CONTRACTOR REFERENCE GUIDE 13

VENTING • COMBUSTION • DRAFT

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FIELD CONTROLS

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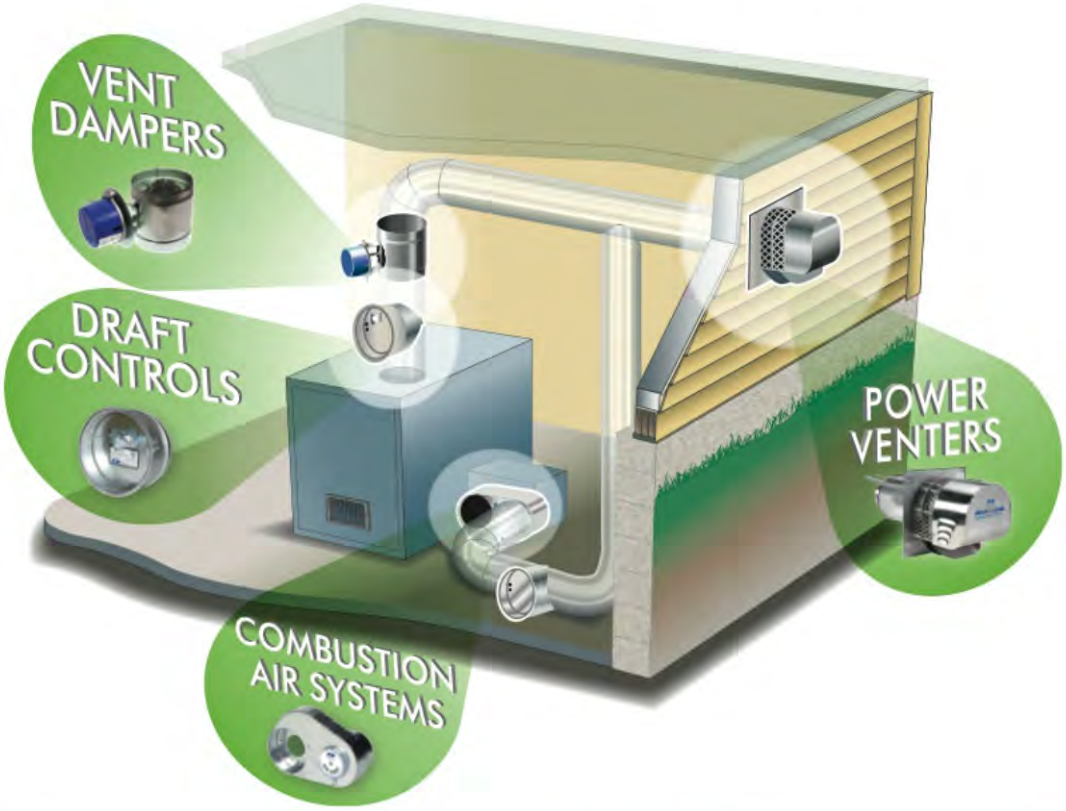
FIELD CONTROLS AIR

Since 1927, our focus has been the control and movement of air. We lead the industry in the fields of venting, combustion, and draft control. This is your guide for product information, specifications, installation, wiring, and replacement parts. For specific installation manuals and more information, visit www.fieldcontrols.com.

Thank you for specifying Field Controls.



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SWG/CV Power Venter

Outdoor Mounted Power Venters for Oil & Gas

Venting

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 or ComboVent™ Power Venter is the safest, most efficient power venter available today.

Patented SWG or ComboVent Power Venters are ETL and cETL listed for all LP gas, natural gas, or oil-fired heating equipment. The SWG or ComboVent 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 or ComboVent 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 or ComboVent is recommended by major heating appliance manufacturers.

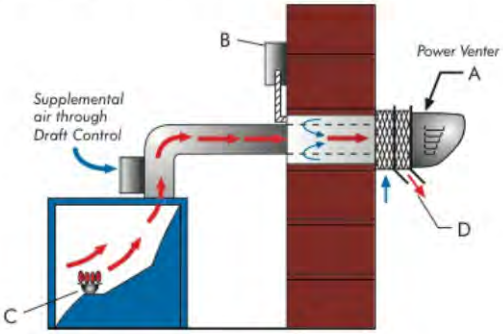
The SWG or ComboVent must be sized to match the appliance or appliances' input firing rate. Most firing rates are published in the manufacturer's installation manual. The SWG and ComboVent must be installed with a CK Control Kit to ensure proper listing and safe, efficient venting.

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

Replacement Motor Kit and Stainless Steel Model shown.

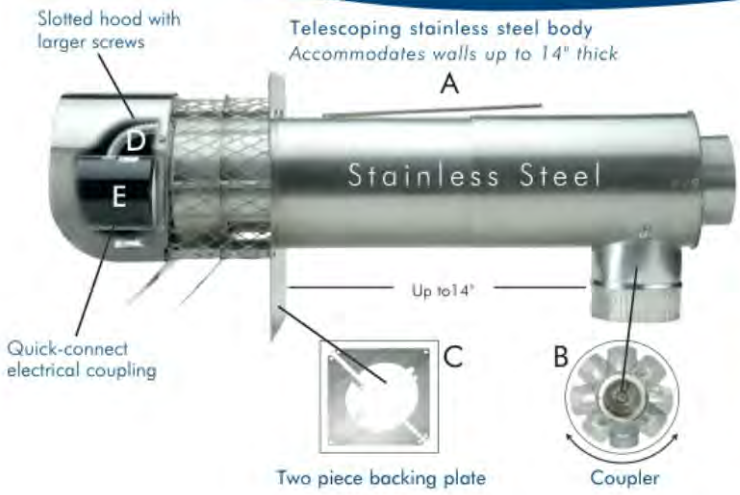
How the SWG/CV Works

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

Easier to Install. Easier to Service. A total system for combustion air and venting.



Features

A - Telescoping stainless steel body
Accommodates walls up to 14" thick

B - Combustion air connection included
Provides fresh air directly to burner
Coupler rotates 360° for easy installation

C - Two piece backing plate
Can be mounted at any point during installation

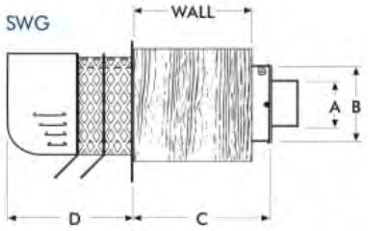
Easier to Service

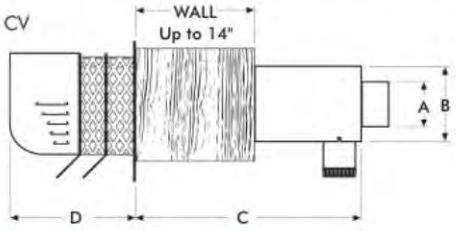
D - Slotted hood with larger screws
Saves time during annual service

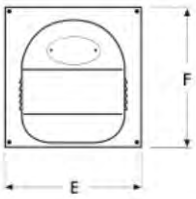
E - Quick-connect electrical coupling
Allows for easy motor access

When to use the SWG/CV Power Venter:

- 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 with water heater or additional appliance, can be used as a gas/oil combo single unit.







Power Venter Specifications and Dimensions

Model	Volts	Hz	Amps	Watts	RPM	Thermal Protection	A	B	C	D	E	F
SWG-3	115	60	0.6	40	3000	YES	3"	5"	9 1/16"	8 1/2"	7 5/8"	9 3/16"
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"
CV-4	115	60	1.7	138	3000	YES	4"	6"	11 3/4"-17 3/4"	9 1/2"	9"	9"
CV-5	115	60	1.3	144	3100	YES	5"	7"	11 3/4"-17 3/4"	10 3/4"	12"	12 1/4"

"s" Designates stainless steel model.

SWG/CV Power Venter

Sizing The Venter

Venting

Size the SWG or ComboVent 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 maximum allowable for that size SWG or CV, move to the next larger size SWG or CV.

Do not select a venter with a maximum BTU/hr. or GPH lower than the appliance. The equivalent feet of vent pipe for the installation must be calculated. Based on the vent pipe diameter to be used, compare the calculated equivalent feet of vent pipe with the maximum equivalent feet allowable for the venter (See Table 1). If the calculated equivalent feet is greater than that allowed for the venter, increase the diameter of the vent pipe to be used and refer to the table or use the next larger size SWG or CV venter.

Note: In Table 1, the maximum equivalent footage allowable for the vent pipe is given for two points, the maximum BTU/hr. venting capacity and at 60% of the maximum. This allows for estimating values between the two given points.

Table 1

Sizing The Venter (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, CV-4	1.10	.90	170,000	35	100	4"
				65	100	5"
				100	100	6"
				100	100	7"
SWG-5, 5s, CV-5	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"

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

* *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 I gas-fired draft induced systems require an SWG-4HD or larger. 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.*

Calculating Equivalent Feet of a Vent System

How to determine total equivalent feet

1. Determine the total equivalent feet for each type of fitting used in the venting system from Tables 2 and 3.
2. Calculate the total feet for the straight lengths of pipe.
3. Add the equivalent feet of the fittings to the total amount of feet of straight length pipe. This will approximate the total equivalent feet of the vent system.
4. Find your total equivalent feet in Table 1 to determine the proper model for your installation.

   Example: System Pipe Size= 6"
   Step 1 2-90° Elbows (6")= 22 Ft.
   Step 2 10-2 Ft. Lengths of 6" Pipe= 20 Ft.
   Step 3 6" to 4" reducer= 4 Ft.
   Step 4 Total Equivalent Feet= 22 Ft. + 20 Ft. + 4 Ft.= 46 Ft.

Table 2

Equivalent Feet for Vent Pipe Fitting										
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

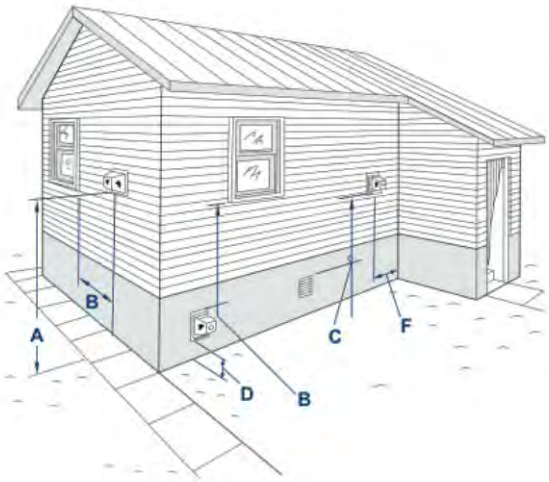
Table 3

Equivalent Feet for a Reducer/Increaser										
	Small Pipe Size									
Large Pipe Size	3"	4"	5"	6"	7"	8"	9"	10"	12"	14"
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 feet length of the Reducer/Increaser chart, find the figure at the intersection of the small pipe size and the large pipe size.

Terminal Locations of a 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 diagram).

F. The vent termination point must not be installed closer than 3' from an inside corner of an L-shaped structure.

G. For basement installations where a window well must be used or in installations where the vent terminal cannot be mounted to maintain the minimum 12" clearance above grade, use a Field Vent Riser™. The Vent Riser ensures the vent termination is above grade or the snow line and is in compliance with local codes (not shown in diagram).

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

SWG/CV 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 breach of the vent system.

Table 4

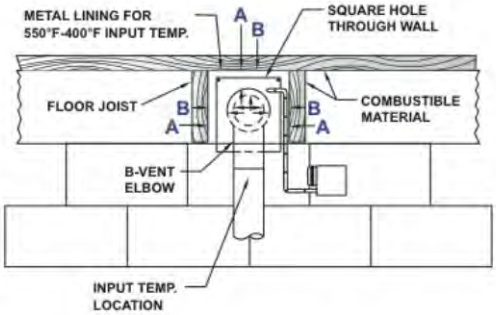
Pipe Size	Nominal Cross-Sectional Area Sq. Inches
3"	7
4"	13
5"	20
6"	28
7"	38
8"	50
9"	64
10"	79
12"	113
14"	154

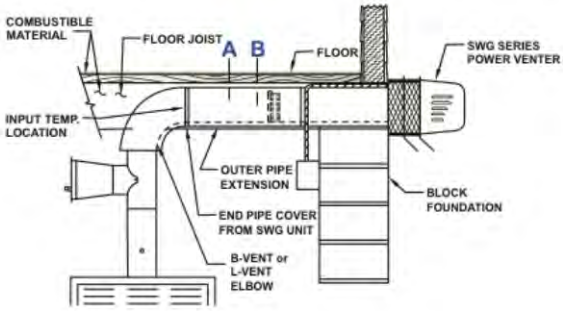
As a rule of thumb, size the vent pipe to the outlet diameter of the heating equipment for a single appliance venting system. For multiple appliance venting systems, use the outlet diameter of the largest unit and add 50%.

