



# TJERNLUND PRODUCTS, INC.

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Visit our web site • www.tjernlund.com

## IMPORTANT!!! UC1 BOARD VERSION X.06 UPDATES

### NEW X.06 VERSION UC1 BOARD FEATURES

**IMPORTANT:** This upgraded circuit board features:

**A new #6 power LED**

Constant red when 115 VAC is supplied to L & N.

**A new color for the #2 LED**

Constant blue when fan prover safety circuit is closed.

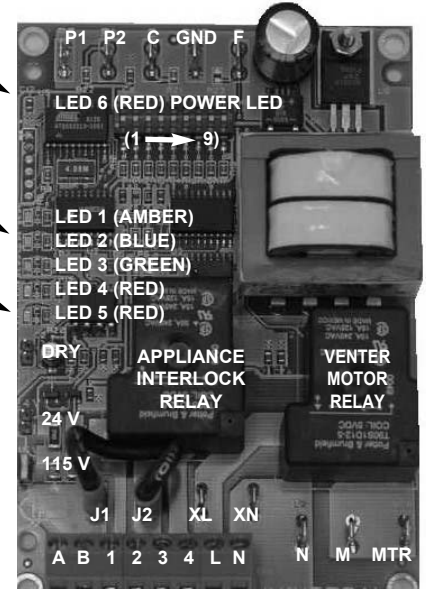
**A revised #5 LED**

With no call for heat present, flashes 3 seconds on / 3 seconds off if microcontroller is working properly.

New LED # 6 RED  
115V power supplied  
to UC1 L & N terminals

LED # 2 now BLUE  
(previously GREEN)

LED # 5 RED With no  
call for heat, flashes 3  
seconds on / 3 seconds  
off if microcontroller is  
working properly.



**IMPORTANT:**

**For 950-8804 UC1 Replacement Board Kits:** If this is a 950-8804 UC1 board kit and you are replacing an existing UC1 board with this new board, note Dip Switch settings on existing UC1 circuit board so that those same settings can be positioned on this replacement circuit board. **NOTE:** Adhere appropriate included label over existing label in UC1 or SideShot electrical box. Also adhere "Checking Memory for Last Fault Code" sticker on inside of UC1 or SideShot SS1 Series electrical box. On SS2 Series adhere to underside of electrical box.

**For SideShot Series SS1 Models:** The Pre-Cycle Prover Status Check is deactivated from the factory on the SS1 Series. Because of the low set point of the SS1 Fan Prover (as low as .03" w.c.) cross winds may cause the Fan Prover to close prior to a call for heat. Activating the Prover Status Check on the SS1 may cause nuisance lockouts. **Important:** Deactivate the Pre-Cycle Prover status check if installing this board on a new or existing SS1 installation by pushing the #9 dip switch up or "ON" to disable.

**For Draft Inducers with the UC1:** Natural draft or winds may be sufficient to close the fan prover switch contacts prior to a call for heat when using the PS1505 fan prover with a draft inducer. Keeping the Pre-Cycle Prover Status Check activated may cause nuisance lockouts. **Important:** Deactivate the Pre-Cycle Prover status check if installing this board on a new or existing draft inducer installation by pushing the #9 dip switch up or "ON" to disable.

### LED INDICATOR LIGHTS

- LED #1 (Amber) Appliance call for heat.
- LED #2 (Blue) Safety circuit through P1 & P2 (Venter Fan Prover and/or High Limit). Indicates Venter prover is closed during run cycle. Burner circuit is energized with Interlock Relay contact closure from terminal 3 to 4.
- LED #3 (Green) Power switched to Venter motor from L to MTR & M.
- LED #4 (Red) Status / Fault indicator.
- LED #5 (Red) Used as a status indicator.
- LED #6 (Red) 115 VAC power supplied to board.

## LED STATUS INDICATORS

LED #4 & #5 (Red) Flashing Alternately	= Venter in Pre-purge. (Pre-Purge options 0, 5, 20, 35 seconds)
LED #4 & #5 (Red) Flashing in Unison	= Venter in Post-Purge. (Post-Purge options 0, 30 seconds or 1, 2, 4, 8, 16 minutes)
LED #4 Flashes Continuously*	= Fan Prover opened for more than 10 seconds during burner cycle. (Venter will run for 10 minutes, attempting to make Fan Prover)
LED #5 (Red) Flashing Intermittently	= With no call for heat, flashes 3 seconds on / 3 seconds off if microcontroller is working properly.

## LED FAULT INDICATORS

Fault conditions are indicated by counting the number of times LED #4 (Red) flashes.

LED #4 Flashes 2 Times	Fan Prover was in electrically closed position prior to venter operation.
LED #4 Flashes 3 Times*	Fan Prover does not close within 60 seconds after call for heat.
LED #4 Flashes 4 Times*	Fan Prover did not re-close after 10 minutes of Venter operation.
LED #4 Flashes 5 Times*	Fan Prover opened for more than 10 seconds during burner cycle but closed within 10 minutes.

\* Investigate cause of Fan Prover short cycling such as; Firing burner at capacities or temperatures exceeding Venter limits, excessive vent pipe runs, elbows directly on venter discharge, high winds, plugged / kinked Fan Prover sensing tube or a faulty Fan Prover switch. In-Forcer model's intake screen and prefilter, if applicable, should be cleaned if necessary.

**IMPORTANT:** Fault codes will automatically be displayed after a fault condition occurs. If the call for heat interlock signal or 115 VAC power is removed, the UC1 board will reset and the fault will be stored in memory instead of displayed. Any new fault will replace any previous fault.

## CHECKING MEMORY FOR LAST FAULT CODE

**IMPORTANT:** Prior to accessing the fault code memory, note the settings of the dip switches so that they can be returned to their original Pre / Post-Purge positions. When power is supplied to the UC1 use caution when moving dip switches.

The last fault code can be retrieved at any time by setting all dip switches 1-8 to the up, or "on" position. The last fault code, or lack there of, will be indicated by counting the number of times LED 4 flashes. By moving any of the dip switches back to their original position, the fault code will be cleared. **NOTE:** The UC1 board must have its 115 VAC power supply present when any of the (1-8) dip switches are moved back to their original position for the fault code to clear.



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**UC1 VERSION  
X.06**



**INCLUDES UC1  
UNIVERSAL CONTROL**

# 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:** Oil 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 "Oil Draft Adjustment Procedure" on page 15 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.**

Address all correspondence to:

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Call us toll free at 800-255-4208, visit our web site @ [www.tjernlund.com](http://www.tjernlund.com) or email us at [fanmail@tjfans.com](mailto:fanmail@tjfans.com).

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SS2 Vent Cabinet Mounting Template (INSERTED)

SideShot® is a registered trademark of Tjernlund Products, Inc. for their Models SS1 & SS2 Vent Systems.

## DESCRIPTION

The SS2 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 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 in post-purge mode to purge the heater and vent of residual flue gases. A factory post-purge time is set at 2 minutes and is adjustable up to 16 minutes, see "Pre / Post-purge Settings" on page 5. The SS2 features a safety system consisting of the integral UC1 Universal Control, 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 Oil Burners for oil installations.**

MODEL	FLAME RETENTION OIL BURNER	FAN ASSISTED NATURAL & LP GAS	ATMOSPHERIC NATURAL & LP GAS	MAX. EQUIV. FEET
SS2	70,000 - 168,000 BTU / hr.	40,000 - 150,000 BTU / hr.	40,000 - 125,000 BTU / hr.	50

Oil 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 "Oil Draft Adjustment Procedure" on page 15 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 -.40" W.C. on pressure drop.

**High Limit:** Manual reset N/C contacts, open at 170°F ± 8°F (77°C ± 5°C).

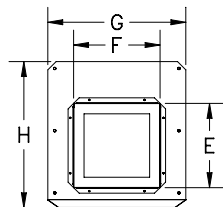
**UC1 Universal Control:** See UC1 Universal Control Board Features on page 4.

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

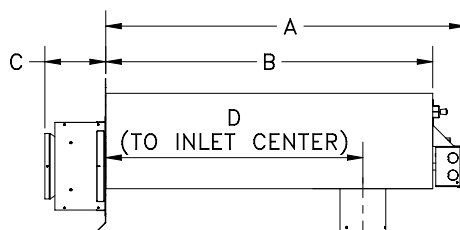
**Pre-Purge:** Options (0, 5, 20, 35 seconds); **Post-Purge:** Factory set at 2 minutes, Options (0, 30 seconds or 1, 2, 4, 8, 16 minutes).  
See page 5 for Pre / Post-purge options.

A	B	C	D	E	F	G	H	I	J
32 1/2"	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"

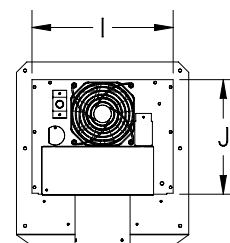
Rough-In  
8 1/2" J  
10 1/2" I



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

- The SS2 may only be installed on flame retention head oil burners for oil installations.
- The SS2 may not be installed on condensing type or solid fuel burning appliances, incinerators or incinerating toilets.
- Oil installations must have a barometric draft control. The SS2 may only be installed on gas appliances equipped with a draft hood, draft diverter or barometric draft control.
- The SS2 may not be connected to a natural draft chimney.
- The SS2 shall not be installed where flue gas temperatures exceed 650°F (343°C) at its inlet. Flue gas temperature verification:
  - A) On oil fuel, verify flue gas temperature at appliance inlet is at or above 250°F (121°C) after 5 minutes of operation during setup. See "Oil Draft Adjustment Procedure" on page 16, step 9.

**AND**

- B) After 15 minutes of operation, measure flue gas temperature to verify it is not more than 650°F (343°C) at SS2 inlet.
- 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 pages 15, 16 again.

## CAUTIONS

### WARNING

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, #54, #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).

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.

1. The installer must verify that the BTU/hr. input of the appliance does not exceed the recommended input of the SS2. See "Application Table" on page 1 of these instructions for maximum input capacities.
2. 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. LED #6 (RED) should be off with power removed.
3. Plan the vent layout so that the code required clearances are maintained from plumbing, wiring and combustible materials.
4. Flue gas temperatures must not exceed 650°F (343°C) at SS2 inlet. Ambient temperature must not exceed 104°F (40°C).
5. Oil fuel flue gas temperature at vent system inlet must be at least 250°F (121°C) during appliance steady state.
6. 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.
7. "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 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.

