

# COMBUSTION AIR SYSTEM

MODEL: CAS-4JR



This product is designed for use with any natural gas or LP burning furnace, water heater, or boiler with a 24 VAC control system. It may be used with a residential water heater with additional hardware. It may also be used with more than one appliance. The CAS unit mechanically draws air into a structure and disperses it near the combustion air intake of an appliance. Refer to Diagram A and Table 1 for guidance in setting up the CAS system based on the size and length of the connecting ductwork and the input rating of the appliance.

#### ITEMS INCLUDED IN KIT:

- 1- CAS fan unit
- 1- 4" galvanized intake Air Vent Hood
- 2- Mounting brackets to secure the CAS to a wall
- 2- Wire/conduit connector(s)
- 1- Instruction Sheet

#### READ THESE INSTRUCTIONS CAREFULLY AND COMPLETELY BEFORE PROCEEDING WITH THE INSTALLATION.

This device MUST be installed by a qualified agency in accordance with the manufacturer's installation instructions. The definition of a qualified agency is: any individual, firm, corporation or company which either in person or through a representative is engaged in, and is responsible for, the installation and operation of HVAC appliances, who is experienced in such work, familiar with all the precautions required, and has complied with all the requirements of the authority having jurisdiction.

Please retain these instructions after installation.

Installed By: \_\_\_\_\_ Phone: \_\_\_\_\_ Installation Date: \_\_\_\_\_



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## GENERAL SYSTEM OPERATION

1. The thermostat (wall thermostat, or Aquastat) calls for heat and energizes a relay which activates the CAS unit. After the CAS fan has come up to speed, an internal air pressure switch closes and completes the circuit to allow the burner to fire. If the appliance is power vented, the venter and CAS activate simultaneously. After the CAS comes up to speed, a pressure switch in the unit closes and allows the appliance to fire.
2. After the heating requirement has been satisfied, the thermostat circuit will open and deactivate the burner and CAS unit.
3. For power vented systems with a post purge device, the power venter and CAS operate for a period of time after the burner has shut off to purge remaining flue gases from the vent system.

## INSTALLATION SAFETY INSTRUCTIONS

CAUTION: This device must be installed by a qualified installer in accordance with the manufacturer's installation instructions.

1. This combustion air system must be installed by a qualified installer. "Qualified Installer" shall mean an individual who has been properly trained or a licensed installer.
2. Plan the system layout before installation to avoid the possibility of accidental contact with concealed wiring or plumbing inside walls.
3. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.

## SIZING AND SETUP

Diagram A shows the maximum equivalent length and size of duct pipe that should be used when installing the CAS system. Using the chart will help ensure that the proper amount of air is drawn into the structure as needed by the appliance. The defined regions shown correspond to the CAS airflow characteristics when using 4" and 6" diameter sheet metal duct pipe. Follow the guidelines below to properly size and set up the CAS.

1. Determine the maximum input firing rate of the appliance, or the maximum total combined input firing rate of multiple appliances that will be used.
2. On Diagram A, locate the point that corresponds to the maximum total combined input firing rate along the horizontal axis.
3. Draw a vertical line through the point on the horizontal axis.
4. Draw a horizontal line through the point where the vertical line intersects the 4" duct pipe curve.
5. The horizontal line will intersect the vertical axis of the graph at the maximum allowable equivalent length of 4" duct pipe, for the given firing rate.
6. Position the motorized CAS unit according to the guidelines in the "Installation" section.
7. Determine where the intake air vent hood will be located based on the recommendations in the "Installation" section.
8. Calculate the total equivalent length of duct pipe including elbows and fittings needed to connect the CAS unit to the vent hood. DO NOT add any equivalent length for the intake hood; the hood effect is figured into the graph.
9. Using Table 1, verify that the calculated total equivalent length of pipe does not exceed the maximum length of 4" pipe as found in Step 5. If so, repeat Step 5, drawing a horizontal line where the vertical line drawn intersects the next larger size duct pipe curve and verify from steps 6-8 that the total equivalent length does not exceed that as found in Step 5 for the larger size duct pipe.
10. EXAMPLE: A gas fired appliance firing at 100,000 BTU/hr where the CAS unit needs to be placed 30 equivalent feet from the intake hood.

