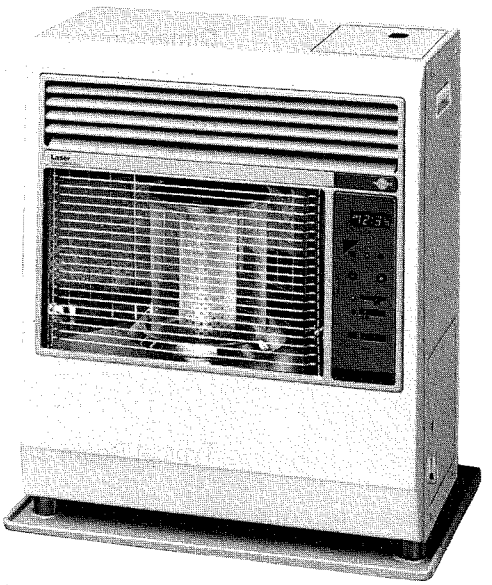
TOYOSTOVE®

VENTED WICKLESS KEROSENE HEATER

INSTALLATION AND OPERATION INSTRUCTIONS



VENTED LASER CLEAN

MODEL **Laser 52**

MEMBER OF NKHA NATIONAL KEROSENE HEATER ASSOCIATION

BOCA BUILDING OFFICIALS' CODE ADMINISTRATORS INTERNATIONAL

IMPORTANT

READ AND UNDERSTAND INSTRUCTIONS BEFORE INSTALLING OR USING HEATER. RETAIN INSTRUCTIONS FOR FUTURE REFERENCE. CHECK STATE AND LOCAL CODES FOR PERMITTED USE. THIS HEATER IS DESIGNED TO BE USED NO MORE THAN 3000 FT. ABOVE SEA LEVEL. DO NOT OPERATE AT ALTITUDES HIGHER THAN 3000 FT. ABOVE SEA LEVEL.

CONTENTS

SECTION A: SPECIFICATIONS

Model:	Laser 52
Heater Efficiency:	93%(1)
Heat Rating:	High — 22,000 BTU/h Low — 11,000 BTU/h
Fuel Consumption:	High — 0.1633 gal/h Low — 0.0817 gal/h
Fuel System:	External tank(3)
Fuel Type:	Water Clear No. 1-K Kerosene Only
Dimensions (W×H×D): (Includes drip tray)	24-3/8" × 26-3/4" × 16"
Weight:	60 lbs. Empty
Vent Pipe Hole:	3-1/8" — 3-3/8" diameter
Maximum Length of Vent Pipe System:	10 ft., 3 bends or less
Electrical Rating:	120 Volts AC, 60Hz Preheat — 265W Burning — 58W
Typical Room Size(2):	850 square feet (0°F) 1280 square feet (20°F)

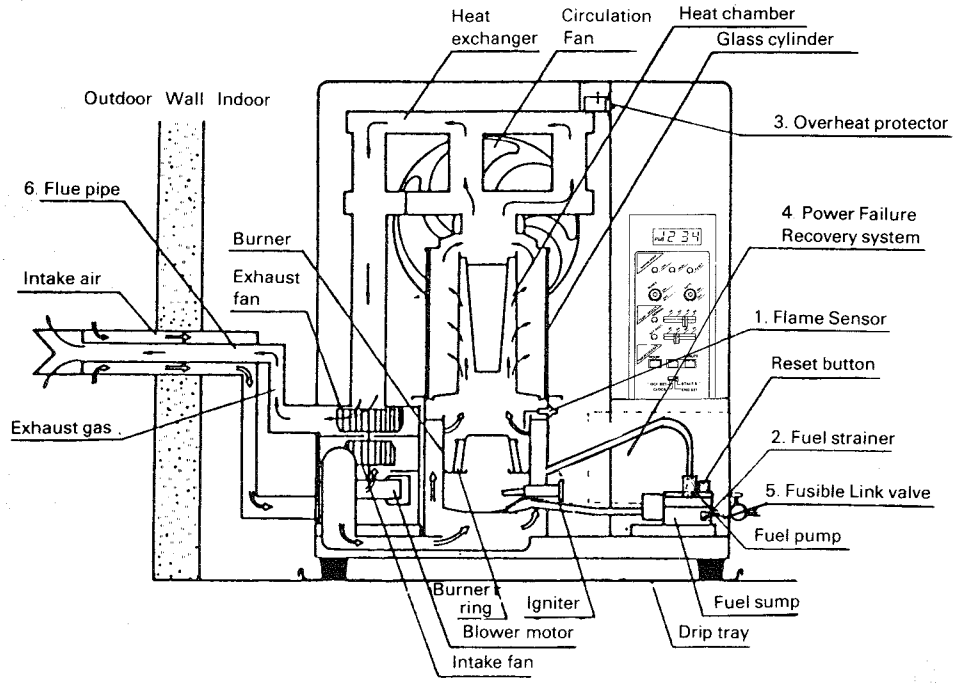
(1) Heat and vaporized water are produced by the combustion process of this kerosene heater. This rating does not take into account heat loss due to condensation of water vapor.

(2) Room size for which this heater is suitable will vary depending on outside temperature, house insulation, window size, and other factors.

(3) External tank to be purchased from local suppliers.

SAFETY FEATURES

Your Laser 52 is equipped with the following safety features. Please familiarize yourself with these features. When your heater is extinguished due to a safety mechanism, be sure to identify and correct the problem.



1. **Flame Sensor**
   Heater will automatically stop all operations if ignition fails or if flame fails during combustion, in order to prevent fuel overflow. Warning lamp turns on.

2. **Fuel Strainer**
   Special strainer catches any dust or impurities present in the fuel before it is sent to the burner.

3. **Overheat Protector**
   Automatically stops all operations if heater cabinet reaches abnormally high temperatures due to motor malfunction or abnormal combustion, in order to prevent fire. Warning lamp turns on.

4. **Power Failure Recovery System**
   If power fails during heater operation, heater will turn off. When power resumes, heater will automatically reignite to maintain the selected room temperature.

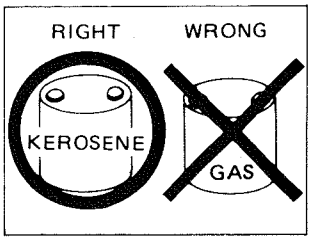
5. **Fusible Link Valve**
   If a household fire should occur, bringing the fuel line or heater to extremely high temperatures, the fusible link valve will stop the fuel supply to the burner. This will prevent the fuel supply from the external tank continuing to flow into the house.

6. **Fully Vented System**
   Flue pipe system provides outside air for combustion and vents all combustion products to the outdoors.

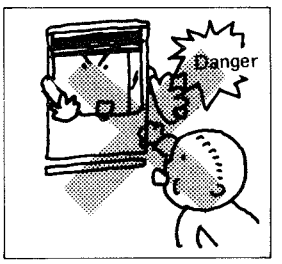
SECTION B:
SAFETY TIPS FOR OPERATION

CAUTION: Heater and vent pipe system must be properly installed before operation. Please follow instructions under "Installation", Section I.

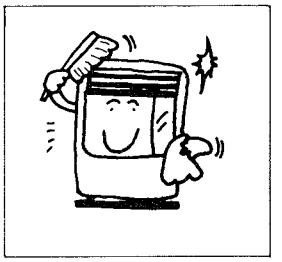
1. Never use any fuel other than water-clear kerosene (ASTM No.1-K Kerosene). NEVER USE GASOLINE. Use of gasoline can lead to uncontrollable flames, resulting in destructive fire.



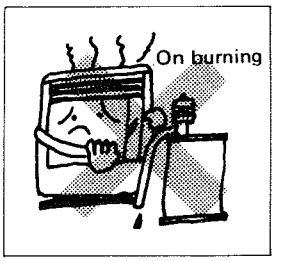
2. Due to high surface temperatures, keep heater away from children, furniture and clothing while in operation (See Page 25).



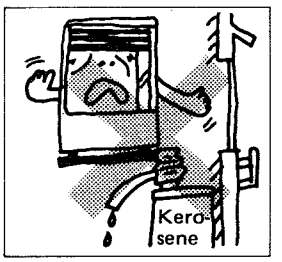
3. To prevent abnormal operation and prolong heater life, be sure to perform routine maintenance (See Pages 13—15).



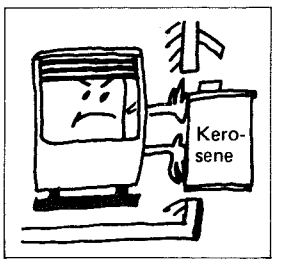
4. Never refill optional removable fuel tank when heater is operating or still hot. To do so may cause a "flash back" of flame, resulting in injury to yourself and your property.



5. Never fill optional removable fuel tank in living space. Fill tank outdoors. Never overfill.
Always replace tank cap securely after refueling.



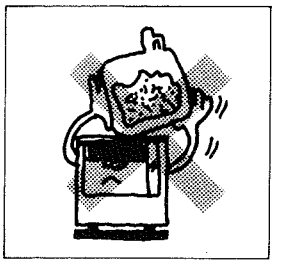
6. Never store or transport kerosene in other than a metal or plastic container that is (1) acceptable for kerosene, (2) non-red in color, and (3) clearly marked, "KEROSENE". Never store kerosene in the living space.

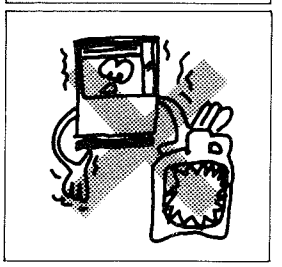


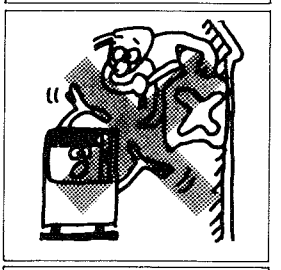
SECTION C:
FUEL GUIDE

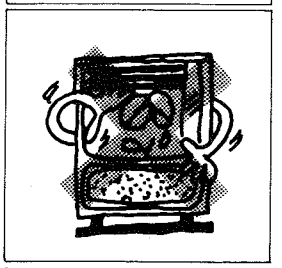
The Toyostove Laser 52 is designed for use with water clear No. 1-K kerosene only. Use of low-quality kerosene will cause burner performance to drop, leading to abnormal combustion and reduced heater life.

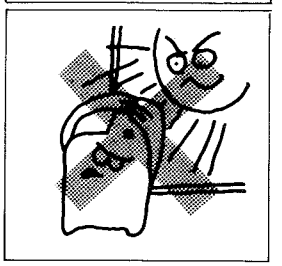
Purchase only 1-K kerosene in non-red cans reserved exclusively for kerosene and marked accordingly with the word "KEROSENE". Always store your kerosene in a separate area from where you store gasoline for your power equipment to avoid accidental use of gasoline in your heater.

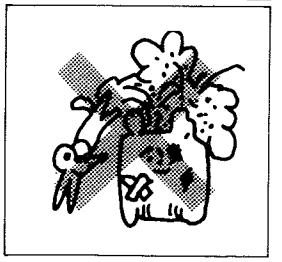












What to Buy . . .

ALWAYS :	Crystal clear, colorless, high-quality KEROSENE, ASTM No. 1-K.
ALWAYS :	Kerosene free of contaminants, water or cloudiness.
NEVER :	Gasoline, alcohol, white gas, camp stove fuel or additives.
NEVER :	Yellow or sour-smelling fuel.

How to Use It . . . (when optional removable fuel tank is used)

ALWAYS :	Fill heater away from living quarters when heater is cool; use siphon.
ALWAYS :	Watch fuel gauge to avoid overfilling heater.

How to Store It . . .

ALWAYS :	Store in a clean container, non-red in color, clearly marked KEROSENE.
ALWAYS :	Store away from direct sunlight, heat sources or extreme temperature changes.
NEVER :	In a glass container, or one that has been used for other fuels.
NEVER :	For longer than six months. Begin each heating season with fresh kerosene; discard at the end of season.
NEVER :	In the living space.

Why It is Important . . .

