



V E N T I N G   G U I D E  
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May 2007



**FIELD** CONTROLS  
**Solutions for the Great Indoors®**

# SWG Power Venter

## (Outdoor Mounted Power Venters for Oil & Gas)

Gas and oil heating appliances generate heat through the combustion of fuel. The heat is transferred through the heat exchanger and distributed to the conditioned space. The products of combustion, however, must be vented safely out of the structure. In a conventional chimney, venting is achieved by the natural lifting action of the hot combustion gas. New, efficient systems absorb more of the heat in the heat exchanger and produce lower temperature vent gas. Lower temperature gas does not rise as quickly or as reliably as in older, less efficient systems. Power venting or sidewall venting is more economical and safer than chimney venting. A power venter uses a motorized blower to vent the products of combustion. A power venter is interlocked with the appliance to ensure that proper draft is achieved before the appliance burner is activated.

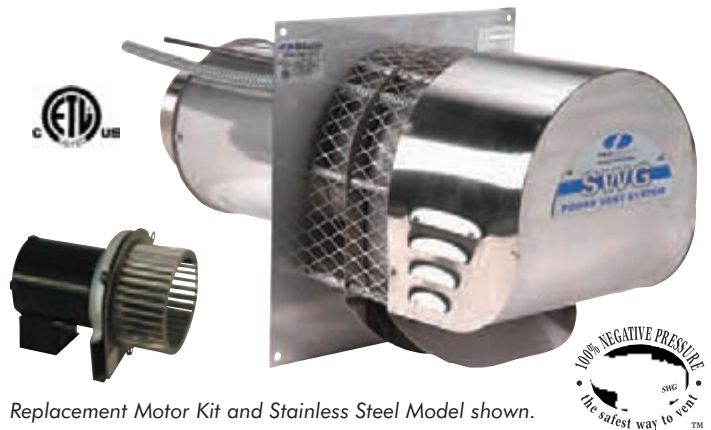
### The SWG Power Venter is the safest, most efficient power venter available today.

Patented SWG Power Venters are ETL and cETL listed for all LP gas, natural gas, or oil-fired heating equipment. The SWG combines the motor, blower, and vent hood in one complete, easy to install unit. The SWG mounts on the outside of the building and pulls the combustion gases from the appliance through the outside wall utilizing 100% negative pressure.

Benefits of the SWG Power Venter include:

- 100% negative pressure in the vent pipe for maximum safety.
- Standard galvanized pipe can be used instead of expensive stainless steel.
- No need to seal vent pipe joints, saving time and money.
- Significantly longer vent lengths than positive pressure, direct vent systems.
- The SWG is recommended by major heating appliance manufacturers.

The SWG must be sized to match the appliance or appliances input firing rate. Most firing rates are published in the manufacturer's installation manual. SWGs must be installed with a CK Control Kit to ensure proper listing and safe, efficient venting.



Replacement Motor Kit and Stainless Steel Model shown.

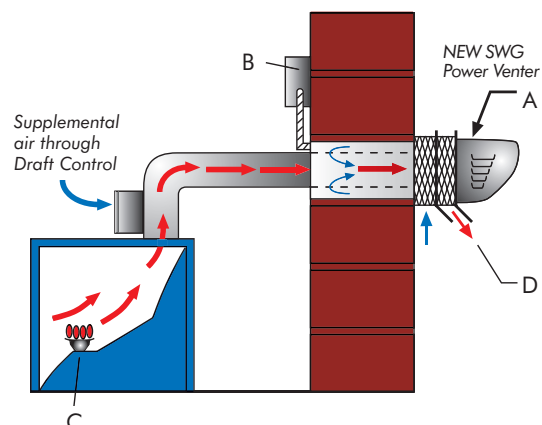
Note: SWG-4HD, 5 & 6 Motor Kits include a stainless steel blower wheel for better performance and extended life.

### When to use the SWG:

- Use with gas or oil furnaces, boilers, and water heaters.
- New construction.
- When converting from electric to gas or oil.
- To avoid relining a chimney.
- When installing an additional heating appliance.
- When co-venting a water heater with a furnace.

### How the SWG Works

1. The thermostat calls for heat, energizing the Power Venter (A).
2. A negative pressure is created, closing the pressure switch on the control kit (B).
3. The burner (C) is activated and combustion gases are exhausted (D).
4. After the thermostat is satisfied, the burner shuts down and the venter continues to post purge, exhausting residual flue gases.
5. When the timer or temperature control is satisfied, the venter is deactivated.



The SWG pulls combustion gases to the outside, creating 100% negative pressure in the vent pipe.

# SWG Power Venter

## (Sizing The Venter)

Size the SWG venter based on the input firing rate of the appliance. If the power venter is being used to vent multiple appliances, add the input firing rates for each appliance and use that total to size the venter. Knowing the total input BTU/hr. for gas, or GPH for oil, the venter can be sized from Table 1. Select the venter rated closest to the total input BTU or GPH for installation. If the input of the appliance is higher than the max allowable for that size SWG, move to the next larger size SWG.

Do not select a venter with a maximum BTU/hr. or GPH lower than the appliance.

### Sizing The Venter Table 1 - Use Maximum BTU or GPH Input

MODEL	MAX* OIL GPH INPUT 100psi	MAX* OIL GPH INPUT 140psi	MAX** GAS BTU/hr. INPUT	Maximum Equivalent Feet of Vent Pipe		VENT PIPE SIZE
				AT MAX BTU/hr. INPUT	AT 60% OF MAX BTU/hr. INPUT	
SWG-3	N/A	N/A	70,000	21	80	3"
				50	100	4"
SWG-4HD, 4HDs	1.10	.90	170,000	35	100	4"
				65	100	5"
				100	100	6"
				100	100	7"
SWG-5, 5s	1.85	1.55	290,000	16	44	4"
				51	100	5"
				95	100	6"
				100	100	7"
SWG-6, 6s	2.65	2.25	416,000	28	78	5"
				68	100	6"
				100	100	7"
SWG-8	4.75	4.0	740,000	26	72	7"
				51	100	8"
				70	100	9"
SWG-10	9	7.5	1,300,000	10	100	8"
				30	100	10"
				75	100	12"
SWG-12	13.5	11.5	1,900,000	16	100	10"
				40	100	12"
				86	100	14"
SWG-14	21	17.75	3,000,000	8	85	12"
				18	100	14"
				35	100	16"

- \* Oil: Select venter according to the actual rated maximum GPH input. SWG GPH ratings at 100 psi. Do not exceed maximum oil GPH input.
- \*\* Gas: Do not exceed maximum BTU/hr. input rating. For multiple venting system applications add the input for each appliance. Category III gas-fired draft induced systems require an SWG-5 or larger. Unit sizing may vary depending on specific application. Consult your dealer or factory representative for the proper sizing for your particular application.



NOTE: Control Kits are required for operation of the SWG. Stainless steel recommended for oil applications.