Table 1

TOTAL INPUT OF APPLIANCE (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

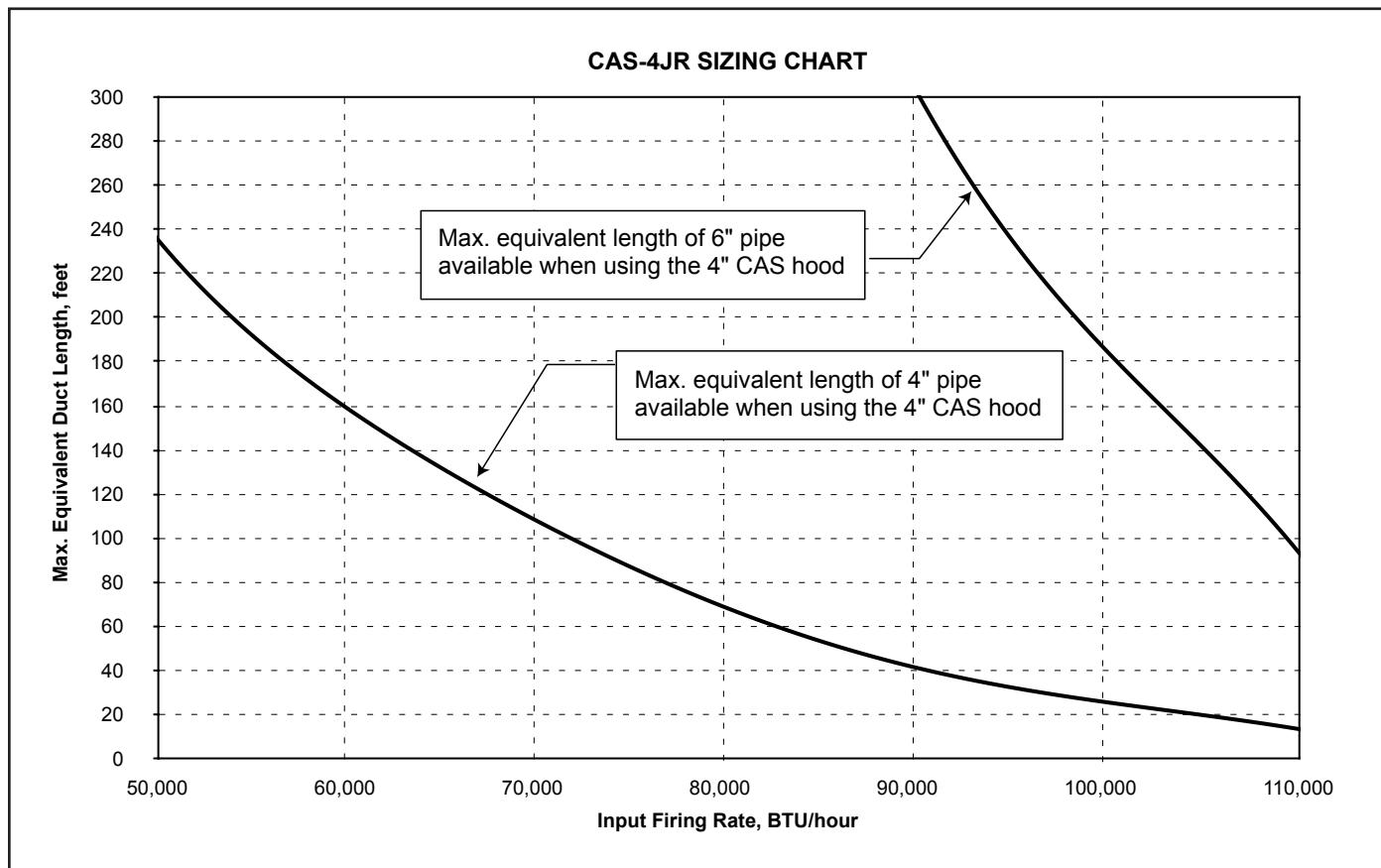


Diagram A

## INSTALLATION

### PLACEMENT OF THE CAS UNIT

The motorized CAS unit should be located on a flat horizontal surface within the same space as the appliance and within 3' of the combustion air intake. Two mounting brackets are provided for securing the unit against a solid structure, such as a wall, column, or the side of the appliance itself. Use the included screws to attach the brackets to the CAS housing as shown in Figure 1. Secure the brackets to a solid structure with appropriate fasteners. It is not required to use the brackets as long as the unit is located so that it may not be bumped, moved, or tipped over.

