

# DYNA-TRAIL

## INSTALLATION, OPERATING, AND SERVICE INSTRUCTIONS SUBURBAN DYNA-TRAIL FURNACES

For Model Numbers

NT-12, NT-16, NT-17

- This book contains complete instructions for installation and operation of your furnace. Keep with unit at all times.
- Should you require further information, contact your dealer or nearest Dyna-Trail Service Center

**SUBURBAN MANUFACTURING COMPANY**

Post Office Box 399

DAYTON, TENNESSEE 37321

# Read This Entire Book

Each item included in your Dyna-Trail furnace unit is of high quality. Properly installed, your furnace will give years of satisfactory, dependable service and economical operation. To simplify any problems of installation, we urge that you read carefully these step-by-step instructions.

## Foreword

The design of this unit has been certified by American Gas Association. In order for this wall furnace to operate according to your expectation and in conformity with generally accepted safety regulations, installation and service instructions outlined in this book **MUST BE FOLLOWED**. Failure to comply with installation and operating instructions will void the responsibility of the manufacturer.

KEEP THIS BOOK in a safe place, because it is an important collection of facts and figures compiled to assure you a satisfactory heating installation that will add to your living pleasure. This book is intended to be a permanent part of your furnace installation and should be preserved in a convenient location for ready reference.



DAYTON, TENNESSEE

# INSTALLATION, OPERATING, AND SERVICE INSTRUCTIONS SUBURBAN DYNA-TRAIL FURNACES

MODELS	BTU/HR		DIMENSIONS		
	INPUT	OUTPUT	HEIGHT	WIDTH	DEPTH
NT-17 Thin-Line	16,500	13,200	15½"	8-5/8"	23¾"
NT-16	16,000	12,800	9½"	11"	24"
NT-12	12,000	9,600	9½"	8"	24"

## INTRODUCTION

The furnace in your recreational vehicle is a Suburban Dyna-Trail furnace. It is a sealed combustion system furnace, design certified by the American Gas Association for safety and performance for installation in recreational vehicles. Your furnace is one of the following models of the Suburban Dyna-Trail furnaces.

NT-17C	Ducted discharge—12 volts d.c.
NT-17CD	Ducted discharge—operates on 12 volts d.c. or 115 volts a.c.
NT-17CE	Direct discharge—12 volts d.c.
NT-17DE	Direct discharge—operates on 12 volts d.c. or 115 volts a.c.
NT-12, NT-16	Ducted discharge—12 volts d.c.
NT-12D, NT-16D	Ducted discharge—operates on 12 volts d.c. or 115 volts a.c.
NT-12E, NT-16E	Direct discharge—12 volts d.c.
NT-12ED, NT-16ED	Direct discharge—12 volts d.c. or 110 volts a.c.

Basically, the combustion chamber is the same in all models as well as the blower, burner, and control assembly. The most significant difference in the models are the electrical systems of the d.c. only models versus the combination a.c./d.c. models, and the method of air discharge. Due to these two differences, the method of installation will vary from model to model, but the operation and general maintenance instructions are common to all models.

This furnace utilizes a sealed combustion system with a patented dual blower, one of which circulates room air while the other furnishes outside air for combustion. The combustion air blower then forces the flue products to the outside for maximum safety and heating efficiency.

**NOTE:** Combustion air must not be drawn from the living area.

## INSTALLATION INSTRUCTIONS DYNA-TRAIL MODELS NT-12, NT-16, NT-17

One of three methods of installing the Dyne-Trail furnace should be determined depending on the serviceability required and the material used in the sidewall construction of the recreational vehicle. If the material is fiberglass or other combustible material, one method utilizing the Dyna-Trail furnace cabinet back is recommended. If the material is non-combustible, such as: aluminum, steel, etc., and the cabinet back is not desired, an alternative method using only the vent cap, is recommended. If the sidewall construction material is combustible, such as: fiberglass, etc., a third method is available which requires a special adaptor back. These methods are recommendations only. If the installer wishes to use the adaptor back or furnace back on a non-combustible sidewall, this can be done.

### 1. INSTALLATION USING SUBURBAN FURNACE CABINET BACK (Recommended for sidewall construction of fiberglass, aluminum, etc., where a cutout through the side of the vehicle is required for removal of the furnace from outside the vehicle.)

- a. Locate furnace near lengthwise center of vehicle.
- b. Cut opening through inner and outer skin to dimensions given below which apply to each model furnace.

MODEL	Inner Skin Dimensions	Outer Skin Dimensions
NT-17	11" wide x 15¾" high with bottom edge flush with mounting surface.	Same as inner skin.
NT-16	13½" wide x 10½" high with bottom edge flush with mounting surface.	Same as inner skin.

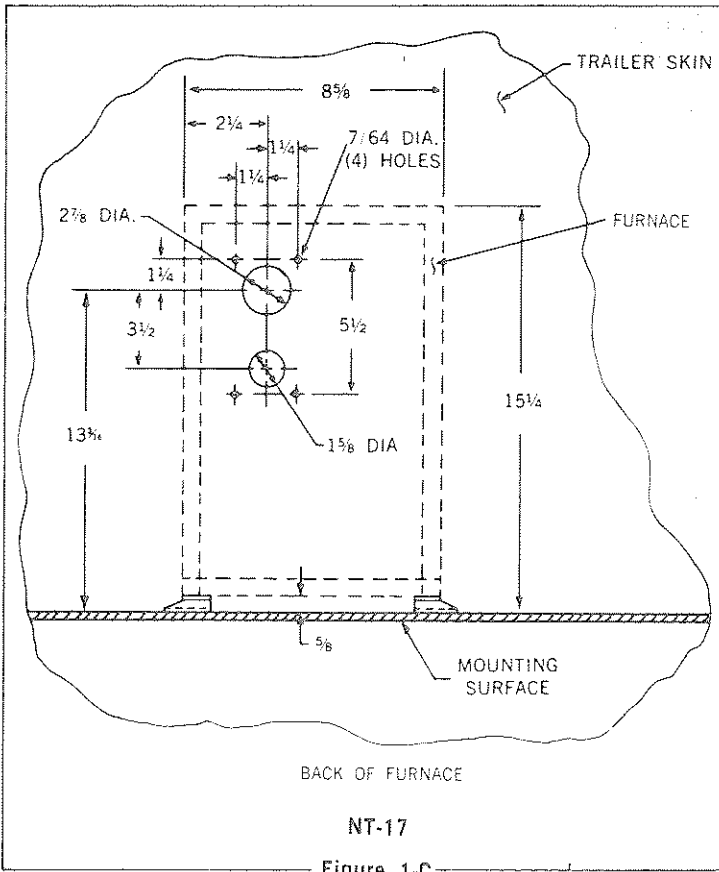
MODEL	Inner Skin Dimensions	Outer Skin Dimensions
NT-12	10½" wide x 10½" high with bottom edge flush with mounting surface.	Same as inner skin.
<ol style="list-style-type: none"> <li>c. Put furnace in place with cabinet rear projecting through vehicle. Do not fasten in place.</li> <li>d. Apply caulking compound between backplate and vehicle's exterior skin.</li> <li>e. Push furnace inward until backplate is tight against vehicle's wall, then using outer row of holes on backplate, screw backplate to vehicle.</li> <li>f. Attach furnace to floor with screws through furnace legs or cabinet bottom.</li> <li>g. Secure the one-piece vent cap to the outside of backplate according to Figure 2. Please be sure the vent cap adaptor is installed on the exterior of the furnace back!</li> </ol>		

**NOTE:** Please insure that approximately 40 square inches of free area have been allowed for cold air return. Be sure this installation allows sufficient room for the furnace to be easily removed for service!

- h. See Figure 1-E for simulated installation of this type.

### 2. INSTALLATION DIRECTLY AGAINST NON-COMBUSTIBLE VEHICLE SKIN (usually aluminum)—no cabinet back required—no cutout in vehicle's outer skin required—except air intake and exhaust openings.

- a. Try to locate furnace near lengthwise center of vehicle.
- b. If vehicle has inner and outer wall skins, proceed with item "C." If no inner skin, go to item "D."
- c. Cut an opening through inner skin to the dimensions given below which apply to each model furnace.



**MODEL Inner Skin Dimensions**

- NT-17 11" wide x 15<sup>3</sup>/<sub>4</sub>" high with its bottom edge flush with mounting surface.
- NT-16 13<sup>1</sup>/<sub>2</sub>" wide x 10" high with its bottom edge flush with mounting surface.
- NT-12 10<sup>1</sup>/<sub>2</sub>" wide x 10" high with its bottom edge flush with mounting surface.

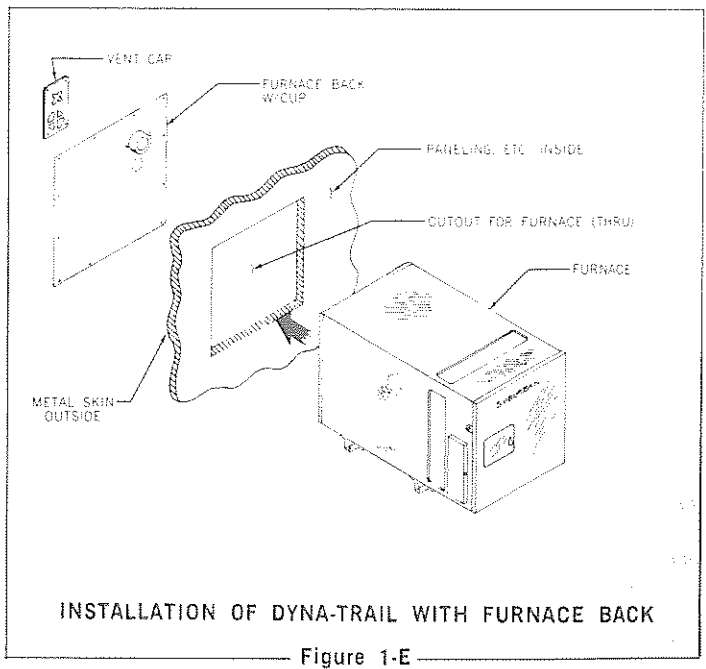
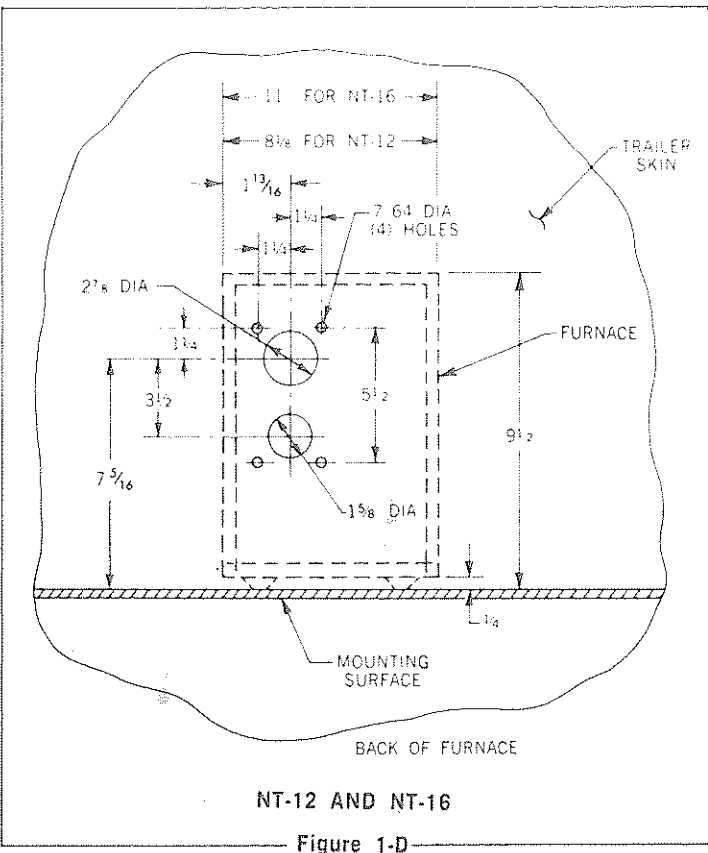
**NOTE:** If extension tubes are used, only a 4" x 8" cutout is necessary in the inner skin. Refer to section (4) for correct installation of extension tubes.

