



UNVENTED KEROSENE HEATER (FORCED CONVECTION TYPE) OPERATION AND MAINTENANCE INSTRUCTION



LASER CLEAN

MODEL LS-6

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1. SPECIAL PRECAUTIONS

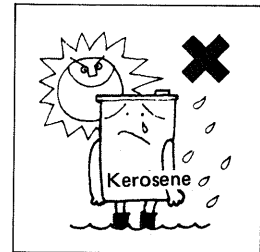
- Keep the following in mind when using the heater and handling kerosene.

* FUEL

1. Be sure to use pure kerosene only. Never use dirty kerosene, deteriorated kerosene, water contaminated kerosene or gasoline.

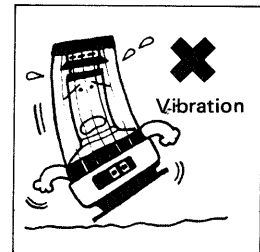
2. Do not use any type additives in this heater.

3. Store kerosene far away from heat source, rain, dust, or direct sunlight.

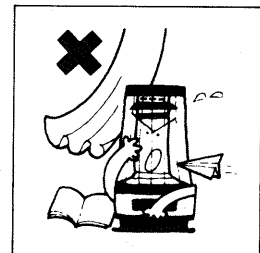


* LOCATION

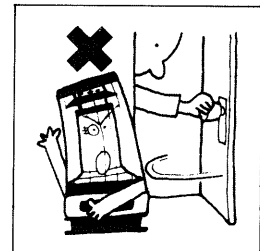
1. Place the heater on a level place, free of vibration.



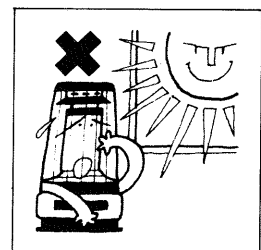
2. Do not use the heater near curtains or inflammable articles.



3. Avoid placing the heater where it will be exposed to strong wind or in high traffic areas such as door or hallways.

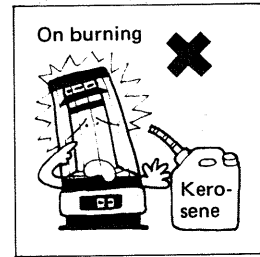


4. Do not use the heater in areas of very high temperature and avoid operating it in direct sunlight.



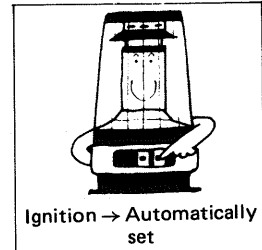
* FUELING

1. Be sure to extinguish the heater before fueling.
Wipe any spilled kerosene off; replace and tighten the fuel tank cap.

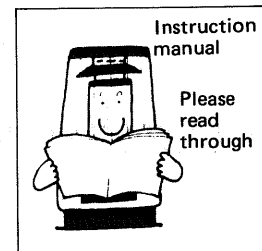


* OPERATION

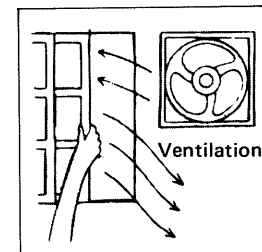
1. The tip-over device (Automatic extinguisher) is set when the heater is ignited. (Refer to page 10.)



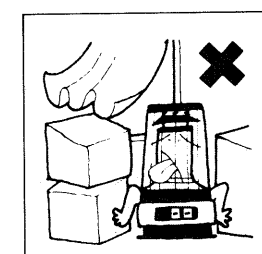
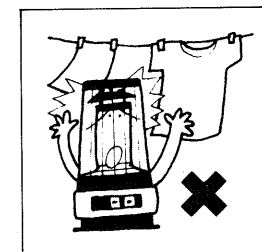
2. Make sure that combustion goes well.



3. Ventilate room adequately to provide fresh air.
Do not use the heater where flammable gases are present.

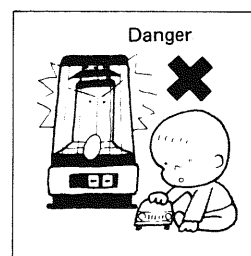


4. Do not drape clothing or other materials on the heater. It will cause overheating and malfunction.
Also avoid using the heater in a room too small or near combustible materials.