Table 2 - Specifications

Model	Volts	Hz	Amps	Watts	RPM	Thermal Protect.	A	B	C	D	E	F
SWG-3	115	60	0.6	40	3000	YES	3"	5"	9 1/6"	8 1/2"	7 5/8"	9 3/6"
SWG-4HD	115	60	1.7	138	3000	YES	4"	6"	11 3/4"	9 1/2"	9"	9"
SWG-4HDs	115	60	1.7	138	3000	YES	4"	6"	11 3/4"	9 1/2"	11"	11 1/2"
SWG-5	115	60	1.3	144	3100	YES	5"	7"	11 3/4"	10 3/4"	12"	12 1/4"
SWG-5s	115	60	1.3	144	3100	YES	5"	7"	11 3/4"	10 1/2"	12"	12 1/2"
SWG-6	115	60	2.1	228	3100	YES	6"	8"	11 3/4"	10 3/4"	12"	12 1/4"
SWG-6s	115	60	2.1	228	3100	YES	6"	8"	11 3/4"	10 1/2"	12"	12 1/2"
SWG-8	115	60	4.37	478	3100	YES	8"	10"	11 3/4"	11 7/8"	13"	14 1/4"
SWG-10	115/230	60	11.4/5.7	1311	1725	YES	10"	14"	19 1/2"	24"	20"	21"
SWG-12	115/230	60	13.6/6.8	1564	1725	YES	12"	16"	19 1/2"	25"	22"	23"
SWG-14	115/230	60	14.0/7.0	1610	1725	YES	14"	18"	19 1/2"	26"	24"	25"

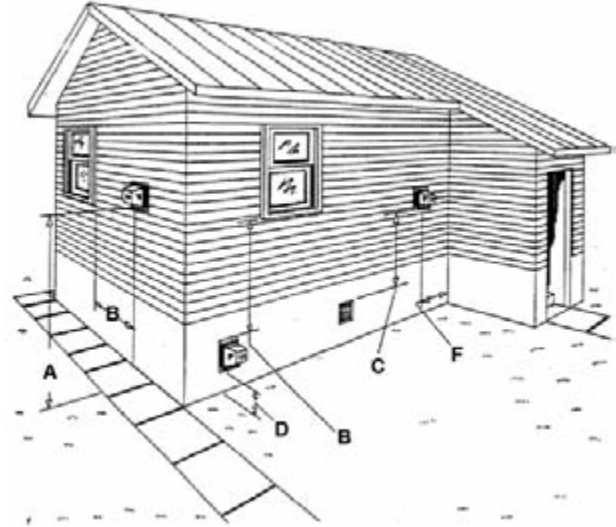
"s" Designates stainless steel model.

# SWG Power Venter

## (Planning the Vent System)

Location of the termination of the venting system should comply with the National Fuel Gas Code, ANSI Z223.1, manufacturer's recommendations and/or applicable local codes. See Diagram for typical terminal locations.

- A. The exit termination of a mechanical draft system must not be less than 7' above grade when located adjacent to a public walkway.\*
- B. The venting systems, with the exception of direct vent appliances, must terminate at least 4' below, 4' horizontally, or 1' above any door, window or gravity air inlet into the building.
- C. A venting system must terminate at least 3' above any forced air inlet located within 10'.
- D. The bottom of the vent terminal must be located at least 1' above finished grade.\*\*
- E. The vent termination should not be mounted directly above or within 3' horizontally from an oil tank vent or gas meter (not shown in image).
- F. The vent termination point must not be installed closer than 3' from an inside corner of an L-shaped structure.



\*10" or larger should be 10 ft. minimum above public walkway.  
 \*\*10" or larger should be 4 ft. above finished grade.

### Calculating Equivalent Feet of a Vent System

Table 3

Vent Pipe Fittings	Vent Pipe Diameter									
	3"	4"	5"	6"	7"	8"	9"	10"	12"	14"
Tee	19	25	31	38	44	50	56	63	75	89
Y-Connection	10	13	16	20	23	26	29	32	39	45
90° Elbow	5	7	9	11	12	14	16	18	21	25
45° Elbow	3	4	4	5	6	7	8	9	10	13

#### Using a Reducer/Incraser

		Small Pipe Size									
		3"	4"	5"	6"	7"	8"	9"	10"	12"	14"
Large Pipe Size	3"	0									
	4"	2	0								
	5"	4	2	0							
	6"	5	4	2	0						
	7"	6	5	4	1	0					
	8"	7	7	6	3	2	0				
	9"	7	8	7	5	4	2	0			
	10"	8	8	8	6	6	4	2	0		
	12"	8	10	10	8	9	8	6	4	0	
	14"	9	10	12	10	12	11	9	8	3	0
	16"	9	11	12	11	14	13	13	11	8	3
	18"	9	11	13	12	15	15	15	14	11	7
20"	9	12	14	13	16	17	17	17	15	11	

To estimate the equivalent foot length of the Reducer/Incraser chart, find the figure at the intersection of the small pipe size and the large pipe size.

#### Procedure

1. Calculate the total equivalent feet for each type of fitting used in the venting system from Table 3.
2. Calculate the total amount of feet for the straight lengths of vent pipe.
3. Add the equivalent feet of the fittings with the total amount of feet of straight length pipe. This will approximate the total equivalent feet of the vent system.

Example:


System Pipe Size = 4"

Step 1 2-90° Elbows (4") = 14 Ft.

Step 2 10-2 Ft. Lengths of 4" Pipe = 20 Ft.

Step 3 Total Equivalent Feet = 14 Ft. + 20 Ft. = 34 Ft.

To calculate the footage, add the lengths of all the straight lengths of vent pipe to the equivalent feet of all the vent pipe fittings, such as tees, elbows, and reducers.



#### SWG Super Lube

- Oil motor and fan shaft with SWG Super Lube annually
- Works in conditions of -40° to 300° (F)
- Synthetic lubricant which maintains specified viscosity
- Use of any other lubricant may cause premature failure

# SWG Power Venter

## (Clearance to Combustibles)

If mounting the venting system near combustible materials, refer to Diagram A for allowable installation clearances. Clearances are based on an installation using single wall galvanized steel vent pipe. If manufactured double wall vent pipe is required or used for the installation, clearance should be based on the vent pipe's rated clearance. Always check local code requirements for code restrictions.

Routing of the vent system and clearances for the vent pipe may be planned once the termination location is determined. Route the vent pipe from the appliance to the venter using as few elbows as possible. The horizontal section of the vent pipe should have a slight upward slope from the appliance to the venter. The vent pipe size (diameter) can be smaller than a typical chimney vented system and still overcome the higher pressure losses because the power venter mechanically creates the required draft or air flow to vent the system.

For estimating the minimum vent pipe diameter for a gas system, divide the BTU/hr. input of the heating equipment by 12,600 BTU/sq. in. For oil systems, multiply GPH by 140,000 BTU/GAL, then divide by 12,600 BTU/sq. in. This will give the minimum cross sectional area required. (See Table 4 for area to diameter conversion.) For multiple equipment venting systems, divide the total BTU/hr. input for all appliances by 9,300 BTU/sq. in. This will give you the minimum vent pipe diameter needed for the common branching of the vent system.

