



**GAS-FIRED FAN TYPE DIRECT VENT WALL
FURNACES FOR RECREATIONAL VEHICLES**

**INSTALLATION INSTRUCTIONS
FOR MODEL
DD-17DSI**



The design of these furnaces has been certified for installation in recreational vehicles only. In order for these furnaces to operate in conformity with generally accepted safety regulations, the installation instructions outlined in this book must be followed. Failure to comply with the installation instructions will void any responsibility of Suburban Manufacturing Company. Your furnace was inspected before it left the factory. If any parts are found to be damaged, do not install the furnace. Any damages should be reported to the transportation company immediately and the appropriate claims filed.

WARNING! Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/or owners manual provided with this appliance. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.
- Contact the nearest gas supplier or qualified service technician for repairs.
- If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

INSTALLATION INSTRUCTIONS

WARNING! Installation of this appliance must be made in accordance with the written instructions provided in this manual. No agent, representative or employee of Suburban or other person has the authority to change, modify or waive any provision of the instructions contained in this manual.

A. GENERAL

These furnaces incorporate a direct vent flue system and use a unique blow through type heat exchanger fabricated of welded drawn steel parts. The lanced port burner is designed for use with propane gas. Gas controls supplied with these units are the 100% shutoff type. Ignition is provided by a direct spark ignitor. A concentric air intake and flue exhaust system is standard on these units. This system consists of a series of sliding pipes and can be installed in various cabinet depths by choosing the correct length assembly. (See Section E, Vent Lengths). The unit is designed for easy removal to aid in servicing.

These units are CGA approved for use from 0-4500 feet altitude at rated input.

NOTE: These furnaces must be installed and vented as described in this manual so that the negative pressure created by the air circulating (return air) fan cannot affect the combustion air intake or venting of any other appliance.

NOTE: These furnaces are not designed nor are they to be used in conjunction with cooling units. To do so will damage the furnace and will void the warranty.

DUE TO HIGH TEMPERATURES, THE APPLIANCE SHOULD BE LOCATED OUT OF TRAFFIC AND AWAY FROM FURNITURE AND DRAPERIES.

CAUTION: If possible do not install the furnace to where the vent can be covered or obstructed when any door on the trailer is opened. If this is not possible, then the travel of the door must be restricted in order to provide a 6" minimum clearance between the furnace vent and any door whenever the door is opened. **NOTE:** The exhaust temperature of this furnace could discolor or warp some materials. You should verify that the material used on the coach door, panel, or cover will not discolor or warp from the exhaust temperature whenever any door, panel, or cover is in the open position.

CAUTION: Due to the differences in vinyl siding, this appliance should not be installed on vinyl siding without first consulting with the manufacturer of the siding or cutting the siding away from the area around the appliance vent.

CAUTION: In any installation in which the vent of this appliance can be covered due to the construction of the RV or some special feature of the RV such as slide out, pop-up, etc. always insure that the appliance cannot be operated by setting the thermostat to the positive "OFF" position and shutting off all electrical and gas supply to the appliance. Never operate furnace with vent covered.

These furnaces are certified for use with Propane/LP gas only. Gas supply pressure for purposes of input adjustment:

Gas	Minimum	Maximum
Propane/LP	11" W.C.*	13" W.C.
*Water Column		

In the U.S.A., the installation must conform with local building codes. In the absence of local building codes, refer to the latest edition of:

1. Standard for Recreational Vehicles ANSI A-119.2/NFPA 501C.
2. National Fuel Code ANSI Z223.1.
3. The furnace must be electrically grounded in accordance with the latest edition of the National Electrical Code ANSI/NFPA No. 70.
4. The installation of the furnace shall be in accordance with any applicable local codes and regulations.

In Canada, the furnace must be installed in accordance with:

1. Standard CSA Z240.4 - Gas Equipped Recreational Vehicles and Mobile Housing.
2. CSA Standard Z240.6.2 - Electrical Requirements for Recreational Vehicles.
3. CAN/CGA B149 Installation Code.
4. Any applicable local codes and regulations.

B. PREPARING FOR INSTALLATION

1. Select a location for the furnace on an outside wall as near the center of the coach as possible. Check for obstructions to be sure that nothing, such as drapes or bed clothes, will interfere with the circulating air openings in the door panel. Do not install the furnace with the vent facing toward the forward end of the coach.

To prevent interference with other fuel burning appliances, such as a range, be sure that the furnace compartment will not communicate with the other appliance compartments.

Review Section C, INSTALLATION CLEARANCES.

2. Provide opening in cabinet or enclosure as specified in Figure 5.
3. Cut a 4 1/8" diameter opening for the vent air intake assembly. See Figure 5 for opening location.

NOTE: The distance from the center line of the vent cap to the nearest corner or obstruction must be at least 24 inches.

C. INSTALLATION CLEARANCES TO COMBUSTIBLE MATERIAL

When an appliance is installed directly on carpeting, tile or other combustible material other than wood flooring, the appliance shall be installed on a metal or wood panel extending the full width and depth of the appliance. If preferred, the carpeting, tile or combustible materials, other than wood may be cut away the full length and depth of the appliance plus the appliance minimum clearances to combustibles.

All recessed portions of the furnace casing (Figure 1-3) are for zero (0) inch clearance to combustible construction from the integral spacers.

The wall in which the unit is installed must be a minimum of 18 inches from the vertical surface facing it. (See Figure 4.)

Clearance from air discharge grille to adjacent side wall may be 0" left side of grille. (See Figure 4.)

A horizontal surface above the unit may be installed with zero (0) inch clearance to the top of the front grille. (See Figure 4A.)

To assure adequate accessibility for servicing and proper furnace operation, it is essential that these installation clearances be maintained.

D. INSTALLATION

1. Remove front grille of furnace.

NOTE: OPTIONAL DISCHARGE DUCT ADAPTOR - The casing has a 4 inch diameter knockout on the right side. See Figure 6. A 4 inch diameter connector can be attached to this location to provide a warm air discharge duct (not to exceed ten inches in length).

2. Slide furnace into opening and extend it beyond the coach cabinetry 3/4" as shown in Figure 5A.
3. Secure the furnace to the floor with screws through the holes in cabinet legs.
4. Determine "X" dimension as shown in Figure 5A. Measure from the front of the installed unit to the outside skin of coach. NOTE: "X" dimension must be a minimum of 22" and cannot exceed 29".
5. Using the chart in Figure 5A, choose the appropriate vent assembly which falls within the range listed for "X" dimension.
6. Install vent from outside coach.

Three vents are available. Be sure proper vent is used. **Do not modify vent in any way.**

Be sure that the word "TOP" is positioned at the top as shown in Figure 7. Slide vent assembly in place being sure to overlap exhaust tube on furnace a minimum of 1 1/4". Caulk to effect a seal against weather and secure in place using selected screws.