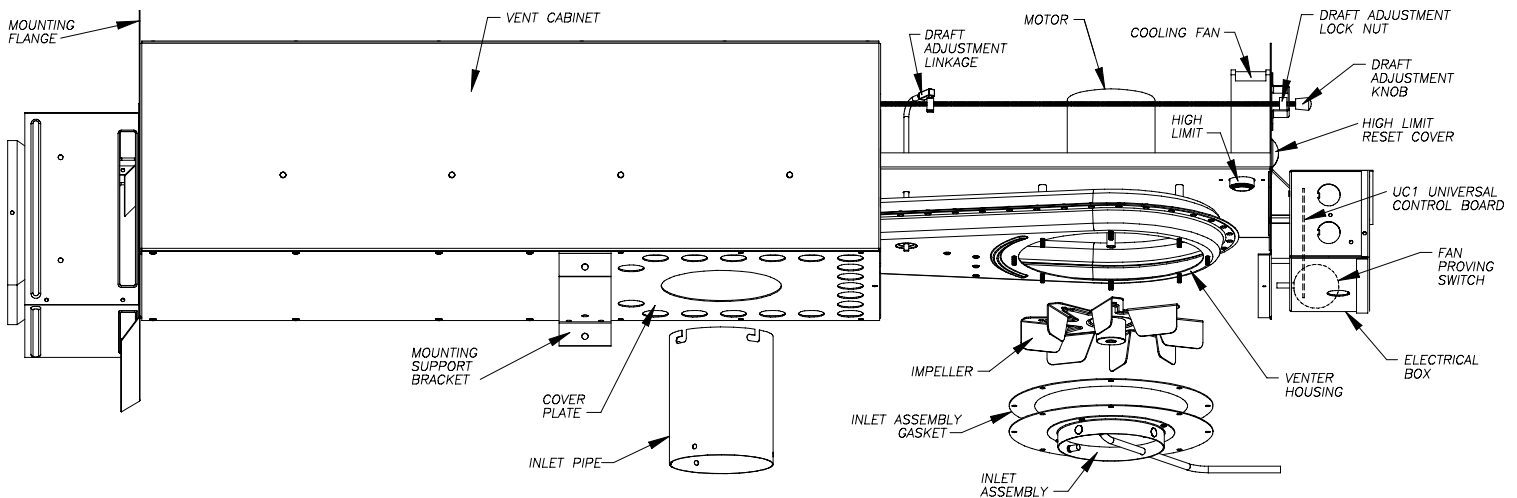
- a. This procedure should be performed prior to any attempt at modifications of the appliance or installation of the SS2.
- b. If it is determined there is a condition which could result in an unsafe operation, the appliance should be shut off and the owner advised of the unsafe condition.

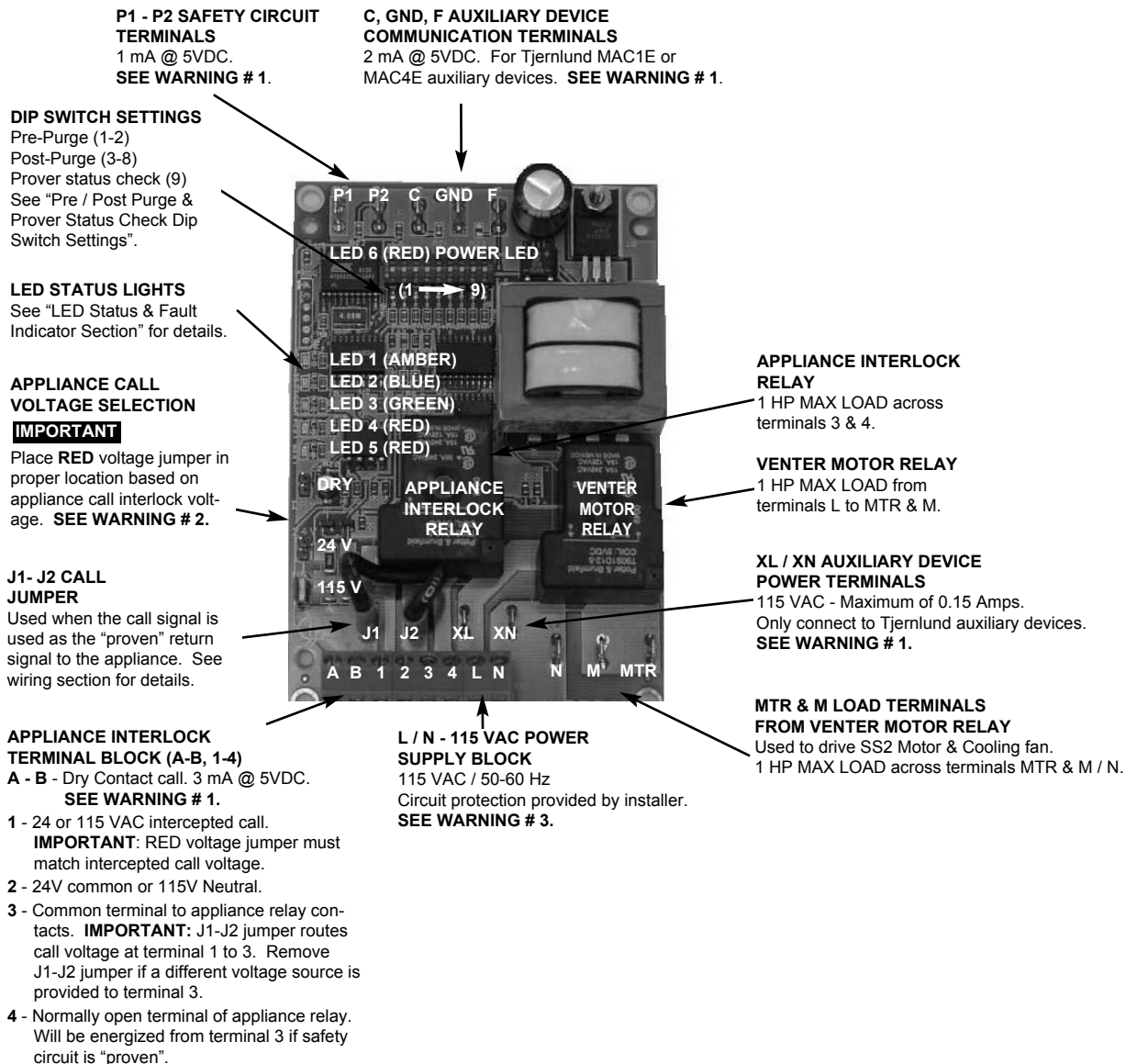
The following steps should be followed in making the safety inspection:

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.
- 2a. Oil Installations: Inspect burner and primary control for proper operation.
- 2b. Gas Installations: Conduct a gas leakage test of the appliance piping and control system downstream of the shutoff valve in the supply line to the appliance.  
Inspect burners and cross overs for blockage and corrosion.
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.

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

### SIDESHOT® MODEL SS2 TERMINOLOGY





**WARNING**

- # 1. Power supplied by board. Do not supply power to this area or control damage may result.
- # 2. Do not supply power to the appliance interlock block with the call selector in the "DRY" position. Control damage may result if power is supplied.
- # 3. Circuit protection must be provided by the installer. 16 Amps is the maximum current allowed for this device at terminal L. A 15 Amp circuit breaker is recommended.

**LED STATUS & FAULT INDICATORS**

**LED INDICATOR LIGHTS**

- LED #1 (Amber) Appliance call for heat.
- LED #2 (Blue) Safety circuit through P1 & P2 (SS2 Limit & Fan Prover). Indicates SS2 Limit & Prover are closed during run cycle. Burner circuit is energized with Interlock Relay contact closure from terminal 3 to 4.
- LED #3 (Green) Power switched to SS2 motor & Cooling Fan from L to MTR & M.
- LED #4 (Red) Status / Fault indicator.
- LED #5 (Red) Used as a status indicator.
- LED #6 (Red) 115 VAC power supplied to board.

**LED STATUS INDICATORS**

- LED #4 & #5 (Red) Flashing Alternately = Venter in Pre-purge. (Pre-Purge options 0, 5, 20, 35 seconds)
- LED #4 & #5 (Red) Flashing in Unison = Venter in Post-Purge. (Post-Purge options 0, 30 seconds or 1, 2, 4, 8, 16 minutes)
- LED #4 Flashing Continuously\* = Fan Prover opened for more than 10 seconds during burner cycle. (Venter will run for 10 minutes, attempting to make Fan Prover)
- LED #5 (Red) Flashing Intermittently = With no call for heat, flashes 3 seconds on / 3 seconds off if microcontroller is working properly.

**LED FAULT INDICATORS**

Fault conditions are indicated by counting the number of times LED #4 (Red) flashes.

- LED #4 Flashes 2 Times                      Fan Prover was in electrically closed position prior to venter operation.
- LED #4 Flashes 3 Times\*                   Fan Prover does not close within 60 seconds after call for heat.
- LED #4 Flashes 4 Times\*                   Fan Prover did not re-close after 10 minutes of Venter operation.
- LED #4 Flashes 5 Times\*                   Fan Prover opened for more than 10 seconds during burner cycle but closed within 10 minutes.

\* Investigate causes of Fan Prover not making, i.e.; Firing burner at capacities or temps exceeding Venter limits, excessive vent pipe runs, high winds, plugged / kinked Fan Prover sensing tube or faulty Fan Prover. Reset SS2 High Limit. If Limit was tripped and SS2 fires, investigate cause of high heat.

**IMPORTANT:** Fault codes will automatically be displayed after a fault condition occurs. If the call for heat interlock signal or 115 VAC power is removed, the UC1 board will reset and the fault will be stored in memory instead of displayed. Any new fault will replace any previous fault.

**CHECKING MEMORY FOR LAST FAULT CODE**

**IMPORTANT:** Prior to accessing the fault code memory, note the settings of the dip switches so that they can be returned to their original Pre / Post-Purge positions. When power is supplied to the UC1 use caution when moving dip switches.

The last fault code can be retrieved at any time by setting all dip switches 1-8 to the up, or "on" position. The last fault code, or lack there of, will be indicated by counting the number of times LED #4 flashes. By moving any of the dip switches back to their original position, the fault code will be cleared.

**NOTE:** The UC1 board must have its 115 VAC power supply present when any of the (1-8) dip switches are moved back to their original position for the fault code to clear.

**PRE / POST PURGE AND PROVER STATUS CHECK DIP SWITCH SETTINGS**

**⚠ WARNING**

Remove power to SS2 and heating equipment when installing, servicing or changing dip switch settings. Failure to do so may result in personal injury and/or equipment damage. LED #6 (RED) should not be on if 115 VAC supply power is removed from the control.

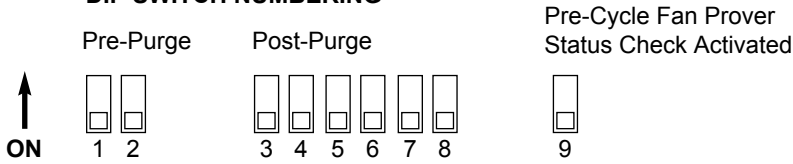
**Pre-purge**

Used for longer vent runs to get draft fully established throughout the vent system prior to burner ignition. Also beneficial for negative pressure prone environments. **IMPORTANT:** Nuisance equipment lockouts may occur if our pre-purge is running in conjunction with and is longer than any equipment timing circuit. Pre-purge settings must be shorter than burner control lockout time unless wired prior to burner control timing circuit (i.e. aquastat / thermostat).

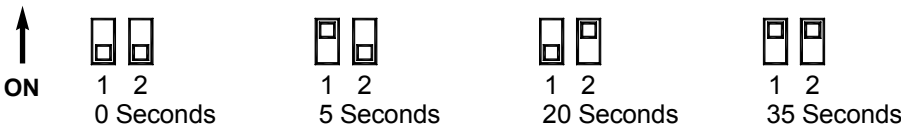
**Post-purge**

A Venter post-purge has been factory set at 2 minutes. Confirm that dip switch #5 is in the up or "on" position. Oil fired equipment requires that the post-purge be long enough to eliminate post cycle nozzle drip odor. A longer post-purge may be necessary for longer vent runs or high heat retention, refractory lined combustion chambers. A shorter post-purge may be desired for gas installations.