### INTAKE AIR HOOD LOCATION

The 4" galvanized vent hood should be located on an outside wall maintaining minimum clearances to other intake and exhaust vents in accordance with the National Fuel Gas Code, ANSI Z223.1, manufacturer's recommendations and/or local codes which are applicable.

The hood should be located at least 10' from a power vented exhaust outlet and should be on the same wall. The intake air hood should be a minimum of 1' above grade or snow lines where applicable.

### INSTALLATION OF INTAKE AIR HOOD

After determining the location of the vent hood, cut a 4½" round or square hole in the wall. Insert the vent hood and secure with appropriate fasteners. Take precautions to avoid interference with wiring or other plumbing in the wall to be cut.

### INSTALLATION OF DUCT

Refer to Diagram A to determine what pipe is needed. Connect the duct pipe from the top of the CAS unit to the Vent Hood in the wall. The duct should be supported with appropriate mounting straps from floor joists, walls, or other solid structures. The straps should be placed so as to keep the duct work out of passageways. (See Figure 2)

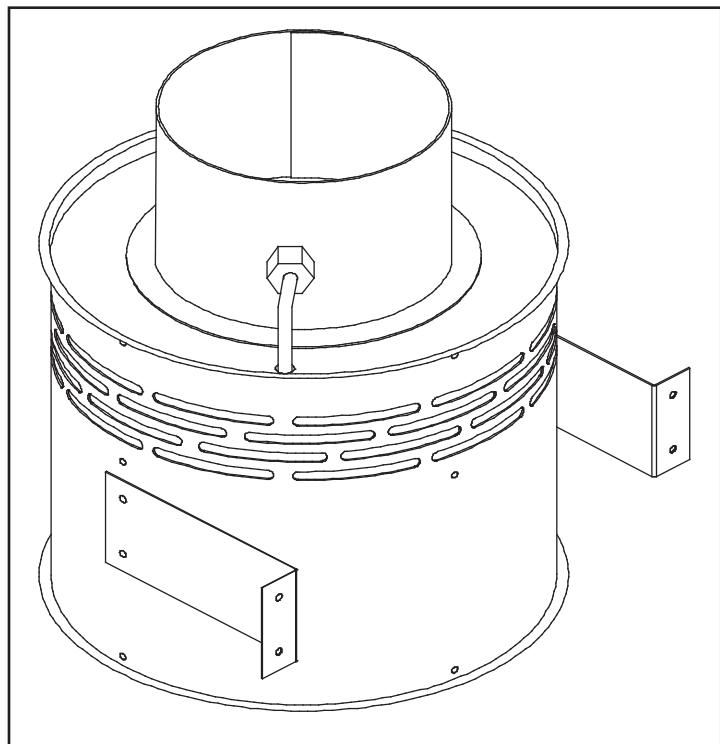


Figure 1

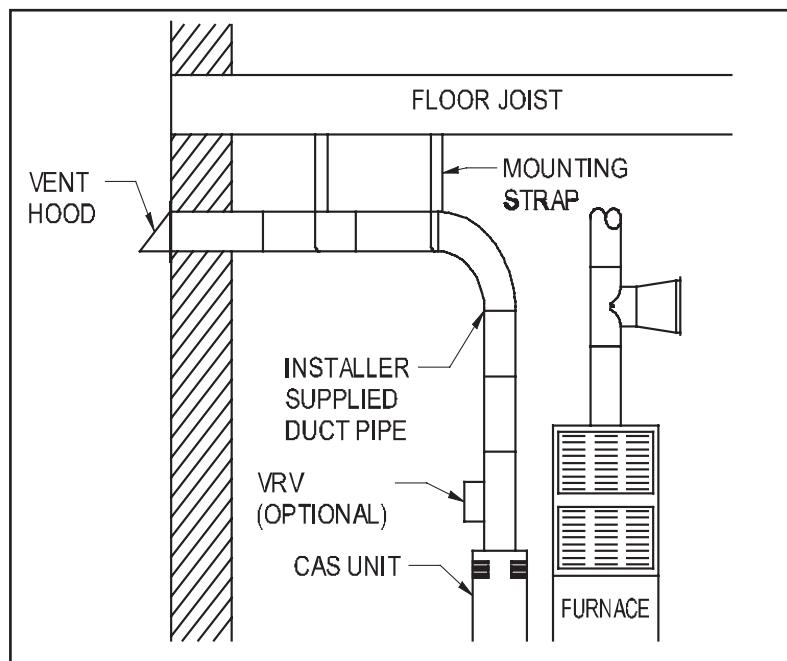
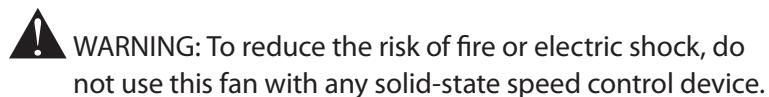


