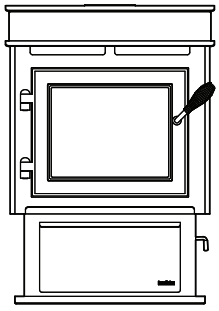
Owner's Manual

Installation and Operation

Model:

ECO-NZ-PS35
Pellet Burning Stove



ECO-NZ-PS35

CAUTION

DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.

WARNING

If the information in these instructions is not followed exactly, a fire may result causing property damage, personal injury, or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not over fire - If heater or chimney connector glows, you are over firing. Over firing will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

WARNING

HOT SURFACES!

Glass and other surfaces are hot during operation AND cool down.

Hot glass will cause burns.

- Do not touch glass until it is cooled
- NEVER allow children to touch glass
- CAREFULLY SUPERVISE children in same room as fireplace & keep them away from the glass.
- Alert children and adults to hazards of high temperatures.

High temperatures may ignite clothing or other flammable materials.

- Keep clothing, furniture, draperies and other flammable materials away.

WARNING

Fire Risk.

Tested and approved for wood pellets. Burning of any other type of fuel will void your warranty.

CAUTION

Check building codes prior to installation.

- Installation MUST comply with local, regional, state and national codes and regulations.
- Consult local building, fire officials or authorities having jurisdiction about restrictions, installation inspection, and permits.

Read this manual before installing or operating this appliance.
Please retain this owner's manual for future reference.

Congratulations!

Congratulations on selecting a Heatilator pellet burning appliance. The pellet burning appliance you have selected is designed to provide the utmost in safety, reliability and efficiency.

As the owner of a new pellet burning appliance, you'll want to read and carefully follow all of the instructions contained in this owner's manual. Pay special attention to all cautions and warnings.

This owner's manual should be retained for future reference. We suggest you keep it with your other important documents and product manuals.

Your new pellet burning appliance will give you years of durable use and trouble-free enjoyment. Welcome to the Heatilator family of pellet burning products!

IMPORTANT

This stove must be installed and commissioned by a trained installer approved by Switch. As well as the instructions in this manual, it is also necessary to take into consideration all applicable laws and standards as well as national, regional, and local regulations relating to the appliance installation. It is the responsibility of the Installer to commission the fire in accordance with manufacturer's instructions and provide a declaration of conformity for the installation of the appliance if required. Please read this User's Guide and Installation Manual before installing the stove.

⚠ WARNING

This appliance and flue system shall be installed in accordance with AZ/NZS 2918 and the appropriate requirements of the New Zealand building code.

Appliances installed in accordance with this standard shall comply with the requirements of AS/NZS 4886 where required by the regulatory authority ie the appliance shall be identifiable by a compliance plate with the marking "tested to AS/NZS 4886".

Any modification of the appliance that has not been approved in writing by the test authority is considered to be in breach of the approval granted for compliance with AS/NZS.

heatilator ECOCHOICE™

HEATILATOR ECO-CHOICE PS35 Freestanding Wood Pellet Burning Heater

Manufactured By:
HEARTH & HOME technologies
1445 North Highway - Colville, WA 99114 - USA

BURN ONLY UNTREATED WOOD PELLETS WITH A MOISTURE CONTENT OF LESS THAN 9% (dry basis).
Ecan approved fuel: 6mm diameter complying with standard AS/NZS 4014.6.
Performance may very from test values depending on actual operating conditions.

SERIAL NUMBER
007035 room for .14 x .875" S/N

1.5" x .375 Barcode Label

2011 2012 2013 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Tested in accordance with AS/NZS 4886:2007 & AS/NZS 5078:2007	
Test Report ARS:	11/2400
Ecan Authorisation Number:	
Expiration Date:	
Maximum Average heat output:	High: 7.0 kW Med: 5.2 kW Low: 2.7 kW
Overall Average efficiency:	71%
Average particulate emission factor:	0.4 g/kg (25 mg/MJ)
Installation Date:	

7072-110

Safety Alert Key:

- ***DANGER!*** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- ***WARNING!*** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- ***CAUTION!*** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- ***NOTICE:*** Indicates practices which may cause damage to the fireplace or to property.

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Hearth & Home Technologies Inc.

HEATILATOR ECO-CHOICE PS35 WARRANTY

Switch and its partner Hearth & Home Technologies Inc.(HHT), extends the following warranty for ECO-CHOICE wood pellet heating appliances that are purchased from an authorised Switch dealer.

Warranty Coverage

Switch warrants to the original owner of the appliance at the site of installation, and to any transferree taking ownership of the appliance at the site of installation within the two years following the date of original purchase, that the appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered, components manufactured by HHT are found to be defective in materials or workmanship during the applicable warranty period, Switch will, at its option, repair or replace the covered components. Switch, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

- This warranty only covers appliances that are purchased through an authorised Switch dealer or distributor. A list of authorised dealers is available on the Switch website (www.switchenergy.co.nz).
- This warranty is only valid while the appliance remains at the site of original installation.
- Contact your installing dealer for warranty service. If the installing dealer is unable to provide necessary parts, contact the nearest authorised Switch dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.
- Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.

Warranty Period

Warranty coverage begins at the date of installation. In the case of new home construction, warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the product by an independent, authorised Switch dealer/distributor, whichever occurs earlier. The warranty period for parts and labour for covered components is produced in the following table.

Warranty Period		Components Covered
Parts	Labour	
1 Year		All parts and material except as covered by Conditions, exclusions and Limitations listed.
3 Years		Firepots and Burnpots
3 Years	1 Year	Castings
5 Years	3 Years	Firebox and heat exchanger
90 Days		All replacement parts beyond warranty period

See conditions, exclusions and limitations on next page

Warranty Exclusions

This warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in colour of interior and exterior surfaces may occur. This is not a flaw and is not covered under warranty.
- Damage to printed, plated, or enamelled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the warranty period. These parts include: paint, gaskets, firebricks, grates, flame guides, and the discolouration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to noise are not covered by this warranty.
- Damages resulting from: (1) failure to install, operate or maintain the appliance in accordance with the installation instructions, operating instructions and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs; (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operating instructions; (7) installation or use of components not supplied with the appliance or any appliance not expressly authorised and approved by Switch/HHT; (8) modification of the interruptions or fluctuations of electrical power supply to the appliance.
- Non Switch approved venting components, hearth components or other accessories used in conjunction with the appliance.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas appliance is installed.
- Switch/HHT's obligation under this warranty does not extend to the appliances' capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

The warranty is void if:

- The appliance has been over-fired or operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over firing can be identified by, but not limited to, warped plates or tubes, rust coloured cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The appliance is subjected to prolonged periods of dampness or condensation.
- There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

The owner's exclusive remedy and Switch/HHT's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will Switch/HHT be liable for any incidental or consequential damages caused by defects in the appliance. Some countries do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from country to country. EXCEPT TO THE EXTENT PROVIDED BY LAW, SWITCH/HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

1 Specifications

A. Glass Specifications

This appliance is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

B. kW & Efficiency Specifications

kW input will vary, depending on the brand of fuel you use in your stove. Consult your dealer for best results.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

WARNING! Risk of Fire! Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the below actions.

DO NOT:

- *Install or operate damaged appliance*
- *Modify appliance*
- *Install other than as instructed by Hearth & Home Technologies*
- *Operate the appliance without fully assembling all components*
- *Over fire*
- *Install any component not approved by Hearth & Home Technologies*
- *Install parts or components not Listed or approved*
- *Disable safety switches*

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

C. Specification Table

Classification	Testing Standard	Description
Class 1 IP-20	Efficiency AS/NZS 5078:2007 Appliance AS/NZS 4886:2007	Residential Wood Pellet Heater
Voltage 220-240 volts	Current 0.7-2.0 Amps	Frequency 50Hz
Max Power Requirement 450 Watts	Weight 120kg with full hopper	Hopper capacity 20kg
High	**Medium**	**Low**
Mean flue gas temp 189°C	Mean flue gas temp 166°C	Mean flue gas temp 110°C
Fuel consumption 1.9kg/hour	Fuel consumption 1.4kg/hour	Fuel consumption 0.7kg/hour
Heating power output - 7kW	Heating power output - 5.2kW	Heating power output - 2.7kW
Average particulate emissions (dry weight) 0.4g/kg	Average emission rate 25mg/MJ	Average efficiency 71%
Gross Calorific value of pellets (dry weight) 20.1MJ/kg	Fuel type Wood pellets -6mm Ø - complying with draft standard AS/NZS4014.6:2008	

2 Operating Instructions

⚠ WARNING

HOT SURFACES!

Glass and other surfaces are hot during operation AND cool down.

Hot glass will cause burns.

- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as appliance.
- Alert children and adults to hazards of high temperatures.

High temperatures may ignite clothing or other flammable materials.

- Keep clothing, furniture, draperies and other flammable materials away.

NOTICE: *If you expect that children may come into contact with this appliance, we recommend a barrier such as a decorative screen. See your dealer for suggestions.*

A. Your Pellet Appliance - General Operating Parts

WARNING! DO NOT *operate appliance before reading and understanding operating instructions. Failure to operate appliance according to operating instructions could cause fire or injury.*

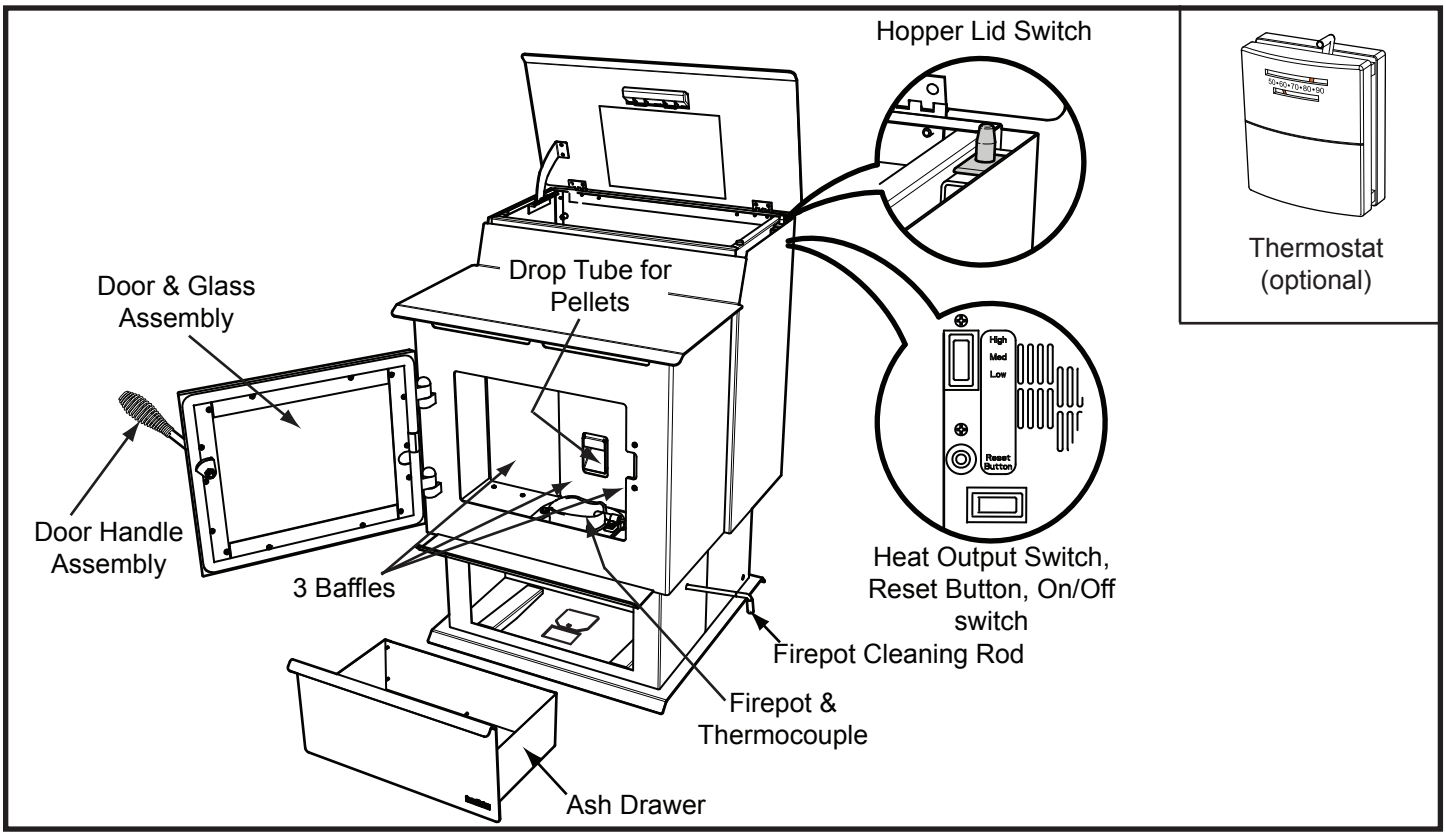


Figure 1 General Operating Parts

The illustration is intended to show an overview of the operating parts for your stove. The appearance of your appliance may vary slightly. For specific part numbers and locations for your model, see the exploded view drawings in the back of the manual.

B. Fire Safety

To provide reasonable fire safety, the following should be given serious consideration:

- Install at least one smoke detector on each floor of your home.
- Locate smoke detector away from the heating appliance and close to the sleeping areas.
- Follow the smoke detector manufacturer's placement and installation instructions and maintain regularly.
- Conveniently locate a Class A fire extinguisher to contend with small fires.

In the event of a hopper fire:

- Evacuate the house immediately.
- Notify fire department.

C. Combustible/Non-Combustible Materials

Combustible Material

Material made of or surfaced with wood, compressed paper, plant fibres, plastics, or any material capable of igniting and burning, whether flame-proofed or not, plastered or unplastered.

Non-combustible Material

Material which will not ignite and burn. Such materials are those consisting entirely of steel, iron, brick, tile, slate, glass or plasters, or any combination thereof.

Non-combustible Sealant Material

Sealants which will not ignite and burn: CRC Maniseal Exhaust Cement, High Temperature Silicon (TRV) Sealant (or equivalent).

D. Fuel Material and Fuel Storage

Pellet fuel quality can greatly fluctuate. We recommend that you buy fuel complying with the wood pellet standard AS/NZS 4014.6:2008. The use of poor quality fuel can affect the performance of your fire, require more frequent cleaning or cause damage to the fire and invalidate the warranty.

Fuel Material

- Made from sawdust or wood by-products
- Depending on the source material it may have a high or low ash content.

Higher Ash Content Material

- Hardwoods with a high mineral content
- Fuel that contains bark
- Standard grade pellets or high ash pellets

Lower Ash Content Material

- Most softwoods
- Fuels with low mineral content
- Most premium grade pellets

Clinkers

Minerals and other non-combustible materials such as sand will turn into a hard, glass-like substance called a clinker when heated in the firepot.

Trees from different areas will vary in mineral content. That is why some fuels produce more clinkers than others.

Moisture

Always burn dry fuel. Burning fuel with high moisture content takes heat from the fuel and tends to cool the appliance, robbing heat from your home. Damp pellet fuel can clog the feed system.

