

**TJERNLUND PRODUCTS, INC.**

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side wall  
 vent  
**systems**

FOR NATURAL GAS, LP OR OIL

**MODELS****HSUL-J****HST-J****HS115-J****HSUL-1****HST-1****HS115-1****HSUL-2****HST-2****HS115-2****OWNER INSTRUCTIONS, DO NOT DESTROY**

 Recognize this symbol as an indication of important Safety Information!

**NOTE:** FLUE GAS TEMPERATURES MUST NOT EXCEED  
 600°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 ON JOB SITE FOR FUTURE REFERENCE.**

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Tjernlund Products welcomes your comments and questions. Call us at 1-800-255-4208, Fax 651-426-9547, Email us at fanmail@tjfans.com or write to: Customer Service, Tjernlund Products, Inc., 1601 Ninth Street, White Bear Lake, MN 55110-6794.

## SPECIFICATIONS

### HS-SERIES MODEL SELECTION TABLE

MODEL NUMBERS	VENT PIPE DIA.	BTU/HR INPUT	MAXIMUM PIPE LENGTH (FT) AT STACK TEMP			CFM AT 70°F				
			GAS FIRED		OIL FIRED	0" SP	.50" SP	75" SP	1.0" SP	1.4" SP
			300°F	400°F	500°F					
HSUL-J HST-J HS115-J	4"	50,000 75,000 100,000 125,000	100' 100' 100' 35'	100' 100' 100' 23'	100' 100' 100' -	110	85	67	10	-
HSUL-1 HST-1 HS115-1	4"	150,000 200,000 250,000 300,000	100' 87' 40' 4'	60' 57' 12' -	35' 27' -	158	115	95	12	-
	6"	150,000 200,000 250,000 300,000	100' 100' 100' 30'	100' 100' 92' -	100' 100' 100' -					
HSUL-2 HST-2 HS115-2	6"	350,000 400,000 450,000 500,000 550,000 600,000	100' 100' 100' 100' 84' 75'	100' 100' 100' 100' 67' -	100' 100' 100' 100' 100' -	286	235	215	196	158
		8"	350,000 400,000 450,000 500,000 550,000 600,000	100' 100' 100' 100' 100' 67'	100' 100' 100' 100' 100' -					

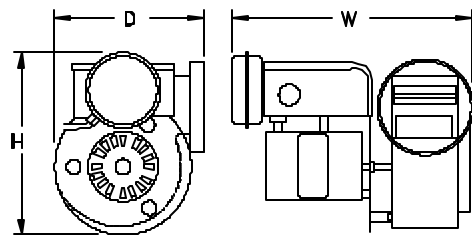
**NOTE:** Oil applications must use HST Series which include integral post-purge Relay/Timer

### IMPORTANT

Table footage is based on equivalent vent pipe length. To calculate equivalent vent pipe length, add the straight vent pipe plus 10' for every 90° elbow and 5' for every 45° elbow.

If venting multiple appliances with one Power Venter, the total combined BTU/hr. input of all appliances must be added together to size the Power Venter.

### POWER VENTER DIMENSIONS



UNIT DIMENSIONS (IN)				
MODEL	(H) HEIGHT	(W) WIDTH	(D) DEPTH	INLET/OUTLET
HSUL-J HST-J HS115-J	7 7/8"	10 1/4"	7"	4"
HSUL-1 HST-1 HS115-1	7 7/8"	11"	7"	4"
HSUL-2 HST-2 HS115-2	9 1/4"	11 1/2"	8 1/2"	6"

MODEL	MOTOR VOLTAGE	CONTROL VOLTAGE	HZ	RPM	WATTS	AMPS	THERM. PROT.
HSUL-J	115	24	60	3000	95	1.26	YES
HST-J	115	24/115	60	3000	95	1.26	YES
HS115-J	115	115	60	3000	95	1.26	YES
HSUL-1	115	24	60	3000	95	1.26	YES
HST-1	115	24/115	60	3000	95	1.26	YES
HS115-1	115	115	60	3000	95	1.26	YES
HSUL-2	115	24	60	3000	224	1.51	YES
HST-2	115	24/115	60	3000	224	1.51	YES
HS115-2	115	115	60	3000	224	1.51	YES

## INSTALLATION RESTRICTIONS

1. This device must be installed by a qualified professional installer in accordance with these instructions. If improperly installed, a hazardous condition such as explosion or carbon monoxide poisoning could result.
2. Do not install the Power Venter on incinerators, incinerating toilets, condensing type appliances or solid-fuel burning appliances.
3. The Power Venter shall only be installed on Natural Gas, LP or Oil-fired appliances.
4. Do not install the Power Venter 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.
5. The Power Venter may only be installed on appliances equipped with a draft hood, draft diverter or barometric draft control.
6. The Power Venter shall not be installed where flue gas temperatures exceed 600° F. at Power Venter inlet.

### FLUE GAS TEMPERATURE VERIFICATION:

A) Consult appliance manufacturer for temperature of gases at the appliance outlet after dilution by draft hood, draft diverter or barometric draft control.

AND

B) Measure temperature of flue gases at the Power Venter inlet at time of installation. Temperature should be measured after appliance and Power Venter have operated for at least 15 minutes, allowing flue gas temperature to stabilize.

### Flue gas temperature at Power Venter inlet must not exceed 600° F.

7. The electrical load controlled through the Fan Proving Switch must not exceed the electrical ratings marked on the Fan Prover.
8. The appliance(s) may only be installed on the suction side of Power Venter.

### WARNING

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

## CAUTIONS

### WARNING

Failure to install, maintain and/or operate the Power Venter in accordance with manufacturer's instructions may result in conditions which can produce bodily injury and property damage.

### WARNING

The Power Venter must be installed by a qualified installer in accordance with these instructions and all local codes or in their absence in accordance with the latest edition of The National Fuel Gas Code (ANSI Z223.1/NFPA #54), NFPA # 31 Oil Burning Equipment, the latest edition of the National Electrical Code (NFPA#70) and the Occupational Safety and Health Act (OSHA) when applicable. Improper installation can create a hazardous condition such as an explosion, fire, electrical shock or carbon monoxide poisoning resulting in property damage, personal injury or death.

"Qualified Installer" shall mean an individual properly trained and licensed.

### WARNING

Disconnect the power supply when making wiring connections or when working around the fan wheel and motor. Failure to do so can result in electrical shock, personal injury, death or property damage.

1. In order to comply with the UL Listing of the Power Venters the Fan Prover must be wired with the appliance so as to prevent the main burner(s) from firing if the Power Venter malfunctions or the flue is blocked. It is not safe to use the Power Venter on millivolt appliances, such as water heaters which employ a combination gas valve/temperature controller, since the Fan Prover can not be wired as described in this booklet. Millivolt appliances require additional, accessory controls.
2. Plan the vent system so that Code required distances are maintained from plumbing and wiring.
3. The Power Venter **motor shaft must be mounted horizontally** to ensure proper operation of the Fan Proving Switch and prevent motor bearing wear.
4. Make certain the power supply is adequate for the fan motor requirements. Do not add the Power Venter to a circuit where the total load is unknown.
5. The installer must verify that the BTU/hr. input of the appliance does not exceed the recommended input of the Power Venter. See selection table on page 1 of these instructions for sizing information.
6. Flue gas temperatures must not exceed 600° F. at the Power Venter inlet. Ambient temperatures surrounding Power Venter must not exceed 104° F. See "Flue Gas Temperature Verification", item # 6 above.
7. "Safety Inspection Of a Previously Used Appliance" (Page 3) must be performed before installation on previously used equipment.

## GENERAL INFORMATION

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

Each Power Venter 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.

### IMPORTANT

- The HSUL, HS115 and HST Series Power Venters may be used for gas fired appliances
- The HST Series Power Venters are the only HS units designed for oil and include integral post-purge Relay/Timer.

## SAFETY INSPECTION OF A PREVIOUSLY USED GAS APPLIANCE

### (Perform prior to Power Venter 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. Perform this procedure prior to any attempt at modifications of the appliance or installation of the Power Venter.
- b. If it is determined there is a condition which could result in unsafe operation, shut off the appliance and advise the owner of the unsafe condition.

Follow the steps below 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.

## SAFETY INSPECTION OF A PREVIOUSLY USED OIL APPLIANCE

### (Perform prior to Power Venter 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 Power Venter.
- 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.

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

VENT SYSTEM TERMINATION

Before installing Power Venter determine location of vent system termination.

TOOLS REQUIRED

- Saber Saw or Cement Drill
- Drill
- 1/8" and 1/4" Drill Bits
- Wood or Masonry Chisel
- Blade Screwdriver or 1/4" Nut Driver
- Wire Cutter/Stripper

**WARNING**

For oil installations do not terminate HS-Series Power Venters on vinyl siding because temperatures can easily exceed 150°F. The SideShot® is the only Tjernlund Power Venter recommended for termination on vinyl siding when using oil.

**NOTE:** Termination of a Side Wall Vent System with a device other than the Tjernlund VH1 Series Vent Hood could affect system performance and result in a possible safety hazard. Consult Vent Hood instructions for complete installation details.

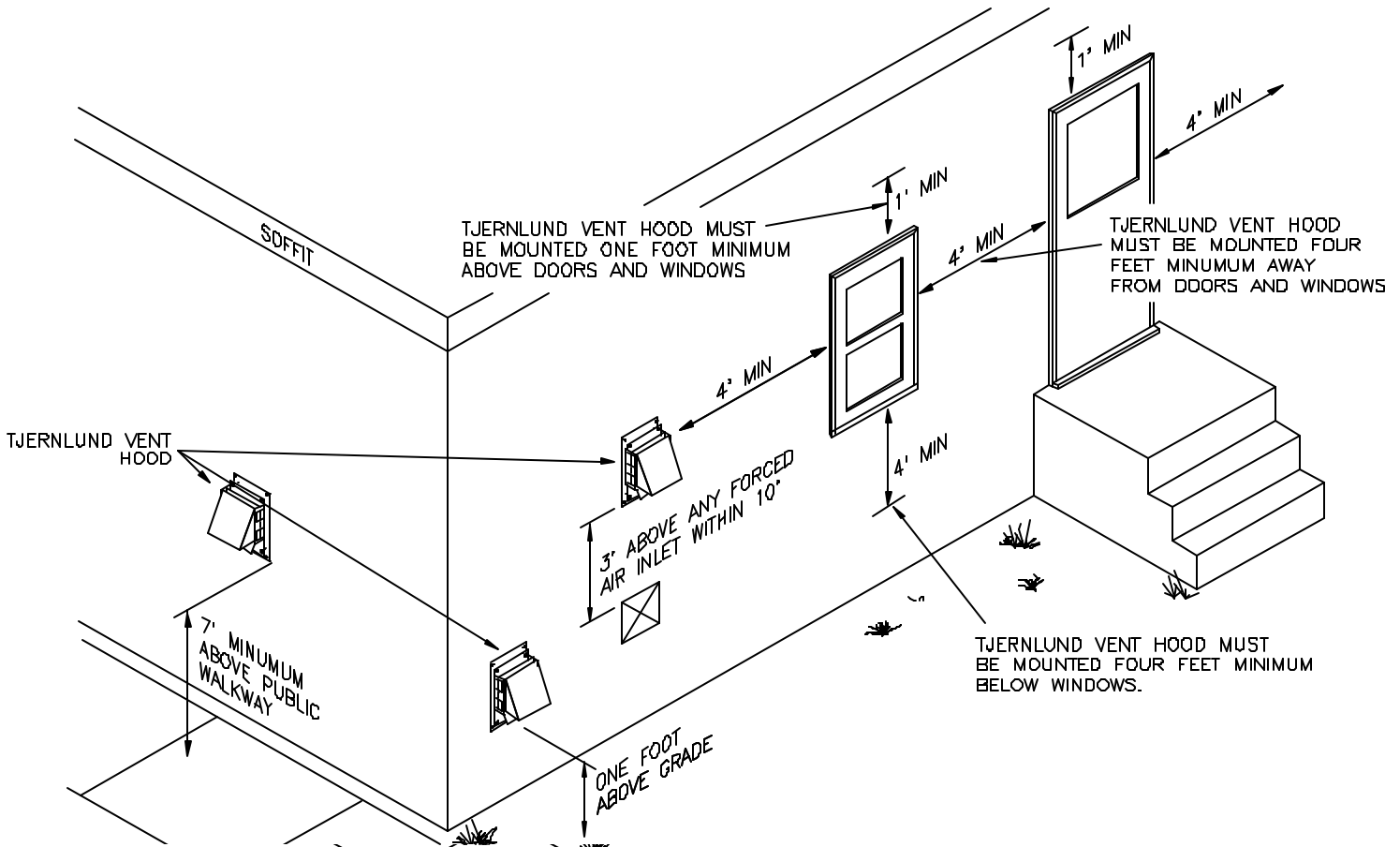
**If possible, locate the Vent Hood on a wall that does not face the direction of prevailing winds. This will diminish the possibility of appliance interruption during periods of extreme winds and prevent oil odors caused by backdrafts.**

If possible, locate the Vent Hood no closer than 3 feet from an inside corner of an L-shaped structure.

