

SF-35

# **SUBURBAN DYNA-TRAIL FURNACE OPERATION AND TROUBLESHOOTING**

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## **DISCLAIMER**

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## INTRODUCTION/Why Me:

The author of this program is not a professional LP gas technician. You are responsible for making your own determinations as to validity and applicability of the information presented

My first heating season for a 1976 Birchaven was coming up. I had never checked out the heating system furnace. Knowing that's a good idea, I went to the coach pulled the front metal cover, Slide 2, turned on the LP tank and the LP valve to the furnace and turned up the thermostat. She fired up just as I had hoped. I looked into the front of the unit (fire box) and I could see yellow colored light which was not a good omen. At this point, I was thinking **CARBON MONOXIDE AND DEATH**. Some previous owner/repair person had attempted to use a product like JB Weld to close up the rusted out portions of the fire box.

This discussion deals only with the Suburban furnace. The reference for all schematics and operations is the Suburban DYNA-TRAIL manual which can be found at <http://www.bdub.net/manuals/SuburbanDynaTrail.pdf>. The Sol-Aire furnace is covered in Section 24G, GMC Motorhome Maintenance Manual X-7524B and the Duo-Therm unit is covered in Section 24G, Manual X-7725.

## OPERATIONAL SCHEME

## BASIC DISSASSEMBLY

## TESTING SETUP

## TROUBLE SHOOTING METHODS AND SEQUENCE

## EXPANDED DISASSEMBLY

## SUMMARY

Remember to do the easy things first. Is there gas in the bottle and the bottle valve open? Is there a possibility that the LP regulator is faulty? Is the valve at the furnace open? Is the wall thermostat calling for heat (sending 12v to the furnace)? Is there 12v at the furnace connection? Answer all of these questions before proceeding to the trouble shooting outlined on Page 13, Service Hints, Diagnosis and Corrective Measures.

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## LIGHTING INSTRUCTIONS

1. To light the furnace, turn the manual valve to the OFF position and wait five (5) minutes with the blower running. (Set thermostat above actual temperature to operate blower.)
2. After five (5) minutes, set the thermostat to the OFF position.
3. Open the manual valve. (Correct operating characteristics depend on this valve being positioned fully open. Never attempt to operate with valve partially closed.)
4. Set thermostat on desired temperature.
5. Allow 15 seconds for the main burner to light.
6. If the burner does not light, set thermostat on OFF and repeat steps 1 through 5.
7. After three (3) attempts with no ignition, go to shutdown and determine cause.

**NOTE: Do not continue to cycle furnace through thermostat in an attempt to get ignition.**

## TO SHUT DOWN

1. Turn manual valve to the OFF position.
2. Set the thermostat on OFF.

## BURNER ADJUSTMENT

A symptom of too much primary air will be a howling or screeching noise when the burner is on. Reduce the air by turning the adjustment screw counterclockwise.

A symptom of too little primary air will be sooting on the exterior vent and a distinct yellow and floating flame. To correct, increase the air by turning the adjusting screw clockwise. **NOTE: If a sooting condition cannot be corrected by the air adjustment on the burner, discontinue use of furnace until the problem can be corrected by a service agency.**

### **SEQUENCE OF NORMAL OPERATION**

1. When the thermostat calls for heat, the blower motor is energized immediately.
2. As the blower motor reaches approximately 75 percent of the normal rpm (within 3 to 5 seconds) the microswitch, in response to the air flow, will engage allowing current flow to the solenoid valve and the spark ignition system.
3. The current to the valve opens it and allows gas to the main burner. The spark then ignites the main burner.
4. After main burner ignition, the flame detector will sense the presence of flame (usually within 7 seconds) and deenergize the lockout feature. If the main burner does not ignite or the flame detector does not deenergize the lockout feature within 7 seconds, the unit will go into lockout. At this time, it will be necessary to set the thermostat on OFF and repeat steps 1 through 6 of the lighting instructions.
5. After three (3) attempts with no ignition or main burner continues to go off within 7 seconds, go to shutdown and determine cause. (see service hints)
6. If within a period of approximately 2 minutes after the main burner is lit, the thermostat is turned back, both the blower motor and solenoid valve are deenergized. However, if the furnace continues to run longer than 2 minutes, which it normally should, a slight snap can be heard from within the casing. The snap is caused by the fan switch as it changes its position. After this occurs, if the thermostat is satisfied or turned back, the solenoid valve will close, the flame on the main burner will go out, but the blower will continue to run for a short period of time and will then shut off. The purpose of this is to remove most of the remaining gases from the heat exchanger. Be assured that this period of blower override is a part of the unit's normal operation.

