



## TJERNLUND PRODUCTS, INC.


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# MODEL SS2 INSTALLATION INSTRUCTIONS

 Recognize this symbol as an indication of important safety information!

### OWNER INSTRUCTIONS, DO NOT DESTROY

 **CAUTION:** The owner of the SS2 must keep the area around the vent terminal free of snow, ice and debris.

**NOTE: MAXIMUM FLUE GAS TEMPERATURES MUST NOT EXCEED 650°F (343° C) MINIMUM TEMPERATURE MUST BE 250° F (121° C) 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, PERSONAL INJURY OR PROPERTY DAMAGE.

**NOTE:** Burner capacities exceeding 1 GPH may require the burner to be adjusted to more efficient (12.5-13% CO<sub>2</sub>) than typical levels to maintain recommended over-fire draft settings. See "Draft Adjustment Procedure" on page 12 of this manual or consult factory at 1-800-255-4208 with questions prior to installation.

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

Tjernlund Products welcomes your comments and questions.  
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Call us toll free at 800-255-4208, visit our web site @ [www.tjernlund.com](http://www.tjernlund.com) or E-mail us at [fanmail@tjfans.com](mailto:fanmail@tjfans.com).

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SideShot® is a registered trademark of Tjernlund Products, Inc. for their Model SS2 Vent System.

## DESCRIPTION

The SS2 is a mechanical vent system designed and listed for use with natural draft oil heating equipment. It is factory assembled and wired. The SS2 automatically vents the flue gases from heating equipment to the outdoors. By recirculating indoor air with a cooling fan, surrounding combustible materials remain at safe temperatures. After each burner cycle the SS2 will continue to operate for an adjustable time period to purge the heater and vent of residual flue gases. The SS2 features a safety system consisting of a Fan Proving Switch and a High Limit temperature control. These devices monitor the SS2's performance and will interrupt the main burner if a venting malfunction is detected.

## APPLICATION TABLE

Verify that the total BTU/hr. input of the heating appliance(s) fall within the inputs listed below. The BTU/hr. capacity range is based on a maximum of 50 equivalent feet (15 meters). To determine equivalent feet, add the total length of straight vent pipe plus 10 feet (3 meters) for each 90 degree elbow and 5 feet (1.5 meters) for each 45 degree elbow. Vent runs of over 15 linear feet (4.5 meters) require the use of an approved, insulated vent connector to prevent problems related to condensation.

### **WARNING**

**The SS2 Vent System may only be used on Flame Retention Head Burners.**

MODEL	Flame Retention Oil Burner BTU/hr.	Max. Equivalent Feet / Meters
SS2	* 70,000-168,000	50 feet 15 meters

\* Burner capacities exceeding 1 GPH may require the burner to be adjusted to more efficient (12.5-13% CO<sub>2</sub>) than typical levels to maintain recommended over-fire draft settings. See "Draft Adjustment Procedure" on page 12 of this manual or consult Tjernlund at 1-800-255-4208 with questions prior to installation.

## SPECIFICATIONS

**Motor:** 115/1/60, 3000 RPM, 1/25 HP, 1.6 FLA, Ball Bearing Permanently Lubricated.

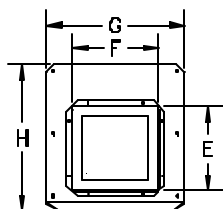
**Fan Proving Switch:** Non-adjustable set point of  $\sim .40''$  W.C. on pressure drop. Contacts rated for an inductive load of 6.2 FLA.

**High Limit:** Manual reset N/C contacts, open at  $170^{\circ}\text{F} \pm 8^{\circ}\text{F}$  ( $77^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ). Contacts rated at 10 FLA at 120 VAC.

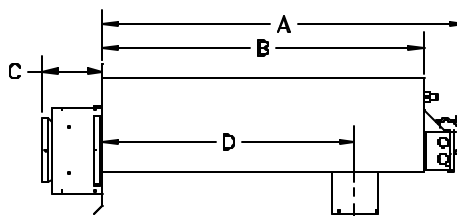
**Post-Purge Timer:** Adjustable from 1 to 10 minutes. Dual voltage, non-polarity sensitive input (24-120 VAC).

**Cooling Fan:** 115/1/60, RPM 3000-3300, AMPS .2, CFM 105, DB Level 50.

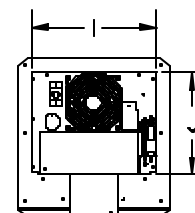
A	B	C	D	E	F	G	H	I	J
34 1/4"	28 1/2"	5 1/2"	22 3/8"	7 3/4"	8"	12 1/2"	13 1/4"	10 1/2"	8 1/2"



FRONT VIEW



SIDE VIEW



REAR VIEW

## GENERAL INFORMATION

Each SS2 is electrically factory line tested before shipment.

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

## INSTALLATION RESTRICTIONS

1. The SS2 may not be installed on condensing type or solid fuel burning appliances, incinerators or incinerating toilets.
2. The SS2 may only be installed on Flame Retention Head Burners.
3. The SS2 may only be installed on appliances equipped with a barometric draft control.
4. The SS2 may not be connected to a natural draft chimney.
5. The SS2 shall not be installed where flue gas temperatures exceed  $650^{\circ}\text{F}$  ( $343^{\circ}\text{C}$ ) at its inlet. Flue gas temperature verification:

A) Verify flue gas temperature at appliance inlet is at or above  $250^{\circ}\text{F}$  ( $121^{\circ}\text{C}$ ) after 5 minutes of operation during setup. See "Draft Adjustment Procedure" on page 12, step 9.

**AND**

B) After 15 minutes of operation, measure flue gas temperature to verify it is not more than  $650^{\circ}\text{F}$  ( $343^{\circ}\text{C}$ ) at SS2 inlet.

6. The electrical load controlled through the Fan Proving Switch must not exceed its nameplate ratings.
7. Vent runs of over 15 linear feet (4.5 meters) require the use of an approved, insulated vent connector to prevent problems related to condensation.

### **⚠ 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.

Do not exceed the recommended input range of the SS2. 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.

If oil nozzle is changed or other equipment is added perform "Draft Adjustment Procedure" on page 12 again.

## CAUTIONS

1. Disconnect power supply from the SS2 and heating equipment when making wiring connections and servicing the SS2. Failure to do so may result in personal injury and/or equipment damage.
2. Failure to install, maintain and/or operate the SS2 in accordance with manufacturer's instructions may result in conditions which can produce bodily injury and property damage.
3. The SS2 must be installed by a qualified installer (an individual properly licensed and/or trained) in accordance with all local codes or, in their absence, in accordance with the appropriate National Fire Protection Association #31, #211 and 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).
4. Plan the vent layout so that the code required clearances are maintained from plumbing, wiring and combustible materials.
5. Flue gas temperatures must not exceed 650<sup>o</sup>F (343<sup>o</sup>C) at SS2 inlet. Ambient temperature must not exceed 104<sup>o</sup>F (40<sup>o</sup>C).
6. Flue gas temperature at vent system inlet must be at least 250<sup>o</sup>F (121<sup>o</sup>C) during appliance steady state.
7. Make certain power source is adequate for the SS2 requirements. Do not add the SS2 to a circuit when the total electrical load is unknown.
8. "Safety Inspection of a Previously Used Appliance", below must be completed when replacing a conventional chimney venting system or when SS2 is installed on used heating equipment.

## SAFETY INSPECTION OF A PREVIOUSLY USED OIL APPLIANCE

(Perform prior to SS2 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.