**Table 4**

Pipe Size	Nominal Cross-Sectional Area Sq. Inches
3"	7
4"	13
5"	20
6"	28
7"	38
8"	50
9"	64
10"	79
12"	113
14"	154

As a rule of thumb, size the vent pipe to the outlet diameter of the heating equipment for a single appliance venting system. For multiple appliance venting systems, use the outlet diameter of the largest unit and add 50%.

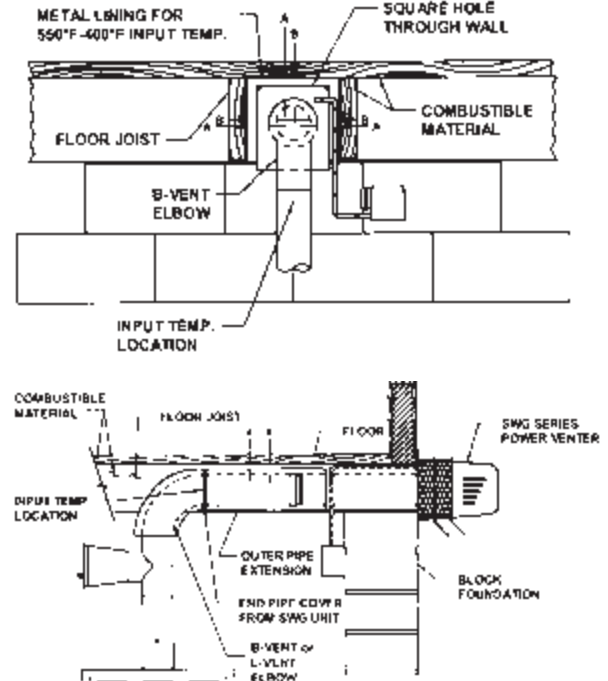
### Diagram A

#### Single Pipe System

#### Double Pipe System

Allowable Inlet Temperature	Clearance (B)	Allowable Inlet Temperature	Clearance (A)
400°F or Less	3" min.	400°F or Less	.5" min.
550°F or Less	4" min.	550°F or Less	1" min.
550°F or Less	3" min.*	550°F or Less	.5" min.*

\* With galvanized sheet metal liner or equivalent



### Extension Kits

The standard SWG Power Venter is designed for walls up to 8" thick. PEK extension kits allow the SWG to be installed in walls up to 16" thick.\* The PEK kit includes the inner/outer pipe extension, air flow damper, and one foot of 1/4" aluminum tubing. It is available for models SWG-4HD through SWG-8.



\* PEK-4 allows the SWG to be installed in walls up to 12" thick.

Power Venter Model	Extension Kit Model
SWG-4HD	PEK-4
SWG-4HDS	PEK-4
SWG-5	PEK-5
SWG-5S	PEK-5
SWG-6	PEK-6
SWG-6S	PEK-6
SWG-8	PEK-8

# Control Kits

## (Required to Operate SWG Power Venters and Draft Inducers)



Control Kit\* Applications

Control Kits (CK) control the operation of SWG Power Venters. See the chart below to select the proper kit for your application. Control Kits can also control the operation of Field Draft Inducers.

			Draft Proving Switch	Gas Pressure Switch	Secondary Safety Switch	Thermal Post Purge	Adjustable Electronic Post Purge	Fixed Post Purge	Draft Control	RJR-6	
Oil	CK-61	All oil-fired systems. Has adjustable electronic post purge.	✓		✓		✓			✓	
	CK-62	All oil-fired systems. Has thermally activated post purge.	✓		✓	✓				✓	
	CK-63	All oil-fired systems. (May require optional delay oil valve for simultaneous burner operation.)	✓		✓		✓				
Gas	30 mv	CK-20FV CK-20FG	30 millivolt gas-fired water heaters and gas-fired pool or spa heaters with a manual or internally mounted thermostat.		✓	✓			✓		
		CK-21	Gas-fired instantaneous water heaters with pressure tap port in the burner manifold.		✓	✓					
	24 v	CK-41F CK-41P**	Furnaces, boilers, unit heaters and water heaters operating with a 24 VAC gas valve without factory mounted spillage switches.	✓		✓			✓		
		CK-43	Draft induced 24 VAC gas valve systems. Includes a 4' MG-1 draft control and post purge.	✓			✓		✓		
		CK-43F		✓				✓	✓		
	750 mv	CK-81***	750 millivolt operated boilers, furnaces, water heaters, pool or spa heaters and gas-fired fireplaces when operated with a remote mounted thermostat or on/off switch. Operated off a 24 VAC circuit.	✓					✓		
	Co-venting Multiple Appliances	CK-91FV CK-91FG	Gas-fired draft induced 24 VAC gas valve systems and a 30 millivolt operated water heater. Includes a 4' MG-1 draft control and post purge.	✓	✓	✓			✓	✓	
		CK-92FV CK-92FG CK-92FVP** CK-92FGP**	Gas-fired furnace or boiler and a 30 millivolt operated water heater. Includes post purge.	✓	✓	✓			✓		

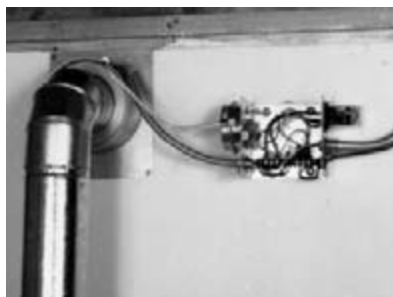
\* Control Kits are ETL approved accessories when used in conjunction with the SWG Power Venter.

\*\* Plugs into 24v electric damper

\*\*\* A secondary safety switch should be used with a CK-81

F = Fixed Post Purge FV= right hand threaded TCA Safety Switch FG= left hand threaded TCA Safety Switch