## **COMPONENT FUNCTIONS**

**MICROSWITCH** - The microswitch has two purposes:

1. It is an AIR PROVER. It operates in response to the flow of air generated by the blower. Hence, if for any reason the air from the blower is not sufficient, the switch will not operate. This may be caused by a slow motor due to low voltage, restricted return air, inadequate duct discharge area, or lint accumulation on the blower wheel.
2. The switch allows time for the blower to pull in a sufficient amount of air to support combustion before it engages. Once it engages, the solenoid valve opens, gas flows to the burner, and ignition occurs.

### **FAN SWITCH**

The purpose of the fan switch is to control the sequence of the blower operation. The fan switch is a two pole switch. When the bimetal disc of the fan switch is heated to the operating temperature, the switch closes. This completes a circuit through the motor from a direct source. The blower will continue to run as long as the chamber is hot even though the thermostat is satisfied and the main burner is off. When the chamber cools, the fan switch changes back to its original position and shuts the blower off. If the blower and burner shut off simultaneously after the thermostat is satisfied, then the fan switch failed to change over. This is a symptom of a faulty switch and it must be replaced.

### **LIMIT SWITCH**

The purpose of the limit control is to turn off the gas to the main burner if for any reason the furnace becomes hotter than that which is safe. Improper operation of the furnace due to the limit control does not always indicate a defective control. If the circulating air is blocked or only partially so, the limit control will function and cause the main burner to cycle. Cycling on the limit is not always undesirable – if it happens only occasionally. This is a good indication of safe operation and will most likely happen on a warm day. If cycling happens too often or for an extended period, the circulating air system should be thoroughly cleaned.

If for any reason the limit control is found to be defective, there is no recommended method of repairing it. Because of its importance for safety reasons, it should be replaced with a new one. **CAUTION: NEVER SHUNT THE LIMIT CONTROL EVEN FOR TEMPORARY OPERATION.**

### **BLOWER ASSEMBLY**

One motor- two fans-compartmentalized

## **SERVICE HINTS, DIAGNOSIS AND CORRECTIVE MEASURES**

### **A. COMPLAINT – NO HEAT**

1. Thermostat off –
2. Gas supply –
3. Electrical connections and power –
4. Malfunctioning microswitch – blower speed, faulty switch, duct discharge area
5. Gas valve
6. Blower not operating
7. Short cycling
8. Defective relay
9. Ignition failures – **CAUTIONS: REFER TO MANUAL SPECIFICS**

