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# SCOTSMAN

**WOOD FURNACE MODEL DB-101**

## OWNER'S MANUAL

### IMPORTANT

READ OWNER'S MANUAL THOROUGHLY BEFORE  
INSTALLING FURNACE OR LIGHTING FIRE.

CONSULT LOCAL AUTHORITIES IF IN DOUBT ABOUT  
YOUR LOCAL FIRE SAFETY REGULATIONS.

ALL INSTALLATIONS MUST BE MADE IN ACCORDANCE  
WITH LOCAL AND STATE OR PROVINCIAL CODES  
WHICH MAY DIFFER FROM THIS MANUAL.

IMPROPER INSTALLATION WILL RESULT IN VOIDING  
OF WARRANTY.

ADD-ON TO CLASSIC AND CLASSIC AIR OIL-FIRED  
FURNACE ONLY

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GRANBY SCOTSMAN Wood Furnace Model DB-101-ADD

Tested and Listed by: Energy Testing Laboratory of Maine  
 Certified by the Canadian Standards Association (CSA) Sept. 1981

COSP No. WCP 001 – Free-Standing  
 COSP No. WCP 005 – Add-On

Manufactured by: GRANBY FURNACES INC  
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 12118 HIGHWAY 209  
 PARRSBORO NOVA SCOTIA CANADA  
 B0M 1S0

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### SPECIFICATIONS

Length	39"
Width	29"
Height	44 1/2"
Shipping Weight	392 lb.
Fire Box 1/8"plate	Length 36"
	Diameter 23"
Secondary Heat Exchanger	14 gauge steel
Fire Box Door	Cast Iron 13" x 13"
Warm Air Plenum	32" x 25 3/8"
Return Air Plenum	N/A
Air Filter Size	16" x 20" x 1"
Blower Size	G10 – 10
Blower Motor	1/3 hp
C.F.M.	1000 (Required)
Smoke Pipe	7" Inside Diameter
Floor to smoke pipe center	38 3/4"
Output (max)	140,000 Btu/h
Fuel	Wood 30" logs
Electrical Rating	Volts 120, Cycles 60, Amps 15

**NOTE** – Keep this manual in a safe place for future reference. Follow manual carefully for the correct way to install and operate this unit.

**CAUTION** – Do not fire this unit until operating instructions have been read and fully understood.

INSTALL WOOD FURNACE ONLY ON A FURNACE DUCT SYSTEM  
 AND CHIMNEY THAT ARE IN GOOD CONDITION.

**SAVE THESE INSTRUCTIONS**

## **1.0 OPERATING INSTRUCTIONS**

### **1.1 INTRODUCTION**

Congratulations on your purchase of the Granby Scotsman wood furnace. Developed in Atlantic Canada, this furnace has been designed to allow you to heat your home with wood, one of North America's most abundant fuels. Designed with you in mind, the furnace will provide you with many years of safe, efficient central heating.

To ensure you have a clear understanding of the operating procedures of this furnace, please take the time to read the remainder of this section on operating procedures.

### **1.2 WOOD-BURNING**

We recommend that only dry, seasoned hardwood be used as much as possible since it affords cleaner, safer and more efficient operation. Burning seasoned hardwood will leave less ash, soot and creosote residue and will require fueling less often. Use smaller loads of wood on warmer days.

**WARNING:** **DO NOT** use chemicals or fluids to start the fire or during operation.  
**DO NOT** burn driftwood or manufactured logs (compressed wood).

Before adding fuel to an existing fire turn up the thermostat for about five minutes or lift damper chain to hold damper fully open for about one minute before opening the loading door. This action will allow residual smoke to clear from the combustion chamber and reduce smoke coming from the opened fuel door while refueling.

Twice daily refueling may be sufficient in modern well-insulated homes. We recommend that small fuel loads be added morning, noon, early evening and late evening, rather than large quantities infrequently. A small intense fire will burn more efficiently than a large smoldering fire in the furnace and will produce less creosote.

When refueling the furnace, the remaining coals should be raked to the front of the combustion chamber before adding any new fuel. Place the fresh supply of wood to the rear of the combustion chamber. This gives more of an even cigar type fuel burn, rather than a large hot fire to a slow amber fire. This will help create a more even and efficient burn. The furnace owner should attempt to gauge fuel quantities with outdoor temperatures; a little practice will provide greater satisfaction and efficiency.

**WARNING:** This furnace is not to be used with an automatic stoker.

Keep firing door tightly closed and maintain door seal in good condition.

**CREOSOTE**

Wood combustion is never 100% complete. Wood smoke always contains some unburned gases and a mixture of unburned tar-like liquids. A percentage of these materials will condense out on any cool surface, leaving a dark brown or black substance with an unpleasant acrid odor. This substance is commonly called creosote.

If these wood gases condense out on cool surfaces such as a cold chimney or a long smoke pipe, they retain large amounts of water and will be very fluid. At higher temperatures the condensed creosote will resemble tar (thick and tacky).

Creosote generation is highest during low heat outputs common with long smoldering burns. Creosote generation is lowest during high heat outputs common with intense fires. It is recommended that a small intense fire be used for best results against creosote build up even though the wood furnace will require refueling more often.

Creosote generation is also higher when burning green wood. The moisture in the green wood absorbs the heat from the fire, cooling the fire below the point at which the creosote can be consumed. The low temperature smoke is then further cooled in the upper furnace chambers; smoke pipe and chimney allowing large amounts of creosote to form.

To reduce creosote build-up during periods of low heat requirements (i.e. Spring and Fall) it is recommended to fuel the wood furnace with smaller quantities of smaller diameter logs. Matching fuel loads and heat requirements will result in cleaner combustion and higher efficiency.

**IN CASE A SERIOUS CREOSOTE FIRE BEGINS:**

- Call the FIRE DEPARTMENT at once!
- Close the damper door by disconnecting chain.
- Close all draft regulators.
- Throw 1/2 lb. of coarse or table salt on the fire and close door immediately.

Have a firmly established Emergency Procedure in place for the handling of a flue fire.

**1.3 STORAGE OF WOOD**

Once cut, green wood dries (or seasons) quickly at first and then at a slower rate. When the wood has been cut to the proper length and split, it should be piled outside during the summer months. Place two poles on the ground to serve as rails to keep the firewood off the moist ground. Stack the wood so that both ends of the logs are exposed to the air if space is available, since more drying occurs through the cut ends than through the sides. This is true even with wood that has been split. The woodpile should be under cover so that it will not absorb moisture from the rain and snow before it is used, but still open on the sides and ends to the drying effect of the wind and sun. Store wood in neat well supported piles.

## 1.4 MAXIMUM SOLID-FUEL CHARGE

The maximum level for a solid-fuel charge is the middle of the loading door or the level of the handle. **DO NOT OVERFILL.** The furnace will accept whole or split logs up to 34" (865 mm) long but a 30" (765 mm) log length is recommended for convenience and ease in handling.

Maximum damper gate opening is 11/16". Do not tamper or adjust to greater opening in an attempt to increase fire or over-firing may result.

## 1.5 MAINTENANCE

Some regular maintenance is necessary on the furnace. A good practice is to establish a routine for the storage of fuel, care of the appliance and firing techniques.

### 1.5.1 CLEANING (Fig. S101-14)

The furnace must be cleaned regularly to maintain top efficiency. The furnace needs cleaning more often when burning green wood or during long periods of low fire. When the furnace is first installed the heat exchanger should be checked visually from the firebox and smoke pipe hole every week to determine the rate at which creosote or ash is accumulating within the furnace. Cleaning should be done whenever there is more than 1/4" of build-up on the heat exchanger or 3" of ash in the base. If the wood furnace is to be left unused for an extended period of time (more than one month) then the appliance should be cleaned of all ash and residual left from the burning of wood.

#### **CLEANING PROCEDURE**

- Make sure fire is completely out and the furnace has cooled.
- Remove the cleanout cover located on the rear of the furnace heat exchanger, smoke pipe and internal breech baffle.
- The heat exchanger is now accessible for cleaning.
- Use the provided scraper to remove all soot and ash from the furnace heat exchanger and exposed surfaces.
- Scrape all residues in the top heat exchanger towards the rear of the furnace where it will fall into the firebox.
- Always check flue pipe for creosote or ash build-up in the pipe and clean if necessary.
- Reinstall cleanout cover, internal breech baffle (see section 2.4.2) and smoke pipe making sure that all joints are secured with at least 3 sheet metal screws.
- Check chimney cleanout for ash build-up and remove any accumulation.
- Residue may be removed from the firebox or left to be burnt during the next fire. It is good practice to leave a layer of ash approximately 1" deep in the base of the firebox.

#### **DISPOSAL OF ASHES**

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. 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 thoroughly cooled. **IMPORTANT** – No other waste shall be placed in this container.

**WARNING** – Ashes usually contain live dormant coals which may burn for many hours after a recognizable flame has disappeared. Use extreme caution when handling and disposing ashes.

## 1.5.2 SERVICING

The furnace air filter must be checked monthly and replaced each year. Annually lubricate the blower motor, if it is not permanently lubricated, with 4-6 drops of SAE-30 oil in each bearing.

**CAUTION:** Failure to keep air filter clean will result in poor furnace performance and possible damage to heat exchanger.

## 1.6 SAFETY

If the furnace overheats due to improper operation the following precautions should be taken:

**DO NOT** shut off power. The blower must be kept running to disperse excessive heat. Manually close the damper door by unhooking the chain. Check controls for proper operation before starting a new fire.

**WARNING** – The maximum opening of the combustion air damper is preset at the factory. **DO NOT** adjust the stop or attempt to increase the combustion air by any means.

## 1.7 CONTROLS

### **Thermostat**

The primary control is the room thermostat located near the center of the house on the main floor or near an existing thermostat. The thermostat operates the damper motor to open and close the damper door thus allowing more or less air into the combustion area to control the fire.

### **Fan and Limit**

The fan and limit control mounted in the plenum controls the operation of the circulating blower and prevents the furnace from over-heating. When the air temperature in the plenum reaches the "ON" set point of the fan switch, usually 140°F (60°C), the blower will run until the plenum cools to the "OFF" set point, usually 100°F (38°C), then the blower is switched off. The limit function in this control is usually set at 280°F (138°C) and will override the room thermostat to close the damper door if the furnace overheats and will also prevent the oil furnace from starting.

## 1.8 ELECTRICAL POWER FAILURE (Fig. S101-3)

If no one is home during a power failure the damper will automatically close and some gravity heating will take place. Combustion air will continue to enter through the secondary air holes and a fire should be maintained.

**IMPORTANT** – This furnace is CSA certified for operation under power failure only if optional Power Failure Kit is installed.

For optimum heating during a power failure follow the procedure listed below:

- 1) For power failure operation remove the power failure gravity air inlet cover before starting or refueling during power failure. The cover is an option available from your dealer. The kit must be installed on the cabinet side directly opposite to the entry of the blower or oil furnace "S" connection ductwork.
- 2) Remove insulated cover on wood furnace or blower compartment access door on connected oil furnace to allow gravity flowing air to all areas (check with your installer).
- 3) Place a coin under the damper flap in such a way that it will fall clear when power is restored.
- 4) Maintain a careful watch on the furnace temperature. If it should exceed 200°F (95°C) close the damper door.
- 5) Do not leave the furnace unattended in this position.
- 6) Refuel frequently with small loads to maintain a small fire at 1/2 normal maximum volume.
- 7) Do not expect to maintain maximum comfort under no power conditions.
- 8) Do not allow anyone who is unfamiliar with the operation of the furnace to attend it during a power failure.

## 1.9 HOMEOWNER CHECKLIST

- Always observe the following minimum clearances to combustible materials – Front 48" (1220 mm); one side 6" (152 mm); opposite side and rear 24" (610 mm); and flue pipe 18" (465 mm).
- Use only dry wood. **DO NOT** burn garbage, gasoline or naphtha.
- Remove ashes as directed. Watch for soot build up in smoke pipe – clean regularly.
- Clean furnace heat exchanger regularly.
- Be aware of danger due to over-firing unit.
- Do not load above maximum load level (middle of loading door) or overheating may result.
- This unit is **NOT** suitable for automatic stoking.
- Load carefully. Do not slam fuel against rear or sides of firebox. This may damage the firebox.
- Do not store solid fuel within the above clearances or within the space required for changing and ash removal.
- Establish a routine for storage of fuel, care of the appliance and firing techniques.