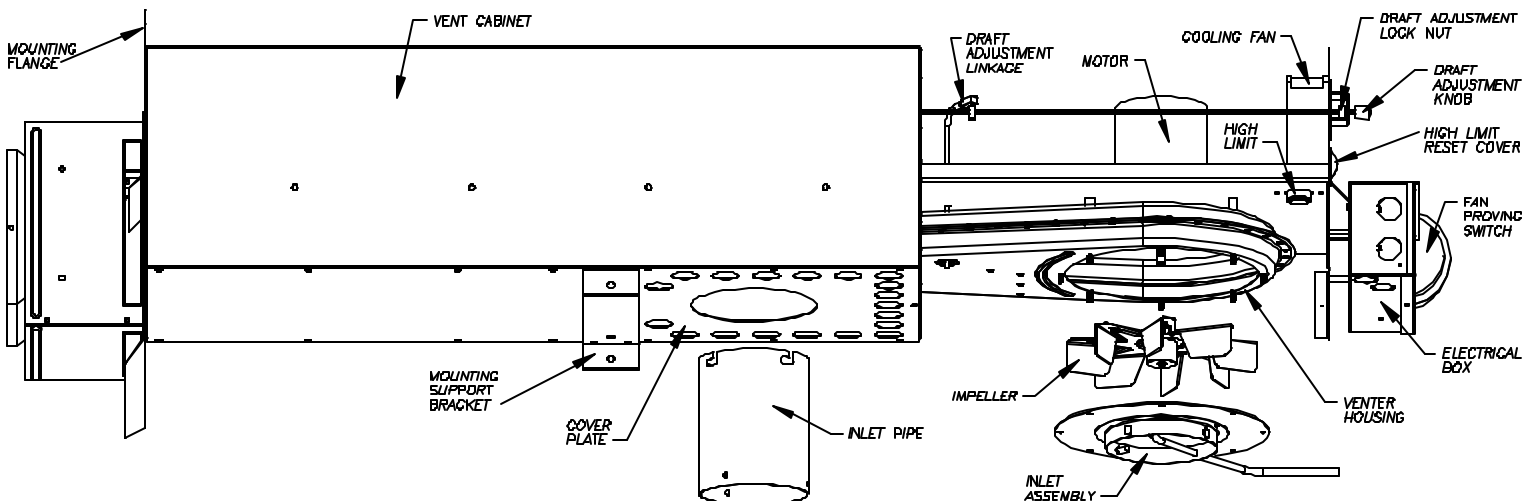
This procedure is based on central furnace and boiler installations and it should be recognized that generalized procedures cannot anticipate all situations. Accordingly, in some cases deviation from this procedure may be necessary to determine safe operation of the equipment.

- a. This procedure should be performed prior to any attempt at modifications of the appliance or installation of the SS2.
- b. If it is determined there is a condition which could result in an unsafe operation, the appliance should be shut off and the owner advised 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. Applicable only to furnaces: Inspect heat exchanger for cracks, openings or excessive corrosion. Check both the limit control and fan control for proper operation.
4. Applicable only to boilers: Inspect for evidence of water or combustion product leaks. Determine that the water pumps are in operating condition. Test low water cutoffs, automatic feed controls, pressure and temperature limit controls and relief valves in accordance with the manufacturer's recommendations to determine that they are in operating order.

## SIDESHOT® MODEL SS2 TERMINOLOGY





## VENT HOOD TERMINATION CLEARANCES FOR CANADIAN INSTALLATIONS

The SS2 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

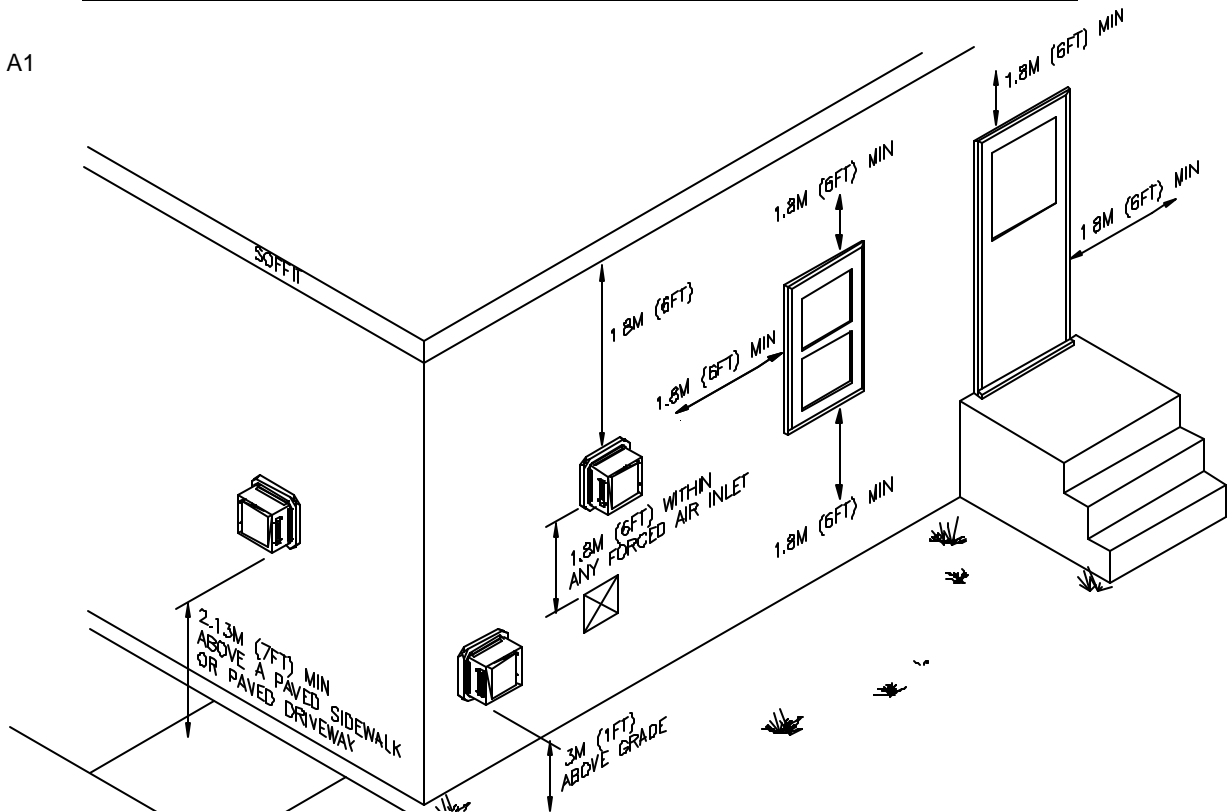
A venting system shall not terminate within .3m (1ft) of the following:

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

**CAUTION:** The owner of the SS2 must keep the area around the vent terminal free of snow, ice and debris.

It is not recommended for the SS2 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



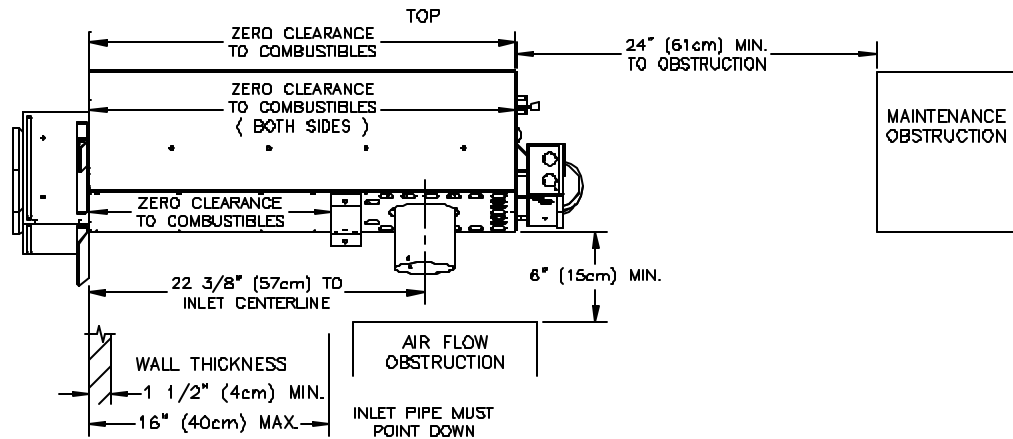
### INSTALLATION TOOLS REQUIRED

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Nut Runner Set</li> <li>• Screwdriver Set</li> <li>• Smoke Tester</li> </ul> | <ul style="list-style-type: none"> <li>• Drill w/Bits</li> <li>• Wire Cutter/Stripper</li> <li>• CO<sub>2</sub> Analyzer</li> </ul> | <ul style="list-style-type: none"> <li>• Combination Wrench Set</li> <li>• Draft Gauge</li> <li>• Reciprocating Saw</li> </ul> |
|---|---|--|

## SS2 VENT SYSTEM CLEARANCES FROM COMBUSTIBLES & OBSTRUCTIONS

With an inlet flue gas temperature of 650°F (343°C) or below, the SS2 has been Listed for Zero Clearance from combustibles.