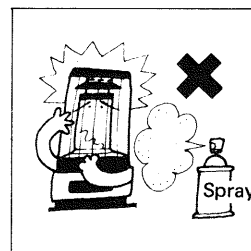


5. Do not touch the heated air outlet. Keep children away from the heater.

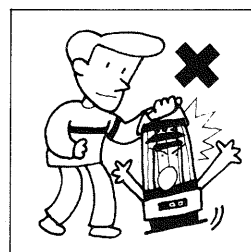
- The heated air outlet is hot.
- Do not insert paper, cloth or other material into the heat outlet.
- Keep all articles away from the outlet.



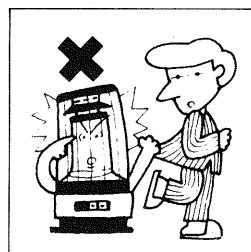
6. When the heater is in use, do not use flammable materials such as spray, or solvents.



7. Do not move the heater while operating, or still hot.



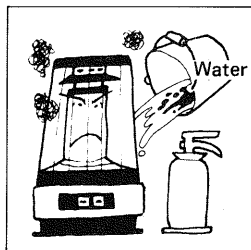
8. Make sure that fire is completely extinguished before going to bed or leaving the heater unattended.



9. If abnormal combustion occurs, or in case of emergency, immediately extinguish the heater. (Refer to page 9)
Also unplug the heater from the outlet.



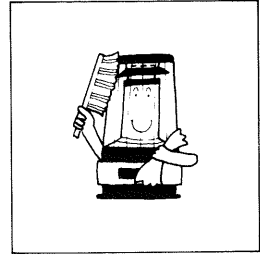
- In case flame is not extinguished when heater is turned off—extinguish with water, or fire extinguisher. Do not attempt to smother with blanket, etc.



10. Do not operate the heater where any materials might fall onto the heater.

* FREQUENT INSPECTION AND MAINTENANCE

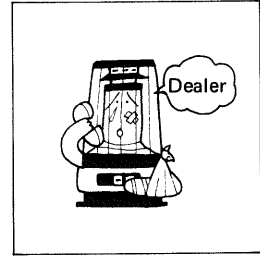
1. Be sure to do frequent inspection and maintenance. (Refer to page 11)



2. Do not use any faulty or damaged parts of the heater.

Incorrect repair might cause trouble.

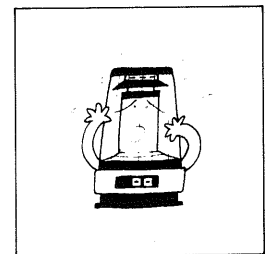
If you have problems with the heater, consult your local Toyotomi America Dealer.



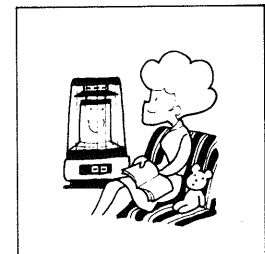
2. PROPER USE OF THE HEATER

* PREPARATION BEFORE USE

1. Take the heater out of the box carefully to avoid damage.
 2. Remove the packing from the heater.
 3. Check to be sure there are no loose screws and that every part is in place.
 - The choice of a place for the heater is very important to the effective and safe use of the heater.
 - Heater air is radiated in all directions. Please keep a distance of at least 4.5 feet between the heater and the surrounding materials.
- (1) Please do not use the heater in a dusty area. Dust will clog up the air intake filter and lines and cause improper combustion.