CODE REQUIREMENTS

Terminate the vent system so that proper minimum clearances are maintained as cited in the latest edition of the National Fuel Gas Code (NFPA # 54) and the latest edition of NFPA #211, or as follows:

- Not be less than 7 feet above grade when located adjacent to public walk ways.
- At least 3 feet above any forced air inlet located within 10 feet.
- At least 4 feet below, 4 feet horizontally from or 1 foot above any door, window or gravity air inlet into any building.
- At least 12 inches above grade.
- So that the flue gases are not directed so as to jeopardize people, overheat combustible structures or enter buildings, and
- Not less than 2 feet from an adjacent building.



**VERIFY POWER VENTER MODEL SELECTION USING TABLES ON PAGE 1.**

**CODE REQUIREMENTS**

The Power Venter installation must be done in accordance with the following requirements of the latest Edition of the National Fuel Gas Code (NFPA #54):

- All portions of the vent system under positive pressure during operation (on the outlet side of Power Venter) shall be designed and installed so as to prevent leakage of flue or vent gases into the building.
- All appliances must enter the vent system on the inlet side of the Power Venter.
- Provision shall be made to interlock the appliance(s) to prevent the flow of gas to the main burners when the draft system is not performing so as to satisfy the operating requirements of the equipment for safe performance. See "Electrical Wiring" section of this manual for details.

**INSTALLATION RESTRICTIONS**

1. Power Venter must be installed as close as possible to the termination of the vent system to obtain optimal appliance efficiency and to prevent flue gas leakage, (See Diagram A).
2. The Power Venter may be mounted in any position as long as the shaft of the motor remains horizontal, to prevent motor bearing wear and to ensure proper Fan Proving Switch operation, (See Diagram B).

DIAGRAM A

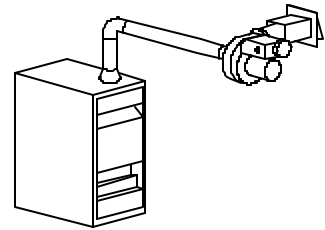
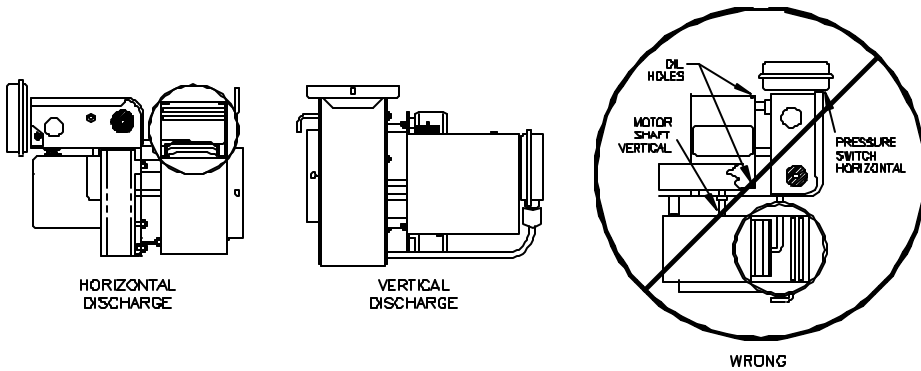


DIAGRAM B



3. The Power Venter housing is single wall. A 6" clearance to combustibles must be maintained for gas and 18" clearance for oil applications, (See Diagram C). If the appliance nameplate specifies a vent connector clearance greater than 6 inches, the greater clearance must be used. Refer to NFPA # 31 for Oil Burning Equipment.

**NOTE:** Clearance to combustibles may be reduced. Please refer to Clearance Table VI in NFPA #54 and your local code authority.

4. Vent pipe transitions, where necessary, must be gradually tapered, (See Diagram D).

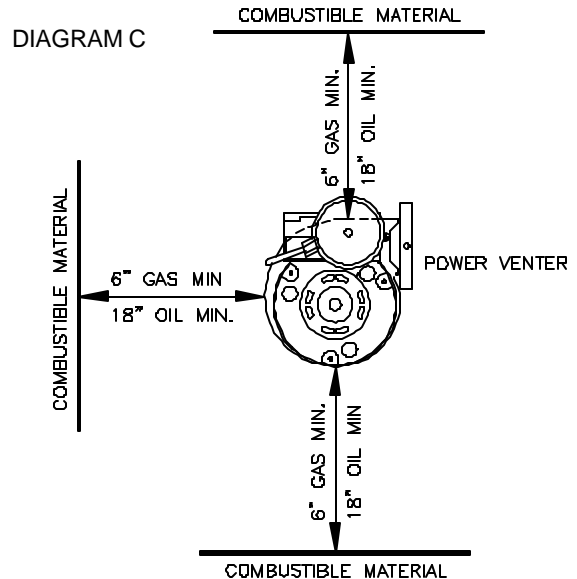
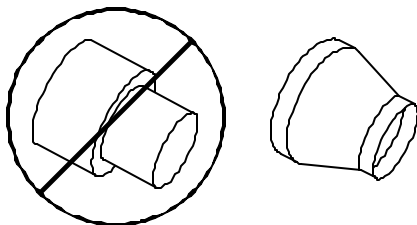
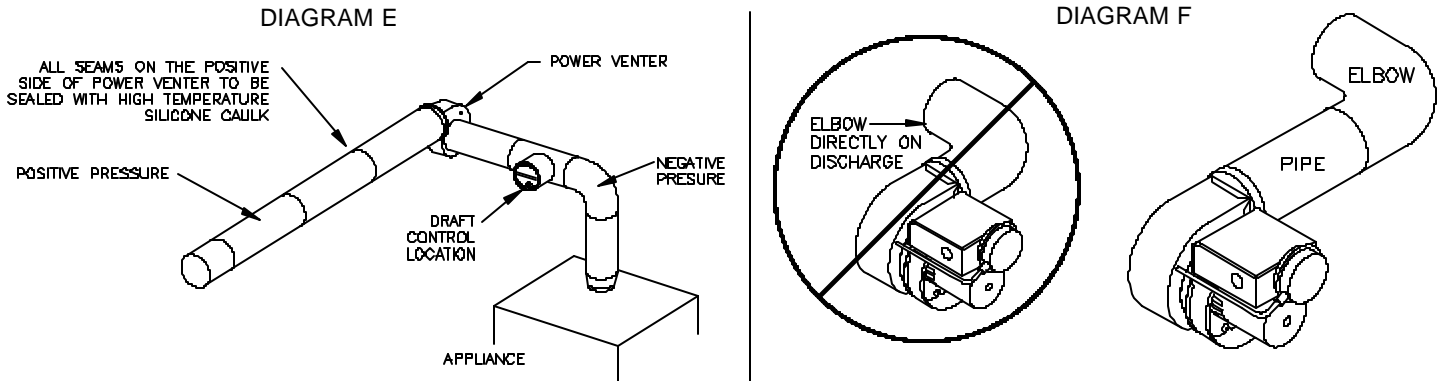


DIAGRAM D

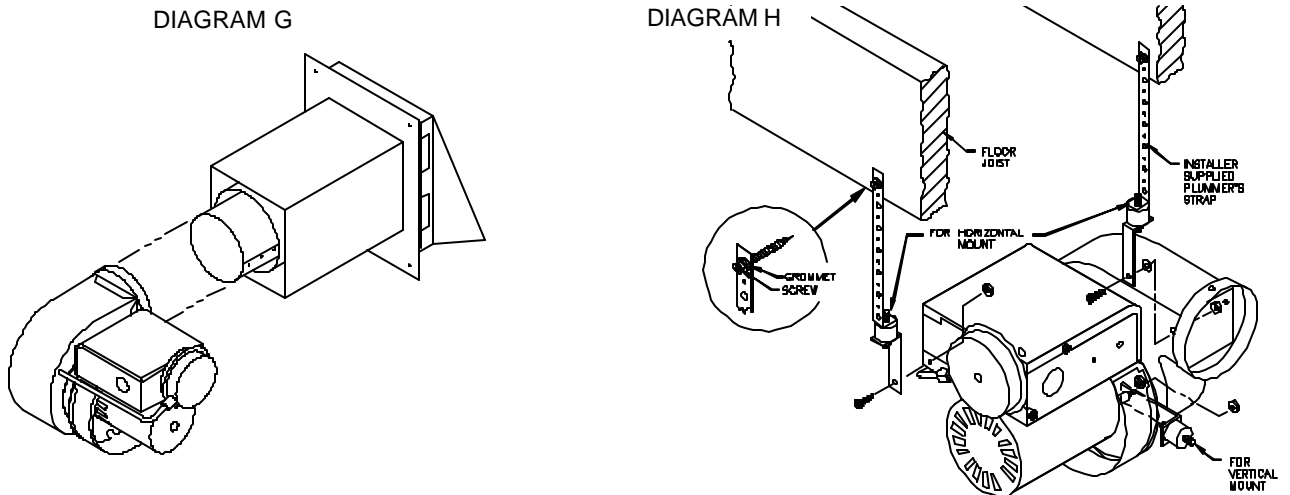


5. Power Venter to vent pipe connections and all joints on the outlet side of the Power Venter must be sealed with high-temperature silicone sealant or aluminum vent pipe tape to prevent flue gas leakage, (See Diagram E).
6. Oil installations require the use of a barometric draft control. Draft control must be installed between the appliance outlet and the Power Venter inlet, (See Diagram E). Oil installations should use the same diameter pipe on the inlet and discharge side of the Power Venter.
7. Allow for a minimum straight section of pipe equal to 3 times the diameter of the vent pipe being used when installing elbows on the discharge side of the Power Venter. For example, if using 4" pipe, allow for 12" of straight pipe before using an elbow, (See Diagram F).



### POWER VENTER MOUNTING

1. Slide the outlet of the Power Venter over the inner sleeve of the Vent Hood and connect them together using a tapered transition fitting if necessary, (See Diagram G). If you are unable to make a direct connection to the Vent Hood, vent pipe may be installed between the Power Venter and Vent Hood. However, all vent pipe connections after the Power Venter must be sealed with high temperature silicone caulk or aluminum vent pipe tape to prevent flue gas leakage, (See Diagram E).
2. To facilitate installation and reduce vibration we have included 2 mounting brackets, 2 rubber isolaters and 2 rubber grommets. One of the brackets may be used temporarily as a "third hand" while positioning it for permanent installation.
3. When installing the Power Venter for horizontal mount, install one of the brackets to the electrical box using the nut/screw provided. Install the other to the damper rod as shown below. When installing the Power Venter for vertical mount, only one bracket is needed. This bracket should be mounted to the motor as shown below. Temporarily support the Power Venter using wire or a ladder and assemble the mounting brackets, (See Diagram H).



