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THIS VENT SYSTEM HAS BEEN LISTED FOR USE WITH SPECIFIED RHEEM, RUUD, WEATHERKING AND HEAT CONTROLLER OIL FURNACES BY UL AND ULC. SEE FURNACE RATING PLATE FOR VERIFICATION.



## MODEL SS1-R INSTALLATION INSTRUCTIONS

 Recognize this symbol as an indication of important Safety Information!

### OWNER INSTRUCTIONS, DO NOT DESTROY

**NOTE:** FLUE GAS TEMPERATURES MUST NOT EXCEED 575°F AT VENT SYSTEM INLET.

 **WARNING**

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, CARBON MONOXIDE POISONING, EXPLOSION, OR PERSONAL INJURY OR PROPERTY DAMAGE.

**DO NOT DESTROY. PLEASE READ CAREFULLY AND  
 KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.**

## TABLE OF CONTENTS

	Page (s)
Description and Specifications .....	1
Installation Restrictions .....	2
Cautions .....	2
Safety Inspection of a Previously Used Appliance .....	3
SS1-R Terminology .....	3
Vent Hood Termination Clearances For U.S. Installations .....	4
Vent Hood Termination Clearances For Canadian Installations .....	5
Installation	
Tools Required .....	6
Vent Hood Installation .....	6, 7
Installation of Rain Shield .....	7
Plenum Installation .....	7, 8, 9
Installation of Vent Pipe .....	9, 10
Electrical Wiring	
Wiring Restrictions .....	11
Installation of Oil Solenoid Valve .....	11
Field Wiring Connections .....	12
Installation of R1 Relay and Junction Box Extension .....	13
Selection of Proper Bleed Orifice & Draft Adjustment .....	13, 14
Combustion Air .....	14
System Operation Check Out .....	15
Trouble Shooting Oil Odors .....	15
Trouble Shooting Electrical Problems .....	16, 17
Maintenance .....	18
Removal & Replacement of Motor/Wheel .....	18
Warranty .....	19
Mounting Templates	
Template B Motor Notch .....	20
Template A Vent Hood Terminus .....	21

SideShot® is a registered trademark of Tjernlund Products, Inc. for their Model SS1-R Vent System.

## DESCRIPTION

The SS1-R is a mechanical vent system designed and listed for use with specified Rheem, Ruud, Weatherking and Heat Controller oil fired furnaces. The SS1-R automatically vents the flue gases away from the oil furnace to the outdoors. By combining outside air with high-tech insulation and maintaining required clearances, surrounding combustible materials remain at safe temperatures. After each burner cycle, the SS1-R and the burner motor will continue operating for an adjustable post-purge period. The post-purge provides numerous system benefits, therefore, it is not recommended to reduce the post-purge time from that which is set at the factory. The SS1-R also features a two way safety system consisting of a fan proving switch and a high limit control. These devices monitor the SS1-R's performance and will interrupt furnace operation if a malfunction is detected.

## APPLICATION TABLE

Verify that the total BTU/hr. input of the heating appliance(s) fall within the proper category listed below. All BTU/hr. capacity ranges are based on a maximum of 10 linear feet of vent pipe with no more than 3 - 90° elbows. (Two 45° elbows are equivalent to one 90° elbow)

Flame Retention Oil Burner Input	Maximum No. of 90° elbows	Linear Feet
70,000–189,000 BTU/hr.	3	10

## SPECIFICATIONS

**Motor:** 115/1/60, 3300 RPM, 212 watts, 2.28 FLA

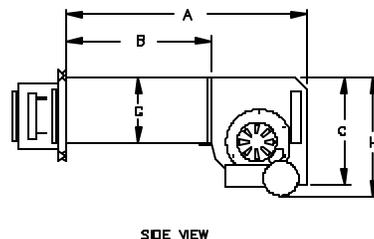
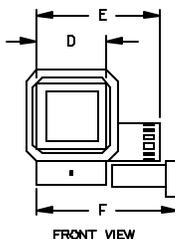
**Fan Proving Switch:** Non-adjustable set point of -.04" W.C., Contacts rated for an inductive load of 6.2 FLA at 120 VAC.

**High Limit:** Manual reset N/C contacts, open at 135°F ± 10°F, Contacts rated at 10 FLA at 120 VAC.

**Post-Purge Timer:** Adjustable from 1 to 10 minutes. Dual voltage, non-polarity sensitive input (24-120 VAC).

**Relay:** (Mounted On junction box extension): SPST, N/O contacts rated at 12 FLA, 60 LRA at 120 VAC

**Oil Solenoid Valve:** ON - Off control of oil flow to burner; 3-8 second valve opening delay; 120 VAC, .115 Amps, 13.8 VA



A	B	C	D
27 3/8"	16 1/2"	12 1/4"	8"
E	F	G	H
13 3/4"	15 1/8"	7 3/4"	14 3/4"

## GENERAL INFORMATION

These units have been factory tested and rated in accordance with AMCA standard 210, Test Code for Air Moving Devices and also rated in accordance with the following Canadian Standards: CAN/CSA - B140.0-M87 General Requirements For Oil Burning Equipment; CAN/CSA - B139-M91 Installation Code For Oil Burning Equipment; CAN3 - B255-M81 Mechanical Flue - Gas Exhausters.

Each SS1-R is electrically factory line tested before shipment.

After opening carton, inspect thoroughly for hidden damage. Wheel should rotate freely. If any damage is found notify freight carrier and your distributor immediately and file a concealed damage claim.

## INSTALLATION RESTRICTIONS

1. Do not install on condensing appliances. Use this device only on specified oil fired Rheem, Ruud, Weatherking & Heat Controller furnaces. Do not use with more than one furnace.
2. A barometric draft control must be used with the SS1-R.
3. Do not use single wall vent pipe in unconditioned or unheated spaces.
4. The SS1-R shall not be installed where flue gas temperatures exceed 575°F at its inlet. Flue gas temperature verification:  
Measure temperature of flue gases at the inlet to the SS1-R at time of installation. Measure the temperature after the appliance and SS1-R operate for at least 15 minutes, allowing flue gas temperature to stabilize.

### WARNING

Improper installation, adjustment, alterations, service or maintenance can cause injury, property damage or death. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the equipment supplier.

### WARNING

Do not exceed the recommended input range of the SS1-R. Under no circumstances shall the minimum draft adjustment be used for the larger input range of this product. Improper adjustment may result in the dispersion of flue products (carbon monoxide) into the building interior causing carbon monoxide poisoning or death.

## CAUTIONS

### WARNING

Disconnect power supply from the oil furnace when making wiring connections and servicing the SS1-R. Failure to do so may result in personal injury and/or equipment damage.

1. The SS1-R must be installed by a qualified installer (an individual properly licensed and/or trained) in accordance with all local codes. In the absence of local codes, USA installations should be in accordance with the latest editions of the applicable National Fire Protection Agency (NFPA) code. These are NFPA 31 (Installation of Oil-Burning Equipment), and NFPA 211 (Chimneys, Fireplaces, Vents and Solid Fuel burning Appliances). In addition, USA installations must comply with the National Electrical Code. In the absence of local codes in Canada, installations must comply with CSA Std 139 (The National Building Code of Canada) and CSA Std 22.1 (The Canadian Electrical Code).
2. Plan the vent layout so that the code required clearances are maintained from plumbing, wiring and combustible materials.
3. The SS1-R motor shaft must be mounted horizontally to ensure proper operation of the Fan Proving Switch and prevent motor bearing wear.
4. Flue gas temperatures must not exceed 575°F at SS1-R inlet. Ambient temperature must not exceed 104°F.
5. Make certain the power source is adequate for the SS1-R requirements. Do not add the SS1-R to a circuit where the total electrical load is unknown.
6. "Safety Inspection of a Previously installed Appliance" must be completed when replacing a conventional chimney venting system or when SS1-R is installed on Rheem, Ruud, Weatherking or Heat Controller oil fired furnaces.
7. The SS1-R vent system, including vent pipe, must be inspected annually by a qualified individual.

**\*SAFETY INSPECTION OF A PREVIOUSLY INSTALLED OIL APPLIANCE**  
(Perform prior to SS1-R installation)

The following procedure is intended as a guide to aid in determining that an appliance is properly installed and is in safe condition for continuing use.

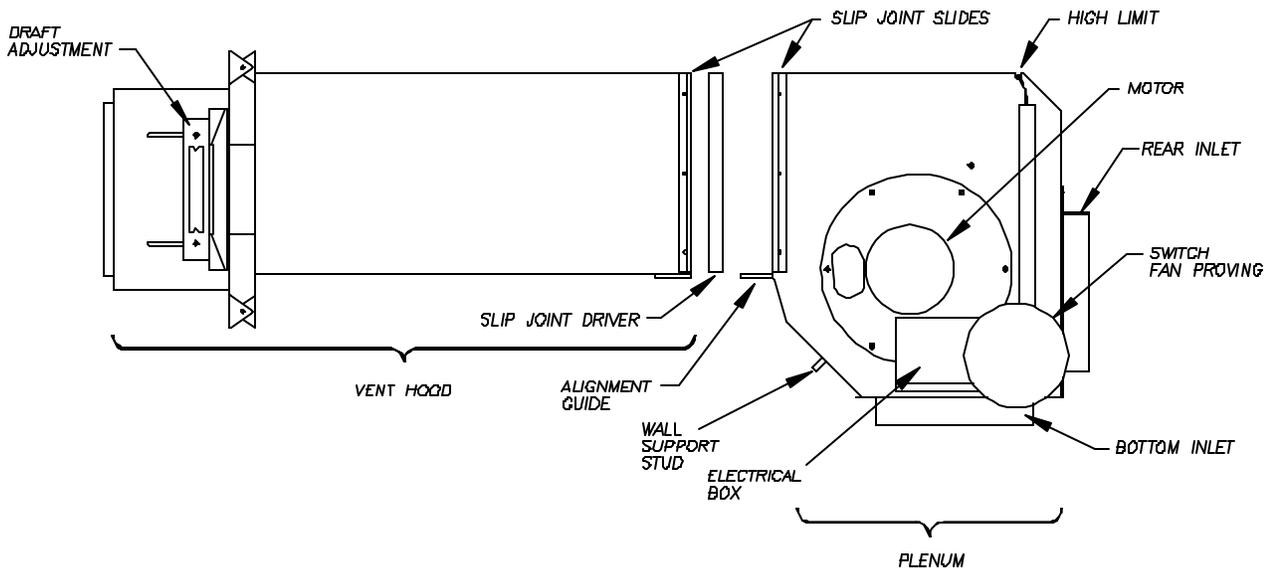
This procedure is based on central furnace installations and it should be recognized that generalized procedures cannot anticipate all situations. Accordingly, in some cases deviation from this procedure may be necessary to determine safe operation of the equipment.