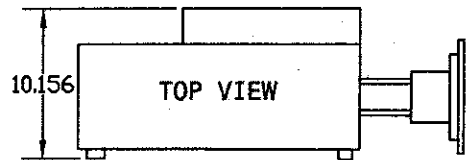


Figure 2

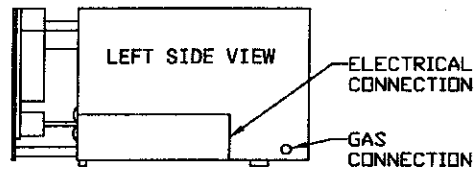


Figure 3

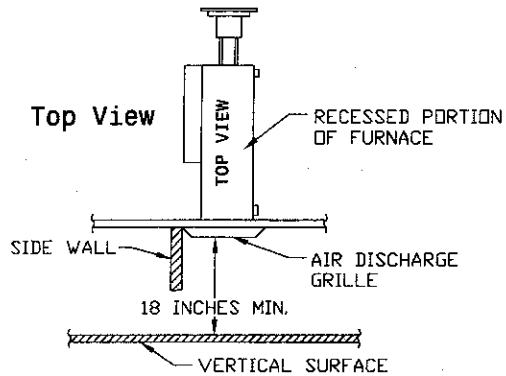


Figure 4

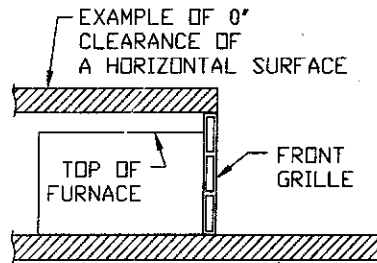


Figure 4A

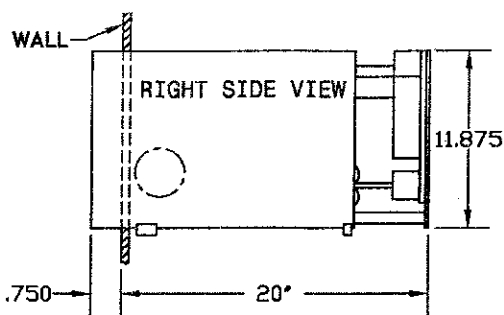


Figure 1

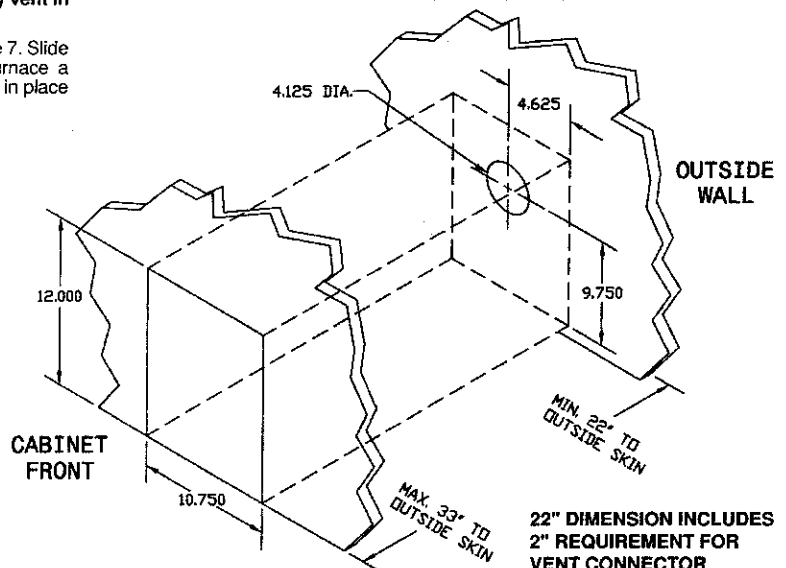
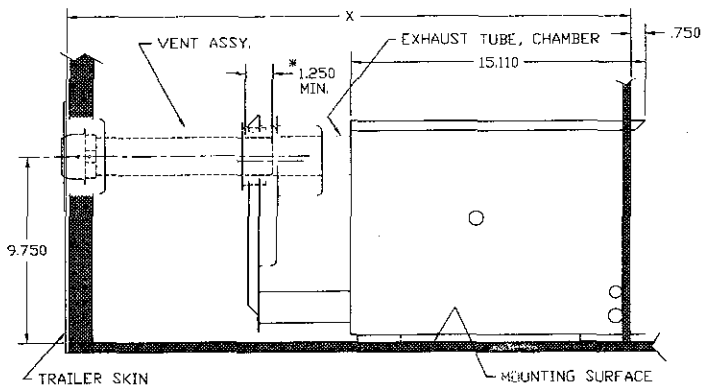


Figure 5

22" DIMENSION INCLUDES 2" REQUIREMENT FOR VENT CONNECTOR

VENT TUBE INSTALLATION
DD-12/17 P, DD-17 DSI



PART NO.	VENT LENGTH	X DIMENSIONS
260197	5 7/8"	22" - 24 3/8"
260198	8 3/16"	24 3/8" - 26 5/8"
260199	10 1/2"	26 5/8" - 29"

* NOTE:
NEVER INSTALL VENT WITH LESS THAN 1.250" OVERLAP
BETWEEN CHAMBER EXHAUST TUBE & VENT ASSY.
EXHAUST TUBE.

Figure 5A

ELECTRICAL WIRING

The wiring connections are located on the left side of the unit. (See Figure 3.) The 12 VDC power supply and thermostat wiring are to be routed to the unit in this area.

Make wiring connections following the wiring diagram. (See Figure 8)

CAUTION: Be sure all power supply wiring to the furnace is properly sized to keep voltage drop to the unit to a minimum. A minimum of 14 gauge wire is recommended for the 12V power supply. AMP draw for 12 VDC operation: 2.6 AMP.

Unit must be electrically grounded in accordance with local codes and the latest edition of the National Electrical Code, ANSI/NFPA No. 70 or in the absence of local codes, with the current CSA C22.1 Canadian Electrical Code.

CAUTION: Polarity must be strictly observed when connecting the unit to a 12 VDC power supply. If polarity is reversed to the unit on some models the blower will run in reverse and the furnace will not heat.

CAUTION: Do not perform any high potential test on this furnace. These tests have been conducted on the furnace before leaving the factory. If vehicle Hi-Pot testing is required, disconnect the furnace wiring before testing.

Do not disconnect any power lead and short to ground. Any shorting or arcing of the leads may damage the furnace components.

ROOM THERMOSTAT LOCATION AND WIRING

Locate the room thermostat approximately 4 1/2 feet above the floor and on an inside wall where it will not be affected by heat from any source except room air. Use 18 gauge stranded or solid thermostat wires and route the thermostat wires to the unit location. Connect thermostat to blue wires on left side of unit. (See Figure 8 or 9, depending on model.)

GAS PIPING

Gas line hook-up is made on the left side of the furnace, See Figure 3.

A 3/8" flare connection is provided at the control valve inlet for the gas supply connection to the furnace. The gas supply line to the furnace must be of adequate size to provide a minimum of 11 inches water column gas pressure (for purpose of input adjustment). This pressure must be maintained under maximum flow conditions with all gas appliances in operation. The inlet supply pressure must not exceed 14 inches water column. Tubing may be type "K" for propane bottle gas. However, be sure to check with ANS, CGA and CSA Standards for any other requirements concerning gas piping.

Piping sealant compounds shall be resistant to the action of LP gases.

CAUTION: Do not twist gas valve during piping.

After connections have been made, be sure all joints are checked with soap solution to detect leaks. This also should include a check of the furnace controls and piping. Correct all leaks immediately.

WARNING! Never check for leaks with an open flame. Turn on the gas and apply soapy water to all joints to see if bubbles are formed.

In order to maintain a check on gas supplied pressure to the furnace, Suburban advises the installer to provide the 1/8" NPT plug tap for test gauge connection immediately upstream of the gas supply connection to the furnace and that it be readily accessible.