## 2.0 INSTALLATION INSTRUCTIONS

### 2.1 INTRODUCTION TO INSTALLERS

Before installing this furnace, please read the following instruction manual carefully. This unit is designed to be a freestanding or an add-on central heating furnace to provide complete central heating in medium sized well-insulated homes. Before installing be sure unit is properly sized for the intended application. Warranty does not cover misapplication of unit.



### **Applicable Standards**

The furnace must be installed in accordance with the requirements of the National Fire Protection Association codes, the Canadian Heating Ventilation and Air Conditioning Code, The National Board of Fire Underwriters and the CSA Standards for solid fuel burning equipment as outlined in B365-01. In all cases consult your local authorities and fire insurance company for specific regulations.

## **2.2 UNCRATING**

When you receive your furnace, check it carefully to ensure that all components are present and in good condition. If there has been any damage or loss in transportation please notify the carrier and retailer at once. Inspect for the following:

- Firebox/Heat exchanger
- Poker/coals rake
- Marking template (return air and power failure bypass inlet)
- Internal Breech Baffle (Scotsman only)
- For free-standing model optional equipment required:
  - a) Scotsman Blower Box (Scotsman only)
  - b) Control Kit "B" (Scotsman only)

**CONTROL KIT A** (Oil add-on), **B** (free-standing with Scotsman Blower Box) or **E** (Electric add-on) selected according to installation, which includes:

- L4064R Fan and Limit Control
- Control Mounting Plate
- Damper Motor
- Thermostat (T822D or equivalent)
- Wiring Harness and Parts
- Switching Relay R8405C (8A05A – 4) – Kit "A" & "E" only
- Transformer – Kit "B" only

**NOTE** - Some parts may be packed inside furnace firebox. Check shipment carefully before assuming shortage.

## **2.3 LOCATING THE FURNACE (Fig. S101-1, Fig. S101-4)**

The location of the furnace must be as close as possible to the tile-lined brick chimney or factory-built solid-fuel approved chimney (ULC S629). Keep in mind also the day-to-day operation and place for ease of fueling and cleaning. We recommend installation, if possible, in a central location in relation to the outlet registers and the use of large warm air ducts to improve heat distribution during a power failure.

It is important to provide adequate combustion air to the furnace. It may be necessary to add a ventilator to an exterior wall of a closed furnace room or an airtight basement.

The furnace must be installed so that the clearances as shown in Fig. S101-1 or those of local authorities are met. If the furnace must be installed on a combustible floor, a non-combustible base must be built as shown in Fig. S101-4. Two layers of hollow masonry block (4" thick) are placed at right angles to each other so that the ventilation holes of one layer are opposite to those of the other layer. Also there must be a minimum of one layer of fireproof board and one layer of 26 gauge galvanized metal beneath the masonry blocks. This base must extend beyond the furnace to a minimum distance of 18" (457 mm) in front and 8" (204 mm) on all other sides.

## **2.4.1 COMBUSTION AIR SUPPLY**

Air inlets of at least 200 square inches free area ( $1.5 \text{ in}^2/1000\text{Btu}$ ) must be provided to the room occupied by the wood-fired or oil-fired furnace. These fresh air inlets must provide or allow free access of fresh outside air to the furnace. At no time or under any circumstances can a wood or oil-burning appliance be starved of combustion air.

The appliance must at all times be able to maintain the approved stack draft. The barometric draft regulator must be installed on the furnace smoke pipe in the same room or at least in such a way that there is unrestricted free passage of air between the combustion air inlet to the furnace or burner and the barometric draft regulator.

It is important to provide adequate combustion air to the furnace. It may be necessary to add a ventilator to an exterior wall of a closed furnace room or an airtight basement. Operating a wood or oil-fired appliance with inadequate combustion air could be hazardous.

## **2.4.2 FLUE PIPE & CHIMNEY**

The internal breech baffle should be inserted through the breech towards the front of the furnace until it hits the internal baffle stop. The open slot running the length of the baffle should be located on the top. This baffle is removed during the cleaning procedure. The purpose of the baffle is to prevent short-circuiting of the flue gases out through the rear breech. The flue gases are forced to fully heat the secondary heat exchanger, which will maintain higher furnace efficiency.

The furnace must be located to meet a minimum venting distance needed between the furnace and the flue. It should also be ducted so that there are a minimum number of elbows used. The flue pipe must be installed with a gradual rise of  $1/2"$  or more per foot from the furnace to the flue.

**NEVER ALLOW THE SMOKE PIPE TO RUN DOWNHILL TO THE FLUE!**

The smoke pipe and chimney should be at least 7" in diameter. The flue pipe or a chimney may be of different cross-sectional area than that of the appliance smoke pipe provided that sufficient draft is available at the appliance. Space must be provided around the smoke pipe and the back of the furnace to allow easy access for the purpose of cleaning. Smoke pipes must not be lighter than 24 gauge black steel. All pipes must be securely fastened with at least 3 sheet metal screws at every joint and properly supported.

Always meet or exceed flue pipe clearance specifications - 18" clearance from flue pipe to combustibles in all directions.

Connect the furnace only to an approved chimney suitable for solid fuel appliances and capable of venting the products of combustion. The chimney must be installed with proper clearances above roof and from adjacent structures and trees. If a masonry chimney is used it must be in good condition and be equipped with a tile liner. Flue thimble or flue pipe must not extend into the chimney flue, as it will reduce the draft.

Connect only to a flue or chimney capable of maintaining a negative draft of .05" wc at all times and conditions.

**WARNING** - If this setting is exceeded it could cause a solid fuel fire to burn out of control.

We recommend that the furnace be connected to its own chimney. However, two or more fuel fired appliances, other than fireplaces or incinerators, may be connected to the same chimney.

The National Standard of Canada, Installation Code for Solid Fuel Burning Appliances and Equipment, CSA-B365-01 clause 5.2.9 states that:

Two or more appliances shall not be connected to the same chimney flue unless:

- 1) The appliances are located on the same story;
- 2) A negative pressure is maintained at the flue collar of each appliance;
- 3) Each appliance is provided with a means to control the rate of flow of air or flue gases through the appliance combustion and heat exchanger chambers. Where limitations on flue pressure (draft) are contained in the manufacturer's instructions, such means shall be capable of maintaining at the flue collar, the pressure specified by the appliance manufacture; **NOTE:** For the purpose of this Clause, draft controls include ash pit air control dampers, dampers or draft slides wherever located, over fire and flue pipe key dampers and check draft controls located on or in the flue pipe.
- 4) The flue pipes of the appliances are connected to a manifold as close to the chimney as practicable or directly to the chimney in the following order:
  - (i) If only solid fuel is used, the flue pipe from the smallest appliance shall be on top (downstream);
  - (ii) If different fuels are used as permitted in Clause 5.2.7, the oil flue pipe shall be on top (downstream); and the solid fuel flue pipe on the bottom (upstream); and
- 5) The chimney flue is capable of venting the flue gas by natural draft when all appliances not interlocked to prevent simultaneous firing are firing at their maximum rate at the same time.

When installing a wood-burning appliance to an existing chimney carefully inspect entire chimney for the presence of old inlet holes which may be improperly covered by metal caps or other unacceptable means. Fill any openings with brick and mortar to ensure no hazardous openings exist.

## 2.5 **CLEARANCES** (Fig. S101-1)

The furnace is to be installed in accordance with National Building Code or local regulations. Allowances front and rear must be made for cleaning and servicing.

**NOTE** - Regardless of minimum clearances to combustibles, for safety reasons a minimum clearance of 30" (765 mm) should be allowed at the furnace rear for cleaning (due to length of cleaning rake) and access to smoke pipe.

### **Minimum safety clearances to combustibles are:**

Front	48"	1220 mm
Side	6"	152 mm
Side (for rear access)	24"	610 mm
Rear (see Note above)	24"	610 mm
Flue Pipe to combustible, other furnace & electrical wiring	18"	457 mm
Wood Furnace Above Plenum and 6' (1.8 m) of duct	6"	152 mm
Supply Duct beyond 6'	2"	50 mm
Return Duct Plenum and 6' (1.8 m) of duct (Free standing)	3"	76 mm

These clearances will also allow adequate combustion air to reach the furnace.

## WARM AIR DUCT & PLENUM CLEARANCES

The following clearances must be observed and must meet all local building, electrical and fire codes. Follow the National Standard of Canada, Installation Code for Solid Fuel Burning Appliances and Equipment, CSA-B365-01; the National Board of Fire Underwriters and in the US the NFPA codes.

The furnace warm air plenum and first 6' (1.8 m) of warm air supply duct in any direction must be installed observing a minimum of 6" (152 mm) clearance from the joists or combustible materials. Beyond the first 6' (1.8 m) of supply duct, a 2" (51 mm) minimum clearance must be maintained between the warm air supply ducts and all joists or combustible material. See Fig. S101-1.

Return air ducts, including main ducts and branch ducts, on solid fuel burning warm air furnaces shall be installed to provide at least 3" (76 mm) clearance to combustible construction for the first 6' (1.8 m) away from the furnace plenum. **This requirement is not intended to apply to return air ducts serving an oil-fired, gas-fired or electric furnace to which an add-on furnace is connected.**

It is recommended that a non-combustible rigid board be fastened on the underside of the floor joists in the area of the ceiling above the furnace, warm air ducts and smoke pipe.

### 2.6.1 FREE-STANDING (Fig. S101-13)

The furnace in the free standing (stand-alone) system is the sole source of central heating using an optional blower box kit to circulate the air. In this system connect the ductwork as you would for any conventional warm air heating system except you use increased clearances. The return air ducts are connected to the blower box, which may be located on either side of the furnace.

**NOTE** - With the optional blower, this furnace is not to be connected to ductwork that is still connected to another furnace.

### 2.6.2 ADD-ON

The wood furnace may be installed very satisfactorily in conjunction with another furnace as tested by ETLM under standard 78-1 and CSA under standard B365/1981.

In this installation the wood furnace is connected downstream in series with a new or the existing oil furnace. The blower from the existing furnace provides the air circulation. The wood furnace may only be added in series downstream from an oil furnace having an input rating (on original nameplate) of between 0.85 and 1.50 gph (US) or SI equivalent.

**For oil furnaces having multi-speed blowers with continuous circulation capability.**

Add-on furnaces such as the Scotsman can be installed with oil-fired warm air furnaces such as the Contour Classic Air that have continuous blower circulation capability. A relay must be used if the furnace is to maintain the continuous circulation feature. The wiring diagrams for this installation are Fig. S101-7 and Fig. S101-9.

**Disconnect Low Speed Circulation Fan Switch if Optional Relay is not used.**  
Fig. S101-8 and Fig. S101-10.

**Disconnecting the circulation fan low speed switch.**

If the red wire from the circulation fan switch in the furnace wiring box were disconnected from the yellow wire leading to the blower compartment and both red and yellow wires marretted off, then there would be no need for the switching relay (Honeywell R4222D 1013 or equiv.).

In that case the two blue wires would marrette together at location "A" of Fig. S101-7 and Fig. S101-8 and provide power to the blower on high speed (black wire). The two blue wires being 1) Wood fan "ON" control and 2) Oil fan "ON" control. Also 120 Volts can be fed back through any unused wire from the blower. All unused wires should be marretted off.

**Optional Low Speed Switching Relay Fig. S101-7, Fig. S101-9.**

The Honeywell (R4222D 1013 or equiv.) relay is to prevent power from being fed to the blower motor on two motor windings at the same time.

The red wire from the circulation fan switch (Low Speed) on the oil furnace. The blue heating wire from the wood fan limit control on high speed. This relay will disconnect the circulation fan low speed switch and connect the high speed to the blower motor when there is a call for heat.

**Items required:**

- 1) Switching Relay R4222D 1013 (120 V Coil, 12 amp @ 120 Vac) or equivalent.
- 2) Junction box (4" x 4") and cover.
- 3) Square extension box (4"x 4" gyproc extension).
- 4) Two plastic universal bushings or junction box connectors.
- 5) White wire (12"), two insulated spade connectors.
- 6) Black wire (6"), two insulated spade connectors.
- 7) Brown wire (12"), two insulated spade connectors.
- 8) Yellow wire (12"), two insulated spade connectors.
- 9) Two cabinet mounting screws.

