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T0890551100

MODEL SS1 INSTALLATION INSTRUCTIONS

 Recognize this symbol as an indication of important Safety Information!

OWNER INSTRUCTIONS, DO NOT DESTROY

NOTE: FLUE GAS TEMPERATURES MUST NOT EXCEED
650°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.**

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

DESCRIPTION

The SideShot is a mechanical vent system designed and listed for use with natural draft oil or gas heating equipment. It is factory assembled and wired. The SideShot automatically vents the flue gases from heating equipment to the outdoors. By combining outside air with high-tech insulation, surrounding combustible materials and the Vent Hood exterior remain at safe temperatures. After each burner cycle the SideShot will continue to operate for an adjustable time period to purge the heater and vent of residual flue gases. The SideShot features a two way safety system consisting of a Fan Proving Switch and a high limit temperature control. These devices monitor the SideShot'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 proper category listed below. All BTU/hr. capacity ranges are based on a maximum of 50 equivalent feet. To determine equivalent feet, add the total length of straight vent pipe plus 10 feet for each 90 degree elbow and 5 feet for each 45 degree elbow. Vent runs of over 15 linear feet should use an approved, insulated vent connector to prevent problems related to sulfur condensation.

MODEL	Natural and LP Gas	Flame Retention Oil Burner	Conventional Oil Burner	Max. Equivalent Feet
SS1	50,000–160,000 BTU/hr.	50,000–220,000 BTU/hr.	50,000–180,000 BTU/hr.	50

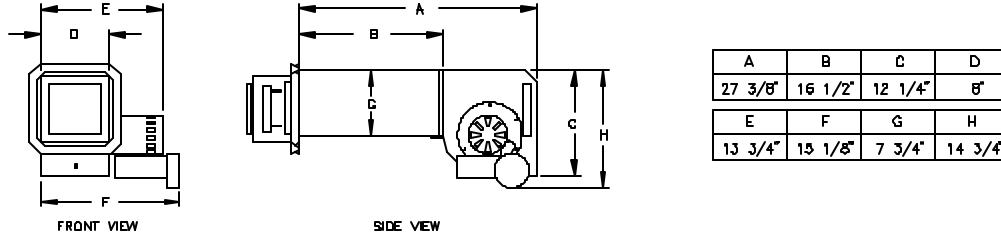
SPECIFICATIONS

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

Fan Proving Switch: Non-adjustable set point of -.05" W.C., Contacts rated for an inductive load of 6.2 FLA at 120 VAC.

High Limit: Manual reset N/C contacts, open at $135^{\circ}\text{F} \pm 10^{\circ}\text{F}$, 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).



GENERAL INFORMATION

These units have been factory tested and rated in accordance with AMCA standard 210, Test Code for Air Moving Devices.

Each SideShot 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. The SideShot may not be installed on condensing appliances.
 2. For Natural Gas, LP Gas and Oil Fired appliances only.
 3. The SideShot may not be installed on an appliance with an automatic valve having a manual opener unless the manual opener has been rendered inoperative or the automatic valve has been replaced with a valve not equipped with a manual opener.
 4. The SideShot may only be installed on appliances equipped with a draft hood, draft diverter or barometric draft control.
 5. The SideShot shall not be installed where flue gas temperatures exceed 650°F at its inlet. Flue gas temperature verification:
 - A) Consult appliance manufacturer for temperature of gases at the appliance after dilution by draft hood, draft diverter or draft control.
- AND**
- B) Measure temperature of flue gases at the inlet to the SideShot at time of installation. Temperature should be measured after appliance and SideShot have operated for at least 15 minutes, allowing flue gas temperature to stabilize.
 6. The electrical load controlled through the Fan Proving Switch must not exceed its nameplate ratings .
 7. Vent runs of over 15 linear feet should use an approved, insulated vent connector to prevent problems related to sulfur 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.

▲ WARNING

Do not exceed the recommended input range of the SideShot. 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

1. Disconnect power supply from the SideShot and heating equipment when making wiring connections and servicing the SideShot. Failure to do so may result in personal injury and/or equipment damage.
2. Failure to install, maintain and/or operate the SideShot in accordance with manufacturer's instructions may result in conditions which can produce bodily injury and property damage.
3. The SideShot 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, #54, #211 and the National Electrical Code.
4. Plan the vent layout so that the code required clearances are maintained from plumbing, wiring and combustible materials.
5. The SideShot motor shaft must be mounted horizontally to ensure proper operation of the Fan Proving Switch and prevent motor bearing wear.
6. Flue gas temperatures must not exceed 650°F at SideShot inlet. Ambient temperature must not exceed 104°F.
7. Make certain power source is adequate for the SideShot requirements. Do not add the SideShot to a circuit when the total electrical load is unknown.
8. "Safety Inspection of a Previously Used Appliance", pages 3 and 4 must be completed when replacing a conventional chimney venting system or when SideShot is installed on used heating equipment.

*SAFETY INSPECTION OF A PREVIOUSLY USED OIL APPLIANCE

(Perform prior to SideShot 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 SideShot.
- b. If it is determined there is a condition which could result in 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.

*SAFETY INSPECTION OF A PREVIOUSLY USED GAS APPLIANCE

(Perform prior to SideShot 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.

The following 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.

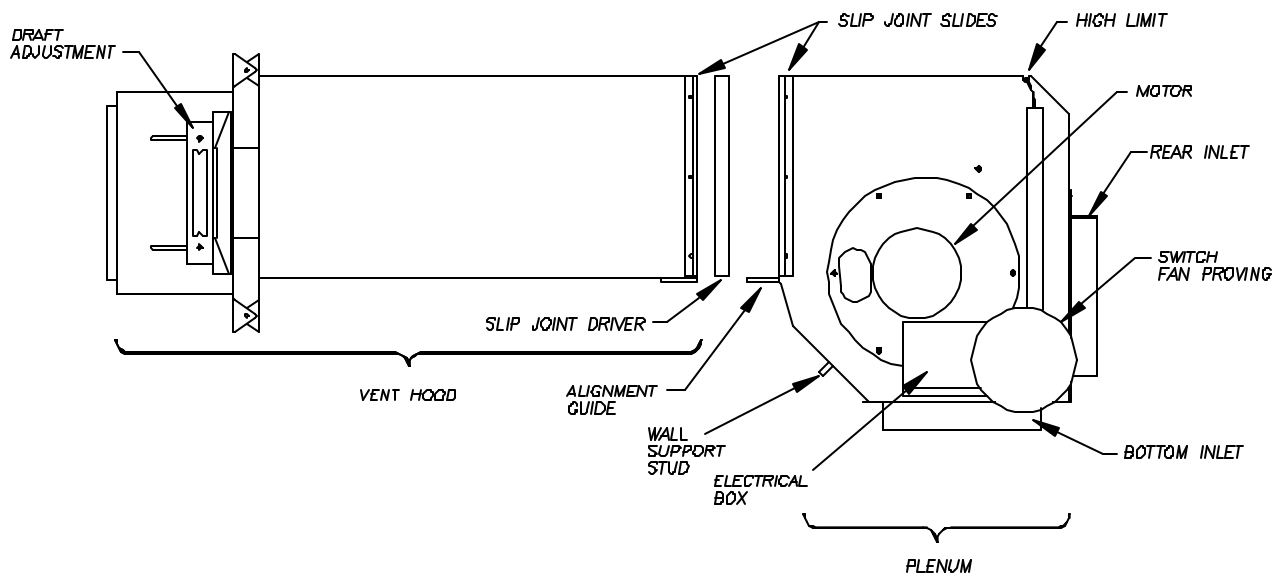
- a. This procedure should be performed prior to any attempt at modifications of the appliance or installation of the SideShot.
- b. If it is determined there is a condition which could result in unsafe operation, the appliance should be shut off and the owner advised of the unsafe condition.

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

1. Conduct a gas leakage test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.
2. Visually inspect the venting system and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. Shut off all gas to the appliance(s).
4. Inspect burners and crossovers for blockage and corrosion.
5. Applicable only to furnaces: Inspect heat exchanger for cracks, openings or excessive corrosion. Check both the limit control and fan control for proper operation.
6. 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.

* Excerpts from the National Fuel Gas Code (ANSI Z223.1/NFPA #54), Appendix H.

