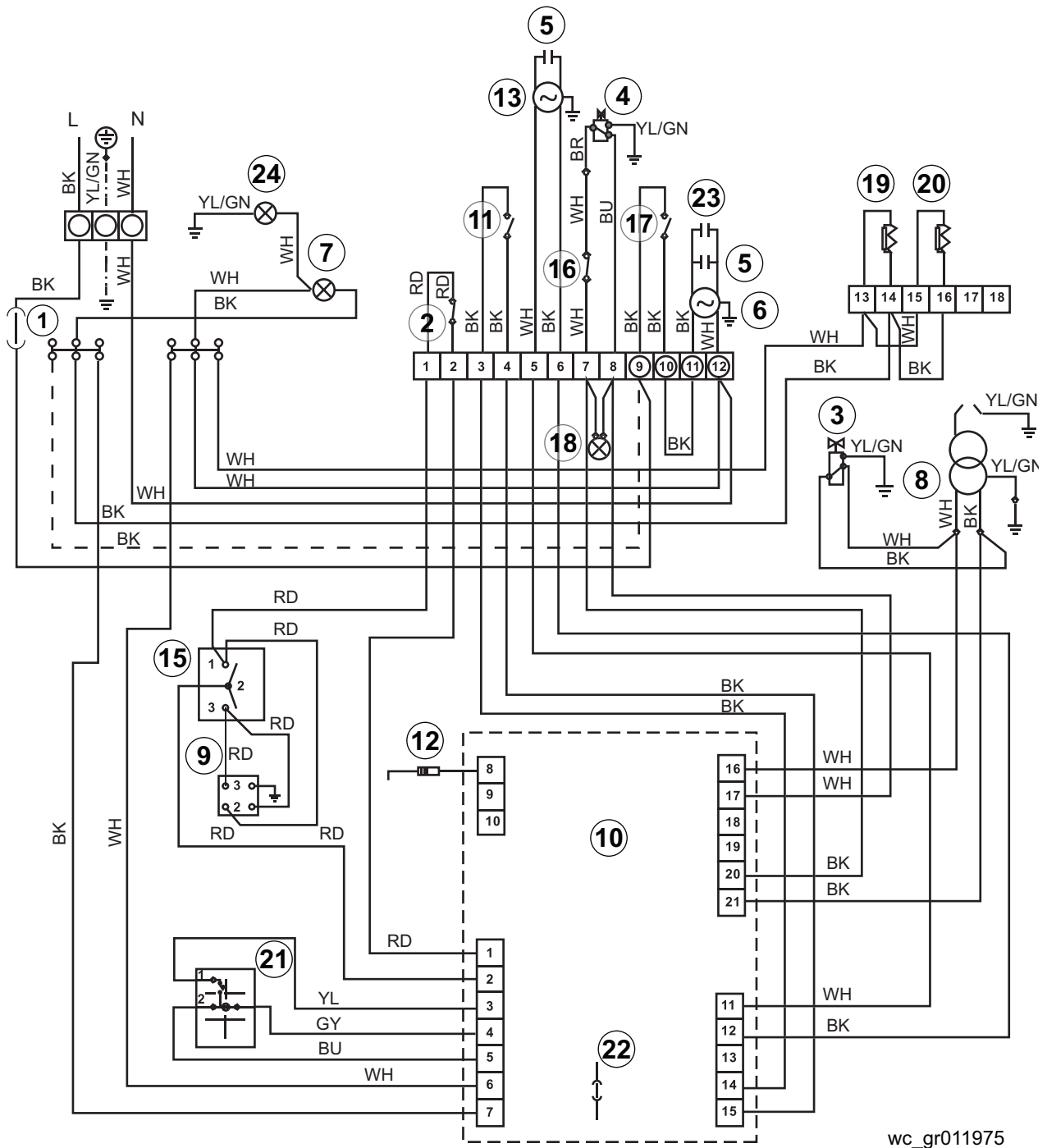
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10.4 Components (2014)

| No. | Description | No. | Description |
|-----|----------------------|-----|----------------------------|
| 1 | Line fuse | 13 | Burner motor |
| 2 | Burner thermostat | 15 | Summer/winter switch |
| 3 | Solenoid valve | 16 | Overheat safety thermostat |
| 4 | Gas train | 17 | Fan thermostat |
| 5 | Capacitor | 18 | Flame lamp |
| 6 | Fan motor | 19 | Control board heater |
| 7 | Electric pilot lamp | 20 | Pressure switch heater |
| 8 | Transformer H.V. | 21 | Gas valve heater |
| 9 | Room thermostat plug | 22 | Controller fuse |
| 10 | Control box | 23 | Starter capacitor |
| 11 | Air pressure switch | 24 | Polarity indicator |
| 12 | Ionization probe | — | — |

| Wire Colors | | | | | | | |
|-------------|-------|-----|--------|----|--------|----|----------|
| BK | Black | RD | Red | YL | Yellow | OR | Orange |
| GN | Green | TN | Tan | BR | Brown | PU | Purple |
| BU | Blue | VIO | Violet | CL | Clear | SH | Shield |
| PK | Pink | WH | White | GY | Gray | LB | Lt. blue |

10.5 HI400HD G (2015)



wc_gr011975

10.6 Components (2015)

| No. | Description | No. | Description |
|-----|----------------------|-----|----------------------------|
| 1 | Line fuse | 13 | Burner motor |
| 2 | Burner thermostat | — | — |
| 3 | Solenoid valve | 15 | Mode switch, ON/Thermostat |
| 4 | Gas train | 16 | Overheat safety thermostat |
| 5 | Capacitor | 17 | Fan thermostat |
| 6 | Fan motor | 18 | Flame lamp |
| 7 | Electric pilot lamp | — | — |
| 8 | Transformer H.V. | — | — |
| 9 | Room thermostat plug | — | — |
| 10 | Control box | 22 | Controller fuse |
| 11 | Air pressure switch | — | — |
| 12 | Ionization probe | 24 | Polarity indicator |

| Wire Colors | | | | | | | |
|-------------|-------|-----|--------|----|--------|----|----------|
| BK | Black | RD | Red | YL | Yellow | OR | Orange |
| GN | Green | TN | Tan | BR | Brown | PU | Purple |
| BU | Blue | VIO | Violet | CL | Clear | SH | Shield |
| PK | Pink | WH | White | GY | Gray | LB | Lt. blue |

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Wacker Neuson Produktion GmbH & Co. KG, Preußenstraße 41, D-80809 München,

Tel.: +49-(0)89-3 54 02-0 Fax: +49 - (0)89-3 54 02-390

Wacker Neuson Production Americas LLC, N92W15000 Anthony Ave., Menomonee Falls, WI. 53051

Tel.: (262) 255-0500 Fax: (262) 255-0550 Tel.: (800) 770-0957

Wacker Neuson Limited - Room 1701-03 & 1717-20, 17/F, Tower 1, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hongkong. Tel: (852) 3605 5360, Fax: (852) 2758 0032

