

DUO-THERM[®]

MOBILE HOME FURNACE

INSTALLATION-OPERATION-MAINTENANCE-PARTS LISTS

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MATERIAL IN THIS BOOK COVERS CURRENT PRODUCTION MODELS ONLY. LITERATURE IS AVAILABLE FOR PRIOR MODELS UPON REQUEST. WHEN ORDERING GIVE COMPLETE MODEL NUMBER SO CORRECT MATERIAL CAN BE SENT. MECHANICS MANUALS FOR CURRENT EQUIPMENT ARE ALSO AVAILABLE UPON REQUEST.

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DUO-THERM DIVISION

Motor Wheel Corporation

LaGrange, Indiana 46761

SECTION 1

INSTALLING FURNACE

UNDERWRITERS' SPECIFICATIONS

Furnaces listed below may be installed on combustible flooring in an alcove or closet with clearances not less than: (See chart below.)

- A – inches from top of furnace casing
- B – inches from sides
- C – inches from back
- D – inches from flue pipe (measured horizontally)
- E – inches from front of furnace (alcove installation)
- F – inches from front of furnace (closet installation)
- G – inches from warm air supply plenum
- H – inches from warm air duct within 6 feet of furnace

Model	A	B	C	D	E	F	G	H
74003	18"	1"	1"	6"	24"	6"	1"	1/4"
74503	18"	1"	1"	6"	24"	6"	1"	1/4"
74601	6"	1"	1"	6"	18"	6"	1"	1/4"
75003	6"	1"	1"	6"	18"	6"	1"	1/4"
75102	6"	1"	1"	6"	18"	6"	1"	1/4"
76003	6"	1"	1"	6"	18"	6"	1"	1/4"
76502	6"	1"	1"	6"	18"	6"	1"	1/4"
84001	24"	1"	1"	6"	18"	6"	1"	1/4"
84501	18"	1"	1"	6"	18"	6"	1"	1/4"
84601	6"	1"	1"	6"	18"	6"	1"	1/4"
85001	6"	1"	1"	6"	18"	6"	1"	1/4"
85102	6"	1"	1"	6"	18"	6"	1"	1/4"
85501	18"	1"	1"	6"	24"	6"	1"	1/4"
86001	6"	1"	1"	6"	18"	6"	1"	1/4"
86505	6"	1"	1"	6"	18"	6"	1"	1/4"
86506	6"	1"	1"	6"	18"	6"	1"	1/4"

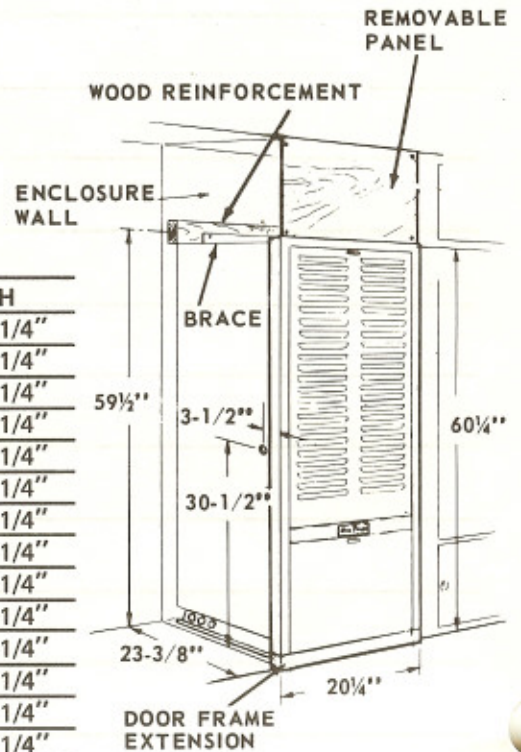


FIGURE 1

The furnace shall be installed in accordance with the regulations of the National Board of Fire Underwriters', the Canadian Standards Association covering the class and authorities having local jurisdiction or local, municipal and provincial laws shall be consulted before installations are made. This applies to installation, wiring and piping.

For closet installations, the flue pipe retaining bracket supplied in parts package MUST be installed. (Figure 12, page 5.)

For closet installations, a return air opening must be provided in front of furnace with a minimum opening of 148 square inches. The return air opening may be a floor return in front of furnace, off the bottom of closet door, a grille in the closet door, or above closet door. For ducted return air systems, the return air registers must total a minimum of 222 square inches of free air surface.

If the furnace is located in a room which may be shut off from the remaining rooms, return air grilles with a minimum free area of 148 square inches must be provided in walls or door, to allow air to return to the furnace.

LOCATING FURNACE

The furnace should be built in an alcove or closet as near the center of the mobile home as possible. The enclosure should be built 23-3/8" deep and 20-1/4" wide with a front opening of 60-1/4" from the floor. Locate

and install a 2 x 4 or 2 x 2 wood reinforcement on the rear wall of enclosure 59-1/2" from the floor to center of wood reinforcement. A removable panel must be installed in the front of enclosure to allow access to the flue pipe.

SUGGESTIONS FOR UNDER FLOOR DUCTS

Locate the main plenum as near as possible to the center of the coach. The main plenum should be approximately 3-1/4" x 34" or 110 sq. inches of free area.

The main trunk duct/ducts should be located so as to keep branch ducts to a minimum. The main trunk duct/ducts should be approximately 3-1/4" x 17" or 55 sq. inches of free area, each way from furnace.

The branch duct/ducts should be approximately 3-1/4" x 10" or 32 sq. inches of free area.

All seams in the duct system should be locked or taped to seal them air tight, also duct system should be wrapped with insulation.

NOTE: The duct system regardless of size or design should not exceed the static pressure as shown on unit rating plate.

REGISTERS

We suggest at least 8 registers, each 2-1/2" wide by 8" long. Locate registers as near the outside walls and windows as possible or in areas of greatest heat loss.

INSTALLATION INSTRUCTIONS FOR STANDARD BASE, Part No. H-3405

CUTTING FLOOR HOLES

Locate and cut hole in the floor 21-3/4" deep by 18-1/2" wide, 1/4" from the front of enclosure and 1-1/16" from left side wall, facing enclosure, and 7/16" from right side wall facing enclosure.

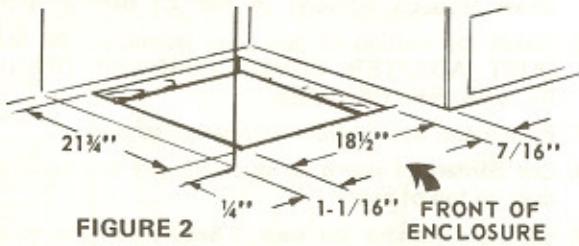
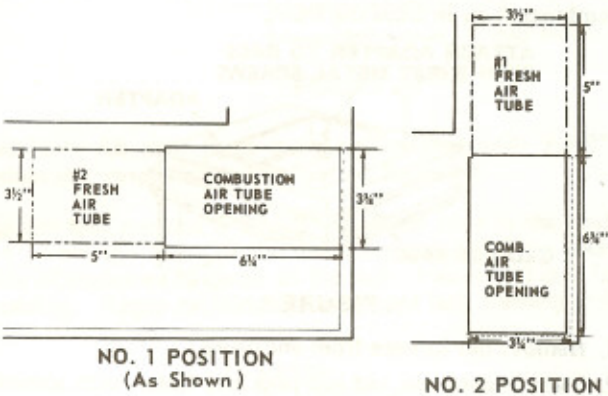


FIGURE 2

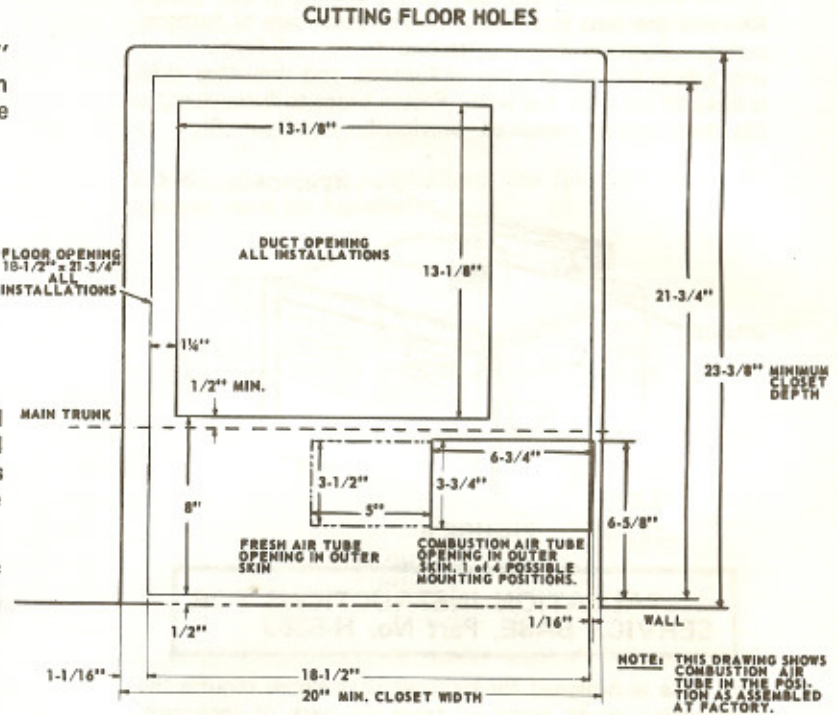
NOTE: Dimensions given in these instructions will allow the door frame assembly to protrude from wall approximately 5/8 - 3/4 of an inch. If these dimensions should be changed, the alcove depth dimensions will have to be changed accordingly.

Illustrations below show the 4 mounting positions of combustion air tube and the possible location of fresh air tube.

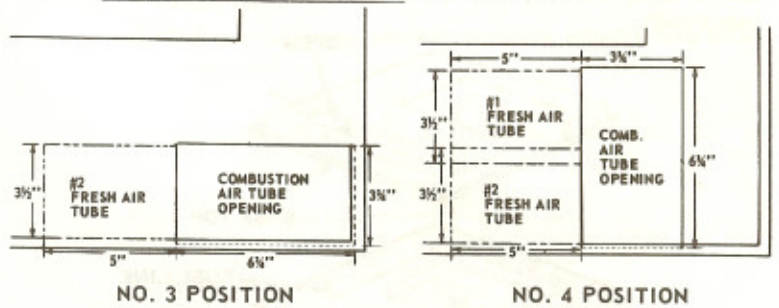


NO. 1 POSITION
(As Shown)

NO. 2 POSITION



COMPLETE FLOOR LAY-OUT



NO. 3 POSITION

NO. 4 POSITION

Set sub-base in the floor opening and scribe around the warm air duct adapter on top of metal under floor feeder duct. Remove sub-base and cut out hole in feeder duct. Opening should be 13-1/8" x 13-1/8" (see illustration above).

SCRIBE ON METAL TRUNK AND CUT OUT.

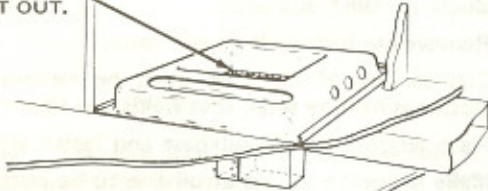
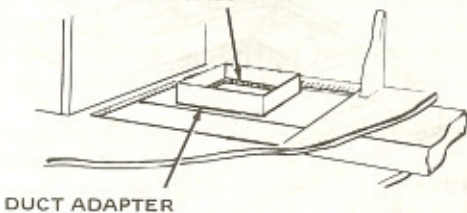


FIGURE 3

Assemble warm air duct adapter to metal under floor feeder duct and be sure to bend over tabs on adapter to make the connection air tight (see figure 4).

BEND OVER TABS



DUCT ADAPTER

FIGURE 4

The opening thru outer skin of mobile home, for the fresh air tube, must be 3-1/2" x 5" wherever it is located.

The opening thru outer skin of mobile home, for the combustion air tube, must be 3-3/4" x 6-3/4" wherever it is located (see illustration above).

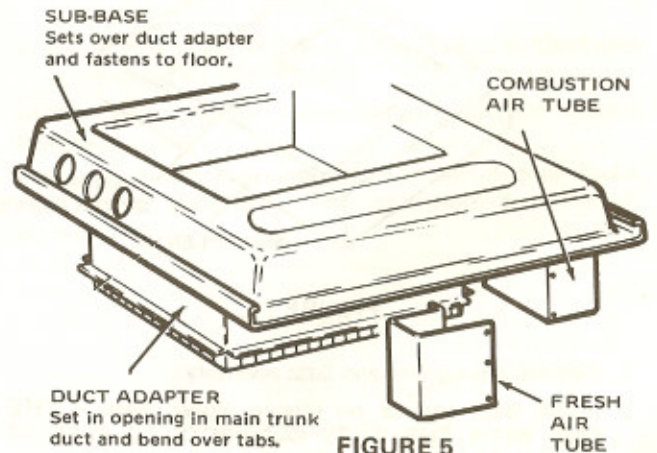


FIGURE 5

Set the sub-base in place in floor opening and over the warm air duct adapter. Be careful not to damage the felt gasket on adapter. Secure sub-base to floor with four screws, one in each corner of base.

Remove the two screws on the top back side of furnace casing. Position brace (attached to top of furnace) so one side is flat on the top of furnace, and the other side is straight up with the wall. Fasten brace to furnace with the two screws removed previously (see figure 6).

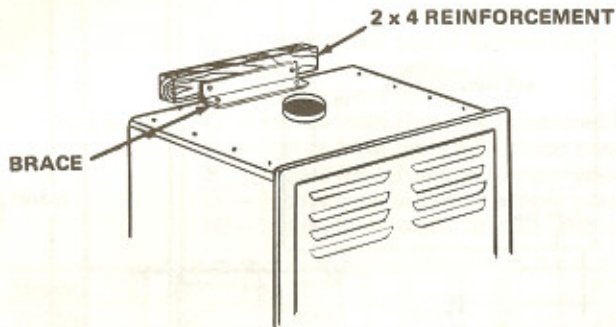


FIGURE 6

INSTALLATION INSTRUCTIONS FOR SERVICE BASE, Part No. H-5883

This base is designed for replacements which require the combustion air to come up from the back of enclosure, due to duct location, etc. Older make furnaces had this base design.

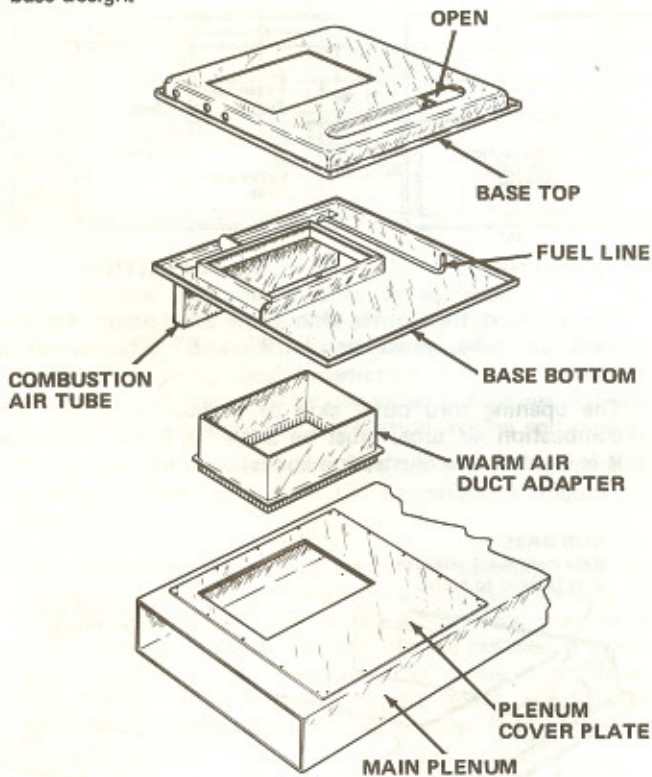


FIGURE 7

1. Remove old furnace and base assembly.
2. Install duct adapter on plenum cover plate — THE END WITH THE TABS CONNECTS TO PLENUM COVER PLATE.
3. Install plenum cover plate over the opening in main plenum. Drill holes and secure with sheet metal screws.

4. Install bottom section of new base assembly over floor opening. Be sure combustion air tube goes through the outer skin of mobile home.
5. Install fuel line, provided. Fuel line should be positioned on right hand side of base, with one end down through opening in rear of base as shown.
6. Install top section of new base assembly. BE SURE DUCT ADAPTER COMES THROUGH OPENING IN CENTER OF BASE.
7. Fasten new base to floor with wood screws.
8. Cut corners of warm air duct adapter and bend tabs over on top of base.
9. Set new furnace on base. Secure furnace to base and wall.

INSTALLATION INSTRUCTIONS FOR BASE ADAPTER, Part No. H-4554

This adapter is designed to convert a rear air intake base, to a front intake. This enables the installation of the current line of mobile home furnace, which take their combustion air in from the front.

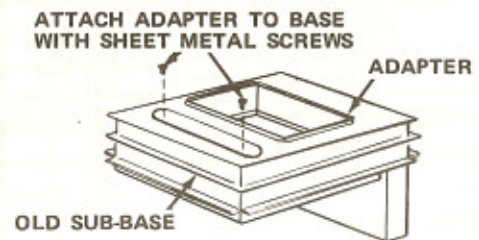


FIGURE 8

1. Remove old furnace from enclosure.
2. Place adapter on old sub-base and fasten with screws.
3. Make provision for gas or oil line to be installed.
4. Reinstall complete base — NOTE: Make sure duct adapter is properly sealed.
5. Properly install new Duo-Therm furnace.

OLD BASE FOR 558 and 570. Products of 1961 and after.

1. Remove old furnace from enclosure.
2. Top section of old base must be removed. (Top section is held by small spot welds, see figure 9.)
3. Place adapter on old sub-base and fasten with screws.
4. Make provision for gas or oil line to be installed.
5. Reinstall complete base — NOTE: Make sure duct adapter is properly sealed.
6. Properly install new Duo-Therm furnace.

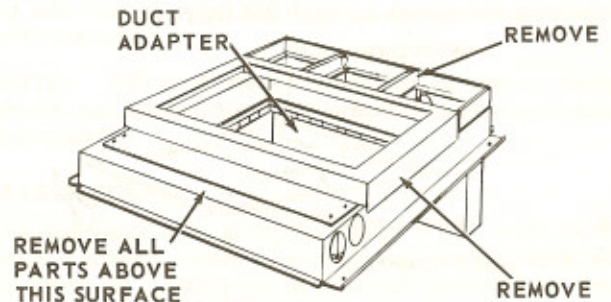


FIGURE 9

INSTALLATION INSTRUCTIONS FOR ROOF JACK

H-5100 — Use with gas or oil furnaces.

H-5101 — Use with gas furnaces only.

These roof jacks are built in various lengths. The dash number indicates body length. (Dimension "A")

Example:

Part No.	Dim. "A"
H-5100-8	8"
H-5100-10	10"
H-5100-15	15"
H-5100-21	21"
H-5101-8	8"
H-5101-10	10"
H-5101-15	15"
H-5101-21	21"

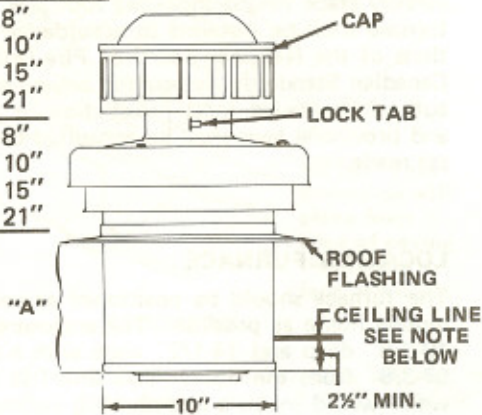


FIGURE 10

NOTE: All roof jacks must be installed with 2-1/2" minimum extending below ceiling, figure 10.

Locate and cut out a 10-3/8" diameter hole in the roof 14" from the front of the enclosure and 10" from each side of enclosure to center of the hole. Install roof jack in opening. Apply caulking between roof jack flashing and roof.

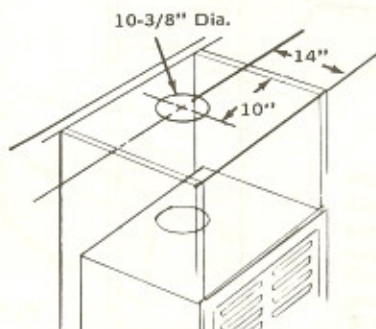


FIGURE 11

CAUTION: The roof jack should extend 1 foot above the highest point of the roof. If necessary install a length of 5" diameter flue pipe between the roof jack body and cap, then secure at both ends with sheet metal screws. —NOTE— A two piece flue pipe is prohibited in some states. Consult local ordinances before installation is made.

A standard length of five inch flue pipe is included with each furnace parts carton. Insert the crimped end of flue pipe into the flue opening of roof jack and push up as far as possible.

Place furnace on sub-base inside enclosure, being careful not to damage the gasket on the bottom of furnace. Slide furnace back as far as possible on base. Attach furnace to base with screws provided.

Fasten the brace on upper rear edge of furnace casing to the rear wall of enclosure with the 2 screws provided.

Slide the flue pipe down from roof jack and over the flue outlet of furnace.

Fasten flue pipe at bottom with a sheet metal screw.

NOTE: For closet installations, the flue pipe retaining bracket must be installed.

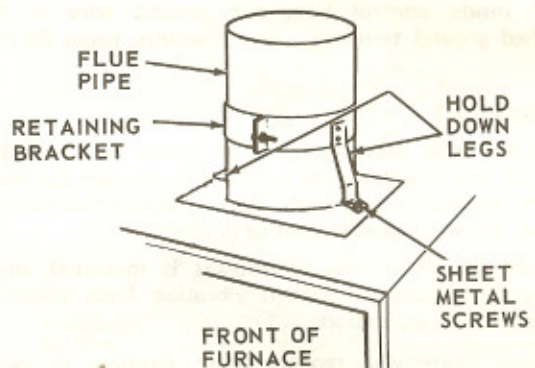


FIGURE 12

1. Bend bracket around lower end of flue pipe and partially tighten draw band.
2. Secure the two hole down legs to casing top with sheet metal screws.
3. Tighten retaining bracket securely around flue pipe.

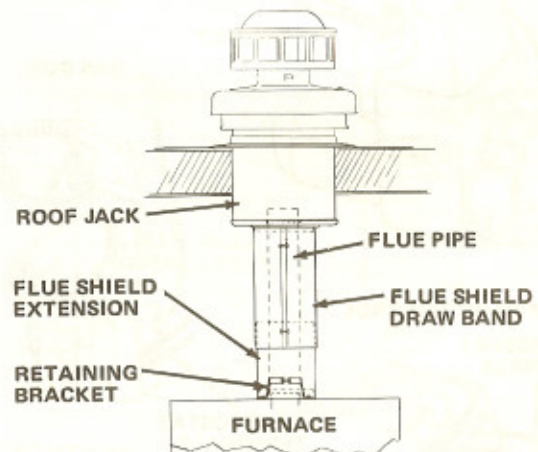


FIGURE 13

4. Install flue shield and draw band as shown. Used only on models 740, 745 and 840.

NOTE: Be sure all flue connections are tight and securely fastened.

Fasten door frame extension to bottom of door frame, with screws provided. This extension is packed in parts carton.

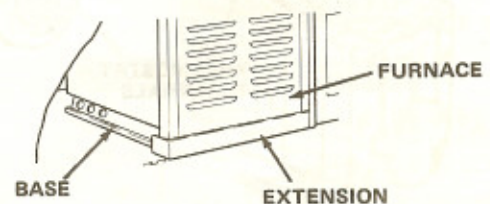


FIGURE 14

SECTION 2

INSTALLATION INSTRUCTIONS FOR ATMOSPHERIC GAS FURNACE, Model 72503

WIRING

The furnace is shipped factory wired except for the thermostat wires and service wires. Run 115 volt, 60 cycle service wire to the control box on front of furnace, in accordance with the National Electrical Code, Canadian Electrical Code Part 1 and the U.S.A. Standard. Do not use less than 12 or 14 gauge wire (with ground). Connect the service wires to the two leads (black and white) inside control box, and ground wire to the identified ground terminal. See diagrams, pages 20 thru 23.