SIDESHOT TERMINOLOGY



PLENUM AND VENT HOOD CLEARANCE FROM COMBUSTIBLES

With an inlet flue gas temperature of 650°F or below, the SideShot 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

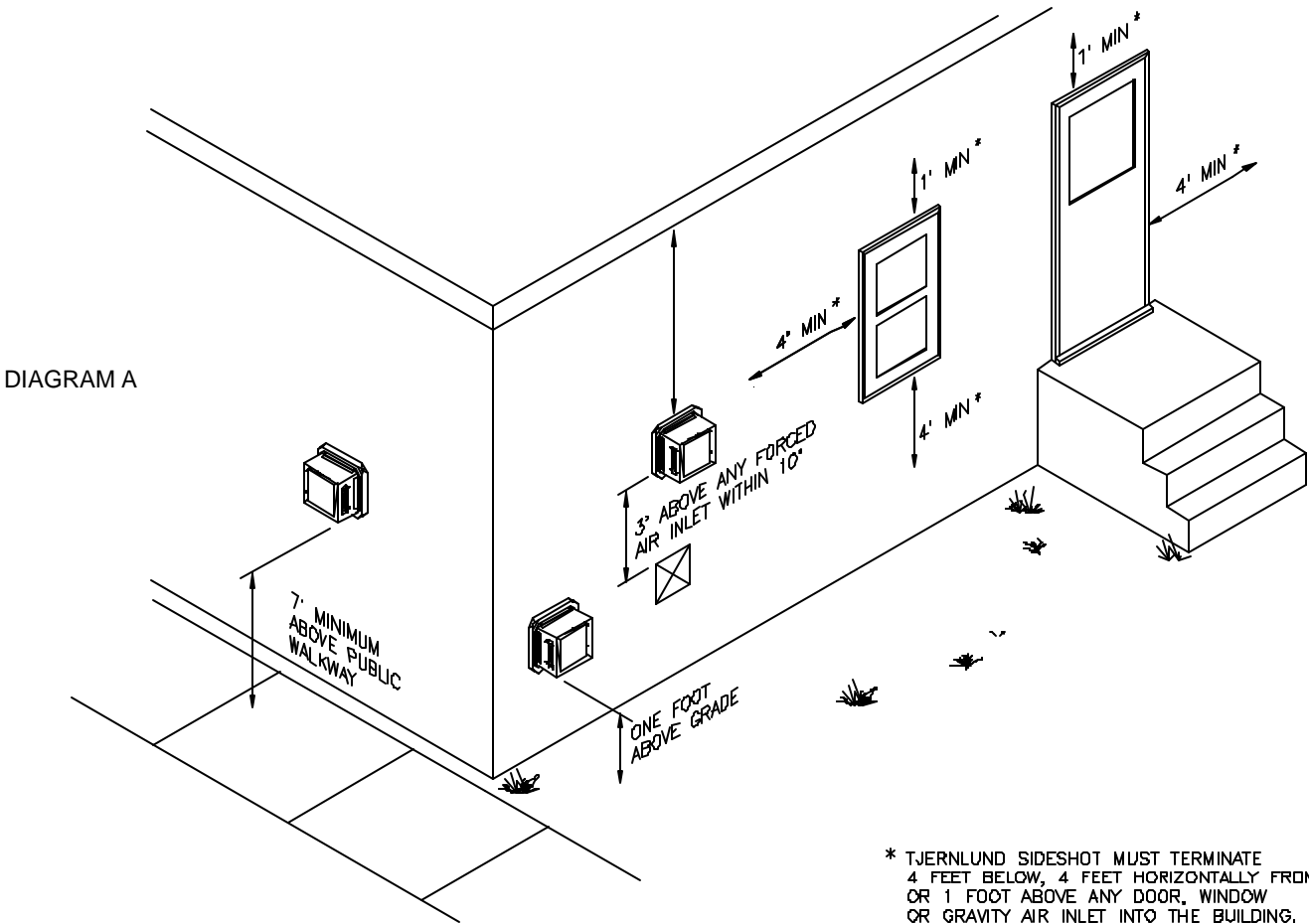
The SideShot has been ETL Listed according to the requirements of the National Fire Protection Association #31, #54 and #211 as follows, (See Diagram A, Page 5):

- 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.
- The exit terminal shall be so arranged that the flue gases are not directed so as to jeopardize people, overheat combustible structures or enter buildings.
- Not to be less than 10 feet from an adjacent building.

The SideShot 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 SideShot 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.



INSTALLATION

Tools required:

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

INSTALLING VENT HOOD TERMINUS

- a) Fold template A (Page 24) 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 SideShot is not being installed between floor joists, attach the template to the wall it will be exiting ensuring it is level.

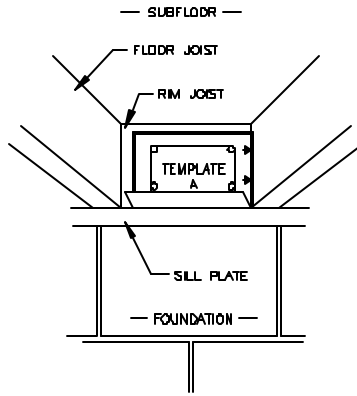


DIAGRAM B

RIM JOIST INSTALLATION

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).

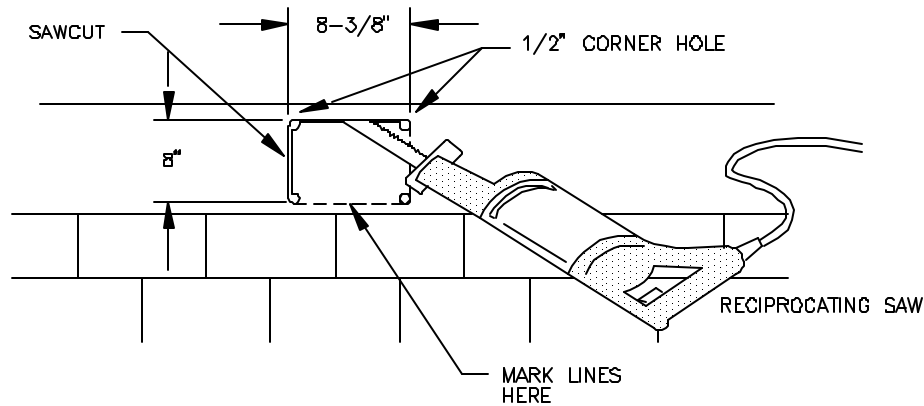


DIAGRAM C

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).

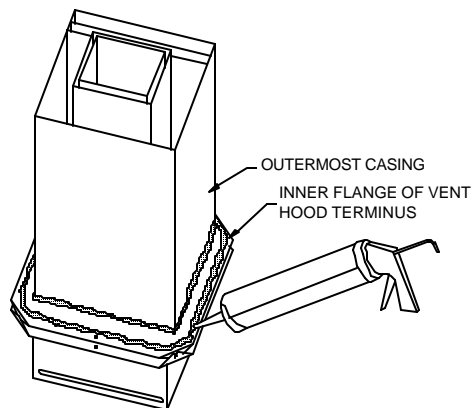
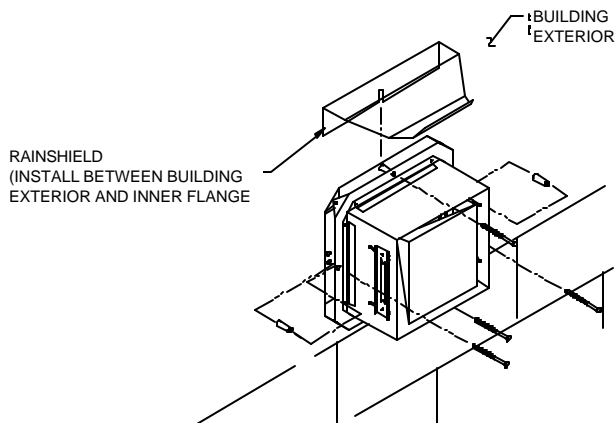


DIAGRAM D

- 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.

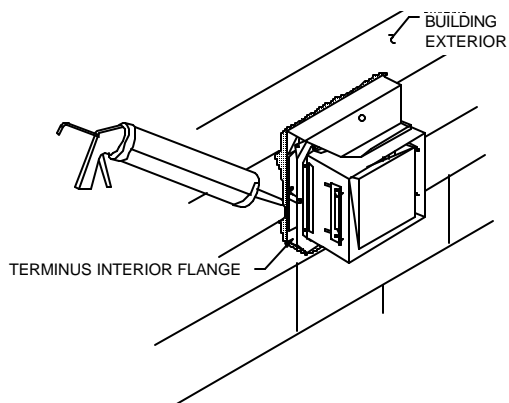
DIAGRAM E



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

- After the SideShot 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

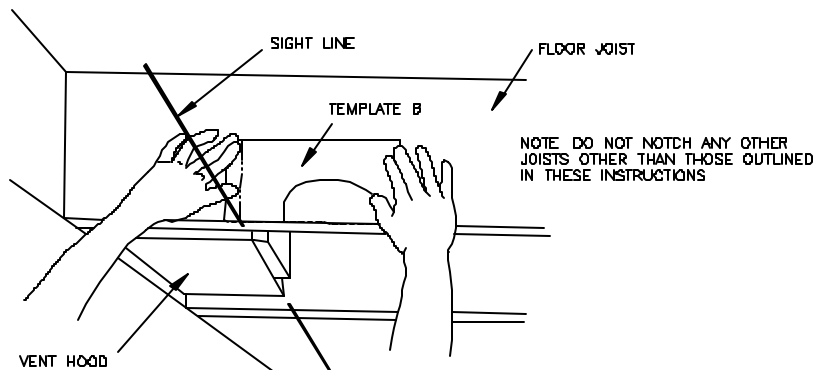


INSTALLING PLENUM

Depending on building construction, it may be necessary to notch out a section of the floor joist to provide proper clearance for the SideShot motor.