Size

- Pellets are either (6-8mm) in diameter
- Length should be no more that (38mm)
- Pellet lengths can vary from lot to lot from the same manufacturer

Performance

- Higher ash content requires the firepot and the ash drawer to be emptied more frequently
- Premium wood pellets produce the highest heat output
- Burning pellets longer than (38mm) can cause an inconsistent fuel feed rate and/or missed ignitions

Storage

- Wood pellets should be left in their original sealed bag until using to prevent moisture absorption
- Do not store any pellet fuel within the clearance requirements or in an area that would hinder routine cleaning and maintenance

E. General Operating Information

1. Turning On/Off

The fire has two switches on the back of the fire one to turn the fire on and off the second is the heat output control (see "Figure 2" on page 9). To turn the fire on press the ON/OFF switch to the on position the fire will then go through its start-up sequence.

The fires also have the option of a room thermostat, when the thermostat calls for heat, the fire will automatically light and deliver heat.

When the room is up to temperature and the thermostat is satisfied, the appliance will shut down (not recommended for older drafty houses)

2. Heat Output Controls

This appliance is equipped with a heat output control switch that has three settings or burn rates; low, medium and high. “Figure 2”

The fire will start up and run on high for 15 minutes to warm the flue and then run as the burn rate for which it is set. If the appliance is set at one of the lower settings, it will run quieter but take longer to heat up an area than if it were set at a higher burn rate.

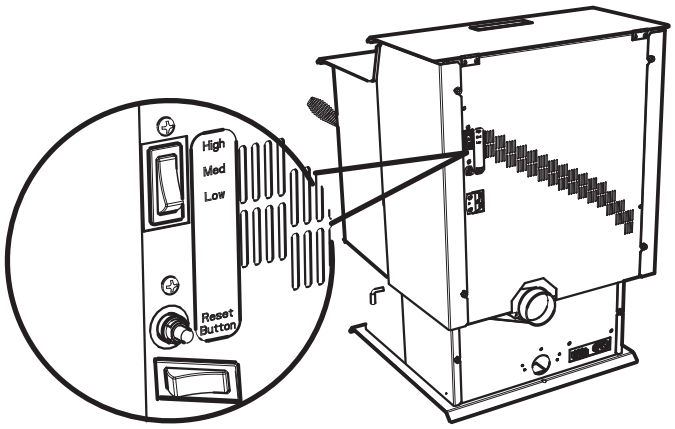


Figure 2

⚠ WARNING

Fire Hazard.
Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

Do NOT store flammable materials in the appliance’s vicinity.

- DO NOT USE GASOLINE, LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR “FRESHEN UP” A FIRE IN THIS HEATER.
- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.
- Keep all such liquids well away from the heater while it is in use.
- Combustible materials may ignite.

F. Before Your First Fire

1. First, make sure your appliance has been properly installed and that all safety requirements have been met. Pay particular attention to the fire protection and flueing.
2. Double check that the ash drawer and firebox are empty!
3. Close and latch the door.

***NOTE*: The tip of the thermocouple must be in contact with the inside end of the thermocouple cover or missed ignitions can occur.**

G. Hopper Lid Latch and Hopper Switch

1. Lift up the hopper lid and lock into open position. Now you can fill the hopper with fuel.
2. The hopper switch is designed to shut down the feed motor when the hopper lid is open. “Figure 3”
3. To close the hopper lid, while holding lid open with one hand, push the bottom of the latch inwards to release from locked position and then slowly close the hopper lid. “Figure 4”

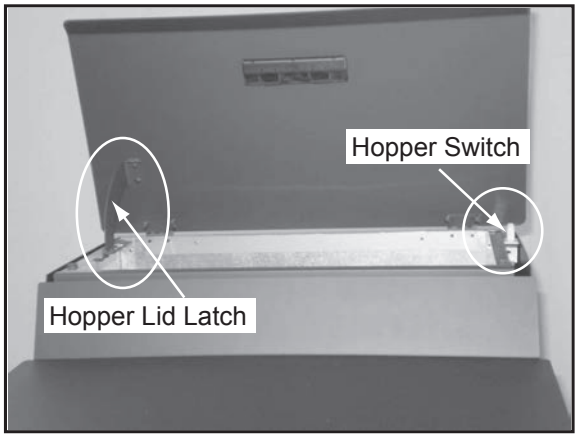


Figure 3

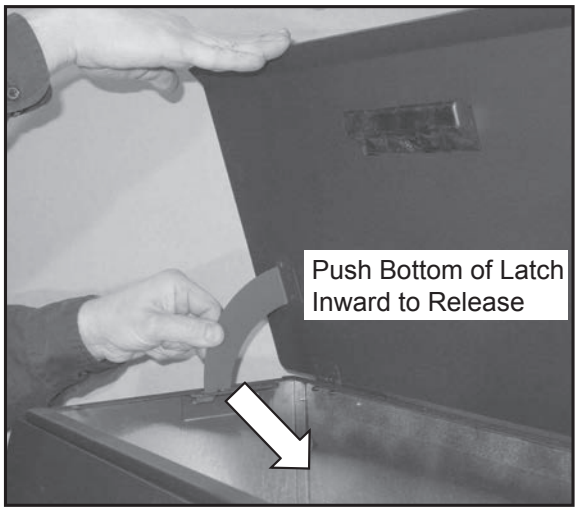


Figure 4

H. Starting Your First Fire

1. Make sure the hopper is full of pellets and the ON/OFF switch is in the OFF position. Plug the fire into a power socket

2. When powered up the exhaust blower will stay on for approximately 18 minutes even though there is no call for heat. This is normal.

3. Locate the heat output control switch mounted on the back of the appliance in the upper left corner (“Figure 2” on page 9) .

4. Turn it to the “high” setting by pushing the top of the control switch in.

5. Turn the fire on using the On/Off switch

6. Look through the hole in the left lower side panel and you will see the red call light on the control box will be on.(“Figure 5”). This indicates there is a call for heat.

7. The fuel feed system and the igniter should now be on.

8. For your first fire it will be necessary to press the reset button once approximately two minutes after start up and again in five minutes. This will fill the feed system and allow the appliance to begin dropping pellets. Or you can put a handful of pellets in the firepot to speed up the process. The appliance will continue to run as long as there is a call for heat.

9. Once the appliance has ignited, let it burn for approximately 15 minutes. For commissioning the installer/technician will then need to set the draft on the fire (see “Reference Materials” on page 31) You can now adjust the heat output control switch to the desired setting.

I. Fire Characteristics

A properly adjusted fire with the heat output control switch set on “high” has a short active flame pattern that extends out of the firepot approximately 102 to 203mm. The flame will rise and fall somewhat. This is normal.

If the fire has tall flames with black tails and seems somewhat lazy, this indicated insufficient air for the volume of fuel being burnt. Check the fire is clean, the air intake is clear and seals are intact.

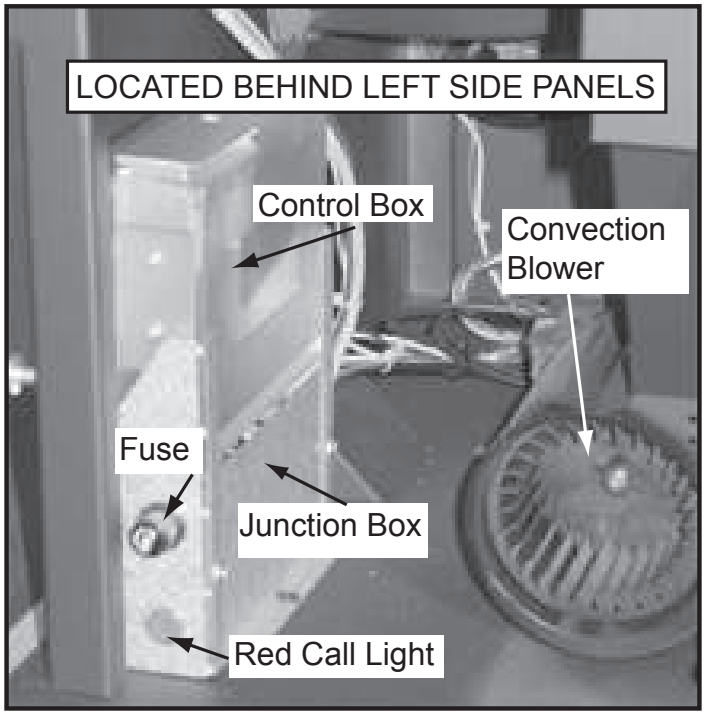


Figure 5

J. Ignition Cycles

1. At the beginning of each ignition cycle, it is normal to see some smoke in the firebox. The smoke will stop once the fire starts.

2. The convection blower will automatically turn on after your appliance has been burning for approximately 10 minutes.

3. This blower transfers heat from your appliance into the room, and will continue to run after the heat demand has gone until the appliance has cooled down.

4. Occasionally the appliance may run out of fuel and shut itself down. When this happens, the red call light will be on. See “Figure 5” on page 10.

5. To restart it, fill the hopper and press the reset button. When you press the reset button the red call light will go out. Release the button and the light will come back on.

6. You should see a fire shortly. If not, follow the instructions on page 10, for “Starting Your First Fire”.

K. Clear Space

Warning! RISK OF FIRE!

- Do NOT place combustible objects in front or to the sides of the appliance. High temperatures may ignite clothing, furniture or draperies. Keep combustible materials, gasoline and other flammable vapours and liquids clear of appliance.
- Do NOT store flammable materials in the appliance’s vicinity.
- Do NOT use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or “freshen up” a fire in this heater.
- *Keep all such liquids well away from the heater while it is in use as combustible materials may ignite.*

Mantel: Avoid placing candles and other heat-sensitive objects on mantel or hearth. Heat may damage these objects.

NOTICE: Clearances may only be reduced by means approved by the regulatory authority having jurisdiction.

CAUTION

Odors and vapors released during initial operation.
- Curing of high temperature paint.
- Open windows for air circulation.

Odors may be irritating to sensitive individuals.

WARNING

Fire Risk
Do NOT operate appliance:
- With appliance door open.
- Firepot floor open.

Do NOT store fuel:
- Closer than required clearances to combustibles to appliance
- Within space required for loading or ash removal.

3 Maintaining & Servicing Your Appliance

A. Proper Shutdown Procedure

⚠ CAUTION

Shock and Smoke Hazard

- Turn fire off or turn down thermostat (if you have one), let appliance completely cool and exhaust blower must be off. Now you can unplug appliance before servicing.
- Smoke spillage into room can occur if appliance is not cool before unplugging.
- Risk of shock if appliance not unplugged before servicing appliance.

Follow the detailed instructions found in this section for each step listed as referenced in the chart below.

B. Quick Reference Maintenance Chart

C. General Maintenance

1. Types of Fuel

Depending on the type of fuel you are burning and how long you run the fire will dictate how often you have to clean your firepot.

If the fuel you are burning has a high dirt or ash content, it may be necessary to clean the firepot more than once a day.

Dirty fuel will cause clinkers to form in the firepot. A clinker is formed when dirt, ash or a non-burnable substance is heated to >1000°C and becomes glass-like. See "D" page 16 more details on fuels with high ash content.

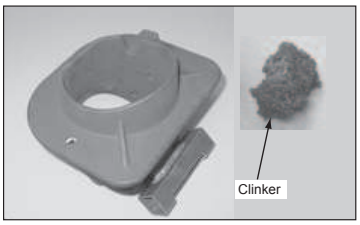


Figure 6 Clinker

Cleaning or Inspection	Frequency		Daily	Weekly	Monthly	Yearly
Ash Drawer	Every 5 bags of fuel	OR		X		
Ash Removal from Firebox	Every 5 bags of fuel or more frequently depending on ash build-up	OR		X		
Blower, Exhaust	More frequently depending on the fuel type	OR				X
Blower, Convection	Every 25 bags or more frequently depending on operating environment.	OR			X	
Door Handle & Gasket Inspection	Prior to heating season	OR			X	
Exhaust Path, Drop Tube and Behind Baffles	Every 25 bags or more frequently depending on ash build-up	OR			X	
Firepot Cleaning Rod	Every 1 bag of fuel	OR	X			
Firepot with Clean-out Tool	Every 5 bags of fuel	OR		X		
Firebox - Prepare for Non-Burn Season	At end of heating season	OR				X
Glass	When clear view of firepot becomes obscure	OR		X		
Hopper	Every 50 bags of fuel	OR			X	
Top Vent Adapter	More frequently depending on ash build-up	OR				X
Venting System	Every 3 tons or more frequently depending on the fuel type	OR				X

NOTICE: These are recommendations. Clean more frequently if you encounter heavy build-up of ash at the recommended interval or you see soot coming from the vent. Failure to properly clean your appliance on a regular basis will void your warranty.

⚠ WARNING

Fire Risk

- NEVER pull firepot cleaning rod out when appliance is operating.
- Cleaning Rod MUST be completely pushed in before operating appliance.
- Hot pellets may fall into ashpan and start a fire or mis-starts due to lack of vacuum.

2. Cleaning Firepot with Cleaning Rod & Firepot Clean-Out Tool

- **Frequency: Daily or more often as needed**
- **By: Homeowner**

a. The appliance must be in complete shutdown and cool and the exhaust blower off. If you are just cleaning the firepot, there is no need to unplug the appliance.

b. Locate the firepot cleaning rod on the right side of the appliance. **("Figure 7").** When you pull the cleaning rod straight out it will slide open the firepot floor to allow the ashes to be deposited in the ash drawer. You will see the light colour painted area on the cleaning rod to let you know the rod is in OPEN position. ("Figure 8")

c. Pull the firepot cleaning rod OUT and IN a couple of times to help shake debris loose. If the rod is hard to pull, it may be necessary to use your firepot clean-out tool to chip away material that has built up on the bottom plate of the firepot and to push out any clinkers while in the open position.

d. To close the firepot floor: **slightly raise the cleaning rod** and then push it back into place. If you have closed the cleaning rod properly (pushed all the way in) you will not see any of the light colour painted area. ("Figure 8").

e. Always have the ash drawer in place before pulling the firepot cleaning rod, otherwise the ashes will fall down and fill the outside air opening and the appliance will produce soot out of the exhaust and will affect efficiency.

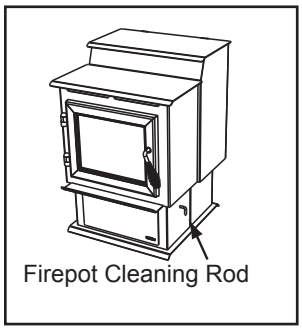


Figure 7

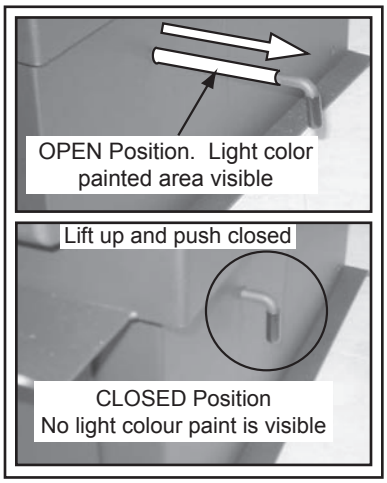


Figure 8

3. Ash Removal from Firebox

- **Frequency: Daily or more often as needed**
- **By: Homeowner**

a. There must not be any hot ashes in the firebox during cleaning so allow the appliance to completely cool. The firebox ash should be removed every time the exhaust path is cleaned. Frequent cleaning of the ash in the firebox will help slow down the build-up of ash in the exhaust blower and vent system.

b. Vacuum out the firebox thoroughly on both sides of the firebox and the floor and ceiling. The ash drawer should be emptied every time you clean the firebox. Remember to place the ash and debris into a metal or non-combustible container. **See "5. Disposal of Ashes" on page 14.**

c. Always have the ash drawer in place before pulling the firepot cleaning rod, otherwise the ashes will fall down and fill the outside air opening and the appliance will produce soot out of the exhaust and will affect efficiency.