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 ¼" 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	Maximum Wall Thickness
SWG-4HD	PEK-4	12"
SWG-4HDS	PEK-4	12"
SWG-5	PEK-5	16"
SWG-5S	PEK-5	16"
SWG-6	PEK-6	16"
SWG-6S	PEK-6	16"
SWG-8	PEK-8	16"

Control Kits

Required to Operate SWG/CV Power Venters

Control Kit*

Control Kits (CK) control the operation of SWG/CV 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.

Venting

Selecting the proper Control Kit for your application

		Model	Applications	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.	✓					✓		
		CK-21	750 millivolt operated gas-fired appliances with pressure tap port in the burner manifold.		✓	✓					
	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).

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

SYSTEM SETUP:

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 breach 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 breach draft. Example: If the appliance manufacturer recommends a 0.02" breach 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 breach. 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.

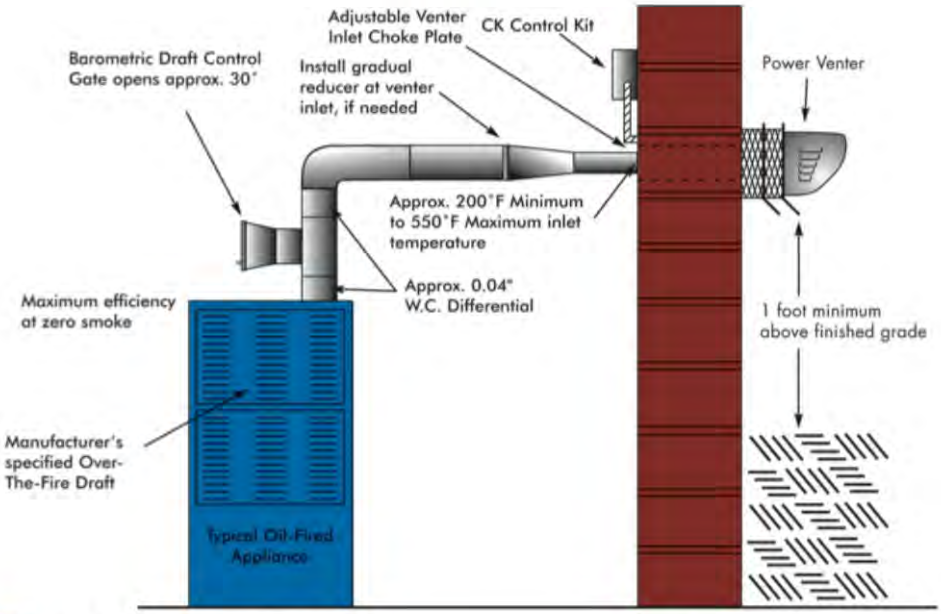
5. If the proper draft cannot be obtained at the breech or if the gate does not open as described, then adjust the choke plate in the SWG to reduce or increase the airflow. Re-adjust the draft control to obtain the required draft, since moving the choke plate will change the system draft.

Procedure for adjusting the pressure switch

- Turn pressure switch adjustment clockwise until the burner quits.
- Turn counterclockwise slowly until the burner starts.
- Turn an additional ¼ to ½ turn counterclockwise.

Note: Every installation will require unique pressure switch adjustment.

Figure 1



6. Once proper draft is achieved, measure CO_2 and smoke level. If necessary, adjust the intake airflow at the burner to obtain the highest possible CO_2 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.

TESTING:

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.

ANNUAL MAINTENANCE:

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.

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

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.

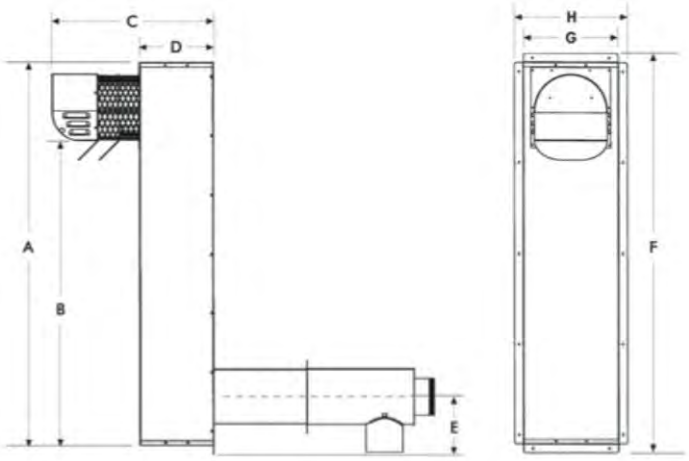
Vent Riser™

Sub-grade Venting Just Got Easier!

For basement installations where a window well must be used, or in installations where the vent terminal cannot be mounted to maintain the minimum 12" clearance above grade, use a Field Vent Riser™

Features

- Ensures the vent termination is above grade and in compliance with codes
- Perfect for basement installations where a window well must be used or when a vent terminal cannot be mounted to maintain a minimum 12" clearance above grade
- Stainless steel construction
- Combustion air connection rotates 360° for easier installation



Dimensions								
Model	A	B	C	D	E	F	G	H
CV-4VR	42 1/16"	33 1/2"	17 3/4"	9"	6 3/8"	44"	10 1/2"	12 1/2"
CV-5VR	42 1/16"	32 1/4"	20 3/8"	9 5/8"	6 7/8"	44"	10"	12 7/8"

Specifications						
Model	Volts	Hz	Amps	Watts	RPM	Thermal Protection
CV-4VR	115	60	1.7	138	3000	YES
CV-5VR	115	60	1.3	144	3100	YES

Calculating Equivalent Feet of a Vent System

How to determine total equivalent feet

1. Determine the total equivalent feet for each type of fitting used in the venting system from Tables 1 and 2.
2. Calculate the total feet for the straight lengths of pipe.
3. Add the equivalent feet of the fittings to the total amount of feet of straight length pipe. This will approximate the total equivalent feet of the vent system.
4. Find your total equivalent feet in Table 3 to determine the proper model for your installation.

Example: System Pipe Size= 6"
Step 1 2-90° Elbows (6")= 22 Ft.
Step 2 10-2 Ft. Lengths of 6" Pipe = 20 Ft.
Step 3 6" to 4" reducer= 4 Ft.
Step 4 Total Equivalent Feet= 22 Ft. + 20 Ft. + 4 Ft. = 46 Ft.

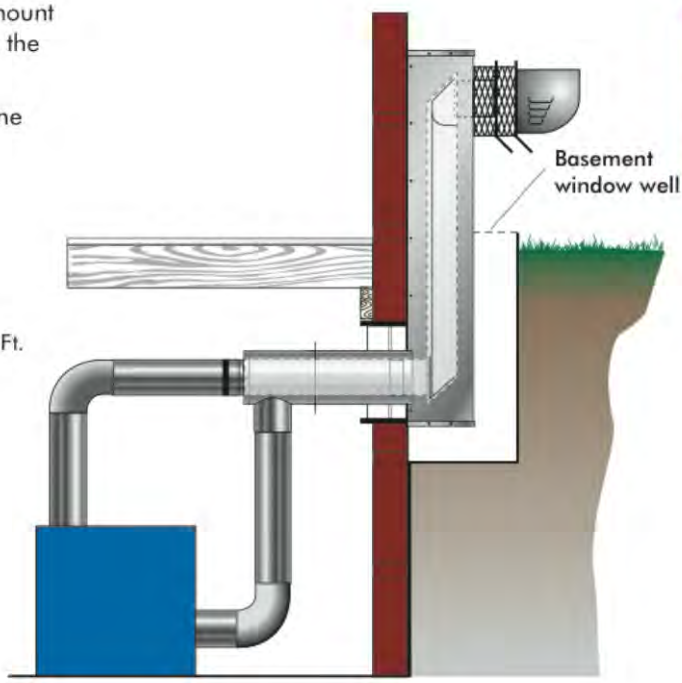


Table 1

Equivalent Feet for Vent Pipe Fittings

VENT PIPE FITTINGS	VENT PIPE DIAMETER			
	4"	5"	6"	7"
Tee	25	31	38	44
Y-Connection	13	16	20	23
90° Elbow	7	9	11	12
45° Elbow	4	4	5	6

Table 2

Equivalent Feet for a Reducer/Increaser

PIPE SIZE		Small	
		4"	5"
Large	4"	0	-
	5"	2	0
	6"	4	2
	7"	5	4

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

Table 3

Sizing The Vent Riser (Use Maximum GPH Input)

MODEL	MAX* OIL GPH INPUT 100psi	MAX* OIL GPH INPUT 140psi	MAX* GAS BTU/hr. INPUT	Maximum Equivalent Feet of Vent Pipe		COMBUSTION AIR OPTION	VENT PIPE SIZE
				AT MAX GPH INPUT	AT 60% OF MAX GPH INPUT		
CV-4VR	1.10	.90	170,000	18	83	yes**	4"
				48	100		5"
				100	100		6"
				100	100		7"
CV-5VR	1.85	1.55	290,000	-	25	yes**	4"
				32	81		5"
				76	100		6"
				100	100		7"

* *Select vent riser according to the actual rated maximum GPH input. ComboVent GPH ratings at 100 psi. Do not exceed maximum oil GPH input. For multiple venting system applications add the input for each. Unit sizing may vary depending on specific application. Consult your dealer or factory representative for the proper sizing for your particular application.*

** *Do not use combustion air intake when using gas.*

Note: In Table 3, the maximum equivalent footage allowable for the vent pipe is given for two points, the maximum GPH venting capacity and at 60% of the maximum. This allows for estimating values between the two given points.

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. We also manufacture the PVU (Universal) Power Venter for use with Oil or Gas appliances up to 300,000 BTUs. It comes standard with a CK-63 Control Kit.

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

This kit allows you to co-vent a residential water heater with a furnace or boiler. 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.

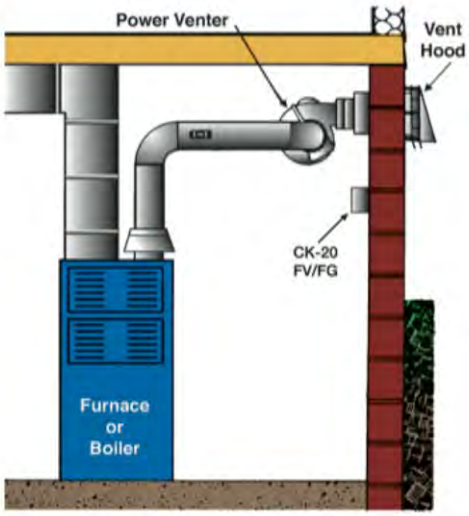
SWH

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.