- Attach Template B (Page 23) 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.
- Cut out notch on line shown on the template.

DIAGRAM G

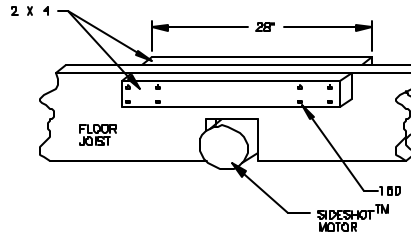


NOTCH BRACING

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 SideShot. Place both slip joint drivers in your pocket before continuing.

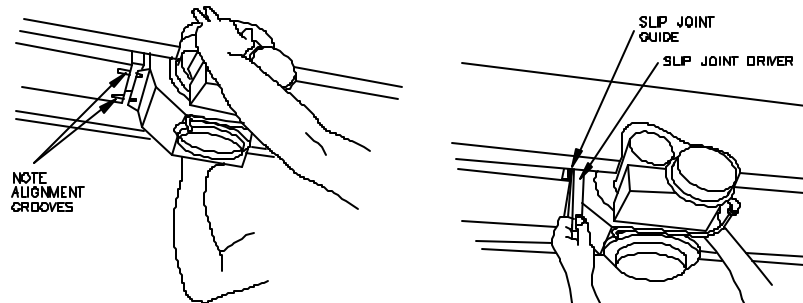
WARNING

Minimum clearances from the Plenum to any combustible materials must be maintained as listed on page 4.

Note: Blower - Motor/Wheel assembly can be removed to make Plenum section lighter & easier to install. Refer to Removal and Replacement of Motor/Wheel Assembly, Page 21.

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).
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 joint drivers past embossing.

DIAGRAM I



INSTALLATION OF WALL SUPPORT BRACKET

1. To prevent damage to the SideShot, temporarily support the bottom of the plenum (prop on ladder top) 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).

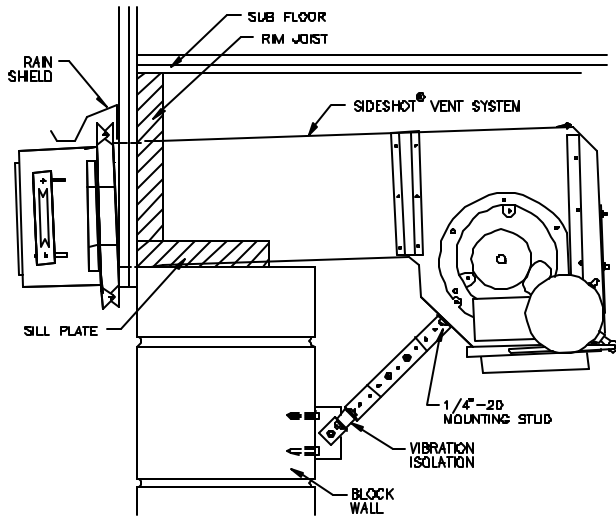
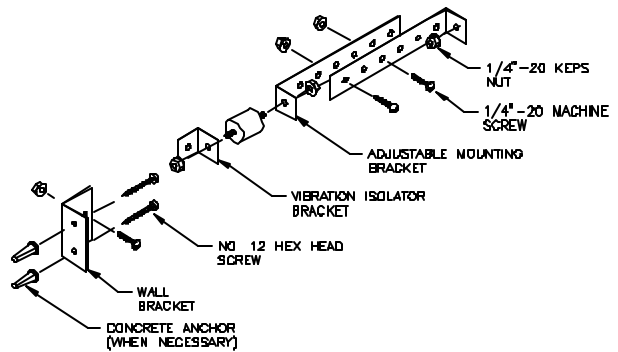


DIAGRAM J



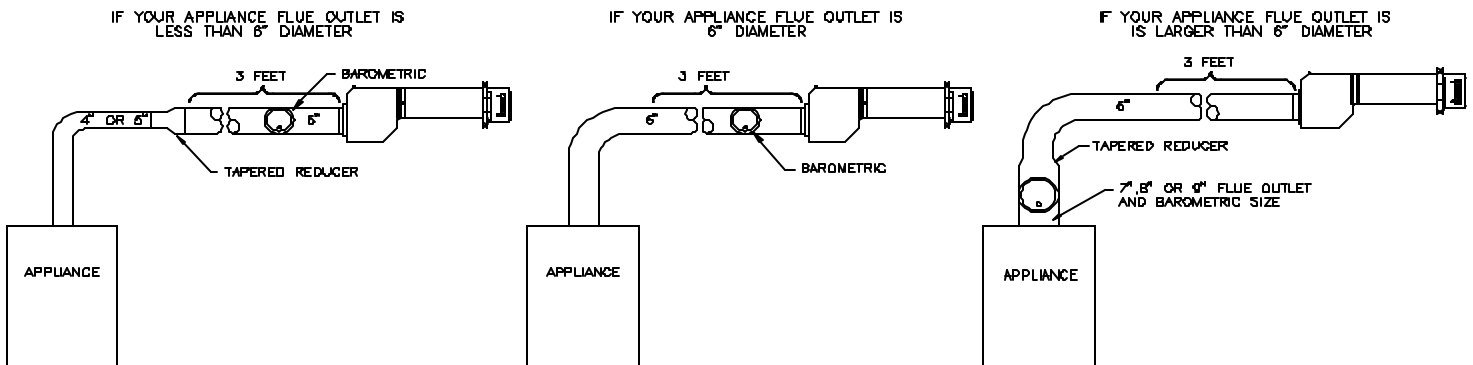
INSTALLATION OF VENT PIPE

If installing the SideShot Vent System on an oil or gas appliance which is not equipped with a draft hood or draft diverter, a barometric draft control must be used. Install the barometric draft control as shown, (See Diagram K). The SideShot Vent System is designed to accept all brands of 6" single wall, Type "B", Class "A" or Type "L" vent pipe. 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 which inlet of the SideShot Vent System will allow for the least amount of elbows to the appliance. **DO NOT USE BOTH INLETS.** Calculate the equivalent vent pipe footage from the appliance to the SideShot Vent System by adding the straight vent pipe length and the equivalent elbow lengths together. Each 90 degree elbow is equal to 10 feet of straight vent pipe, each 45 degree elbow is equal to 5 feet of straight pipe. The equivalent vent pipe length must not exceed 50 feet from the appliance to the SideShot Vent System. Vent runs of over 15 linear feet should use an approved, insulated vent connector to prevent problems related to sulfur condensation. It is not necessary to maintain a 1/4" rise per every foot of horizontal when Side Wall Venting.

The SideShot Vent System is shipped from the factory with the plug connected to the rear and the vent pipe inlet collar connected to the bottom. If using the bottom inlet, skip to the section entitled "Vent Pipe Clamp Assembly". If your 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.

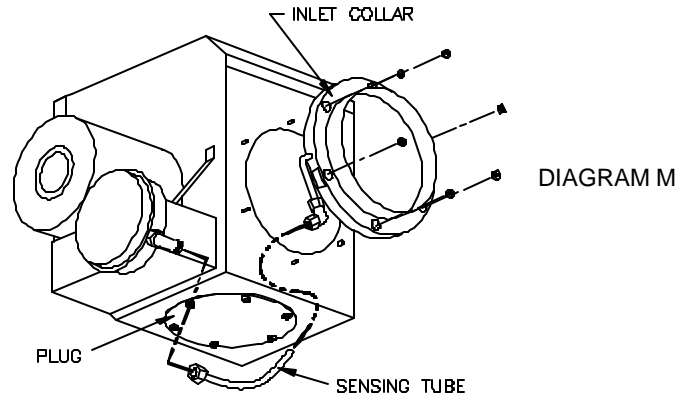
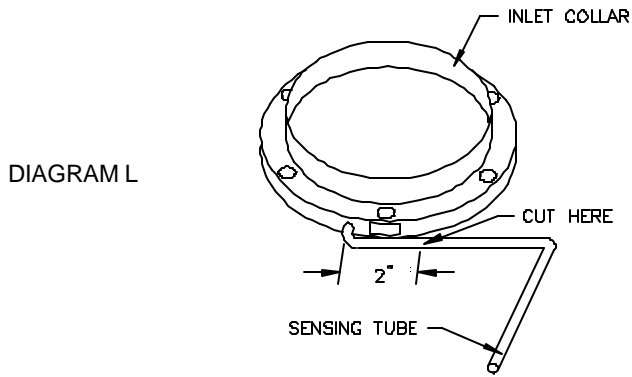
DIAGRAM K



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. Keep the nuts for later use.

