



Installation, Operation and Maintenance Manual

90,000 BTU & 105,000 BTU Stoker Coal Stoves, Direct Vent



105K BTU Stove Shown

About Us

Keystoker had its inception in 1946.

Two electrical engineers saw the need for a way to conveniently burn anthracite coal, which was plentiful, but heating with coal had a bad reputation of being dirty and requiring maintenance several times a day. Our engineers developed an automatic stoker unit equipped with a coal hopper that held enough fuel for several days. This allowed the coal to be cleanly burned and without frequent maintenance. They then saw the need to make a hot water boiler specifically designed to burn coal and built them in multiple sizes to meet our customers' needs.

As prices of energy continued to escalate, Keystoker continued its research. Over 60 years of research has developed a patented feed-in system, a patented flat grate, and a patented thermal heat exchange, which has produced the highest efficiency possible.

Keystoker --- Made in America with American Technology and utilizing American resources is now known internationally for its simplicity, quality, and dependability, all this and still an economical price.



CONAM Inspection, Inc.
Auburn, MA 01501 STL-002

TESTED 9/89 TO ANSI/UL 1482, CSA B366-m1979 & ETLM 78-1



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Safety

Precautions & Definitions

Our stoves have been designed for safe and reliable operation when properly used and maintained in accordance with instructions contained in this manual. A stoker stove is a precision system that if not properly installed or maintained can be hazardous, cause burns, electrical shock or even loss of life. Keystoker shall not be liable for physical injury, damage to property or death caused by a failure to observe the instructions in this manual.

Please note the following symbols are used to denote special attention within this manual:



Electrical Hazard. Particular care must be taken when electrical power source to the unit is energized.



Warning. Operating procedure, practice etc. which, if not correctly followed, could result in personal injury.



Caution. Operating procedure, practice etc. which if not followed could result in damage or destruction of unit.



Fire. Operating procedure, practice, etc. which if not followed could result in severe burns, bodily harm, loss of life and property damage.



Death. Critical situation or operation of unit that may cause death.

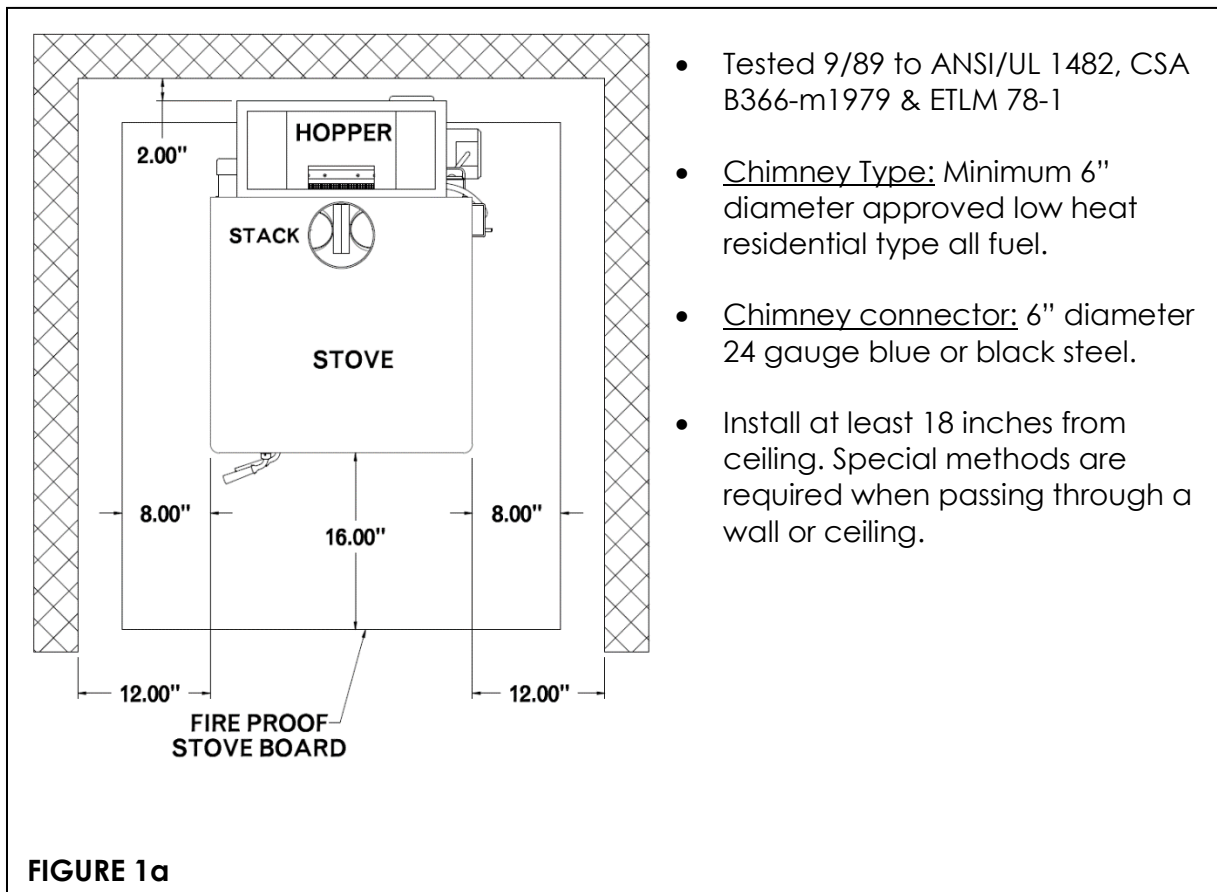
General Safety Statements:

- Thoroughly read and understand all instructions
- Always leave this manual with the owner of the stove.
- A carbon monoxide (CO) detector has been supplied with your stove.
 - **The CO Detector needs to be plugged in.**
 - CO is colorless, odorless & tasteless gas that can be deadly if not monitored or detected properly.
- Danger risk of fire or explosion. Do not burn garbage, gasoline, drain oil, or other flammable liquids. Do not use chemicals or fluids to start fire.
- Stove surfaces may be hot while in operation. Keep children away. Do not touch during operation
- Do not connect this unit to a chimney flue serving another appliance
- Please follow all local building and zoning ordinances
- Use the proper fuel type as noted in this manual

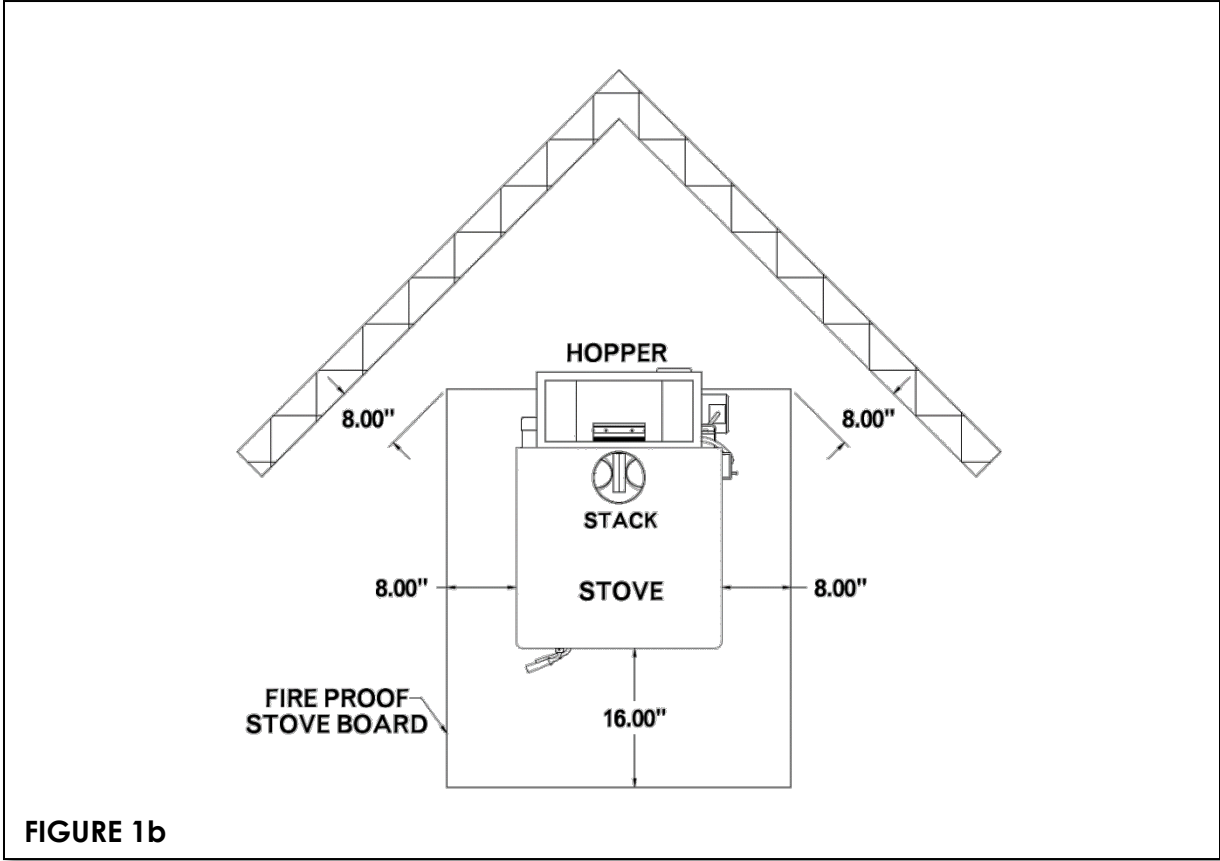
Installation

Stove Placement

1. Safety inspection of a venting system should be performed before and after installing your new stove. Procedures to follow are those recommended by National Fuel Gas Code, ANSI Z223.1 or refer to local codes or ordinances.
2. Plan the vent system layout before installation to avoid possibility of accidental contact with concealed wiring or plumbing inside walls.
3. Select a position on a solid level surface with direct access to a chimney. On non-masonry floors, use an approved fire & ember resistant floor protector under stove. Maintain 12" clearance on sides of stove to combustibles. Maintain 6" clearance from 4" pipe to combustible. Clearance from 6" black wall pass thru pipe is 0" to combustibles. A 2" clearance on rear and 16" clearance on front of stove. Clearance from corners of stove is 8". See label on stove. Refer to Figure 1a & 1b.



- Tested 9/89 to ANSI/UL 1482, CSA B366-m1979 & ETLM 78-1
- Chimney Type: Minimum 6" diameter approved low heat residential type all fuel.
- Chimney connector: 6" diameter 24 gauge blue or black steel.
- Install at least 18 inches from ceiling. Special methods are required when passing through a wall or ceiling.



Vent Terminator Location & Direct Vent Arrangement**VENT TERMINATOR MAY NOT BE LOCATED**