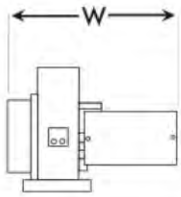


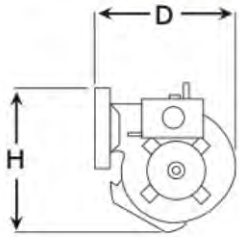
PVG - Gas and PVG PAK

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

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

SWG Vent Kits

Complete Venting Packages

Venting

Gas Furnace Vent Kit

SWG Power Venter

CK-43F Control Kit

4" MG-1 Draft Control

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

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

Vent Hoods

Aluminum Construction

For use with

- PVG Power Venters
- PVO Power Venters
- PVE Power Venters
- PVU 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

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

Figure 1

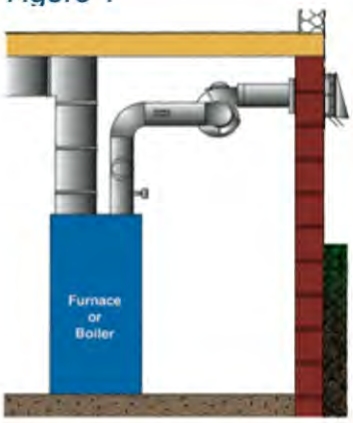
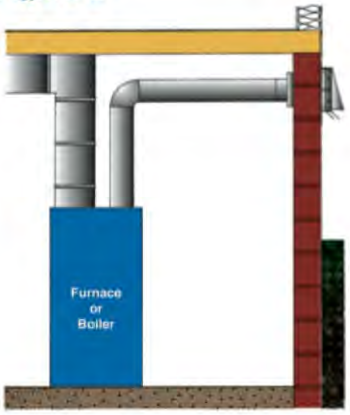
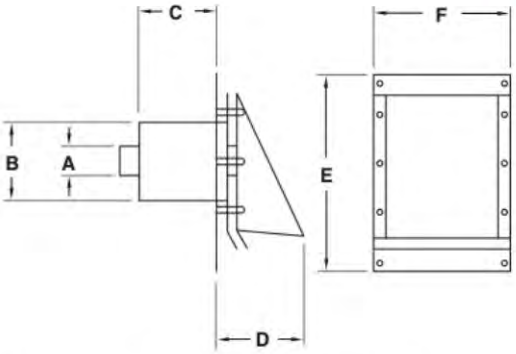


Figure 2





Model	Dimensions (inches)					
	A	B	C	D	E	F
SWH-3	3 Dia.	5 Dia.	8 ½	4 ⅜	8 ⅞	7 ⅝
SWH-4*	4 Dia.	6 Dia.	8 ½	6 5/16	12 ⅝	10 ⅝
SWH-5	5 Dia.	8 Dia.	8 ½	8	12 ⅝	10 ⅝
SWH-6	6 Dia.	8 Dia.	8 ½	8 11/16	12 ⅝	10 ⅝
SWH-8	8 Dia.	10 Dia.	8 ½	9 ⅝	15	14

** SWH-4 has a 7 ⅝ x 7 ⅝ 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.

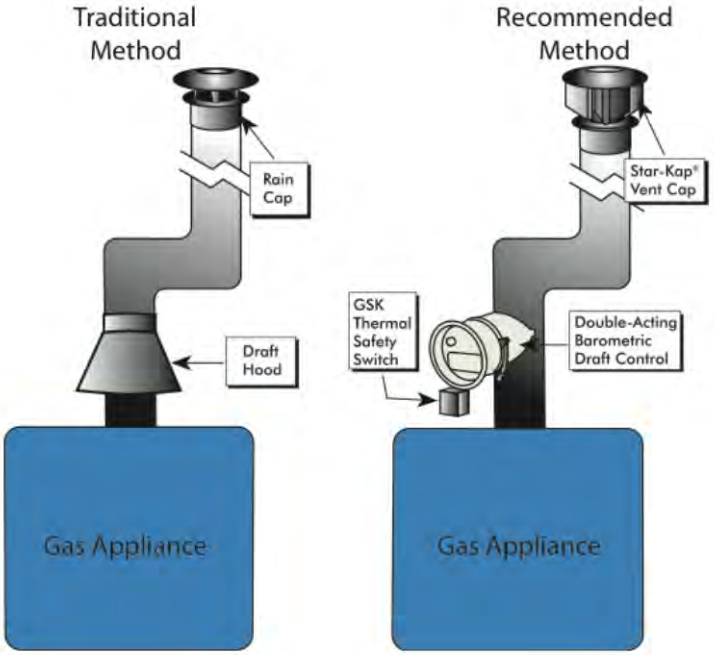
Although vent stacks are designed to remove dangerous gases and smoke created by burning gas and oil, this process can be adversely affected by the direction of the wind. A sudden gust could blow noxious waste gases down the vent stack and into the building. The Star-Kap prevents a potentially dangerous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

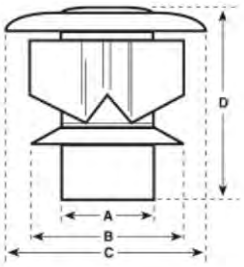
Prevent Flue Gas Spillage

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 7/8	6 1/2	8 1/4	8 3/8
SK-4	4	3 7/8	6 1/2	8 1/4	8 3/8
SK-5	5	4 7/8	6 1/2	8 1/4	8 3/8
SK-6	6	5 7/8	10	12 3/8	11
SK-8	8	7 7/8	10	12 3/8	11
SK-10	10	9 7/8	16	21 7/8	13 5/8
SK-12	12	11 7/8	16	21 7/8	13 5/8
SK-14	14	13 7/8	16	21 7/8	13 5/8

GVD Series Vent Damper

Improves Gas Boiler Efficiency. Keeps Cold Air Out, Warm Air In.

The Field Vent Damper works automatically to allow natural draft during appliance operation while preventing residual appliance heat and conditioned air from escaping during off cycles. It also prevents the infiltration of cold air during down drafts. It's made of stainless steel and is available in 8 sizes, 4" through 10" and 12".

Safety Features

Dual safety switches allow the burner to fire only when the damper is in the open position. This unit will not interfere with existing appliance safety controls, when properly installed.

Operational Features

- Operates with all 24 VAC, 60hz intermittent ignition and standing pilot ignition systems.
- Stainless steel construction provides superior corrosion resistance.
- Damper operation: power opens in 15 seconds, power closes in 15 seconds. Power is off at damper motor when it is at rest.
- Hold open switch allows damper to be placed in an open position and taken out of service to assist with trouble shooting appliance problems.
- Keyed wiring harness connector plug installs only one way, preventing incorrect wiring connection.

How the GVD Works

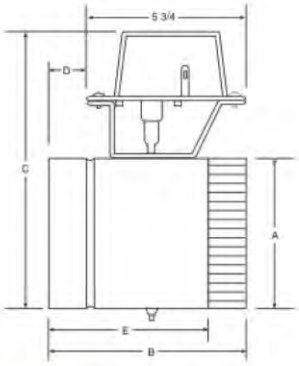
The Field Vent Damper is installed in the vent pipe, after the draft hood, or barometric. During off cycles, it remains closed, preventing air flow through the vent. When there is a call for heat, the motor is energized, rotating the damper 90 degrees to an open position. Opening and closing takes approximately 15 seconds. When the damper is fully open, the burner is allowed to fire and flue gases pass freely through the vent. When the thermostat is satisfied, the burner stops, and the damper automatically closes. For service and trouble shooting, the damper can be locked in the open position.

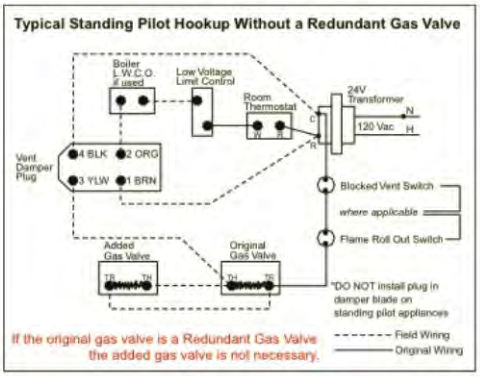
Electrical Specifications

- Minimum wiring requirements: 24 VAC • 18 gauge • 105°C
- Power requirements: 3 watts at 24 VAC, 60 Hz, when opening or closing

Motor Assembly

Wiring harnesses are sold separately. They can be found in the replacement parts section.





Wiring diagram for a typical standing pilot hookup when wiring harness is not provided.

Dimensions (inches)					
Model	Pipe Size	Length	Height	Clearance	Exposed Pipe
	A	B	C	D	E
GVD-4PL	4	6 1/16	8 7/8	15/16	4 13/16
GVD-5PL	5	6 1/16	9 7/8	15/16	4 13/16
GVD-6PL	6	6 1/2	10 7/8	1 3/16	5 1/4
GVD-7PL	7	7 1/16	11 7/8	1 7/16	5 13/16
GVD-8PL	8	8 1/16	12 7/8	1 15/16	6 13/16
GVD-9PL	9	10 1/8	13 7/8	3	8 7/8
GVD-10PL	10	12 1/8	14 7/8	4	10 7/8
GVD-12PL	12	12 1/8	16 7/8	4	10 7/8

All dimensions are in inches and are approximate. Specifications subject to change. For the most current specifications, contact Field Controls.

Oil Vent Damper

Venting

Saves Fuel. Reduces Heating Bills. Improves Efficiency.

Invest in your energy future with the Field Oil Vent Damper (OVD) system. It works automatically to save fuel, improve comfort, and keep the heat within the conditioned space. The Field OVD installs in the vent pipe after the draft control and before the chimney. It can increase Annual Fuel Utilization Efficiency (AFUE) by up to 2%.

By automatically closing the damper at the end of each heating cycle like a fireplace damper, the OVD prevents drafts, improves comfort, and reduces heat loss. The average boiler or furnace will use a minimum of 5% less fuel. Homes with taller chimneys may save 10% or more.

A seven foot wiring harness is included with a pre-wired WMO-1 blocked vent safety switch. The WMO-1 shuts the oil burner off when a blocked vent condition is detected.

Benefits

- Reduces heating bill
- Improves efficiency
- Increases comfort
- Reduces off-cycle heat loss

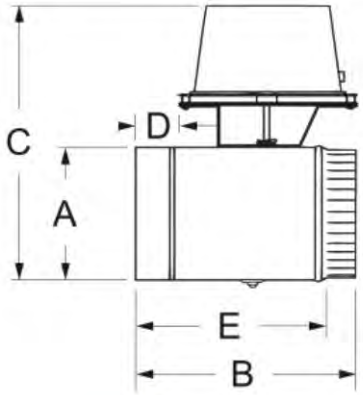
Burner and Transformer Electrical Rating

- Burner motors rated up to ⅙ hp, 5.8 Amps
- Ignition Transformer rated at 250 VA or less

Features

- Available in sizes 4"– 8"
- Blocked vent safety switch included
- Automatic power open/power close
- Two internal safety switches
- Flex seal provides self cleaning action
- Hold open service switch
- Stainless steel construction
- CSA listed
  (Listed to UL-17 Standard and CSA B140.14)

Note: Not for use with direct vent systems, sealed combustion systems, or vaporizing type burners.



Dimensions (inches)

Model	Pipe Size A	Length B	Height C	Clearance D	Exposed Pipe E	Pipe Removal
OVD-4PL	4	6	10 1/16	15/16	5	3 ½
OVD-5PL	5	6	11 1/16	15/16	5	3 ½
OVD-6PL	6	6 ½	12 1/16	1 ⅛	5 ½	4
OVD-7PL	7	7 1/16	13 1/16	1 ⅜	6 1/16	4 9/16
OVD-8PL	8	8 1/16	14 1/16	1 ⅞	7 1/16	5 9/16

All dimensions are in inches and are approximate. Specifications subject to change. For the most current specifications, contact Field Controls.

Oil Vent Damper

Put a Damper on Oil Heating Bills

Field's Oil Vent Damper increases AFUE by up to 2% which translates to a savings of approximately 5% to 10% per year on heating costs. See the chart for a quick reference of potential savings over five years on a typical mid-efficiency system.

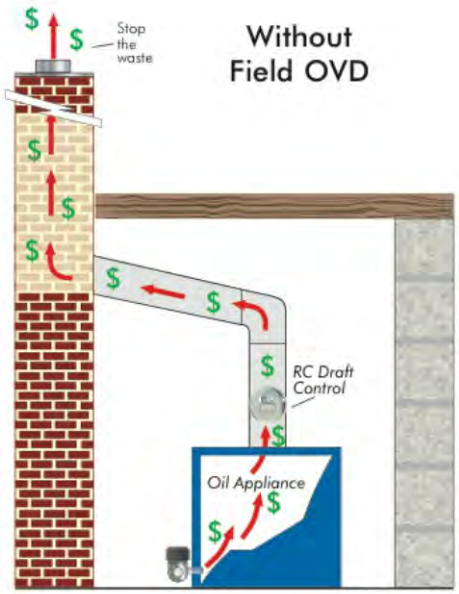
	Annual Fuel Usage (gallons)	900	1200	1500	1800
Potential Savings (over 5 years)	5% (5 ft. chimney)	$787	$1050	$1312	$1575
	10% (taller chimney)	$1575	$2100	$2625	$3150

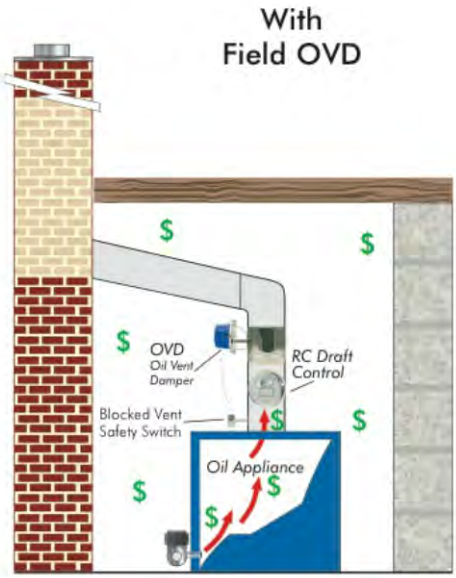
Assumes an average fuel cost of $3.50 per gallon.

