



VENTING



DRAFT



COMBUSTION





# Table of Contents



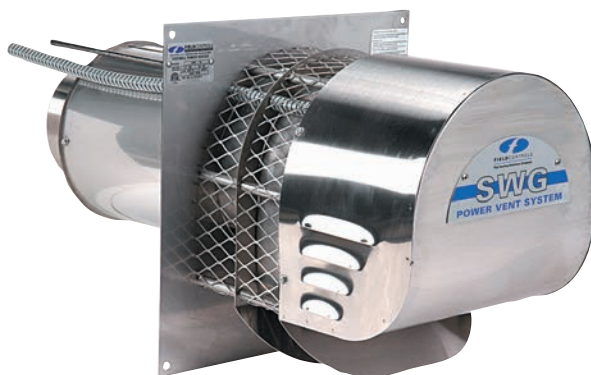
Since 1927, our focus has been the control and movement of air. We lead the industry in the fields of venting, combustion, and draft control. This is your guide for product information, specifications, installation, wiring, and replacement parts. For specific installation manuals and more information,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

*Thank you for specifying Field Controls.*



## Vent Dampers

for Oil & Gas  
Heating Appliances



## Power Venters

for Oil & Gas  
Heating Appliances



## Draft Controls

for Gas, Oil and Coal  
Heating Appliances

## Venting

SWG/CV Power Venter	2
ComboVent™ (CV)	3
Power Venter Sizing & Installation	4-6
Control Kits	7
System Setup & Maintenance	8-9
VentRiser™	10-11
PV Power Venters	12-13
SWG Vent Kits	14
Vent Hoods	15
Vent Caps	16
Gas Vent Damper	17
Oil Vent Damper	18-19
Thermal Safety Switches	20-21

## Combustion

Combustion Air Systems	22-26
Make-Up Air System	27

## Draft

Draft Control	28-32
Draft Control Installation & Sizing	33-34
Draft Inducers	35-36
Chimney Top Draft Inducer	37
Chimney Fan with Damper	38

## More

ClearWave® Water Conditioner	39
Humidifiers	40
Air Boosters	41

## Wiring

Troubleshooting	76-82
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## Parts

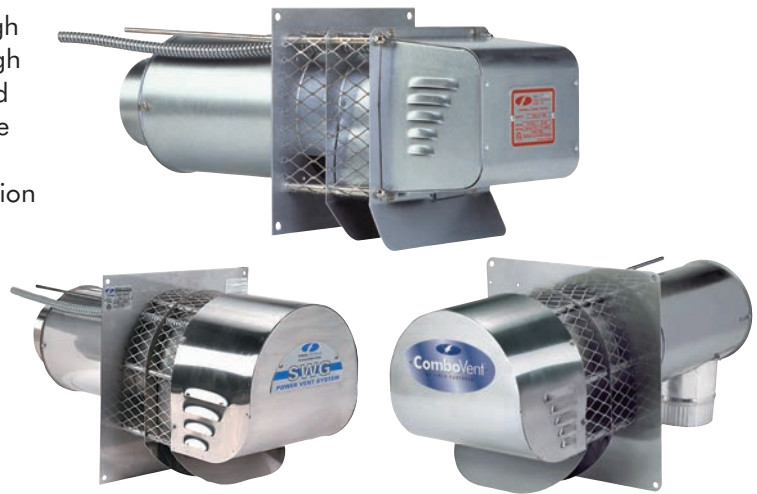
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# SWG/CV Power Venter

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.

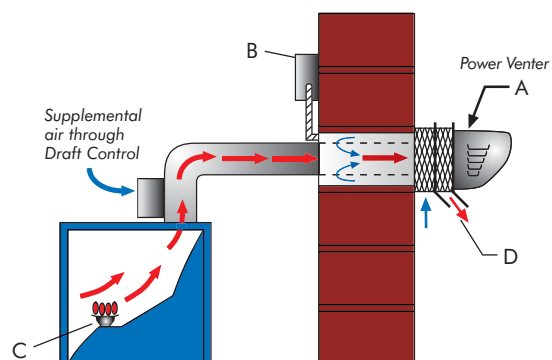
Note: ComboVent and SWG-4HD, 5 & 6 Motor Kits include a stainless steel blower wheel for better performance and extended life.



Replacement Motor Kit and Stainless Steel Blowerwheel 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.

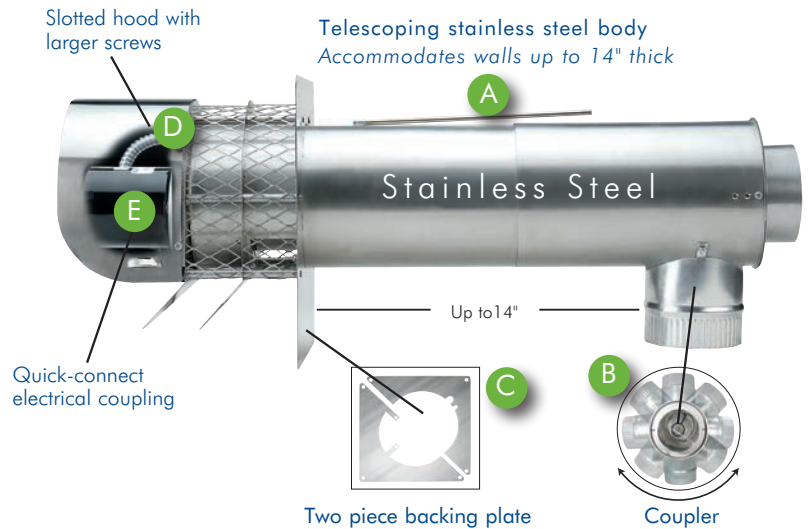
**Easier to Install. Easier to Service.**  
A total system for combustion air and venting.

**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 with CAS boot
- C** • Two piece backing plate  
• Can be mounted at any point during installation

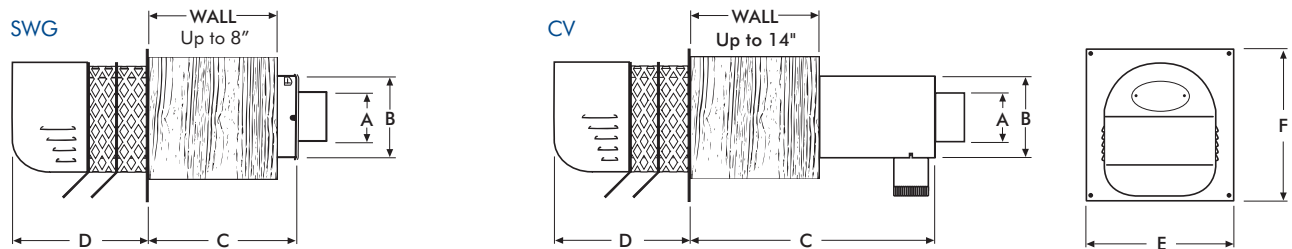
**Easier to Service**

- 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	UL Listed	CSA Listed	Dimensions					
									A	B	C	D	E	F
SWG-3	115	60	0.6	40	3000	✓	✓		3"	5"	9 1/16"	8 1/2"	7 5/8"	9 3/16"
SWG-4HD	115	60	1.7	138	3000	✓	✓		4"	6"	9 1/4"	9 1/2"	9"	9"
SWG-4HDs	115	60	1.7	138	3000	✓	✓	✓	4"	6"	9 1/4"	9 1/2"	11"	11 1/2"
SWG-5	115	60	1.3	144	3100	✓	✓		5"	7"	9 7/32"	10 3/4"	12"	12 1/4"
SWG-5s	115	60	1.3	144	3100	✓	✓	✓	5"	7"	9 7/32"	10 1/2"	12"	12 1/2"
SWG-6	115	60	2.1	228	3100	✓	✓		6"	8"	9 7/32"	10 3/4"	12"	12 1/4"
SWG-6s	115	60	2.1	228	3100	✓	✓	✓	6"	8"	9 7/32"	10 1/2"	12"	12 1/2"
SWG-8	115	60	4.37	478	3100	✓	✓		8"	10"	9 7/32"	11 7/8"	13"	14 1/4"
SWG-10	115/230	60	11.4/5.7	1311	1725	✓	✓	✓	10"	14"	19 1/2"	24"	20"	21"
SWG-12	115/230	60	13.6/6.8	1564	1725	✓	✓	✓	12"	16"	19 1/2"	25"	22"	23"
CV-4	115	60	1.7	138	3000	✓	✓	✓	4"	6"	11 3/4"-17 3/4"	9 1/2"	9"	9"
CV-5	115	60	1.3	144	3100	✓	✓	✓	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

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"

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.

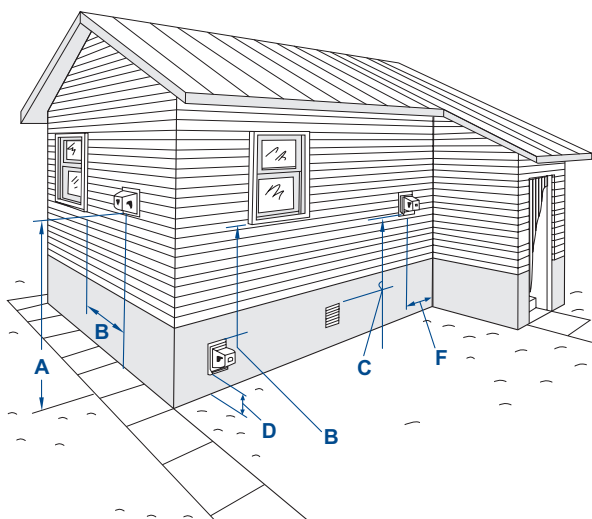
Example: System Pipe Size= 6"  
 Step 1 2-90° Elbows (6")= 22 Ft.  
 Step 2 10-2 Ft. Lengths of 6" Pipe= 20 Ft.  
 Step 3 6" to 4" reducer= 4 Ft.  
 Step 4 Total Equivalent Feet= 22 Ft. + 20 Ft. + 4 Ft.= 46 Ft.

**Table 2**

Vent Pipe Fittings	Equivalent Feet for Vent Pipe Fitting									
	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

### 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.



- The exit termination of a mechanical draft system must not be less than 7' above grade when located adjacent to a public walkway.\*
- 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.
- A venting system must terminate at least 3' above any forced air inlet located within 10'.
- The bottom of the vent terminal must be located at least 1' above finished grade.\*\*
- 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).
- The vent termination point must not be installed closer than 3' from an inside corner of an L-shaped structure.
- 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.

**Table 3**

		Equivalent Feet for a Reducer/Inceaser										
		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/Inceaser chart, find the figure at the intersection of the small pipe size and the large pipe size.

# 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.

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%.

**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

### Extension Kits

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

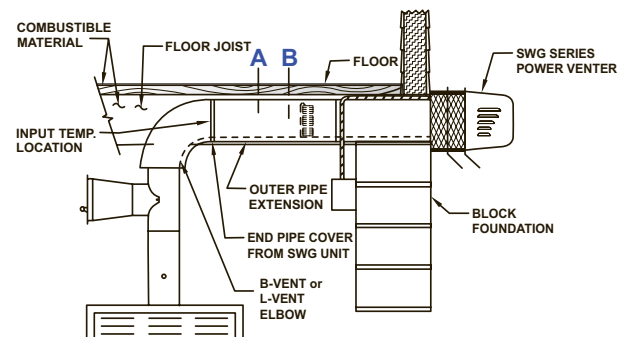
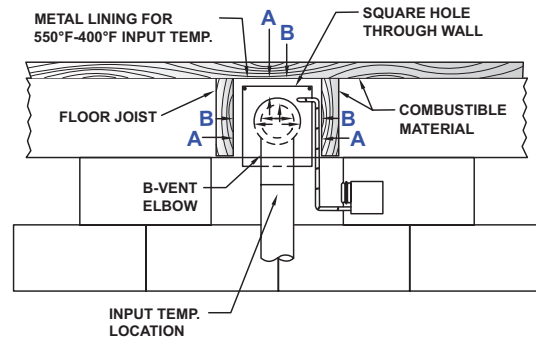
\* PEK-4 allows the SWG to be installed in walls up to 12" thick.



**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



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 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.

Selecting the proper Control Kit for your application			Draft Proving Switch	Gas Pressure Switch	Secondary Safety Switch	Thermal Post Purge	Adjustable Electronic Post Purge	Fixed Post Purge	Draft Control	RJR-6
	Model	Applications								
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	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	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-92FVP**	Gas-fired furnace or boiler and a 30 millivolt operated water heater. Includes post purge.	✓	✓	✓			✓	

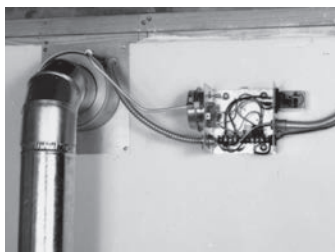
\* Control Kits are ETL approved accessories when used in conjunction with the SWG Power Venter.

\*\* Plugs into 24v electric damper

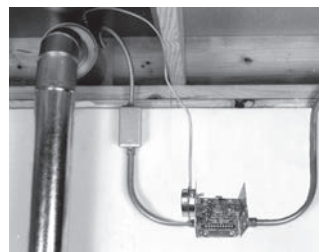
\*\*\* A secondary safety switch should be used with a CK-81

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

## Control Kit Installation



CK-62 mounted at venter. For use with a 24 VAC, gas-fired system (shown with cover off).



CK-63 remote mounted. For use with 120V or 24V oil or gas systems. Electronic post purge is included (shown with cover off).

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

# Power Venter

## System Setup

### 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.

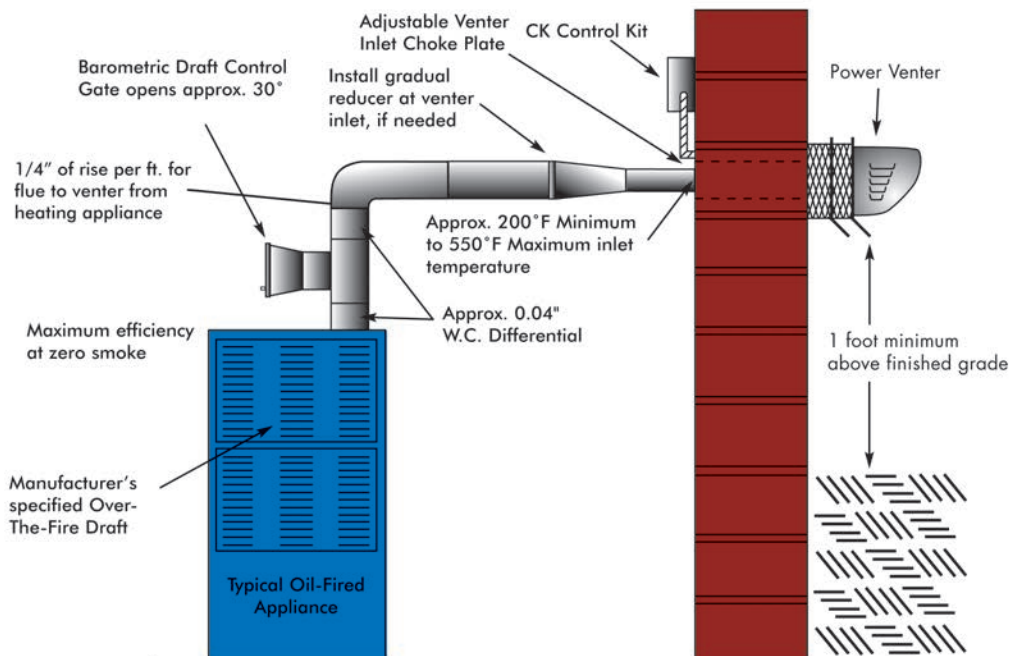
1. Set the choke plate in the power venter, or extension kit, to its full open position. Set the draft control adjustment weight to its midpoint position.
2. Adjust the thermostat so that the unit will run continuously. Allow the unit to operate for 5 to 10 minutes to ensure stack temperature stabilization.
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 breach 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  $\frac{1}{4}$  to  $\frac{1}{2}$  turn counterclockwise.

**Note:** Every installation will require unique pressure switch adjustment.

Figure 1



- Once proper draft is achieved, measure CO<sub>2</sub> and smoke level. If necessary, adjust the intake airflow at the burner to obtain the highest possible CO<sub>2</sub> reading with a zero smoke reading. As the intake airflow is increased or decreased, the draft may change. Repeat steps 3 through 6 to re-adjust the draft control and choke plate before attempting any other adjustments.
- 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.
- If maximum efficiency and zero smoke yields a temperature below 200°F at the inlet to the venter, the following suggestions must be considered.
  - 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.
  - Reduce the length of the duct from the appliance to the venter which will increase the venter inlet temperature.
  - Insulate the vent pipe to minimize heat loss.
  - Seal the vent pipe joints to reduce uncontrolled dilution air.

### TESTING:

- The thermostat (wall thermostat, or aquastat) calls for heat, starting venter motor.
- 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.
- After the heating requirement is satisfied, the thermostat circuit opens and deactivates the burner and power venter circuit.
- 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:

- 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. **Note: Permanently-lubricated electric motors with sealed, lubricated bearings should not be oiled. Doing so may damage the motor.**
- 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.
- 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.
- 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.



#### 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

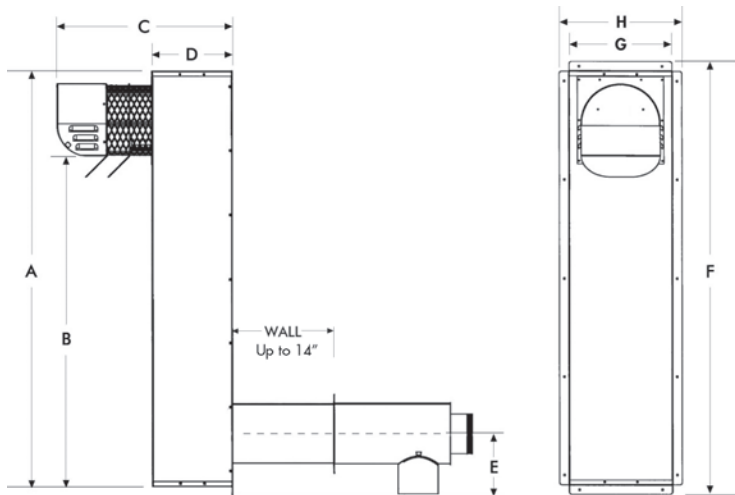
## Sub-grade Venting Just Got Easier!

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™

Venting

### 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 for use with CAS Boot rotates 360° for easier installation



### Dimensions

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

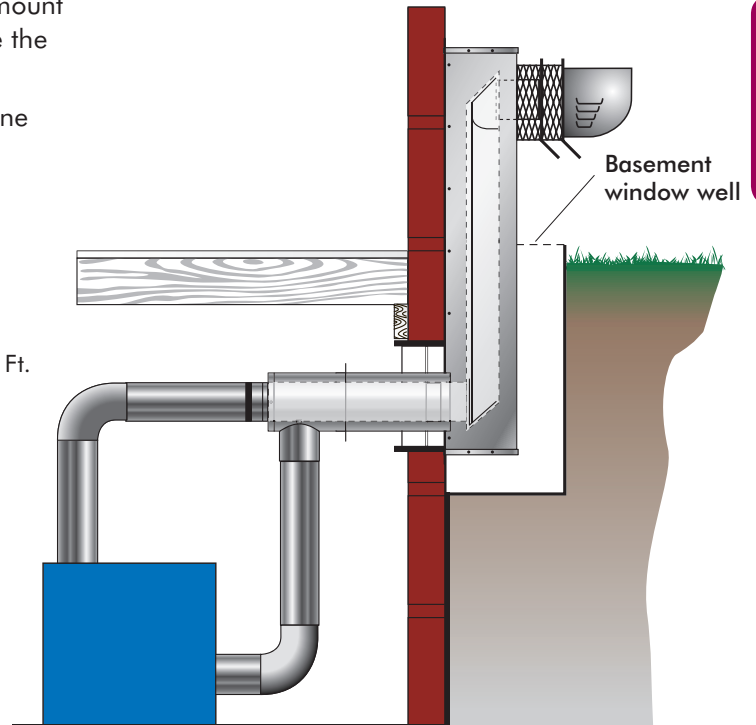
Step 2 10-2 Ft. Lengths of 6" Pipe = 20 Ft.

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



Venting

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.

Venting

## Accessories

### SWH Vent Hoods

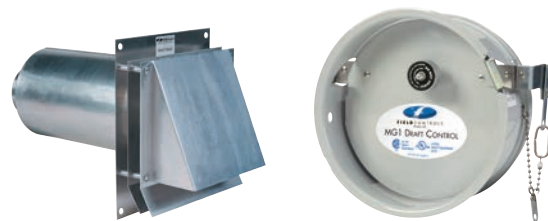
Designed for standard vent pipe and Class B type double-wall (B-Vent) connection. Provides proper clearance between flue gas stream and wall combustibles. Available in 3" through 8" sizes.

### MG-1 Series Draft Control

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

### CK-20FV 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

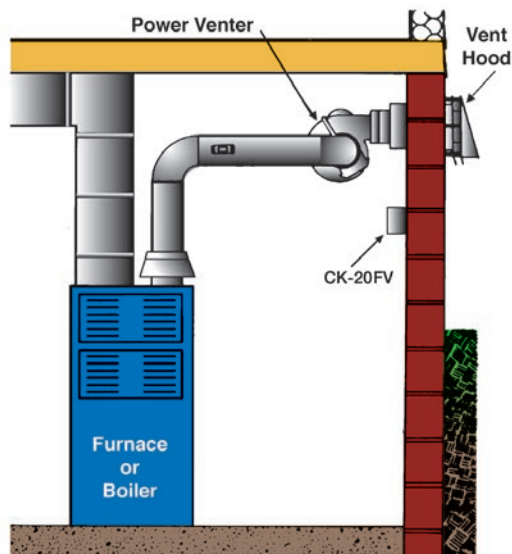
MG-1



CK-20FV

## 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.



# PV Power Venters

Indoor Mounted Power Venters for Oil & Gas

Venting

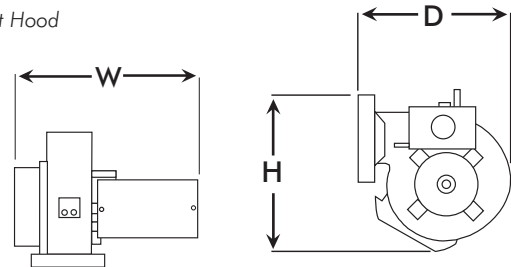
PVG - Gas and PVG PAK													
Maximum Equivalent Horizontal Pipe Length (Feet) <sup>†</sup>													
Model	DIA.	(BTU/hr Input)											
		25,000	55,000	70,000	100,000	145,000	220,000	310,000	400,000	520,000	610,000	900,000	1,250,000
PVG-100	3"	270	100	–	–	–	–	–	–	–	–	–	–
PVGPAK-100*	4"	455	169	144	100	–	–	–	–	–	–	–	–
PVG-300	4"	–	–	–	305	145	64	–	–	–	–	–	–
	5"	–	–	–	–	247	100	54	–	–	–	–	–
PVGPAK-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



<sup>†</sup> 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	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) <sup>†</sup>												
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	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



<sup>†</sup> 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

	Model	Application	Description
	SWG-4G	24V Gas Furnaces.  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.	Includes: <ul style="list-style-type: none"> <li>• SWG Power Venter</li> <li>• CK-43F Control Kit</li> <li>• 4" MG-1 Draft Control</li> </ul>

## Gas Water Heater Vent Kits

	Model	Application	Description
	SWG-3WH	30mV Gas Water Heater up to 70,000 BTU	Includes: <ul style="list-style-type: none"> <li>• SWG Power Venter</li> <li>• CK-20FV Control Kit</li> </ul>
	SWG-4WH	30mV Gas Water Heater up to 170,000 BTU	

## Oil Fired System Stainless Vent Kits

	Model	Application	Description
	SWG-40S	120V Oil-Fired Appliance up to 1.10 gph	Includes: <ul style="list-style-type: none"> <li>• Stainless Steel SWG Power Venter</li> <li>• Control Kit (CK-61, CK-62 or CK-63)</li> </ul> See chart on Control Kits to determine which control kit to use for your application.
	SWG-50S	120V Oil-Fired Appliance up to 1.85 gph	
	SWG-60S	120V Oil-Fired Appliance up to 2.65 gph	

Note: See chart on Control Kits page to determine which control kit to use for your application.





Aluminum Construction

### For use with

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

All Field Vent Hoods are made of heavy gauge aluminum and can be used with LP gas or oil-fired equipment. There are five diameters ranging from 3" to 8". *NOTE: Field aluminum Vent Hoods are not recommended for Natural gas.*

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, and PVE Power Venters (Figure 1) or with forced draft systems (Figure 2).

Figure 1

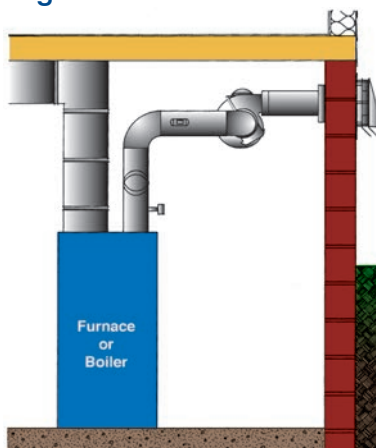
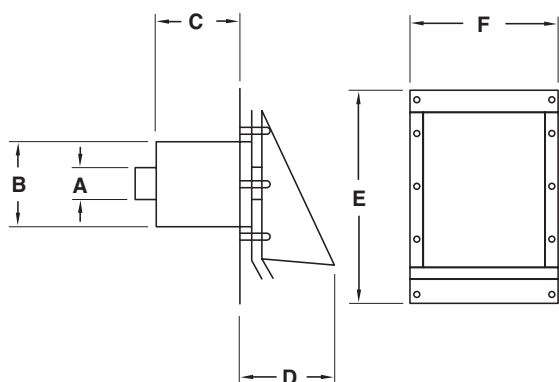
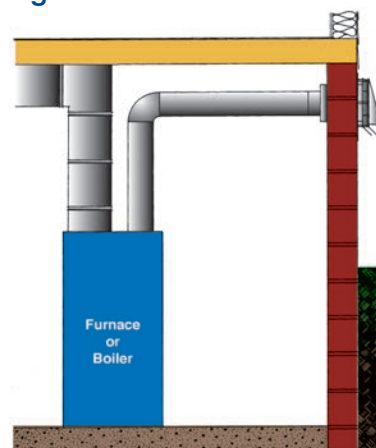


Figure 2



Model	Dimensions (inches)					
	A	B	C	D	E	F
SWH-3	3 Dia.	5 Dia.	8 ½	4 ¾	8 7/8	7 5/8
SWH-4*	4 Dia.	6 Dia.	8 ½	6 5/16	12 5/8	10 5/8
SWH-5	5 Dia.	8 Dia.	8 ½	8	12 5/8	10 5/8
SWH-6	6 Dia.	8 Dia.	8 ½	8 11/16	12 5/8	10 5/8
SWH-8	8 Dia.	10 Dia.	8 ½	9 5/8	15	14

\* SWH-4 has a 7 7/8 x 7 7/8 shield for 0 clearance to combustibles

# Vent Caps

Venting

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.

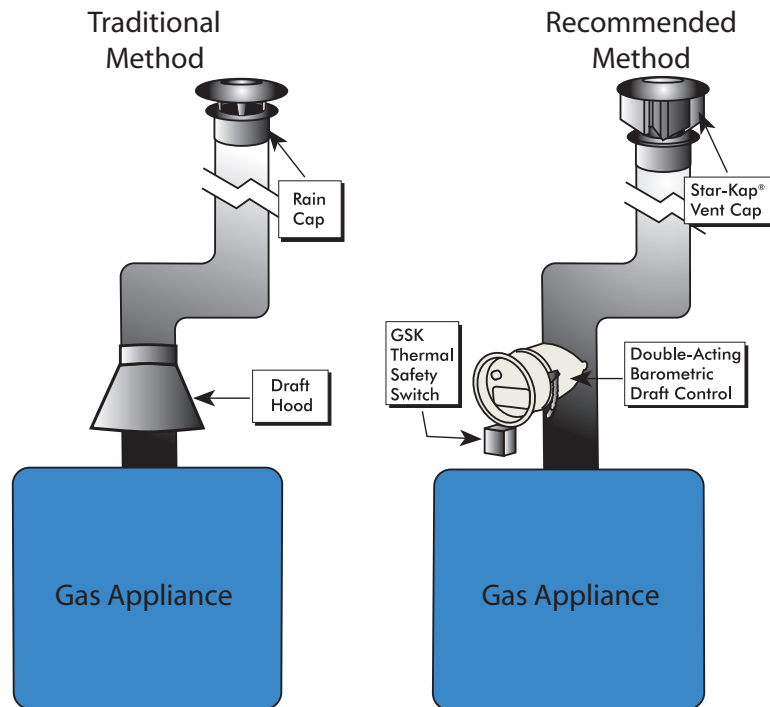
Although vent stacks are designed to remove dangerous gases and smoke created by burning gas and oil, this process can be adversely affected by the direction of the wind. A sudden gust could blow noxious waste gases down the vent stack and into the building. The Star-Kap prevents a potentially dangerous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



Star-Kap®

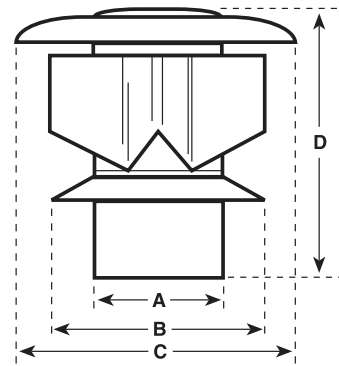
## Prevent Flue Gas Spillage

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. 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.
- 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

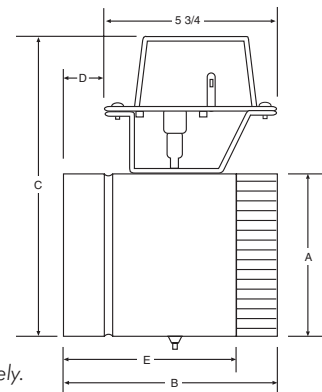
Dual safety switches allow the burner to fire only when the damper is in the open position. This unit will not interfere with existing appliance safety controls, when properly installed.

### 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:

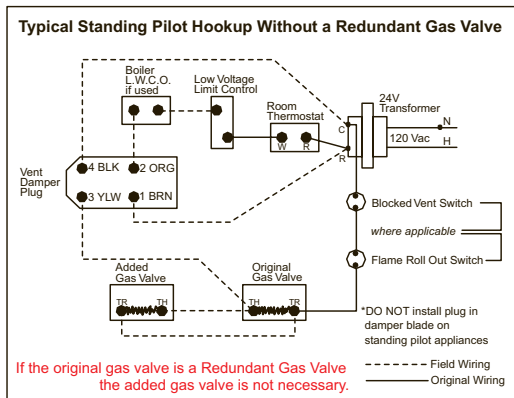
- 3 watts at 24 VAC
- 60 Hz when opening or closing



Motor Assembly



Wiring harnesses are sold separately. See replacement parts section.



