

SERIES 05-21*

Silicon Carbide Ignition System

Patent No. 4,459,097

INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

Utilizing a high energy ignition source and the principals of flame rectification, the 05-21 combines an interrupted means of ignition and monitoring of main burner flame. Specifically designed for use in residential gas heating applications, the 05-21 can provide positive ignition over a wide range of air/gas mixtures.

PRINCIPLE OF OPERATION

The system utilizes a silicon carbide element that performs a dual function of ignition and flame detection. The ignitor is an electrically heated resistance element which thermally ignites the gas. The flame detector circuit utilizes flame rectification for monitoring the gas flame.

The ignitor serves two functions. Upon a call for heat, the element is powered from the 120VAC line and allowed to heat for 45 seconds (typical). Then the main valve is powered, permitting gas to flow to the burner for the trial-for-ignition period which is typically seven seconds long, although other timings are available. At the end of this period, the ignitor is switched from its heating function to that of a flame probe which checks for the presence of flame. If flame is present, the system will monitor it and hold the main valve energized. If flame is not established within the trial-for-ignition period the system will lock out, de-energizing the main valve and shutting off power to the ignitor. If, during the heating cycle a loss of flame occurs, the system will recycle through the ignition sequence.

MOUNTING

The Series 05-21 is not position sensitive and can be mounted vertically or horizontally. The case, or printed circuit board, may be mounted with #6 hardware. Integral standoffs on the bottom of the PC board provide proper electrical and thermal isolation between the board and the mounting surface.



ATTENTION: To assure safe and proper performance, read these instructions carefully before attempting to install or operate this Fenwal 05-21 Silicon Carbide Ignition System. Please retain for future reference.

INITIAL OPERATION

1. Check installation, mounting and position of ignitor in the flame envelope.
2. Apply 120VAC power to the system. Manually shut off the gas supply and apply 24VAC power to the system by advancing the thermostat.
3. Check to insure that the ignitor "glows" during the trial-for-ignition period specified for the unit. The system should lock out after the trial-for-ignition period. Set thermostat to the lowest setting.
4. Manually open the gas supply line and advance the thermostat to recycle the system.
5. Check that ignition has been accomplished within the trial period. The ignitor "glow" will diminish after the trial-for-ignition period.
6. If the system ignites but fails to hold in, check for 5 microamps minimum flame sense current using a Fenwal Test adapter, P/N 05-080223-001 and a 0-50DC moving coil microammeter per Figure 4B. Also, insure that the system is properly grounded per Figure 4A and 4B.

WIRING

CAUTION: I. Note that both 24VAC and 120VAC are required for the system. Interrupt both supplies before proceeding.
 II. Do not apply power to the module until wiring is completed and the system is properly grounded.

CABLE ASSEMBLY

Fenwal P/N 05-128070-0XX (Last two digits indicate length of wire in inches.)

Insert plastic connector onto edge of PC board as shown in Figure 1. (Connector will not fit if reversed.) Connect leads as shown in Figures 4A and 4B.

CAUTION: 120 Volts

- Black wire to hot-side 120VAC line.
- Gray wire to silicon carbide ignitor
- Blue wire to silicon carbide ignitor } Non-polarized
- White wire to neutral side of 120VAC line
- Brown wire to gas valve (24VAC)
- Red wire to 24VAC supply
- Green wire to ground (Control module, burner, and gas valve must have common ground)

NOTE: If the cable assembly is not ordered from Fenwal, component parts may be procured using Table 1 below.

CAUTION: High Voltage

TABLE I

9-pin edge connector	AMP #640136-9 with terminals #61668-1
	Molex #09-01-1091 with terminals #08-01-0101