Figure 2

## WIRING INSTRUCTIONS

Wire the CAS unit in accordance with the National Electrical 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.

Remove the wiring access cover to access the wiring terminals. Use the included conduit connector(s) to route the appropriate wires through the CAS housing. The incoming ground wire must be attached to the green colored ground screw near the wire terminals. The following sections describe the most common applications. The references to various series of control kits implies that any kit in that series may be used. If further information or additional wiring diagrams are needed please consult Field Controls' technical support.



## INTERNAL WIRING CONNECTIONS FOR THE CAS UNIT

Refer to Figure 3 for the internal wiring of the CAS-4JR unit.

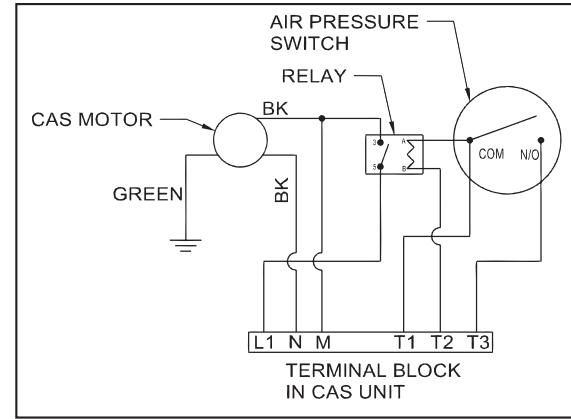


Figure 3

## EXTERNAL WIRING CONNECTIONS

Refer to Figures 4-9 for appropriate wiring method.