When the vehicle gas supply piping system is pressure tested at pressures greater than 1/2 PSIG, the unit **MUST BE DISCONNECTED** from the system.

The unit must be isolated from the gas supply piping system during any pressure testing of the gas supply piping system at test pressures up to 1/2 PSIG.

SEQUENCE OF NORMAL OPERATION

NOTE: During initial firing of this furnace, a burn-off of excess paint and oils remaining from manufacturing process may cause "smoking" for 5- 10 minutes.

1. When the thermostat calls for heat a delay of 15 to 30 seconds will elapse before the time delay relay energizes the fan motor.
2. As the fan motor reaches approximately 75% of the normal r.p.m. (within 1 to 2 seconds) the sail switch, in response to the air flow, will engage allowing current flow to the gas valve.
3. The gas valve will open and allow gas to flow to the main burner. The spark produced from the ignitor electrode ignites the main burner.
4. If the thermostat is satisfied or turned back, the gas valve will close and the flame on the main burner will go out. 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 and heat from the heat exchanger.

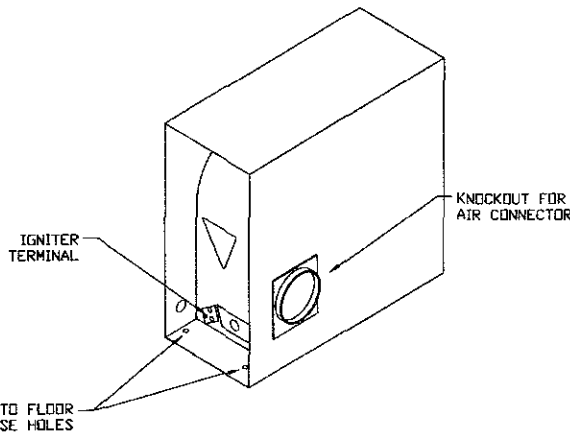


Figure 6

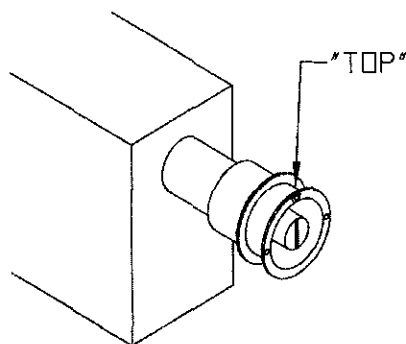


Figure 7

OPERATIONAL CHECKOUT - DIRECT SPARK IGNITION MODEL

IMPORTANT: Failure to follow these lighting instructions exactly may result in damage to the unit.

WARNING! Do not operate furnace while vehicle is in motion or being towed.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A.** This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do **not** light the burner by hand.
- B.** BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electric switch or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.

- Contact the nearest gas supplier or qualified service technician for repairs.
 - If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
 - Do not turn on the gas supply until the gas leak(s) has been repaired.
- C.** Use only your hand to turn the handle on the manual shut off valve. Never use tools. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D.** Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. The appliance is equipped with an ignition device which automatically lights the burner. Do **not** try to light the burner by hand.
5. Turn shut-off valve to "OFF". This furnace is equipped with a valve shut-off switch. With switch in "OFF" position, gas will not flow to burner nor will the furnace operate.
6. Wait five (5) minutes to clear out any gas. Then smell for gas including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
7. Turn on all electric power to the appliance. These units are for use with LP gas only. LP gas is heavier than air. Therefore, to better clear out any gas, the heater should be operated for five (5) minutes with the blower on and the gas off.
8. Turn shut-off valve to "ON".
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn shut-off valve to "OFF". Do not force.

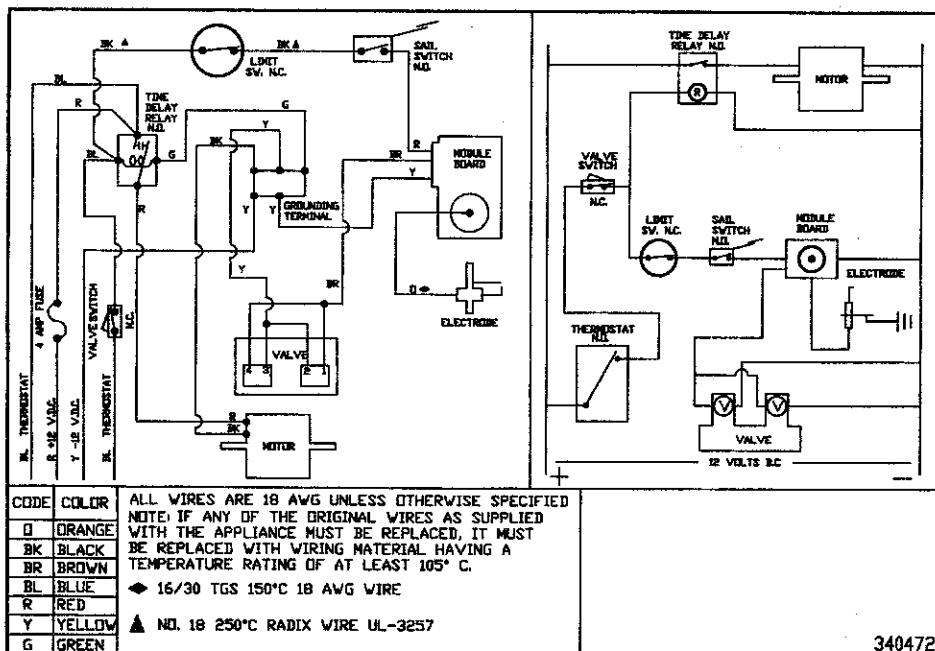


Figure 8



Suburban
Manufacturing Company

a subsidiary of AIRXCEL, Inc.

SUBURBAN MANUFACTURING COMPANY
Post Office Box 399
Dayton, Tennessee 37321

OWNERS' INFORMATION MANUAL DIRECT SPARK IGNITION For Model DD-17DSI

This book contains instructions for operating and maintaining the furnace. Keep with unit at all times.

Should you require further information, contact your dealer or nearest Suburban Service Center.

WARNING! Installation of this appliance must be made in accordance with the written instructions provided in this manual. No agent, representative or employee of Suburban or other person has the authority to change, modify or waive any provision of the instructions contained in this manual.

WARNING! Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/or owners manual provided with this appliance.

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.
- Contact the nearest gas supplier or qualified service technician for repairs.
- If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.



Due to high temperatures, the unit should be located out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns or clothing ignition.

Young children should be carefully supervised when they are in the same room as the unit.

Clothing or other flammable material should not be placed on or near the unit.

Any safety screen or guard removed for servicing the unit must be replaced prior to operating the unit.

The area around the unit must be kept clear from combustible materials, gasoline and other flammable vapors and liquids.

Installation and repairs should be done by a qualified service person. The unit should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners, and circulating air passageways of the unit be kept clean.

WARNING!

This unit must be serviced only by a qualified serviceman. Modification of the appliance can be extremely hazardous and could lead to serious injury or death.

Fuel burning appliances generate toxic flue products. Modification or improper maintenance can cause carbon monoxide in deadly amounts. To prevent this, maintain appliance in safe operating condition.

DO NOT Block or modify any combustion air or flue gas passageways.

DO NOT Add any devices or accessories to this appliance except those specifically authorized by Suburban Manufacturing Co.