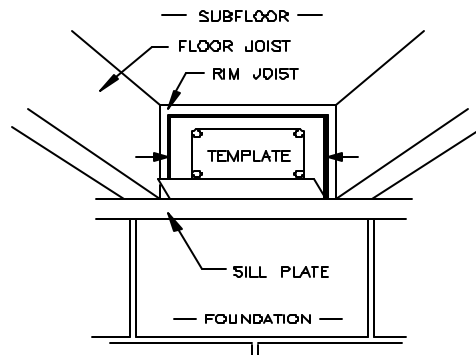
**NOTE:** You must allow a minimum 2 foot distance of unobstructed clearance behind the SS2 Vent System for doing maintenance. Allow 6" minimum clearance from bottom of vent cabinet to any obstruction for air flow.



## INSTALLING SS2 VENT CABINET

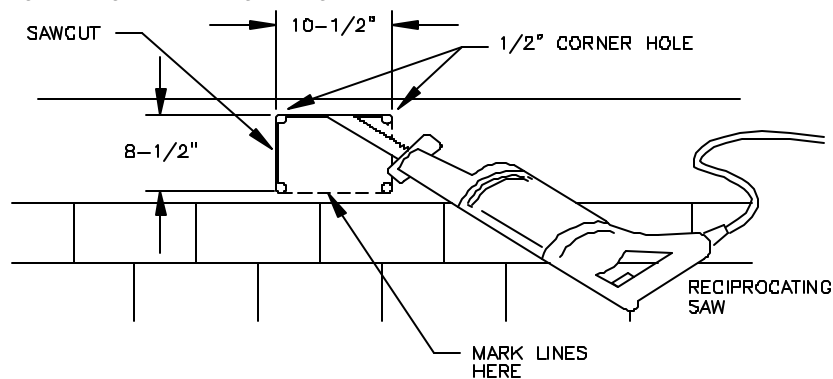
1. a) Fold SS2 Vent Cabinet template (Page 18) along dashed line and attach between the floor joists ensuring that it is snug against the sill plate and centered between the floor joists. Follow same procedure if floor trusses are used, (See Diagram B).
- b) If the SS2 is not being installed between floor joists, attach the template to the wall it will be exiting ensuring it is level.

DIAGRAM B



2. Verify that wall penetration will not come in contact with concealed wiring or plumbing. 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 remaining (4) 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 10-1/2" in width by 8-1/2" in height, (See Diagram C).
6. Knock out block material exposing rectangular opening through the wall.

DIAGRAM C



**NOTE:** For easy one person installations, remove (9) screws from rear and bottom of vent cabinet. Slide venter assembly out of SS2 cabinet and set aside being careful not to damage housing. After SS2 cabinet is secured to the outside wall, and the vibration isolation mount is installed to the inside wall, replace venter assembly and (9) screws, (See Diagram D).

7. Apply two beads of exterior rated caulk approximately 3/8" in width at the seam of the outside casing of the SS2 Vent Cabinet and on the inner flange of the Vent Hood Termination, (See Diagram E).

DIAGRAM D

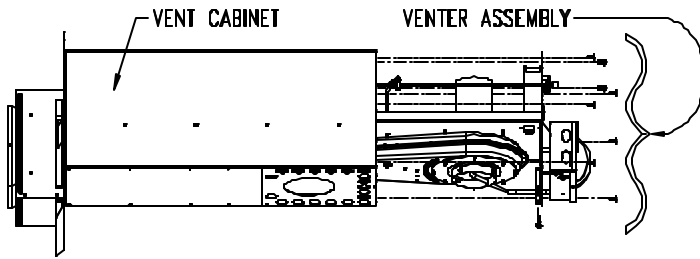
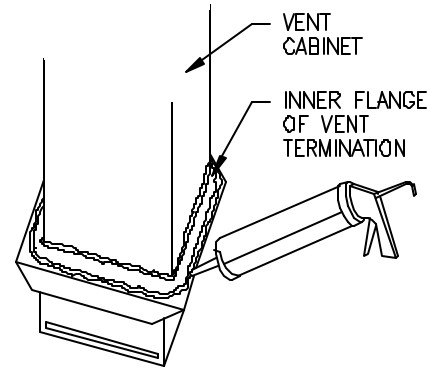
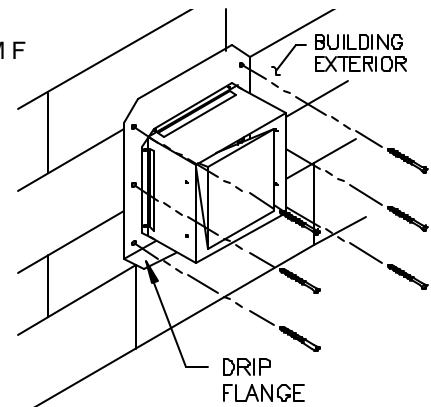


DIAGRAM E



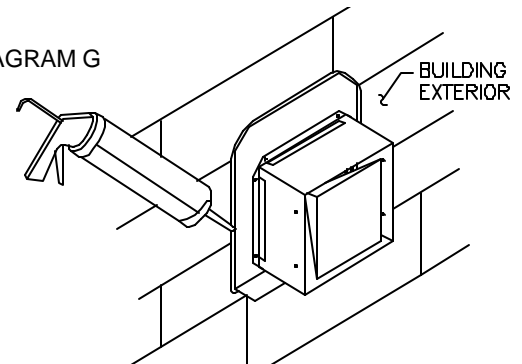
8. Slide the SS2 vent cabinet through the wall with drip flange facing down towards ground, (See Diagram F). Mount Vent Hood to exterior using (6) #10 x 1 1/4" wood screws provided, (See Diagram F). If installing in masonry wall drill 1/4" holes and use wall anchors provided.

DIAGRAM F



9. After the SS2 is completely installed, apply a bead of exterior rated caulk between the Vent Hood Termination mounting flange and the exterior of the building, (See Diagram G).

DIAGRAM G

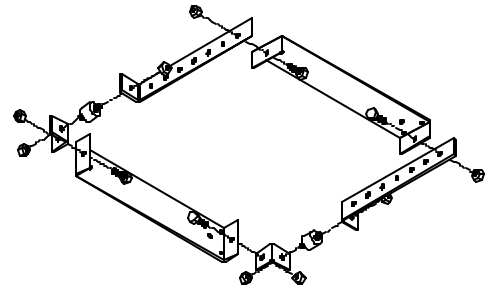
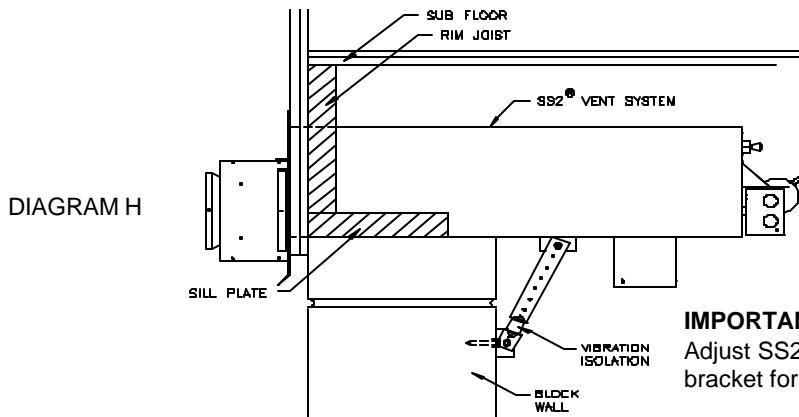


### INSTALLATION OF WALL SUPPORT BRACKET

1. To prevent damage to the SS2, temporarily support the bottom of the SS2 cabinet (prop on ladder top) while assembling the wall support bracket. Assemble the wall support bracket as shown, (See Diagram H, Page 8).
2. Connect mounting bracket to SS2 using (4) #8 x 3/8" sheet metal screws. Line up holes on bottom of SS2 with mounting bracket to ensure proper placement, (See Diagram H, Page 8).
3. Adjust the wall support bracket so that a slight pitch is maintained for moisture drainage and vibration isolation. Use the prepunched holes on the wall bracket as a template to mark holes to be drilled into the side wall for mounting screws, (See Diagram H, Page 8).