- a. Install the SS1-R only on specified Rheem, Ruud, Weatherking & Heat Controller oil fired furnaces.
- b. Complete this procedure prior to any attempt at modifications of the appliance or installation of the SS1-R.
- c. If there is a condition which could result in unsafe operation, shut off the appliance and advise the owner of the unsafe condition.

The following steps should be followed in making the safety inspection:

1. Visually inspect the venting system and determine there is no blockage or restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.
2. Inspect burner and primary control for proper operation.
3. Inspect heat exchanger for cracks, openings or excessive corrosion. Check both the limit control and fan control for proper operation.

**SS1-R TERMINOLOGY**



**PLENUM AND VENT HOOD CLEARANCE FROM COMBUSTIBLES**

With an inlet flue gas temperature of 575°F or below, the SS1-R has been Listed for the following clearances from combustible materials:

**IMPORTANT**

Vent Hood and top of Plenum: Zero Clearance  
Plenum front and sides: 1/2 inch  
Plenum rear: 3 inches

## VENT HOOD TERMINATION CLEARANCES FOR U.S. INSTALLATIONS

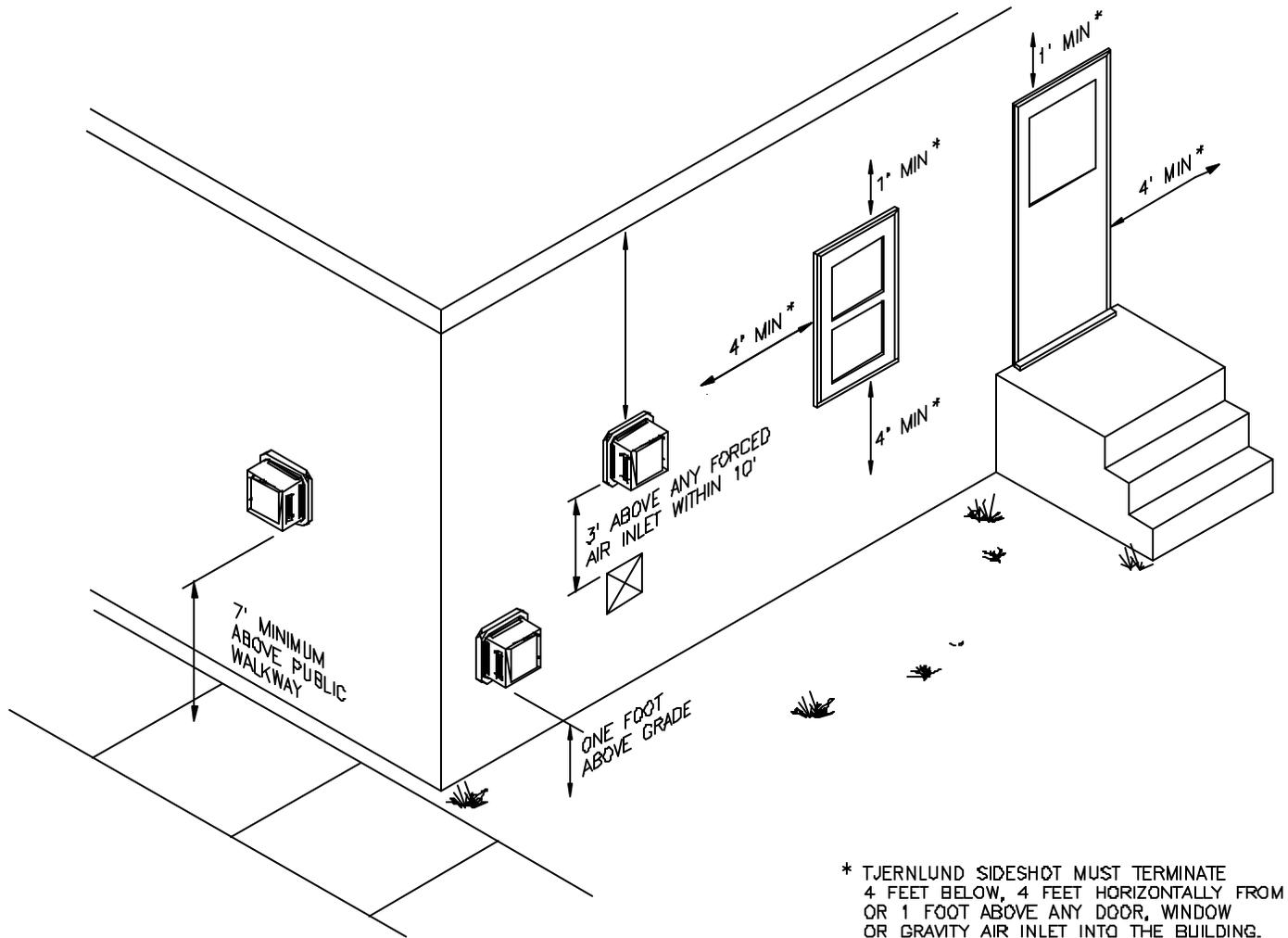
Install the SS1-R according to the requirements of the National Fire Protection Association #31, #54 and #211 as follows, (See Diagram A):

- The exit terminals of mechanical draft systems shall not be less than 7 feet above grade when located adjacent to public walk ways.
- A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet.
- The venting system shall terminate at least 4 feet below, 4 feet horizontally from or 1 foot above any door, window or gravity air inlet into any building.
- The bottom of the vent terminal shall be located at least 12 inches above grade.
- Arrange the exit terminal so that the flue gases are not directed so as to jeopardize people, overheat combustible structures or enter buildings.
- Not to be less than 2 feet from an adjacent building.

The SS1-R is also Listed to terminate a minimum of 12" below, above or horizontally from a soffit, deck or adjacent sidewall.

It is not recommended for the SS1-R to be terminated on a wall that faces the direction of the prevailing winds. Backdrafts by severe winds can cause oil odors to remain in the structure and/or interrupt heating equipment operation.

DIAGRAM A



## TERMINATION CLEARANCES FOR CANADIAN INSTALLATIONS

The SS1-R has been CSA Listed according to the requirements of "Mechanical Flue-Gas Exhausters" CSA Std B255-M81 and the "Installation code for Oil burning Equipment" CSA Std B139-M91. (See Diagram. A1)

- A venting system shall not terminate underneath a veranda, porch, or deck, or above a paved sidewalk or a paved driveway that is located between two buildings, and that serves both buildings.
- The exit terminals of mechanical draft systems shall not be less than 2.13m (7ft) above grade when located adjacent to a paved sidewalk or driveway.
- A venting system shall not direct flue gases towards brickwork, siding, or other construction, in such a manner that may cause damage from heat or condensate from the flue gases.
- A venting system shall not direct flue gases so as to jeopardize people, overheat combustible structures, or enter buildings.

A venting system shall not terminate within 1.8 m (6ft) of the following:

- A window, door or mechanical air supply inlet of any building, including soffit openings
- A gas service regulator vent outlet
- A combustion air inlet
- A property line
- A direction facing combustible materials or openings of surrounding buildings

A venting system shall not terminate within 1m (3ft) of the following:

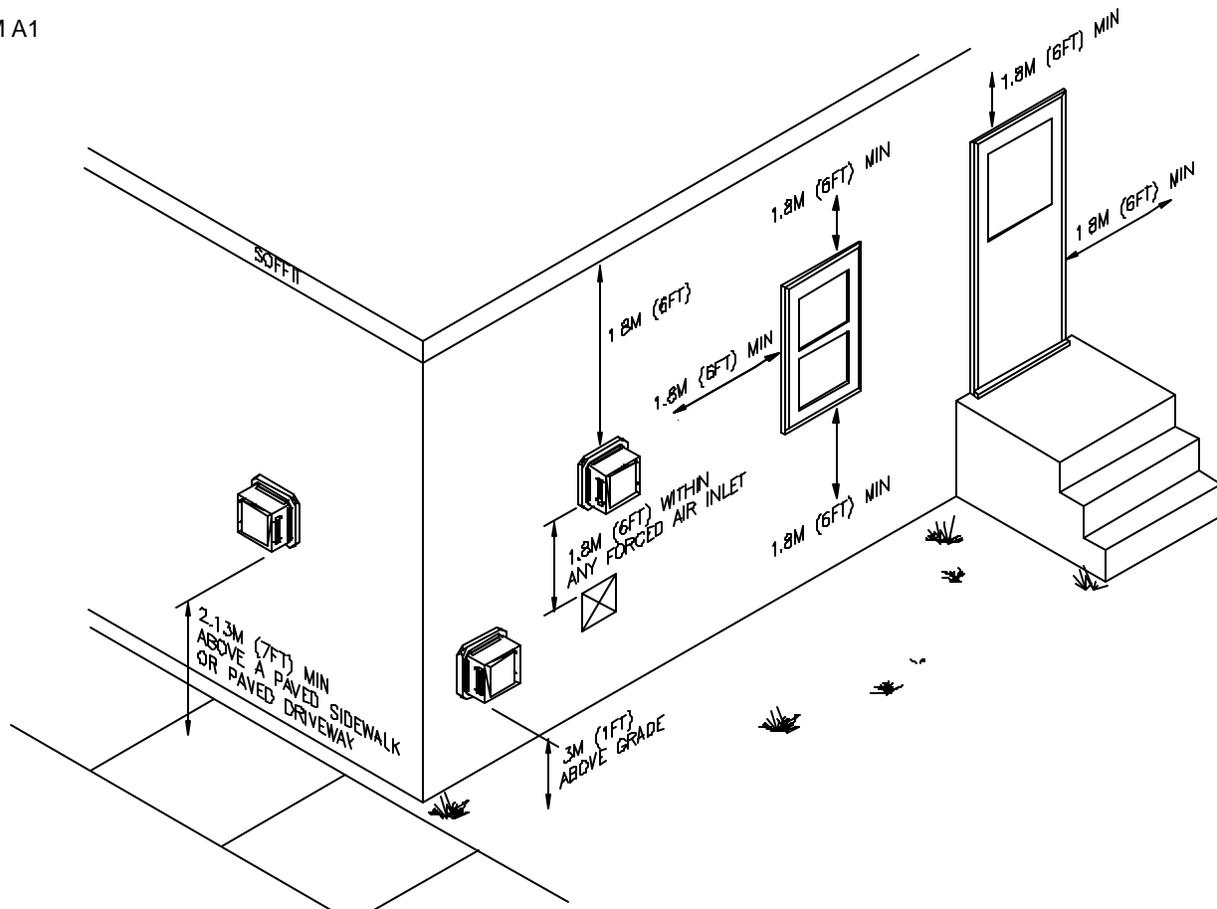
- Above a gas meter/regulator assembly within 1m (3ft) horizontally of the vertical centreline of the regulator
- A oil tank or an oil tankfill inlet
- The inside corner of an L-shaped structure

A venting system shall not terminate within .3m (1ft) of the following:

- Above grade level or any surface that may support snow, ice, or debris

It is not recommended for the SS1-R to be terminated on a wall that faces the direction of the prevailing winds. Backdrafts by severe winds can cause oil odors to remain in the structure and/or interrupt heating equipment operation.