⚠ WARNING

Burn Risk

- NEVER remove ash drawer while appliance is operating.

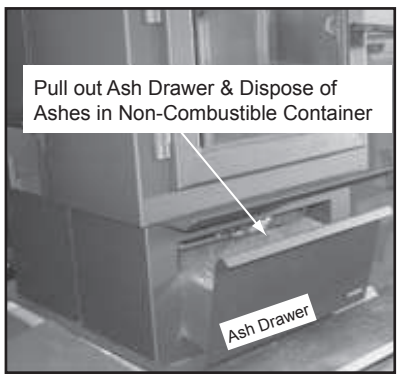
4. Cleaning Ash Drawer

- **Frequency: Weekly or every 5 bags of fuel**
- **By: Homeowner**

a. There must not be any hot ashes in the ash drawer when you empty it, so allow the appliance to completely cool.

b. Locate the ash drawer underneath the firepot. Slide the ash drawer straight out. Empty into a non-combustible container and re-install the ash drawer. See **"5. Disposal of Ashes" on page 14.**

c. Always have the ash drawer in place before pulling the firepot cleaning rod, otherwise the ashes will fall



down and fill the outside air opening and the appliance will produce soot out of the exhaust and will affect efficiency.

5. Disposal of Ashes

- **Frequency: As needed**
- **By: Homeowner**

Ashes should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal.

⚠ WARNING

Disposal of Ashes

- **Ashes should be placed in metal container with tight fitting lid.**
- **Ashes should be retained in closed container until all cinders have thoroughly cooled.**

If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.

6. Cleaning the Exhaust Path, Baffles & Drop Tube

- **Frequency: Monthly or every 25 bags or more frequently depending on ash build-up.**
- **By: Homeowner**

a. Appliance must be completely cool.

b. Open the door and remove the centre baffle first and then the right and left baffles. See Baffle Removal Instructions on **page 21**. Thoroughly vacuum the exhaust path and drop tube and continue throughout the rest of the firebox. Also vacuum the front and back of the baffles.

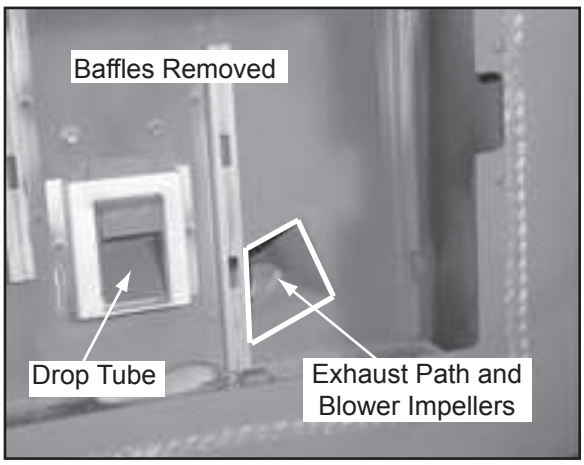


Figure 10

c. Also vacuum the convection blower impellers or use a soft brush to remove any ash build-up.

d. Replace the right and left baffles and then the centre baffle and close and latch the door.

7. Cleaning the Hopper

- **Frequency: Monthly or after burning 50 bags of fuel**
- **By: Homeowner**

After burning approximately 50 bags of fuel you will need to clean the hopper to prevent sawdust build-up.

A combination of sawdust and pellets on the bottom end of the auger reduces the amount of fuel supply to the firepot. This can result in nuisance shutdowns and mis-starts.

a. The appliance must be in complete shutdown. Allow the appliance to completely run out of pellets and cool down.

NOTE: Hearth & Home Technologies recommends to use a heavy duty vacuum cleaners specifically designed for solid fuel appliance cleaning.

b. Empty the hopper of any remaining pellets.

c. Vacuum the hopper and feed tube.

8. Soot and Fly Ash: Formation & Need for Removal in Exhaust Venting System.

- **Frequency: Yearly or more frequently depending on ash build-up.**
- **By: Qualified Service Technician**

Be sure the appliance is allowed to cool, has been unplugged and the exhaust blower is off.

The products of combustion will contain small particles of fly ash. The fly ash will collect in the exhaust venting system and restrict the flow of the flue gases.

At start-up if there is incomplete combustion, or if there is a shutdown or incorrect operation of the appliance it will lead to some soot formation. This will collect in the exhaust venting system.

The venting (chimney) system may need to be cleaned

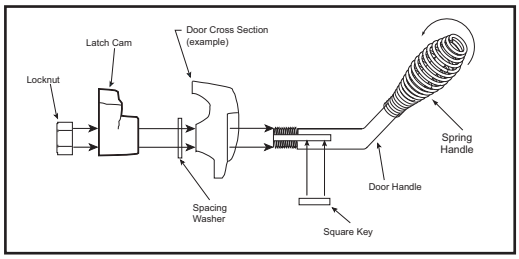


Figure 11

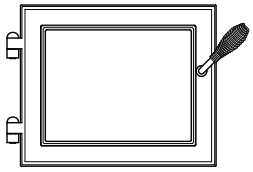
at least once a year or more often depending upon the quality of your fuel or if there are any horizontal pipe sections. Ash will build up more quickly in the horizontal sections and elbows.

9. Door Handle Inspection

- **Frequency: Monthly or prior to heating season**
- **By: Homeowner**

The gasketing between the glass and firebox should be inspected periodically to make sure there is a good seal.

CAUTION

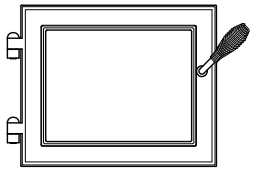


Handle glass assembly with care.

When cleaning glass:
• Avoid striking, scratching or slamming glass.
• Do NOT clean glass when hot.
• Do NOT use abrasive cleaners.

- Refer to maintenance instructions.

⚠ WARNING



Handle glass with care.
• Inspect the gasket to ensure it is undamaged.
• Do NOT strike, slam or scratch glass.
• Do NOT operate appliance with glass assembly removed.

- Do NOT operate with glass cracked, broken or scratched.

Check door handle for smooth cam operation.

10. Cleaning the Glass

- **Frequency: When clear view of the firepot becomes obscure**
- **By: Homeowner**

a. Appliance must be completely cool before cleaning glass.
b. Vacuum fly ash from glass and door rope.
c. Use a damp paper towel or any non-abrasive glass cleaner. Wipe off with dry towel.

11. Cleaning Exhaust Blower - Requires No Lubrication

- **Frequency: Yearly or more frequently depending on ash build-up**
- **By: Qualified Service Technician**

d. Be sure the appliance is allowed to cool, has been unplugged and the exhaust blower is off.

NOTE: Hearth & Home Technologies recommends to use a heavy duty vacuum cleaners specifically designed for solid fuel appliance cleaning.

e. Follow the directions for cleaning the exhaust path found on page 14.
f. If unable to thoroughly clean the blower through this access, then follow the directions on page 19 for direct access to the exhaust blower.
g. Vacuum the blower's impellers. Use care not to bend or damage the blower fins.

12. Cleaning Convection Blower - Requires No Lubrication

- **Frequency: Yearly or more frequently depending on Dust/Dirt build-up**
- **By: Qualified Service Technician**

a. Be sure the appliance is allowed to cool and has been unplugged.
b. Follow the directions on page 18 for direct access to the convection blower.
c. Sweep or vacuum out any build-up. Use a brush or compressed air to loosen dirt if needed.

13. Cleaning the (optional) Top Vent Adapter

- **Frequency: Yearly or more frequently depending on ash build-up**

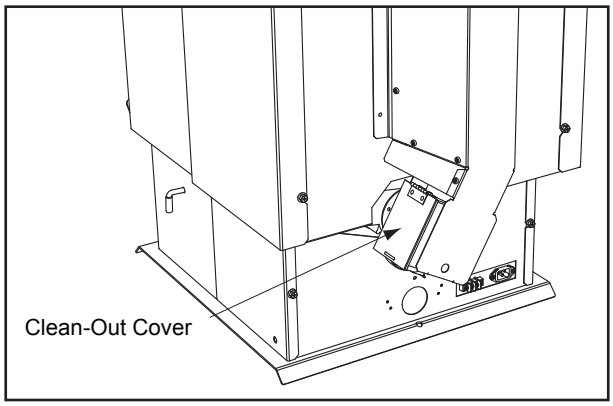


Figure 12

- **By: Homeowner/Qualified Service Technician**

a. The appliance must be in complete shutdown and the exhaust blower should be off. Allow the appliance to completely cool down.
b. Open the clean-out cover. ("Figure 12").
c. Sweep or vacuum out any ash build-up.

14. Preparing Firebox for Non-Burn Season

- **Frequency: Yearly**
- **By: Homeowner/Qualified Service Technician**

a. Be sure the appliance is allowed to cool, has been

unplugged and the exhaust blower is off.

b. Remove all ash from the firebox and vacuum thoroughly.
c. Paint all exposed steel, including cast-iron.
    - Purchase paint from your local dealer.
    - Must use a high-temperature paint made specifically for heating appliances.

D. High Ash Fuel Content Maintenance

- **Frequency: As needed**
- **By: Homeowner**

Poor quality pellet fuel, or lack of maintenance, can create conditions that make the firepot fill quickly with ashes and clinkers.

This condition makes the appliance susceptible to overfilling the firepot with pellets which may result in smoking, sooting and possible hopper fires. “Figure 13” shows an example where the firepot overfills, pellets back up into the feed tube and ash has accumulated in the firebox.

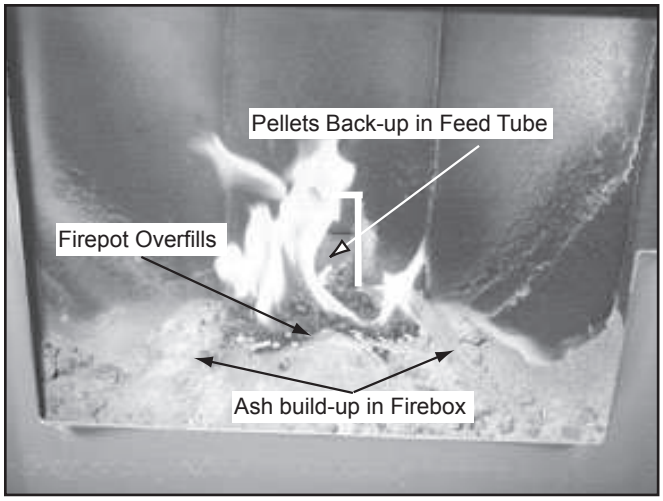


Figure 13

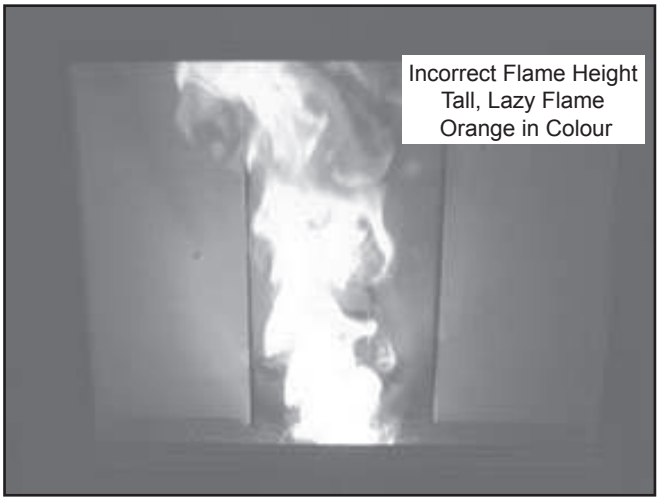


Figure 14

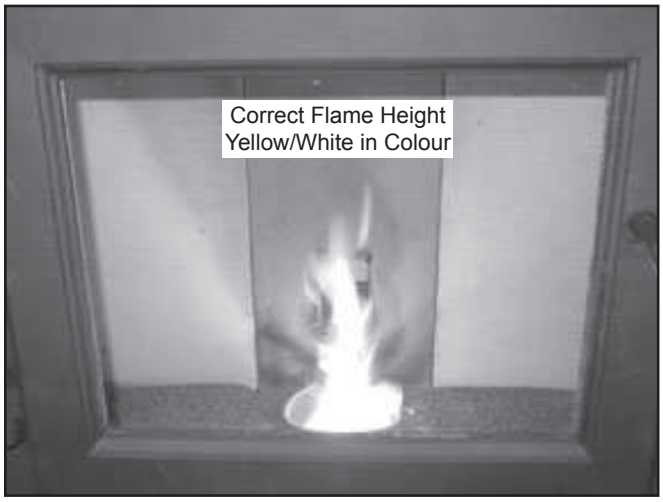


Figure 15

⚠ WARNING

Fire Risk

- **High ash fuels or lack of maintenance can cause the firepot to overfill. Follow proper shutdown procedure if ash buildup exceeds half way point in firepot.**
- **Failure to do so could result in smoking, sooting and possible hopper fires.**

CAUTION

Odors and vapors released during initial operation.

- Curing of high temperature paint.
- Open windows for air circulation.

Odors may be irritating to sensitive individuals.

An inefficient and non-economical method of burning of fuel caused by poor quality pellet fuel is shown in “Figure

ISSUES	SOLUTIONS
Metallic noise.	Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a log fire. This noise does not affect the operation or longevity of your appliance.
White ash buildup on glass.	This is normal. Clean the glass.
Glass has build-up of black soot.	Excessive build up of ash. See solution #4. The lower burn settings will produce more ash, the higher burn settings produce less. The more it burns on low the more frequent cleaning of the glass is required.
Fire has tall flames with black tails and is lazy.	The firepot, exhaust blower, exhaust path or baffles needs cleaning.
Smokey start-up or puffs of smoke from the airwash.	The firepot is dirty. Check the air holes have not been blocked with clinker this can be removed using the supplied tool
Large flame at start-up.	This is normal. Flame will settle down once the fire is established.
Rumbling sound.	Make sure the ash drawer is completely closed.

4 Replacement Parts

NOTE: Any warranty on the fire or its parts is void if damage is caused during maintenance, or if maintenance is done incorrectly.

A. Convection Blower Replacement

1. Turn the fire off or turn down the thermostat (if applicable), let appliance completely cool and then unplug appliance before servicing.

2. The convection blower is located on the floor at the rear of the appliance.

3. Lift the hopper lid up until it locks into place.

4. Loosen the 4 screws on the upper back panel and the 2 screws on the lower back panel, using a #2 Phillip Head screwdriver, a 3/8 inch or 10mm wrench or socket. You do not need to remove them. "Figure 16".

5. Remove the left upper and lower side panels by lifting up and out. The hooks on the panels will slide out of the slots on the appliance. "Figure 17"**.**

6. Release blower wires from the nylon wire retainer if applicable. Model ECO-ADV-PS35 has one red wire and one black wire coming from the blower.