**Low Speed Switching Relay Installation Instructions:**

- 1) Turn off power to the oil furnace and wood furnace.
- 2) Mount the switching relay in a junction box in the blower compartment near the blower motor and motor wires. If possible mount relay on rubber or foam pad to reduce noise.
- 3) Remove the white neutral wire from the blower motor and connect it to a selected neutral side of the relay coil.
- 4) Connect the white wire (item 5) to the second spade of the selected neutral side of the relay coil and the other end into the blower neutral wire location (where initial white wire was removed).
- 5) Remove the black high-speed wire from the blower motor (this should be the selected blower heating speed) and connect it to the power side of the relay coil (no relay spade #).
- 6) Connect the black wire (item 6) to the second spade of the selected power side of the relay coil and the other end of the wire on to one side of the normally open contacts (relay spade #1).
- 7) Connect the brown wire (item 7) to the high-speed connection on the blower motor and the other end of the wire on to the other side of the normally open contacts (relay spade #3).
- 8) Remove the yellow low-speed wire from the blower motor (this should be the selected low-speed in the furnace wiring box) and connect it to one side of the normally closed contacts (relay spade #4).
- 9) Connect the yellow wire (item 8) to the low-speed connection on the blower motor and the other end of the wire to the other side of the normally closed contacts (relay spade #5).
- 10) Turn on power to the oil furnace and wood furnace. Check relay operation.

## 2.7 DUCT CONNECTION (Fig. S101-5, Fig. S101-1)

See Fig. S101-16 for Approved Furnace Ductwork Configurations.

See Fig. S101-17 for Prohibited Furnace Ductwork Configurations.

*The use of A/C coils is not recommended unless special arrangements are made.*

Minimum cross-sectional area of ductwork from furnace should be approximately 180 sq. in. with equal or larger size for return air.

The furnace must not be installed as a gravity system as the controls are not designed for this type of operation.

The dimensions and locations of permissible openings in casings for ducts, blower or emergency air are clearly identified on the furnace or on specific templates enclosed in the firebox.

**DO NOT** use duct elbows having an inside radius of less than 6" (155 mm). Use only 16" x 20" duct "S" type interconnection for this furnace.

Make or enlarge the openings in the wood furnace casing exactly as identified for add-on connection and on the appropriate side trim the furnace insulation flush with cut opening. Fasten edges of insulation securely with metal straps or bend tabs of duct starting collar over insulation edge to hold it in place.

Make all duct connections for the "S" type interconnection, see Fig. S101-5.

**CAUTION** – The Scotsman Add-On is **NOT** certified for installations using a divider in the plenum of the oil furnace. An Add-On unit must only be connected to a furnace, duct system and chimney, which are in good operating condition. **DO NOT** relocate any of the safety controls in the original furnace installation. Operate the oil-fired unit periodically to ensure that it will operate satisfactorily when needed.

**DO NOT** connect to duct work so that a reverse flow is possible. Before attempting installation, determine if there is suitable space available in the furnace area for the furnace connection outlined herein.

The external static pressure in the warm air duct to the house of the original system must be measured prior to any changes to the system. These are to be reset to the same values after the add-on procedure to maintain airflow through the oil furnace.

An important requirement of this type of installation is that when installed in an existing system the main ducts may have to be lowered to assure proper and safe clearances from combustible material. See Fig. S101-1.

After all connections are made a static pressure test and/or temperature measurement must be made in the outlet plenum of the wood furnace. This is a simple procedure and is outlined as follows using a Dwyer Model 25 or equal inclined manometer:

Drill hole in wood outlet plenum. Level inclined manometer and adjust to zero, insert manometer tube (Pressure end). With all duct work and doors in place static pressure should measure 0.2 in (50 Pa) with blower running.

Pressure may be corrected by the following measures:

- 1) Change blower pulley size (usually decrease)
- 2) Change blower motor pulley (usually increase)
- 3) Increase return air duct area (if restricted)

**CAUTION** – Current draw by blower motor should be checked after making any pulley change. If motor now draws greater current than that shown on the nameplate a larger more powerful motor must be installed.

**IMPORTANT** – **DO NOT** change the blower.

As an alternative to the static pressure test method, the installer may make adjustments on the basis of temperature measurement. For this test wood furnace must be at full operating temperature.

Take one temperature measurement in the front of the oil furnace plenum 12" to 16" up or approximately center. Take a second measurement in the wood furnace plenum (same position). Subtract one measurement from the other to arrive at a temperature difference (TD). The TD must be between 40°F and 100°F during normal operation and ideally around 80°F. The same adjustment procedure for pulleys applies for correction when using this method.

**CAUTION** – Most thermometers have a large time lag in reaching accurate measuring levels. It is important that this interval be measured for your thermometer by immersing it in boiling water and observing the time required for it to reach correct reading.

**IMPORTANT** – This equipment shall be installed in accordance with the instructions of the manufacturer and in a manner acceptable to the regulatory authority by technicians experienced in such services. When required by the regulatory authority, such technicians shall be licensed to perform this service.

The installation shall comply with the applicable requirements of CSA standard B365, Installation Code for Solid Fuel Burning Appliances and Equipment and if changes are made to the oil furnace this shall comply with CSA Standard B139, Installation Code for Oil Burning Equipment.

## 2.8 Control System (Fig. S101-5)

The fan and limit control and the damper motor should be located as shown in Fig. S101-5.

The control system serves the following functions:

### **T822 – Room Thermostat – Wood Furnace**

The primary control is the room thermostat located near the center of the house in the main floor or near an existing thermostat. The thermostat operates the damper motor to open and close the damper door thus allowing more or less air into the combustion area to control the fire.

### **M847 – Damper Motor**

The damper door lever should be attached to the damper motor wheel with the chain included. Be sure the damper door is fully closed and the damper motor is not powered. Connect the chain to the damper door level and to the bottom hole in the damper motor wheel. As a final adjustment bend the top chain link slightly to vary the damper position.

**L4064R – Wood Furnace/Limit Control**

The fan and limit control mounted in the plenum controls the operation of the circulating blower and limits the air temperature to prevent the furnace from overheating.

**Set Points:**

- 1) "ON" is usually set to 140°F (60°C). It turns on the circulating blower when the air temperature in the plenum reaches this temperature.
- 2) "OFF" is usually set to 100°F (38°C). It turns off the circulating blower when the circulating air temperature in the plenum drops to this temperature.
- 3) "Hi limit" is preset to 280°F (138°C). This will over ride the room thermostat to close fire damper door if the wood furnace overheats.

**2.9 INSTALLERS FINAL CHECKLIST****DUCTWORK INSPECTION**

- 1) Furnace ducted properly?
- 2) Proper duct clearances maintained?

**FURNACE INSPECTION**

- 1) **DO NOT** use firebrick in the furnace.
- 2) Check settings on fan limit controls.

**WIRING INSPECTION**

- 1) Is main disconnect switch within view?
- 2) Wiring cables protected from heat and not touching hot surfaces?

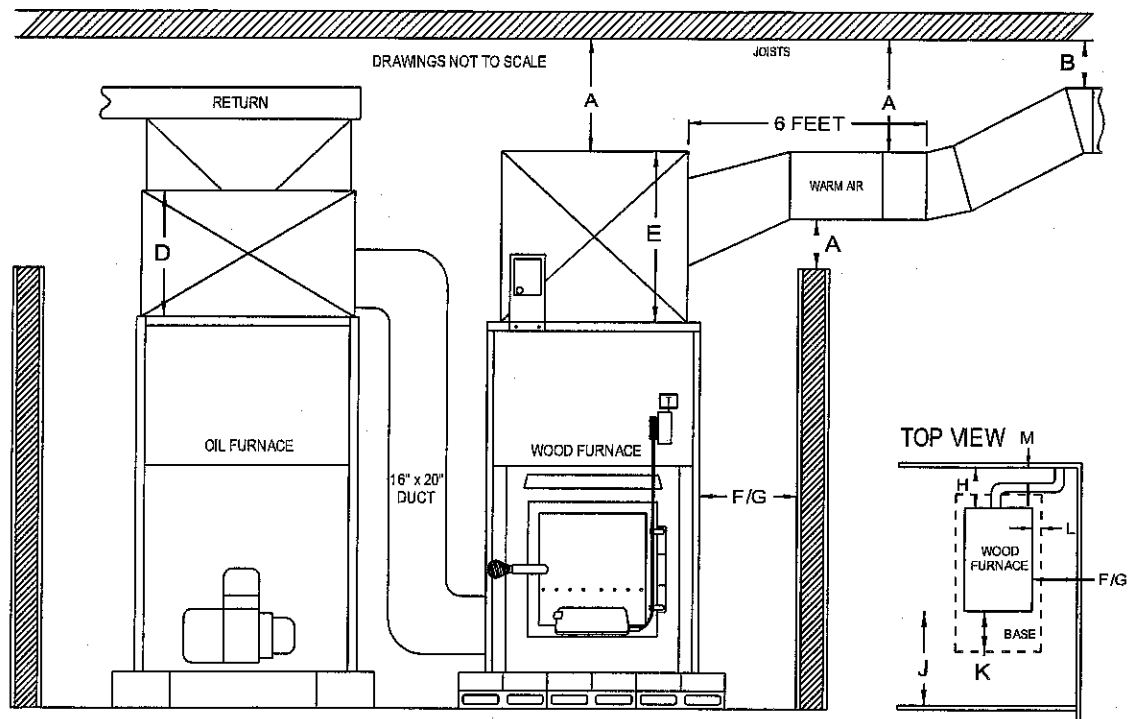
**FLUE AND SMOKE PIPE INSPECTION**

- 1) Flue inner size equivalent to 7" round or larger?
- 2) Separate entry and lower to flue for both solid-fuel and oil or gas smoke pipes?
- 3) Smoke pipe 24 gauge or better?
- 4) Smoke pipe secured by screws?
- 5) Draft regulator (if used) set at .05" wc maximum?
- 6) Clearances of smoke pipe 18" or better from combustible material?  
Metal protection is recommended.

**DEALER TO INSTRUCT HOMEOWNER**

- 1) Keep area around unit clean.
- 2) Use DRY wood only. Hardwood preferred.
- 3) Load carefully.
- 4) Load level no higher than center of door.
- 5) Remove ash regularly as directed.
- 6) Watch for soot build up in smoke pipe.
- 7) Danger of flue fire if poor fuel or poor maintenance produces creosote buildup.
- 8) Operation of unit during power failure. (i.e. manual operation.)
- 9) When shutting down for extended periods, clean unit thoroughly.