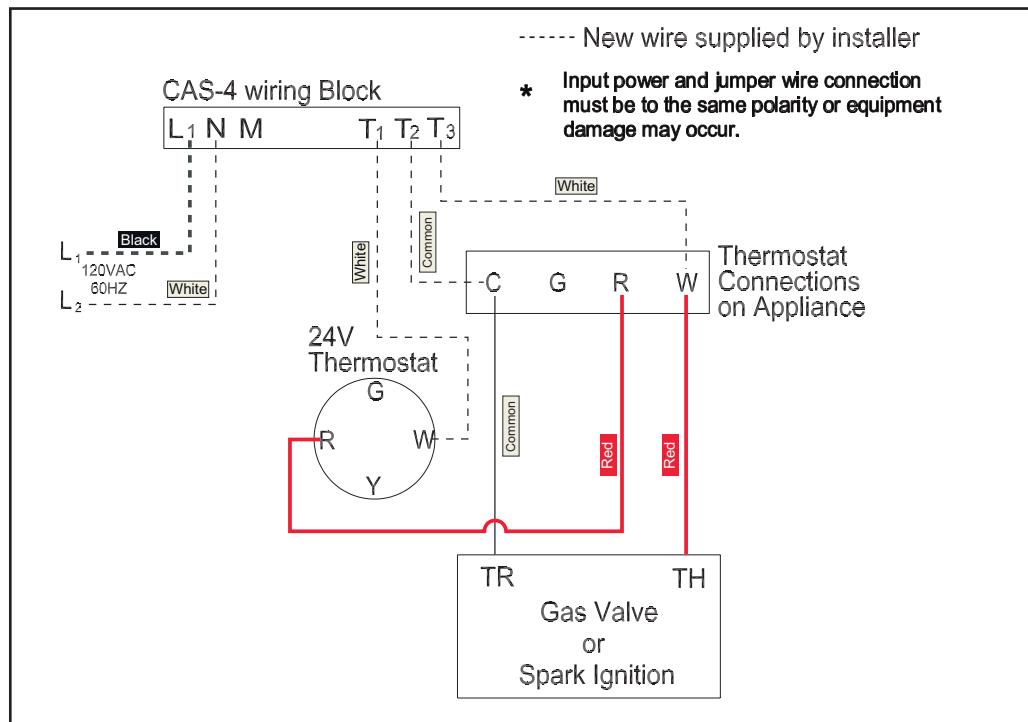


Figure 4 - Chimney Vent Single 24V Furnace

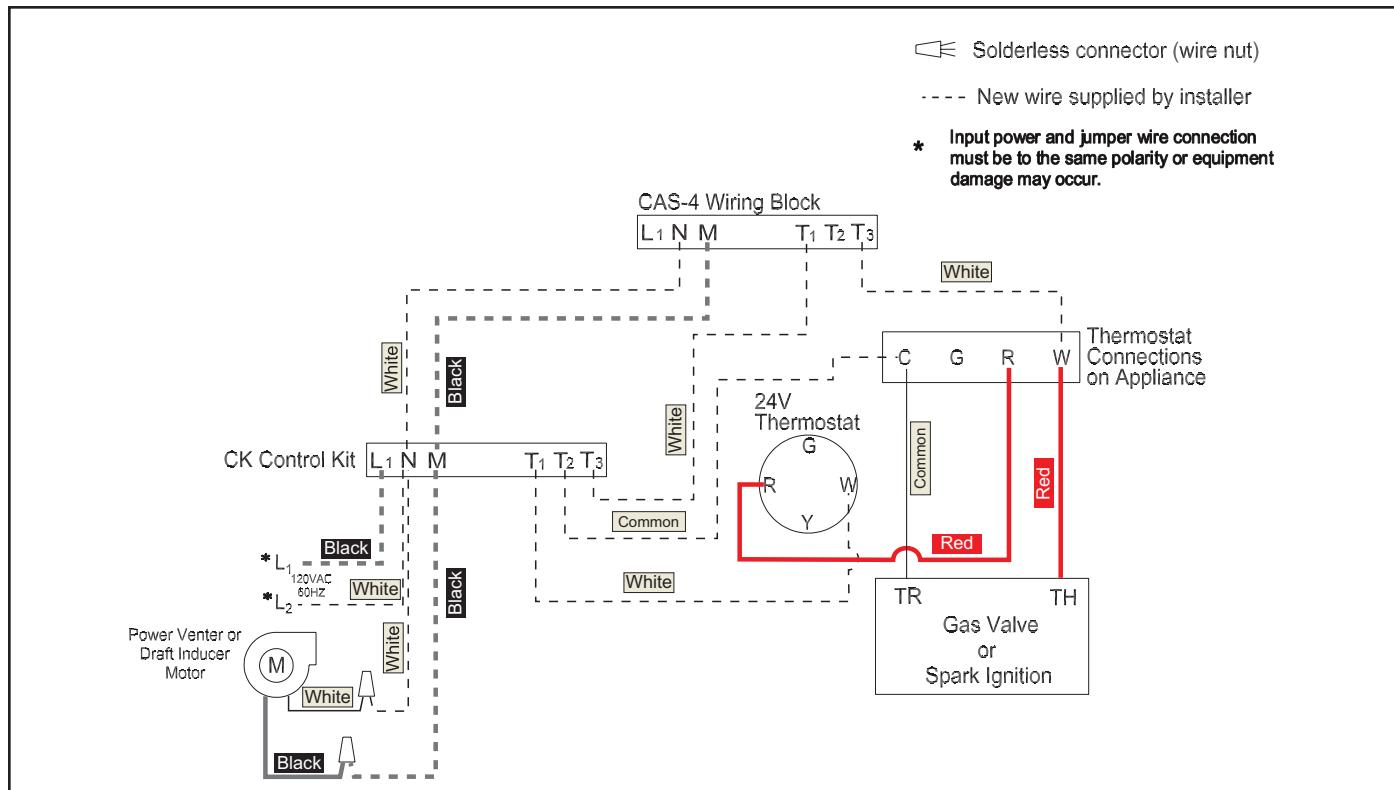