DIAGRAM A1



## INSTALLATION

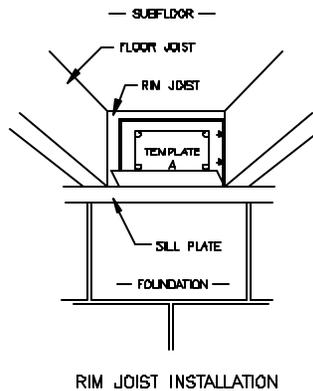
Tools required:

- Reciprocating Saw
- Drill and 1/8", 1/4", 1/2" Bits, 1" hole saw
- Blade Screwdriver
- Wire Cutter/Stripper
- Tube Cutter
- 1/2", 7/16", 5/8" Wrench
- 1/4" Masonry Drill Bit
- 1/4", 5/16", 11/32" Nut Driver or Socket
- Hammer

### INSTALLING VENT HOOD TERMINUS

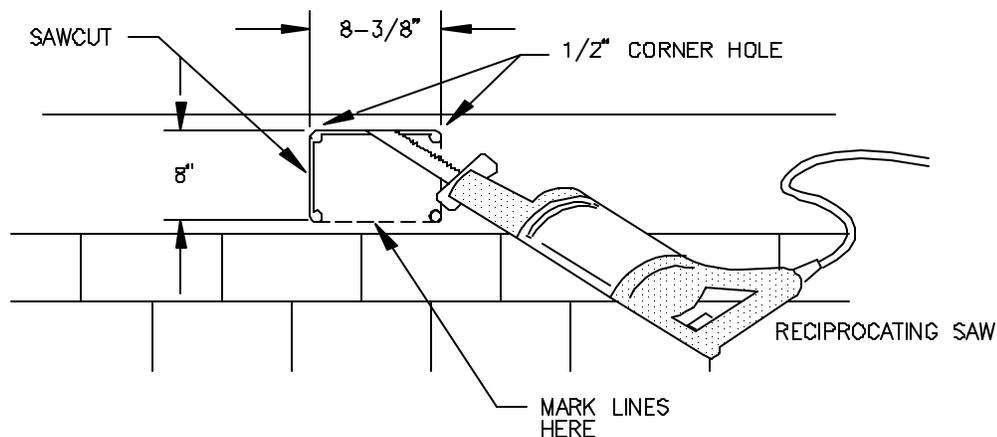
1. a) Fold template A along dashed line and attach in between the floor joists ensuring that it is snug against the sill plate and right hand floor joist. Follow same procedure if floor trusses are used, (See Diagram B).  
b) If the SS1-R is not being installed between floor joists, attach the template to the wall it will be exiting ensuring it is level.

DIAGRAM B



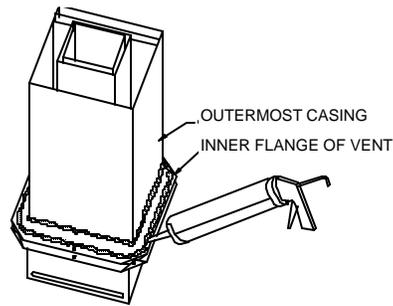
2. Using 1/2" bit, drill pilot holes noted on each side of the template from inside through rim-joist, wall board, siding, etc., keeping drill bit perpendicular to the wall. 1/2" bit must be long enough to penetrate through exterior.
3. Remove template from rim-joist and attach to building exterior, aligning pilot hole markings on template with holes previously created in Step #2.
4. Drill the four corner holes noted on the template through the building exterior. Remove the template and mark lines from the **outside** edge of the holes drilled, forming a rectangle.
5. Using reciprocating saw and appropriate blade, cut a rectangular opening through the rim joist, wall board, siding, etc., on the lines marked in step 4. The rectangular opening should be no larger than 8-3/8" in width by 8" in height, (See Diagram C).

DIAGRAM C



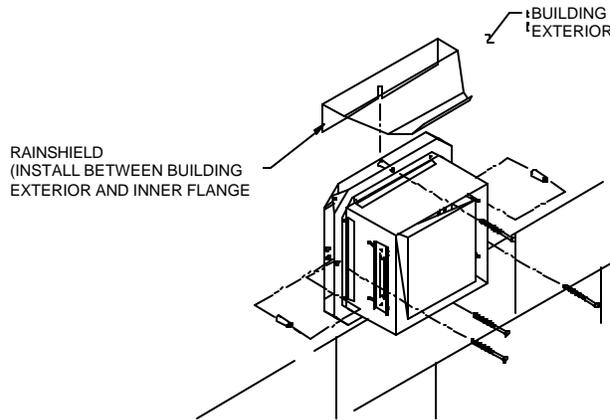
6. Knock out block material exposing rectangular opening through the wall.
7. Apply two beads of exterior rated caulk approximately 3/8" in width at the seam of the outermost casing of the Vent Hood and the inner flange of the Vent Hood Terminus, (See Diagram D).

DIAGRAM D



8. Slide the Vent Hood through the wall while taking care installing the rain shield as shown, (See Diagram E). The nuts located on the Vent Hood outermost casing should be facing up when sliding it through the wall. Mount Vent Hood to the exterior using four #8 x 3" wood screws and spacers provided, (See Diagram E). Wall anchors are provided for installation into masonry wall.

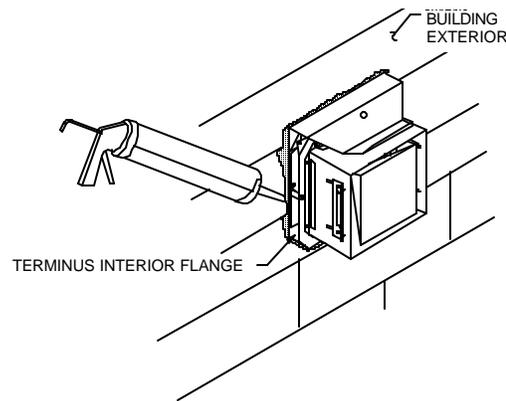
DIAGRAM E



9. Connect the Plenum to the Vent Hood of the SS1-R following the steps on pages 7, 8 and 9.

10. After the SS1-R is completely installed, apply a bead of exterior rated caulk between the Vent Hood Terminus inner flange and the exterior of the building, (See Diagram F).

DIAGRAM F



### INSTALLING PLENUM

Depending on building construction, it may be necessary to notch out a section of the floor joist to provide proper clearance for the SS1-R motor, (See Diagram G).

1. Attach Template B to the floor joist that is to be notched, aligning the sight line noted on the template with the end or the outside casing of the vent hood.
2. Cut out notch on line shown on the template.

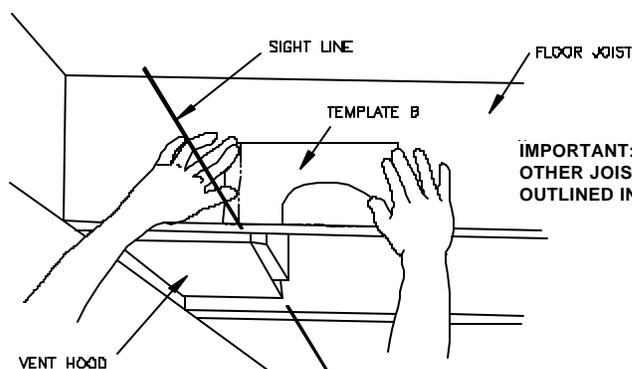


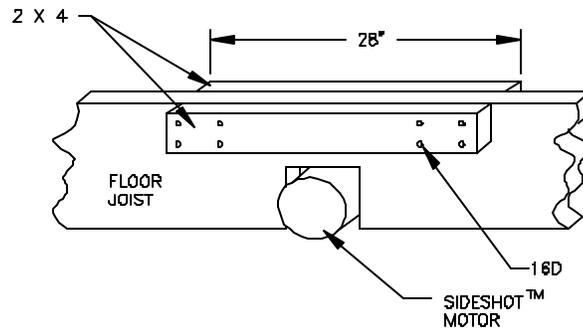
DIAGRAM G

## NOTCH BRACING

It is recommended and local codes may dictate that the joist be reinforced as outlined below. Bracing of the rim joist is not necessary.

1. Cut two 2 x 4 pieces of wood 28 inches in length.
2. Center both pieces on each side of the floor joist above the notch and drive 8 16D or larger nails into each piece, (See Diag. H)

DIAGRAM H



## CONNECTING THE PLENUM TO THE VENT HOOD

NOTES: Cut any nails which are protruding downward from the subfloor that may come in contact with the SS1-R. Place both slip joint drivers in your pocket before continuing.

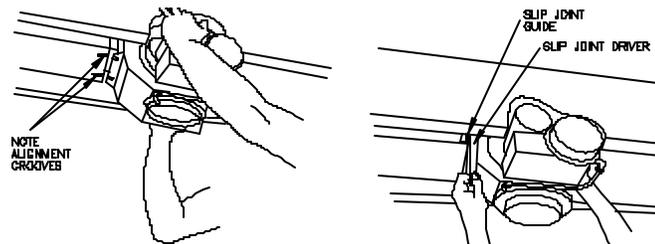
### WARNING

Minimum clearances from the Plenum to any combustible materials must be maintained as listed on page 3. Failure to do so can cause a fire or explosion resulting in property damage, personal injury or death.

**Note:** Blower - Motor/Wheel assembly can be removed to make Plenum section easier & lighter to install. Refer to Removal and Replacement of Motor/Wheel Assembly, Page 18.

1. Connect the Plenum to the Vent Hood by aligning both grooves on the bottom of Plenum with both grooves on the bottom of the Vent Hood. The Plenum is designed to slide into the Vent Hood, (See Diagram I).