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

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

## 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.

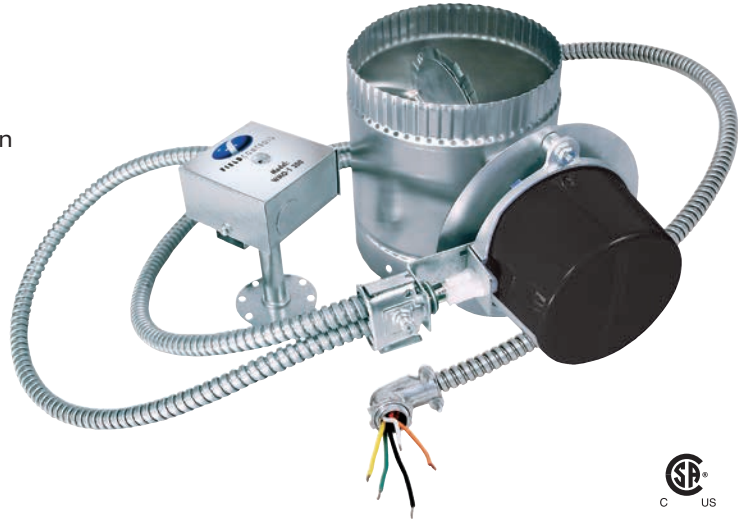
A seven foot wiring harness is included with a pre-wired WMO-1 blocked vent safety switch. The WMO-1 shuts the oil burner off when a blocked vent condition is detected.

### Benefits

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

### Burner and Transformer Electrical Rating

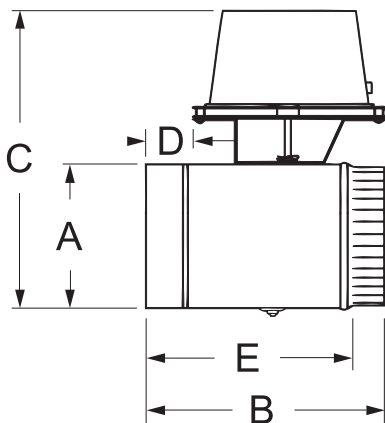
- Burner motors rated up to 1/2 hp, 5.8 Amps
- Ignition Transformer rated at 250 VA or less



### 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	Length	Height	Clearance	Exposed Pipe	Pipe Removal
	A	B	C	D	E	
OVD-4PL	4	6	10 1/16	15/16	5	3 1/2
OVD-5PL	5	6	11 1/16	15/16	5	3 1/2
OVD-6PL	6	6 1/2	12 1/16	1 1/8	5 1/2	4
OVD-7PL	7	7 1/16	13 1/16	1 3/8	6 1/16	4 9/16
OVD-8PL	8	8 1/16	14 1/16	1 7/8	7 1/16	5 1/16

*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.

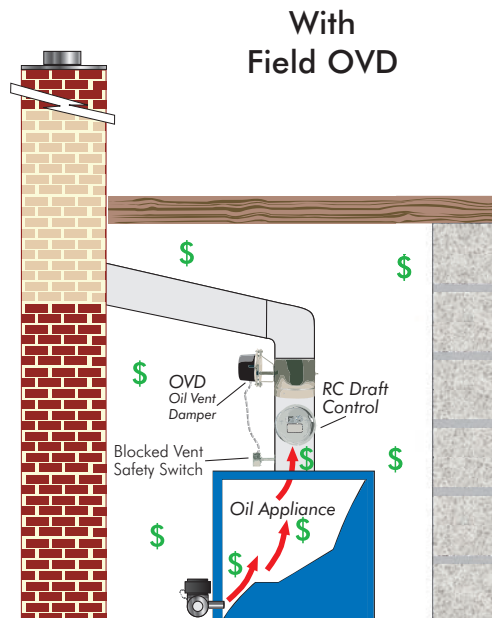
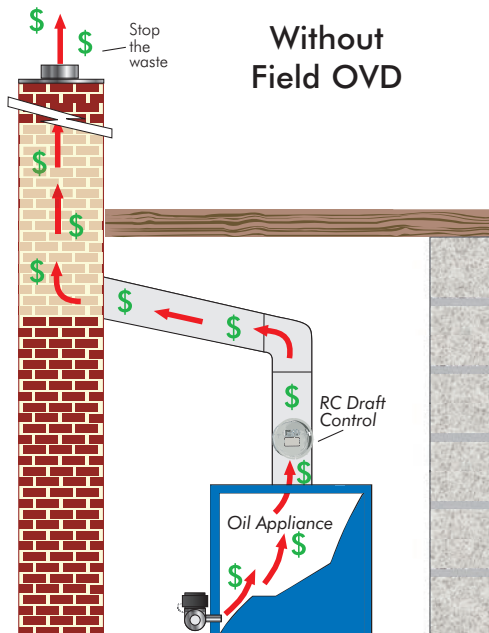


	Annual Fuel Usage (gallons)	900	1200	1500	1800
Potential Savings (over 5 years)	5% (5 ft. chimney)	\$787	\$1050	\$1312	\$1575
	10% (taller chimney)	\$1575	\$2100	\$2625	\$3150

Assumes an average fuel cost of \$3.50 per gallon.

## 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

Our thermal safety switches detect flue gas spillage due to a blocked flue. 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.

Venting

Model		Typical Applications
 <p>FTS</p>	<p>FTS-4 &amp; FTS-6</p>	<p>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.</p>
 <p>SSK</p>	<p>SSK-1 &amp; SSK-3</p>	<p>Kit form of GSK-3 or GSK-4 generally used on millivolt water heaters. Can also be used with 24 VAC gas furnaces or boilers. Kit includes (2) GSK style Thermal Safety Switches, (1) 12-gauge Jumper Wire and (1) 6 ft. length 12-gauge lead wire. SSK-3 switches not supplied with switch enclosures. TCA-1 Thermocouple Adapter required for 30 millivolt applications.</p>
 <p>WMO</p>	<p>WMO-1</p>	<p>Designed for use with power venting and chimney vented systems for oil-fired applications. Manual reset.</p>
 <p>GSK</p>	<p>GSK-160A &amp; GSK-250M</p>	<p>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.</p>
	<p>GSK-3 &amp; GSK-4</p>	<p>Designed for use on residential and light commercial millivolt or 24 VAC gas furnaces, boilers and water heaters. Generally used with sidewall venting applications.</p>
 <p>LS</p>	<p>LS-140A, LS-550A</p>	<p>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.</p>
 <p>TCA</p>	<p>TCA</p>	<p>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.</p>

# 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 conversion burner 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).
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  $\frac{1}{2}$  air changes per hour. For newer homes and conversion of electrically heated homes, the air changes could be reduced to  $\frac{1}{3}$  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.

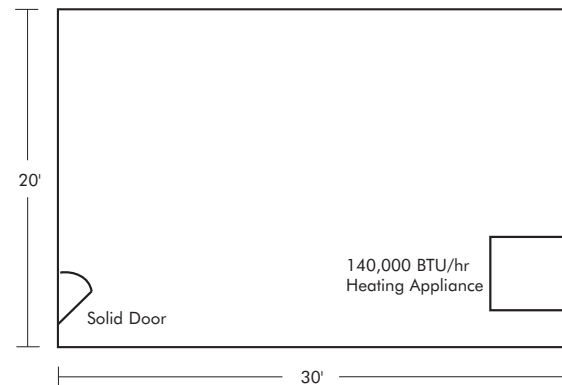
## Calculating Confined Space

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:

$$\begin{aligned} \text{Boiler room } 30' \times 20' \times 8' &= 4,800 \text{ cu. ft.} \\ 4,800 \text{ cu. ft.} \times 1,000 \text{ BTU} \div 50 \text{ cu. ft.} &= 96,000 \text{ BTU} \\ 96,000 \text{ BTU} \times 1 \text{ GPH \#2 fuel} \div 140,000 \text{ BTU} &= 0.69 \text{ GPH} \end{aligned}$$

**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.



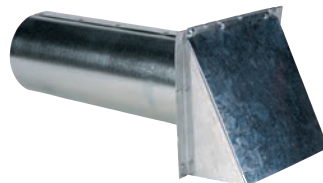
According to NFPA 31 and NFPA 54, an Engineered system such as a CAS-3, 4, 4Jr., 6 or 7 may be used to overcome a confined space.



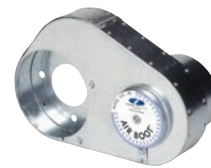
# Combustion Air Systems

## 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.



Intake Air Hood



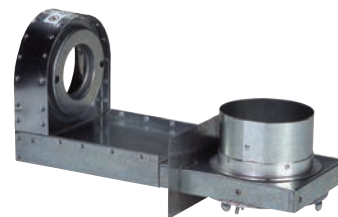
Field AirBoot®

### 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)



FurnaceBoot™



ComboVent™  
Power Venter

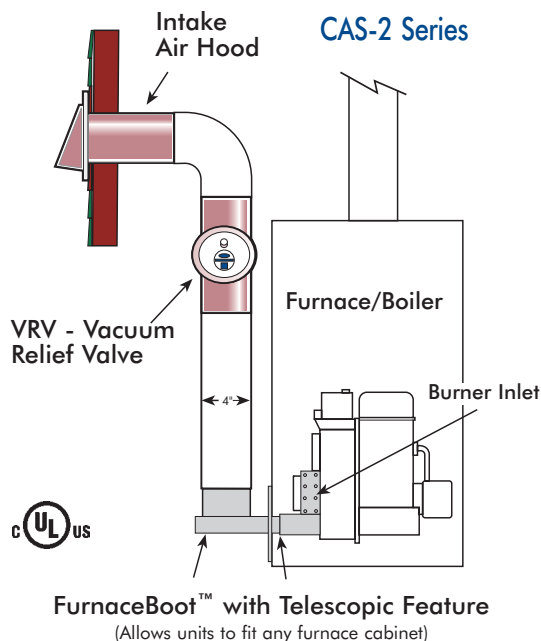
The ComboVent combines combustion air connection and venting in one, convenient, easy-to-install package. For more information and details, refer to the Venting section.

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.

### 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

AirBoot® / FurnaceBoot™	Pipe Diameter	Maximum Linear Feet	Feet/Elbow
	4"	44'	7'
	5"	60'	9'
	6"	90'	11'



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™

Combustion

# Combustion Air Systems

## Combustion Air Solutions for any Application

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



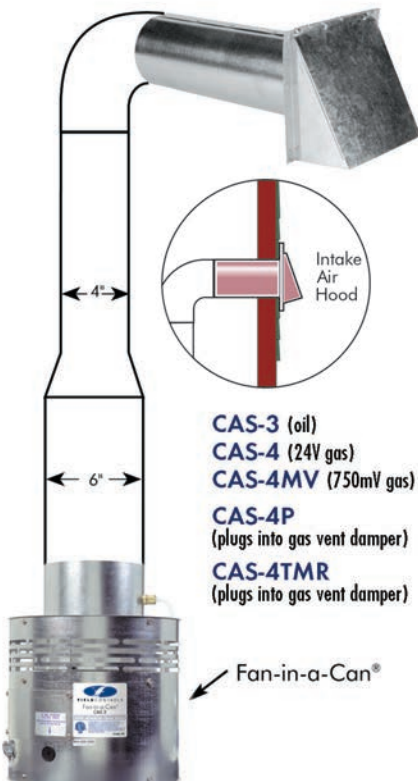
CAS-4Jr.™

The CAS-4TMR is designed for use with natural gas or LP gas fired boilers equipped with a 24 VAC vent damper control system. The CAS-4TMR mechanically draws air into a boiler room and disperses it near the boiler combustion air intake, and is interlocked with the boiler gas valve control by means of the boiler's vent damper control cable.

The Fan-in-a-Can, Jr. is designed for gas appliances up to 110,000 BTU/hr input. It may be used with a residential water heater with the addition of control kit CK-20 FV/FG.

## How the CAS-3, CAS-4, and CAS-4TMR work

When the thermostat calls for heat, the CAS-3 and CAS-4 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. The CAS-4TMR has a differential pressure switch that eliminates the need for a flow switch in areas that require air flow proving. The CAS-4TMR also includes an interval shut-off timer designed to reduce the risk of freeze-up in the event of boiler ignition failure, and a "plug-n-play" modular damper adapter for use with boilers having an automatic vent damper, greatly simplifying control wiring connections.



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®
CAS-4TMR	Gas	24V Gas Appliance	See Specifications	4" Intake Air Hood 6" to 4" Reducer ADA-2 damper adapter (no restrictor plate)

# Combustion Air Systems

Installation Specifications							
Total Input of Appliance(s)		Max. Equivalent Feet of Installation					
CAS-3 OIL (gph)	CAS-4, 4mV, 4P, 4TMR GAS (BTU/hr)	4" duct & hood w/ Restrictor		4" duct & 4" hood		6" duct & 6" hood	
		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) BTU/hr	Maximum Equivalent Feet of Duct Pipe		
	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	Additional 30mV gas water heater control for use with CAS-4, CAS-4Jr., and CAS-4TMR
CAC-24	Additional 24 Volt appliance for use with CAS-4, CAS-4Jr., CAS-4TMR, CAS-6, and CAS-7
CAC-120	Additional 120 Volt appliance for use with CAS-3, CAS-6, and CAS-7

# Combustion Air Systems

Commercial



Fan-in-a-Drum®



## CAS-6 and CAS-7

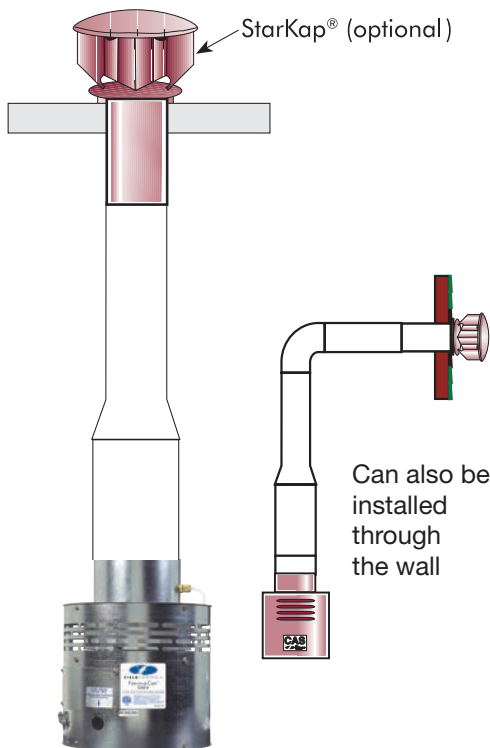
The Fan-in-a-Drum® is a commercial product designed to deliver combustion air into the mechanical room, boiler room, or furnace location to overcome a confined space or inadequate air supply. CAS 6 & 7 are dual volt units for oil or gas applications.

## 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.



StarKap®



Fan-in-a-Drum® Assembly

## 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

Combustion

### 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.



Includes Intake Air Hood IAH-6

### Make-Up Air System

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

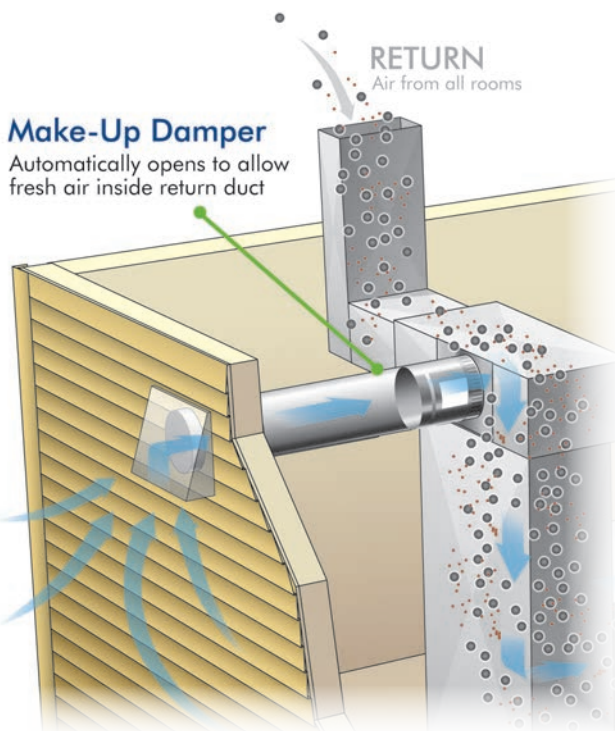
### When to use the MAS

- 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

Combustion

### Make-Up Damper

Automatically opens to allow fresh air inside return duct



### 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 Control

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



M



M+MG2



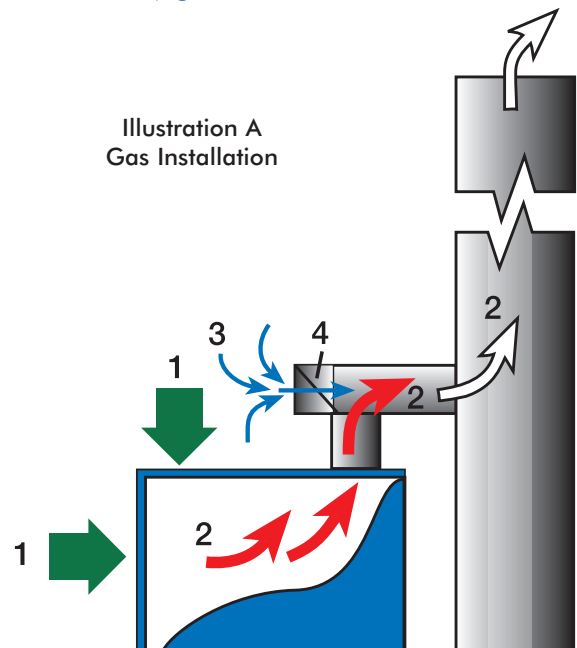
MG-1

Draft

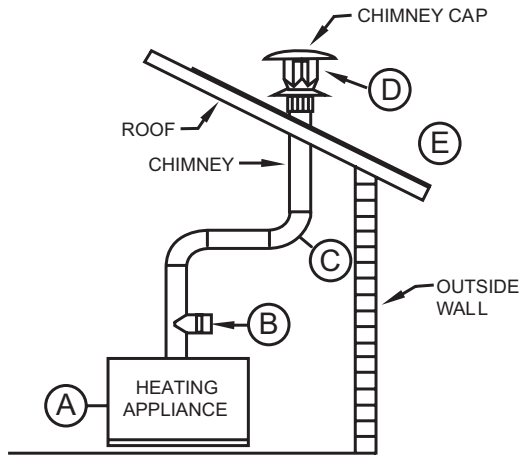
## How Draft Controls Work

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.

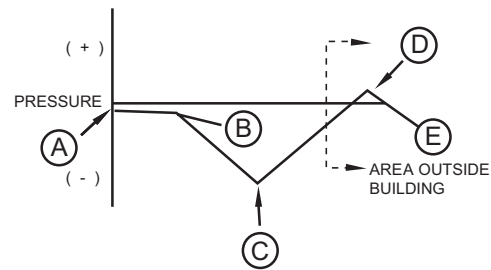
Illustration A  
Gas Installation



## 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.

# Draft Control

## 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

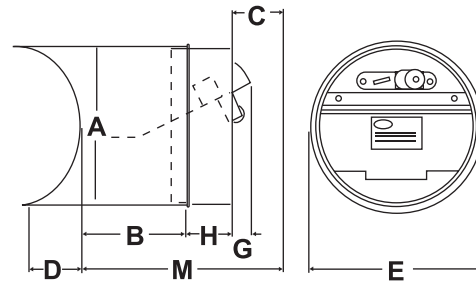


RCBT\*



### 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 1/2 to 15 3/4	4	2 1/2	2	2 5/16	4 1/16	1	2 1/2	7
5" RC/RCBT	5	19.6	4-5-6	12 1/2 to 19	5	2 1/2	2	2 5/16	5 1/16	1	2 1/2	7
6" RC/RCBT	6	28.3	5-6-7	15 3/4 to 22	6	1 7/8	3	2	6 5/8	1	2 3/4	7 5/8
7" RC	7	38.5	6-7-8	19 to 25 1/4	7	2 5/8	3 1/2	2 1/2	7 5/8	1	2 3/4	8 5/8
8" RC/RCBT	8	50.3	7-8-9	22 to 28 1/8	8	4 3/8	4	3 3/8	8 1/16	1 1/8	2 5/8	11
9" RC	9	63.6	8-9-10	25 1/4 to 31 1/2	9	5 1/8	4 1/2	3 3/4	9 1/16	1 1/2	2 5/8	12 1/4

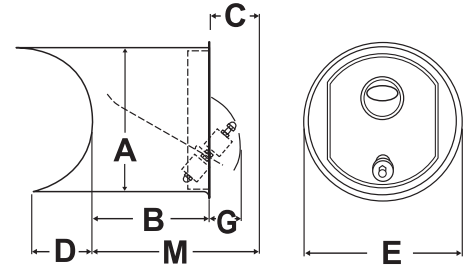
\*RCBT is recommended for wood and coal burning applications or anytime black pipe is preferred.



## 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.



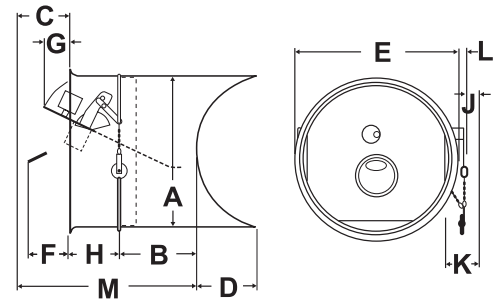
Material Gauges				
Size	6"	7"	8"	9"
RING	24	22	20	20
GATE	26	22	20	20
COLLAR	26	26	24	24

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 3/4 to 22	6	5	3	3 1/4	6 1/32	2	8
7" M	7	38.5	6-7-8	19 to 25 1/4	7	5 1/4	3 1/2	3 3/4	7 3/8	2 1/4	8 3/4
8" M	8	50.3	7-8-9	22 to 28 1/4	8	6 3/8	4	3 3/8	8 5/8	3	10 3/8
9" M	9	63.6	8-9-10	25 1/4 to 31 1/2	9	7 1/4	4 1/2	3 3/4	9 5/8	1 29/32	11 3/4

## 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".



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 1/2 to 12 1/2	4	2 1/2	2	2 5/16	4 1/16	1 1/2	1/4	2 1/2	1/2	1 1/4	3/8	7
5" MG-1	5	19.6	4 - 5	12 1/2 to 15 3/4	5	2 1/2	2	2 5/16	5 1/16	2	5/8	2 1/2	1/2	1 1/4	1/2	7
6" MG-1	6	28.3	5 - 6	15 3/4 to 19	6	2 11/16	3	3 1/4	6 5/8	2 1/8	13/16	2 3/4	3/4	1 3/4	5/8	8 7/16
7" MG-1	7	38.5	6 - 7	19 to 22	7	3 3/8	3 1/2	3 3/4	7 5/8	2 3/8	1 1/8	2 3/4	3/4	2	1/4	9 5/8
8" MG-1	8	50.3	7 - 8	22 to 25 1/4	8	4 3/8	4	3 3/8	8 11/16	3	1 1/2	2 5/8	3/4	2 1/4	3/8	11
9" MG-1	9	63.6	8 - 9	25 1/4 to 28 1/4	9	5 1/8	4 1/2	3 3/4	9 11/16	3 1/2	1 3/4	2 5/8	3/4	2 1/2	3/8	12 1/4

# Draft Control

## 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 dual 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 ¾	5	4 ¼	11	3 ¾	1 ⅛	4 ¾	1	3 ½	1	14 ½
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 ⅝	2 ⅛	5 ⅝	1	3 ½	⅝	19 ¼
16" M+MG2	16	201	15 - 16	47 to 50 ¼	16	8 ⅝	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 ⅝	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 ⅝	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 ⅝	2	6 ¼	⅞	38 ½
32" M+MG2**	32	804	31 - 34	97 ½ to 107	32	15 ⅝	16	-	35	12 ¼	4 ¾	12 ⅛	2	6 ¼	⅝	43 ½

\*CSA certified

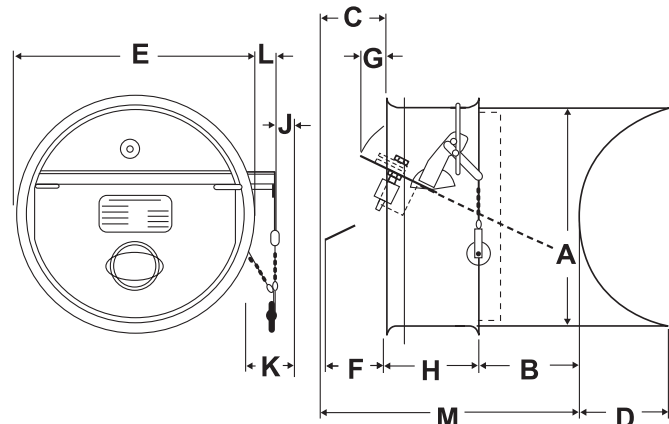
\*\*An increaser or reducer may be necessary in order for the Barometric Draft Control to adapt to off-sized pipe.

## 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.

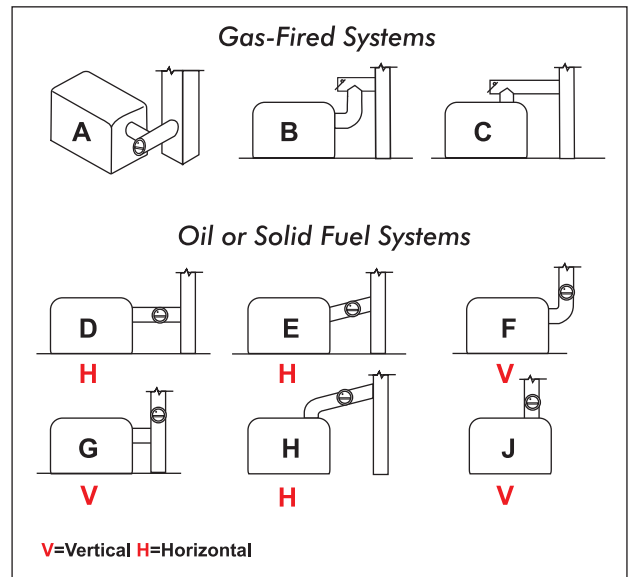


Figure 1

### 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.

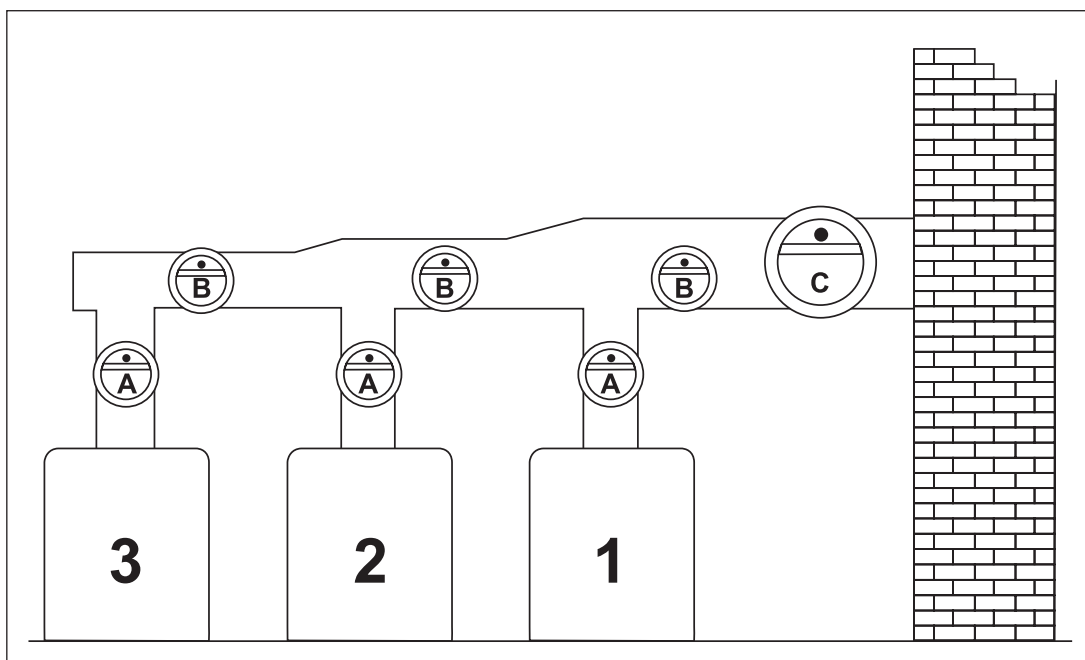


Figure 2

# Draft Control

## Sizing the Control

### Choosing The Right Size

Simple rules of thumb to guide size selections:

- 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.
- 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.
- 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.
- 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.
- 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.

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		

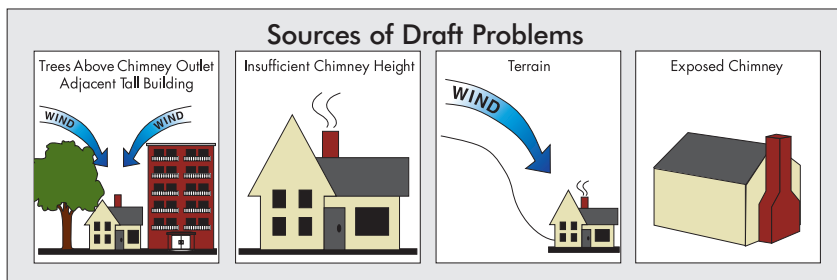
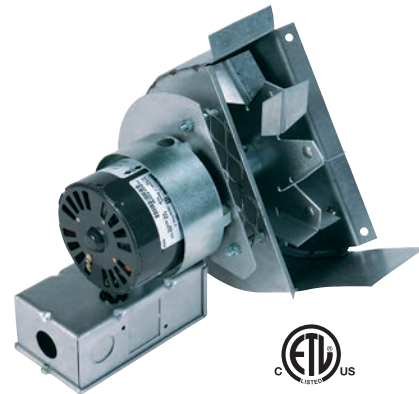
Diameter of Vent or Breach	If Chimney Height is	Use This Size Control	If Chimney Height is	Use This Size Control	If Chimney Height is	Use This Size Control
4"	15' or less	4"	16' or more	5"		
5"	15' or less	5"	16' or more	6"		
6"	15' or less	6"	16' or more	7"		
7"	15' or less	7"	16' or more	8"		
8"	15' 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: CK Control Kit required according to NFPA code.  
Not for sidewall venting.