4. Verify required vent pipe diameter from "Power Venter Selection" on Page 1. Verify that a full sized barometric control has been installed on appliances not equipped with a draft hood or draft diverter.
5. Install properly sized vent pipe sections from Power Venter inlet to appliance outlet avoiding elbows wherever possible, using only tapered transitions. In most cases a reduction in vent pipe diameter from that of the appliance flue outlet will be necessary.
6. Using four holes as guides, attach vent pipe to Power Venter inlet collar using sheet metal screws.
7. Support vent pipe in accordance with vent pipe manufacturer's instructions.
8. All necessary vent pipe connections after the Power Venter will be under positive pressure during operation. These connections must be sealed with high-temperature silicone sealant or aluminum vent pipe tape supplied by the installer, (See Diagram E).

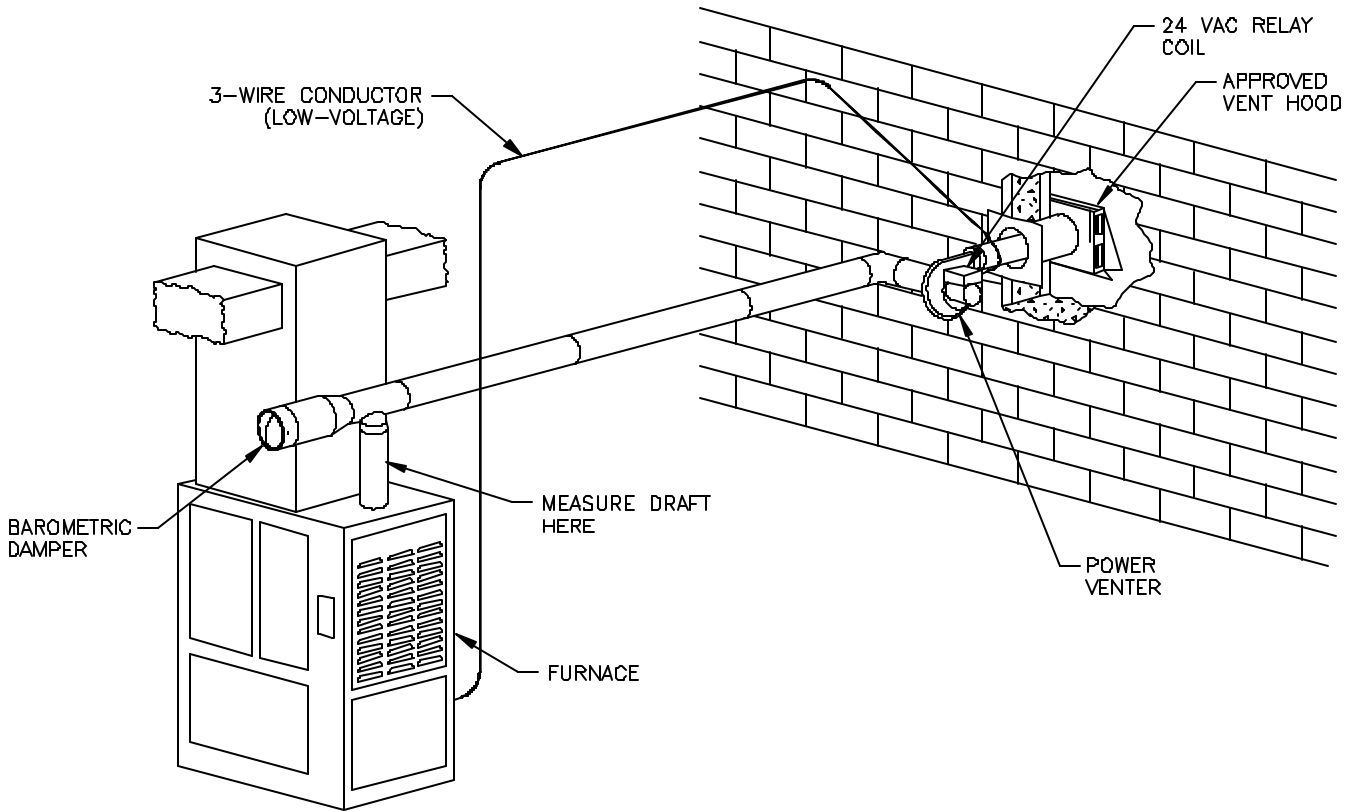
## POWER VENTER ON INDUCED DRAFT GAS APPLIANCES

When installing the Power Venter on induced draft gas appliances, a barometric draft control must be added. The draft control provides pressure relief to neutralize over-drafting and allows a means of draft adjustment for optimum burner efficiency. By adjusting the draft control the installer can obtain the appliance manufacturer's recommended draft setting.

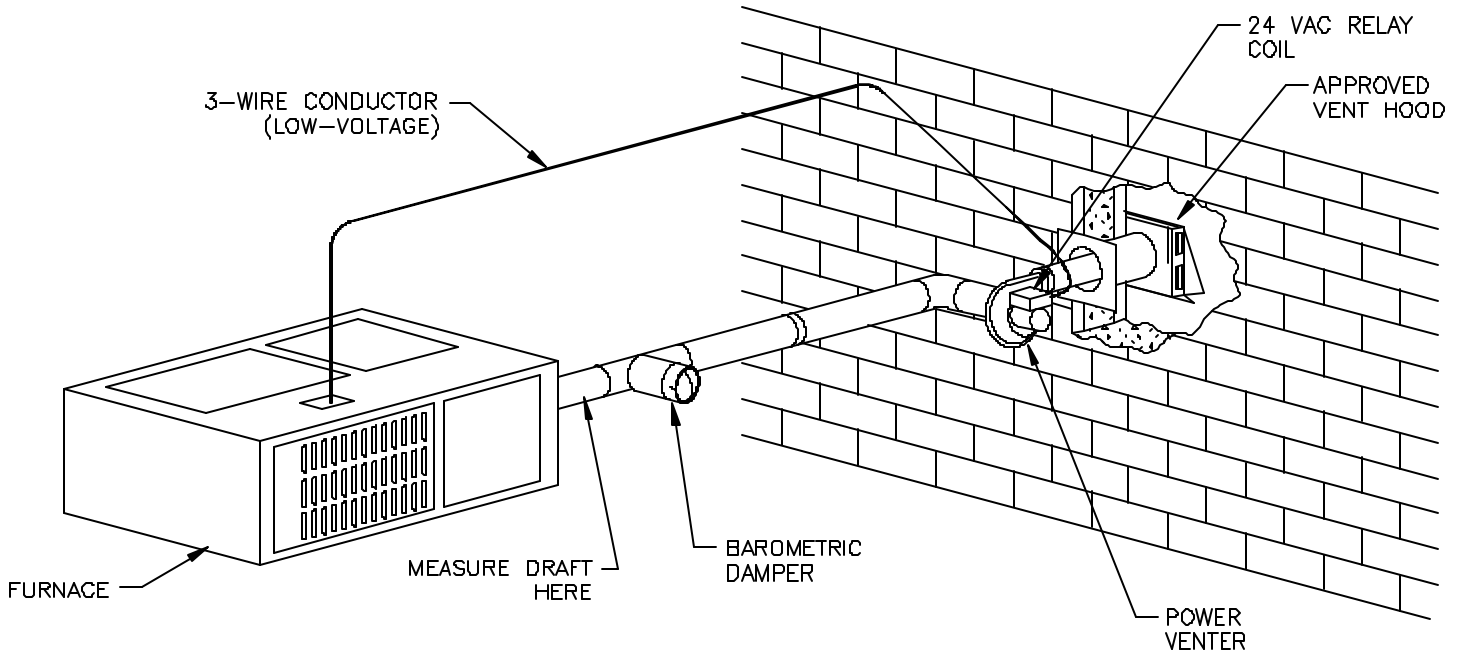
Install the vent pipe and draft control as shown in the diagrams below. The draft control should connect to a tee off of the appliance flue outlet.

The Power Venter may only be used with appliances capable of being chimney vented. It is not suitable for use on high-efficiency, condensing models.

### (UPFLOW APPLIANCE)



### (DOWNFLOW APPLIANCE)





## WIRING RESTRICTIONS

1. All wiring from the Power Venter 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.
2. The electrical contact ratings for the diaphragm Fan Proving Switch are as follows:

3 amps (full load) at 120 VAC  
28VA Pilot Duty (1.16 amps) at 24 VAC  
125 VA Pilot Duty at 120 VAC

The Fan Proving Switch and Power Venter are not suitable for use with loads which exceed the above limitations.

## TJERNLUND POWER VENTER SEQUENCE OF OPERATION

**HSUL OR HST SERIES WIRED AT 24V GAS VALVE:**

As the thermostat senses a need for heat, 24V is applied to the Power Venter relay. The 24 volts applied to the relay coil bring in the 115 volt power to the motor. The air movement generated by the Power Venter closes the Fan Proving Switch contacts which allow the thermostat signal to reach the 24 volt gas valve. The Fan Proving Switch actually becomes the burner controller and will allow the appliance to operate only when the thermostat is calling for heat and the Power Venter is operating. **DO NOT OPERATE THE APPLIANCE WITHOUT THE FAN PROVING SWITCH WIRED INTO THE 24V APPLIANCE CIRCUIT!**

**HSUL OR HST SERIES WIRING TO THERMOSTAT ON SINGLE ZONE FURNACE/BOILER INSTALLATIONS**

As the thermostat senses a need for heat, 24V is applied to the Power Venter relay. The 24 volts applied to the relay coil bring in the 115 volt power to the motor. The air movement generated by the Power Venter closes the Fan Proving Switch contacts which allow the thermostat signal to reach "W" on the 24 volt burner control. The Fan Proving Switch actually becomes the burner controller and will allow the appliance to operate only when the thermostat is calling for heat and the Power Venter is operating. **DO NOT OPERATE THE APPLIANCE WITHOUT THE FAN PROVING SWITCH WIRED INTO THE 24V APPLIANCE CIRCUIT!**

**HS115 SERIES WIRED AT 115V GAS VALVE OR BURNER MOTOR:**

As the thermostat senses a need for heat, 115V is applied to the Power Venter motor. The air movement generated by the Power Venter closes the Fan Proving Switch contacts which allow 115V to be applied to the gas valve or burner motor. The Fan Proving Switch actually becomes the burner controller and will allow the appliance to operate only when the thermostat is calling for heat and the Power Venter is operating. **DO NOT OPERATE THE APPLIANCE WITHOUT THE FAN PROVING SWITCH WIRED INTO THE 115V APPLIANCE CIRCUIT!**

**HST SERIES WIRED TO OIL BURNER:**

Control signal from thermostat, aquastat or primary control is intercepted and routed to the ORANGE of Relay/Timer and BLUE from HST Fan Prover with either 24 VAC or 120 VAC. The Relay/Timer receives current and HST motor is energized. After draft is established within the HST, the Fan Proving Switch closes completing the circuit allowing burner to fire.