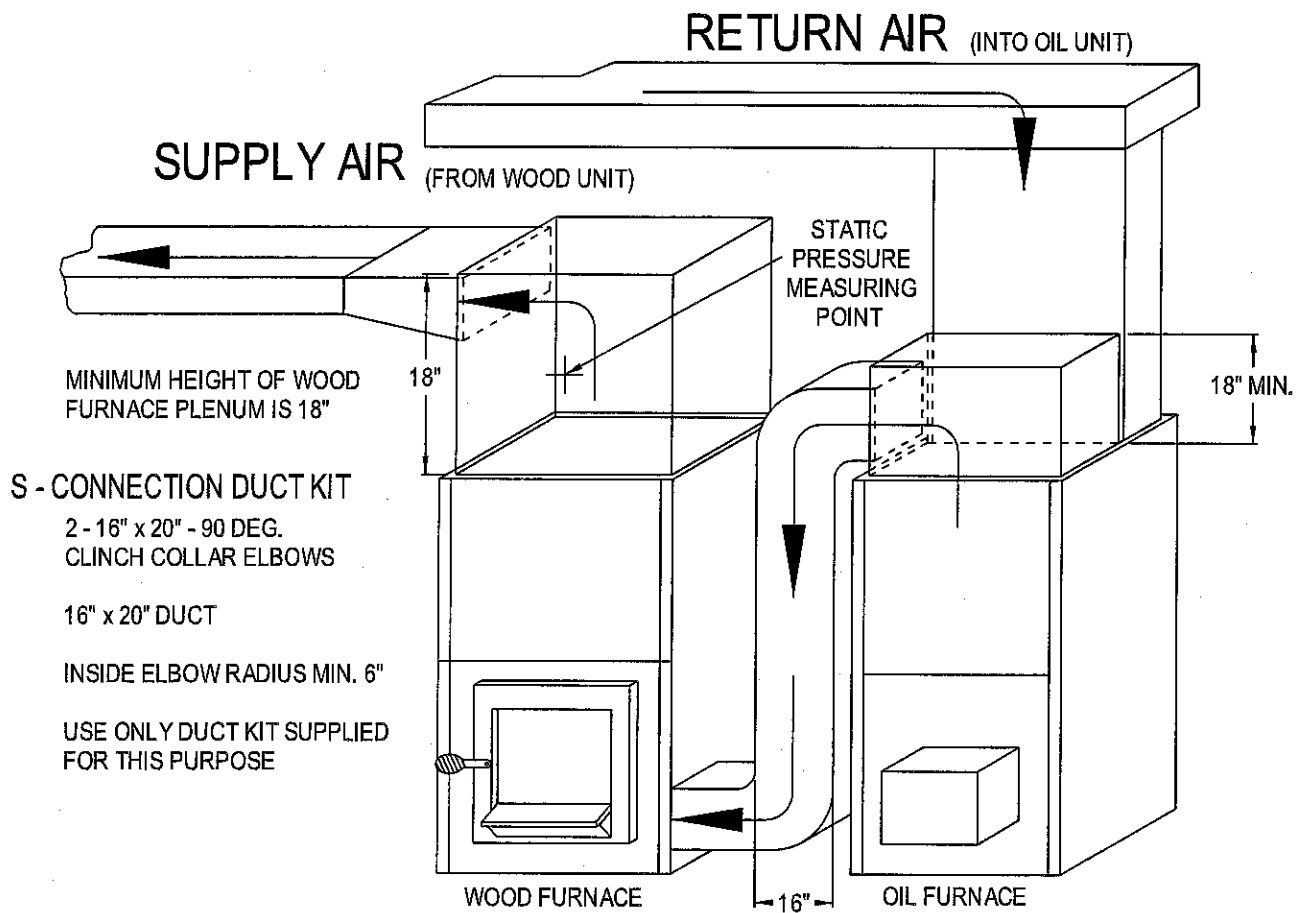
- A - 6" (152 mm) supply plenum and all supply ducts within 6' (1.8 m) of supply plenum.
- B - 2" (51 mm) all sides of warm air supply 6' (1.8 m) remote from plenum.
- C - 3" (76 mm) all sides of wood furnace return air plenum and return air duct within 6' (1.8 m) of plenum.
- D - 18" (457 mm) minimum warm air supply plenum height of the oil furnace.
- E - 18" (457 mm) minimum warm air supply plenum height of the wood furnace.
- F - 6" (152 mm) one side of furnace.
- G - 24" (610 mm) other side of furnace for access to rear.
- H - 24" (610 mm) rear clearance to combustibles. A rear clearance of 30" should be maintained for cleaning.
- J - 48" (1220 mm) front clearance.
- K - 18" (457 mm) door side floor protecting pad (if not on concrete floor or concrete pad on ground).
- L - 8" (204 mm) floor protecting pad (if not on concrete floor or concrete pad on ground).
- M - 18" (457 mm) flue pipe to combustibles and electrical services.

NOTE - The return air plenum clearances to the wood furnace do not apply to return air ducts serving an oil-fired, gas-fired or electric furnace to which an add-on furnace is connected.

## CLEARANCES - ADD ON TO OIL FURNACE

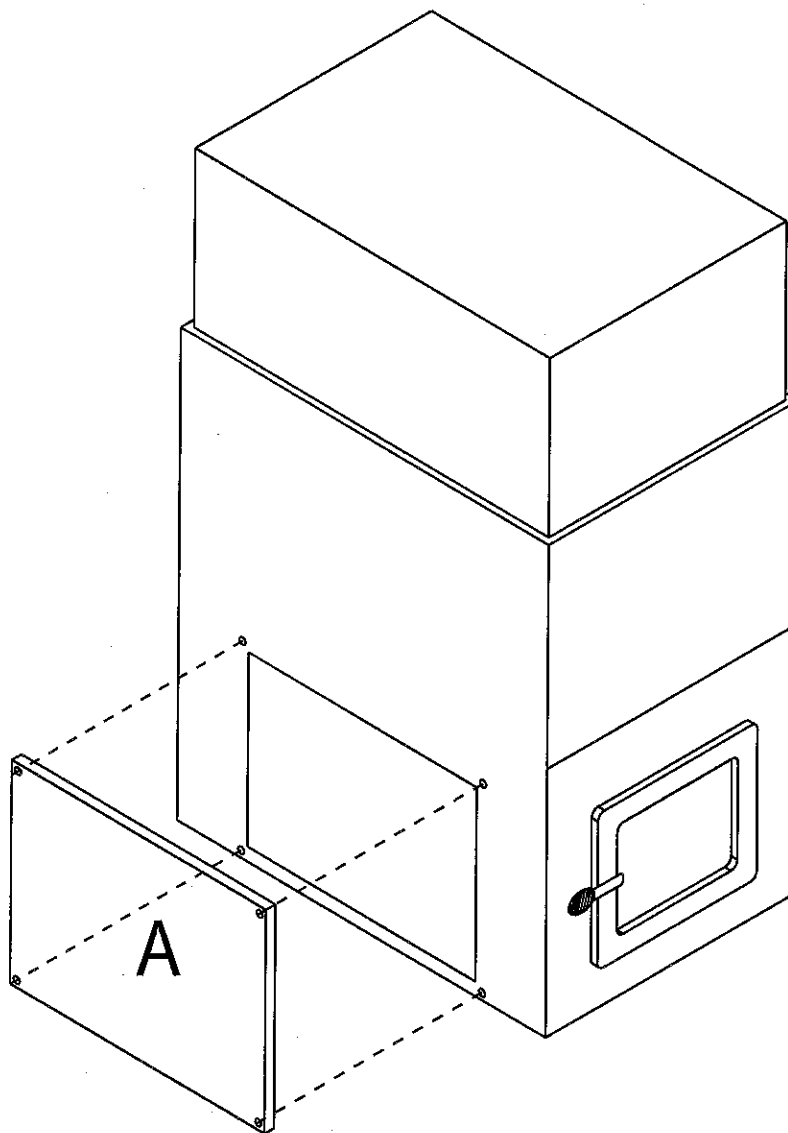
FIG. S101-1

101M0001 JAN11



**SCOTSMAN ADD-ON TO OIL QUICK CONNECTION  
 KIT "S" TYPE**

**FIG. S101-2**



POWER FAILURE KIT (D00-KA-0500-00)

MUST BE INSTALLED ON FURNACE CABINET OPPOSITE  
TO "S" DUCT CONNECTION.

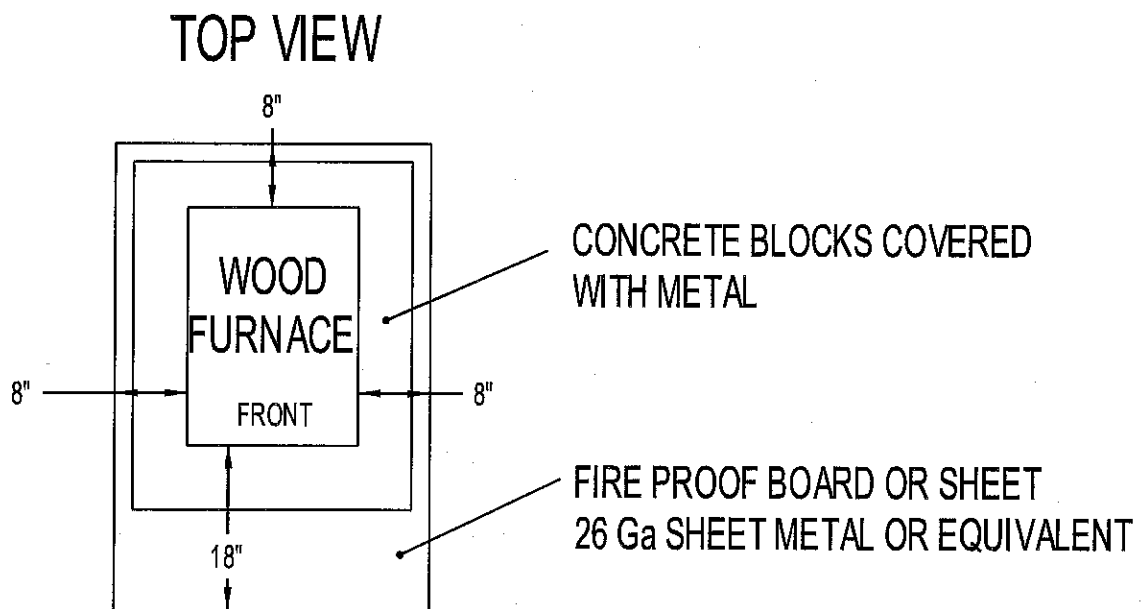
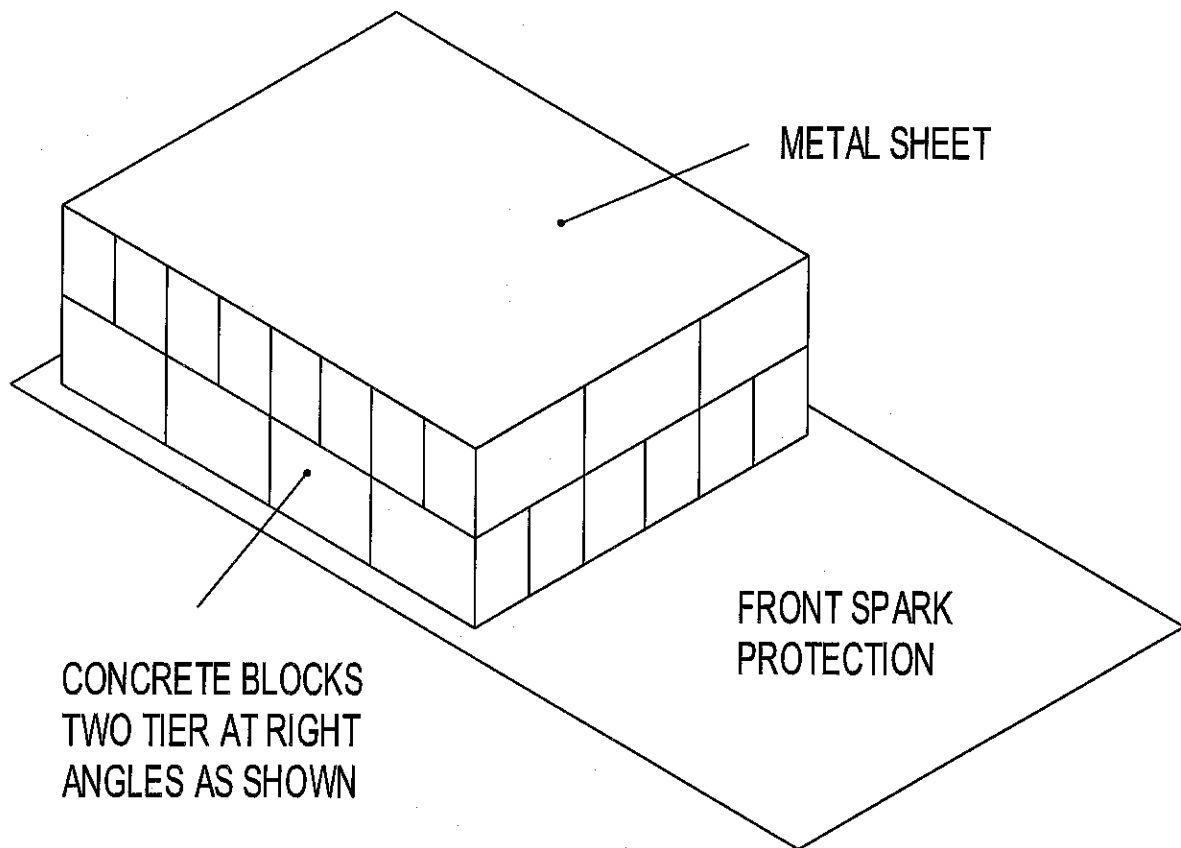
LOCATE AND CUT HOLE IN CABINET USING TEMPLATE  
PROVIDED.