THERMOSTAT

Locate the wall thermostat on an inside wall near the center of the mobile home which will provide the most uniform temperature control. Avoid locating the thermostat near direct sources of heat or drafts.

The wall on which the thermostat is mounted, must have solid support to prevent vibration from effecting the thermostat operation.

To install thermostat, remove cover, connect 18 gauge thermostat cable to the two terminals or leads marked "Therm" or "S.S." of electric control. Attach other end of cable to thermostat. Fasten thermostat to wall with wood screws provided.

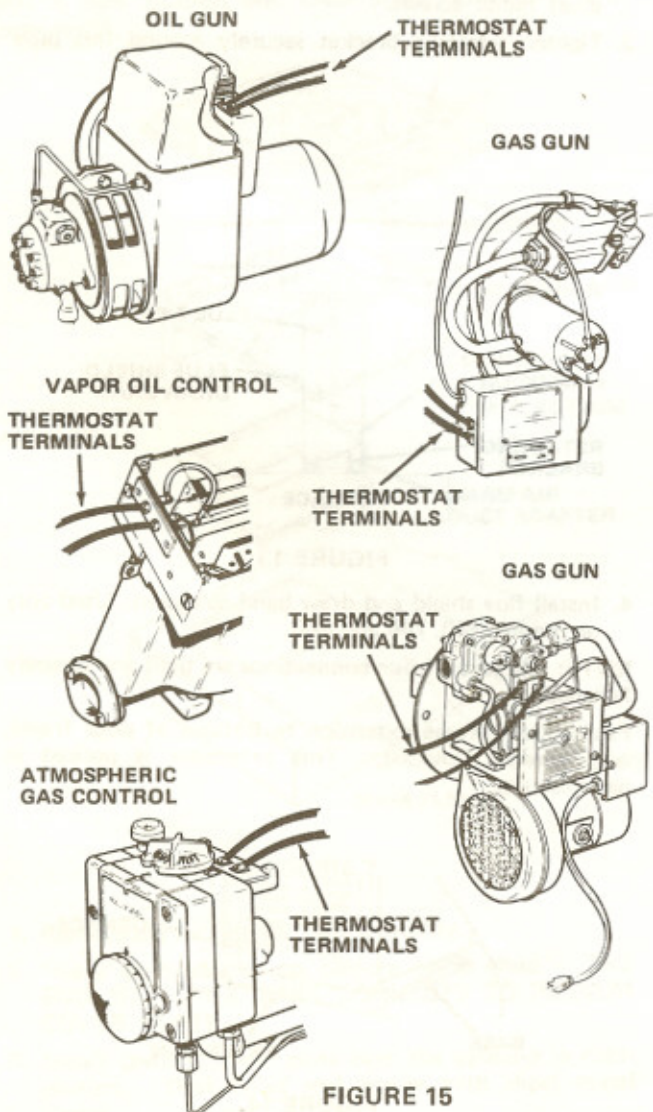


FIGURE 15

UNDERWRITERS' SPECIFICATIONS

The furnace may be installed on combustible flooring in an alcove with clearances not less than: 6" from top of furnace casing, 18" from front of furnace, 0" from sides, 0" from back, 2-1/4" from flue pipe measured horizontally, 2-1/4" from any side of supply plenum, and 1/2" from warm air duct within 6' of furnace. Minimum vertical stack height including roof jack is 22-1/2". The furnace shall be installed in accordance with the regulations of the National Board of Fire Underwriters or the Canadian Standards Association covering the CLASS and authorities having local jurisdiction or local, municipal and provincial laws shall be consulted before installations are made.

LOCATING FURNACE

The furnace should be positioned as near the center of mobile home as possible. The enclosure should be built 19-3/8" deep and 14-1/2" wide with a front opening of 57-3/8" from the floor. This unit has a painted casing which would enable a free standing installation.

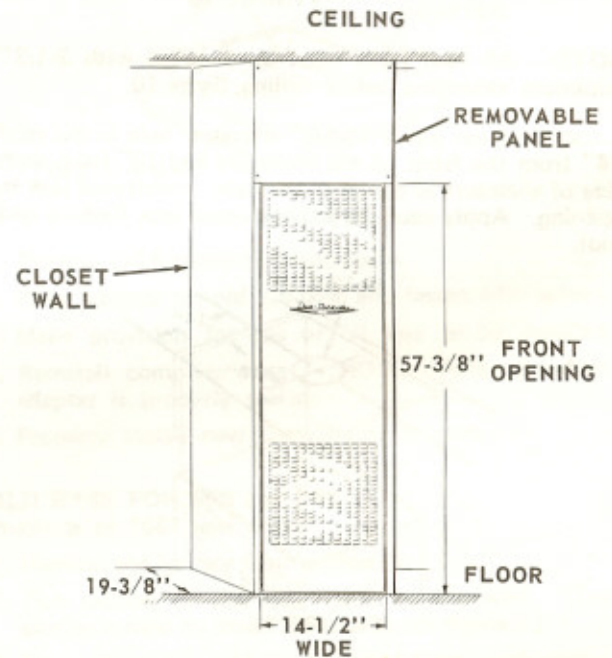


FIGURE 16

For alcove installations — A removable panel should be installed in the front of enclosure to allow access to the flue pipe. The removable panel must be located 57-3/8" from floor to clear the furnace casing.

If the furnace is located in a room which may be shut off from the remaining rooms, return air grills with a minimum free area of 148 square inches must be provided in walls or door to allow air to return from all parts of the mobile home. Also, if a room or rooms may be blocked off, return air grills must be provided to allow air to return to remaining rooms with a minimum area equal to the area of the total registers within the closed off portion.

CUTTING FLOOR HOLES

Locate and cut out 13" wide by 18-1/8" deep hole in the floor, 5/8" from the rear of enclosure and 3/4" from both side walls.

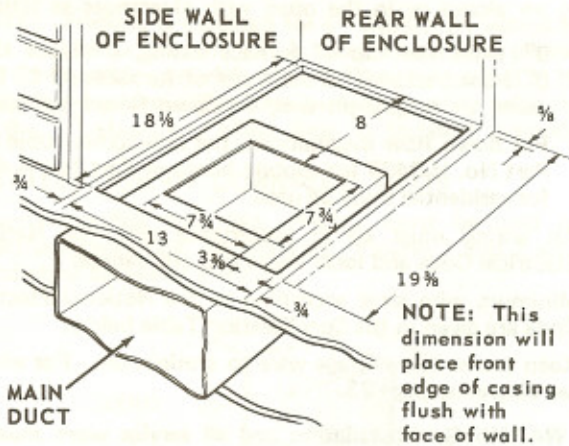


FIGURE 17

Locate and cut out hole, for warm air duct adapter, in the metal under floor feeder duct, 7-3/4" x 7-3/4". Locate hole 8" from rear wall and 3-3/8" from side wall of enclosure.

Locate and cut out hole to fit tight around the 4-1/4" by 7-1/4" combustion air tube in outer skin of the mobile home 2" from rear wall of the enclosure and 3-9/16" from side walls. The hole must fit tight around the tube to keep cold air from leaking in around the under floor duct.

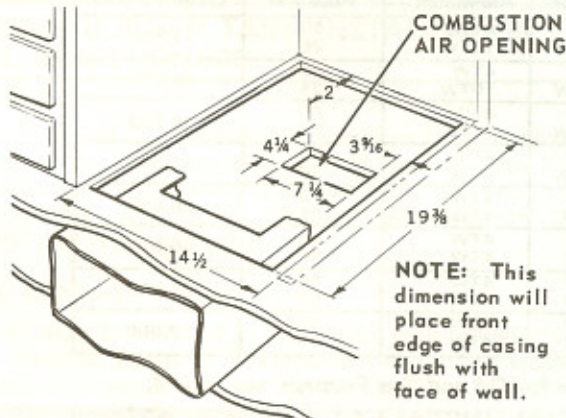


FIGURE 18

Assemble warm air duct adapter to metal underfloor feeder duct and be sure to bend over end tabs of adapter to make the connection air tight.

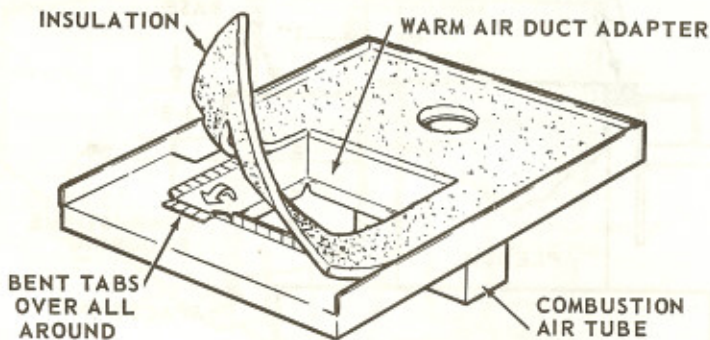


FIGURE 19

Set sub-base over warm air duct adapter and into hole in floor. Lift up on one side of insulation and secure base to floor with 4 screws through top of base. With adapter protruding through top of base, cut down on the corners of adapter to enable the bending of the top 4 sides of adapter over onto the top of base. Bend sides down tight against top of base, and lay insulation back in place.

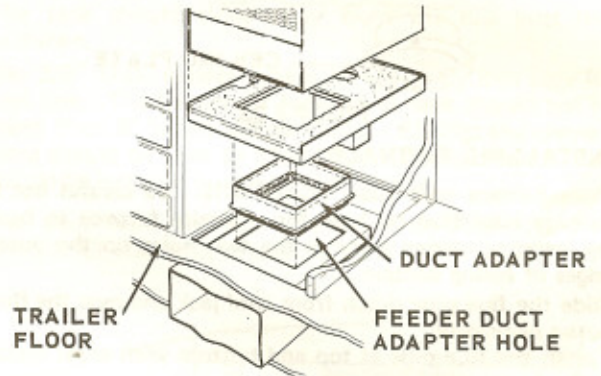


FIGURE 20

ROOF JACK

Locate and cut out an 8" hole in the roof 4-3/8" from the rear of the enclosure and 7-1/4" from each side of enclosure to center of the hole. Install Part No. H-3737 roof jack.

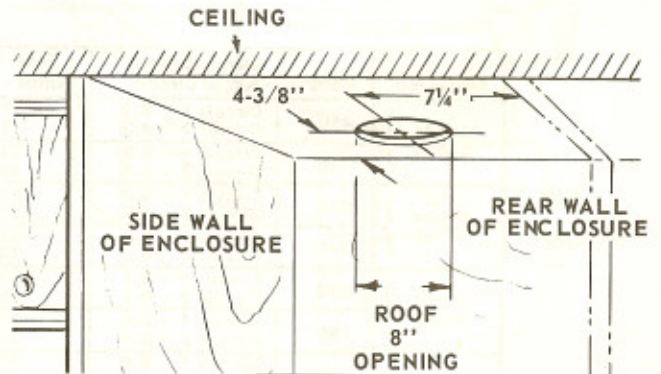


FIGURE 21

CAUTION: The roof jack must extend 1' above the highest point of the roof. If necessary, install a length of 4" diameter flue pipe between the roof jack body and cap, then secure at both ends with sheet metal screws.

Insert the crimped end of a piece of 4" flue pipe, furnished, in the flue outlet of the roof jack and push up as far as possible.

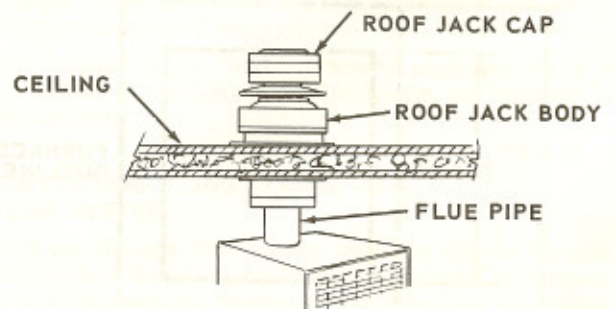


FIGURE 22

SECTION 3

INSTALLATION INSTRUCTIONS FOR ELECTRIC FURNACE

SPECIFICATIONS

The furnace may be installed on combustible flooring in an alcove or in the open with clearances as follows:

0" from the top of furnace casing, 0" from sides, 0" from back, 6" from front of furnace and 1" from warm air supply plenum, on down flow installations.

For down flow installations, the non-combustible base Part No. H-3405 for mobile home or Part No. H-4342 for residential must be used.

All wiring must be in accordance with the National Electrical Code and local codes and ordinances.

Minimum wire sizes according to the National Electrical Code are given in the Specification Table below.

Keep excess low voltage wire to a minimum. For wiring, see diagrams, page 23.

WARNING: Installation and all service work must be done by an authorized serviceman.

This furnace is connected to more than one branch circuit. Disconnect all branch circuits before servicing.

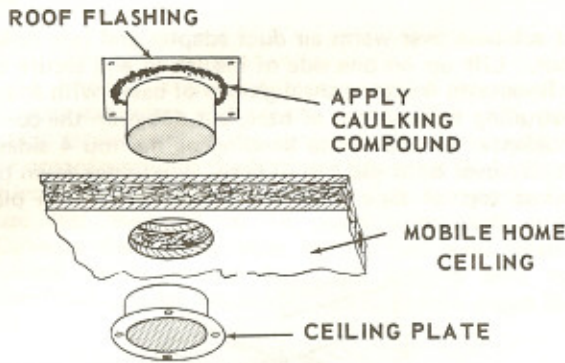


FIGURE 23

INSTALLING FURNACE

Place furnace onto base. **CAUTION:** Be careful not to damage insulation on base top. Secure furnace to base by inserting screws through the two holes on the outer edges of casing bottom.

Slide the flue pipe down from roof jack and over the flue outlet of furnace.

Fasten the flue pipe at top and bottom with sheet metal screws.

NOTE:

For pipe hook up and wiring, see pages 15, 20, 21 and 22.

Model Number	Blower Motor HP	Motor Volts	Motor Amps	Filter Size	Motor RPM	CFM @ .15" W.C.*
34501 - 35004 - 34502 - 35005	1/4	240	2.7	18-5/8" x 16-3/4"	1725	600
36001 - 36804 - 36002 - 36805	1/4	240	2.7	18-5/8" x 16-3/4"	1725	710

*Based on Clean Filters.

Model No.	Volts	Element Input KW - Circuit	Total Input Amps - Circuit	Wire Size		Fuse Size	Output BTUH
				Copper	Aluminum		
34501 34502	230	Circuit 1 - 8.1	37.9	6TW	4TW	50	41,300
		Circuit 2 - 4.0	17.5	10TW	10TW	25	
35004 35005	240	Circuit 1 - 8.8	39.3	6TW	4TW	50	45,000
		Circuit 2 - 4.4	18.3	10TW	10TW	25	
35004 35005	230	Circuit 1 - 9.0	41.3	6TW	4TW	60	46,000
		Circuit 2 - 4.5	19.5	10TW	10TW	25	
36001 36002	240	Circuit 1 - 9.8	43.7	6TW	4TW	60	50,200
		Circuit 2 - 4.9	20.4	10TW	8TW	30	
36001 36002	230	Circuit 1 - 8.1	37.9	6TW	4TW	50	55,200
		Circuit 2 - 8.1	35.2	6TW	4TW	45	
36804 36805	240	Circuit 1 - 8.8	39.3	6TW	4TW	50	60,000
		Circuit 2 - 8.8	36.6	6TW	4TW	50	
36804 36805	230	Circuit 1 - 9.0	41.8	6TW	4TW	60	61,500
		Circuit 2 - 9.0	39.1	6TW	4TW	50	
36804 36805	240	Circuit 1 - 9.8	43.7	6TW	4TW	60	67,000
		Circuit 2 - 9.8	41.0	6TW	4TW	60	

BASE INSTALLATION FOR MOBILE HOME, same as for Oil and Gas Furnace, see page 3.

INSTALLING BASE FOR RESIDENTIAL INSTALLATIONS

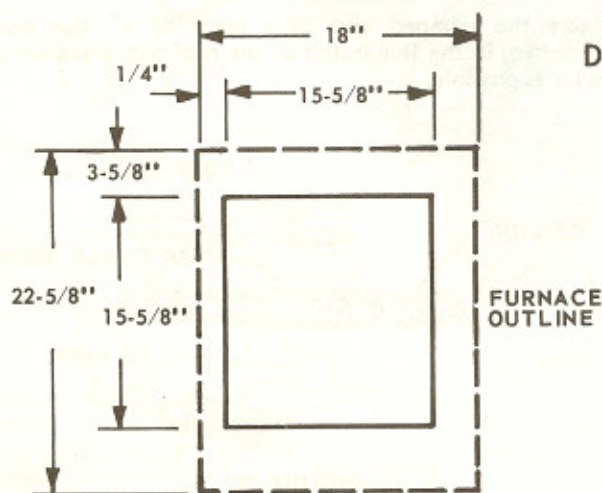
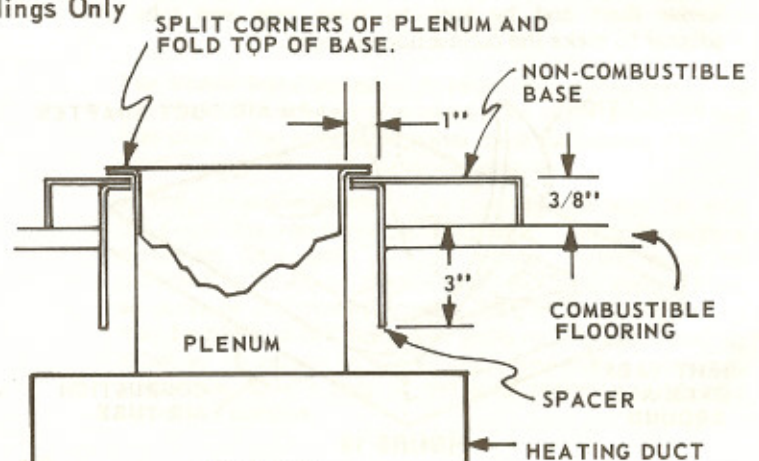


FIGURE 24

Single Story Dwellings Only



8

FIGURE 25

NOTE: The plenum or duct adapter is not furnished with the residential base and must be designed by installer for each application.

If furnace is built-in, the wall opening should be 37-1/4" from floor to top of opening.

NOTE: Furnace is designed for 0" clearances, except for duct adapter or plenum. 1" is required between plenum and combustible material, when furnace is installed in the downflow position. The base is so designed to take care of the 1" clearance, when base is installed properly.

INSTALLATION OF DOWNFLOW UNITS

Non-combustible base No. H-4342 must be used for downflow residential installations. Figures 1 and 2 show installation details of this base.

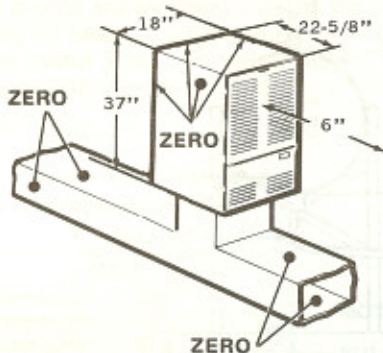


FIGURE 26

SECTION 4

ABOVE BURNER TANK INSTALLATION OIL GUN FURNACE

FUEL OIL

No. 1 Oil (U.S. Government specifications) is recommended, No. 2 Oil congeals in cold weather. No. 2 Oil may be used, if No. 1 Oil is not available. **DO NOT USE GASOLINE, ALCOHOL, CRANKCASE OIL, OR OIL CONTAINING GASOLINE.**

OIL STORAGE TANKS

Tanks must be installed in accordance with regulations of the National Board of Fire Underwriters or the Canadian Standards Association covering the CLASS. Authorities having local jurisdiction or local, municipal and provincial laws shall be consulted before installations are made.

The fuel line should drop down to a point below the burner and tank, to eliminate air traps in the line.

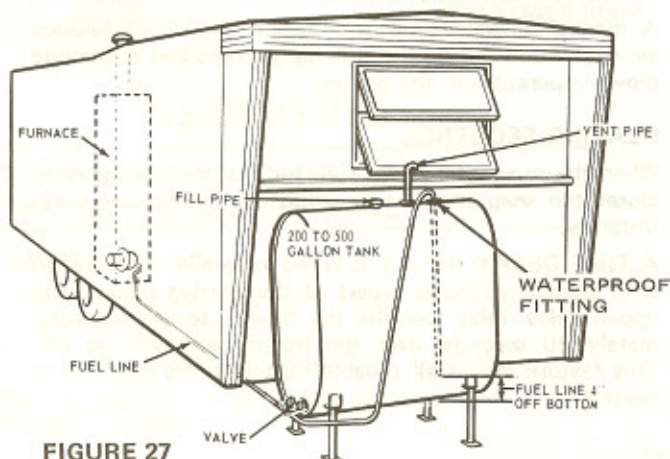


FIGURE 27

BELOW BURNER TANK INSTALLATION 1 LINE SYSTEM OIL GUN FURNACE

An approved, clean 200 to 500 gallon tank is suitable for outside storage. It should be equipped with a 2" fill pipe with weather proof fill cap and 1-1/4" vent pipe. The tank should slope away from the fuel inlet line as shown.

Use 3/8" O.D. copper tubing or 1/4" I.D. iron pipe for fuel line. The bottom of fuel line at tank should not be more than 8' below burner pump. Fittings and connections should be kept to a minimum. The fuel line at tank should be installed in a water tight fitting.

Use pipe dope on male threads of all connections to prevent oil leaks. Make sure all joints are sealed and tight.

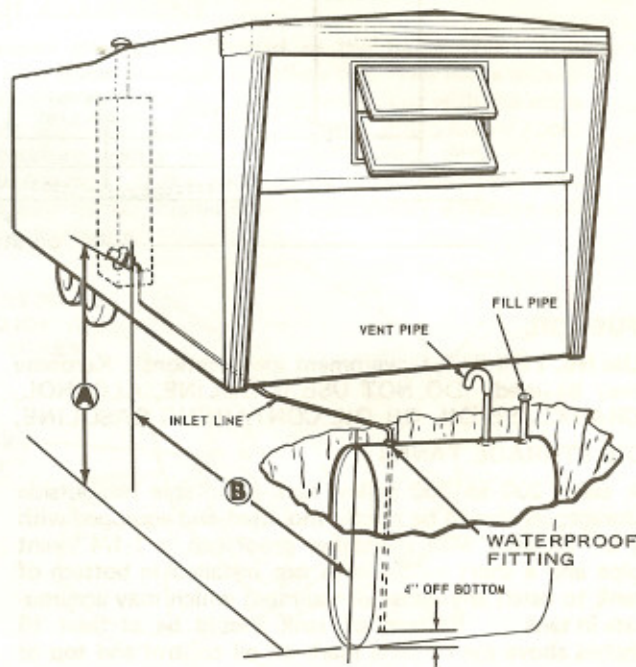


FIGURE 28

MAXIMUM DIMENSIONS FOR ONE LINE SYSTEM WITH 3/8" LINE

Lift A	Horizontal Run B
8 ft.	50 ft.

A single line system will lift a maximum of 8'. If over 8' of lift, convert to a 2 line system.

This furnace if oil fired is factory equipped for a 1 line system. To convert to a 2 line system, see (conversion instructions).

CONVERTING 1 LINE SYSTEM TO A 2 LINE SYSTEM

Units are shipped from factory with the internal by-pass plug left out; therefore, set for a 1 line system. To connect to a 2 line system, remove internal by-pass plug from cloth bag attached to pump. Insert as shown in illustration and tighten securely. Connect return line to return port as shown.