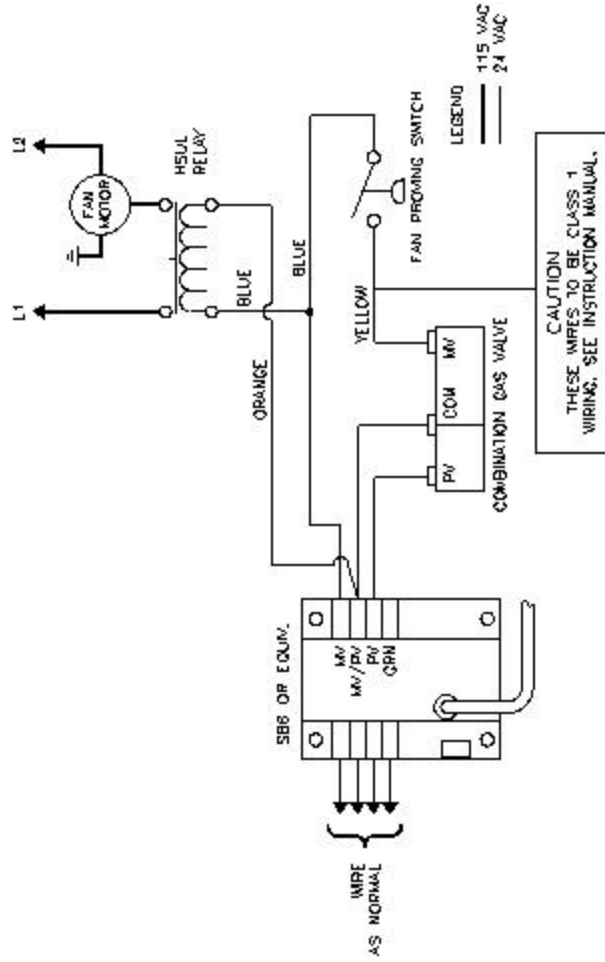
**The ORANGE wire from Relay/Timer can accept either a 24 VAC or 120 VAC control signal.** For most furnace applications it may be easier to interlock with the 24 VAC thermostat circuit. For most boiler applications it may be easiest to interlock with the 120 VAC primary control circuit to the burner 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 HST by circuit checks that are common with solid state controls. Choose the interlock method that best fits your application. **DO NOT OPERATE THE BURNER WITHOUT THE FAN PROVING SWITCH WIRED INTO THE BURNER CIRCUIT!**

**WARNING**

DISCONNECT 115 VAC POWER TO THE APPLIANCE BEFORE PROCEEDING WITH POWER VENTER WIRING. THE POWER MAY BE DISCONNECTED BY TRIPPING THE CIRCUIT BREAKER OR REMOVING THE FUSE PROTECTING THE APPLIANCE. ELECTRICAL CONDUIT AND 24 VAC WIRING MUST BE ROUTED AWAY FROM ANY HOT SURFACES. USE ADEQUATE CONDUIT SUPPORTS WHERE NECESSARY. ALL WIRING MUST COMPLY WITH APPLICABLE CODES AND ORDINANCES. ALL 115 VAC WIRING MUST USE RIGID OR SEMI-RIGID METAL CONDUIT WITH 18 AWG, 300 VAC, 90 DEGREE C-RATED COPPER WIRE.

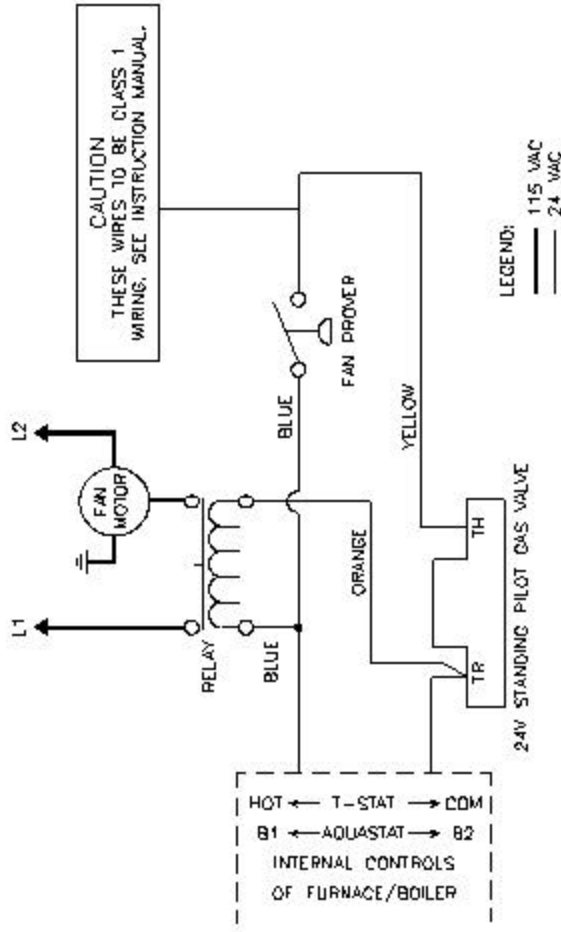
**NOTE:**

The following wiring diagrams are designed to satisfy most installations. Should your installation be different from those shown in these instructions, please contact the Tjernlund Technical Service Department for assistance at 1-800-255-4208, 7:30 - 4:30 CST.



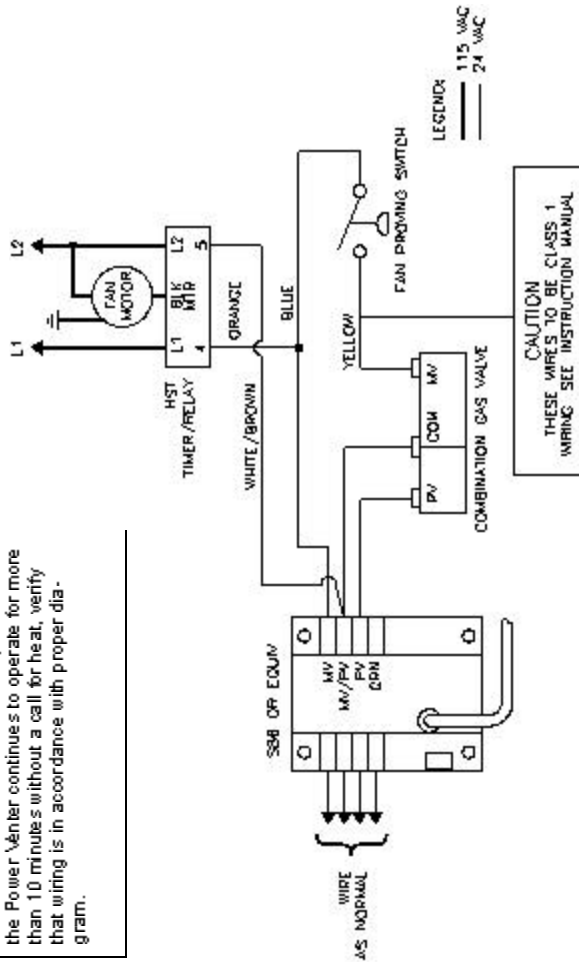
NOTES: The Power Venter is always interlocked with the gas valve of the appliance. Wire all other furnace/boiler controls as normally done when conventional venting before continuing. If your appliance is not equipped with the controls shown on this diagram, determine which terminals on the gas valve are "HOT" and "COM" and follow the steps below.

1. Cut the wire that is factory installed to the TH or MV (HOT) terminal of the gas valve while leaving approximately 2 inches of wire still connected to the terminal.
2. Connect both BLUE wires in Power Venter to the wire that was cut from the TH or MV (HOT) terminal which is **not** connected to the gas valve.
3. Connect the YELLOW in the Power Venter to the wire connected to the TH or MV (HOT) terminal of the gas valve.



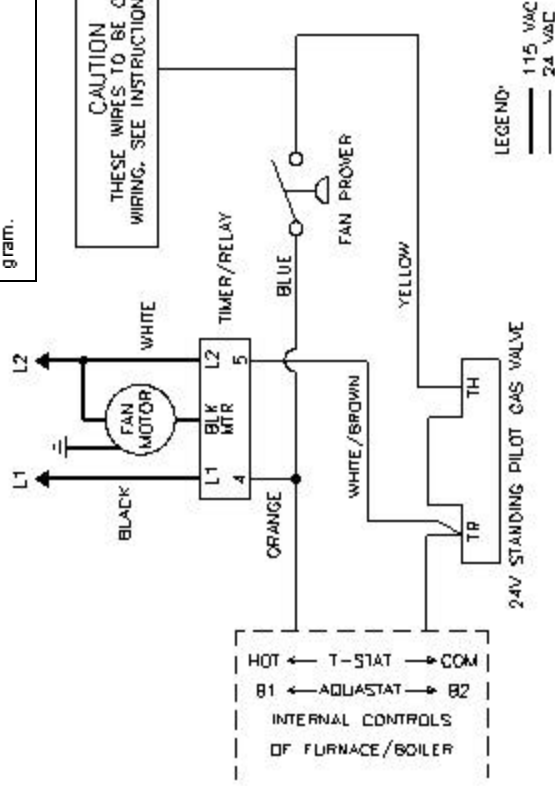
4. Connect the ORANGE wire in the Power Venter to the TR or MV/PV (COM) terminal of the 24V gas valve. NOTE: Do not remove the factory installed wire from this terminal.
5. Connect the BLACK wire in the Power Venter to L1.
6. Connect the WHITE wire in the Power Venter to L2.

**NOTE:** Power Venter may operate independently of burner circuit when power is initially supplied to L1 and L2 connections of the Relay/Timer. If the Power Venter continues to operate for more than 10 minutes without a call for heat, verify that wiring is in accordance with proper diagram.



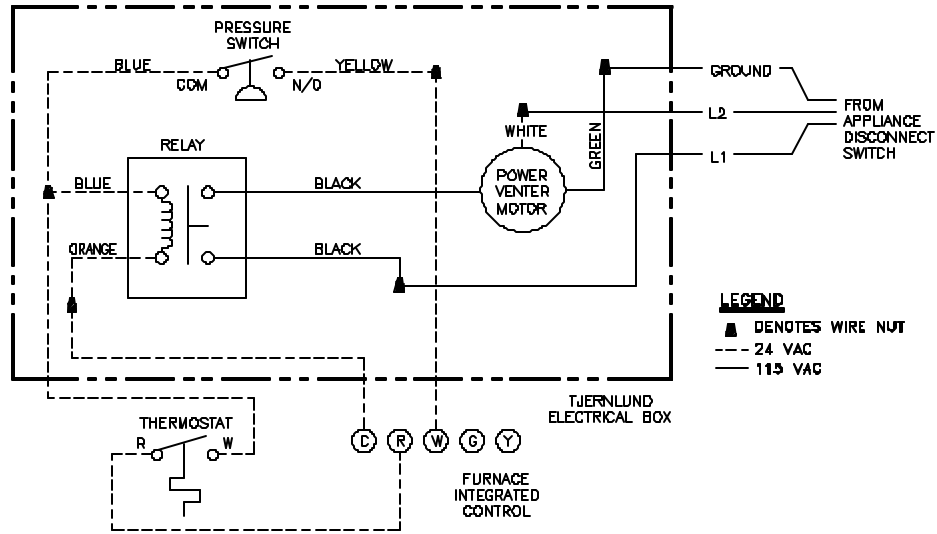
- NOTES:** The Power Venter is always interlocked with the gas valve of the appliance. Wire all other furnace/boiler controls as normally done when conventional venting before continuing. If your appliance is not equipped with the controls shown on this diagram, determine which terminals on the gas valve are "HOT" and "COM" and follow the steps below:
1. Cut the wire that is factory installed to the TH or MV (HOT) terminal of the gas valve while leaving approximately 2 inches of wire still connected to the terminal.
  2. Connect both the BLUE wire from Fan Proving Switch and the ORANGE wire connected to terminal #4 on Relay/Timer in Power Venter to the wire that was removed from the TH or MV (HOT) terminal on gas valve.
  3. Connect the YELLOW from Fan Proving Switch to the TH or MV (HOT) terminal of the gas valve.

**NOTE:** Power Venter may operate independently of burner circuit when power is initially supplied to L1 and L2 connections of the Relay/Timer. If the Power Venter continues to operate for more than 10 minutes without a call for heat, verify that wiring is in accordance with proper diagram.