7. Remove the wing bolt and move the blower and hold-down bracket toward the back of the appliance to release the locating tab. "Figure 18". Pull the blower out from under the convection plenum. Slide the blower out of the appliance. Disconnect the wires from the spade connectors at this time. **"Figure 19".**

8. Return wires to nylon wire retainer. Make sure wires do not contact any moving parts or touch any surfaces that may become hot **"Figure 19".**

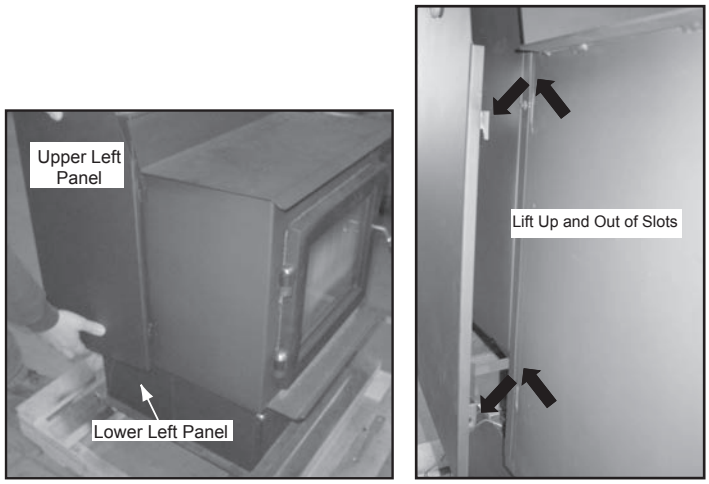


Figure 17

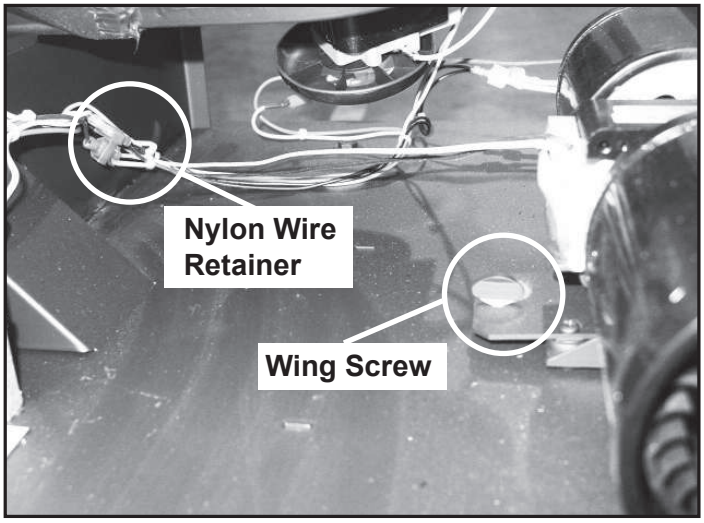


Figure 18

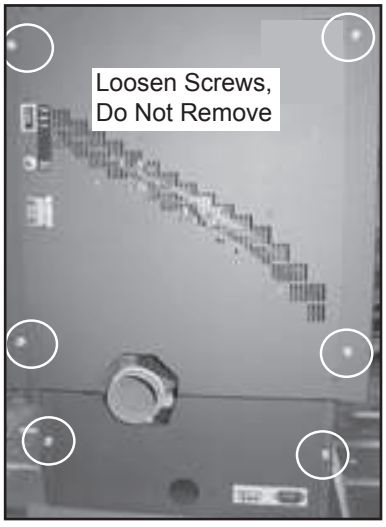


Figure 16

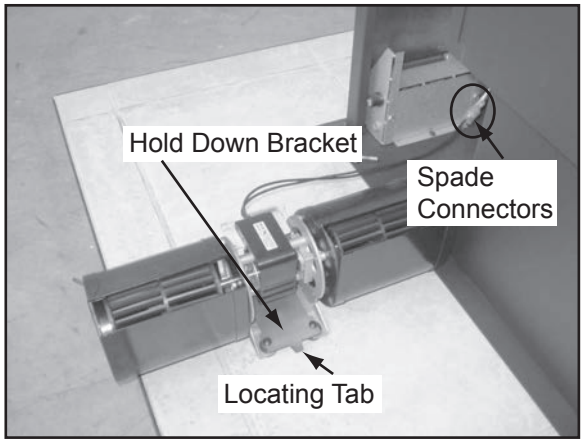


Figure 19

B. Exhaust Blower Replacement

1. Turn the fire off or turn down the thermostat (if applicable), let appliance completely cool and then unplug appliance before servicing.

2. Remove both upper and lower right side curtains. **"Figure 17" on page 18.**

3. Disconnect red and black wires from the white and blue wires of the exhaust blower.

4. There is a removable plate on the exhaust blower. Depending on the model, use a 1/4 inch socket, or 1/4 inch Nut Driver or #2 Phillips Head screw driver to loosen the 6 screws in the keyhole shaped holes and rotate the plate. It is only necessary to loosen screws. **"Figure 20".**

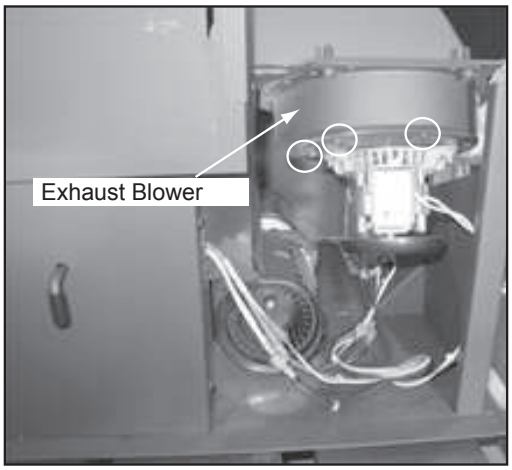


Figure 20

5. Remove the exhaust blower and gasket.

6. Check for degradation on the gasket and replace if necessary using the gasket included in the kit.

7. Re-install in reverse order.

C. Snap Disc Replacements

Snap Disc #1 - Convection Blower

1. Turn the fire off or turn down the thermostat (if applicable), let appliance cool completely if running. Then unplug appliance before servicing.

2. Using #2 Phillips screwdriver, 3/8" wrench, or 3/8" socket loosen the three screws that hold the right upper and lower side panels in place. You do not need to remove the screws. Remove side panels by lifting up and out.

3. Snap disc #1 is located on the convection plenum below the feed motor. **"Figure 21"**.

4. It has two purple wires attached to it with 1/4 inch female spade terminals.

5. Disconnect the two wires from the snap disc. Using a #2 Phillips screwdriver, remove the two screws securing the snap disc to the appliance.

6. Re-install in reverse.

Snap Disc #2 - Fuel Delivery Interrupt

1. Turn the fire off or turn down the thermostat (if applicable), let appliance cool completely if running. Then unplug appliance before servicing.

2. Using #2 Phillips screwdriver, 3/8" or 10mm wrench or socket, loosen the three screws that hold the right upper and lower side panels in place. You do not need to remove the screws. Remove side panels by lifting up and out.

3. Snap disc #2 is located on the convection plenum in the centre of the appliance above the convection blower. **"Figure 21"**.

4. It has a black wire and an orange wire attached to it with 1/4 inch female spade terminals.

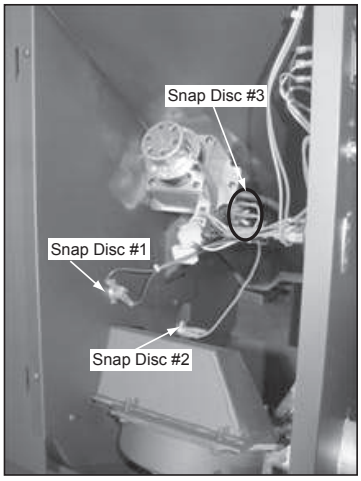
5. Disconnect the two wires from the snap disc. Using a #2 Phillips screwdriver, remove the two screws securing the snap disc to the appliance.

6. Re-install in reverse.

Snap Disc #3 - Feed Motor - Manual Reset

1. Turn the fire off or turn down the thermostat (if applicable), let appliance cool completely if running. Then unplug appliance before servicing.

2. Using #2 Phillips screwdriver, 3/8" wrench, or 3/8" socket loosen the three screws that hold the right upper and lower side panels in place. You do not need to remove the screws. Remove side panels by lifting up and out.



3. Snap disc #3 is located on the bracket on the feed tube near the feed motor. **"Figure 21"**.

4. It has two gray wires attached to it with 1/4 inch female spade terminals.

Figure 21

5. The locating bracket is attached to the feed tube with an 8 X 32 wing nut. Remove the wing nut to detach the bracket from the feed tube.

6. Disconnect the two wires from the snap disc.

7. Using a #2 Phillips screwdriver, remove the screw securing the snap disc to the bracket. **"Figure 22"**.

8. Re-install in reverse.

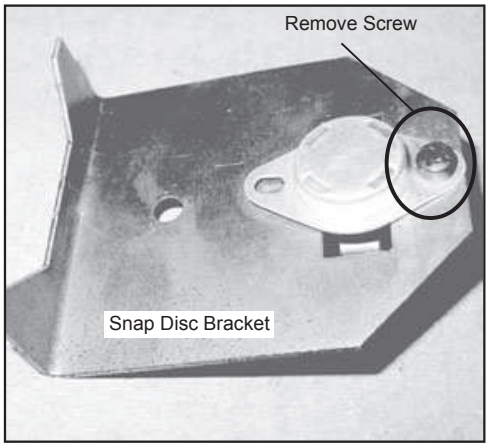


Figure 22

D. Igniter Replacement

⚠ WARNING

Shock Risk.
- Igniter Wires MUST route through wire retainer hook.
  - Failure to do so may result in:
  - Pre-mature failure of igniter
  - Shorted out igniter
  - Appliance failing to light
  - Damaged control box

1. Shut down the appliance or turn down the thermostat and let the appliance completely cool down. After the appliance has cooled down, unplug it and remove the ash drawer.

2. The wire leads to the igniter are connected to the wire harness with 1/4 inch male / female spade connectors.

3. Follow the directions on page 18 to remove the upper and lower right side panels to expose the spade connect

4. Disconnect the spade connectors and remove the igniter from the chamber. Loosen thumb screw and slide igniter out.

5. Install new igniter into the chamber and tighten thumb screw. The wires MUST route through the wire retainer hook and then re-connect the wires to the 2 leads with the spade connectors. "Figure 23".

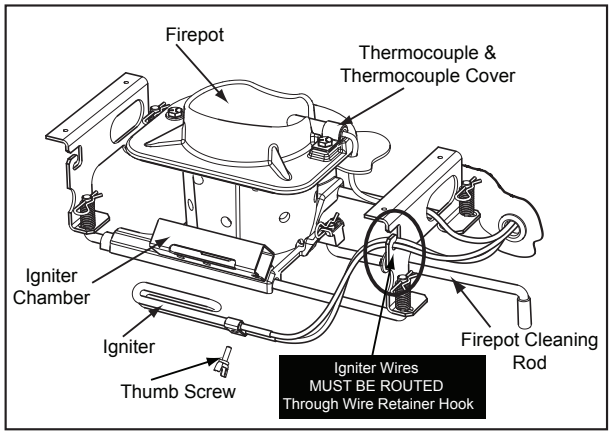


Figure 23

6. Double check that the igniter wires are clear of any movement, i.e. ash drawer, firepot cleaning rod, , etc.

7. Re-install the ash drawer and side panel and re-connect the power.

E. Baffle Removal & Replace

1. Shut down the appliance or turn down the thermostat and let the appliance completely cool down.

2. Remove the centre baffle first by using the handle at the top of the baffle and pull up and then towards you. The hooks on the baffle will slide out of the slots in the bracket. **"Figure 24"**

Figure 24

3. Remove the left baffle and then the right baffle by pulling up and then towards you. The left and right baffles have similar hooks and slots. **"Figure 25" and "Figure 26".**

4. Re-install the baffles in reverse order. Be careful to insert the hooks in their respective slots. Be sure the baffles are completely secure/seated (close, if not touching, the firebox floor).

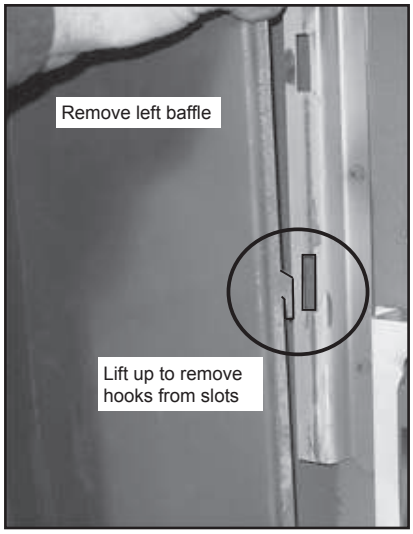


Figure 25

Figure 26

F. Glass Replacement

1. Open the door from the appliance by lifting door off of hinge pins and lay on a flat surface face down.

2. Using a Phillips Head screw driver, remove the 4 brackets and set aside. **"Figure 27".**

3. Remove old glass and replace with the new glass.

4. Re-install the brackets using the same screws.

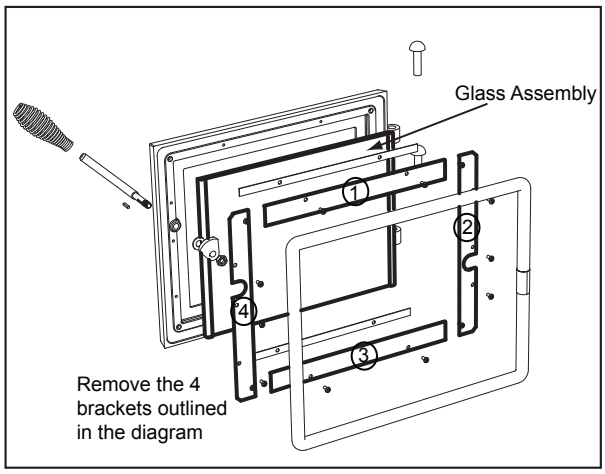


Figure 27

⚠ WARNING

- Glass is 5mm thick high temperature heat-resistant ceramic glass.
- DO NOT REPLACE with any other material.
- Alternate material may shatter and cause injury.

5 Getting Started

Notice: This manual is based on North American installation requirements and some aspects may not be directly applicable to New Zealand installations. Please contact Switch (0800765 431) for more information.

A. Design, Installation & Location Considerations

Notice: Check building codes prior to installation.

- Installation MUST comply with local, regional, and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

Since pellet exhaust can contain ash, soot or sparks, you must consider the location of:

- Windows
- Air Intakes
- Air Conditioner
- Overhang, soffits, porch roofs, adjacent walls
- Landscaping, vegetation

When locating the flue and termination, vent above roof line when possible. Minimum flue length should be 600mm above roof penetration.

Warning! Risk of Fire, Damaged parts could impair safe operation. Do NOT install damaged, incomplete or substitute components.

Notice: Locating the appliance in a location of considerable air movement can cause intermittent smoke spillage from appliance. Do not locate appliance near:

- Frequently open doors
- Ventilation/ extractor fans
- Ducted heating / cooling outlets or returns

B. Draft

Draft is the pressure difference needed to exhaust appliances successfully. When an appliance is drafting successfully, all combustion by-products are exiting the home through the flue.

Considerations for successful draft include:

- Preventing negative pressure
- Location of appliance and chimney

To measure the draft or negative pressure on your appliance use a magnahelic or a digital pressure gauge capable of reading 0 - .25 inches of water column (W.C.).

The appliance should be running on high for at least 15 minutes for the test.

With the stove running on high you should have a negative pressure equal to the number given in the chart below. This can be adjusted up or down by altering the combustion fan speed adjustment on the control box (see"Commissioning" on page 31). If after adjusting the fan speed you have a lower reading than you find on the chart, your stove does not have adequate draft to burn the fuel properly.