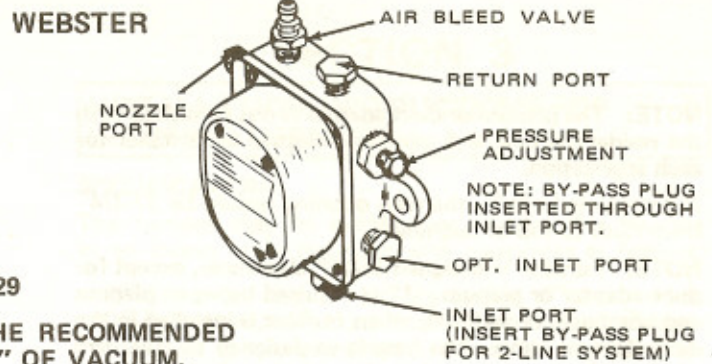
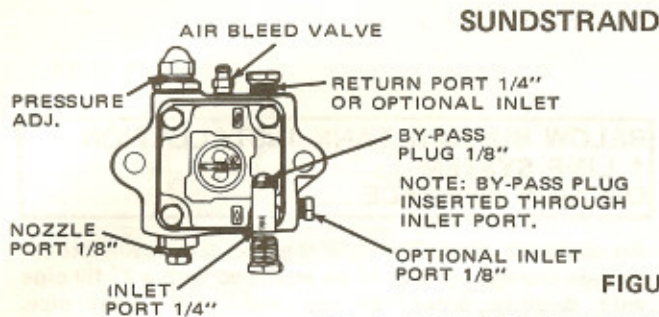


FIGURE 29

ON 1 OR 2 LINE SYSTEMS, THE RECOMMENDED LIFT SHOULD NOT EXCEED 10" OF VACUUM.

TANK INSTALLATIONS VAPORIZER OIL FURNACES

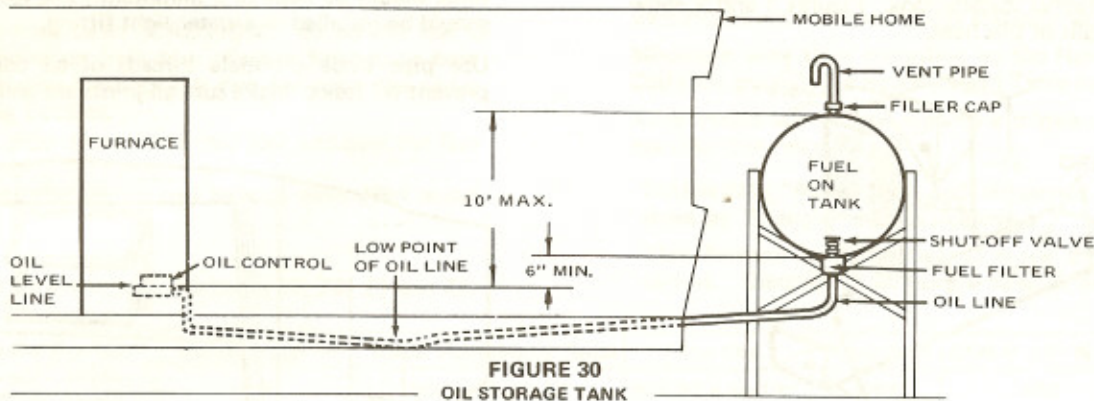


FIGURE 30
OIL STORAGE TANK

FUEL OIL

Use No. 1 Oil (U.S. Government specifications). Kerosene may be used. **DO NOT USE GASOLINE, ALCOHOL, CRANKCASE OIL OR OIL CONTAINING GASOLINE.**

OIL STORAGE TANKS

A clean 200 to 300 gallon tank is suitable for outside storage. It should be rigidly mounted and equipped with a 2" fill pipe with a weather proof cap, a 1-1/4" vent pipe and a short nipple with cap installed in bottom of tank to catch any water or sediment which may accumulate in tank. Bottom of tank should be at least 18 inches above the oil level mark on oil control and top of tank not more than 8 feet above.

Install a shut-off valve with a metal seat at tank. The installation of a Duo-Therm oil filter is recommended.

The fuel line should drop down to a low point between the oil control and tank, with a gradual rise to the control and tank to eliminate air traps in line.

Connect the storage tank to the furnace with 3/8" O.D. copper tubing or 1/4" I.D. iron pipe. Use pipe dope on male threads on all connections to prevent oil leaks.

NOTE: It is recommended that the fuel line be run up through the combustion air tube and connected to furnace.

The small plate on right hand side of casing bottom, can be turned to allow fuel line to reach furnace. After fuel line is connected to furnace, tighten screw in center of plate securely.

SECTION 5

OPERATING INSTRUCTIONS ELECTRIC FURNACE

TO START FURNACE

Be sure power is turned on and set room thermostat to desired temperature. Place manual fan switch in the "Winter" position.

TO SHUT OFF FURNACE

To shut furnace off for the summer, turn thermostat back as far as possible. If furnace is shut down for service, remove line fuses or if a circuit breaker is installed, throw switch on breaker box.

AIR SHUTTER ADJUSTMENT

Adjust air shutter to desired setting to regulate humidity in the mobile home. *In residential applications, this shutter must remain closed.*

FUSTATS

All fustats should be replaced only with ones having the same rating as those supplied with the furnace. All line fuses should be replaced as per chart on Page 8.

MANUAL BLOWER SWITCH

A manual blower switch is provided to give continuous air circulation during the summer months and automatic blower operation in the winter.

HEATING SEQUENCE

When the room thermostat calls for heat the heating relay closes the snap switches in sequence. The blower starts instantly.

A TIME DELAY RELAY is wired in parallel with the fan snap switch, which is a part of the heating relay. The upper delay relay permits the blower to run approximately 30 seconds after the heating elements go off. This feature moves all useable heat into the space being heated.

LOWER TIME DELAY RELAYS

These relays provide a time delay between elements. When thermostat calls for heat, the first element and blower come on. Approximately 50 seconds later the second element is energized, 50 seconds later the third element is energized, etc. When the thermostat is satisfied, all the elements go off at once.

LIMIT CONTROLS

These devices protect the unit from overheating during abnormal operation resulting from low air flow caused by dirty filters, blocked ductwork, broken or slipping fan belts, motor failure or low blower RPM. Always look for the cause of the trouble.

The limit located on the blower scroll must be manually reset to restart the unit. To restart, press the red reset button. The fan should start immediately if the room thermostat is calling for heat. If the motor does not start, check for a blown motor fuse. If blown, replace with fustat having the same rating as the original.

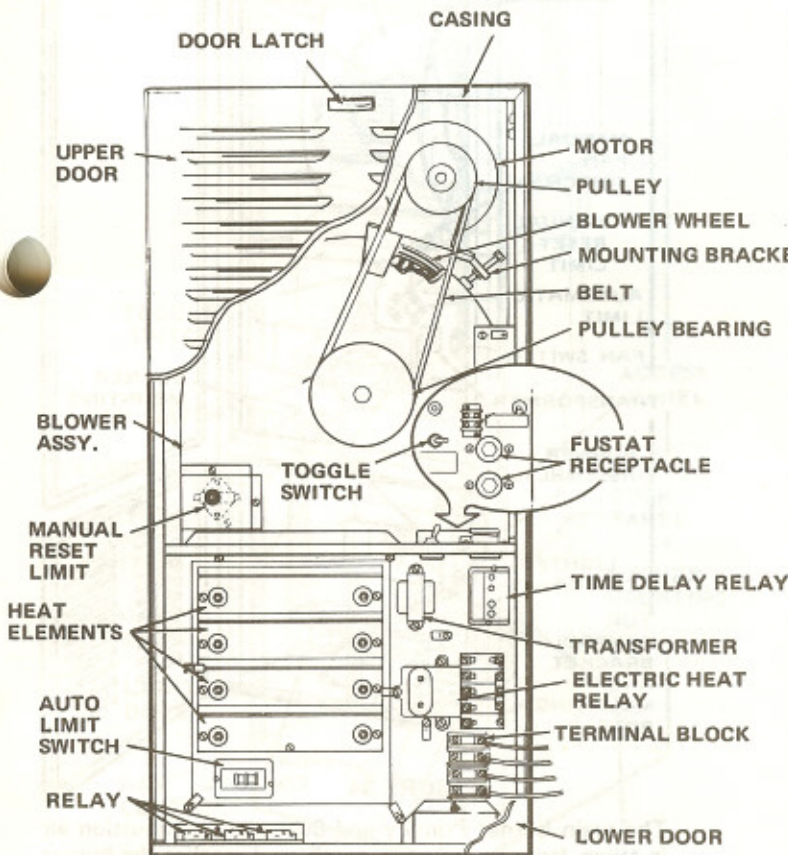


FIGURE 31

SECTION 6

OPERATING INSTRUCTIONS FOR ATMOSPHERIC GAS FURNACE

TO LIGHT FURNACE

Set thermostat so that it is above room temperature. Be sure the gas is turned on.

1. Turn Gas Control Dial to the "OFF" position.
2. Wait 5 minutes — turn Gas Control Dial to the "PILOT" position.

3. Place manual fan switch in the "Winter" position.
4. Open the lighter door.
5. Fully depress pilot button and light pilot burner, by placing a match in the lighter rod, and inserting it through the lighter door. Hold pilot button in for one minute. If pilot goes out when button is released, repeat the lighting procedure, allowing a longer period before releasing pilot button.
6. Turn the gas control dial to the "On" position.
NOTE: There is a time delay of approximately 20 seconds, before burner will come to high fire after thermostat calls for heat. When burner lights, set room thermostat to desired temperature.

If the pilot goes out, when the thermostat is turned down and the main burner shuts off, wait five minutes and repeat the lighting procedure . . . If pilot needs adjusting, see (Pilot Adjustment).

PILOT ADJUSTMENT

The pilot should be adjusted so the flame burns with soft blue color and slightly yellow tips. The flame should be checked to make sure it does not go out with the main burner shut off. Turn the thermostat down below room temperature, wait a few minutes and check to see if pilot is still burning. If the pilot burner is out, adjust the pilot for higher flame. Flame should completely envelope end of thermocouple.

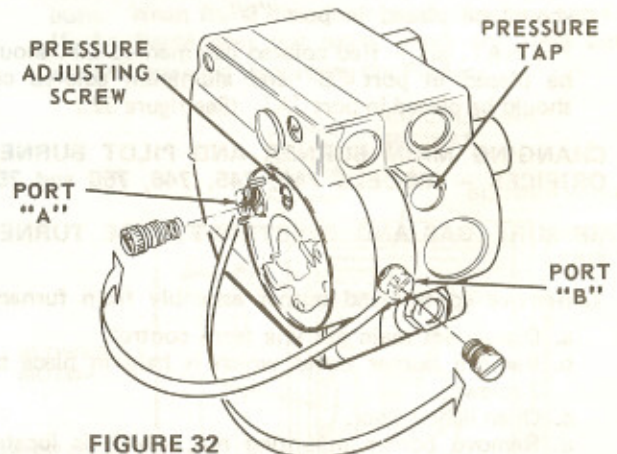


FIGURE 32

To adjust the pilot burner flame, remove the cap screw and turn the pilot adjustment screw counterclockwise to increase or clockwise to decrease the flame. Turn the thermostat down and check the flame to make sure it doesn't go out. The furnace is equipped with a safety pilot. If the pilot flame goes out, the gas is automatically shut off and the lighting procedure must be followed again.

TO TURN FURNACE OFF

To turn the main burner and pilot burner off, turn the dial to "OFF". If the furnace is turned off for the summer or a long period, the gas should be turned off at the shut-off valve.

CAUTION: BE SURE THE FURNACE IS EQUIPPED FOR THE TYPE OF GAS BEING USED. THESE FURNACES ARE LABELED FOR THE TYPE OF GAS THAT THEY ARE EQUIPPED FOR. THE ALTERNATE ORIFICES ARE ATTACHED TO GAS CONTROL AND IDENTIFIED.

NEVER OPERATE FURNACES WITH INCORRECT ORIFICES.

GAS CONVERSION

1. Select and install proper main burner and pilot burner orifices from the chart below.

Altitude	72503		74003		74503	
	Prop.	Nat.	Prop.	Nat.	Prop.	Nat.
Sea Level	52	34	48	30	43	26
2,000	53	36	49	30	44	27
4,000	53	37	50	31	44	28
6,000	53	38	50	31	45	29
8,000	54	40	51	32	47	30
10,000	54	42	52	35	48	31
12,000	55	43	53	37	49	31

Altitude	74601		75003		76003	
	Prop.	Nat.	Prop.	Nat.	Prop.	Nat.
Sea Level	44	27	42	24	38	18
2,000	45	28	42	26	39	19
4,000	45	29	43	27	41	20
6,000	46	29	44	28	42	22
8,000	47	30	45	29	43	25
10,000	49	31	46	30	44	27
12,000	50	32	48	31	45	29

For NAT. gas use .024 pilot orifice. For L.P. gas use .0135 pilot orifice. For operation at elevations of more than 2000 ft. above sea level, the input should be reduced 4% for each 1000 ft. above sea level. This chart shows orifices at various altitudes and should be used as a guide, depending on the B.T.U. content of the gas being used.

2. For L.P. gas - Red colored cap marked L.P. should be placed in port "A" and aluminum colored cap should be placed in port "B".

For NAT. gas - Red colored cap marked L.P. should be placed in port "B" and aluminum colored cap should be placed in port "A". (See figure 32.)

CHANGING MAIN BURNER AND PILOT BURNER ORIFICES - MODELS 740, 745, 746, 750 and 760

BE SURE GAS AND ELECTRICITY ARE TURNED OFF.

1. Remove control and burner assembly from furnace.
 - a. Disconnect main gas line from control.
 - b. Remove burner cover which is held in place by 2 screws.
 - c. Open lighter door.
 - d. Remove burner mounting nut, which is located inside heat chamber, and can be reached thru lighter door.
 - e. Remove bolt from control mounting bracket.
2. Remove orifice extension and change main orifice.
3. Disconnect pilot tube from pilot burner and change pilot orifice.
4. Place burner back in furnace making sure burner mounting nut is tight.
5. Place burner cover back on furnace.

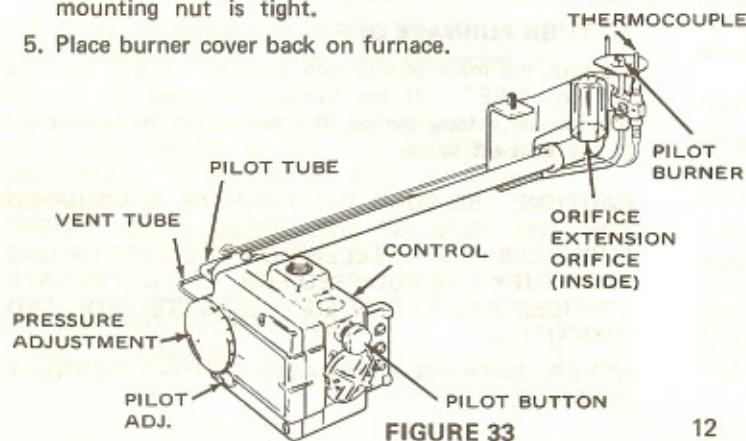


FIGURE 33

6. Connect main gas line to control.

7. When assured all parts are installed properly, turn gas on and check for leaks.

PRESSURE ADJUSTMENT

If it is necessary to adjust pressure, remove dust cap and turn regulating adjustment screw clockwise to increase pressure and counterclockwise to decrease pressure. **NOTE: This is a sealed screw and coating will have to be removed before adjusting (see figure 32).**

This control is preset to operate at 3.5" water column with Natural gas and 11" of water column for L.P. gas. A pressure check plug is provided for connecting the pressure gauge.

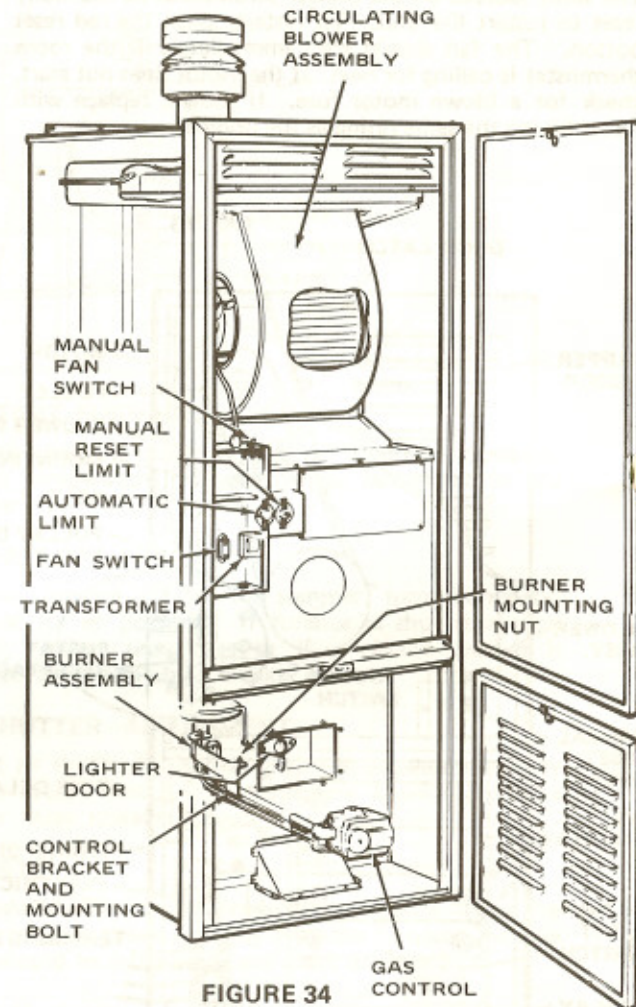


FIGURE 34 GAS CONTROL

The main burner Primary and Secondary combustion air is taken from outside the coach, and reaches the burner through the built in base openings. No air adjustments are provided, or necessary for the main burner.

CHANGING MAIN BURNER AND PILOT BURNER ORIFICES, MODEL 72503

BE SURE GAS AND ELECTRICITY ARE TURNED OFF.

1. Remove control and burner assembly from furnace.
 - a. Disconnect main gas line from control.
 - b. Open access panel by removing screw and sliding panel up.

- c. Remove lighter door panel, which is held in place by 8 screws.
 - d. Remove the screws from the burner cover.
 - e. Remove burner support, held in place by 2 screws.
 - f. Remove burner mounting nut, located inside heat chamber and can be reached thru lighter door panel opening.
2. Remove orifice extension and change main orifice.
 3. Disconnect pilot tube from pilot burner and change pilot orifice.
 4. Place burner back in furnace, making sure burner mounting nut is tight.
 5. Install all parts back on furnace, in the order in which they were removed.
 6. Reconnect main gas line to control.
 7. When assured all parts are installed properly, turn on gas and check for leaks.

2. Place manual fan switch in the "Winter" position. Push in on manual reset limit button. Make sure the combustion blower is plugged into the bottom of the control box and is operating. (Model 84001 does not have a combustion blower.) Push oil control reset lever down. Press in on burner starting switch for 2 or 3 minutes and release.
3. Make sure oil is flowing into the burner. If the solenoid, in the top of oil control, does not click or snap, when the burner starting switch is pushed in, oil will not flow into the burner.
4. Drop a flaming match or blazing tissue paper into the bottom of the burner.
5. Allow flame to burn about 5 minutes with lighter door closed. Keep pressing and releasing the starting switch button until the clicking sound of the solenoid relay is no longer heard.
6. Make sure flame does not go out. If flame goes out, repeat lighting procedure.
7. Set room thermostat at desired temperature.

NOTE: The heat chamber finish will smoke when the furnace is fired up for the first time. Adequate ventilation should be provided until smoking stops.

If the flame goes out and a pool of oil accumulates in the bottom of the burner, **DO NOT LIGHT**. Pull up on reset lever on the end of oil control. Remove the hex plug from the oil inlet of burner and drain oil into a container, replace hex plug. Light and allow excess oil to burn. When flame dies down, push down on reset lever. If the flame goes out again, check the steps outlined under "Servicing Vaporizing Oil Furnace".

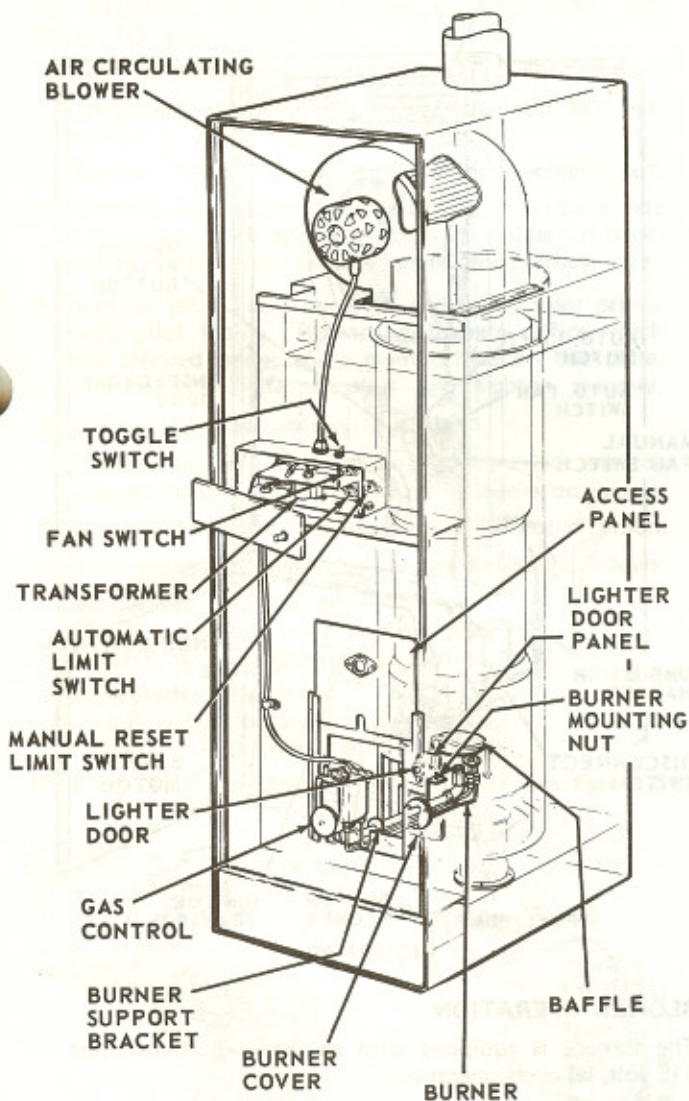


FIGURE 35

OPERATING INSTRUCTIONS FOR VAPORIZING OIL FURNACES

**LIGHTING FURNACE —
NEVER LIGHT A HOT BURNER**

1. Turn on oil shut-off valve at the storage tank. Turn thermostat dial to highest temperature setting.

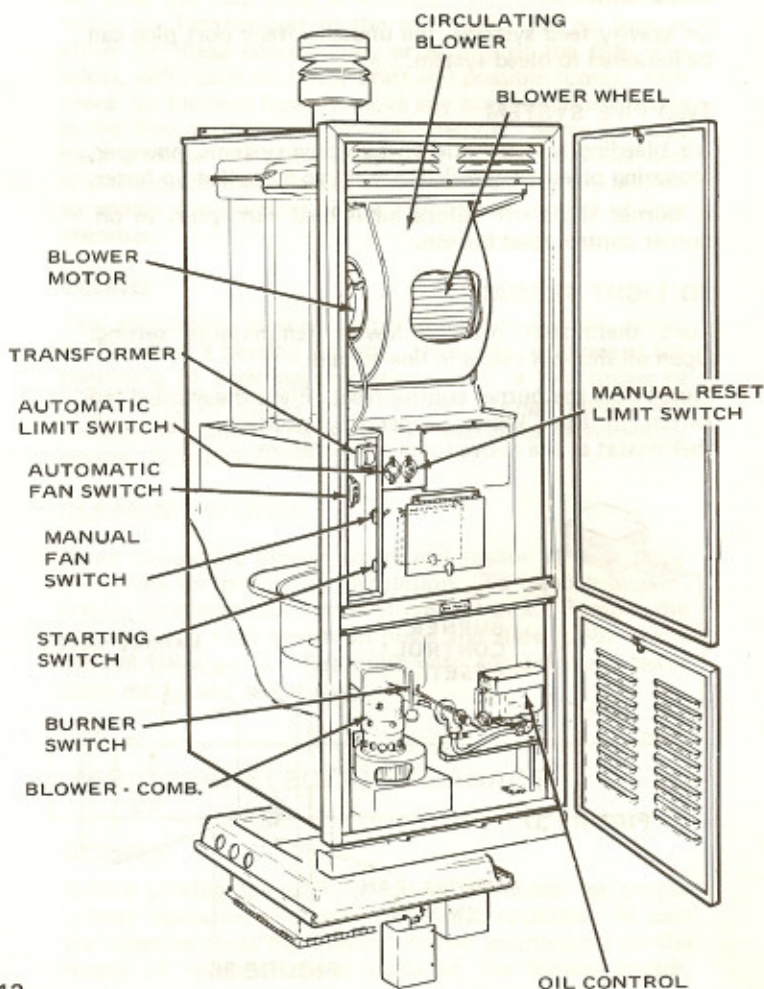


FIGURE 36

BLOWER OPERATION

The furnace is equipped with a blower for 115 volt, 60 cycle operation. The circulating blower is wired separately and must be plugged into the outlet at the top of control box.