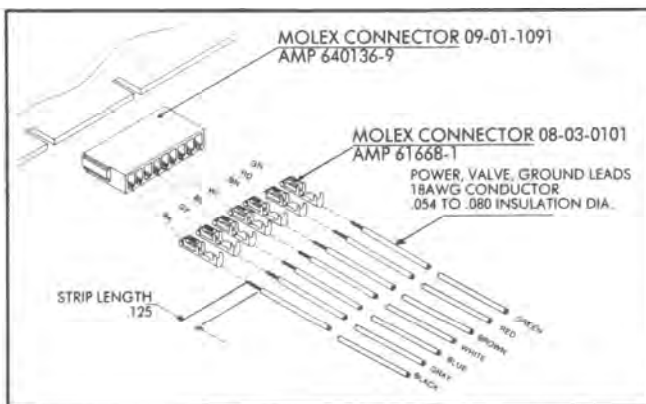


Figure 1

SILICON CARBIDE IGNITOR

Proper location of the silicon carbide ignitor is important for optimum system performance. It is recommended that the ignitor be mounted temporarily using clamps or other suitable means so that the system can be tested before permanent mounting is accomplished. The ignitor should be located so that its tip extends $\frac{3}{4}$ " thru the center of the flame and about $\frac{1}{2}$ " above the base of the flame.

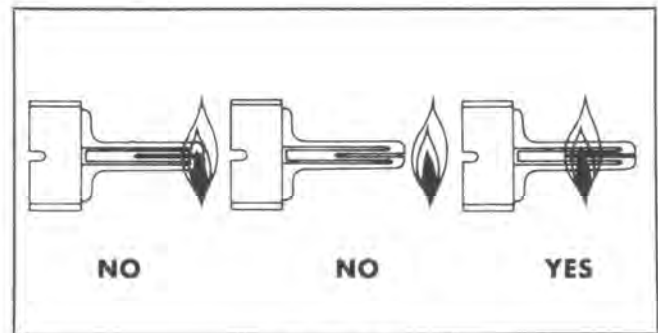


Figure 2

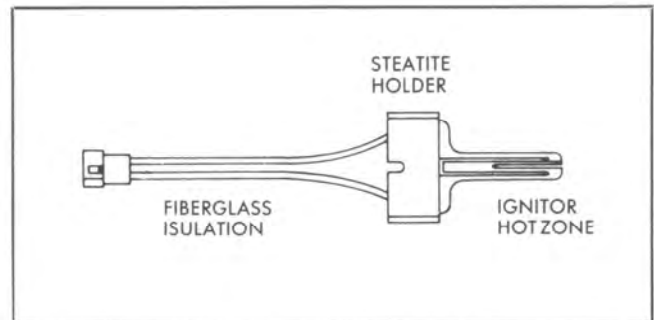


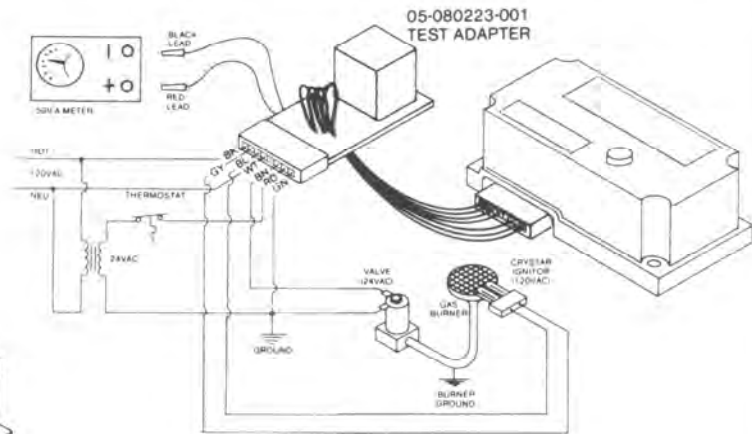
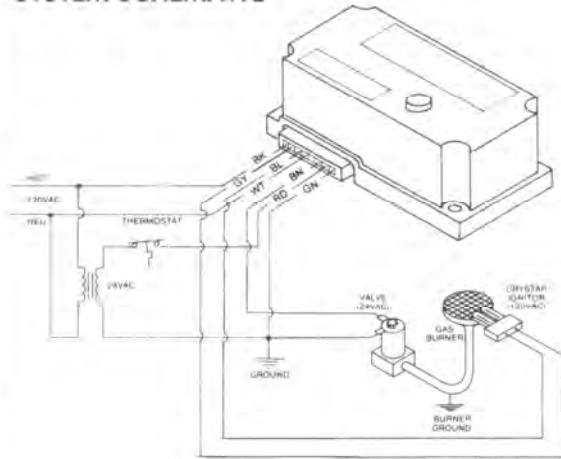
Figure 3

PRELIMINARY SYSTEM CHECKS

The system must be checked after installation and before gas supply is turned on.