DIAGRAM I

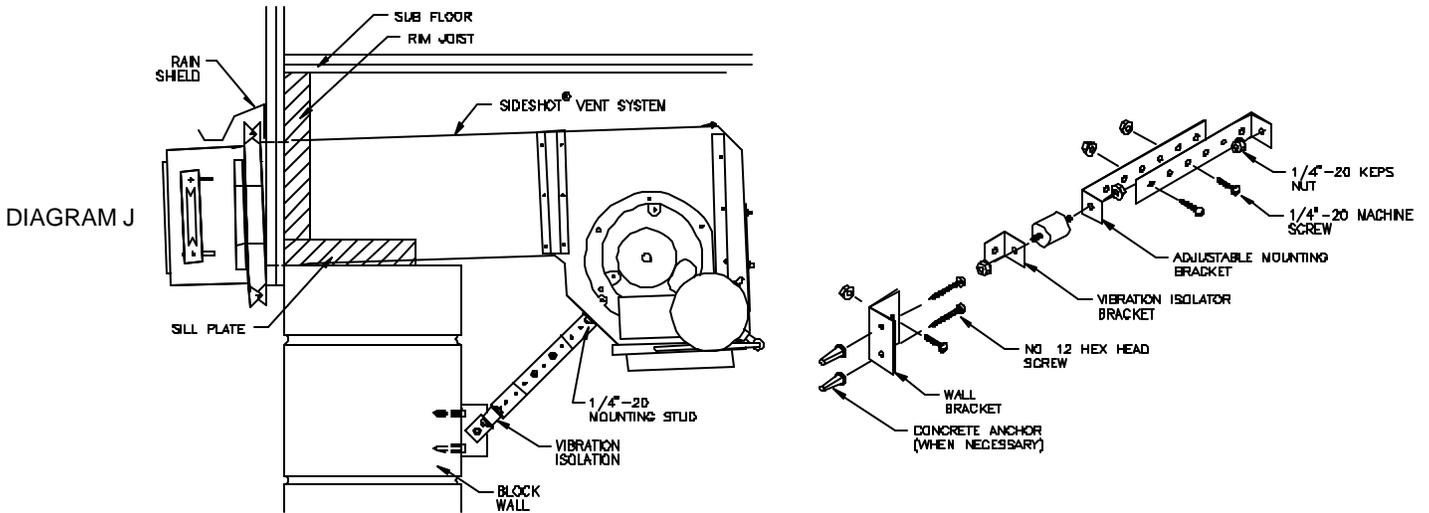


2. Gently slide the Plenum into the Vent Hood until the slip joint guides located on each side of the Plenum are in contact with each other.
3. Slide the slip joint drivers from the bottom upward over the the slip joint guides as far as possible by hand. A hammer may be used to tap the slip joint drivers to their final position. Start the slip joint drivers on the slip joint guides with the embossed end facing down. Do not force slip joints past embossing.

## INSTALLATION OF WALL SUPPORT BRACKET

1. To prevent damage to the SS1-R, temporarily support the bottom of the plenum (prop on ladder) while assembling the wall support bracket. Assemble the wall support bracket as shown, (See Diagram J, Page 9).
2. Using the prepunched holes, adjust the wall support bracket so that a **slight pitch** is maintained for water drainage, (See Diagram J, Page 9).
3. Use the prepunched holes on the wall bracket as a template to mark holes to be drilled into the side wall for mounting screws.
4. a) If installing the bracket into a wood wall, drill 2 pilot holes at each point established in step 3 with a 1/8" drill bit approximately 1" deep and install the screws provided to secure the bracket to the wall.  
b) If installing the bracket into a masonry wall, drill 2 holes at each point established in step 3 with a 1/4" masonry drill bit approximately 1" deep. Tap the masonry anchors into the holes drilled in step 4. Screw the wall bracket onto the wall.

5. Connect the other end of wall support bracket to the stud on the plenum using the supplied 1/4"-20 keps nut. (See Diagram J).



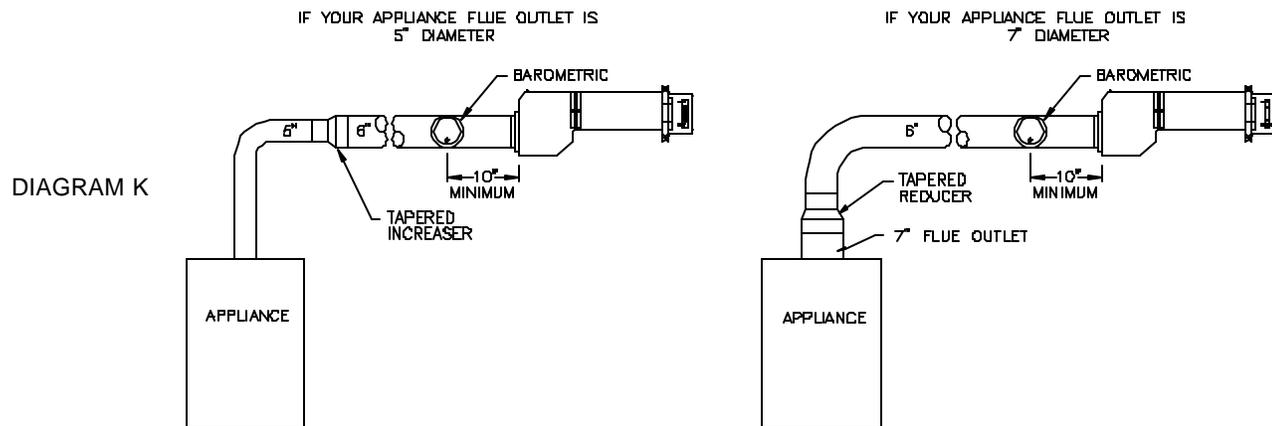
**INSTALLATION OF VENT PIPE**

Single wall vent pipe is not allowed in unconditioned or unheated space. When installing the SS1-R vent system, a barometric draft damper control must be used. Install the barometric draft damper as close as is practical to the SS1-R with the center line of the barometric damper not closer than 10 inches to the SS1-R inlet. Always install the draft damper in a 6" section of pipe. The general venting configurations are shown in diagram K. The SS1-R vent system is designed to accept 6" single wall, type "L" or type "A" vent pipe. When installing the vent system, it will be necessary to use the tapered reducers or increasers as shown.

Determine which inlet of the SS1-R will allow for the least amount of elbows to the furnace. When using single wall pipe, a minimum clearance of 18" must be maintained between the vent pipe and combustible materials and the vent pipe must be exposed to view for its entire length. If this clearance cannot be maintained, type "L" or type "A" vent may be used according to its listing and vent pipe manufacturers instructions.

A maximum of 10 linear feet of vent may be used to connect the SS1-R to the furnace. No more than three 90° elbows may be used (two 45° elbows will be considered equivalent to one 90° elbow).

The SS1-R vent system is shipped from the factory with the plug connected to the rear and the vent pipe inlet collar connected at the bottom. If using the bottom inlet, read the section entitled "Vent Pipe Clamp Assembly". If the installation requires the use of the rear inlet, follow the steps in the section entitled "Vent Pipe Inlet Collar Conversion" to move the vent pipe inlet collar from the bottom to the rear.



**VENT PIPE INLET COLLAR CONVERSION**

1. Remove the plug from rear inlet port by unfastening the 6 nuts that secure it to the Plenum. Keep the plug & nuts for later use.
2. Remove the sensing tube from the Fan Proving Switch by loosening the plastic compression fitting.
3. Remove the vent pipe inlet collar from the bottom port by unfastening the 6 nuts that secure it to the plenum. Keep the nuts for later use.

- Using a tube cutter, cut the sensing tube 2" from the elbow directed at the vent pipe inlet collar, (See Diagram L). Discard the cut off section of metal tube.

DIAGRAM L

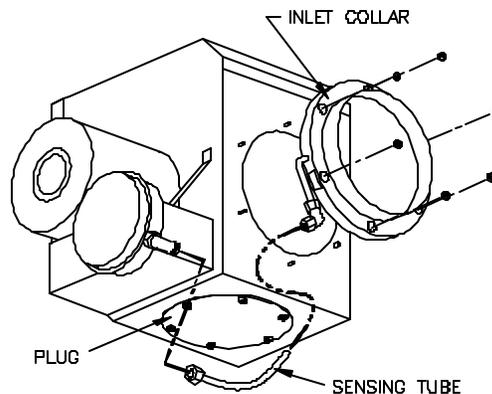
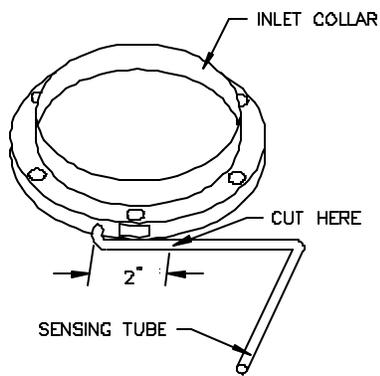


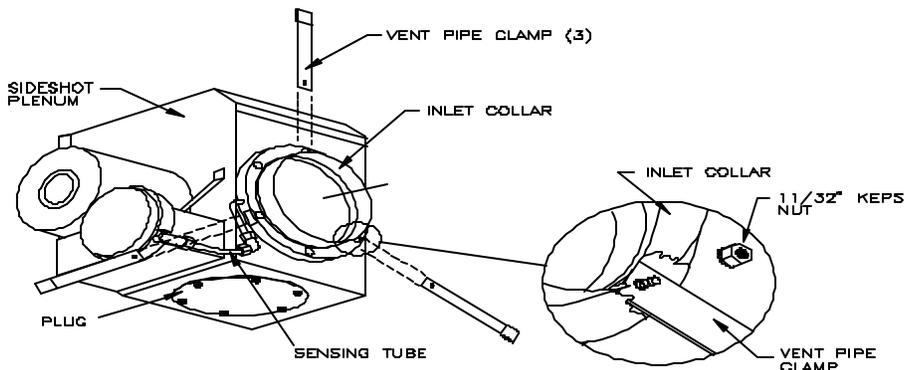
DIAGRAM M

- Attach the vent pipe inlet collar to the rear inlet port making sure that the sensing tube is orientated as shown, (See Diagram M). NOTE: Alignment marks on the inlet collar and plenum casing must match.
- Attach 90° compression fitting to the short tube on the inlet collar.
- Using the "soft" aluminum tubing, connect the Fan Proving Switch to the inlet collar. Take care not to crimp the tubing.
- Install the plug removed in step 1 over the bottom inlet port, tightening securely.

#### VENT PIPE CLAMP ASSEMBLY

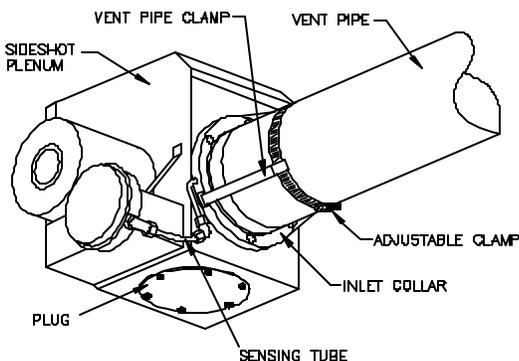
- Attach the three vent pipe clamps to the inlet collar, (See Diagram N). NOTE: The following diagrams show the use of the rear inlet. The same steps will apply if using the bottom inlet.