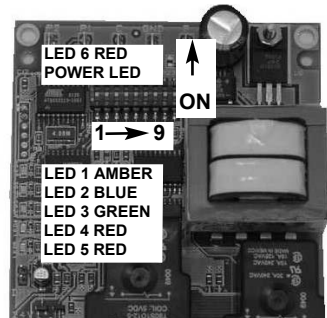
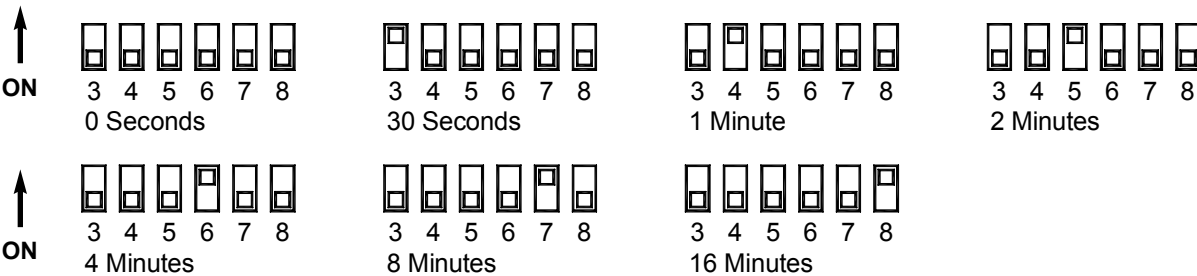
**DIP SWITCH NUMBERING**



**PRE-PURGE SETTINGS (SEE "PRE-PURGE" ABOVE PRIOR TO SETTING)**



**POST-PURGE SETTINGS (SEE "POST-PURGE" ABOVE PRIOR TO SETTING)**



**P1 & P2 PRE-CYCLE FAN PROVER STATUS CHECK**

Pre-Cycle Prover Status Check Activated     9    The Pre-Cycle Prover Status Check is activated from the factory. When activated the UC1 Universal Control checks across P1 & P2 safety circuit (SS2 Prover & Limit) to verify that the Fan Prover switch is "Open" upon a call for heat and not stuck "Closed".



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

The SS2 has been Listed according to the requirements of the National Fire Protection Association #31, #54 and #211 as follows below, (See Diagram A).

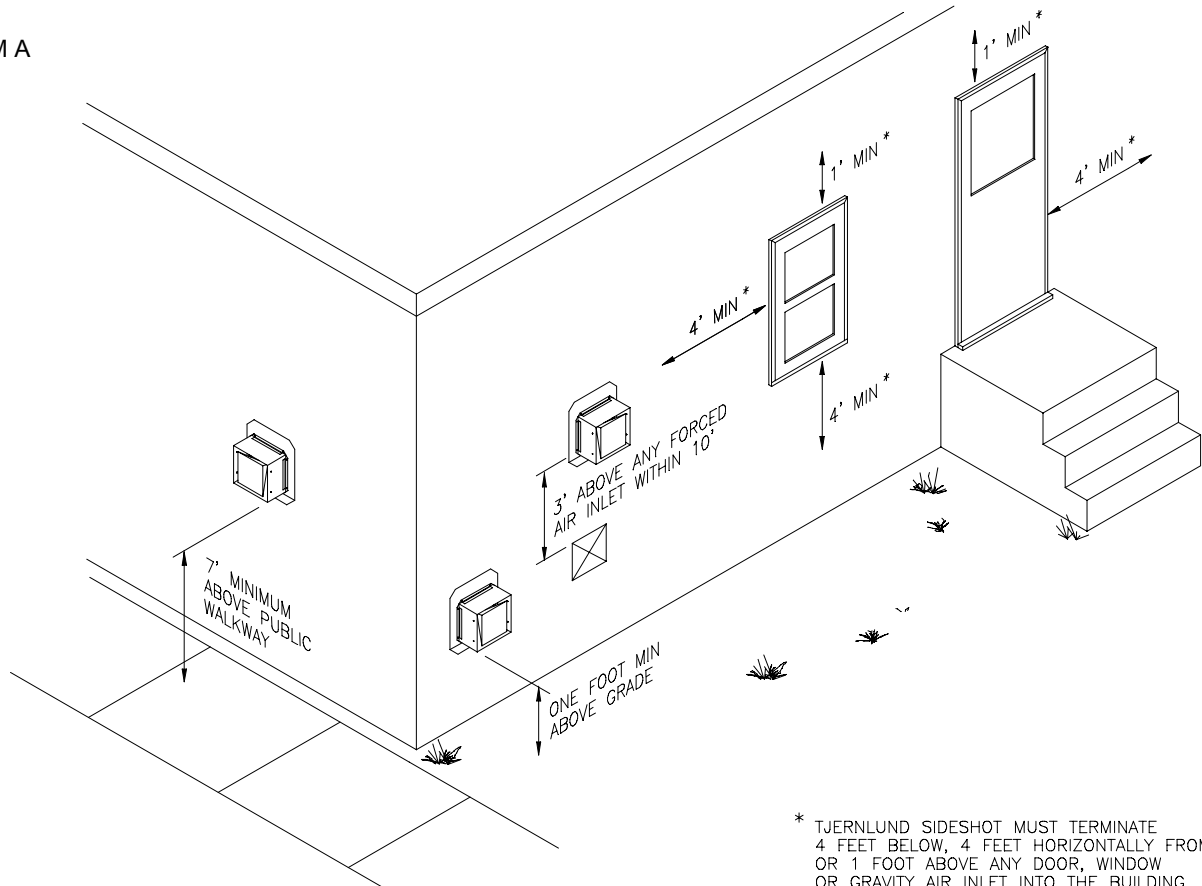
- The exit terminals of mechanical draft systems shall not be less than 7 feet above grade when located adjacent to public walkways.
- A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet.
- The venting system shall terminate at least 4 feet below, 4 feet 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 SS2 is also Listed to terminate a minimum of 12" below, above or horizontally from a soffit, deck or adjacent sidewall.

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

**If possible, do not terminate the SS2 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 equipment operation.**

DIAGRAM A



## VENT HOOD TERMINATION CLEARANCES FOR CANADIAN INSTALLATIONS

The SS2 has been 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

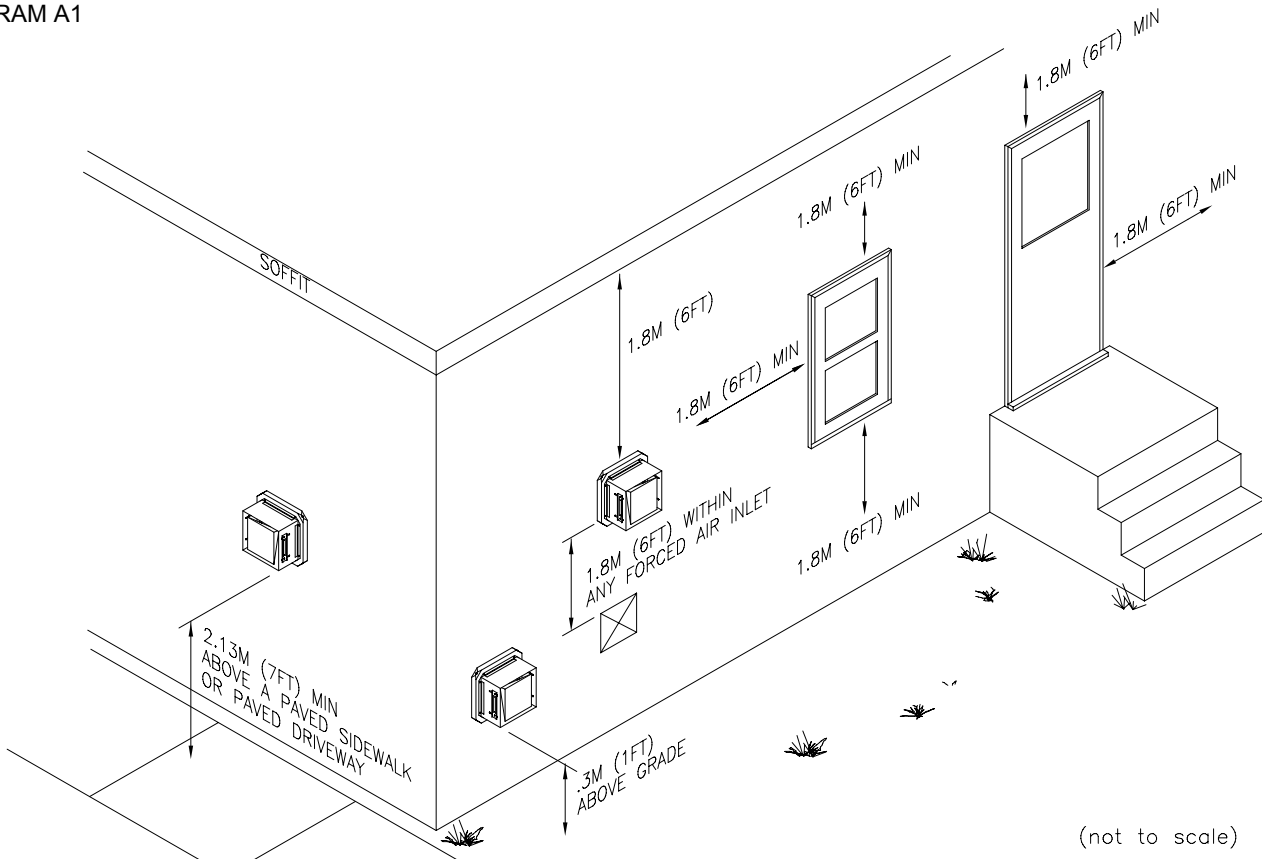
A venting system shall not terminate within .3m (1ft) of the following:

- 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.

**If possible, do not terminate the SS2 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 equipment operation.**

DIAGRAM A1



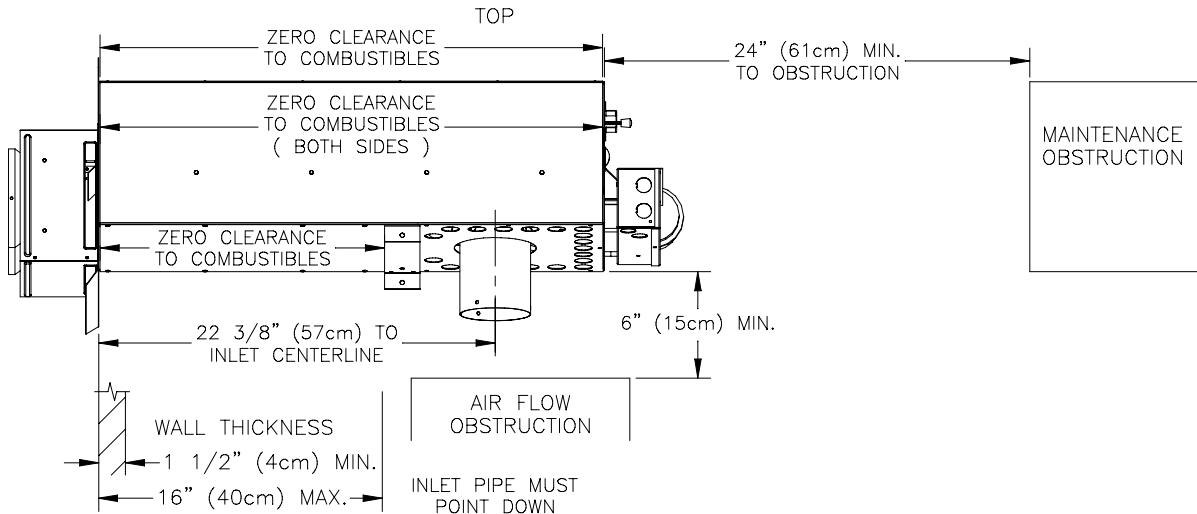
**INSTALLATION TOOLS REQUIRED**

- Nut Runner Set
- Screwdriver Set
- Smoke Tester
- Drill w/Bits
- Wire Cutter/Stripper
- CO2 Analyzer
- Combination Wrench Set
- Draft Gauge
- Reciprocating Saw

**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.



- Fold SS2 Vent Cabinet template (Inserted) 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).
  - If the SS2 is not being installed between floor joists, attach the template to the wall it will be exiting ensuring it is level.
- 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-joint, wall board, siding, etc., keeping drill bit perpendicular to the wall. 1/2" bit must penetrate through exterior.
- Remove template from rim-joint and attach to building exterior, aligning pilot hole markings on template with holes previously created in Step #2.
- 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.
- Using reciprocating saw and appropriate blade, cut a rectangular opening through the rim joint, 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).
- Knock out block material exposing rectangular opening through the wall.