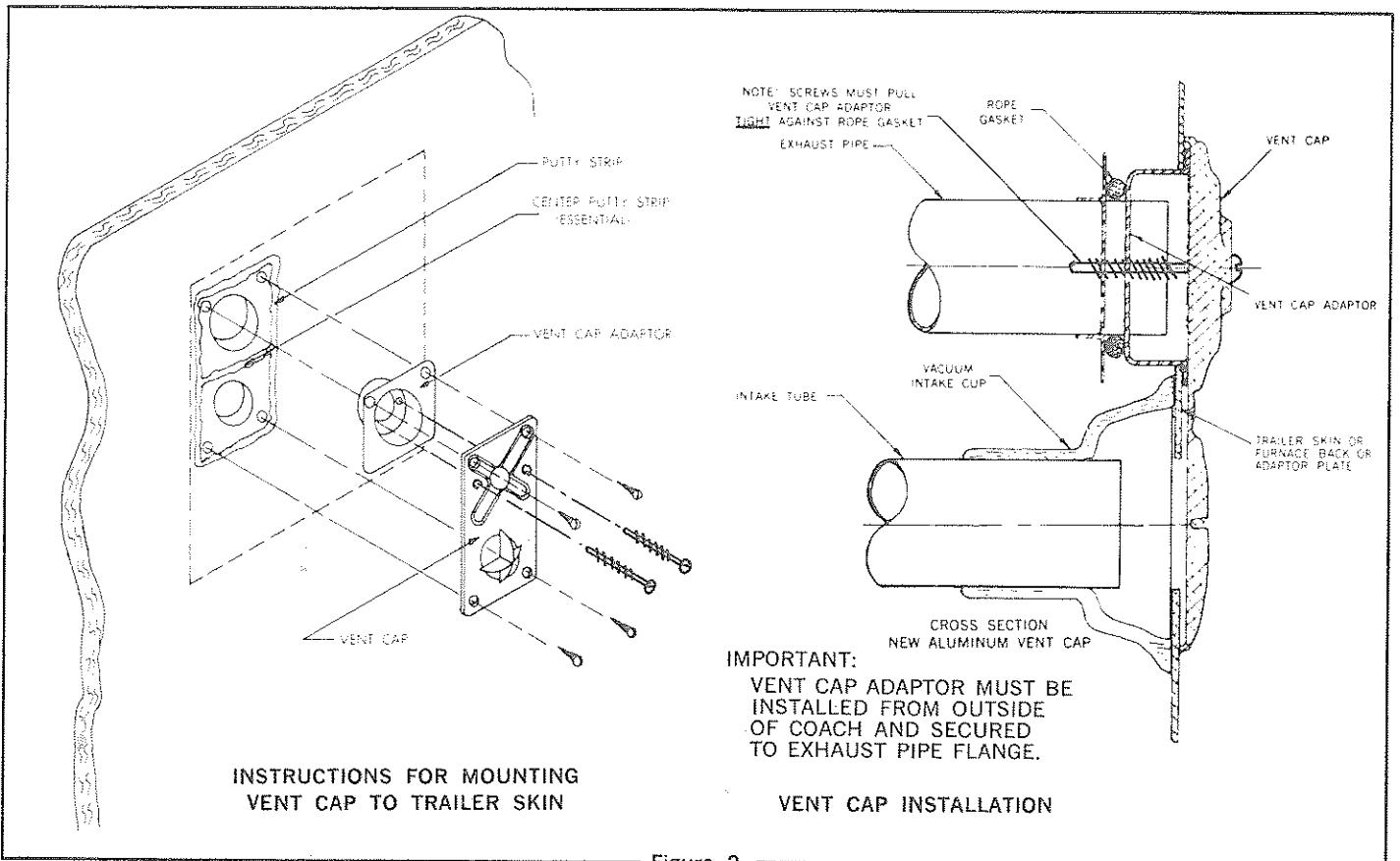
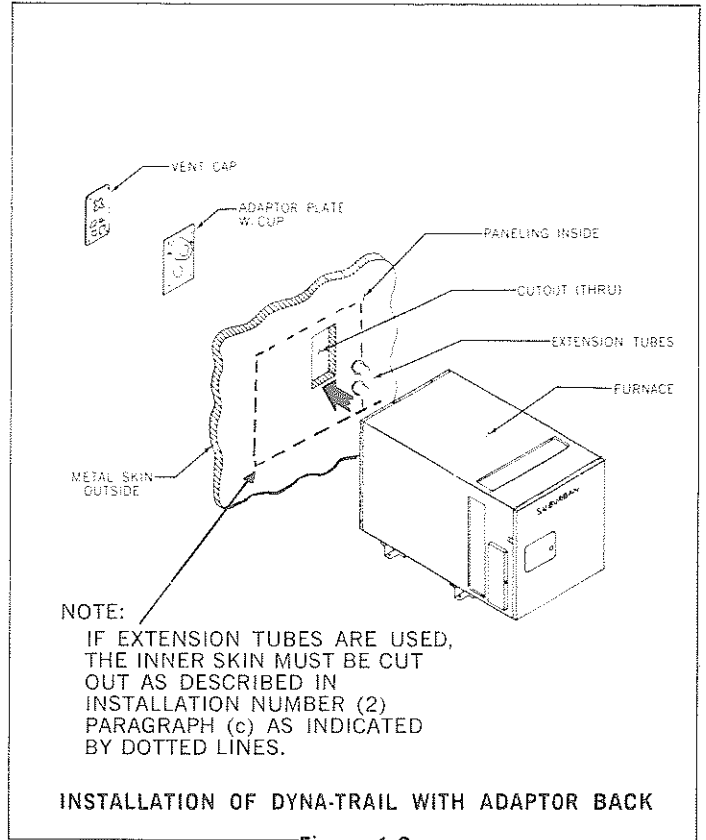
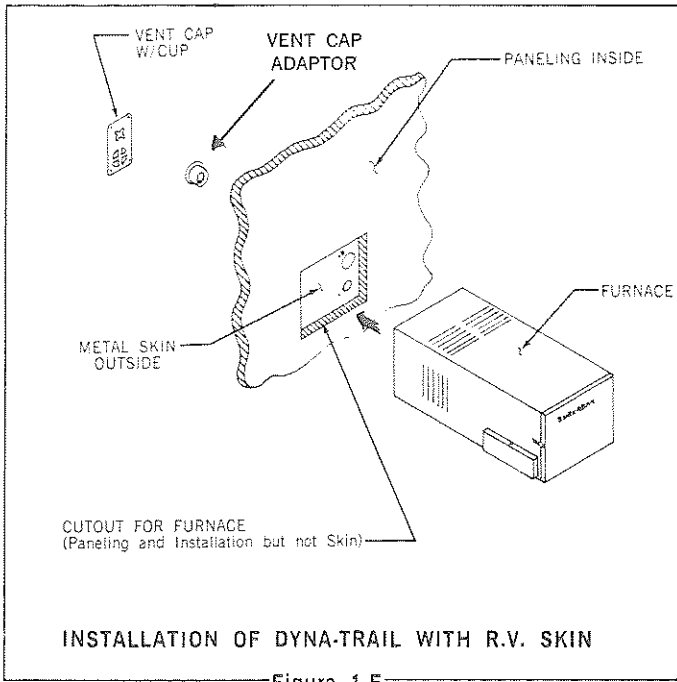
- d. Refer to Figure 1-C or 1-D and pierce holes in outer skin as shown.
- e. Put furnace in place and press it hard against vehicle's outer skin before securing furnace to the outer skin. Then, bolt furnace to floor.
- f. Secure one-piece vent cap to the outside of the outer skin with the four (4) screws provided. (Please refer to Figure 2 for instructions showing correct installation of the vent cap and vent cap adaptor.
- g. Please refer to Figure 1-F showing simulated installation of this type.

**NOTE:** Please insure that approximately 40 square inches of free area have been allowed for cold air return. Be sure this installation allows sufficient room for the furnace to be easily removed for service!

**3. INSTALLATION IN RECREATIONAL VEHICLE WITH FIBER-GLASS SKIN, etc., where large Suburban back is not desired. This installation requires a 4" x 8" cutout in the vehicle's skin and utilizes a special adaptor back to cover the 4" x 8" cutout.**

- a. Locate furnace near lengthwise center of vehicle.
- b. Refer to Figure 1-D and find centers of exhaust and intake holes. Draw a 4" wide x 8" high rectangle equal distances around the two centers as indicated by the dotted line in Figure 2-A. From each center the rectangle should measure 2<sup>1</sup>/<sub>4</sub>" vertically and 2" horizontally. Cut this out through inner and outer skin of vehicle.
- c. Put furnace in place and press it hard against inner skin of vehicle.
- d. Place special adaptor back in place on the vehicle's exterior and secure it with screws provided.





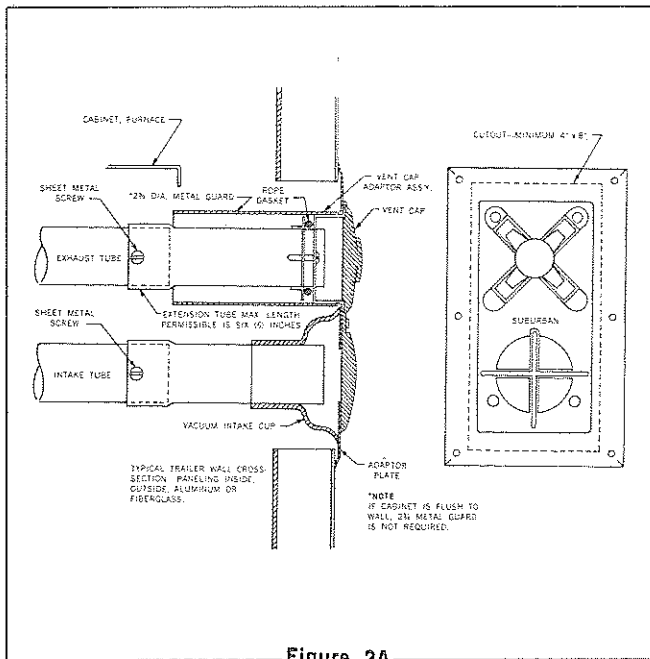
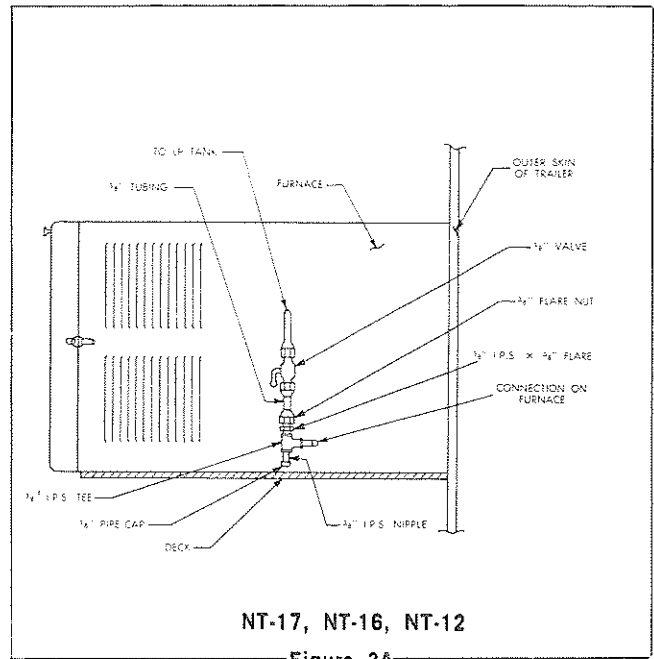


Figure 2A



NT-17, NT-16, NT-12

Figure 3A

- e. Secure one-piece vent cap to vehicle's exterior skin in accordance with Figure 2. **CAUTION: Be sure the vent cap adaptor is installed on the exterior of the special adaptor back!**
  - f. Attach furnace to floor with screws through furnace legs or cabinet bottom.
  - g. See Figure 1-G for a simulated installation utilizing the special adaptor back.
- NOTE: Please insure that approximately 40 square inches of free area have been allowed for cold air return. Be sure this installation allows sufficient room for the furnace to be easily removed for service!**

4. **INSTALLATION USING EXTENSION TUBES.** Extension air intake and exhaust tubes can be used in any of the installations. Such tubes and their usage are limited to a maximum length of 9 inches.