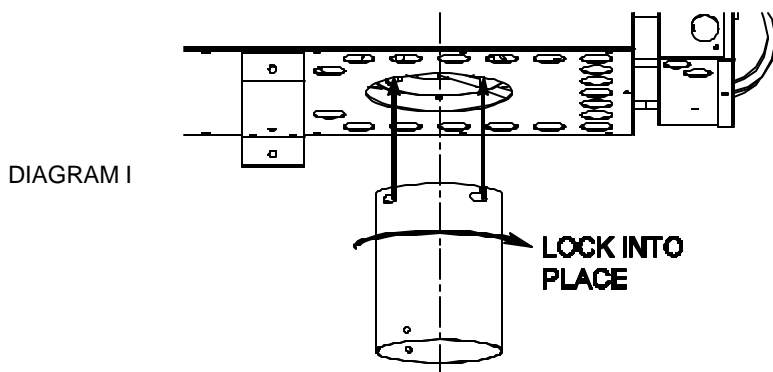
4. a) If installing the bracket into a wood wall, drill 2 pilot holes at each point established in step 3 with a 1/8" drill bit approximately 1" deep and install the screws provided to secure the bracket to the wall.
- b) If installing the bracket into a masonry wall, drill 2 holes at each point established in step 3 with a 1/4" masonry drill bit Tap the masonry anchors into the 2 holes drilled and screw the wall bracket onto the wall.



**IMPORTANT:**  
Adjust SS2 mounting bracket for slight pitch.

DIAGRAM H

### INLET PIPE INSTALLATION



1. Remove 4" round inlet pipe from box.
2. Align the 4 slots of the inlet pipe to the 3 pins and proving switch sensing tube, push pipe up until it bottoms out in the SS2 inlet.
3. Turn the inlet collar clockwise to lock in place, (See Diagram I). **IMPORTANT:** After vent pipe is installed verify inlet pipe is locked tightly in place.

DIAGRAM I

### INSTALLATION OF VENT PIPE

When installing the SS2 Vent System on an oil appliance, a full size barometric draft control must be used. Install the barometric draft control as shown, (See Diagram J). The SS2 inlet pipe is designed to accept 4" single wall, or Type "L" vent pipe. Type "B" vent pipe is not acceptable for the SS2. The vent pipe used must be in compliance with local codes and the listing of the vent pipe manufacturer. When necessary, install tapered reducers and increasers as shown below.

Determine vent pipe layout which will allow for the least amount of elbows to the appliance. Calculate the equivalent vent pipe length from the appliance to the SS2 Vent System by adding the straight vent pipe length and the equivalent elbow lengths together. Each 90 degree elbow is equal to 10 feet (3 meters) of straight vent pipe, each 45 degree elbow is equal to 5 feet (1.5 meters) of straight pipe. The equivalent vent pipe length must not exceed 50 feet (15 meters) from the appliance to the SS2 Vent System. Vent runs of over 15 linear feet (4.5 meters) require the use of an approved, insulated vent connector to prevent problems related to condensation. It is not necessary to maintain a 1/4" rise per foot of horizontal when Side Wall Venting.

**NOTE: Installing a vent pipe "jog" on vertical vent pipe layouts allows for easier dismantling when servicing is necessary, (See Diagram J).**

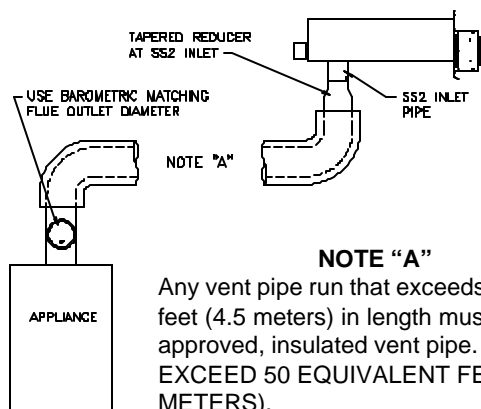
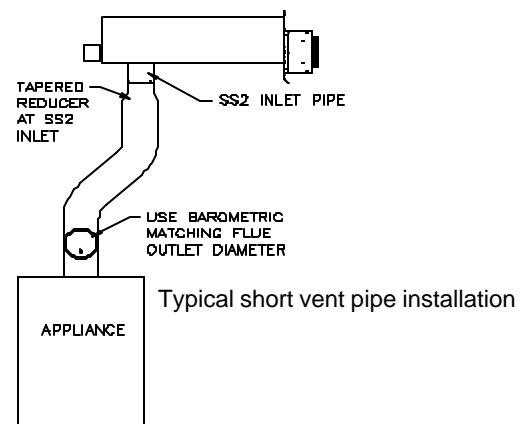


DIAGRAM J



**WARNING**

All wiring from the SS2 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. **Note:** We recommend the use of flexible conduit for connections to the SS2 to allow for slide out servicing feature of venter assembly.

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

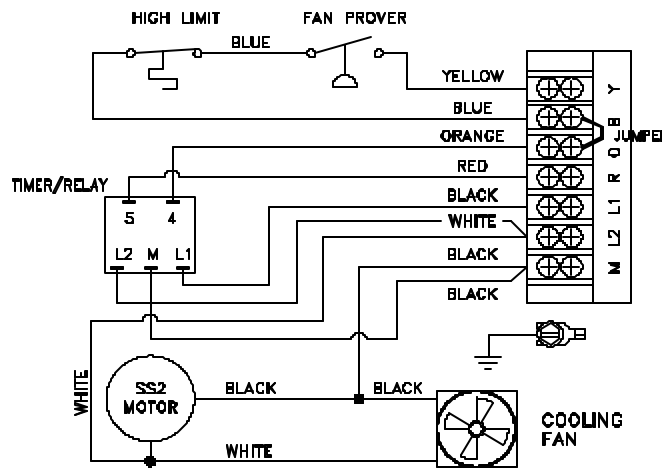
The Fan Proving Switch and High Limit are not suitable for loads which exceed the above limits.

**SEQUENCE OF OPERATION WITH SS2 INSTALLED ON OIL FIRED APPLIANCES:**

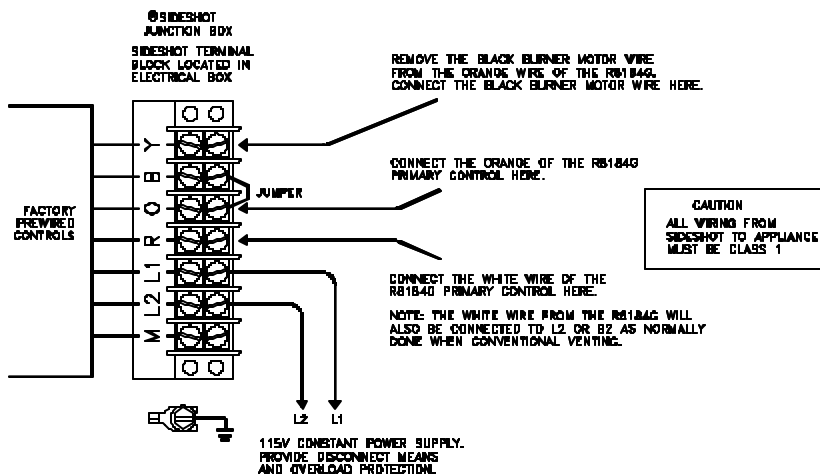
Control signal from thermostat, aquastat or primary control is intercepted and routed to terminal "O" on SideShot terminal strip. When terminal "O" is energized with either 24 VAC or 120 VAC, the SS2 Relay/Timer receives current and SS2 motor and cooling fan are energized. After draft is established within the SS2, the Fan Proving Switch closes within 5 to 10 seconds energizing terminal "Y", which completes the circuit allowing burner to fire.

The "O" input terminal on the SideShot can accept either a 24 VAC or 120 VAC control signal. For most furnace applications it may be easier to interlock with the 24 VAC thermostat circuit. For most boiler applications it may be easiest to interlock with the 120 VAC primary control circuit to the burner motor. For boiler applications with solid state primary controls it is recommended that the interlock be made between the aquastat and the primary control to avoid the need for a field installed isolation relay. This relay is necessary to eliminate false triggering of the SideShot by circuit checks that are common with solid state controls. Choose the interlock method that best fits your application.