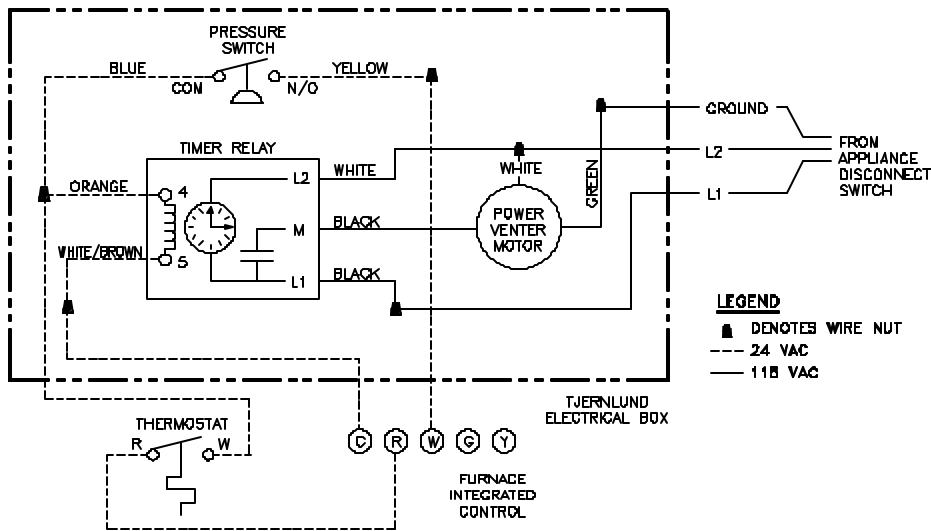


- Wire all other furnace/boiler controls as normally done when conventional venting before continuing. If your appliance is not equipped with the controls shown on this diagram, determine which terminals on the gas valve are "HOT" and "COM" and follow the steps below:
4. Connect the WHITE/BROWN wire on terminal #5 of Relay/Timer in Power Venter to the TR or MV/PV (COM) terminal on the gas valve.  
**NOTE:** Do not remove the factory installed wire from this terminal.
  5. Connect the BLACK wire in the Power Venter to L1.
  6. Connect the WHITE wire in the Power Venter to L2.

## HSUL SERIES CONNECTED WITH 24V THERMOSTAT ON SINGLE ZONE GAS EQUIPMENT



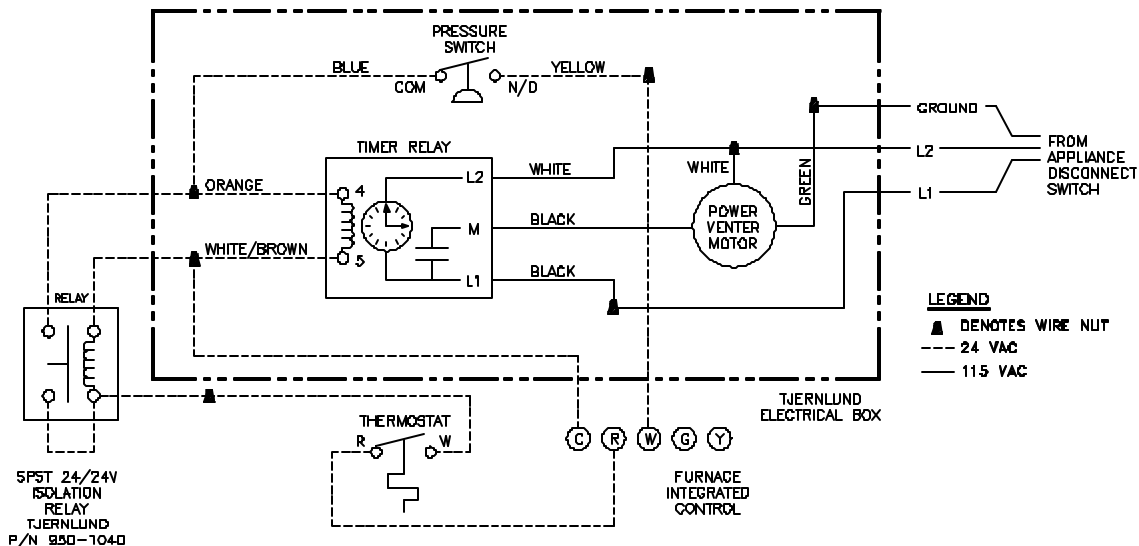
## HST SERIES CONNECTED WITH 24V THERMOSTAT ON SINGLE ZONE GAS OR OIL EQUIPMENT



**NOTE:**  
 Power Venter may operate independently of burner circuit when power is initially supplied to L1 and L2 connections of the Relay/Timer. If the Power Venter continues to operate for more than 10 minutes without a call for heat, verify that wiring is in accordance with proper diagram.

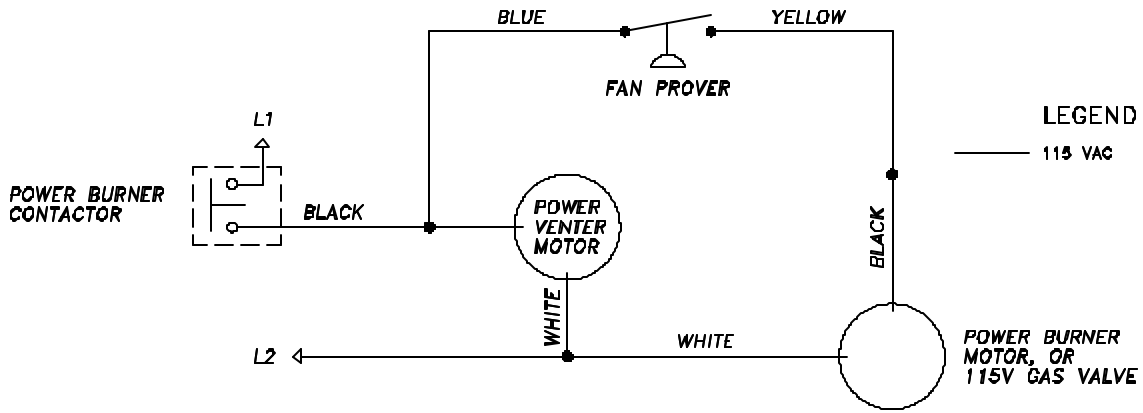
**NOTE:** This wiring diagram may not be compatible with certain set-back thermostats. If the Power Venter runs without a call for heat, (after initial post-purge time delay from 1-10 minutes), an isolation relay will have to be added to isolate the 4 & 5 coil inputs on Relay/Timer. See diagram below for wiring with isolation relay.

## HST SERIES CONNECTED WITH SET BACK THERMOSTAT AND ISOLATION RELAY (NECESSARY IF HST CYCLES ERRATICALLY)

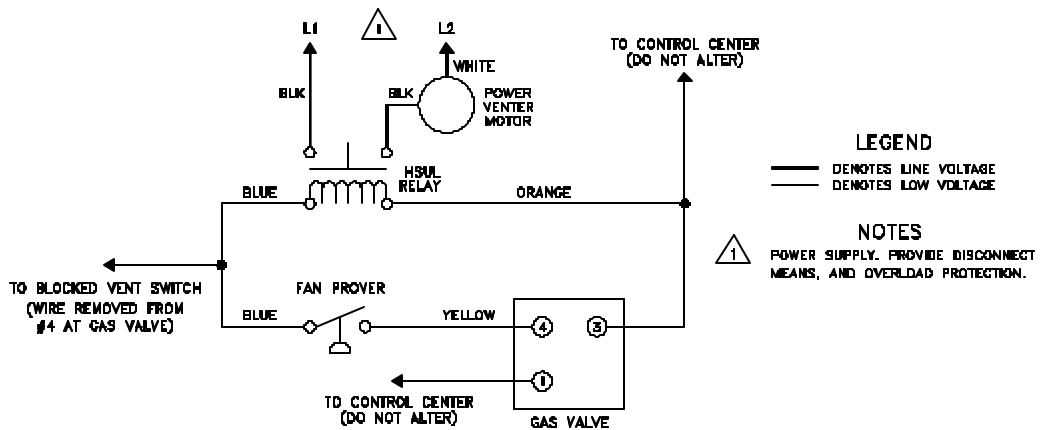


**NOTE:**  
 Power Venter may operate independently of burner circuit when power is initially supplied to L1 and L2 connections of the Relay/Timer. If the Power Venter continues to operate for more than 10 minutes without a call for heat, verify that wiring is in accordance with proper diagram.

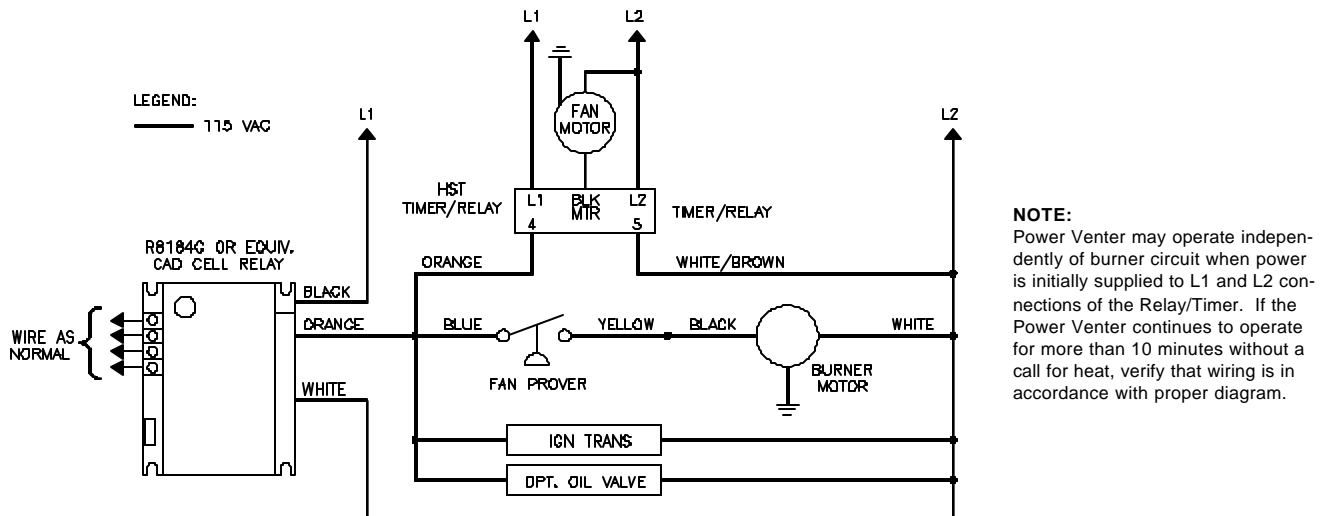
**HS115 SERIES CONNECTED TO ANY 115V BURNER MOTOR OR GAS VALVE  
(BURNER MOTOR OR GAS VALVE LESS THAN 3 AMPS @ 120 VAC)**



**HSUL SERIES CONNECTED TO A 24V GAS HONEYWELL  
SMART VALVE (SV9500 - SV9600 SERIES)**



**HST SERIES CONNECTED TO AN R8184G WITH THE APPLIANCE  
BURNER MOTOR LESS THAN 3 AMPS @ 120 VAC**



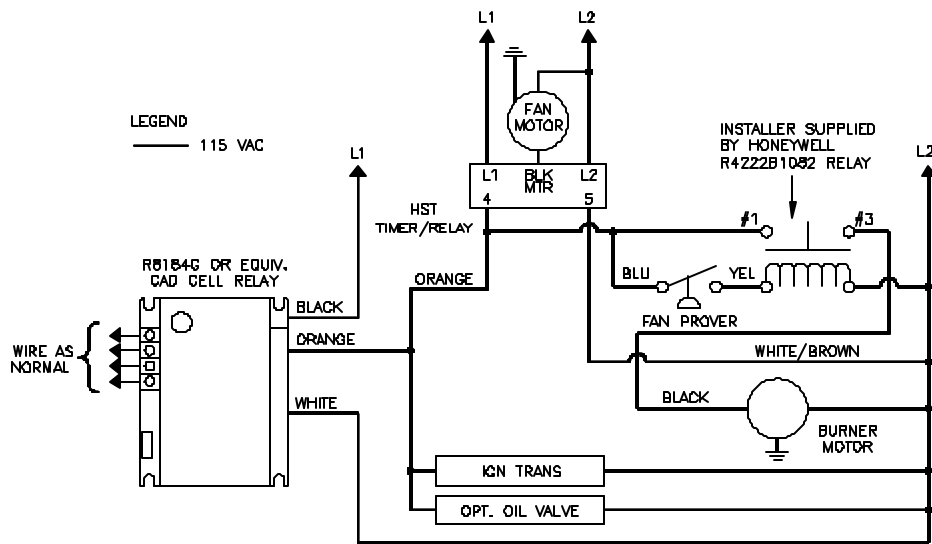
NOTES: The Power Venter is usually interlocked with the primary control of the appliance. Wire all other furnace/boiler controls as normally done when conventional venting before continuing. Disconnect power from the appliance before attempting to interlock Power Venter.