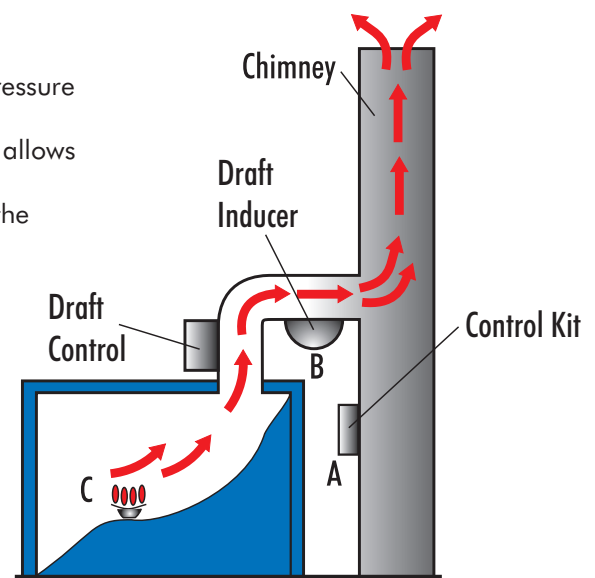
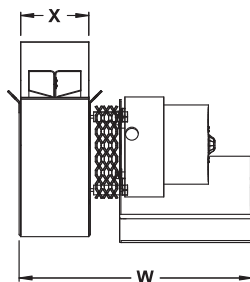
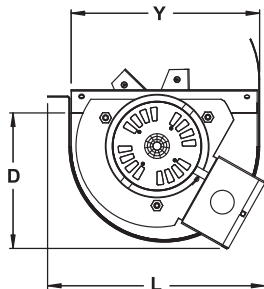


## When to use a Draft Inducer

- 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 <sup>3</sup> / <sub>32</sub>	8 <sup>13</sup> / <sub>16</sub>	5 <sup>17</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	7	115	60	1550	33	.43	yes
DI-2	9 <sup>7</sup> / <sub>16</sub>	9 <sup>3</sup> / <sub>16</sub>	6 <sup>7</sup> / <sub>16</sub>	3	8 <sup>3</sup> / <sub>8</sub>	115	60	1550	78	1.1	yes
DI-3	12 <sup>9</sup> / <sub>16</sub>	10 <sup>1</sup> / <sub>8</sub>	9	3 <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>	115	60	1725	186	3.9	yes
DI-4	12 <sup>9</sup> / <sub>16</sub>	14 <sup>3</sup> / <sub>16</sub>	9	7	11 <sup>3</sup> / <sub>4</sub>	115	60	1725	440	5.0	yes
DI-5	12 <sup>9</sup> / <sub>16</sub>	16 <sup>3</sup> / <sub>16</sub>	9	9	11 <sup>3</sup> / <sub>4</sub>	115	60	1725	560	5.7	yes

# Draft Inducers

Draft

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	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	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-92FVP**	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



# 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.



Optional Speed Control for 6" & 8" or 10" & 13" applications.



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.

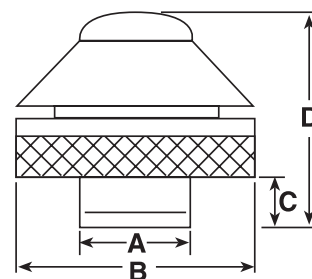
Draft

## 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 <sup>59</sup> / <sub>64</sub>	16	3 <sup>15</sup> / <sub>32</sub>	14 <sup>3</sup> / <sub>4</sub>	3.5 sq. ft.
8" C Draft Inducer	7 <sup>15</sup> / <sub>16</sub>	16	3 <sup>3</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>4</sub>	7 sq. ft.
10" C Draft Inducer	10	16	3 <sup>3</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>4</sub>	12 sq. ft.
13" C Draft Inducer	13	16	3	14 <sup>3</sup> / <sub>4</sub>	30 sq. ft.



# Chimney Fan with Damper

For Gas Fireplaces

Introducing the Flue Sentinel Chimney Fan with Automatic Damper. This all-in-one includes a virtually air-tight flue damper with a heavy duty fan and chimney cap in one convenient, high performance package. The unit eliminates the need for glass doors on a hearth to conserve heat, and can save as much as 30% in energy costs that would normally be caused by heat loss through a chimney with a traditional damper.

The Flue Sentinel® Chimney Fan with Damper is constructed of high-grade stainless steel and can be installed in new or pre-existing chimneys. It is available in two sizes for chimneys with 8" and 12" openings.

The Flue Sentinel® comes complete with a control kit that interfaces with the gas logs and automatically opens the damper and engages the fan before allowing the fire to start. Back-up safety features ensure the fire won't start until the damper is fully open and draft has been proven.



FSGD-8 Chimney Fan with Damper

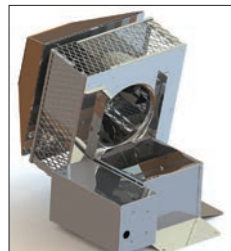
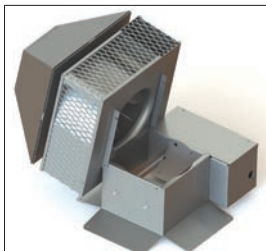
Flue Sentinel Gas Controller (FSGC) Included

## Features

- Stainless steel housing
- Powder-coated, stainless steel chimney cap
- Two sizes: 8" and 12"
- Easy access for service

## Benefits

- Integrated system for easy installation
- Reliable draft to exhaust fumes and gases
- Damper reduces heat loss and downdrafts



The Flue Sentinel is designed with a hinged cap so the fan, motor, and damper are easily accessed for service or maintenance.



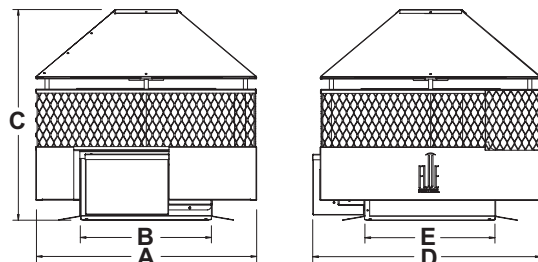
## Specifications

### Electrical Data

Model	Volts	Hz	RPMs	HP	Amps	Thermal Protection
FSGD-8	120	60	1,050	1/10	2.5	Yes
FSGD-12	120	60	1,050	1/4	3.5	Yes

## Dimensions

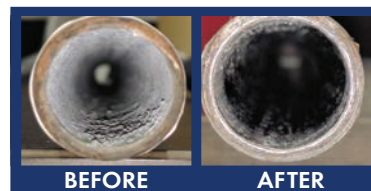
Model	Dimensions (Inches)					Max. Hearth Opening (sq. ft.)
	A	B	C	D	E	
FSGD-8	14 1/4	8	19 1/2	17	8	12
FSGD-12	20 1/4	12	19 1/2	21	12	25





## Prevent and Remove Hard Water Scale\*

ClearWave® is a revolutionary product that conditions hard water without the expense and hassle of salt, chemicals, or traditional hard water systems. 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. 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.

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



### Benefits

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

### Applications include:

- Ice Makers
- Dishwashers
- Washing Machines
- Boilers
- Humidifiers
- Swimming Pools
- Ideal for water heaters (including tankless models)

Note: Multiple units may be required in some applications.

### Independent Testing Proves:

- ✓ Prevents scale build-up
- ✓ Reduces existing scale
- ✓ Effective at any temperature or flow rate



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.

Specifications				
Capacity		Electrical Specs		
Max. Pipe Diameter	Max. Flow Rate	Volts	Watts	Amps
2"	28 gpm	18.8 VAC	0.2	.021

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

\*Independent lab testing results prove ClearWave was “very efficient at preventing and removing scale formation irrespective of water hardness, water temperature, and recycling flow rates.” See full test results at [fieldcontrols.com/clearwave](http://fieldcontrols.com/clearwave).

# Humidifiers

## Residential Steam Humidifier

### The humidifier that works when you need it.

The Field Controls Residential Steam Humidifier operates when there is a call for humidity, not just when there is a call for heat. This means maximum comfort for the homeowner. It is also designed for optimum efficiency with an onboard system that automatically performs routine maintenance and monitors operations for maximum safety.



### Automatic Maintenance

The automatic flush system drains the humidifier every twenty-four hours of operation. This is a preventative maintenance mode that keeps the pan clean and the water fresh. Since the pan refills only when there is a call for humidity, the pan is empty during the summer months. This prevents stagnant water and the problems associated with other types of humidifiers. The S2000 can output up to 16 gallons of water per day and the S2020 can output up to 23 gallons per day.

### Information is Power

The S2000 and S2020 steam humidifiers have a built-in computer chip to ensure maximum efficiency, accuracy, reliability and safety. The easy to read LEDs on the unit communicate operation and troubleshooting information.

### Features

- Interlocking wiring for fan control
- LEDs for system readout
- Replaceable sacrificial anode
- Optional water filter
- Copper heating element for improved durability

### Benefits

- Humidifies without a call for heat
- Compatible with all forced air heating systems
- Most effective cure for dry homes
- 100% guaranteed fresh water
- Water is allowed to cool before draining, reducing risk of scalding if servicing
- Reduced clogging because tank does not drain from the bottom
- Works with heat pumps and geothermal systems

## Sizing the humidifier for your home

- 1 Calculate the total cubic feet of your home**  
 \* Total home square feet x Average ceiling height  
 Note: Include the basement
- 2 Calculate humidity load requirement in pounds per hour (lbs/hr)**  
 \* Total cubic feet of your home x Preferred indoor RH% factor (see table)  
 \* Multiply result by 1.05 for each fireplace
- 3 Converting (lbs/hr) to gallons per day (gpd)**  
 \* Humidity load (lbs/hr) x 2.88 Factor = Gallons per day (gpd)

Source: Residential Humidity Load Made Easy; Scheurich, Dean, 12/23/09 et al.

### Example

- 1** 2,500 sq ft x 8 ft ceiling height = 20,000 cubic ft
- 2** 20,000 cubic ft x 0.00021 (RH% Factor for 45% humidity @ 68°) = 4.2 lbs/hr
- 3** 4.2 lbs/hr x 2.88 = 12.096 (gpd)

Indoor Air Temp °F	Preferred Indoor RH% Factor			
	35%	40%	45%	50%
68°	0.00015	0.00018	0.00021	0.00024
70°	0.00017	0.00020	0.00023	0.00026
72°	0.00019	0.00022	0.00025	0.00028

\* Factors based on 0.5 air changes per hour (ACH)

### Specifications

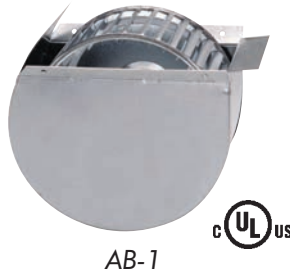
Model	Output Capacity	Max coverage area (sq. ft.)	Voltage	Watts	Amps	Hz	Plenum Opening (inches)	Weight (Lbs.)	Humidistat Included
S2000	16 Gal./Day	2,400	120 VAC	1.4	11.6	-	6 x 6	9	Yes
S2020	23 Gal./Day	3,200	220 VAC	2.0	8.5	-	6 x 6	9	Yes



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 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

## 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



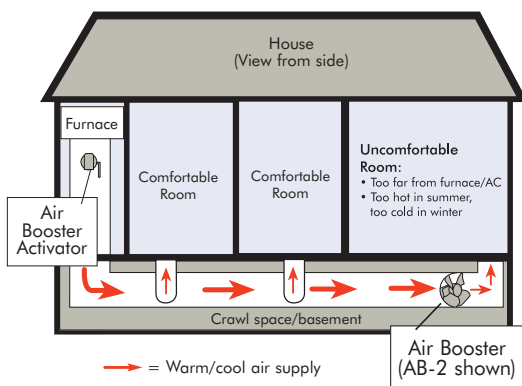
AB-2

Optional Air Booster Activator  
For automatic, year-round operation of Air Boosters.

ABA-1

## 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.

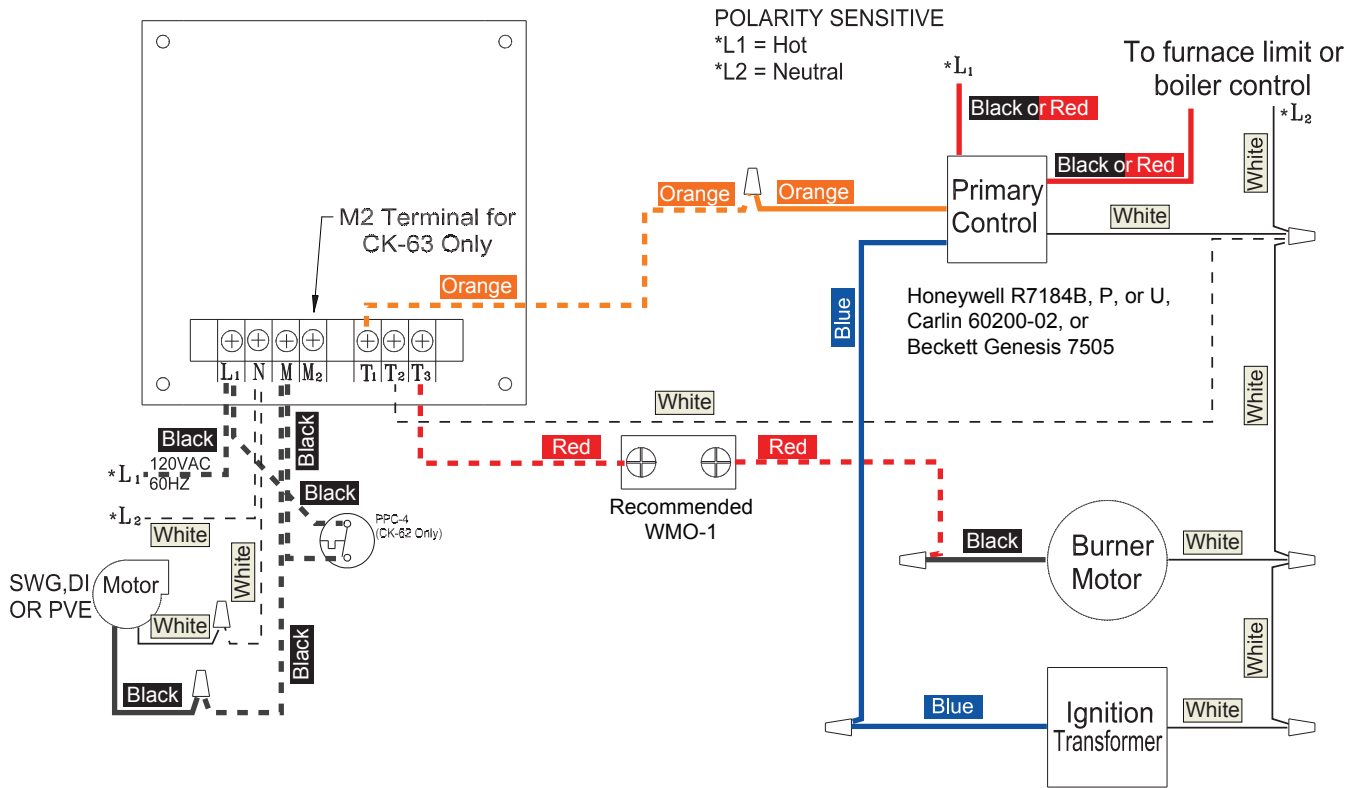


Specifications								
Model	Electrical Data					Thermal or Impedance Protection	Maximum Temp Rating (F)	Air Flow Capacity CFM Up To
	Volts (AC)	Amps	Hz	Watts	RPM			
AB-1	120	.5	60	38	1725	Yes	180°	305
AB-2	120	.6	60	35	3000	Yes	180°	220
AB-4	120	.29	60	19	3000	Yes	155°	80
AB-5	120	.5	60	30	3000	Yes	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 GeniSys™ 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

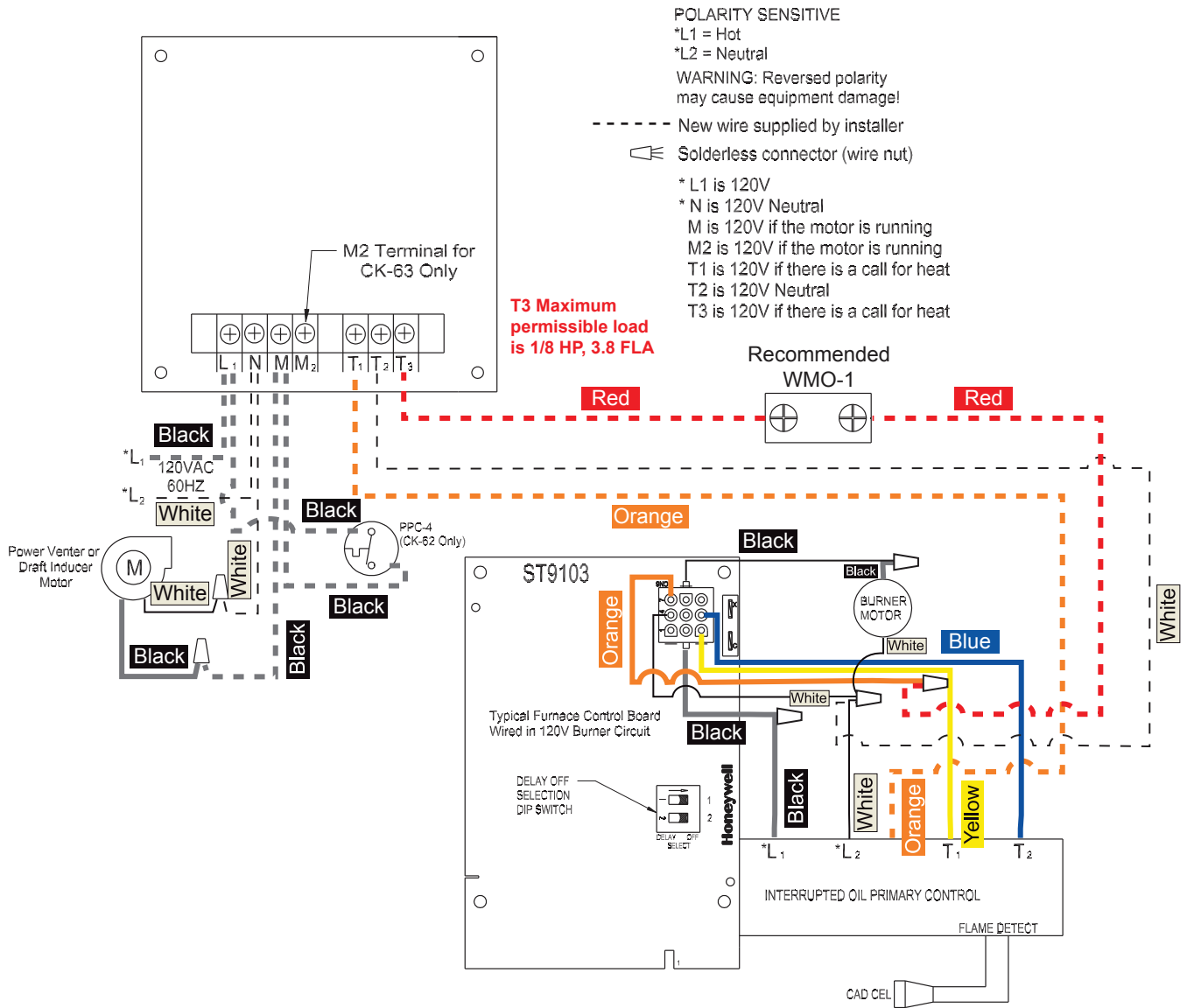
## Important Wiring Information:

Ensure motor and control kit are properly grounded to power source prior to energizing unit.

# Wiring Diagrams

for SWG/CV Power Venter or DI Draft Inducer

## CK-61, 62, 63 Oil Fired Warm Air Furnace with a Honeywell ST9103 Control Board



Note: N and M are pre-wired at the factory to motor on PVO or CAS-3.

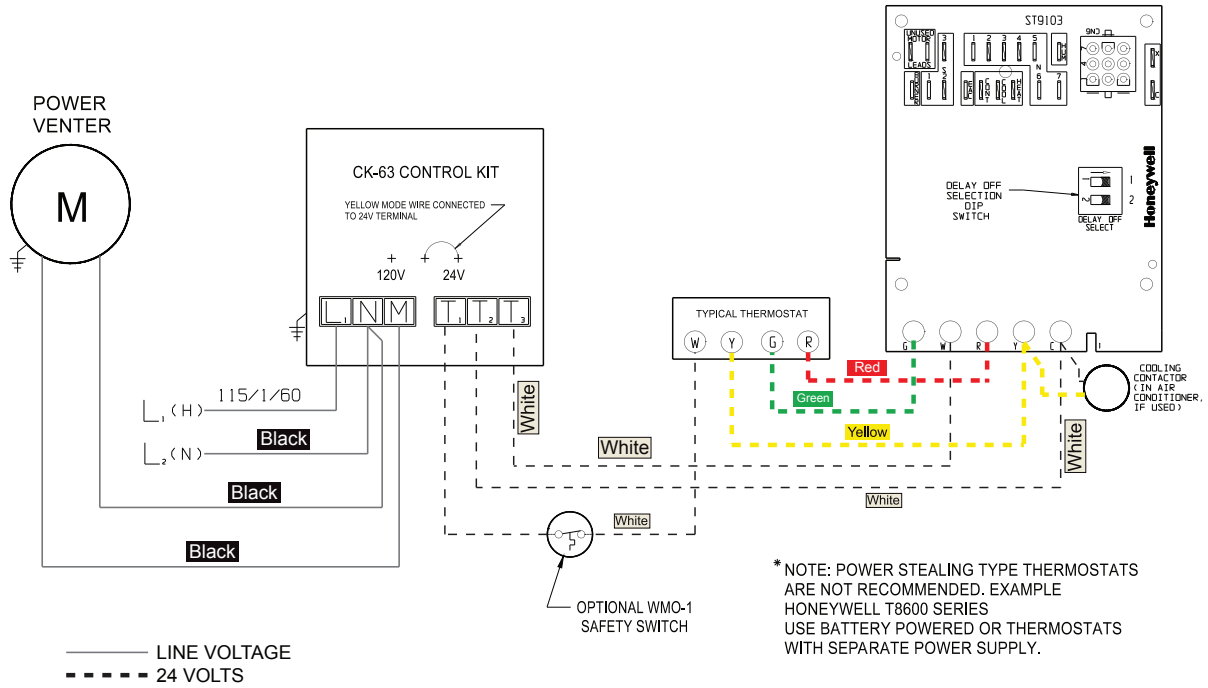
Wiring

# Wiring Diagrams

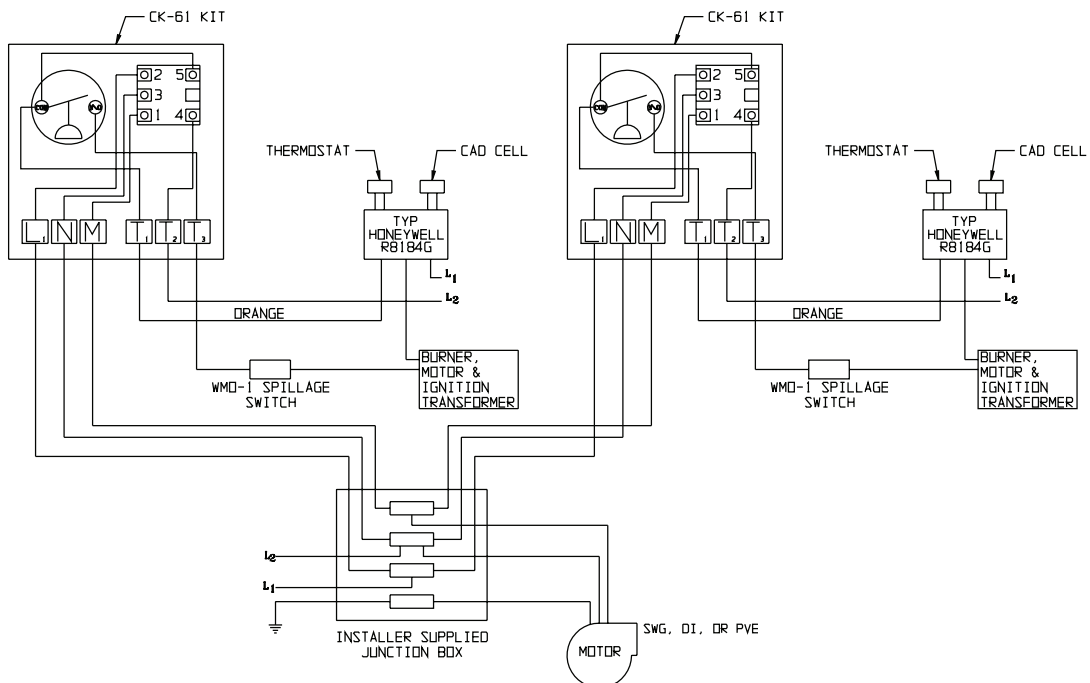
for SWG/CV Power Venter or DI Draft Inducer

## CK-63, Oil Fired Warm Air Furnace with a Honeywell ST9103 or ST9103A 24V Control Board

Includes Riello Burners w/ 24V Primary Control



## CK-61, 63 for two Oil Fired Systems with Standard Primary Control



Wiring

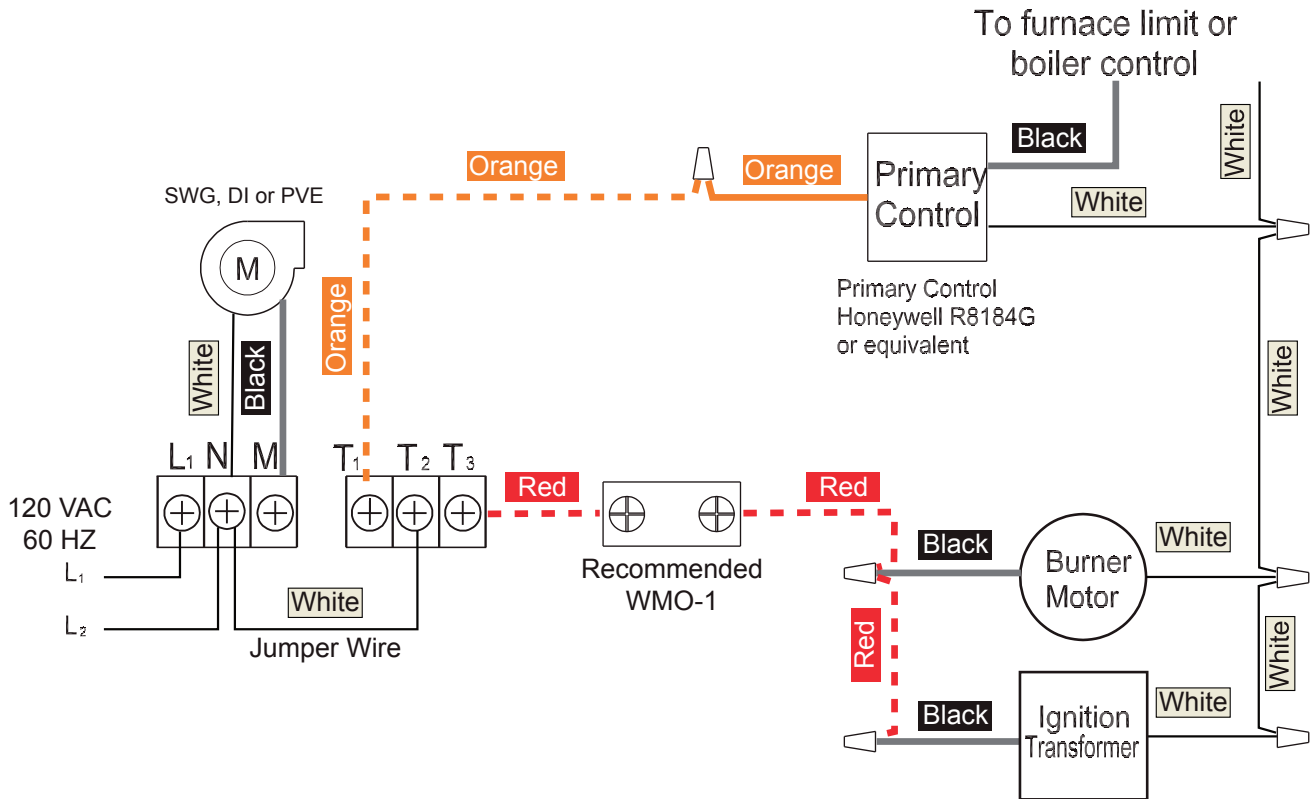


# Wiring Diagrams

for SWG/CV Power Venter or DI Draft Inducer

## CK-63 Oil Fired System

Includes Riello Burners w/ 24V Primary Control

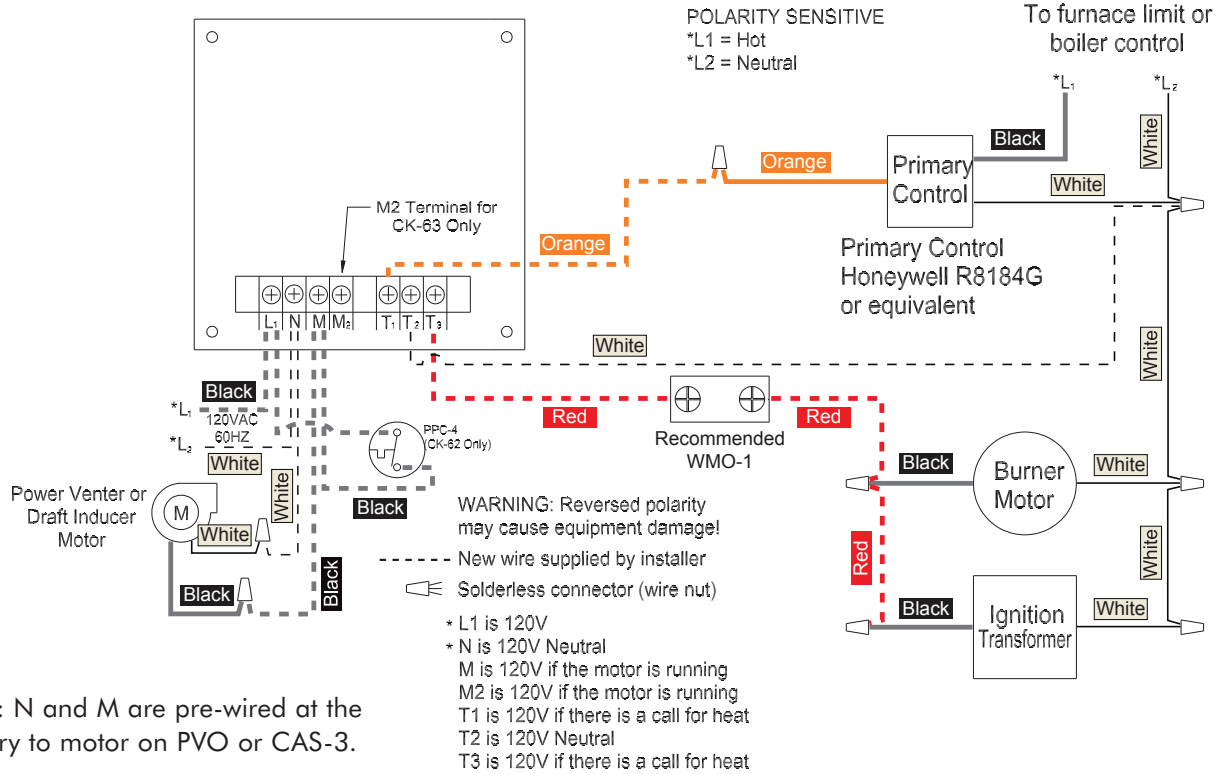




# Wiring Diagrams

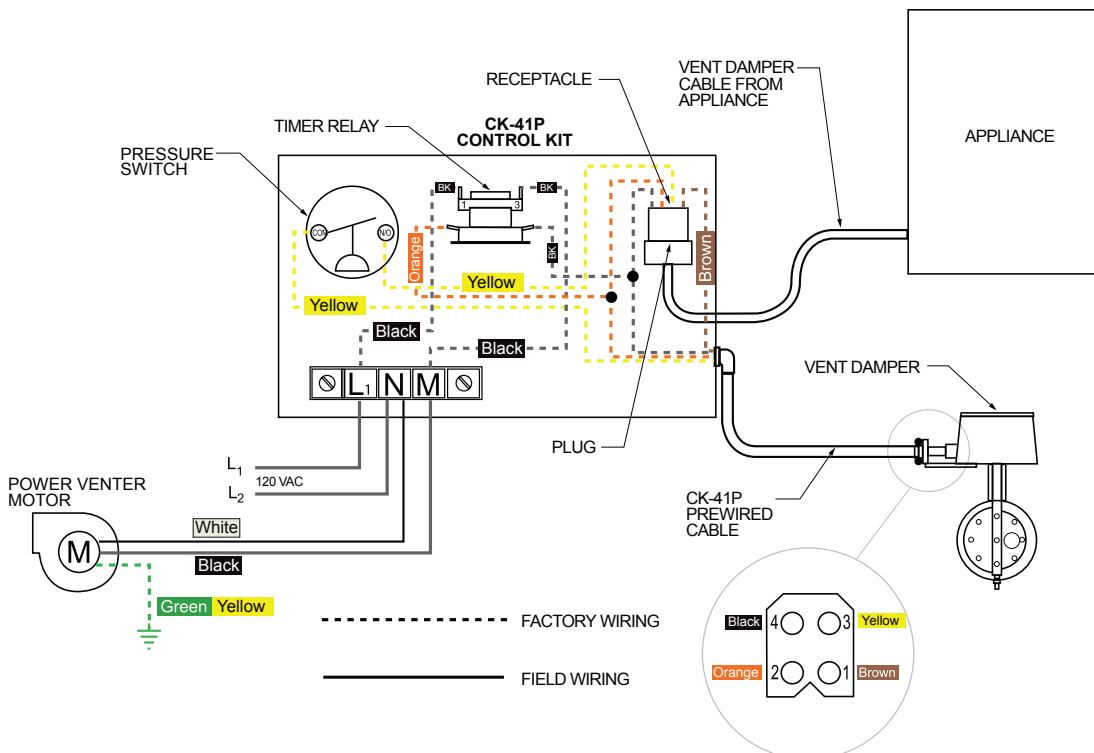
for SWG/CV Power Venter or DI Draft Inducer

## CK-61, 62, 63 Oil Fired System Single Unit



Note: N and M are pre-wired at the factory to motor on PVO or CAS-3.