**NOTE:** For easy one person installations, remove (3) 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 all (9) screws, (See Diagram D).

- 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 B

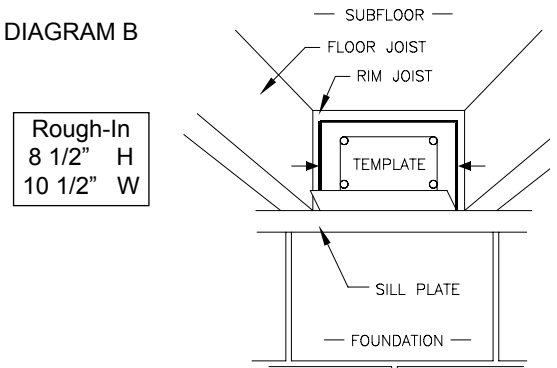


DIAGRAM C

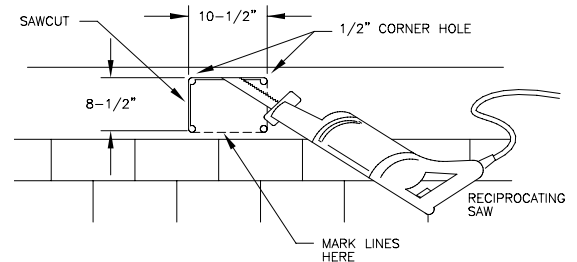


DIAGRAM D

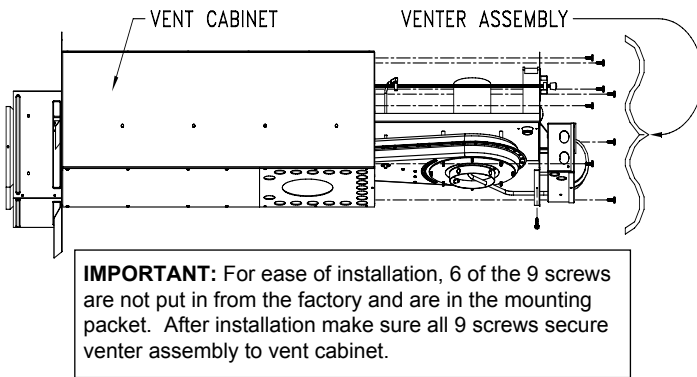
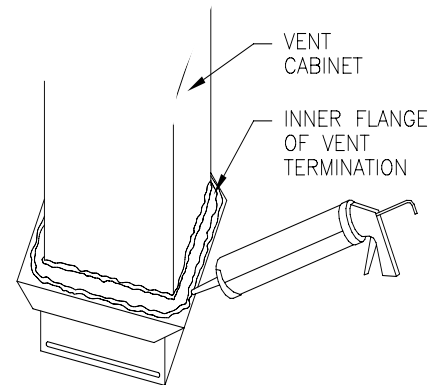


DIAGRAM E



- 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.

**NOTE:** For mounting on vinyl or lap siding a wood frame with 1" x 2" on the sides and top and 1" x 3" material on bottom can be utilized on exterior wall. This will provide a flush mounting surface for the hood and a nicely finished look with "J" channel when siding. Inside of frame opening should be 10 1/2" wide by 8 1/2" high.

DIAGRAM F

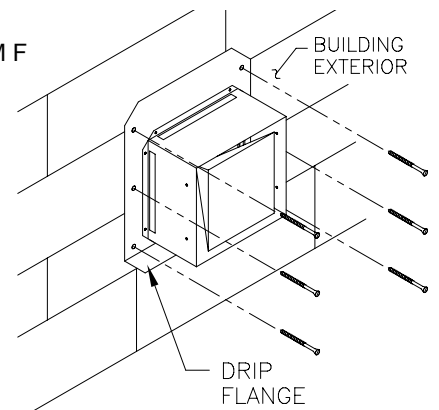
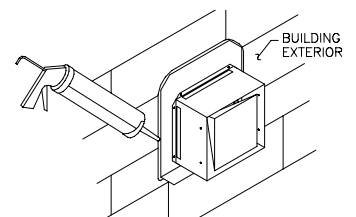


DIAGRAM G

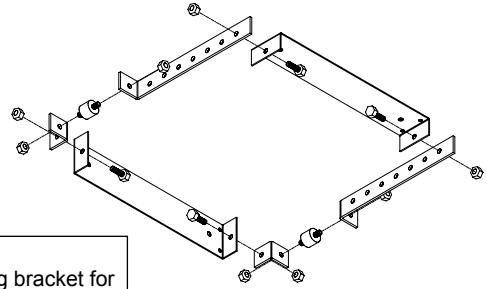
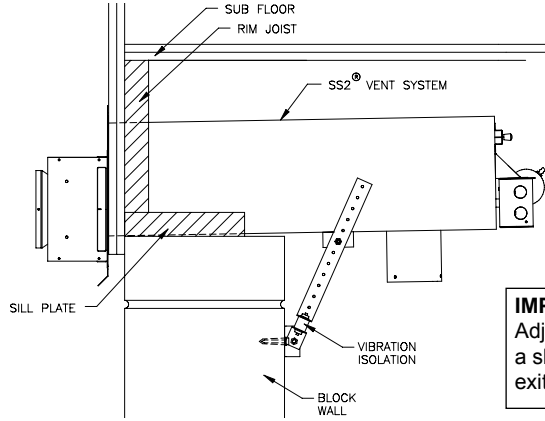


- After the SS2 is completely installed, apply a bead of exterior rated caulk between the Vent Hood Termination mounting flange and the exterior of the building, (See Diagram G).

## 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).
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).
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).
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.

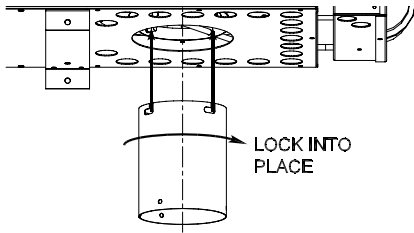
DIAGRAM H



**IMPORTANT:**  
Adjust SS2 mounting bracket for a slight downward pitch towards exit terminal.

## INLET PIPE INSTALLATION

DIAGRAM I



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.

## 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 may only be installed on gas appliances equipped with a draft hood, draft diverter or barometric draft control. The SS2 inlet pipe is designed to accept 4" vent pipe. Choose type of vent pipe based upon fuel and heater manufacturer's recommendations. 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 if servicing is necessary, (See Diagram J).

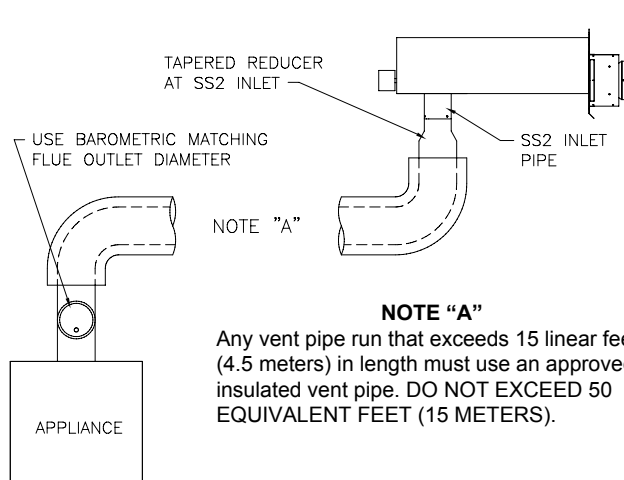
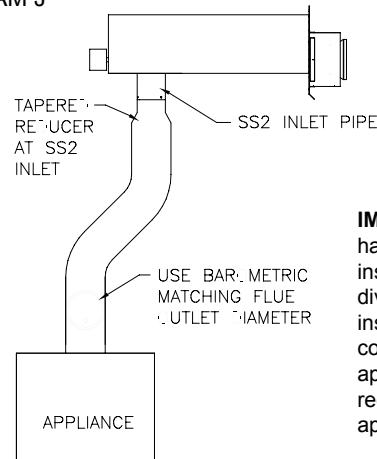


DIAGRAM J



Typical short vent pipe installation.

**IMPORTANT:** Oil installations must have a barometric draft control. Gas installations must have a draft hood, diverter or barometric draft control installed. Always use a vent pipe / connector of the same diameter as the appliance flue outlet. Use a tapered reducer near the SS2 inlet pipe if the appliance flue outlet is larger than 4".

**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.

**IMPORTANT: MORE THAN ONE INTERLOCK METHOD MAY BE APPLICABLE**

In many cases it is easier to interlock with the thermostat/aquastat portion of the heater control circuit vs. the primary control portion of the heater control circuit. Review all of the wiring diagram options prior to choosing the best method.

**SS2 SEQUENCE OF OPERATION WITH INTEGRAL UC1 UNIVERSAL CONTROL AND 24 VAC OR 115 VAC HEATER CONTROL CIRCUIT:**

Control signal from thermostat, aquastat or primary control is intercepted and routed to terminal "1" on UC1 terminal strip. When terminal "1" is energized with either 24 VAC or 115 VAC, the Venter motor is energized. After draft is established, the Fan Proving Switch closes within 5 to 10 seconds energizing terminal "4", which completes the circuit allowing burner to fire. **NOTE:** If a Venter pre-purge is selected, the burner will not fire until the pre-purge time is finished. The Venter will continue to run after the burner has finished firing for the set post-purge time cycle. The UC1 is set for a 2 minute post-purge time period from the factory. See "Pre / Post-Purge Settings" on page 5 for details.

The "1" input terminal on the SideShot can accept either a 24 VAC or 115 VAC control signal. **IMPORTANT:** The RED voltage jumper must be positioned based on appliance interlock voltage 24V or 115V. If using the "DRY" contact activation method, use terminals A & B on UC1 control and position the RED voltage jumper tab in the "DRY" position. **IMPORTANT:** Only one interlock method (i.e. 24V, 115V or "Dry") can be used with the UC1. Multiple appliance interlocks require the use of our MAC-Series multiple appliance controls.

The steps listed under each diagram are intended as a supplement to the diagram. Wiring colors or designations may vary by manufacturer. If you are unable to wire the SS2 as outlined in these instructions, call Tjernlund's Customer Service Department toll free at 1-800-255-4208 for assistance.

**IMPORTANT:** If the call for heat interlock signal or 115 VAC power is removed, the UC1 board will reset and any fault, if present, will be stored in memory instead of displayed. See page 5, "Checking Memory for Last Fault Code".