1. Disconnect the BLACK burner motor wire from the ORANGE wire of the R8184G.
2. Reconnect the BLACK burner motor wire to the YELLOW wire in the Power Venter electrical box.
3. Connect the ORANGE wire from R8184G to the ORANGE and BLUE wires in Power Venter electrical box.

NOTE: Ignition transformer will continue to be attached to the ORANGE of the cad cell relay.

4. Connect the WHITE/BROWN wire in Power Venter electrical box to the WHITE wire on the burner motor.
5. Connect the BLACK wire in Power Venter to L1.
6. Connect both WHITE wires in the Power Venter to L2.

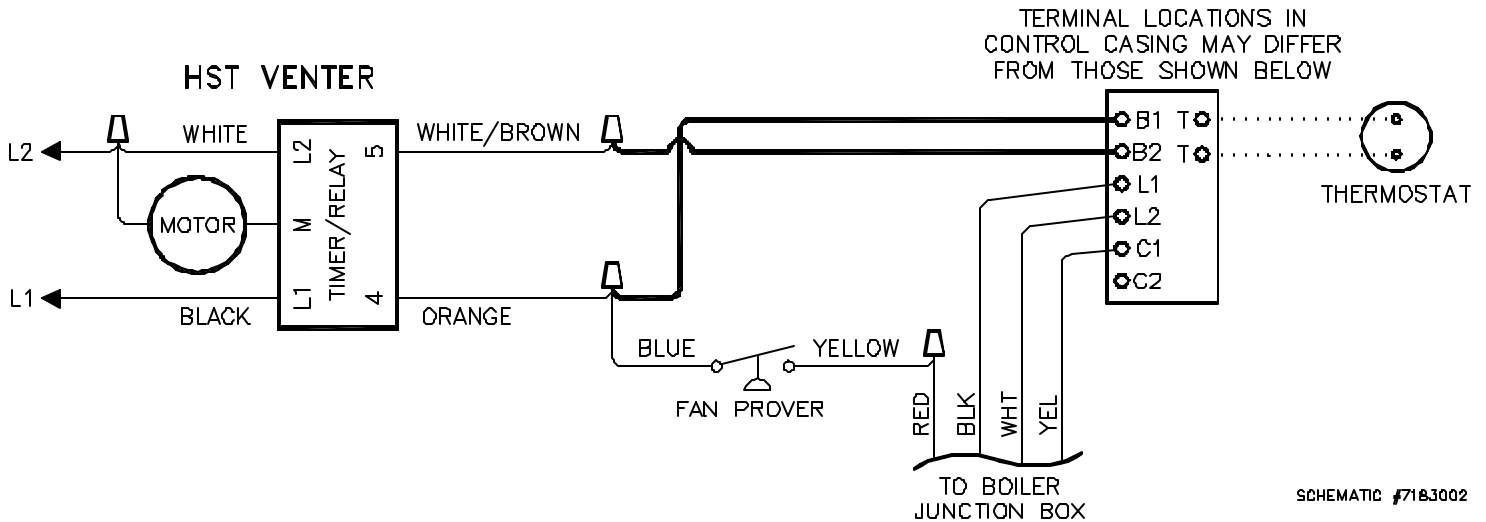
**HST SERIES CONNECTED TO AN R8184G WITH THE APPLIANCE  
BURNER MOTOR GREATER THAN 3 AMPS AND LESS THAN 7.4 AMPS @ 120 VAC**



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

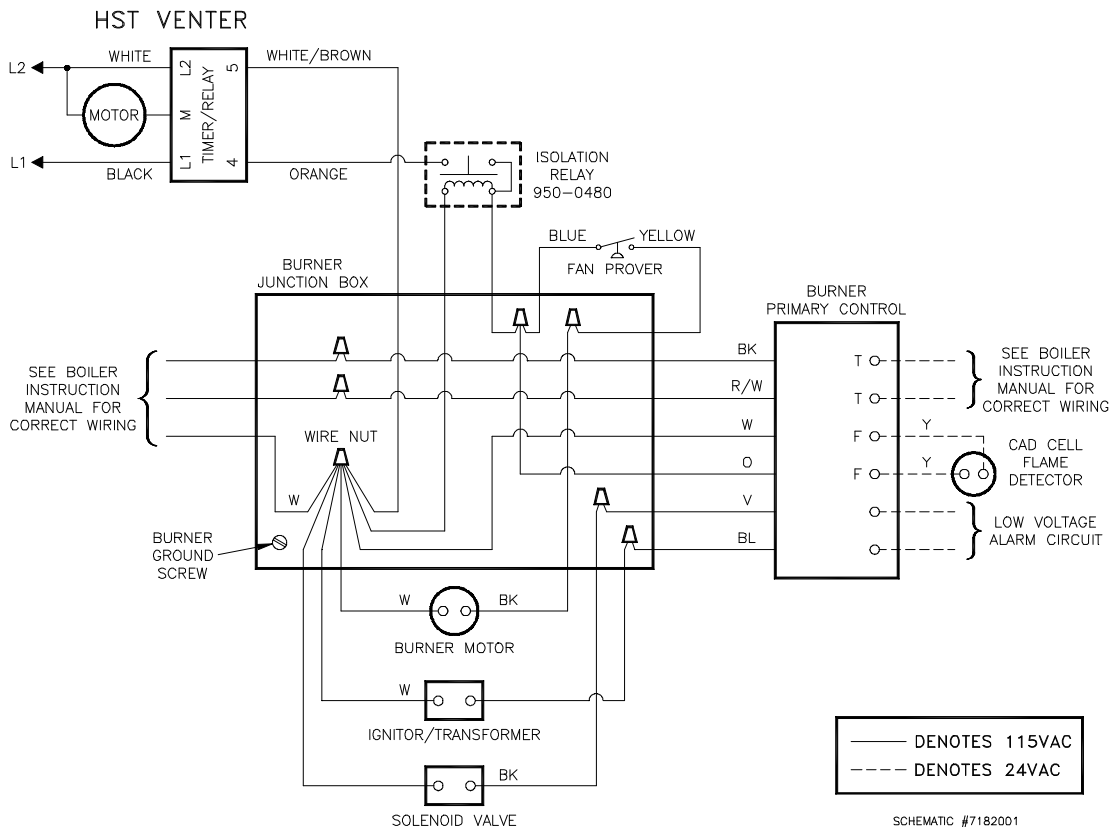
1. Disconnect the BLACK burner motor wire from the ORANGE wire of the R8184G Cad Cell Relay.
2. Connect the BLACK burner motor wire to terminal 3 of the installer supplied R4222B1082 relay.
3. Connect the ORANGE wire of the R8184G to the ORANGE and BLUE wires in the Power Venter and terminal #1 on R4222B1082.
4. Connect the YELLOW wire from the Power Venter to one side of coil on installer supplied R4222B1082 relay.
5. Connect Common of R4222B1082 coil to L2.
6. Connect the WHITE and WHITE/BROWN wire in the Power Venter to L2.
7. Connect the BLACK wire in the Power Venter to L1.

**HST WIRED WITH AQUASTAT CONTROLLED OIL BURNERS**



SCHEMATIC #71B3002

## HST CONNECTED TO A CARLIN PRIMARY CONTROL

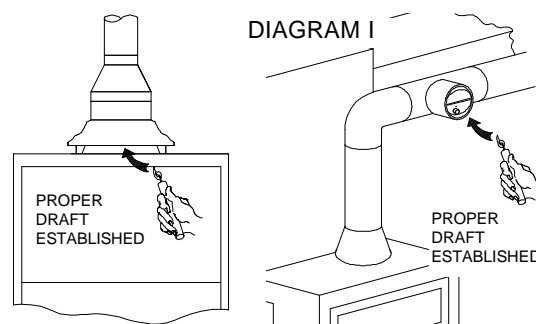


## SAFETY INTERLOCK / COMBUSTION AIR TEST

### ⚠ WARNING

The Power Venter Fan Proving Switch is designed to disable the appliance gas valve or burner motor upon Power Venter failure only! It is not designed and cannot replace, regular vent system inspection, appliance servicing and combustion testing.

1. Close all doors and windows of the building. If the appliance is installed in a utility room or closet, close the entrance door to this room. Close fireplace dampers.
2. Turn on clothes dryer and all exhaust fans such as range hoods, bathroom exhausts and whole house fans to maximum speeds. Do not operate a fan used strictly for Summer exhausting.
3. Following the appliance manufacturer's instructions, place the appliance in operation, set thermostat for continuous operation.



### GAS

After allowing appliances to operate for five minutes, test for spillage at the "draft hood relief opening" (draft diverter or draft control). Approved method follows (ANSI Z2331, section 8.6): "CHECKING THE DRAFT. Vent connected gas utilization equipment shall be operated for several minutes and checked to see that the combustion products are going up the chimney or gas vent properly, by passing a lighted match or taper around the edge of the relief opening of the draft hood. If not, the combustion products will tend to extinguish this flame. If the combustion products are escaping from the relief opening of the draft hood, the equipment shall not operate until proper adjustments or repairs are made to provide adequate draft through the chimney or gas vent.", (See Diagram I). If the draw of the flame or smoke appears to be excessive, make necessary adjustments to barometric draft control (if needed) or follow the "Power Venter Air Flow Damper Adjustment" procedure outlined on page 15.

### OIL

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 Power Venter draft adjustment must be repositioned accordingly. Measure over-fire draft after repositioning Power Venter draft adjustment, (See Diagram J, Page 15).

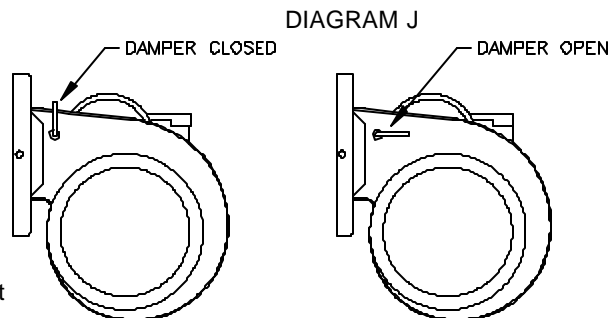
4. Next, turn on all other fuel-burning appliances within the same room so they will operate at their full input. Repeat Step 3 above, checking the draft on each appliance.

## POWER VENTER AIR FLOW DAMPER ADJUSTMENT

The Air Flow Damper Adjustment on the Power Venter is factory set for maximum air flow. Operating a properly sized Power Venter at its maximum setting will assure that combustion gases are safely removed to the outside. If the Power Venter has excess venting capacity than what is required for this application, operating the Power Venter with the air-flow adjustment at the maximum setting may draw more dilution air than necessary.

The Air Flow Damper Adjustment may be set by use of a combustion analyzer, inclined manometer or draft gauge. Alternatively, the damper adjustment can be set using a smoke candle or taper, as follows:

1. With all exhaust fans operating, air inlets closed and all appliances firing (as instructed above), hold a lighted match or taper around the edge of the relief opening of the draft hood(s) or barometric draft control, (See Diagram I).
2. Set Air Flow Adjustment by loosening locknut and turning damper rod handle. CAUTION: HANDLE MAY BE HOT, use pliers to move handle. Position of rod handle indicates the position of Air Flow Adjustment inside housing, (See Diagram J).
3. Using pliers, move handle towards minimum draft setting until spillage is detected at draft hood relief opening, then re-open Air Flow Adjustment just enough to eliminate spillage.
4. Lock Air Flow Adjustment at desired setting by tightening locknut.
5. Return doors, windows, exhaust fans, fireplace dampers and appliances to their previous conditions of use.



## COMBUSTION AIR

Adequate combustion air is vital for proper combustion and for safe venting. Likewise, for proper Power Venter 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 local or national codes. Tjernlund's IN-FORCER™ Combustion Air Intake Systems provide a convenient interlocked way to provide combustion air to the equipment room. When installing a Power Venter 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 end of burner cycle, outside air enters the structure through the Power Venter during appliance off cycle.