A. Less than 1 foot above grade.

B. Above or within 3 feet horizontally of oil tank or gas meter.

C. Closer than 3 feet to inside corner of home.



D. Closer than 1 foot from any opening that gasses could re-enter home.

E. Less than 4 feet below windows.

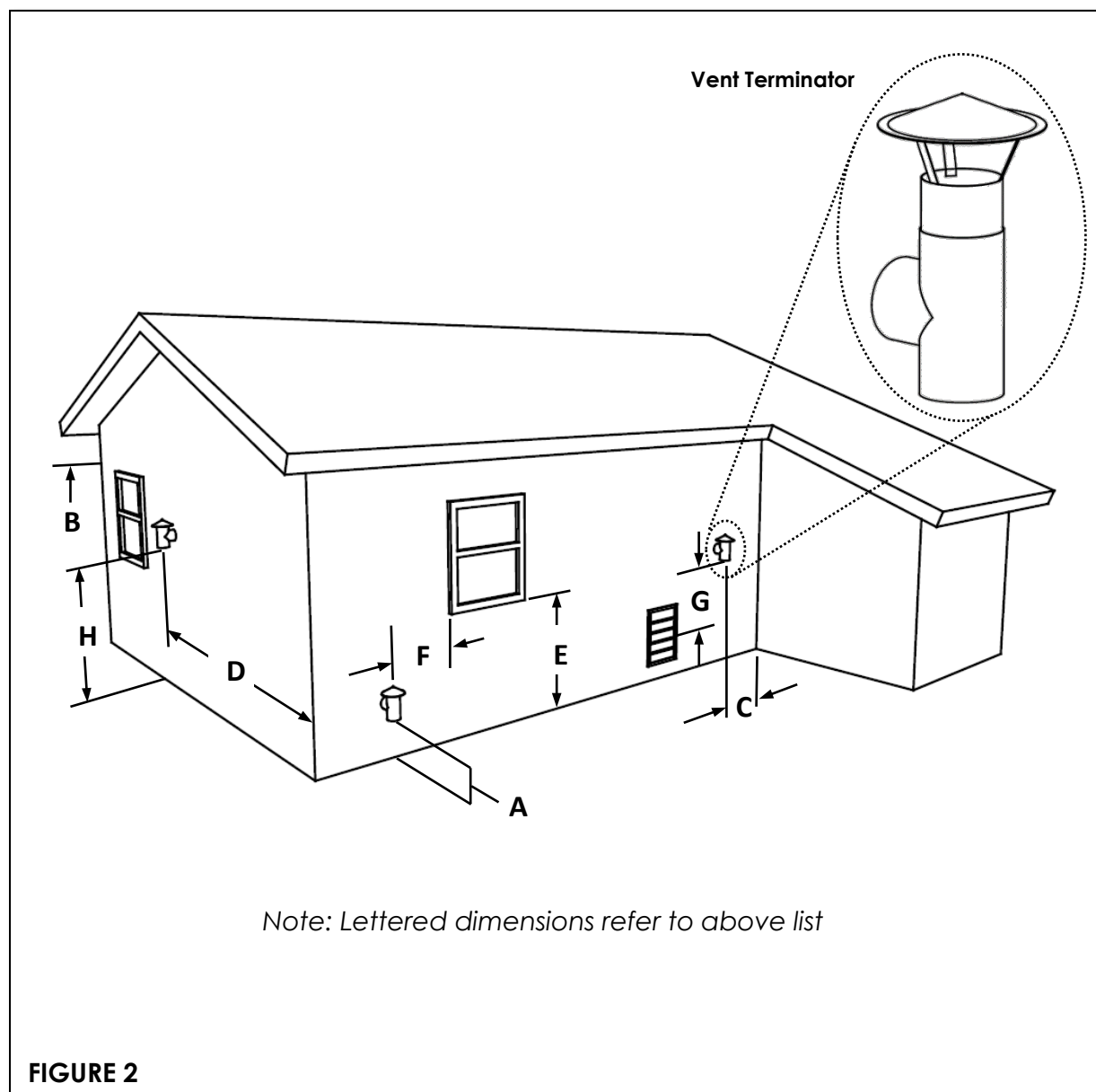


F. Less than 1 foot horizontally of door or window.

G. Less than 3 feet above any forced air inlet located within 10 feet.

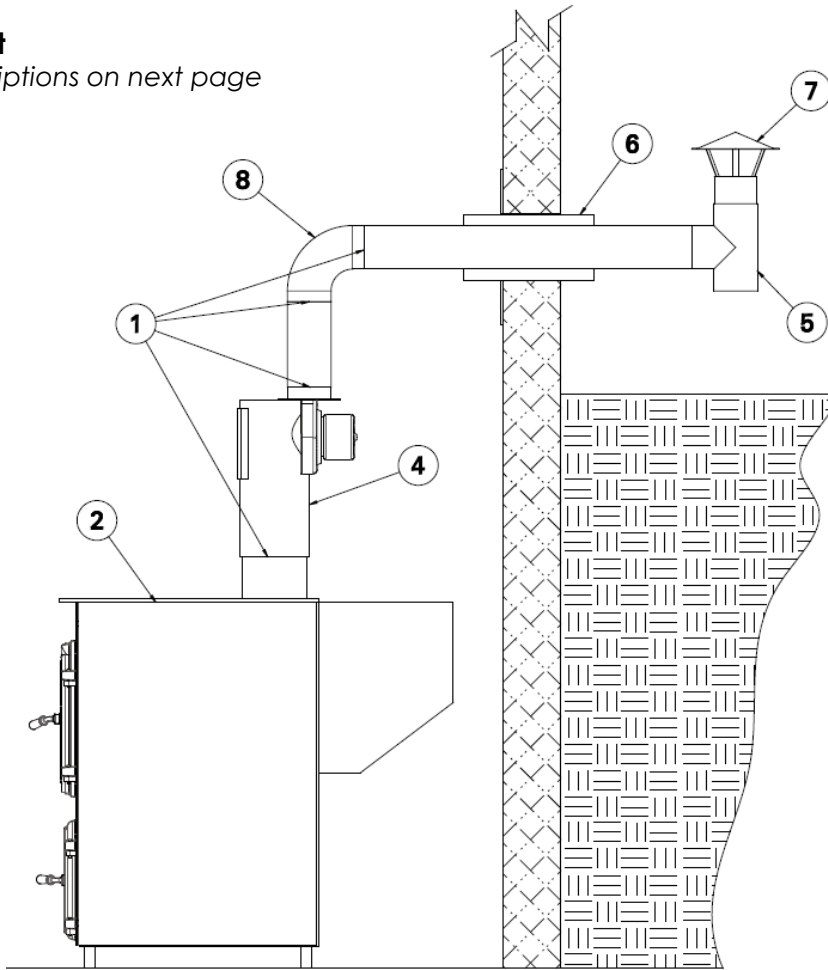
H. Less than 7 feet above grade when adjacent to public walkways

Refer to Figure 2



Top Vent Layout

Note: Item descriptions on next page



Bottom Vent Layout

Note: Item descriptions on next page

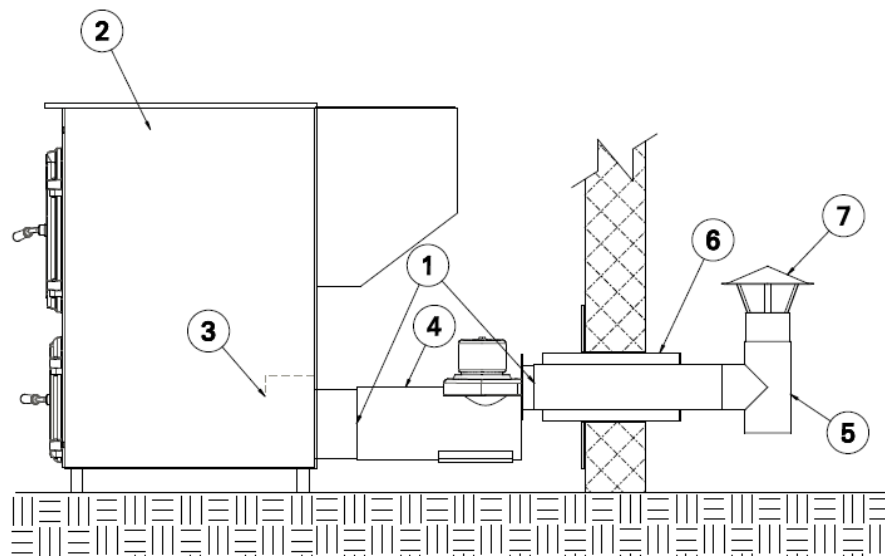


FIGURE 3

Item #	Component	Item #	Component
1*	Sealer for All Joints	5*	4" Tee
2	Stove	6	1 Piece Wall Kit
3	Hanging Baffle	7	Stainless Steel Rain Cap
4*	Direct Vent Unit	8	4" Elbow



1* Seal All Joints: When it becomes necessary to run exhaust pipe up the interior wall of home, every joint must be sealed with a high temperature silicone or equivalent. This will prevent fumes from escaping into home.



4* Draft Port: It may be necessary to clean draft port (Located inside exhaust outlet of the Direct Vent Unit) every several weeks to keep the stove from tripping out on safety reset. Removal of the Direct Vent side plate will aide in cleaning.

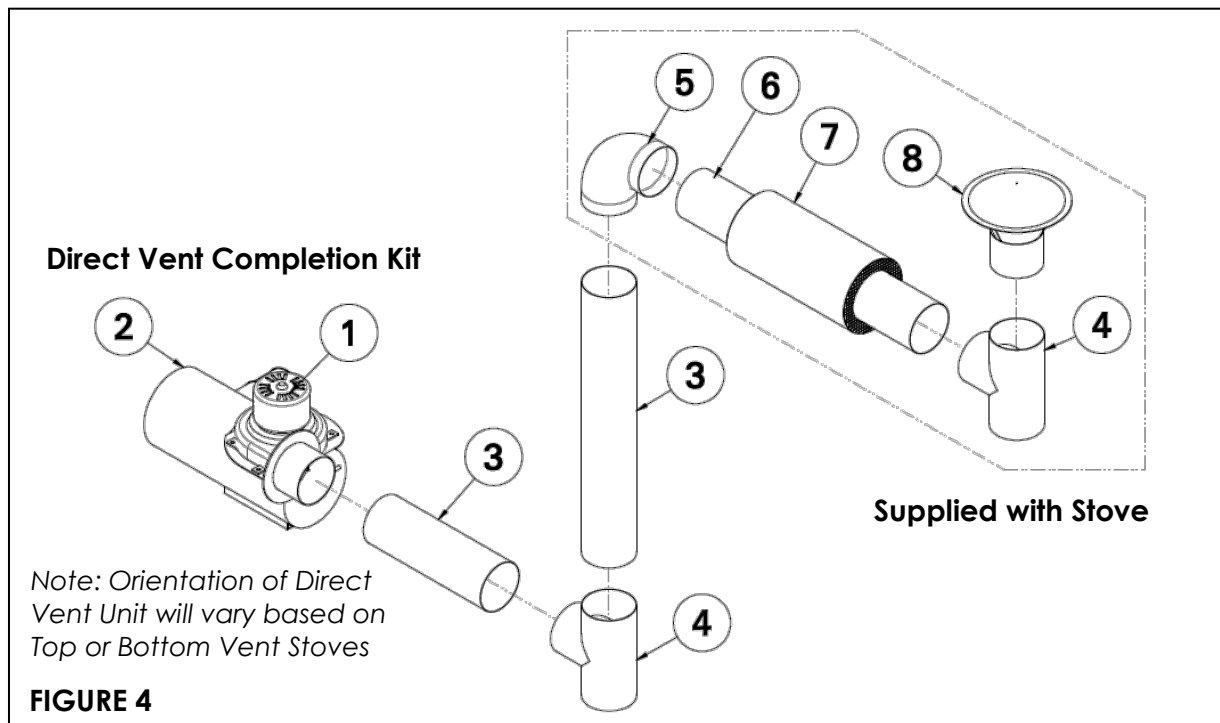


Using brush (furnished with stove), bottom vent only, remove ash pan, reach into 6" exhaust pipe, and by using a swirling or circular motion, remove dust.

5* Tee: A tee should be used at this location. A tee will ease the cleaning of the piping throughout the heating season.

Direct Vent Completion Kit

Item #	Component	Item #	Component
1	Direct Vent Exhaust Motor	5	4" Elbow
2	Direct Vent Unit	6	4" Stainless Steel Pipe
3	4" Stainless Steel Pipe	7	6" 24 Ga. Wall Kit or Thimble
4	4" Tee	8	Stainless Steel Rain Cap



Assembly



1. Plumb hopper end of stove with level. Hopper end of stove must be vertical.
2. Mount hopper in place and fasten securely. Carefully, reach down into bottom of inside hopper and bend flange of hopper into throat of stoker unit.
3. After determining location of stove, (if you are going through a frame wall) cut a hole through exterior & interior walls slightly larger than the 6" stainless steel pipe. Put stove into position to determine stove pipe length needed to have at least 6" of pipe extending past exterior wall.
4. Slide 6" Wall Kit through opening with screened side facing outward.
5. Insert 4" pipe through Wall Kit and attach to Venter Unit piping on inside.
 - a. For TOP VENT: Attach to 4" Elbow
 - b. For BOTTOM VENT: Attach directly to straight 4" Pipe or Venter Unit

NOTE: It is not necessary to use 6" stainless steel wall kit if 4" pipe is going through a non-combustible wall, such as concrete or block. No barometric draft control is required

6. On outside of home, place 4" stainless steel tee on exhaust pipe. Place 4" stainless steel rain cap on top of 4" tee. Secure with screws. Leave bottom of stainless tee open.
7. Depending on location of exhaust venting to outdoors, varying draft and wind conditions may cause occasional tripping of reset button, causing fire to go out.
8. Draft and air intake settings are preset at factory and it is usually not necessary to change for installation going straight out through the wall. It is still recommended to check draft settings with draft gauge after starting fire.
9. If extra stove pipe must be added inside home to achieve necessary height to go above outside grade level, it may be necessary to adjust exhaust intake shutter located on direct vent unit, to achieve proper draft setting of -.02

The continuous running of exhaust fan is necessary to expel fumes from stove to outside of home, eliminating the need for a chimney.

10. Timer MUST be mounted on the side of coal hopper or on rear of coal hopper. DO NOT MOUNT TIMER ON STOVE BODY.
11. On all TOP VENT, DIRECT VENT models, the wire to exhaust motor may not be allowed to come into contact with stove body. This would cause damage to electrical wires.



12. Ensure all power for this unit is turned off. Locate thermostat in an area where heat from stove can be freely reached. Mount plastic wall plate of thermostat. Connect thermostat wires to screws on lower portion of wall plate. According to instructions, run terminal Red & White thermostat wires to Relay on stove and connect wires to terminals marked T.T. (note: color coding of thermostat wires is unimportant.) Be sure to snap thermostat securely onto wall plate.