REMOVE INSULATED COVER "A" ABOVE BEFORE ANY  
GRAVITY OPERATION (Power Failure)

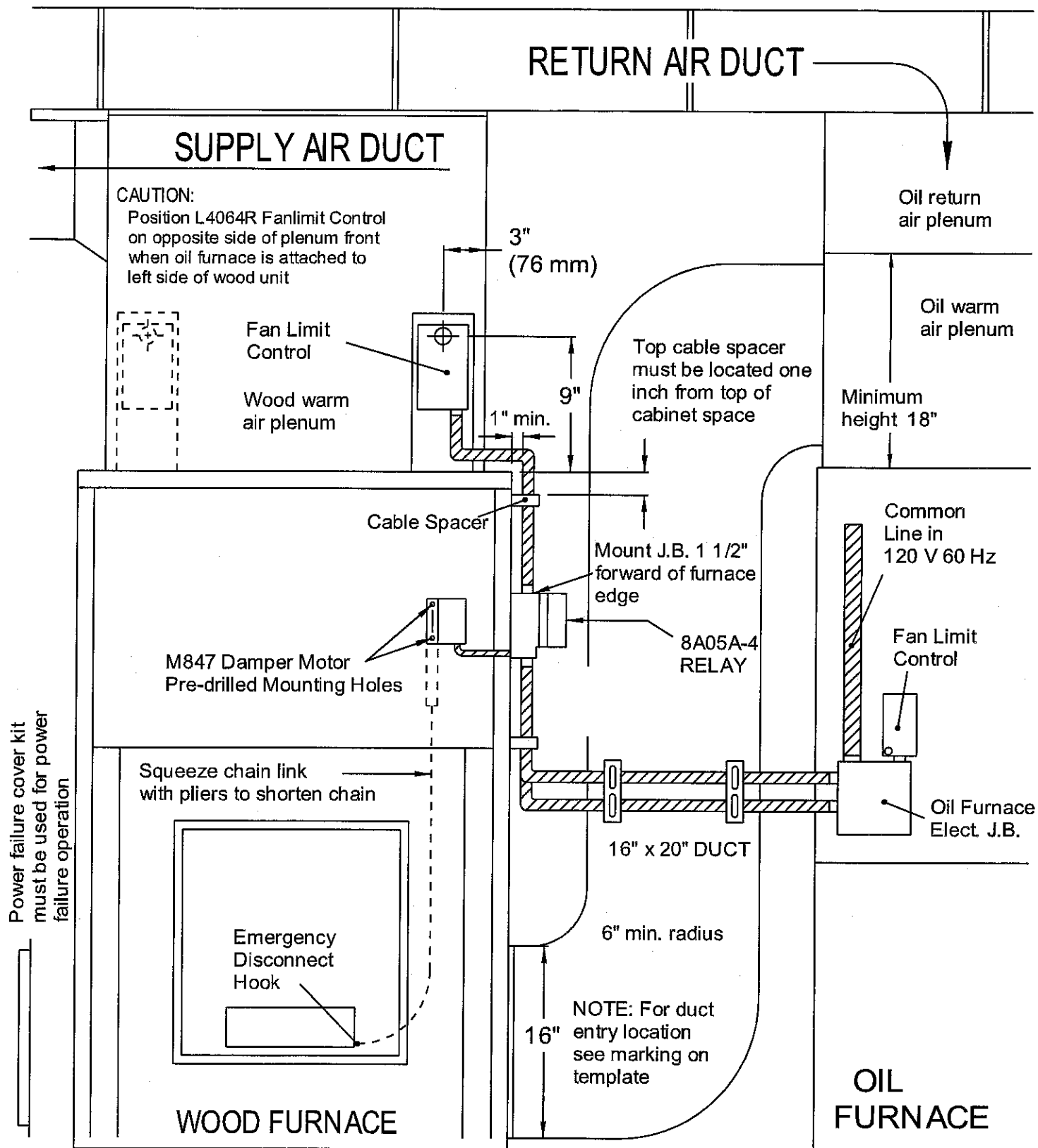
**SCOTSMAN POWER FAILURE KIT**

**FIG. S101 - 3**

101M003JAN11



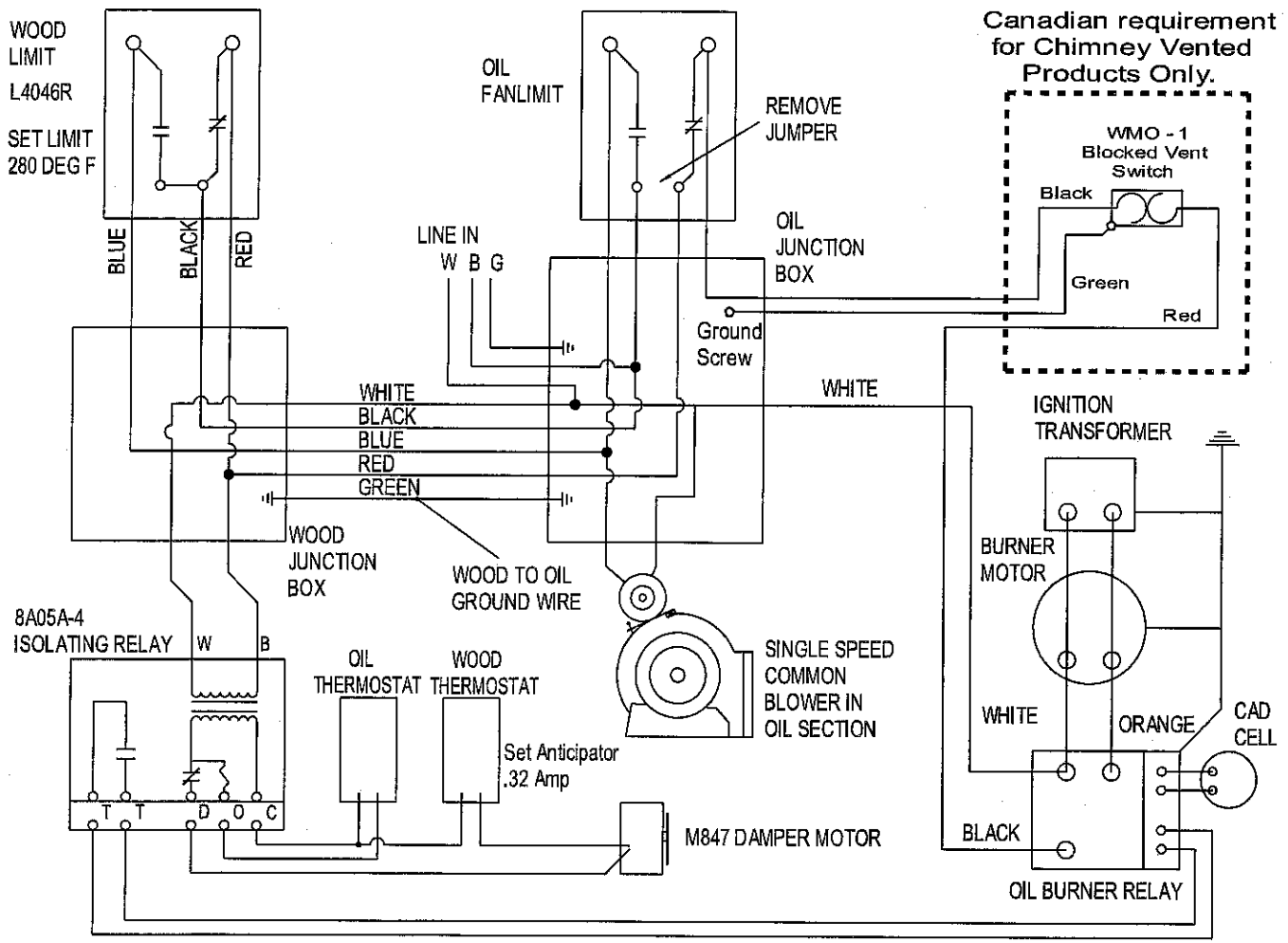
**BASE FOR USE ON COMBUSTIBLE FLOOR**  
**FIG. S101-4**



## SCOTSMAN WOOD OIL ADD-ON CONTROLS PLACEMENT

FIG.S101-5

101M0005JAN11



NOTE: OIL THERMOSTAT SHOULD BE SET LOWER THAN WOOD THERMOSTAT

**SCOTSMAN ADD-ON TO OIL WIRING SCHEMATIC**  
**BELT DRIVE MOTOR**  
**FIG. S101-6**

# Classic Oil Add-On to Wood With Relay

## FIG. S101-7

Oil Furnace with Multi-speed blower motor and optional relay for Low Speed Air Circulation.

101M0007 JAN11

See control kit instructions for oil fan/limit installations

Install to code

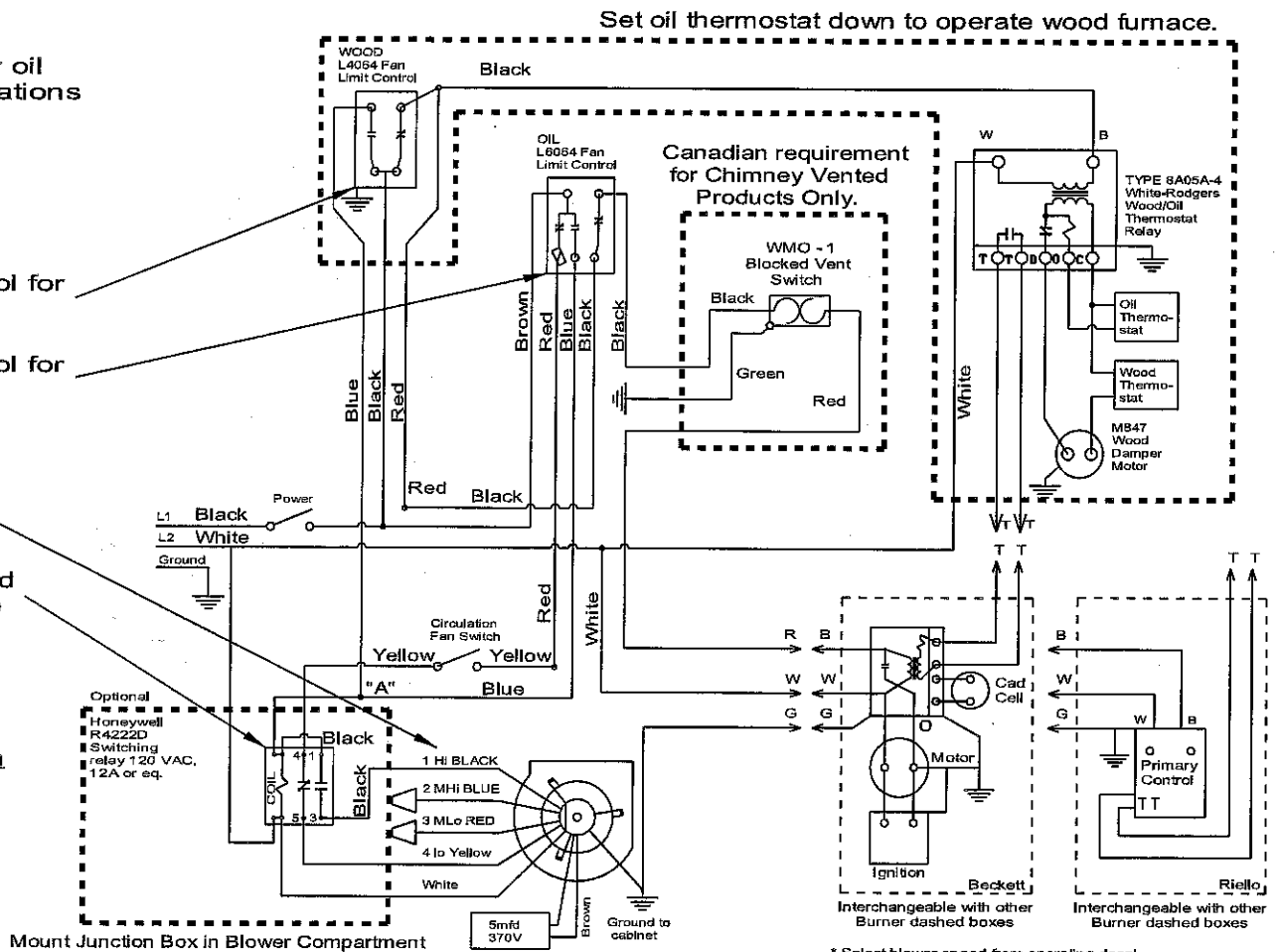
Fan/limit control for wood furnace

Fan/limit control for oil furnace

Set Hi blower speed

Install Lo speed relay (optional)

Disconnect Low speed Circulation Fan Switch if optional relay is not used.