## HST SERIES POST PURGE TIMER ADJUSTMENT

1. Disrupt 115 VAC power to the Power Venter.
2. Loosen the two screws and remove junction box cover.
3. The post purge Relay/Timer is marked adjustable delay control. The adjustment is made by turning the small slotted screw. Turn it counter clockwise to increase the delay, clockwise to decrease the delay. Nominal adjustment range is 1 to 10 minutes. NOTE: Do not overturn adjustment on Relay/Timer. This will damage Relay/Timer and void warranty.

## MAINTENANCE

1. Oil motor every six months with 2 drops of S.A.E. #20. The oil ports are located on the top ends of the motor. **Magnetek motors on the HSJ and HS1 Series do not need to be oiled.**
2. The end-user must semiannually inspect the Vent Hood and vent pipe for blockage, corrosion and leaks.
3. A vent system inspection must be performed annually by a qualified service agency. The inspection should include the operation circuit check, safety interlock test, combustion air test and a visual inspection of the complete vent system for corrosion, blockage or leaks. Any corrosion, blockage or leaks detected must be repaired or replaced immediately.

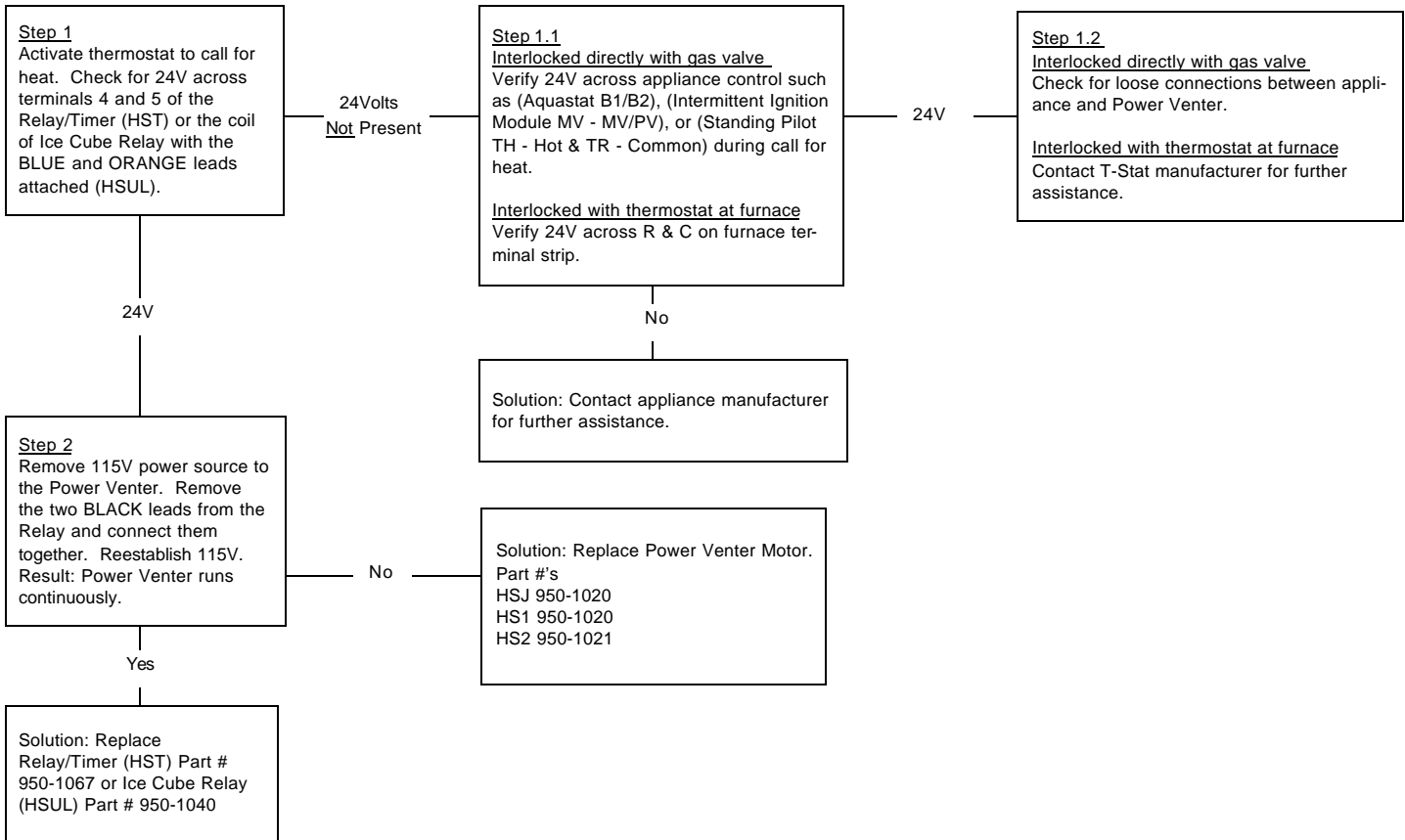
## TROUBLESHOOTING

### WARNING

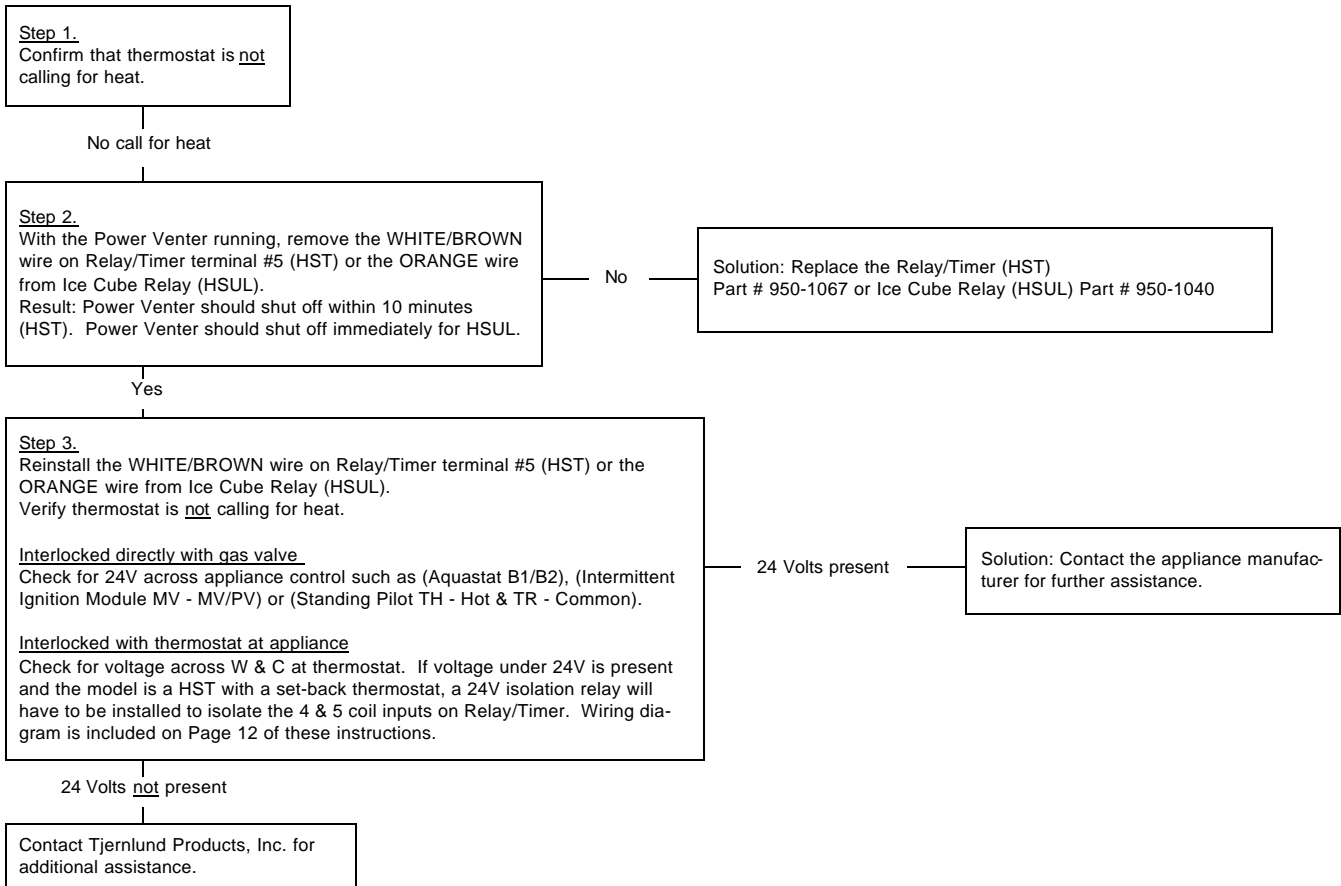
The following guide is intended to be used if a problem occurs during the use of the Power Venter. At several steps throughout the guide you will be required to measure 115 Volts with a voltmeter. **Extreme caution must be exercised to prevent injury.** If you are unable to determine the defective part with the use of this guide, call your Tjernlund distributor or Tjernlund Products direct at 1-800-255-4208 for further assistance.



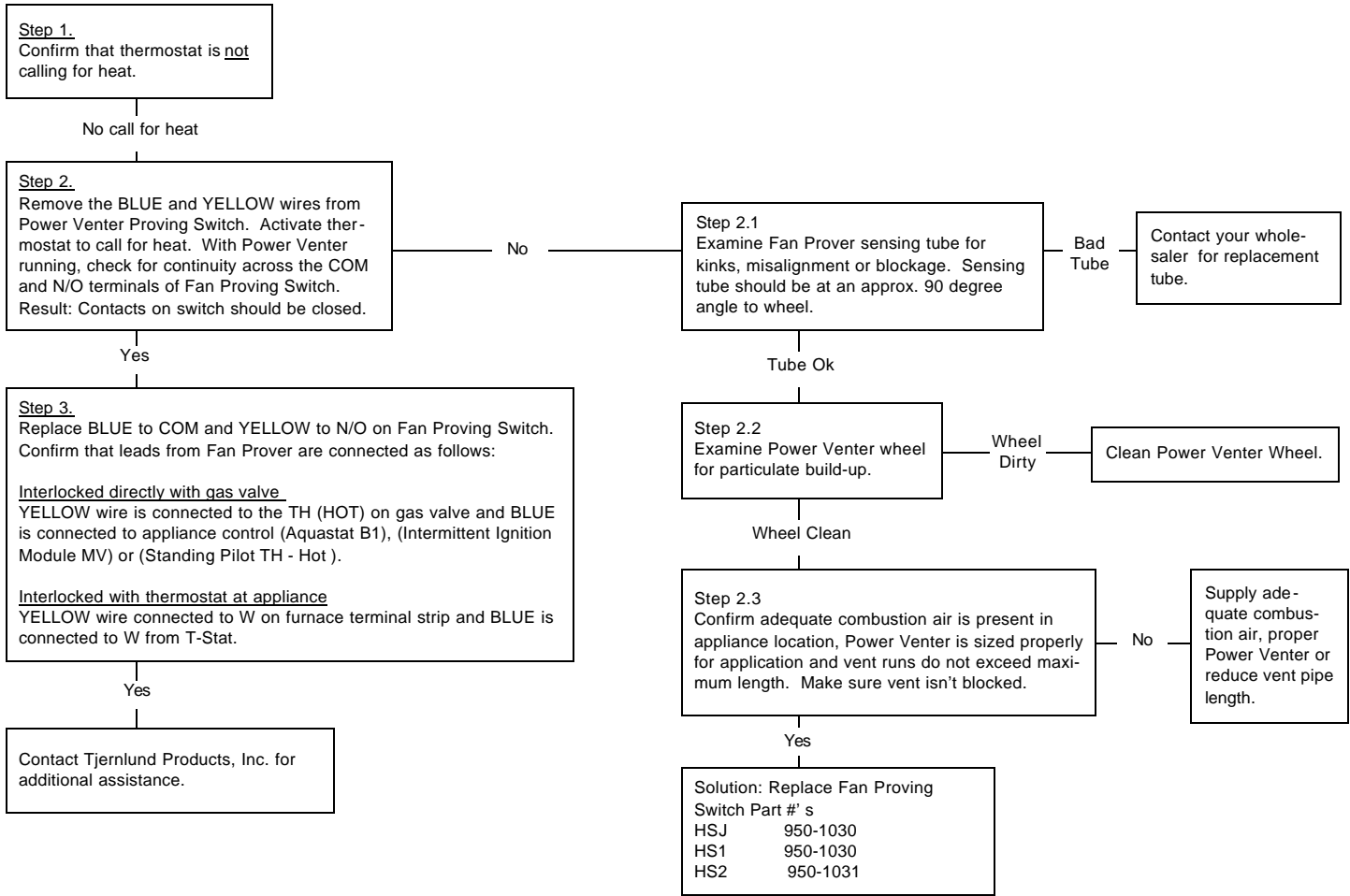
**SYMPTOM 1: POWER VENTER DOES NOT RUN DURING CALL FOR HEAT (HSUL & HST SERIES ON GAS OR HST SERIES ON OIL WIRED WITH SINGLE ZONE 24V THERMOSTAT)**