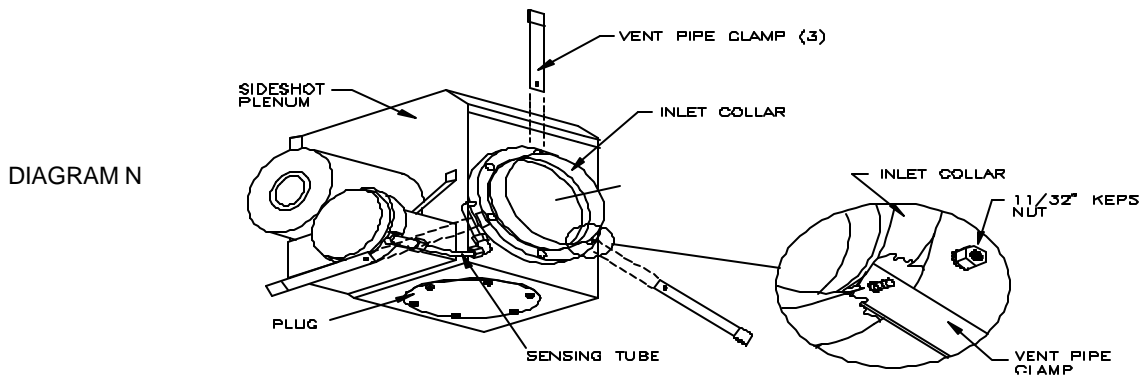
- Using a tube cutter, cut the sensing tube 2" from the elbow directed at the vent pipe inlet collar, (See Diagram L). Discard the cut off section of metal tube.
- Attach the vent pipe inlet collar to the rear inlet port making sure that the sensing tube is orientated as shown, (See Diagram M).
NOTE: Alignment marks on the inlet collar and plenum casing must match.



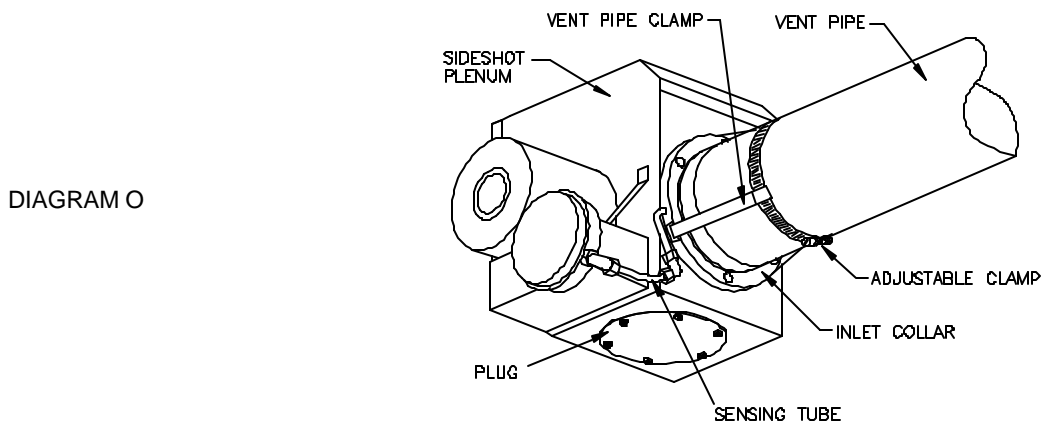
- Attach 90° compression fitting to the short tube on the inlet collar.
- Using the "soft" aluminum tubing, connect the Fan Proving Switch to the inlet collar. Take care not to crimp the tubing.
- Install the plug removed in step 1 over the bottom inlet port, tightening securely.

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.
- 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 SideShot.
- Tighten the adjustable clamp around the vent pipe, (See Diagram O).



WARNING

All wiring from the SideShot 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

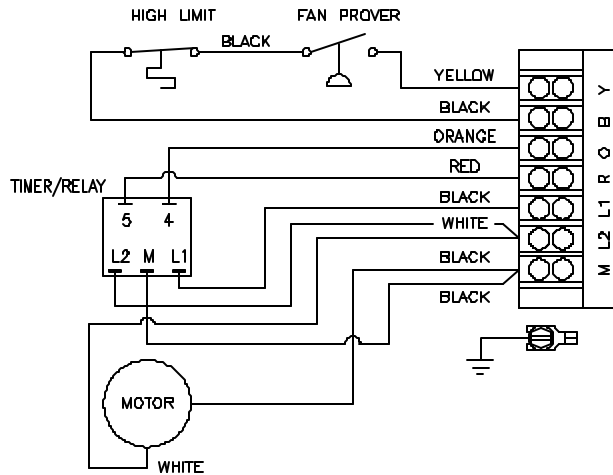
The Fan Proving Switch and High Limit are not suitable for loads which exceed the above limits.

SEQUENCE OF OPERATION WITH SIDESHOT MODEL SS1 INSTALLED ON OIL FIRED APPLIANCES:

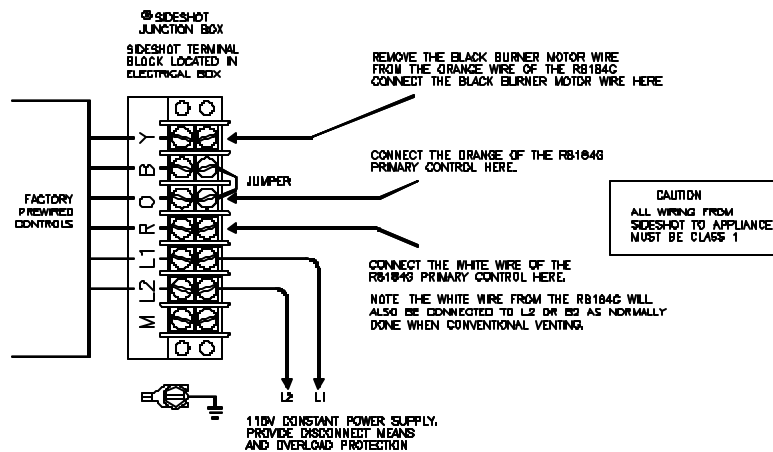
Control signal from thermostat, aquastat or primary control is intercepted and routed to terminal "O" on SideShot terminal strip. When terminal "O" is energized with either 24 VAC or 120 VAC, the SS1 Relay/Timer receives current and SS1 motor is energized. After draft is established within the SS1, the 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.

SIDESHOT FACTORY WIRING

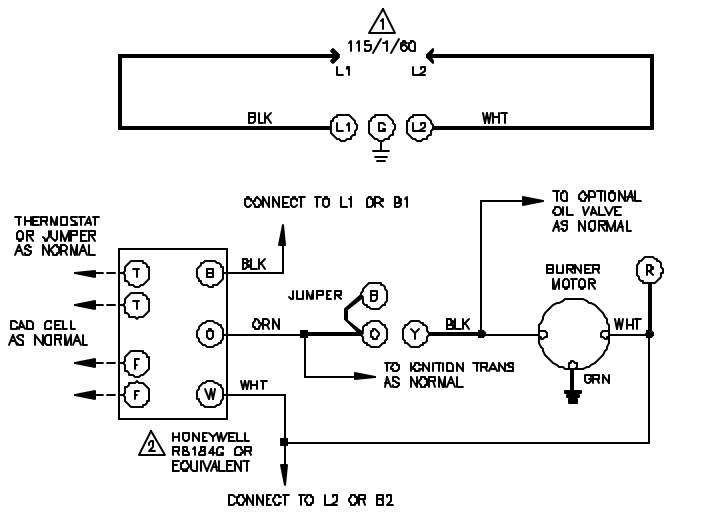


TYPICAL OIL FIELD WIRING

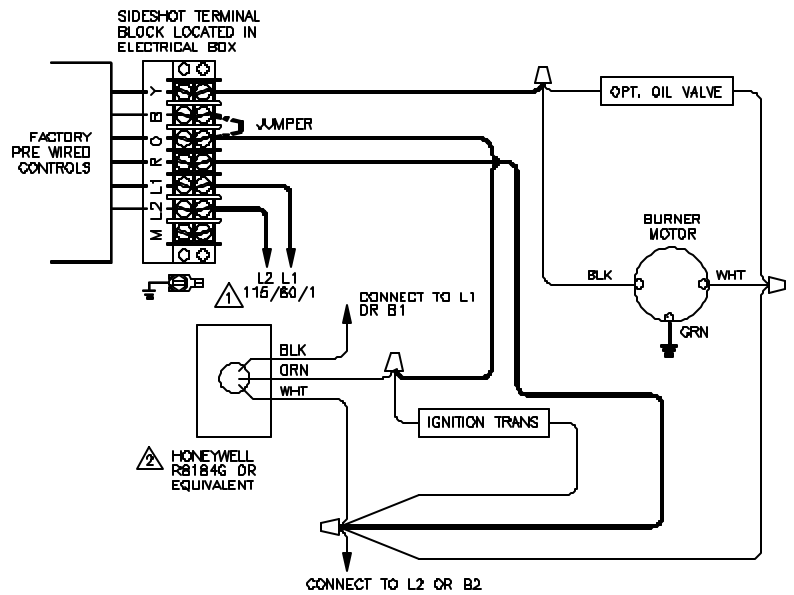


SIDESHOT CONNECTED TO AN R8184G WITH THE APPLIANCE BURNER MOTOR LESS THAN 6.2 AMPS @ 120 VAC

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 FIELD
 - DENOTES LINE VOLTAGE BY TJERNLUND