5. **GENERAL NOTES**

NOTE: Disregard step "D" for all d.c. only models.

- a. After one of the two preceding steps has been finished, the installation of the furnace may be completed by the following program.
- b. Connect the gas supply to the furnace at manifold provided on the right side of each furnace (Figure 3-A. All male pipe joints should be treated with a sealing compound resistant to the action of liquid petroleum gases. Be sure manual shutoff valve is outside the furnace jacket as shown.
- c. Connect the 12-volt d.c. power supply to the junction box located on the side of the furnace. The wires are color coded positive (+) and negative (-). This polarity must be observed so the furnace motor will run with the power direction of rotation to insure correct air delivery.
- d. Connect the 115-volt a.c. power supply to the black and white wires within the junction box on the side of the furnace. The furnace is equipped with an external relay which automatically switches the furnace's power supply source from d.c. to a.c. when the a.c. power is connected to the trailer. The relay automatically switches back to d.c. when the a.c. power supply is disconnected from the trailer.

- e. Locate the room thermostat approximately 4 to 4½ feet above the floor on an inside bulkhead where it will not be affected by heat from any source except room air. Connect it at the junction box as mentioned in step "C."
- f. Be sure all voltage wiring to the furnace is of heavy enough gauge to keep voltage drop through it to a minimum. No. 14 gauge wire is recommended.
- g. For side ducts on all models it is recommended that a minimum of 25 square inches of duct area be provided.
- h. To put the furnace in operation, follow the lighting instructions on it. On the initial starting, considerable time may be required to bleed air from the gas supply line before the pilot will ignite.
- i. The cold air return for the furnace must be approximately 40 square inches free area.
- j. Usually the furnace will be installed under a counter. For easy access to it, the furnace enclosure should consist of a door or pair of doors through which the furnace can be serviced if the need arises.
- k. Clearance from combustible material adjacent to the unit must not be less than the dimensions given in the following table for your particular furnace.

Model	Right Side	Left Side	Top	Bottom	Back	Front
NT-17-16-12	1"	1"	1"	0"	0"	1"

- l. After the furnace has been connected to the gas supply, all joints must be checked for leaks.
- m. All installations of the furnace shall be in accordance with local codes.
- n. Refer to Figure 4, page 10, for the d.c. electrical circuits.
- o. After installation is completed and furnace is put into operation, it must be adjusted to obtain a normal temperature rise within the range specified on the plate adjacent to the rating plate.

## OPERATING INSTRUCTIONS

1. To light the furnace, turn the manual valve to the "off" position and wait 5 minutes. Set the thermostat at its lowest setting. Open manual valve. Correct operating characteristics depend on this valve being positioned fully open. Never attempt to operate with valve partially closed.
2. Remove the lighter hole cover. On ducted models, the furnace front is not exposed, so the lighter hole must be reached by removing access door. After removing access door, then remove lighter hole cover.
3. Press reset button and hold. Insert a burning match through opening so that the flame is near the pilot. On the initial lighting the pilot may not light immediately due to air in the gas line. If such is the case, it may be necessary to hold the reset button in for a minute or more before the pilot lights. When the pilot is burning, continue to hold the reset button in for approximately 30 seconds or until the pilot continues to burn when the reset button is released.
4. Replace the lighter hole cover.
5. Replace furnace access door.
6. Set thermostat at desired position.

### BURNER ADJUSTMENT

After the pilot is lit, the furnace is ready for adjustment and observation of the main burner and pilot flame.

To adjust primary air to the main burner, it is necessary to gain access the same way as with lighting the pilot. The small sheet metal cover found just below and to the right of the lighter opening must be removed. Behind the cover is a slotted screw head. With a screwdriver, turn screw head counterclockwise for less primary air and clockwise for more primary air. A symptom of too much primary air will be a howling or screeching noise when the burner is on (reduce air to correct). A symptom of too little primary air will be sooting on the exterior vent and a distinct yellow and floating flame (increase air to correct). A slight trace of orange should remain at the tip of the burner flame—this is a sign of correct adjustment.

### 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 r.p.m. (within 3 to 5 seconds) the microswitch, in response to the air flow, will engage allowing current flow to the solenoid valve or gas valve.
3. The current to the valve opens it and allows gas to the main burner. The pilot light then ignites the main burner.
4. 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.

### FAN SWITCH

The fan switch is to control the sequence of the blower operation. Current is supplied to the motor through the thermostat's relay. When the combustion chamber heats up, heating the bimetal disc of the fan switch to the operating temperature, the switch changes position to close 1 and 3. This completes a circuit through the motor from a direct source. Because of this, 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. After the chamber cools down, the fan switch changes back to its original position and shuts the blower off. If burner and blower shut off simultaneously after several minutes of operation, then the fan switch failed to completely change over. This may be a symptom of a faulty switch.

### 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 ONLY TEMPORARY OPERATION.

### MICROSWITCH

The microswitch has two purposes:

1. It is an "air prover." It operates in response to the current 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, lint accumulation on the blower wheel or inadequate duct discharge area.
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 burner, and ignition occurs.

### BLOWER ASSEMBLY

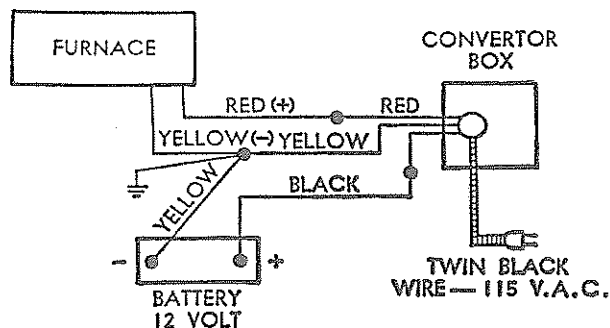
Although one motor drives all wheels, the blowers are separate. The combustion-air blower is sealed so as to allow no passage of air between it and the circulating room-air blower. The combustion-air blower draws air from the outside atmosphere, discharges it into the combustion chamber, and forces the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

### AUTOMATIC SOLID STATE RECTIFIER SYSTEM ON DUAL VOLTAGE MODELS

Two diodes are mounted on a larger heat sink and combine with the transformer to create a full-wave rectifier which converts 115-volt a.c. to 12-volt d.c.

A single-pole, double-throw relay switches the unit from a.c. to d.c./d.c. to a.c. automatically.

The converter is to be installed with the furnace and wired to it according to the following diagram:



## MAINTENANCE AND CLEANING

The Suburban Dyna-Trail unit does not require any routine maintenance or cleaning.

If for any reason the main burner has been allowed to operate with a high yellow flame, a soot formation is sometimes deposited inside the combustion chamber. The carbon deposit may be of such quantity that cleaning will be necessary. To clean the combustion chamber, there is an access hole on the front of each radiation chamber. A vacuum cleaner is ideal to clean out any carbon deposit.

The Dyna-Trail is equipped with an oiled, sealed motor and requires no oiling.

### COMBUSTION CHAMBER REMOVAL—NT-12, NT-16, NT-17 DUCTED AND NONDUCTED MODELS

The combustion chamber must be removed from the front or inside of the recreational vehicle.

1. Disconnect gas and power supply.
2. Remove four vent cap screws and two inner vent assembly screws to free exhaust pipe.
3. Remove cabinet front.
4. Remove bottom cabinet liner from inside the cabinet (NT-17 only).
5. Remove the remaining cabinet liner which is the two sides and top—one-piece.
6. Remove the combustion chamber assembly.

## SERVICE HINTS, DIAGNOSIS, AND CORRECTIVE MEASURES

### A. COMPLAINT—NO HEAT

1. Thermostat off—Check to be sure thermostat is calling for heat. Wire to thermostat could be off terminal.
2. Gas supply—Be sure manual gas valve is in the open position (level parallel to gas line).
3. Pilot—Check to be sure pilot is lit (pilot outage discussed in "B" category).
4. Electrical connections and power—Battery must be charged. If battery is low, there will be sufficient power to run the blower, but not enough to run the blower at full speed. If blower doesn't run at its prescribed speed, the microswitch cannot be engaged and gas will not flow to the main burner. Be sure the connection of the voltage lines in the terminal block are tight.
5. Malfunctioning microswitch—Be sure the microswitch is sailing in far enough to open the solenoid valve. If the switch is not sailing in, clean any dust or dirt from the actuator pin. Other reasons for switch not sailing in are:
  - a. Insufficient blower speed (slow motor due to low charged battery, faulty motor, lint and dust accumulation on the blower wheels, or restriction of return air to furnace). Check wiring in accordance with unit's wiring diagram to assure the proper polarity of the 12-volt d.c. power supply is observed. 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 doesn't open when switch is manually engaged. Switch should also be replaced if battery is fully charged and blower motor running at top speed fails to engage switch within 6 to 7 seconds.

**NOTE: To service switch, combustion chamber must be pulled out.**
6. Inadequate duct discharge (See duct requirements page 6 paragraph G).
6. Gas valve—With test light check gas valve terminals. If current is present, but valve is not opening (when microswitch engages), replace valve. The chamber must also be removed check the above. The valve may be replaced by:
  - a. Shutting off manual gas valve.
  - b. Removing the gas valve.
7. Blower not operating—Check for burned-out motor.

8. Short cycling (fan switch)—If burner and fan shut off simultaneously when the fan switch closes (2 or 3 minutes after burner comes on) it indicates a shorted fan switch. Replace switch (chamber must be removed).
9. Defective relay—Relay may be faulty if motor fails to start when thermostat calls for heat.

### B. COMPLAINT—PILOT OUTAGE

Pilot outage can be due to several reasons. To isolate the source of a pilot outage complaint, it is very helpful to determine exactly when the pilot is going out. There are three phases of the unit operation.

1. Off phase.
2. Start up or ignition phase.
3. Operating phase.

If the time of outage can be linked to one of these phases, then possible sources can be isolated.