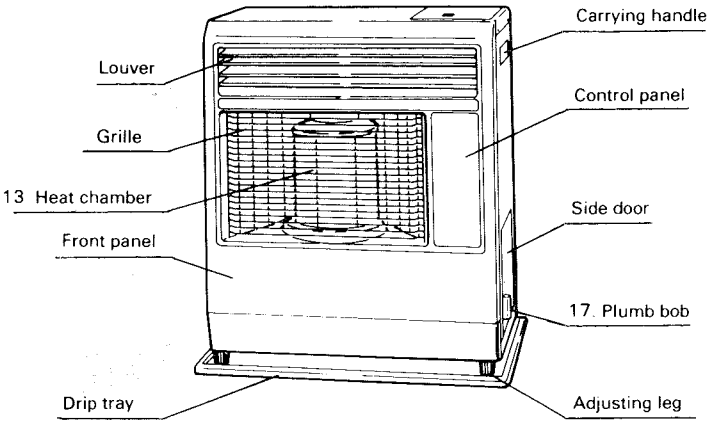
Pure, clean kerosene is essential for safe and efficient heater operation. Poor quality or contaminated kerosene can cause:

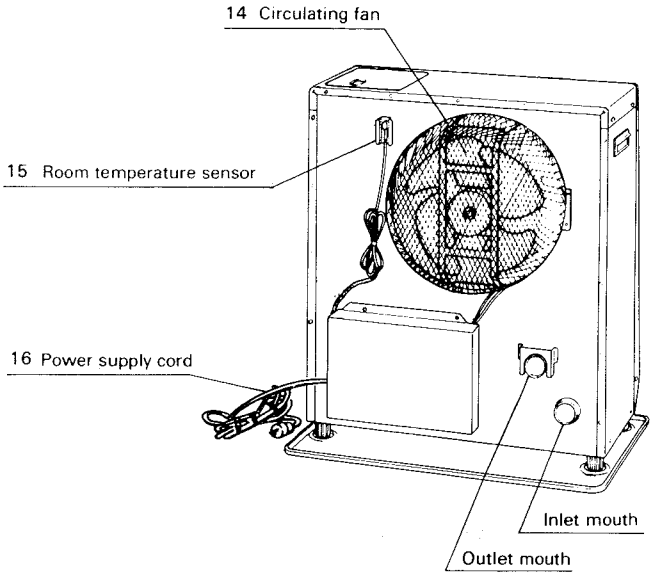
- Excess tar deposits on burner and flue pipe
- Incomplete combustion
- Reduced heater life

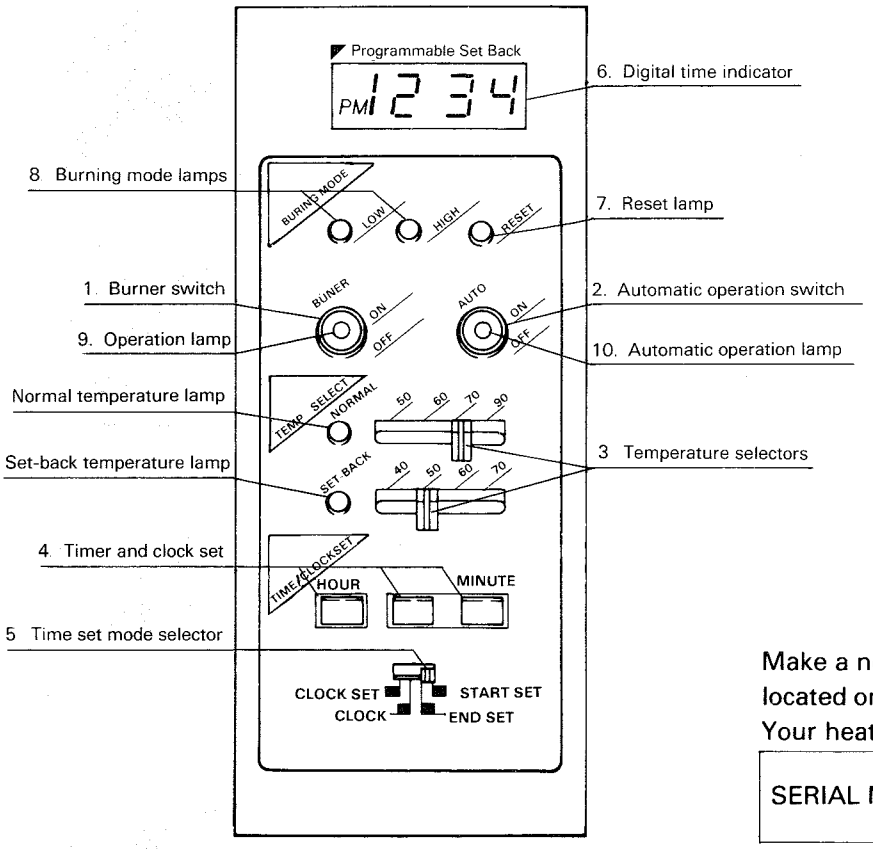
Use of a highly volatile flammable fuel such as gasoline can produce uncontrollable flames, creating a severe fire hazard.

SECTION D:
OPERATING CONTROLS AND PART NAMES

Before using heater, familiarize yourself with the following operating controls and part names.





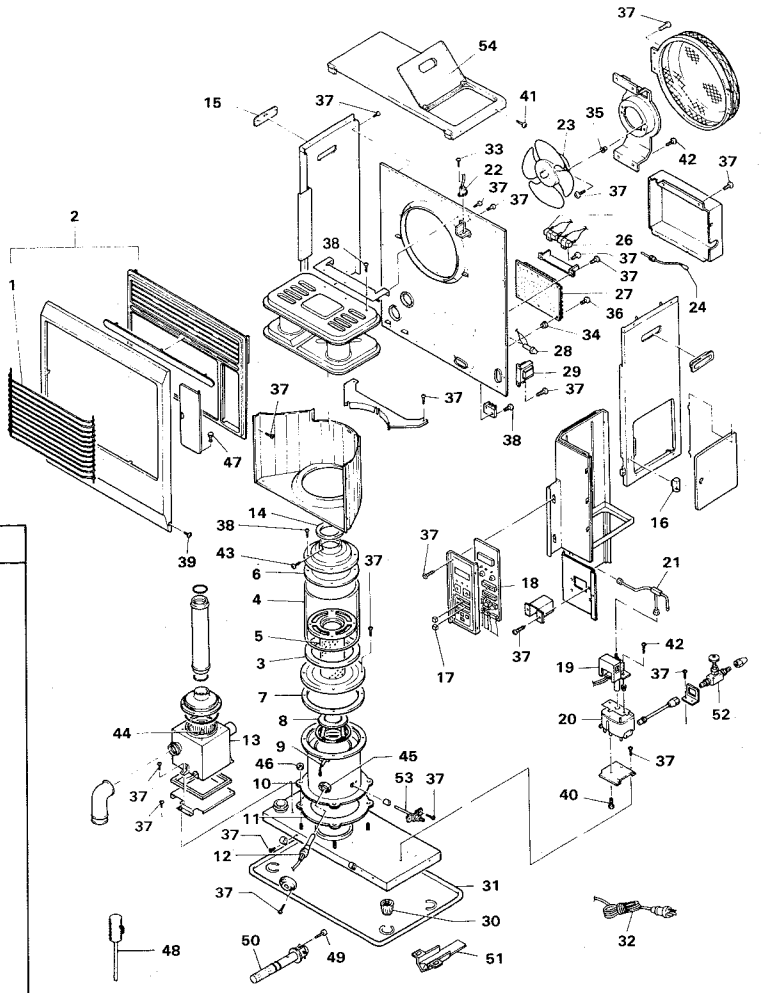


Make a note of your heater's serial number, located on the outside cabinet surface.
Your heater's serial number:

SERIAL NO.

1. Burner switch:	Main switch turns heater burner on and off. When switched on, heater begins operation and combustion starts after a 80-second preheat period.
2. Auto. operation switch:	The switch turns automatic operation modes on and off which have been programmed into timer.
3. Temperature selectors:	"Normal" and "Set-Back" temperature selectors allow user to select desired temperature during manual or automatic operation.
4. Timer and clock set:	Clock and timer set modes can be set by pressing hour or minute buttons.
5. Time set mode selector:	Clock, clock set, "Set-back" mode, start time set or end time set can be selected by this switch.
6. Digital time indicator:	Continuous display on digital clock.
7. Reset lamp:	Lights when safety devices activate due to heater malfunction. Flame will be extinguished automatically. Heater may be reignited after problem is corrected (See Page 3).
8. Burning mode lamps:	Indicates whether heater is operating at high or low combustion.
9. Operation lamp:	Lights when heater is in operation.
10. Auto. operation lamp:	Lights when automatic operation is in use.
11. Normal temperature lamp:	Lights when heater runs with manual or "Normal" mode of automatic operation.
12. Set-back temperature lamp:	Lights When heater runs with "Set-back" mode of automatic operation.
13. Heat chamber:	Warms room efficiently by emitting powerful radiant heat during high combustion, and gentle radiant heat during low combustion.
14. Circulating fan:	Two-speed motor supplies high-capacity warm air flow during high combustion for heating room up quickly, and low-capacity warm air flow during low combustion for maintaining comfortable room temperature.
15. Room Temperature sensor:	Constantly senses room temperature and supplies information to heater so that desired room temperature can be maintained.
16. Power supply cord:	For use in 120V,AC electrical outlets.
17. Plumb bob:	Allows user to check if heater is positioned evenly.

Laser 52 (VENTED)



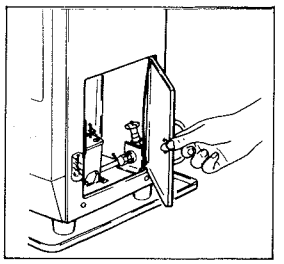
REF #	PART #	PART NAME
1	20475003	Grille
2	20475946	Front panel assembly
3	20475082	Glass cylinder lower gasket
4	20474109	Glass cylinder
5	20475008	Heat element assembly
6	20475081	Glass cylinder upper gasket
7	20475093	Radiant chamber gasket
8	20475543	Burner ring
9	20475011	Primary flame rod
10	20475542	Burner assembly
11	20475094	Burner gasket
12	20475518	Igniter
13	20475537	Blower motor assembly
14	20474992	Joint packing
15	20450004	Carrying handle
16	20450007	Plumb bob
17	20475701	Knob for temperature selector
18	20475976	Indicator lamp circuit
19	20475519	Fuel pump
20	20475534	Fuel sump
21	20475741	Fuel pipe assembly
22	20474506	High limit switch
23	20475569	Circulation fan motor
24	20475773	Thermistor
25	20475591	Resistor B
26	20475590	Resistor A
27	20475712	Main circuit board
28	20474579	Fuse
29	20475717	Transformer
30	20474970	Adjustable leg
31	20475929	Drip tray
32	20475535	Power supply cord
33	20450120	Screw for igniter unit
34	20474014	Spacer A
35	20474039	Insulator A
36	20474049	Screw R
37	20474050	Screw C
38	20474051	Screw D
39	20478156	Screw 1S
40	20475553	Screw 1P
41	20475554	Screw 1Q
42	20474055	Screw O
43	20475556	Screw 1R
44	20474057	Flange nut
45	20474080	Igniter gasket
46	20474586	Nut H
47	20474059	Holder A
48	20474045	Syringe
49	20474272	Screw M
50	20475501	Adjustable flue pipe
51	20474925	Oil catch
52	10005597	Fusible link valve
53	20475526	Fuel nozzle
54	20475965	Tank lid with pin
55	20475995	Instruction manual
56	20475999	Carton

SECTION E:
OPERATION

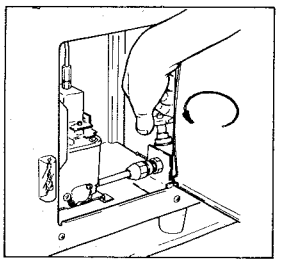
BEFORE IGNITION

1. Open the valve(s) of the separate fuel tank.

2. Open the side door on right side of heater cabinet.

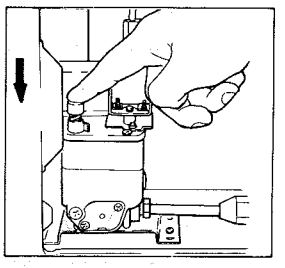


3. Turn knob of fusible link valve counterclockwise to open the valve.



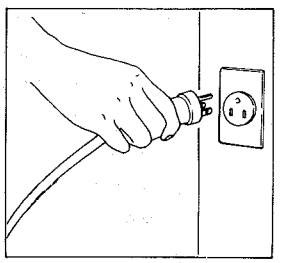
4. If using heater for the first time, or after heater has been out of fuel, press the red reset button once for a period of one second in order to send fuel to the fuel regulator.

   Note: Make sure there is no fuel leakage from the fuel line or joints.



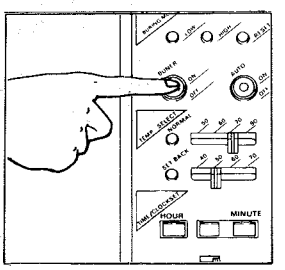
IGNITION

1. Plug heater into a 120V, AC electric outlet.

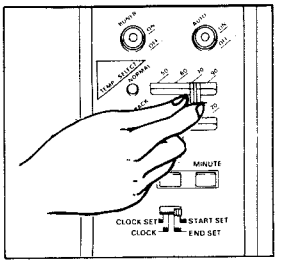


2. Press burner switch to the "ON" position. Operation lamp should turn on.

   Note: Automatic switch should be "OFF" position for manual operation.