# Classic Oil Furnace - Add-On To Wood Without Relay

## FIG. S101-8

Oil Furnace with Multi-speed Direct Drive Blower Motor  
Low Speed Circulation Fan Switch Disconnected.

101M0008JAN11

Set oil thermostat down to operate wood furnace.

See control kit  
instructions for oil  
fan/limit installations

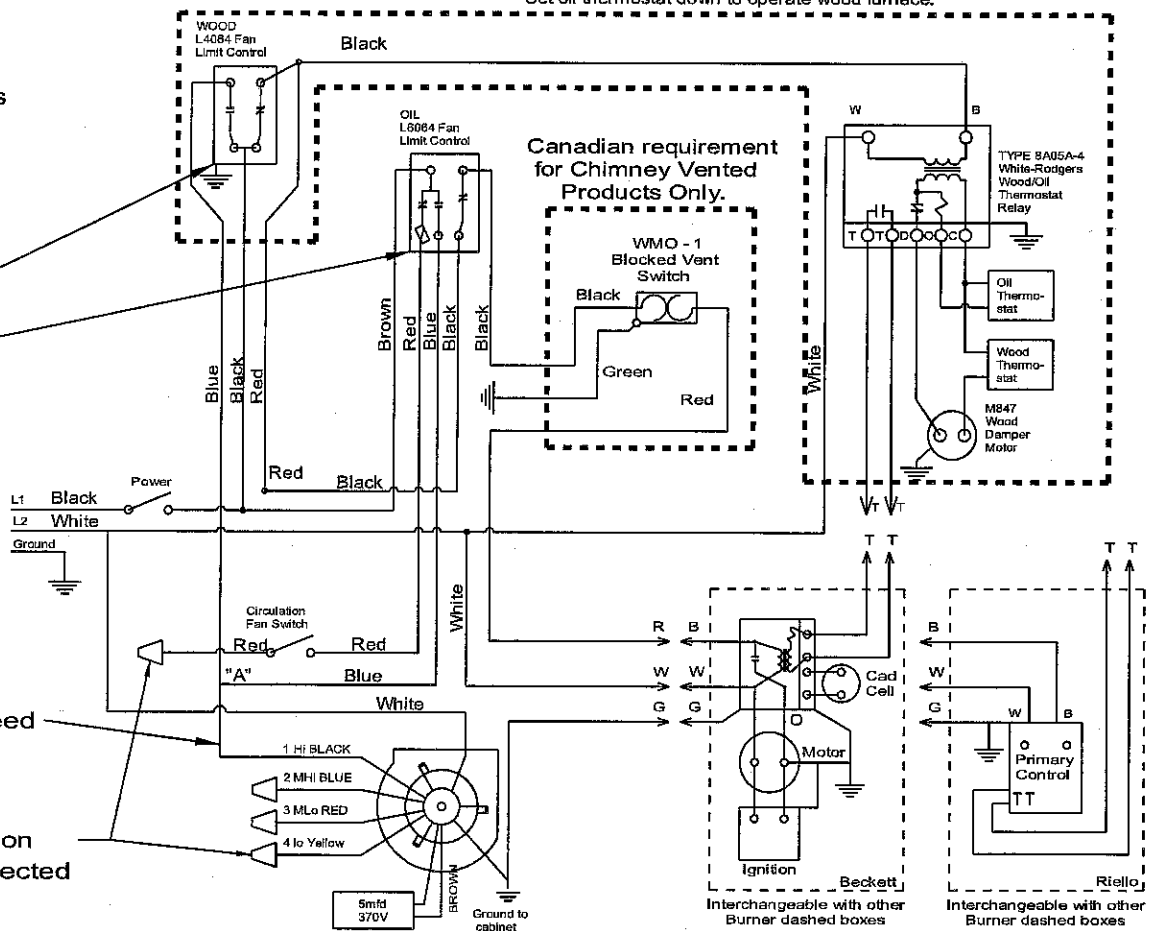
Install to code

Fan/limit control for  
wood furnace

Fan/limit control for  
oil furnace

Set High blower speed

Low Speed Circulation  
Fan Switch Disconnected



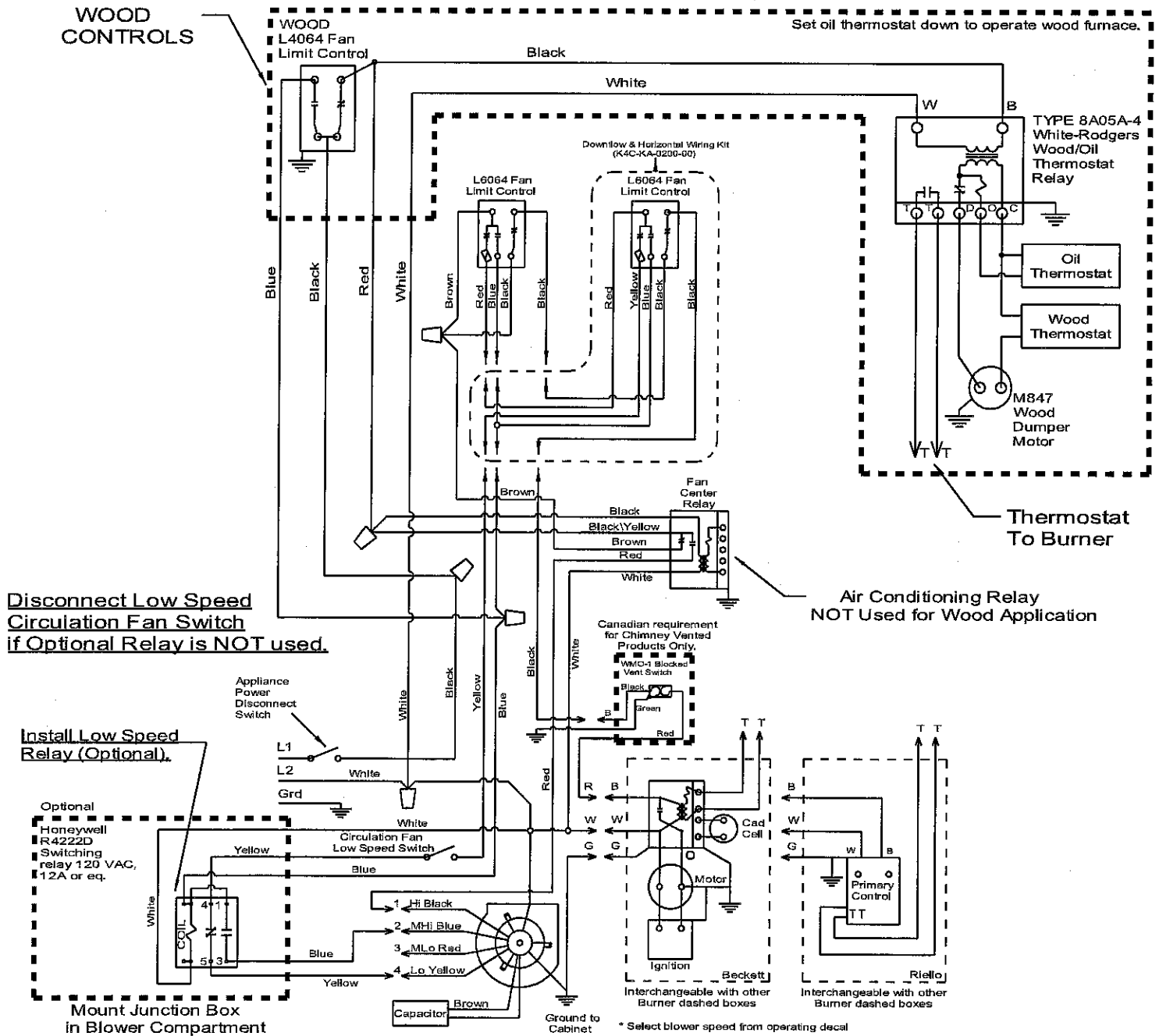
\* Select blower speed from operating decal