**SS2 WITH INTEGRAL UC1 UNIVERSAL CONTROL  
(THE SS2 MOTOR, COOLING FAN, LIMIT & PROVER ARE ALL FACTORY PREWIRED)**

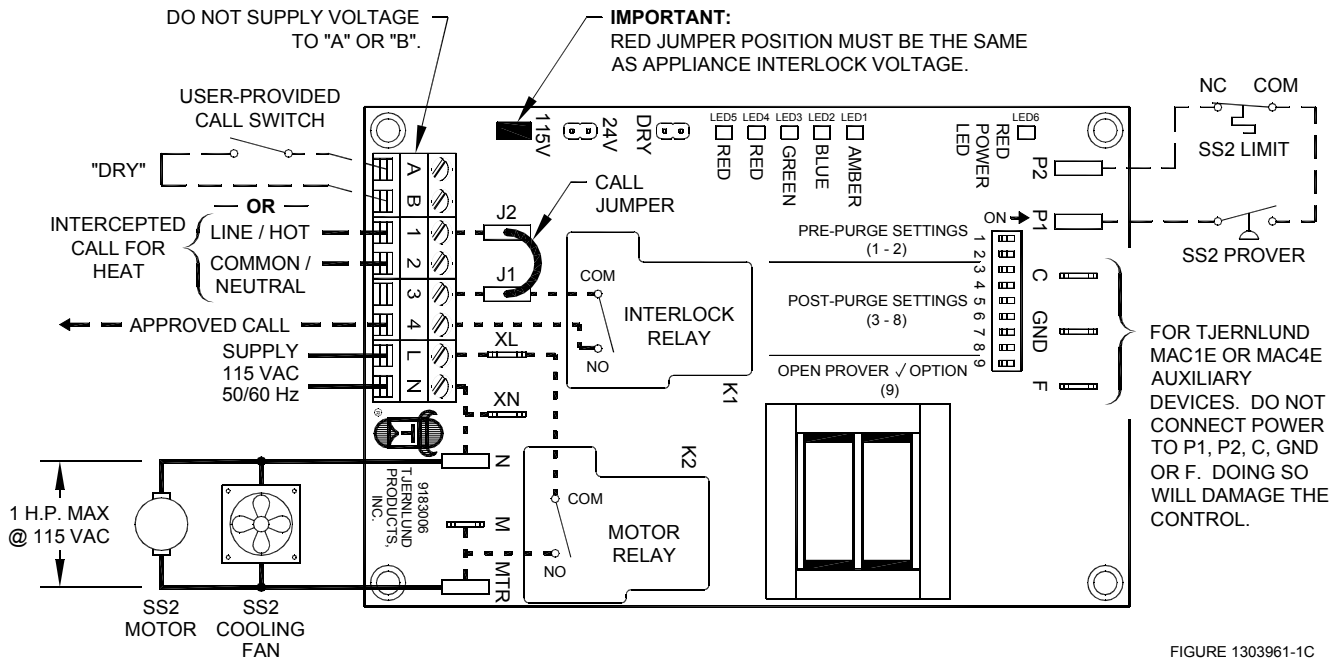
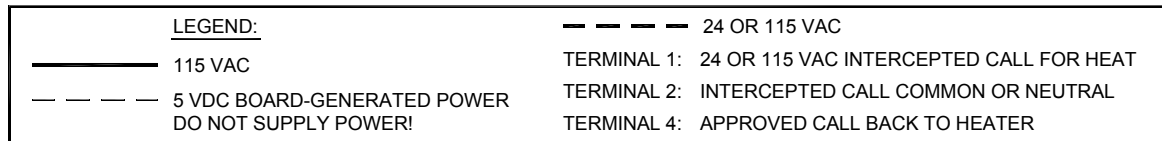
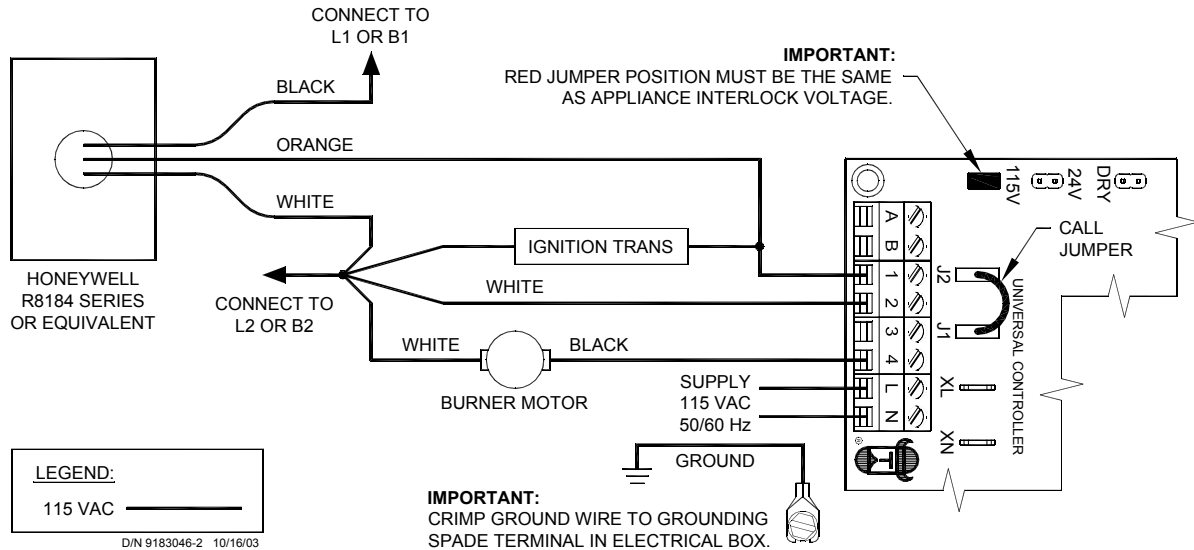


FIGURE 1303961-1C

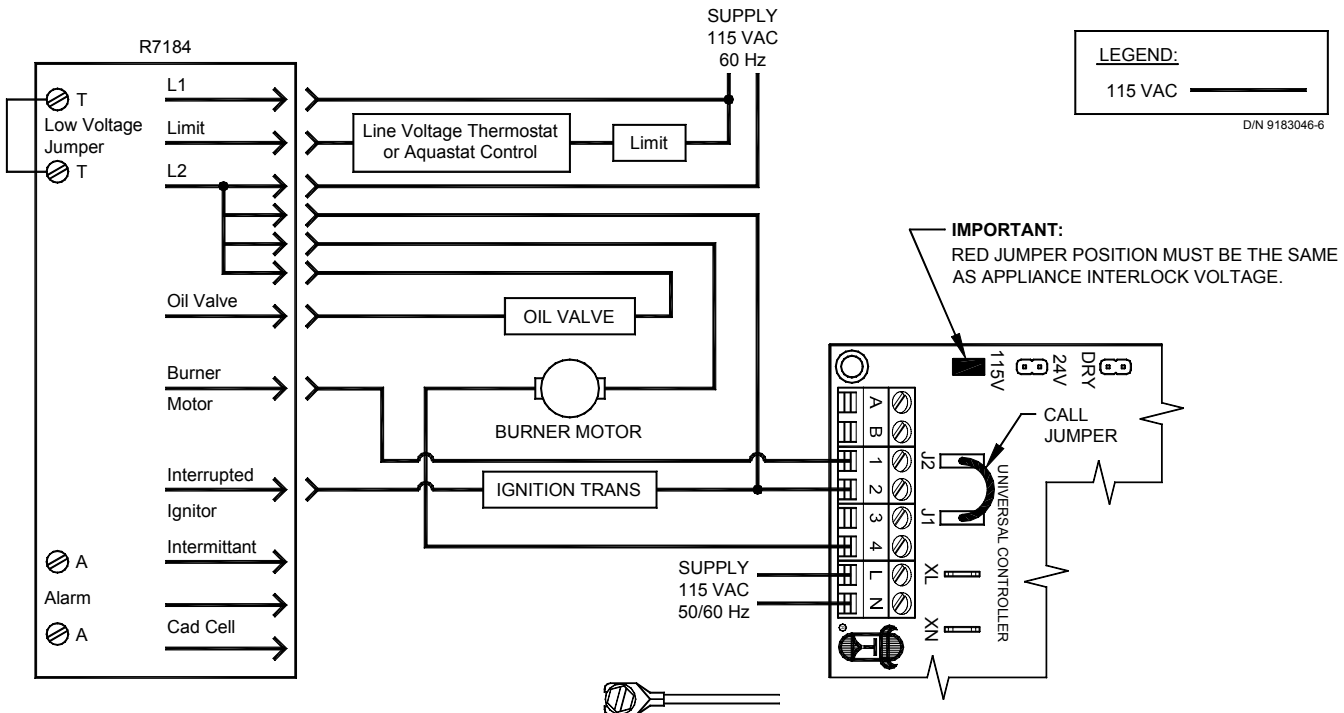
**WARNING:** Disconnect power supply from the SS2 and heating equipment when making wiring connections and servicing the SS2. Failure to do so may result in personal injury and/or equipment damage. LED #6 (RED) should be off with power removed.

## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED TO A HONEYWELL R8184 SERIES OR EQUIVALENT PRIMARY CONTROL



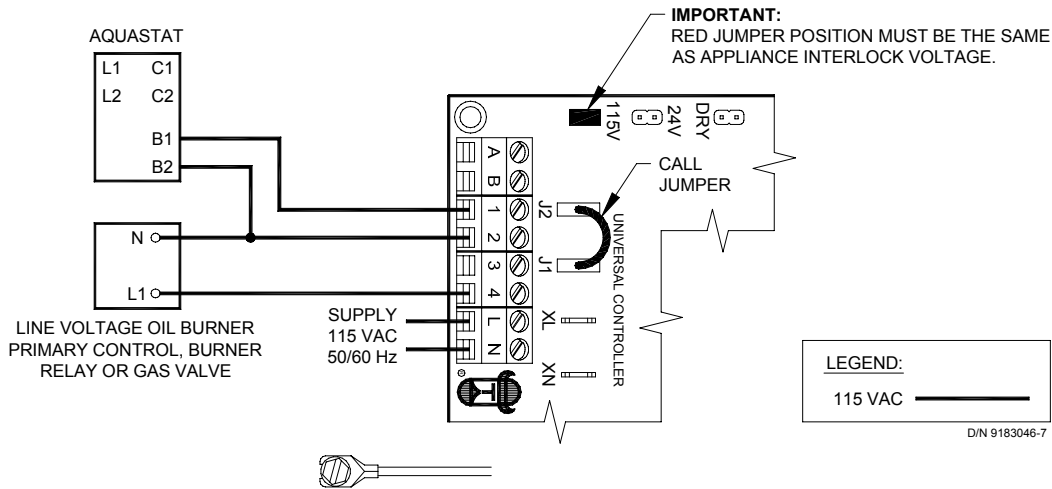
1. Separate the Black burner motor wire from the Orange wire of R8184 Primary Control.  
NOTE: Do not separate the ignition transformer wire from the Orange.
2. Connect Orange wire of R8184 to #1 on UC1 terminal block.
3. Connect #2 on UC1 terminal block to White on R8184 and L2 or B2.
4. Connect Black of burner motor to #4 on UC1 terminal block.
5. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
6. Crimp ground wire to grounding spade in SS2 electrical box.
7. Make sure RED voltage jumper on UC1 is on 115V.

## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED TO A HONEYWELL R7184 SERIES OR EQUIVALENT PRIMARY CONTROL WITH A LINE VOLTAGE THERMOSTAT OR AQUASTAT



1. Disconnect burner motor wire off the R7184.
2. Connect burner motor terminal of R7184 to #1 on UC1 terminal block.
3. Connect #2 on UC1 terminal block to L2 or N.
4. Connect #4 on UC1 terminal block to burner motor wire removed from R7184.
5. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
6. Crimp ground wire to grounding spade in SS2 electrical box.
7. Make sure RED voltage jumper on UC1 is on 115V.

## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED WITH AN AQUASTAT



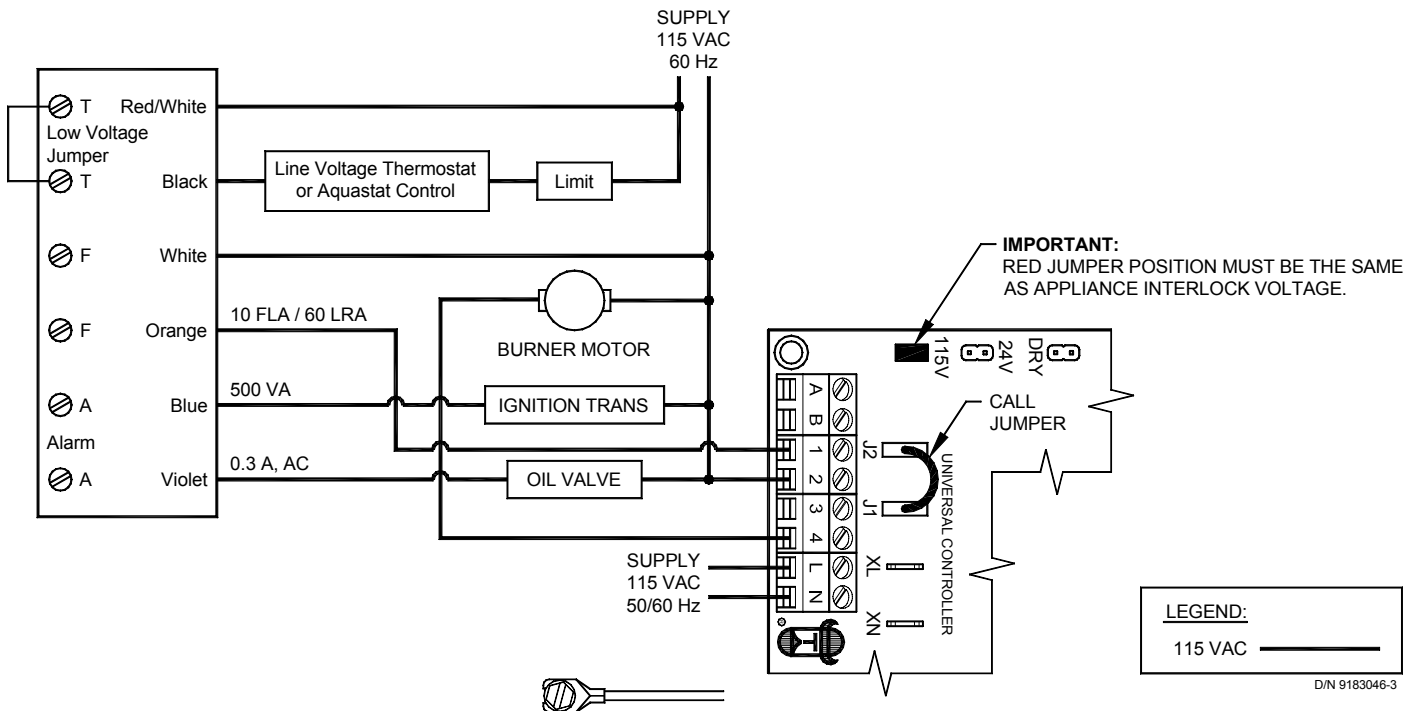
**IMPORTANT:** CRIMP GROUND WIRE TO GROUNDING SPADE TERMINAL IN SS2 ELECTRICAL BOX.

**CAUTION:** WHEN INTERLOCKING WITH AQUASTAT **DO NOT** DISCONNECT BURNER MOTOR FROM PRIMARY CONTROL / CAD CELL RELAY.

1. Disconnect B1 from L1 of oil burner primary control, burner relay or hot of gas valve and reconnect to #1 on UC1 terminal block.
2. Connect #2 on UC1 terminal block to B2 or N.
3. Connect #4 on UC1 terminal block to the L1 on line voltage oil burner primary control, burner relay or gas valve.
4. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
5. Crimp ground wire to grounding spade in SS2 electrical box.
6. Make sure RED voltage jumper on UC1 is on 115V.

**NOTE:** If burner safety control goes out on lockout, the SideShot will continue to run as long as a call for heat is present.

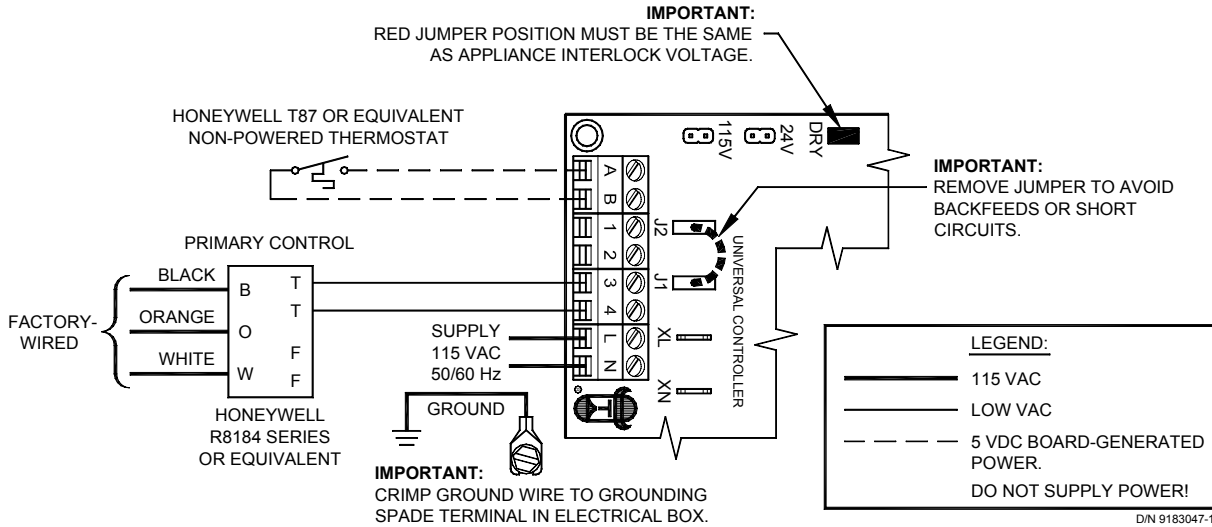
## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED WITH A CARLIN 40200, 42230, 48245, 50200, 60200 SERIES OR EQUIV. AND A LINE VOLTAGE THERMOSTAT OR AQUASTAT



**IMPORTANT:** CRIMP GROUND WIRE TO GROUNDING SPADE TERMINAL IN SS2 ELECTRICAL BOX.

1. Disconnect burner motor wire off the Orange on Carlin.
2. Connect burner motor terminal Orange of Carlin to #1 on UC1 terminal block.
3. Connect #2 on UC1 terminal block to L2 or N
4. Connect #4 on UC1 terminal block to burner motor wire removed from Orange of Carlin.
5. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
6. Crimp ground wire to grounding spade in SS2 electrical box.
7. Make sure RED voltage jumper on UC1 is on 115V.

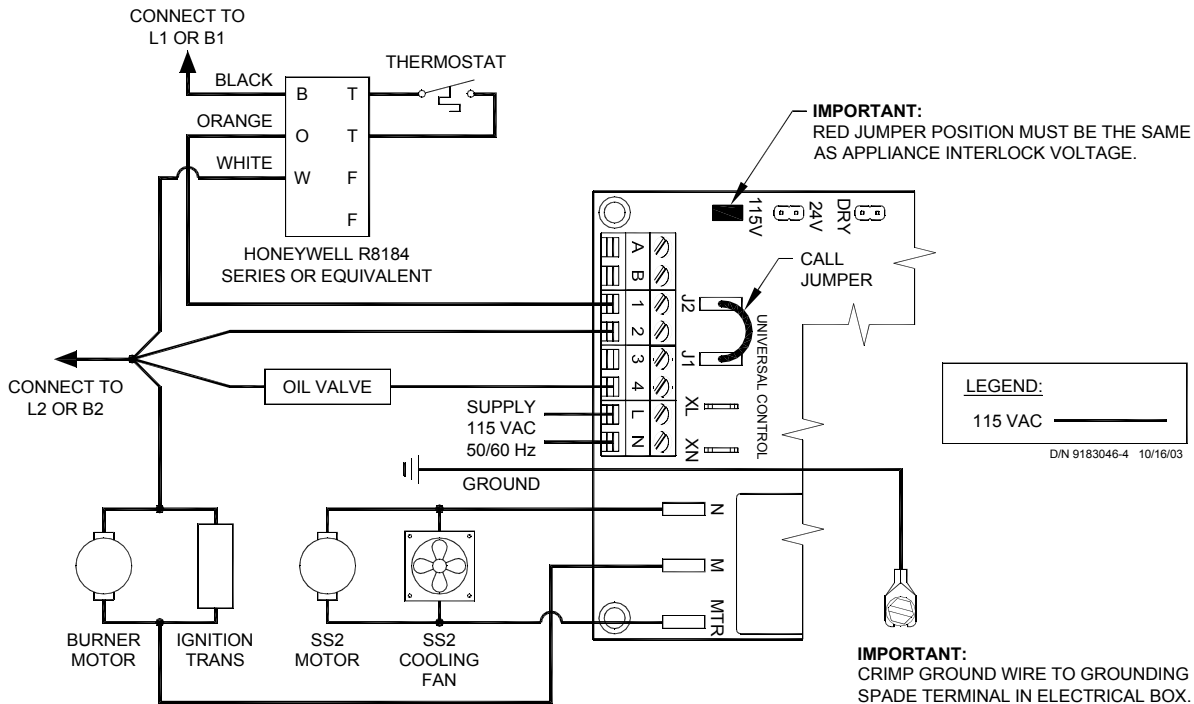
## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED TO AN OIL-FIRED FURNACE WITH A HONEYWELL T87 OR EQUIVALENT NON-POWERED THERMOSTAT



1. **IMPORTANT:** Remove J1 & J2 Call Jumper on UC1 to avoid backfeeds or short circuits.
2. Connect T87 or Equivalent non-powered thermostat to A and B terminals on UC1.
3. Remove T T Jumper from R8184 or equivalent Primary Control.
4. Connect #3 on UC1 terminal block to T terminal of Primary Control.
5. Connect #4 on UC1 terminal block to remaining T terminal of Primary Control.
6. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
7. Crimp Ground wire to grounding spade in SS2 electrical box.
8. Make sure RED voltage jumper on UC1 is on DRY.

**NOTE:** If burner safety control goes out on lockout, the SideShot will continue to run as long as a call for heat is present.