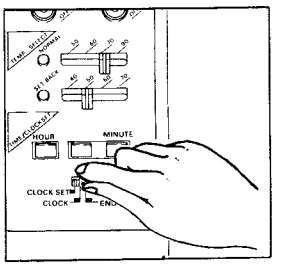
3. Ignition takes place after 80 seconds of preheat time. Heater operates at low combustion for 5 — 6 minutes after startup, regardless of temperature control setting. After this period, output may be adjusted as desired using the "NORMAL" temperature selector.



24 HOURS A DAY AUTOMATIC OPERATION

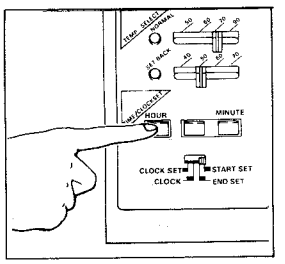
1. SET CLOCK — Position Timer Set Mode Selector to "Clock Set". Press hour or minute buttons of Timer & Clock Set to correct time. Position Timer Set Mode Selector to "Clock" after clock setting is completed. Clock will be shown on Digital Time Indicator.

   Note: In case of power failure for over 30 seconds, all clock & timer settings are cancelled. If Digital Time Indicator is flashing "PM 12:00", this indicates a power loss of more than 30 seconds.
   At this point, you need to reset all timer functions.



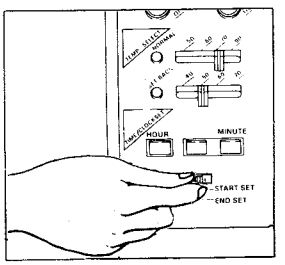
2. SET START TIME OF "SET-BACK" MODE OPERATION — Position Timer Set Mode Selector to "Start Set". Press hour or minute buttons of Timer & Clock Set to desired time. Start time of "Set-Back" mode operation will be shown on Digital Time Indicator.

   Note: Automatic Operation provides two different temperature settings which are "Normal" mode operation and "Set-Back" mode operation.
   Each mode can be programmed once in 24 hours period.



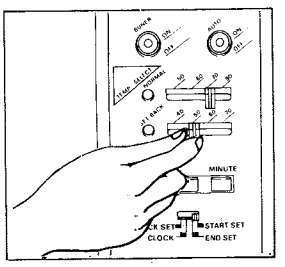
3. SET END TIME OF "SET-BACK" MODE OPERATION — Position Timer Set Mode Selector to "End Set". Press hour or minute buttons of Timer & Clock Set to desired time. End time of "Set-Back" mode operation will be shown on Digital Time Indicator. Always return Timer Set Mode Selector to "Clock" position for time indication.

   Note: "Set-Back" mode operation is designed for energy saving lower temperature setting. One "Set-Back" mode operation can be programmed in 24 hours period.

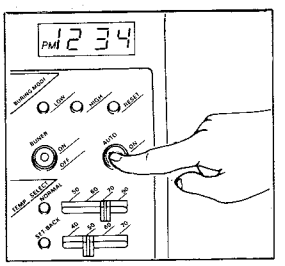


4. SET TEMPERATURE — Move temperature selector knobs of "Normal" mode operation and "Set-Back" mode operation to desired temperatures to determine temperature of "Normal" mode operation and "Set-Back" mode operation.

   Note: Heater will maintain the determined temperatures by regulating combustion on, off, high, and low.

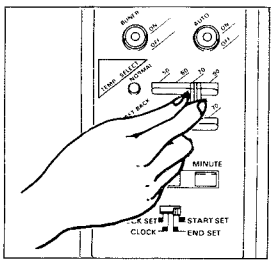


5. TURN POWER ON — Press both burner switch and automatic switch to the "ON" position.



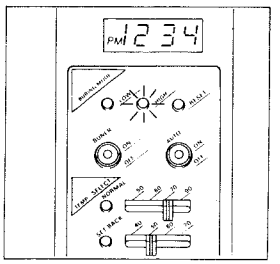
TEMPERATURE REGULATION

1. The temperature control should be set at the position you find most comfortable. Heat output will be regulated automatically in accordance with the room temperature registered by the room temperature sensor.



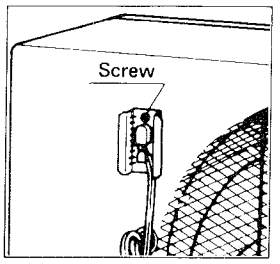
2. Heater will burn at high combustion until room temperature reaches the selected temperature level. When room temperature exceeds the selected setting, heater will automatically shift to low combustion to maintain the desired temperature.

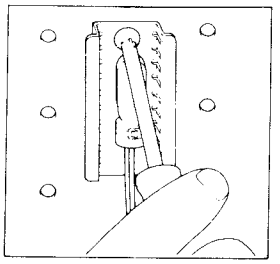
3. Burning mode lamps indicate at which output level the heater is operating at any given time. The heater shifts automatically between low and high output levels to maintain the desired temperature.

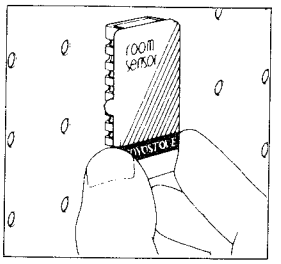


4. A room temperature sensor is provided with approximately 8 feet long extension wire. It is located on the rear of the cabinet. Choose a location for the sensor that is not in the path of direct sunlight, drafts or the flow of warm air from the heater. Loose the screw and release the sensor. Fasten the sensor to the wall with the screw or tape provided. Put the sensor cover attached on the sensor case and fix it by bending the tabs inward.

Note: Use "NORMAL" temperature selector for room temperature setting.

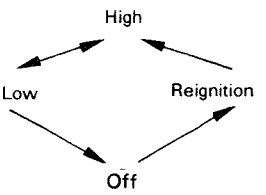




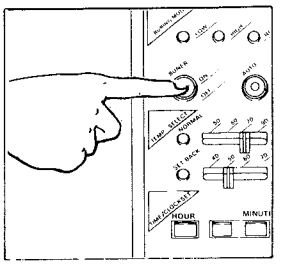


TEMPERATURE REGULATION (AUTOMATIC OPERATION)

When the automatic operation is selected, heater will not only alternate automatically between high and low combustion, but will also include an "OFF" cycle if room temperature goes 4°F above the desired temperatures ("Normal" temperature or "Set-Back" temperature) selected by user. If room temperature drops 4°F below selected temperature, heater will automatically reignite.

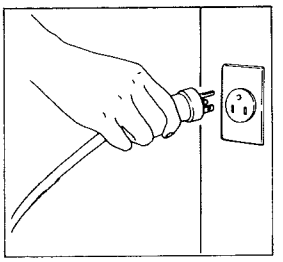


TURNING HEATER OFF



Press burner switch to "OFF" position. Circulation fan and combustion fan motors continue to operate for approximately three minutes to cool heater down. Make sure power lamp goes out when fans stop.

Note: After turning heater off, wait approximately 10 minutes before relighting.



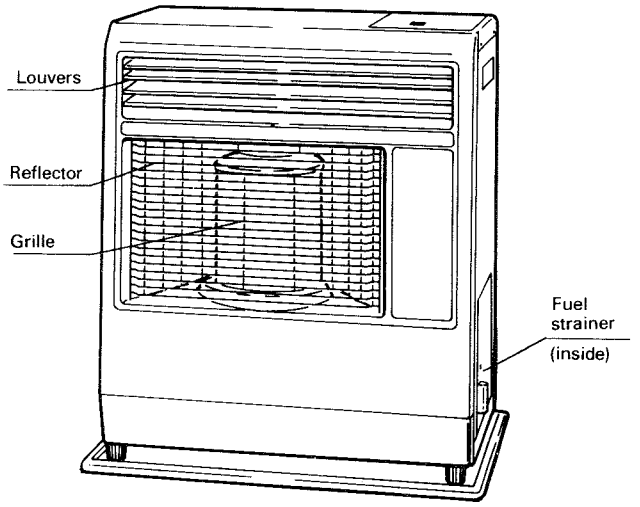
Note: Disconnect heater plug from electrical outlet after power lamp has turned off if heater will be out of use for any period. Plug should also be disconnected during electrical storms.

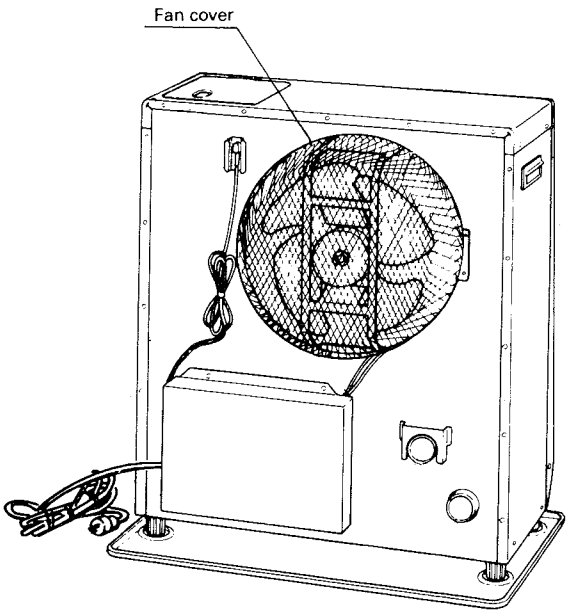
SECTION F:
ROUTINE MAINTENANCE

CAUTION: Be sure to unplug heater before performing any checks or cleaning.

CAUTION: Allow heater to cool completely before cleaning or maintenance.

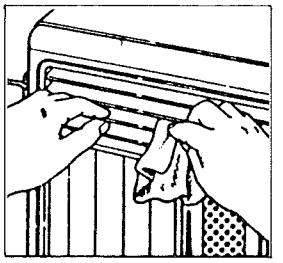
FOR OPTIMUM HEATER PERFORMANCE, THE PARTS SHOWN BELOW SHOULD BE CLEANED REGULARLY:





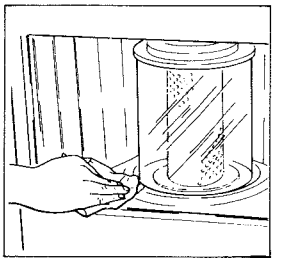
1. Clean Louvers and Grille (ONCE A WEEK)

   Dust and stains should be wiped off louvers and grille with a damp cloth.



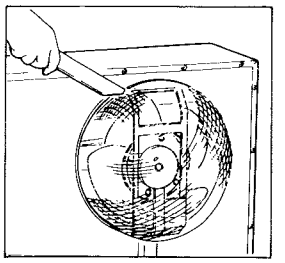
2. Clean Reflector (ONCE A WEEK)

   Reflector should always be kept clean for optimum heating efficiency. Wipe away any dust and stains on reflector with a damp cloth.



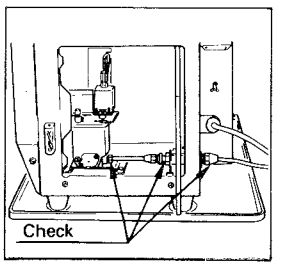
3. Clean Circulation Fan Cover (ONCE A WEEK)

   Remove any dust or pet hair from the fan cover on the back of the heater.



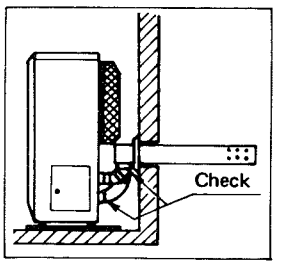
4. Check for Kerosene Leaks (REGULARLY)

   Make it a habit to check for any sign of kerosene leakage along the fuel line and at all joints. Kerosene leaks may lead to risk of fire.



5. Check Flue Pipe Area (ONCE A WEEK)

   Check the flue pipe joint to make sure connection is firm. Use a vacuum cleaner to remove any dust or pet hair.



6. Clean Fuel Strainer (ONCE A MONTH)

The strainer of the fuel sump should be cleaned once a month and before storing heater at the end of each season.

(a) Open the door on the right side of cabinet.

(b) Turn knob of the fusible link valve clockwise to close the fuel line.

(c) To catch the fuel which will drain out, set the oil catch below the strainer cover, with a small container under it.

(d) Loosen the two screws from the strainer cover and remove.

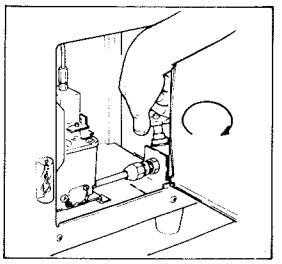
(e) Remove the strainer and wash with kerosene.

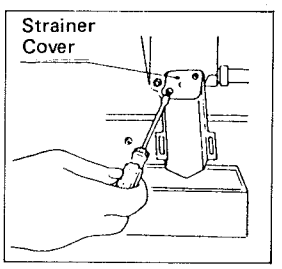
(f) Return the strainer to its original position. Replace strainer cover and screw to secure.