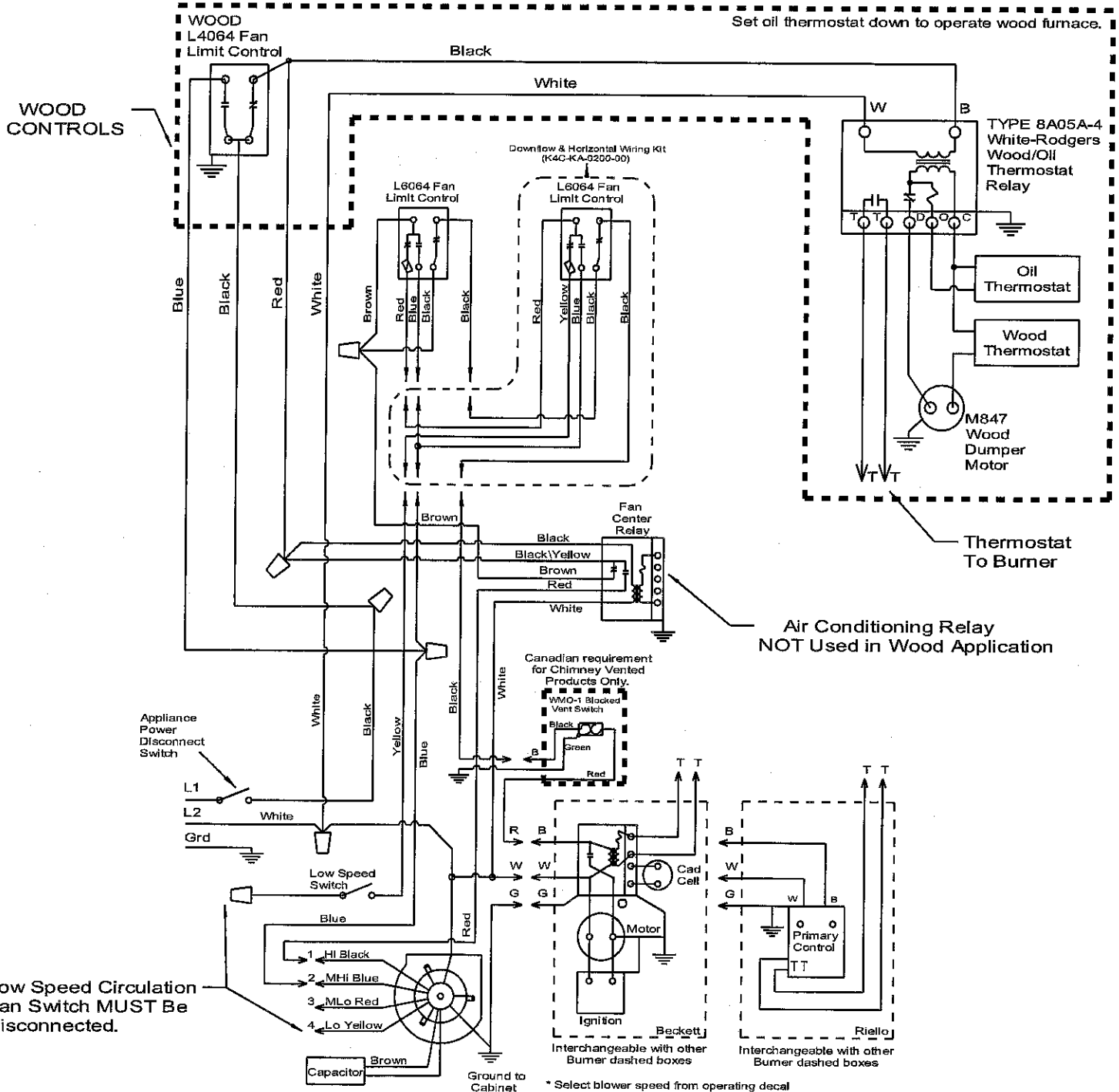


**FIG. S101-9**

101 M0009JAN11

Set oil thermostat down to operate wood furnace. ■

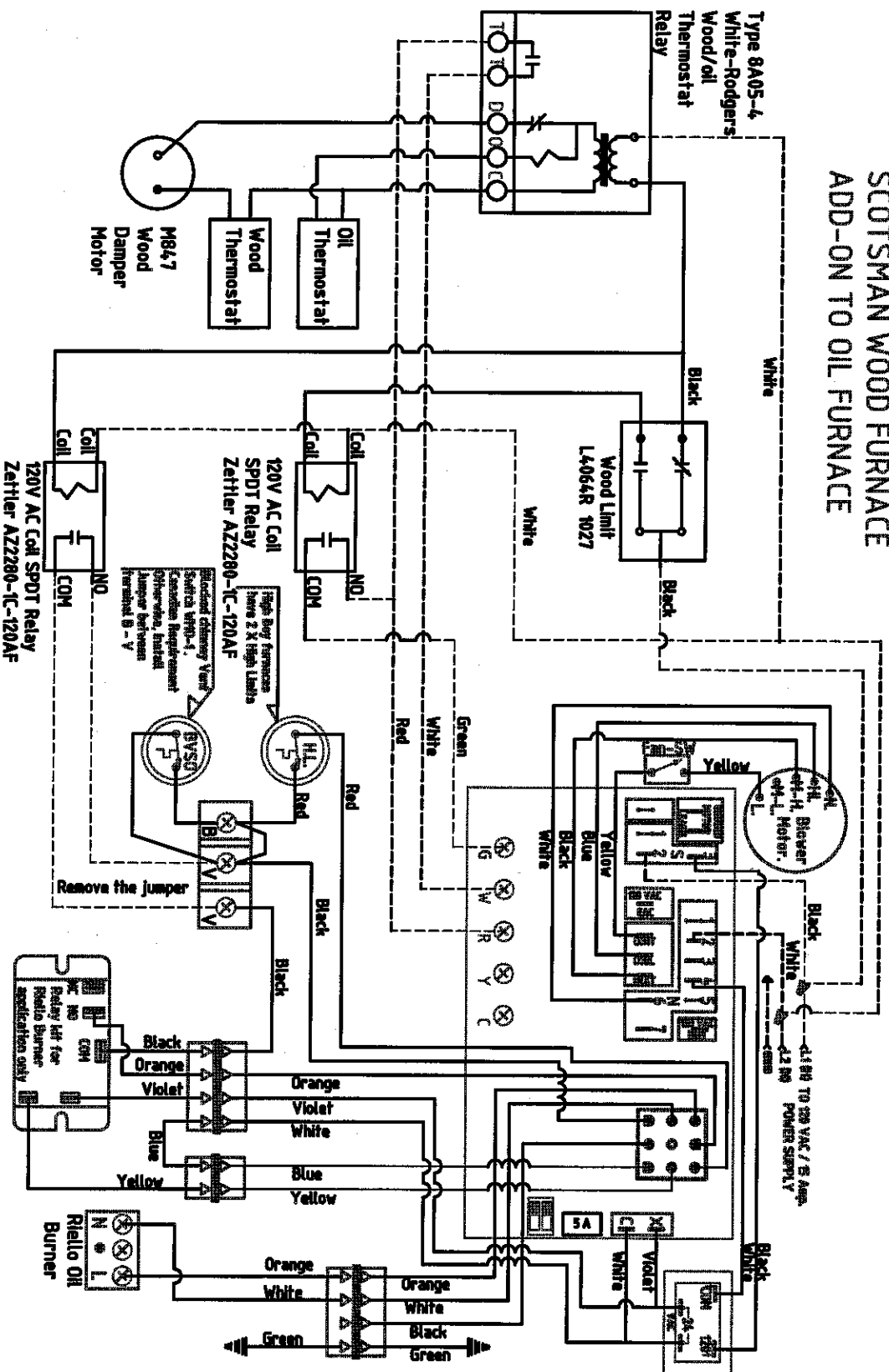




Classic Air Oil-Fired furnace Wood ADD-ON  
ST9103A1028 Control Board with Riello burner  
FIG. S101-11

OIL-CLASSIC AIR RIELLO  
WIRING DIAGRAM

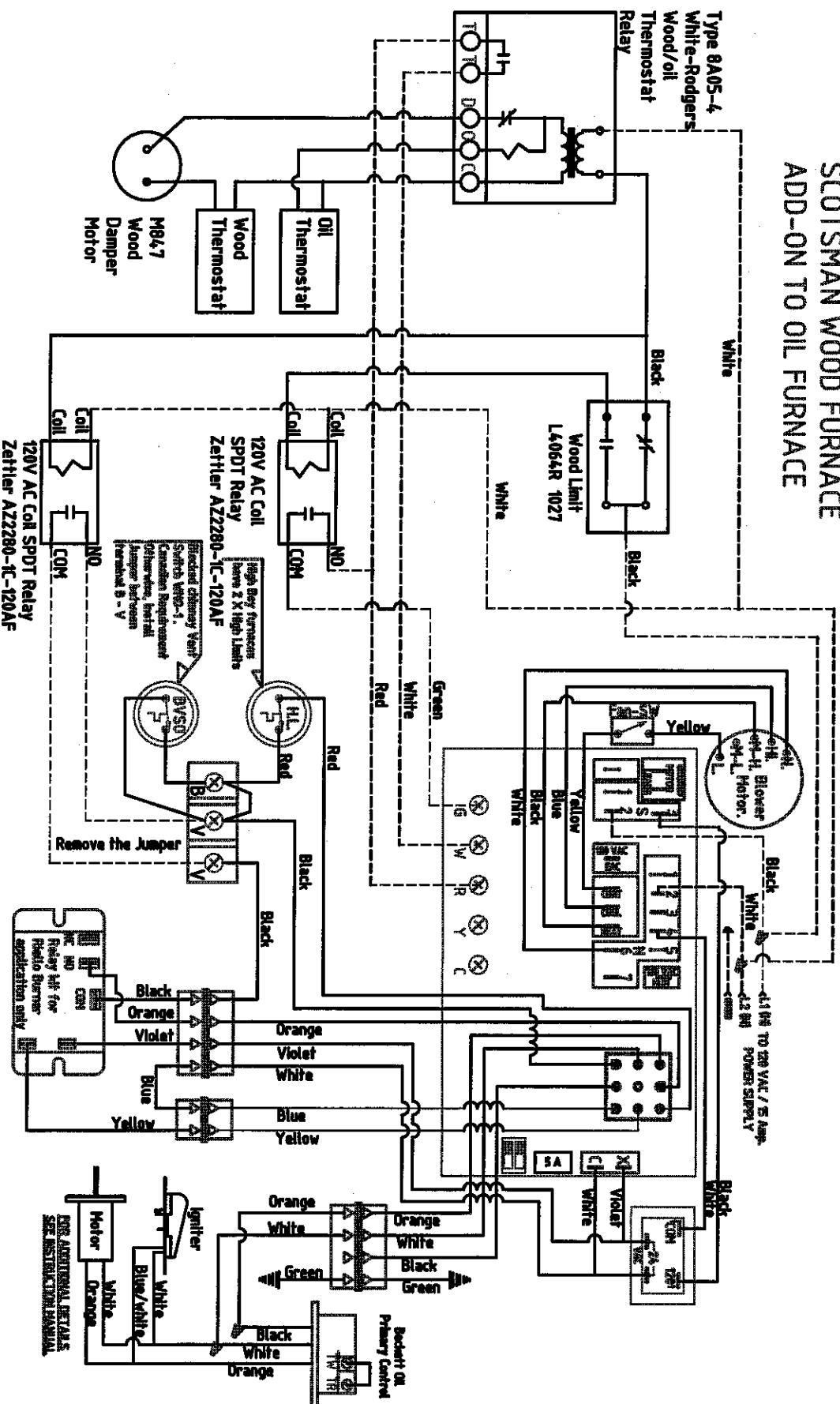
SCOTSMAN WOOD FURNACE  
ADD-ON TO OIL FURNACE

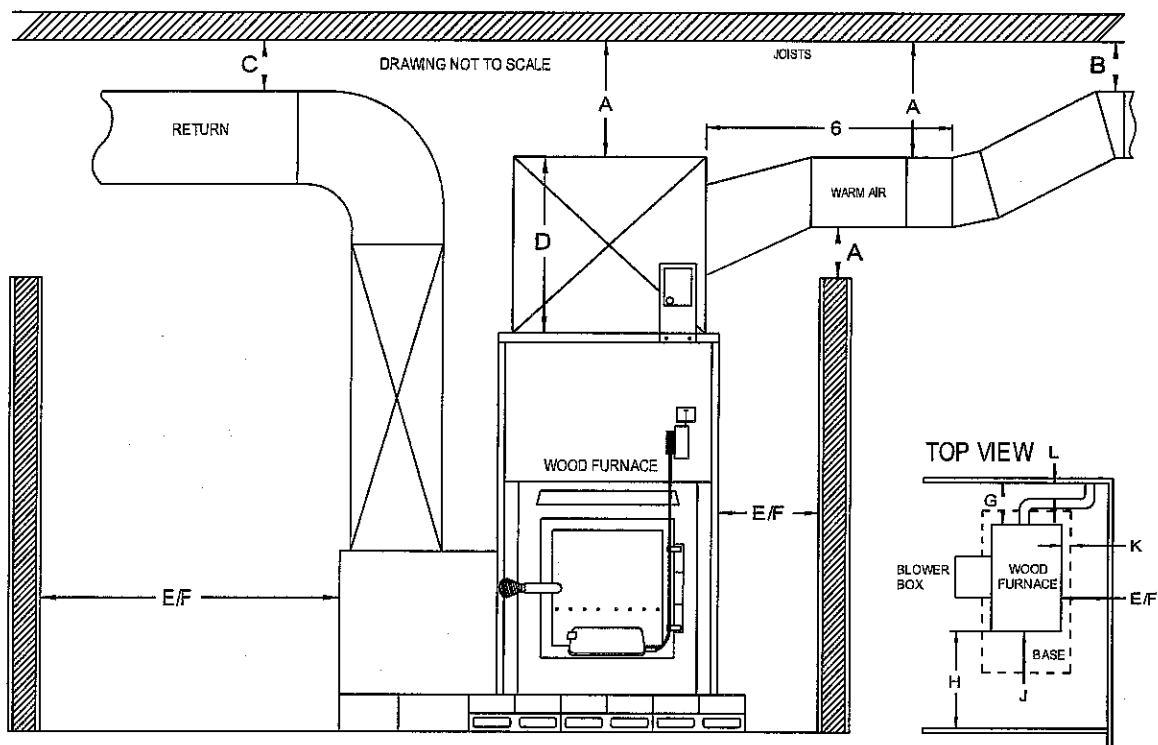


Classic Air Oil-Fired furnace Wood ADD-ON  
ST9103A1028 Control Board with Beckett burner  
FIG. S101-12

OIL-CLASSIC AIR RIELLO  
WIRING DIAGRAM

SCOTSMAN WOOD FURNACE  
ADD-ON TO OIL FURNACE



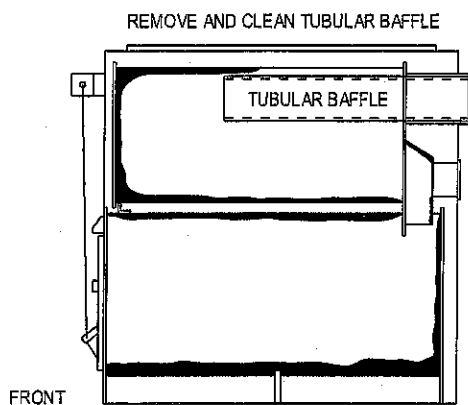


- A - 6" (152 mm) supply plenum and all supply ducts within 6' (1.8 m) of supply plenum.
- B - 2" (51 mm) all sides of warm air supply 6' (1.8 m) remote from plenum.
- C - 3" (76 mm) all sides of wood furnace return air plenum and return air duct within 6' (1.8 m) of plenum.
- D - 18" (457 mm) minimum warm air supply plenum height.
- E - 6" (152 mm) one side of furnace.
- F - 24" (610 mm) other side of furnace for access to rear.
- G - 24" (610 mm) rear clearance to combustibles. A rear clearance of 30" should be maintained for cleaning.
- H - 48" (1220 mm) front clearance.
- J - 18" (457 mm) door side floor protecting pad (if not on concrete floor or concrete pad on ground).
- K - 8" (204 mm) floor protecting pad (if not on concrete floor or concrete pad on ground).
- L - 18" (457 mm) flue pipe to combustibles and electrical services.