**SS2 FACTORY WIRING**

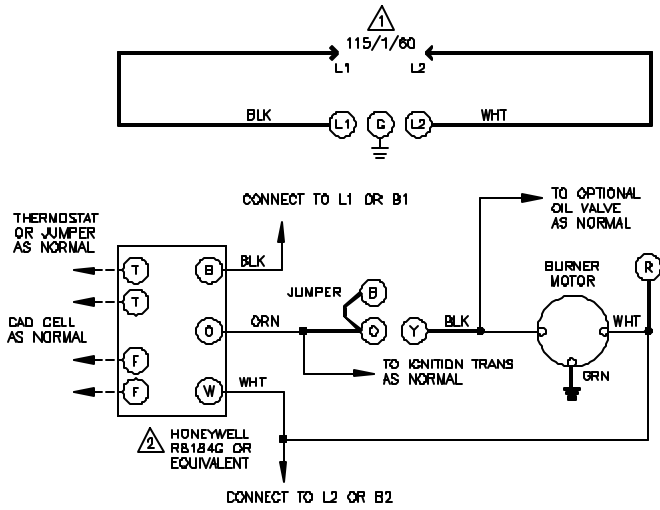


**TYPICAL OIL JOB SITE WIRING**

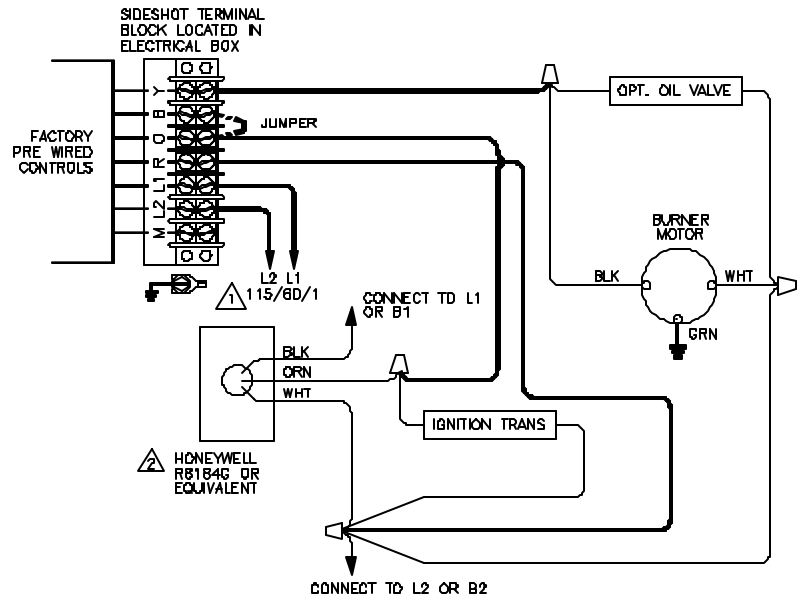


## SS2 CONNECTED TO AN R8184G WITH THE APPLIANCE BURNER MOTOR LESS THAN 6.2 AMPS @ 120 VAC

LADDER DIAGRAM



CONNECTION DIAGRAM



- LEGEND**
- DENOTES TERMINAL CONNECTION
  - DENOTES WIRE CONNECTION
  - DENOTES LOW VOLTAGE BY APPLIANCE MANUFACTURER
  - DENOTES LINE VOLTAGE BY APPLIANCE MANUFACTURER
  - DENOTES LINE VOLTAGE BY TJERNLUND

- NOTES**
- POWER SUPPLY PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION.
  - SUPPLIED BY APPLIANCE MANUFACTURER

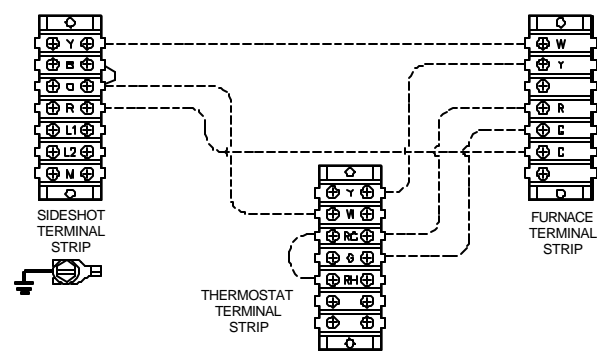
- LEGEND**
- DENOTES WIRE NUT
  - DENOTES LINE VOLTAGE BY APPLIANCE MANUF
  - DENOTES LINE VOLTAGE BY TJERNLUND
  - DENOTES LINE VOLTAGE FIELD
- NOTES**
- POWER SUPPLY PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION.
  - SUPPLIED BY APPLIANCE MANUFACTURER

NOTES: The SS2 is normally interlocked with the primary control of the appliance. Wire all other furnace/boiler controls as normally done when conventional venting before continuing. Disconnect power from the appliance before attempting to interlock the SideShot.

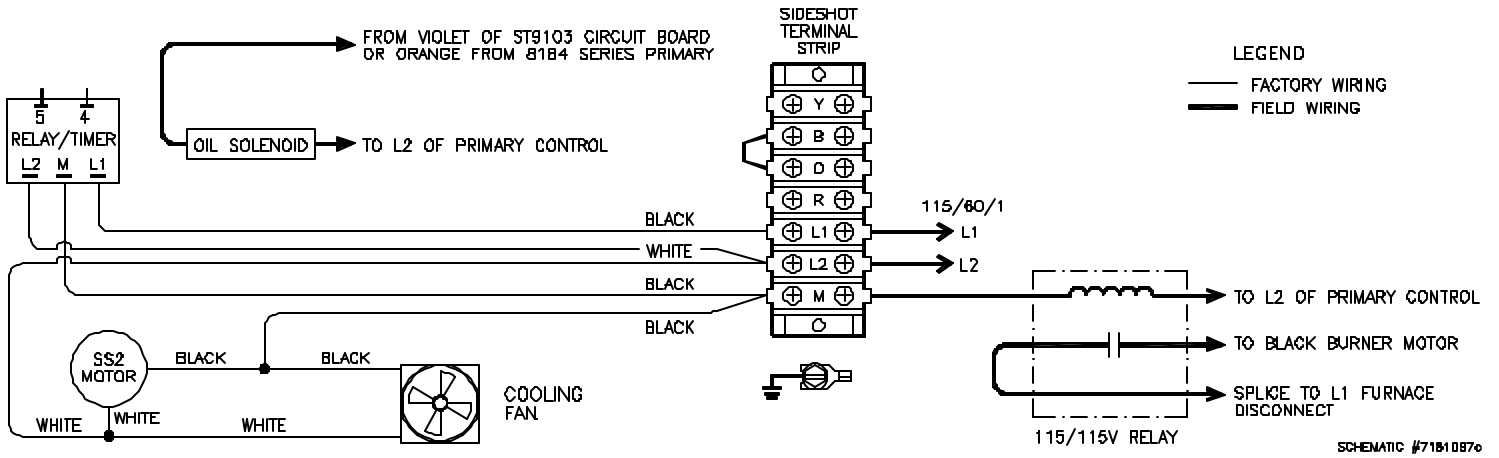
1. Separate the Black burner motor wire from the Orange wire of the R8184G. NOTE: Do not separate ignition transformer wire from the Orange.
2. Connect the Black burner motor wire to terminal Y on the SS2 terminal strip.
3. Connect the Orange wire of the R8184G to the O terminal on the SS2 terminal strip.
4. Connect the White wire of the R8184G to the R terminal of the SS2 terminal strip.

- NOTE: The White wire from the R8184G will also be connected to L2 or B2 as normally done when conventional venting.
5. Connect L1 terminal of the SS2 terminal strip to L1.
  6. Connect the L2 terminal of the SS2 terminal strip to L2.
  7. Connect the Ground to grounding screw in SS2 electrical box.