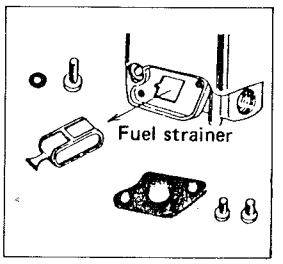
(g) Wipe away any spilled kerosene.

(h) Turn the knob of the fusible link valve counterclockwise to open. Check for kerosene leakage.

Note: Be sure to unscrew the drain screw to remove all remaining kerosene from the fuel sump at the end of each season.







SECTION G: TROUBLESHOOTING

Should problems arise during operation or ignition, use this chart to determine the cause and the proper steps to take. Be sure to unplug heater and allow to cool completely before taking corrective measures.

PROBLEM	CAUSE	SOLUTION
POWER LAMP FAILS TO TURN ON	Disconnected power plug	Plug into 120V AC outlet.
	Circuit board malfunction	Consult your dealer.
NO IGNITION	Out of fuel	Check fuel gauge on fuel tank; refuel.
	Fusible link valve closed	Open valve by turning counterclockwise.
	Air pocket in fuel line	Push reset button on the fuel sump, located inside side door, once.
	Clogged fuel strainer	Clean fuel strainer (see page 15).
	Igniter, circuit board or fuel pump malfunction	Consult your dealer
EXTINGUISHED AFTER IGNITION	Air pocket in fuel line	Push reset button on the fuel sump, located inside side door, once.
	Out of fuel	Check fuel gauge on fuel tank; refuel.
	Incorrect, missing or misset air damper	Check that correct damper is in place; replace as necessary (see page 29).
	High limit switch activated	Clean circulation fan cover, remove any obstructions
	Flame sensor malfunction	Consult your dealer.
POOR COMBUSTION/NOISY COMBUSTION	Incorrect, missing or misset air damper	Check that correct damper is in place; replace as necessary (see page 29).
	Soot buildup on flue pipe line	Clean out any soot.
	Burner ring not properly seated	Consult your dealer.
	Altitude too high	Consult your dealer.
ODOR	Leaking flue pipe	Tighten all flue pipe connections.
	Kerosene leakage	Tighten all fuel line joints. Wipe away any kerosene drippage.
	Faulty packing or gasket in combustion area	Consult your dealer

If the corrective measures outlined above do not solve the problem, please consult your TOYOSTOVE dealer.

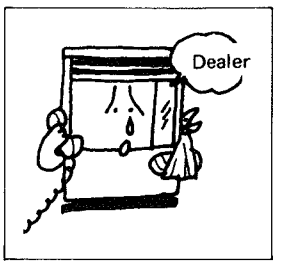
SECTION H:
LONG TERM STORAGE

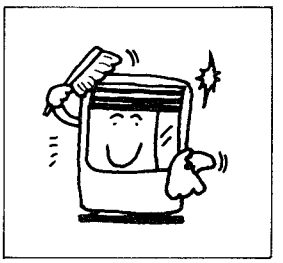
At the close of each heating season, or when you do not plan to use your heater for an extended period, the following procedures are recommended.

1. As the end of the season approaches, calculate your kerosene purchases so that you can use up all the kerosene you have on hand. When kerosene is stored for over six months, its quality may deteriorate. The use of such kerosene will have an unfavorable effect on heater operation.

2. If your heater needs any service or repair, now is the time to call your dealer and get it done before storage. That way your heater will be ready for immediate use when the next heating season begins.

3. If you plan to store your heater in place,
   (a) Unplug heater.
   (b) Close the main tank valve.
   (c) Close the fusible link valve by turning knob clockwise. Remove all kerosene from the fuel sump and clean the fuel strainer (see page 15).
   (d) Wipe off any stains or dust on heater with a damp cloth, then wipe once again using a dry cloth.
   (e) Cover heater completely with a large plastic bag to protect from dust.





4. To store heater in another location,
   (a) Unplug heater.
   (b) Close the main tank valve.
   (c) Close the fusible link valve by turning knob clockwise. Remove all kerosene from the fuel sump and clean the fuel strainer (see page 15).
   (d) Disconnect fuel line and flue pipe from the heater.

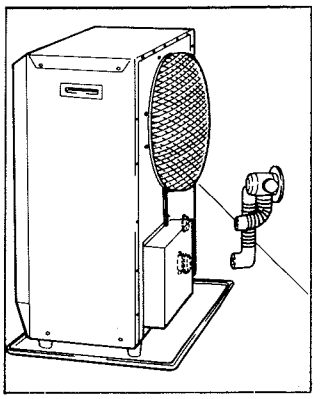
   Note: Kerosene remaining in the fuel line may flow out when fuel line is disconnected. Have a container ready to catch drainage.

(e) Remove any soot accumulated in the flue pipe using a brush and/or vacuum cleaner.

(f) Wipe off any stains or dust on heater with a damp cloth, then wipe once again using a dry cloth.

(g) Put the heater and flue pipe in the original shipping box, and store in a dry place. If original shipping box is not available, cover the heater completely with a large plastic bag to protect from dust during storage.

(h) Plug inner and outer sleeve openings using the two rubber caps provided for this purpose.



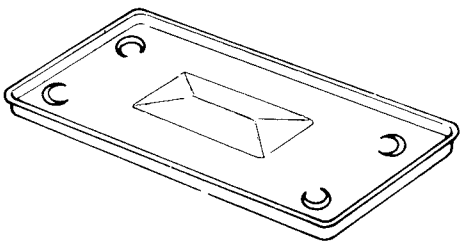
SECTION I: INSTALLATION

TOOLS NEEDED FOR INSTALLATION

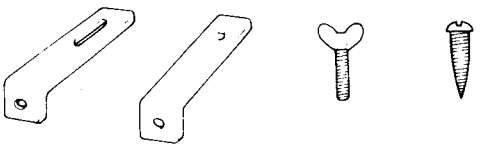
Tool	Use
Phillips Head Screwdriver	Installation of flue pipe, etc.
Electric Drill	Drilling hole in wall for flue pipe
Hole Saw, 3¼" diameter (3⅛" or 3⅜" may also be used)	Making hole in wall for flue pipe
Hacksaw (with a 32 teeth/inch blade)	Cutting wall sleeve

STANDARD INSTALLATION PARTS

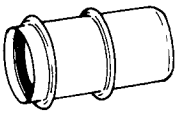
The following standard installation parts are enclosed with heater. For alternate installation methods, you may need to purchase additional accessories which are available from your TOYOSTOVE dealer. See "Accessory Parts", page 21.



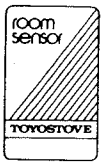
Drip tray (1)



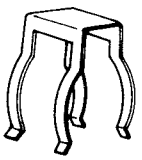
Wall Brackets (2 sets)



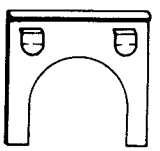
Extension pipe (S) (1)



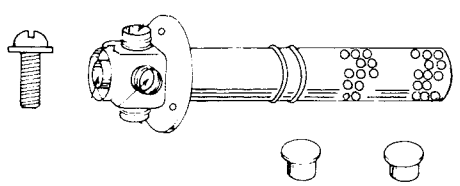
Sensor cover (1)



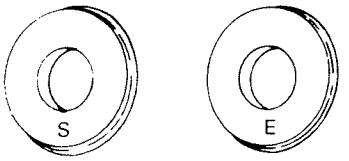
Pipe holder (2)



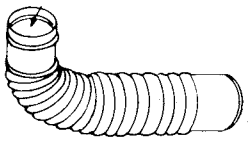
Pipe stopper (1)



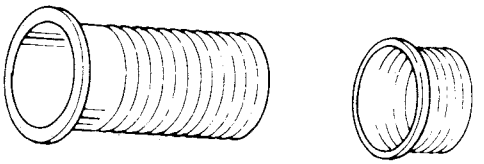
Telescoping Flue Pipe (1)



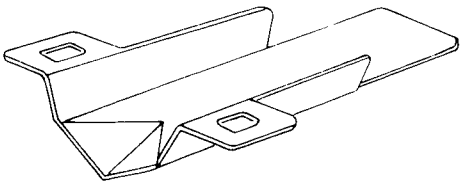
Air Damper (2)



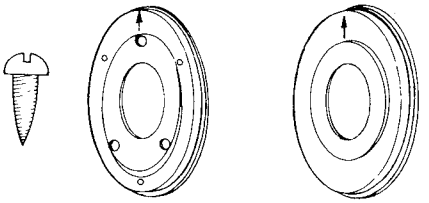
Bent Joint (1)



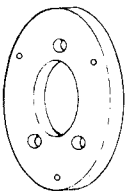
Wall Sleeve and Sleeve Nut (1 ea.)



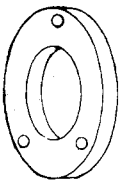
Oil Catch (1)



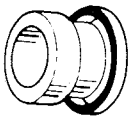
Inner and Outer Sleeve Flange (1 ea.) w/screws



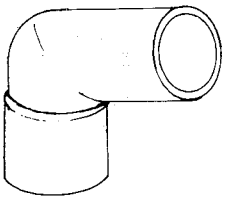
Flange Gasket (2)



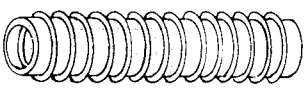
Flue Pipe Gasket (1)



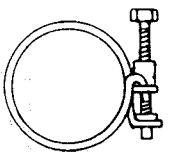
Sleeve Cap (2)



L-Shaped Hose (2)



Inlet Hose (1)



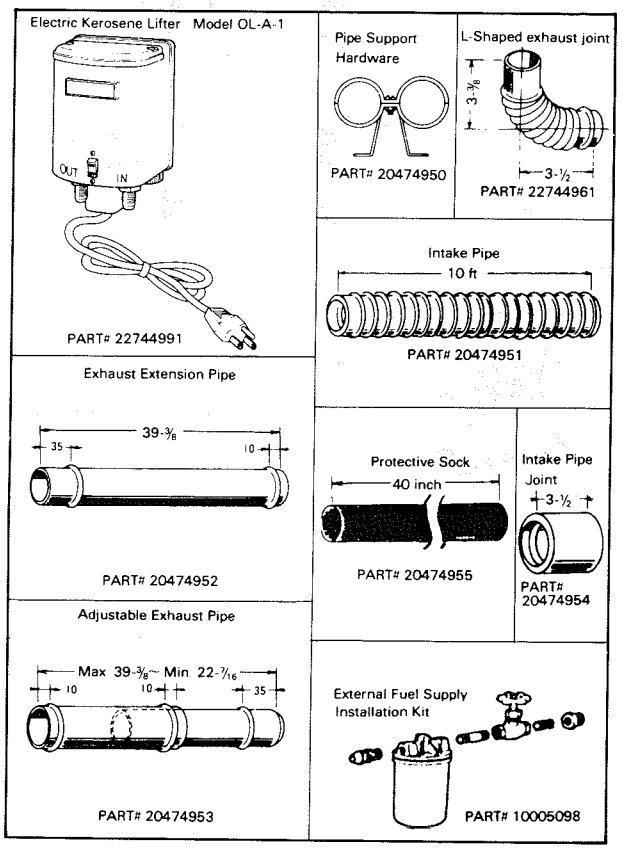
Hose Band (2)

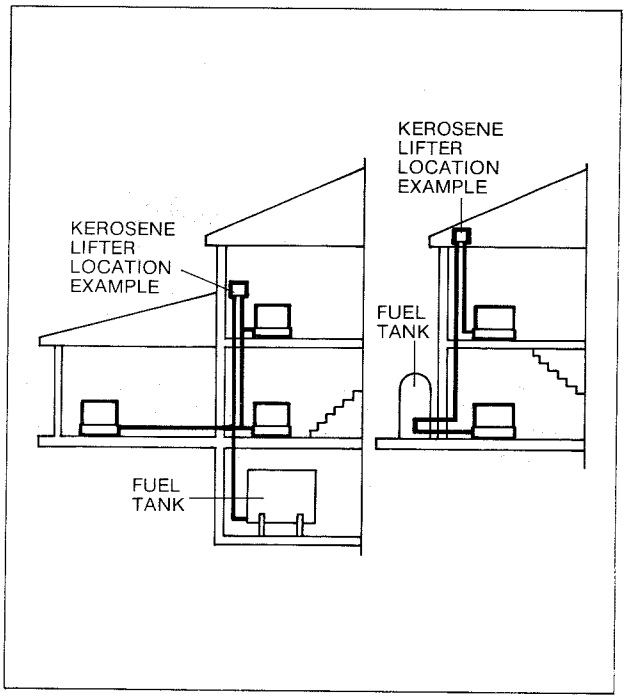
ACCESSORY PARTS

The following accessory parts are available for use in non-standard installation of the Laser 52. After giving careful consideration to your desired heater and flue pipe locations and fueling system, consult your TOYOSTOVE dealer to purchase the necessary accessory parts.