DO NOT Install screens over the vent for any reason. Screens will become restricted and cause unsafe furnace operation. Accessories are being marketed for RV products which we do not recommend. For your safety, only factory authorized parts are to be used on your furnace.

ALWAYS Consult a qualified serviceman for any problems or questions you may have pertaining to this appliance.

ALWAYS Inspect the appliance before starting a new heating season, paying special attention to combustion air, flue gas passageways and gas lines.

OPERATING INSTRUCTIONS

Direct Spark Ignition

WARNING! Be sure the furnace and all ignition systems are "OFF" during any type of refueling and while vehicle is in motion or being towed.

IMPORTANT: Failure to follow these lighting instructions exactly may result in damage to the unit.

WARNING! Do not operate furnace while vehicle is in motion or being towed.

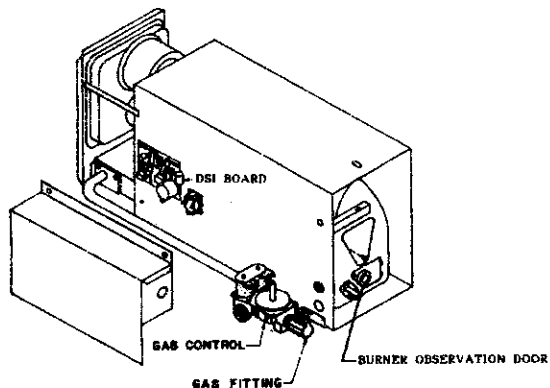


Figure 1

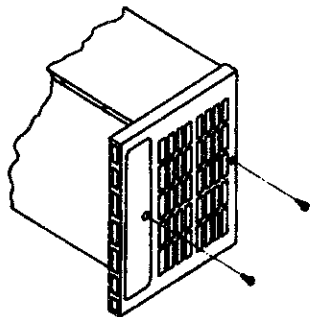


Figure 2

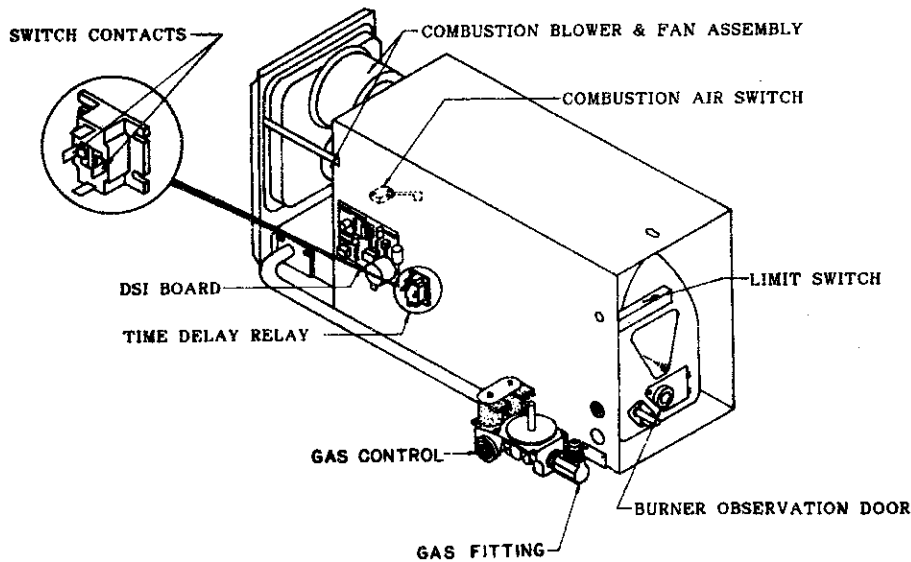


Figure 5

SEQUENCE OF NORMAL OPERATION

1. When the thermostat calls for heat, a delay of 15 to 30 seconds will occur before the fan motor is energized.
2. As the fan motor reaches approximately 75% of its normal r.p.m. (within 1 to 2 seconds) the microswitch, in response to the air flow, will engage, allowing current flow to the gas valve.
3. The gas valve will open and allow gas to the main burner. The spark produced from the ignitor electrode ignites the main burner.
4. When the thermostat is satisfied or turned back, the gas valve will close and the flame on the main burner will go out. 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 and heat from the heat exchanger.

TIME DELAY FAN RELAY

This relay controls the sequence of the blower operation. When the bimetal disc of the relay is heated internally to the operating temperature, the switch closes. This completes the circuit to the motor. The blower will continue to run as long as the relay is hot even though the thermostat is satisfied and the main burner is off. When the relay sensor cools, after the thermostat is satisfied, the switch opens and the blower shuts off. See Figure 5 for terminal orientation.

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 abnormally hot. If the circulating air is blocked, even partially, the limit control will function and cause the main burner to cycle. If cycling of the limit control occurs, the circulating air passage should be thoroughly cleaned.

If the limit control is damaged, it cannot be repaired. It must be replaced with a new one.

CAUTION: Never short across or bypass the limit control even for only temporary operation.

MICROSWITCH

The microswitch has two purposes:

1. It is an "air prover". It operates in response to the flow of air generated by the fan. Hence, if for any reason the air from the fan is not sufficient, the switch will not operate. One cause of insufficient air is a slow motor caused by low voltage.
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 gas valve opens, gas flows to the main burner and ignition occurs.

BLOWER ASSEMBLY

One motor is used to drive both the combustion air wheel and the circulating air fan blade. Although one motor drives both, the wheel and fan blade are separate. The combustion air blower is sealed so as to allow no passage of air between it and the circulating room air fan. The combustion air blower draws air from the outside atmosphere, discharges it into the combustion chamber, and forces the combustion products out the exhaust tube. The circulating room air fan blade pulls return air in and forces it across the heat chamber discharging it into the area to be heated.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electric switch or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.

- Contact the nearest gas supplier or qualified service technician for repairs.
 - If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
 - Do not turn on the gas supply until the gas leak(s) has been repaired.
- C. Use only your hand to turn the handle on the manual shut off valve. Never use tools. If the handle will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. The appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn shut-off valve to "OFF". This furnace is equipped with a valve shut-off switch. With switch in "OFF" position, gas will not flow to burner nor will the furnace operate.
6. Wait five (5) minutes to clear out any gas. Then smell for gas including near the floor. If you then smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
7. Turn on all electric power to the appliance. These units are for use with LP gas only. LP gas is heavier than air. Therefore, to better clear out any gas, the heater should be operated for five (5) minutes with the blower on and the gas off.
8. Turn shut-off valve to "ON".
9. Set thermostat to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas to Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn shut-off valve to "OFF". Do not force.

MAINTENANCE AND CLEANING

WARNING! If the user of this appliance fails to maintain it in the condition in which it was shipped from the factory or if the appliance is not used solely for its intended purpose or if appliance is not maintained in accordance with the instructions in this manual, then the risk of a fire and/or the production of carbon monoxide exists which can cause personal injury, property damage or loss of life.

CAUTION: Label all wires before disconnecting for servicing. Proper polarity must be observed so the furnace motor will run with the proper direction of rotation to insure correct air delivery. (See wiring diagram.)

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous furnace operation.

Always verify proper operation of furnace after servicing.

Your furnace should be inspected by a qualified service agency yearly before turning the furnace on. Particular attention should be given to the following items.