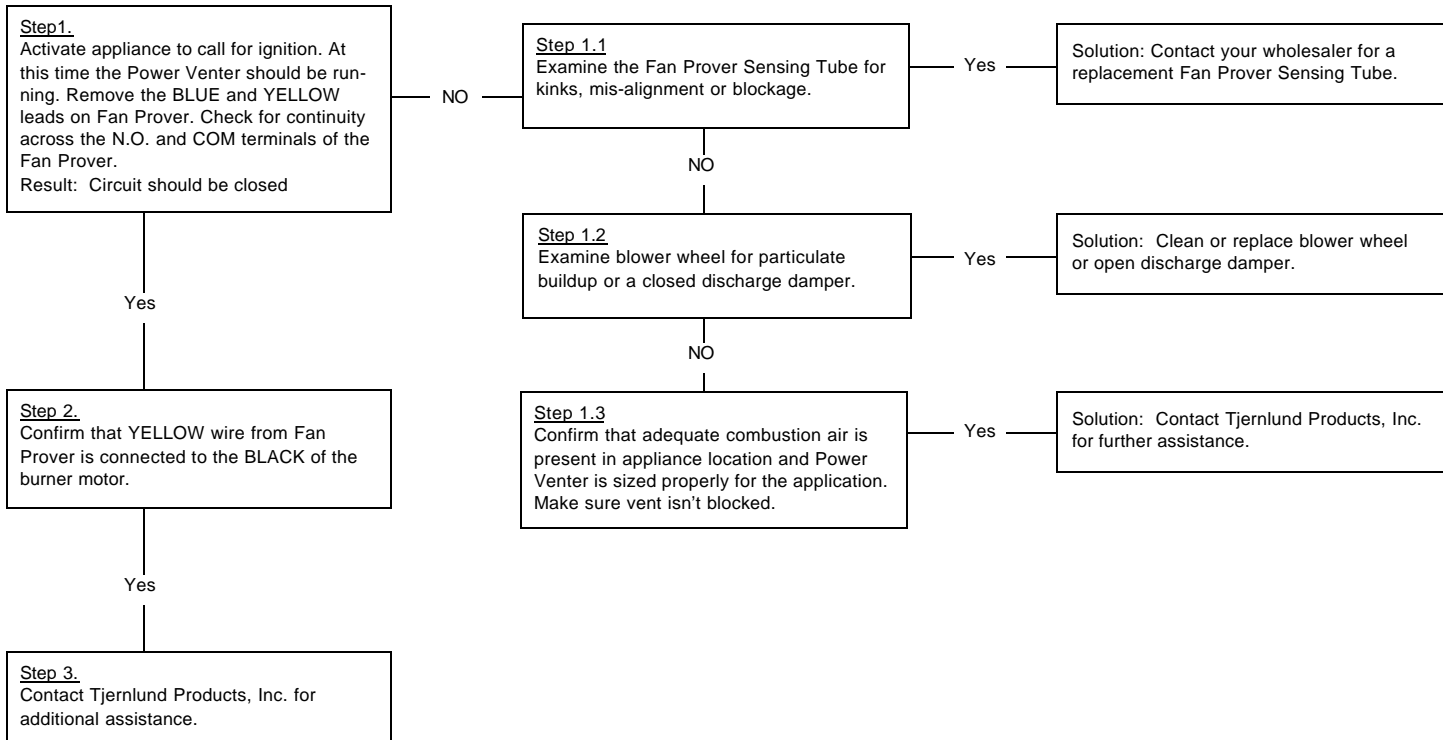
**SYMPTOM 2: POWER VENTER RUNS CONTINUOUSLY / ERRATICALLY (HSUL & HST SERIES ON GAS OR HST SERIES ON OIL WIRED WITH SINGLE ZONE 24V THERMOSTAT)**



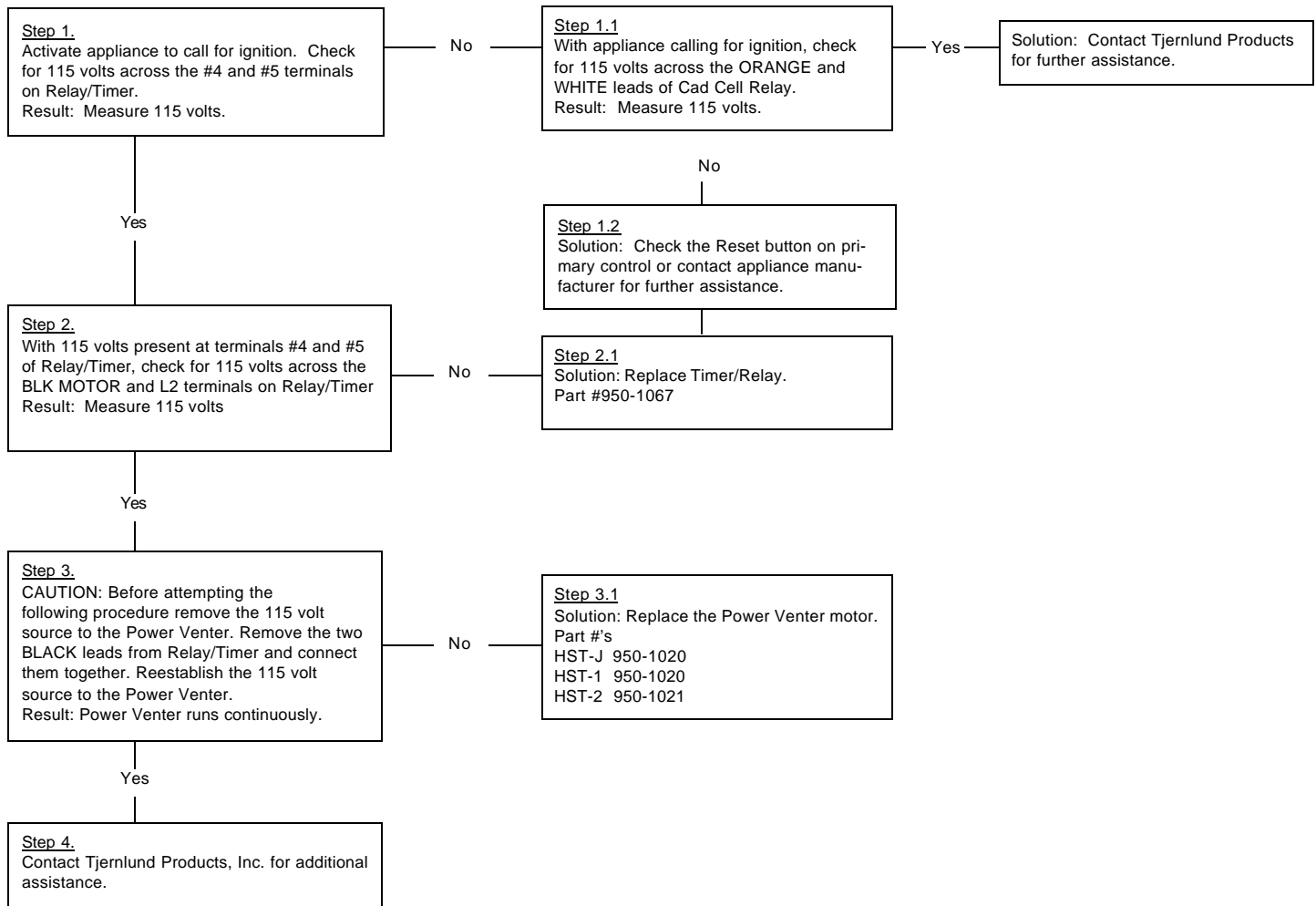
**SYMPTOM 3: POWER VENTER RUNS BUT APPLIANCE DOESN'T (HSUL & HST SERIES ON GAS OR HST SERIES ON OIL WIRED WITH SINGLE ZONE 24V THERMOSTAT)**



**SYMPTOM 1: POWER VENTER RUNS BUT BURNER DOES NOT FIRE (HST SERIES ON OIL WIRED WITH R8184 SERIES PRIMARY CONTROL)**



**SYMPTOM 2: POWER VENTER DOES NOT RUN DURING CALL FOR HEAT  
(HST SERIES ON OIL WIRED WITH R8184 SERIES PRIMARY CONTROL)**



**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 or [www.tjernlund.com](http://www.tjernlund.com).

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

1. Model number of the Power Venter
2. Name and address of installer and service agency
3. Date of original installation and dates any service work was performed
4. Details of the problem

**LIMITED PARTS WARRANTY AND CLAIM PROCEDURE**

Tjernlund Products, Inc. warrants the components of its products for one year 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. Products that are tampered with, damaged or defective due to malfunctioning appliances are not covered under this warranty. This warranty DOES NOT cover the complete Power Venter 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 one year warranty period. If the part is over 18 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 one year. All receipts should include the date code of the Power Venter to ensure that the defective component corresponds with the complete unit. This will help preclude possible credit refusal.

Please direct any contractor who wants to make a warranty claim to follow these instructions:

- 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 Power Venter date code component was taken from. The date code is located on the electrical box cover plate. If Power Venter date code is older than 18 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.

### REPLACEMENT PARTS

**MODEL HSUL-J**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1010	WHEEL KIT
950-1030	FAN PROVER KIT
950-1040	RELAY KIT

**MODEL HSUL-1**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1011	WHEEL KIT
950-1030	FAN PROVER KIT
950-1040	RELAY KIT

**MODEL HSUL-2**

PART NUMBER	DESCRIPTION
950-1021	MOTOR KIT W/WHEEL
950-1012	WHEEL KIT 3/8" BORE
950-1031	FAN PROVER KIT
950-1040	RELAY KIT

**MODEL HST-J**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1010	WHEEL KIT
950-1030	FAN PROVER KIT
950-1067	RELAY/TIMER

**MODEL HST-1**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1011	WHEEL KIT
950-1030	FAN PROVER KIT
950-1067	RELAY/TIMER

**MODEL HST-2**

PART NUMBER	DESCRIPTION
950-1021	MOTOR KIT W/WHEEL
950-1012	WHEEL KIT 3/8" BORE
950-1031	FAN PROVER KIT
950-1067	RELAY/TIMER

**MODEL HS115-J**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1010	WHEEL KIT
950-1030	FAN PROVER KIT

**MODEL HS115-1**

PART NUMBER	DESCRIPTION
950-1020	MOTOR KIT
950-1011	WHEEL KIT
950-1030	FAN PROVER KIT

**MODEL HS115-2**

PART NUMBER	DESCRIPTION
950-1021	MOTOR KIT W/WHEEL
950-1012	WHEEL KIT 3/8" BORE
950-1031	FAN PROVER KIT

### 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 ONE YEAR LIMITED 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 (1) year 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