Figure 5 - Power Vent Single 24V Furnace

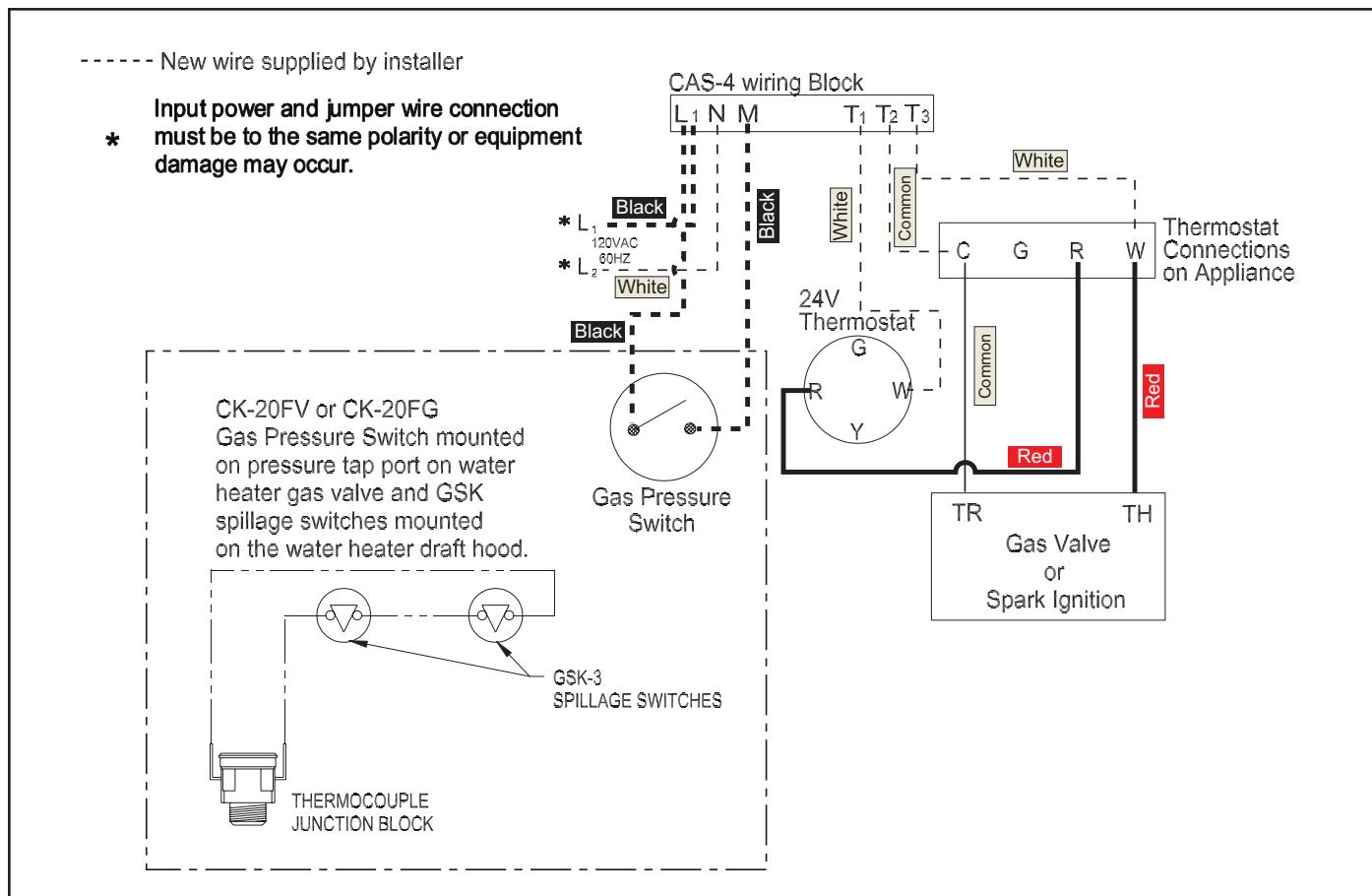


Figure 6 - Chimney Vent 24V Furnace and 30mV Water Heater with CK-20FV or CK-20FG