MODEL	Minimum Vacuum Requirements
ECO-NZ-PS35	0.11 inches W.C.

Correct low draft or low vacuum problems by doing one of the following:

- Thoroughly inspect and if necessary, clean the exhaust path and flue. See "Cleaning the Exhaust Path, Baffles & Drop Tube" on page 14. Inspect for worn or broken gaskets. Repair any gaskets suspected of leaking.
- Refer to "Design, Installation & Location Considerations" on page 22 for recommendations on locating your appliance and chimney and for causes of and minimizing negative pressure

Notice: Hearth & Home Technologies assumes no responsibility for the improper performance of the flue system caused by:

- Inadequate draft due to environmental conditions
- Downdrafts
- Tight sealing construction of the structure
- Mechanical exhausting devices

C. Negative Pressure

Warning! Risk of Asphyxiation! Negative pressure can cause spillage of combustion fumes and soot.

Negative pressure results from the imbalance of air available for the appliance to operate properly. It can be strongest in lower levels of the house.

Causes include:

- Exhaust fans (kitchen, bath, etc.)
- Range hoods
- Combustion air requirements for furnaces, water heaters and other combustion appliances
- Heat transfer kits
- Clothes dryers
- Location of return-air vents to furnace or air conditioning

- Imbalances of the HVAC air handling system
- Upper level air leaks such as:
    - Recessed lighting
    - Attic hatch
    - Duct leaks

To minimize the effects of negative air pressure:

- Install the outside air kit with the intake facing prevailing winds during the heating season
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the appliance
- Avoid installing the appliance near doors, walkways or small isolated spaces
- Recessed lighting should be a “sealed can” design
- Attic hatches weather stripped or sealed
- Attic mounted duct work and air handler joints and seams taped or sealed structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the appliance location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements on **page 28 and page 29.**

D. Thermostat Location

1. A low voltage thermostat can be installed to operate this pellet fire. You may use the optional wall mount thermostat kit (“Figure 28”) or purchase a programmable thermostat, timer or remote control. The optional wall mount thermostat is equipped with an adjustable heat anticipator. The current rating is .05 amps. The anticipator needs to be adjusted to the lowest setting available.

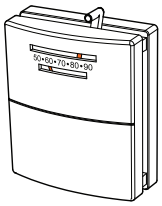


Figure 28

2. When mounting a thermostat on a wall, be sure to follow your thermostat installation instructions carefully.

NOTE: Thermostat must be mounted level for accurate readings. The thermostat should be mounted on an inside wall, not directly in line with the appliance’s convection air and away from drafts.

NOTE: Thermostats are not recommended for old drafty poorly insulted house as the fire may start and stop often increasing cleaning schedules, increase power consumption and potentially reducing component life

3. There is a 4 screw terminal block located on the back lower left corner of the stove directly above the power cord inlet. The centre 2 screws are for the thermostat wires. “Figure 29”. closing the terminals will activate the fire

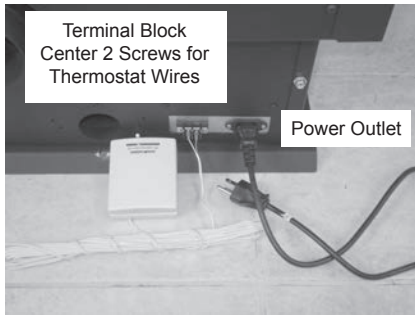


Figure 29

E. Locating Your Appliance & Flue

Location of the appliance and flue will affect performance.

- It is recommended that you install through the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the affects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the appliance location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements on **page 28 and page 29.**

Figure for information purposes only

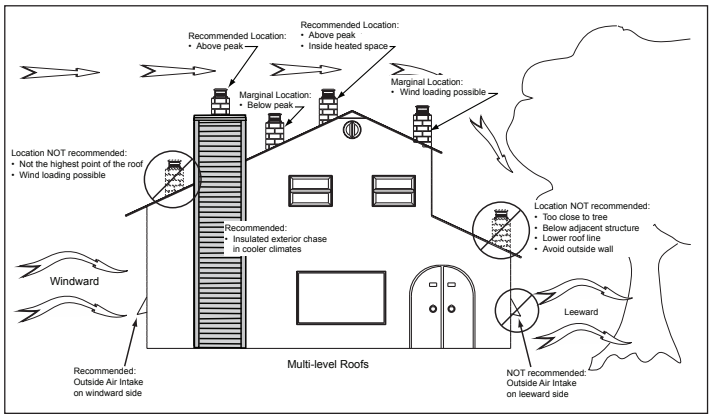


Figure 30

F. Tools And Supplies Needed

Tools and building supplies normally required for installation, unless installing into an existing masonry fireplace:

Reciprocating Saw	Gloves
Channel Locks	Safety Glasses
Hammer	Framing Square
Phillips Screwdriver	Electric Drill & Bits (1/4”)
Tape Measure	1/4” Self-Tapping Screws
Plumb Line	
Level	<u>May also need:</u>
Framing Material	Vent Support Straps
Non-combustible Sealant	Venting Paint
Material	

⚠ WARNING

Fire Risk.

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by, the following actions:

- *Installation and use of any damaged appliance.*
- *Modification of the appliance.*
- *Installation other than as instructed by Hearth & Home Technologies.*
- *Installation and/or use of any component part not approved by Hearth & Home Technologies.*
- *Operating appliance without fully assembling all components.*
- *Operating appliance without legs attached (if supplied with unit).*
- *Do NOT Overfire or any such action that may cause a fire hazard.*

G. Inspect Appliance & Components

- Remove appliance and components from packaging and inspect for damage.
- Report to your dealer any parts damaged in shipment.
- **Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.**

⚠ WARNING

Inspect appliance and components for damage. Damaged parts may impair safe operation.

- Do NOT install damaged components.
- Do NOT install incomplete components.
- Do NOT install substitute components.

Report damaged parts to dealer.

H. Pre-Burn Check List

1.		Place the appliance in a location near the final installation area and follow the procedures below:
2.		Open the appliance and remove all the parts and articles packed inside the Component Pack. Inspect all the parts and glass for shipping damage. Contact your dealer if any irregularities are noticed.
3.		All safety warnings have been read and followed.
4.		This Owner’s Manual has been read.
5.		Floor protection requirements have been met.
6.		Venting is properly installed.
7.		The proper clearances from the appliance and chimney to combustible materials have been met.
8.		The masonry chimney is inspected by a professional and is clean, or the factory built metal chimney is installed according to the manufacturer’s instructions and clearances.
9.		The chimney meets the required minimum height.
10.		All labels have been removed from the glass door.
11.		Plated surfaces have been wiped clean, if applicable.
12.		Thermostat or remote has been installed (if applicable).
13.		A power outlet is available nearby.

6 Dimensions and Clearances

MODEL: ECO-ADV-PS35

A. Appliance Dimensions

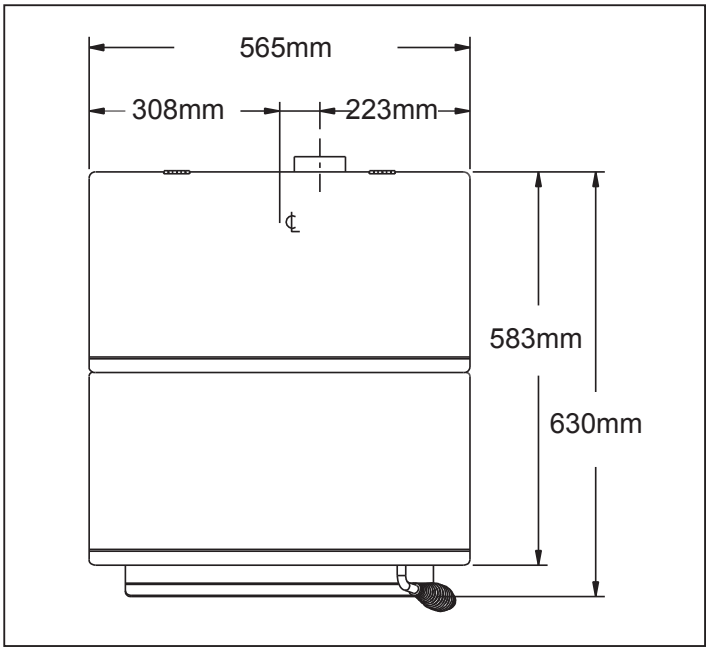


Figure 31 Top View

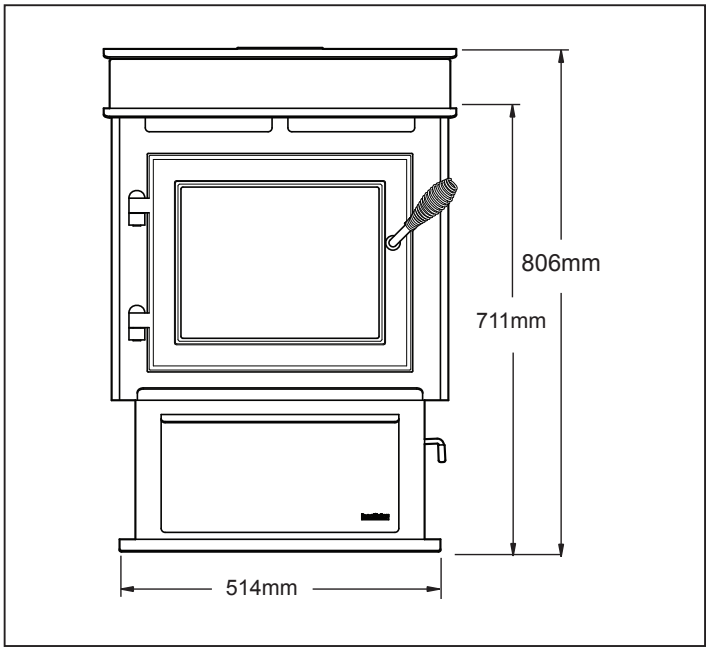


Figure 32 Front View

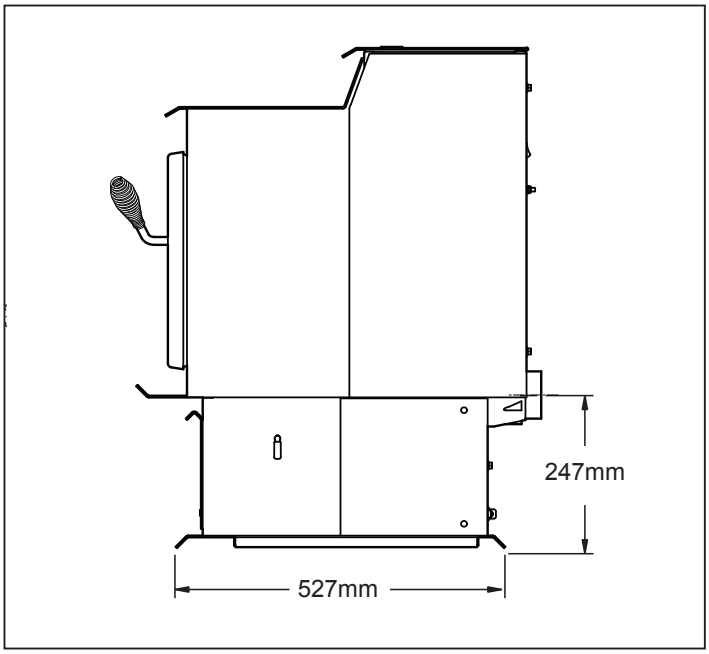


Figure 33 Side View

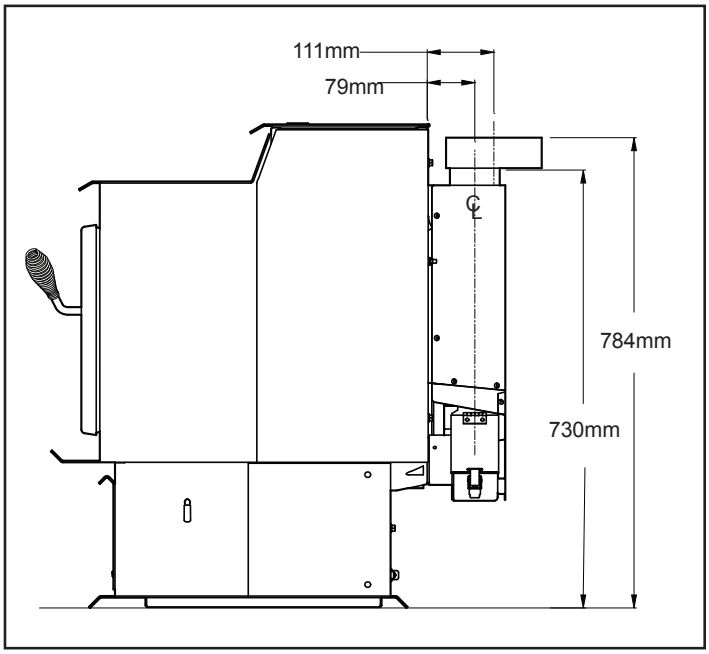


Figure 34 Side View with Top Vent Adapter

NOTE:

- Illustrations reflect typical installations and are FOR DESIGN PURPOSES ONLY.
- Illustrations/diagrams are not drawn to scale.
- Actual installation may vary due to individual design preference.

⚠ WARNING

Fire Risk.

Comply with all minimum clearances to combustibles as specified.

Failure to comply may cause house fire.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to the owner's information manual provided with this appliance. For assistance or additional information consult a qualified installer, service agency or your dealer.

Asphyxiation Risk.

NEVER INSTALL IN A SLEEPING ROOM.

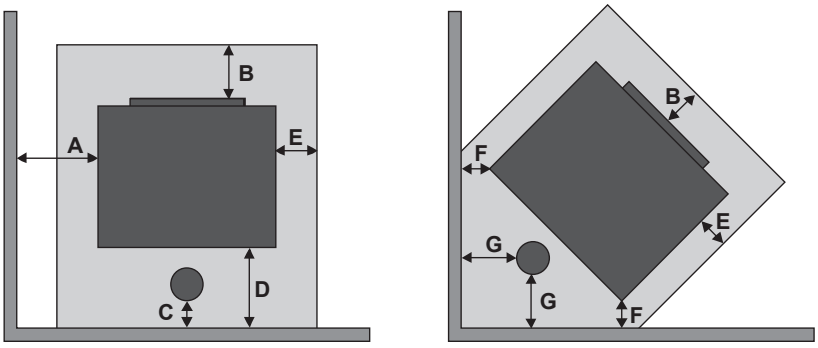
Consumes oxygen in the room.

B. Hearth Pad Requirements

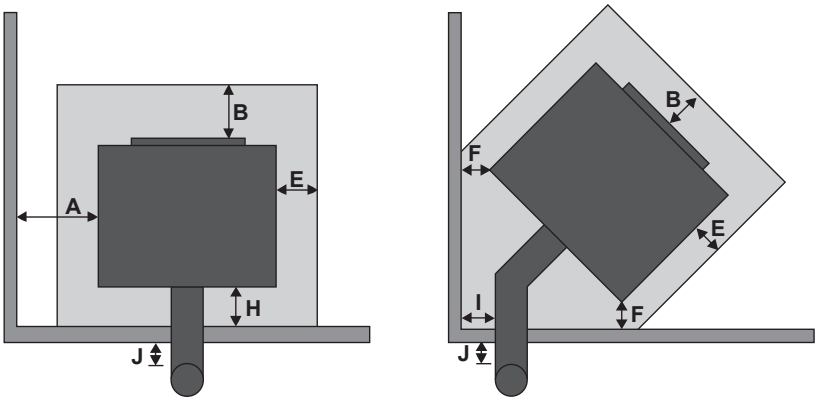
Use a non-combustible floor protector, extending beneath appliance and to the front, sides and rear as indicated. Measure front distance "B" from the surface of the glass door.