### **B. ELECTRONIC IGNITION SYSTEM – Review operation sequence**

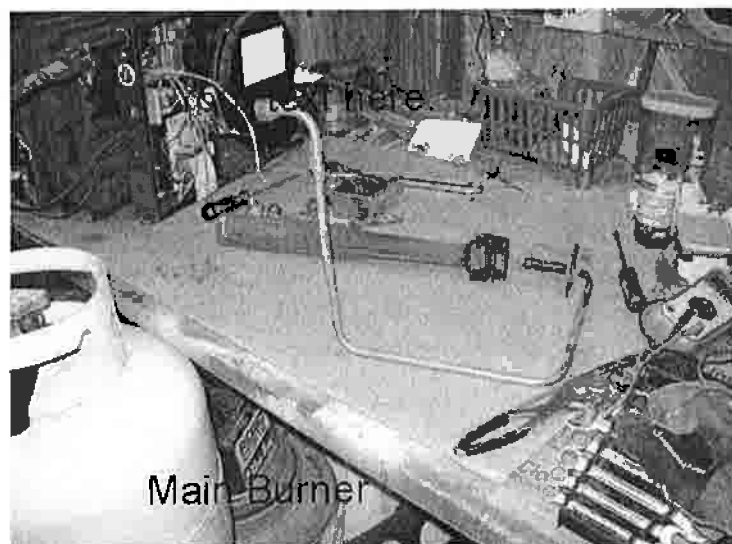
1. Electrode not sparking
2. Electrode sparking but gas not coming through burner
3. Electrode sparking and gas valve opening but burner will not light
4. Burner ignites but goes off and into lock-out
5. Repeated module board failures
6. Unit goes into lock-out occasionally

### **C. COMPLAINT – EXCESSIVE NOISE**

### **D. COMPLAINT – ERRACTIC BLOWER OPERATION**

### **E. MAIN BURNER WILL NOT CYCLE OFF**

### **F. COMPLAINT – UNIT WILL NOT OPERATE**



Main Burner

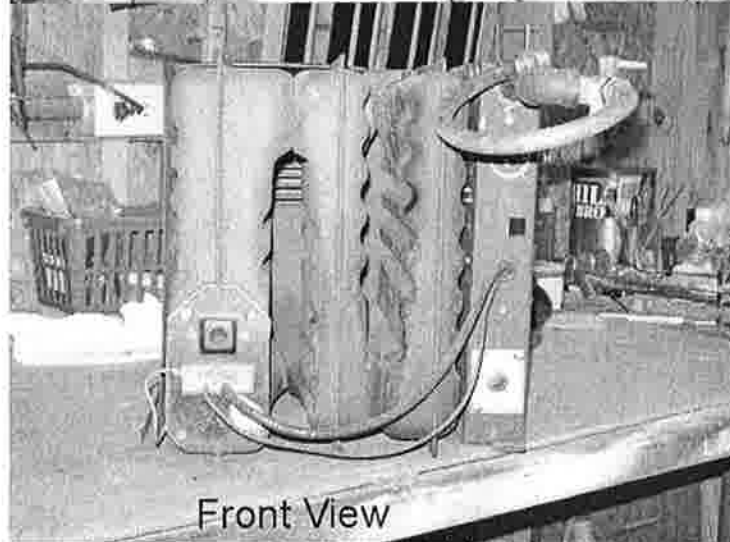


Extracting Burner

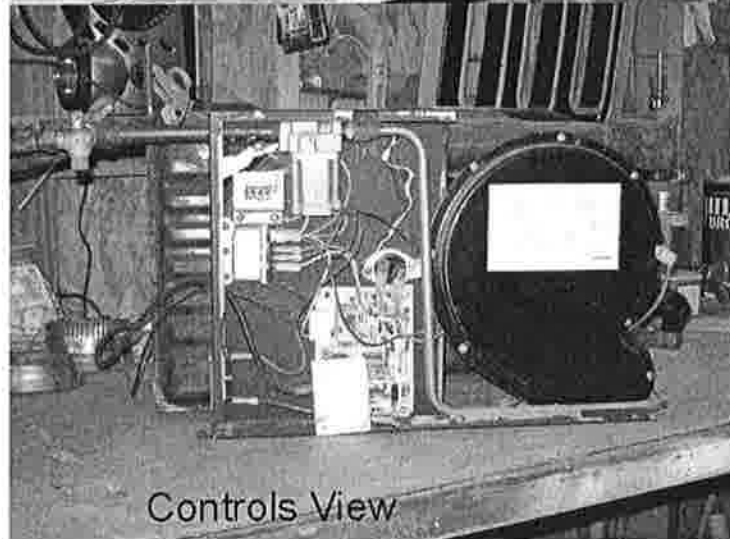




Adjusting air flow



Front View



Controls View