Venting

How It Works

1. When the thermostat calls for heat, the vent damper begins to open.
2. Within five seconds, the damper opens completely.
3. Two safety switches prove the damper is completely open before allowing the burner to fire.
4. When the oil appliance thermostat is satisfied, the vent damper remains open for approximately three minutes before closing. This allows the remaining products of combustion to safely vent up the chimney.
5. The vent damper remains closed until the next call for heat, preventing drafts, improving comfort, and reducing heat loss.





Thermal Safety Switches

Venting

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

FTS

SSK

WMO

GSK

LS

TCA

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.

- **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 or TCA-2 Thermocouple Adapter required for 30 millivolt applications.

- **WMO-1**
  Designed for use with power venting and chimney vented systems for oil-fired applications. Manual reset.

- **GSK-160A & GSK-250M**
  The GSK-160A is designed for use on draft induced furnaces. Activates at 160°F. Silver Contacts. Auto reset. The GSK-250M is designed for use on steam boilers. Activates at 250°F. Silver Contacts. 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.

- **LS-140A, LS-550A**
  Installation of a high temperature vent limit switch is recommended for LP and Natural gas fired power vented and natural draft water heaters. This device is installed to limit the vent temperature in either plastic pipe (140° F temperature limit) or B vent installations (550° F temperature limit) caused by scaled up tanks and/or inadequate venting.

Note: *For 30 millivolt applications (residential water heaters), a thermocouple adapter is required to connect the GSK. The TCA is used to splice into the thermocouple circuit. The TCA-1 has standard threads. The TCA-2 has left handed threads for Flame Guard water heaters.*

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.

Thermal Safety Switches

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	Manual Reset	SPST	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	Manual Reset	SPST	Draft Control or Draft Hood mounting Manual reset. For use on 24/120/240 Volt equipment over 400,000 BTU/hr.
GSK-160A	46086403	Silver	- 24 VA	120AC	160°F	Automatic Reset	SPST	Draft induced furnaces. Activates at 160°. Auto reset.
GSK-250M	46086404	Silver	- 24 VA	Millivolt 24 AC	250°F	Manual Reset	SPST	Steam Boilers. Activates at 250°. Manual Reset.
GSK-3	46086400	Gold	- 24 VA	Millivolt 24 AC	180°F	Manual Reset	SPST	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	Manual Reset	SPST	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	Manual Reset	SPST	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	Manual Reset	SPST	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 (residential water heaters).
TCA-2	46429900	-	-	-	-	-	-	Same as TCA-1, except with left handed threads for Flame Guard water heaters.
LS-140A	46564100	Silver	15	120 AC	140°F	Automatic Reset	SPDT	For plastic vent applications. Recommended for LP and Natural gas fired power vented and natural draft water heaters.
LS-550A	46564200	Silver	15	120 AC	550°F	Automatic Reset	SPDT	For B-Vent applications. Recommended for LP and Natural gas fired power vented and natural draft water heaters.
WMO-1	46086900	Silver	10	120 AC	200°F	Manual Reset	SPST	Manual reset. Designed for use with power venting and chimney vented systems for oil-fired applications.

NOTE: SPST = Single Pole Single Throw, SPDT = Single Pole Double Throw

Combustion Air Systems

Effects of Insufficient Combustion Air on Draft and Heating Systems:

For the proper operation and venting of gas or oil heating appliances, sufficient outside air must be supplied to the structure to make up for the air lost from venting heating appliances, fireplaces, clothes dryers, exhaust fans, and other building air losses. Insufficient combustion air can cause major problems for proper draft and operation of both gas and oil heating systems. For years, it has been assumed that when a heating appliance was located in an unconfined area, there was sufficient air for both ventilation and combustion. Today, in most cases that is not true! With new construction, standards for building insulation and energy efficient windows and doors have reduced the amount of air changes per hour. The combustion and make up air requirements in the codes are based on 1/2 air changes per hour. For newer homes and conversion of electrically heated homes, the air changes could be reduced to 1/3 or less air changes per hour. Air problems are most notable on the coldest days when heat loss is the greatest and there is a chance that windows or doors are closed for an extended period of time.

When installing new equipment or troubleshooting problem equipment, the first determination that needs to be made is whether the equipment is located in a confined or unconfined space.

In accordance with NFPA 31 and NFPA 54, an unconfined space is defined as follows: Any space whose volume is equal to or greater than 50 cubic feet per 1,000 BTU (or 20 BTU/Cubic Foot).

This is calculated on the sum of the total input ratings of all fuel burning appliances installed in that space. Only areas connected to the space that have no doors or with fully louvered doors can be considered part of the unconfined space. If the actual free area of the louvers is not known, wood louvers are assumed to have a 20% to 25% free opening. Metal louvers or grills are assumed to have 60% to 70% free opening.

Calculating Confined Space

For a room 30' x 20' x 8' ceiling height and a heating appliance rated at 140,000 BTU/hr.

To determine the maximum total input firing rate allowable in this room:

Boiler room 30' x 20' x 8' = 4,800 cu. ft.
4,800 cu. ft. x 1,000 BTU ÷ 50 cu. ft. = 96,000 BTU
96,000 BTU x 1 GPH #2 fuel ÷ 140,000 BTU = 0.69 GPH

Result: If you fire greater than 0.69 GPH or 96,000 BTU, you will need additional combustion air.

Overcoming the Confined Space Problem

To add air from an adjacent room, two openings between the rooms could be made 12 inches above the floor and 12 inches below the ceiling. The size of these openings is based on 1 square inch per 1,000 BTU input.

To add air directly from the outside of the structure, two openings could be made. The size of these openings is based on 1 square inch per 4,000 BTU input. The above requirements are based on guidelines in NFPA 31 or NFPA 54. Alternately, if operating in a confined space, additional air may be added by a duct to the outside, sized on 1 square inch per 5,000 BTU input.

OR...Add air from outside via a Field Combustion Air System.

According to NFPA 31 and NFPA 54, an Engineered system such as a CAS-3, 4, 4Jr., 6 or 7 may be used to overcome a confined space.

CAS-1 and CAS-2 (Oil)

Direct Connect

The CAS-1 and CAS-2 Field Combustion Air Systems provide controlled amounts of outside air for proper combustion of oil heating appliances. These models are designed specifically for use with Aero, Beckett, Carlin, Riello, or Wayne burners.

Field AirBoot®

Field BigBoot®

When to use the CAS

- Too tight construction
- Provide source of fresh air for combustion
- CAS-1 and CAS-2 connect directly to oil burners
- CAS-3, CAS-4, CAS-6 and CAS-7 are for multiple appliances or when direct connection is not possible

Vacuum Relief Valve (VRV)

Intake Air Hood

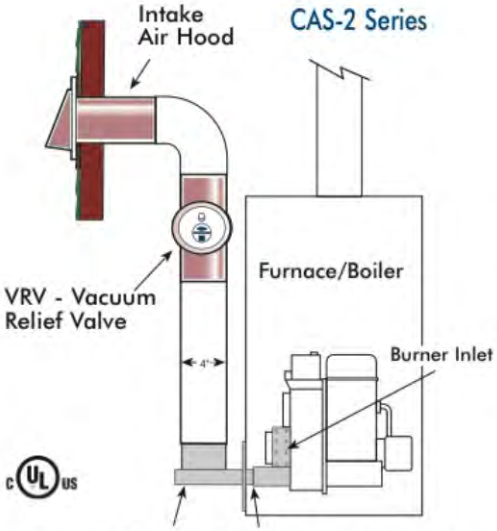
FurnaceBoot™

ComboVent™ Power Venter

The ComboVent combines combustion air connection and venting in one, convenient, easy-to-install package. For more information and details, refer to the Venting section.

Longer intake air runs require the use of larger diameter pipe between the VRV and the Intake Air Hood. Use a pipe increaser at the VRV and a reducer at the Intake Air Hood.

	Pipe Diameter	Maximum Linear Feet	Feet/Elbow
AirBoot® / FurnaceBoot™	4"	44'	7'
	5"	60'	9'
	6"	90'	11'
Field BigBoot®	6"	30'	11'
	7"	60'	12'
	8"	100'	14'



FurnaceBoot™ with Telescopic Feature
(Allows units to fit any furnace cabinet)

Model	Fuel	Burner	Appliance Input	Components
CAS-1	Oil	Beckett AFII, NX, Riello 40BF	Up to 2 gph	4" Intake Air Hood 4" Vacuum Relief Valve
CAS-2B CAS-2C CAS-2W	Oil	Beckett AFG or AF, Carlin EZ-1, CRD, FRD, Wayne MSR	Up to 2 gph	4" Intake Air Hood 4" Vacuum Relief Valve Field AirBoot®
CAS-2B-90E	Oil	Beckett AF and AFG, warm air furnaces	Up to 1.5 gph	4" Intake Air Hood 4" Vacuum Relief Valve FurnaceBoot™
CAS-2BB	Oil	Beckett SF, SMG, CF-500, CF-800	Up to 4.5 gph	6" Intake Air Hood 6" Vacuum Relief Valve Field BigBoot®
CAS-2B375	Oil	Beckett CF-375 and AFG	Up to 3.5 gph	6" Intake Air Hood 6" Vacuum Relief Valve Field BigBoot®
CAS-2CB	Oil	Carlin, 99-FRD, 100-CRD, 102-CRD, EZ-3	Up to 4.5 gph	6" Intake Air Hood 6" Vacuum Relief Valve Field BigBoot®

Combustion Air Systems

CAS-3 (Oil) and CAS-4 (Gas)

These models are designed to provide combustion air for appliances when direct connection to the burner is not possible (when the appliance is located in a confined space). According to NFPA 54 and NFPA 31, an engineered system such as a CAS-3, 4, 6, or 7 may be used to overcome the lack of air in a confined space. The CAS-3 is designed for use with oil appliances. The CAS-4 is for use with gas appliances with 24 VAC gas valve controls. The CAS-4MV is for use with 750mV power pile gas appliances. Each is designed for optimum safety and includes a proving device that won't allow the burner to engage without the Fan-in-a-Can® operating. Multiple units or additional controls are required for multiple appliance installations. Each is equipped with a two speed control for enhanced versatility.

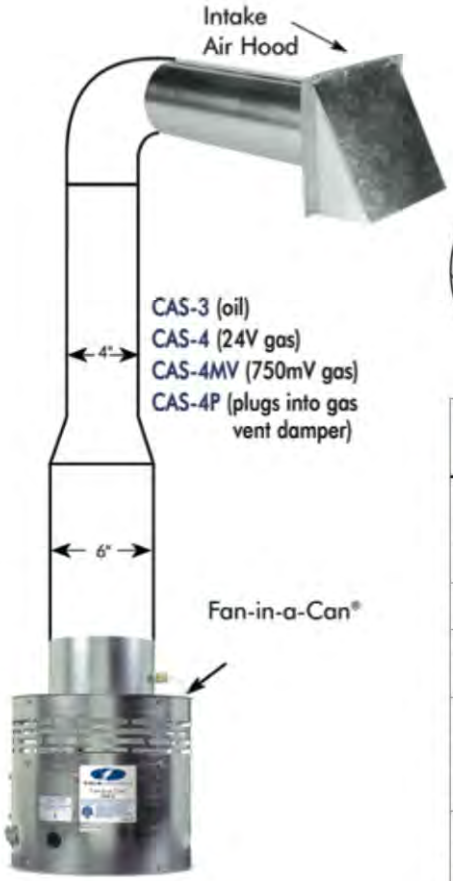
CAS-3

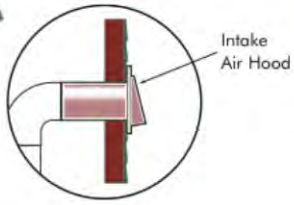
How the CAS-3 and CAS-4 work

When the thermostat calls for heat, the Fan-in-a-Can® engages and begins drawing air into the structure. When air flow is established, the pressure switch closes. The CAS sends a signal to the appliance, allowing the burner to fire. The Fan-in-a-Can® diffuses the outside air into the room near the burner to ensure adequate air for efficient combustion.

CAS-4Jr.™

The Fan-in-a-Can, Jr. is designed for gas appliances up to 110,000 BTU/hr input. A 4" Intake Air Hood (IAH) is included along with mounting brackets to secure the Fan-in-a-Can, Jr. to a wall. It may be used with a residential water heater with the addition of control kit CK-20 FV/FG.