#### Off Phase

1. Weak thermocouple or gas valve—Thermocouples are generally long lived, but failures can occur after a period of use. If the pilot is observed going out during the off cycle, it could be due to either a weak thermocouple gas valve. A simple check can be made in the field by a time check. Remove the lighter hole can and extinguish the flame after the pilot has been lit for approximately 5 minutes. Use a watch to check the time that elapses between extinguishing the pilot and the snap of the safety valve. If this is less than 30 seconds, it indicates a weak thermocouple gas valve. Replace the thermocouple first and repeat the test for the valve. If the time lapse is still less than 30 seconds, replace the valve.
2. Air leakage—Draft should not affect the pilot. The unit has a sealed combustion chamber with an air intake and exhaust subject to the same atmospheric pressure. Therefore, the pressure within the chamber is equalized and air is steady. Regardless of the wind or draft condition the pilot will not be blown out as long as the chamber is sealed properly. If, however, a leak is evident, it would disrupt the pressurized chamber, and a draft air movement would commence. As a result the pilot could possibly go out. The following are points to check for air leakage. The unit should be pulled and all of these points should be carefully checked.



- a. Pilot burner gasket must be absolutely tight.
  - b. Air shutter adjustment cover gasket must be absolutely tight.
  - c. Vacuum cup on air intake tube should fit against cabinet back so that no room air can enter air intake.
  - d. Asbestos exhaust gasket should be fitted properly at the end of the exhaust tube to insure proper seal.
  - e. Lead-in wires to the blower motor should be sealed where they enter the blower housing.
  - f. All other gasket points; e.g., blower assemblies, sponge rubber gaskets.
  - g. It is possible that the felt gasket on the interior of the blower assembly may not be properly sealed. If not, air can flow from the sealed combustion compartment which is, in effect, air leakage. Checking this point will necessitate breaking down the blower assembly; therefore, it should be the last point to check. Nevertheless, this is an important hint as this could also be a contributing factor to pilot outage.
3. Lack of sufficient air—Another reason for pilot outage during the off cycle is the lack of sufficient air to support proper pilot flame adjustment. It is important that the flame be the proper size. Unlike most heating equipment, too large a flame is a common cause of pilot outage. It should be just high enough to envelop the thermocouple. If the pilot flame is other than this or yellowish in color, replace the pilot orifice.
  4. Leaky solenoid valve—If gas leaks by the solenoid valve during the off burner periods, it burns, using the oxygen in the chamber and causing the pilot to go out because of lack of oxygen. Observe the main burner through the lighter hole to be sure that the burner cuts off completely on the off cycle. If a flame is present, no matter how small, it indicates that a small amount of gas is leaking through. If there is leakage, inspect the valve to be sure there is no dirt between the valve and valve seat. If there is no dirt to account for the trouble, replace the valve head.
  5. Malfunctioning microswitch—Make sure the microswitch is dropping all the way out and breaking the connection in the solenoid valve on the off cycle of the blower.
  6. Gas supply—Check gauge for proper gas supply and pressure.
  7. Clogged pilot orifice—Evident by small pilot flame.

8. Pilot adjustment—Pilot should be adjusted to where the pilot flame just envelopes the thermocouple tip.

#### Start-up or Ignition Phase

If the pilot is observed and is going out when the burner comes on, check for the following:

1. Malfunctioning microswitch—The microswitch allows gas to reach the main burner by closing the circuit through the gas valve, after the blower motor has started and reached approximately 75 percent of its maximum r.p.m. This takes about 3 to 7 seconds. If the microswitch opens the gas valve too soon, the main burner flame may float and pull the pilot flame out. This is caused by lack of oxygen in the combustion chamber. If microswitch is engaging too fast, replace switch.
2. Primary air—Too little primary air will cause burner to float on ignition and could pull pilot out.
3. When the furnace pilot is observed going out immediately when the blower starts, check for pinched gas line or partially clogged gas line. The obstruction may be an excess of pipe dope which has gathered in the manual shut off valve or in one of the pipe fittings.

#### Operating Phase

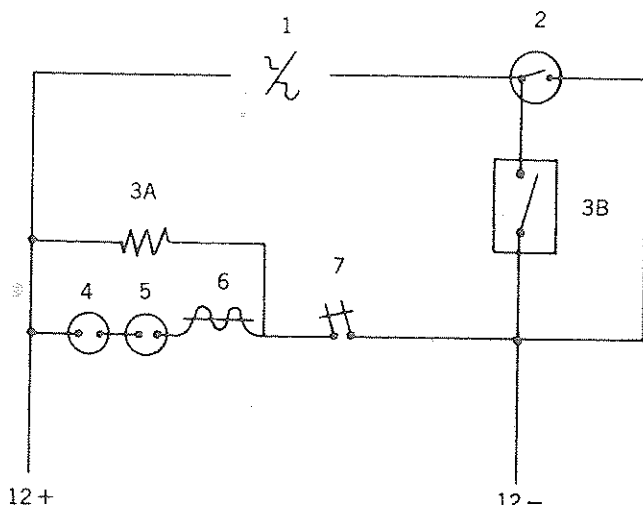
If burner and fan shut off simultaneously when the fan switch closes 2 to 3 minutes after the burner comes on, it indicates a shorted fan switch. Replace the switch. If this symptom occurs, it is also possible for the pilot to go out because the blower was not allowed to run and purge out the combustion products. The excessive amount of combustion products can smother the pilot.

#### C. COMPLAINT—EXCESSIVE NOISE

1. Blower out of balance—Replace blower.
2. Motor hum—Replace motor.
3. Air adjustment—A screeching or howling noise while burner is on is due to excessive primary air. To adjust for less air see instructions on page 7.

#### D. COMPLAINT—ERRATIC BLOWER OPERATION

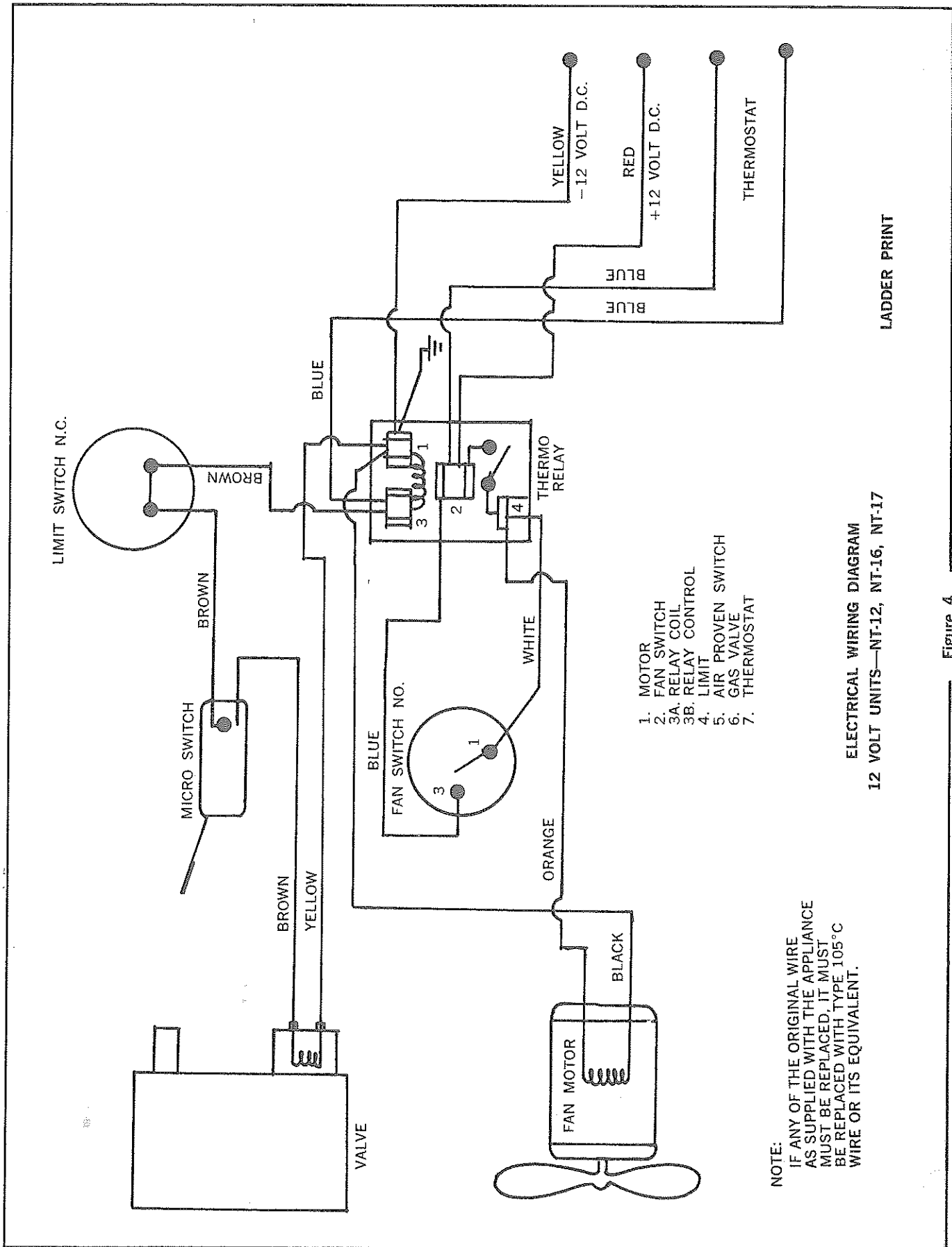
1. Automatic blower motor overload switch may be defective—replace blower motor.
2. When the furnace thermostat is observed opening and closing rapidly when furnace first starts, the gas valve may be shorted or a wire may be shorting out. If furnace runs properly with gas valve disconnected, this indicates a shorted gas valve. Replace gas valve.