### Control Kit Installation



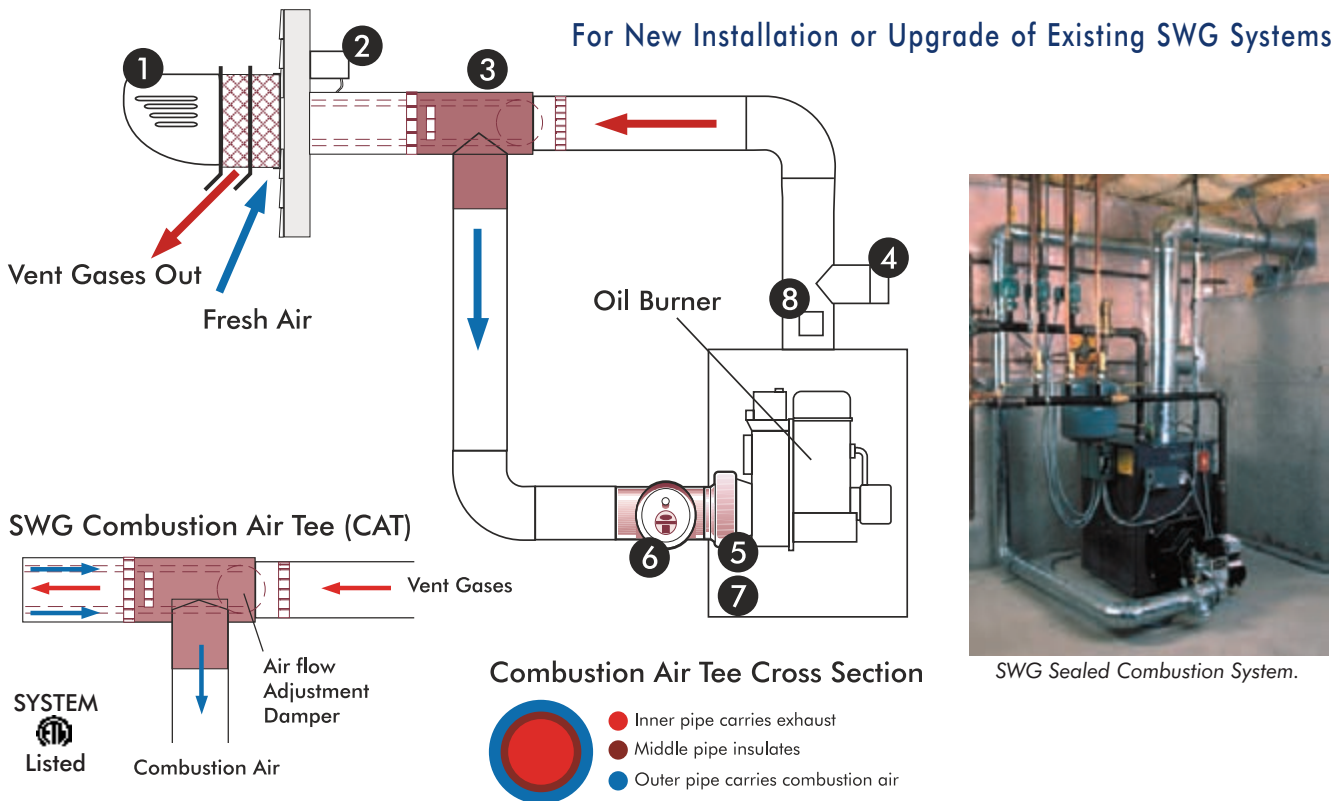
CK-41F mounted at venter. For use with a 24 VAC, gas-fired system (shown with cover off).



CK-63 remote mounted. For use with 120 VAC oil-fired systems. Electronic post purge is included (shown with cover off).

CK kits can be mounted up to 100 feet from venter.

# SWG "Sealed Combustion System"



SWG Sealed Combustion System.

1. SWG Power Vent System
2. CK-Control Kit
3. Combustion Air Tee
4. RC Draft Control
5. Field AirBoot®
6. VRV - Vacuum Relief Valve
7. FurnaceBoot™
8. WMO - Safety Switch

Follow steps A through D to select the proper components for the SWG Sealed Combustion System. If an SWG is already installed, start at step B.

## A. Size the Venter

Choose the model that matches GPH Intake.

Model	Max Oil GPH Intake	Maximum 30 Feet of Pipe and Three 90° Elbows For Each: Intake & Exhaust	
		Vent Pipe	Intake Pipe
SWG-4 HD SWG-4 HDs	1.10	4"	4"
SWG-5 SWG-5s	1.85	5"	4"

## B. Select the Combustion Air Tee

Select the CAT to match the Power Venter.

Model	Part#	Description
CAT-4HD	46335601	Fits SWG-4HD, 4HDs
CAT-5	46335602	Fits SWG-5,5s

NOTE: Control Kits are required for operation of the SWG. Do not exceed maximum oil GPH input.

## C. Select the Control Kit

Select the Control Kit to match the application.

Model	Application & Description
CK-61	Any oil appliance / Electronic post purge
CK-62	Any oil appliance / Thermal post purge
CK-63	Any oil appliance / Electronic post purge or operates the venter and burner motor simultaneously w/ optional delay oil valve

## D. Select the Combustion Air System

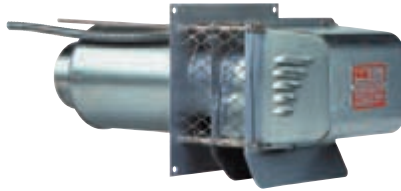
Select the model that matches the burner.

Model	Burner	Appliance Input	Components
CAS-1	Beckett AFII Burners, Riello 40BF, NX	Up to 2 gph	4" Intake Air Hood 4" Vacuum Relief Valve
CAS-2B CAS-2C CAS-2W	Beckett AFG or AF Burners Carlin EZ-1, CRD, FRD Wayne MSR	Up to 2 gph	4" Intake Air Hood 4" Vacuum Relief Valve Field AirBoot®
CAS-2B90E	Beckett AFG and AF Warm Air Furnaces	Up to 1.5 gph	4" Intake Air Hood 4" Vacuum Relief Valve FurnaceBoot™

# SWG Vent Kits

(Complete Venting Packages)

## Gas Furnace Vent Kit



SWG Power Venter



4" MG-1 Draft Control

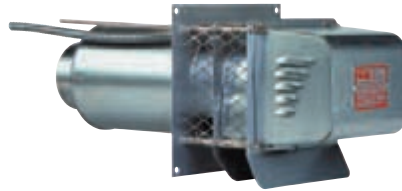


CK-43F Control Kit

Model	Application
SWG-4G	24V Gas Furnaces

The SWG-4G can be used with all 80+ gas draft induced furnaces, including those manufactured by the following companies: Amana, Armstrong, Bard, Carrier, Consolidated, Dunkirk, ICP, Lennox, Rheem, Trane and York.

## Gas Water Heater Vent Kits



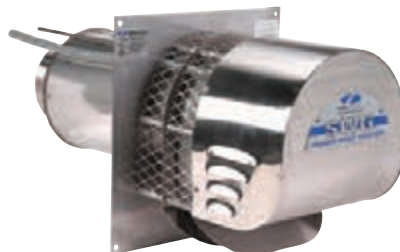
SWG Power Venter



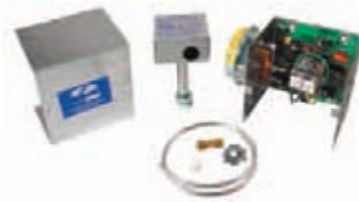
CK-20FV/FG Control Kit

Model	Application
SWG-3WH	30mV Gas Water Heater up to 70,000 BTU
SWG-4WH	30mV Gas Water Heater up to 170,000 BTU

## Oil Fired System Stainless Vent Kits



New Stainless Steel  
SWG Power Venter



CK-63 Control Kit

Model	Application
SWG-40S	120V Oil-Fired Appliance up to 1.10 gph
SWG-50S	120V Oil-Fired Appliance up to 1.85 gph
SWG-60S	120V Oil-Fired Appliance up to 2.65 gph

# PV Power Venters

(Indoor Mounted Power Venters for Oil & Gas)



The indoor mounted PVG and PVO Power Venters provide an economical power venting system for gas and oil appliances. All controls are built into these units. A Vent Hood is required to terminate the vent system.