Model	Fuel	Application	Appliance Input	Components
CAS-3	Oil	Any oil heating appliance 120V	See Specifications	4" Intake Air Hood Fan-in-a-Can® 6" to 4" Reducer Restrictor Plate
CAS-4	Gas	24V Gas Appliance	See Specifications	4" Intake Air Hood Fan-in-a-Can® 6" to 4" Reducer Restrictor Plate
CAS-4MV	Gas	750mV Power Pile Gas Appliance		
CAS-4P	Gas	Boiler with automatic vent damper	See Specifications	4" Intake Air Hood Fan-in-a-Can® 6" to 4" Reducer Restrictor Plate ADA-1
CAS-4Jr.	Gas	24V Gas Appliance	See Specifications	4" Intake Air Hood Fan-in-a-Can®

Installation Specifications							
Total Input of Appliance(s)		Max. Equivalent Feet of Installation					
CAS-3 OIL	CAS-4, 4mV, 4P GAS	4" duct & hood w/ Restrictor		4" duct & 4" hood		6" duct & 6" hood	
(gph)	(BTU/hr)	HI	LOW	HI	LOW	HI	LOW
-	50,000	300	300	300	300	300	300
.50	75,000	300	300	300	300	300	300
.75	100,000	300	300	300	300	300	300
.90	125,000	300	220	300	220	300	300
1.00	150,000	174	108	232	118	300	300
1.25	175,000	99	48	152	63	300	300
1.35	200,000	52	14	102	32	300	300
1.55	225,000	20	NA	68	13	300	239
1.75	250,000	NA	NA	45	NA	300	150
2.00	300,000	NA	NA	16	NA	300	53
2.50	350,000	NA	NA	NA	NA	193	8
2.75	400,000	NA	NA	NA	NA	109	NA
3.25	450,000	NA	NA	NA	NA	56	NA

Installation Specifications for CAS-4Jr.™			
Total Input of Appliance(s)	Maximum Equivalent Feet of Duct Pipe		
BTU/hr	4" Pipe	5" Pipe	6" Pipe
50,000	230	300	300
60,000	160	300	300
70,000	105	300	300
80,000	70	214	300
90,000	40	122	300
100,000	25	76	180
110,000	15	46	80

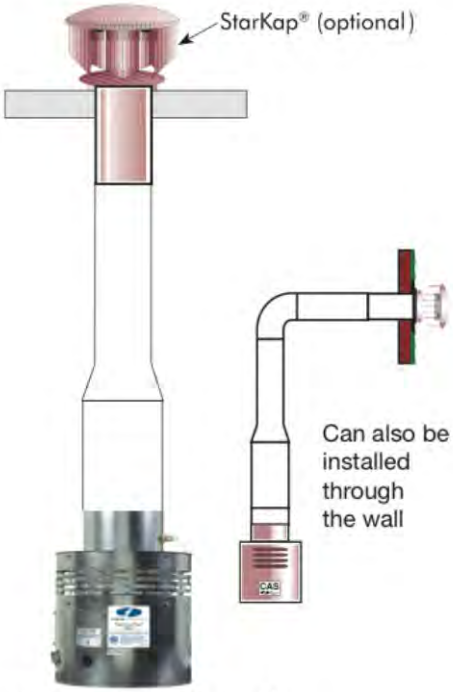
CAS-4Jr.™

For multiple appliances, the following additional controls should be used:

Model	Description
CK-20FV/FG	Additional 30mV gas water heater control for use with CAS-4 and CAS-4Jr.
CAC-24	Additional 24 Volt appliance for use with CAS-4, CAS-4Jr., CAS-6, and CAS-7
CAC-120	Additional 120 Volt appliance for use with CAS-3, CAS-6, and CAS-7

Fan-in-a-Drum®

StarKap®



Fan-in-a-Drum® Assembly

CAS-6 and CAS-7

The Fan-in-a-Drum® is a commercial product designed to deliver combustion air into the mechanical room, boiler room, or furnace location to overcome a confined space or inadequate air supply. CAS 6 & 7 are dual volt units for oil or gas applications.

How the CAS-6 and CAS-7 Work

When the thermostat calls for heat, the Fan-in-a-Drum® engages and begins drawing air into the structure. When air flow is established, the pressure switch closes. The CAS sends a signal to the appliance, allowing the burner to fire. The Fan-in-a-Drum® diffuses the outside air into the room near the burner to ensure adequate air for efficient combustion.

Max. Equivalent Length of Pipe, Including StarKap®

CAS-6 OIL (gph)	CAS-6 GAS (BTU/hr)	8" duct	10" duct	12" duct
3	420,000	410	1253	3119
3.25	455,000	344	1051	2616
3.5	490,000	291	890	2217
3.75	525,000	249	760	1893
4	560,000	214	653	1627
4.25	595,000	185	584	1405
4.5	630,000	160	489	1217
4.75	665,000	139	424	1057
5	700,000	121	369	919
5.25	735,000	105	321	800
5.75	805,000	79	241	601
6	840,000	58	176	519
6.50	910,000	49	151	377
CAS-7 OIL (gph)	**CAS-7 GAS (BTU/hr)**	**10" duct**	**12" duct**	**14" duct**
6	840,000	469	1167	2523
6.5	910,000	381	948	2050
7	980,000	311	776	1678
7.5	1,050,000	256	637	1378
8.25	1,155,000	191	476	1029
9	1,260,000	142	354	766
9.75	1,365,000	104	260	563
10.5	1,470,000	74	186	403
11.25	1,575,000	51	127	274
12	1,680,000	31	78	207
12.75	1,785,000	15	39	114
12.88	1,803,000	13	33	72

Whole House Make-Up Air System

Efforts to make your home more energy efficient prevent fresh air from entering the home and can lead to compromised air quality and appliance inefficiency. Weather stripping, caulk, sealants, and moisture barriers such as Tyvek® tighten the home, reducing air changes and locking stale air inside. When a home can't breathe, laundry dryers, range hood fans, bathroom fans and heating appliances take more time to do their jobs, wasting precious energy.

These problems can be solved with the installation of a Make-Up Air System from Field Controls. The MAS delivers fresh air automatically, improving indoor air quality, improving appliance efficiency, and saving energy.

Make-Up Air System

Note: The IAH-4 and the IAH-6 can be purchased separately.

When to use the MAS

- To improve appliance efficiency
- To improve Indoor Air Quality
- To conserve energy
- To increase fresh air changes
- To replace air exhausted by bathroom fans, laundry dryers, range hood fans, and other exhaust devices

How the MAS works

The Make-Up Air System connects the HVAC system to the outside to allow controlled amounts of fresh air to enter the system when needed. The system automatically senses pressure changes and a need for air flow and opens to bring a precise, metered amount of fresh air into the air handler. Here the cold air is tempered as it mixes with warm air in the return duct. The air is then heated and distributed through the home via the central duct system. When the need for air is fulfilled, the system closes to prevent further air infiltration. The system must be installed by a qualified heating and air conditioning professional and is adjustable for homes from 1000 to 4000 square feet. It does not require any electricity or maintenance.

Draft

For proper operation and efficient fuel consumption in oil, gas, and/or coal-fired heating appliances, draft must remain constant. When it is, combustion is more complete, fuels are utilized efficiently, and money is saved.

Field Draft Controls maintain consistent draft by counteracting the negative forces caused by changes in temperature and barometric pressure, as well as the effects of wind.

RC

MG-1

M

M+MG2

Draft

How Draft Controls Work

Static pressure of the cool air **Illustration A** (1) exerts pressure on the outside of the furnace or boiler, the breaching, and stack. The pressure difference between the room air and heated gas (air) causes products of combustion (2) to flow (draft) through the unit and rise through the breach and chimney. Room temperature air (3) enters through the barometric draft control (4) in the precise amount needed to overcome the excess drafts caused by temperature variations, wind fluctuations, and barometric pressure changes. Combustion of fuel is complete and the process is stabilized. The velocity of combustion gases through the heat exchanger is slowed so more heat is extracted. The unit operates more efficiently, reliably, and requires less maintenance.

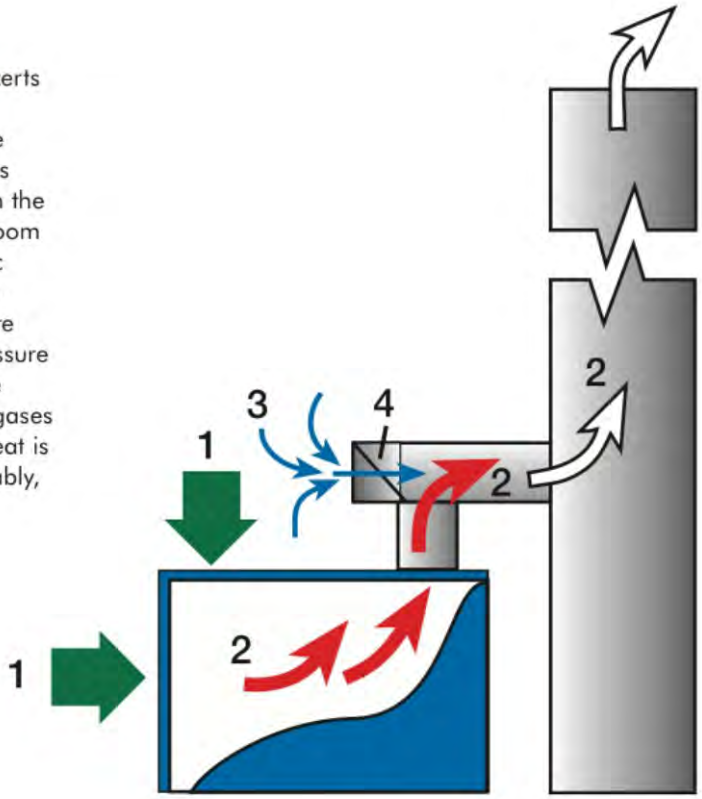


Illustration A
Gas Installation

Typical Natural Vent System

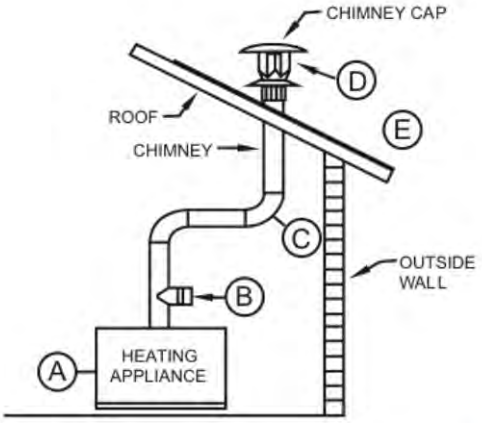


Illustration B demonstrates how pressure changes as air/gases flow through the appliance **(A)**, past the draft control **(B)**, through the vent pipe **(C)**, and outside the building **(D/E)**.

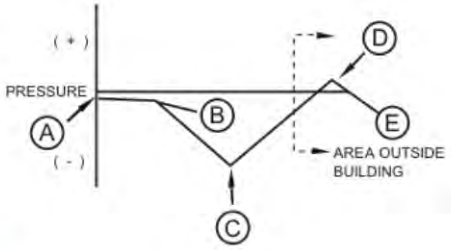


Illustration B

When to Use a Draft Control

- **Draft Inducers/Power Venters**
  With these devices, draft is increased or created, causing fluctuations in air flow through the combustion chamber. These fluctuations can be negated by the use of a barometric draft control located between the draft inducer or power venter and the furnace, boiler, or water heater it services. Use a single-acting control for oil and gas-fired equipment with a power vented system. Use a single acting control for oil, and a double-acting control for gas-fired equipment with a draft induced system.

- **Power Burners**
  A power burner is designed so that a fan delivers negative air pressure to the combustion chamber. A single-acting draft control for oil maintains that negative pressure. A power burner designed to burn natural or LP gas operates in the same manner. While a draft hood (diverter) is often used on gas units fired with an atmospheric burner, a double-acting barometric draft control should be used for furnaces or boilers fired with power burners.

- **Forced Draft Burners**
  Forced Draft installed with a stack height in excess of 30' will probably develop excessive natural draft, reducing the amount of pressure within the furnace or boiler. A barometric draft control will help eliminate this undesirable stack action and permit the unit to be pressurized.

- **Dual Fuel Appliances**
  Burners capable of burning either gaseous fuels or oil should be equipped with a barometric draft control. We suggest using a double-acting control on units where fuels are frequently changed. The double-acting feature is important for gas-firing appliances because it allows spillage of combustion products in case of blocked flues or downdrafts. To detect flue gas spillage on dual fuel installation, a Field Thermal Safety Switch is recommended.