1. MOTOR
2. FAN SWITCH
- 3A. RELAY COIL
- 3B. RELAY CONTROL
4. LIMIT
5. AIR PROVEN SWITCH
6. GAS VALVE
7. THERMOSTAT

MODELS  
NT-12, -16, -17

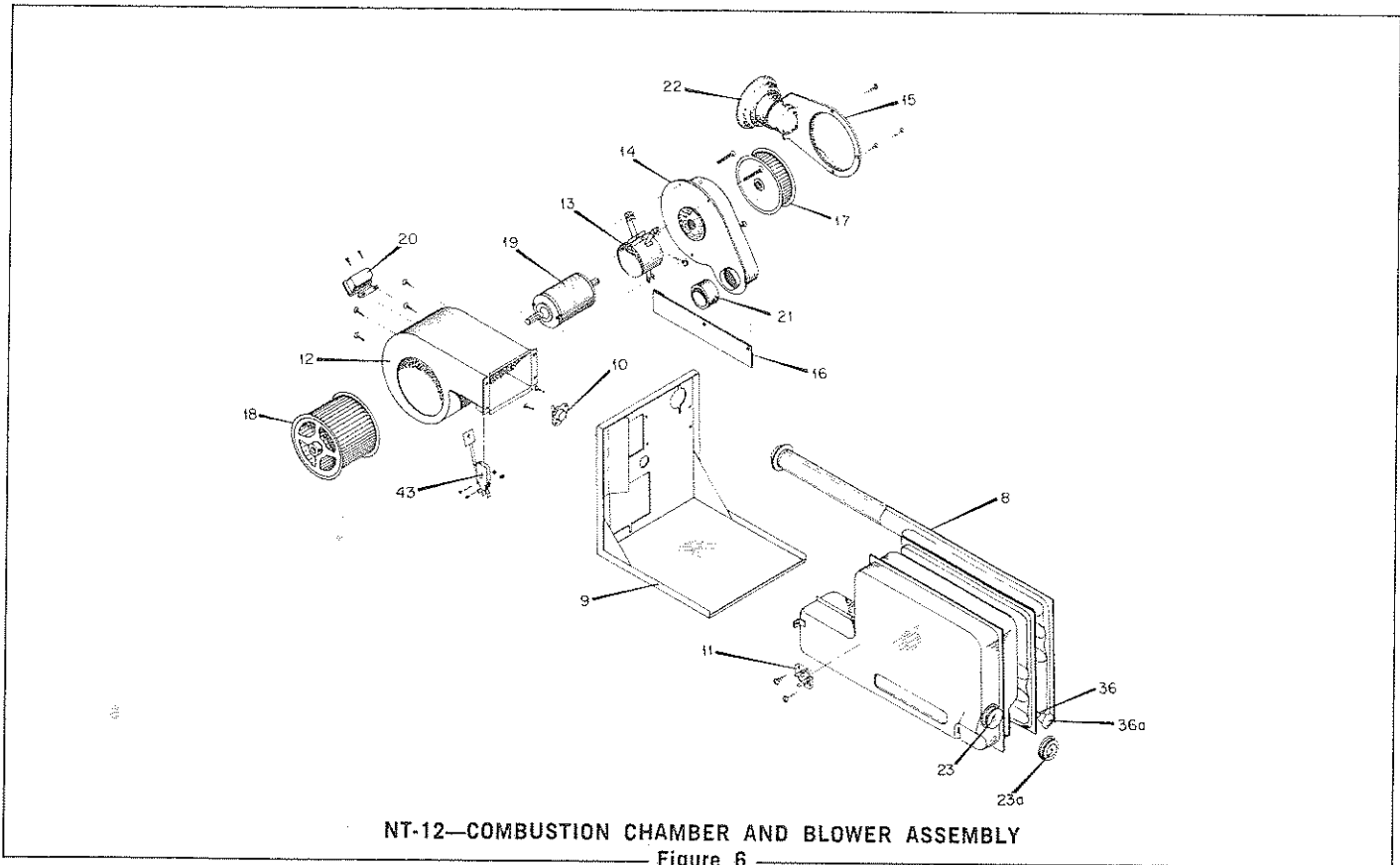
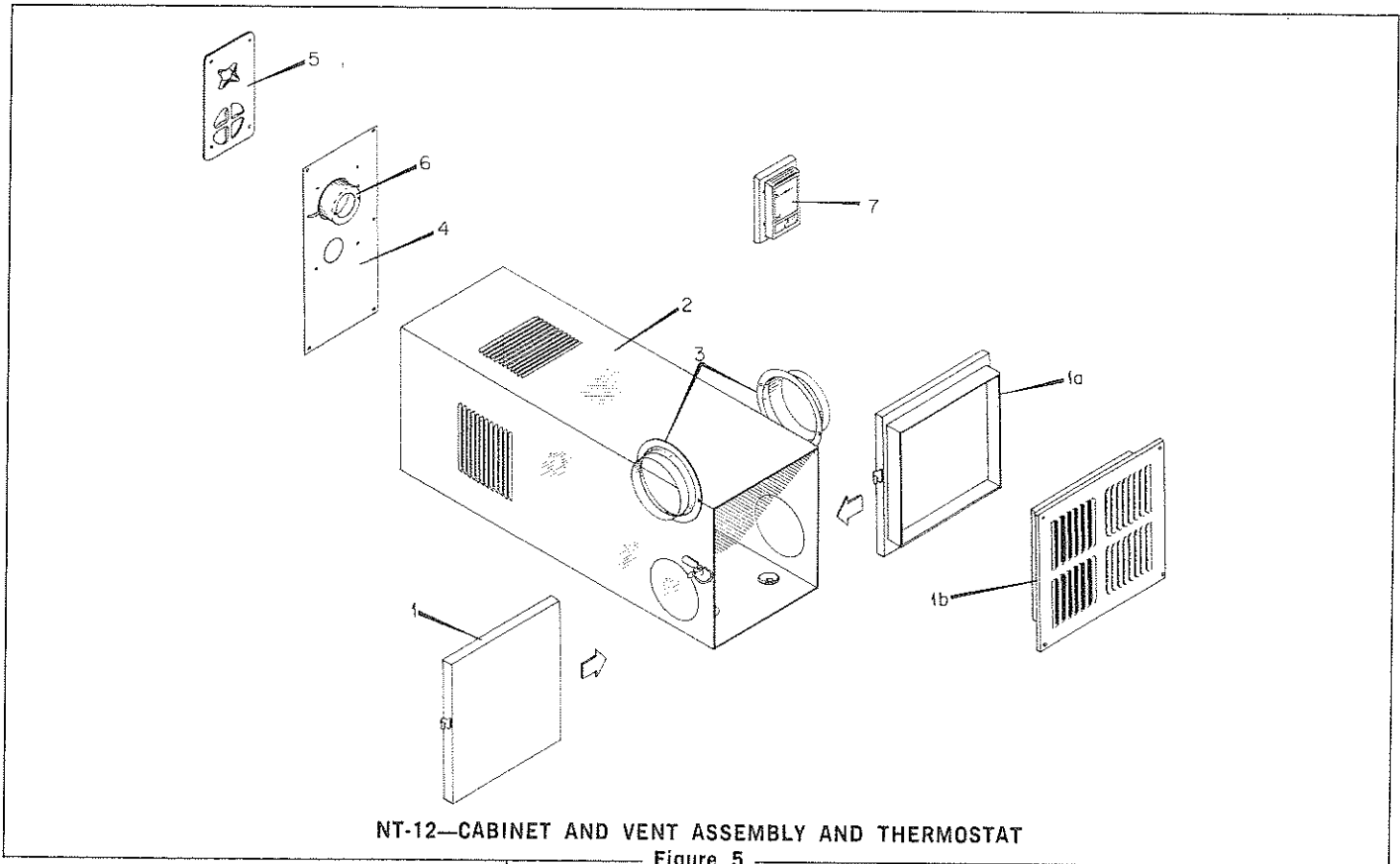
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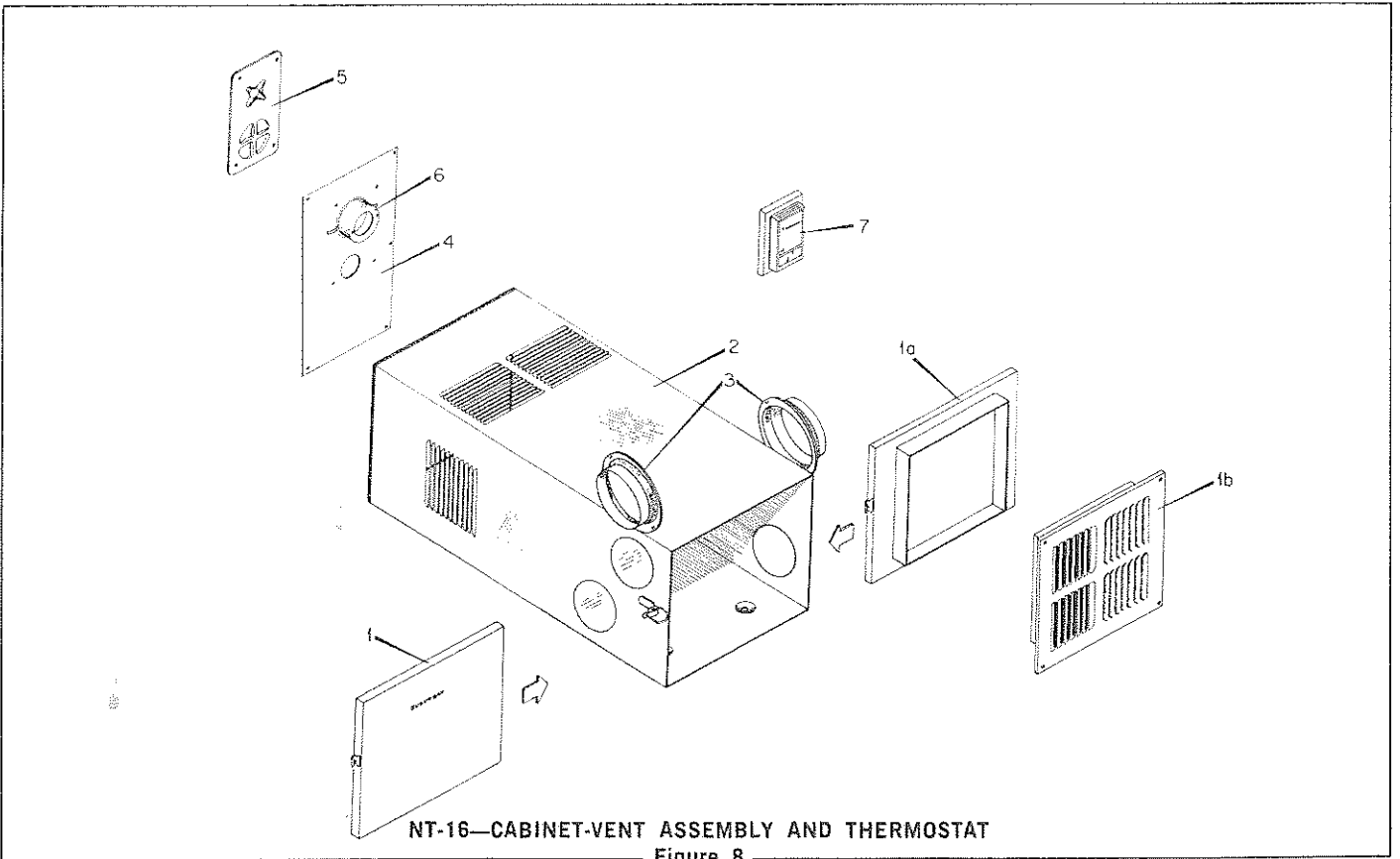
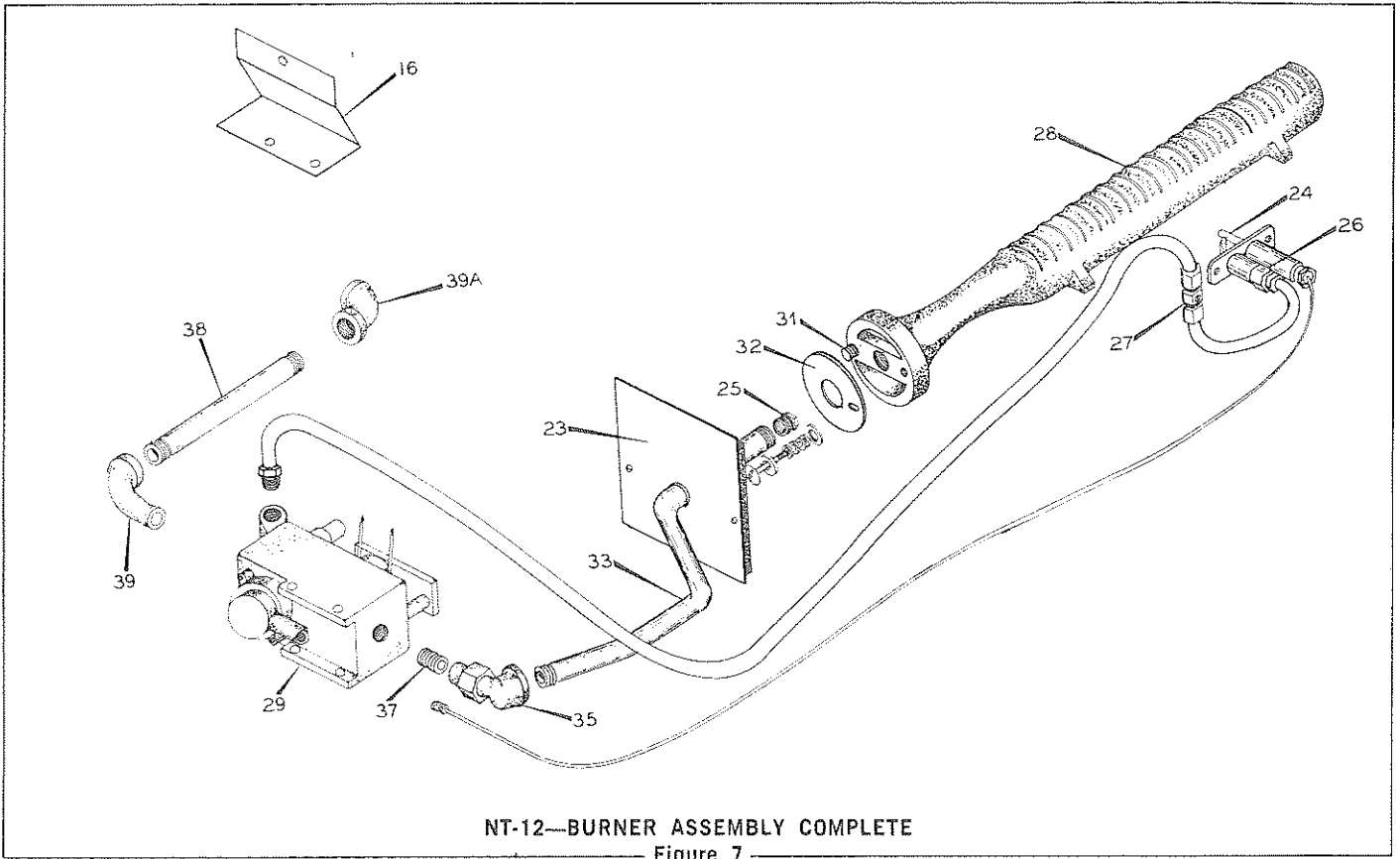