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

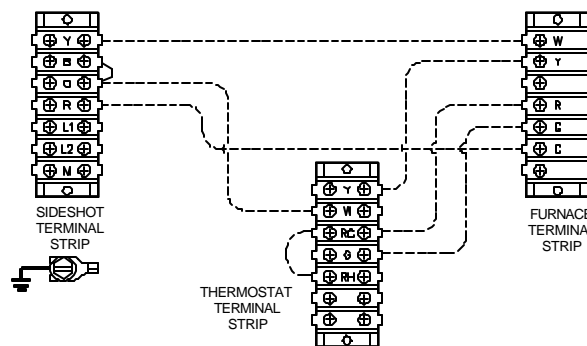
- LEGEND**
- DENOTES WIRE NUT
 - DENOTES LINE VOLTAGE BY APPLIANCE MANUF
 - DENOTES LINE VOLTAGE BY TJERNLUND
 - DENOTES LINE VOLTAGE FIELD
- NOTES**
- POWER SUPPLY, PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION
 - SUPPLIED BY APPLIANCE MANUFACTURER

NOTES: When interlocking the SideShot 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.

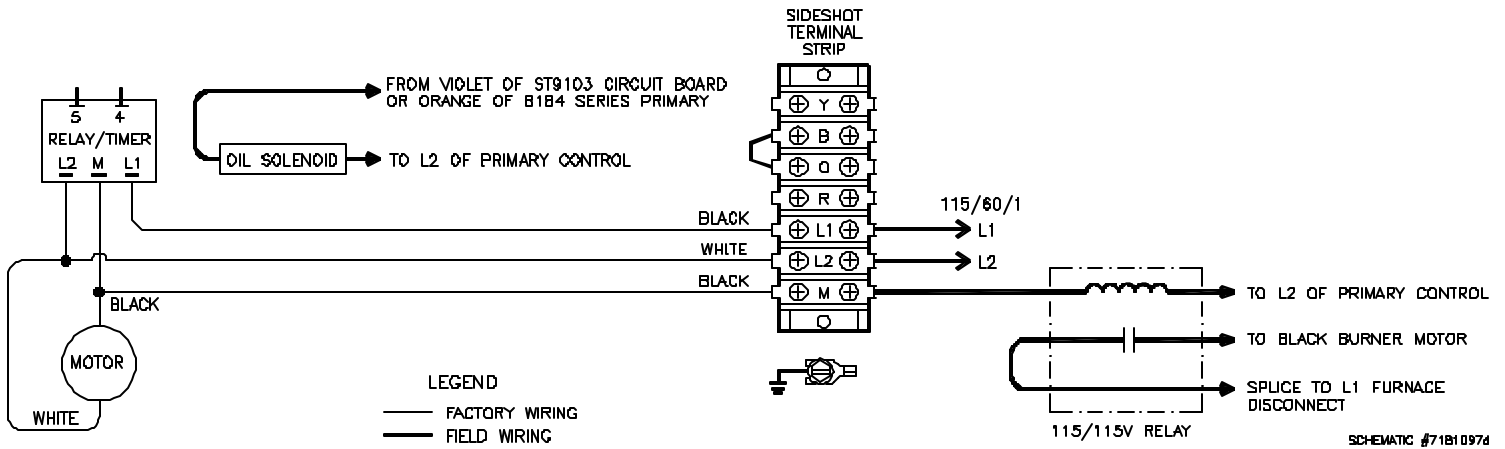
1. Separate the black burner motor wire from the Orange wire of the R8184G. NOTE: Do not separate ignition transformer wire or the optional oil valve wire from the Orange.
2. Connect the Black burner motor wire to terminal Y on the SideShot terminal strip.
3. Connect the Orange wire of the R8184G to the O terminal on the SideShot terminal strip.
4. Connect the White wire of the R8184G to the R terminal of the SideShot 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 SideShot terminal strip to L1.
 6. Connect the L2 terminal of the SideShot terminal strip to L2.
 7. Connect the Ground to grounding screw in SideShot electrical box.

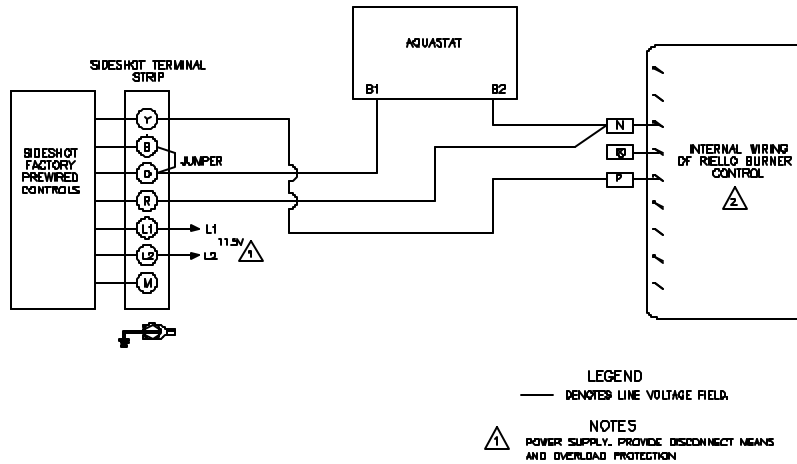
SIDESHOT CONNECTED TO A 24 VAC THERMOSTAT CIRCUIT



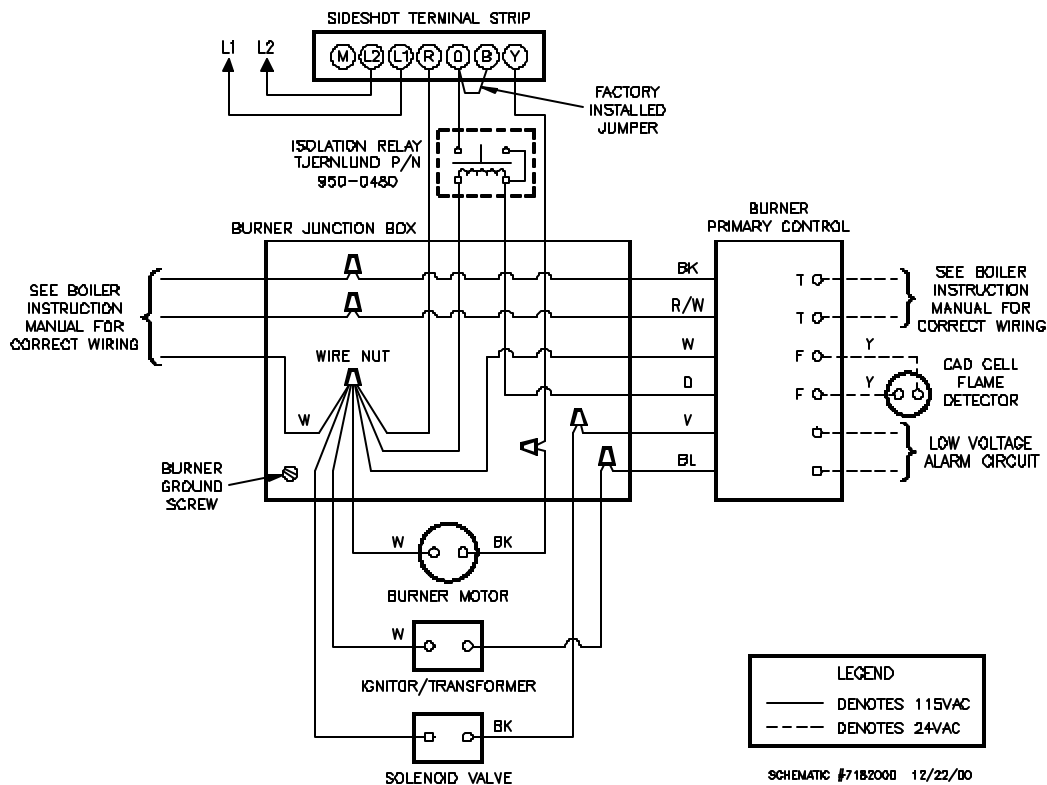
**SIDESHOT CONNECTED TO 24 VAC THERMOSTAT CIRCUIT WITH BURNER MOTOR POST PURGE (P/N 950-2043)
(USE IN CONJUNCTION WITH DIAGRAM ON BOTTOM OF PAGE 12)**