- **Gas-Fired Appliances**
  Gas-fired furnaces and boilers generally require a double-acting draft control. Like a single-acting control, it opens inwardly to maintain a uniform draft. But, unlike a single-acting control, it is also free to open outwardly to spill the products of combustion, in case of blocked flues or downdrafts. National codes often mandate the use of a draft control. Usage is generally limited to furnaces or boilers designed for use with power burners and incinerators. Draft controls are generally used when oil-fired units are converted to gas.

Type RC

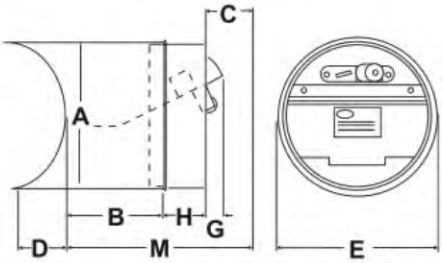
Oil or Coal – Residential and Commercial

The Field RC is furnished as standard equipment on many leading brands of oil or coal-fired heating equipment. It is calibrated to allow for easy adjustment to the furnace or boiler manufacturer's specifications. Designed for settings from .02" to .08", this control is so sensitive that instrumentation should be used when adjusting the unit during installation.

RC

RCBT*

Material Gauges						
Size	4"	5"	6"	7"	8"	9"
RING	22	24	24	22	20	20
GATE	24	24	24	24	20	20
COLLAR	26	26	26	26	26	26



Specifications													
Model	Control Size	Nominal Capacity Sq. In.	Recommended Pipe Sizes (in.)		Dimensions (inches)							
			Dia.	Circum.	A	B	C	D	E	G	H	M
4" RC	4	12.6	3-4-5	9 ½ to 15 ¾	4	2 ½	2	2 5/16	4 9/16	1	2 ½	7
5" RC/RCBT	5	19.6	4-5-6	12 ½ to 19	5	2 ½	2	2 5/16	5 9/16	1	2 ½	7
6" RC/RCBT	6	28.3	5-6-7	15 ¾ to 22	6	1 ⅞	3	2	6 ⅝	1	2 ¾	7 ⅝
7" RC	7	38.5	6-7-8	19 to 25 ¼	7	2 ⅝	3 ½	2 ½	7 ⅝	1	2 ¾	8 ⅝
8" RC/RCBT	8	50.3	7-8-9	22 to 28 ⅛	8	4 ⅜	4	3 ⅜	8 11/16	1 ⅛	2 ⅝	11
9" RC	9	63.6	8-9-10	25 ¼ to 31 ½	9	5 ⅛	4 ½	3 ¾	9 11/16	1 ½	2 ⅝	12 ¼

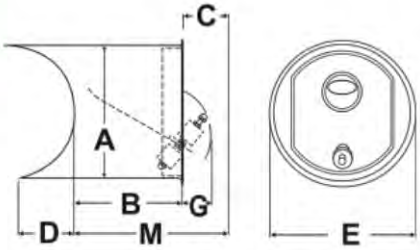
**RCBT is recommended for wood and coal burning applications or anytime black pipe is preferred.*

Type M

Oil or Coal - Residential

The M control lends itself ideally to conditions requiring a great deal of stability and accuracy. Designed for settings from .01" to .1", the Field M Control is recommended for oil or coal-fired residential heating applications. The Type M features an infinitely variable screw adjustment, permitting an extremely fine instrument setting. The M employs side wings to control air direction with gate curvatures designed to compensate for differences in horizontal and vertical settings.

M



Material Gauges				
Size	6"	7"	8"	9"
RING	24	22	20	20
GATE	26	22	20	20
COLLAR	26	26	24	24

Specifications

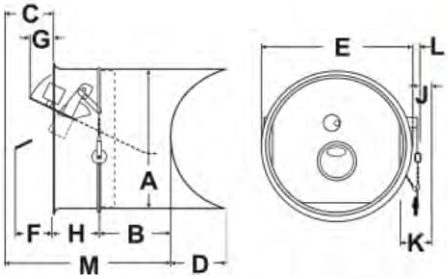
Model	Control Size	Nominal Capacity Sq. In.	Recommended Pipe Sizes (in.)		Dimensions (inches)						
			Dia.	Circum.	A	B	C	D	E	G	M
6" M	6	28.3	5-6-7	15 ¾ to 22	6	5	3	3 ¼	6 17/32	2	8
7" M	7	38.5	6-7-8	19 to 25 ¼	7	5 ¼	3 ½	3 ¾	7 ⅜	2 ¼	8 ¾
8" M	8	50.3	7-8-9	22 to 28 ¼	8	6 ⅜	4	3 ⅜	8 ⅝	3	10 ⅜
9" M	9	63.6	8-9-10	25 ¼ to 31 ½	9	7 ¼	4 ½	3 ¾	9 ⅝	1 29/32	11 ¾

Type MG-1

Gas

A double-acting control for gas-fired furnaces and boilers is widely used for conversion burner installations, gas draft-induced appliance operation with mechanical draft inducers, or sidewall power venters. It is also recommended for use on gas atmospheric appliances where a draft hood cannot be installed, and can improve combustion stability and draft on many gas atmospheric installations with venting problems. The MG-1 provides precise, accurate control of drafts at levels higher than permitted by a standard draft diverter, which is a frequent requirement with gas. Because it is double-acting, it opens out to relieve positive vent system pressures as low as .01". Draft adjustments using weights are simple and accurate from .01" to .1".

MG-1



Material Gauges						
Size	4"	5"	6"	7"	8"	9"
RING	24	24	24	22	20	20
GATE	24	24	24	22	20	20
COLLAR	26	26	26	26	26	26

Specifications

Model	Control Size	Nominal Capacity (Sq. In.)	Recommended Pipe Sizes (in.)		Dimensions (inches)											
			Dia.	Circum.	A	B	C	D	E	F	G	H	J	K	L	M
4" MG-1	4	12.6	3 - 4	9 ½ to 12 ½	4	2 ½	2	2 5/16	4 9/16	1 ½	¼	2 ½	½	1 ¼	⅜	7
5" MG-1	5	19.6	4 - 5	12 ½ to 15 ¾	5	2 ½	2	2 5/16	5 9/16	2	⅝	2 ½	½	1 ¼	½	7
6" MG-1	6	28.3	5 - 6	15 ¾ to 19	6	2 11/16	3	3 ¼	6 ⅝	2 ⅛	13/16	2 ¾	¾	1 ¾	⅝	8 7/16
7" MG-1	7	38.5	6 - 7	19 to 22	7	3 ⅜	3 ½	3 ¾	7 ⅝	2 ⅜	1 ⅛	2 ¾	¾	2	¼	9 ⅝
8" MG-1	8	50.3	7 - 8	22 to 25 ¼	8	4 ⅜	4	3 ⅜	8 11/16	3	1 ½	2 ⅝	¾	2 ¼	⅜	11
9" MG-1	9	63.6	8 - 9	25 ¼ to 28 ¼	9	5 ⅛	4 ½	3 ¾	9 11/16	3 ½	1 ¾	2 ⅝	¾	2 ½	⅜	12 ¼

Type M+MG2

Solid, Oil or Gas Commercial/Industrial

This is a series of compact, rugged, heavy-duty controls for use on large residential, commercial, and industrial applications. The Field Type M+MG2 Draft Control provides precise draft regulations for solid fuels, oil, gas, or oil/gas appliances requiring only the simplest, on-the-job adjustments depending on which fuel is to be utilized. In a gas installation, the double-acting Type M+MG2 is specified instead of a draft hood to give the appliance the assistance of the chimney. In a duel fuel oil/gas or a gas-fired only application, use the M+MG2 as a double-acting draft control with the optional Field Thermal Switch accessory. Use the M+MG2 as a single-acting draft control for oil or solid fuel applications. For any installation with 10" or larger diameter vent pipe, specify our standard M+MG2 Draft Control, the unit that can be adapted to any fuel. The moving part (gate) rests on a long, thin, stainless steel knife edge which, in turn, is supported by self-aligning and self-cleaning bearings. When the heavy gauge gate moves, only the knife edge rests on the bearing for minimum friction and maximum sensitivity to draft changes.

M+MG2

Specifications

Model	Control Size	Nominal Capacity (Sq. In.)	Recommended Pipe Sizes (in.)		Dimensions (inches)											
			Dia.	Circum.	A	B	C	D	E	F	G	H	J	K	L	M
10" M+MG2*	10	78.5	9 - 10	28 ¼ to 31 ½	10	4 ⅜	5	4 ¼	11	3 ⅜	1 ⅛	4 ¾	1	3 ½	1	14 ⅛
12" M+MG2*	12	113	11 - 12	34 ½ to 37 ¾	12	5 ¾	6	5	13 ¼	4 ⅝	1 ¾	4 ¾	1	3 ½	⅞	16 ½
14" M+MG2*	14	154	13 - 14	40 ¾ to 44	14	7 ⅛	7	5 ¾	15 ½	5 ⅜	2 ⅛	5 ⅛	1	3 ½	⅝	19 ¼
16" M+MG2	16	201	15 - 16	47 to 50 ¼	16	8 ⅜	8	6 ½	17 ½	6 ⅛	2 ⅜	5 ⅝	1 ½	4	⅝	22
18" M+MG2	18	255	17 - 18	53 ½ to 56 ½	18	8 ¼	9	7 ½	19 ½	6 ⅞	2 ¾	7 ⅜	1 ½	5 ¼	1 ⅝	24 ⅝
20" M+MG2**	20	314	19 - 21	59 ¾ to 66	20	9 ⅝	10	8 ⅛	22	7 ⅝	3	7 ¾	1 ½	6 ¼	1 ¼	27 ⅜
24" M+MG2**	24	452	22 - 25	69 to 78 ½	24	12 ⅜	12	10 ½	26	9 ¼	3 ⅝	8 ⅝	2	6 ¼	1 ¼	33
28" M+MG2**	28	616	26 - 30	81 ¾ to 94 ¼	28	13 ⅛	14	-	30 ½	10 ¾	4 ⅛	11 ⅜	2	6 ¼	⅞	38 ½
32" M+MG2**	32	804	31 - 34	97 ½ to 107	32	15 ⅜	16	-	35	12 ¼	4 ¾	12 ⅛	2	6 ¼	⅝	43 ½

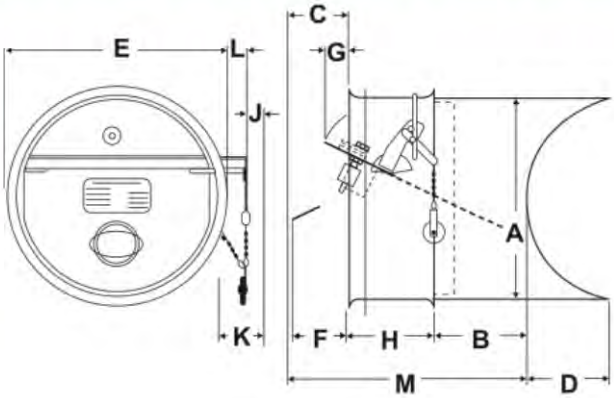
*CSA certified

**An increaser or reducer may be necessary in order for the Barometric Draft Control to adapt to off-sized pipe.

Material Gauges

Size	10"	12"	14"	16"	18"	20"	24"	28"	32"
RING	20	20	20	18	18	18	18	16	16
GATE	18	16	16	16	16	16	14	14	14
COLLAR	24*	24*	22*	20*	20*	18*	18*	14**	14**

* Galvanized **HRPO with Enamel Finish



Recommended Locations for Field Draft Controls

For gas-fired equipment, the preferred location of the control is on the bull head tee. This location provides maximum relief of downdrafts with minimum positive pressure. **(See Figure 1, Diagram A-C)**

With oil or solid fuels, the bull head tee is not recommended, so locate the control as shown. **(See Figure 1, Diagram D-J)** These locations are acceptable for gas units as well. Except on forced draft systems, locate the control as close as possible to the furnace or boiler, at least 12" beyond a stack switch on oil-fired units, and at least 18" from a combustible ceiling or wall.

