DUO-THERM **SERVICE**

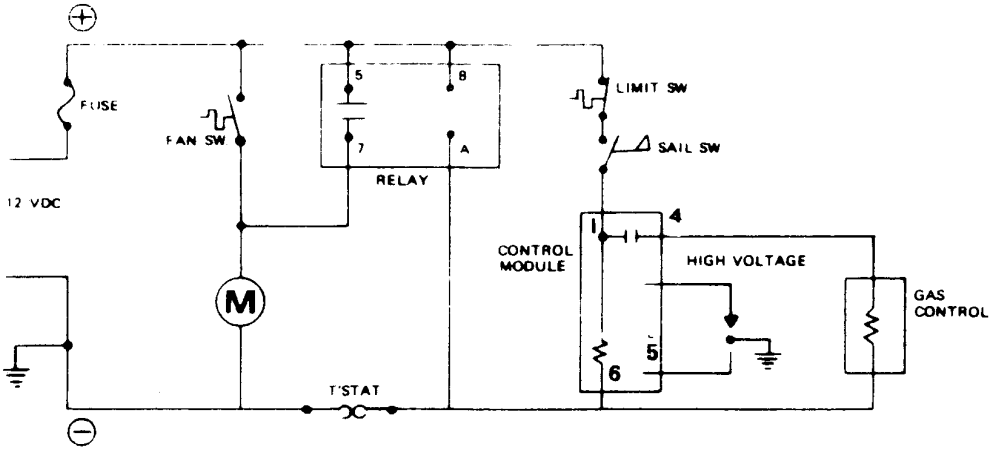
## DIRECT SPARK IGNITION SYSTEM SERVICE GUIDE:

Direct Spark Ignition Systems operate through a thermostat to provide a means of ignition for the main burner on gas-fired equipment. This is accomplished by generating a spark between high voltage electrode and ground. Once the flame is established a flame rod monitors the main burner flame.

SEQUENCE OF OPERATION: On a call for heat, voltage is applied to the ignitor across Terminals 1 (power) and 6 (ground) of the input connector. A high voltage spark is then generated from the spark electrode to ground. Simultaneously, the gas valve is energized.

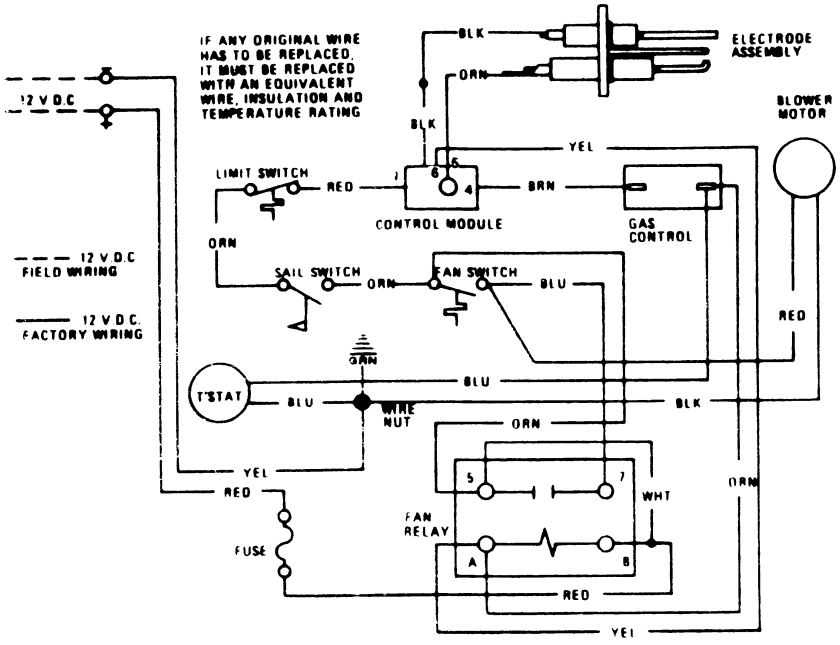
At the start of each heat cycle, there is a "Trial for Ignition Period" of three to ten seconds duration depending upon the model ignitor used. Normally, main burner flame will be established before the end of this period. Once the flame is established, sparking will cease and the "flame rod" will provide flame monitoring for the remainder of the heat cycle. If the flame is extinguished during this cycle, the ignitor will start sparking automatically in an attempt to re-establish the flame. If this does not occur within the "Trial for Ignition Period" the system will go into lockout, closing the gas valve.

**WIRING SCHEMATIC** **12 VDC**



WIRING DIAGRAM 12 VDC

DIRECT SPARK IGNITION




Preliminary checks: (1) Input polarity. If a spark is present and the gas valve opens for the flame establishing period but then locks out at the end of three to ten seconds, check the input voltage at Terminals 1 and 6 for the proper polarity. Terminal 1 should be "hot"; 12VDC (05-15) with respect to ground. Terminal 6 is neutral, or zero voltage, with respect to ground. (See Figure 1).