## Accessories

### SWH Vent Hoods

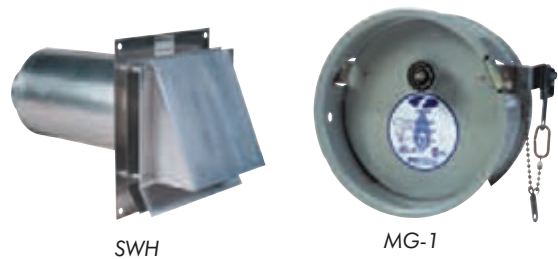
Designed for standard vent pipe and Class B type double-wall (B-Vent) connection. Provides proper clearance between flue gas stream and wall combustibles. Available in 3" through 8" sizes.

### MG-1 Series Draft Control

Required for 80+ draft induced system applications. Available in 4" through 9" sizes.

### CK-20FV/FG Water Heater Control

(Required for co-venting residential water heaters.) Provides all system control components required to utilize the Field Power Venter with natural gas or LP gas millivolt water heater, including safety interlock controls. This kit allows you to co-vent a residential water heater with a furnace or boiler.



SWH

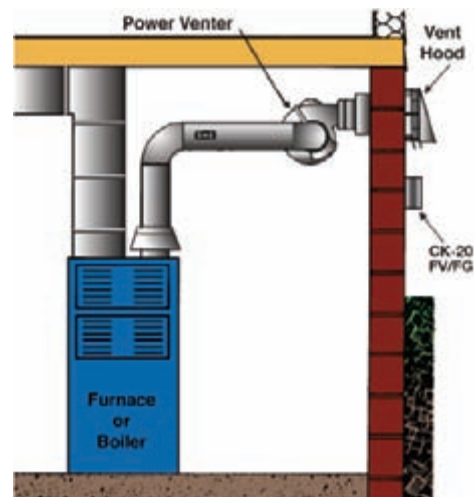
MG-1



CK-20FV/FG

## How PV Series Venters Work

1. Thermostat or aquastat calls for heat and starts the Power Venter.
2. The Pressure Switch senses sufficient air flow and allows burner(s) to start.
3. The Power Venter draws combustion air through the system and forces gases outside through an external Vent Hood.
4. Draft Hood or Barometric Draft Control between the appliance(s) and the Power Venter maintains consistent air flow.
5. After the thermostat is satisfied, the burner shuts down and the Post Purge Control clears the venting system of combustion gases.
6. The Power Venter shuts down.



Co-venting: Use CK-20FV/FG

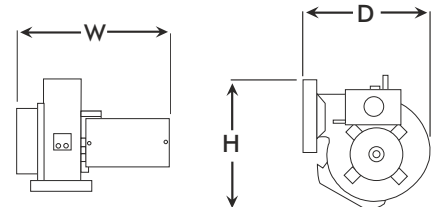
PVG - Gas and PVG PAK													
Maximum Equivalent Horizontal Pipe Length (Feet)†													
Model	DIA.	(BTU/hr Input)											
		25,000	55,000	70,000	100,000	145,000	220,000	310,000	400,000	520,000	610,000	900,000	1,250,000
PVG-100	3"	270	100	-	-	-	-	-	-	-	-	-	-
PVGPak-100*	4"	455	169	144	100	-	-	-	-	-	-	-	-
PVG-300	4"	-	-	-	305	145	64	-	-	-	-	-	-
PVGPak-300*	5"	-	-	-	-	247	100	54	-	-	-	-	-
PVU-300	6"	-	-	-	-	334	147	74	-	-	-	-	-
PVG-600	5"	-	-	-	-	413	181	91	54	-	-	-	-
	6"	-	-	-	-	-	-	146	87	52	-	-	-
	8"	-	-	-	-	-	-	216	134	86	66	-	-
PVE-1200**	8"	-	-	-	-	-	-	-	-	-	313	180	-
	10"	-	-	-	-	-	-	-	-	-	390	290	80



† See calculating equivalent feet of a vent system

\* PVG PAKs include a Power Venter, a 4" MG-1 Draft Control, and a 4" Vent Hood.

\*\* PVE-1200 requires a CK-Kit.



## Specifications

UNIT DIMENSIONS (INCHES)					ELECTRICAL DATA						
Model	Height	Width	Depth	Inlet/Outlet	Volts	Hz	RPM	Watts	Amps	Therm. Prot.	
PVG/PVO-100	7.50	7.75	7.00	4.00	115	60	3000	145	2.1	YES	
PVG/PVO/PVU-300	7.50	9.25	7.00	4.00	115	60	3000	145	2.1	YES	
PVG/PVO-600	8.75	9.75	8.50	5.00	115	60	3000	167	1.5	YES	
PVE-1200	13.75	11.50	13.50	8.00	115	60	1750	186	3.9	YES	

Note: New universal Power Venter (model PVU-300) now available.

PVO - Oil													
Maximum Equivalent Horizontal Pipe Length (Feet)†													
Model	DIA.	GPH Input											
		0.40	0.50	0.75	1.00	1.50	2.25	3.00	3.75	4.00	6.00	9.00	
PVO-300 PVU-300	4"	-	-	287	150	75	-	-	-	-	-	-	-
	5"	-	-	-	257	120	51	-	-	-	-	-	-
	6"	-	-	-	346	172	70	-	-	-	-	-	-
PVO-600	5"	-	-	-	428	212	86	46	-	-	-	-	-
	6"	-	-	-	-	-	143	74	51	-	-	-	-
	8"	-	-	-	-	-	211	116	84	77	-	-	-
PVE-1200*	8"	-	-	-	-	-	-	-	436	385	208	-	-
	10"	-	-	-	-	-	-	-	-	407	311	74	-



† See calculating equivalent feet of a vent system

\* PVE-1200 requires a CK-Kit.

Select venter according to the actual rated maximum GPH Input. GPH ratings at 100 PSI.

Do not exceed maximum oil GPH Input.

# Vent Hoods



Aluminum Construction

## For use with

- PVG Power Venters
- PVO Power Venters
- Forced Draft Systems

All Field Vent Hoods are made of heavy gauge aluminum and can be used with natural gas, LP gas or oil-fired equipment. There are five diameters ranging from 3" to 8".

The concentric pipe, angled outlet deflectors, and spaced plate design allow for better heat dissipation. This type of construction minimizes the effects of heat on the outside wall. The angled hood design reduces the effects of wind on the venting system.

The inner and outer pipe are a continuous structure. This allows for easy installation to power venter or vent pipe and also eliminates possible positive pressure leaks in the wall section.

Field Vent Hoods meet the highest standards for safety and reliability, built in accordance with guidelines from NFPA211, NFPA54 and ANSIZ21.47.