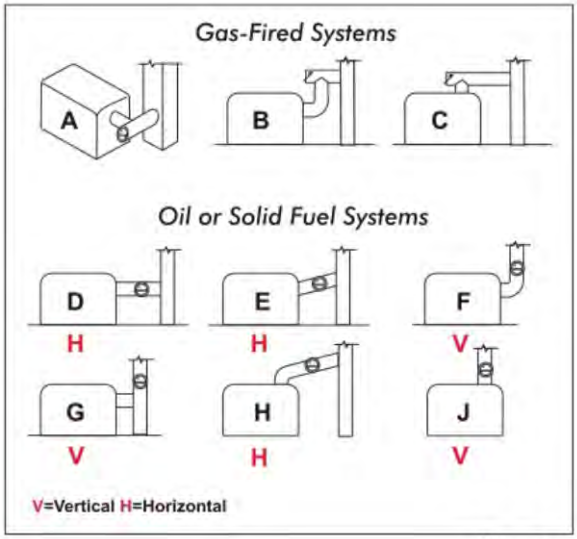


Figure 1

Multiple Appliance Location Recommendations

Commercial and industrial furnaces and boilers are frequently installed in multiples. **(See Figure 2)** Use a draft control for each boiler located on the uptake between the smoke outlet and the breach **(location A)**. When this uptake is too short to permit the installation of a control, locate a separate control for each boiler on the main breach **(location B)**. If neither of these locations is possible, use a single large control in the breaching between the chimney and the nearest boiler **(location C)**. Where several units are vented into a common breaching, the most draft-critical should vent highest in, or be placed closest to the chimney. Incinerators should generally be placed farthest from, or vented lowest in the chimney.

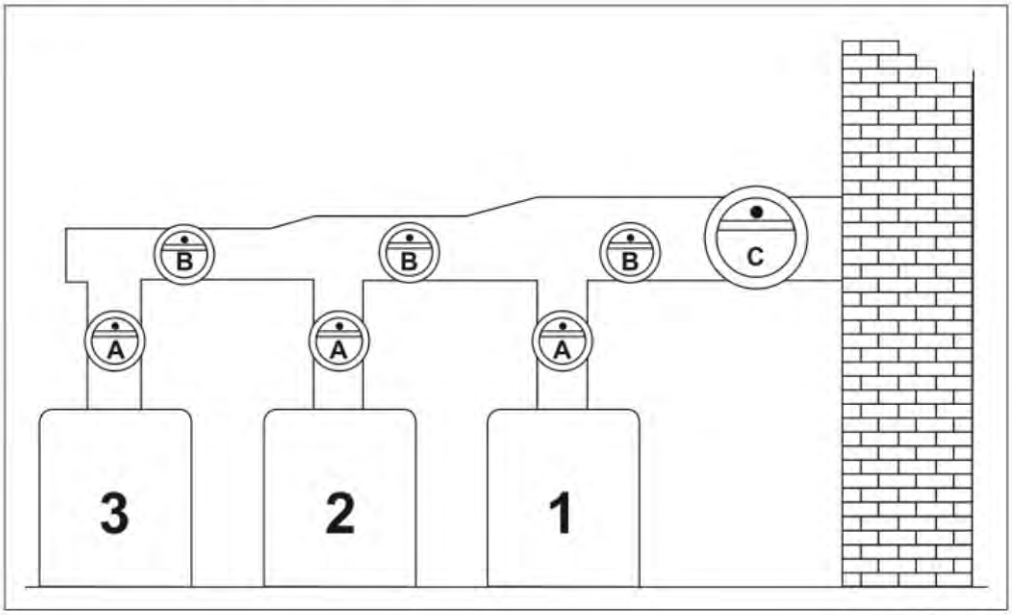


Figure 2

Choosing The Right Size

Simple rules of thumb to guide size selections:

1. **For most applications,** the draft control should be the same size as the flue pipe. In other words, use a 6" control for a 6" pipe.

2. **If the vent pipe or breach is square,** use the round equivalent. For example - on a 14" x 14" breach use a 14" control. Little flow occurs in the corners of a square pipe, so its capacity is approximately the same as a round pipe of the same diameter.

3. **If the breach is rectangular or oval,** compute its cross-sectional area and select a draft control having the same or a greater nominal cross-sectional area. A breach 14" high x 10" wide would have a cross-sectional area of 140 square inches. From Table 1, select a 14" control with a cross-sectional area of 154 square inches.

4. **Where a control larger than 32" is required,** use more than one draft control with combined cross-sectional areas equal to or greater than that of the breach.

5. **When chimneys are of an unusual height,** or if the draft to be maintained is either very high or very low, it is advisable to deviate from the rules of thumb outlined here and refer to the sizing chart.

Table 1

Control Size	Nominal Cross-Sectional Area (Sq. In.)	Control Size	Nominal Cross-Sectional Area (Sq. In.)
6"	28	16"	201
7"	38	18"	255
8"	50	20"	314
9"	63	24"	452
10"	78	28"	616
12"	113	32"	804
14"	154		

Sizing Chart

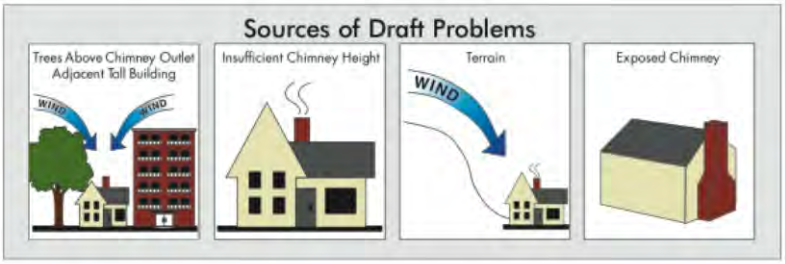
Diameter of Vent or Breach	If Chimney Height is	Use This Size Control	If Chimney Height is	Use This Size Control	If Chimney Height is	Use This Size Control
4"	15' or less	4"	16' or more	5"		
5"	15' or less	5"	16' or more	6"		
6"	15' or less	6"	16' or more	7"		
7"	15' or less	7"	16' or more	8"		
8"	15' or less	8"	16' or more	9"		
9"	15' or less	9"	16'-30'	10"	31' or more	12"
10"	20' or less	10"	21'-40'	12"	41' or more	14"
11"	20' or less	12"	21'-40'	12"	41' or more	14"
12"	20' or less	12"	21'-40'	14"	41' or more	16"
13"	22' or less	14"	23'-45'	16"	46' or more	18"
14"	22' or less	14"	23'-45'	16"	46' or more	18"
15"	22' or less	16"	23'-45'	16"	46' or more	18"
16"	30' or less	16"	31'-50'	18"	51' or more	20"
17"	30' or less	18"	31'-50'	20"	51' or more	20"
18"	30' or less	18"	31'-50'	20"	51' or more	20"
19"	30' or less	20"	31'-50'	20"	51' or more	24"
20"	30' or less	20"	31'-50'	20"	51' or more	24"
21"	30' or less	20"	31'-50'	24"	51' or more	24"
22"	30' or less	24"	31'-50'	24"	51' or more	24"
23"	35' or less	24"	36'-60'	24"	61' or more	28"
24"	35' or less	24"	36'-60'	24"	61' or more	28"
25"	35' or less	28"	36'-60'	28"	61' or more	28"
26"	40' or less	28"	41'-70'	28"	71' or more	28"
27"	40' or less	28"	41'-70'	28"	71'-100'	28"
28"	50' or less	28"	51'-100'	32"	100' or more	32"
29"	50' or less	28"	51'-100'	32"	100' or more	32"
30"	50' or less	32"	51'-100'	32"	100' or more	32"
31"	50' or less	32"	51'-100'	32"	100' or more	Two 24"
32"	50' or less	32"	51'-100'	32"	100' or more	One 24" One 28"
33"	50' or less	32"	51'-100'	One 32" One 20"	100' or more	One 32" One 24"
34"	50' or less	32"	51'-100'	One 32" One 24"	100' or more	One 32" One 24"

Draft Inducers

Field Draft Inducers solve the drafting problems caused by short chimneys, undersized vent pipes and negative building pressures.

Draft Inducers are designed for easy installation in a wide variety of applications, including oil or gas-fired furnaces, water heaters, and boilers. For venting single or multiple appliances, use a control kit.

Note: Pressure switch required according to NFPA code.
Not for sidewall venting.

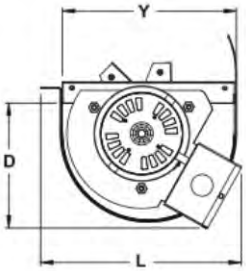


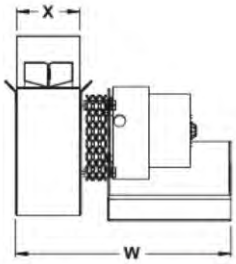
When to use a Draft Inducer

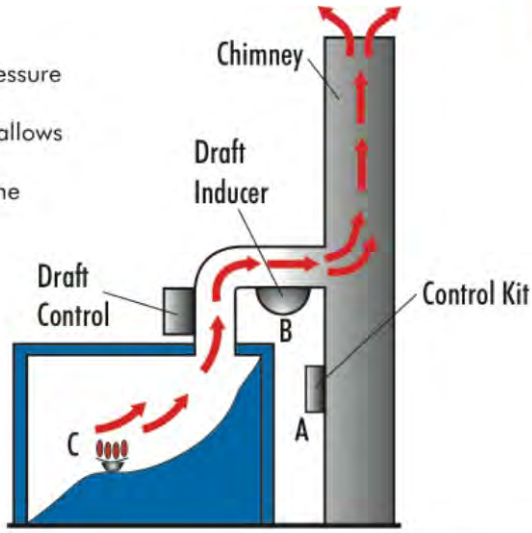
- Long horizontal vent runs
- Undersized vent pipes
- Short chimneys
- Outside exposed chimney

How Draft Inducers Work

1. Thermostat calls for heat.
2. Control Kit (A) energizes Draft Inducer (B).
3. Draft Inducer forces air flow in chimney, creating negative pressure in burner chamber.
4. Once negative pressure (draft) is established, the Control Kit allows the burner (C) to start.
5. When the thermostat is satisfied, the Control Kit shuts down the burner and the Draft Inducer.







Specifications

Unit Dimensions (inches)						Electrical Data					
Model	L	W	D	X	Y	Volts	Hz	RPM	Watts	Amps	Thermal Protection
DI-1	8 3/32	8 13/16	5 17/32	2 5/8	7	115	60	1550	33	.43	yes
DI-2	9 7/16	9 3/16	6 7/16	3	8 3/8	115	60	1550	78	1.1	yes
DI-3	12 9/16	10 1/8	9	3 3/4	11 3/4	115	60	1725	186	3.9	yes
DI-4	12 9/16	14 3/16	9	7	11 3/4	115	60	1725	440	5.0	yes
DI-5	12 9/16	16 3/16	9	9	11 3/4	115	60	1725	560	5.7	yes

Draft Inducers

Sizing Chart

Gas-Firing with Draft Hood					Gas-Firing with Barometric Draft Control					Oil or Coal-Firing with Barometric Draft Control				
Input (BTU/HR)	Pipe Dia. (IN)	Draft Inducer (Model)	Static Pressure (IN W.C.)	Flow (CFM)	Input (BTU/HR)	Pipe Dia. (IN)	Draft Inducer (Model)	Static Pressure (IN W.C.)	Flow (CFM)	Max. Input per GPH	Pipe Dia. (IN)	Draft Inducer (Model)	Static Pressure (IN W.C.)	Flow (CFM)
69,000	3	DI-1	.04	47	69,000	3	DI-1	.05	36	.5	3	DI-1	.05	36
105,000	4		.04	72	105,000	4		.05	55	.7	4		.05	48
111,000	5		.06	75	118,000	5		.06	65	.9	5		.05	67
120,000	6		.05	82	123,000	6		.05	68	.95	6		.04	68
279,000	5	DI-2	.06	190	300,000	5	DI-2	.07	156	2	5	DI-2	.06	156
308,000	6		.07	210	340,000	6		.08	176	2.5	6		.07	175
330,000	7		.11	225	364,000	7		.09	189	2.75	7		.08	200
353,000	8		.07	240	390,000	8		.06	200	3	8		.05	215
522,000	8	DI-3	.18	355	683,000	8	DI-3	.15	355	5	8	DI-3	.13	355
674,000	9		.15	458	880,000	9		.13	458	6	9		.11	458
694,000	10		.12	472	908,000	10		.10	472	6.5	10		.09	472
835,000	12		.08	568	1,092,000	12		.06	568	7.5	12		.06	568
900,000	10	DI-4	.18	612	1,177,000	10	DI-4	.15	612	8.5	10	DI-4	.13	612
1,250,000	12		.20	850	1,635,000	12		.17	850	11	12		.14	850
1,400,000	14		.19	952	1,831,000	14		.16	952	13	14		.13	952
1,800,000	16		.15	1,224	2,300,000	16		.13	1,224	17	16		.10	1,224
2,000,000	14	DI-5	.14	1,224	2,350,000	14	DI-5	.12	1,224	17	14	DI-5	.10	1,224
2,200,000	16		.18	1,500	2,885,000	16		.15	1,500	21	16		.13	1,500
2,400,000	18		.10	1,632	3,140,000	18		.09	1,632	22	18		.07	1,632
2,800,000	20		.09	1,900	3,654,000	20		.08	1,900	26	20		.06	1,900

Control Kits (CK) control the operation of Field Draft Inducers.