C. Clearance to Combustibles

Internal Flue



External Flue



Location	Dimension (mm)
A	200
B	150
C*	25
D	172
E	75
F	50
G*	75
H	50
I*	53
J*	25

* from shielded flue

Note: AS/NZS 2918 requires a minimum of 100mm clearance for any side requiring access.

Note: These are minimum clearances to combustibles. Actual installation distances may be greater.

7 Flueing Information

A. Chimney and Exhaust Connection

The flue must be installed by a suitably qualified person in accordance with AS/NZS2918:2001 and the manufactures instructions. The ECO-CHOICE pellet fire range use a fan powered exhaust system with a slightly negative pressure in the combustion chamber and a slightly positive pressure in the flue.

Flue parts need to be

1. Combustion and condensation proof (stainless steel)
2. Have no restrictions or draft adjustment devices
3. Must be suitably insulated where they are outside the room the fire is located
4. Have the correct clearances from combustible materials
5. Free standing models must have a T adapter / cleanout at the connection to the fire.
6. INSTALL FLUE AT CLEARANCES SPECIFIED BY THE FLUE MANUFACTURER.
7. Secure flue system to the appliance with at least three (3) screws/rivets per the pipe manufacturer's instructions. Also secure all connector pipe joints with at least three (3) screws/rivets through each joint.
8. DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
9. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

Switch recommends the use of Davin flu kits as outlined on page 28 and page 29. These have been tested and approved for use with the ECO-CHOICE range of fires if you intend to use a different flue kit you will need to consult with your local council

NOTE: Seal pipe joints with high temperature silicone , or equivalent, (250°C minimum rated only). Do not put sealant inside of pipe.

⚠ WARNING

Vent surfaces get HOT, can cause burns if touched. Non-combustible shielding or guards may be required.

NOTE:

- **Illustrations reflect typical installations and are FOR DESIGN PURPOSES ONLY.**
- **Illustrations/diagrams are not drawn to scale.**
- **Actual installation may vary due to individual design preference.**

B. Outside Air Kit Instructions

There are two Outside Air Kits that will work with this appliance. One kit, 811-0872 uses a 2 inch flex hose (included) and uses hose clamps to secure the hose. The other kit, OAK-3, uses a 3 inch flex hose (not included) and uses wire ties to secure the hose.

Parts Included in 2 inch Kit 811-0872: 1 piece of 2 inch x 3 ft. flex hose, 2 hose clamps, 1 collar assembly, 1 termination cap assembly, trim ring, 1 intake air channel, fasteners (Discard the air intake channel, it is not needed for this appliance.

2 Inch Outside Air Kit Shown

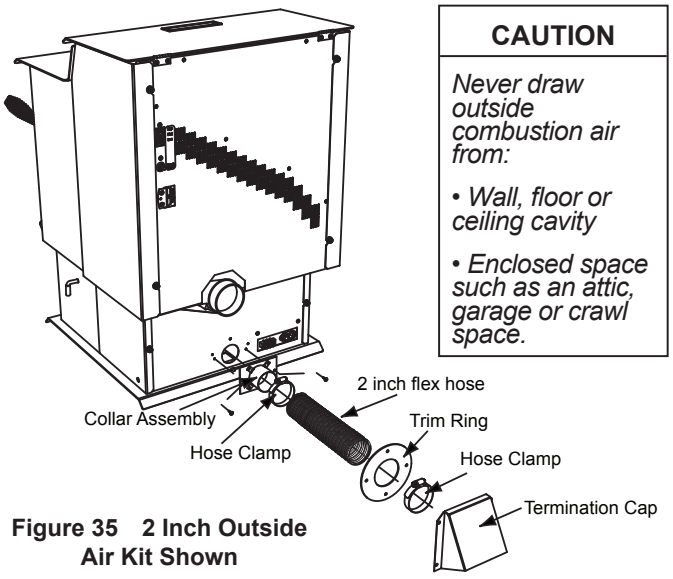


Figure 35 2 Inch Outside Air Kit Shown

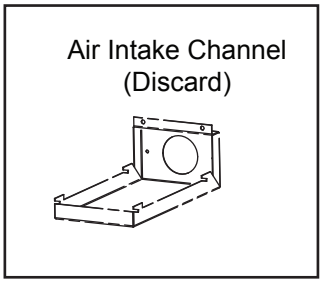


Figure 36

Parts Included in 3 inch Kit OAK-3: 2 wire ties, 1 collar assembly, 1 termination cap assembly, 1 trim ring, fasteners.

Tools Needed: Phillips Head screw driver; wire cutters; hole saw or jig saw, and the length of flex hose needed for your installation if using the 3 inch kit.

10. Measure distance from floor to air vent opening in appliance and mark location on wall.

11. Use saw to cut opening in wall.

    - ***2 inch kit:*** Cut a 2-1/2 to 3 inch opening on inside wall and a 3 to 3-1/2 inch opening on outside of house.
    - ***3 inch kit:*** Cut a 3-1/2 to 4 inch opening on inside wall and a 4 to 4-1/2 inch opening on outside of house.

12. Use wire tie or hose clamp depending on the Outside Air Kit to secure flex pipe to collar assembly.

13. Slide trim ring over flex pipe and run pipe through wall.

14. Attach flex pipe to outside termination cap with second wire tie or hose clamp.

15. Secure termination cap to outside surface.

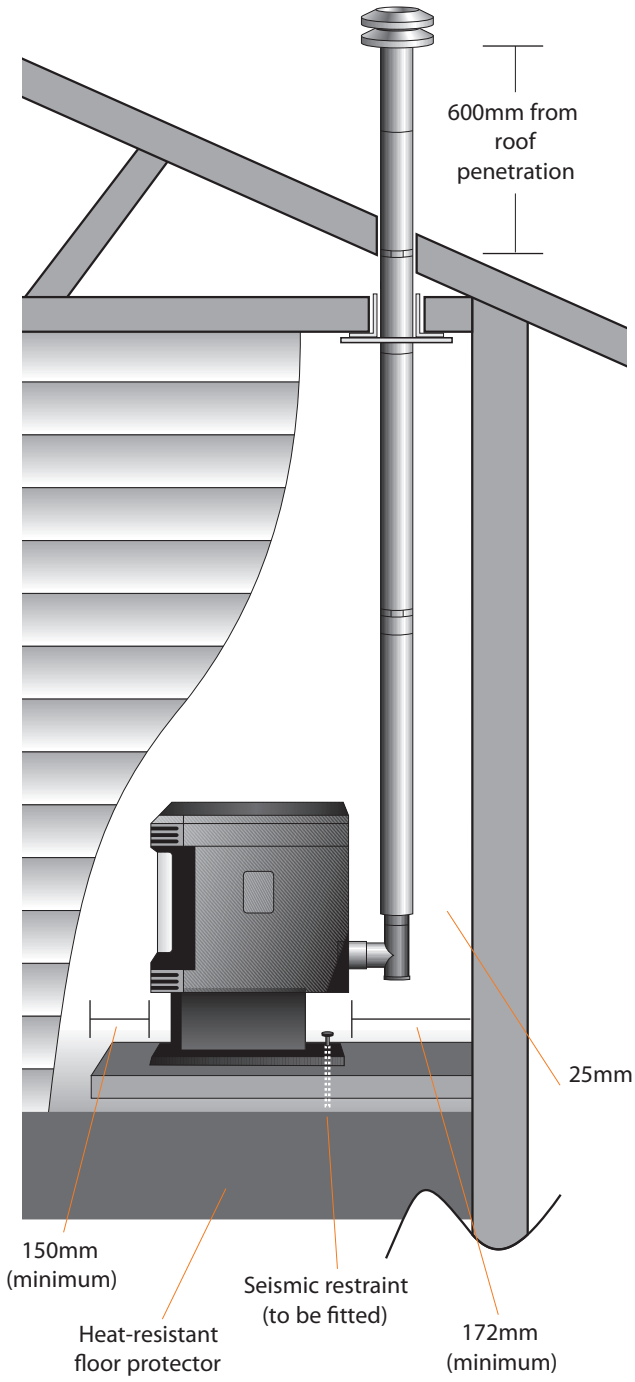
16. Secure trim ring to interior wall.

WARNING

Fire Risk.
Follow Flue Manufacturer's Instructions for Proper Installation

Maintain minimum clearances to combustibles

50 Internal Standard Flue Kit



This flue kit may be used in new and replacement applications in rooms with stud height of 2.4m. The overall height of the flue is 3.6m. The visible flu e is finished in black and the ceiling plate is white. T he support angles for securing the liner to the ceilin g are not shown. Kit is supplied in a carton.

Each 50 Internal Standard Flue Kit contains:-

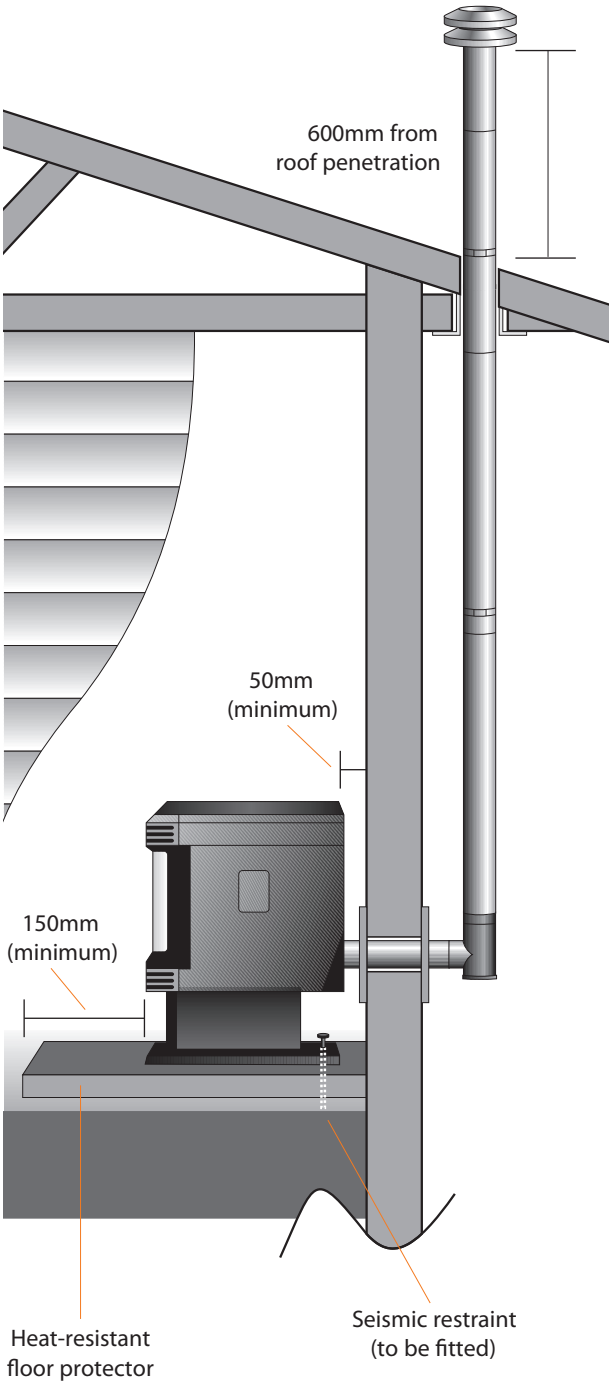
Part No	Description	Quantity
1	Galvanised outer liner ø100mm x 900mm long	1
2	Stainless steel inner liner ø75mm x 900mm long	4
4a	Black p/coat outer liner ø100mm x 900mm long	3
5	Inner/outer flue liner spacer	2
6c	Ceiling thimble ø107mm hole	1
7c	Ceiling decor plate ø107mm hole – white	1
8	Rain cap 75mm	1
9	Rain Cap 100mm	1
10b	Elbow 45° – ø75mm stainless – black (painted)	1
12H	T-adaptor/cleanout – ø75mm – black (painted)	1
23	Support angle 950mm long – 50mm x 50mm sides	2

Note: The Davin 50 Internal Standard Flue Kit complies with AS/NZS 2918:2001 as per Applied Research Test Report 05/1185, dated 15 September 2005.
All fires must be installed by a qualified installer as per the manufacturer's instructions and AS/NZS2918:2001.

DAVIN

Drawing representative only - not to scale.

51 External Standard Flue Kit



This flue kit may be used in new and replacement applications with the flue penetrating the wall behind the fire, running vertically up an outside wall and penetrating the soffit. The overall height of the f lue is 3.6m. All visible flue has a galvanised finish, and can be powdercoated on request. Kit is supplied in a carton.

Each 51 External Standard Flue Kit contains:-

Part No	Description	Quantity
1	Galvanised outer liner ø100mm x 900mm long	4
2	Stainless steel inner liner ø75mm x 900mm long	4
5	Inner/outer flue liner spacer	2
6w	Wall thimble – 2 pieces ø102mm holes	1
6s	Soffit thimble ø107mm hole	1
7w	Wall decor plate ø102mm hole – white	1
8	Rain cap 75mm	1
9	Rain Cap 100mm	1
26	Lined T-adaptor	1

Note: The Davin 51 External Standard Flue Kit complies with AS/NZS 2918:2001 as per Applied Research Test Report 05/1185, dated 15 September 2005.

All fires must be installed by a qualified installer as per the manufacturer's instructions and AS/NZS2918:2001.

DAVIN

8 Reference Materials

A. Commissioning

Once the fire has been installed it will need to be tested and commissioned for correct running and to comply with the NZ clean air regulations. To do this you may need to alter the rotary selector switch on the top of the control box to achieve the correct Magnahelic reading, with the unit running on high (0.11 inches WC).

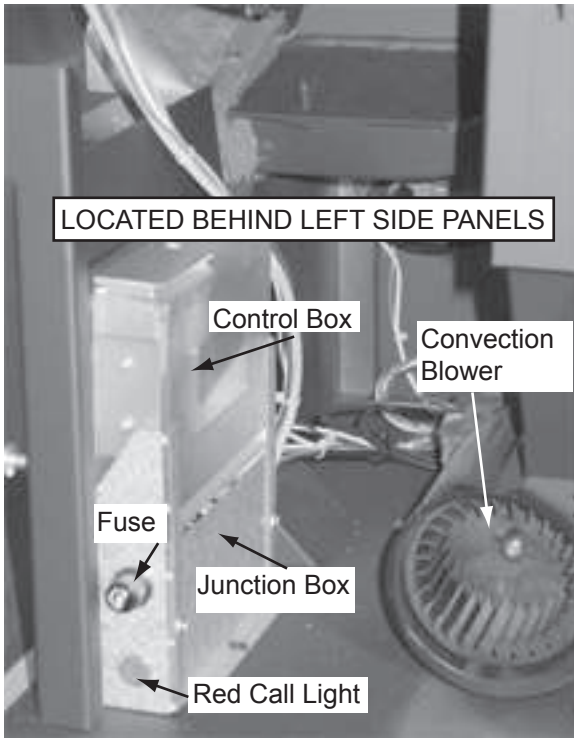


Figure 37

NOTE:
Do **NOT** open the control box. This will void the warranty. If you need to plug in or remove the control box you must first **unplug the appliance.**

To adjust the Magnahelic of the fire you need to adjust the rotary switch setting on the control box.