Accessory	Part No.	Application
Extension pipes (L)*	22744998	Extends pipe system by 61-3/4 to 78-3/4"
Extension pipes (M)*	22744997	Extends pipe system by 22-1/2 to 39-3/8"
Extension pipes (S)*	22744996	Extends pipe system by 12-5/8 to 19-5/8"
L-Shaped exhaust joint*	22744961	For 90 degree bend in exhaust pipe
Electric Kerosene Lifter Model OL-A-1	22744991	Used to lift fuel to heater when fuel tank is located underground or outdoors in a position lower than the heater
External Fuel Supply Installation Kit	10005098	For installation of external tank system

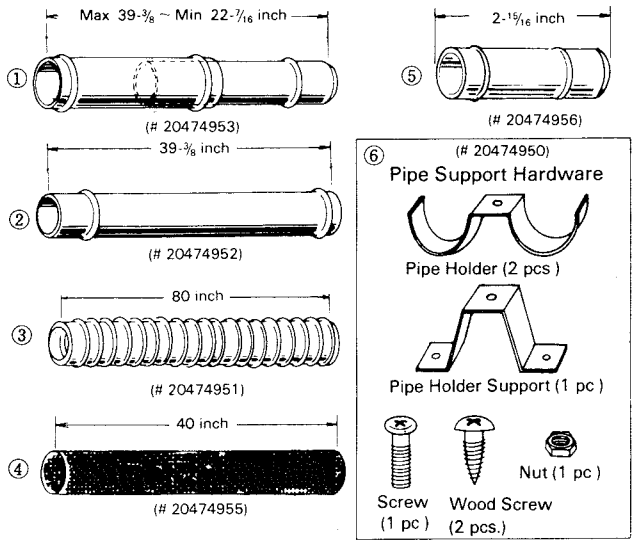
* Total length of extension pipe between heater and flue pipe must be no greater than 10 ft. No more than three bends may be used in extension pipe. When an extension pipe kit is used, type "E" air damper must be used at the intake hole of the heater (see page 29).





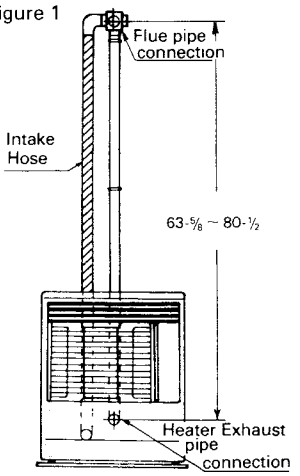
EXTENSION KIT

Extension Pipes (L) PART #22744998



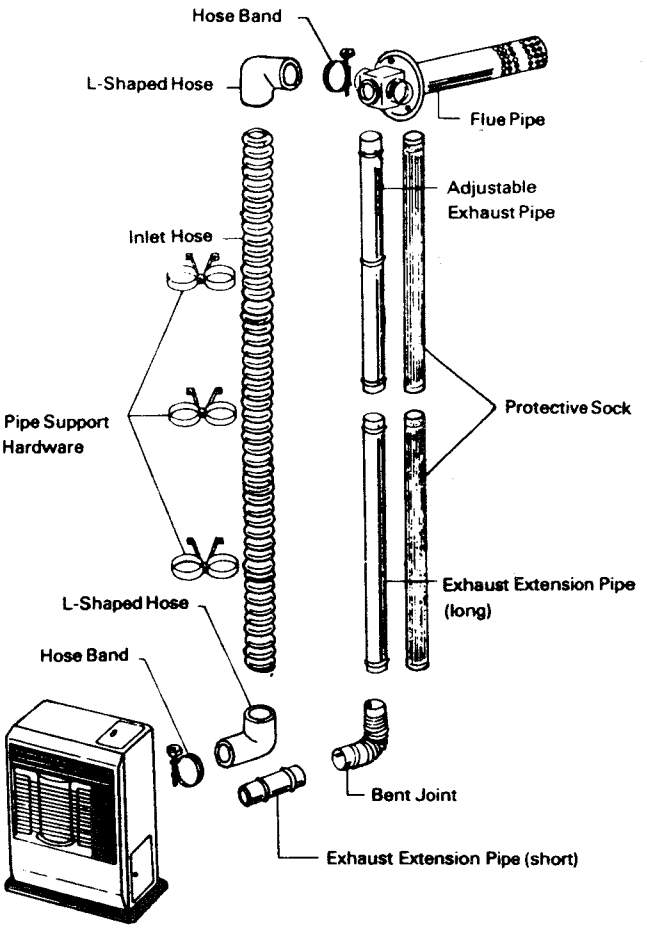
No.	Name of Part	Qty.
①	Adjustable Exhaust Pipe Max. 39-3/8 ~ 22-7/16	1
②	Exhaust Extension Pipe (long, 39-3/8 inch)	1
③	Intake Hose 80 inch	1
④	Protective Sock 40 inch	2
⑤	Exhaust Extension Pipe (short, 2-15/16 inch)	1
⑥	Pipe Support Hardware	3 sets

Figure 1

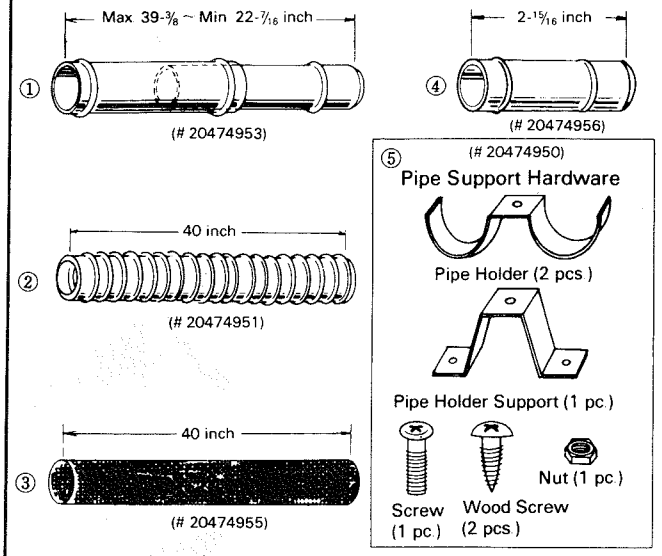


When using the "Extension pipes (L)" extension kit, the distance between the heater exhaust pipe connection and the flue pipe connection must be at least 63-5/8 inch but no more than 80-1/2 inch. (see Figure 1 for reference)

Ex. Extension pipes (L)

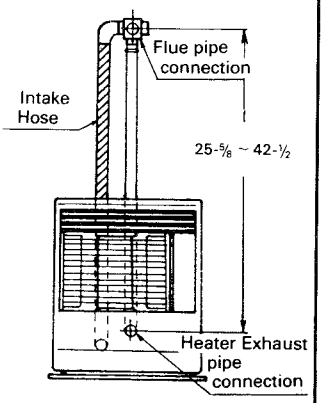


Extension Pipes (M) PART #22744997



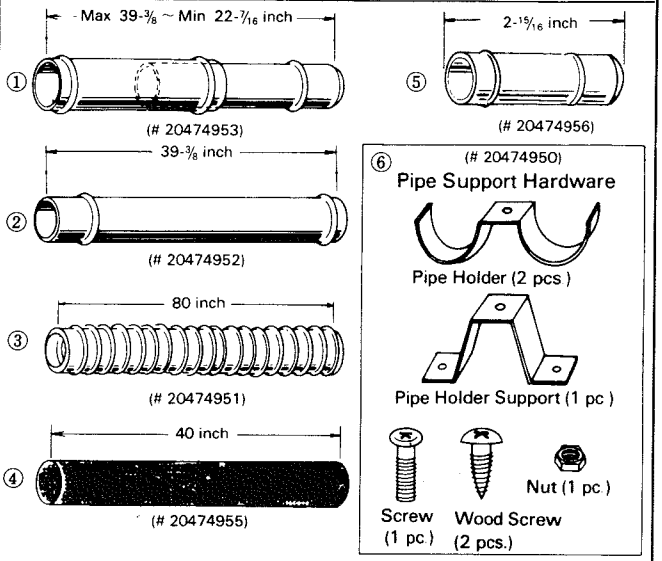
No.	Name of Part	Qty.
①	Adjustable Exhaust Pipe Max. 39-3/8 ~ 22-7/16	1
②	Intake Hose 40 inch	1
③	Protective Sock 40 inch	1
④	Exhaust Extension Pipe (short, 2-15/16 inch)	1
⑤	Pipe Support Hardware	2 sets

Figure 1



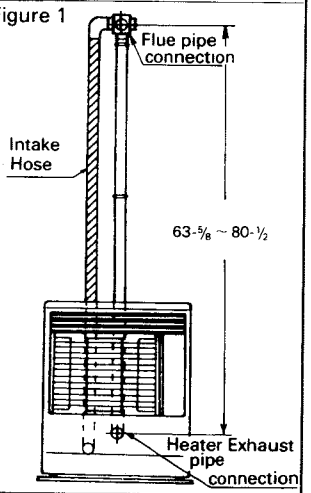
When using the "Extension pipes (M)" extension kit, the distance between the heater exhaust pipe connection and the flue pipe connection must be at least 25-5/8 inch but no more than 42-1/2 inch. (see Figure 1 for reference)

Extension Pipes (S) PART #22744996



No.	Name of Part	Qty.
①	Adjustable Exhaust Pipe Max. 39-3/8 ~ 22-7/16	1
②	Exhaust Extension Pipe (long, 39-3/8 inch)	1
③	Intake Hose 80 inch	1
④	Protective Sock 40 inch	2
⑤	Exhaust Extension Pipe (short, 2-15/16 inch)	1
⑥	Pipe Support Hardware	3 sets

Figure 1

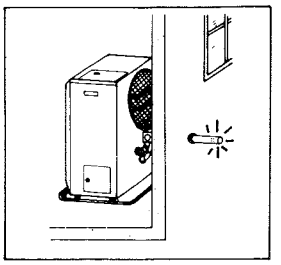


When using the "Extension pipes (L)" extension kit, the distance between the heater exhaust pipe connection and the flue pipe connection must be at least 63-5/8 inch but no more than 80-1/2 inch. (see Figure 1 for reference)

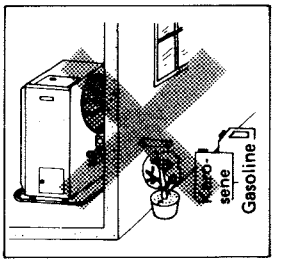
TIPS FOR SAFE INSTALLATION

Follow the safety tips below when planning the installation of your Laser 52.

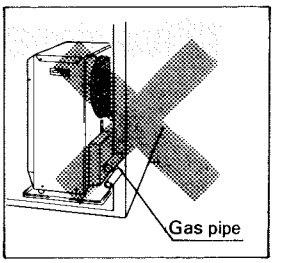
1. Intake and exhaust flue pipe openings must be fully exposed to outside air. Do not vent into garage, basement under the floor, or into any enclosed area.



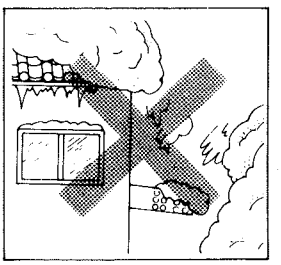
2. Do not install flue pipe in close proximity to other objects or materials (see page 25).



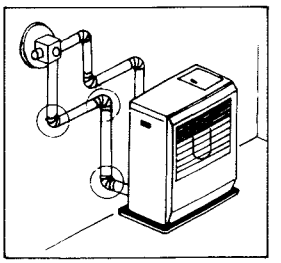
3. Before making a hole in your wall for the flue pipe, make sure the area is free of electrical wires, gas pipes and other obstacles.



4. Do not install flue pipe where it will be exposed to heavy snow or strong drafts.



5. Total length of extension pipe between heater and flue pipe must be no greater than 10 ft., and no more than 3 bends may be used.



INSTALLATION OF HEATER AND FLUE PIPE

NOTE: Check and comply with all state and local codes that may apply to vented heaters before beginning installation.

1. Select heater location. Allow clearances as indicated below between heter and all other materials. (See Fig. 1)

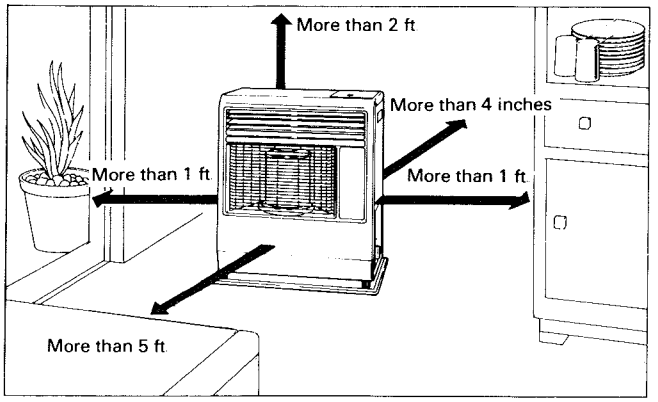


Fig. 1

2. Make sure that the outside area to where the telescoping flue pipe will be extended is clear of any objects. (See Fig. 2 & 3)

NOTE: Make sure wall thickness is no greater than 12 inches.