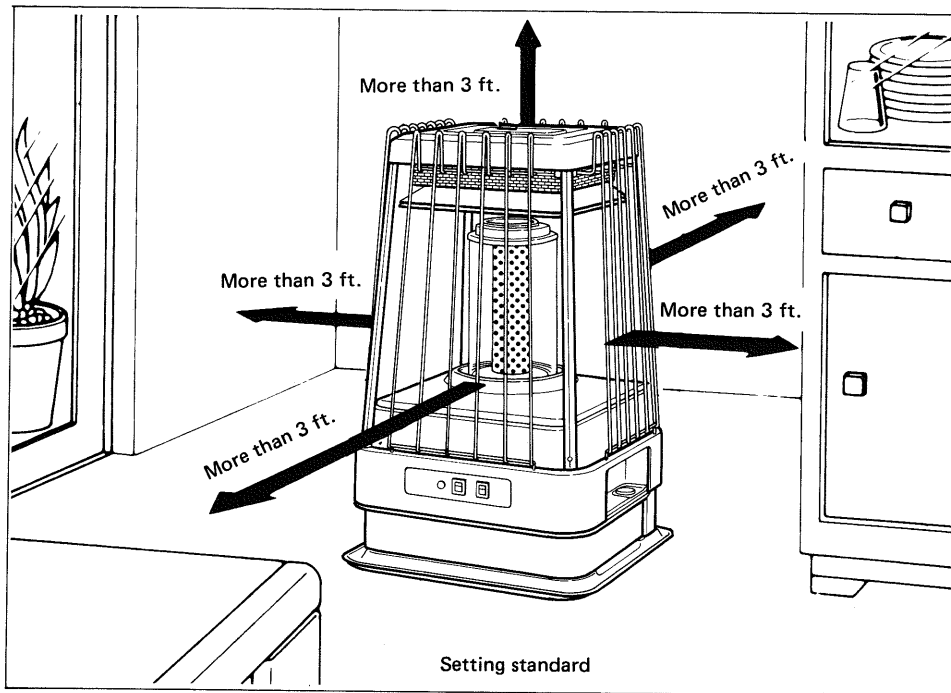


- (2) Please do not use the heater unattended.



* SAFE USE OF THE HEATER

- (1) Please keep the heater away from flammable materials as shown in the illustration.
- Be sure to keep the heater more than 3 ft away from shelves or the like above the heater.
 - The floor on which the heater is placed should be level and stable.

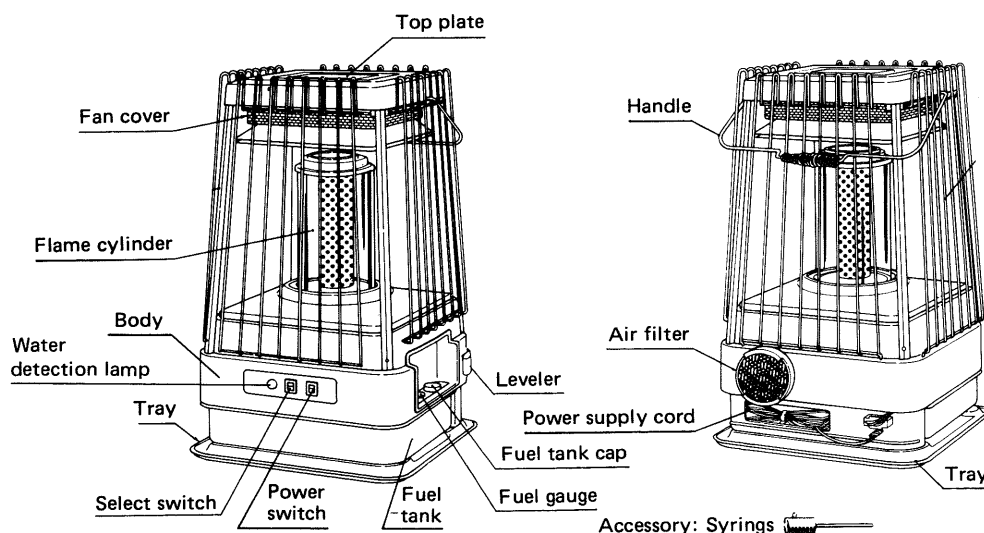


- (2) Provide adequate ventilation by keeping doorways open to the rest of the house, or a window open slightly.

* EFFECTIVE USE OF THE HEATER

- Please keep clear around the heater.
- Locate the heater such that the hot air does not blow directly on room occupants.