## CK-41P, CAS-4P, CAS-4TMR, ADA-1 with Gas Boiler



Wiring

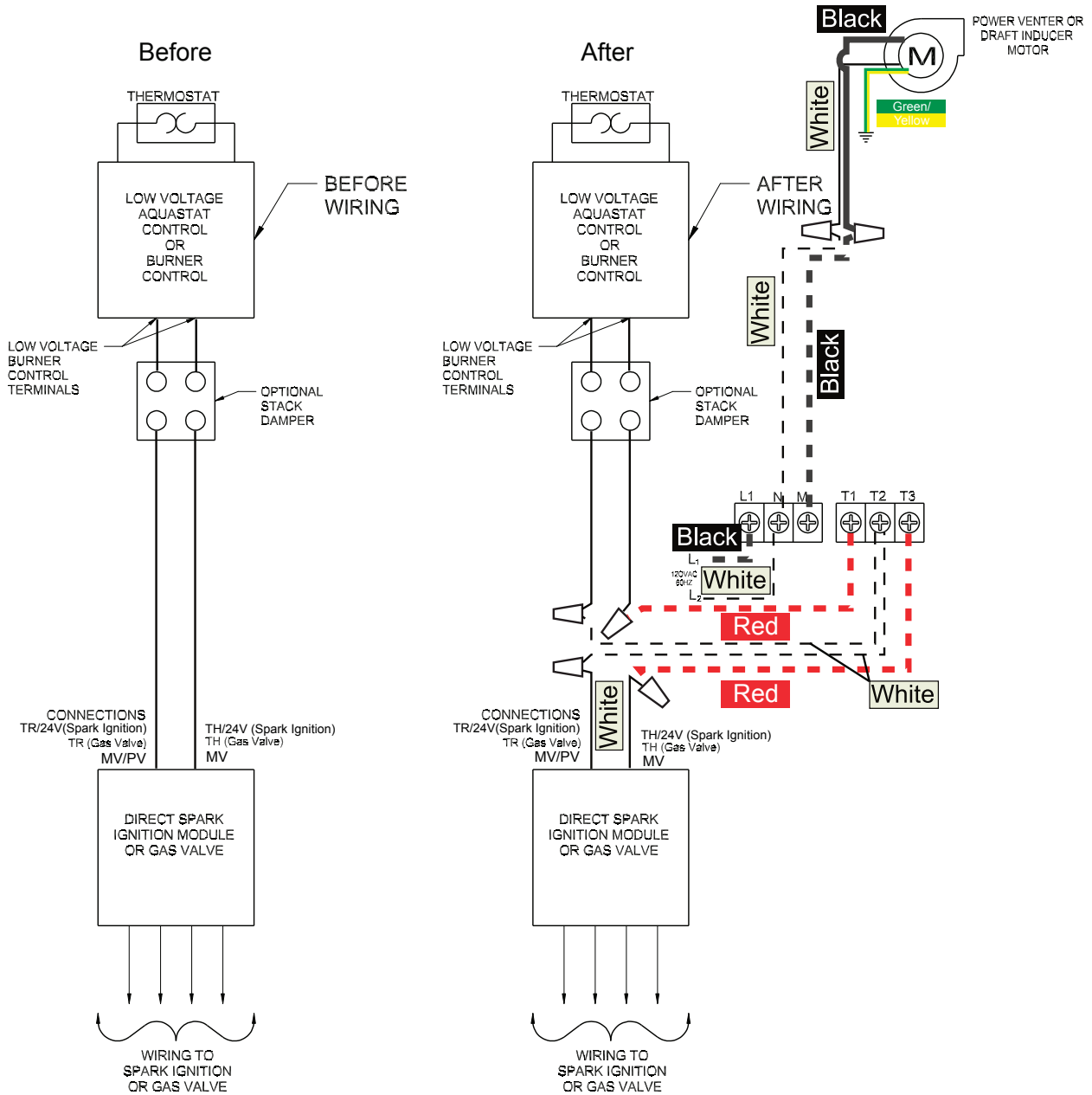
# Wiring Diagrams

for SWG, DI, or CAS-4

## CK-40 Series\*, PVG, or CAS Series\*\* for 24 Volt Gas Boiler

\*CK-40, 40F, 41, 41F, 42, 43F, 44, 44F, PVG

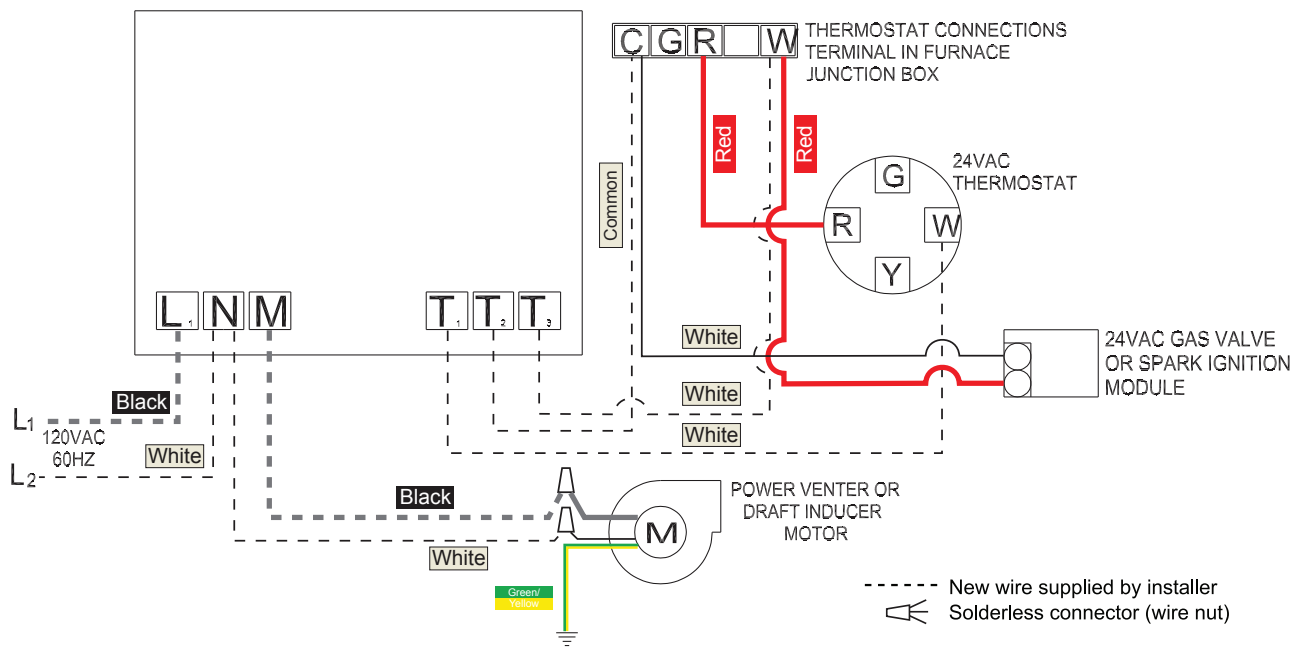
\*\*CAS-4Jr., CAS-6, and CAS-7



----- New wire supplied by installer

⚡ Solderless connector (wire nut)

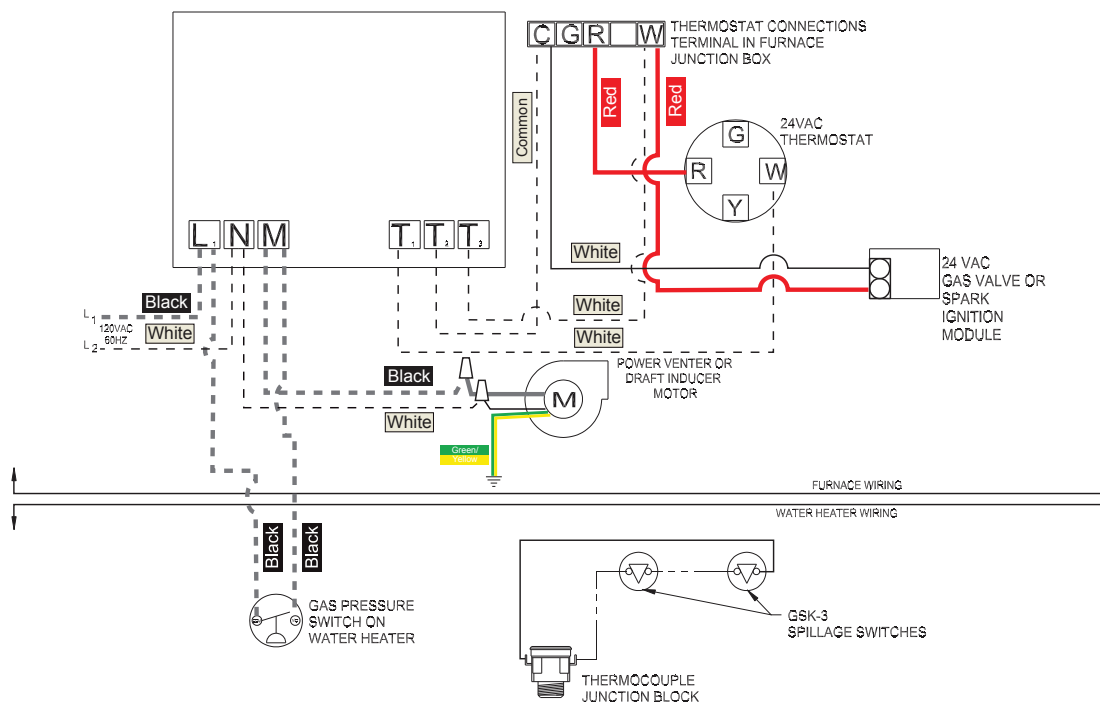
## CK-40 Series, PVG, or CAS Series for 24 Volt Gas Furnace



## CK-90 Series\*, PVG, or CAS Series for 24 Volt Gas Furnace and 30 Millivolt Gas Water Heater

\*CK-91FV, 92FV, and PVG

--- New wire supplied by installer  
 ⚡ Solderless connector (wire nut)



Wiring

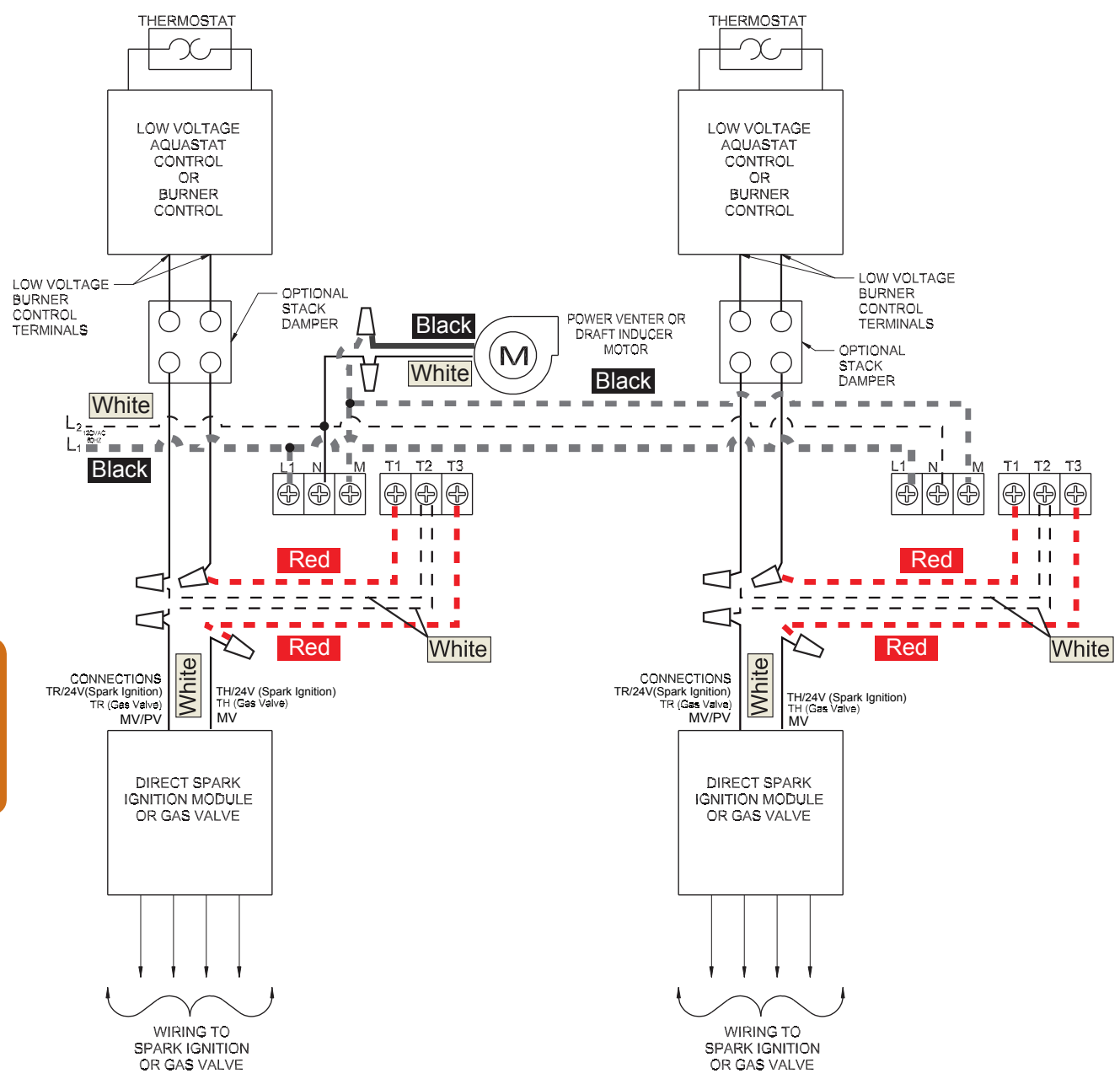
# Wiring Diagrams

for SWG, DI

## CK-40 Series\* for Multiple 24 Volt Gas Boiler

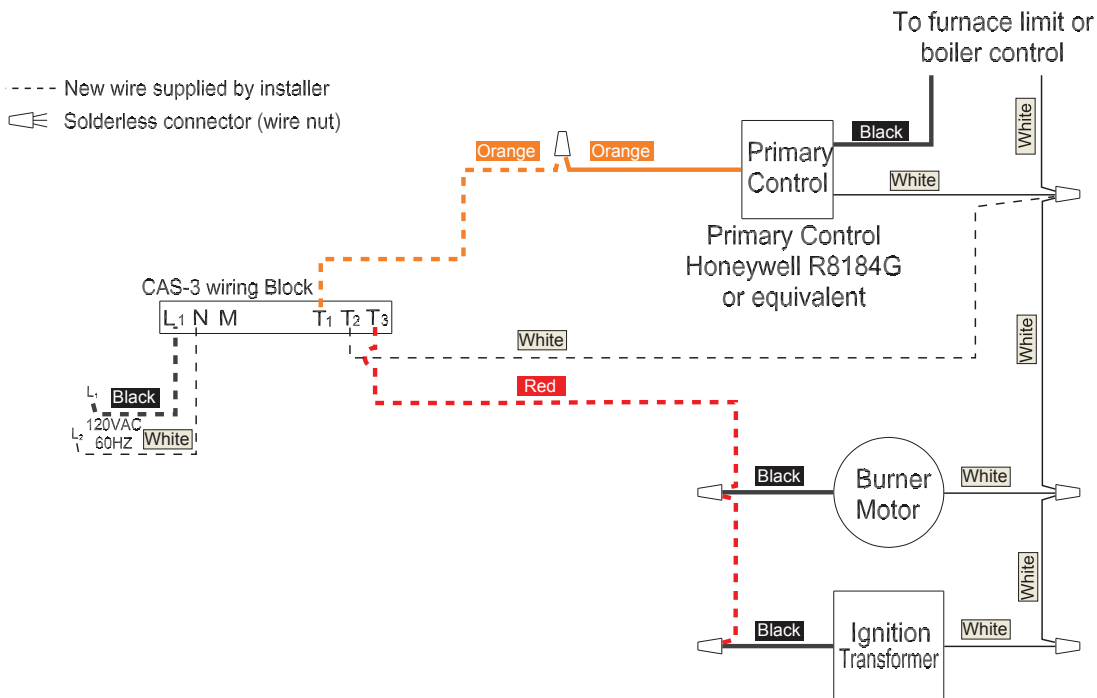
\*CK-40, 40F, 41, 41F, 42, 43F, 44, 44F

- New wire supplied by installer
- ⏏ Solderless connector (wire nut)

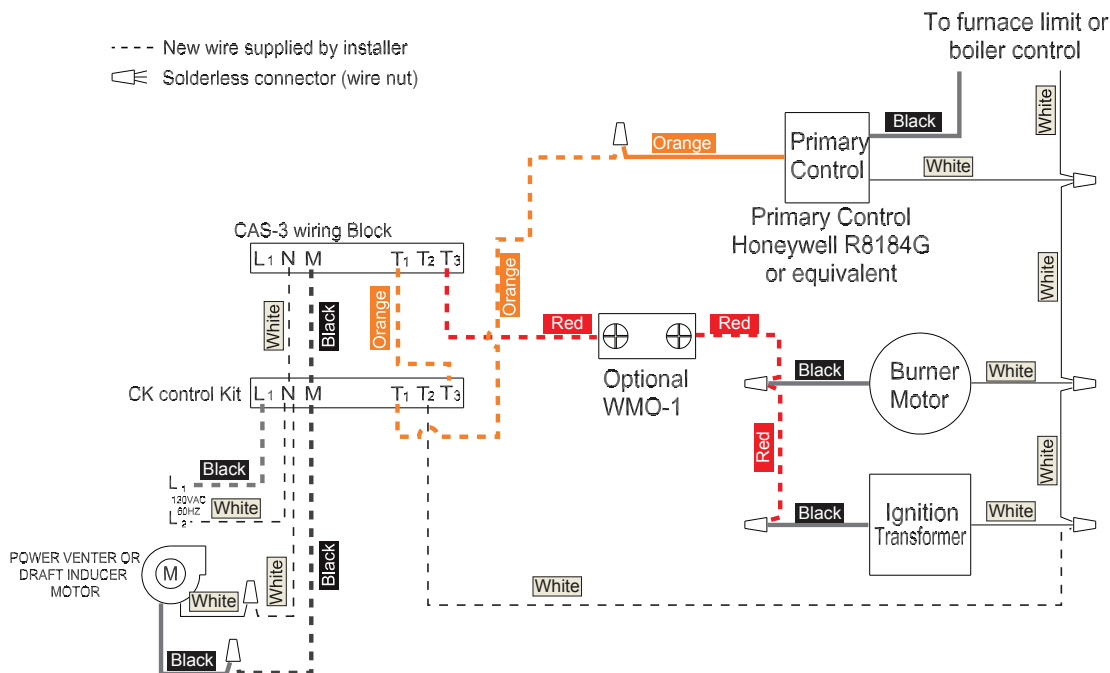


Wiring

## CAS-3, 6, and 7 Chimney Vent, and PVO Single Oil-Fired System with Standard Primary Control



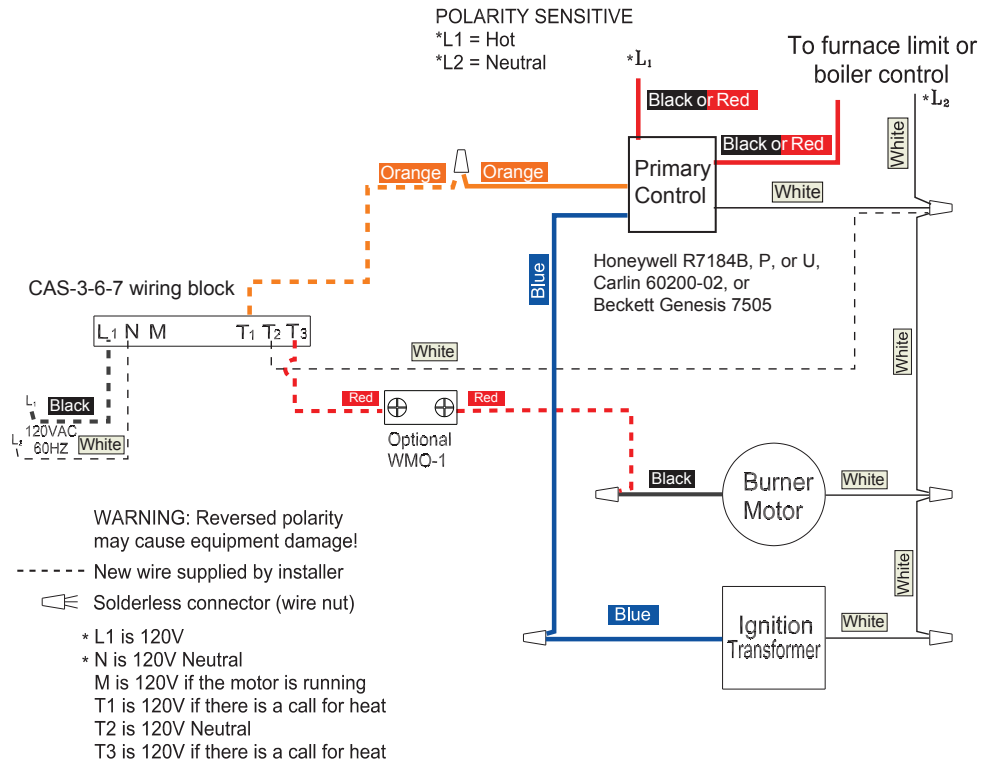
## CAS-3, 6, and 7, Power Vent, Single Oil-Fired System with Standard Primary Control



# Wiring Diagrams

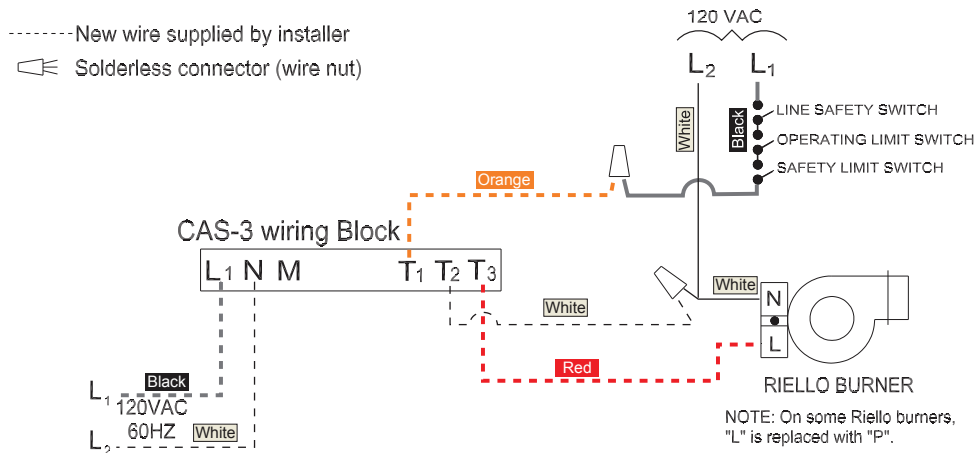
for CAS Units

CAS-3, 6, and 7 Chimney Vent, and PVO Single Oil-Fired System with Honeywell R7184B, Carlin 60200-02, or Beckett GeniSys™ 7505

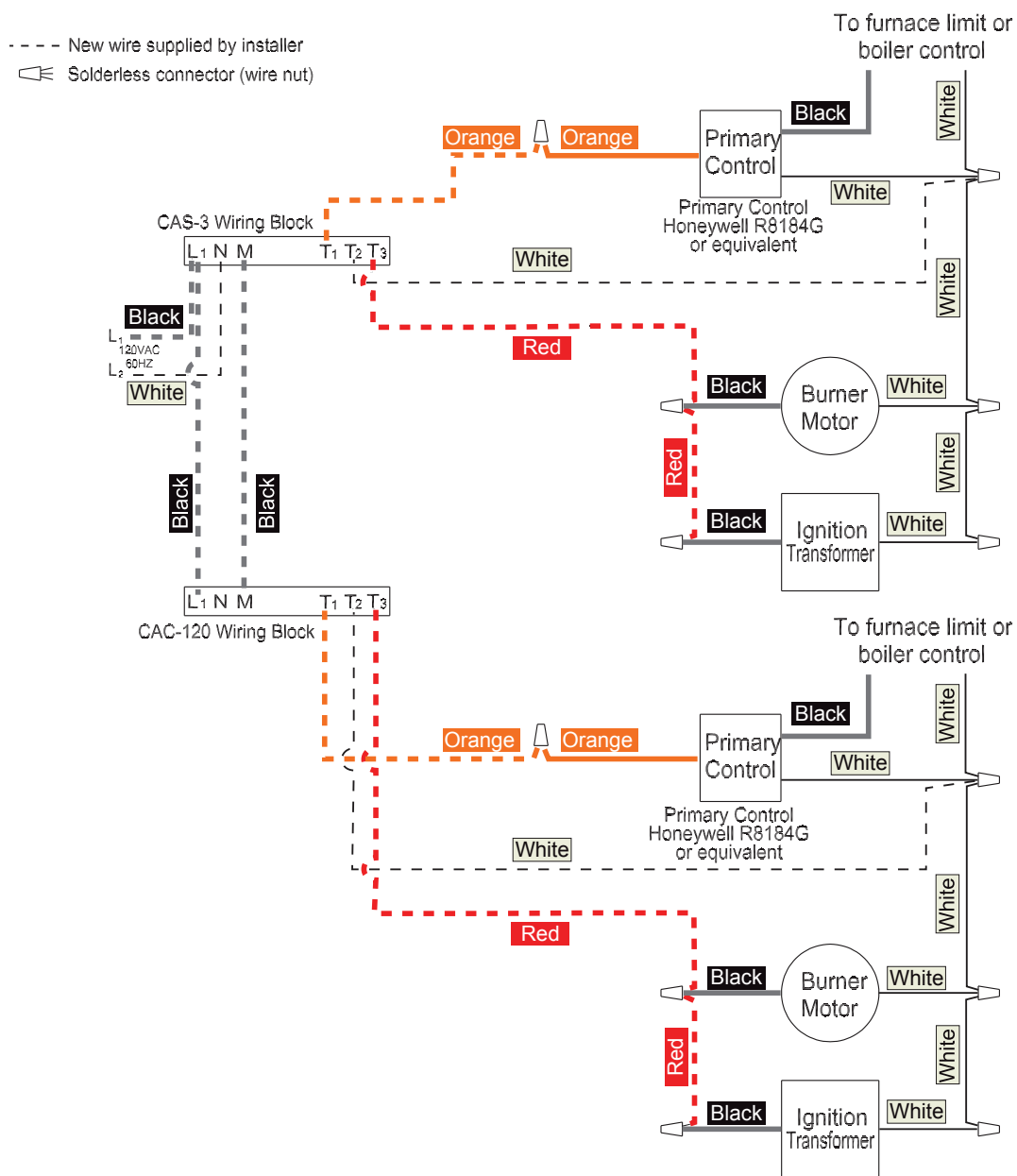


Wiring

## CAS-3, 6, and 7 with Riello Burner on Boiler




## CAS-3, 6, and 7, Chimney Vent, Two Oil-Fired Systems with CAC-120 Combustion Air Controller

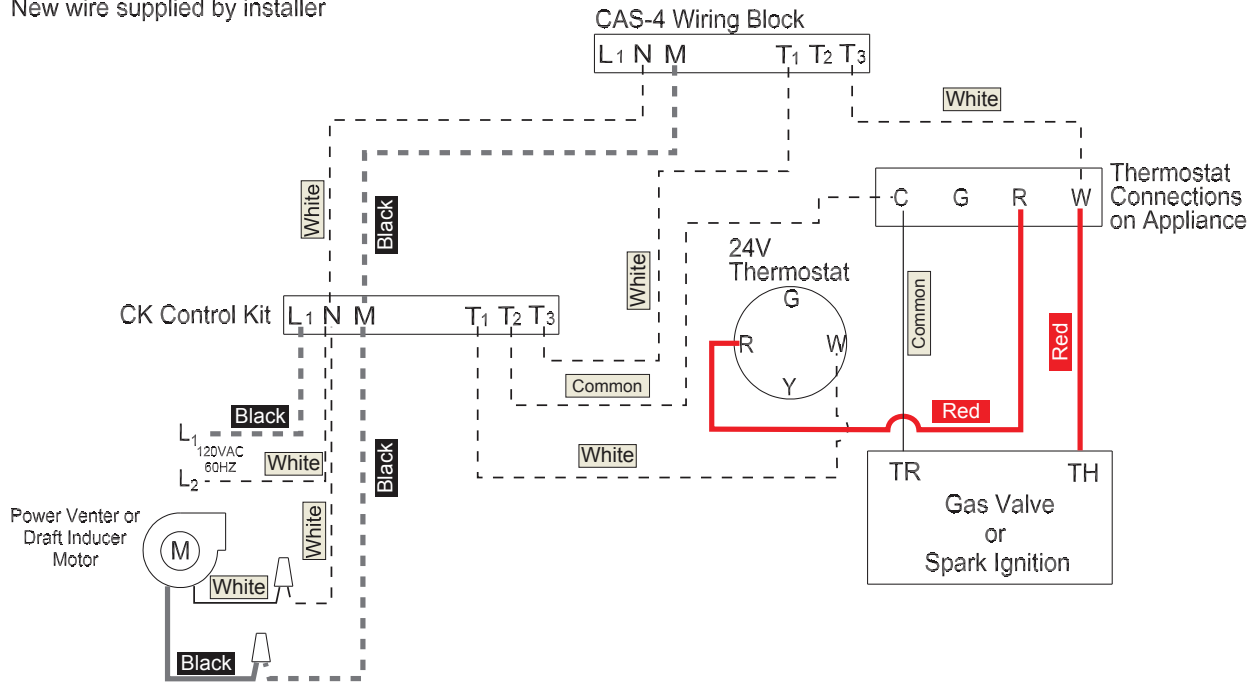


# Wiring Diagrams

for CAS Units

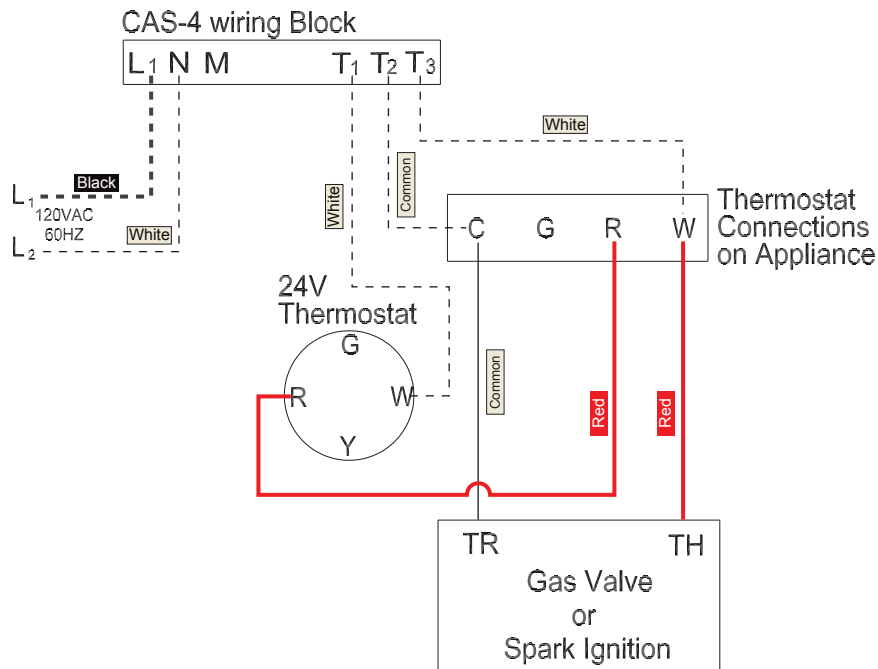
## CAS-4, CAS-4Jr., 6, 7, Power Venter, Single 24 Volt Gas Appliance