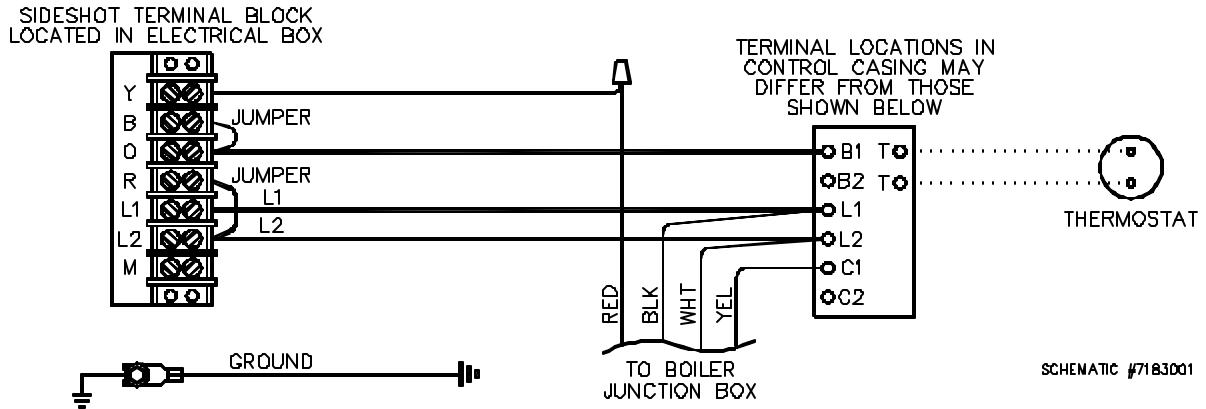
SIDESHOT CONNECTED TO A RIELLO BURNER



SIDESHOT CONNECTED TO A CARLIN CONTROL



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



LEGEND

- DENOTES WIRE NUT
- DENOTES FACTORY HIGH VOLTAGE WIRING
- DENOTES FIELD HIGH VOLTAGE WIRING
- DENOTES FIELD LOW VOLTAGE WIRING

NOTES:

1. INSTALLER MUST ADD JUMPER BETWEEN R AND L2 ON SIDESHOT TERMINAL STRIP.
2. "Y" IS ENERGIZED WHEN SIDESHOT PROVER CLOSES.
3. WIRE COLORS SHOWN MAY VARY BY MANUFACTURER.

ELECTRICAL WIRING GAS

WARNING

All wiring from the SideShot 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

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

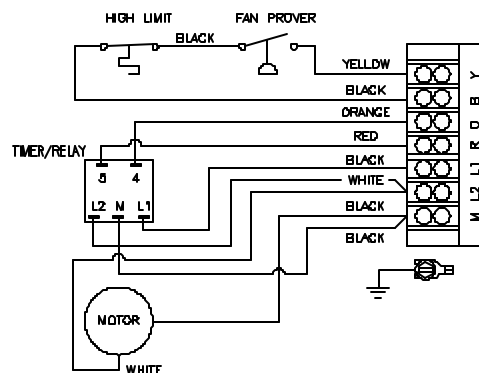
SEQUENCE OF OPERATION WITH THE SIDESHOT INSTALLED ON 24 VOLT CONTROLLED GAS APPLIANCES:

As the thermostat/aquastat senses a need for heat, the internal switch of the thermostat/aquastat will close. The switch closure sends current through the internal controls of appliance (e.g. high limit, low limit and all other safety controls the appliance is equipped with) and continues to the SideShot Relay/Timer and safety circuit. When the Relay/Timer receives current, the SideShot motor is energized. After draft is established within the SideShot, the Fan Proving Switch closes completing the circuit to the 24 volt gas valve. It is important to remember that the electrical interlock of the SideShot is always done at the final signal which would normally control the gas valve. All thermostats, zones, limits and circulators are to be wired as normally done on a chimney vented appliance.

All diagrams in this section show the same electrical connections. Follow the diagram which is most appropriate for your installation.

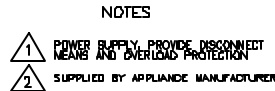
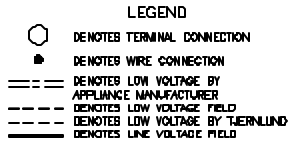
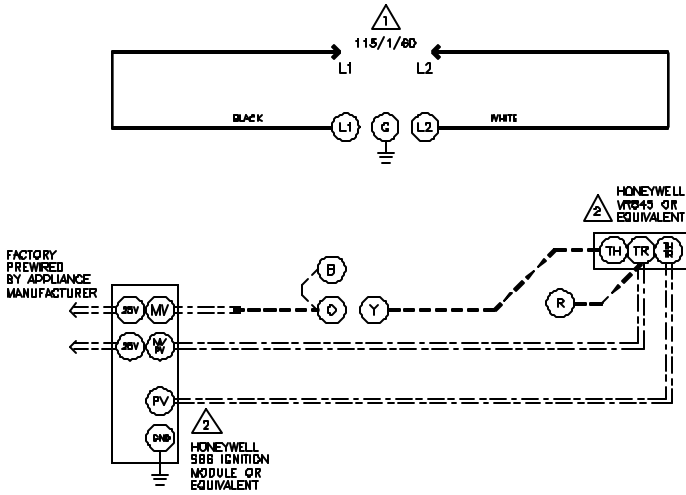
If your appliance gas valve is not labeled TH, TR as outlined in these diagrams, determine the "HOT" and "COM" terminals on the gas valve and follow the steps outlined on the bottom of Page 15.

SIDESHOT FACTORY WIRING

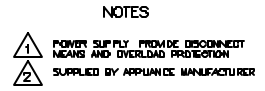
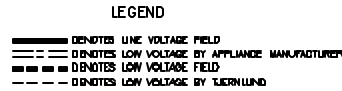
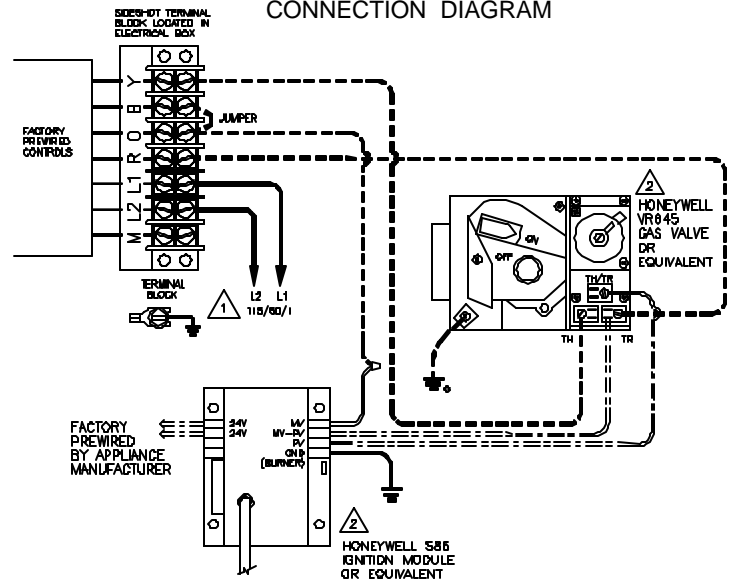


SIDESHOT CONNECTED TO A 24V FURNACE OR BOILER WITH INTERMITTENT IGNITION

LADDER DIAGRAM

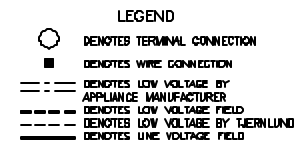
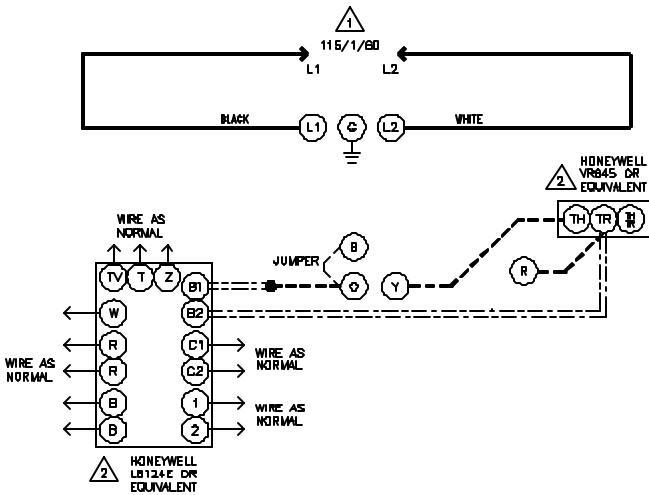