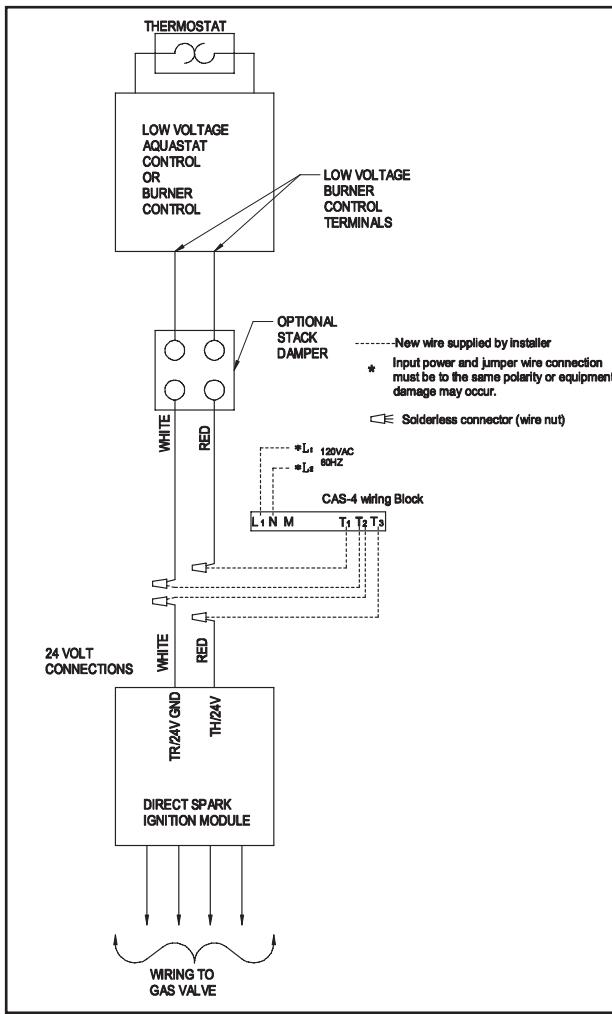


Figure 7 - Chimney Vent 24V Boiler

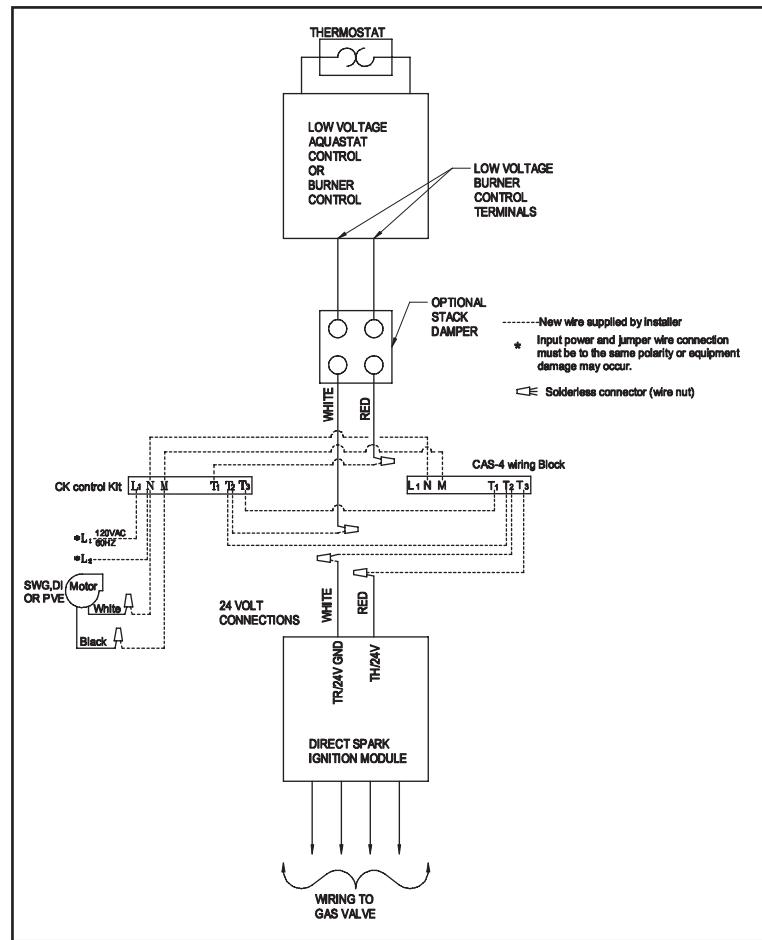


Figure 8 - Power Vent Single 24V Boiler

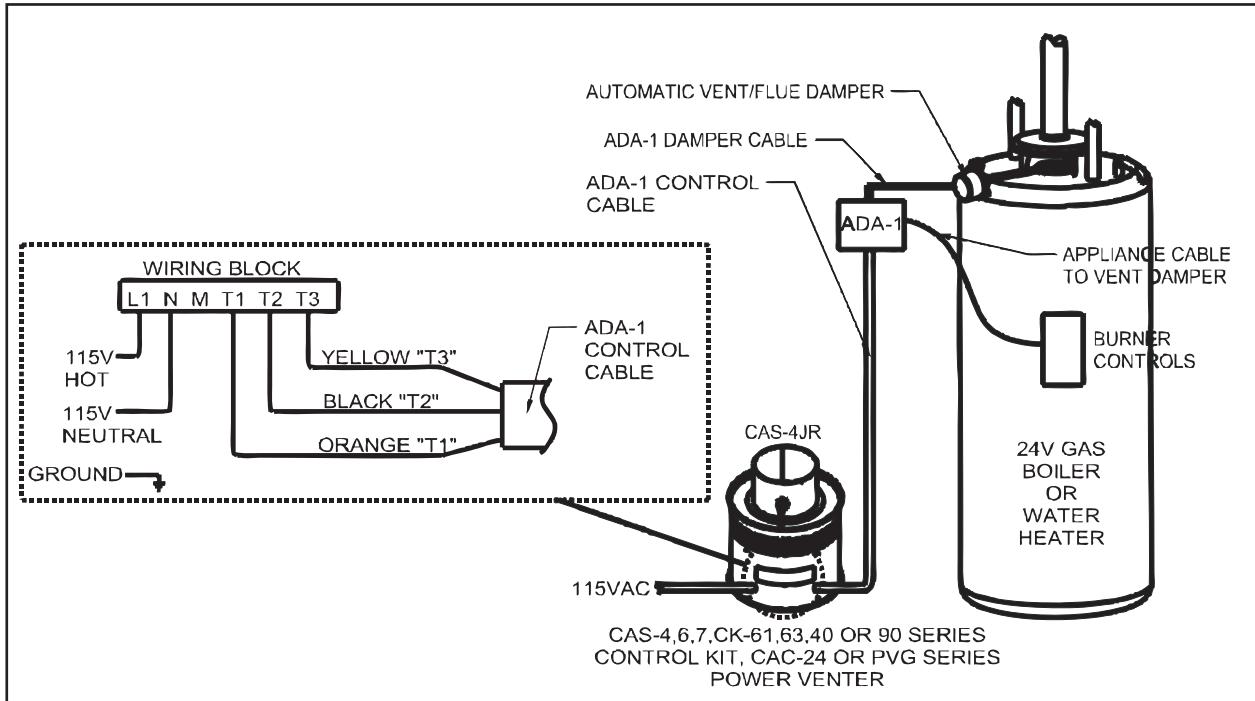


Figure 9

## MAINTENANCE

1. Inspect the system annually to ensure proper operation by observing that the fan activates when a call for heat occurs and deactivates when the call for heat is satisfied.
2. Disconnect power to the CAS unit and repeat Step 1. Note: The unit should not run and the appliance should not fire in this condition.
3. Inspect the duct pipe for cracks and security to the CAS unit and vent hood.
4. Clear any obstructions, if present, from the inlet of the vent hood and the outlet of the CAS unit.
5. Periodically, the fan blade chamber may need cleaning. First, disconnect the power supply to the CAS. Next, disconnect the duct pipe from the unit. Then remove the top pan and clean the fan housing area as needed. Reattach the top pan, reconnect the duct pipe and the power supply.

## REPLACEMENT PARTS

The following items are available for replacement, if needed. In order to replace these parts, power must be disconnected and the unit must be partially disassembled. If this is necessary, take note of the positions and locations of whatever items that may need to be removed to replace other items. If in doubt, please consult Field Controls Technical Support at 1-800-742-8368.

ITEM DESCRIPTION	FIELD PART NUMBER
Motor, DI-1	46070100
Fan Blade Assembly	46528500
Air Pressure Switch	46525700
24 VAC Relay for CAS-4	46161400
4" Intake Hood	46252600
6" Intake Hood (not included)	46233300

## Warranty

For warranty information about this or any Field Controls product, visit:  
[www.fieldcontrols.com/warranty](http://www.fieldcontrols.com/warranty)



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