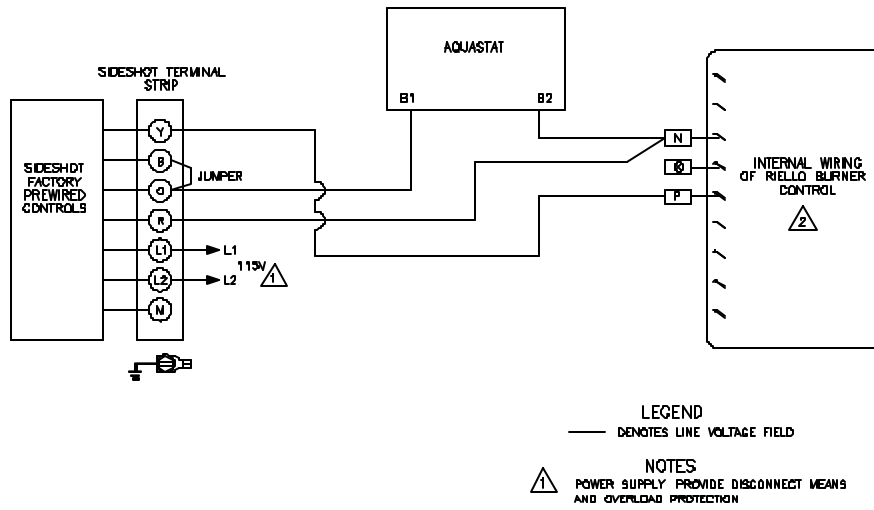
### SS2 CONNECTED TO A 24 VAC THERMOSTAT CIRCUIT



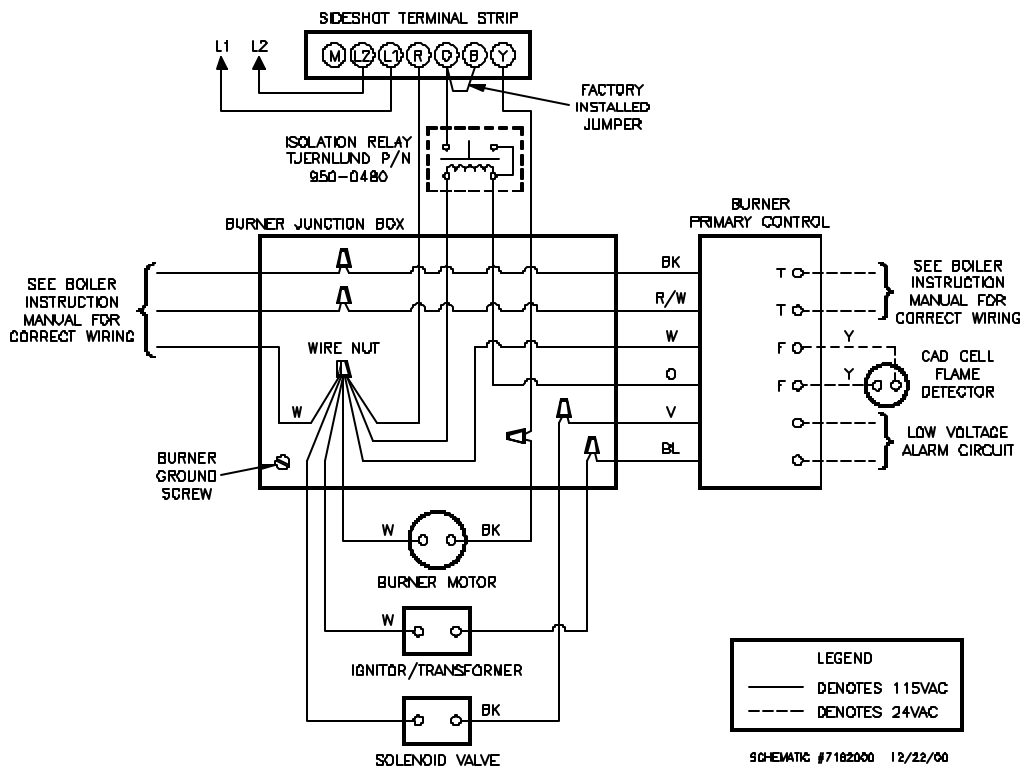
**SS2 CONNECTED TO 24 VAC THERMOSTAT CIRCUIT WITH BURNER MOTOR POST PURGE (P/N 950-2043)  
(USE IN CONJUNCTION WITH DIAGRAM ON BOTTOM OF PAGE 10)**



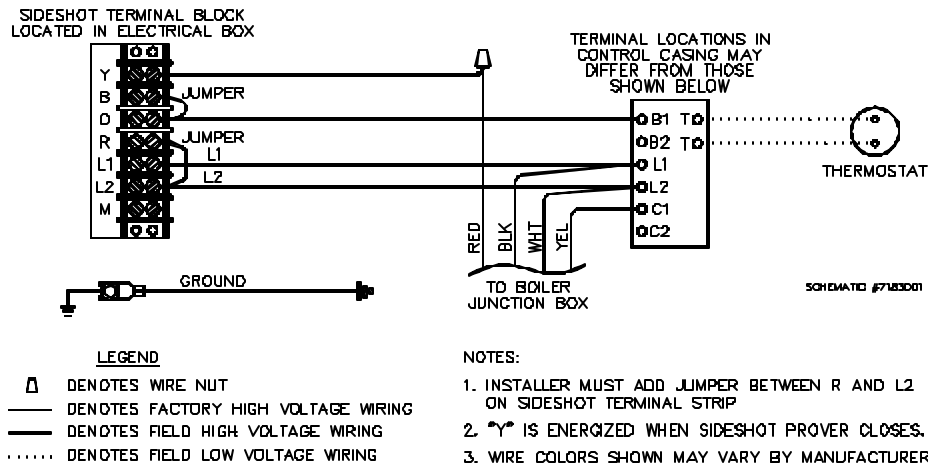
**SS2 CONNECTED TO A RIELLO BURNER**



**SS2 CONNECTED TO A CARLIN CONTROL**



**SS2 WIRED WITH WEIL-MCLAIN WGO, WTGO AND SGO-W WATER BOILERS  
OR AQUASTAT CONTROLLED BURNERS WITH CARLIN 602002 PRIMARY CONTROL**



**DRAFT ADJUSTMENT PROCEDURE**

The SS2 Vent system will properly vent a wide range of BTU/hr. input capacities. To compensate for different burner capacities, vent connector lengths, types and sizes, it features a draft adjustment located on the back of the venter assembly. Turning this draft adjustment knob clockwise will increase draft and raise the BTU capacity. Turning the knob counter-clockwise will decrease draft and lower the BTU capacity. The SS2 is factory set for the highest draft (BTU capacity).

**IMPORTANT:**

Before proceeding, close all windows, doors and fireplace dampers. Turn on all appliances in the structure that exhaust indoor air such as clothes dryer, exhaust fans, range hoods, bathroom and whole house exhaust fans. Failure to perform the draft adjustment procedure may cause a poor vent system installation possibly resulting in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

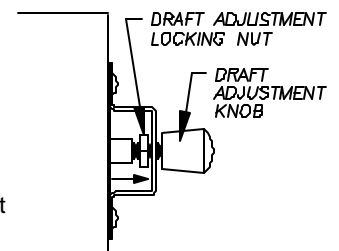
1. Insert a stack thermometer into the vent pipe as close as possible to the SS2 inlet. **NOTE:** plug hole when finished with installation.
2. Adjust barometric draft control to the minimum or least draft setting.
3. Place the heating system into operation. **NOTE:** There will be a slight pause between the venter operation and the burner operation.
4. Continuously monitor the over fire draft and adjust the SS2 draft adjustment knob to maintain a reading of  $-.02$  to  $-.03$ " W.C.. When the flue gas temperature at the venter inlet has stabilized make any final draft adjustment necessary to maintain a reading of  $-.02$  to  $-.03$ " W.C.. **IMPORTANT:** If a minimum of  $-.02$ " W.C. cannot be obtained with the SS2 draft adjustment knob turned fully clockwise, close the burner air shutter until a reading of  $-.02$ " W.C. is obtained.
5. Perform a smoke test and make any adjustments to the burner air shutter and venter draft adjustment to arrive at a trace of smoke (between 0 and 1) at a minimum over fire draft of  $-.02$ " W.C..
6. Perform a CO<sub>2</sub> test at the same location as the smoke test. Reduce the CO<sub>2</sub> 1% to 2% by opening the burner air shutter. Recheck over fire draft and increase venter draft if necessary to maintain a minimum of  $-.02$ " W.C.. **IMPORTANT:** Depending on installation variables it may be necessary to operate burner at CO<sub>2</sub> levels of 12% to 13% with firing rates over 1 GPH to maintain a minimum of  $-.02$ " W.C. over fire draft. Consult factory at 1-800-255-4208 if you experience burner setup problems.