3. PARTS NAMES



4. USING OF THE HEATER

A. FUELING

* FUEL FOR THE HEATER

Only ASTM 1K kerosene, or completely clear and colorless kerosene. Never use gasoline.

*** DO NOT USE COLORED, WET OR SOUR SMELLING KEROSENE. DO NOT USE "FUEL AIDS".**

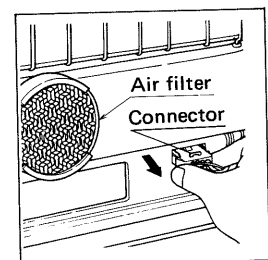
*** FUELING PROCEDURE. (FUELING SHOULD BE DONE ONLY AFTER TURNING OFF THE HEATER.)**

1. Turn the fuel tank cap counterclockwise and remove it.
2. Fill the tank with kerosene with a siphon, watching the fuel gauge to avoid overfilling.
 - Do not remove the filter.
 - Do not let water or dust into the fuel tank.
3. Keep filling until the needle of the fuel gauge moves to the point of "F". Do not fill much more than the "F" level.
4. Replace and tighten the fuel tank cap.
5. Wipe off any spilled kerosene.
 - Replace and tighten the cap of the kerosene can.
 - Sometimes water may accumulate at the bottom of the kerosene can. Be careful about such water. Water in the fuel tank can cause improper burning, odor and rust in the fuel tank.

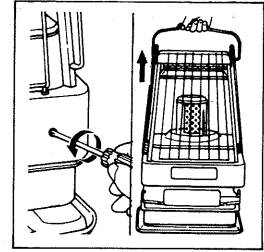
WHAT TO DO IN CASE POOR QUALITY FUEL HAS BEEN USED.
(PLEASE CONSULT YOUR TOYOTOMI AMERICA DEALER.)

If a large amount of inferior fuel is burned, tar and soot may accumulate inside the burner, and eventually, the flames may be affected. In that case, complete cleaning is necessary.

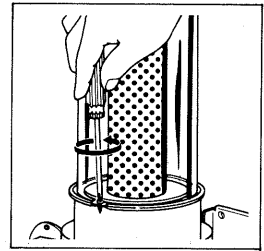
1. Take out the air filter and connector.



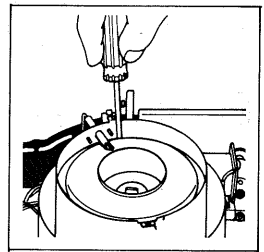
2. Loosen the four screws for the body of the unit and remove the body.



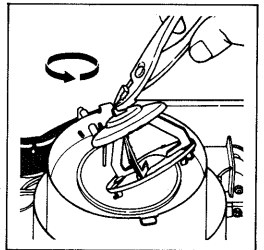
3. Loosen the two screws for the flame cylinder and take it out.



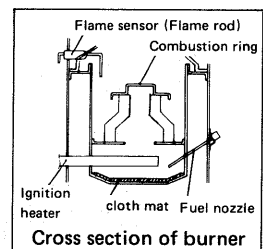
4. Loosen the three screws for the flame lead ring and take it out.



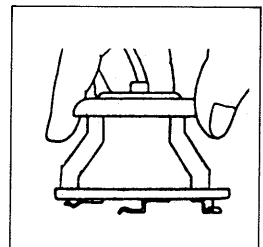
5. Turn the combustion ring to the left and tilt it so as not to get caught in the tip of the flame rod and take it out. If combustion ring is caught in the tip of the flame rod, lower the ring and try to take it out again.



6. Scrape the tar or soot inside the burner with a pallet or the like. Please be careful not to damage the ignition heater, the fuel nozzle, or the cloth mat.



7. Reassemble all the parts in the reverse procedure. Be sure to place the combustion ring with the mark engraved "UP" up. Tighten up the flame lead ring and the flame cylinder with the screws.