13. Ensure all terminals are properly connected. Plug power cord into 115 volt grounded wall outlet. Combustion blower should be running. Turn the thermostat up to make the feed motor operate and you are now ready to start a fire.

Fuel Type



1. Burn rice Anthracite coal only.

Danger risk of fire or explosion. Do not burn garbage, gasoline, drain oil, or other flammable liquids. Do not use chemicals or fluids to start fire.

Operation

Startup



1. To start a fire, fill hopper with coal, reach in through fire door and pull coal down to cover entire grate area. Place kindling (charcoal supplied) into a full sheet of newspaper, crumble paper, and dig kindling deep into coal in the center of grate. Light newspaper with match and plug power cord into outlet. NEVER USE GASOLINE OR LIGHTER FLUID TO START FIRE. When kindling is burning well, place a few small shovels of coal onto the fire.



NOTE: The coal feeder adjustment nut is PRESET and may not need to be changed. If it becomes necessary to adjust coal feed, the white nut on stoker unit may be turned **CLOCKWISE** for **MORE** coal feed and **COUNTER-CLOCK WISE** for **LESS** coal feed. NEVER USE A WRENCH ON COAL FEED ADJUSTMENT NUT (USE FINGERS ONLY).

When stoker unit is running to satisfy thermostat, you should have a full grate of fire, except for the bottom 1" to 2" of grate. The end part of the grate should have ash covering it. (Refer to pages 12 & 13, Diagrams 1 & 2)

When thermostat is satisfied, the gear motor will not run continuously, gear motor will only run intermittently. During the time when thermostat does not call for heat, the timer will turn feed motor on to maintain a small fire approximately 2" in length. Settings of timer may be adjusted.

To increase size of fire bed or to reduce coal feed, adjust white nut (coal feed adjustment nut). To start another fire, it is not necessary to adjust coal feed. Some smoke may be visible when starting a fresh fire, but should not persist.

After a fire, has been established and the stove is warmed up, a draft reading should now be taken. Remove set screw in ash door and insert draft gauge. Draft gauge should read between -.02 to -.04. The combustion air shutter is preset at factory. If any further adjustment is needed to obtain proper draft reading . . . slide adjusting rod (located in direct venter) in or out to obtain proper draft. Secure adjustment rod with set screw.



Failure to install, maintain, and/or operate the venting system in accordance with manufacturer's instructions could result in conditions which may produce injury and/or property damage.

Cont'd next page

The stove is equipped with a safety fume switch. If hot coal gases are not vented outdoors, the safety switch will trip out on reset, which will shut off stoker unit. The fire will go out and cannot be restarted until reset button on safety switch cools down. Then the button must be manually reset. If safety switch trips out frequently, it may be caused by:

1. Restricted or blocked vent tube between stove and exhaust fan. **SOLUTION:** Pull power plug from receptacle, remove ash pan, and using brush supplied with stove, reach brush into exhaust pipe. Move brush in a circular motion to clean pipe and exhaust area. Plug power cord back in.

Note: On Top Vent models, remove power and cleanout plate. Brush down pipes in back of stove.

2. Restrict or blocked exhaust pipe from stove to outside of home. **SOLUTION:** Clean exhaust pipe.
3. Accumulation of dust on exhaust fan blade. **SOLUTION:** remove screws on motor mounting bracket and thoroughly clean fan blades on exhaust motor.
4. Extreme windy conditions outside of home blowing against exhaust air.
5. Safety switch defective. **SOLUTION:** Replace safety switch.



Do not allow ashes to overflow out of ash pan, this can cause blockage in exhaust system causing safety switch to trip, resulting in loss of fire. Blockage will have to be cleared before pushing reset button and re-starting fire

Diagram 1 – Continuous Heating

Depicts what fire should look like when thermostat calls for heat for extended period:

- A. Unburned fresh coal supply from coal hopper
- B. Burning Coals
- C. Ash on end of grate (around 1" to 2")

The actual length of burning coals will vary as heat demand increases or decreases. If burning coals fall off grate, reduce coal feed by turning white adjustment nut in a counter clock-wise direction 1 or 2 full turns. Wait at least 1 hour before making any more adjustments.

When thermostat is calling for heat, the gear motor will be in continuous run, but if the fire bed remains small, increase the coal feed by turning white adjustment nut clock-wise.

Under normal draft conditions, when fire bed has reached its maximum length (with 2" of ash) flames should be touching top of interior stove plate. If flame is not reaching top of stove:

1. Fire bed may be too thick.
2. Reduce coal feed.
3. Hopper end of stove is not plumb.
4. Burrs may be stuck on grate, scrape grate until it is smooth.
5. Not enough air flow, adjust air intake shutter on combustion motor

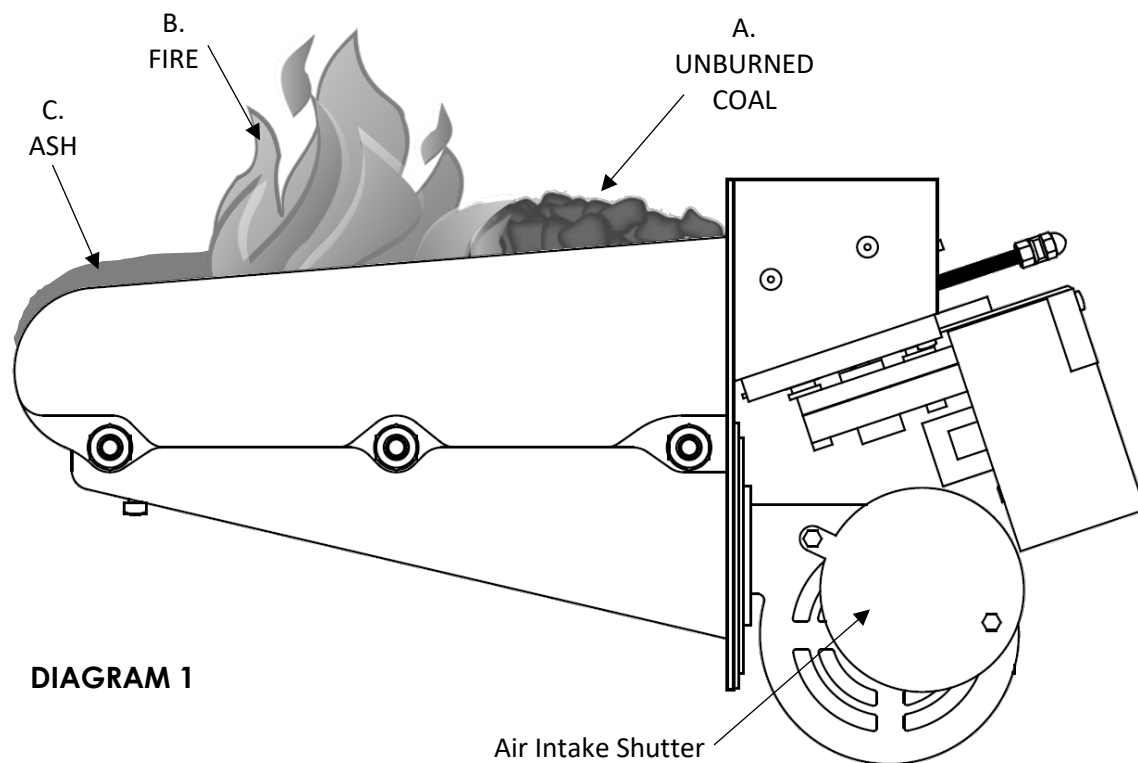


Diagram 2 – Intermittent Heating

Depicts what fire size should look like when thermostat has not called for heat for extended periods:



- A. Unburned fresh coal supply from hopper.
- B. Burning coal (about 1-1 ½" to 2") (low flames).
- C. Ash on end of grate