Do this prior to starting the fire

- Unplug / depower the appliance.
- Using #2 Phillips screw driver, 3/8" or 10mm wrench or socket, loosen the three screws that hold the right upper and lower side panels in place. You do not need to remove the screws. Remove side panels by lifting up and out.
- Use a #2 Phillips screw driver to remove the control box retainer bracket.

Start the fire on high (see "Starting Your First Fire" on page 10) and let it run for at least 15 minutes

- Unplug / depower the appliance (this can be done even when the fire is hot for a short period).
- Lift control box out of the junction box
- Using a small flat head screw driver turn the rotary switch until the desired number is showing on the dial, (default position is 2). This alters the combustion fan speed and hence the Magnahelic reading. This should increase readings from position 1(lowest) to position 7 (highest). Position 0 in not used.
- Re install control box and plug the appliance back in.

Once the power is re applied the fire will go back through its start-up process. You will need to wait at least 10 minutes to check if the Magnahelic is now correct. If not repeat the process. Experience will help judge the correct setting for the installation.

When describing the location of a component, it is always AS YOU FACE THE FRONT OF THE APPLIANCE.

B. Component Function

1. Control Box

a. The control box is located on the lower left side of the appliance, behind the lower left side panel and above the junction box.

b. There is a light located inside of the control box. The internal light will turn green when the appliance has reached a temperature of 200°F (93°C) in the firepot and will turn red when it reaches 600°F (315°C).

c. There is also an internal blue light located in the control box. When you plug in the appliance the blue light will automatically start blinking. For model PS35 the blue light should flash 6 times every 10 seconds for the first 60 seconds after power up.

2. Convection Blower

The convection blower is mounted at the bottom rear of the appliance. There are 2 impellers, one on each side of the motor. The convection blower pushes heated air through the heat exchange system into the room.

3. Exhaust Blower

The exhaust blower is mounted on the right side of the appliance. The exhaust blower is designed to pull the exhaust from the appliance and push it out through the flue system.

4. Feed System

The feed system is located on the right side of the appliance and can be removed as an entire assembly. The assembly includes the feed motor, mounting bracket, bearing and feed spring (auger). The hollow feed spring (auger) pulls pellets up the feed tube from the hopper area and drops them down the feed chute into the firepot.

5. Firepot

The firepot is made of high quality ductile iron and has a cleaning pull-out rod. The floor of the firepot opens for cleaning when you pull out the rod. Be sure that the floor returns to a completely closed position or your appliance will not operate properly.

6. Fuse

The fuse is located on the side of the junction box above to the red call light. The fuse will blow should a short occur and shut off power to the appliance.

7. Heat Output Switch

The heat output switch is located on the upper right back panel. The function of the heat output switch is to regulate the burn rates; low, medium and high settings.

8. Hopper Switch

The hopper switch is located in the upper right hand corner of the hopper. This switch is designed to shut down the feed motor whenever the hopper lid is opened.

9. Igniter

The igniter is mounted on the base of the firepot. Combustion air travels over the red hot igniter creating super heated air that ignites the pellets.

10. Thermocouple

The thermocouple is located on top of the firepot inside the thermocouple cover (ceramic protection tube). The thermocouple sends a millivolt signal to the control box indicating the preset temperatures of the green and red lights have been obtained.

11. Thermostat (optional)

The appliance has the option to be run off a thermostat. For the The heat anticipator should be set on the lowest setting available.

12. Snap Disc #1 (Convection Blower) 43°C

Snap disc #1 is located on the right side of the appliance behind the right side panel. There are 2 purple wires connected to it. This snap disc turns the convection blower on and off as needed. Power is always present at snap disc #1.

13. Snap Disc #2 (Fuel Delivery Interrupt) 79°C

Snap disc #2 is located on the centre of the convection plenum above the convection blower. There is an orange and a black wire connected to it. This snap disc will turn off the feed system which will turn off the appliance if an over fire condition should occur or if the convection blower should fail to operate. If this occurs you will have to manually reset the snap disc.

14. Snap Disc #3 (Back Burn Protector) 121°C

Snap disc #3 is mounted on the back of the auger tube in the centre of the appliance and has a reset button. There are two grey wires connected to it. To access it remove the right side panel. If the fire tries to burn back into the feed system or push exhaust up the feed tube, this snap disc will shut the entire system off. This disc must be manually reset.

15. Vacuum Switch

The vacuum switch is located on the lower right side of the appliance behind right side panel. There are two red wires attached to it. This switch turns the feed system on when vacuum is present in the firebox. The vacuum switch is a safety device to shut off the feed motor if the exhaust or the heat exchanger system is dirty or plugged or if the firebox door is open.

16. Wiring Harness

See “Figure 38” below.

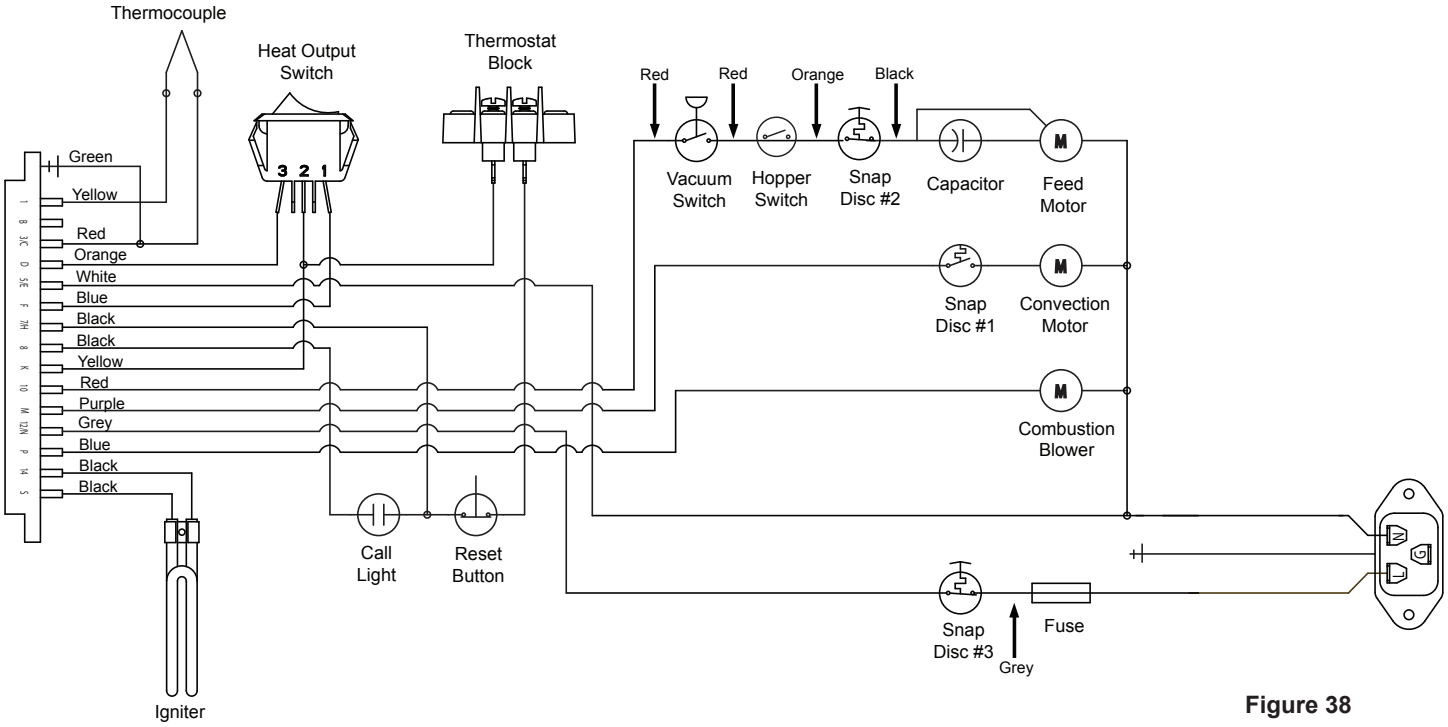

Thermocouple
Heat Output Switch
Thermostat Block
3 2 1
Red
Red
Orange
Black
Vacuum Switch
Hopper Switch
Snap Disc #2
Capacitor
M
Feed Motor
Green
Yellow
Red
Orange
White
Blue
Black
Black
Yellow
Red
Purple
Grey
Blue
Black
Black
Snap Disc #1
Convection Motor
Combustion Blower
Call Light
Reset Button
Snap Disc #3
Fuse
Grey
Igniter