Place the "manual fan switch" in the "Winter" position for heating, and it will allow the blower to operate off and on automatically as the temperature of the heat chamber drops and rises again. If the blower operates continuously in warm weather, resulting in too much heat, with the thermostat turned down below room temperature, lift up on the reset lever on the end of oil control, shutting off all oil flow. Unplug the combustion blower cord at control box. (Model 84001 does not have a combustion blower.)

TO TURN FURNACE OFF

Pull up on reset lever on end of oil control. Wait about 6 minutes or until fire is out and unplug the combustion blower cord at the bottom of control box. (Model 84001 does not have a combustion blower.)

OPERATING INSTRUCTIONS FOR OIL GUN

ONE PIPE SYSTEM

NOTE: Before starting burner, be sure to bleed air out of the system by loosening the easy flow air bleed valve. Turn valve counterclockwise 1/4 turn. In restricted places, a hose can be attached to bleed valve to direct oil into a container.

On gravity feed systems, the unused intake port plug can be loosened to bleed system.

TWO PIPE SYSTEM

Air bleeding is automatic on two pipe systems, however, loosening bleed valve will allow oil to be pulled up faster.

If burner shuts off before air is bled out, push in on burner control reset button.

TO LIGHT FURNACE

Turn thermostat dial to lowest temperature setting. Open oil shut-off valves in line to tank.

Push in on the burner control reset. Place the manual fan switch in the "Winter" operating position. Set wall thermostat at the above room temperature.

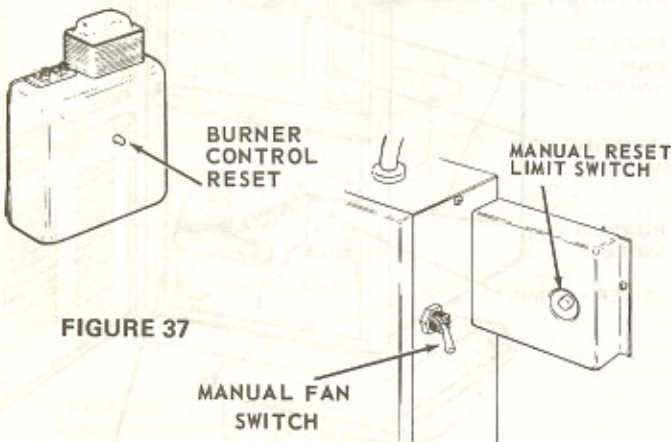


FIGURE 37

FIGURE 38

If furnace will not light or come to high fire, make sure there is a good supply of oil, check fuses, push in on control reset, push in on manual reset limit switch button and push in on the red reset button located on the end of the gun burner motor. Place manual fan switch in the "Winter" position.

CAUTION: Do not push burner reset button more than 4 or 5 times. Continuous resetting will flood fire box.

NOTE: The heat chamber finish will smoke when the furnace is fired up for the first time. Adequate ventilation should be provided until smoking stops.

TO TURN FURNACE OFF

Place the manual fan switch in the "OFF" position. Close all oil shut-off valves in the oil line to the tank.

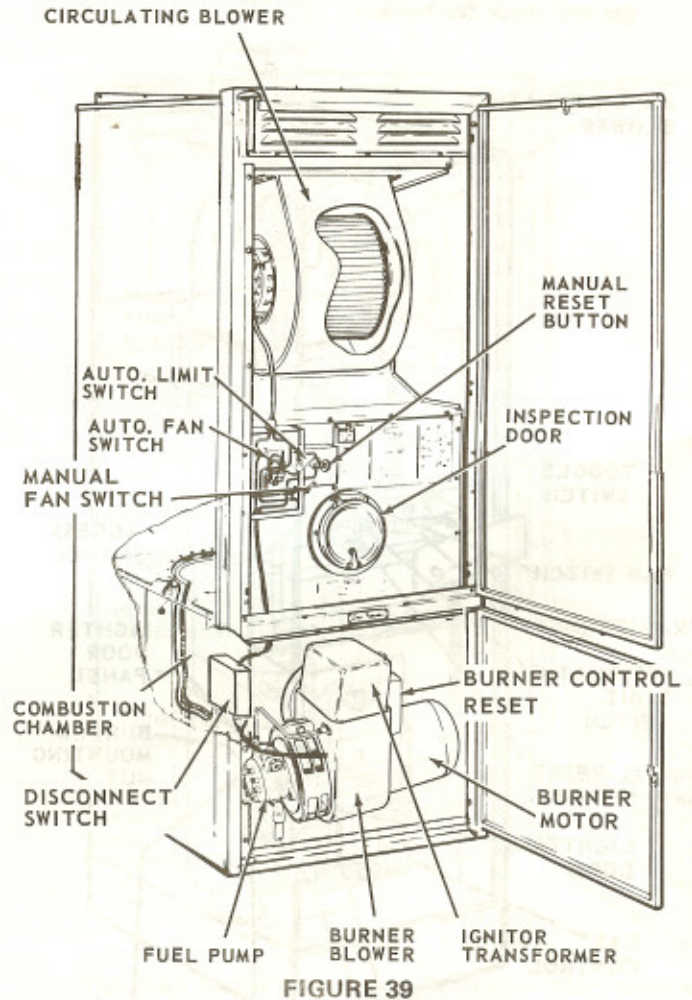


FIGURE 39

BLOWER OPERATION

The furnace is equipped with an automatic blower for 115 volt, 60 cycle operation.

The blower may be operated continuously in the summer for air circulation by placing the manual fan switch in the "Summer" position. The burner will not operate with switch in this position.

NOTICE: This furnace is designed to burn either gas or oil. To change furnace from oil to gas, or gas to oil, it is necessary to change complete burner assemblies. For further information on conversion instructions, see instructions packed with conversion burners.

OPERATING INSTRUCTIONS FOR GAS GUN FURNACE

PIPING

Use only piping designed and approved for L.P. or natural gas. For hook-up and pipe size, contact local gas supplier for specifications.

Be sure the proper orifice is installed, for the type of gas being used. NEVER OPERATE UNIT WITH INCORRECT ORIFICES.

NOTE: This is a sealed combustion system. Do not fill combustion chamber with gas, and attempt to light. If unit fails to light after 15 seconds, turn control off, discontinue actuating lever, and open inspection door. Wait 5 minutes and repeat lighting procedure.

GAS CONVERSION

TO CHANGE BURNER FROM L.P. TO NAT. OR NAT. TO L.P.

1. Turn off main gas valve and switch.
2. Disconnect thermocouple, pilot line, vent line and union.
3. Remove backplate and pull burner assembly out.
4. Remove main orifice from square block on backplate and replace with spare orifice from holder on backplate. Refer to furnace plate for orifice size.
5. Remove pilot line from pilot and dump pilot orifice from pilot fitting. Replace with spare orifice which was trapped under spare main orifice on backplate. Replace pilot line at pilot and tighten securely.
6. Replace removed orifices in holder.
7. Replace burner assembly noting that rivet on top engages holder and bus wire is in saddle on ignitor.
8. Replace backplate and reassemble lines and union.
9. Turn selector on gas valve for proper gas as follows:

Robertshaw — Figure 40.

- L.P. — Turn screw driver slot to L.P.
- NAT. — Turn screw driver slot to NAT.

Honeywell — Figure 41.

- L.P. — Turn pointer to L.P. (Right).
- NAT. — Turn pointer to NAT. (Left).

10. Pilot orifices — Nat. .018, L.P. .010, see figure 2.

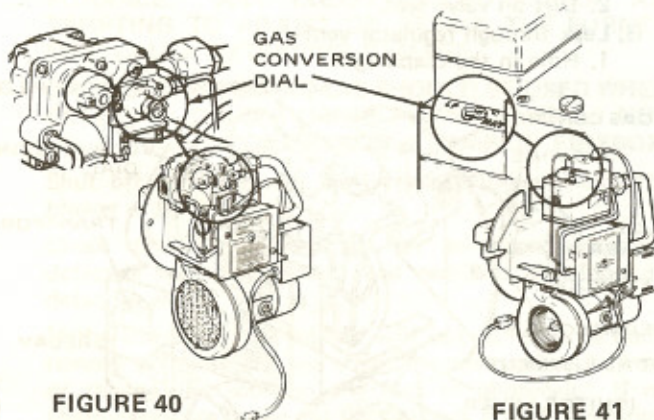


FIGURE 40

FIGURE 41

LIGHTING PROCEDURE

1. Turn control dial to the "OFF" position.
2. Turn on power supply. Set thermostat to highest position, and let combustion blower run 5 minutes.

3. Set thermostat to lowest position.
4. Rotate control dial to the "PILOT" position and depress. Holding dial in, actuate ignitor lever several times, or until pilot flame is visible through peep sight hole. Continue holding dial in for 1 minute after pilot is burning.
5. Rotate control dial to the "ON" position.
6. Set thermostat to the desired position. If burner does not light, repeat all steps. (Thermostat must be set above the room temperature.)

SECTION 7

GENERAL MAINTENANCE ALL FURNACES

AIR FILTER

The air filter for most Duo-Therm Furnaces is an optional, extra charge accessory. (Models not equipped to take a filter are: 740, 745, 840 and 845.)

When used, it should be washed in luke warm soapy water every two weeks.

A filter is recommended for cleaner air and easier house keeping. When furnace is used with an air conditioner, the use of a filter is necessary to maintain proper cooling.

Original filters and mounting frames as well as replacement filters are available from your dealer, service point, or direct from factory.

CHECK FLUE

Be sure the flue pipe is securely fastened to the flue collar on furnace and to the roof jack. An air leak at either of these connections, or at any of the flue pipe joints, will result in a poor draft and possible fumes. Also check for blocked flue. Remove any accumulation of soot in the flue, economizer, or heat chamber. Some furnaces have a clean out door in the top of heat chamber and others require the removal of the economizer top section to enable the cleaning of the economizer section of heat chamber.

OILING

The circulating blower motor does not require oiling, for the first 3 heating seasons. Thereafter, oil once at the beginning of each heating season with a few drops of S.A.E. No. 20 motor oil. For gun burner motors and combustion blower motors, oil at least twice each heating season. DO NOT OVER OIL.

CLEANING BLOWER

Clean circulating blower wheel and motor at least every 6 months for proper air circulation. To remove blower, unplug or disconnect motor at control box. Remove the screws which hold blower in place and slide it out of the mounting supports. For units with combustion blower clean motor and wheel also.

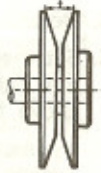
SERVICING ELECTRIC FURNACE

BLOWER

Before placing the unit in operation, check for proper blower operation. Check for proper rotation. In case the rotation must be reversed, follow instructions on the inside of terminal cover plate of the blower motor.

Models 34501 - 34502 - 35004 - 35005 and 36001 - 36002 - 36804 - 36805 are equipped with belt drives and have an adjustable sheave to change blower speed. These units are set at factory to be satisfactory for most installations with duct work. Factory setting for the No. 34501-34502 and 35004 - 35005 is 13/16" open and for the No. 36001 - 36002 and 36804 - 36805 is 11/16" open.

11/16" FOR
36001 - 36804 -
36002 - 36805
13/16" FOR
34501 - 35004
34502 - 35005



In any installation be sure the blower speed is high enough that the limit switch will not cut-off.

To adjust the blower speed, loosen the set screw in the hub of the adjustable motor pulley; the sheaves may be brought together to increase blower speed or moved apart to decrease speed. Tighten the set screw against the flat, unthreaded portion of the hub.

After changing blower speed, check for correct pulley alignment. Realign the motor pulley with the fan pulley by loosening the set screw in the hub of the motor pulley, moving the pulley to the proper position and tightening the set screw.

BELT

Fan belts should be just tight enough to prevent slippage when the fan starts, but not so tight as to misalign fan and motor shafts. Make sure belt is not too tight! A tight fan belt will not only increase fan noise, but it will place an excessive load on the motor and may prevent starting.

The blower belt must be inspected periodically to insure that it is in good operating condition. Replace when it appears worn.

BLOWER AND MOTOR

The blower has lifetime sealed bearings and require no lubrication. Lubricate the blower motor bearings as described in Section 7 (General Maintenance).

SERVICING GAS GUN FURNACE

PILOT ADJUSTMENT

The pilot can be adjusted by removing the cap screw on top of control and turning the small screw inside.

ELECTRODE ADJUSTMENT

The electrode setting is very important. The electrode must ark on the thermocouple, as shown, for proper ignition (see figure 42).

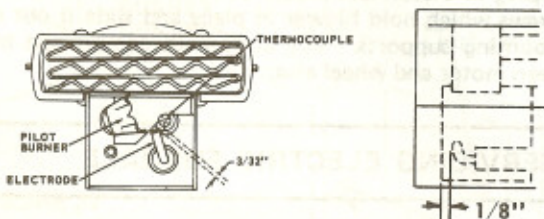


FIGURE 42

AIR SHUTTER ADJUSTMENT

To provide the proper amount of air to the burner, loosen the thumb screw and slide forward or back as needed.

CENTRIFUGAL SWITCH ADJUSTMENT

This switch is located on end of combustion motor, and can be cleaned and adjusted by removing the cap from end of motor. This switch can also be adjusted by loosening the set screw and moving contacts to the proper position.

FOR SAFETY SWITCHES - REFER TO PAGES 18, 19 and 20.

CHECKING PRESSURE

A pressure tap is provided on the outlet end of control, for checking operating pressures. The proper operating pressure for L.P. gas is 11" w.c., and 3.5" w.c. for natural gas. Pressure tap provided on end of control.

TROUBLE CHART

- A. Pilot Ignition trouble-
 1. High or low gas pressure.
 2. Air in the gas line.
 3. Electrode improperly located.
 4. Clogged orifice in pilot.
- B. Frequent pilot outage during standby-
 1. Restriction in pilot gas line.
 2. Improper gas pressure (too high or too low).
 3. Pilot orifice clogged.
 4. Loose connection between valve and thermocouple.
- C. Motor refuses to run-
 1. Look for burned out fuse.
 2. Loose connections (limit controls, relays thermostat and valves).
 3. Defective relay, motor needs oiling, motor burned out, motor bearings too tight, or improper wiring.
- D. No flame but motor running-
 1. Pilot is out.
 2. Insufficient heat on thermocouple.
 3. Insufficient gas.
 4. Centrifugal switch out of adjustment or dirty contacts.
- E. Noisy fire-
 1. Insufficient gas for the amount of air entering burner.
 2. Improper air adjustment.
 3. Check for defective controls.
- F. Gas leakage through main-
 1. Obstruction in main valve.
 2. Dirt on valve seat.
- G. Leak through regulator vent-
 1. Hole in the diaphragm.

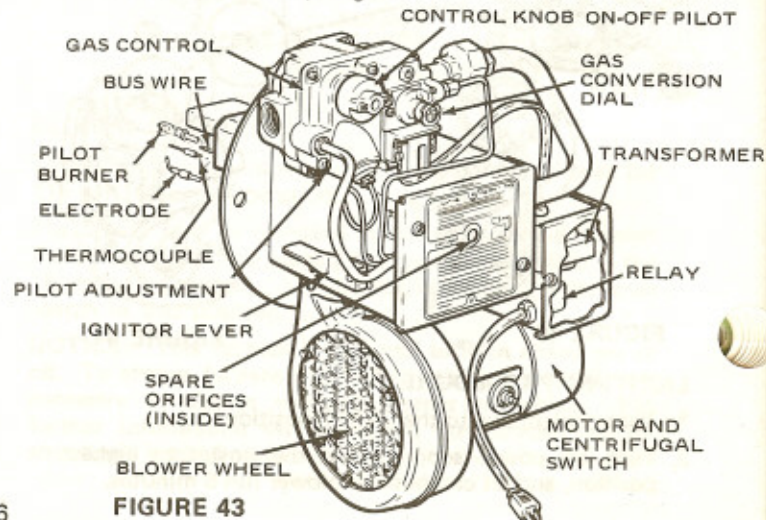


FIGURE 43

SERVICE CHECKS IF FURNACE WILL NOT HEAT

1. Make sure gas and electricity are on.
2. Check to see if any limit switches are functioning. If any limit switch has operated, check for and correct the cause.

Check lower door to be sure it is closed.

3. Check for pilot flame. (a) If pilot is burning, check for proper pilot flame. The pilot flame heats the thermocouple which automatically shuts off all gas to the furnace should the pilot go out or be burning too low. If the pilot flame can not be properly adjusted this is probably due to some obstruction in the pilot line. (b) If the pilot will not remain on after following the lighting instructions this may be an indication of a defective pilot thermocouple.
4. Check for defective room thermostat. Short the thermostat terminals which are located on the gas control. If the furnace comes on, this indicates the trouble is not in the furnace. Check terminals for loose connections. Next, short the terminals at the room thermostat. If the furnace does not light, this indicates that the trouble is in the thermostat cable.

NOTE: This circuit is 24 volts and presents no shock hazards.

5. Be sure the air circulating blower is working properly. Before condemning blower motor as being defective, be sure there are no loose connections. Be sure blower wheel is clean and blower motor turns freely.
6. Be sure all registers are open and air ducts are free from any obstruction.
7. The manifold gas pressure can be checked by removing pressure check plug and attaching gauge.
8. The main burner orifice and pilot burner orifice may be removed for cleaning when necessary.

SERVICING OIL GUN

INFORMATION FOR THE SERVICEMAN

THE FOLLOWING SERVICE PROCEDURES MUST BE PERFORMED BY AN EXPERIENCED SERVICEMAN WITH PROPER EQUIPMENT AND KNOWLEDGE FOR ADJUSTING AND REPAIRING A GUN BURNER FURNACE. ANY INEXPERIENCED PERSON ATTEMPTING TO ADJUST OR REPAIR THE BURNER MAY CAUSE EXTENSIVE DAMAGE.

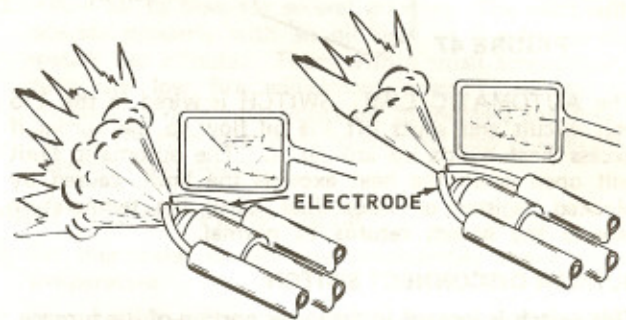
CAUTION: SPECIAL CARE SHOULD BE USED WHEN CLEANING OR SERVICING FURNACE SO AS NOT TO DAMAGE COMBUSTION CHAMBER FIREBOX.

Shut off all current to the furnace before servicing the blower or burner.

Check the electrical circuit for an open switch or defective wiring. Replace bad switches and loose or defective wires.

If the furnace comes on but will not continue to burn, remove the photocell and check for obstructions in front of the cell or soot on the face of photocell. If no obstructions are found put the cell back into its mounting. Check the voltage drop thru the photocell by attaching a voltmeter to the two photocell lead connections inside burner housing. Be sure probes are making contact inside connectors. Turn on electric current to the burner and turn up the thermostat above room temperature. The voltage should drop to 50 volts or less.

If voltage is greater than 50 volts check the following: Check flame shape with a flame mirror. If the flame is lop-sided replace the burner nozzle.



**CORRECT
FLAME SHAPE**

**LOP-SIDED
FLAME SHAPE**

FIGURE 44

Check CO₂. Adjust the CO₂ to 10% by loosening the nut and sliding air band forward or back until proper adjustment is obtained (see figure 45 below).

NOTE: The 85102 has only 2 slots in air band.

	86505	85102
"A"	5/8"	1-1/2"

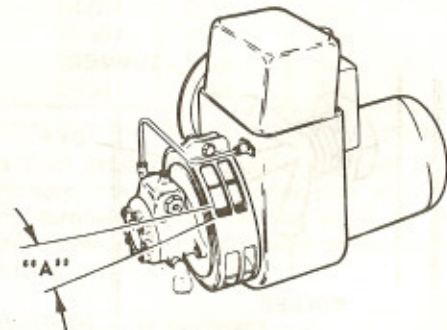


FIGURE 45

If the flame sputters and continues after furnace shuts off, air has entered the supply line or fuel unit. Check all supply line connections and tighten where necessary.

SAFETY SWITCHES — for illustration, see page 18.

The MANUAL RESET LIMIT SWITCH is wired in the 115 volt circuit and shuts off the flow of oil to the burner if excess heat builds up around it. The manual reset limit switch is installed near the air circulating blower and shuts off all oil flow in case of blower failure or blocked flue outlet.

When the trouble is corrected and the furnace cools, the furnace may be lighted by pushing in on the reset button until the switch clicks on and then follow the lighting procedure.

The PHOTOCELL detects oil stoppage, no ignition, or improper flame. A time delay circuit in the primary control will automatically shut off the burner in 45 seconds, if the Photocell detects a malfunction. When burner adjustments have been completed or oil supply is continued the furnace may be lighted by pushing in on the reset button.

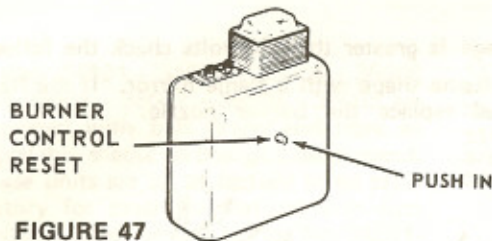


FIGURE 47

The AUTOMATIC LIMIT SWITCH is wired in the 115 volt circuit and shuts off the oil flow to the burner if excess heat builds up around it. The automatic limit will open when the heat exceeds the limit, caused by blocked register or floor duct, until the temperature around the switch returns to normal.

BURNER DISCONNECT SWITCH

This switch is located in the lower portion of the furnace, just above the gun burner.

This switch automatically shuts off the power to the burner, when the lower door is opened. This switch is also the electrical outlet for the burner.

To service furnace, with lower door open, pull out on disconnect switch to supply power to burner.

The CIRCULATING BLOWER is wired in the 115 volt circuit and operates from the AUTOMATIC FAN SWITCH and the MANUAL FAN SWITCH.

The manual fan switch marked "winter-off-summer" turns the furnace on in the "winter" position, turns furnace off in "OFF" position, and turns circulating blower on for air circulation, without heat, in "summer" position.