1. Inspect furnace installation and vent termination to be sure furnace is properly secured in place (See Installation Instructions), that vent terminates to the atmosphere, and that vent tubes overlap properly (See Installing Vent Assembly).
2. Inspect chamber and venting to assure that these components are physically sound, without holes or excessive corrosion and that the installation and/or reinstallation is in accordance with Suburban's Installation Instructions. (Reference installation manual supplied with furnace.)

WARNING! It is imperative that the products of combustion be properly vented to atmosphere and that all combustion air supplied to burner be drawn from outside atmosphere.

3. Check the base on which furnace is mounted. Be sure it is physically sound, void of any sagging, deterioration, etc.
4. Inspect furnace, the venting and the gas piping to furnace for obvious signs of deterioration. Correct any defects at once.

5. Inspect main burner. To properly inspect burner, it must be removed (See Figure 8.) If excessive rust and corrosion are present on burner surface, the burner must be cleaned or replaced. The burner may be cleaned with a steel wire brush and the burner ports and venturi blown clean using compressed air.

If the main burner has been allowed to operate with a high yellow flame, a soot formation may be deposited inside the combustion chamber. The carbon deposit may be of such quantity that cleaning will be necessary. A vacuum cleaner is ideal to clean out any carbon deposit in the combustion chamber.

6. Inspect combustion chamber for restrictions in exhaust or intake. It is imperative that the flow of intake combustion air and the flow of exhaust gases being expelled to the outside atmosphere not be obstructed. Any soot or loose debris should be blown out using compressed air.

7. Inspect all gaskets. If any gaskets show signs of leakage or deterioration, replace them. Safe operation of the furnace depends on all gaskets being tight.

8. Inspect return air inlet openings to the furnace. Remove any restrictions to assure adequate air flow.

You, as the owner/user, should inspect the furnace monthly during the heating season for presence of soot on vent. Operating the furnace under this condition could lead to serious property damage, personal injury or loss of life. If soot is observed on the vent, immediately shut the furnace down and contact a qualified service agency.

Listed below are several safety related items that you should follow during the heating season to assure continued safe operation of the furnace.

1. Inspect furnace venting. Venting must be free of obstructions, void of soot and properly terminated to the atmosphere.

WARNING! Do not install screens over the vent for any reason. Screens will become restricted and cause unsafe furnace operation. Accessories are being marketed for RV products which we do not recommend. For your safety, only factory authorized parts are to be used on your furnace.

2. Periodically observe the main burner flame to assure it is burning with a hard blue flame with well defined burner ports (See Figure 6). If flame appears yellow or burner has a lazy flame, shut furnace down and contact a qualified service person.

NOTE: To observe flame, remove front discharge grille. Operation of burner can then be observed through the viewing window on front of chamber. (See Figure 7.)

3. Periodically inspect the vent for obstructions or presence of soot. Soot is formed whenever combustion is incomplete. This is your visual warning that the furnace is operating in an unsafe manner. If soot is present, immediately shut furnace down and contact your dealer or a qualified service person.

4. Keep furnace clean. More frequent cleaning may be required due to excessive lint from carpeting, bedding material, etc. It is imperative that control compartments, burners and circulating air passageways of the appliance be kept clean.

5. The motor is permanently lubricated and requires no oiling.

6. Keep the furnace area clear of any combustible materials, gasoline or other flammable vapor and liquids.

7. Before operating furnace, check the location of the furnace vent to make sure it will not be blocked by the opening of any door on the trailer. If it can be blocked, do not operate the furnace with the door open.

8. Do not restrict the flow of combustion air or the warm air circulation to the furnace. To do so could cause personal injury and/or death.

9. Never operate the furnace if you smell gas. Do not assume that the smell of gas in your RV is normal. Any time you detect the odor of gas, it is to be considered life threatening and corrected immediately. Extinguish any open flames including cigarettes and evacuate all persons from the vehicle. Shut off gas supply at LP gas bottle. (See safety notice on front cover of this manual.)

10. Immediately shut furnace down and call a service agency if furnace cycles erratically or delays on ignition.

WARNING! Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

11. Never attempt to repair damaged parts. Always have them replaced by a qualified service agency.

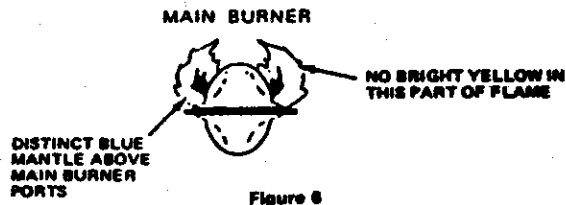
12. Never attempt to repair the furnace yourself. Seek the help of a qualified service person.

13. Clothing or other flammable material should not be placed on or near the appliance.

14. Always follow the Operating Instructions. Do not deviate from the step-by-step procedures.

15. In any installation in which the vent of this appliance can be covered due to the construction of the RV or some special feature of the RV such as slide out, pop-up etc. always insure that the appliance cannot be operated by setting the thermostat to the positive "OFF" position and shutting off all electrical and gas supply to the appliance. Never operate furnace with vent covered.

16. When considering add-on rooms, porch or patio, attention must be given to the venting of your furnace. For your safety, do not terminate furnace vent inside add-on rooms, screen porch or onto patios. Doing so will result in products of combustion being vented into the room or occupied areas.



TO REMOVE FURNACE FOR SERVICE

1. Remove the front grille.
2. Disconnect wiring.
3. Disconnect gas supply. (Be sure gas supply to the unit is turned off.)
4. Remove screws securing furnaces to cabinet.
5. Remove the vent cap screws (outside) and remove vent assembly.
6. Pull furnace forward and remove.

TO REMOVE BURNER & GAS VALVE

1. Shut off gas supply
2. Disconnect electrical supply.
3. Remove front grille.
4. Remove nuts holding burner access door and remove door.
5. Remove nut holding burner in place.
6. Raise burner off mounting pin and remove.
7. Burner orifice may not be serviced with long extension and 1/2" socket.
8. To replace gas valve, remove manifold mounting screws and remove manifold from furnace. Place manifold in a vise to remove gas valve.

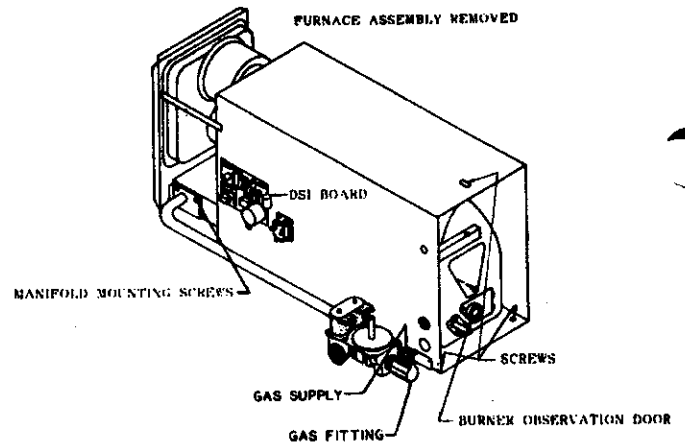


Figure 7

TO REPLACE BURNER

1. Center orifice end of burner over orifice, slide other end over burner mounting pin.
2. Reassemble nut over burner mounting stud until it is firmly against burner.
3. Reinstall burner access door and secure with nuts.