## When to use a Vent Hood

Fig. 1

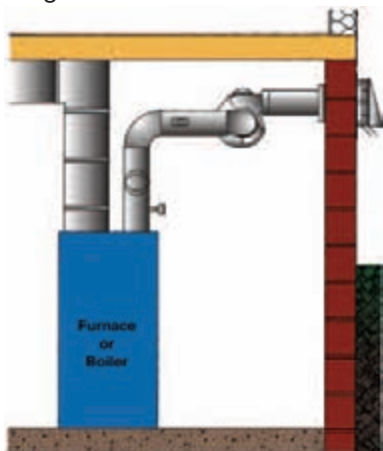
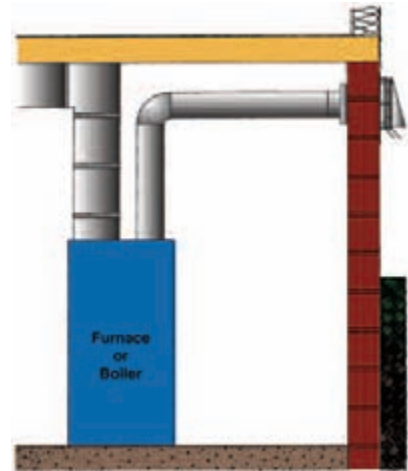
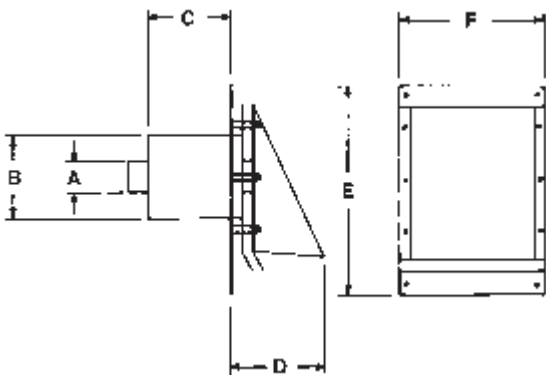


Fig. 2



Vent Hoods can be used in conjunction with PVG and PVO Power Venters (Fig. 1) or with forced draft systems (Fig. 2).



Model	Dimensions (inches)					
	A	B	C	D	E	F
SWH-3	3 Dia.	5 Dia.	8 1/2	4 3/8	8 7/8	7 5/8
SWH-4*	4 Dia.	6 Dia.	8 1/2	6 5/16	12 5/8	10 5/8
SWH-5	5 Dia.	8 Dia.	8 1/2	8	12 5/8	10 5/8
SWH-6	6 Dia.	8 Dia.	8 1/2	8 11/16	12 5/8	10 5/8
SWH-8	8 Dia.	10 Dia.	8 1/2	9 5/8	15	14

\* SWH-4 has a 7% x 7% shield for 0 clearance to combustibles

# Vent Caps



Star-Kap®



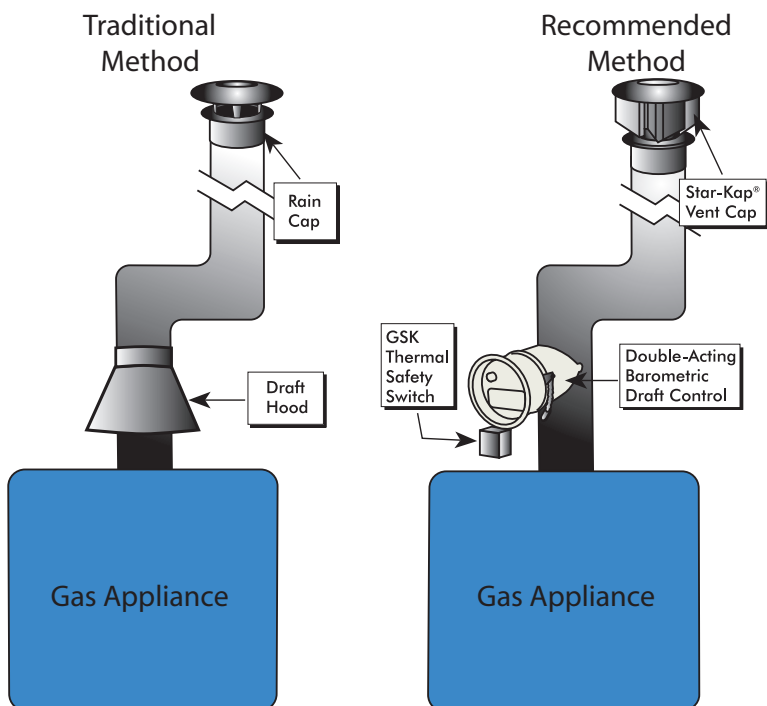
The Star-Kap® is the only vent cap that is not required to be two feet higher than any structure within ten feet when used on detached or lean-to buildings that house heating equipment outside of the living space.

The unique design of the aluminized Star-Kap Vent Cap prevents downdrafts and assists the vent in drawing off and exhausting waste gases regardless of wind direction. The Star-Kap can be used to vent gas or oil-fired boilers, furnaces, water heaters and more.

Although vent stacks are designed to remove dangerous gases and smoke created by burning gas and oil, this process can be adversely affected by the direction of the wind. A sudden gust could blow noxious waste gases down the vent stack and into the building. The Star-Kap prevents a potentially dangerous situation.

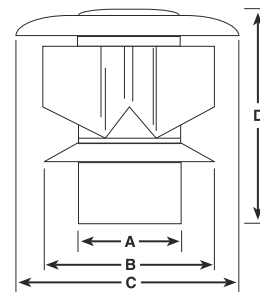
## Prevent Flue Gas Spillage

The Star-Kap, when used in conjunction with a double-acting Draft Control and Thermal Safety Switch, creates a system that prevents flue gas spillage and carbon monoxide formation. Ask about AGA testing reports for more information.



## When to use a Star-Kap

- To prevent downdrafts.
- To keep birds and debris out of the vent stack.
- To keep rain out of the vent stack.
- In conjunction with Barometric Draft Control and Thermal Safety Switch to prevent carbon monoxide formation in draft hooded gas appliances with a poorly drafting vent system.
- When venting gas or oil appliances.



Model	Fits Pipe	Dimensions (inches)			
		A	B	C	D
SK-3	3	2 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>
SK-4	4	3 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>
SK-5	5	4 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>4</sub>	8 <sup>3</sup> / <sub>8</sub>
SK-6	6	5 <sup>7</sup> / <sub>8</sub>	10	12 <sup>3</sup> / <sub>8</sub>	11
SK-8	8	7 <sup>7</sup> / <sub>8</sub>	10	12 <sup>3</sup> / <sub>8</sub>	11
SK-10	10	9 <sup>7</sup> / <sub>8</sub>	16	21 <sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>8</sub>
SK-12	12	11 <sup>7</sup> / <sub>8</sub>	16	21 <sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>8</sub>
SK-14	14	13 <sup>7</sup> / <sub>8</sub>	16	21 <sup>7</sup> / <sub>8</sub>	13 <sup>5</sup> / <sub>8</sub>

# Thermal Safety Switches

Our thermal safety switches efficiently detect flue gas spillage due to a blocked flue, continuous down drafting or inadequate draft condition. With the safety switch wired in series with the burner circuit, the switch

will de-energize the system's burner or burner control once it senses the spillage of hot flue gases. Available for gas-fired and oil-fired applications.