Figure 38

9 Component Locations

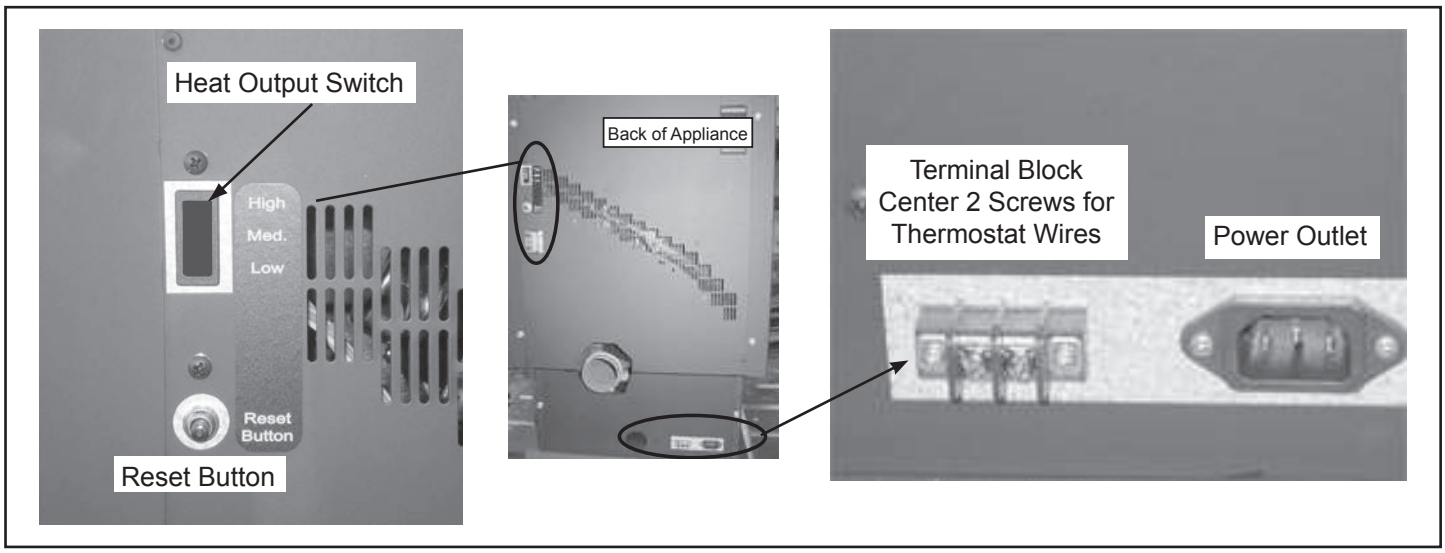


Figure 39

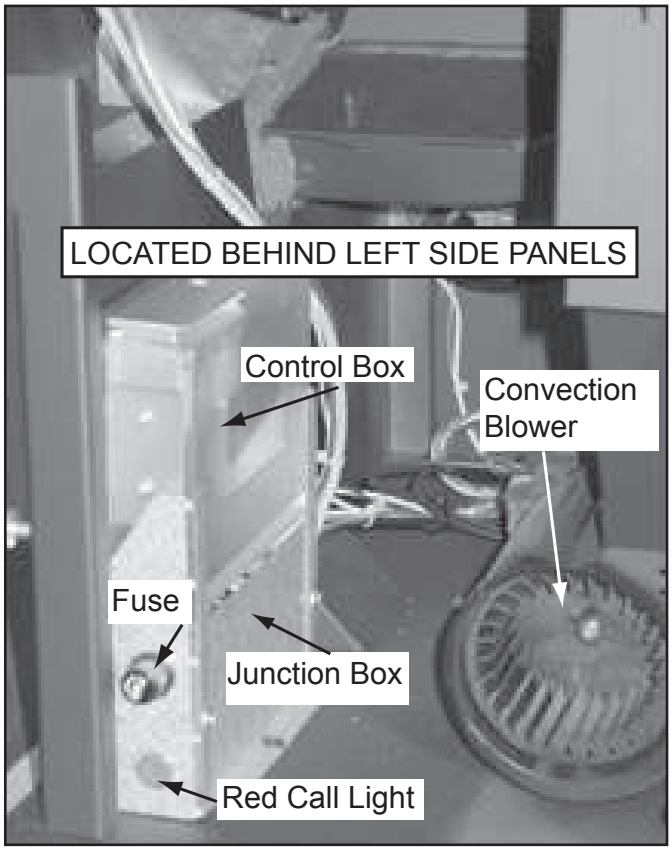


Figure 40

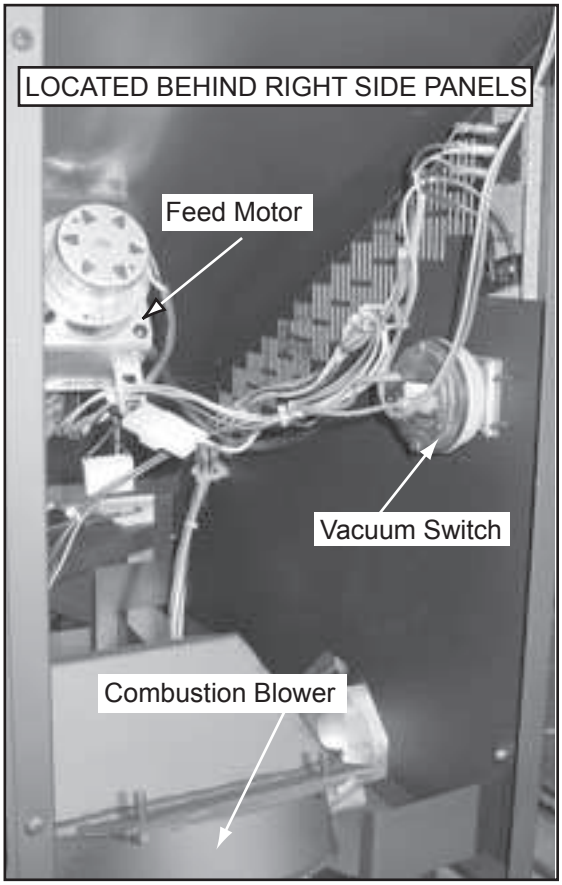


Figure 41

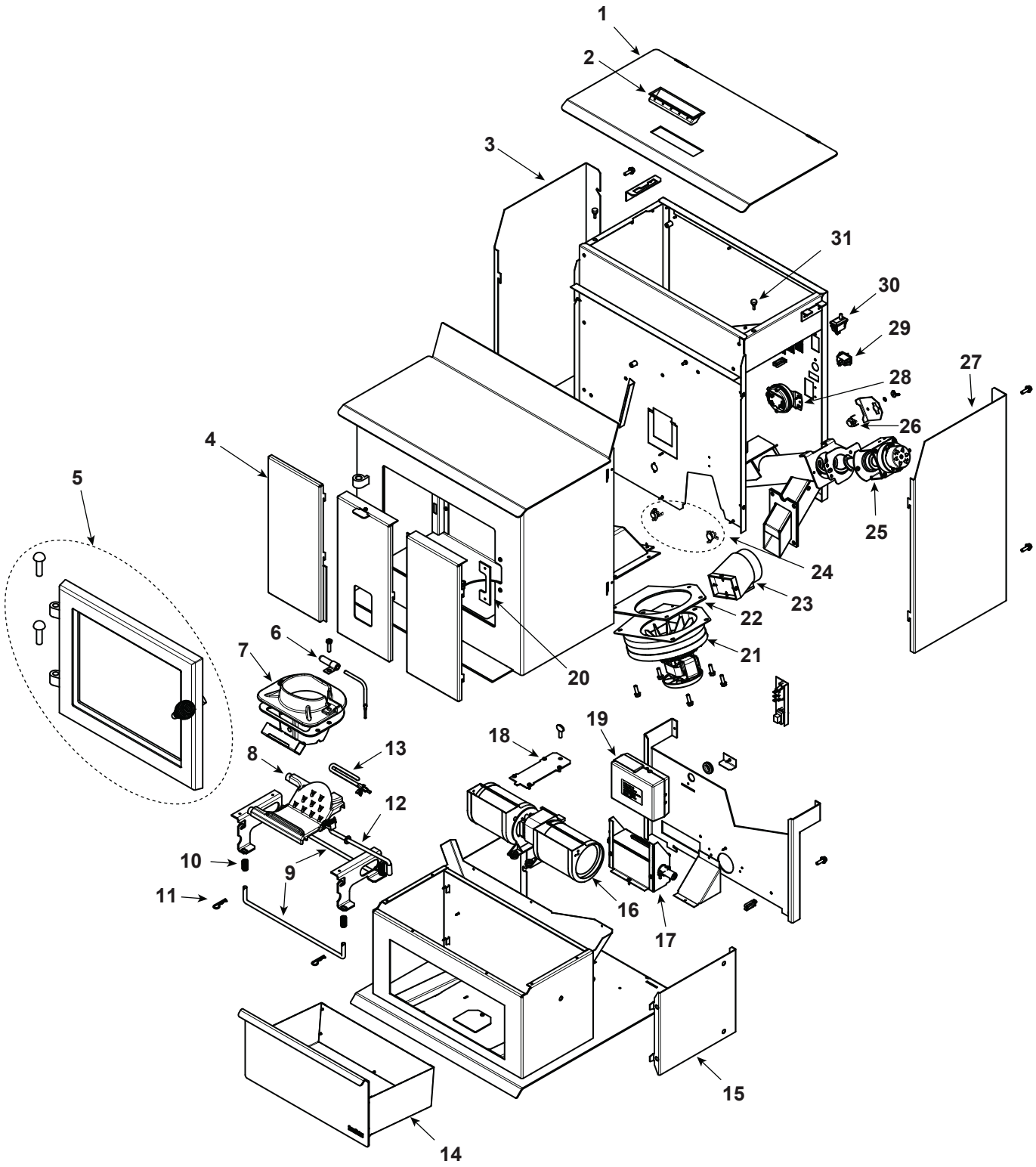
10 Troubleshooting

With proper installation, operation, and maintenance your appliance will provide years of trouble-free service. If you do experience a problem, this troubleshooting guide will assist a qualified service person in the diagnosis of a problem and the corrective action to be taken.

Symptom	Possible Cause	Corrective Action
Plug in appliance - No response.	No Power to outlet. 7 amp fuse defective or blown #3 snap disc tripped or defective. Control box is loose or defective.	Check circuit breaker at service panel. Replace fuse. Reset or replace snap disc. Reseat or replace control box.
Call light on. No fire. No fuel in firepot.	Out of fuel. #2 snap disc may be defective or tripped. Vacuum switch not closing, no vacuum. Hopper lid open. Defective hopper switch. Missing or out of place hopper switch magnet. (CAB50) Control box defective.	Check hopper. Fill with fuel. Reset or replace snap disc. Check exhaust blower is plugged in and operating. Check vacuum switch is plugged in. Check vacuum hose is in good condition, clear and connected at both ends. Check thermocouple is in good condition and plugged in properly. Make sure venting system is clean. Make sure front door is closed. Check vacuum switch fitting on back of auger tube for blockage. Replace control box. Close Hopper Lid. Check hopper switch operation. Check/adjust magnet position.
Call light on. No fire. Partially burned fuel in firepot.	Firepot is dirty (missed ignition). Vent system plugged. Igniter chamber blocked	Clean firepot. Make sure there is no clinker in the firepot. Close firepot bottom plate/ Clinkers may have to be broken up with firepot clean-out tool or other means. Check flue vent for obstruction Check if firepot floor is closed all the way Clear igniter chamber using firepot clean-out tool
Call light on. No fire. Unburned pellets in firepot.	Firepot is dirty. Igniter chamber blocked. Igniter not working. Control box defective. Firepot floor open.	Clean firepot. Make sure there is not a clinker in the firepot. Clinkers may have to be pushed out of firepot with firepot clean-out tool or other means. Clear igniter chamber using firepot clean-out tool. Remove ash drawer to see if igniter is glowing red on start-up. Check igniter wires for good connection. Use a multimeter to check igniter for continuity. Replace igniter using instructions in manual. Replace control box.
Slow or smoky start-up.	Firepot is dirty. Igniter chamber blocked. Firepot floor partially open. Excessive amount of fuel at start-up.	Clean firepot. Make sure there is not a clinker in the firepot. Clinkers may have to pushed out of firepot with firepot clean-out tool or other means. Check if firepot floor is closed all the way Reduce feed rate using feed rate adjustment control rod located inside hopper. Close firepot floor. Clear igniter chamber using firepot clean-out tool.

Symptom	Possible Cause	Corrective Action
Slow or smoky start-up (Cont'd)	Dirty exhaust and/or venting system.	Check for ash build up in unit, including behind rear panels, firebox, exhaust blower and venting.
	Wet fuel / poor quality fuel	Replace fuel
Feed system fails to start	Out of fuel.	Check hopper, fill with fuel.
	#2 snap disc may be defective or tripped.	Reset or replace snap disc
	Vacuum switch not closing. No vacuum.	Check vacuum fitting on auger tube for restrictions. Check door rope and replace if necessary. Check exhaust blower is plugged in and operating. Check vacuum switch is plugged in. Check vacuum hose is in good condition, clear and connected at both ends. Check thermocouple is in good condition and plugged in properly. Make sure venting system is clean. **NOTE:** High winds blowing into the venting system can pressurize the firebox causing loss of vacuum.
	Defective vacuum switch	Replace vacuum switch
	Feed system jammed or blocked.	Empty hopper of fuel. Use a wet/dry vacuum cleaner to remove remaining fuel, from hopper, including feed tube. Check feed chute for obstructions. Remove feed assembly & check for obstruction.
	Feed spring not turning with feed motor.	Check that set screw is tight on feed spring shaft at end of feed motor.
	Feed motor defective or not plugged in.	Check connections on feed motor, replace if defective.
Amber light blinking	Thermocouple may have failed. Amber light will blink 3 times, pauses, and keeps repeating	Replace Thermocouple
No call light. Unit does not begin start sequence.	Thermostat not set to a high enough temperature.	Adjust thermostat above room temperature.
	Snap disc #3 tripped or defective.	Reset snap disc or replace if defective.
	No power.	Connect to power.
	Fuse blown.	Replace fuse.
	Connections at thermostat and/or appliance not making proper contact.	Check connections at thermostat and appliance. Temporarily jump connection to verify
	Defective thermostat or thermostat wiring.	Replace thermostat or wiring. NOTE: To test thermostat and wiring, use a jumper wire at the thermostat block on the unit to by-pass thermostat and wiring.
	Control box defective.	Replace control box.
Unit fails to shut off.	Call light on.	Turn thermostat off. If call light does not go out, disconnect thermostat wires from unit. If call light does go out, thermostat or wires are defective.

Symptoms	Possible Cause	Corrective Action
Convection blower fails to start.	#1 snap disc defective. Blower not plugged in. Blower is defective or object jammed in impeller. Control box is defective.	Replace snap disc. Check that blower is plugged into wire harness. Replace blower. Replace control box.
Exhaust blower fails to start.	Blower not plugged in. Intermittent electrical connection. Obstruction in blower. Blower is defective. Control box is defective.	Check that blower is plugged into wire harness. Verify fit of plug to outlet Clean exhaust system. Replace blower. Replace control box.
Exhaust blower does not shut off.	Control box is defective.	Replace control box.
Large, lazy flame, orange color. Black ash on glass.	Dirty appliance. Poor fuel quality, high ash content. Excessive amount of fuel. Control box is on the wrong setting.	Clean unit, including firepot and venting system. Clean exhaust path. Try a different brand of pellets. Reduce feed rate using feed rate adjustment control rod located inside hopper. “See owner’s manual for correct setting for your model and how to adjust control box setting.
Nuisance shutdowns.	Low flame. Sawdust buildup in hopper. Feed motor is reversing. Feed motor is weak Feed bearing adjustment Defective thermocouple. Defective control box. Firepot more than 1/2 full.	Increase feed by opening feed rate adjustment control rod located inside hopper. Clean hopper, see **page 14.** Check for good connections between feed motor and wire harness. Test feed motor torque. Adjust feed bearing Replace thermocouple. Replace control box. See **page 16** for detailed instructions for “High Ash Fuel Content Management” Reduce feed rate
Appliance calls for heat. Call light illuminates. Exhaust blower starts. No feed or igniter.	Thermocouple is defective or not properly plugged in. Defective control box	Check connections on thermocouple or replace if defective. A flashing yellow light on the control box indicates a problem with the thermocouple. Replace control box.

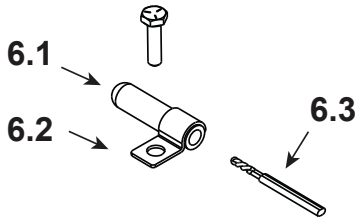


Part number list on following page.

IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your appliance please provide model number and serial number. All parts listed in this manual may be ordered from an authorized dealer.

Item	Description	Comments	Part Number
1	Hopper Lid Assembly		SRV7058-009
2	Handle, Hopper Lid		200-0110
3	Side Curtain, Left		SRV7058-125
4	Baffle Assembly		SRV7058-026
5	Door Assembly		SRV7058-014
	Door Handle Assembly		SRV7058-030
	Gasket, Glass Tape, 3/4" X 1/8"	5 Ft	832-0460
	Glass Assembly		SRV7058-015
	Rope, Door, 3/4" X 84"		832-1680

#6 Thermocouple Assembly



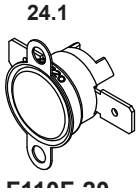
6	Thermopcouple Assembly		
6.1	Thermocouple Protection Tube		SRV7034-186
6.2	Half Clip		7000-321
6.3	Thermocouple		812-4470
7	Firepot Assembly		SRV7058-022
	Gasket, Firepot		7034-190
8	Firepot Bottom		7034-153
9	Rail, Auto-Clean		SRV7034-152
10	Spring	Pkg of 4	7000-513/4
11	Hitch Pin Clip 3/32	Pkg of 10	7000-374/10
12	Pull Rod		SRV7058-141
13	Igniter (Loop), 220V		812-3901
	Wing thumb Screw 8-32 x 1/2		7000-223/24
14	Ash Pan Assembly		SRV7058-013
	Heatilator Logo		4021-049
15	Pedestal Side	Qty 2 req	SRV7058-153
16	Blower, Convection 230V		SRV7000-630
17	Wire Harness		SRV7072-112
	Fuse 7 AMP, Junction Box	Pkg of 10	812-0380/10
18	Blower Retainer		SRV7058-148
19	Control Board		SRV7000-651
20	Latch Backing Plate		SRV7058-155
21	Blower, Exhaust Combustion		SRV7000-628

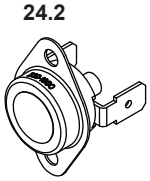
Additional service parts on following page

IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your appliance please provide model number and serial number. All parts listed in this manual may be ordered from an authorized dealer.

Item	Description	Comments	Part Number
22	Gasket, Exhaust Combustion Blower	Between housing & stove	240-0812
		Between motor & housing	812-4710
23	Casting, Exhaust Transition		180-0190

Snap Disc's





24	Snap discs		
24.1	Snap Disc, 110-20	Right	SRV230-1220
24.2	Snap Disc Manual Reset	Left	230-1960
25	Feed Assembly		SRV7072-004
	Feed Bearing		SRV7000-598
	Feed Motor		7034-144
26	Snap Disc		SRV230-1290
27	Side Curtain, Right		SRV7058-124
28	Vacuum Switch		SRV7000-531
	Hose Vacuum, 5/32 Id	3 Ft	SRV240-0450
29	Switch Rocker		230-0730
	Wire Harness On/Off Switch		SRV7068-124
30	Hopper Switch		SRv7000-612
31	Bumper, Rubber	Pkg of 12	SRV224-0340/12
	Component Pack		SRV7072-008
	Cleanout Tool		414-1140
	Flue Adapter		SRV7027-281
	Power Cord		SRV7000-636

Additional service parts on following page.

Beginning Manufacturing Date: Dec 2011
Ending Manufacturing Date: Active

IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your appliance please provide model number and serial number. All parts listed in this manual may be ordered from an authorized dealer.

Item	Description	Comments	Part Number
	ACCESSORIES		
	Log Set		811-0592
	Outside Air Kit,2 "		811-0872
	Fastener Packs		
	AVK Rivnut Repair Kit 1/4 -20 & 3/8-16 Rivnut Tools		RIVNUT-REPAIR
	Bolt, Hex Head	Pkg of 10	25221A/10
	Nut, 2-WY SIDE-LOCK JAM 3	Pkg of 24	226-0100/24
	Screw HWH MS 1/4-20 X3/4 NS	Pkg of 25	220-0080/25
	Screw Machine Screw 1/4-20 x 5/8	Pkg of 24	229-1100/24
	Screw PH PHL TC 8-32 X 3/4	Pkg of 24	220-0030/25
	Screw PH PHL TC 8-32 X 3/8	Pkg of 40	225-0500/40
	Screw PH PHL TC 8-32X1/2	Pkg of 25	220-0030/25
	Screw, Set 5/16-18 x 1/4	Pkg of 25	225-0550/25
	Screw, Wing Thumb, 8-32X1/2	Pkg of 24	7000-223/24
	SMS #8 X 1/2 S-GRIP BO	Pkg of 40	12460/40
	Thumb Screw, 1/4-20 x3/4	Pkg of 10	844-5070
	Washer, 1/4 SAE	Pkg of 24	28758/24
	Washer, SAE, 3/8 black		222-0010

Service and Maintenance Log

Date of Service	Performed By	Description of Service

Homeowner's Notes:

CONTACT INFORMATION:

Please contact your Heatilator dealer with any questions or concerns.

For the number of your nearest Heatilator dealer, please visit
www.heatilatorecochoice.com

Prior to contacting, please have the model and serial number of the unit you are calling about.
This information can be found at the rear of the unit.

CAUTION

DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.

We recommend that you record the following pertinent information for your ECO-CHOICE PELLET STOVE

Date purchased/installed: _____

Serial Number: _____ Location on appliance: _____

Dealership purchased from: _____ Dealer phone: _____

Notes: _____

_____

_____

This product may be covered by one or more of the following patents: (United States) 6830000 and 5582117 or other U.S. and foreign patents pending.