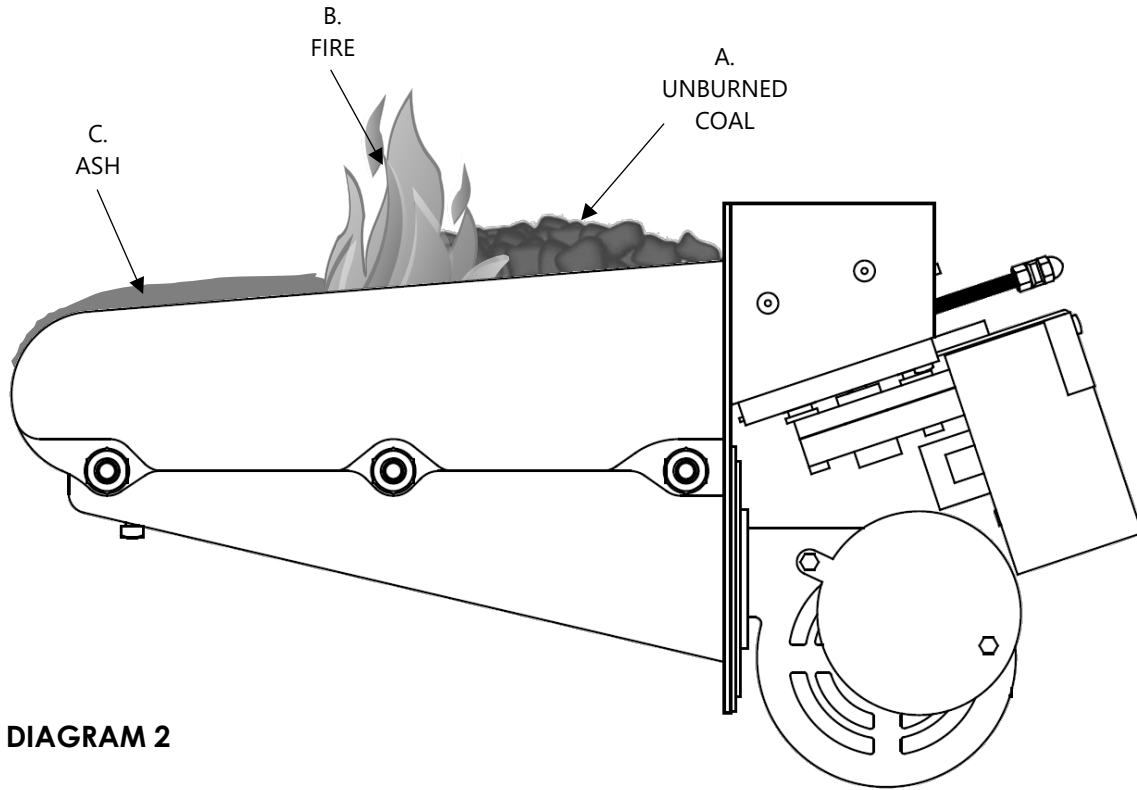


DIAGRAM 2

Component Descriptions & Operation

Stoker Unit Components

105K BTU Unit Shown

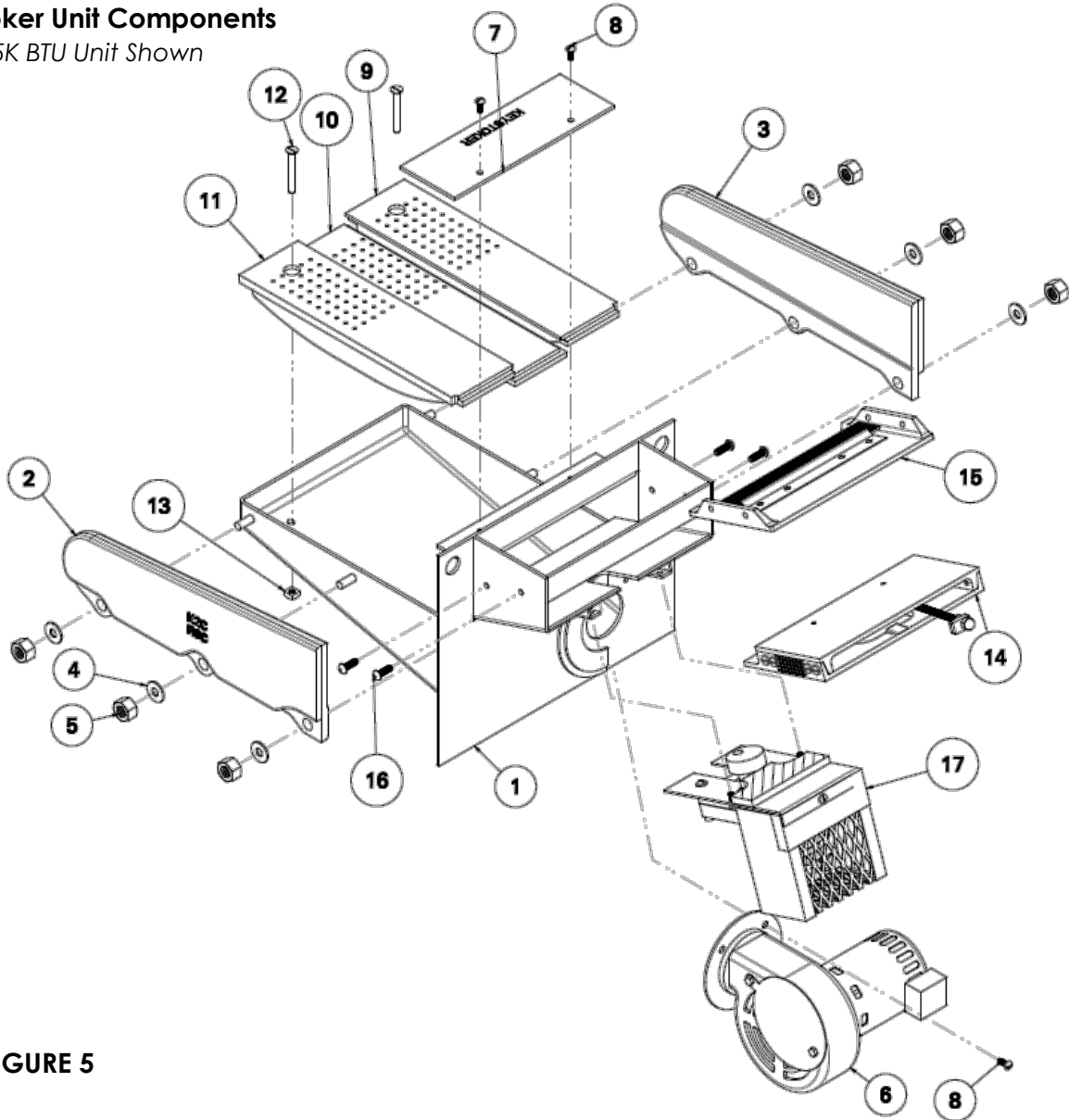


FIGURE 5

Item #	Component	Item #	Component
1	Stoker Sub-frame	10	Stoker Grate # 2
2	Side Rail, Left	11	Stoker Grate # 4
3	Side Rail, Right	12	Screw, 1/4-20UNC x 2.00" Long
4	Washer, 5/16"	13	Square Nut, 1/4"
5	Nut, 5/16"	14	Pusher Bar Subassembly
6	Combustion Blower	15	Top Plate Subassembly
7	Coal Level Plate	16	Drive Screw 1/2" x 3/4" Long
8	Screw, #10-24UNC x 1/2" Long	17	Stoker Motor Subassembly
9	Stoker Grate # 1		

PUSHER BAR SUBASSEMBLY: Moves in a reciprocating motion. Activated by cam on gear motor to force coal from hopper onto grate and pushes ashes off grate into ash pan. Length of stroke is adjustable by turning white coal feed adjustment nut. Replaceable parts include Nylon Screws (#5 & #6) & Insulation Strip (#7). All other parts are non-serviceable.

Item #	Component	Item #	Component
1	Movable Plate 2	7	Insulation Strip
2	Movable Plate 1	8	Stoker Bar
3	Screw, #10-24 x 1/2" Long	9	Threaded Rod, 1/4"
4	Screw, #6-32 x 1.00" Long	10	Cap Nut, 1/4"
5	Nylon Screw, #10-24 x 1/2" Long	11	WHITE Coal Feed Adjustment
6	Nylon Screw, #10-24 x 3/4" Long	12	Nut, 1/4"

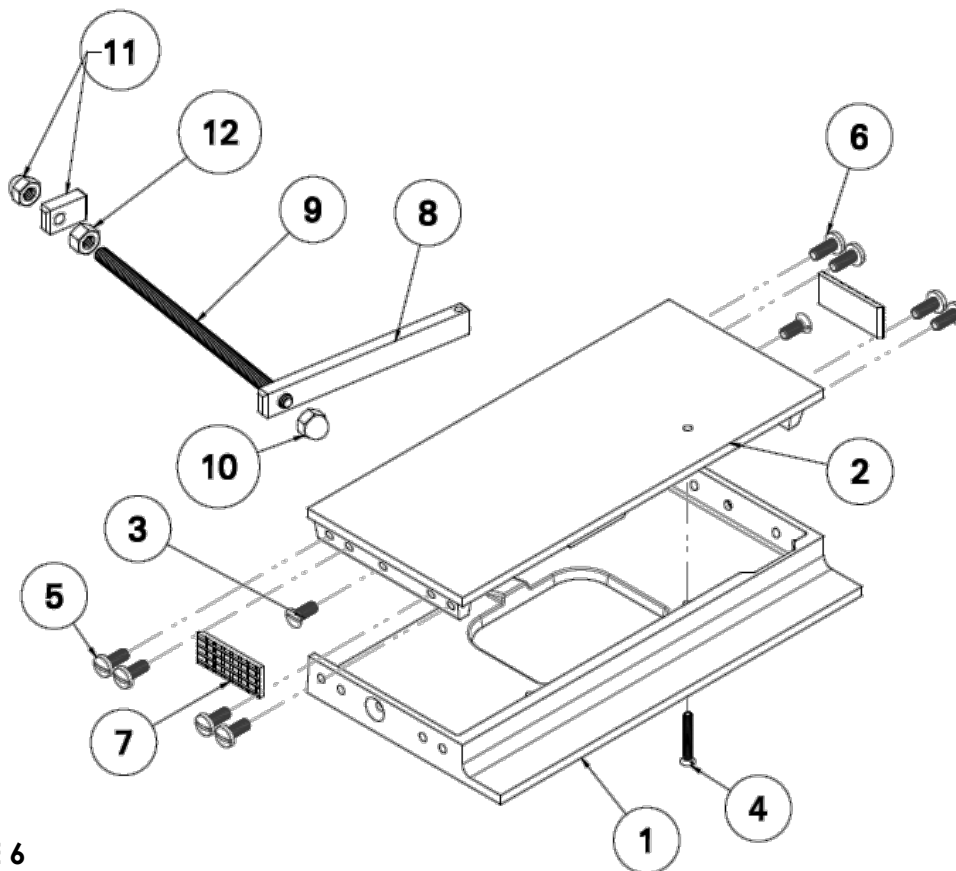


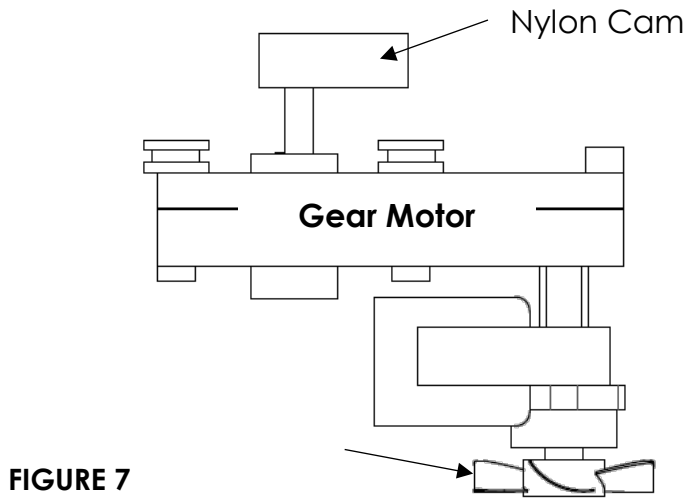
FIGURE 6

WHITE COAL FEED ADJUSTMENT (ITEM # 11): Turn clockwise for more coal feed, turn counterclockwise for less coal feed.

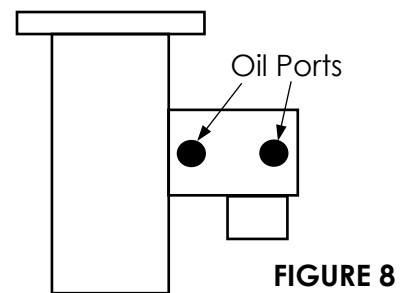


NYLON ADJUSTING SCREWS (ITEM #'s 5 & 6): To eliminate metal on metal contact. There are 8 nylon screws on the pusher bar, 4 on each side. The 4 nylon screws pictured on diagram are used to adjust the amount of sideward movement of pusher bar. When nylon screws are properly aligned, the pusher bar will slide in and out freely and have only a slight sideward movement.

NYLON CAM: located on gear motor. To give reciprocating motion to pusher bar shown below.

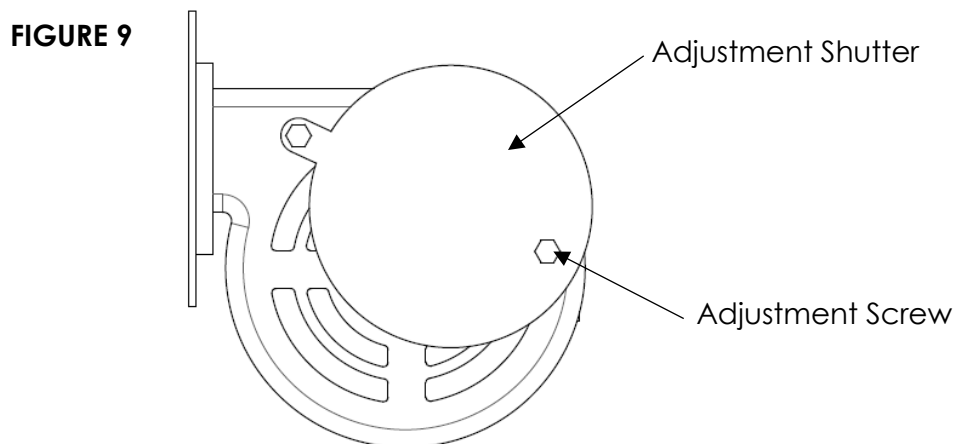


GEAR MOTOR: The drive shaft turns approximately 1RPM. The nylon cam on drive shaft will, when moving inward, force coal from hopper onto grate. When withdrawing, will allow coal to fall in front of pusher bar for preparation of next inward stroke. The gear motor will only run when activated by a call for heat from thermostat or when timer turns it on.



AIR INTAKE ADJUSTMENT SHUTTER: Adjusts amount of air flow through fire.

COMBUSTION MOTOR: Combustion motor will run all the time to force air through holes in grate to burn coal. The constant running of motor will assure the maximum amount of heat is gained and will aid in a more complete burning of coal. The motor has an adjustable air shutter for regulating air flow through fire.



TIMER: Unless your stove had been a special order, it will be equipped with our patented flat grate stoker unit and a timer. The purpose of a timer is to maintain a minimum fire when the thermostat is not calling for heat.

Timer Switch Examples

Times can be adjusted by moving the switch next to the number.

	ON TIME	SWITCHES TURNED ON	OFF TIME	SWITCHES TUNED ON
Average Boiler and Warm Air furnace Idle Time Examples	34 seconds on	#6, #2	10 minutes off	#4, #2
	40 seconds on	#6, #4	10 minutes off	#4, #2
	45 seconds on	#6, #4, #3, #1	10 minutes off	#4, #2
Older boiler and Warm Air Furnace idle time without secondary blower Examples	1 min on	#6, #5, #4, #3	10 minutes off	#4, #2
	1 min 15 sec on	#7, #4, #2, #1	10 minutes off	#4, #2
	1 min 30 sec on	#7, #5, #4, #2	15 Minutes Off	#4, #3, #2, #1
	ON TIME	SWITCHES TURNED ON	OFF TIME	SWITCHES TUNED ON
Average Stove with combustion fan running constantly	1 min 15 sec on	#7, #4, #2, #1	10 minutes off	#4, #2
	1 min 30 sec on	#7, #5, #4, #2	15 minutes Off	#4, #3, #2, #1
Average older stove without combustion fan running constantly	1 min 15 sec on	#7, #4, #2, #1	10 minutes off	#4, #2
	1 min 30 sec on	#7, #5, #4, #2	10 minutes Off	#4, #2

Refer to pages 30 - 33 for wiring diagrams.

Light will be red when N.O. is powered. Sending power to feeder motor.

Light will be green when N.C. is powered. Not sending power to feeder motor.