Be sure that the system is electrically grounded.

**Figure 4A
SYSTEM SCHEMATIC**



**Figure 4B
SYSTEM SCHEMATIC
WITH TEST ADAPTER IN PLACE**

SAFETY CHECKS

1. Manually shut off gas supply and apply 120V power and 24VAC to the module by advancing the thermostat. After the system has locked out, check that there is no voltage across the gas valve terminals with a suitable voltmeter. Set thermostat to the lowest setting.
2. Wait 15 seconds, then manually open the gas supply and reactivate the system by advancing the thermostat to a setting above room temperature. The ignitor should glow brightly and then diminish after the flame has been established. While the system is operating, manually shut off gas supply. The gas valve solenoid will be deenergized and the ignitor should begin to glow brightly as soon as the flame is extinguished. After the 45 second warm up period the gas valve solenoid will be energized and the ignitor should continue to glow brightly for the trial-for-ignition period (system then locks out). Check that there is no voltage across the valve terminals.

SERVICE CHECKS

Flame sense current is the current that passes through the flame from the ignitor/sensor to ground to complete the primary safety circuit. The minimum flame sense current required for proper operation is five (5) microamps DC. To

measure flame current, first DISCONNECT BOTH POWER SOURCES (120VAC & 24VAC). Then connect the Fenwal Test adapter P/N 05-080223-001 as shown in Figure 4B. Meter reading should be 5 microamps or higher after reconnecting power and establishing flame.

If meter reads below "0" on scale, the meter leads are reversed. Disconnect power and reconnect leads for proper polarity.

If the flame current reading is less than 5 microamps DC, reposition the ignitor in the flame (see Figure 2) to get a higher reading.

REPAIRS

WARNING: The Fenwal Series 05-21 Silicon Carbide Ignition Module is NOT REPAIRABLE. Any modifications or repairs to Series 05-21's will invalidate Fenwal's standard warranty as well as agency certifications AND MAY CREATE HAZARDOUS CONDITIONS THAT COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY OR EVEN DEATH FROM FIRE, EXPLOSION AND/OR TOXIC GASES. Faulty units should be returned to the factory for repair or replacement.

Figure 4A
SYSTEM SCHEMATIC

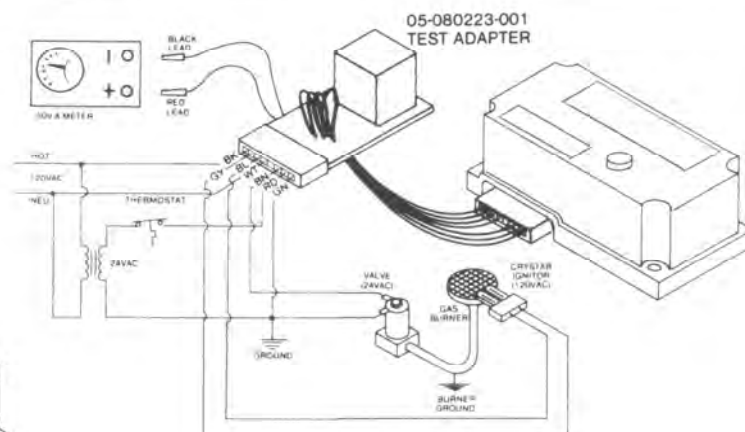
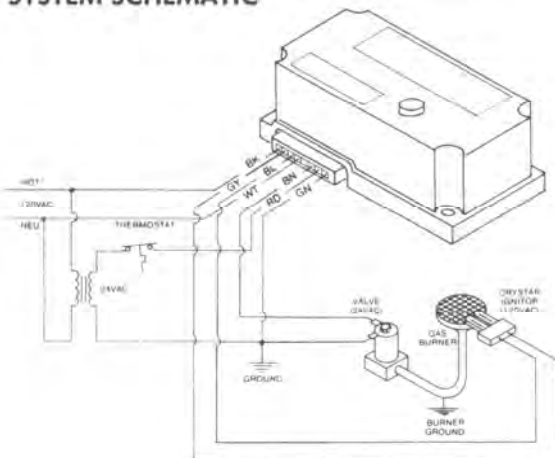


Figure 4B
SYSTEM SCHEMATIC
WITH TEST ADAPTER IN PLACE

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