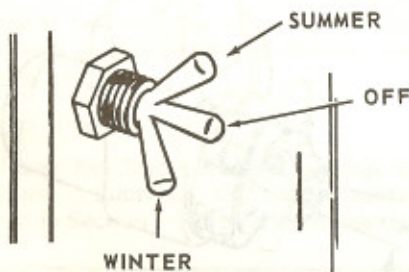
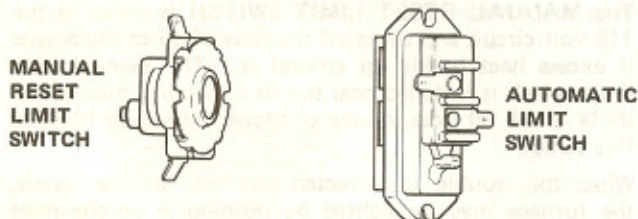


FIGURE 48

SERVICING VAPORIZING OIL FURNACES

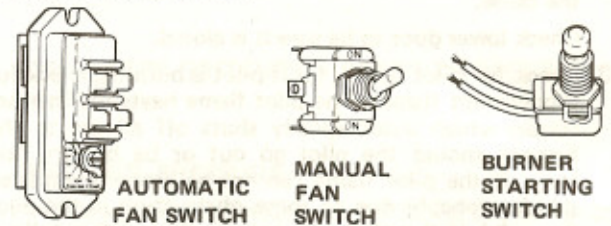
SAFETY SWITCHES

Your Duo-Therm furnace is equipped with various switches and blower to give you safe and efficient heating.



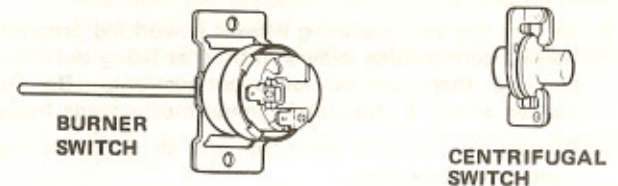
The MANUAL RESET LIMIT SWITCH is located on the control panel on right side of the control box. This switch is wired in the 24 volt circuit and shuts off the gas to the main burner. Should the furnace overheat due to blower failure or a blocked flue, push in on reset button, to restore high fire. Time will have to be allowed for furnace to cool, and the cause of the limiting corrected before high fire can be restored.

The AUTOMATIC LIMIT SWITCH is wired in the 24 volt circuit and shuts off the fuel to the main burner if excess heat builds up around it. The automatic limit will open when the heat exceeds the limit, caused by blocked registers or floor duct and will operate the furnace on pilot fire until the temperature around the switch returns to normal.



The MANUAL FAN SWITCH located on right side of the control box and marked "summer-off-winter" permits manual or automatic operation. In the summer position, the blower will run continuously, and in the winter position, the blower is controlled by the AUTOMATIC FAN SWITCH. This switch will turn blower on and off in response to the amount of heat produced by the furnace. This switch is heat activated and on most units is adjustable.

The BURNER STARTING SWITCH is a push button switch, which when pushed in allows oil to flow into the burner so it can be lighted.



The BURNER SWITCH is a thermo-electric switch located near the bottom of the burner and wired in parallel with the burner starting switch. After lighting and after enough heat has been produced, the burner switch will stay in the closed position, allowing oil to flow into the burner. If the switch cools, it will open and shut off all flow of oil.

The COMBUSTION BLOWER is wired separately from the burner switch or burner starting switch and must be plugged into the outlet at control box, when heating, or unplugged when not heating. The combustion blower provides the proper amount of air to the flame in the burner for efficient and clean burning. (Model 84001 does not have a combustion blower.)

The combustion blower is equipped with a CENTRIFUGAL SWITCH, which operates from the speed of the combustion blower motor and will shut off all flow of fuel to the burner if the combustion blower should fail.

SERVICING CONTROL

If furnace will not light or come to high fire, make sure there is a supply of oil, the combustion blower and circulating blower are plugged in and proceed as follows until the trouble is remedied.

Shut off oil and place a shallow pan under oil control. Remove strainer and clean it in clean oil or boiling water to remove any dirt or the invisible paraffin that collects. The strainer must be dry before it is replaced. Be sure the gasket is in good condition and does not leak oil.

Remove burner clean out plug. Clean opening to burner with the cleaner rod supplied with the furnace, pushing any carbon into the burner.

CLEANING OIL CONTROL

Be sure oil is turned off at tank and avoid spilling oil out of the control as it is removed.

To remove oil control for cleaning and servicing, disconnect oil lines at control, disconnect electric operator at the junction box and disconnect thermostat wires. Loosen bolts and remove control.

1. Remove top cover screw and lift off cover.
2. Remove upper cover plate assembly screws and lift off cover plate.
3. Remove float bracket screws and lift off float and bracket assembly.
4. The metering stem may be removed by lifting straight up.
5. Remove the strainer screws and pull out on strainer.
CAUTION: BE CAREFUL NOT TO DAMAGE STRAINER GASKET. If damaged, replace with a new gasket.

Clean the metering stem by rubbing with clean cloth. Clean the metering stem slot with a toothpick or small brush. Do not use emery cloth and do not scratch. If it sticks down, lift out and rub with a clean cloth. Do not turn needle in the square nut. If float needle spring is corroded or has been damaged, replace it with a new spring.

Before reassembling control, inspect float chambers for cleanliness. If not clean, flush out with fuel oil.

CHECKING OIL FLOW

To check oil flow, place a shallow pan under the tee fitting and remove the hex plug in the tee. Force a piece of cloth about 1/2" wide and 6 or 8 inches long into the tee. It must be placed so oil cannot flow into burner, but can flow out the opening from which the hex plug was taken. Run the cleaner rod through the tee before inserting the cloth in tee.

Screw a short nipple into the tee. The nipple should have a lip cut in one end so oil will drop off the end and not run back along the nipple.

ADJUSTING OIL CONTROL

For most satisfactory operation, oil flows must be checked and, if necessary, adjusted. To check the oil flows, set the wall thermostat on 90° for high fire check and 45° for pilot fire check. Plug in draft blower and hold in on "burner starting switch" button.

PILOT OIL FLOW CHECK

When the pilot oil flow is not adjusted properly, the heater may be subject to pilot failure or overheating in mild weather. The pilot oil flow should be 3cc per minute.

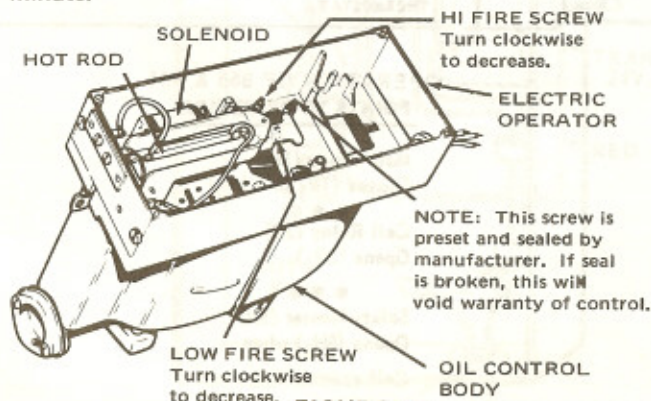


FIGURE 49

1. Set thermostat below room temperature.
2. Place a shallow pan under tee fitting, remove hex plug from tee at burner outlet.
3. Allow oil to flow for several minutes. The pilot will operate properly with an oil flow of 3 cubic centimeters per minute. Then, with a small screwdriver, turn the low fire adjustment screw clockwise to decrease, and counterclockwise to increase the flow. Adjust 1/4 turn at a time and wait for flow to level off between adjustments.

HIGH FIRE OIL FLOW CHECK

1. Set thermostat on 90°, or considerably above room temperature.
2. Place a shallow pan under tee fitting, remove hex plug from tee at burner outlet.
Allow oil to flow for several minutes.
3. Catch oil in test beaker and transfer to cubic centimeter graduate. Then with a small screwdriver, turn the high fire adjustment screw clockwise to decrease and counterclockwise to increase the flow. Adjust 1/4 turn at a time and wait for flow to level off between adjustments.

OIL FLOW CHART

Model	Hi-Fire	Pilot
84001	22cc	3cc
84501	26cc	3cc
84601	26cc	3cc
85001	29cc	3cc
85501	32cc	3cc
86001	32cc	3cc

4. Push cloth into burner and replace hex plug.
5. Make a final inspection of pilot and high fire flows, after furnace has been in operation about fifteen minutes, turning the thermostat back up to 90°. After inspection return thermostat to desired temperature setting.

CLEAN BURNER — If necessary

A small amount of carbon in the burner is not detrimental to its operation. Carbon caused by improper draft or poor oil will be consumed on high fire if broken loose with a stick inserted thru the lighter door. An excessive accumulation of paper or burned matches may be removed from burner with a vacuum cleaner. **BE SURE BURNER IS OUT AND COLD.**

CAUTION: DO NOT WIPE BURNER SIDE WALLS WITH A RAG. For proper operation the holes in the side walls must be open.

SERVICING ATMOSPHERIC GAS FURNACE

SAFETY SWITCHES — for illustration, see page 18.

Your Duo-Therm furnace is equipped with various switches and blower to give you safe and efficient heating.

These furnaces are equipped with a blower for 120 volt, 60 cycle operation. The blower is wired to a fan switch which automatically turns fan off and on as furnace heats up and cools down. This fan switch is adjustable.

These furnaces are equipped with a manual fan switch, with a winter-off-summer operation. In the winter

position the fan is automatically controlled by the auto fan switch. In the summer position, the fan runs continuously until switch is shut off.

The **MANUAL RESET LIMIT SWITCH** is located on the control panel on right side of the junction box. This switch is wired in the 120 volt circuit and shuts off the gas to the main burner. Should the furnace overheat due to blower failure or a blocked flue, push in on reset button, to restore high fire. Time will have to be allowed for furnace to cool, and the cause of the limiting corrected before high fire can be restored.

The **AUTOMATIC LIMIT SWITCH** is wired in the 120 volt circuit and shuts off the gas to the main burner if excess heat builds up around it. The automatic limit will open when the heat exceeds the limit, caused by blocked registers or floor duct and will operate the furnace on pilot fire until the temperature around the switch returns to normal.

SERVICE CHECKS IF FURNACE WILL NOT HEAT

1. Make sure gas and electricity are on.
2. Check to see if any limit switches are functioning. If any limit switch has operated, check for and correct the cause.
3. Check for pilot flame. (a) If pilot is burning, check for proper pilot flame as described under "Pilot Adjustment". The pilot flame heats a thermocouple

which automatically shuts off all gas to the furnace should the pilot go out or be burning too low. If the pilot flame can not be properly adjusted this is probably due to some obstruction in the pilot line. (b) If the pilot will not remain on after following the lighting instructions this may be an indication of a defective pilot thermocouple.

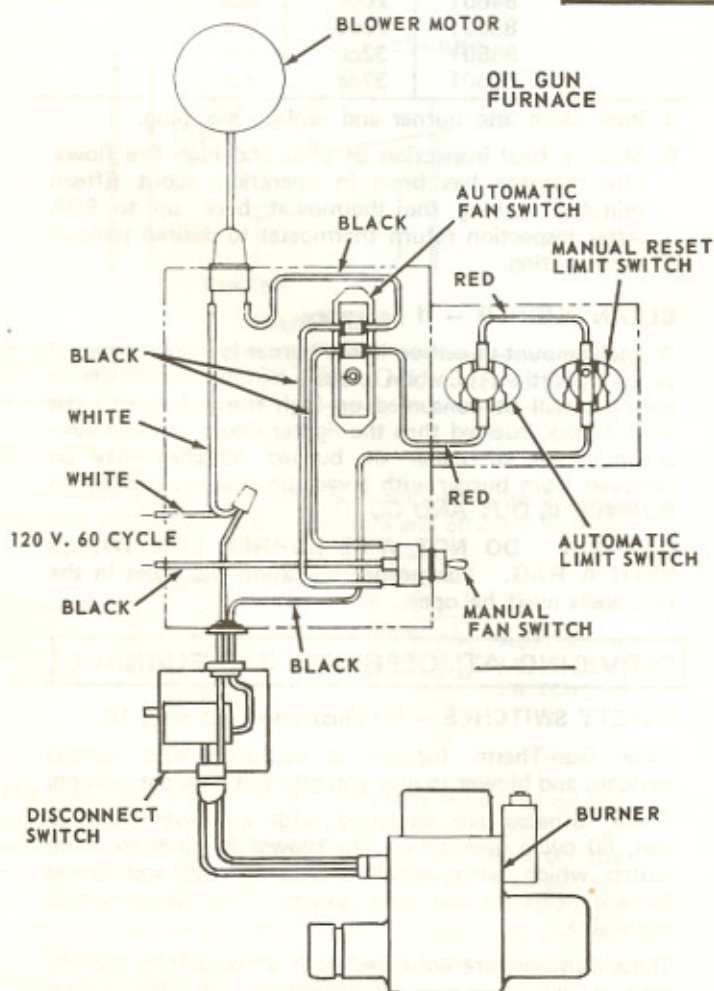
4. Check for defective room thermostat. Short the thermostat terminals which are located on the gas control. If the furnace comes on, this indicates the trouble is not in the furnace. Check terminals for loose connections. Next short the terminals at the room thermostat. If the furnace does not light this indicates that the trouble is in the thermostat cable.

NOTE: This circuit is 24 volts and presents no shock hazards.

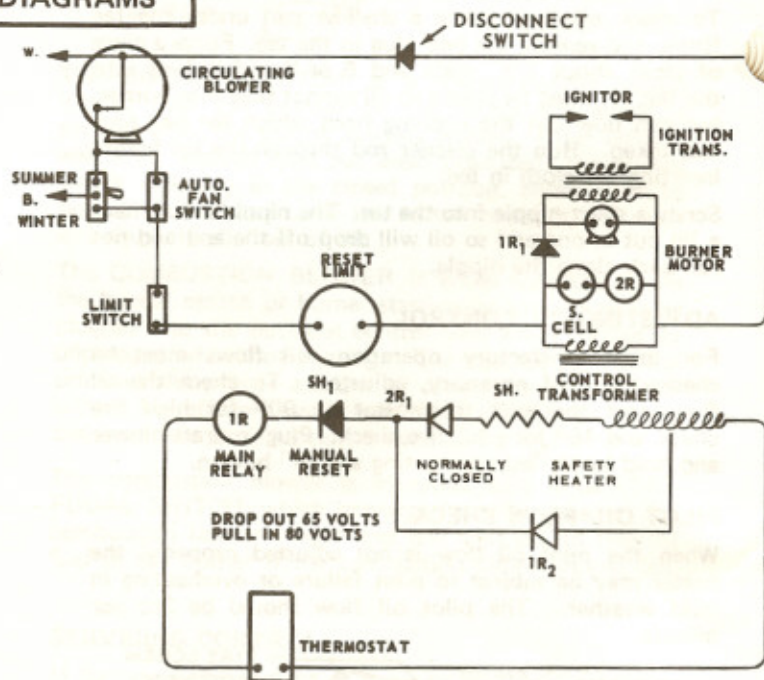
5. Be sure the air circulating blower is working properly. Before condemning blower motor as being defective, be sure there are no loose connections. Be sure blower wheel is clean and blower motor turns freely.
6. Be sure all registers are open and air ducts are free from any obstruction.
7. The manifold gas pressure can be checked by removing pressure check plug and attaching gauge.
8. The main burner orifice and pilot burner orifice may be removed for cleaning when necessary.

SECTION 8

WIRING DIAGRAMS



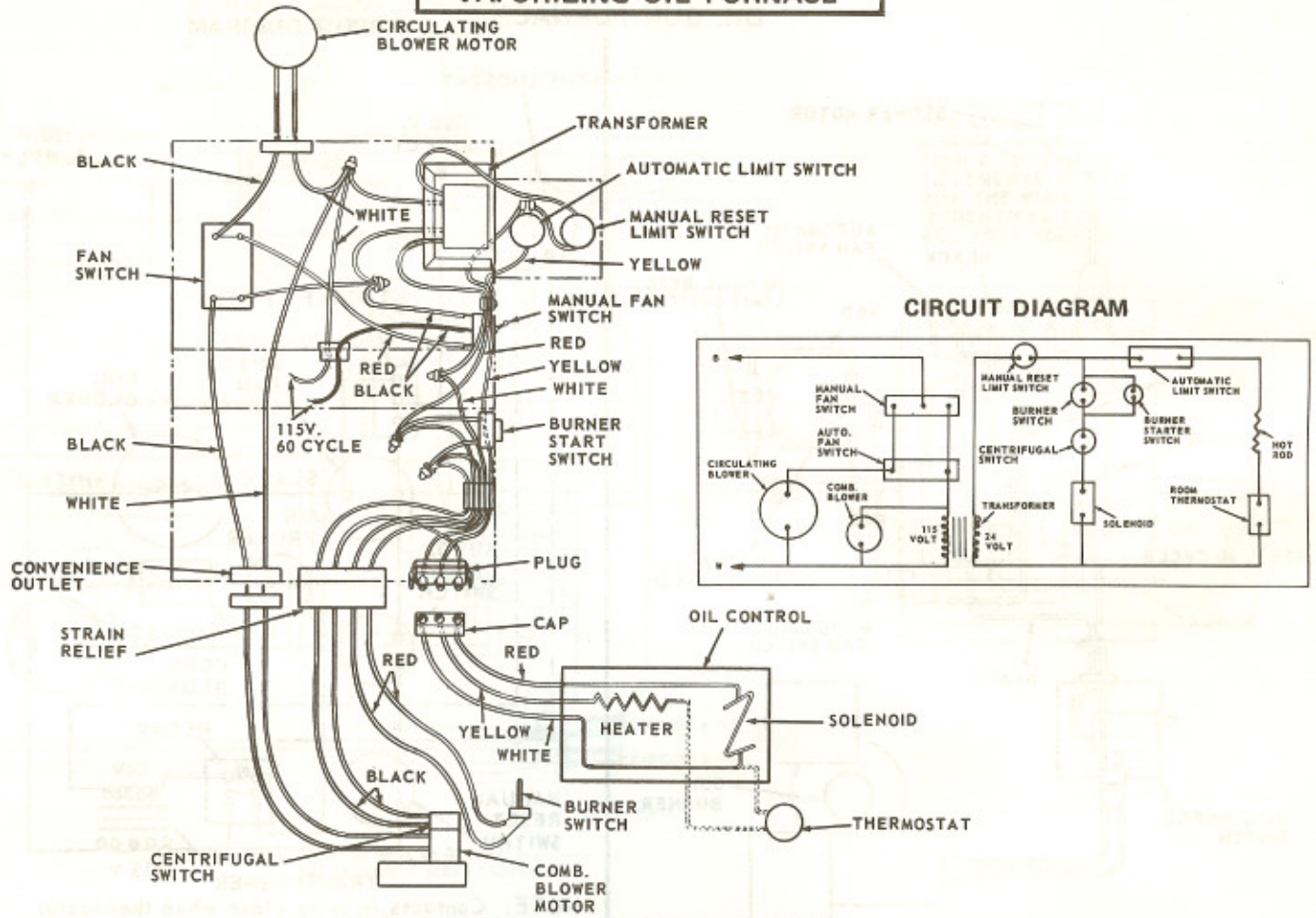
CIRCUIT DIAGRAM



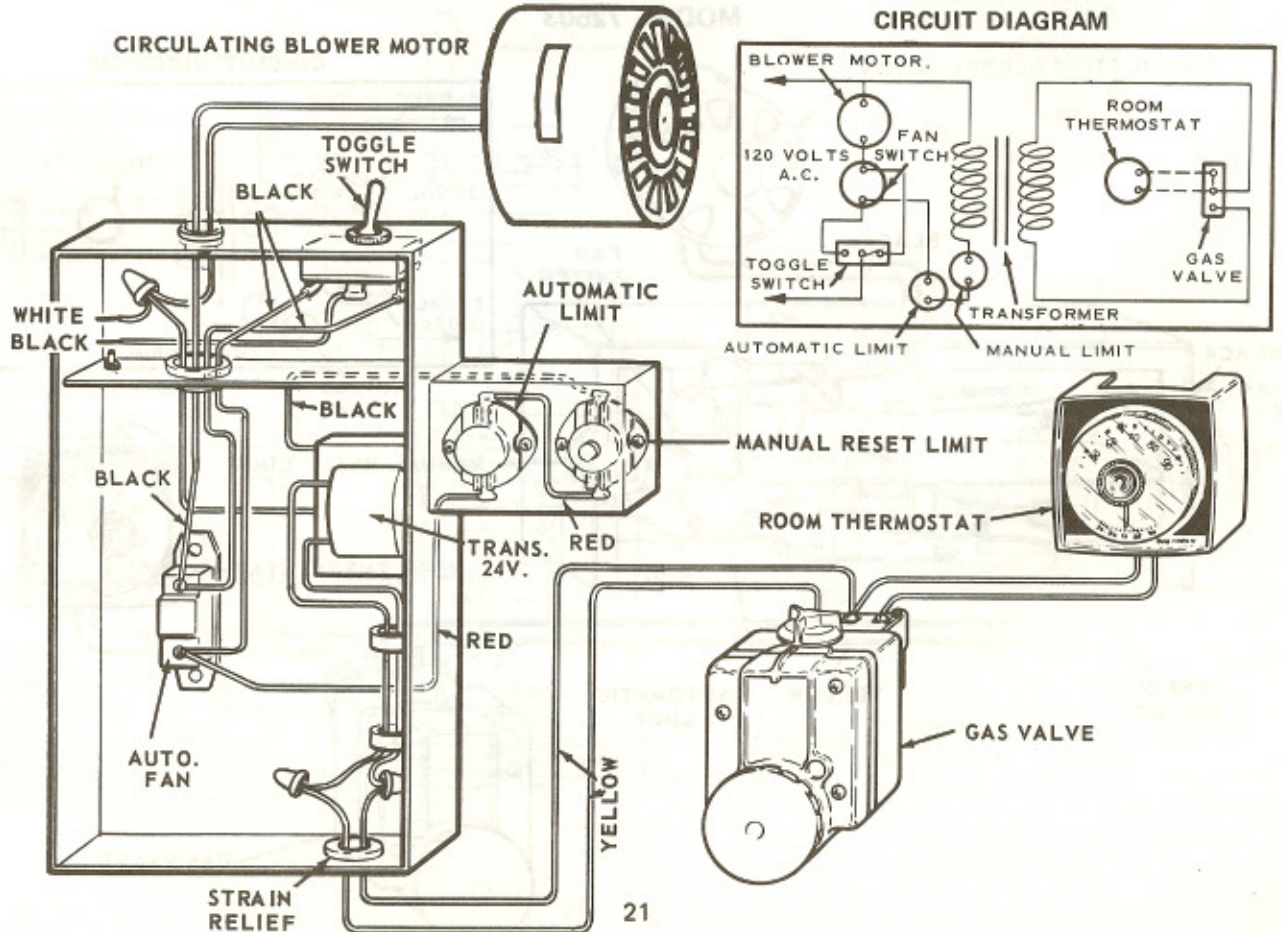
OPERATION OF 865 & 851 POINTS TO REMEMBER

- Main Relay (1R)
Closes (1R₁ and 1R₂)
- Cell Relay (2R)
Opens (2R₁)
- Safety Heater (SH)
Opens (SH₁) when
Cell sees no fire