See the chart below to select the proper kit for your application.

		Model	Applications	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.	✓					✓		
		CK-21	750 millivolt operated gas-fired appliances with pressure tap port in the burner manifold.		✓	✓					
	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.	✓	✓	✓			✓		

*** 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

Chimney Top Draft Inducer

For Wood/Gas/Coal Fireplaces

The Type C Chimney Top Draft Inducer provides negative pressure to overcome the effects of wind, cold chimneys, insufficient chimney height, and downdraft. The Type C Draft Inducer is effective when venting standard fireplaces and freestanding gas fireplaces.

The Type C Draft Inducer is available in four sizes: 6", 8", 10", and 13", and is designed to provide years of trouble-free operation. It is insulated to withstand peak temperatures up to 1300° F and operates continually at 900° F without overheating the motor windings or bearings. It can operate with a standard manual on-off switch, or can be installed with the Field Controls variable speed motor control.

Stainless Steel Construction

When to Use a Chimney Top Draft Inducer

- **To Provide Additional Air**

  A considerable amount of air is necessary to allow for good chimney draft. In many tightly constructed homes, this air is not readily available. The addition of a Type C Draft Inducer will compensate for lack of air by supplementing the chimney's natural draft.

- **To Create Draft in Cold Chimneys**

  A chimney, especially on an outside wall, may be so cold prior to starting a fire that no draft exists. A Type C Draft Inducer switched on before starting the fire will provide draft until the chimney has become hot enough to generate a natural draft.

- **To Prevent Occasional or Continuous Smoking**

  Occasional smoking may be the result of several factors including downdraft caused by adjacent buildings, terrain, or trees. Remodeling, new additions, or the addition of an exhaust fan can change air flows and result in poor draft. Or a fireplace design inadequacy, such as an undersized flue, may prevent adequate draft.

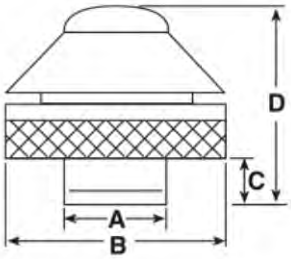
Draft

Specifications

	Motor Information						Speed Control		
Inducer Size	Volts	Amps	Watts	Hz	RPMs	Max. Hearth Opening	Volts	Amps	Hz
6" Type C	115	.81	57	60	1550	3.5 sq. ft.	115	5	60
8" Type C	115	.81	57	60	1550	7 sq. ft.	115	5	60
10" Type C	115	3.75	252	60	1050	12 sq. ft.	115	5	60
13" Type C	115	3.75	252	60	1050	30 sq. ft.	115	5	60

Dimensions

Model	Dimensions (inches)				Max. Hearth Opening
	A	B	C	D	
6" C Draft Inducer	5 59/64	16	3 15/32	14 3/4	3.5 sq. ft.
8" C Draft Inducer	7 15/16	16	3 3/8	14 3/4	7 sq. ft.
10" C Draft Inducer	10	16	3 3/8	14 3/4	12 sq. ft.
13" C Draft Inducer	13	16	3	14 3/4	30 sq. ft.



ClearWave®

Water Conditioner

The ClearWave® is a revolutionary product that conditions hard water without the expense and hassle of salt, chemicals, or traditional hard water systems. The ClearWave attacks hard water particles with electro-magnetic waves, treating the entire water system in your home and helping prevent and reduce hard water problems.

Calcium and magnesium particles tend to stick to each other and any surface they contact, forming layers of hard scale. This scale buildup damages water heater elements and restricts water flow. The ClearWave "neutralizes" these particles. Once treated by the ClearWave Water Conditioner, calcium and magnesium particles remain in suspension, flowing freely through the system and down the drain.

The ClearWave not only prevents new scale formation, over time it helps break down existing scale, protecting the water heater, pipes, shower heads, and appliances. The ClearWave is maintenance-free, environmentally friendly, and uses less water than traditional water softeners. The ClearWave works on all types of pipes including copper, PVC, galvanized, and stainless steel.

Benefits

- Salt-free
- Environmentally friendly
- Removes existing scale
- Maintenance free
- Prevents scale buildup
- Easy to Install

Applications include:

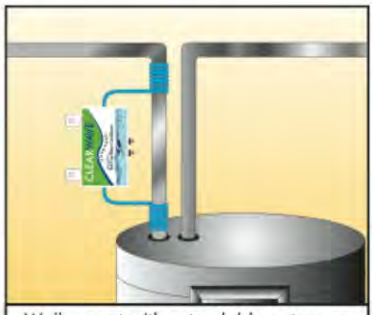
- Ice Makers
- Dishwashers
- Washing Machines
- Boilers
- Humidifiers
- Swimming Pools
- Water Heaters
  Gas, Electric, and Tankless

Note: Multiple units may be required in these applications.

More

How it Works

The ClearWave® Water Conditioner generates a series of electromagnetic waves that affect hardwater crystals (calcium and magneseum) in water so that they are unable to stick to each other, pipes, or fixtures. These enhanced microscopic particles then contact existing scale and cause it to loosen, break down, and dissolve.



Wall mount with extendable antennae

Specifications

Capacity		Electrical Specs		
Max. Pipe Diameter	Max. Flow Rate	Volts	Watts	Amps
1"	28 gpm	18 VAC	5	.09

Note: Units can be combined and used in series for larger pipes.

System Solutions for CW-125 Model

Water Hardness		Recommended Solution
Grains	PPM	
Up to 25	Up to 425	ClearWave-125
25 plus	425 plus	ClearWave-125 prior to traditional water softener.

Air Boosters

Field Air Boosters improve air flow and distribution of conditioned air to "problem" rooms in homes and businesses. They are mounted in ductwork and increase air flow by up to 1400 cfm, improving heating/cooling system efficiency, and saving energy. There are nine models designed for round or square ducts up to 14" in diameter.

Heavy-Duty Model for Round and Square Metal Duct

- Increase air flow to problem rooms up to 305 CFM
- Unique design will work with square, rectangular, and round metal ductwork
- Easy installation
- Can be used with forced air, oil, gas, and electric furnaces and heat pumps
- The most durable, long lasting air booster on the market

AB-1

For Round or Square Metal Duct

- Increase air flow to problem rooms up to 220 CFM
- Designed for round or square metal ducts 6" or larger
- Easy installation
- Heavy-duty motor
- Motor is designed for years of trouble free operation

AB-2

For Round Metal Duct and Flex Duct

AB-4, 5, 6, 8, 10, 12, & 14

- Increase air flow to problem rooms from 80 CFM to 1400 CFM depending on model
- Designed for use in 4", 5", 6", 8", 10", 12" and 14" round metal or flexible ductwork
- Easy installation
- Heavy-duty motor
- Motor is designed for years of trouble free operation

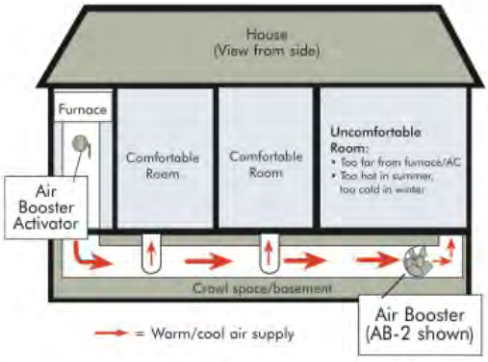
ABA-1

Optional Air Booster Activator

For automatic, year-round operation of Air Boosters.

How Air Boosters Work

Air Boosters are typically wired parallel with the furnace or air conditioner blower. When the blower activates, the Air Booster will activate. The Air Booster can also be wired to an on/off switch to provide additional air flow only when needed. For remote locations, where wiring into the furnace is not practical, the Air Booster Activator (ABA-1) is available. The ABA-1 senses an air pressure change in the duct when the blower activates and starts the Air Booster.



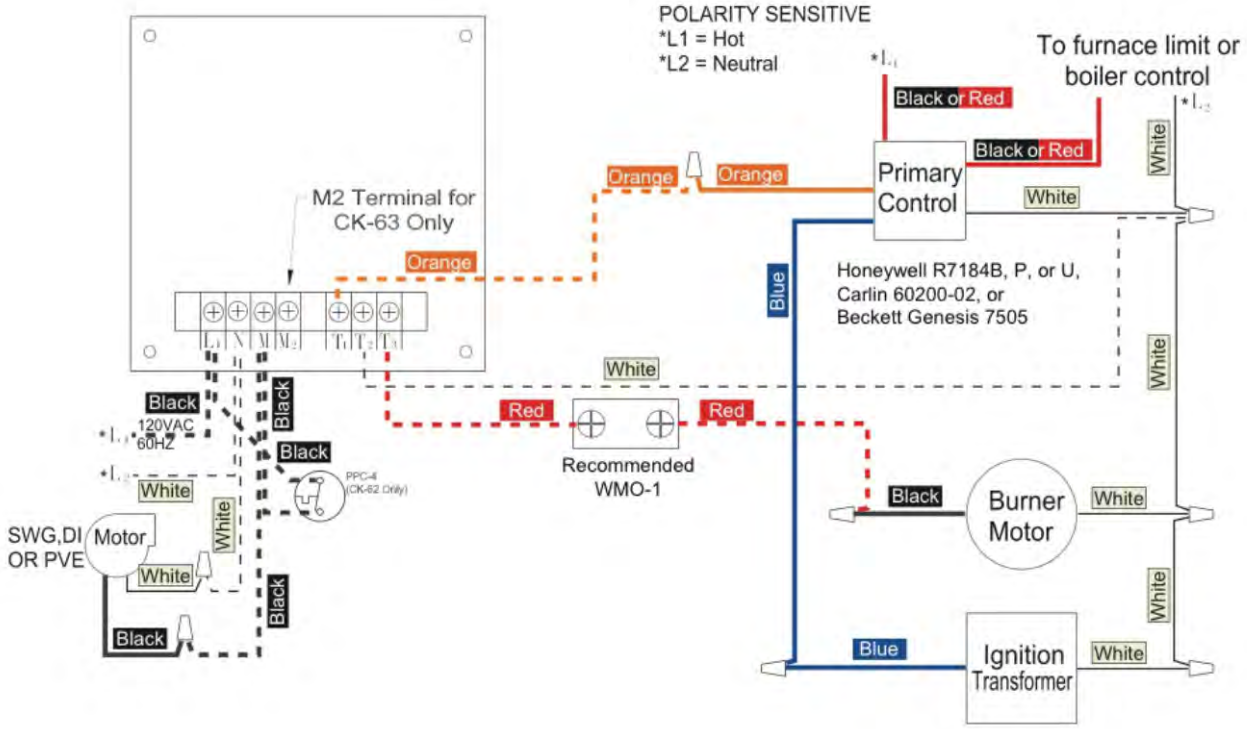
Specifications

Model	Electrical Data: Volts (AC)	Amps	Hz	Watts	RPM	Thermal or Impedance Protection	Maximum Temp Rating (F)	Air Flow Capacity CFM Up To
AB-1	120	.5	60	38	1725	Yes	180°	305
AB-2	120	.6	60	35	3000	Yes	180°	220
AB-4	120	.29	60	19	3000	Yes	155°	80
AB-5	120	.5	60	30	3000	Yes	155°	165
AB-6	120	.6	60	35	3000	Yes	180°	225
AB-8	120	.8	60	45	3000	Yes	160°	425
AB-10	120	.4	60	37	1450	Yes	180°	600
AB-12	120	1.1	60	91	1500	Yes	180°	1050
AB-14	120	1.1	60	91	1500	Yes	160°	1400

Wiring Diagrams

for SWG, CV, DI, or PVE

CK-61, 62, 63 Series with Honeywell R7184B, P, or U, Carlin 60200-02, and Beckett Genesis 7505 Primary Control



WARNING: Reversed polarity may cause equipment damage!

- - - - - - New wire supplied by installer

Solderless connector (wire nut)

* L1 is 120V
* N is 120V Neutral
M is 120V if the motor is running
T1 is 120V if there is a call for heat
T2 is 120V Neutral
T3 is 120V if there is a call for heat

Wiring

Important Wiring Information:
Ensure motor and control kit are properly grounded to power source prior to energizing unit.