## Models

## Typical Applications



- **FTS-4 & FTS-6**

Designed for use on large gas furnaces and boilers. Can be mounted on Draft Hood or double-acting Barometric Draft Control (both brackets included). Manual reset.



- **GSK-3 & GSK-4**

Designed for use on residential and light commercial millivolt or 24 VAC gas furnaces, boilers and water heaters. Generally used with sidewall venting applications. TCA-1 Thermocouple Adapter required for 30 millivolt applications. Gold Contacts. Manual reset.



- **SSK-1 & SSK-3**

Kit form of GSK-3 or GSK-4 generally used on millivolt water heaters. Can also be used with 24 VAC gas furnaces or boilers. Kit includes (2) GSK style Thermal Safety Switches, (1) 12-gauge Jumper Wire and (1) 6 ft. length 12-gauge lead wire. SSK-3 switches not supplied with switch enclosures. TCA-1 Thermocouple Adapter required for 30 millivolt applications.



- **TCA-1 & TCA-2**

Thermocouple Adapter for use on 30 millivolt gas thermocouple powered valves, for splicing into thermocouple circuit.



- **WMO-1**

Designed for use with power venting and chimney vented systems for oil-fired applications. Manual reset.

# Thermal Safety Switches

## How Thermal Safety Switches Work

The Thermal Safety Switch detects the increased heat generated by the flue gas spillage and deactivates the furnace or boiler. It will not allow the burner to restart until the switch has been manually reset.

## When to use a Thermal Safety Switch

On Barometric Draft Controls and draft hoods to detect flue gas spillage and deactivate oil and gas burners.

Model	Field Part No.	Contact Material	Load-Rating		Normally Closed Switch		Switch Type	Application
			AMP	Volts	Opens	Closes		
FTS-4	01170004	Silver	12 6	120 AC 240 AC	140°F	M	SPDT	Draft Control or Draft Hood mounting Manual reset. Quicker response time than FTS-6.
FTS-6	01170006	Silver	12 6	120 AC 240 AC	180°F	M	SPDT	Draft Control or Draft Hood mounting Manual reset. For use on 24/120/240 Volt equipment over 400,000 BTU/hr.
GSK-3	46086400	Gold	- 24 VA	Millivolt 24 AC	180°F	M	SPDT	Standard Gold Contact Manual Reset Switch. For gas-fired millivolt or 24 VAC application.
GSK-4	46086402	Gold	- 24 VA	Millivolt 24 AC	200°F	M	SPDT	Manual Reset Switch, same as GSK-3. Where slower response time is a requirement.
SSK-1	46111501	Gold	- 24 VA	Millivolt 24 AC	180°F	M	SPDT	Kit includes (2) GSK-3 switches (1) 6 ft. length of 12 GA wire and Switch Jumper Wire.
SSK-3	46111503	Gold	- 24 VA	Millivolt 24 AC	200°F	M	SPDT	Kit same as SSK-2 Kit, except switches not enclosed in electrical box.
TCA-1	46082700	-	-	-	-	-	-	Required adapter for operation of Gold Contact Thermal Safety Switches with 30 millivolt systems.
TCA-2	46429900	-	-	-	-	-	-	Same as TCA-1, except with left handed threads for Flame Guard water heaters.
WMO-1	46086900	Silver	10	120 AC	200°F	M	SPDT	Manual reset. Designed for use with power venting and chimney vented systems for oil-fired applications.

NOTE: M = Manual Reset, SPDT = Single Pole Double Throw

# Eliminator<sup>®</sup> Foundation Vent Fan

## Eliminate Moisture In Crawl Spaces

Reduce Fungus, Dry Rot and Termite Potential

The Eliminator<sup>®</sup> Foundation Vent Fan is a motorized fan designed for circulating outside air through the crawl space of a structure to reduce moisture problems. Moisture causes dry rot and fungus growth and increases the potential for termite infestation. With the Eliminator, air changes are increased dramatically for better moisture removal and control.

The Eliminator is designed to be mounted to a new or existing crawl space vent. It operates off a temperature switch which activates the motor at or above 50°F. An optional, adjustable de-humidistat can be used to operate the unit at varying levels of relative humidity. This optional control can be wired in place of, or in series with, the standard temperature switch.



Eliminator<sup>®</sup>



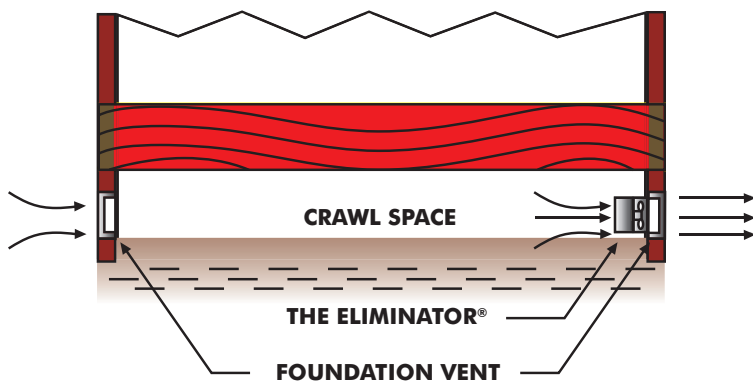
De-Humidistat  
(optional)

### When to Use

To reduce moisture problems in a crawl space, including: dry rot, fungus growth, or moisture that can encourage termite infestation.

### How it Works

- Mounts to crawl space vent
- Circulates outside air through crawl space
- Increases air changes for moisture control
- Automatic operation



### Fan Specifications

Voltage	115 VAC
Amps	.60 Amps
Cubic Feet per Minute	100 CFM
Housing material	Galvanized Steel
Number of units required	One per 1,000 square ft. of crawl space
Temperature Switch Operation	Above 50°F
Optional De-humidistat	Adjustable from 20%-80%
Mounting Plate Dimensions (inches)	14 7/8 X 6 7/8

# Power Venter Service Guide

## I. VISUALLY INSPECT THE GENERAL SYSTEM OPERATION:

1. The thermostat (wall thermostat, or aquastat) calls for heat, starting venter motor.
2. After the venter motor has come up to speed, the pressure switch closes. This closes the circuit to the burner and allows the burner to operate. This occurs in approximately 1 to 2 seconds.
3. After the heating requirement is satisfied, the thermostat circuit opens and deactivates the burner and power venter circuit.
4. Oil venting systems require a post purge device. During the post purge cycle, the venter operates for a period after the burner has shut off. This is to purge the remaining flue gases and to cool the combustion chamber. Typical post purge times are 3 to 5 minutes. Longer purge times may be required depending on system installation.