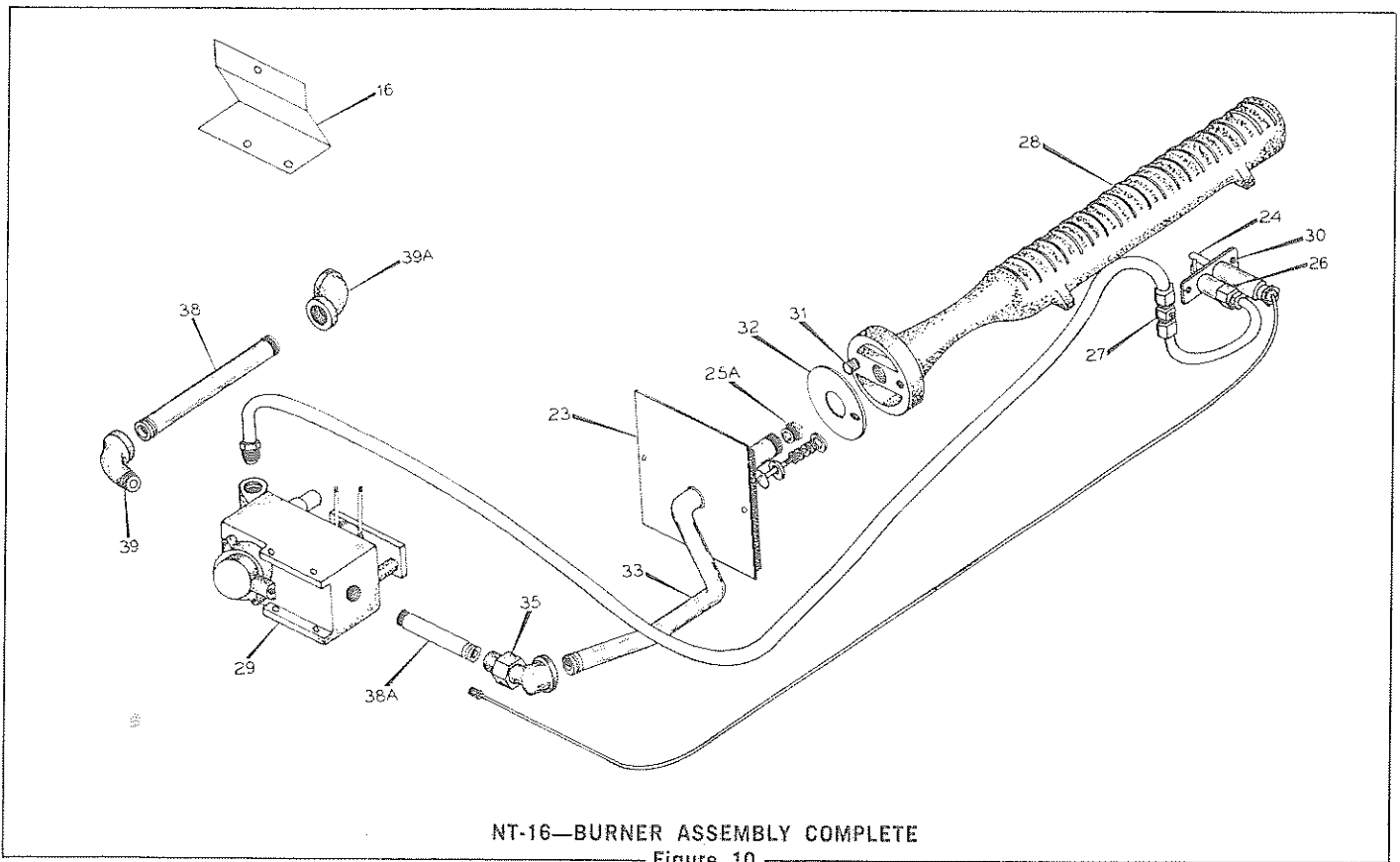
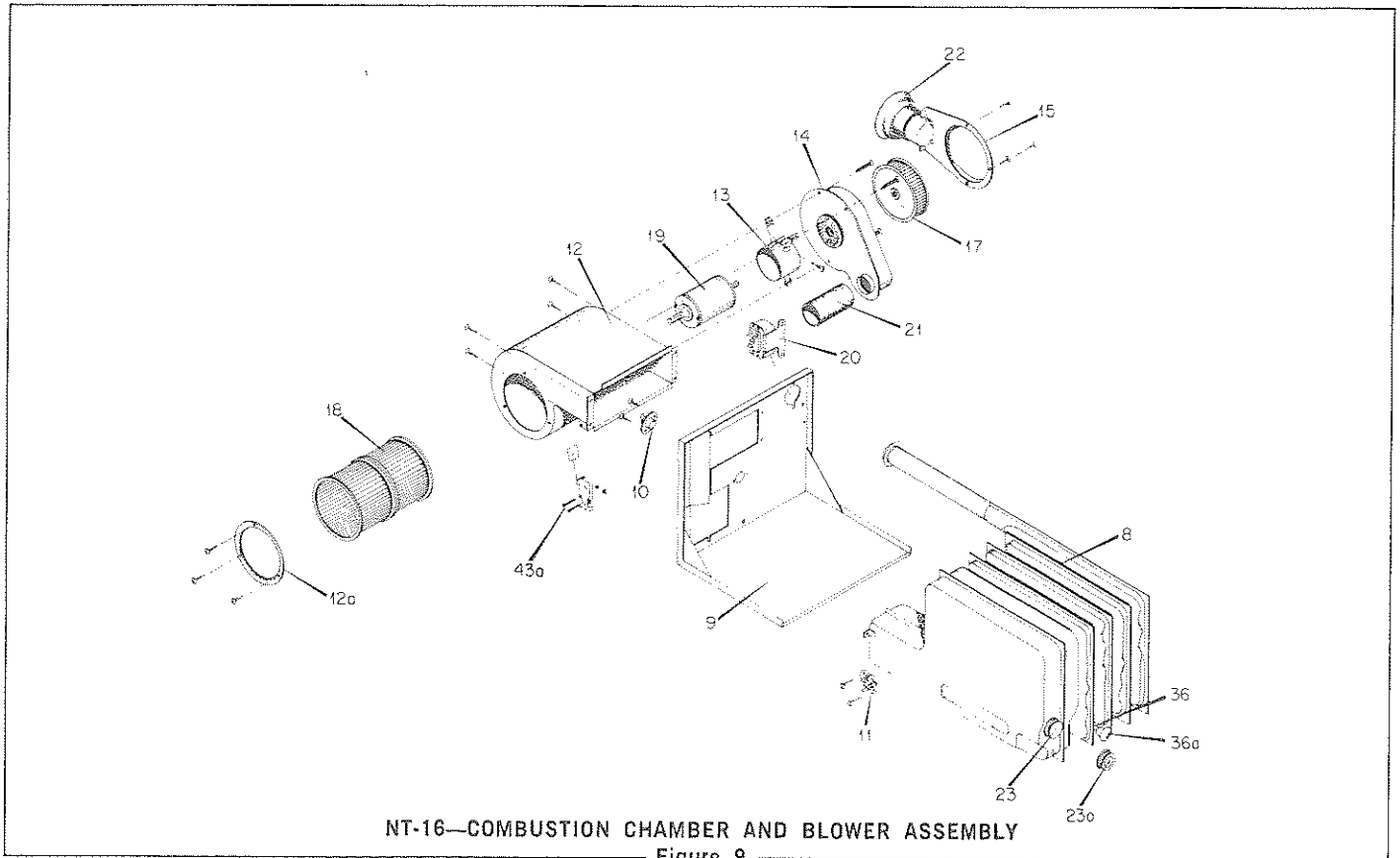
ELECTRICAL WIRING DIAGRAM  
12 VOLT UNITS—NT-12, NT-16, NT-17