-  Solderless connector (wire nut)
- New wire supplied by installer



## CAS-4, CAS-4Jr., 6, 7, Chimney Vent, and PVG Single 24 Volt Gas Appliance

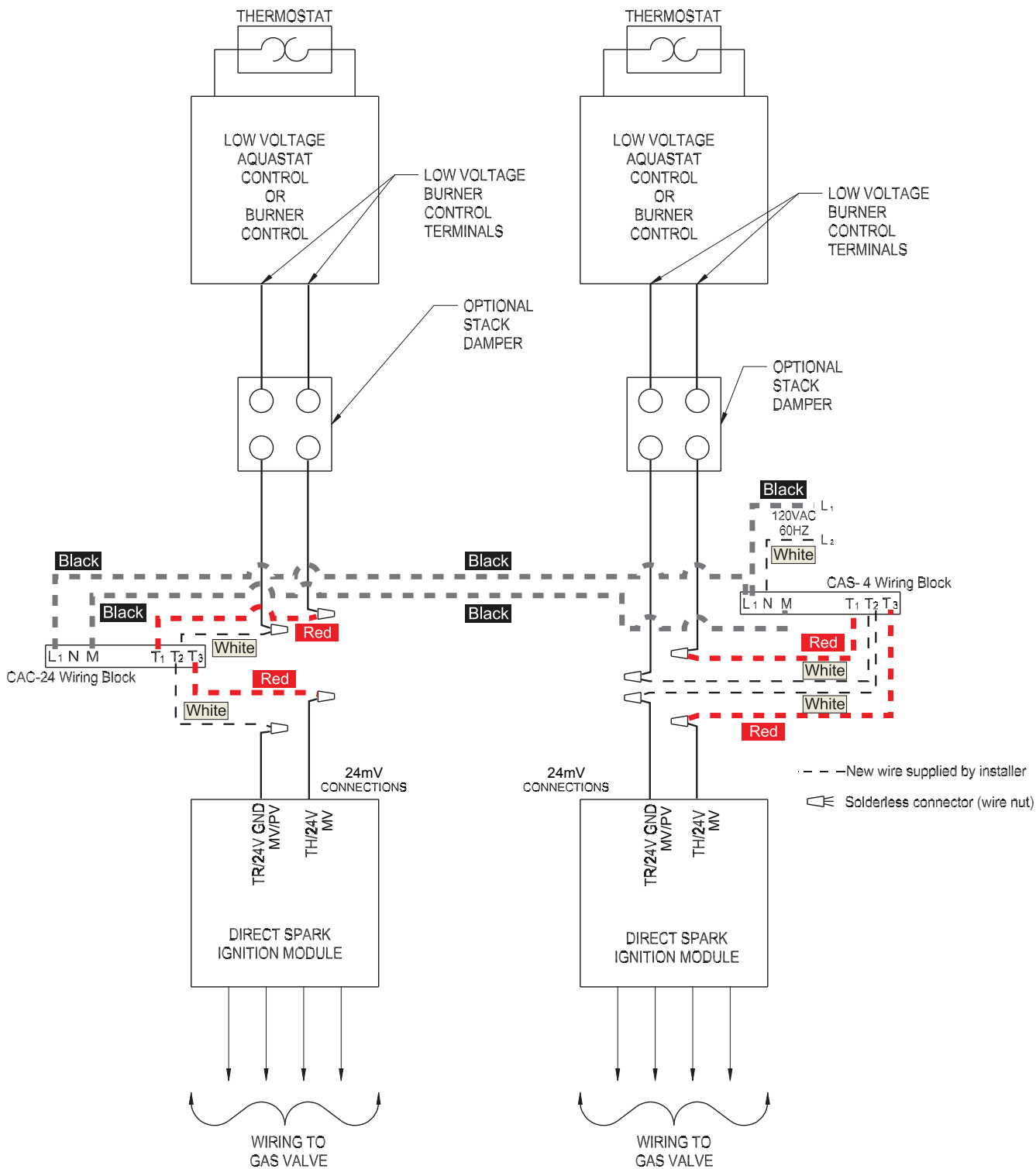
----- New wire supplied by installer



Wiring



## CAS-4, CAS-4Jr., 6, 7, PVG, Chimney Vent, Two 24 Volt Gas Appliances with CAC-24 Combustion Air Controller

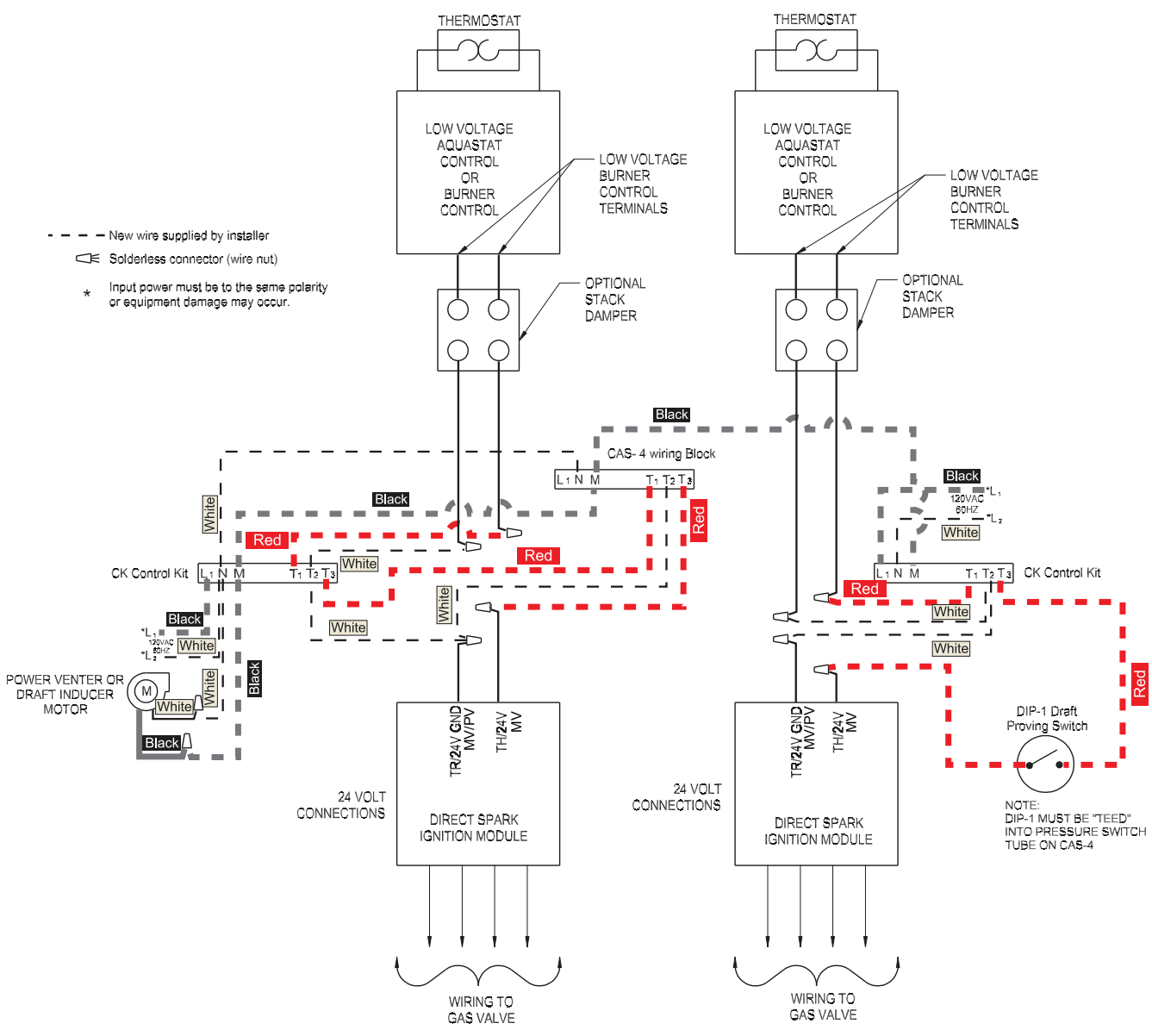


Wiring

# Wiring Diagrams

for CAS Units

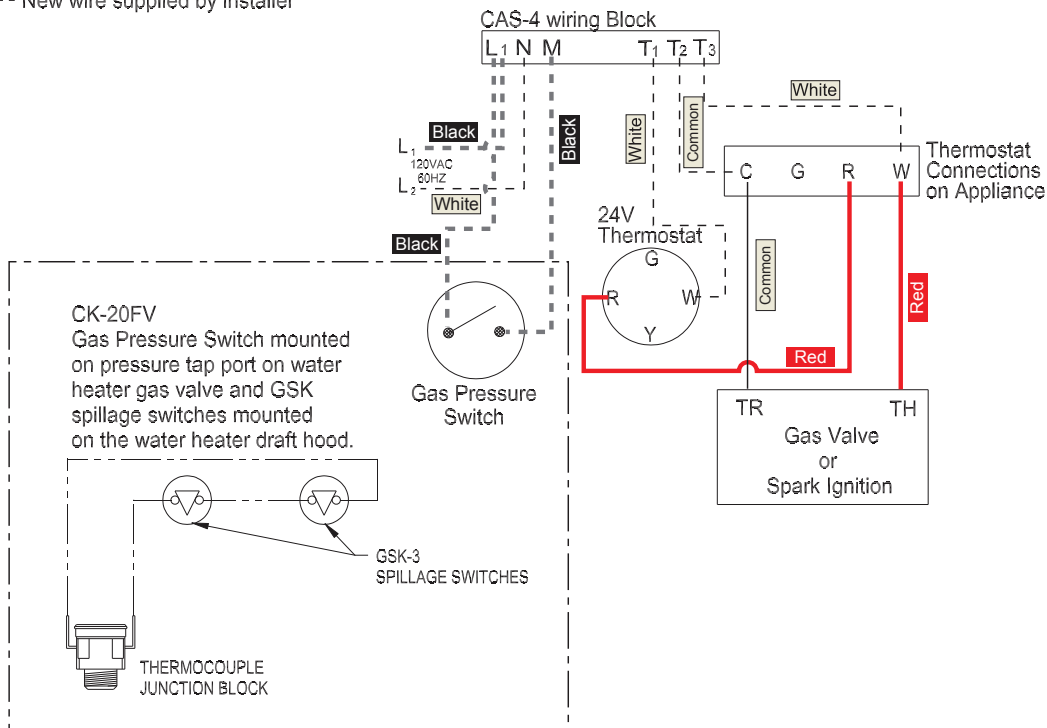
## CAS-4, CAS-4Jr., 6, 7, PVG, One Power Venter, Two 24 Volt Gas Appliances



Wiring

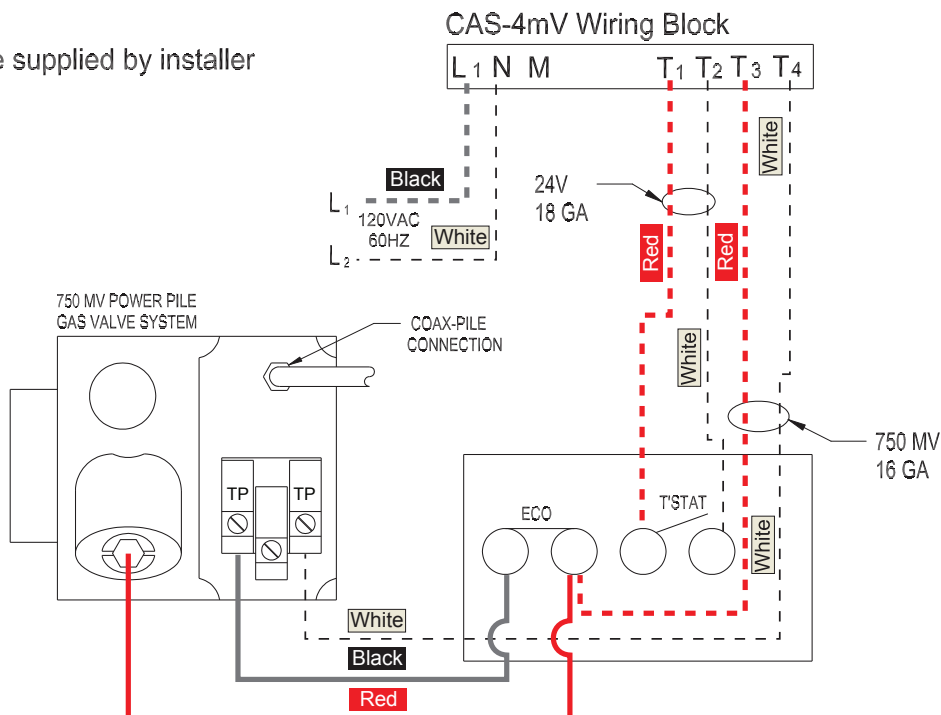
## CAS-4, CAS-4Jr., 6, 7, Chimney Vent, and PVG 24 Volt Gas Appliance with 30mv Water Heater

----- New wire supplied by installer



## CAS-4mV, CK-81, Chimney Vent, Single 750mv Gas Appliance

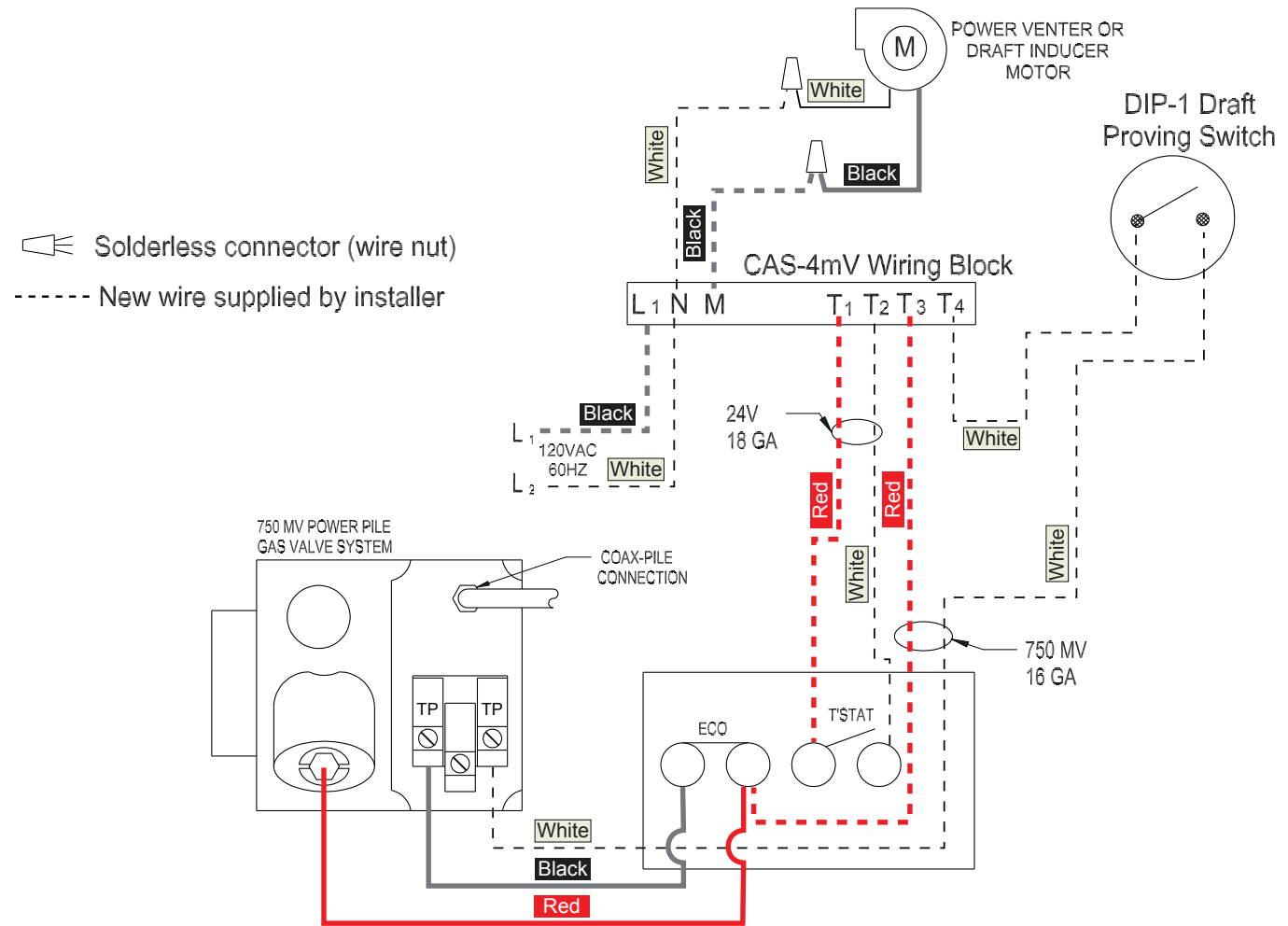
---- New wire supplied by installer



# Wiring Diagrams

for CAS Units

## CAS-4mv Power Vent, Single 750mv Gas Appliance



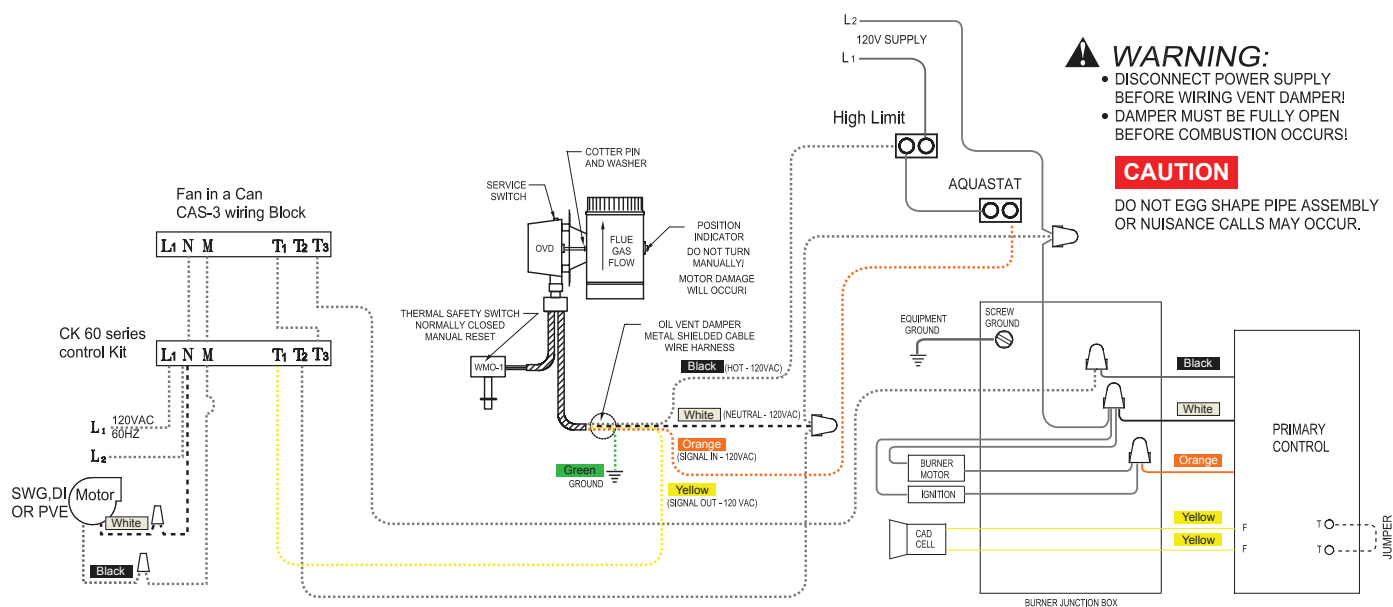
Wiring

# Wiring Diagrams

for Oil Vent Damper

## Oil-Fired Water Heater with OVD, SWG and CAS-3

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.



**WARNING:**

- DISCONNECT POWER SUPPLY BEFORE WIRING VENT DAMPER!
- DAMPER MUST BE FULLY OPEN BEFORE COMBUSTION OCCURS!

**CAUTION**

DO NOT EGG SHAPE PIPE ASSEMBLY OR NUISANCE CALLS MAY OCCUR.

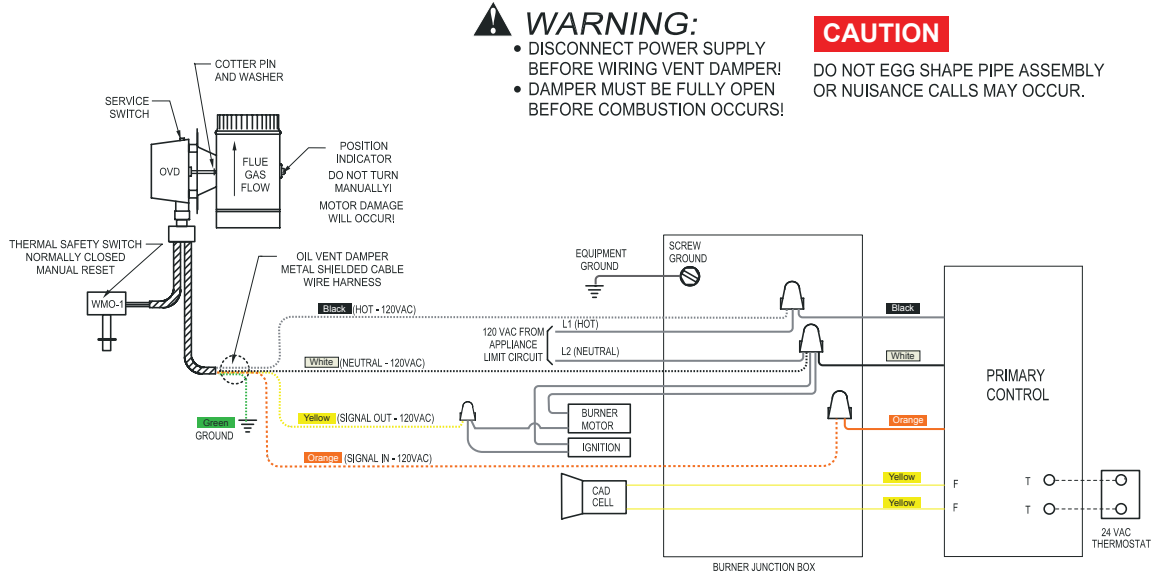
LINE VOLTAGE BY QUALIFIED AGENCY
  LINE VOLTAGE BY FACTORY
  LOW VOLTAGE BY QUALIFIED AGENCY
  LOW VOLTAGE BY FACTORY
 
 WIRENUT

# Wiring Diagrams

for Oil Vent Damper

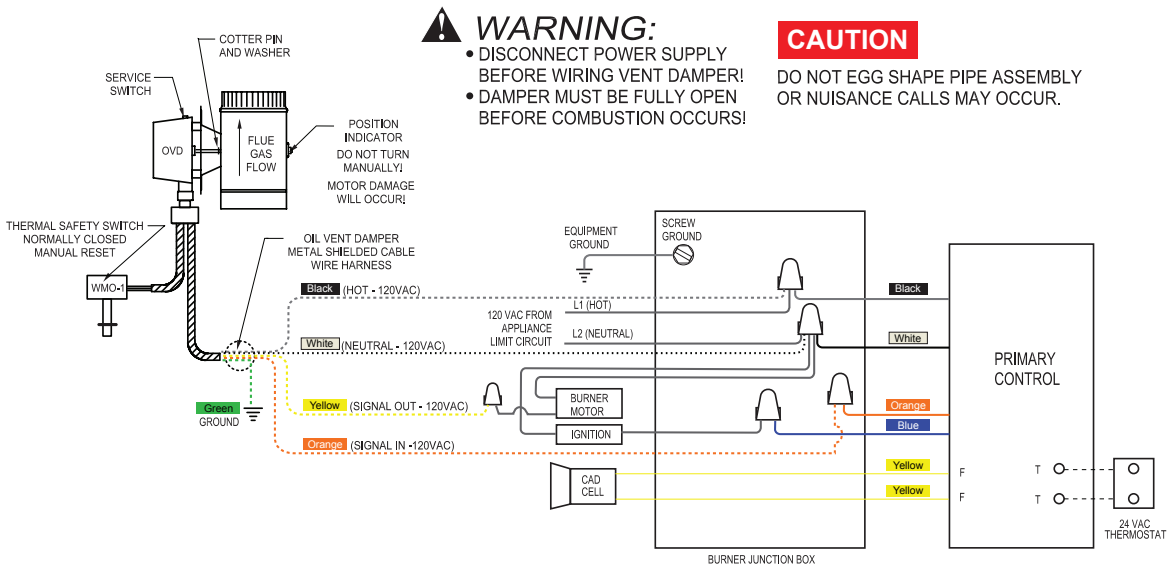
## Oil-Fired System with OVD and Honeywell R8184G Primary Control

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.



## Oil-Fired System with OVD and R7184A Primary Control

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.



..... LINE VOLTAGE BY QUALIFIED AGENCY  
 ——— LINE VOLTAGE BY FACTORY

..... LOW VOLTAGE BY QUALIFIED AGENCY  
 ——— LOW VOLTAGE BY FACTORY

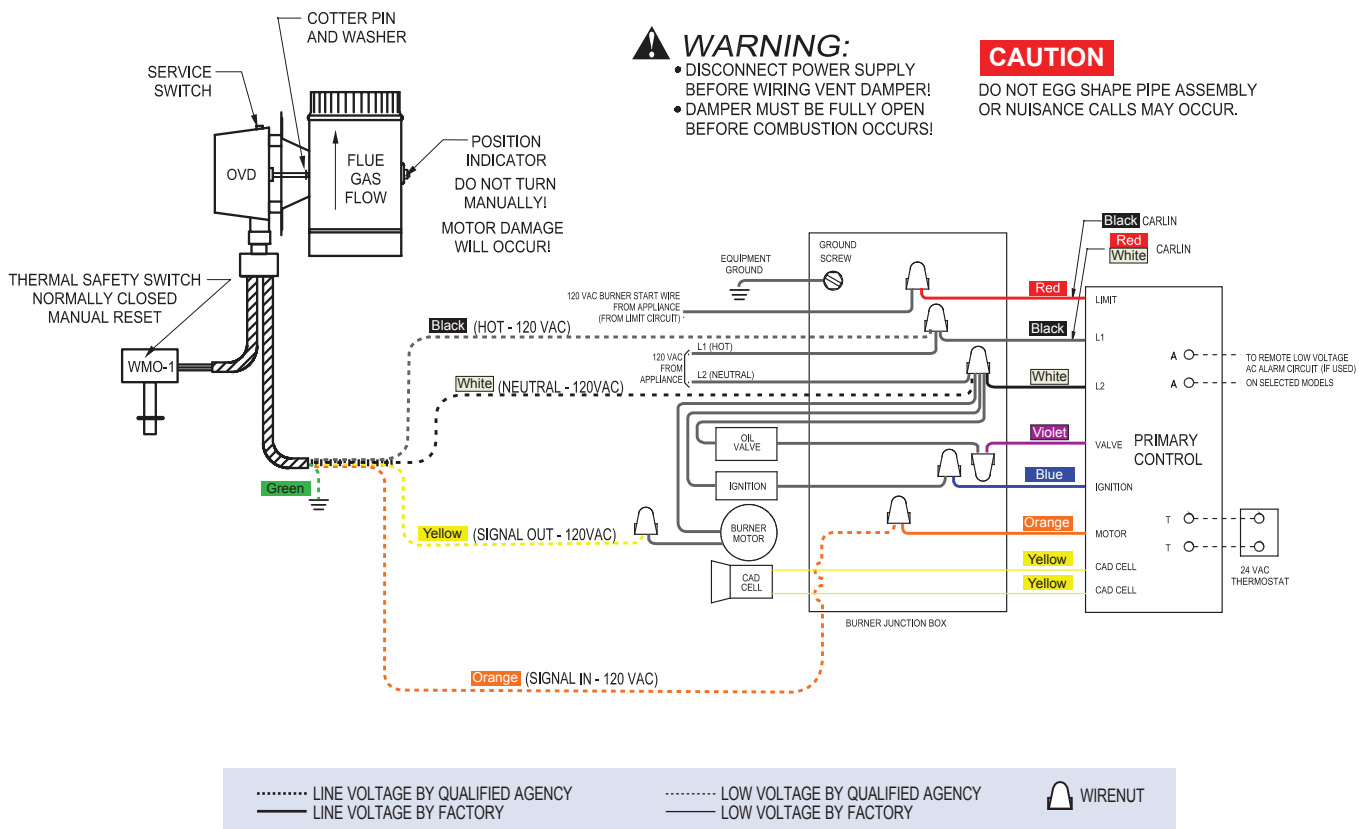


# Wiring Diagrams

for Oil Vent Damper

## Oil-Fired System with OVD and Honeywell R7184B, P, or U, Carlin 60200-02, and Beckett GeniSys™ 7505 Primary Control

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.