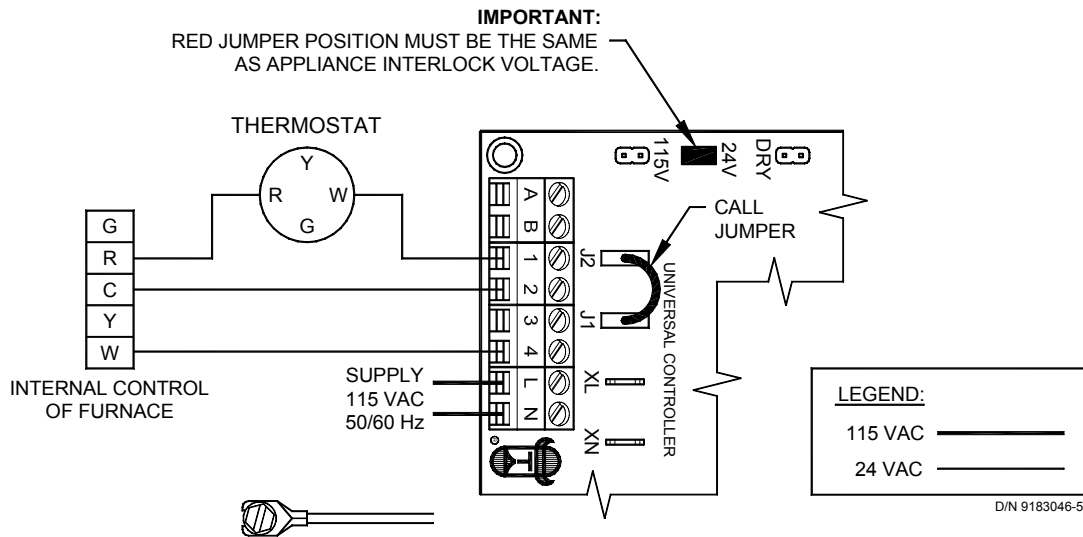
## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED WITH A HONEYWELL R8184 SERIES OR EQUIVALENT PRIMARY CONTROL AND A BURNER MOTOR POST-PURGE



1. Separate the burner motor wire and ignition transformer from the Orange wire of R8184.
2. Connect the Orange of R8184 to #1 on UC1 terminal block.
3. Connect #2 on UC1 terminal block to White on R8184 and L2 or B2.
4. Connect the HOT wire of oil solenoid valve to #4 on UC1 terminal block and neutral wire to White or N.
5. Connect burner motor and ignition transformer HOT wires to M terminal on UC1 and neutrals to White or N.
6. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
7. Crimp ground wire to grounding spade in SS2 electrical box.
8. Make sure RED voltage jumper on UC1 is on 115V.



## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED WITH A SINGLE ZONE 24 VAC THERMOSTAT

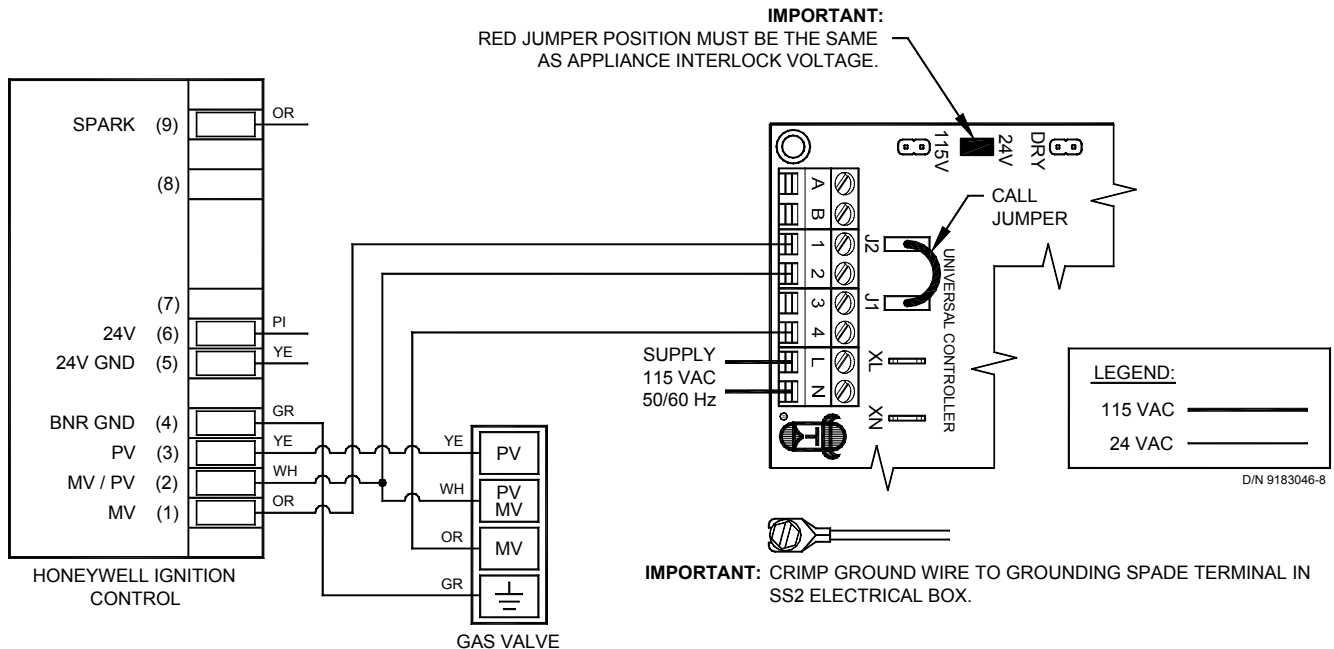


**IMPORTANT:** CRIMP GROUND WIRE TO GROUNDING SPADE TERMINAL IN SS2 ELECTRICAL BOX.

1. Connect W from t-stat to #1 on terminal block of UC1.
2. Connect #2 on UC1 terminal block to C on internal control terminal strip of furnace/boiler.
3. Connect #4 on UC1 terminal block to W on internal control terminal strip of furnace/boiler.
4. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
5. Crimp ground wire to grounding spade in SS2 electrical box.
6. Make sure RED voltage jumper on UC1 is on 24V.

**NOTE:** If burner safety control goes out on lockout, the SideShot will continue to run as long as a call for heat is present.

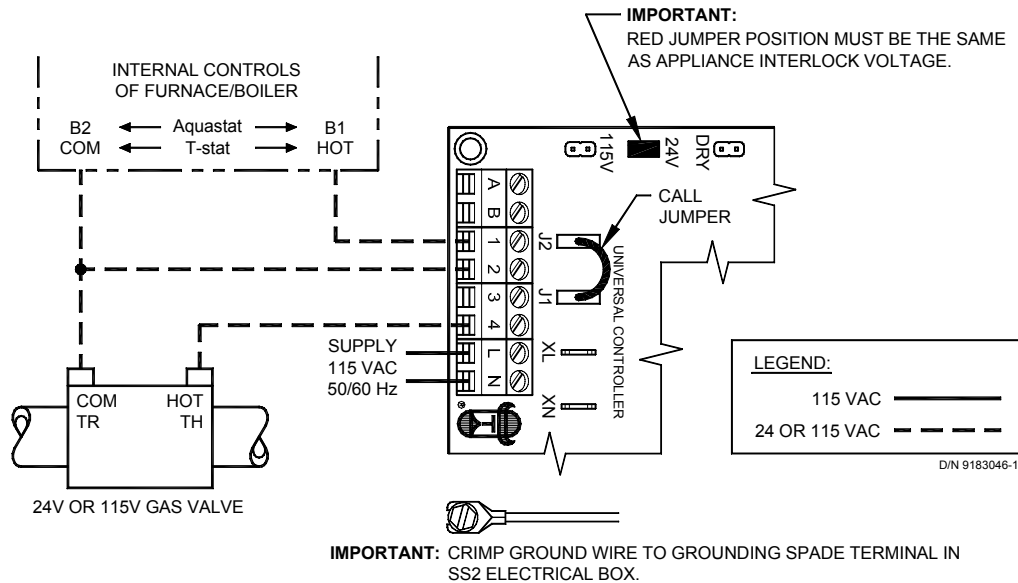
## SIDESHOT WITH INTEGRAL UC1 CONTROL CONNECTED WITH A 24 VAC ELECTRONIC IGNITION MODULE



**IMPORTANT:** CRIMP GROUND WIRE TO GROUNDING SPADE TERMINAL IN SS2 ELECTRICAL BOX.

1. Remove the wire on MV at gas valve and connect it on #1 on UC1 terminal block.
2. Connect #2 on UC1 terminal block to MV/PV.
3. Connect #4 on UC1 terminal block to MV on gas valve.
4. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
5. Crimp ground wire to grounding spade in SS2 electrical box.
6. Make sure RED voltage jumper on UC1 is on 24V.

## SIDESHOT WITH INTEGRAL UC1 UNIVERSAL CONTROL CONNECTED WITH A 24 OR 115 VAC STANDING PILOT



1. Remove the wire on TH or HOT of gas valve and connect it on #1 on UC1 terminal block.
2. Connect #2 on UC1 terminal block to TR or Common.
3. Connect #4 on UC1 terminal block to TH or HOT on gas valve.
4. Connect 115 VAC supply voltage to L & N terminals on UC1. Installer must supply overload and disconnect protection.
5. Crimp ground wire to grounding spade on terminal XN.
6. Make sure RED voltage jumper on UC1 is on 24V or 115V depending on control voltage.

**NOTE:** If burner safety control goes out on lockout, the SideShot will continue to run as long as a call for heat is present.

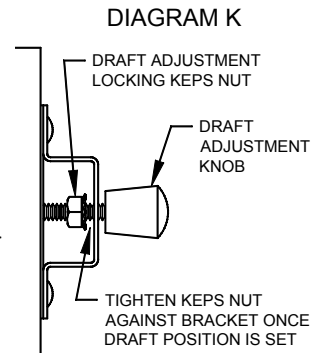
### DRAFT ADJUSTMENT PROCEDURE FOR OIL EQUIPMENT

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. A Venter pre-purge of up to 35 seconds may also be selected. See "Pre / Post-Purge Settings" on page 5.
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 and adjust barometric damper closed "more draft" 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 or adjust barometric damper closed "more draft" if necessary to maintain a minimum of  $-.02$ " W.C..



**⚠ 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 which is factory set at 2 minutes and adjustable up to 16 minutes. 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 CO2 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 CO2 readings have not changed from the earlier values.

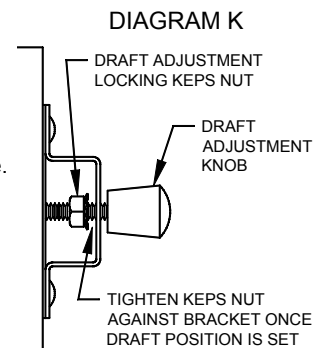
### DRAFT ADJUSTMENT PROCEDURE FOR GAS APPLIANCES

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. Place the heating system into operation. **NOTE:** there will be a slight pause between venter operation and burner operation. A Venter pre-purge of up to 35 seconds may also be selected. See "Pre / Post-Purge Settings" on page 5. If installation uses a barometric draft control adjust it to the minimum or least draft setting. Allow heater to operate for 5 minutes.
2. **PREFERRED METHOD: MUST HAVE DRAFT GAUGE AVAILABLE**  
Sample draft one foot after draft hood, diverter or barometric draft control using a draft gauge. If the draft reading is in excess of -0.05" W.C. turn the draft adjustment knob on the SS2 counterclockwise so that a draft reading of -0.02" to -0.05" W.C. is obtained. Never adjust draft to a setting of less than -0.02" W.C. If the vent system is terminated on a wall subject to prevailing winds a -0.05" W.C. draft setting is recommended.
3. If a draft gauge is not available test for spillage at the draft hood, diverter or barometric draft control using the flame from a match, lighter or candle and determine the following:
  - A. The flame or smoke is being drawn into the draft hood, diverter or barometric draft control.
  - B. The main burner is burning properly, i.e. no floating, lifting or flash back.
  - C. If the heater has a two stage or modulating gas valve verify that burner operates properly at both low and high fire.
 If the draft appears excessive turn the draft adjustment knob counterclockwise and repeat steps A through C.
4. Lock the draft adjustment knob in place by tightening the locking nut behind the bracket, (See Diagram K).
5. Turn off appliances and exhaust fans activated for draft adjustment procedure.



### 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 venter operates for the post-purge time period set while burner is not firing before the SS2 turns off. See "Pre / Post-Purge Settings" on page 5.
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.

**Post-purge:** A post-purge is always necessary on oil installations. The factory default post-purge time period is 2 minutes. Just as a chimney continues to draft after the burner has shut-down, the SS2 will continue to run to clear the vent system of residual gases. The duration of the post-purge cycle is adjustable from 0 to 16 minutes. We recommend a minimum of 2 minutes post-purge on oil.