CONNECTION DIAGRAM

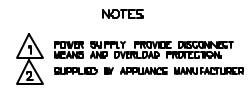
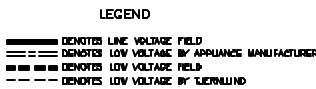
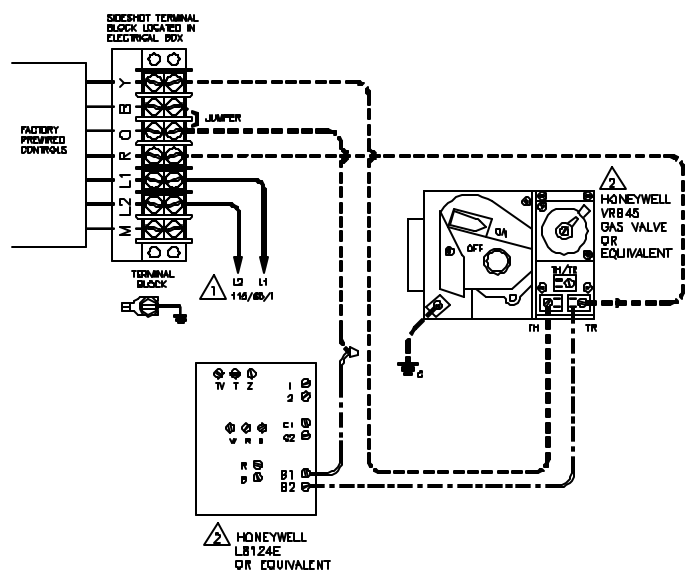


SIDESHOT CONNECTED TO A 24V BOILER WITH A STANDING PILOT

LADDER DIAGRAM



CONNECTION DIAGRAM



NOTES: The SideShot is always interlocked with the gas valve 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. Remove the wire that is factory installed to the TH (HOT) terminal of the 24V gas valve.
2. Connect the wire removed from the TH(HOT) terminal in step 1 to terminal O of the SideShot terminal strip.
3. Connect terminal Y of the SideShot terminal strip to the TH (HOT) terminal of the 24V gas valve.
4. Connect terminal R of the SideShot terminal strip to the TR(COM) terminal of the 24V gas valve. NOTE: Do not remove the factory installed wire from the TR(COM) terminal.
5. Connect terminal L1 of the SideShot terminal strip to L1.
6. Connect terminal L2 of the SideShot terminal strip to L2.
7. Connect the Ground to grounding screw in SideShot electrical box.

DRAFT ADJUSTMENT OIL

The SideShot 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 SideShot to operate at lowest capacity. Positioning the draft adjustment **outward** will cause the SideShot 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 on Page 17. We recommend that the 25 MPH category be used to allow for excursions beyond the 15 MPH average. It is not recommended for the SideShot 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 SideShot 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 disrupt the burner until the wind load drops below 25 MPH. 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 SideShot 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. In most cases, the over-fire draft should be in a range of -.02" to -.04" W.C. If adjustments to the primary air intake and barometric draft control do not provide the required over-fire draft, the SideShot draft adjustment must be repositioned, accordingly. Measure over-fire draft after repositioning SideShot draft adjustment.

DRAFT ADJUSTMENT GAS

The SideShot 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 SideShot to operate at lowest capacity. Positioning the draft adjustment **outward** will cause the SideShot 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 on Page 17. We recommend that the 25 MPH category be used to allow for excursions beyond the 15 MPH average. It is not recommended for the SideShot 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 SideShot 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 disrupt the burner until the wind load drops below 25 MPH. Wind loads 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 SideShot in operation. The appliance must be operated at its full input. Determine if there is any spillage of flue gas from the draft hood or draft diverter. Spillage can be detected by holding a taper or other smoke producing device adjacent to the draft hood or draft diverter and observing that the smoke **is not** being pulled into the draft hood or draft diverter. If flue gas spillage is detected move the SideShot draft adjustment outward to the next highest setting and recheck for flue gas spillage. Repeat as necessary until there is no flue gas spillage.

DRAFT ADJUSTMENT CHART

BTU/HR INPUT	FLAME RETENTION OIL BURNER		CONVENTIONAL OIL BURNER		GAS APPLIANCE	
	25 mph	40 mph	25 mph	40 mph	25 mph	40 mph
50,000	1	1	1	2	2	4
60,000	1	1	2	3	2	4
70,000	1	2	3	4	3	5
80,000	1	2	3	4	3	5
90,000	1	2	3	4	4	6
100,000	1	2	5	6	4	6
110,000	2	3	5	6	5	7
120,000	2	3	5	6	5	7
130,000	2	3	5	6	6	8
140,000	2	3	6	8	6	8
150,000	3	4	6	8	6	8
160,000	3	4	6	8	6	8
170,000	3	4	6	8	—	—
180,000	3	4	6	8	—	—
190,000	4	5	—	—	—	—
200,000	4	5	—	—	—	—
210,000	4	5	—	—	—	—
220,000	4	5	—	—	—	—

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.

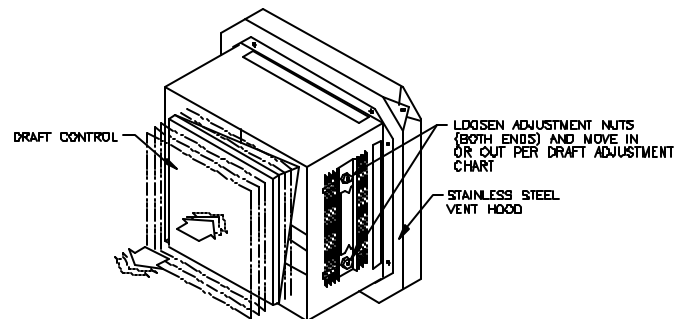
BTU/HR input ratings assume 30% or less excess air for flame retention burners and 50% to 100% excess air for conventional oil burners.

⚠ WARNING

Do not exceed the recommended BTU/HR input range of the SideShot.

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 SideShot 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 SideShot, 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 SideShot Vent System on SideShot/Appliance off cycle.

SYSTEM OPERATION CHECK-OUT

1. Adjust thermostat or appliance controls to call for heat.
2. Verify that the SideShot operates first, prior to burner ignition.
Allow heating equipment and SideShot 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 SideShot 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 or equipment controls to the "off" position. Verify that the post-purge timer operates the SideShot for several minutes while burner is not firing before the SideShot turns off. Post-purge adjustment is made by turning the small slotted screw. Counter clockwise will increase delay, clockwise will decrease delay. Overturning adjustment screw will damage 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 SideShot 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 Timer/Relay counter-clockwise to accomplish a longer post purge. Over turning adjustment screw will damage timer.

Draft Adjustment: The SideShot Draft Adjustment, located outdoors on the Vent Hood, has two functions: A) It allows the installer to fine-tune the amount of draft that the SideShot must develop to vent the specific appliance, and B) 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 SideShot 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 17 . 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, pages 16 and 17.

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.

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 SideShot. 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.

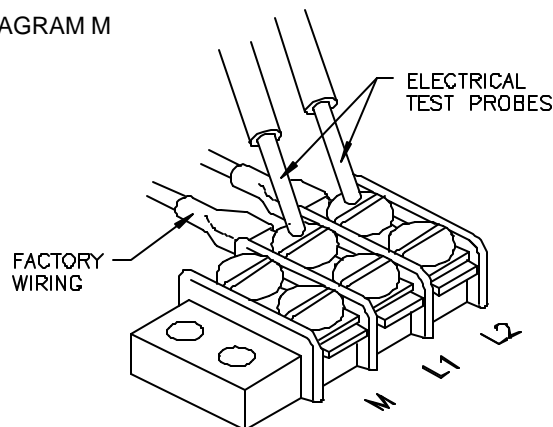
TROUBLESHOOTING ELECTRICAL PROBLEMS

WARNING

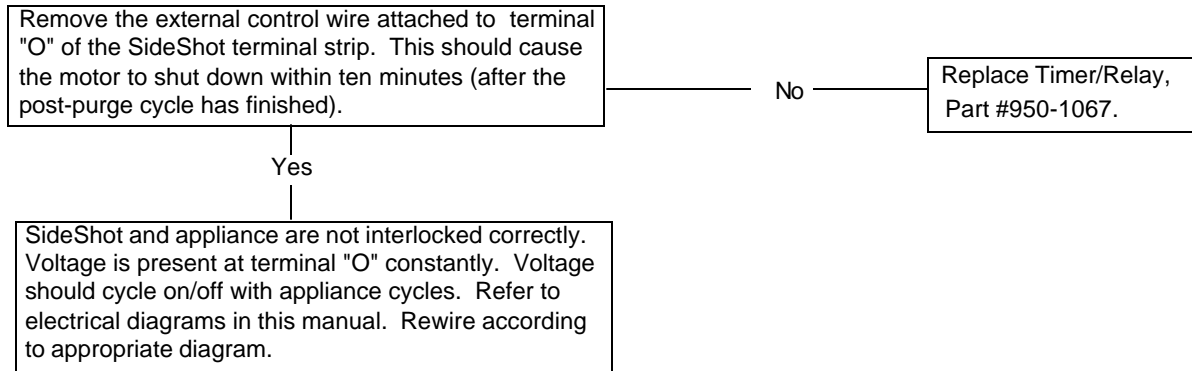
The following guide is intended to be used if a problem occurs during the use of the SideShot side wall vent system. At several steps throughout the guide you will be required to measure 115 Volts with a voltmeter, (See Diagram M).