VAPORIZING OIL FURNACE

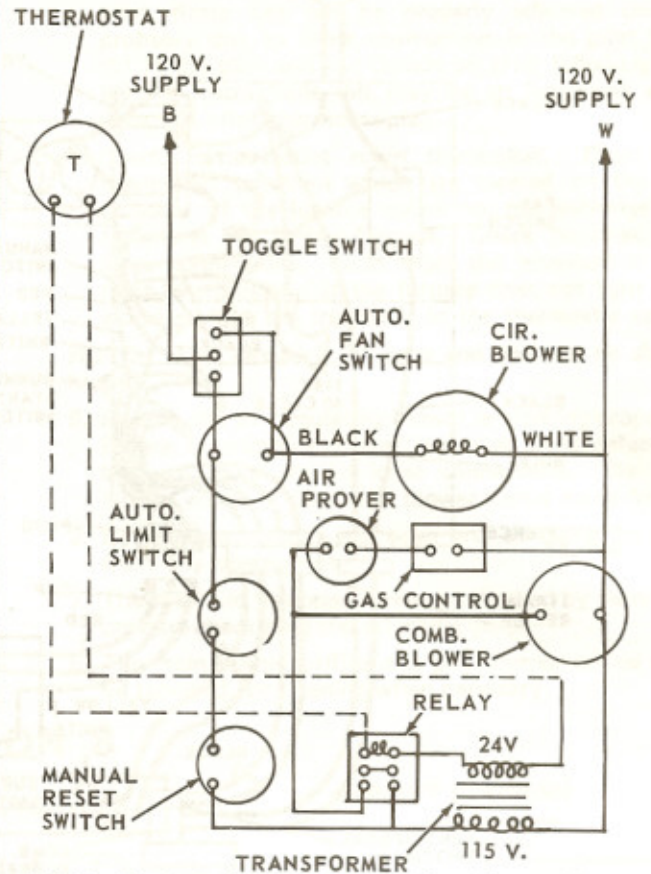
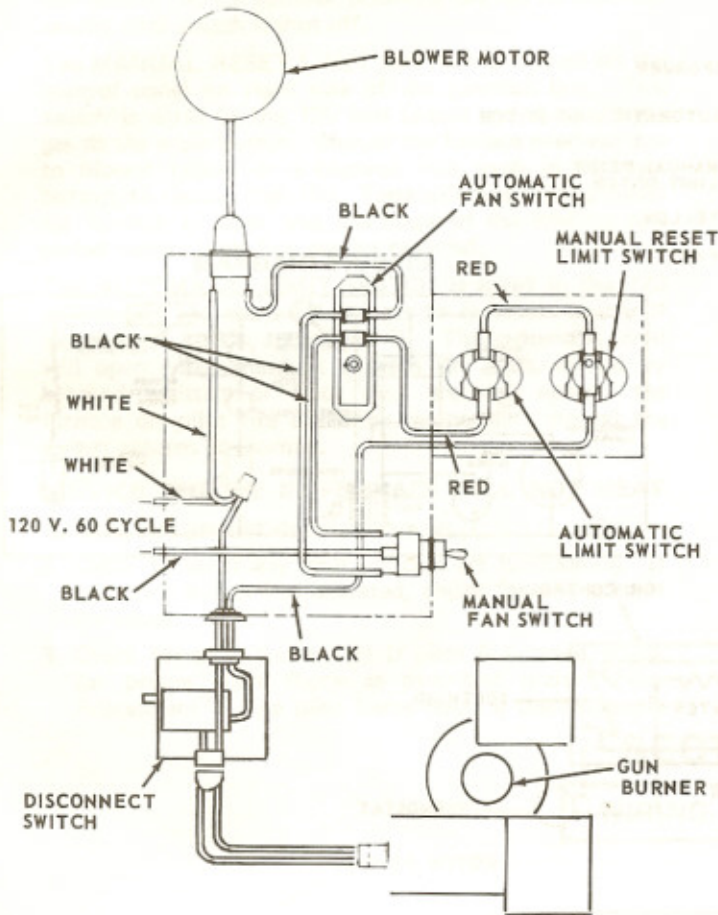


ATMOSPHERIC GAS FURNACE



OIL GUN FURNACE

CIRCUIT DIAGRAM

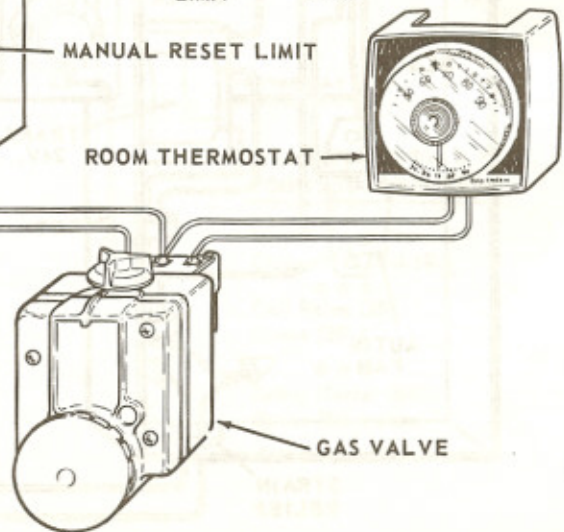
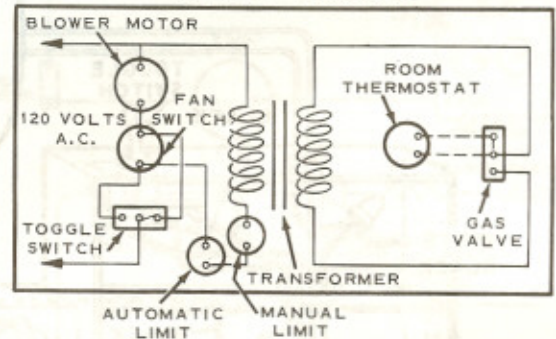
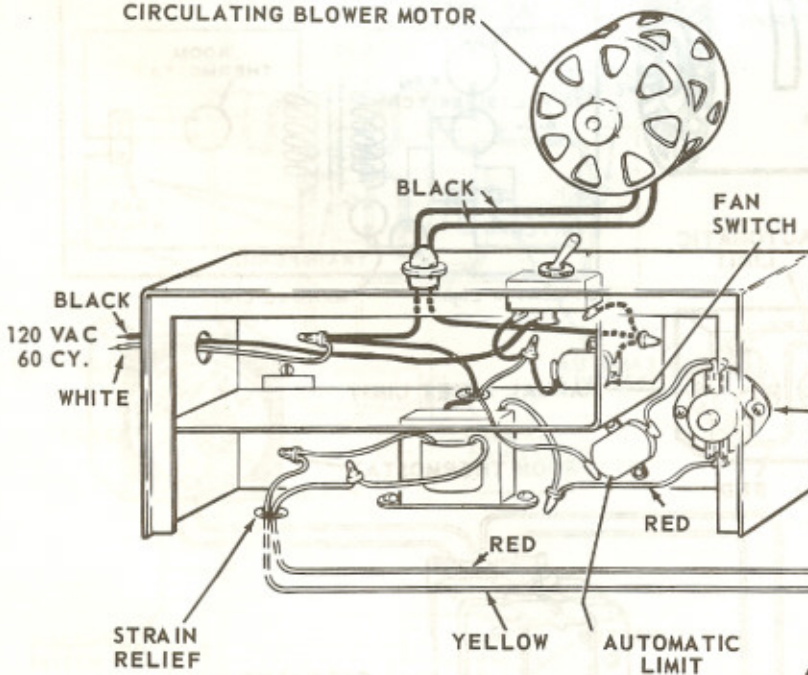


NOTE: Contacts in relay close when thermostat calls for heat.

MODEL 72503

CIRCULATING BLOWER MOTOR

CIRCUIT DIAGRAM



**MODELS 34501 - 36001
35004 - 36804**

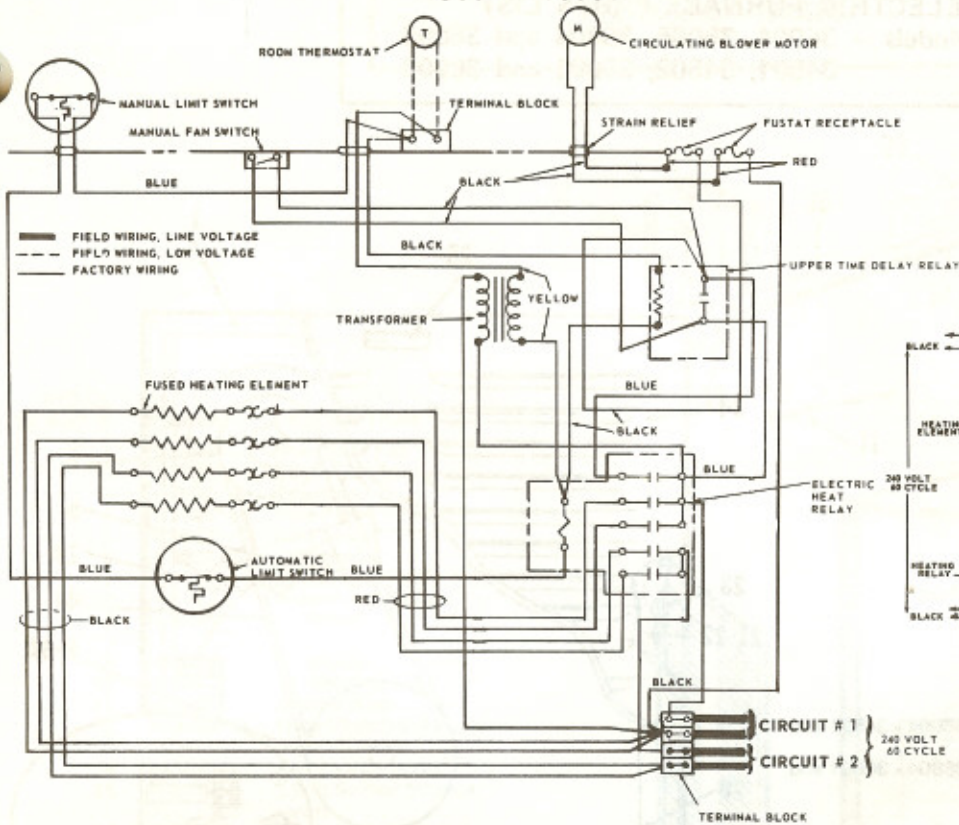
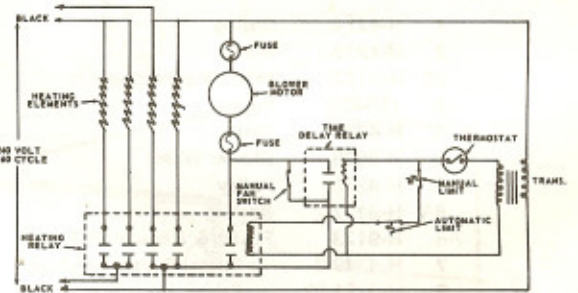


DIAGRAM SHOWN IS FOR MODELS 36001 & 36804. MODELS 34501 & 35004 HAVE 3 ELEMENTS, OTHERWISE THE WIRING IS IDENTICAL FOR ALL FOUR MODELS.

CIRCUIT DIAGRAM



**NOTE: FURNACE MUST BE GROUNDED.
USE GROUNDING SCREW PROVIDED.**

**MODELS 34502 - 36002
35005 - 36805**

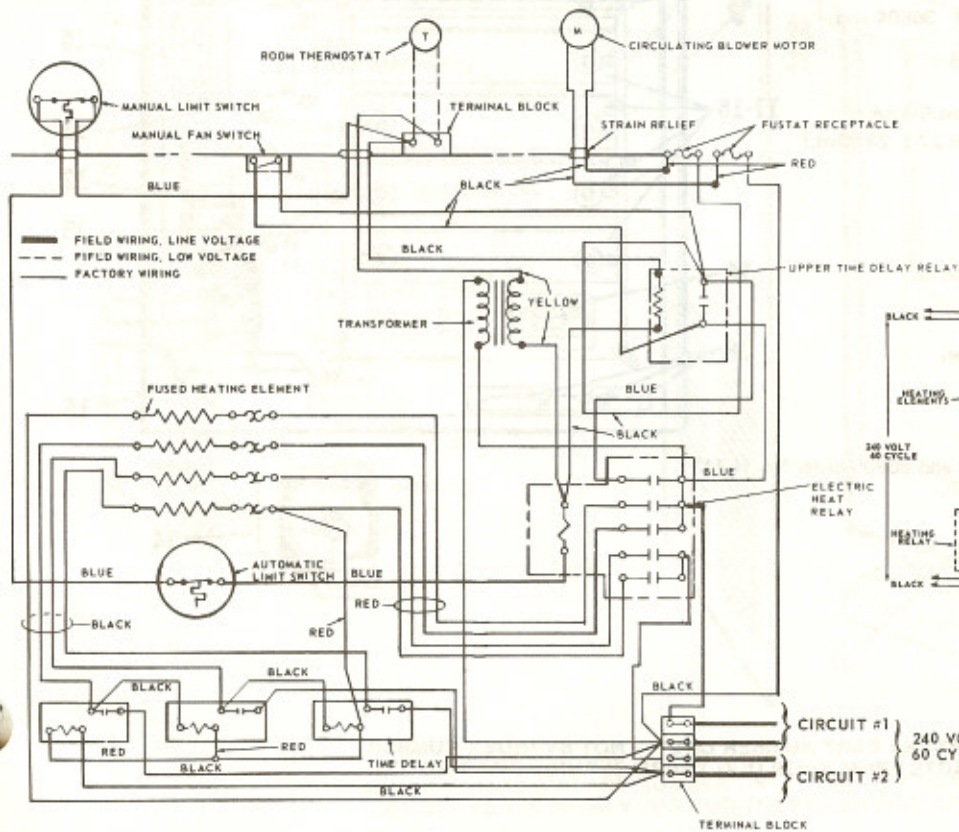
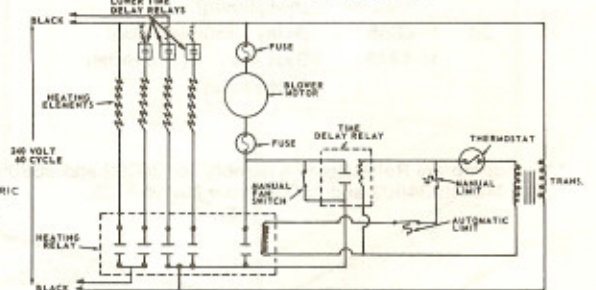


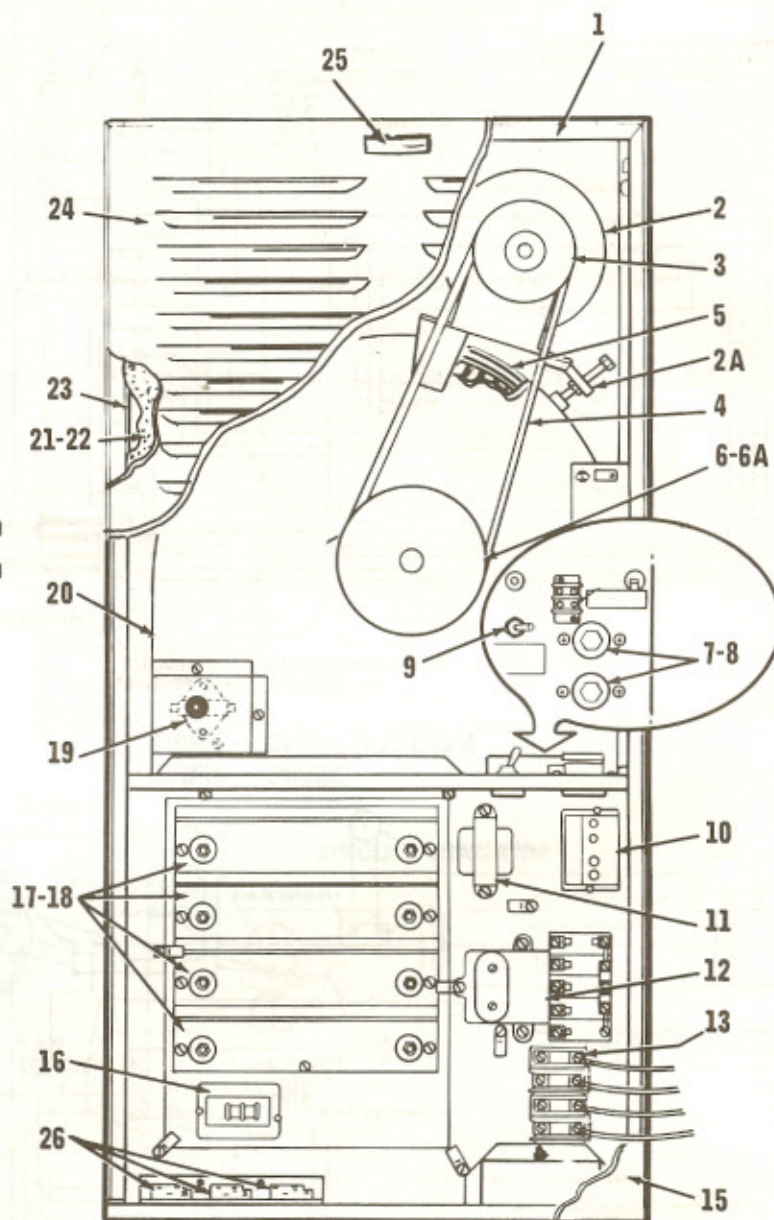
DIAGRAM SHOWN IS FOR MODELS 36002 & 36805. MODELS 34502 & 35005 HAVE 3 ELEMENTS AND 2 LOWER TIME DELAY RELAYS OTHERWISE THE WIRING IS IDENTICAL FOR ALL FOUR MODELS.

CIRCUIT DIAGRAM



ELECTRIC FURNACE PARTS LIST
 For Models – 35004, 35005, 36804 and 36805
 34501, 34502, 36001 and 36002

INDEX NUMBER	PART NUMBER	DESCRIPTION
1	H-4224	Casing
2	H-4233	Motor
2A	H-9162	Mounting Bracket Kit
3	110433	Pulley
4	H-4238	Belt
5	H-9029	Blower Wheel
6	H-4235	Pulley
6A	H-9117	Bearing
7-8	H-9123	Fustat & Receptical Assy.
7	H-4349-3	Fustat Receptical Assy.
8	H-4351-22	Fustat 6 1/4 Amp.
9	H-1171-C	Toggle Switch
10	H-4249	Time Delay Relay
11	H-4246-1	Transformer
12	H-4242-5	Electric Heat Relay (35004 - 34501 and 35005 - 34502)
12	H-4242-4	Electric Heat Relay (36804 - 36001 and 36805 - 36002)
13	H-7855	Terminal Block
14	H-3236	Thermostat
15	H-4254	Door (lower)
16	H-4366	Auto. Limit Switch (35004 - 34501 and 35005 - 34502)
16	H-4365	Auto. Limit Switch (36804 - 36001 and 36805 - 36002)
17	H-8050	Heat Elements (34501 - 36001 and 34502 - 36002)
17	H-4206	Heat Elements (35004 - 36804 and 35005 - 36805)
18	H-9030	Fuse Link (not shown)
19	H-4239	Manual Reset Limit
20	H-6906	Blower Assy. Incl. Items 5-6-6A
21	H-4264	Filter Assy. Incl. Items 22 & 23 (Opt.)
22	H-4262	Filter (Opt.)
23	H-4263	Frame (Opt.)
24	H-4265	Door (upper)
25	H-9105	Door Latch
	H-3405	Base Assy. (Mobile Home) (not shown)
26	H-6865**	Relay (35005-36805)
	H-4342	Base Assy. (Residential) (not shown)



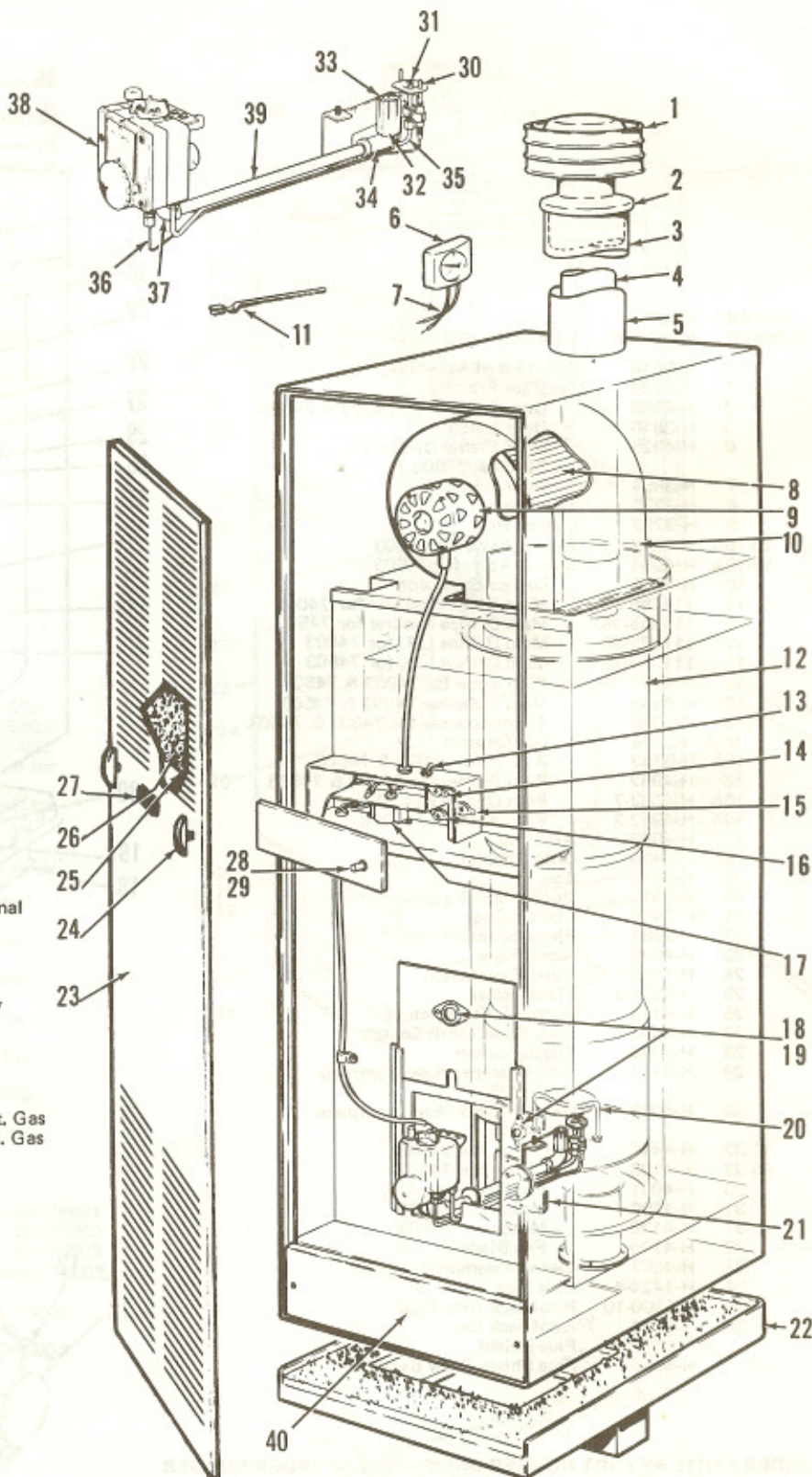
**For complete Relay Panel Assembly for 36002 and 36805 order No. H-7131.
 For Models 34502 and 35005 order No. H-7135.