**WARNING**

Do not allow heating system to run at less than a  $-.02$ " W.C. over fire draft or at a CO<sub>2</sub> level that is less than a 1% reduction from the value measured at a trace of smoke and a  $-.02$ " W.C. over fire draft. If these parameters are unobtainable, contact Tjernlund at 1-800-255-4208 for Technical Assistance.

7. Remove the call for heat from the heating system. **NOTE:** The SS2 will run in post-purge mode from the Relay/Timer. Allow the system to cool down to ambient room temperature.
8. Restart the heating system.
9. At 5 minutes into the restart, read and record the inlet temperature \_\_\_\_\_ F, \_\_\_\_\_ C. If this temperature is above 250° F (121° C), continue to step 10. If this temperature is below 250° F (121° C), insulate the pipe with an approved pipe insulation. Verify that the over fire draft and CO<sub>2</sub> have not changed. If they have, redo the adjustment steps. With the pipe insulated, redo the 5 minute temperature test and record the new value here \_\_\_\_\_ F, \_\_\_\_\_ C. If insulating the pipe did not increase the inlet temperature above 250° F. (121° C) within 5 minutes of the heating system call for heat, call 800-255-4208 for technical support.
10. Lock down the burner primary air adjustment, the barometric adjustment knob and the SS2 draft adjustment with the lock nut that is behind the knob bracket, (See Diagram K). Verify the over fire draft and CO<sub>2</sub> readings have not changed from the earlier values.

DIAGRAM K



## COMBUSTION AIR

Adequate combustion air is vital for proper combustion and for safe venting. Likewise, for proper SS2 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 54/NFPA 211. When installing a SS2, it is 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 SS2 Vent System on SS2/Appliance off cycle.

## FINAL SYSTEM OPERATION CHECK-OUT

1. Adjust thermostat or appliance controls to call for heat.
2. Verify that the SS2 operates first, prior to burner ignition.  
Allow heating equipment and SS2 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 and exhaust fans such as range hoods, bathroom exhaust and whole house fans.
5. Allow SS2 and equipment to operate for at least 15 minutes. Tripping of the burner circuit by the Fan Prover Switch during the 15 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 or equipment controls to the "off" position. Verify that the post-purge timer operates the SS2 for several minutes while burner is not firing before the SS2 turns off. Post-purge adjustment is made by turning the small slotted screw. Counter clockwise will increase delay, clockwise will decrease delay. **NOTE:** Overturning adjustment screw will damage timer and void warranty.
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 troubleshooting recommendations that follow assume the equipment is installed and maintained by a qualified service person.

**Relay/Timer:** The factory installed Relay/Timer provides the post purge cycle for the venting system. Just as a chimney continues to draft after the burner has shut-down, the Relay/Timer operates the SS2 to clear the vent system of residual gases. The duration of the post-purge cycle is adjustable from 1 to 10 minutes. Turn the adjustment on the Relay/Timer counter-clockwise to accomplish a longer post purge. **NOTE:** Over turning adjustment screw will damage timer and void warranty.

**Draft Adjustment:** The SS2 Draft Adjustment, located on the rear housing of the SS2 is used for setting up the appliance for proper draft. See "Draft Adjustment Procedure" on page 12.

### 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 12.

**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. See "Draft Adjustment Procedure" on page 12.

**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.

**Chronic Oil Odor Conditions:** Certain features of the specific appliance and installation, e.g. high heat-retention combustion chamber; low-mass, dry-base; piping system design; oil impurities; air in lines, can all contribute to an increased production of oil odor and cannot always be anticipated. For extreme cases of oil odor nuisance Tjernlund recommends the practice of post-purging the burner during the vent system post-purge. A burner post-purge cycle can eliminate any shortcomings of compatibility between the specific installation and the SS2. Burner post-purge kits, such as, Tjernlund's P/N 950-2043, are available from most oil equipment distributors. Burner post-purge kits should be used on installations where the combustion air is being adequately supplied, yet oil odors continue.

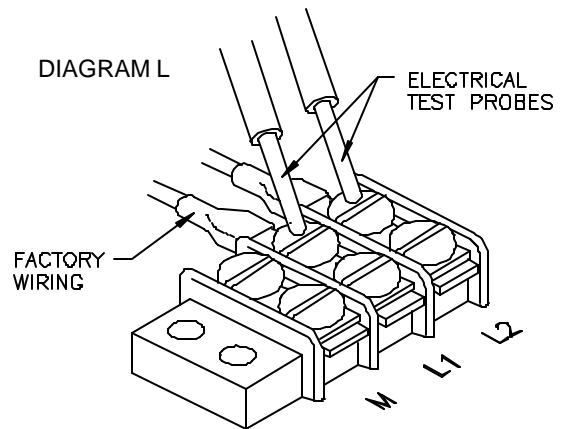
## TROUBLESHOOTING ELECTRICAL PROBLEMS

**NOTE:** When 120 VAC is applied to terminals L1 and L2 of the SS2 terminal strip, the SS2 may start up and run for 1 to 10 minutes. Do not initiate a call for heat with the appliance until the SS2 is finished with its post-purge time cycle.

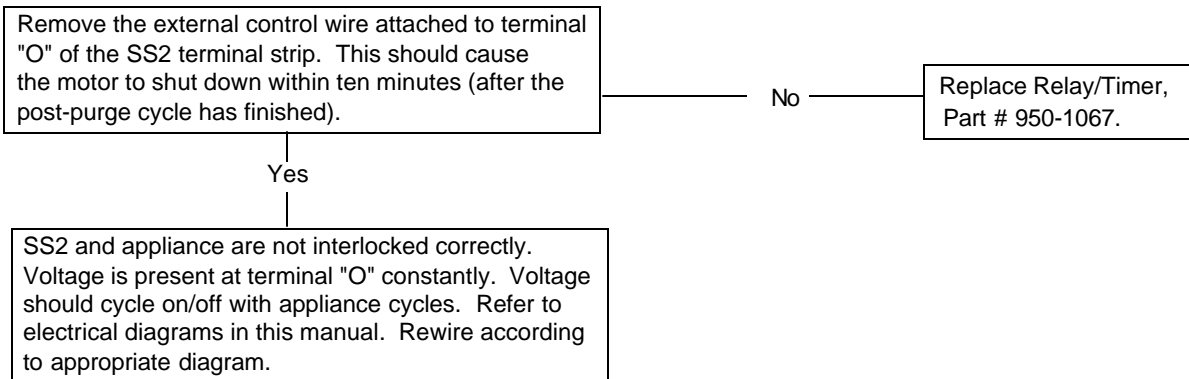
### **⚠ WARNING**

The following guide is intended to be used if a problem occurs during the use of the SS2 side wall vent system. At several steps throughout the guide you will be required to measure 115 Volts with a volt-meter, (See Diagram L).