**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 pages 15, 16.

#### **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 pages 15, 16.

**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 pages 15, 16.

**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**

### **⚠ WARNING**

The following guide is intended to be used if a problem occurs during the use of the SS2 side wall vent system. It may be necessary to measure voltage during troubleshooting. **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.

### **LED STATUS & FAULT INDICATORS**

#### **LED INDICATOR LIGHTS**

LED #1 (Amber)	Appliance call for heat.
LED #2 (Blue)	Safety circuit through P1 & P2 (SS2 Limit & Fan Prover). Indicates SS2 Limit & Prover are closed during run cycle. Burner circuit is energized with Interlock Relay contact closure from terminal 3 to 4.
LED #3 (Green)	Power switched to SS2 motor & Cooling Fan from L to MTR & M.
LED #4 (Red)	Status / Fault indicator.
LED #5 (Red)	Used as a status indicator.
LED #6 (Red)	115 VAC power supplied to board.

#### **LED STATUS INDICATORS**

LED #4 & #5 (Red) Flashing Alternately	= Venter in Pre-purge. (Pre-Purge options 0, 5, 20, 35 seconds)
LED #4 & #5 (Red) Flashing in Unison	= Venter in Post-Purge. (Post-Purge options 0, 30 seconds or 1, 2, 4, 8, 16 minutes)
LED #4 Flashing Continuously*	= Fan Prover opened for more than 10 seconds during burner cycle. (Venter will run for 10 minutes, attempting to make Fan Prover)
LED #5 (Red) Flashing Intermittently	= With no call for heat, flashes 3 seconds on / 3 seconds off if microcontroller is working properly.

#### **LED FAULT INDICATORS**

Fault conditions are indicated by counting the number of times LED #4 (Red) flashes.

LED #4 Flashes 2 Times	Fan Prover was in electrically closed position prior to venter operation.
LED #4 Flashes 3 Times*	Fan Prover does not close within 60 seconds after call for heat.
LED #4 Flashes 4 Times*	Fan Prover did not re-close after 10 minutes of Venter operation.
LED #4 Flashes 5 Times*	Fan Prover opened for more than 10 seconds during burner cycle but closed within 10 minutes.

\* Investigate causes of Fan Prover not making, i.e.; Firing burner at capacities or temperatures exceeding Venter limits, excessive vent pipe runs, high winds, plugged / kinked Fan Prover sensing tube or a faulty Fan Prover. Reset SS2 High Limit. If Limit was tripped and SS2 fires, investigate cause of high heat.

**IMPORTANT:** Fault codes will automatically be displayed after a fault condition occurs. If the call for heat interlock signal or 115 VAC power is removed, the UC1 board will reset and the fault will be stored in memory instead of displayed. Any new fault will replace any previous fault.

#### **CHECKING MEMORY FOR LAST FAULT CODE**

**IMPORTANT:** Prior to accessing the fault code memory, note the settings of the dip switches so that they can be returned to their original Pre / Post-Purge positions. When power is supplied to the UC1 use caution when moving dip switches.

The last fault code can be retrieved at any time by setting all dip switches 1-8 to the up, or "on" position. The last fault code, or lack thereof, will be indicated by counting the number of times LED 4 flashes. By moving any of the dip switches back to their original position, the fault code will be cleared.

**NOTE:** The UC1 board must have its 115 VAC power supply present when any of the (1-8) dip switches are moved back to their original position for the fault code to clear.

### SYMPTOM 1: SS2 OPERATES CONTINUOUSLY

Verify that Venter is not in post-purge mode which could last up to 16 minutes. A factory post-purge has been set for 2 minutes. LED #4 & #5 (Red) will flash in unison during post-purge. A Venter pre-purge could also be set for up to 35 seconds. LED #4 & #5 (Red) will flash alternately during pre-purge. See "Pre / Post-Purge Settings" on page 5.

Verify that LED #1 (Amber) is not lit.

Yes, LED #1 (Amber) is lit: Check interlock wiring. Confirm burner control(s) are functioning properly. UC1 control is receiving constant call for heat signal.

LED #1 (Amber) is not lit: Replace UC1 circuit board part number 950-8804.

### SYMPTOM 2: SS2 MOTOR AND/OR COOLING FAN DOES NOT OPERATE

Verify that UC1 control has power, LED #6 (Red) should be lit. Verify that LED #4 (Red) is not flashing. See "LED Status & Fault Indicators", page 17. Verify RED voltage selection jumper corresponds with interlock voltage (i.e 24V, 115V or "Dry").

No: Check circuit breaker, disconnect switches and wiring. Confirm that Venter motor leads are connected to N & MTR terminals.

Yes, LED #6 (Red) is lit: Verify that the interlocked burner is calling for heat, LED #1 (Amber) should be lit.

No, LED #1 (Amber) is not lit: Verify interlock wiring and that thermostat/aquastat is adjusted to call for heat. Verify that the RED voltage selection jumper is installed so that it matches the voltage of the interlocked burner.

Yes, LED #1 (Amber) is lit: Verify Prover safety circuit fault does not exist. See, "LED Status & Fault Indicators", page 17.

If faults exist check Prover P1 & P2 safety circuit.

If no faults exist, check for 115 VAC across terminals N and MTR.

Voltage present: Confirm motor & cooling fan leads are securely on N and MTR. If so, replace SS2 motor p/n 950-0015 or SS2 cooling fan, p/n 950-0020.

No voltage present: Replace UC1 circuit board part number 950-8804.

### SYMPTOM 3: SS2 OPERATES, BUT BURNER DOES NOT

Push reset button on SS2 high limit behind access cover underneath SS2 draft adjustment knob. **NOTE:** Insufficient post-purge may cause limit to trip. If the limit switch trips, verify that the post-purge setting is long enough to remove residual heat from the combustion chamber. If high limit will not reset and has an open circuit, replace high limit part number 950-0018. Verify that the cooling fan operates whenever the SS2 is running. If high limit trips repeatedly, do not operate the heater until the source of excessive heat has been determined and repaired. For any newly established call for heat the SS2 will run for 60 seconds to try to close the fan prover circuit (P1 to P2). If circuit can not be made after 60 seconds LED #4 (Red) will flash 3 times, indicating a prover check circuit fault on UC1 start up. **NOTE:** The UC1 safety circuit and LED #4 will be reset if the call for heat interlock signal or 115 VAC power is removed. If the fan prover makes on start up, but breaks for more than 10 seconds during the burner cycle, LED #4 will flash continuously indicating a prover circuit fault. The SS2 will continue to run for 10 minutes to try to make the prover circuit as long as a call for heat exists. If Prover is not made within 10 minutes the SS2 will shut down and LED #4 will flash 4 times indicating a prover circuit fault. Remove the call for heat and then reestablish to reset the UC1 prover safety circuit (P1 to P2) & LED #4.

Verify that LED #2 (Blue) is lit.

Yes, LED #2 (Blue) is lit: Verify that "call jumper" is connected from J1 to J2 on UC1 circuit board if using typical wiring where supply voltage from terminal 1 is routed to terminal 3 through "call jumper" then to 4 when appliance interlock relay makes. With call for heat established, verify that wiring is correct by measuring voltage between terminals 1 & 2 and 2 & 4 of UC1 terminal strip. **NOTE:** If a different voltage source is provided to terminal 3 which is switched to terminal 4 or when using the A-B dry contacts, voltage measurements may not apply. For millivolt installations make sure system Limits are reset and relight pilot.

No, LED #2 (Blue) is not lit: Remove power from UC1 and push dip switch #9 up or "on" to deactivate Pre-Cycle Fan Prover status check. Remove P1 and P2 prover leads off of Fan Prover switch and jumper together. Reset SS2 High Limit if not previously done. Reestablish power and call for heat. After Venter pre-purge, if set (up to 35 seconds), LED #2 (Blue) should light.

No, LED #2 (Blue) does not light: Replace UC1 circuit board, part number 950-8804.

Yes, LED #2 (Blue) lights up: The Fan Proving switch may not be closing, SS2 High Limit may be tripped, wiring connections are incorrect/broken or burner control(s) are not functioning properly. Push reset button on SS2 high limit behind access cover underneath SS2 draft adjustment knob. **NOTE:** Insufficient post-purge may cause limit to trip. If the limit switch trips, verify that the post-purge setting is long enough to remove residual heat from the combustion chamber. Verify that the cooling fan operates whenever the SS2 is running. If high limit trips repeatedly, do not operate the heater until the source of excessive heat has been determined and repaired. If high limit will not reset and has an open circuit, replace high limit part number 950-0018. Verify inlet assembly sensing tube is clean. Verify fan proving switch flexible sensing tube is clean and not crimped or cracked. Remove two fan prover switch retaining screws, disconnect sensing tube from the proving switch and connect sensing tube to draft gauge. Initiate call for heat. With SS2 running, verify that venter performance is sufficient to close fan prover. Draft gauge should read a minimum of -0.40" w.c. If draft gauge is unavailable, verify that Venter performance is sufficient to close Fan Prover contacts by checking for continuity across switch. **IMPORTANT:** After continuity check push dip switch #9 back down to "activate" Pre-Cycle Fan Prover status check. Replace Fan Prover leads from P1 and P2 back on Fan Proving switch.

No, measured draft is less than -0.40" w.c. or Prover contacts are not making: Verify that SS2 damper is completely open and visually inspect system for blockages. Confirm that maximum BTU/hr. input, temperature and vent pipe lengths are not exceeded. See "Application Table" on page 1 for capacities.

Yes, measured draft is at least -0.40" w.c.: Replace fan proving switch, (**Old style** metal, exterior junction box mounted, p/n 950-0016) (**New style** plastic, interior junction box mounted, p/n 950-0029). **IMPORTANT:** Old and new style Fan Provers are not interchangeable.

## MAINTENANCE

### INSTALLER AND USER REQUIREMENTS

- Installer must visually inspect unit annually.
- On oil, installer must verify over-fire draft, CO2 and smoke readings are all correct. See "Draft Adjustment Procedure" on pages 15, 16.
- Inspect vent pipe for evidence of corrosion. If any corrosion is found replace vent pipe and inspect venter.

### WARNING

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. LED #6 (RED) should be off with power removed.

## IMPELLER INSPECTION

We recommend that the SS2 impeller be inspected annually. Improper oil 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 pages 15, 16. If inlet assembly is removed for cleaning or replacement of impeller, make sure inlet assembly gasket is in good shape when replacing inlet assembly. If gasket is damaged use a 1/8" bead of high temperature RTV sealant on inlet assembly before securing to venter housing.

## 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 with the following information:
  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 and details of problem.

## 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. 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 2 years, 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, altered, neglected or misused

Product that has been wired incorrectly or damaged by a malfunctioning or maladjusted burner

Any labor charges related to evaluating and replacing the defective part or freight charges related to the return of the defective part

## REPLACEMENT PARTS

<u>Component</u>	<u>Part Number</u>	<u>Component</u>	<u>Part Number</u>
SS2 Motor	950-0015	SS2 Impeller	950-0017
SS2 Proving Switch (Old Style metal <b>exterior</b> Junction box mount)	950-0016	SS2 High Limit Switch	950-0018
SS2 Proving Switch (New Style plastic <b>interior</b> Junction box mount)	950-0029	SS2 Venter Housing	950-0019
<b>IMPORTANT:</b> Old style and new style Fan Provers are not interchangeable.		SS2 Cooling Fan	950-0020
		Universal Control Circuit Board	950-8804

## 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.