## CLEARANCES - FREE STANDING FURNACE

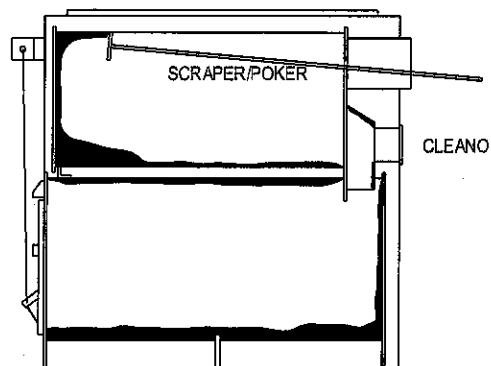
FIG. S101-13

101M0013JAN11



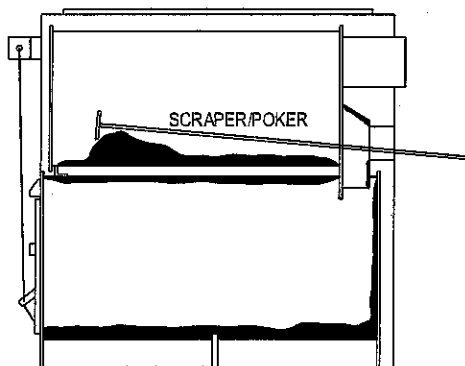
A

USING PROVIDED SCRAPER/POKER REMOVE CREOSOTE FROM HEAT E



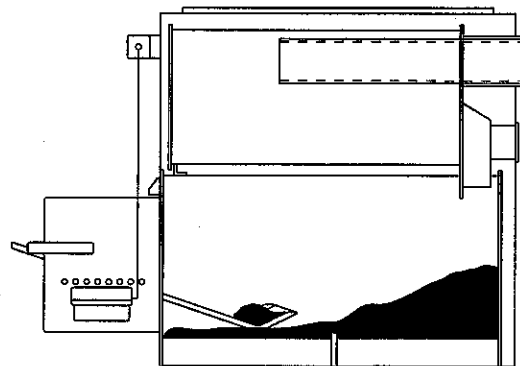
B

THROUGH THE REAR CLEANOUT, SCRAPE ALL CREOSOTE INTO THE FIRE BOX



C

SHOVEL ALL CREOSOTE FROM THE FIREBOX THROUGH THE FRONT D  
REPLACE THE CLEANOUT COVER, TUBULAR BAFFLE AND FLUE PIPE



D

(CREOSOTE AMOUNTS EXAGGERATED)

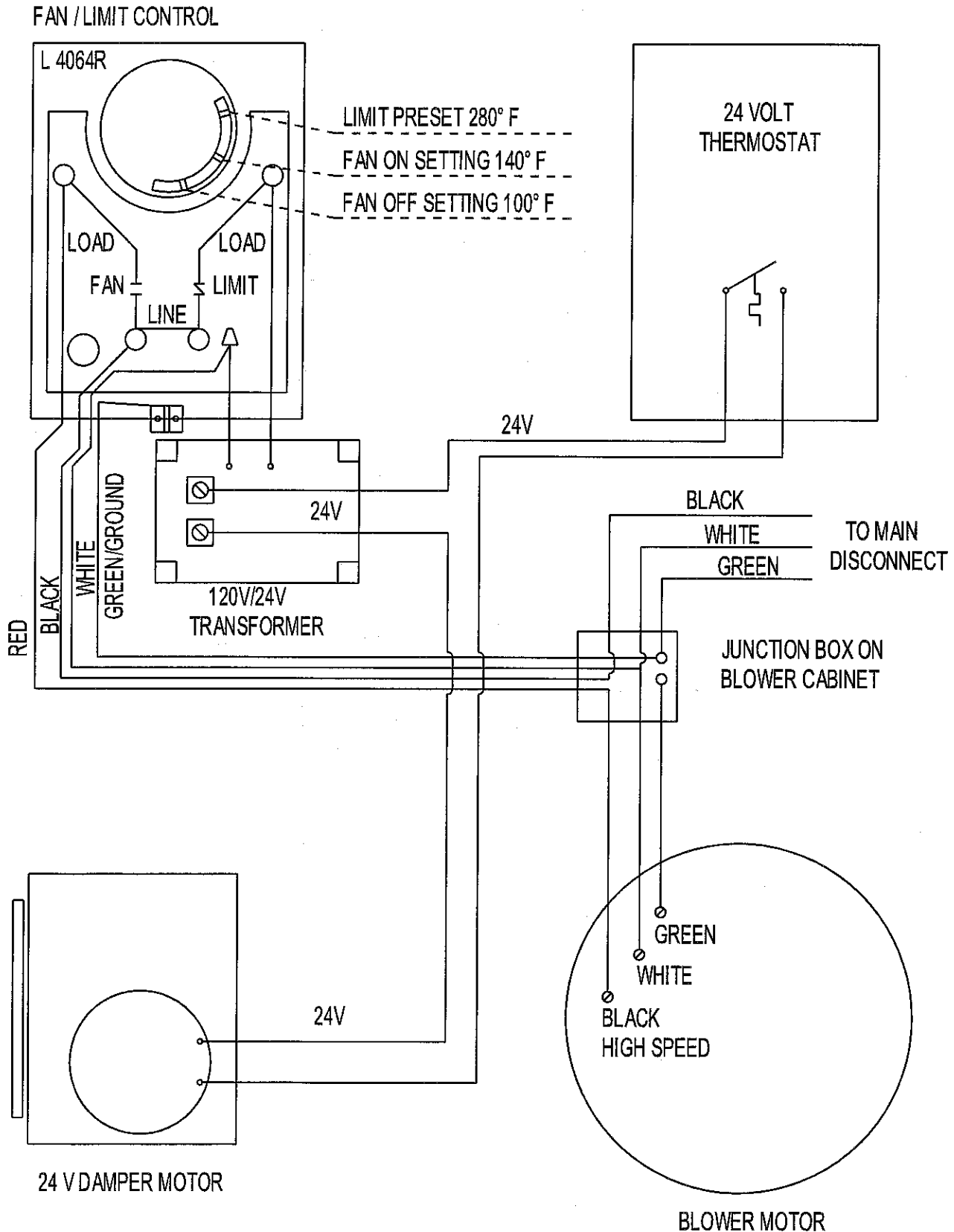
**CLEANING FIG. S101-14**

101M0014JAN11

# WIRING DIAGRAM - FIG. S101-15

## FREE STANDING

101M0015JAN11



# APPROVED FURNACE DUCTWORK CONFIGURATIONS

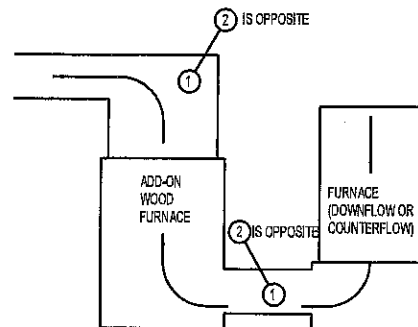
FIG. S101-16

101M0016.JAN11

The following three ductwork configurations are approved:

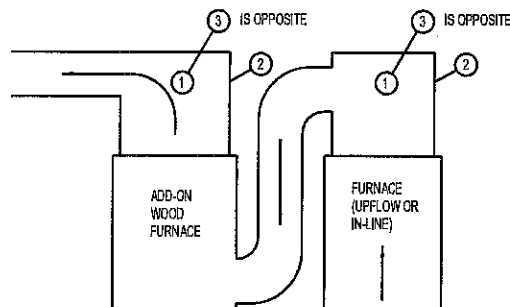
APPROVED 1 - Typical ductwork for add-on to a downflow furnace.

1 and 2 are static pressure test points.



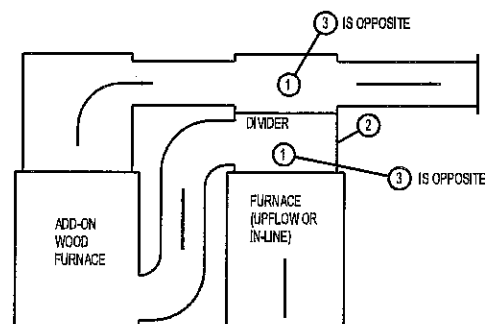
APPROVED 2 - Typical ductwork for add-on to an upflow furnace with straight-through (non Divided ) plenum.

1 and 2 are static pressure test points.



APPROVED 3 - Typical ductwork for add-on to an upflow furnace - divided plenum.

1,2 and 3 are static pressure test points.





# PROHIBITED FURNACE DUCTWORK CONFIGURATIONS

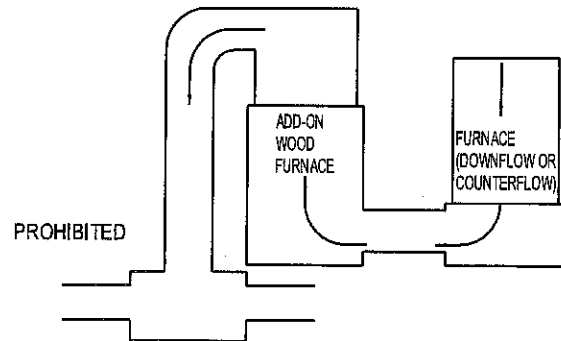
FIG. S101-17

101MOD17JAN11

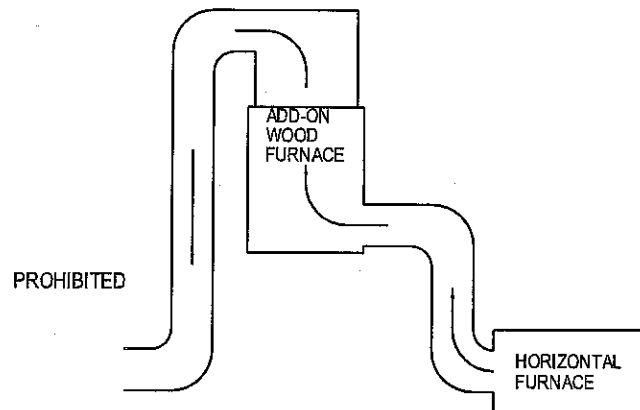
UNDER NO CIRCUMSTANCES CAN THE FOLLOWING CONFIGURATION BE USED

The following three ductwork configurations are prohibited:

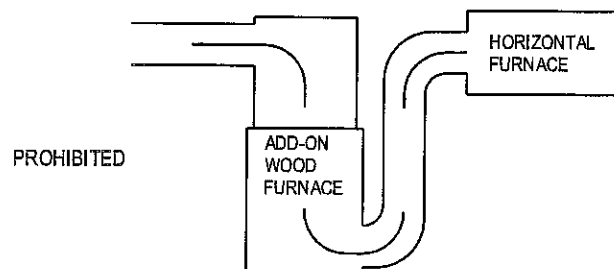
PROHIBITED 4 - Ductwork for add-on to a downflow furnace - Ductwork below furnace.



PROHIBITED 5 - Ductwork for add-on to floor mounted horizontal furnace.



PROHIBITED 6 - Ductwork for add-on to a ceiling mounted horizontal furnace.



LAYOUTS 4, 5 and 6 are PROHIBITED because of the danger of reverse flow occurring under power failure conditions. The location of the supply and return ducts are such that the natural convection of heat will not occur through the supply ducts.