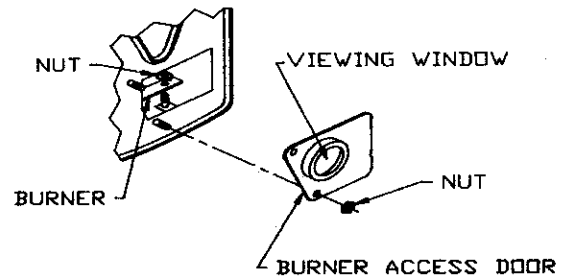


Figure 8

SERVICE HINTS, DIAGNOSIS & CORRECTIVE MEASURES

INSTALLATION SHOULD BE DONE BY A QUALIFIED SERVICE PERSON. THE APPLIANCE SHOULD BE INSPECTED BEFORE USE AND AT LEAST ANNUALLY BY A PROFESSIONAL SERVICE PERSON. MORE FREQUENT CLEANING MAY BE REQUIRED DUE TO EXCESSIVE LINT FROM CARPETING, BEDDING MATERIAL, ETC. IT IS IMPERATIVE THAT CONTROL COMPARTMENTS, BURNERS AND CIRCULATING AIR PASSAGeways OF THE APPLIANCE BE KEPT CLEAN.

A. COMPLAINT - NO HEAT

1. Check electrical supply to make sure that 12 volt D.C. is available at unit. Battery must be charged. If battery is low, there may be sufficient power to run the blower but not enough to run the blower at full speed. If blower does not run at it's prescribed speed, the microswitch cannot engage and gas will not flow to the main burner. Be sure the connections to the voltage lines in the terminal block are tight.
2. Manually rotate fan to make sure motor is free to turn.
3. Check for blown fuse in 12 Volt circuit to furnace.
4. **SHORT CIRCUIT CHECKOUT:** if fuses are blown, a short is indicated and should be checked.
 - a. Turn off all appliances including furnace.
 - b. Install an ammeter on the positive (+) lead of the battery. Amperage reading should be 0. If an amperage reading is noted, a short exists in the vehicle electrical system.
 - c. Disconnect the red (+) DC lead at the furnace. If the amperage continues, the short is exterior to the furnace.
5. **GAS SUPPLY:** Be sure gas supply is on.
6. **THERMOSTAT OFF:** Check to be sure thermostat is properly wired and is calling for heat.
7. **MALFUNCTIONING MICROSWITCH:** Be sure the microswitch is moving far enough to close its contacts. If the switch is not closing, clean any dust or dirt from the actuator pin. Other reasons for switch not operating are:
 - a. **Insufficient fan speed** (slow motor due to low charged battery, faulty motor or lint and dust accumulation restricting return air to furnace). Check wiring in accordance with units wiring diagram to assure that the proper polarity of the 12 Volt DC power supply is observed. On certain models this polarity must be observed so the motor will run the proper direction of rotation to insure correct air delivery.

b. **Faulty Microswitch:** Replace switch if valve does not open when switch is engaged. Switch should also be replaced if battery is fully charged and with the fan motor running at top speed the switch fails to engage within 3 to 4 seconds.

NOTE: To service switch, heating assembly must be pulled out.

8. **GAS CONTROL VALVE:** With test light, check valve terminals. If voltage is present but valve is not opening (when microswitch engages), replace control valve.

9. **FAN NOT OPERATING:** Check for burned-out motor or loose wiring terminals.

10. **DEFECTIVE FAN RELAY:** Relay may be at fault if motor fails to start when thermostat calls for heat. This can be suspected if the thermostat is raised and the motor fails to operate within 60 seconds.

B. COMPLAINT - EXCESSIVE NOISE

1. Motor or blade out of balance. Replace motor or blade.

2. Motor hum. Replace motor.

C. COMPLAINT - ERRATIC FAN OPERATION

A loose terminal or a defective relay may cause the motor to cycle off while the thermostat is calling for heat. An outage will occur because the blower is not purging the system of combustion products.

THERMOSTAT ADJUSTMENT

This unit is equipped with an adjustable thermostat. Improper setting of the heat anticipator can cause either abnormally short or long heating cycles resulting in discomfort.

For correct heating anticipator adjustment, proceed as follows:

Cycle system to determine if cycling rate is satisfactory. If adjustment is necessary, move pointer to a higher setting for longer "ON" cycle and to a lower setting for shorter "ON" cycle.

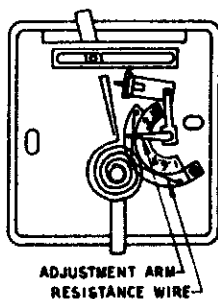


Figure 9

HIGH ALTITUDE DERATION

These units are certified by the Canadian Gas Association for operation without modification at altitudes up to 4500 feet.

Operation at increased elevations require deration of 4% for each 1000 feet above sea level. Example: At 8,000 feet, derate furnace 32%.

If the unit is not properly derated the following conditions will exist:

1. Due to the lack of sufficient oxygen for proper combustion, carbon monoxide will be produced and exhausted through the vent. Entry of these fumes into the vehicle (due to improper installation of the vent or through another opening in the vehicle (exterior) could create a hazardous condition which could endanger the life of anyone exposed to these fumes for a prolonged period of time.

2. Due to incomplete combustion of LP gas at the burner, the actual heat output of the furnace will be considerably less than the rating of the unit. Fuel which is not burned will be wasted.

If the unit is properly derated, it will produce approximately the same amount of heat at higher elevations, but will do so with considerably less fuel.

Consult with local gas company, your dealer or RV service agency for proper orifice size when derating unit. Change out of orifice should be done by your dealer or a qualified service agency.

DIRECT SPARK IGNITION SYSTEM

The direct spark ignition system consists of a solid state printed circuit control module, an electrode assembly, a 12 volt gas control and connecting high and low voltage wires.

To ignite the burner, it is necessary only to set the thermostat above room temperature. The thermostat, in series with the microswitch, powers the ignitor to simultaneously open the main burner valve and provide the ignition spark. Should the flame not be established within a period of 15 seconds, the system provides safety shut-down.

Electronic flame sensing circuitry in the ignitor detects the presence or absence of main burner flame. If the flame is not established during the Flame Establishing Period (6 seconds), the system closes the gas valve and locks out. To reactivate ignition, if lock-out has occurred, set the thermostat to the "OFF" position for 4 to 5 seconds, then reset to the "ON" position.

TROUBLE SHOOTING GUIDE

CAUTION: Servicing this device should only be performed by a qualified serviceman with due regard for safety as improper actions could result in a hazardous condition, resulting in serious injury or death.

WARNING! Do not apply power to control module unless wiring connections are complete and electrode is properly grounded. Use extra caution in areas where high voltage is present.

A. Input Polarity: If a spark is present and the gas valve opens but the system shuts down after the trial period, check input voltage for proper polarity.

B. Grounding: It is essential to proper operation that the system be properly grounded. If a spark is present and the gas valve opens but the system shuts down after the trial for ignition period, check for proper ground. The following items should be checked:

1. Ground screw connecting black motor lead.
2. The burner must be securely fastened to mounting pin in heat chamber.

C. Wiring: Check all wiring for proper and secure connections. Be sure the AMP connector is fully engaged on the control board. Check the high voltage wire for proper connection at both ends. Clean any corrosion that may interfere with good electrical contact.