DIAGRAM N



- Bend each vent pipe clamp so it conforms to the outside diameter of the vent pipe being used, (See Diagram O)
- Route the adjustable clamp through the openings at the opposite end of the legs.
- Slide the vent pipe over the inlet collar of the SS1-R.
- Tighten the adjustable clamp around the vent pipe, (See Diagram O).

DIAGRAM O



## ELECTRICAL WIRING OF SS1-R ON OIL EQUIPMENT

All wiring from the SS1-R to the appliance must be appropriate Class 1 wiring as follows: installed in rigid metal conduit, intermediate metal conduit, rigid non-metallic conduit, electrical metallic tubing, Type MI Cable, Type MC Cable, or be otherwise suitably protected from physical damage.

The electrical contact ratings for the diaphragm Fan Proving Switch and High Limit are as follows:

### FAN PROVING SWITCH

6.2 Amps (full load) at 120 VAC  
36 Amps (locked rotor) at 120 VAC

### HIGH LIMIT

10 Amps (full load) at 120 VAC  
60 Amps (locked rotor) at 120 VAC

### OIL SOLENOID VALVE

0.115 Amps at 120 VAC

### RELAY, R1

0.10 Amps at 120 VAC (Coil)  
12 Amps (full load) at 124 VAC (Contacts)  
60 Amps (locked rotor) at 125 VAC (Contacts)

The Fan Proving Switch, High Limit Switch, Oil Solenoid Valve and R1 Relay are not suitable for loads which exceed the above limits.

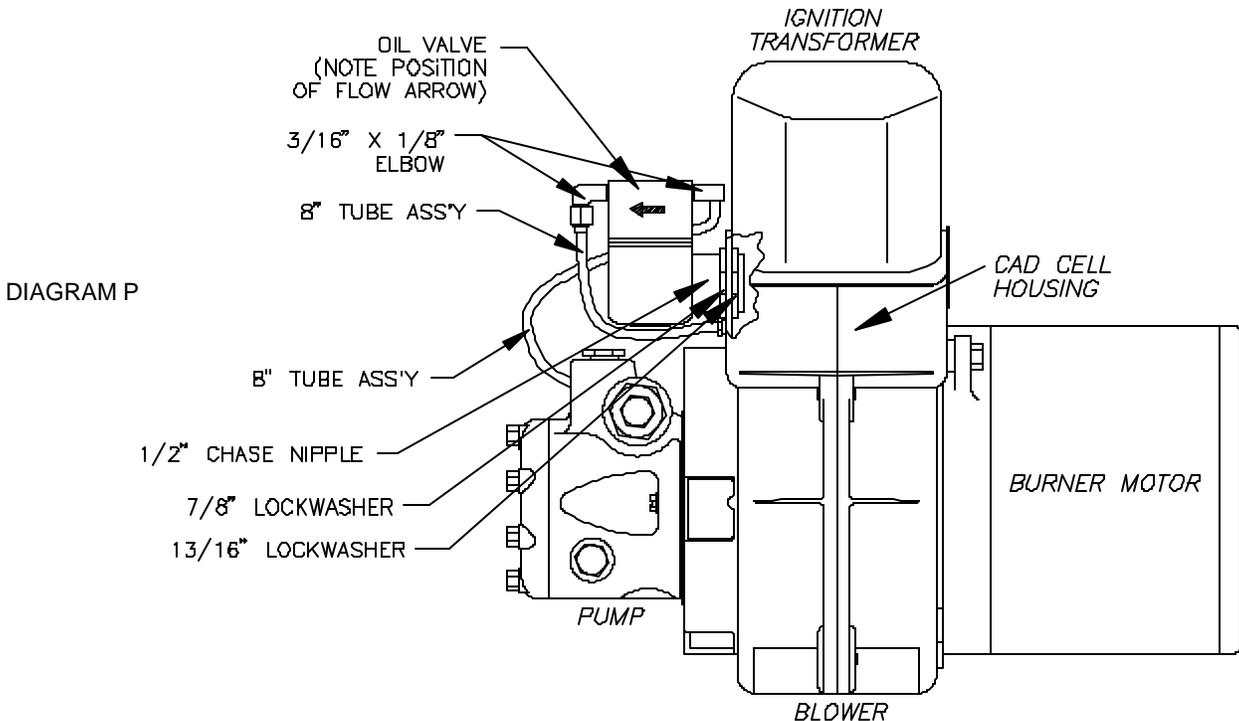
## PREPARATION FOR SYSTEM WIRING

### **⚠** WARNING

Make sure all power is disconnected from the furnace before attempting to install the SS1-R. Failure to do so can cause electrical shock resulting in personal injury or death.

### INSTALLATION OF OIL SOLENOID VALVE (DIAGRAM P)

1. Apply pipe sealant to the Elbows and attach the Elbows to the valve in the positions shown.
2. Place the Chase Nipple through the Cad Cell housing with the 13/16" Lockwasher on the inside of the housing and the 7/8" Lockwasher on the outside of the housing as shown below.
3. Thread the Chase Nipple into the valve passing the wires of the Valve through the Chase Nipple.
4. Connect one 8" Tube Assy. from the pump to the Valve and the remaining 8" Tube Assy. from the Valve to the Nozzle Line paying attention to the direction of flow as shown.
5. Thread wires (two) from solenoid valve through Cad Cell housing of burner to the existing junction box.

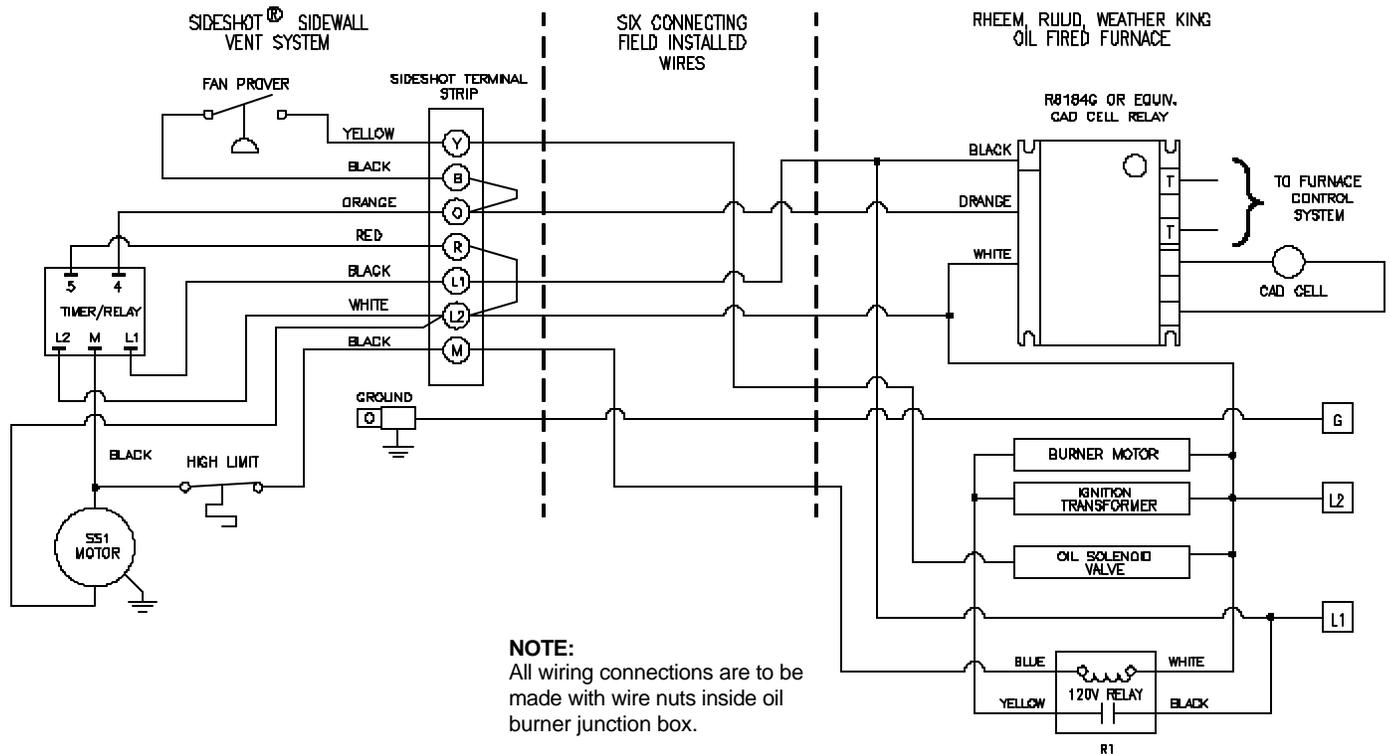


## FIELD WIRING CONNECTIONS (DIAGRAM Q)



Disconnect power supply when wiring SS1-R failure to do so may result in personal injury and/or equipment damage.