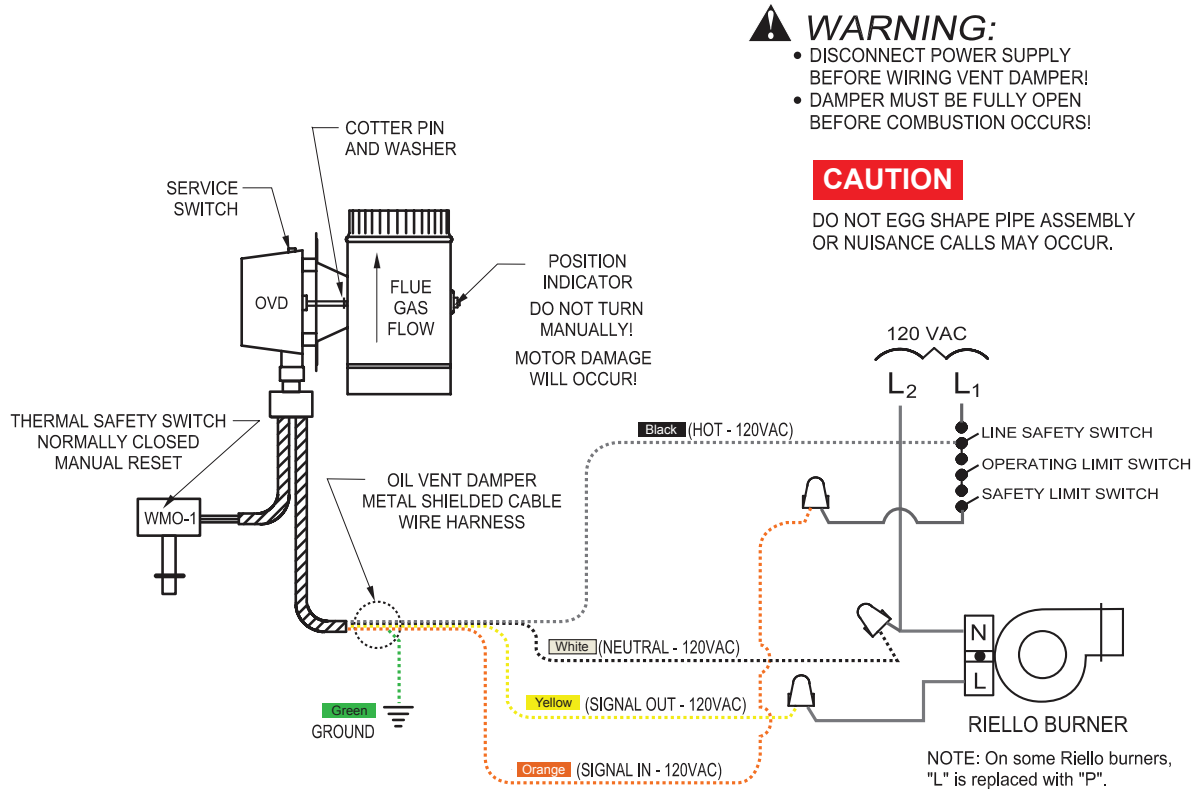


# Wiring Diagrams

for Oil Vent Damper

## OVD with Riello Boiler

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.



..... LINE VOLTAGE BY QUALIFIED AGENCY	..... LOW VOLTAGE BY QUALIFIED AGENCY	⊖ WIRENUT
—— LINE VOLTAGE BY FACTORY	—— LOW VOLTAGE BY FACTORY	

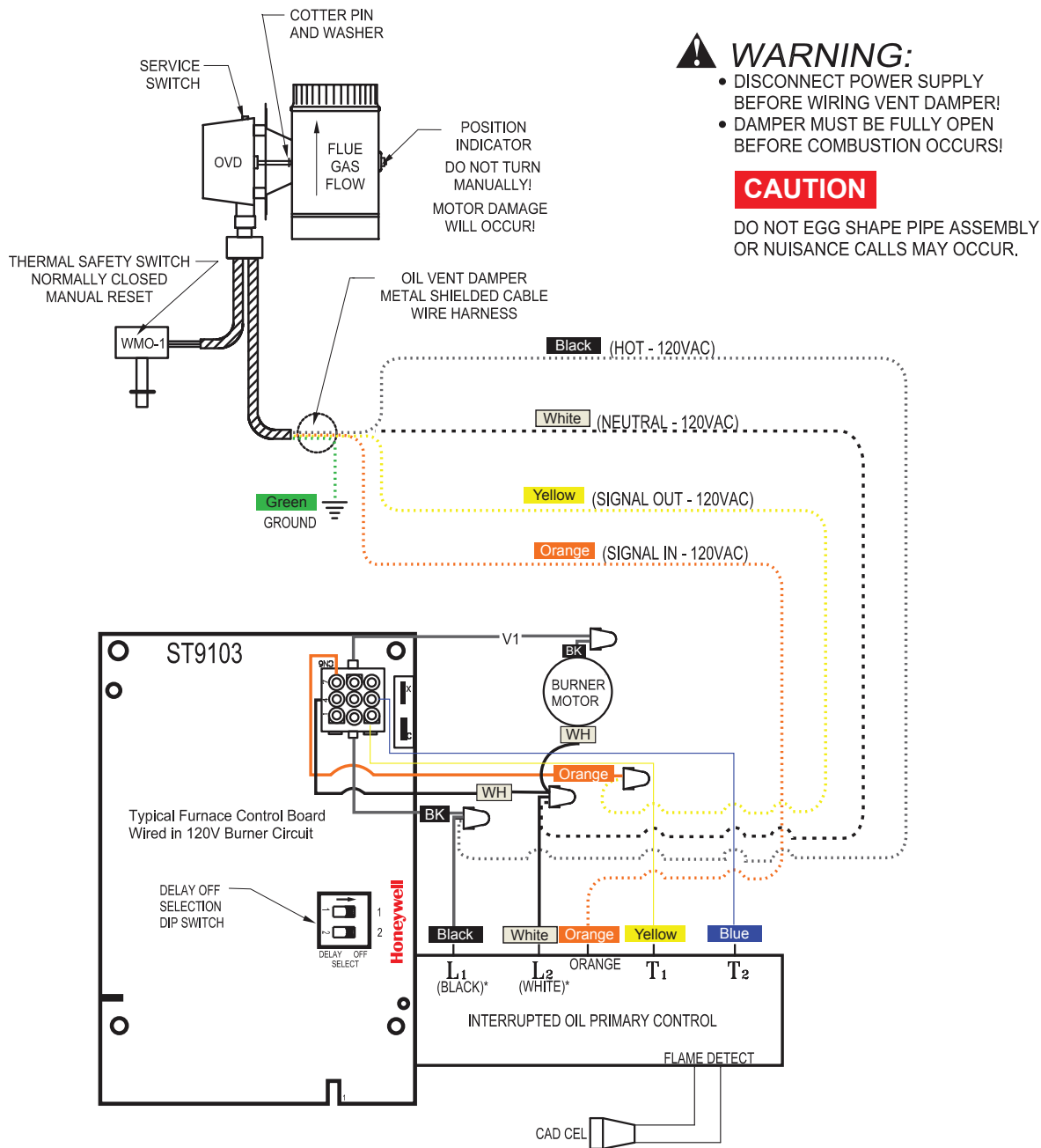
Wiring



## Warm Air Furnace with OVD and Honeywell ST9103 Control Board

Black, Orange, and Yellow wires from Vent Damper MUST be the same polarity or product damage will occur.

### OVD WITH ELECTRONIC PRIMARY CONTROL



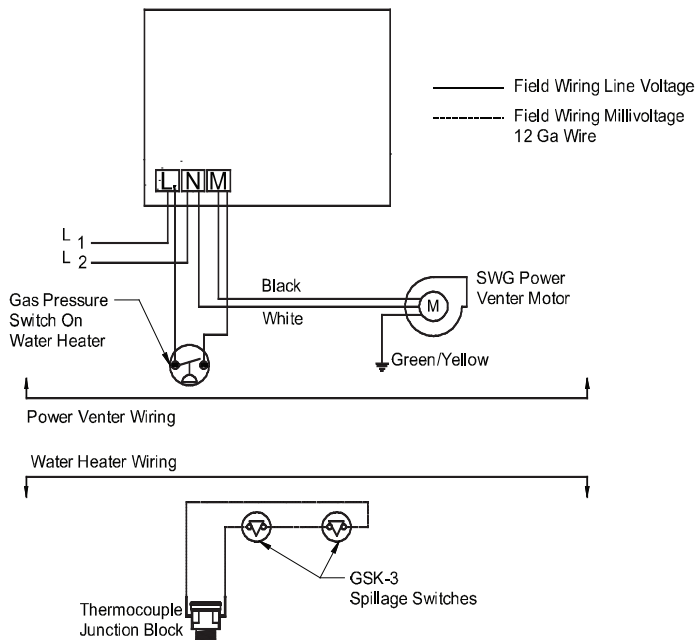
..... LINE VOLTAGE BY QUALIFIED AGENCY  
 \_\_\_\_\_ LINE VOLTAGE BY FACTORY

..... LOW VOLTAGE BY QUALIFIED AGENCY  
 \_\_\_\_\_ LOW VOLTAGE BY FACTORY

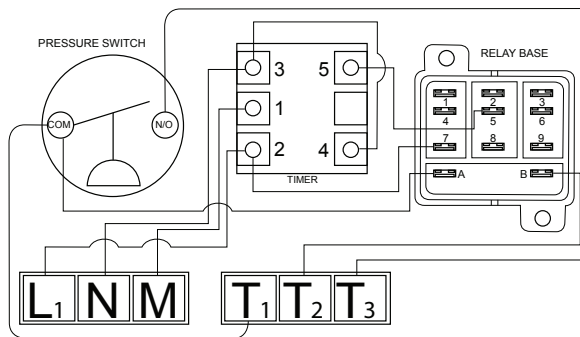




### CK-20FV

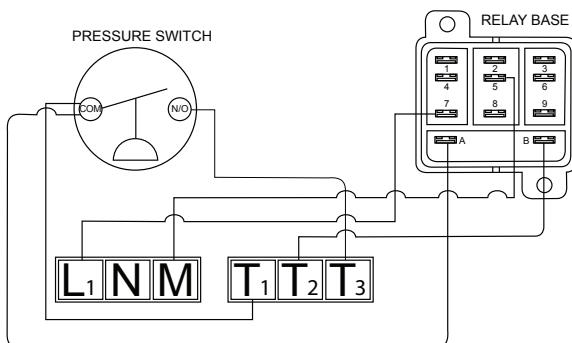


### CK-61 (new style)



Wiring

### CK-62

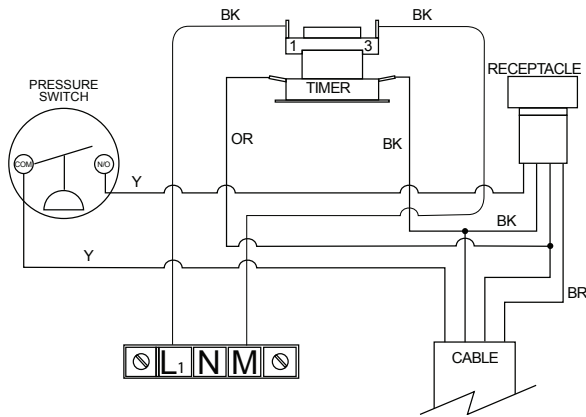


INTERNAL WIRING DIAGRAM: CK-62  
 (L1) TO (7) ON RELAY BASE  
 (M) TO (5) ON RELAY BASE  
 (T1) TO (COM) ON PRESSURE SWITCH  
 (T2) TO (B) ON RELAY BASE  
 (T3) TO (N/O) ON PRESSURE SWITCH  
 (COM) ON PRESSURE SWITCH TO (A) ON RELAY BASE

# Wiring Diagrams

## Internal Wiring Diagrams

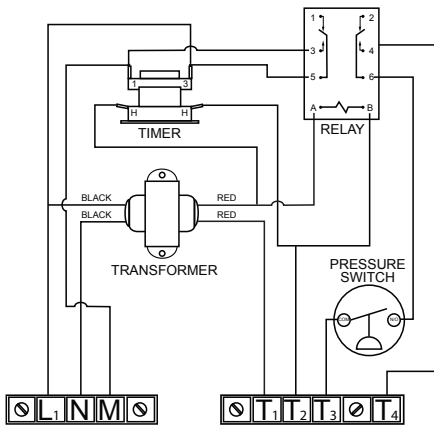
### CK-41P, CK-92 FVP



INTERNAL WIRING DIAGRAM: CK-41P, 92P

- (L1) TO (1) ON TIMER BASE
- (YELLOW - CABLE) TO (COM) ON PRESSURE SWITCH
- (ORANGE) TO TIMER BASE
- (YELLOW - PLUG) TO (N/O) ON PRESSURE SWITCH
- (BLACK) TO TIMER BASE

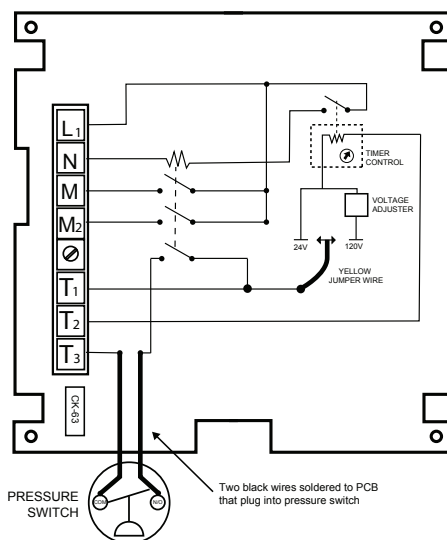
### CK-81



INTERNAL WIRING DIAGRAM: CK-81

- (L1), (BLACK) ON TRANSFORMER AND (3) ON TIMER CONNECT WITH WIRE JOINT
- (N) TO (BLACK) ON TRANSFORMER
- (M) TO (1) ON TIMER
- (T1) TO (RED) ON TRANSFORMER
- (T2), (H) ON TIMER BASE AND (B) ON RELAY, CONNECT WITH WIRE JOINT
- (T3) TO (COM) ON PRESSURE SWITCH
- (T4) TO (4) ON RELAY
- (1) ON TIMER TO (3) ON RELAY
- (6) ON RELAY TO (N/O) ON PRESSURE SWITCH
- (3) ON TIMER TO (5) ON RELAY
- (A) ON RELAY, (RED) ON TRANSFORMER AND (H) ON TIMER BASE CONNECT WITH A WIRE JOINT

### CK-63



#### Electrical Ratings

- (L1) 120VAC, 60Hz, 15A MAXIMUM (supply to M1 and M2)
- (N) Neutral
- (M1) 120VAC switched output, 1/3hp maximum load, 7.2 FLA
- (M2) 120VAC switched output, 1/3hp maximum load, 7.2 FLA

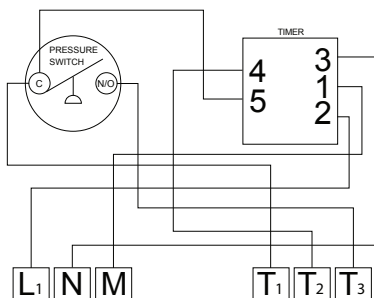
#### 120VAC CONTROL (select appropriate jumper wire)

- (T1) 120VAC Control Input (supply to T3)
- (T2) Neutral
- (T3) 120VAC switched output 1/8hp (3.8 FLA)

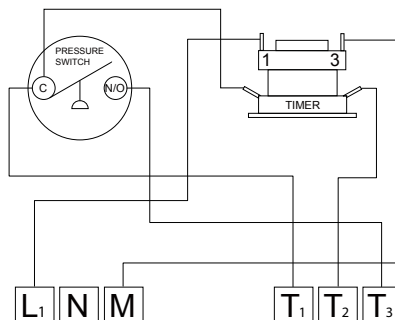
#### 24VAC CONTROL (select appropriate jumper wire)

- (T1) 24VAC Control Input (supply to T3)
- (T2) Common
- (T3) 24VAC switched output

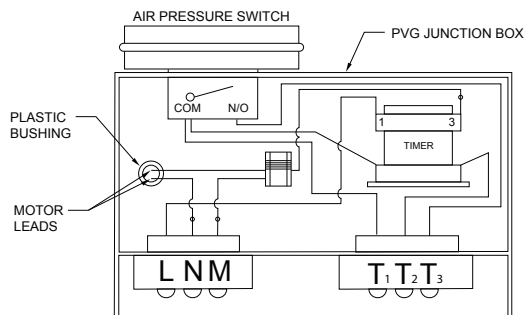
### CK-43, CK-91 and old style CK-61



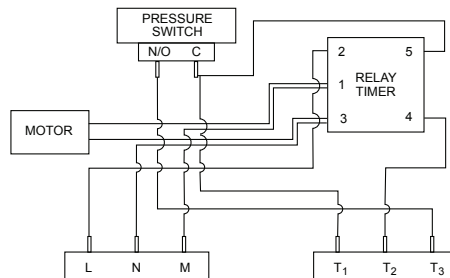
### CK-41F, CK-43F, CK-91 FV, CK-92 FV



### PVG



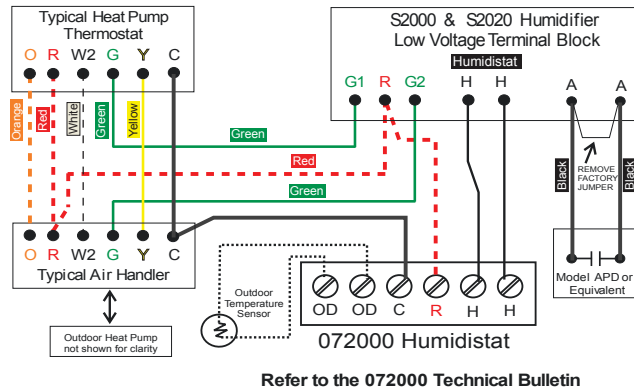
### PVO



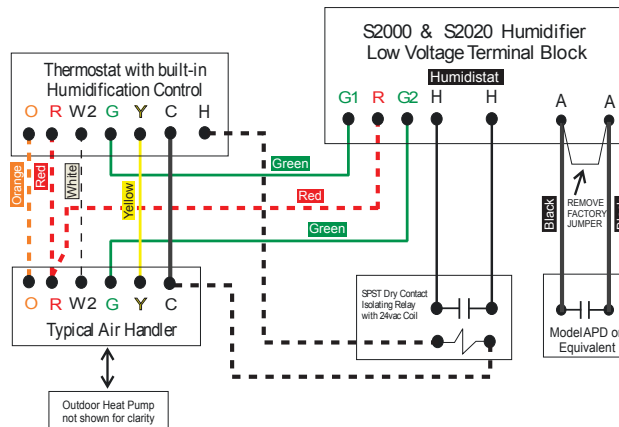
# Wiring Diagrams

for Steam Humidifier

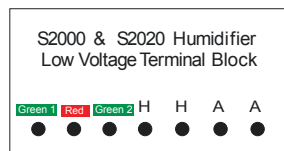
## Heat Pump System and Steam Humidifier with 072000 Humidistat



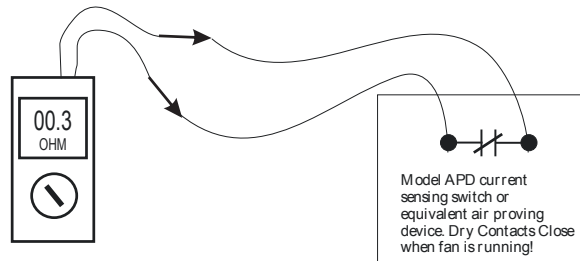
## Heat Pump System and Steam Humidifier with Combo Thermostat/Humidistat and Isolating Relay



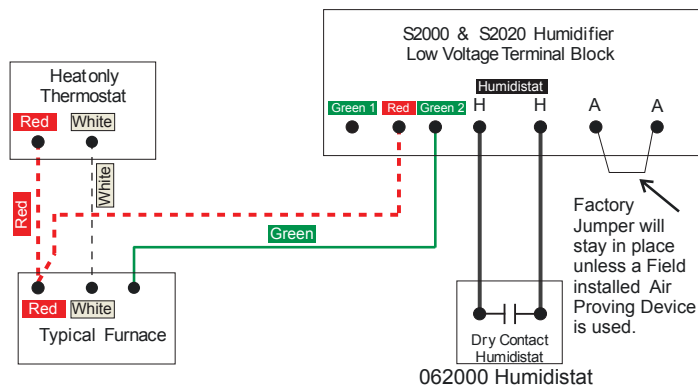
## S2000 & S2020 Humidifier Low Voltage Terminal Block



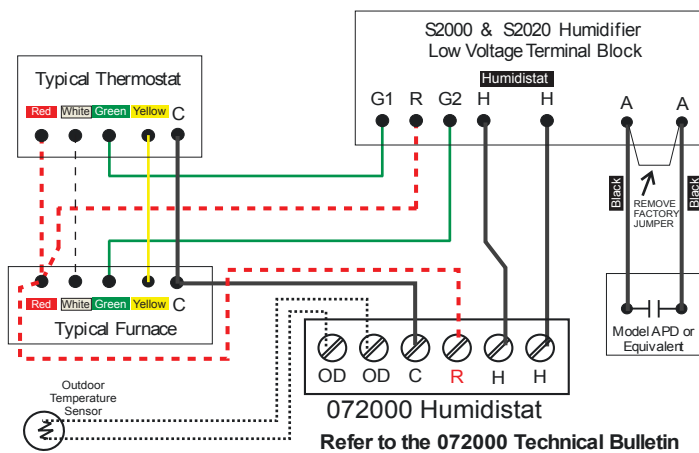
Disconnect the wires from the "A" terminals and check the device & circuit with a reliable ohm meter. Check continuity when the fan is off and when it is running.



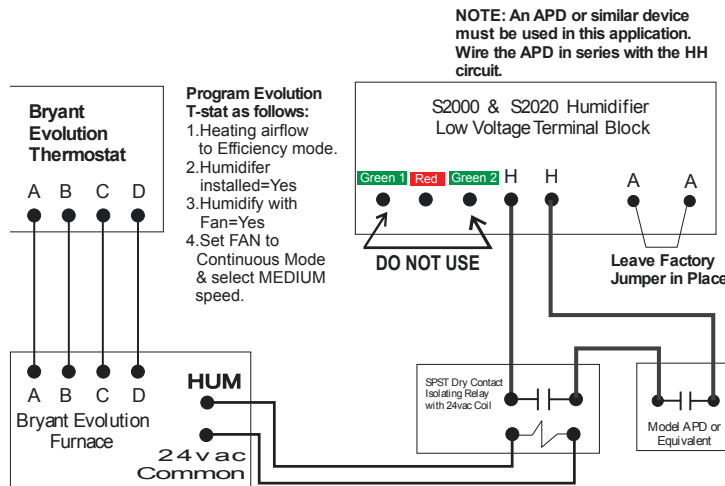
## Heat Only System and Steam Humidifier with Standard Dry Contact Humidistat



## Conventional Heat & Cool System and Steam Humidifier with 072000



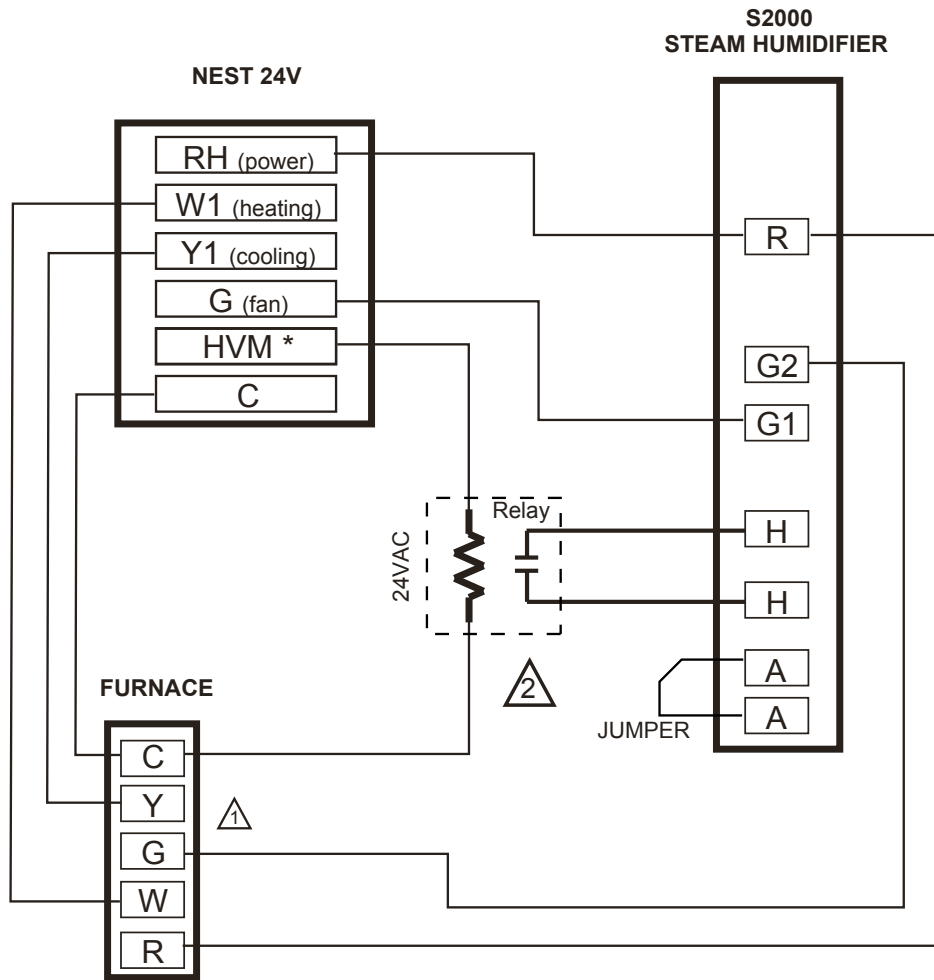
## Bryant/Carrier Evolution/Infinity Variable Speed Heat/Cool System



# Wiring Diagrams

for Steam Humidifier

## S2000 Steam Humidifier with Nest thermostat

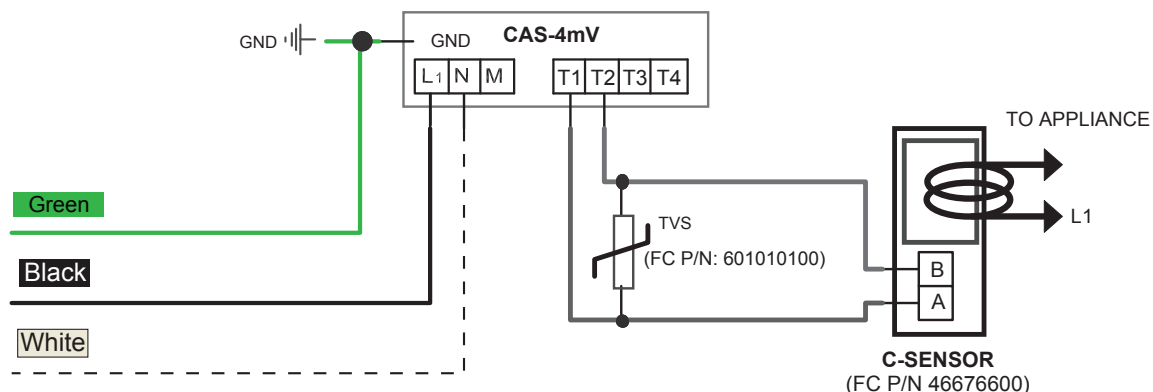


- ⚠️ EQUIPMENT WIRING NOT SHOWN FOR CLARITY.  
EQUIPMENT MAY VARY FROM WHAT IS SHOWN
- ⚠️ MODEL OAS -- OUTSIDE AIR SENSOR (OPTIONAL)



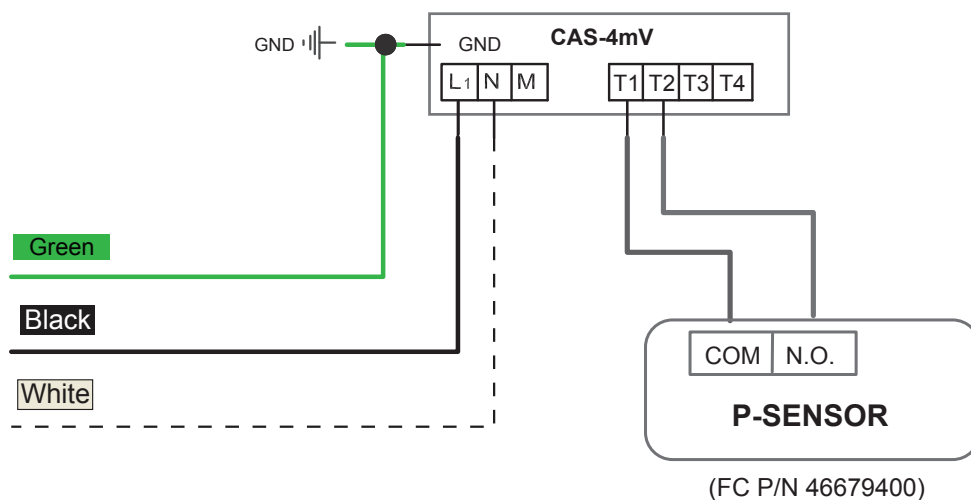
**WIRING INSTRUCTIONS:** MUST be installed by a Certified Electrician. Wire the CAS unit in accordance with the National Electric Code and applicable local codes. UNIT MUST BE GROUNDED. Check the ground circuit to make certain that the unit has been properly grounded. The wiring should be protected by an over-current circuit device rated at 15 amperes. CAUTION must be taken to ensure that the wiring does not come in contact with any heat source. All line voltage and control circuits between the CAS unit and the appliance MUST be wired in accordance with the National Electrical Code for Class I wiring or equivalent.

## CAS-4mV Controlled by C-Sensor, 24 Volt Application



Transient suppressor (FC P/N: 601010100) should be installed directly onto the C-Sensor terminals.

## CAS-4mV Controlled by P-Sensor, 24 Volt Application



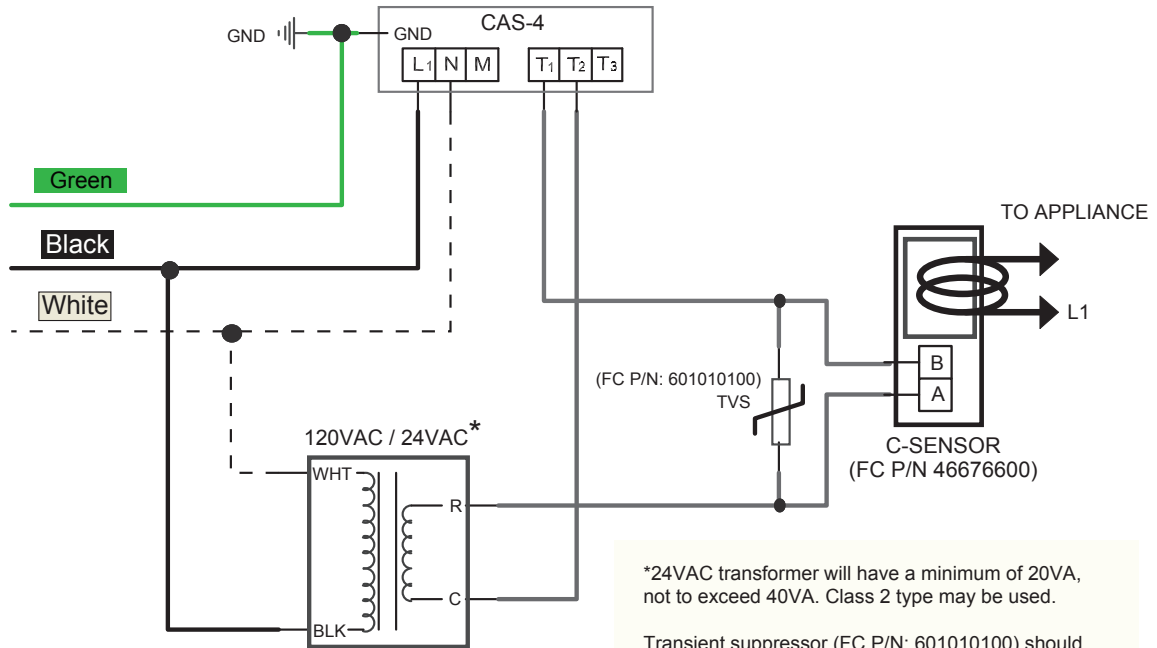
**IMPORTANT:** If using the quick connect crimp terminals supplied with the P-Sensor, use stranded wire only. Do not crimp terminals with the solid copper wire.