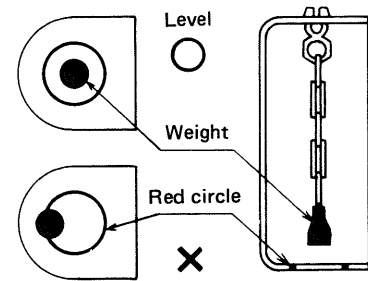
- When the cloth mat is stuck to the bottom of the burner with tar, cut off the part that is stuck. When more than half of the cloth mat is usable, lay the cloth mat under the fuel nozzle.
- When the usable part of the cloth mat is less than half, replace the cloth mat with a new one.
- The cloth mat plays an important role of preventing noise at the time of ignition and immediately after turning the heater off.

B. PREPARATION AND CHECKING BEFORE IGNITION

* CHECKING LEVEL

- Please place the heater on a level floor.

Look at the leveller on the side of the heater from above.
If the weight of the leveller is within the red circle,
the floor is level.



The leveller looked from above.

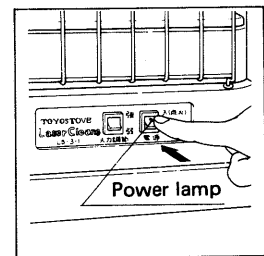
* SETTING OF THE SAFETY DEVICE

All the safety devices are set automatically at time of ignition.

C. IGNITION

1. Press the "Power Switch" to put it in the "ON" position. "Power lamp" goes on.

- Power lamp is on when the heater is in operation. When the heater is stopped by one of the safety devices, the lamp goes off.



2. Ignition takes place in about 3 or 4 minutes.

- When the heater is used for the first time, ignition may not occur on the first press of the power switch because sufficient fuel has not been supplied to the fuel lines or other related parts. In that case, please repeat ignition procedure.

D. HEATING POWER SELECTION

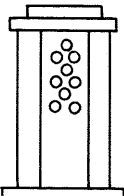
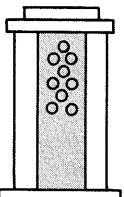
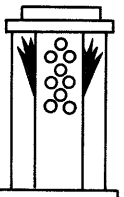
* Heating power selection can be made in 1.5 minutes after ignition has taken place.

After 1.5 minutes, the heating power can be selected by switching to "HIGH" or "LOW" using the select switch.

A sound is made when the heating power is changed. The change of the air amount for burning makes the sound. It is not an abnormal operation.

* FLAME CONDITION

- The flame condition shown below is in the HIGH select setting.

Flame		Cause	Measures
Normal <ul style="list-style-type: none"> • This is blue flame burning. The tip of the flame is tinged with yellow. • The heat element is almost uniformly red. The flame is low and the burning sound is small. 			
Abnormal <ul style="list-style-type: none"> • The heat element is not uniformly red. The burning sound is big. 		<ul style="list-style-type: none"> • There is too much air for burning. 	
Abnormal <ul style="list-style-type: none"> • The flame extends high enough to reach the heat element. • The flame is, as a whole, yellow. Sometimes the flame comes out of holes of the heat element. 		<ul style="list-style-type: none"> • Air for burning is short. • Malformation or damage of cloth mat. 	<ul style="list-style-type: none"> • See if the filter is plugged or not. Exchange cloth mat.

(IF NORMAL FLAMES CANNOT OBTAINED AFTER THE MEASURES SHOWN IN THE ABOVE CHART HAVE BEEN TAKEN, PLEASE CONSULT OUR DEALER.)

E. TURNING OFF THE HEATER

Press the "Power switch" to turn the heater "OFF". The power lamp goes out also.

F. NOTE FOR REIGNITION IMMEDIATELY AFTER TURNING THE HEATER OFF.

If you reignite the heater soon after turning off the heater, the heater might make an abnormal sound. Please wait (for about 10 minutes), and then reignite the heater.

- It takes about 3 or 4 minutes for preheating, even if the heater is reignited while the heater is still warm.

5. SAFETY DEVICES

- In case any of the following safety devices operate when the heater is burning, the burning is automatically stopped. At that time the power switch is in the "ON" position but "Power lamp" is turned off.
- Reignition procedure after the automatic extinguisher has been activated.
 1. Press the power switch to "OFF" and then to the "ON" position.
 2. When the heater is again operating normally the "Power lamp" goes on. This means the reignition procedure has been done successfully.
- If there still appears to be some problems with the heater, please consult our dealer.