DIAGRAM Q

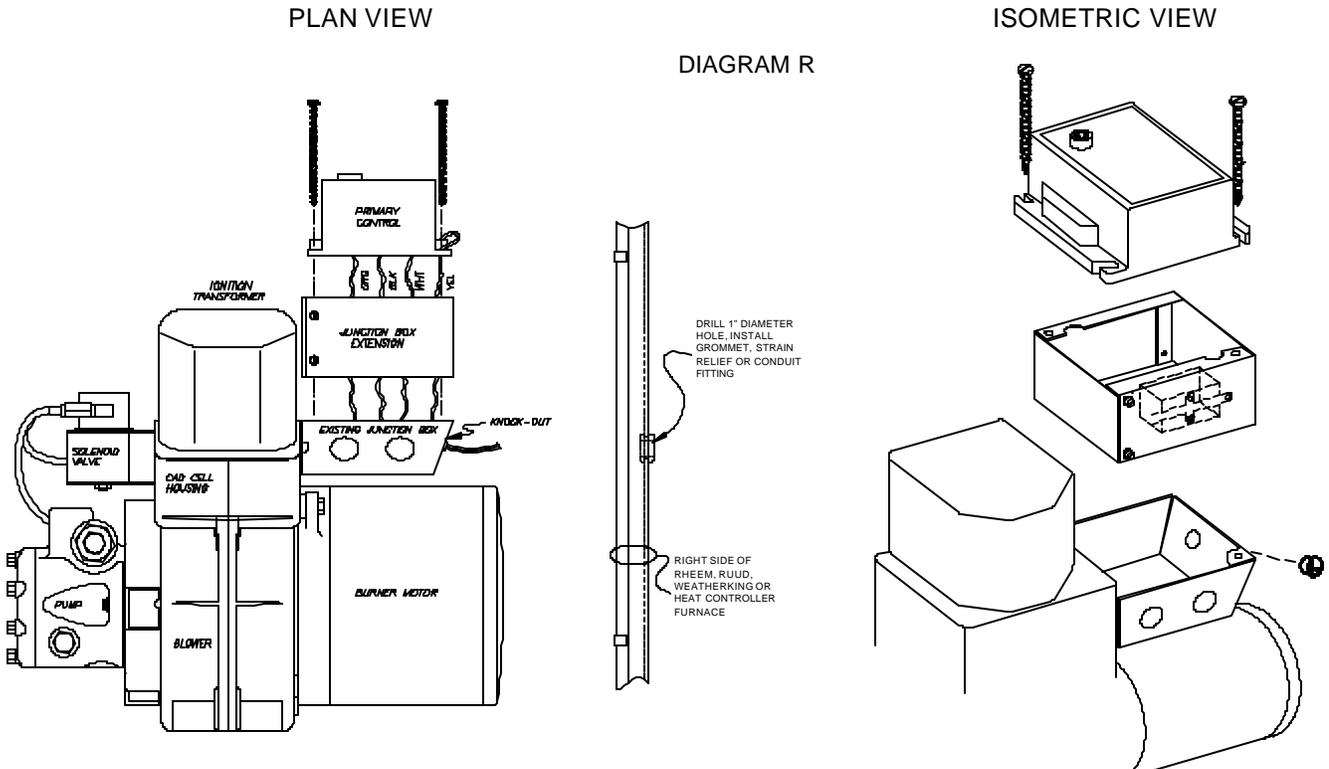


**NOTE:**  
All wiring connections are to be made with wire nuts inside oil burner junction box.

1. All wiring from the SS1-R to the oil furnace must be appropriate Class 1 wiring as follows: installed in rigid metal conduit, intermediate metal conduit, rigid non-metallic conduit, electrical metallic tubing, Type MI Cable, Type MC Cable, or be otherwise suitably protected from physical damage.
2. Six wires are to be run from the Rheem, Ruud, Weatherking & Heat Controller oil fired furnace to the SS1-R Side Wall Vent System.
3. Drill a 1" diameter hole into the junction box side of the furnace, allowing for adequate clearance from electrical components. See Diagram R Plan view. Use caution when drilling into furnace so existing wiring and components are not damaged. The six wires connecting the Rheem, Ruud, Weatherking & Heat Controller oil fired furnace to the SS1-R must be routed through this hole to the burner junction box. If electrical conduit is not going to be used, then a mechanical strain relief must be used where wires pass into the burner junction box.
4. Remove screws that secure R8184G primary control unit to the existing junction box.
5. Remove wire nuts which secure the Orange, Black, and White wires of the R8184G primary control.
6. Remove a knock-out slug from the existing junction box. Do not use the front knock-outs.
7. Route the six field installed wires from the SS1-R terminal strip through the 1" diameter hole in the side of the Rheem, Ruud, Weatherking or Heat Controller oil fired furnace to the existing junction box of the burner motor. A bushing is recommended for the 1" diameter hole if metal conduit is not used.
8. Use a field installed wire and a wire nut to connect the Orange wire of the R8184G primary control to the O terminal on the SS1-R terminal strip.
9. Use a field installed wire and a wire nut to connect the L1 terminal of the SS1-R terminal strip to the Black wire of the R8184G primary control, the Black lead of the R1 relay contact and L1 of the existing burner junction box. R1 relay is attached to one half of the junction box extension.
10. Use a field installed wire and a wire nut to connect the L2 terminal of the SS1-R terminal strip to the White wire of the R8184G primary control, the White wire of the R1 relay, the White wire of the burner motor, a black lead from the oil solenoid valve, a black lead from the ignition transformer, and L2 of the existing burner junction box. It may be necessary to use two wire nuts and a connecting wire.
11. Use a field installed wire and a wire nut to connect the Y terminal of the SS1-R terminal strip to the remaining wire from the oil solenoid valve.
12. Use a field installed wire and a wire nut to connect the M terminal of the SS1-R terminal strip to the Blue wire of the R1 relay.
13. Connect the ground terminal of the SS1-R to the existing ground terminal of the burner junction box.
14. Using a wire nut, connect the Yellow wire of the R1 relay contact to the Black wire of the burner motor and the remaining Black wire of the ignition transformer.

## INSTALLATION OF R1 RELAY AND JUNCTION BOX EXTENSION (DIAGRAM R)

1. Install the junction box extension only after the wiring has been completed.
2. Rotate the junction box extension so that the R1 relay locates to the front. (toward the cabinet door)
3. Align the junction box extension to the top of the existing burner motor junction box.
4. Insert and start the 2 1/2" sheet metal screws to locate the junction box extension to the existing junction box.
5. Install the R8184G primary control and tighten the 2 1/2" sheet metal screws.



## SEQUENCE OF OPERATION WITH SS1-R INSTALLED ON OIL FIRED APPLIANCES:

When the thermostat calls for heat, the circuit across the T-T terminals on the Honeywell 8184G burner control is completed. This causes 120V to be applied to the orange wire that exits the bottom of the 8184G control. The orange wire applies power to the O and B contacts on the SS1-R's terminal strip. The O contact on the terminal strip supplies 120V to terminal 4 on the SS1-R timer/relay which causes 120V power to be supplied by the M terminal to the SS1-R motor. Terminal M also supplies power to the 120V coil on the R1 relay which acts to supply power to the furnace burner motor and transformer. When the SS1-R inducer motor attains running speed, the contacts on the fan proving switch will close. This provides power to the oil solenoid valve causing it to open so that oil can flow and ignition can occur.

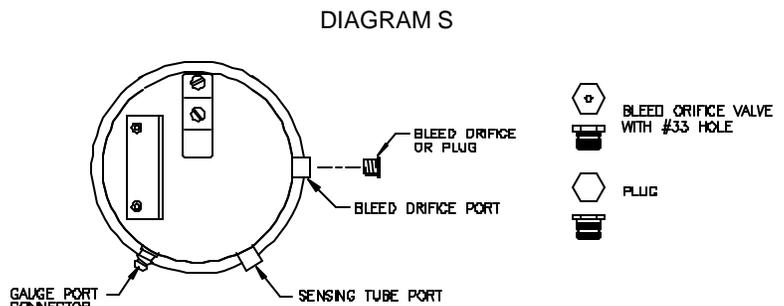
Once the thermostat is satisfied, the Honeywell 8184G burner control will remove 120V power from the orange wire exiting its base. As a result, the oil solenoid valve snaps closed and causes the burner flame to be extinguished. A loss of power to terminal 4 of the SS1-R timer/relay signals the beginning of the post-purge period. The M terminal on the timer/relay will retain 120V power until the end of the post purge period. The SS1-R inducer motor and the oil furnace burner motor will both operate during the post purge period. However, no flame will be present because the oil solenoid valve will prevent oil from flowing.

Note: When power is initially applied to the system, the furnace burner and SS1-R inducer motor will go through a "post-purge" period. If there is not a call for heat, there will be no oil ignition during this period. This "post-purge" action can be expected immediately following a power interruption.

## SELECTION OF PRESSURE SWITCH BLEED ORIFICE

In order for the SS1-R pressure switch to function properly for the intended application, the proper bleed orifice has to be selected as determined below.

1. Upon installation, if the furnace input rate is 1 gallon per hour or less (140,000 BTU/hr. or less), then the plug should be installed in the pressure switch.
2. Upon installation, if the furnace input rate is greater than 1 gallon per hour or 140,000 BTU/hr., then the #33 bleed orifice should be used.
3. Once the proper bleed orifice has been determined, install into bleed orifice port as shown in Diagram S.



## DRAFT ADJUSTMENT OIL

The SS1-R Vent system will properly vent a wide range of BTU/hr. input capacities. To compensate for different burner capacities, vent connector lengths and wind conditions it features a draft adjustment located on the outside of the Vent Hood. In general, positioning the draft adjustment **inward** will cause the SS1-R to operate at lowest capacity. Positioning the draft adjustment **outward** will cause the SS1-R to operate at highest capacity.

### IMPORTANT:

The following paragraph describes the initial draft adjustment. It may be necessary to make a slight readjustment to compensate for various conditions: wind, vent connector resistance, negative building pressure and multiple appliances.

ASHRAE lists the average design factor for wind loads in North America at 15 MPH. Refer to the Draft Adjustment Chart below. We recommend that the 25 MPH category be used to allow for excursions beyond the 15 MPH average. It is not recommended for the SS1-R to be terminated on a wall that faces the direction of the prevailing winds. Backdrafts by severe winds can cause oil odors to remain in the structure and/or interrupt heating equipment operation. If the SS1-R is terminated in a direction prone to higher winds, or if higher winds are common in your geographic area, use the 40 MPH category to determine the proper draft adjustment setting. If the draft adjustment is set at the 25 MPH category and sustained winds exceeding 25 MPH are present, the Fan Proving Switch will act to close the oil solenoid valve. Wind loads referenced are based on straight line winds directed against the Vent Hood.

### DRAFT ADJUSTMENT PROCEDURE:

- 1) Set the draft adjustment to the appropriate setting based on the above instructions and the Draft Adjustment Chart. Adjustment is accomplished by loosening both nuts on each side of the Vent Hood and centering **both** indicators to the desired setting. Tighten the four nuts to secure the draft adjustment at desired setting.
- 2) Place the appliance and SS1-R in operation. Measure the over-fire draft. Make necessary adjustments to the primary air intake and barometric draft control to comply with the over-fire draft requirements of the appliance. The over-fire draft should be in a range of  $-.02''$  to  $-.04''$  W.C., with the optimum setting at  $-.03''$  W.C. If adjustments to the primary air intake and barometric draft control do not provide the required over-fire draft, the SS1-R draft adjustment must be repositioned, accordingly. Measure over-fire draft after repositioning SS1-R draft adjustment.

DRAFT ADJUSTMENT CHART				
RHEEM RUUD WEATHERKING FURNACE	BTU/HR INPUT	GPH INPUT	25 MPH	40 MPH
D58	70,000	0.50	1	2
D67	84,000	0.60	1	2
DB4	105,000	0.75	1	2
D95	119,000	0.85	2	3
112	140,000	1.00	2	3
130	168,000	1.20	4	6
150	189,000	1.35	5	8

NOTES: All draft adjustments are approximate. This chart is to be used for initial draft adjustment only. Subsequent draft adjustments may be required to compensate for various field conditions: wind, vent pipe resistance, building pressure, multiple appliances, etc.

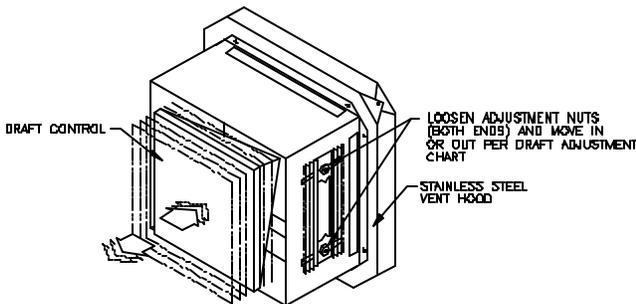
BTU/HR input ratings assume 30% or less excess air for flame retention burners.