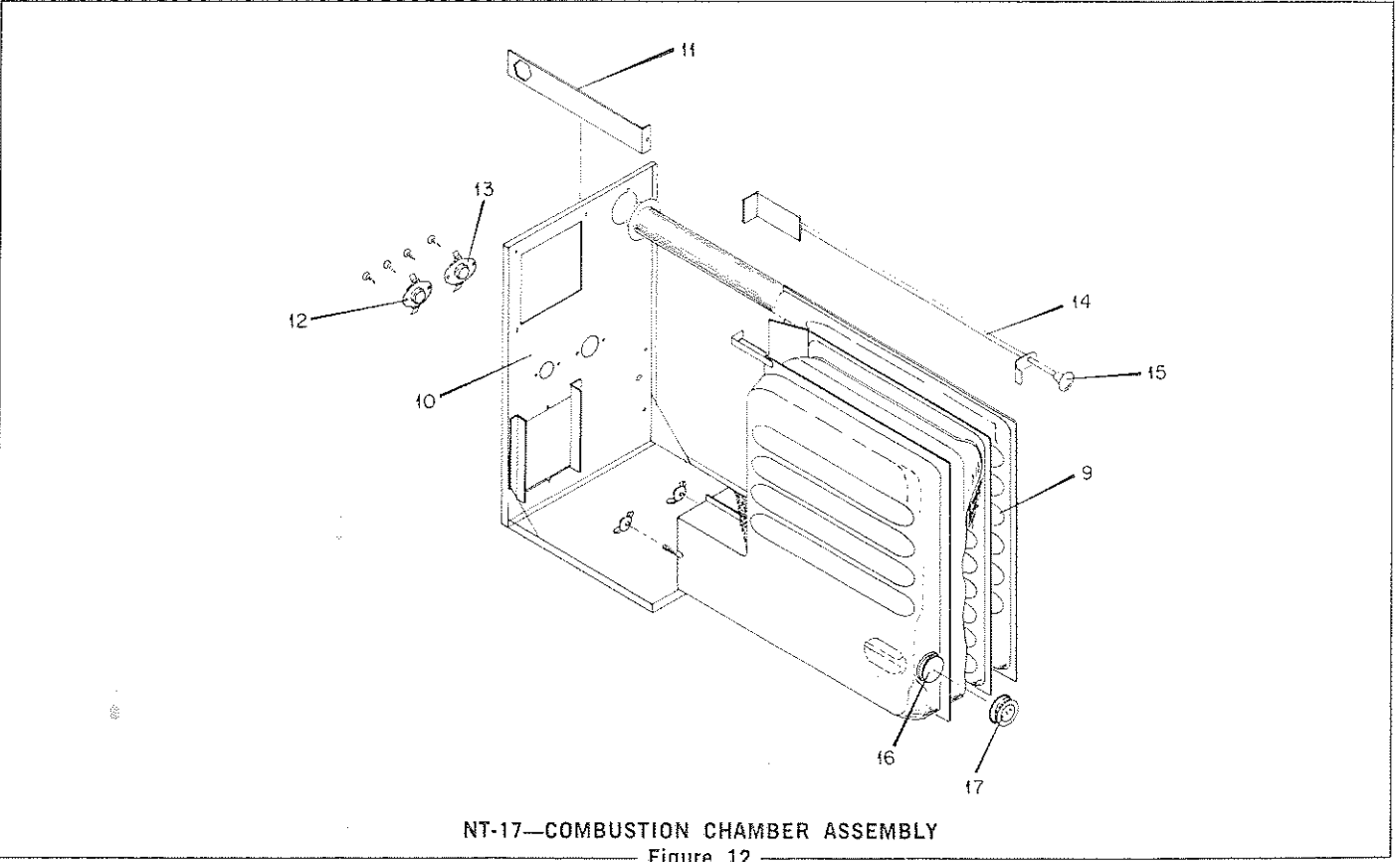
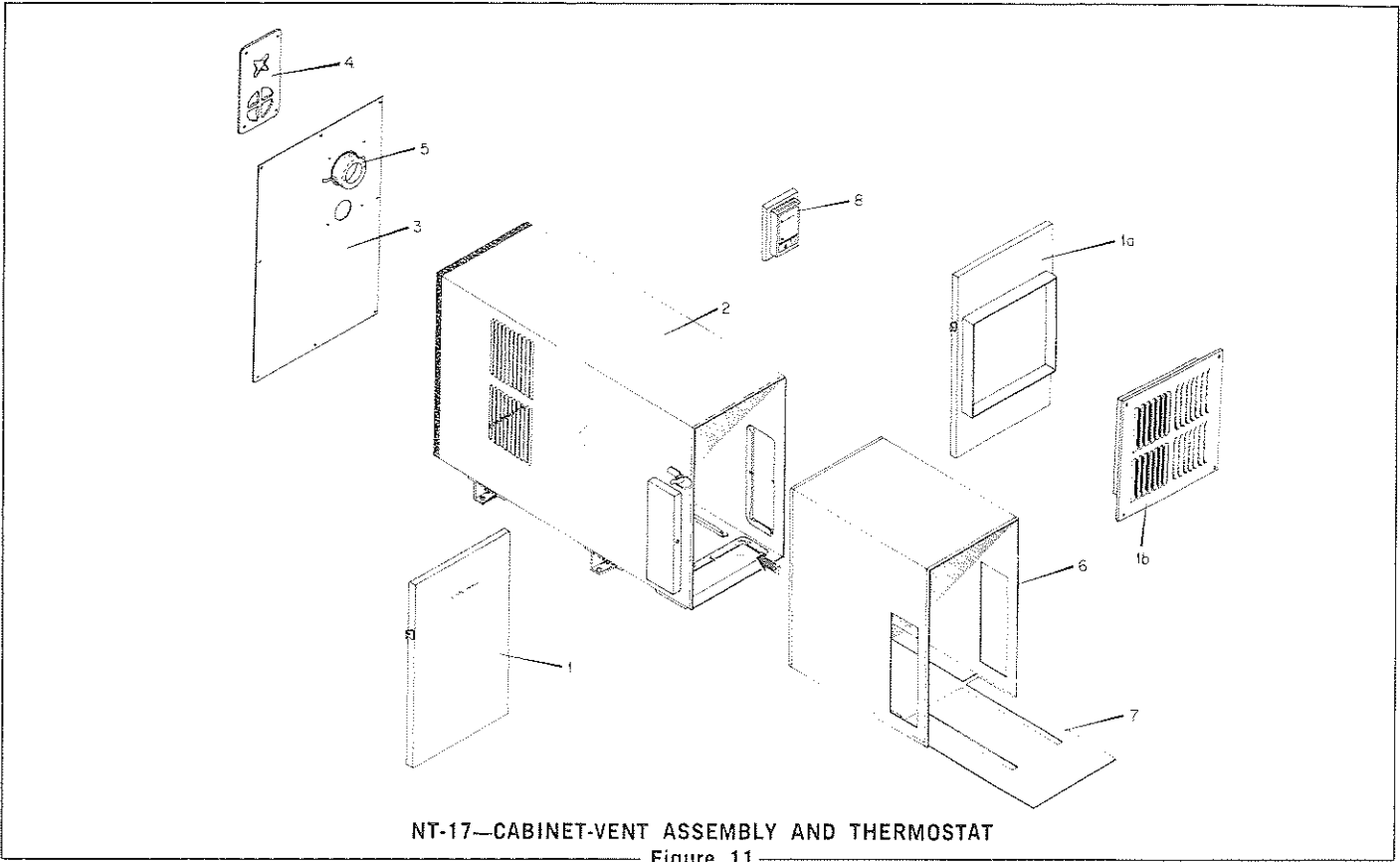
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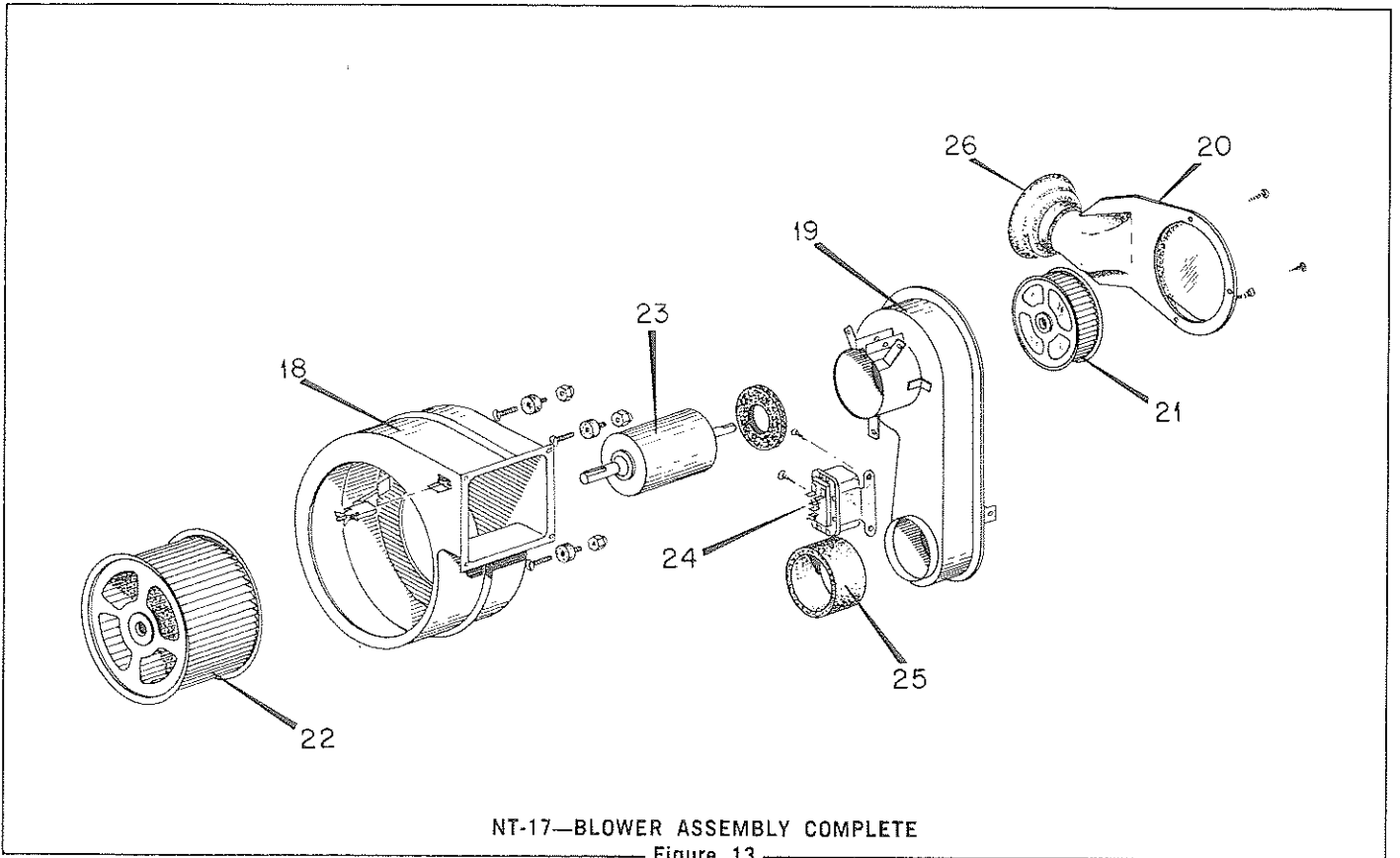
Figure 4