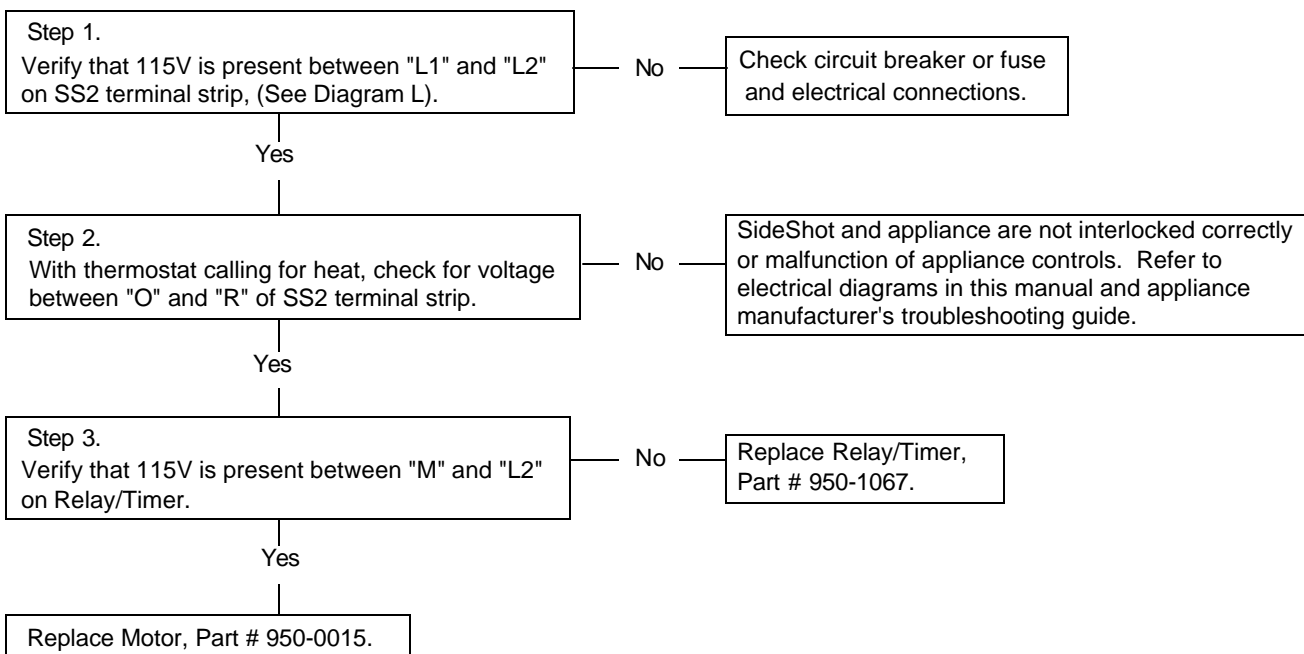
**Extreme caution must be exercised to prevent injury.** If you are unable to determine the defective part with the use of this guide, call your Tjernlund distributor or Tjernlund Products direct at 1-800-255-4208 for further assistance.



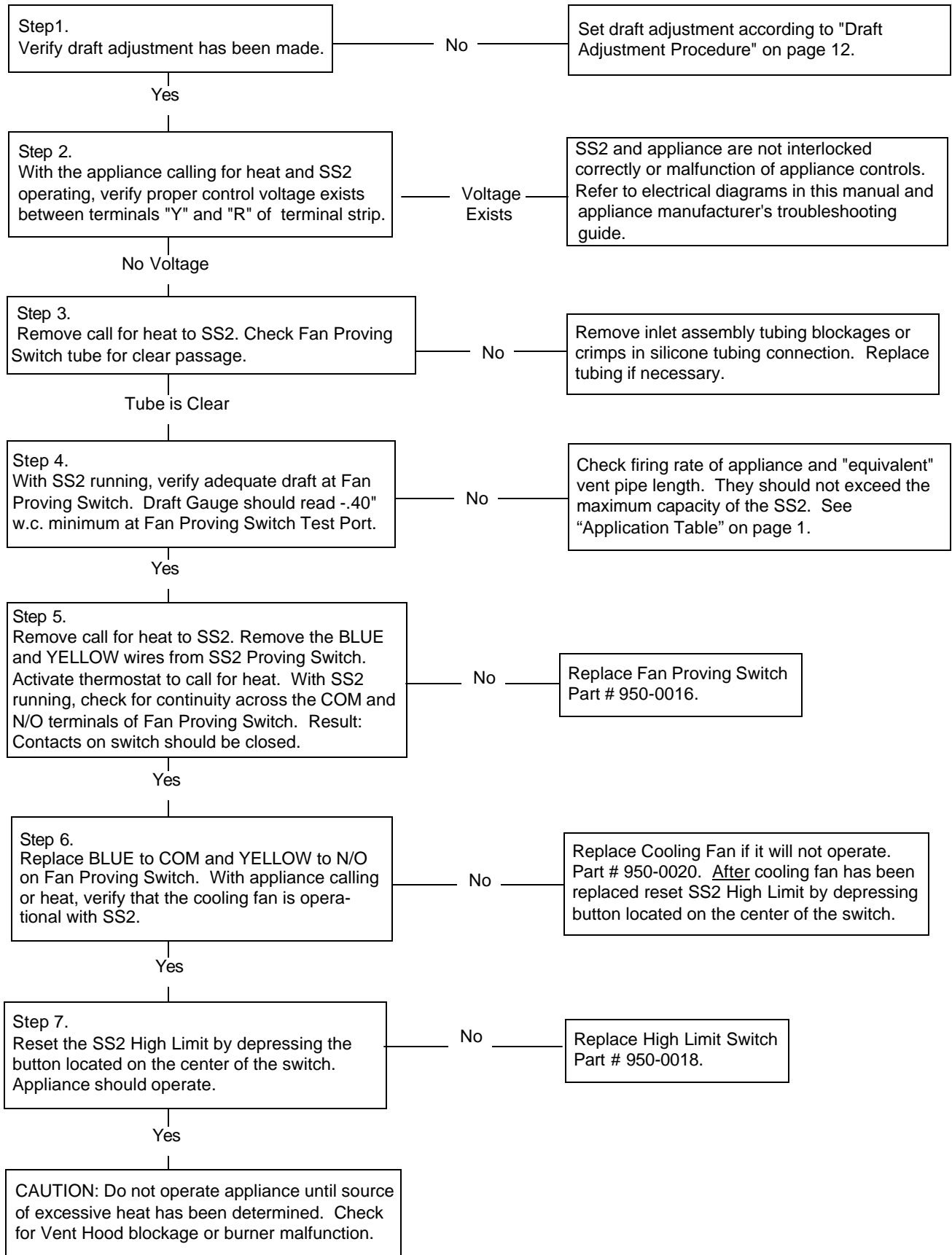
### SYMPTOM 1: SS2 MOTOR RUNS CONTINUOUSLY



### SYMPTOM 2: SS2 MOTOR WILL NOT OPERATE



**SYMPTOM 3: APPLIANCE WILL NOT OPERATE, BUT SS2 DOES**





**INSTALLER AND USER REQUIREMENTS**

- Installer must visually inspect unit annually.
- Installer must verify over-fire draft, CO<sub>2</sub> and smoke readings are all correct. See "Draft Adjustment Procedure" on page 12.
- Inspect vent pipe for evidence of corrosion. If any corrosion is found replace vent pipe and inspect venter.

**IMPELLER INSPECTION**

We recommend that the SS2 impeller be inspected annually. Improper burner adjustment can cause excessive particulate build up over time and impair venter performance. **NOTE:** See "SS2 Terminology" on page 3 for isometric diagram when following impeller inspection procedure.

**NOTE: The following inspection procedure should be done when SS2 is mounted. Use care so hardware is not lost.**

1. To examine impeller, remove vent pipe and SS2 inlet pipe by twisting counter clockwise.
2. Remove (7) screws which hold Cover Plate to Vent Cabinet.
3. Remove flexible tubing from Fan Prover sensing tube and remove (8) nuts which hold inlet assembly to Venter Housing.

An impeller that exhibits large amounts of particulate should be cleaned with a soft metal wire brush and soot cleaner. Clean each blade, as well as the rest of the impeller. An impeller that appears to be out of round should be replaced with a new impeller. After cleaning or replacing impeller, perform "Draft Adjustment Procedure" on page 12.

**MOTOR OILING**

The SS2 Motor has sealed ball bearings and requires no oiling.

**HOW TO OBTAIN SERVICE ASSISTANCE**

1. If you have any questions about your Power Venter or if it requires adjustment, repair or routine maintenance, we suggest that you contact your installer, contractor or service agency.
2. If you require technical information contact Tjernlund Products, Inc. at 1-800-255-4208.

When contacting Tjernlund Products, Inc., please have the following information available:

1. Model of the Power Venter as shown on the label attached to Power Venter.
2. Name and address of installer and any service agency who performed work on Power Venter.
3. Date of original installation and dates any service work was performed.
4. Details of the problem as you can best describe them.

**LIMITED PARTS WARRANTY AND CLAIM PROCEDURE**

Tjernlund Products, Inc. warrants the components of the SideShot 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 SS2 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 SideShot 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 SideShot date code component was taken from. The date code is located on the Electrical Box coverplate. 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.

## 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 (651) 426-2993 • (800) 255-4208 • Fax (651) 426-9547.

## REPLACEMENT PARTS

<b><u>Component</u></b>	<b><u>Part Number</u></b>
Motor	950-0015
Proving Switch	950-0016
Timer/Relay	950-1067
Impeller	950-0017
High Limit Switch	950-0018
Venter Housing	950-0019
Cooling Fan	950-0020