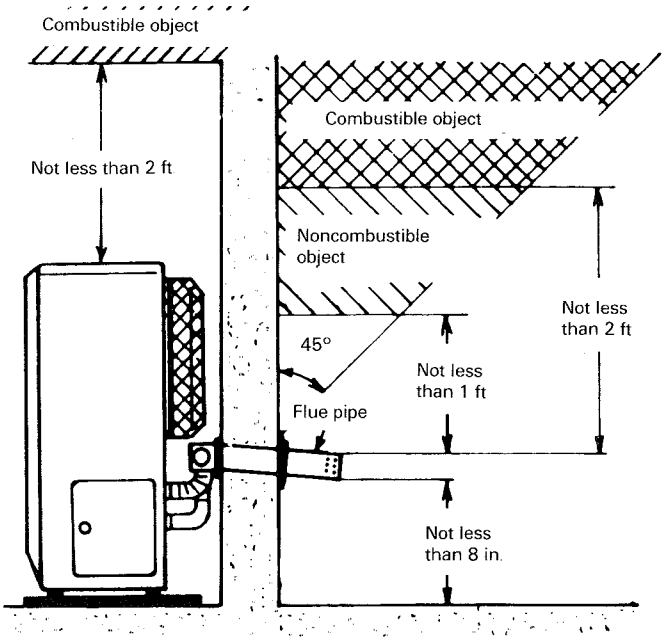


Fig. 2

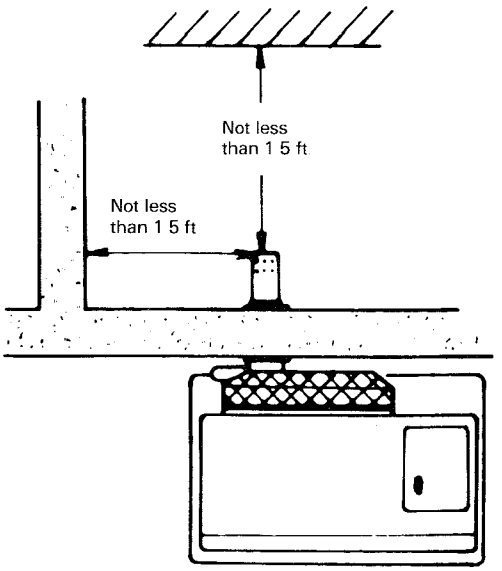


Fig. 3

3. For standard installation, use the template enclosed with the heater to position the hole for the telescoping flue pipe. Tack or tape the template to the wall at the desired position (See Fig. 4).

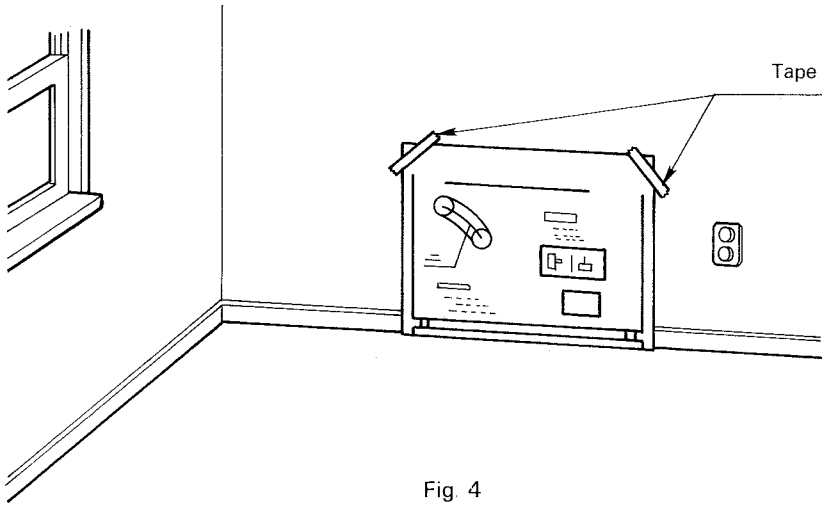


Fig. 4

NOTE: Heater should be installed on a sturdy floor. Should be level and flat.

NOTE: The template can be adjusted for use of non-standard installations such as the installation of the extension pipe kits.

4. Cut the hole for the telescoping flue pipe from inside the room. Use a 3-1/4" diameter hole saw attached to an electric drill (See Fig. 5). The opening on the inside wall should be slightly higher than the outside opening (approximately 1/2") so that the wall sleeve and the telescoping flue pipe will slope slightly downward (approximately 3 degrees) after it is installed (See Fig. 6). This will enable the draining of condensed moisture from the telescoping flue pipe to the outside and prevent rain or snow entering from outside after installation.

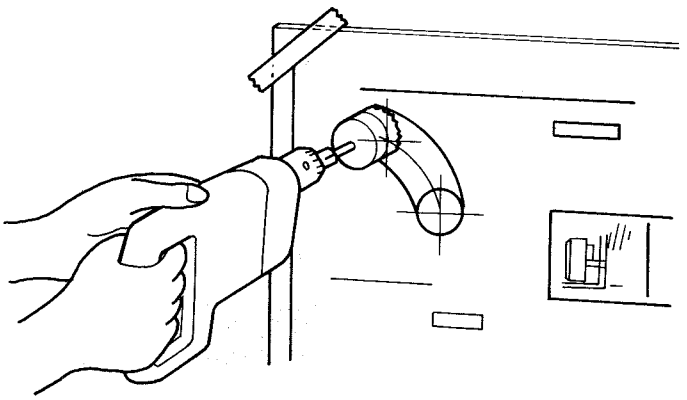


Fig. 5

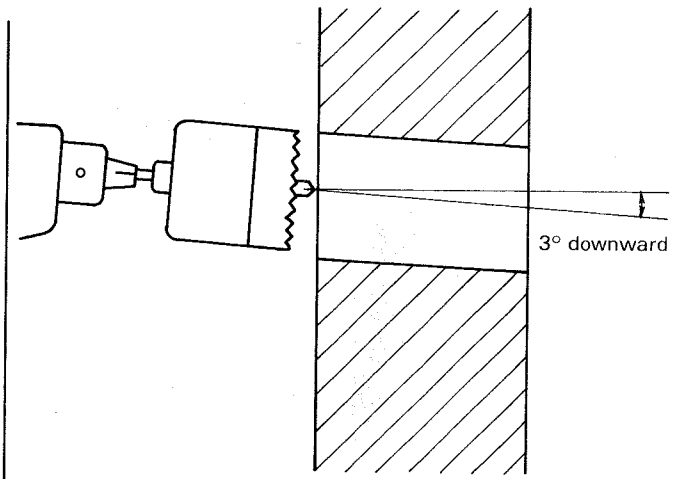


Fig. 6

NOTE: After the cutting of the hole is completed, remove the template from the wall.

5. a Install the inner sleeve flange and the flange gasket to the wall sleeve and insert the wall sleeve through the wall hole from inside the room. Make sure the arrow on the inner sleeve flange is pointing up. Secure the inner sleeve flange to the wall with the three wood screws provided with the heater (See Fig. 7).

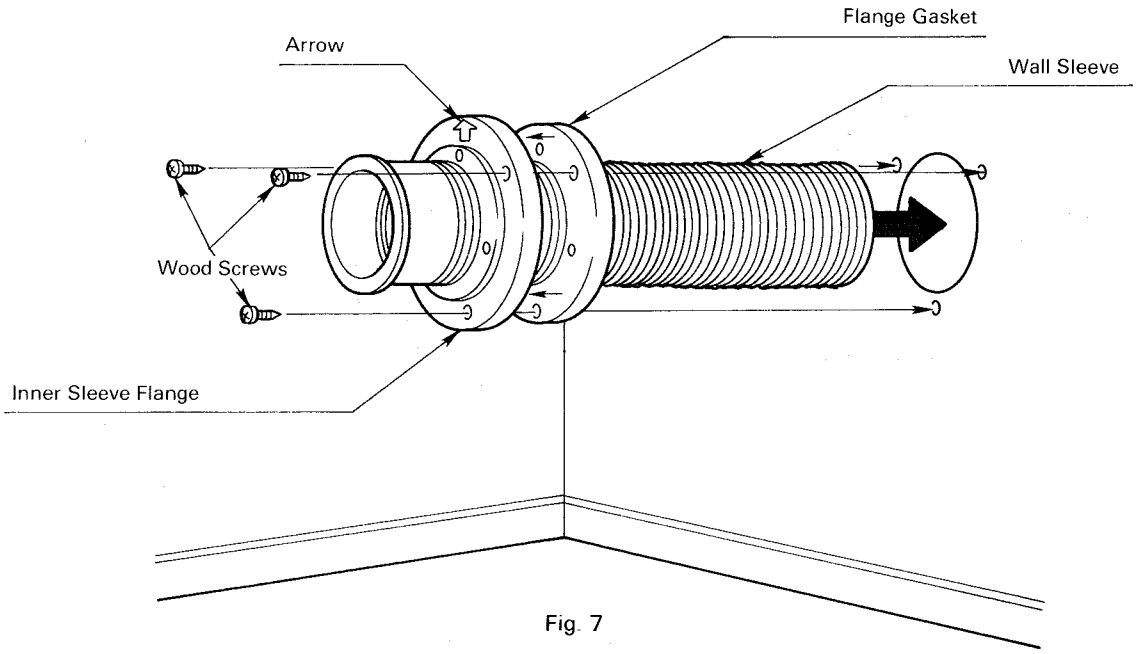


Fig. 7

b. From outside, install the outer sleeve flang and the flange gasket to the wall sleeve. Secure the wall sleeve and the outer sleeve flange tightly with the sleeve nut. Make sure arrow on the outer sleeve flange is pointing up (See Fig. 8).

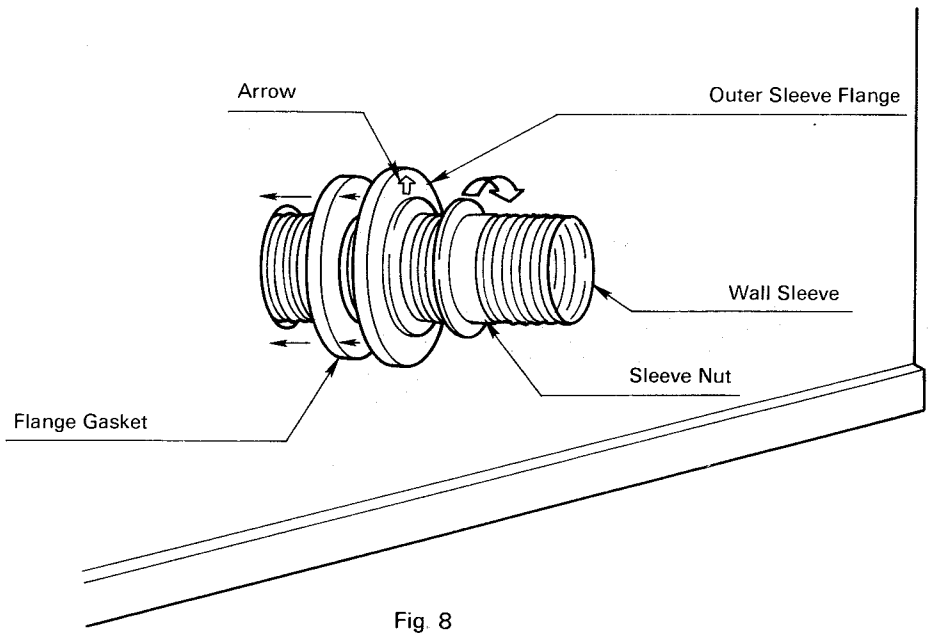


Fig. 8

c. From outside, cut off the extra protruding length of the wall sleeve. Leave 2 or 3 threads from sleeve nut (See Fig. 9 & 10).

NOTE: Use a hacksaw with a fine blade (32 teeth per inch).