D. High Voltage Malfunction: If during the trial for ignition, the spark is intermittent and the valve may or may not open, the following should be checked:

1. Electrode spark gap - should be 1/8" + 1/32".
2. Ceramic housing - check for cracks.
3. Electrode lead wires - check for cracks or breaks.

E. Valve Malfunction: If there is power to the gas valve and a spark during the trial for ignition, but the valve will not open, check the valve for an open coil or other malfunction.

F. Erratic Operation: If the system operates properly for a period of time but randomly shuts down during the duty cycle, or will not operate during cold starts, check the flame proving circuit (sensor wire) with a D.C. Microamp Meter. The current may cause nuisance tripping. If this condition is experienced, the electrode location should be checked to make sure the sensor electrode is in the flame.

G. The solid state control module is not field repairable. Any modifications or repairs will invalidate the warranty and agency certifications.

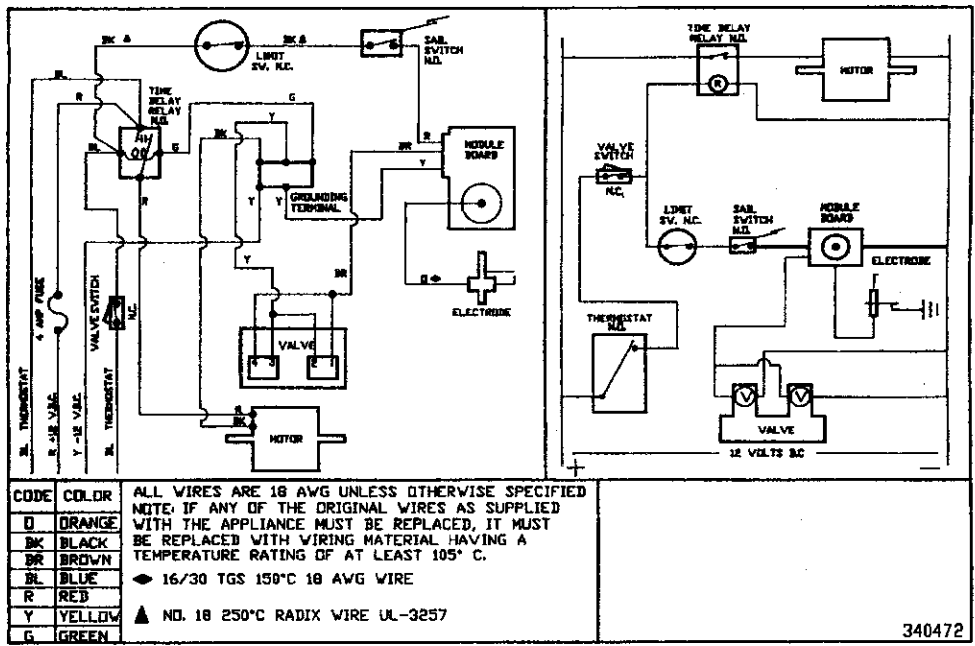


Figure 10

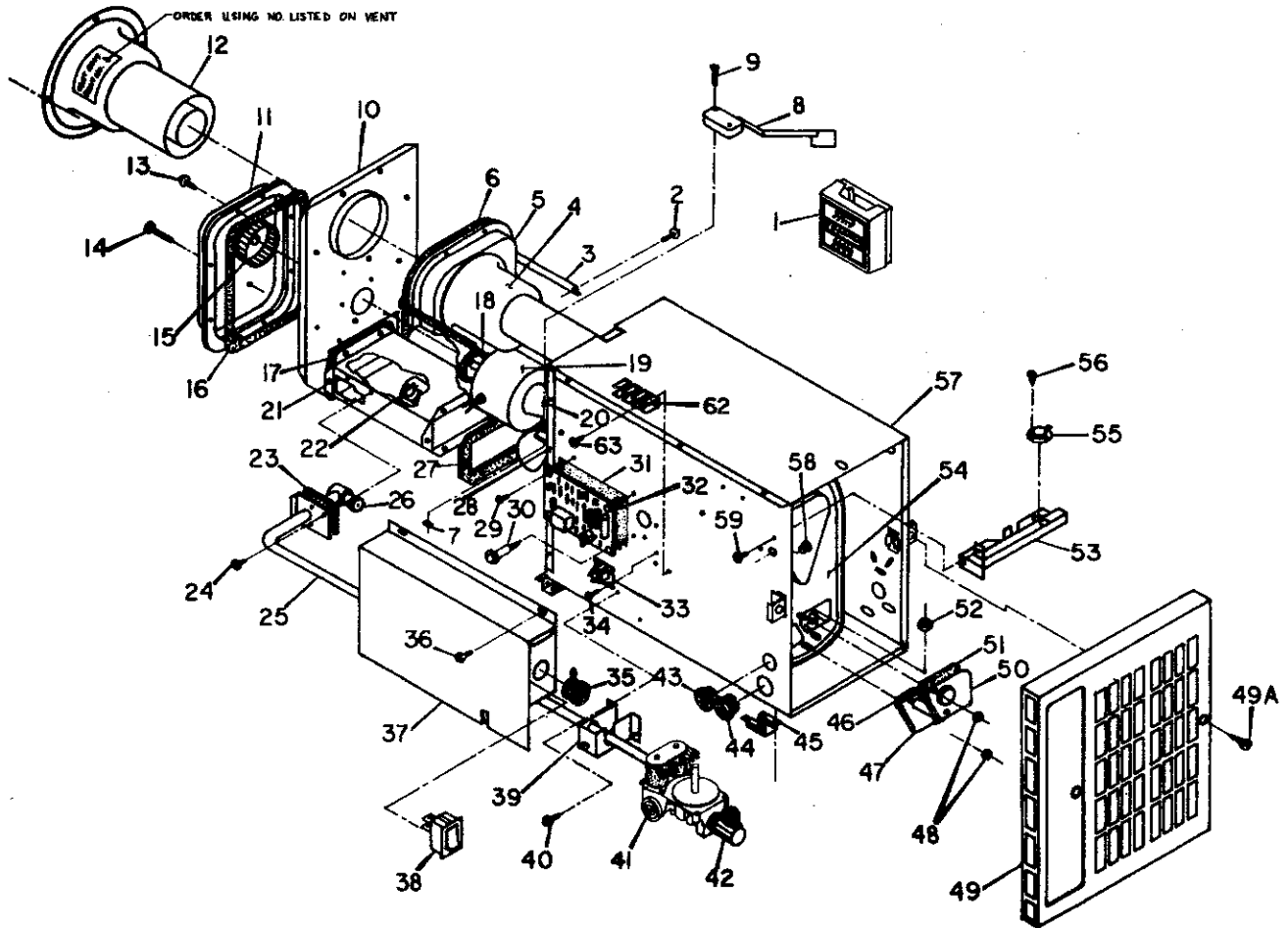


Figure 11

REPLACEMENT PARTS LIST
MODEL DD-17DSI

Only factory authorized parts are to be used. Do not attempt to repair defective parts.

When ordering repair parts from your dealer, a Suburban Service Center or a distributor, always give the following information.