### WARNING

Do not exceed the recommended BTU/HR input range of the SS1-R.

Under no circumstances shall the minimum draft adjustment be used for the larger input range of this product.

Improper draft adjustment may result in the dispersion of flue products (carbon monoxide) into the building interior.



## COMBUSTION AIR

Adequate combustion air is vital for proper combustion and for safe venting. Likewise, for proper SS1-R performance, adequate combustion air must be available to the appliance. Many installers assume adequate combustion air is present, especially in older homes. In some cases this is a false assumption, because many older homes have been made "tight" due to weatherization. Size the combustion air opening(s) into the appliance room as outlined NFPA 31/NFPA 211. When installing a SS1-R, it is usually not necessary to supply any more combustion air than normally required when conventional venting. Common symptoms of inadequate combustion air include: Fan Proving Switch short cycling, odor present at the end of burner cycle, outside air enters the structure through the SS1-R Vent System on SS1-R/Appliance off cycle.

## SYSTEM OPERATION CHECK-OUT

1. Adjust thermostat to call for heat.
  2. Verify that the SS1-R and the burner motor both operate prior to ignition.
- Allow heating equipment and SS1-R to operate continuously while performing steps 3-5.
3. Close all doors and windows of the building. If heating equipment is installed in utility room or closet, close the entrance door to this room. Close fireplace dampers.
  4. Turn on all appliances in the structure that exhaust indoor air during their operation, e.g. turn on clothes dryer, exhaust fans, such as range hoods, bathroom exhaust and whole house fans.
  5. Allow SS1-R and equipment to operate for at least five minutes. Tripping of the burner circuit by the Fan Prover Switch during the five minute operation indicates an unsafe operating condition. Turn fuel supply off to appliance and **DO NOT OPERATE UNTIL UNSAFE VENTING CONDITION IS INVESTIGATED BY QUALIFIED SERVICE PERSONNEL.**
  6. Turn thermostat to the "off" position. Verify that the post-purge timer operates the SS1-R and the burner for several minutes, without a burner flame, before the system shuts off. Post-purge adjustments are made by turning the small slotted screw of the SS1-R. Turning the screw counter clockwise will increase the post-purge delay. Decreasing the factory set post-purge timing, by turning the adjustment screw clockwise, is not recommended. **NOTE:** Overturning the adjustment screw will damage the timer.
  7. Return all windows, doors and exhaust fans to their original conditions of use.

## TROUBLESHOOTING OIL ODORS

Many problems can be eliminated quite easily by having the equipment properly set up by a professional oil-heat service contractor. The sophistication of today's heating equipment and instrumentation needed for efficient operation requires proper training. There is no substitute for the work of a qualified oil-heat service professional. All trouble shooting recommendations that follow assume the equipment is installed and maintained by a qualified service person.

**Timer/Relay:** The factory installed Timer/Relay provides the post purge cycle for the venting system. Just as a chimney continues to draft after the burner has shut-down, the Timer/Relay operates the SS1-R to clear the vent system of residual gases. The duration of the post-purge cycle is factory set at approximately 4 minutes, but is adjustable from 1 to 10 minutes. Reducing the duration of the post purge cycle to less than 4 minutes is not recommended. Turn the adjustment on the Timer/Relay counter-clockwise to accomplish a longer post purge. **NOTE:** Over turning adjustment screw will damage timer.

**Draft Adjustment:** The SS1-R Draft Adjustment, located outdoors on the Vent Hood, has two functions: A) It allows the installer to adjust the amount of draft in accordance with the draft adjustment chart that the SS1-R must develop to vent the specific appliance, and B) During the off-cycle, when the SS1-R is off, it prevents air infiltration caused by strong winds and gusts. Air infiltration back through the vent system will bring with it the odors from the flue gas residue on the inside of the vent pipe. When the Draft Adjustment is at an inward setting (lower number) the Vent Hood will deflect a greater volume of wind than at a higher setting.

**(REMINDER :** The most significant preventer of wind-induced air infiltration is choosing a proper termination location of the SS1-R before installation, see requirements on pages 4 and 5, under "Vent Hood Termination Clearances.")

Verify that the Draft Adjustment is appropriate for the BTU/hr input, as shown on the "Draft Adjustment Chart," page 14 . If necessary, change setting by loosening both nuts on each side of the Vent Hood and center both indicators to the desired setting. Tighten the four nuts to secure new Draft Adjustment.

### IMPORTANT

Any adjustment to the draft setting must be followed by an over-fire draft measurement and necessary adjustments to the primary air intake on the burner and barometric draft control. See Draft Adjustment Procedure on page 14.

**Burner Adjustment:** Verify that the over-fire draft matches that recommended by the heating equipment manufacturer. Adjust the combustion efficiency and smoke characteristics to optimum levels of performance.

**Combustion Air:** Modern construction methods and materials have reduced natural air infiltration rates to extremely low levels. Even older homes can lack adequate air for combustion, when insulation upgrades and other weatherization methods have been installed.

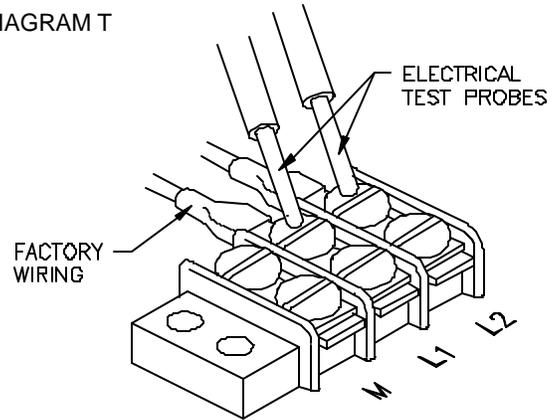
It is recommended that fuel burning appliances have dedicated sources of outside air for combustion. This may be simply accomplished by running a properly sized duct from outdoors and terminating it near the burner air intake. Accessory air intakes are available that connect to the burner motor, using it to pull in the outdoor air. The Tjernlund IN-FORCER™ Combustion Air Intake tempers the raw outdoor air as it is delivered to the burner. Without a source of outdoor air for combustion, a tight home's negative pressures will draw odors back through the venting system during the appliance off cycle.

**⚠ WARNING**

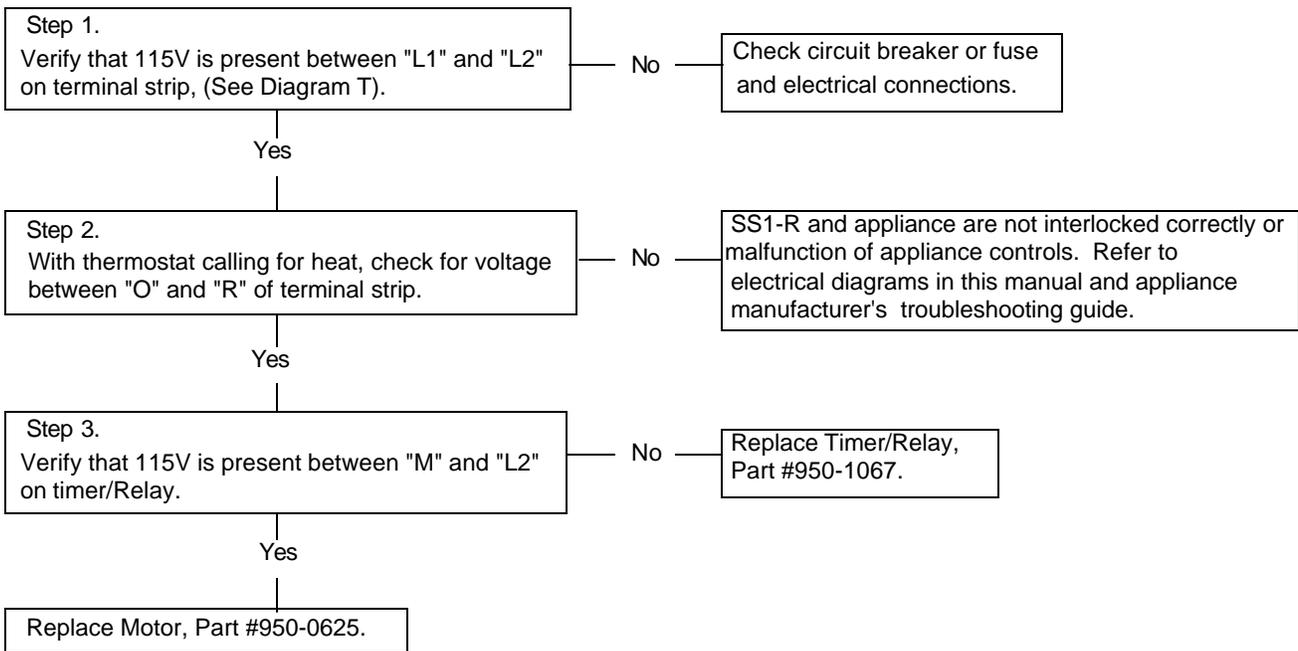
The following guide is intended to be used if a problem occurs during the use of the SS1-R side wall vent system. At several steps throughout the guide you will be required to measure 115 Volts with a voltmeter, (See Diagram T).

**Extreme caution must be exercised to prevent injury.** If you are unable to determine the defective part with the use of this guide, call your Tjernlund distributor or Tjernlund Products direct at 1-800-255-4208 for further assistance.