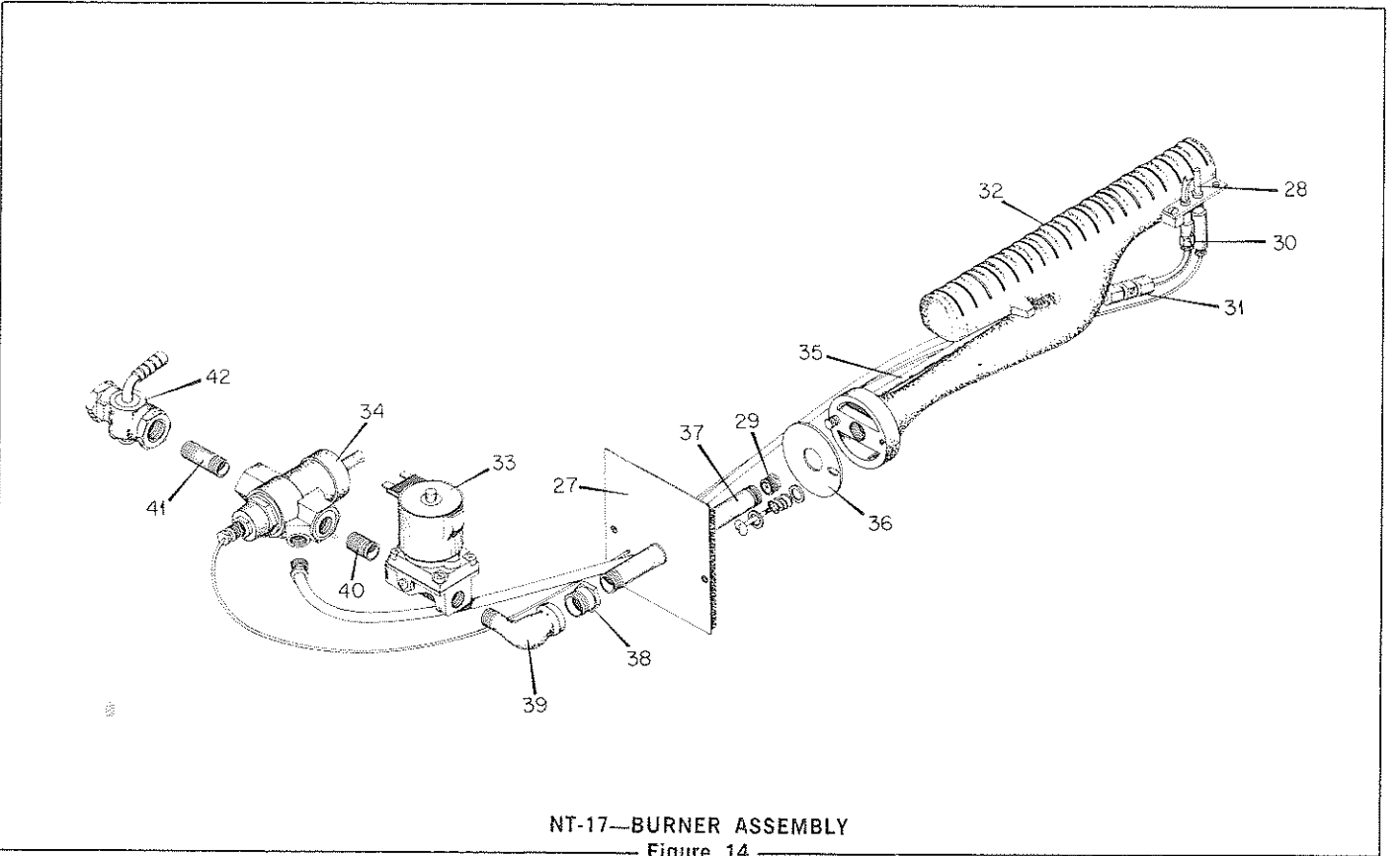








NT-17—BLOWER ASSEMBLY COMPLETE  
Figure 13



NT-17—BURNER ASSEMBLY  
Figure 14

**DYNA-TRAIL TRAVEL TRAILER FURNACE  
PARTS LIST FOR MODELS NT-12 AND NT-16**

Effective Immediately

Item No.	Description	Part No.
1	Front, Outer Cabinet (NT-16)	100600
	Front, Outer Cabinet (NT-12)	100611
1A	Flange, Adaptor, D.D. Grille (NT-16)	X100666
	Flange, Adaptor, D.D. Grille (NT-12)	X100662
1B	Grille, Front Assembly, Nonadjustable (NT-12, NT-16)	X030402
2	Cabinet, Outer Assembly (NT-16)	X100709
	Cabinet, Outer Assembly (NT-12)	X100605
3	Collar, Duct—Round (NT-12, NT-16)	050296
4	Back, Cabinet Assembly (NT-16)	X100594
	Back, Cabinet Assembly (NT-12)	X100603
5	Cap, Vent (NT-12, NT-16)	260060
6	Adaptor, Vent Cap (NT-12, NT-16)	061727
7	Thermostat, Honeywell T819 (NT-12, NT-16)	160616
8	Combustion Chamber and Radiator Assembly (NT-16)	X020195
	Combustion Chamber and Radiator Assembly (NT-12)	X020198
10	Switch, Limit 140°—60T-11 (NT-16)	230303
	Switch, Limit 135°—60T-11 (NT-12)	230307
11	Switch, Fan 190°, 11T-13 (NT-12, NT-16)	230316
12	Housing, Blower Assembly (NT-16)	X390071
	Housing, Blower Assembly (NT-12)	X390079
12A	Ring, Blower (NT-16 Only)	390078
12B	Assembly, Blower Complete (Specify Furnace Model When Ordering)	_____
13	Mount, Motor Assembly (NT-12, NT-16)	X061873
14	Housing, Combustion Air Blower Assembly (NT-12, NT-16)	X390075
15	Air Scoop, Intake Assembly (NT-12, NT-16)	X061834
16	Support, Valve Assembly (NT-12)	X061870
	Support, Valve Assembly (NT-16)	X061870
17	Wheel, Combustion Air Blower (NT-12, NT-16)	350063
18	Wheel, Large Blower (NT-16 AD-408-228-1)	350066
	Wheel, Large Blower (NT-12 AA-408-228-1)	350067
19	Motor, Redmond (NT-16)	230291
	Motor, Redmond (NT-12)	230306
20	Relay, Thermostat—150-7 (NT-12, NT-16)	230275



**PARTS LIST FOR MODELS NT-12 AND NT-16 (Continued)**

Item No.	Description	Part No.
21	Connector, Cross-Over Tube (NT-16)	070290
	Connector, Cross-Over Tube (NT-12)	070294
22	Cup, Vacuum Intake (NT-12, NT-16)	290107
23	Door, Combustion Chamber (NT-12, NT-16)	030399
23A	Cap, Mica (NT-12, NT-16)	X290101
23B	Cap, Lighter, Solid (NT-12, NT-16)	290081
24	Thermocouple, 88D (NT-12, NT-16)	160527
25	Orifice, Main Burner, No. 62, 11/32 (NT-12)	180106
25A	Orifice, Main Burner, No. 57, 11/32 (NT-16)	180194
26	Orifice, Pilot Burner .007 (NT-12, NT-16)	160659
26A	Pilot Assembly-Burner-Orifice-Tubing-Thermocouple (Not Pictured) Specify Correct Model Furnace When Ordering	_____
27	Regulator, Pilot, LB414 (NT-12, NT-16)	160556
28	Burner, Cast Iron .040 (NT-12, NT-16)	010532
28A	Burner, Main, Assembly Complete—Specify Correct Model Furnace When Ordering	_____
29	Valve, Basotrol G92SGD-1' (NT-12, NT-16)	160657
30	Burner, Pilot 2R152-1L	160618
31	Rod, Air Shutter Adjustment (NT-12, NT-16)	140091
32	Shutter, Air (NT-12, NT-16)	010533
33	Pipe, Manifold, 1/4" (NT-12, NT-16)	170355
35	El, Union No. 422MD 1/4" in and out (NT-12, NT-16)	170358
36	Rod, Reset Button (NT-12, NT-16)	140113
36A	Knob, Black (NT-12, NT-16)	140093
37	Nipple, Close 1/4" (NT-12)	170345
38	Nipple, Pipe, 3/8" x 4 1/4" (NT-12, NT-16)	170282
38A	Nipple, Pipe, 1/4" x 2 1/2" (NT-16)	170252
39	El, Street 90° (NT-12, NT-16)	170012
39A	El, 90° (NT-12, NT-16)	170082
40	Valve, Gas, Shut-Off (NT-12, NT-16)	160683
43	Switch, Micro-Assembly (NT-12)	X230305
43A	Switch, Micro-Assembly (NT-16)	X230328
44	AC/DC Convertor Package (Not Pictured), Specify Furnace Model When Ordering	_____
45	Combustion Chamber Assembly Complete (NT-12)	_____
46	Combustion Chamber Assembly Complete (NT-16)	_____

# DYNA-TRAIL TRAVEL TRAILER FURNACE

## PARTS LIST FOR MODEL NT-17

Effective Immediately

Item No.	Description	Part No.
1	Front, Outer Cabinet (NT-17C, NT-17CD)	100580
1A	Front, Outer Cabinet (NT-17E, NT-17ED)	X100669
1B	Grille, Front, Direct Discharge	X030402
2	Cabinet, Outer Assembly	X100575
3	Back, Cabinet	100576
4	Cap, Vent	260060
5	Adaptor, Vent Cap	061727
6	Liner, Cabinet	110224
7	Liner, Bottom	110239
8	Thermostat, Honeywell T819F	160616
9	Combustion Chamber	X020204
11	Bracket, Valve Support	061815
12	Switch, Limit—60T-11 (230°) X30606	160584
13	Switch, Fan—60T13 (170°) X30604	230292
14	Rod, Reset Button	140110
15	Knob, Black	140093
16	Cap, Lighter	290099
16A	Chain, Lighter Cap	150038
17	Cap, Mica Assembly	X290101
18	Housing, Blower Assembly	X390064
19	Housing, Combustion Air Blower Assembly	X390062
20	Air Scoop, Intake Assembly	X061789
21	Wheel, Combustion Air Blower	350063
22	Wheel, Circulating Blower	350064
23	Motor, Redmond—GJ-15C	230291
23A	NT-17 Blower Assembly Complete (Not Pictured)	
24	Relay, Thermostat 150-7	230275
25	Connector, Rubber T-236	070298
26	Cup, Vacuum Intake (Rubber)	290104
27	Door, Combustion Chamber	030396
28	Thermocouple, 88D-30	160527
29	Orifice, Main Burner 11-32/No. 58	180113
30	Orifice, Pilot Burner .007	160659
30A	Burner, Pilot 2R57-2L	160535
31	Regulator, Pilot LB414	160556
32	Burner, Cast Iron .040	010531
33	Valve, Alpha (Solenoid)	160650
34	Valve, Baso (Safety Pilot)	160654
35	Rod, Air Shutter Adjustment	140091
36	Shutter, Air	010366
37	Pipe, Manifold ¼ x 4½	170339
38	Bushing, Pipe, ¼ x ¾	170280
39	Elb—90°, Street	170012
40	Nipple, Close ¾"	170278
41	Nipple, Pipe 1½"	170281
42	Valve, Gas Shut-Off	160683
43	Switch, Micro Assembly	X061280
45	Rectifier, Westinghouse IN1187R (Not Pictured)	230297
46	Relay, AC/DC, 84-20203-301	230255
47	Transformer, 93-000-416-00	230295
48	Combustion Chamber Assembly Complete With Controls	

# RECREATIONAL VEHICLE LIMITED WARRANTY

## PARTS

Suburban Manufacturing Company ("Suburban") warrants to the first purchaser the heating unit against defects in material and workmanship under normal use for a period of one year from date of first purchase of the recreational vehicle. The heat exchanger is warranted to the first purchaser against rustout and burnout for a period of 5 years from date of first purchase of the recreational vehicle. In-warranty parts will be replaced at no charge for the parts. Labor will be paid only as set forth in the "In-Warranty" Service Policy below.

## EXCLUSIONS AND LIMITATIONS

This limited warranty is void if the heating unit is improperly installed, tampered with, or not operated in accordance with the Installation, Operating and Service Instructions book of Suburban, or within its proper voltage and fuel ratings as design certified by the American Gas Association. This warranty is in lieu of all other express warranties, is limited to replacement of defective parts and does not cover any damages resulting from failure of the heating unit. Any implied warranties are limited to one year from the date of first purchase of the recreational vehicle. Malfunctions caused by improper installation or operation, accident, misuse, abuse, neglect or other circumstances beyond Suburban's control such as fire, flood or other acts of God are not covered by this limited warranty.

## "IN-WARRANTY SERVICE POLICY"

Suburban Manufacturing Company, with the cooperation of its authorized service centers, will endeavor to assure customer satisfaction. If there is a defect of material or workmanship in the heating unit within the limited warranty period, Suburban will pay a service allowance to the authorized service center under the terms of Suburban's contract with the service center. In-warranty repairs cover one year from date of original purchase; all other service expenses over one year will be made at the expense of the owner-user. The owner-user is responsible for transportation of the heating unit to and from the service center. A list of authorized service centers is enclosed with Suburban's Installation, Operating and Service Instructions book.

## EXCLUSIONS AND LIMITATIONS

The exclusions and limitations contained in the limited warranty apply to this service policy. In addition, certain services are not included under in-warranty services. They are:

1. Initial checkout and subsequent checkouts which determine that the furnace is operating properly.
2. Cleaning.
3. Water or dirt in controls, fuel lines, and gas tanks.
4. Broken or shorted thermostat wires.
5. Restriction or alteration of warm air or return air circulation.
6. Thermostat adjustments.
7. Instructing owners in operation.
8. Adjusting primary air.
9. Pilot adjustment.
10. Electrode adjustments.
11. Clogged orifice.

 SUBURBAN MANUFACTURING COMPANY

DAYTON, TENNESSEE



SUBURBAN MANUFACTURING COMPANY

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