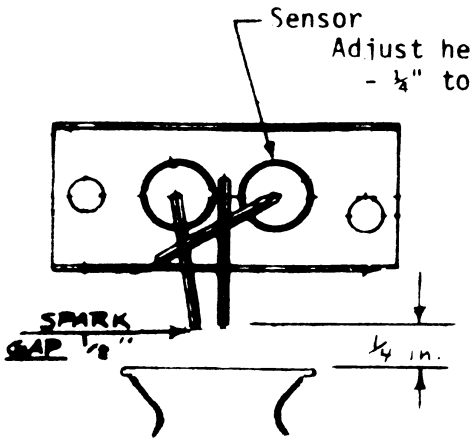
(2) Improper grounding. If a flame is present during the Trial for ignition period but the system shuts down, insure that the burner is properly grounded. If the burner is not grounded, the flame monitoring signal will not function and the system will go into lockout. Check for loose or corroded terminals and replace if necessary. Insure good electrical connection by scraping paint or any other foreign matter off the area where ground connection is made.

It is equally important to be certain that the electrode bracket assembly is properly grounded. The bracket should be common with the ground lead on the input connector (ground terminal 6). If the bracket is not properly grounded, damage to the ignitor can result.

(3) Inoperative high voltage. If there is no spark or sparking is intermittent, check the following after disconnecting voltage to the system. (See Figure 2).

(a) Check spark gap. Gap should be 1/8"± 1/32" FROM H.V. TO GRND. CAUTION: NEVER REPLACE THE COMPONENT BOARD WITHOUT FIRST CHECKING TO INSURE THAT THE ELECTRODE HAS THE PROPER GAP. IF THE GAP IS TOO WIDE, DAMAGE TO THE IGNITOR CAN RESULT.

FLECTRODE SETTINGS
65900 Series




(b) Check electrode leads and determine there is no corrosion at the terminals. If there is corrosion, clean it off.

(c) Check ceramic insulators for cracks, foreign matter, and carbon. If there are cracks, replace electrodes. If there is carbon or foreign matter, clean it off.

(d) Check high voltage lead wire for cracks or breaks. If there are cracks, breaks or chaffing, replace high voltage wire.

(e) Check that the high voltage lead wire is not too close to a metal surface to insure that arcing will not occur at any point other than across the H.V. electrode. Also, insure that the high voltage lead wire is not taped or connected to a metal frame along it's length, sharp metal edges, or crossing, DO NOT BUNDLE WITH OTHER WIRES. Always leave one inch spacing between the high voltage lead wire and any other metal or wires.

(f) For best operation, the high voltage wire should be as short as possible and should not exceed 24 inches in length.

(g) Check to insure that the high voltage terminal is clear of dust, moisture or any foreign matter that could create high voltage leakage to ground.

4. Valve malfunction. With power applied to the ignitor, sparking should occur and the solenoid valve should open simultaneously. If sparking occurs but the valve does not open, place a volt meter between Terminal 4 on the input connector and ground (or across valve). Recycle the ignitor by turning the thermostat down for five seconds minimum and then back up and determine if voltage is present at the valve. [Terminals 4 (valve) and 6 (ground) in Figure 1.] If voltage is present and the valve does not open, remove wires from the valve terminals and retest the valve on a known voltage source. If valve still does not function, it should be replaced. If the voltage is not present at Terminals 4 and 6, the ignitor should be replaced. Check p.c. connector area. (Clean with soft rubber eraser only.) Also, check the terminals in the plastic connector for good contact.

The valve relay is rated for 12VDC at .5 amps. If a valve is used with a higher current rating than specified, damage can result to the relay contacts.

5. Electrode placement. (a) Electrode should be placed so optimum flame current is achieved for proper application. (b) Flame should not impinge on any portion of ceramic insulator.

6. The flame detector circuit uses the ionized gas flame to conduct the flame signal. This signal is a small DC current which can be measured directly with a 0 to 50 microamp meter.

Although the minimum flame current necessary to keep the 05-15 and ignitor from going into lockout is 2.5 microamps, the lowest recommended is 5.0 microamps. These ignitors can stand flame currents as high as 30 to 40 microamps.

To measure flame current, first shut off the power to the system and then remove the flame sensing lead wire from the electrode terminal and insert a 0-50 DC microamp meter in series with the sensor electrode and the sensor lead wire. "Plus" terminal of meter to component board and "Negative" terminal to sense electrode. Energize the ignitor. If the meter reads below zero, shut the system off and reverse meter leads.

Once the flame is established, assure that the flame current is above the minimum specified. If not, assure that the system has the proper input voltage, and then relocate the sensor electrode in the flame pattern until flame current is increased.

Once the flame has been established and the system is in its heat cycle, occasional sparking may occur. This is common in some installations and is not significant. Sparking will not damage the ignitor.

7. Ambient temperature. The 05-15 is designed to operate over the temperature range of $-40$ to $150^{\circ}F$. Care should be taken to insure that it operates within this range. If these limits are exceeded, the ignitor should be relocated to an area that is within this temperature range.

8. Relative humidity. The 05-15 is coated for moisture resistance to 90 percent relative humidity. Caution should be taken to protect the component board against direct exposure to water.

Manual provided courtesy
Bryant RV Services
www.bryantrv.com

All manuals are believed to be released for distribution, and/or in the public domain.

Service manuals provided with the understanding that persons using them are well versed in proper safety practices, and are familiar with basic safety procedures, including, but not limited to safety procedures dealing with 120 volt electricity, high amperage 12 volt circuits an LPG (propane) systems.

If in doubt, consult a professional (better safe than sorry).