# Wiring Diagrams

For CAS with Sensors

**WIRING INSTRUCTIONS:** MUST be installed by a Certified Electrician. Wire the CAS unit in accordance with the National Electric Code and applicable local codes. UNIT MUST BE GROUNDED. Check the ground circuit to make certain that the unit has been properly grounded. The wiring should be protected by an over-current circuit device rated at 15 amperes. CAUTION must be taken to ensure that the wiring does not come in contact with any heat source. All line voltage and control circuits between the CAS unit and the appliance MUST be wired in accordance with the National Electrical Code for Class I wiring or equivalent.

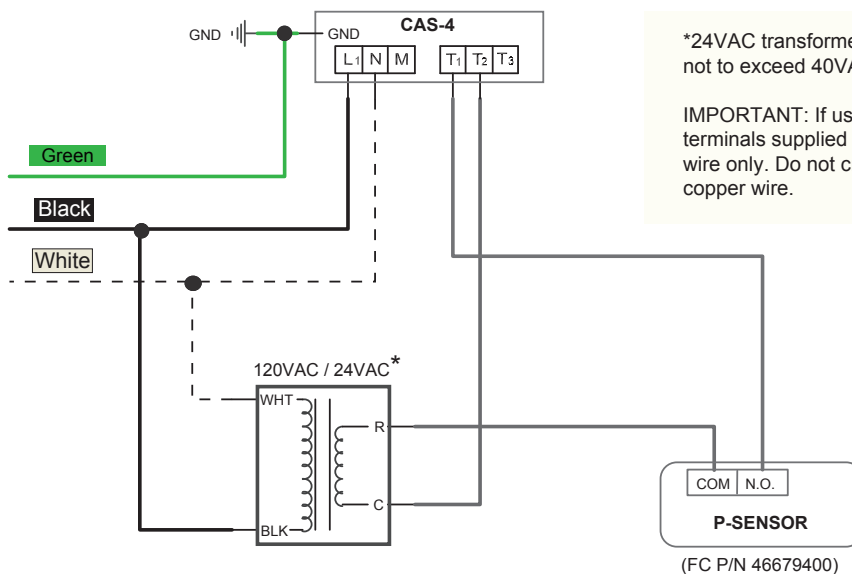
## CAS-4 Controlled by C-Sensor, 24 Volt Application



\*24VAC transformer will have a minimum of 20VA, not to exceed 40VA. Class 2 type may be used.

Transient suppressor (FC P/N: 601010100) should be installed directly onto the C-Sensor terminals.

## CAS-4 Controlled by P-Sensor, 24 Volt Application

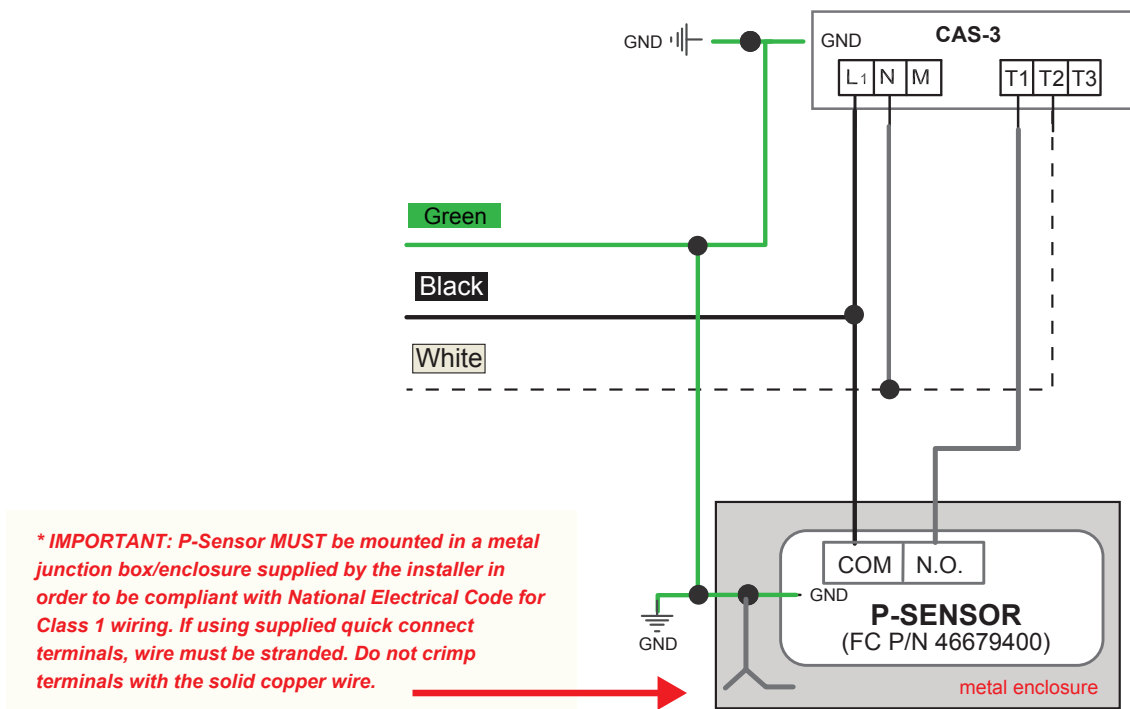


\*24VAC transformer will have a minimum of 20VA, not to exceed 40VA. Class 2 type may be used.

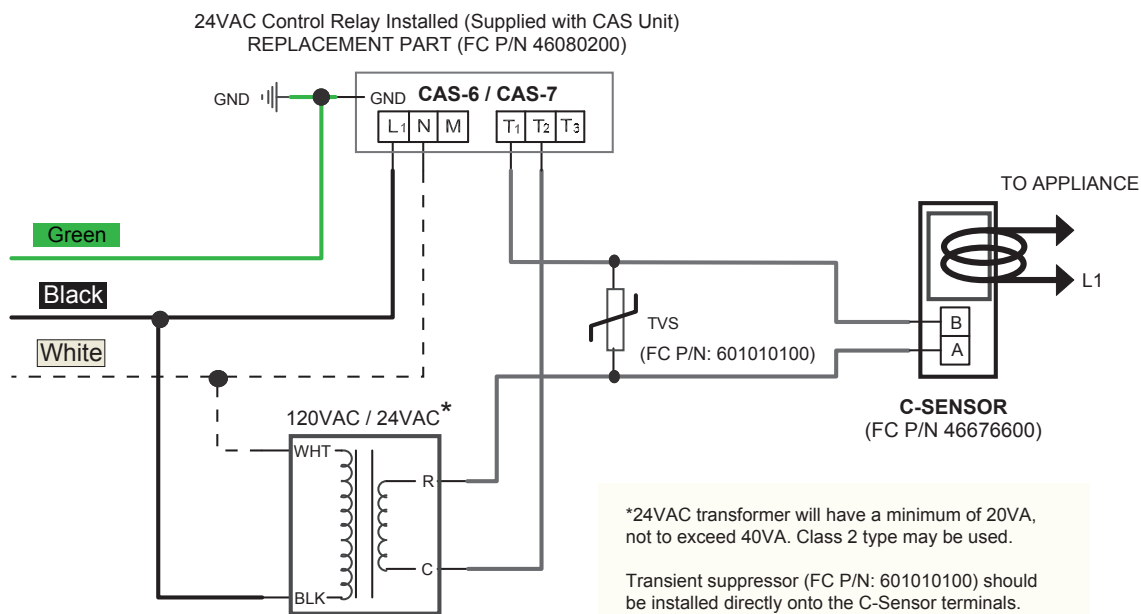
**IMPORTANT:** If using the quick connect crimp terminals supplied with the P-Sensor, use stranded wire only. Do not crimp terminals with the solid copper wire.

**WIRING INSTRUCTIONS:** MUST be installed by a Certified Electrician. Wire the CAS unit in accordance with the National Electric Code and applicable local codes. UNIT MUST BE GROUNDED. Check the ground circuit to make certain that the unit has been properly grounded. The wiring should be protected by an over-current circuit device rated at 15 amperes. CAUTION must be taken to ensure that the wiring does not come in contact with any heat source. All line voltage and control circuits between the CAS unit and the appliance MUST be wired in accordance with the National Electrical Code for Class I wiring or equivalent.

## CAS-3 Controlled by P-Sensor, 120 Volt Application



## CAS-6, CAS-7 Controlled by C-Sensor, 24 Volt Application

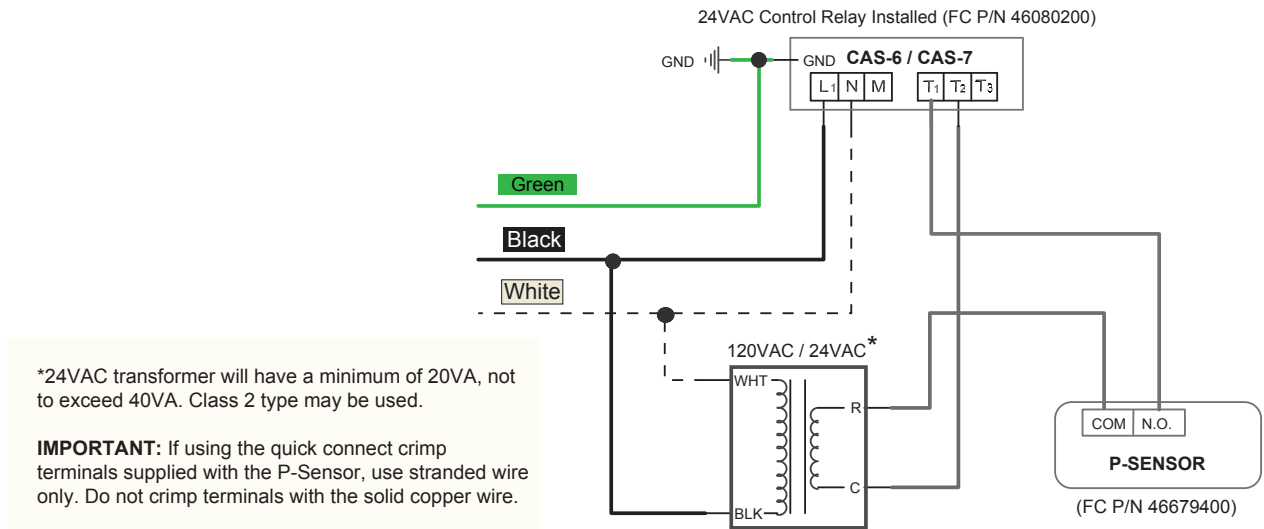


# Wiring Diagrams

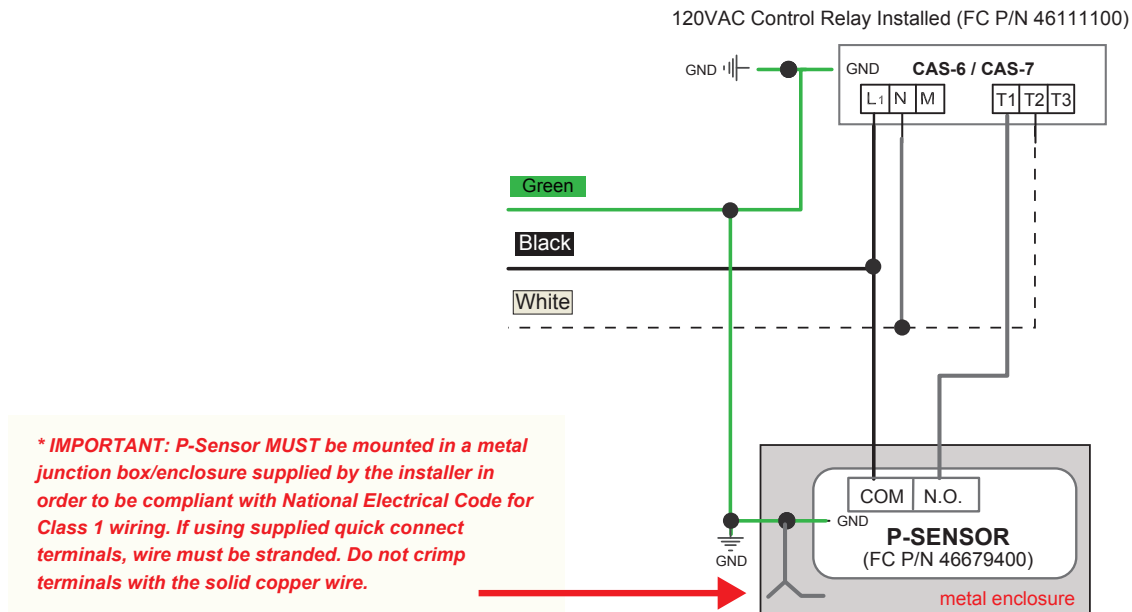
For CAS with Sensors

**WIRING INSTRUCTIONS:** MUST be installed by a Certified Electrician. Wire the CAS unit in accordance with the National Electric Code and applicable local codes. UNIT MUST BE GROUNDED. Check the ground circuit to make certain that the unit has been properly grounded. The wiring should be protected by an over-current circuit device rated at 15 amperes. CAUTION must be taken to ensure that the wiring does not come in contact with any heat source. All line voltage and control circuits between the CAS unit and the appliance MUST be wired in accordance with the National Electrical Code for Class I wiring or equivalent.

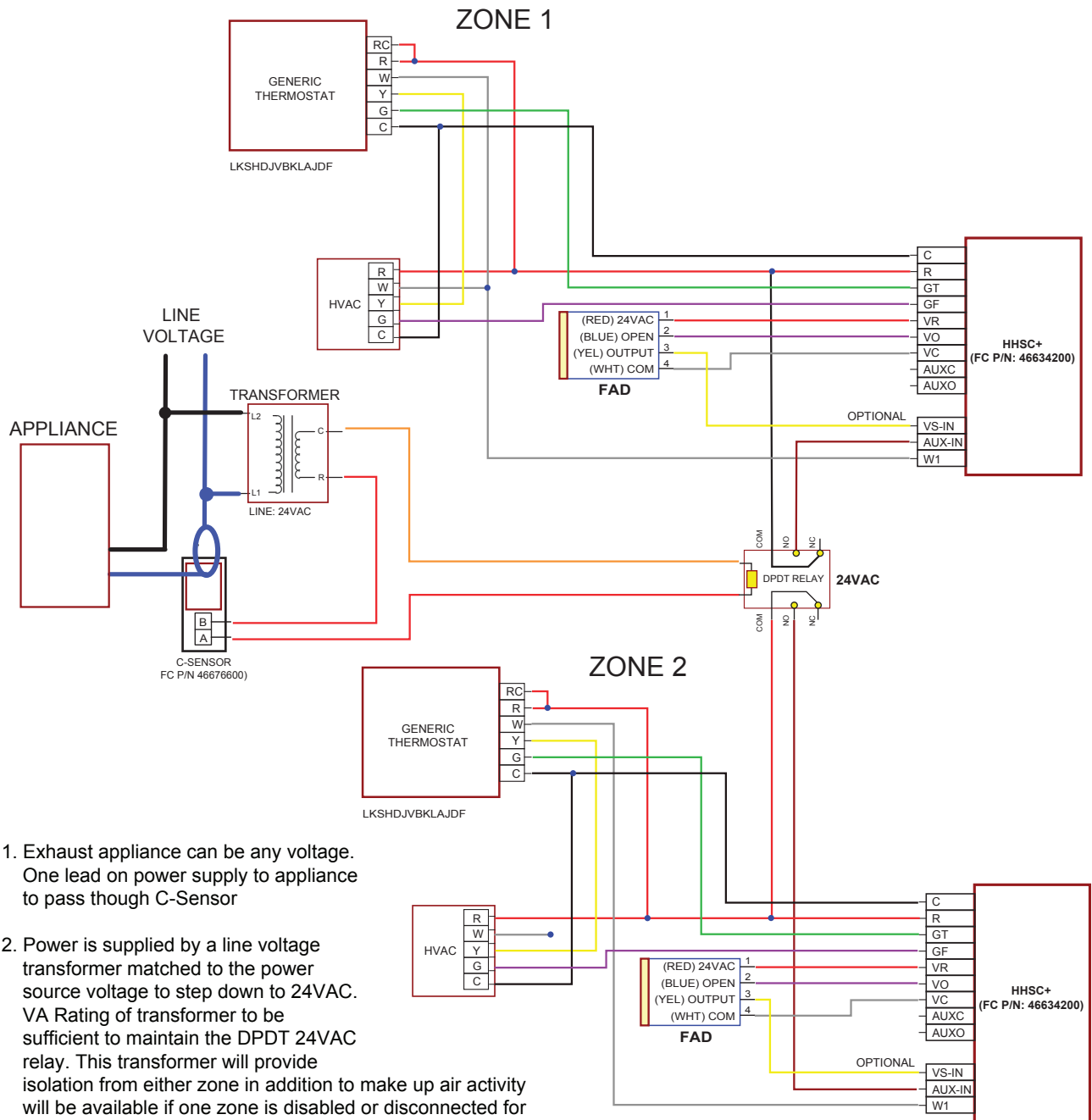
## CAS-6, CAS-7 Controlled by P-Sensor, 24 Volt Application



## CAS-6, CAS-7 Controlled by P-Sensor, 120 Volt Application



## Dual Zone Ventilation Control for Make-Up air with C-Sensor

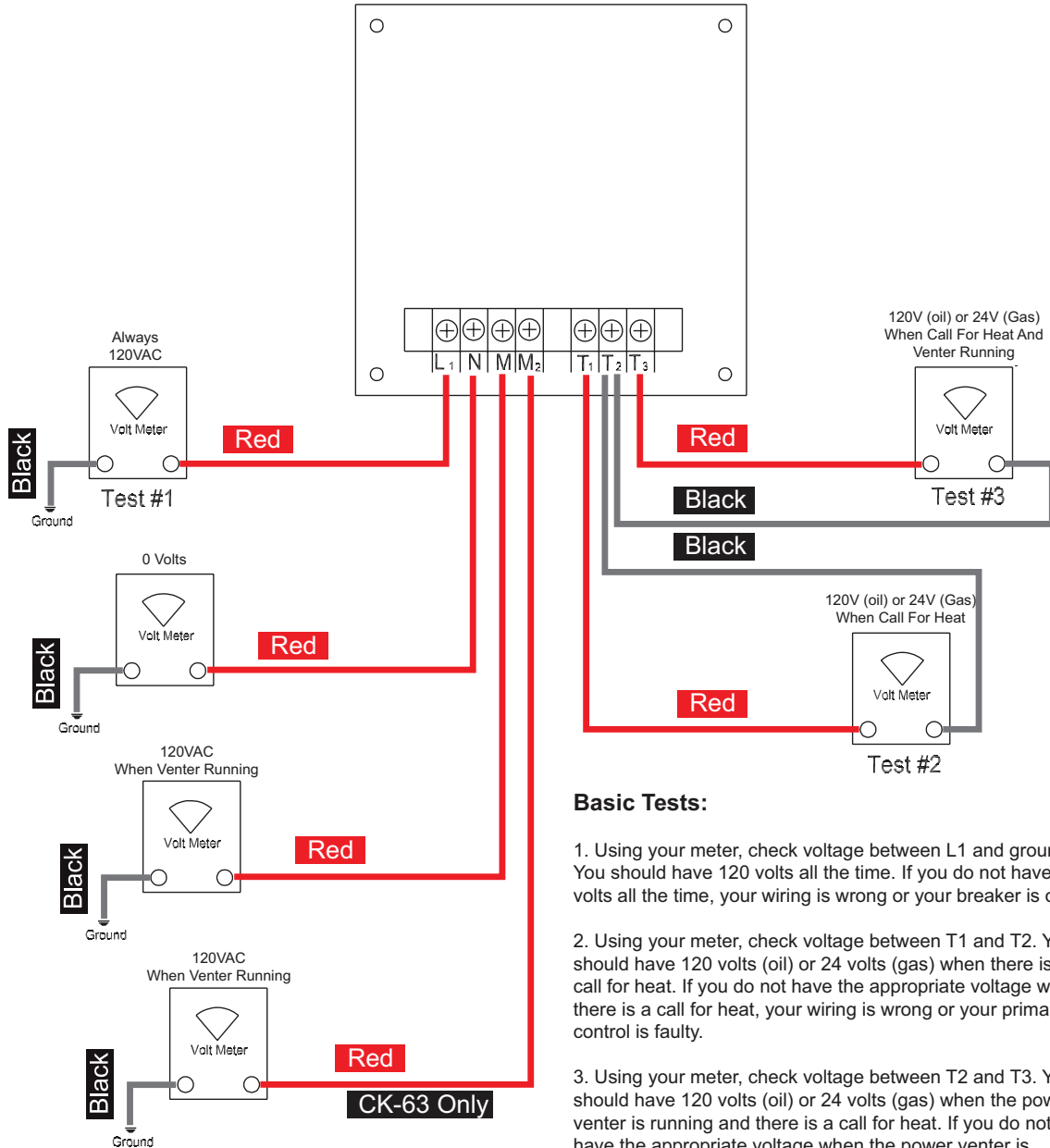


1. Exhaust appliance can be any voltage. One lead on power supply to appliance to pass through C-Sensor
2. Power is supplied by a line voltage transformer matched to the power source voltage to step down to 24VAC. VA Rating of transformer to be sufficient to maintain the DPDT 24VAC relay. This transformer will provide isolation from either zone in addition to make up air activity will be available if one zone is disabled or disconnected for service. This also aids to reduce current draw from the HVAC system if the additional relay load is to large.
3. 24VAC DPDT relay is used to maintain circuit isolation between Zone 1 and Zone 2.
4. Current from appliance will activate C-Sensor and DPDT relay. Both HHSC+ controls on each zone will be operating on remote control causing the central fan on each zone to be operating. Dampers on each zone will also be open.

# Troubleshooting

## Wiring Diagrams

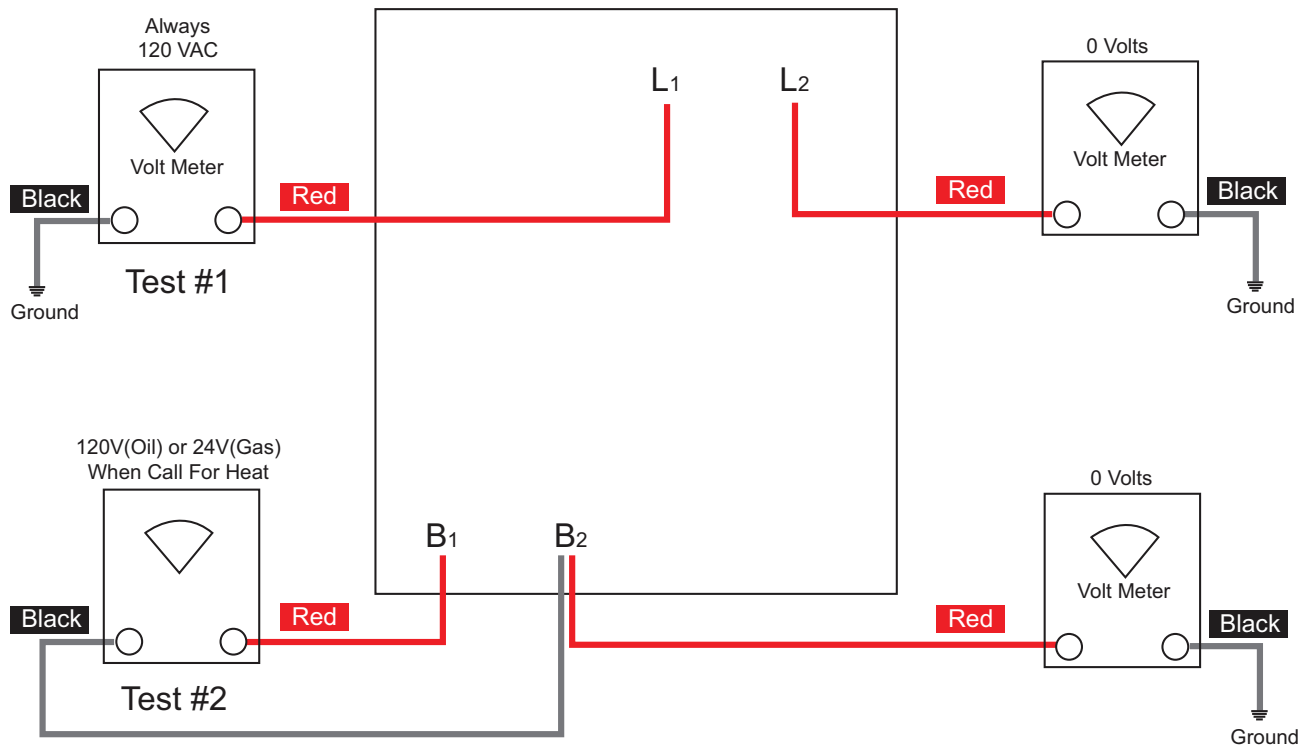
CK's, PVG, PVO, CAS



### Basic Tests:

1. Using your meter, check voltage between L1 and ground. You should have 120 volts all the time. If you do not have 120 volts all the time, your wiring is wrong or your breaker is off.
2. Using your meter, check voltage between T1 and T2. You should have 120 volts (oil) or 24 volts (gas) when there is a call for heat. If you do not have the appropriate voltage when there is a call for heat, your wiring is wrong or your primary control is faulty.
3. Using your meter, check voltage between T2 and T3. You should have 120 volts (oil) or 24 volts (gas) when the power venter is running and there is a call for heat. If you do not have the appropriate voltage when the power venter is running and there is a call for heat, the pressure switch is not closing or is defective: perform the pressure switch adjustment procedure; if the switch will not close, check the sensing tube and tube connections.

### Aquastat Relay Checkout



1. Using your meter, check voltage between L1 and ground. You should have 120 volts all the time. If you do not have 120 volts all the time, the wiring is wrong or your breaker is off.
2. Using your meter, check voltage between B1 and B2. You should have 120 volts (oil) or 24V (gas) when there is a call for heat. If you do not have 120 volts (oil) or 24V (gas) when there is a call for heat, you have a bad aquastat or thermostat.

# Troubleshooting

## Gas Water Heaters

### Troubleshooting pilot flame outages with power-vented residential (*millivolt thermocouple-controlled*) gas-fired water heater applications

#### Typical Installation Description:

Field Controls SWG or PV series power venter, CAS-series motorized combustion air system, or DI-series draft inducer, controlled by a CK-20FV control kit mounted on a millivolt controlled gas-fired water heater.

#### Description of Proper Operation:

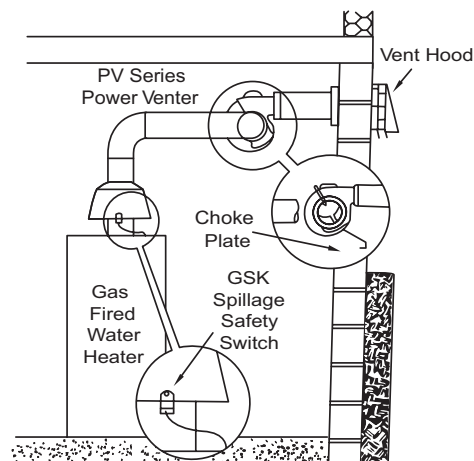
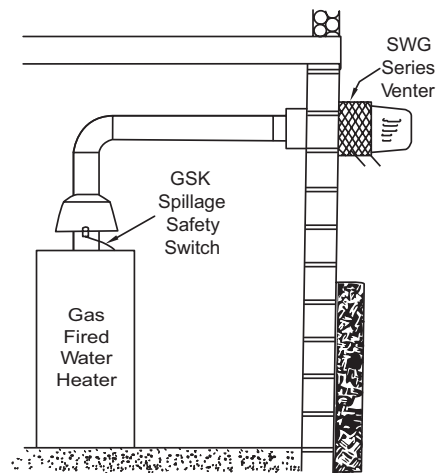
##### Venting/Combustion Air Equipment Motor Operation:

The venting/combustion air equipment motor is controlled directly by the CK-20FV gas pressure switch, which senses gas pressure in the main burner when firing.

##### Safety Circuit Operation:

Two GSK-3 exhaust gas spillage switches (mounted on the water heater draft hood), one six foot length of 12 gauge wire and jumper wire, and one TCA-1 thermocouple adapter block (all included in the control kit) are installed as a safety circuit to prevent gas flow if exhaust gas spillage around the draft hood occurs. When heated by the pilot flame, the thermocouple generates a millivolt electrical current that is routed through the GSK-3 safety circuit to the gas valve. If spillage is detected, this millivolt current is interrupted by the GSK-3 spillage switches and results in shutdown of the gas valve, whereupon the pilot and main burner flame are extinguished.

#### Diagnosis and Correction of Improper Operation Resulting in Pilot Outages:



#### Causes of Pilot Flame Outage:

- Exhaust gas spillage, due to:
  - Inadequate venting
  - Slow response of gas pressure switch
  - Excessive downdrafts (vertical venting or wind loads (sidewall venting)
  - Depressurization of surrounding area
- Excessive electrical resistance of the GSK safety circuit
- Inadequate thermocouple output



**CAUTION:** If for any reason the system has shut down during operation, the cause of the system failure should be investigated and corrected before restarting the system!

### 1. Check GSK spill switches to see if one or both have tripped:

- **Using an ohmmeter/multimeter or continuity tester:** check continuity through the safety switches by removing the two wires from the TCA thermocouple adapter, and connecting the leads to the ends of the wires. Discontinuity will indicate that either or both switches have tripped, or faulty wiring.
- **Without ohmmeter or continuity tester:** Remove the metal covers from the switches and attempt to reset the switches by pushing the reset button in the center of the switch. If either switch has tripped, an audible click will usually be produced when the reset button is pushed inward.

#### Corrective Action:

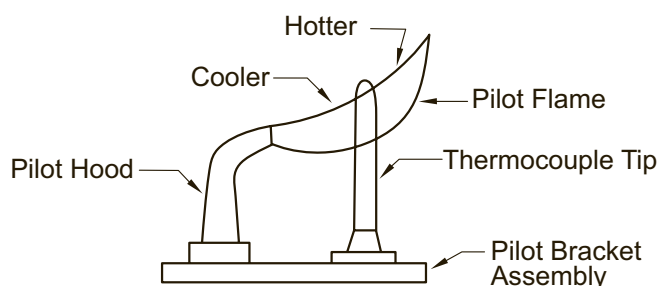
**CAUTION:** If either or both switches have tripped, the venting system must be thoroughly inspected for proper venting operation.

- Check for exhaust gas spillage around the draft hood when the venting/combustion air equipment and water heater are operating, and at the time the venter shuts off. If spillage occurs

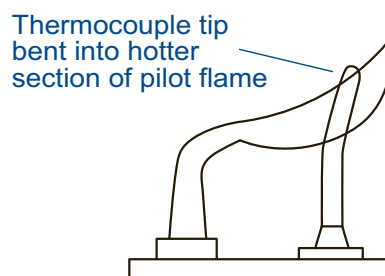
during operation, adjust the air flow damper on the venter (or air flow adjustment plate on the draft inducer) to increase the draft provided.