ORDER PARTS BY PART NUMBER ONLY – NOT BY INDEX NUMBER
ORDER PARTS FROM YOUR DUO-THERM SERVICE DISTRIBUTOR

ATMOSPHERIC GAS FURNACE PARTS LIST

For Model - 72503

INDEX NUMBER	PART NUMBER	DESCRIPTION
1	H-3895	Roof Jack Cap
2	H-3737	Roof Jack Assy.,
3	H-3601	Drawband
4	H-3744	Flue Pipe Extension
5	H-3667	Flue Shield
6	H-3236	Thermostat
7	107344	Thermostat Cable (optional)
8-9-10	H-5322	Blower Assembly
8	H-3694	Wheel
9	H-5315	Motor
10	H-3693	Housing
11	H-3292	Lighter Rod
12	H-3509	Heat Chamber Assembly
13	H-2990	Toggle Switch
14	H-3680	Fan Switch (auto.)
15	H-5155	Limit Switch (manual reset)
16	H-3681	Limit Switch (auto.)
17	H-3287-2	Transformer
18	H-2818	Sight Glass
19	114563	Gasket
20	H-2861	Flame Spreader
21	H-3525	Gasket
22	H-3629	Base
23 thru 26	H-5113	Door Assembly
23 use	H-5113	Door
24	H-3810	Latch
25-26	H-3646	Filter Assembly } Optional
25	H-3647	Frame
26	H-3648	Filter
27	H-4028	Name Plate
28	H-4813	Reset Extension
29	H-3691	Reset Spring
30 thru 39	H-4954	Burner & Control Assembly
30	H-5050	Thermocouple
31	H-4952	Pilot Burner
	H-4002-7	Pilot Orifice .024, Nat.
	H-4952-2	Pilot Orifice .018 L.P.
32	111255-34	Main Burner Orifice Nat. Gas
32	111255-52	Main Burner Orifice L.P. Gas
33	H-4025	Orifice Extension
34	H-1122	Elbow
35	H-4950	Pilot Tube
36	H-4951	Vent Tube
37	107555	Elbow 3/8" Std.
38	H-3666	Control
39	H-3663	Burner Assembly
40	H-3605	Plenum Plate
	H-3738	Register Kit

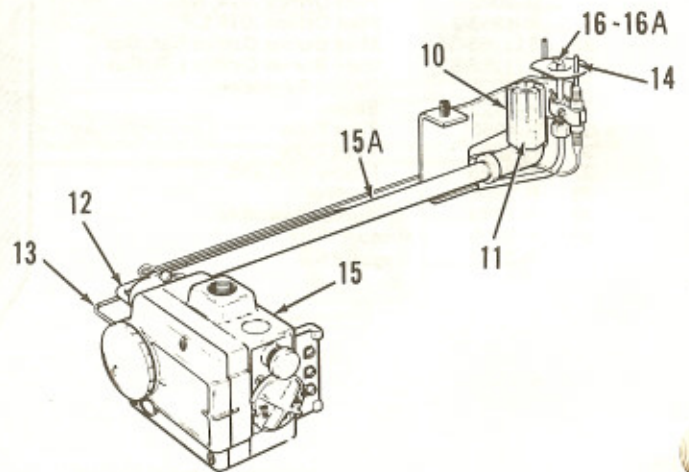
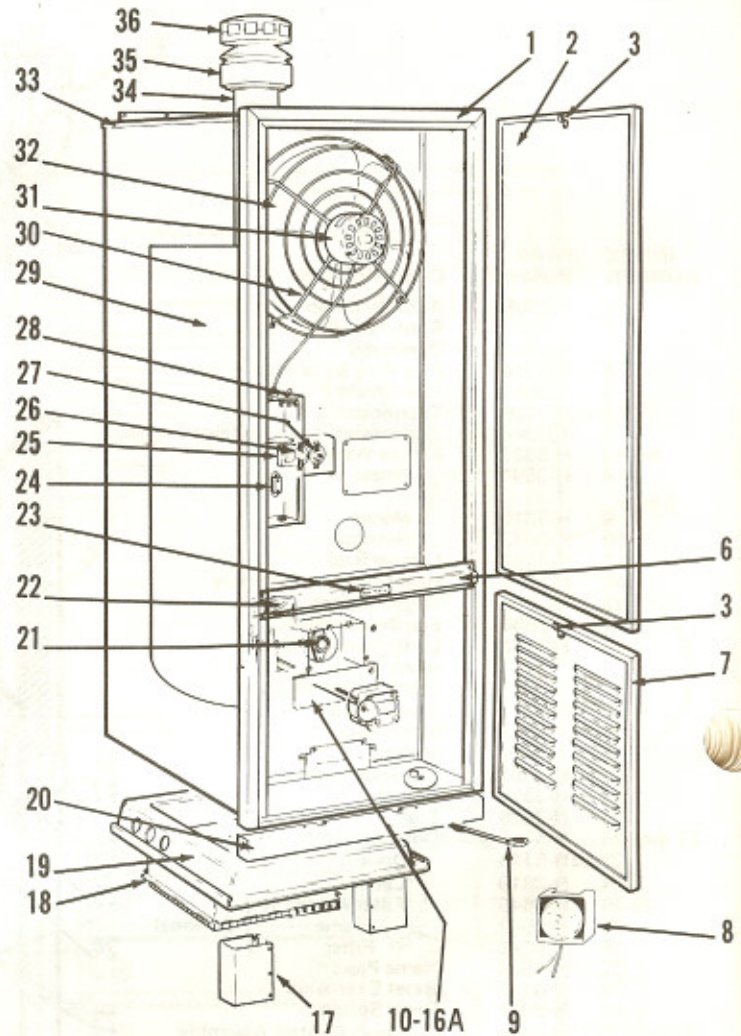


ORDER PARTS BY PART NUMBER ONLY - NOT BY INDEX NUMBER
ORDER PARTS FROM YOUR DUO-THERM SERVICE DISTRIBUTOR

ATMOSPHERIC GAS FURNACE PARTS LIST

For Models — 74003 and 74503

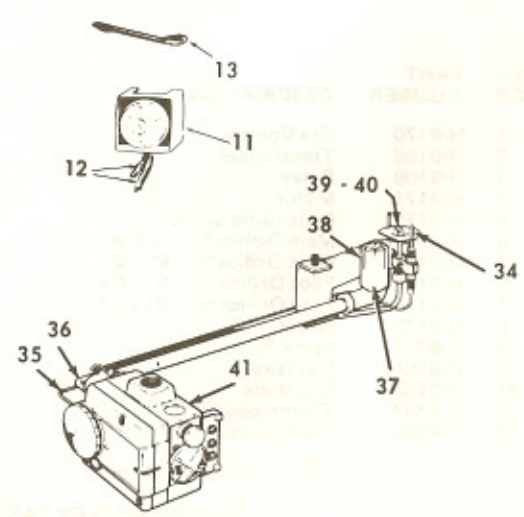
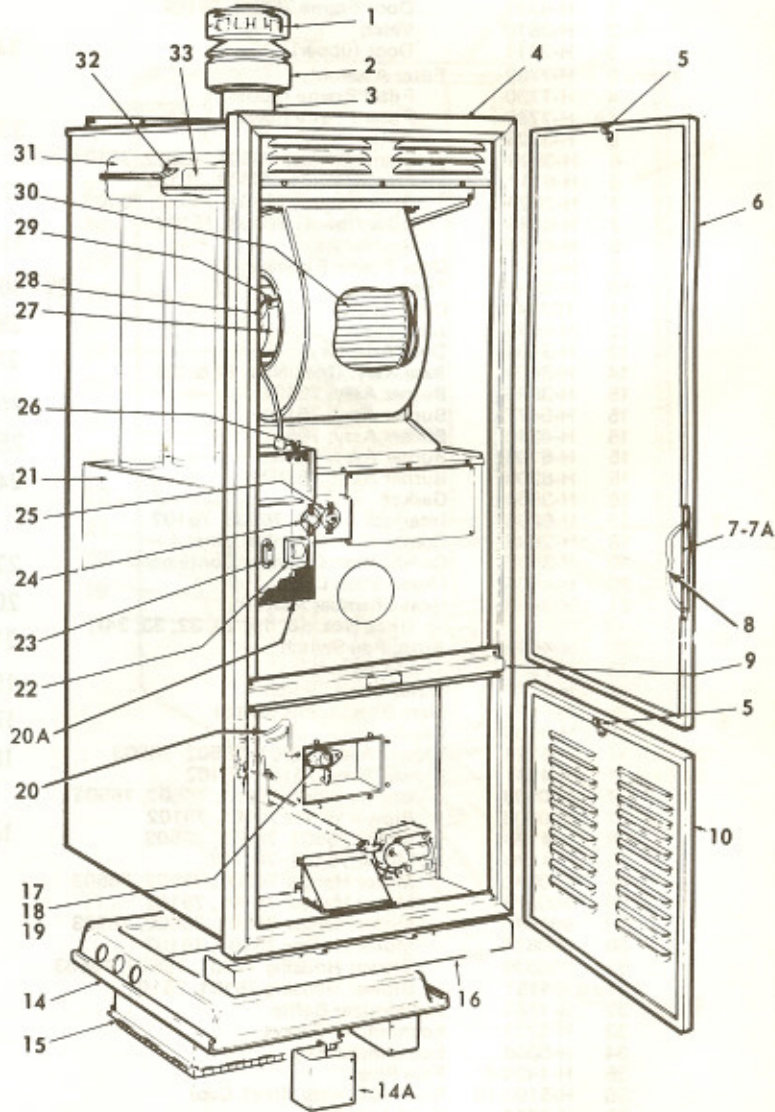
INDEX NUMBER	PART NUMBER	DESCRIPTION
1-7	H-9018	Front Panel Assembly
1	H-3729	Door Frame
2	H-4955	Door (upper) for 74003 & 74503
3	H-3810	Door Latch
6	H-4928	Door Frame Divider for 74003 & 74503
7	H-3854	Door (lower)
8	H-3236	Thermostat
9	H-3292	Lighter Rod
10-16A	H-4957	Burner Assy. for 74003
10-16A	H-4958	Burner Assy. for 74503
10	H-4025	Orifice Extension
11	111255-30	Main Orifice Natural for 74003
11	111255-26	Main Orifice Natural for 74503
11	111255-48	Main Orifice L.P. for 74003
11	111255-43	Main Orifice L.P. for 74503
12	H-4944	Pilot Tube for 74003 & 74503
13	H-4945	Vent Tube for 74003 & 74503
14	H-5050	Thermocouple for 74003 & 74503
15	H-3226	Gas Control
15A	H-5153	Burner for 74003 & 74503
16	H-4952	Pilot Burner for 74003 & 74503
16A	H-4002-7	Pilot Orifice Nat. .024
16A	H-4952-2	Pilot orifice L.P. .018
17	H-4049	Air Tube
18	H-3409	Duct Adapter
19	H-3411	Base
20	H-3641	Door Frame Extension
21	H-3468	Lighter Door
22	H-2861	Flame Spreader
23	H-4028	Name Plate
24	H-4165	Auto. Fan Switch
25	H-3287-2	Transformer
26	H-4119	Auto. Limit Switch
27	H-4033	Man. Reset Limit Switch
28	H-2990	Toggle Switch
29	H-4411	Heat Chamber Assy. complete for 74003
29	H-4093	Heat Chamber Assy. complete for 74503
30-32	H-4414	Fan Assy. for 74003
30-32	H-4138	Fan Assy. for 74503
30	H-4061	Fan Mounting Assy.
31	H-4399	Motor for 74003
31	H-4139	Motor for 74503
32	H-4140	Fan Blade
33	H-4067	Casing Assembly
34	H-1424-4	Flue Pipe
35	H-5100-10	Roof Jack (Inc. Cap)
36	H-4444	Roof Jack Cap
	100548	Flue Shield
	H-4385	Flue Shield Draw Band



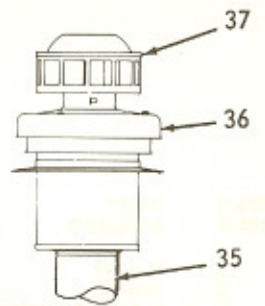
ORDER PARTS BY PART NUMBER ONLY — NOT BY INDEX NUMBER
ORDER PARTS FROM YOUR DUO-THERM SERVICE DISTRIBUTOR

ATMOSPHERIC GAS FURNACE PARTS LIST
For Models - 74601, 75003, 76003

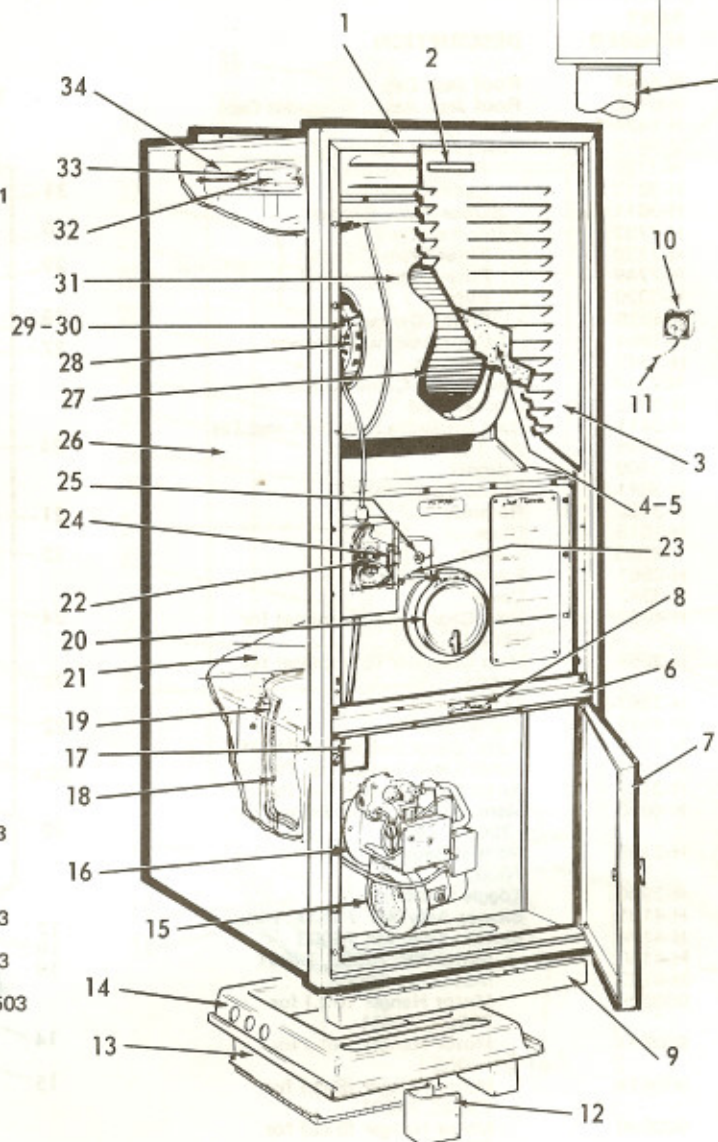
INDEX NUMBER	PART NUMBER	DESCRIPTION
1	H-4444	Roof Jack Cap
2	H-5100	Roof Jack Assy., (Includes Cap)
3	H-1424-4	Flue Pipe
4 thru 10	H-9018	Front Panel Assembly
4	H-3729	Frame Assembly
5	H-3812	Latch Assembly
6	H-3811	Door Assy. (Upper)
7 and 8	H-7732	Filter Assembly
7	H-7730	Filter Frame (upper)
7A	H-7749	Filter Frame (lower)
8	H-3329	Filter
9	H-4928	Frame Divider
10	H-3854	Door Assembly (Lower)
11	H-7442	Thermostat
12	107344	Thermostat Cable (Optional)
13	H-3292	Lighter Rod
14	H-3411	Base (Includes Item 14A and 15)
14A	H-3395	Air Tube
15	H-3409	Adapter
16	H-3641	Frame Extension
17	H-3459	Retainer
18	H-2818	Glass
19	114563	Gasket
20	H-2861	Flame Spreader
20A	H-3942	Cover
21	H-4027	Heat Chamber (Complete) for 75003, 74601
21	H-3959	Heat Chamber (Complete) for 76003
22	H-3287-2	Transformer
23	H-4019	Fan Switch
24	H-7425	Auto. Limit Switch for 74601
24	H-4032	Auto. Limit Switch for 75003
24	H-3797	Auto. Limit Switch for 76003
25	H-4033	Manual Reset Limit Switch for 75003, 74601
25	H-3798	Manual Reset Limit Switch for 76003
26	H-2990	Toggle Switch
27-30	H-4131	Blower Assy. for 75003, 74601
27-30	H-4124	Blower Assy. for 76003
27	H-4130	Motor for 75003, 74601
27	H-4123	Motor for 76003
28	900575	Motor Hanger (Int.) for 75003, 74601
28	900541	Motor Hanger (Int.) for 76003
29	900574	Motor Hanger (Ext.) for 75003, 74601
29	900540	Motor Hanger (Ext.) for 76003
30	900605	Blower Wheel for 75003, 74601
30	900538	Blower Wheel for 76003
31	H-5356	Economizer Top
32	H-1223	Economizer Gasket
33	H-3233	Economizer Baffle
34-41	H-7424	Burner and Control Assy. for 74601
34-41	H-4959	Burner and Control Assy. for 75003
34-41	H-4960	Burner and Control Assy. for 76003
34	H-5050	Thermocouple for 75003, 76003, 74601
35	H-4945	Vent Tube for 75003, 76003, 74601
36	H-4944	Pilot Tube for 75003, 76003, 74601
37	111255-27	Orifice Nat. } 74601
37	111255-44	Orifice L.P. } 74601
37	111255-24	Orifice Nat. } 75003
37	111255-42	Orifice L.P. } 75003
37	111255-18	Orifice Nat. } 76003
37	111255-38	Orifice L.P. } 76003
38	H-4025	Orifice Extension
39	H-4952	Pilot Burner for 75003, 76003, 74601
40	H-4002-7	Pilot Orifice, Nat. .024
40	H-4952-2	Pilot Orifice, L.P. .018
41	H-3226	Gas Control



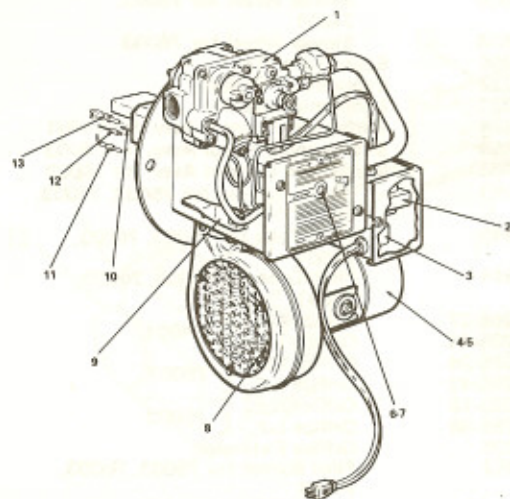
GAS GUN FURNACE PARTS LIST
For Models — 76501, 76502, 76503, 75101, 75102



INDEX NUMBER	PART NUMBER	DESCRIPTION
1 thru 8	H-9122	Front Panel Assembly
1	H-3729	Door Frame 76501, 76502, 75101
1	H-6391	Door Frame 76503, 75102
2	H-3810	Latch
3	H-3811	Door (upper)
4 thru 5	H-7732	Filter Assembly
4	H-7730	Filter Frame (upper)
4A	H-7749	Filter Frame (lower) } Optional
5	H-3329	Filter
6	H-3828	Frame Divider 76501, 76502, 75101
6	H-6117	Frame Divider 76503, 75102
7	H-3829	Door (lower) 76501, 76502, 75101
7	H-6285	Door (lower) 76503, 75102
8	H-4028	Nameplate
9	H-3641	Door Frame Extension
10	H-3983	Thermostat
11	107344	Cable (opt.)
12	H-4049	Air Tube
13	H-3409	Duct Adapter
14	H-3404	Base Assy. (Incl. Nos. 12 & 13)
15	H-3846	Burner Assy. 76501
15	H-5477	Burner Assy. 75101
15	H-4915	Burner Assy. 76502
15	H-6198	Burner Assy. 76503
15	H-6205	Burner Assy. 75102
16	H-3054	Gasket
17	H-6095	Interlock Switch 76503, 75102
18	H-2888	Combustion Chamber Liner
19	H-3485	Combustion Chamber Container
20	H-4405	Observation Door
21	H-3483	Heat Chamber Assy. (Incl. Nos. 18, 19, 20, 32, 33, 34)
22	H-4019	Auto. Fan Switch
23	H-2990	Toggle Switch
24	H-3229	Auto. Limit Switch
25	H-4033	Man. Reset Limit Switch
26	H-3488	Casing Assy.
27 thru 31	H-4124	Blower Assy. 76501, 76502, 76503
27 thru 31	H-4131	Blower Assy. 75101, 75102
27	900538	Blower Wheel 76501, 76502, 76503
27	900605	Blower Wheel 75101, 75102
28	H-4123	Motor 76501, 76502, 76503
28	H-4130	Motor 75101, 75102
29	900541	Motor Hanger 76501, 76502, 76503
29	900575	Motor Hanger 75101, 75102
30	900540	Motor Hanger 76501, 76502, 76503
30	900574	Motor Hanger 75101, 75102
31	900539	Blower Housing 76501, 76502, 76503
31 use	H-4131	Blower Housing 75101, 75102
32	H-1743	Economizer Baffle
33	H-1223	Economizer Gasket
34	H-5356	Economizer Top
35	H-1424-4	Flue Pipe
36	H-5100-10	Roof Jack Assy. (Incl. Cap)
37	H-4444	Roof Jack Cap
	H-5806	Ceiling Ring



INDEX NUMBER	PART NUMBER	DESCRIPTION
1	H-9170	Gas Control
2	H-9166	Transformer
3	H-9169	Relay
4	H-9171	Motor
5	H-6172	Centrifugal Switch
6	H-9167	Main Orifice No. 20 Nat.
6	H-9168	Main Orifice No. 41 L.P.
7	H-9174	Pilot Orifice No. .018 Nat.
7	H-9173	Pilot Orifice No. .010 L.P.
8	H-9172	Wheel
9	H-6012	Spark Pump
10	H-9164	Bus Wire
11	H-9165	Electrode
12	H-4743	Thermocouple
13	H-9163	Pilot Burner

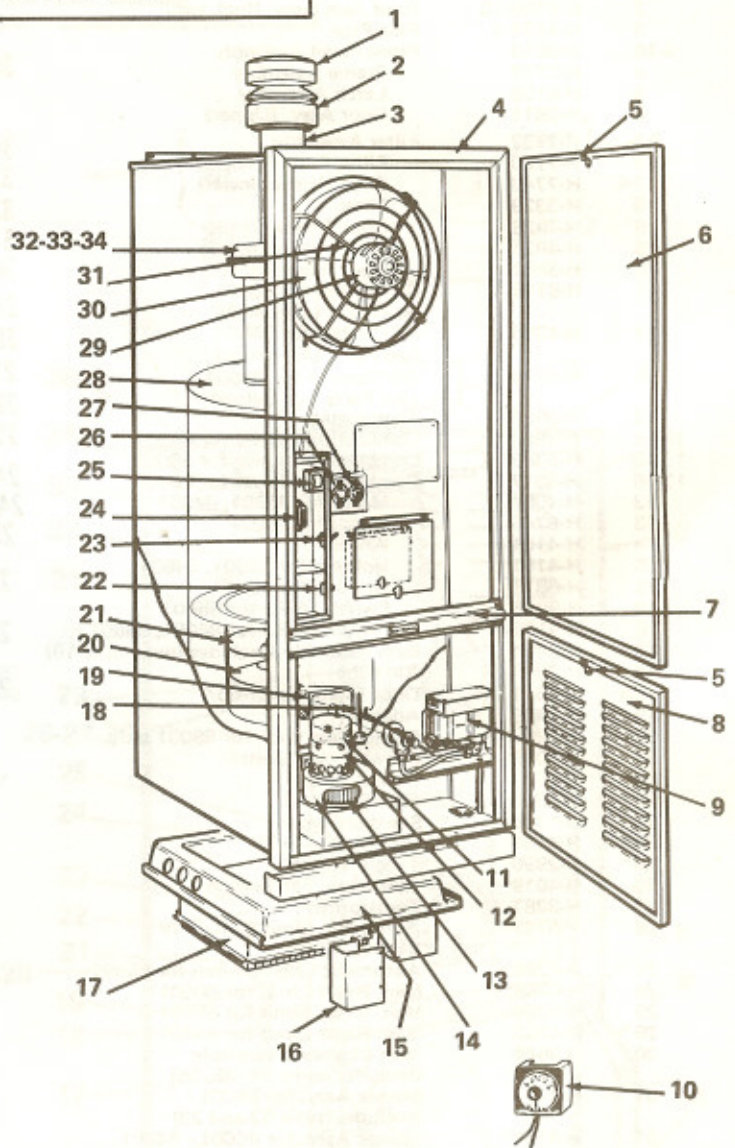


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VAPORIZING OIL FURNACE PARTS LIST