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.

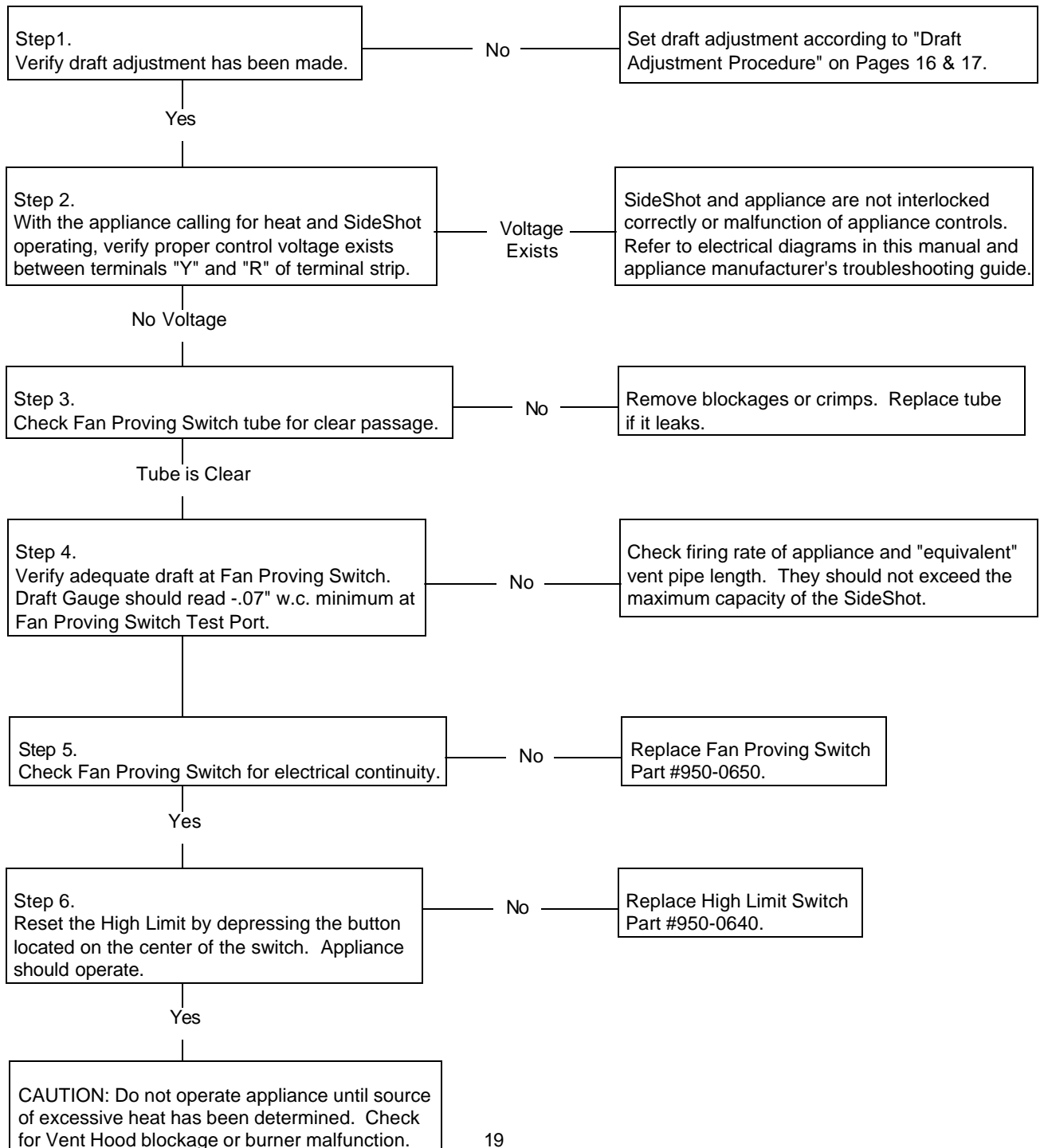
DIAGRAM M



SYMPTOM 1: SIDESHOT MOTOR RUNS CONTINUOUSLY



SYMPTOM 2: APPLIANCE WILL NOT OPERATE, BUT SIDESHOT DOES



SYMPTOM 3: SIDESHOT MOTOR WILL NOT OPERATE

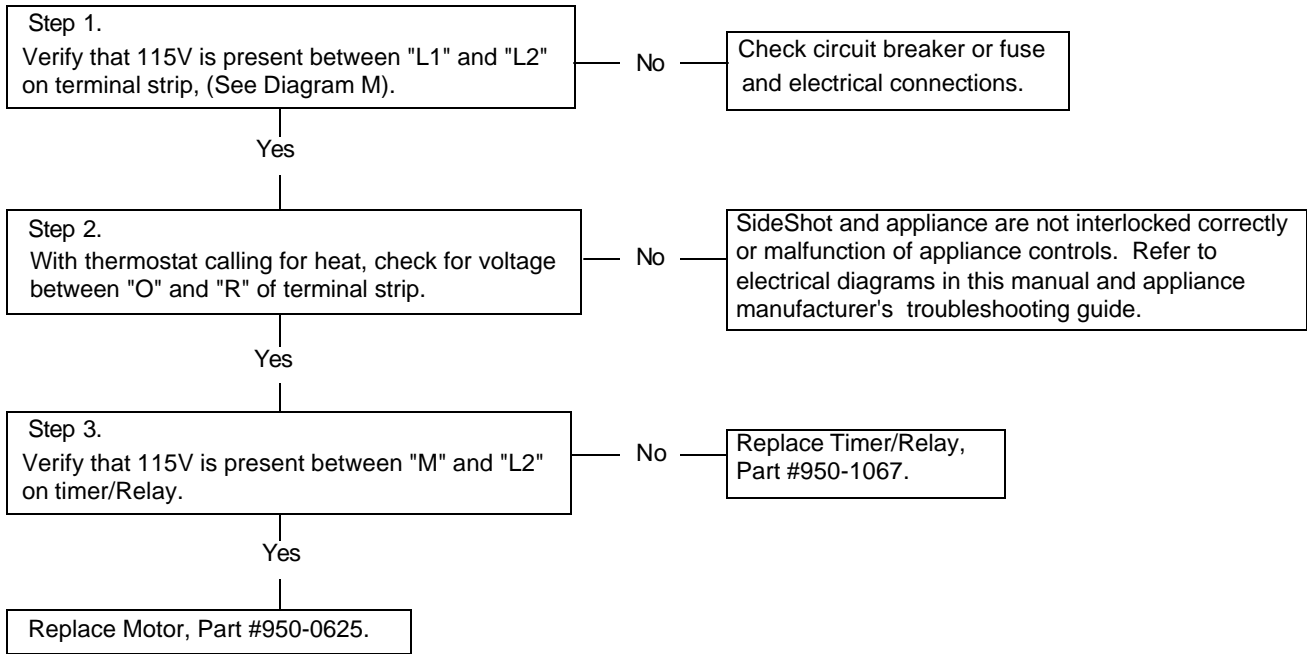
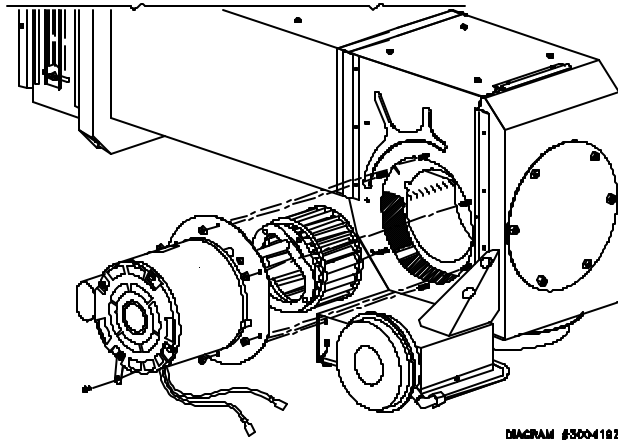


DIAGRAM N



WHEEL INSPECTION (DIAGRAM N)

1. The SideShot 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 N)

⚠ WARNING

Disconnect power supply to the SideShot and heating equipment when servicing the SideShot. 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 SideShot 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 N)

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

The SideShot motor is permanently lubricated and requires no oiling.

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 SideShot 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.

COVERED PARTS

<u>Component</u>	<u>Part Number</u>
Motor	950-0625
Proving Switch	950-0650
Timer/Relay	950-1067
Wheel	950-0635
High Limit Switch	950-0640

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 • Email fanmail@tjfans.com.