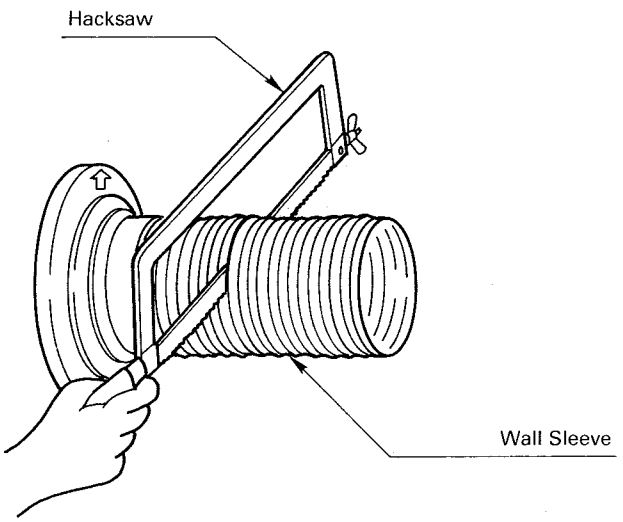


Fig. 9

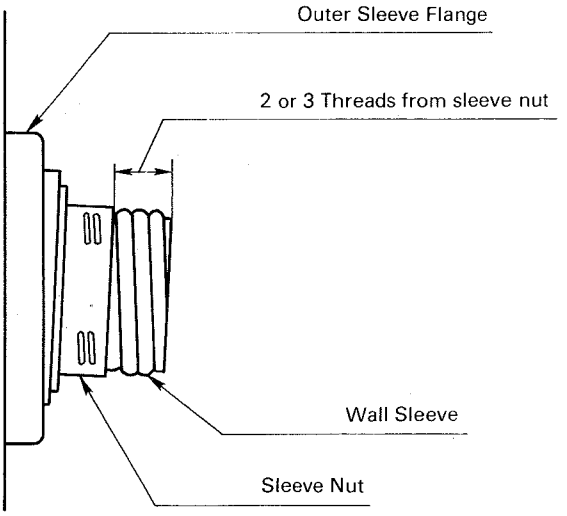


Fig. 10

6. a. From inside the room, insert the telescoping flue pipe with gasket attached through the wall sleeve. Secure the telescoping flue pipe to the inner sleeve flange with the three machine screws provided with the heater (See Fig. 11).

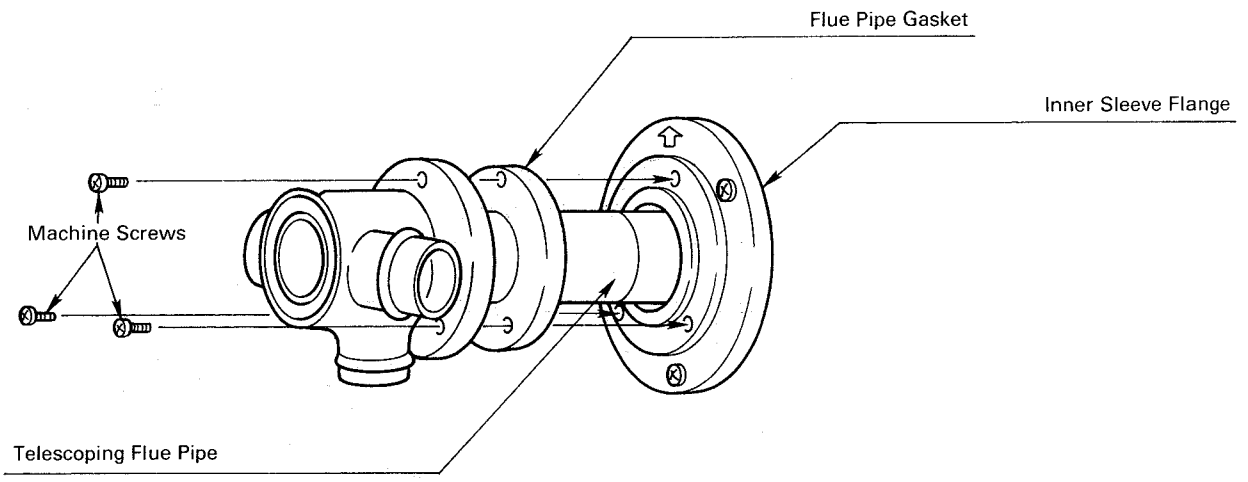


Fig. 11

b. From outside, adjust the length of the telescoping flue pipe, so that the telescoping flue pipe extends beyond the wall sleeve. Leave approximately 1 inch distance between the edge of the wall sleeve and the first row of holes on the telescoping flue pipe (See Fig. 12).

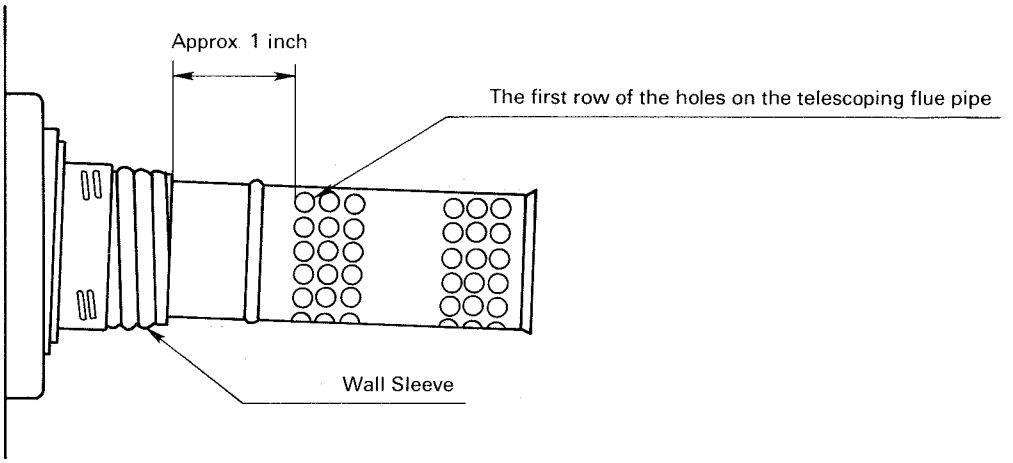


Fig. 12

IMPORTANT: The wall sleeve must not cover any of the holes on the telescoping flue pipe. If the wall sleeve covers the holes on the telescoping flue pipe, it can cause ignition failure, start-up difficulty, abnormal combustion, and explosion in the heater burner and the heat exchanger.

7. Attach the type "S" air damper to the L-shaped hose (See Fig. 13).

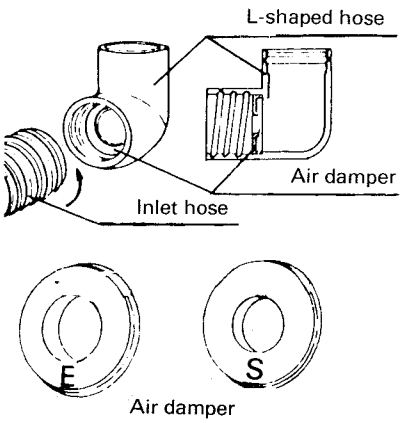


Fig. 13

NOTE: If the heater is installed with the extension pipe kit, the type "E" air damper should be used.

NOTE: If the heater makes a whistling noise during operation of the heater, this is a sign of lack of combustion air. Check to see if there is any clogging of the intake holes or the air way of the telescoping flue pipe, improper bending of the inlet hose or a strong draft in the outside area where the telescoping flue pipe is exposed. Recitify these problems. If the heater still makes a whistling noise after the above causes are eliminated, change the air damper form type "S" to type "E" or remove the air damper for standard pipe installation (for the extension pipe kit installation just remove the air damper).

8. Insert the bent joint to the exhaust mouth of the telescoping flue pipe. Cut the inlet hose for desired length if necessary. Attach the L-shaped hose to each end of the inlet hose and attach the L-shaped hose to the intake mouth of the telescoping flue pipe. Secure the L-shaped hose to the intake mouth with the hose band. Plug the unused exhaust and intake mouth with the caps provided with the heater. Make sure the caps fit tightly onto the mouth (See Fig. 14).

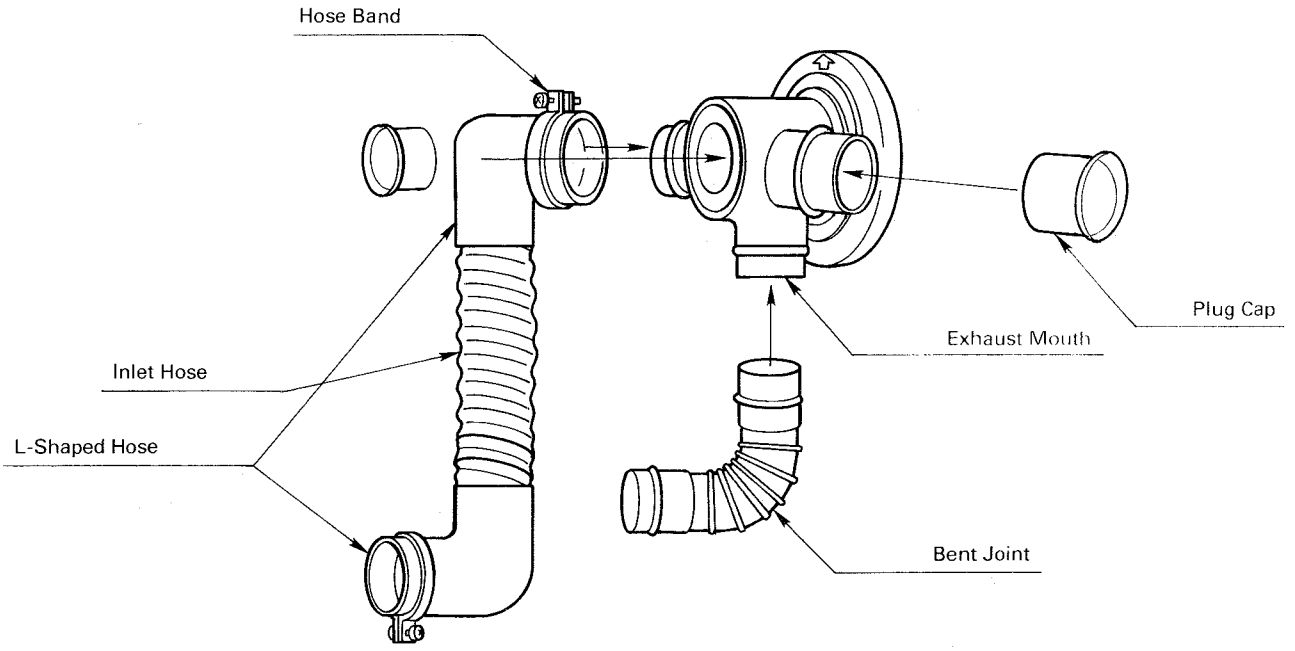


Fig. 14

NOTE: If the inlet hose is not smoothly inserted into the L-shaped hose, apply water or soap suds to the inlet hose.

9. In case the circuit board cover gets in the way of the connection of the telescoping flue pipe, use the extension pipe for the exhaust outlet mouth of the heater (See Fig. 15).

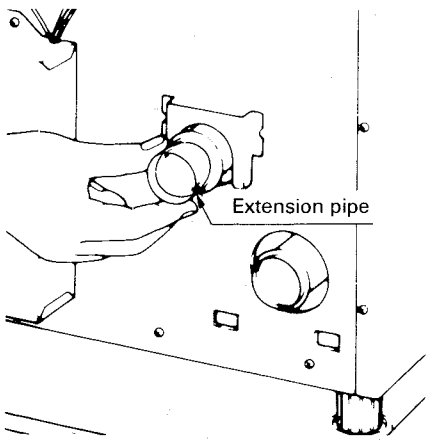


Fig. 15

10. Move the heater into position. Connect the bent joint to the exhaust outlet mouth (upper opening) and attach the L-shaped hose to the intake inlet mouth. Make sure all connections are tight (See Fig. 16).

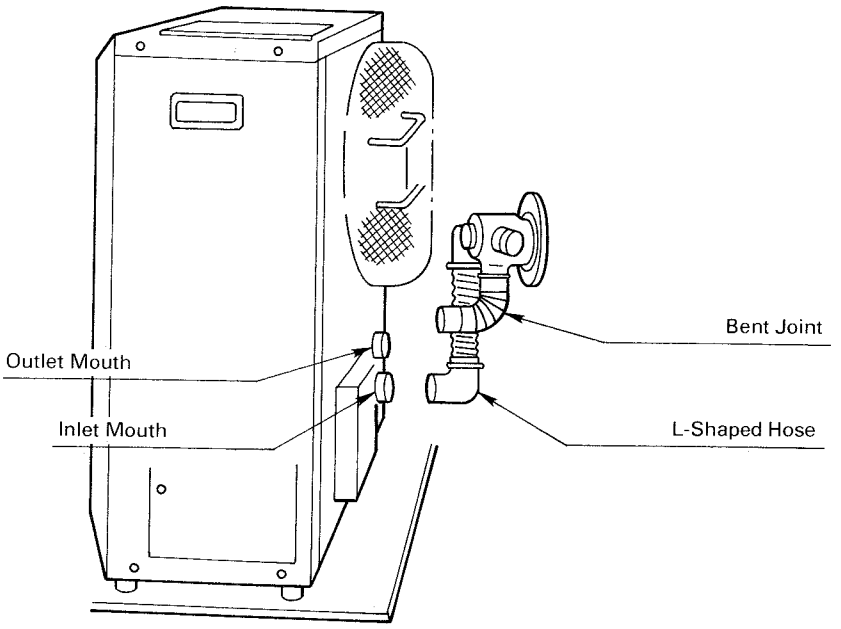


Fig. 16

11. Secure the L-shaped hose to the intake inlet mouth with the hose band. Secure the bent joint to the telescoping flue pipe with the pipe holder (If the extension pipe is used, also attach the pipe holder to the connection of the bent joint and the extension pipe). Secure the bent joint (or the extension pipe) to the exhaust outlet mouth by sliding the pipe stopper in the exhaust mouth bracket (See Fig. 17).