A. TIP-OVER DEVICE

- This safety device turns off the heater in order to prevent a fire when the heater is tipped over while operating.
- This safety device is set automatically after the heater is reignited.

B. IGNITION SAFETY DEVICE

- This safety device turns off the heater when the heater does not get ignited due to the malfunction of the ignition heater, the power operated pump, the blower for burning, etc.
- The heater stops working due to the malfunction of the ignition heater. In such a case, kerosene has soaked into the cloth mat at the bottom of the burner. Take out the cloth mat, dry it thoroughly, and then put it back. (Refer to page 13)
- Solve the other possible problems and reignite the heater.

C. SAFETY DEVICE FOR POWER FAILURE

- The heater stops working when a power failure occurs or when it is unplugged. This safety device does not allow the heater to start working after the heater gets power again.
- Manual reignition of the heater is required.

D. THERMOSTAT

- The thermostat turns the heater off if the heater becomes too hot due to malfunction of the blower motor, or abnormal burning.
- Solve the possible problems and reignite the heater.

E. FLAME SENSOR

- This safety device turns the heater off automatically when the flame dies for whatever reason.

F. WATER DETECTOR

If you use kerosene mixed with water, the water stays at the bottom of the fuel tank. "Water detection lamp" goes on, and the heater stops operating. Remove the kerosene mixed with water from the tank.

Solve the problems and reignite the heater.

G. OIL SURFACE SENSOR

This safety device turns off the heater automatically when the fuel is less than a certain amount while the heater is in use.

The oil-surface sensor prevents the power operated pump from idling and burning while idling.

Reignite the heater after fueling.

6. ROUTINE CHECK AND MAINTENANCE

* PRECAUTIONS

1. Be sure to unplug the heater before checking and cleaning.
2. Be careful not to do the following while checking and cleaning.
 - Do not take off and disassemble the tip-over extinguishing device.
 - Do not take off and disassemble the controller and electric parts.
 - Do not take off and disassemble the combustion apparatus.
 - Do not take off and disassemble the parts related to kerosene supply and the power operated pump.

* NOTE : FOR CHECKING AND CLEANING

1. Cleaning and checking

The heater should be kept clean. Dirt and dust can reduce and shorten the heater's life. Only the clean heater can give you best performance.

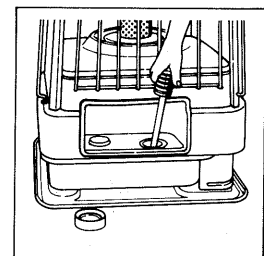
2. Surrounding area

Please keep the area cleaned and clear around the heater. Do not put flammable articles near the heater.

3. Oil leak, standing oil, and oil film

Please make it a habit to see if there is an oil leak, standing oil, or oil film. Wipe off the spilled kerosene at the time of filling up the tank. In case standing oil or oil film due to oil leak is found, turn off the heater, check the heater for the cause, and take some action for the oil leak. Reignite the heater after making sure that there is not oil leak.

When dust, dirt or water are found in the fuel tank, clean the fuel tank using the syringe supplied with the heater.



4. Cleaning of the filter at the fuel tank inlet.

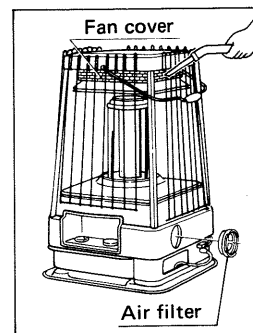
When dirt or dust has accumulated in the filter it should be cleaned, otherwise, filling the fuel tank will be difficult.

5. Cleaning of the air filter

Clean the air filter frequently. If the air filter is plugged with dirt or dust, air flow for combustion is restricted. Eventually, it may cause improper combustion soot and smoke.

- The air filter is on the side of the heater. Take out the filter and remove the dust every ten days.

6. Cleaning the fan cover
Remove the dust on the fan cover with a vacuum hose.



7. Catalyst

The catalyst helps further clean and deodorize the exhaust air. The catalyst will deteriorate with use. If the catalyst appears to have lost its effectiveness, please replace it with a new one. (The effectiveness of the catalyst usually lasts 2 or 3 seasons, depending on how heater is used or stored.)