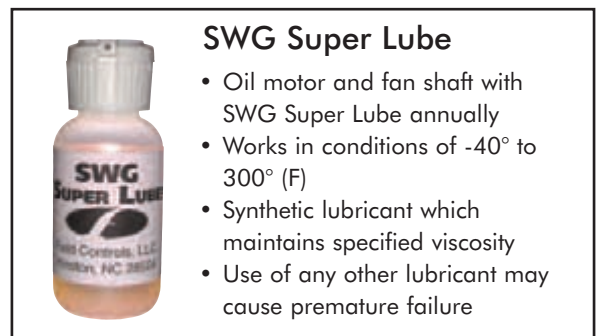
## II. INSPECTION AND MAINTENANCE ITEMS:

1. Motor: Inspect the motor once a year, it should rotate freely. To prolong the life of the motor, lubricate with six drops of SWG Super Lube, Part #46226200, annually. Use of any other type of lubricant may cause premature motor failure.
2. Wheel: Inspect the venter wheel annually to clear any soot, ash, or coating which inhibits either rotation or air flow. Remove all foreign materials before operating.
3. Vent System: Inspect all vent connections annually for looseness, for evidence of corrosion, and for flue gas leakage. Replace, seal or tighten pipe connections if necessary. Check the venter choke plate to ensure it is secured in place. Check the barometric draft control to ensure the gate swings freely.
4. System Safety Devices: With the heating system operating, disconnect the pressure sensing tube from the pressure switch on the CK Kit. This should stop the burner operation. Re-connecting the tube should relight the burner.

## III. SYSTEM SETUP AND TESTING:

Figure 1 shows a typical oil-fired appliance and the expected ranges of several readings taken at various locations in the system. Note: If a vent pipe reducer is required, use a smooth walled gradual reducer. Place it at the venter inlet as shown in Figure 1.

1. Set the choke plate in the power venter, or extension kit, to its full open position. Set the draft control adjustment weight to its midpoint position.
2. Adjust the thermostat so that the unit will run continuously. Allow the unit to operate for 5 to 10 minutes to ensure stack temperature stabilization.
3. Find out the manufacturer's recommended over-fire or breeching draft. Close the choke plate on the SWG until the draft above the draft control reads approximately 0.04" w.c. greater than the recommended breeching draft. Example: If the appliance manufacturer recommends a 0.02" breech draft, adjust the choke plate to get an approximate 0.06" draft above the draft control.
4. Adjust the barometric draft control to obtain the manufacturer's recommended draft over-fire or at the breech. The draft control gate should be open approximately half its full swing during normal operation. This allows the gate to swing open or closed depending on changes in atmospheric pressure or operating conditions.
5. If the proper draft cannot be obtained at the breech or if the gate does not open as described, then adjust the choke plate in the SWG to reduce or increase the airflow. Re-adjust the draft control to obtain the required draft, since moving the choke plate will change the system draft.



# Power Venter Service Guide

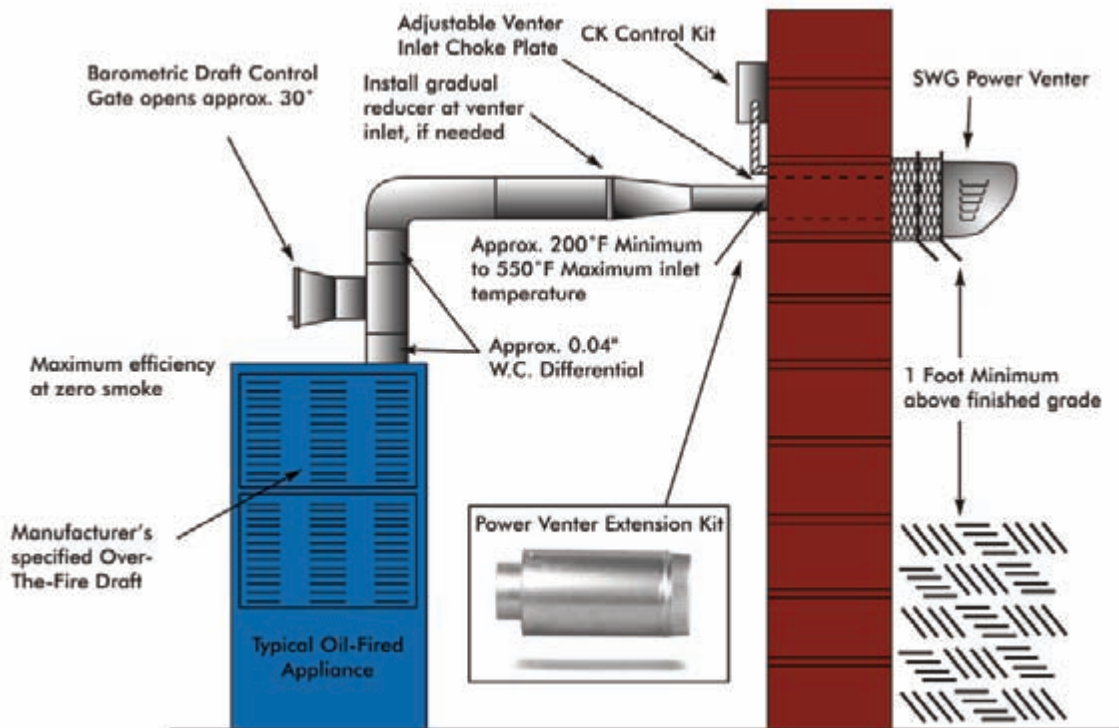
## III. SYSTEM SETUP AND TESTING: (Continued)

6. Once proper draft is achieved, measure CO<sub>2</sub> and smoke level. If necessary, adjust the intake airflow at the burner to obtain the highest possible CO<sub>2</sub> reading with a zero smoke reading. As the intake airflow is increased or decreased, the draft may change. Repeat steps 3 through 6 to re-adjust the draft control and choke plate before attempting any other adjustments.
7. Measure combustion efficiency and exhaust gas temperature at the venter inlet. Combustion efficiency should be adjusted to maximum attainable at zero smoke. Exhaust gas temperature at the venter inlet should range between 200°F and 550°F.
8. If maximum efficiency and zero smoke yields a temperature below 200°F at the inlet to the venter, the following suggestions must be considered.
  - A. Use a larger oil nozzle or higher oil pump pressure to raise the firing rate of the burner. Repeat steps 3 through 7 until all combustion parameters are within the specified ranges.
  - B. Reduce the length of the duct from the appliance to the venter which will increase the venter inlet temperature.
  - C. Insulate the vent pipe to minimize heat loss.
  - D. Seal the vent pipe joints to reduce uncontrolled dilution air.

### Procedure for adjusting the pressure switch

- Turn pressure switch adjustment clockwise until the burner quits.
- Turn counter-clockwise slowly until the burner starts.
- Turn an additional 1/4 to 1/2 turn counter-clockwise.

Note: Every installation will require unique pressure switch adjustment.





**FIELD CONTROLS**

**Solutions for the Great Indoors®**

[www.fieldcontrols.com](http://www.fieldcontrols.com)

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