- **If spillage occurs when the venter shuts off, negative pressure exists in the building.** Negative pressure problems can be corrected by providing make-up air and/or combustion air.
- **Check for exhaust gas spillage around the draft hood when the main burner ignites:** the gas pressure switch may be responding too slowly due to damage or blockage of the ports. If the venting/combustion air equipment motor is not activated by the gas pressure switch within 15-30 seconds (or as otherwise specified in the CK-kit installation instructions), temporary spillage may be sufficient to trip the GSK spill switches. Inspect the gas pressure switch, and check the main burner manifold pressure and verify that it is within manufacturer's specification. Replace the pressure switch or gas valve as necessary.

Figure 2: Thermocouple Tip Location



**Original**  
Pilot/Thermocouple Orientation



**Modified**  
Pilot/Thermocouple Orientation

# Troubleshooting

## Gas Water Heaters

### 2. If the GSK-3 switches have not tripped:

- Inspect the GSK-3 and 12 gauge wire safety circuit for loose or dirty electrical connections. Clean and tighten all connections of corrosion or other contaminants, and apply dielectric grease as necessary to prevent corrosion.
- Check the GSK-3 and 12 gauge wire safety circuit for excessive electrical resistance using an ohmmeter/multimeter by removing the two wires from the TCA thermocouple adapter, and connecting the test leads to the ends of the wires and across each individual component of the circuit. All parts of the circuit should indicate near zero ohms resistance when measured with a multimeter. Any parts that have a high resistance are defective and should be replaced.
- Check the thermocouple for sufficient output: Refer to Figures 3 and 4 for technique description. Millivolt output should be between 8 and 14 millivolts when measured as shown in Figure 3, and between 17 and 25 millivolts when measured as shown in Figure 4.
- If thermocouple output is within or above the stated ranges, there may be a problem with the gas supply of the gas valve. Check gas supply pressure and gas valve operation.
- If thermocouple output is below the stated ranges: relocating the thermocouple tip as illustrated in Figures 2 and 8 increases the heat impingement on the thermocouple tip, which results in an increase in the millivolt output. Application of the technique can result in an increase in millivolt output from a range of 8 to 11.5 millivolts to a range of 17 to 20 millivolts, as measured as shown in Figure 4.

Figure 3: Closed Circuit Voltage GSK-3 Switches Included

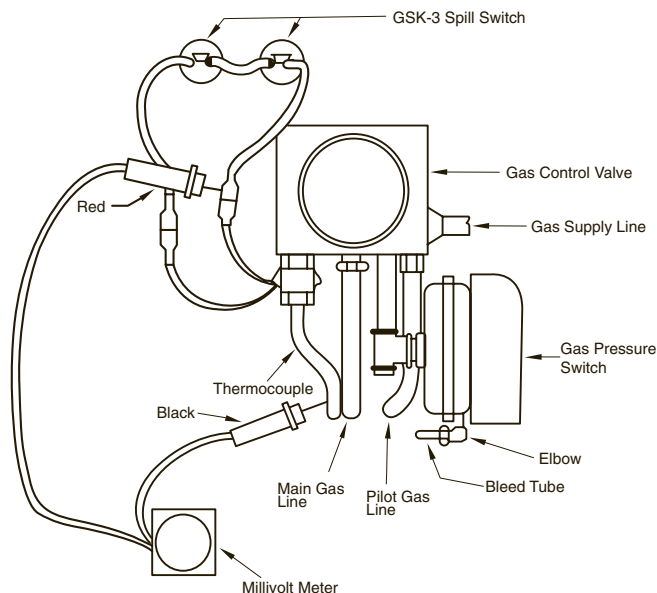
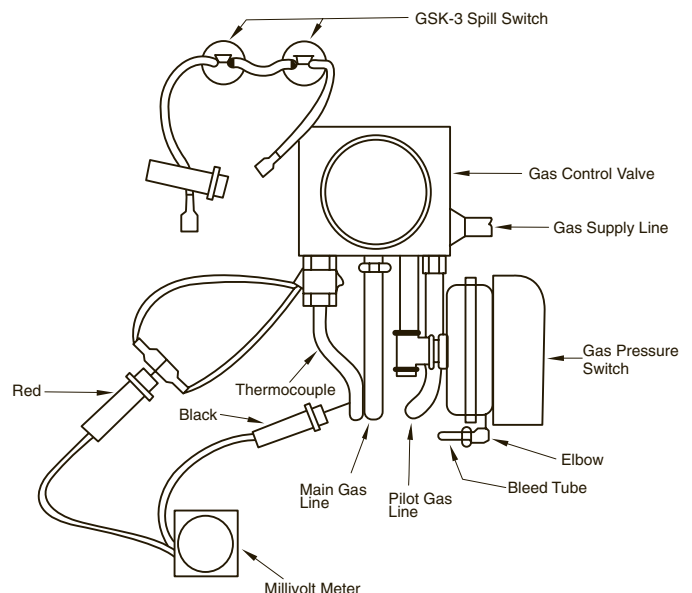


Figure 4: Closed Circuit Voltage GSK-3 Switches NOT Included



- If relocation of the thermocouple is unsuccessful, replacement of the thermocouple or thermocouple assembly may be necessary.

**NOTE:** Only copper thermocouples should be used. In addition, the length of the thermocouple tip can vary. Thermocouples with a 2 ½" tip should be used.

**NOTE:** The thermocouple should be screwed only finger tight plus one turn into the TCA-1. Damage to the TCA-1 will occur if the thermocouple is over tightened.

- Check hole depths in gas valve and TCA adapter thermocouple fitting for proper fit of the TCA adapter into the gas valve, and of the thermocouple into the TCA. In both cases, the tip of the mating male part must make firm and solid contact with the center of the mating female part when installed.

Figure 5: Unmodified Thermocouple

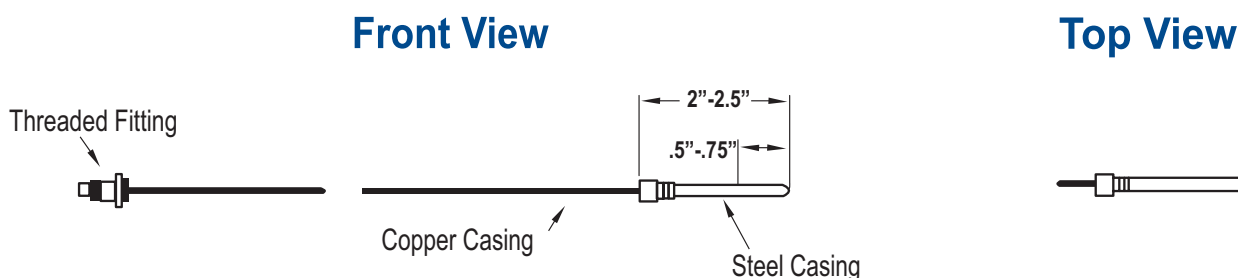
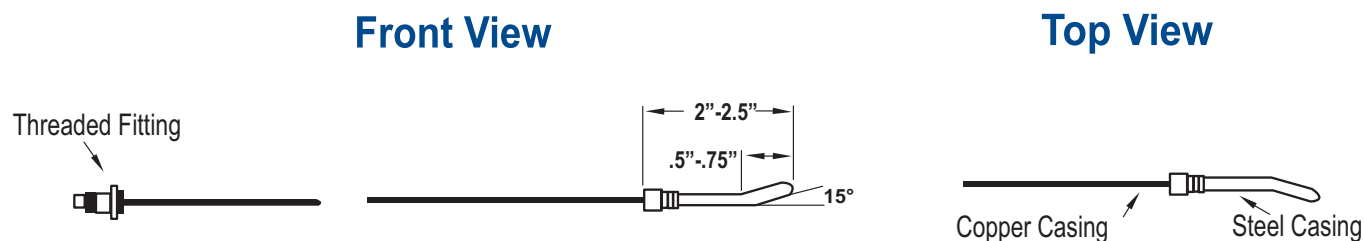


Figure 6: Modified Thermocouple



# Troubleshooting

Gas Water Heaters

Figure 7: Unmodified Thermocouple Orientation

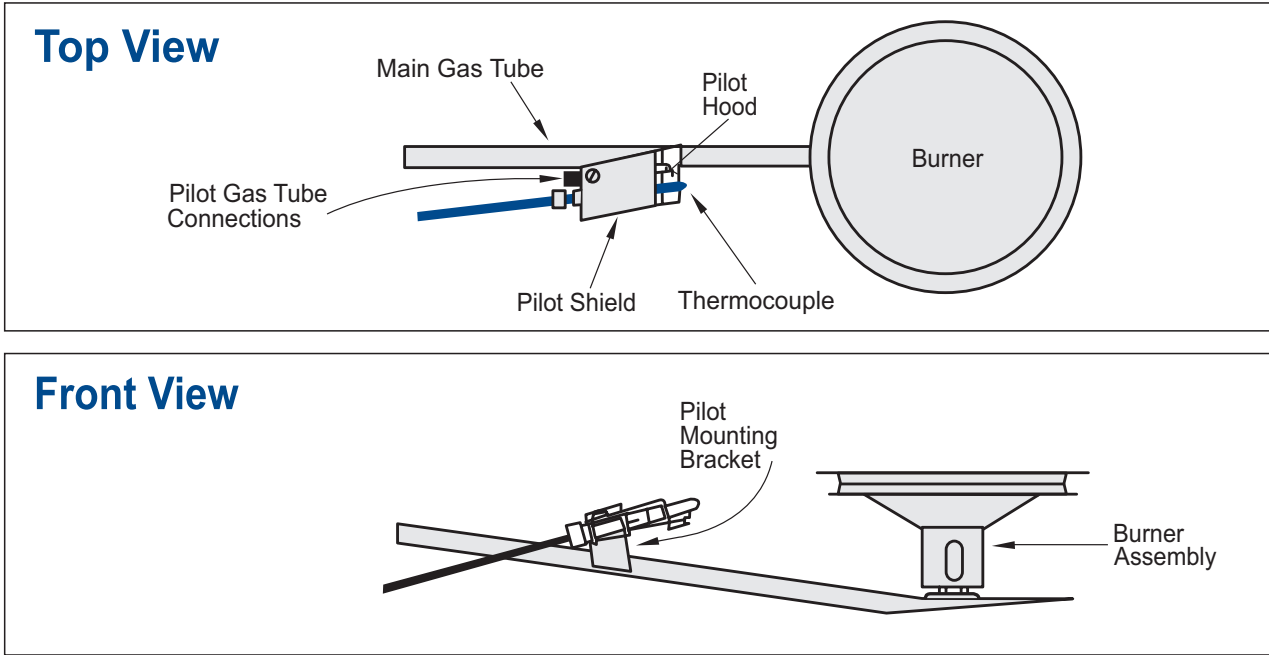
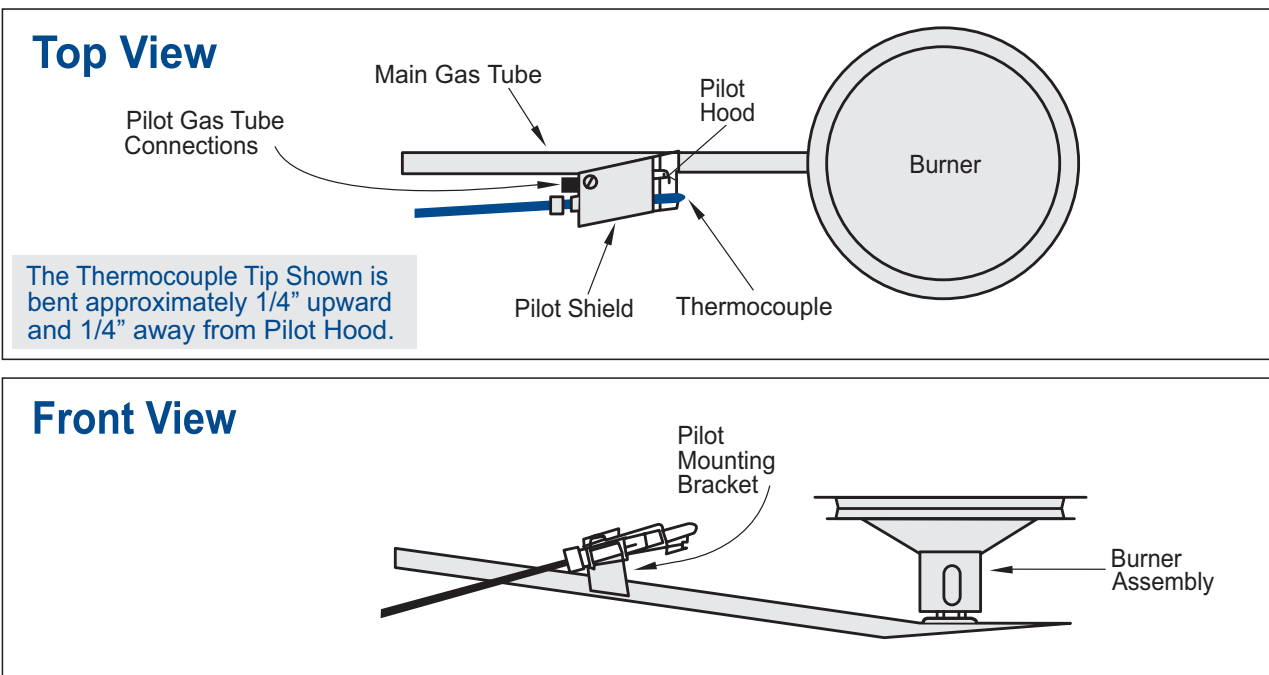


Figure 8: Modified Thermocouple Orientation



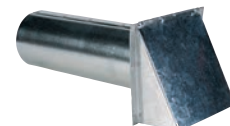
Troubleshooting

CAS SERIES COMBUSTION AIR SYSTEMS		
MODEL	DESCRIPTION	PART NO.
CAS-2B	VRV-4	46257100
	IAH-4 Intake Air Hood	46292000
CAS-2C	VRV-4	46257100
	IAH-4 Intake Air Hood	46292000
CAS-2W	VRV-4	46257100
	IAH-4 Intake Air Hood	46292000
CAS-2B90E	VRV-4	46257100
CAS-2C90E	IAH-4 Intake Air Hood	46292000
CAS-2BB*	IAH-6 Intake Air Hood	46293000
CAS-2B 375*		
CAS-2CB*		
CAS-3	IAH-4 Intake Air Hood	46292000
	Air Pressure Switch	46273100
	Motorized Fan	46274100
	120 VAC Relay For CAS-3	46257300
CAS-34	IAH-4 Intake Air Hood	46292000
	Air Pressure Switch	46273100
CAS-4P	Motorized Fan	46274100
	24 VAC Relay For CAS-4	46161400
	ADA-1	46473300
CAS-4Jr.	IAH-4 Intake Air Hood	46252600
	Air Pressure Switch	46525700
	Fan Blade	46528500
	24 VAC Relay For CAS-4Jr	46161400
	Motor	46070100
CAS-4TMR	ADA-1	46473300
	Motorized Fan	46274100
	Relay, Timer Interval	510800100
	Air Pressure Switch, Pressure Fixed	511100200
CAS-4mV	IAH-4 Intake Air Hood	46292000
	Air Pressure Switch	46158500
	Motorized Fan	46274100
	24 VAC Relay	46161400
CAS-6	Air Pressure Switch	46363500
	Blower Wheel	46363600
	Motor	46363400
	24 Volt SPDT Relay (RJR-5)	46080200
	120 Volt SPDT Relay (RJR-6)	46111100
CAS-7	Air Pressure Switch	46363500
	Blower Wheel	46363700
	Motor	46363400
	24 Volt SPDT Relay (RJR-5)	46080200
	120 Volt SPDT Relay (RJR-6)	46111100

VRV



IAH-4 Intake Air Hood



Air Pressure Switch



Motorized Fan



24 VAC Relay For CAS



Motor



ADA-1



Fan Blade



24 or 120 Volt SPDT Relay



\*Products are discontinued but replacement parts are available.

# Replacement Parts

VENTING

COMBOVENT/ SWG SERIES POWER VENTER		
MODEL	DESCRIPTION	PART NO.
SWG-3	Replacement Motor Assembly	46196601
	Blower Wheel	46131800
SWG-4	Replacement Motor Assembly	46131501
	Blower Wheel	46131800
SWG-4 HD 4HDS CV-4 CV-4VR	Universal Replacement Motor Assembly	46234800
	Blower Wheel, Stainless	46310400
	Motor Enclosure	46451601
	Motor Enclosure, Stainless	46526401
SWG-5 5S CV-5 CV-5VR	Universal Replacement Motor Assembly	46234900
	Blower Wheel, Stainless	46213800
	Motor Enclosure	46451602
	Motor Enclosure, Stainless	46526402
SWG-6 6S	Universal Replacement Motor Assembly	46235000
	Blower Wheel, Stainless	46385800
	Motor Enclosure	46451603
	Motor Enclosure, Stainless	46526403
SWG-8	Replacement Motor Assembly	46160101
	Blower Wheel	46154800
SWG-10	Replacement Motor Assembly	46414101
	Blower Wheel	46413501
SWG-12	Replacement Motor Assembly	46414102
	Blower Wheel	46413502



PV SERIES POWER VENTER		
MODEL	DESCRIPTION	PART NO.
PVE-1200	Replacement Motor	46226500
	Blower Wheel	46124000
PVG-100	Replacement Motor	46032000
	Blower Wheel	46080100
	Pressure Switch	46282900
	Timer Fixed Post Purge	46282800
PVG-300	Replacement Motor	46032000
	Blower Wheel	46033400
	Pressure Switch	46246100
	Timer Fixed Post Purge	46282800
PVG-600	Replacement Motor	46083300
	Blower Wheel	46089400
	Pressure Switch	46283000
	Timer Fixed Post Purge	46282800
PVO-300	Replacement Motor	46032000
	Blower Wheel	46033400
	Pressure Switch	46311000
	Post Purge Relay Timer	46144700
PVO-600	Replacement Motor	46083300
	Blower Wheel	46089400
	Pressure Switch	46311000
	Post Purge Relay Timer	46144700
PVU-300	Pressure Switch	46513200
	Circuit Board	46399200

Replacement Motor



Blower Wheel



PVO-  
Pressure  
Switch



PVG-  
Pressure  
Switch



Timer Fixed  
Post Purge



PVU-  
Pressure  
Switch



Circuit Board



Post Purge  
Relay Timer



# Replacement Parts

VENTING

## MODEL RJR-5, RJR-6

MODEL	DESCRIPTION	PART NO.
RJR-5	24 Volt SPDT Relay	46080200
RJR-6	120 Volt SPDT Relay	46111100

24 or 120 Volt  
SPDT Relay



## MODEL CK-20FV MILLIVOLT GAS-FIRED WATER HEATER CONTROL KIT

MODEL	DESCRIPTION	PART NO.
CK-20FV	Fan Control Gas Pressure Switch	46506800
	GSK-3 Spillage Switch Kit	46086400
	TCA-1 Thermocouple Adapter (FV model)	46082700

Fan Control  
Gas Pressure  
Switch



GSK-3 Spillage  
Switch Kit



## MODEL CK-21 MILLIVOLT INSTANTANEOUS GAS-FIRED WATER HEATER CONTROL KIT

MODEL	DESCRIPTION	PART NO.
CK-21	Fan Control Gas Pressure Switch	46506800
	SSK-3 Spillage Switch Kit	46111503

TCA-1  
Thermocouple  
Adapter  
(FV model)



SSK-3 Spillage  
Switch Kit



## MODEL CAC-24 AND CAC-120 COMBUSTION AIR CONTROLLER

MODEL	DESCRIPTION	PART NO.
CAC-24 CAC-120	Pressure Switch	46273100
CAC-24	RJR-5 24 Volt Relay Kit (CAC-24)	46080200
CAC-120	RJR-6 120 Volt Relay Kit (CAC-120)	46111100

Pressure Switch



Timer Fixed  
Post Purge



## MODEL CK-41F and CK-41P GAS-FIRED CONTROL KIT WITH FIXED POST PURGE

MODEL	DESCRIPTION	PART NO.
CK-41F CK-41P	Pressure Switch	46273100
	Timer Fixed Post Purge	46282800
	GSK-3 Spillage Switch	46086400
CK-41P	Wiring Harness for CK-41P only	46457200

Wiring Harness  
for CK-41P





## MODEL CK-43 24 VAC GAS-FIRED CONTROL KIT

MODEL	DESCRIPTION	PART NO.
CK-43	Pressure Switch	46273100
	4" MG1 Draft Control	46198901
	Post Purge Relay Timer	46144700

Pressure Switch



4" MG1 Draft Control



Timer Fixed Post Purge



## MODEL CK-43F 24 VAC GAS-FIRED CONTROL KIT

MODEL	DESCRIPTION	PART NO.
CK-43F	Pressure Switch	46273100
	4" MG1 Draft Control	46198901
	Timer Fixed Post Purge	46282800

## MODEL CK-61 120 VAC OIL-FIRED CONTROL KIT WITH ELECTRONIC POST PURGE

MODEL	DESCRIPTION	PART NO.
CK-61	Pressure Switch	46273100
	WMO-1 Secondary Safety Switch	46086900
	RJR-6 120V Relay Kit	46111100
	Post Purge Relay Timer	46144700

WMO-1 Secondary Safety Switch



RJR-6 120V Relay Kit



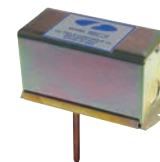
## MODEL CK-62 120 VAC OIL-FIRED CONTROL KIT

MODEL	DESCRIPTION	PART NO.
CK-62	Pressure Switch	46273100
	WMO-1 Secondary Safety Switch	46086900
	PPC-4 Post Purge	46094100

Post Purge Relay Timer



PPC-4 Post Purge



## MODEL CK-63

MODEL	DESCRIPTION	PART NO.
CK-63	Pressure Switch	46273100
	WMO-1 Secondary Safety Switch	46086900
	Circuit Board Assembly	46399200

Circuit Board Assembly



# Replacement Parts

VENTING

## CK-81 OPERATED OFF A 24-VOLT CIRCUIT

MODEL	DESCRIPTION	PART NO.
CK-81	Pressure Switch with Gold Contacts	46158500
	24 Volt Relay	46161400
	Timer Fixed Post Purge	46282800

Pressure Switch with Gold Contacts



24 Volt Relay



Timer Fixed Post Purge



## MODEL CK-91FV, GAS-FIRED APPLIANCE and WATER HEATER COMBINATION KIT

MODEL	DESCRIPTION	PART NO.
CK-91FV	Timer Fixed Post Purge	46282800
	Pressure Switch	46273100
	Gas Pressure Switch W/PP Opt.	46506800
	GSK-3 Spillage Switch Kit	46086400
	4" MG1 Draft Control	46198901

Pressure Switch



Gas Pressure Switch W/PP Opt.



GSK-3 Spillage Switch Kit



4" MG1 Draft Control



Wiring Harness only used with P series



## MODEL CK-92FV, CK-92 FVP GAS-FIRED APPLIANCE and WATER HEATER COMBINATION KIT

MODEL	DESCRIPTION	PART NO.
CK-92FV CK-92 FVP	Timer Fixed Post Purge	46282800
	Pressure Switch	46273100
	Gas Pressure Switch W/PP Opt.	46506800
	GSK-3 Spillage Switch Kit	46086400
	4" MG1 Draft Control	46198901
	Wiring Harness only used with P series	46457200

Note: All of these parts are not in all of the Control Kits listed.

## GVD VENT DAMPER MOTOR

MODEL	DESCRIPTION	PART NO.
GVD	Motor Assembly Plastic Base	46491600

Motor Assembly  
Plastic Base



## OVD VENT DAMPER MOTOR

MODEL	DESCRIPTION	PART NO.
OVD	Motor Assembly Aluminum Base	46564000

## GVD UNIVERSAL WIRING KIT

MODEL	APPLICATION	PART NO.	
FC-4/6	Bryant	Moncrief	46579100
	Buderus	Payne	
	Burnham	Raypack	
	Carrier	Triple Aquastat with plug	
	Day & Night	Utica	
	Fraser-Johnson	Vaillant	
	Honeywell ignition module	Weil-McLain	
	Lennox	Whirlpool with Penn G-60 & G-65 ignition plug	
	Luxaire	York	
FC-Loch	Lochinvar	46579100	
PP-5	American Standard	46579100	
	Slant Fin		
	Trane		
QP-4	Teledyne Laars	46579100	
VP-6	H B Smith	46579100	

GVD Universal  
Wiring Kit



# Replacement Parts

DRAFT

## TYPE C DRAFT INDUCERS MOTOR and FAN BLADE

MODEL	DESCRIPTION	PART NO.
6" TYPE C	Motor	04047100
	Fan Blade	03896200
8" TYPE C	Motor	04047100
	Fan Blade	03898700
10" TYPE C	Motor	46067500
	Fan Blade	46306200
13" TYPE C	Motor	46067500
	Fan Blade	04314000

Type C  
DI Motor



Fan Blade



Speed  
Control



DI Motor



Fan Blade  
Assembly



Fan  
Proving  
Switch



24 or 120 Volt  
SPDT Relay



## TYPE C SPEED CONTROL

MODEL	DESCRIPTION	PART NO.
6" & 8" TYPE C	Speed Control 6" & 8"	04325108
10" & 13" TYPE C	Speed Control 10" & 13"	04325113

## DI DRAFT INDUCERS

MODEL	DESCRIPTION	PART NO.
DI-1	Motor	46070100
	Fan Blade Assembly	46073700
DI-2	Motor	46070200
	Fan Blade Assembly	46075000
DI-3	Motor	46124300
	Fan Blade Assembly	46090600
DI-4	Motor	46120300
	Fan Blade Assembly	46553201
DI-5	Motor	46120300
	Fan Blade Assembly	46553202

## ACCESSORIES FOR DRAFT INDUCERS and CONTROL KITS

MODEL	DESCRIPTION	PART NO.
DIP-1	Fan Proving Switch	46089800
RJR-5	24 Volt SPDT Relay	46080200
RJR-6	120 Volt SPDT Relay	46111100

# Replacement Parts

FSDG- FLUE SENTINEL DAMPER

FSDG- FLUE SENTINEL DAMPER GAS		
MODEL	DESCRIPTION	PART NO.
FSDG-8	FSDG-8 Motor	46668800
	FSDG-8 Blower Wheel	46665601
FSDG-12	FSDG-12 Motor	46668800
	FSDG-12 Blower Wheel	46669702
FSDG-8	FSGC - Draft Inducer/fan dual voltage controller	FSP-RC-DG
FSDG-12	Pressure Switch	46525700
FSDG-8 FSDG-12	SVC Part - Electronic Ignition System (Does not include gang box & wiring)	FSP-EI
	SVC Part - Electronic Ignition Kit	FSP-EIK
	SVC Part - Fan Controller, FSM	FSP-RC-MV
	SVC Part - Controller, FSE	FSP-RC-24
	SVC Part - Controller, FSE (Low Profile)	FSP-RCL-24
	SVC Part - Controller, FSM (Low Profile)	FSP-RCL-MV
	Type C- Speed Control 6" & 8"	04325108
	Type C- Speed Control 10" & 13"	04325113
	Combustion Air Kit- 4"	CAU-4
	Combustion Air Kit - 6"	CAU-6
	Battery, D-Cell	0241-00
	Termination Cap - 8"	FSP-TC8
	Termination Cap - 10"	FSP-TC10
	Termination Cap - 12"	FSP-TC12
	Termination Cap - 14"	FSP-TC14
	Wiring Harness High Temperature Universal 25ft (continuous temps to 1000° F)	FSP-HHT25
	Wiring Harness High Temperature Universal 30ft (continuous temps to 1000° F)	FSP-HHT30
	Wiring Harness High Temperature Universal 35ft (continuous temps to 1000° F)	FSP-HHT35
	Wiring Harness High Temperature Universal 40ft (continuous temps to 1000° F)	FSP-HHT40
	Wiring Harness High Temperature Universal 45ft (continuous temps to 1000° F)	FSP-HHT45
	Wiring Harness High Temperature Universal 50ft (continuous temps to 1000° F)	FSP-HHT50
	Wiring Harness High Temperature Universal 60ft (continuous temps to 1000° F)	FSP-HHT60
	SVC Part - Harness, FSM - 55ft	FSP-MH
	SVC Part - Harness, FSE - 6ft	FSP-24H
	Wiring Harness, FSE - 50ft	FSP-24H50

FSDG-8/12  
Motor



FSDG-8/12  
Blower Wheel



FSGC - Draft  
Inducer/fan dual  
voltage controller



Pressure  
Switch



Electronic  
Ignition Kit



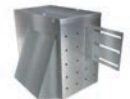
Fan Controller



Type C-  
Speed Control



Combustion  
Air Kit



Battery



Termination Cap



Wiring Harness



Wiring Harness  
FSM/FSE



Parts

# Replacement Parts

## STEAM HUMIDIFIERS

STEAM HUMIDIFIERS			
Model Part No.		DESCRIPTION	PART NO.
S2000	S2020		
2120	—	120 Volt Heater Assembly	094021A0201
—	2240	240 Volt Heater Assembly	094021A0202
2001	2001	24 Volt Solenoid Valve Assembly	094021A0203
2002	2002	Thermistor Probe Assembly	094021A0205
2003	2003	Water Level Probe Assembly	094021A0204
2010	—	120V Circuit Board Assembly	094021A0206
—	2011	200V Circuit Board Assembly	094021A0207
2006	2006	Drain Valve Assembly	094021A0208
2007	2007	Tank Baffle	094021A0209
2008	2008	Insulation Kit	094021A0210
WH-100	WH-100	Water Hammer Arrestor <i>Used to eliminate pipe noise.</i>	090478A0001
Z-100	Anode	Replacement sacrificial anode. Lasts one full season.	090421A0211
2009	2009	Under Duct Tank Enclosure	090421A0156
APD	APD	Air Proving Device <i>Proves air flow before engaging heating element. A split core current sensing relay will monitor the on/off status of any blower motor. Insures humidifier only operates when your fan is functioning.</i>	090558A0001
WC-25	WC-25	Steam Treatment Water Filter Cartridge <i>Helps reduce mineral build up. Lasts for one heating season.</i>	094021A1122
IDB	IDB	Internal Duct Bracket <i>Permanent mounting bracket makes servicing quicker and easier.</i>	094021A2040
UDB	UDB	Under Duct Permanent Mounting Bracket <i>Makes servicing quicker and easier.</i>	094021A2041
46645200	46645200	Bimetallic Thermal Cutoff <i>Electrical safety device that interrupts electric current in case of overload. Opens at a high temperature and re-closes when the temperature drops.</i>	46617003 46617001 (prior to 7/2015)
072000	Humidistat Control	Humidistat Control <i>Automatic Humidistat adjusts the indoor Relative Humidity (RH)% based on the outdoor temperature. Wall mount or duct mount. Can be used in Automatic or Manual mode for RH setting. Outdoor air sensor included.</i>	094021A0001
DHS	DHS	Drain Hose Kit	094024A0001





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## Residential Ventilation Guide

Our full line of ventilation products offer controlled and balanced ventilation solutions for every home application. Included in the guide are models, specifications, and wiring diagrams for products ranging from ventilation controls and HRVs and ERVs, to Fresh Air Systems, whole house fans, and more. This guide provides home builders and HVAC contractors with reliable, practical, and proven ventilation solutions that meet code and satisfy homeowners' expectations for comfort, safety, and energy efficiency.

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