THERMOSTAT: Top pointer is to be set at warmth desired in home. Bottom pointer is the present temperature in room. When room temperature (bottom pointer) falls below desired room temperature, (top pointer), this will send a signal to the Relay control to activate gear motor to push fresh coal onto grate

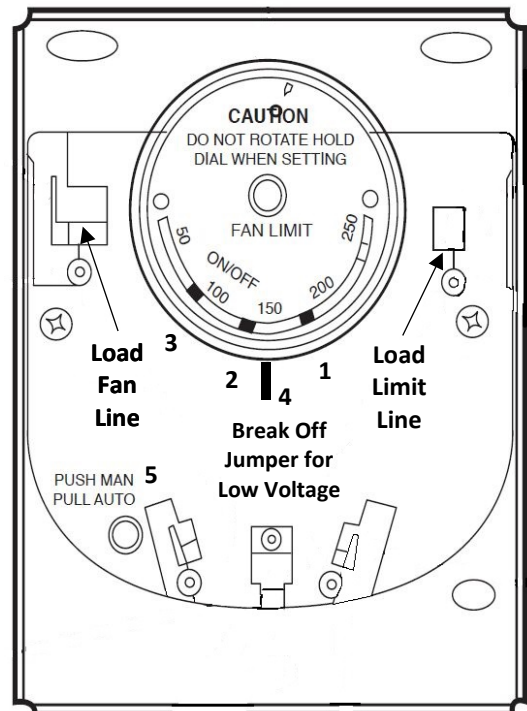
FIGURE 11



FAN LIMIT SWITCH:

1. HIGH LIMIT POINTER-is a safety switch that stops gear motor from pushing coal onto grate at 200 degrees (If stove gets too hot, this switch will turn off gear motor).
2. CENTER POINTER-turns convection blower on when internal air temperature reaches this setting (normally set around 160 degrees, but is adjustable).
3. LOW POINTER-turns convection blower off when internal air temperature falls to this setting (normally set around 120 degrees, but is adjustable).
4. Whatever number on silver dial is directly above this point is temperature of internal air.
5. WHITE BUTTON-pull out for automatic operation of convection blower. Push in for constant running of convection blower.
6. On this application, the JUMPER PIN is left intact

FIGURE 12



RELAY: Receives signal from 24V thermostat to turn on or turn off gear motor.

CONVECTION BLOWER: When running, it will take cool air from room, and force it through heated air chamber inside stove, and return heated air into room. Blower can only be activated by Fan Limit Switch.

MANOMETER (direct vent models only):

A Dwyer manometer is supplied with the stove for your convenience. This is used to monitor the draft and during initial setup at installation. This can be mounted on the stove hopper or wall near the stove.



DO NOT mount directly on side of the stove. Damage to the manometer, stove or personal injury could occur.



1. Installation: Position manometer on a vertical surface. Drill two 1/8" or 9/64" holes on a vertical line 3-15/16" apart. Loosely mount manometer with self-tapping screws provided. Adjust gage until level bubble is centered in level vial. Secure the manometer tightly.
2. Filling: Turn the zero-set knob counterclockwise until it stops. Then turn zero-set knob clockwise 3 full turns. This puts zero in approximately the middle of the travel adjustment in either direction. Remove the fill plug and fill with **gage fluid** until fluid reaches zero on scale. Minor adjustments can be made to adjust zero by adjusting zero knob. Replace fill plug. If gage is overfilled, remove excess by inserting pipe cleaner through the fill port to blot-up excess fluid.
3. Maintenance: Check fluid level regularly and adjust zero with zero-set knob. Be sure tubing connections are disconnected and gage is open to atmosphere before adjusting zero. Clean with mild soap and water. Avoid any cleaning fluids which may result in damaging the gage.
4. Accessories: Each Mark II manometer includes two tubing connectors for 1/8" pipe or sheet metal ducts, two mounting screws, 1 oz. bottle of indicating fluid, red and green pointer flags, 8' of double column tubing and instructions.
5. Usage: When using this gauge for a draft gauge you only need 1 hose connected to the high side of the gauge. The probe is attached to the other end of the hose. The hose can be trimmed for convenience.

On 90 and 105 models with cast iron ash doors; **remove** the set screw in the upper right-hand corner of the door and insert probe to check the draft.

On Koker, Koker Lite and Econo 90 the draft hole will be drilled in the ash door frame. For these models, insert the probe at that location.

Draft should be set at -.02 to -.04. We recommend checking the draft after the stove has been cleaned, start-up for the upcoming season or on a weekly basis.

Maintenance

Cleaning & Lubrication of Stove



Stove pipe and exhaust tubes must be cleaned once during the heating season. On top exhaust stoves, brush exhaust tubes out with a flexible brush. Keep base and interior openings below interior exhaust tubes clear of ash. Clean under grates annually by removing combustion motor and vacuuming under grates or you may remove the bolt holding the grates and then remove the grate and proceed to vacuum. Grates must **then be re-cemented** back into their place. Upper portion of grates must be sealed (air tight) with furnace cement, from the upper portion of the grate (close to hopper) down to where the 1/8" holes are drilled in grates.



1. Motor: Inspect and oil motor at least once a year, motor should rotate freely
2. Wheel: Inspect venter and exhaust wheel at least once a year to thoroughly clean soot, ash, dust or any coating which may inhibit either rotation or air flow
3. Vent System: Inspect all vent connections at least once a year for looseness, evidence of corrosion and for flue gas leakage. Replace seal or tighten pipe as necessary.



It may be necessary to clean exhaust system and stove pipe during heating season. On bottom vent design, remove hanging baffle above 6" exhaust outlet inside stove. Brush pipe in circular motion and vacuum stove pipe. To clean exhaust motor and radial fan blade, remove 4 screws on mounting bracket of exhaust fan and clean fan housing.

During annual maintenance, the 1/2 tube on safety fume switch must be cleaned out by vacuuming or by using a small brush. Vacuum or brush from inside of stove.

Oil fire door and ash door hinges. Oil threads on fire door and ash door handles to prevent freeze up over summer.



To minimize corrosion of stove accessories, it is important to clean stove thoroughly at the end of heating season. Completely remove all coal from hopper. Remove and clean stove pipe. Check chimney and base of chimney for obstructions or blockage. Clean under grate.

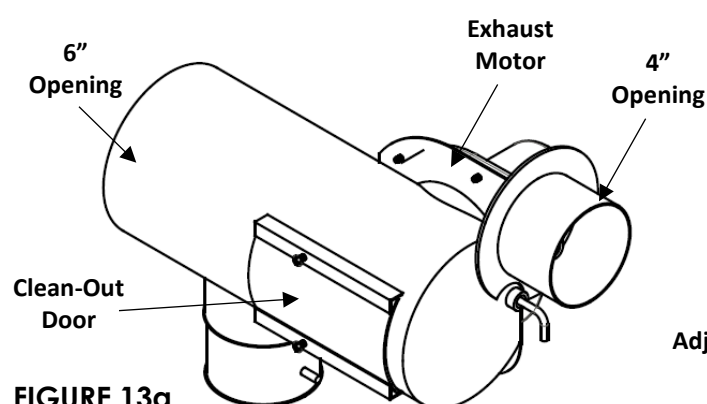


FIGURE 13a

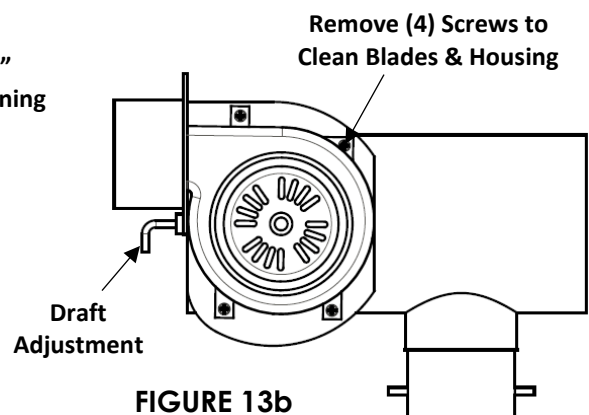


FIGURE 13b

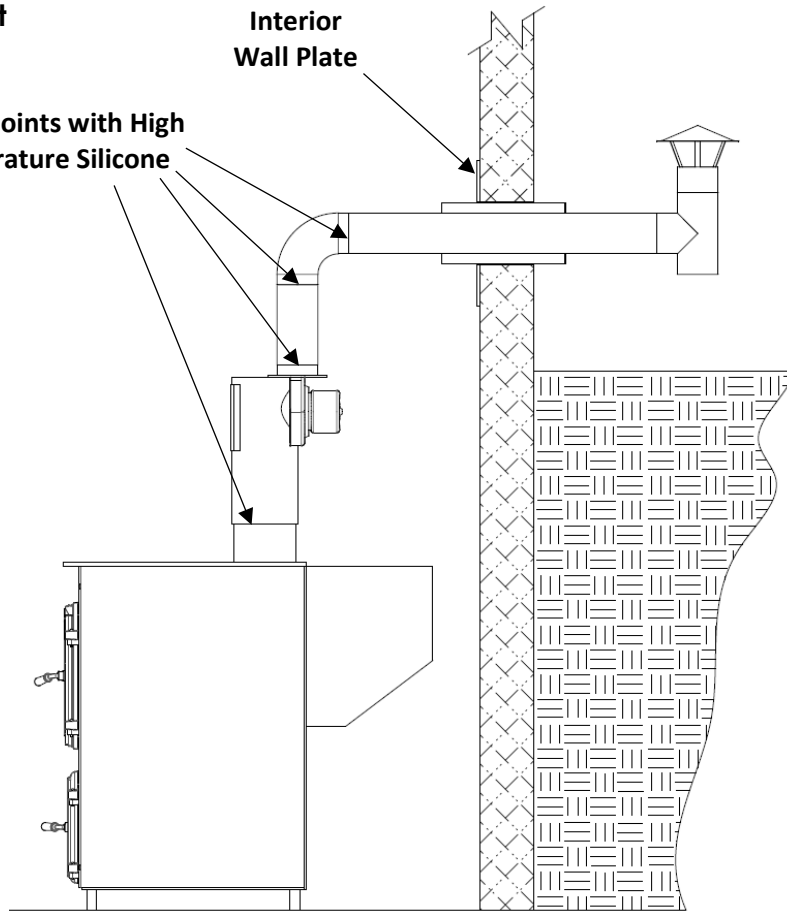
Reassembly of Direct Vent Piping

Top Vent Layout



Seal All Joints with High Temperature Silicone

Interior Wall Plate



Bottom Vent Layout



Seal All Joints with High Temperature Silicone

Interior Wall Plate

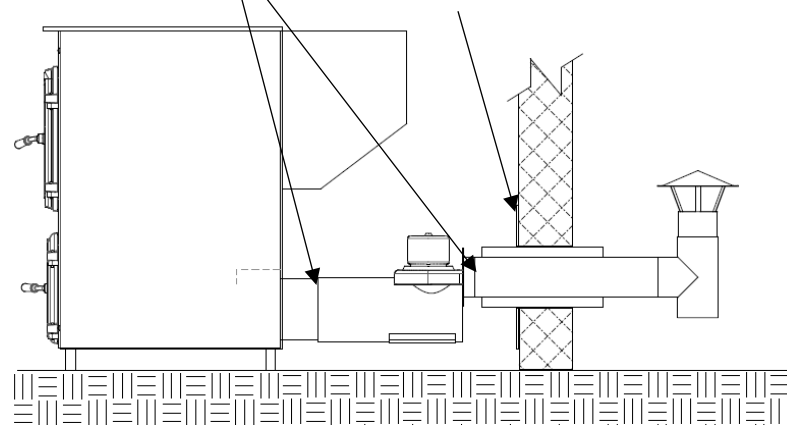


FIGURE 14

Cleaning Stove Glass

The following instructions are meant to serve as guidelines for proper cleaning and care of **ROBAX** glass ceramic windows.



To clean glass, first turn down the thermostat to allow the stove to cool. Assemble fire door shield, using metal plate (approximately 16" x 14") and wooden dowel with threaded rod. Remove nut from threaded rod, push threaded rod through hole in metal shield and tighten nut to hold wooden dowel onto metal shield. Refer to Figure 15 below.

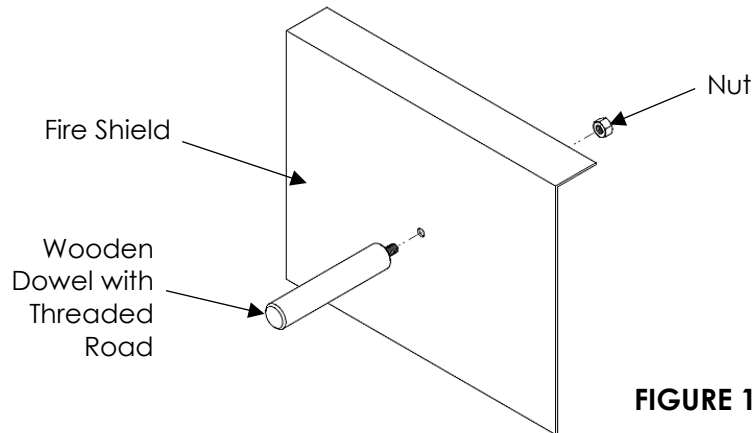


FIGURE 15



ALL cleaning procedures should be done at room temperature **CLEANING OF HOT GLASS SHOULD BE AVOIDED.** Cleaning solutions applied to hot glass may dry before



cleaning agent is removed, which may result in creating a film or deposit that can react with combustion by products. Dried on cleaning solution may react with surface causing discoloration or a permanent film.