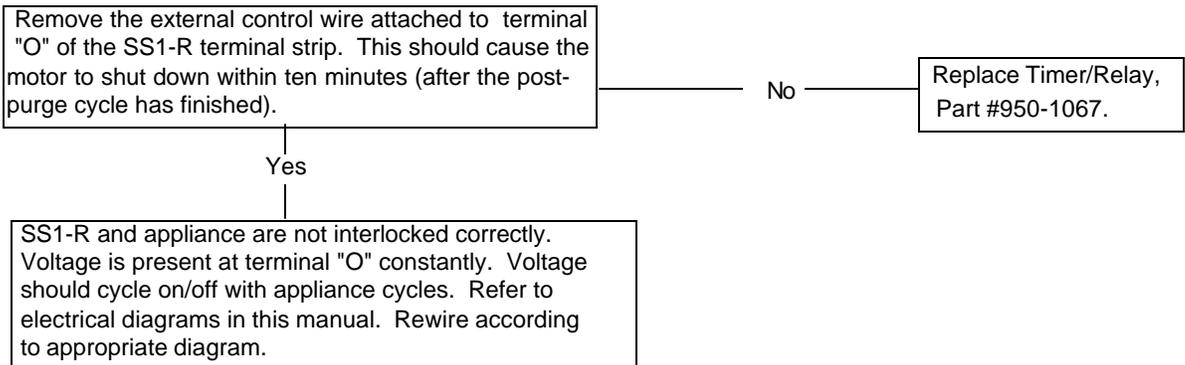
DIAGRAM T



**SYMPTOM 1: SS1-R MOTOR WILL NOT OPERATE**



**SYMPTOM 2: SS1-R MOTOR RUNS CONTINUOUSLY**



SYMPTOM 3: APPLIANCE WILL NOT OPERATE, BUT SS1-R DOES

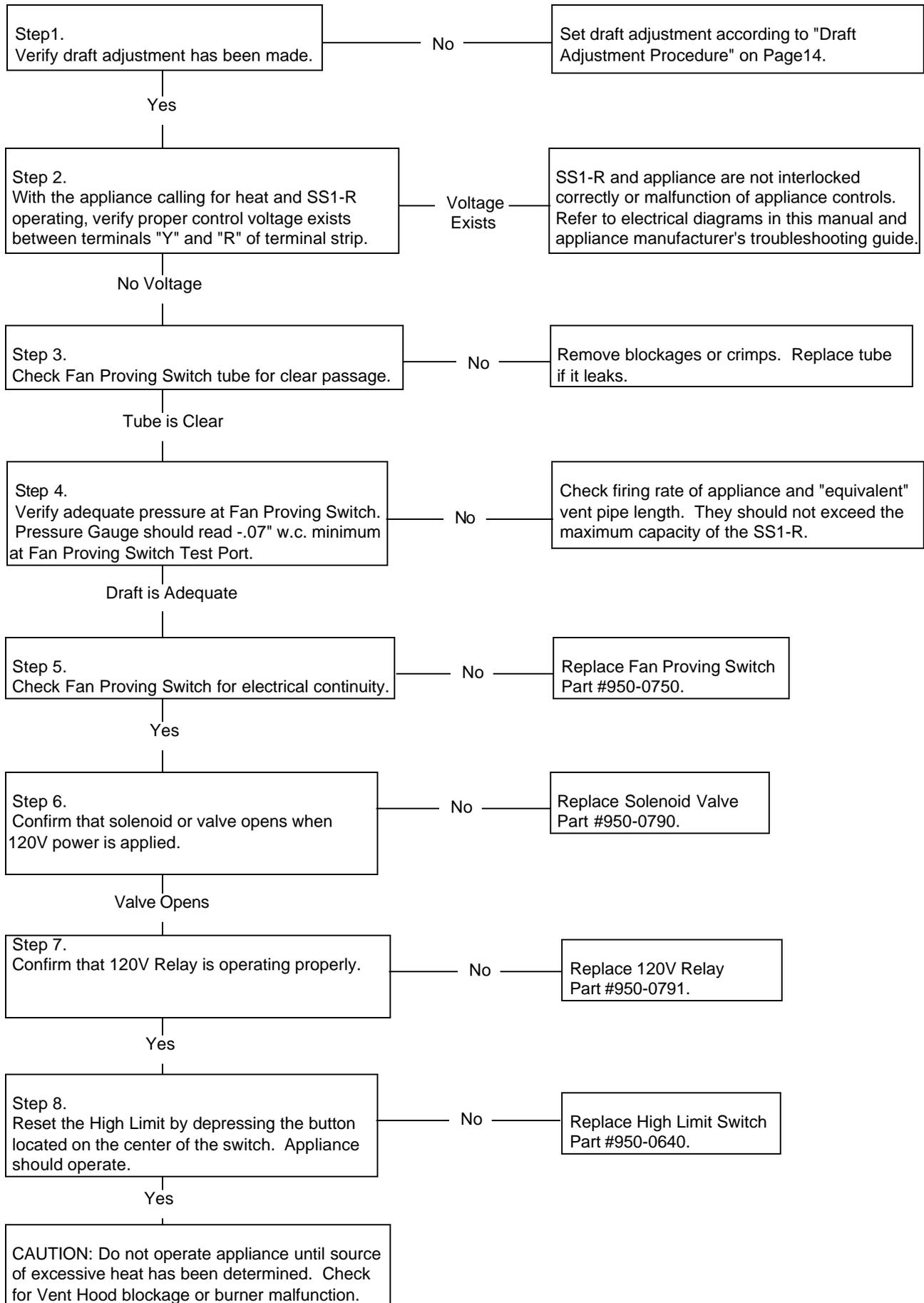
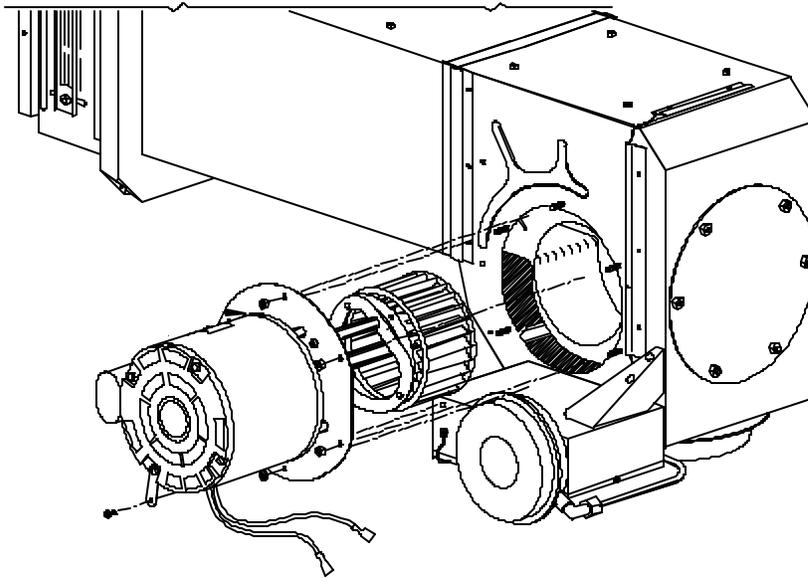


DIAGRAM U



### WHEEL INSPECTION (DIAGRAM U)

1. The SS1-R blower wheel **must** be inspected annually. Particulates, such as soot, oil impurities and sheet rock dust, can prevent proper venting and will cause noise and vibration. Follow instructions, below for motor/wheel assembly removal.
2. Clean all particulate from wheel with a soft metal wire brush and soot cleaner. Clean the pocket of each blade, as well as the rest of the wheel.
3. A wheel that exhibits large amounts of particulate or appears to be out of round should be replaced with a new wheel. Instructions for wheel replacement are listed below.

### REMOVAL AND REPLACEMENT OF MOTOR/WHEEL ASSEMBLY (DIAGRAM U)

#### **⚠ WARNING**

Disconnect power supply to the SS1-R and heating equipment when servicing the SS1-R. Failure to do so may result in personal injury and/or equipment damage.

1. Remove electrical box cover.
2. Disconnect the two motor leads from the terminal strip.
3. Remove motor bracket screw from electrical box.
4. Holding the motor, apply firm pressure towards the plenum of the SS1-R and remove the six motor mount nuts. **Note: Hold the assembly firmly; failure to do so could damage internal parts.**
5. Slide motor/wheel assembly from Plenum. Grasp only the motor casing; do not damage wheel, shaft or other components on Plenum. Do not rest assembly on wheel.

### WHEEL REPLACEMENT (DIAGRAM U)

1. Loosen set screw from wheel hub by using a 5/32" allen wrench.
2. Twist wheel to loosen and pull off of motor shaft. **Do not pull too hard; wheel may bend.** Wheels "fused" to shaft may require penetrating oil and/or a wheel puller to facilitate removal.
3. Slide new wheel on to flat of shaft and firmly tighten set screw.

### MOTOR OILING (DIAGRAM U)

The SideShot motor is permanently lubricated and requires no oiling.

## LIMITED PARTS WARRANTY AND CLAIM PROCEDURE

Tjernlund Products, Inc. warrants the components of the SS1-R for two years from date of installation. This warranty covers defects in material and workmanship. This warranty does not cover normal maintenance, transportation or installation charges for replacement parts or any other service calls or repairs. This warranty DOES NOT cover the complete SS1-R if it is operative, except for the defective part.

Tjernlund Products, Inc. will issue credit or provide a free part to replace one that becomes defective during the two year warranty period. If the part is over 30 months old, proof of date of the installation in the form of the contractor sales/installation receipt is necessary to prove the unit has been in service for under two years. All receipts should include the date code of the SS1-R to ensure that the defective component corresponds with the complete unit. This will help preclude possible credit refusal.

- 1.) Follow troubleshooting guide to determine defective component. If unable to determine faulty component, contact your Tjernlund distributor or Tjernlund Products Technical Customer Service Department at 1-800-255-4208 for troubleshooting assistance.
- 2.) After the faulty component is determined, return it to your Tjernlund distributor for replacement. Please include SS1-R date code component was taken from. The date code is located on the Electrical Box cover plate. If the date code is older than 30 months you will need to provide a copy of the original installation receipt to your distributor. Credit or replacement will only be issued to a Tjernlund distributor after the defective part has been returned prepaid to Tjernlund.

## COVERED PARTS

<u>Component</u>	<u>Part Number</u>
Motor	950-0625
Proving Switch	950-0750
Timer/Relay	950-1067
Wheel	950-0635
High Limit Switch	950-0640
Oil Solenoid	950-0690
120V R1 Relay	950-0695

## WHAT IS NOT COVERED

Product installed contrary to our installation instructions  
Product that has been altered, neglected or misused  
Product that has been wired incorrectly  
Product that has been damaged by a malfunctioning or mistuned burner  
Any freight charges related to the return of the defective part  
Any labor charges related to evaluating and replacing the defective part

### TJERNLUND LIMITED TWO YEAR WARRANTY

Tjernlund Products, Inc. warrants to the original purchaser of this product that the product will be free from defects due to faulty material or workmanship for a period of (2) years from the date of original purchase or delivery to the original purchaser, whichever is earlier. Remedies under this warranty are limited to repairing or replacing, at our option, any product which shall, within the above stated warranty period, be returned to Tjernlund Products, Inc. at the address listed below, postage prepaid. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, AND TJERNLUND PRODUCTS, INC. EXPRESSLY DISCLAIMS LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF THIS PRODUCT. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND NO AGENT IS AUTHORIZED TO ASSUME FOR US ANY LIABILITY ADDITIONAL TO THOSE SET FORTH IN THIS LIMITED WARRANTY. IMPLIED WARRANTIES ARE LIMITED TO THE STATED DURATION OF THIS LIMITED WARRANTY. Some states do not allow limitation on how long an implied warranty lasts, so that limitation may not apply to you. In addition, some states do not allow the exclusion or limitation of incidental or consequential damages, so that above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state. Send all inquiries regarding warranty work to Tjernlund Products, Inc. 1601 9th Street, White Bear Lake, MN 55110-6794. Phone (612) 426-2993 • (800) 255-4208 • Fax (612) 426-9547