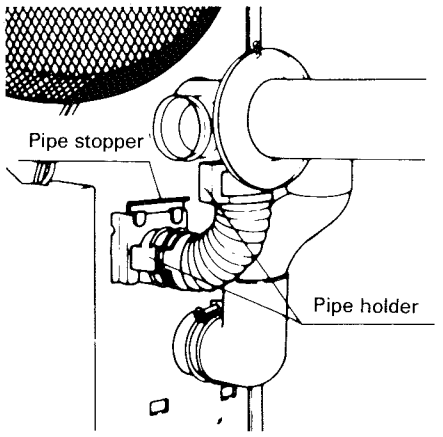
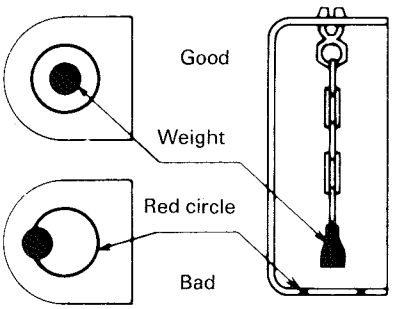


Fig. 17

12. Make sure the position of the heater is level by using the plumb bob located at the right side of the heater. The plumb bob weight should be within the red circle. If the plumb bob weight is not within the red circle, adjust the heater legs until the plumb bob weight is within the red circle (See Fig. 18 & 19).



Plumb bob as viewed from above

Fig. 18

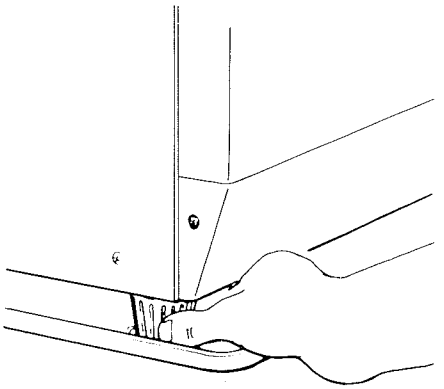


Fig. 19

13. After installation is completed, secure heater to the wall with the wall brackets provided with the heater. Make sure the heater is parallel to the wall (See Fig. 20).

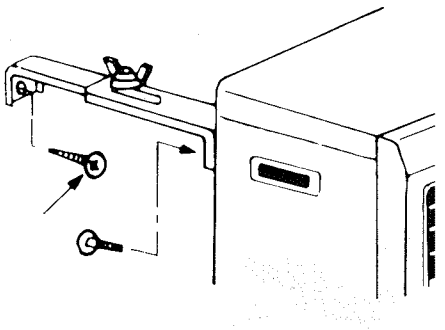


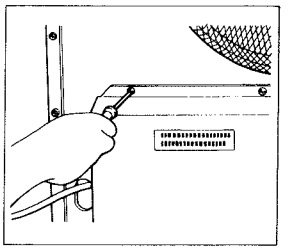
Fig. 20

14. Before ignition, recheck the followings:
    a. All connections are tight and firm.
    b. The heater and the telescoping flue pipe areas are free of any materials.
    c. The heater is level and parallel to the wall.
    d. The exhaust and the intake holes of the telescoping flue pipe are fully exposed to outdoor air, but not protruded too far from the wall sleeve.

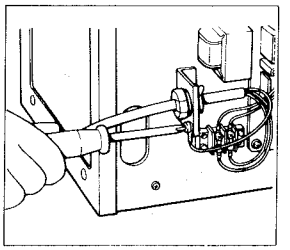
PERMANENT WIRING INSTALLATION

WARNING: MAKE SURE POWER SUPPLY CORD IS DISCONNECTED TO AVOID ANY ELECTRIC SHOCK BEFORE SERVICING. ELECTRIC SHOCK MAY CAUSE SERIOUS INJURY.
INSTALLATION SHOULD BE CONDUCTED BY A LICENCED ELECTRICIAN.

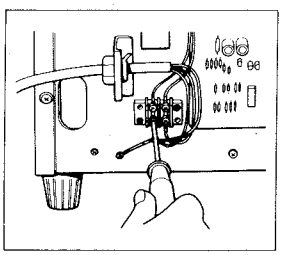
Step 1. Disconnect power supply cord from power source. Remove screws and control box cover on the back of the heater.



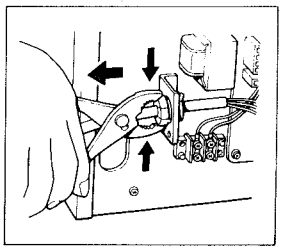
Step 2. Disconnect ground wire (green wire) from the power supply cord bracket.



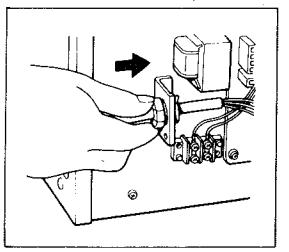
Step 3. Disconnect two power supply wires from bottom row of the terminal.



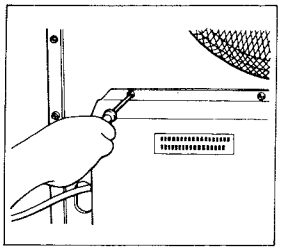
Step 4. Squeeze strain relief with the adjustable pliers to remove plastic bushing from the power supply cord bracket.
Remove the power supply cord.



Step 5. Insert the power supply cable from junction box and connect ground wire to the power supply cord bracket and power wires to the terminal.



Step 6. Affix the control box cover to the heater and insert screws.



SECTION J: FUELING

WARNING: Use only water-clear No. 1-K kerosene. NEVER USE GASOLINE. Use of gasoline can lead to uncontrollable flames resulting in destructive fire.

Laser 52 FUEL SYSTEM OPTIONS

- **Large Capacity External Tank**

  Where bulk delivery of kerosene is available, an outdoor or underground fuel tank may be used. Tank must be purchased separately and installed by a qualified fuel supply technician.

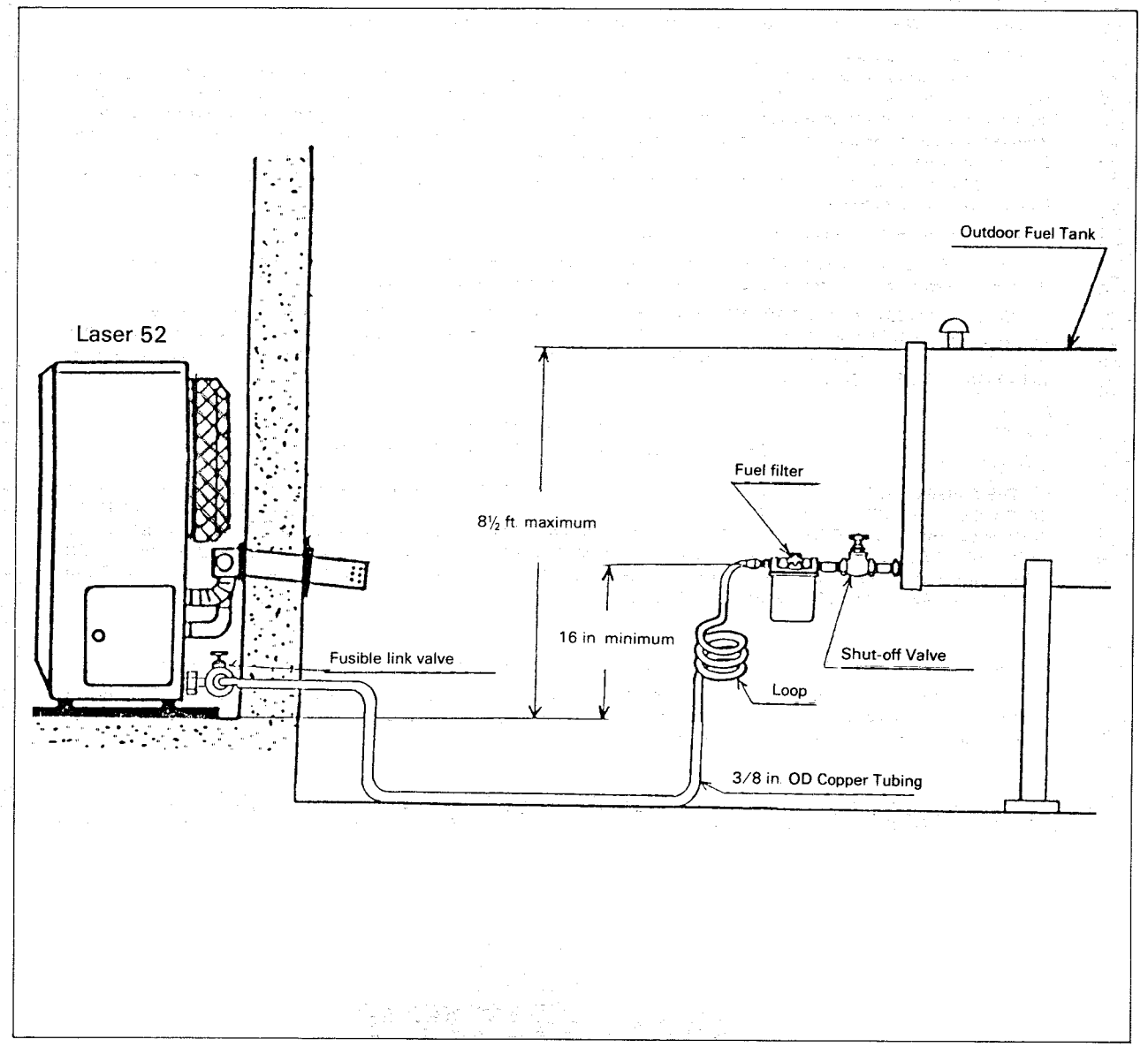
EXTERNAL TANK INSTALLATION

NOTE: External tank installation must comply with National Fire Protection Association Code NFPA 31 or locally applicable codes. Check with local building officials.

The following instructions should be followed for installtion of a large capacity, gravity-fed external fuel tank.

- Installation height of tank's fuel outlet should be at least 16 in. above floor surface upon which heater rests.
- To avoid excess fuel pressure to heater, top of fuel tank should be no more than 8½ ft. above floor surface upon which heater rests.
- Fuel tank should be located at least 6 ft. away from all heat sources.

- 3/8" OD copper tubing should be used for fuel line.
- To prevent air locks in fuel line, fuel line should be smooth with no U-shaped or sharp bends.
- Use of a fuel filter in fuel line adjacent to tank is recommended. A shut-off valve should also be connected to the tank.



LIMITED WARRANTY

TOYOTOMI AMERICA INC. ("TOYOTOMI") warrants each product and any parts thereof sold by it to be free from defects in materials or workmanship under normal use and service for TWELVE (12) MONTHS from the date of delivery to the original purchaser at retail subject to the following terms and conditions:

An extended warranty period of 36 months is offered for vented FF heaters. This coverage is limited to the combustion assembly, specifically the burner pot, radiant chamber and heat exchanger. The remainder of heater is subject to 12 months.

WHAT IS COVERED: Product or any parts thereof which are defective in materials or workmanship.

WHAT IS NOT COVERED:

(1) This warranty does not extend to any defect due to the negligence of others; failure to instal, operate or maintain unit in accordance with installation instfuctions (operating and maintenance instructions are furnished with each new unit); unreasonable use; accidents; alteration, use of unauthorized or non-standardized Toyotomi parts and accessories; electrical malfunctions, i.e., as resulting from large power surges, short circuit, etc.; incorrect installation; use of any fuel other than that specified in owners manuals; or repair by anyone other than a service facility specified by Toyotomi.

(2) Normal wear and tear of parts, including wicks, batteries, igniter coils and siphons, cutting blades, hoses, cables, burner mats and accessories.

WHO IS COVERED: The original purchaser at retail.

WHAT WE WILL DO: TOYOTOMI will either repair or replace, at its option, all defective parts free of charge that are covered by this limited warranty on a carry-in basis, to your nearest authorized dealer or distributor of TOYOTOMI.

WHAT YOU MUST DO FOR WARRANTY SERVICE: You must return the defective Product or part to any authorized dealer or distributor of TOYOTOMI with this LIMITED WRRANTY CARD and a copy of your bill of sale or credit card charge receipt or other document evidencing the date of the Product s delivery. If service is not available locally, please contact our CUSTOMER RELATIONS DEPARTMENT or call:

TOYOTOMI AMERICA INC
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