If white deposits are found to be on the surface of glass, these should be scraped off using a sharp bladed scrapper and wiped away with a dry cloth prior to any wet cleaning. Scrapping should be done at a low angle below 30 degrees.



Although glass is extremely hard and very scratch resistant, it is not scratch proof. The use of abrasive cleaners (i.e., any cleaners containing grit) and scouring pads (i.e., steel wool, plastic with embedded grit) should be strictly avoided.

Soft cloths should be used for all cleaning steps. The cloths should be free of any abrasive agents from any previous use.

Dried on cleaning solutions may react with glass surface causing discoloration or a permanent film.

While **ROBAX** glass is the best glass for use on anthracite burning coal stove, the manufacturer does not warranty the glass.

Ash Pan Emptying

To prevent toxic carbon monoxide gases from entering the home, certain precautions must be taken.



1. Ash pan must be emptied on a regular basis to prevent ashes from overflowing into ash pit area. Excessive ash accumulation may impede air flow to chimney, preventing gases to be drawn up chimney.
2. Fire door and ash door must be kept closed at all times during normal operation.
3. It is necessary to keep coal in hopper while stove is in operation.
4. In most applications, it is sufficient to clean stove and stove pipe twice during heating season. However, under extreme weather conditions, or high demand on stove running periods, the stove and stove pipe may need more frequent cleaning. Clean as often as necessary.



CAUTION: ASH PAN IS HOT-Always Use Gloves to Remove Ash Pan



1. Before removing ash pan, turn switch off, or pull power cord plug from 110V outlet.
2. Open ash door.
3. Use a heat-rated pair of gloves, to remove ash pan.
4. Place filled ash pan on a non-combustible surface.
5. Slide an empty ash pan into stove.
6. Close ash door.
7. Turn switch on or plug power cord back into 110V outlet.

After removing ash pan, using long brush supplied with stove. Either in back of stove or through clean-out door on Direct Vent Unit, sweep brush around pipe and inside of stove. Sweep excess toward bottom of stove and remove or vacuum dust out of stove. This procedure may only be required once or twice a month during heating season. Place empty ash pan into stove and turn switch on or plug power cord into 110V outlet. Fan blade and fan blade chamber may have to be cleaned several times during heating season.

The 4" exhaust pipe going through outside wall of home should also be cleaned when fan chamber is being cleaned.

If 4" exhaust pipe is not going straight out through outside wall and 4" pipe is in a vertical position to access an area above outside grade, the 4" elbow is a common location for dust to accumulate and restrict exhaust air flow to outside of home. A 4" tee may also be used in place of a 4" elbow. This will allow the bottom of tee to be used as a collection point (out of the flow of exhaust gases) providing an easier access for cleaning and less chance for restriction or blockage.



It is ESSENTIAL...that every 4" pipe joint or connection be sealed with a high temperature silicone or equivalent. All adjustable joints on elbow must also be sealed with silicone. **FAILURE TO SEAL ALL JOINTS** could allow carbon monoxide to leak into home.

Gear Motor Removal & Installation

Refer to the following Figures 16 & 17

TO REMOVE GEAR MOTOR:



1. Pull power cord pug from 115V outlet.
2. Remove #10-24 machine screw and then remove protective cage.
3. Disconnect both blue wire nuts marked.
4. Remove both #10-24 machine screws from mounting bracket.
5. Slide gear motor out of its track toward you, pusher bar will also come out with gear motor.
6. While pusher bar is out of its chute, clean chute area and remove any obstructions. Check nylon screws on pusher bar (4 on each side) for wear or breakage. (Replace if necessary)
7. Slide pusher bar in and out of chute (should move freely) check for sideward movement.
8. Adjust nylon screws on right side to allow only a slight sideward movement.



TO REPLACE GEAR MOTOR:

1. Remove (4) 10-32 machine screws that hold gear motor onto mounting bracket.
 - a. Before removing gear motor from bracket, look at position of gear motor; install new motor in exact same position before reinstalling screws.
2. Reverse removal procedure and reinstall.
3. When replacing gear motor with a new one, both gear motor wires are black; either wire may go to red or white wire from power supply.

FIGURE 16

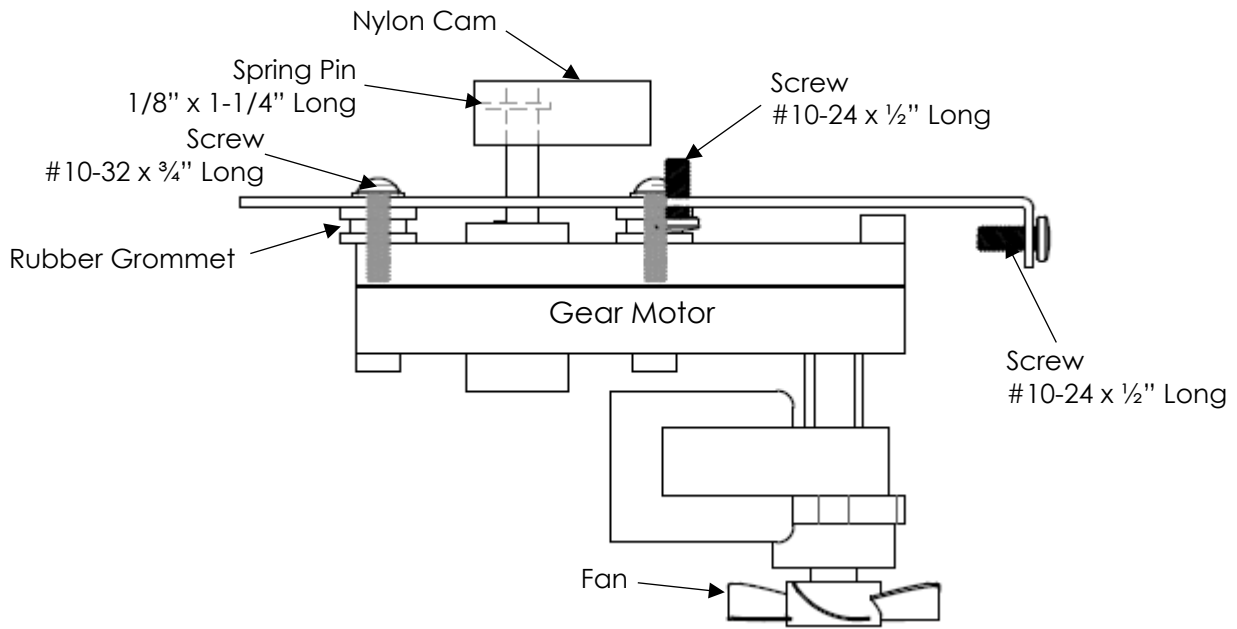
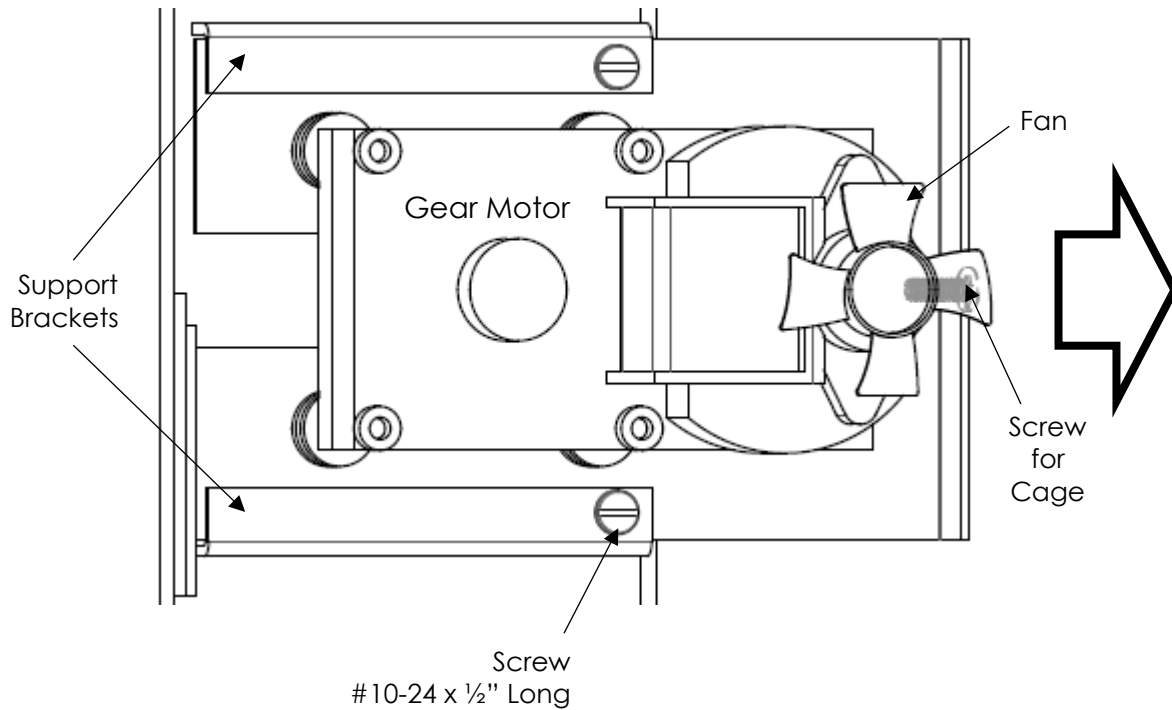


FIGURE 17

Bottom of Stoker Unit



Troubleshooting Guide

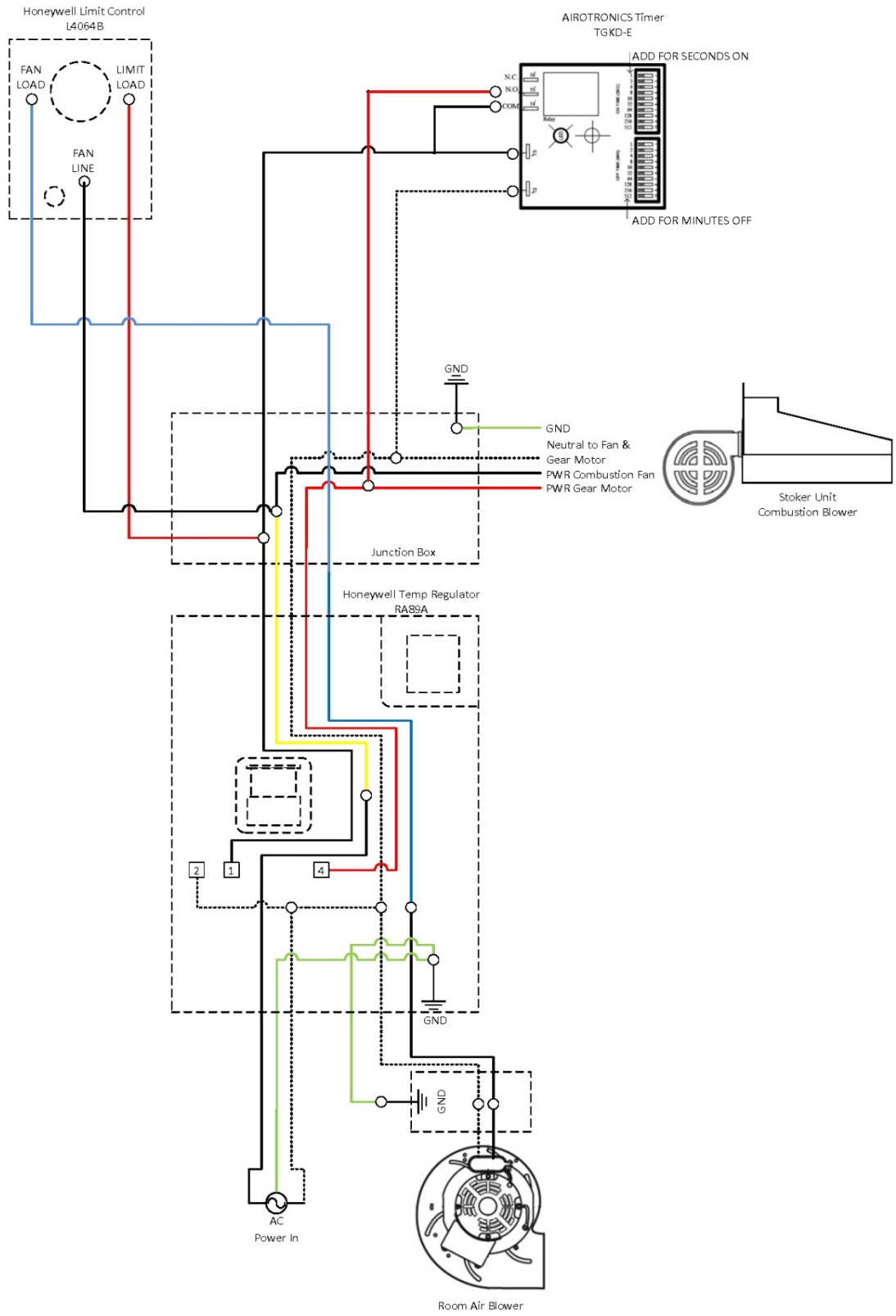
Problem	Fix
FIRE GOES OUT	See page 19 (Timer) and Page 15 Diagram 2
COAL KLINKERING OR FUSING TOGETHER	See page 15 Diagram 1 & 2
SULFUR SMELL	See page 22 (Cleaning & Lubrication)
STOKER UNIT DOESN'T FEED COAL	See page 17 (Pusher Bar)
PUSHER BAR IS NOT MOVING STRAIGHT	See page 17 (Pusher Bar)
CONVECTION BLOWER RUNS TOO OFTEN	See page 20
CONVECTION BLOWER RUNS CONSTANTLY	Pull white button on Fan Limit Switch out for automatic operation. Clean screen and fan blades on blower. See page 20
THERMOSTAT CALLS FOR HEAT, but CONVECTION BLOWER OFF TOO LONG	See Page 15 Diagram 1
FIRE IS LIT, BUT NOT ENOUGH HEAT	If gear motor only runs short cycles, timer is working. When thermostat calls for heat, gear motor should run steady. If gear motor is running steady, but fire is small, increase coal feed. See pages 12, 13 & 14
	If gear motor is not running steady, check for loose wire in Thermostat or in Relay. Check for broken thermostat wire between thermostat and Relay.
GEAR MOTOR RUNS CONSTANTLY MAKING TOO MUCH HEAT	<ol style="list-style-type: none"> 1. Gear motor can only be activated by thermostat or timer. 2. Remove thermostat wires from T.T. terminals in Relay, if gear motor shuts off, replace thermostat wire or Thermostat. 3. OLDER MODELS: Check timer to see if yellow wheel is turning, if not replace timer motor. 4. Check timer switch. See page 19 and Fig. 10 Timer
CONVECTION BLOWER NOT BLOWING MUCH AIR	Clean screen and fan blades on blower.
GEAR MOTOR SHUTS OFF ON HI-LIMIT	High Limit pointer in Fan Limit Switch is designated to shut gear motor off when internal air temperature reaches 200 degrees. If internal air temperature stays on 200 degrees, Convection Blower is not cooling stove off quickly enough. Clean screen and fan blades on blower or replace convection blower or See Page 20, Fan Limit Switch.