1. Part Number (Not Item No.)
2. Part Description
3. Model and Serial Number of Furnace
4. Number of Parts Required

Item No.	Description	Part Number
1	Thermostat	161154
2	Screw (2 Required)	121717
3	Brace, Combustion Air Housing	062945
4	Intake Air Cup Assembly	051288
5	Housing, Combustion Air (Front)	390536
6	Gasket, Combustion Air Housing (Front)	070862
7	Fastener, Tinnerman (2 Required)	121661
8	Microswitch	231930
9	Screw (2 Required)	121247
10	Panel Assembly, Combustion Air	390537
11	Combustion Air Housing Rear	390535
12	Vent Assembly (Order by Part No. listed on vent assembly supplied with furnace. If Part No. label is not attached, contact SUBURBAN MFG. CO.)	
13	Screw (8 Required)	121717
14	Screw	121715
15	Wheel, Combustion Air	350126
16	Gasket, Combustion Air Housing (Rear)	070906
17	Gasket, Burner Tunnel	070859
18	Gasket, Motor	070849
19	Motor	231916
20	Impeller, Room Air	350125
21	Burner, Tunnel Assembly	051159
22	Burner	010763
23	Gasket, Manifold	070847
24	Screw (3 Required)	121717
25	Manifold	171408
26	Orifice	530415
27	Gasket, Burner Tunnel (Chamber End)	070848
28	Cabinet Back Assembly	101422
29	Screw (2 Required)	121357
30	Screw	121713
31	Insulator, Module Board	070807
32	Module Board	520741
33	Relay, Time Delay	231769
34	Screw (2 Required)	121502
35	Bushing, Strain Relief	230216
36	Screw (2 Required)	121717
37	Cover, Module Board	090430
38	Switch, ON/OFF	232351
39	Bracket Manifold	063235
40	Screw (2 Required)	121717
41	Valve	161071
42	Gas Fitting	170374
43	Bushing, Universal	070862
44	Bushing, Open/Close	070855
45	Bracket, Cabinet Tie-Down (4 Required)	062942
46	Gasket (Electrode)	070851
47	Electrode	231934
48	Nut (4 Required)	121694
49	Grille Assembly	030966
49A	Screw, 10 - 24 x 1/2 (2 Required)	121877
50	Door, Burner Access	030767
51	Gasket, Burner Access Door	070850
52	Nut	121474
53	Bracket, Limit Switch	062944
54	Chamber Assembly (Comes with Item No. 4)	021049
55	Limit Switch	231768
56	Screw (2 Required)	121502
57	Cabinet Wrap Assembly	101601
58	Bushing	070856
59	Screw (2 Required)	121717
60	Fuseholder (Not Shown)	231908
61	Electrode Wire (Not Shown)	231783
62	Splicer	230714
63	Screw (2 Required)	121244

TWO YEAR LIMITED WARRANTY SUBURBAN RECREATIONAL VEHICLE FURNACE

TWO YEAR LIMITED WARRANTY

This Suburban product is warranted to the original purchaser to be free from defects in material and workmanship under normal use and maintenance for a period of two years from date of purchase whether or not actual use begins on that date. It is the responsibility of the consumer/owner to establish the warranty period. Suburban does not use warranty registration cards for its standard warranty. You are required to furnish proof of purchase date through a Bill of Sale or other payment record.

Suburban will replace any parts that are found defective within the first two years and will pay a warranty service allowance directly to the authorized Suburban Service Center at rates mutually agreed upon between Suburban and its authorized service centers. Replacement parts will be shipped FOB the shipping point within the Continental United States, Alaska and Canada to authorized service centers performing such repairs. Before having warranty repairs made, confirm that the service agency is an authorized service center for Suburban. **DO NOT PAY THE SERVICE AGENCY FOR WARRANTY REPAIRS; SUCH PAYMENTS WILL NOT BE REIMBURSED.**

For warranty service, the owner/user should contact the nearest authorized Suburban Service Center, advising them of the model and serial numbers (located on the furnace) and the nature of the defect. Transportation of the unit to and from the Service Center and/or travel expenses of the Service Center to your location is the responsibility of the owner/user. A listing of authorized Service Centers is included in the owner's packet supplied with the furnace and a current listing may be obtained from Suburban. If you cannot locate an authorized service center locally, the service agency chosen to perform warranty repairs must contact our Service Department at 423-775-2131 for authorization. Unauthorized repairs made will not be paid by Suburban.

THREE YEAR LIMITED WARRANTY ON HEAT EXCHANGER

The furnace heat exchanger is further warranted to be free from defects in material and workmanship during the third through fifth year after the date of original purchase. A replacement heat exchanger will be provided under the same conditions as stated in the two year warranty **EXCEPT** no labor reimbursement will be provided.

LIMITATION OF WARRANTIES

ALL IMPLIED WARRANTIES (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY) ARE HEREBY LIMITED IN DURATION TO THE PERIOD FOR WHICH EACH LIMITED WARRANTY IS GIVEN. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. THE EXPRESSED WARRANTIES MADE IN THIS WARRANTY ARE EXCLUSIVE AND MAY NOT BE ALTERED, ENLARGED, OR CHANGED BY ANY DISTRIBUTOR, DEALER OR OTHER PERSON WHOMSOEVER.

SUBURBAN WILL NOT BE RESPONSIBLE FOR:

1. Normal maintenance as outlined in the installation, operating and service instructions owner's manual including cleaning of component parts; such as, orifices and burners.
2. Initial checkouts and subsequent checkouts which indicate the furnace is operating properly, or diagnosis without repair.
3. Damage or repairs required as a consequence of faulty or incorrect installation or application not in conformance with Suburban instructions.
4. Failure to start and/or operate due to loose or disconnected wires; water or dirt in controls, fuel lines and gas tanks; restriction or alteration of return air circulation; low voltage.
5. Routine adjustments that may be required to the thermostat, electrode and burner.
6. Costs incurred in gaining access to the furnace.
7. Parts or accessories not supplied by Suburban.
8. Freight charges incurred from parts replacements.
9. Damage or repairs needed as a consequence of any misapplication, abuse, unreasonable use, unauthorized alteration, improper service, improper operation or failure to provide reasonable and necessary maintenance.
10. Suburban products whose serial number has been altered, defaced or removed.
11. Suburban products installed or warranty claims originating outside the Continental U.S.A., Alaska, Hawaii and Canada.
12. Damage as a result of floods, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of Suburban.
13. ANY SPECIAL, INDIRECT OR CONSEQUENTIAL PROPERTY, ECONOMIC OR COMMERCIAL DAMAGE OF ANY NATURE WHATSOEVER. Some states do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you. NO REPRESENTATIVE, DEALER OR OTHER PERSON IS AUTHORIZED TO ASSUME FOR SUBURBAN MANUFACTURING COMPANY ANY ADDITIONAL, DIFFERENT OR OTHER LIABILITY IN CONNECTION WITH THE SALE OF THIS SUBURBAN PRODUCT.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

IF YOU HAVE A PRODUCT PROBLEM

FIRST:

If your RV has its original furnace and is still under the RV manufacturer's warranty, follow the steps described in your RV owner's manual.

SECOND:

Contact a conveniently located authorized Suburban Service Center. Describe to them the nature of your problem, make an appointment, if necessary, and provide for delivery of the furnace to the selected service center.

THIRD:

For the location of the nearest service center, refer to the listing provided or contact:

Suburban Manufacturing Company
Customer Service Department
Post Office Box 399
Dayton, Tennessee 37321
(423) 775-2131, Ext. 1

For future reference, you should record the following information

MODEL NUMBER _____

SERIAL NUMBER _____

STOCK NUMBER _____

DATE OF PURCHASE _____