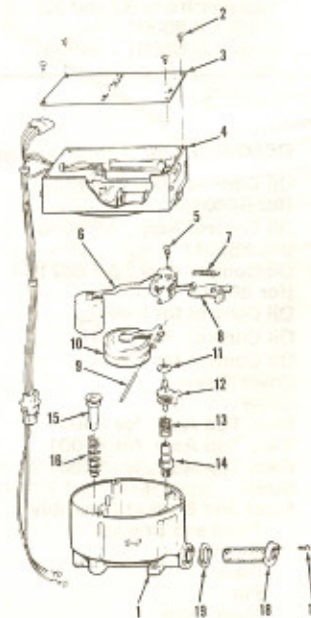
For Models – 84001, 84501

INDEX NUMBER	PART NUMBER		DESCRIPTION
	Model 84001	Model 84501	
1	H-4444	H-4444	Roof Jack Cap
2	H-5100-10	H-5100-10	Roof Jack (Inc. Cap)
3	H-1424-4	H-1424-4	Flue Pipe
4-8	H-9121	H-9121	Front Panel Assy.
4	H-4928	H-4928	Frame Assy.
5	H-9105	H-9105	Latch Assy.
6	H-4955	H-4955	Door (upper)
7	H-4928	H-4928	Door Frame Divider
8	H-3854	H-3854	Door (lower)
9	H-4286	H-4170	Oil Control (see Parts List below)
10	H-7442	H-7442	Thermostat
11-14	—	H-5385	Combustion Blower
11	—	H-9035	Centrifugal Switch
12	—	H-4084	Motor
13	—	H-4161	Wheel
14	—	H-4706	Housing
15	H-3405	H-3405	Base (Inc. 16 & 17)
16	H-3395	H-3395	Air Tube
17	H-3409	H-3409	Adapter
18	H-9086	H-9086	Burner Switch
19	900629	900629	Pilot Stabilizer
20	H-9036	H-2905	Burner Ring (lower)
21	H-9037	—	Burner Ring (upper)
22	H-1305	H-1305	Burner Starter Switch
23	H-2990	H-2990	Toggle Switch
24	H-4019	H-4019	Auto. Fan Switch
25	H-3195	H-3195	Transformer
26	H-4119	H-4119	Auto Limit Switch
27	H-4033	H-4033	Man. Reset Limit
28	H-4408	H-4188	Heat Chamber
29-31	H-4414	H-4138	Fan Assy.
29	H-4399	H-4139	Motor
30	H-4140	H-4140	Fan Blade
31	H-4061	H-4061	Motor Mount
32	—	H-1223	Economizer Gasket
33	—	H-1220	Economizer Baffle
34	—	H-4226	Economizer Top
	100548	—	Flue Shield Ext. (not shown)
	H-4385	—	Flue Shield Draw Band



INDEX NUMBER	PART NUMBER		DESCRIPTION
	Model 84001	Model 84501	
1-19	H-4286	H-4170	Oil Control
1 use	H-4286	H-4170	Control Body
2	33469	33469	Cover Screw
3	52915	52915	Cover
4	590114*	590112*	Electric Top
5	26687	26687	Screw
6-10	169713	169713	Float & Brkt. Assy.
6	99901	99901	Float & Brkt.
7	28256	28256	Spring
8	42116	42116	Plate
9	73699	73699	Pin
10	69696	69696	Float
11	32650	32650	Washer
12-14	49148	49148	Needle Valve Assy.
12 use	49148	49148	Needle Valve
13	28180	28180	Spring
14 use	49148	49148	Valve Seat
15	H-9056	H-9059	Metering Stem
16	38187	38187	Spring
17	26070	26070	Screw
18	169685	169685	Strainer
19	75252	75252	Gasket

*Serviced as complete assembly only.

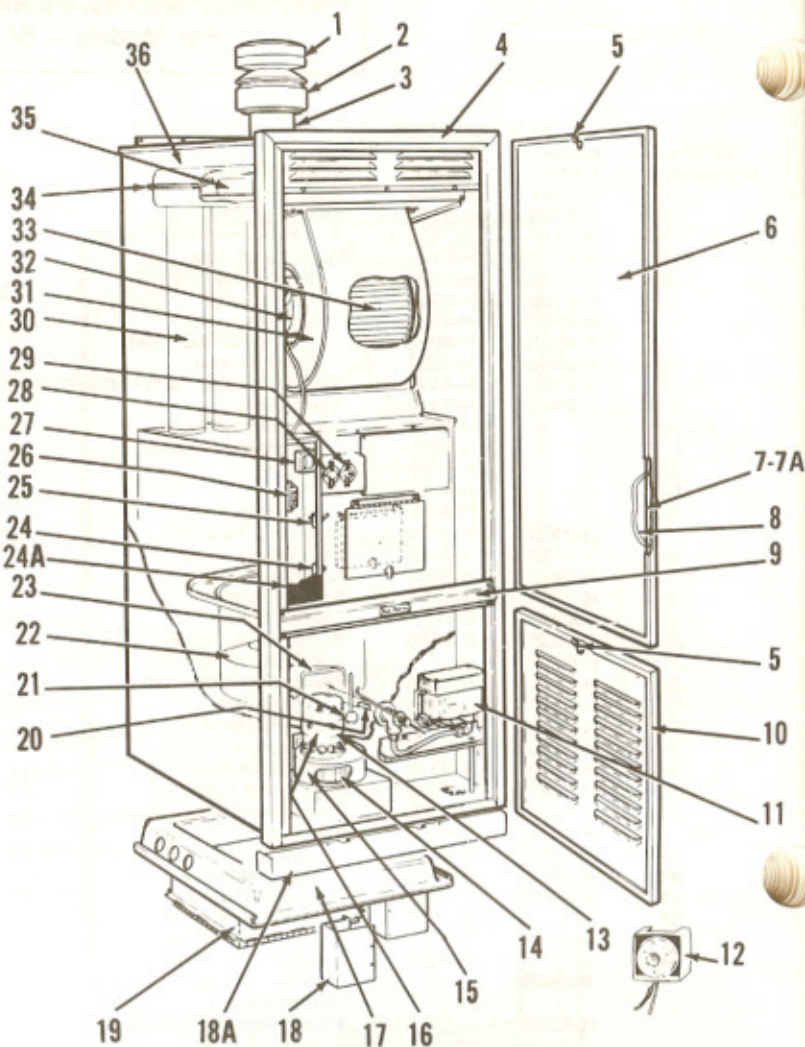


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ORDER PARTS FROM YOUR DUO-THERM SERVICE DISTRIBUTOR

VAPORIZING OIL FURNACE PARTS LIST

For Models — 84601, 85001, 86001

INDEX NUMBER	PART NUMBER	DESCRIPTION
1	H-4444	Roof Jack Cap
2	H-5100-10	Roof Jack Assy. (Incl. cap)
3	H-1424-4	Flue Pipe
4-10	H-9018	Front Panel Assembly
4	H-3729	Frame Assembly
5	H-9105	Latch Assembly
6	H-3811	Door Assy. (Upper)
7-8	H-7732	Filter Assembly
7	H-7730	Filter Frame (upper)
7A	H-7749	Filter Frame (lower)
8	H-3329	Filter
9	H-4928	Door Frame Divider*
9	H-4928	Door Frame Divider
10	H-3854	Door Assembly (Lower)
11	H-6745	Oil Control for 86001 (see Parts List below)
11	H-4285	Oil Control for 85001 (see Parts List below)
11	H-4170	Oil Control for 84601 (see Parts List below)
12	H-3983	Thermostat
13-16	H-5384	Combustion Blower for 84601
13-16	H-5383	Combustion Blower for 85001
13-16	H-6817	Combustion Blower for 86001
13	H-4084	Motor for 85001, 84601
13	H-6746	Motor for 86001
14	H-4161	Wheel
15	H-4151	Housing for 85001, 84601
15	H-6818	Housing for 86001
16	H-9035	Switch (A.P.) for 85001
16	H-9138	Switch (A.P.) for 86001, 84601
17	H-3405	Base Assembly (Includes items 18 & 19)
18	H-3395	Air Tube
18A	H-3641	Door Frame Extension
19	H-3409	Adapter
20	H-1359	Burner Pipe Wick for 86001 only
21	H-9086	Flame Prover Switch
22	H-2905	Burner Ring
23	900629	Pilot Stabilizer
24	H-1305	Starting Switch
24A	H-4149	Cover
25	H-2990	Toggle Switch
26	H-4019	Automatic Fan Switch
27	H-3287-3	Transformer
28	H-6747	Automatic Limit Switch for 84601, 86001
28	H-4288	Automatic Limit Switch for 85001
29	H-6748	Man. Reset Limit for 86001
29	H-4289	Man. Reset Limit for 85001
29	H-4163	Man. Reset Limit for 84601
30	H-3944	Heat Chamber Assembly (Includes items 34, 35, 36)
31	H-4124	Blower Assy. for 86001 (Includes items 32 and 33)
31	H-4131	Blower Assy. for 85001 - 84601 (Includes items 32 and 33)
32	H-4123	Motor for 86001
32	H-4130	Motor for 85001 - 84601



INDEX NUMBER	PART NUMBER	DESCRIPTION
33	900538	Blower Wheel for 86001
33	900605	Blower Wheel for 85001 - 84601
34	H-1223	Economize Gasket
35	H-1220	Economize Baffle
36	H-1217	Economize Top

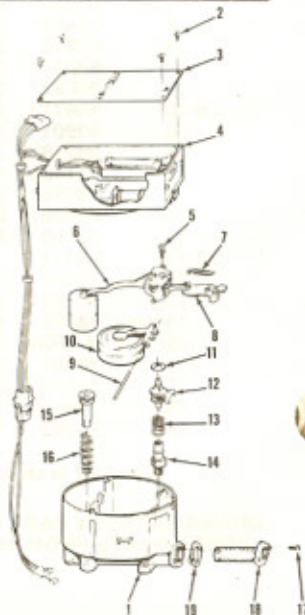
*Use on Earlier Models 85001

OIL CONTROL

INDEX NUMBER	PART NUMBER	DESCRIPTION	INDEX NUMBER	PART NUMBER	DESCRIPTION
1 thru 19	H-4170	Oil Control Assy. 80447 (for 84601)	13	28180	Spring
1 thru 19	H-4285	Oil Control Assy., AP 80461 (for 85001)	14 use	49148	Valve Seat
1 thru 19	H-6745	Oil Control Assy., AP 80714 (for 86001)	15	H-9059	Metering Stem, 26cc for 84601
1 use	H-4070	Oil Control for 84601	15	H-9057	Metering Stem, 29cc for 85001
1 use	H-4285	Oil Control for 85001	15	H-9177	Metering Stem, 35cc for 86001
1 use	H-6745	Oil Control for 86001	16	38187	Spring
2	33469	Cover Screw	17	26070	Screw
3	52915	Cover	18	169685	Strainer
4	590112*	Elec. Top Assy. for 84601	19	75252	Gasket
4	590113*	Elec. Top Assy. for 85001			
4	590130*	Elec. Top Assy. for 86001			
5	26687	Screw			
6 thru 10	169713	Float and Bracket Assembly			
6	99901	Float and Bracket			
7	28526	Spring			
8	42116	Plate			
9	73699	Pin			
10	69696	Main Float			
11	32650	Washer			
12 thru 14	49148	Needle Valve Assembly			
12 use	49148	Needle Valve			

**ORDER PARTS BY PART NUMBER ONLY —
NOT BY INDEX NUMBER**

**WHEN ORDERING PARTS FOR THIS
CONTROL, SPECIFY MODEL OR FURNACE
AND MODEL NUMBER OF CONTROL**



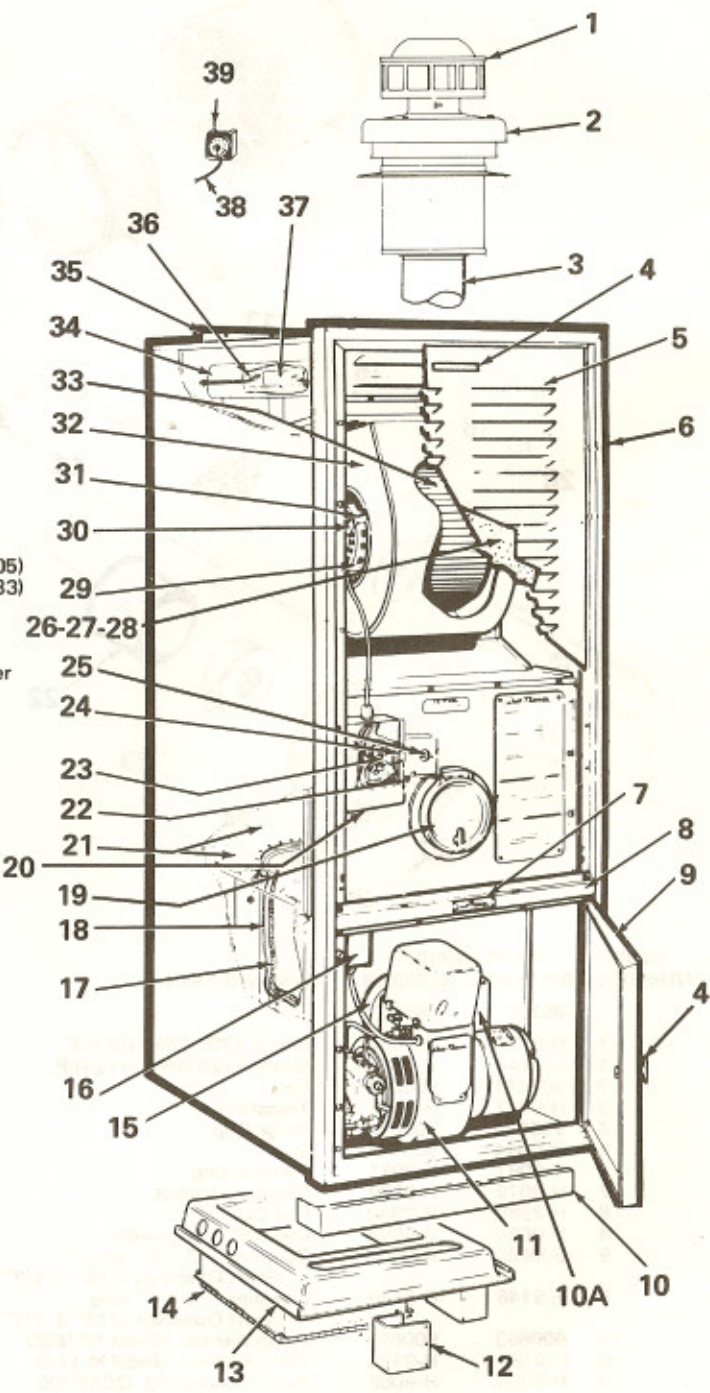
OIL GUN BURNER FURNACE PARTS LIST

For Models – 85102, 86505

INDEX NUMBER	PART NUMBER BY MODEL NUMBER		DESCRIPTION
	85102	86505	
1	H-4444	H-4444	Roof Jack Cap
2	H-5100-10	H-5100-10	Roof Jack (Incl. cap)
3	H-1424-4	H-1424-4	Flue Pipe
4-9	H-9122	H-9122	Front Panel Complete
4	H-9105	H-9105	Latch
5	H-3811	H-3811	Door (Upper)
6	H-6391	H-6391	Door Frame
7	H-4028	H-4028	Nameplate
8	H-6117	H-6117	Frame Divider
9	H-6285	H-6285	Door (Lower)
10	H-3641	H-3641	Frame Extension
10A	H-9069	H-9069	Primary (Penn.)
10A	H-9093	H-9093	Primary (Honeywell)
11	H-5478	H-6197	Gun Burner (Oil)
11	H-6205	H-7215	Gun Burner (Gas)
12	H-3395	H-3395	Air Tube (used with H-3405)
13	H-3405	H-3405	Sub-base (Std.)
13	H-5883	H-5883	Sub-base (Serv.)
14	H-3409	H-3409	Duct Adapter (used with H-3405)
14	H-5862	H-5862	Duct Adapter (used with H-5883)
15	H-3054	H-3054	Burner Gasket
16	H-6095	H-6095	Interlock Switch
17	H-2888	H-2888	Combustion Chamber Liner
18	H-3485	H-3485	Combustion Chamber Container
19	H-4405	H-4405	Observation Door
20	H-6093	H-6093	Cover
21	H-3483	H-3483	Combustion Chamber Assy. (Includes 17-18)
22	H-2990	H-2990	Toggle Switch
23	H-4019	H-4019	Auto. Fan Switch
24	H-3229	H-3229	Auto. Limit Switch
25	H-4033	H-4033	Reset Limit Switch
26-27-28	H-7732	H-7732	Filter Assembly
26	H-7730	H-7730	Frame (upper)
27	H-7749	H-7749	Frame (lower)
28	H-3329	H-3329	Filter
29-33	H-4131	H-4124	Blower Assembly
29	H-4130	H-4123	Motor
30	900575	900541	Motor Hanger
31	900574	900540	Motor Hanger
32		900539	Housing
33	900605	900538	Blower Wheel
34	H-5356	H-5356	Economizer Top
35	H-4889	H-4889	Brace
36	H-1223	H-1223	Economizer Gasket
37	H-1743	H-1743	Economizer Baffle
38	107344	107344	Cable (Optional)
39	H-7442	H-7442	Thermostat
	H-5806	H-5806	Ceiling Ring
	H-3132	H-3132	Safety Kit

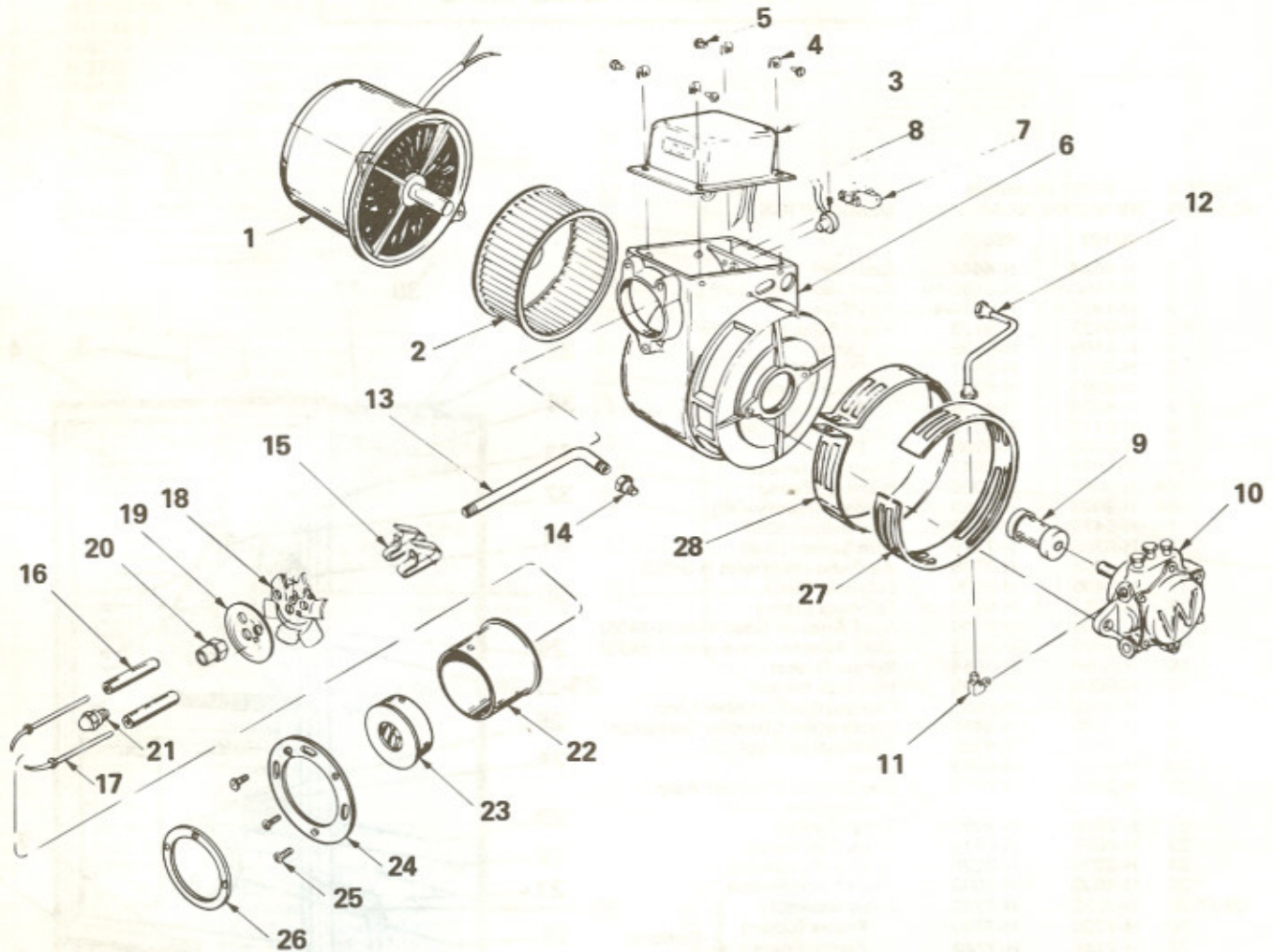
Optional

(not shown)



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OIL GUN PARTS LIST



INDEX NUMBER	PART NUMBER BY MODEL NUMBER	DESCRIPTION	INDEX NUMBER	PART NUMBER BY MODEL NUMBER	DESCRIPTION
	85102 86505			85102 86505	
1	H-9082 H-9082	Motor 1725 RPM 1/8 H.P.	13-20	900675 900675	Drawer Assembly
1	H-9144 H-9144	Motor 1725 RPM 1/12 H.P.	13	900657 900657	Oil Pipe
2	900641 900641	Fan	14	900658 900658	Fitting
3	H-9077 H-9077	Transformer	15	H-9085 H-9085	Buss Bar
4	900643 900643	Hinge Clip	16-17	900674 900674	Electrode Assembly
5	900644 900644	Screw	16	900667 900667	Insulator
6	H-9081 H-9081	Fan Housing	17	900668 900668	Electrode Stem & Washer
7	H-9079 H-9079	Cad Cell Bracket	18	900661 900661	Stabilizer
8	H-2980 H-2980	Cad Cell (Penn.)	19	900664 900664	Plate
8	H-9094 H-9094	Cad Cell (Honeywell)	20	900666 900666	Nozzle Adapter
9	900652 900652	Coupling - 3-1/8" long Shaft Openings 7/16" & 1/2"	21	— H-2988	Nozzle (Monarch)
9	H-9146 H-9146	Coupling - 4-1/4" long Shaft Openings 5/16" & 1/2"	21	— H-9070	Nozzle (Delavan)
10	900653 900653	Pump Webster Model 1R162D	21	H-5479 —	Nozzle (Monarch)
10	H-9188 H-9188	Pump Webster Model M-17-D	21	H-9136 —	Nozzle (Delavan)
10	H-9068 H-9068	Pump Sundstrand J2CBF100	22	900669 900669	Air Tube
10	H-9139 H-9139	Pump Sundstrand A1VA17J1600	23	900670 900670	Air Cone
11	900655 900655	Elbow (Std. Pipe to Copper)	24	900672 900672	Mounting Flange
11	H-9187 H-9187	Elbow (Inverted Flare)	25	900673 900673	Screw
12	H-9080 H-9080	Oil Line (Used with Webster Pump Model 1R162D)	26	H-3054 H-3054	Gasket
12	H-9145 H-9145	Oil Line (Used with Sundstrand Pump Models J2CBF100 & A1VA17J1600)	27	H-9083 H-9083	Air Band (Inner)
			28	H-9084 H-9084	Air Band (Outer)

DUO-THERM Division of Motor Wheel Corporation, LaGrange, Indiana 46761