Troubleshooting Guide – cont'd

Problem	Fix
BIG FIRE BUT NOT MUCH HEAT	Fan blades on combustion motor dirty. Brush off.
	Accumulated fly ash under grate. Remove combustion motor and clean under grate. Holes blocked in grate. Open holes with 1/8" center punch. See Page 16 Figure 5
	TO CLEAN UNDER OR REPLACE GRATE See Page 22 (Cleaning & Lubrication) & Page 16 Figure 5
NYLON CAM MELTS	Under normal operating conditions, nylon cam will not melt. Melting of nylon cam can be caused by a draft problem or grates are not sealed.
	A blockage in chimney, chimney connector, stove pipe, or stove. Inspect and clean.
	Or you would need to make an adjustment to Direct Vent Unit to obtain a draft of -.02 to -.04

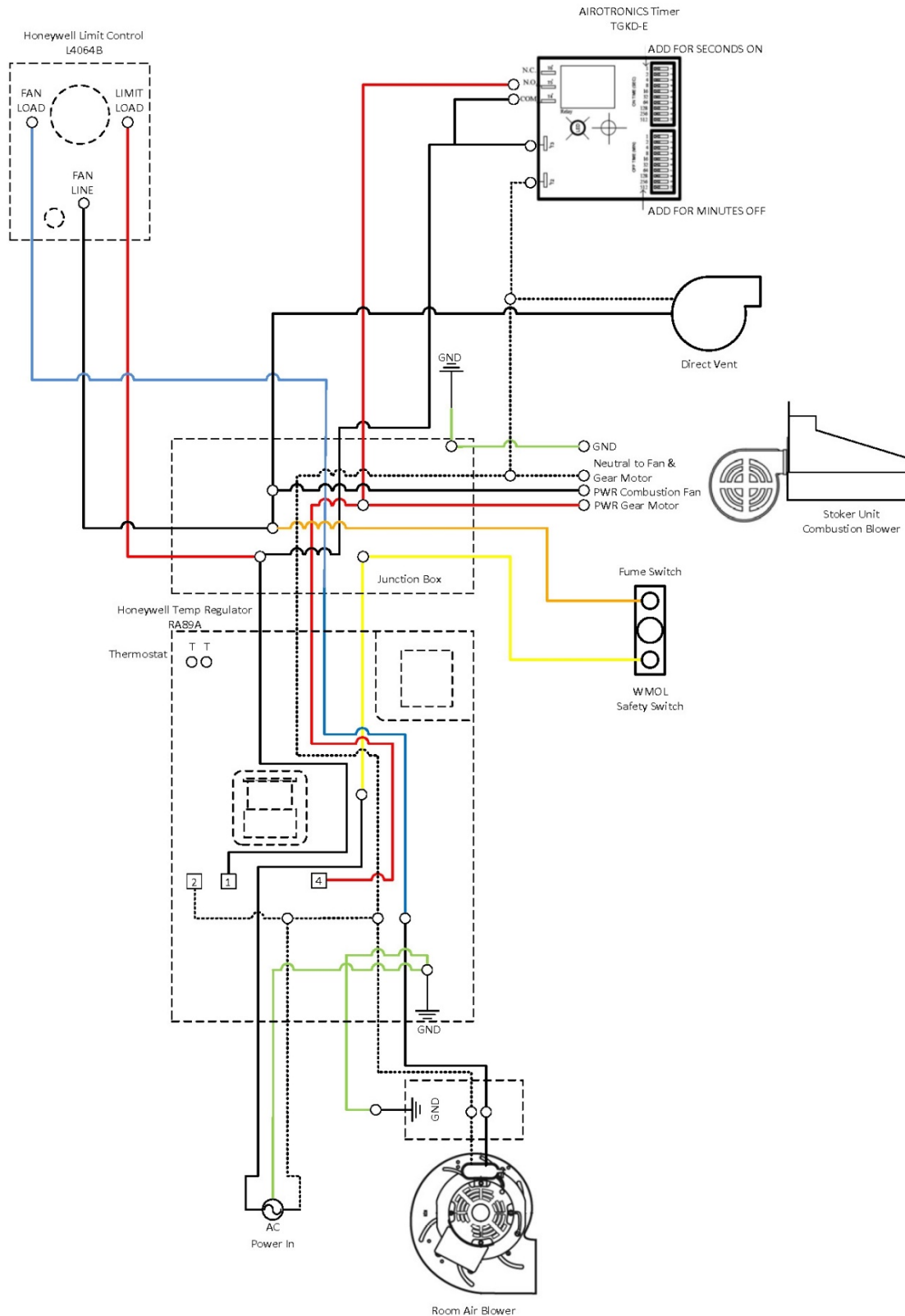
Diagrams

Wiring – Thermostat: Honeywell Relay & Airotronics Timer



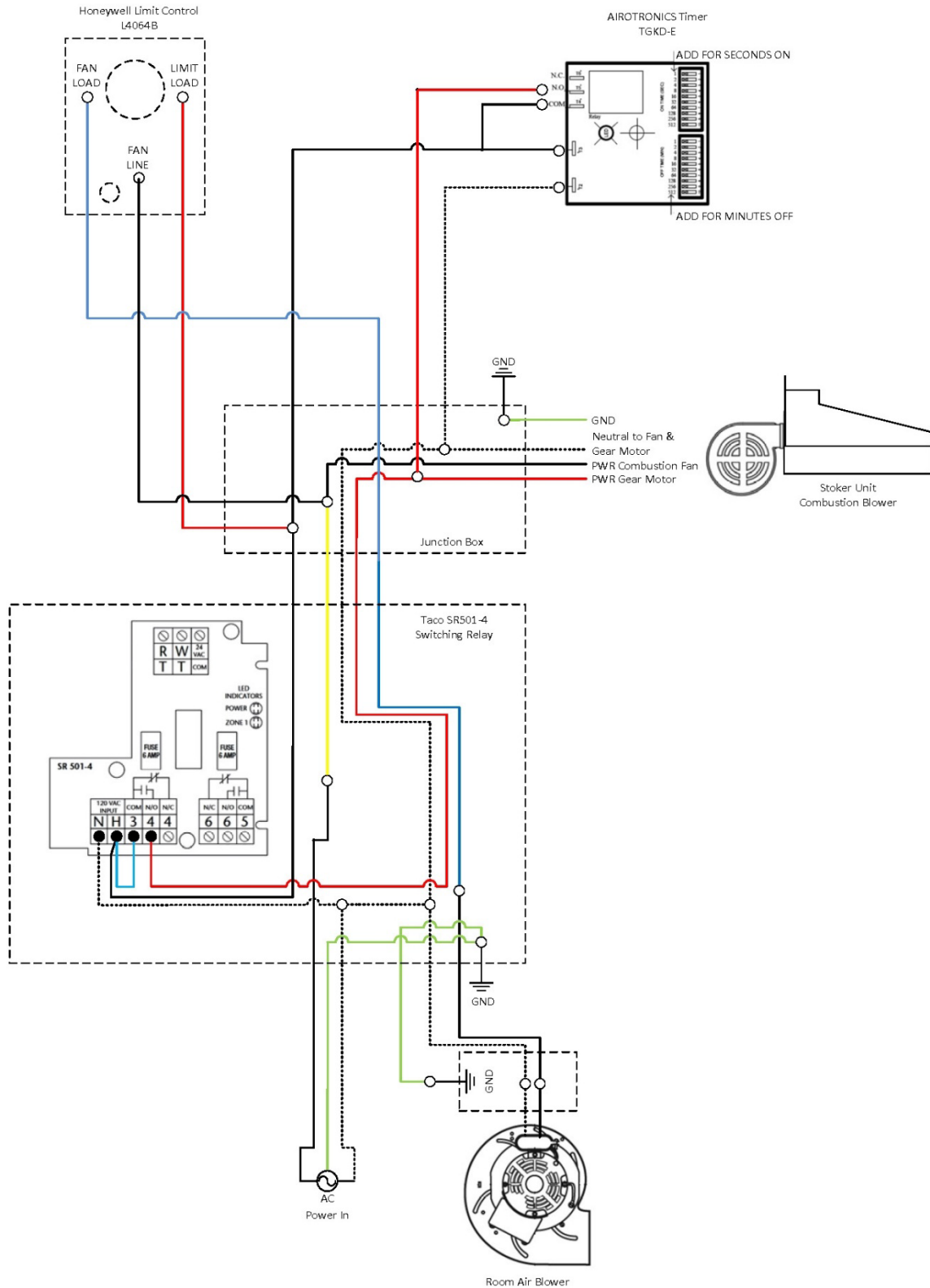
Diagrams – cont'd

Wiring – Thermostat, Direct Vent: Honeywell Relay & Airotronics Timer



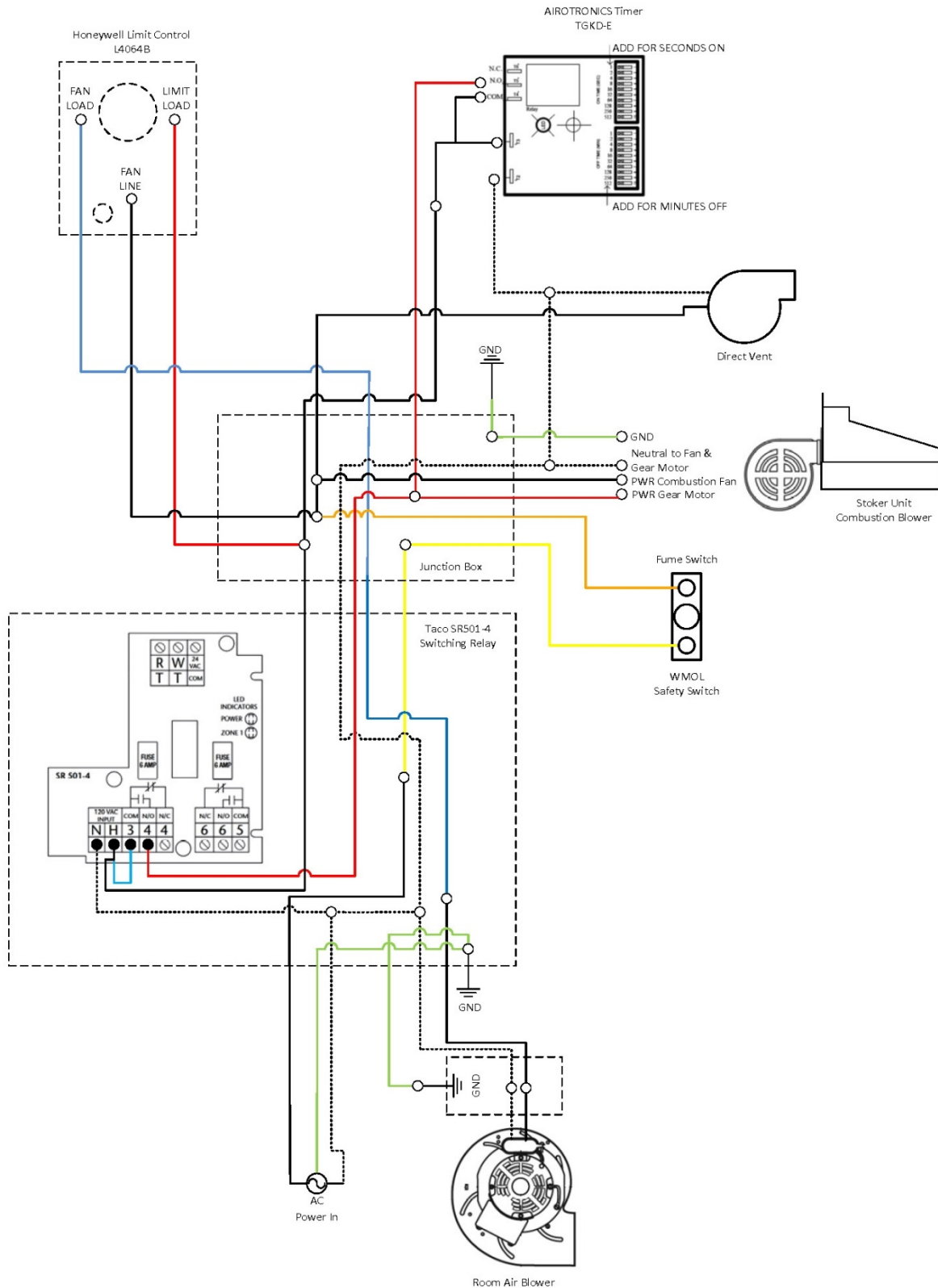
Diagrams – cont'd

Wiring – Thermostat: Taco Relay & Airotronics Timer



Diagrams – cont'd

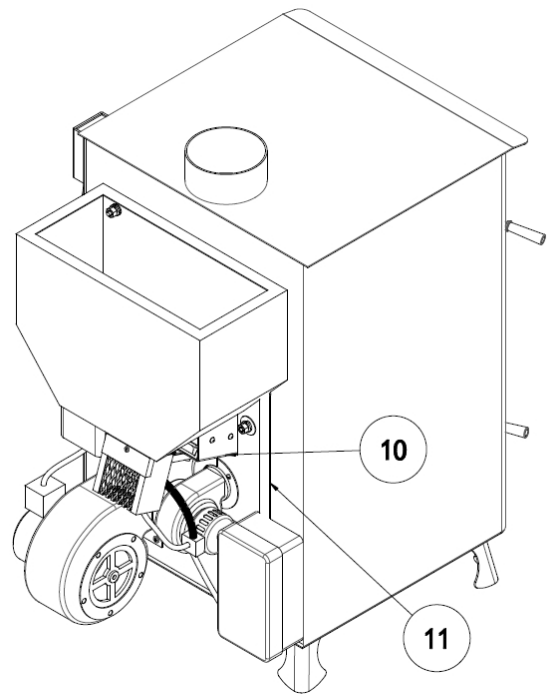
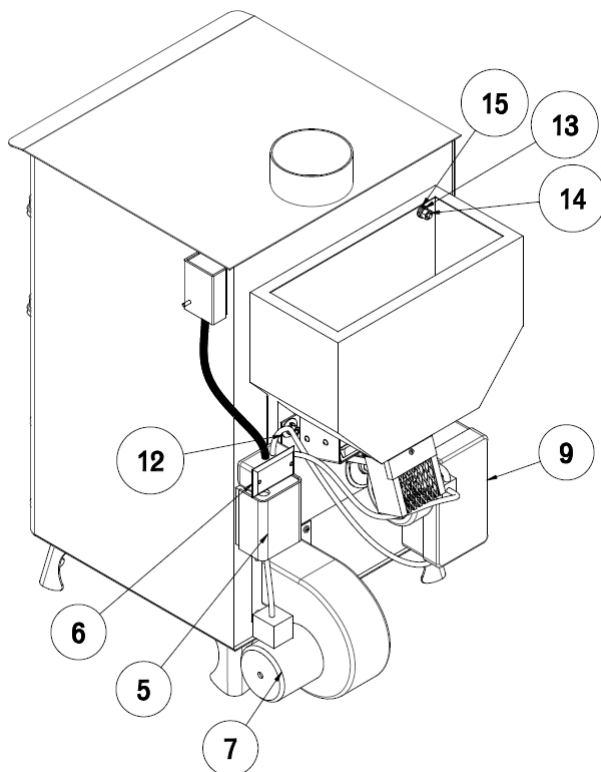
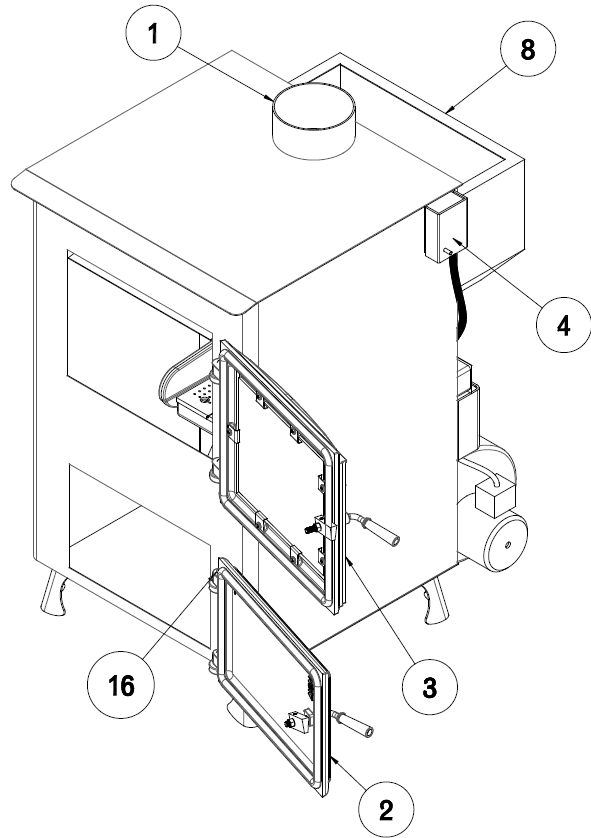
Wiring – Thermostat, Direct Vent: Taco Relay & Airotronics Timer



Diagrams – cont'd

Stove Parts List – 105K, Top Vent Shown

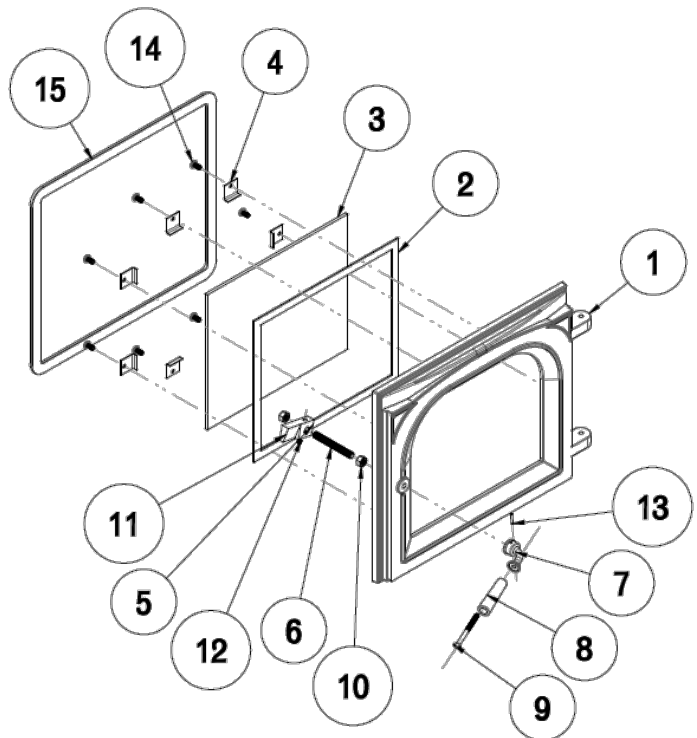
Item #	Component
1	Stove Pipe, 6"
2	Ash Door Subassembly
3	Fire Door Subassembly
4	Limit Control
5	Thermostat Relay
6	Junction Box
7	Room Blower
8	Hopper
9	Timer
10	Stoker Subassembly
11	Gasket
12	Washer, 5/16"
13	Lock washer, 5/16"
14	Hex Nut, 5/16"
15	Large Washer, 5/16"
16	Hinge Pin



Diagrams – cont'd

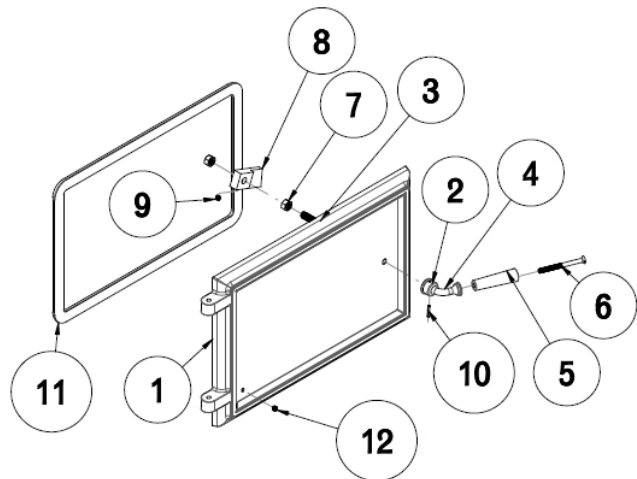
Fire Door Parts List – 105K, Top Vent Shown

Item #	Component
1	Ash Door
2	Gasket
3	Glass
4	Glass Clip
5	Lever Handle Subassembly
6	Threaded Rod
7	Lever Base
8	Handle
9	Machine Screw
10	Hex Nut
11	Door Latch
12	Set Screw
13	Roll Pin
14	Machine Screw
15	Insulation



Ash Door Parts List – 105K, Top Vent Shown

Item #	Component
1	Ash Door
2	Lever Handle Subassembly
3	Threaded Rod
4	Lever Base
5	Handle
6	Machine Screw
7	Hex Nut
8	Door Latch
9	Set Screw
10	Roll Pin
11	Insulation
12	Set Screw



Warranty

Keystone Manufacturing company extends the following warranties to the original owner from the date of purchase.

- Ten Years Workmanship on stove body
- Two years on grates and side rails
- One year all electric controls and motors.
- Warranty does not apply if damage occurs because of improper handling, operation, abuse, rust, corrosion, misuse or use beyond rated capacity.
- This warranty does not apply if the product has been altered in any way after leaving the factory.
- All warranty claims should be made through dealer where the appliance was originally purchased. Model, **Stoker Unit** Number 1 ½ x 3 tag (found below hopper) and original copy of the sales receipt need be presented to dealer.
- If a consumer chooses to make a warranty claim directly through Keystone Manufacturing Company model, stoker unit number, and copy of the original sales receipt are required. Customer must provide a credit card which will be charged for the full retail price for the product plus shipping and handling. When defective part is returned to the company and found to be a defect within warranty period the consumer's credit card will be credited back the cost of part.
- Keystone Manufacturing Company assumes no responsibility for any labor expenses, for service, product removal, reinstallation or any freight charges for parts returned to the company.
- If defective in material or workmanship and if removed by the owner with in warranty period Keystone manufacturing will at their opinion repair or replace the product.
- This warranty is limited to defective parts, repair, or replacement at our opinion and excludes any incidental and consequential damages connected there with.
- Warranty exclusions, labor, glass, door gasket, ash tub, hopper and paint



Stove Information

Dealer / Phone #: _____

Date of purchase: _____

Stoker unit number: _____

Stove Model: _____

Parts Ordering

If not listed above, locate the metal 1 ½" x 3" Keystoker label fastened to stoker unit body, near gear motor. The four or five-digit number will be required to get proper replacement parts from your dealer.

Stove Contents Checklist

TT Models	
	Manual
	Carbon Monoxide Detector
	Charcoal
	Thermostat
	2-Handles & Bolts
	Brass Handle / Koker
	Brass Trim – 90K/105K
	2-Ash Tubs
	Manometer (direct vent models only)

Packed By: _____