7. TROUBLESHOOTING

Cause \ Trouble	Measure									
	No power lamp on	No ignition	White steam on and off	No flame growth	Yellow flames	Odor	Extinguished flame in use	Oil blur in the tray	Noise	Big burning sound
Disconnected power plug	<input type="radio"/>									Put the plug into the outlet
Power failure	<input type="radio"/>						<input type="radio"/>			Reignite after power is restored
Activation of the automatic tip over extinguishing switch							<input type="radio"/>			Reignite
Water in the fuel tank							<input type="radio"/>			Remove the kerosene mixed with water from the fuel tank
Plugged air filter			<input type="radio"/>		<input type="radio"/>	<input type="radio"/>				Clean the filter
No kerosene in the fuel tank	<input type="radio"/>						<input type="radio"/>			Fill the tank with kerosene
Spilled kerosene						<input type="radio"/>		<input type="radio"/>		Wipe off the spilled kerosene
Use of inferior kerosene		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/> Consult our dealer
Wrong wiring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					<input type="radio"/> Consult our dealer
Malfunction of the controller	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					<input type="radio"/> Consult our dealer
Deteriorated catalyst						<input type="radio"/>				Consult our dealer
Untightened screws and wrong assembly of the parts						<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	Consult our dealer
Malfunction of the flame sensor							<input type="radio"/>			Consult our dealer
Malfunction of the power operated pump		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/> Consult our dealer
Malfunction of the ignition heater		<input type="radio"/>	<input type="radio"/>							Consult our dealer
Malfunction of solenoid						<input type="radio"/>	<input type="radio"/>			<input type="radio"/> Consult our dealer

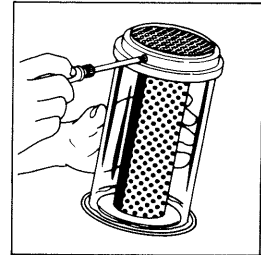
If there is trouble other than the one in the above list, please consult our dealer.

8. REPLACEMENT OF PARTS

Most parts of the heater are long lasting. However, when the replacement of the catalyst and cloth mat is necessary, please ask our dealer from whom you purchased the heater.

REPLACEMENT OF THE CATALYST (PLEASE CONSULT OUR DEALER.)

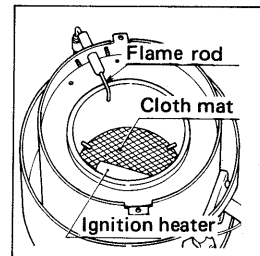
1. Take out the flame cylinder according to the procedures described on page.6. (Refer to 1, 2, and 3)
2. Loosen the 2 screws which fasten the flame cylinder and the catalyst and then, replace the catalyst with a new one.
3. Reassemble the parts.



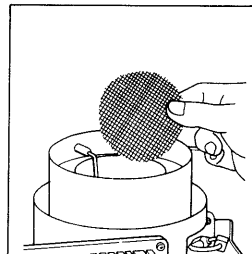
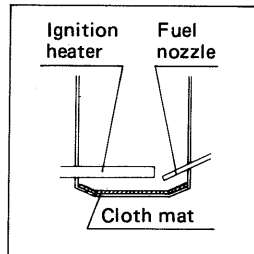
REPLACEMENT OF THE CLOTH MAT (PLEASE CONSULT OUR DEALER)

1. Take out the flame lead ring and the combustion ring according to the procedure described on page 6. (Refer to 1, 2, 3, 4, and 5.)
2. Take out the cloth mat WHICH is laid at the bottom of the burner. If the cloth mat is stuck to the bottom with tar, scrape the tar and get the vacuum cleaner to suck out the cloth mat.

Do not place the new mat on the old one.



3. Place a new cloth mat on the bottom of the burner.



Note for placing a cloth mat.

The cloth mat should be placed under the tip of the fuel nozzle and the ignition heater. Please lay the mat closely to the bottom of the burner.

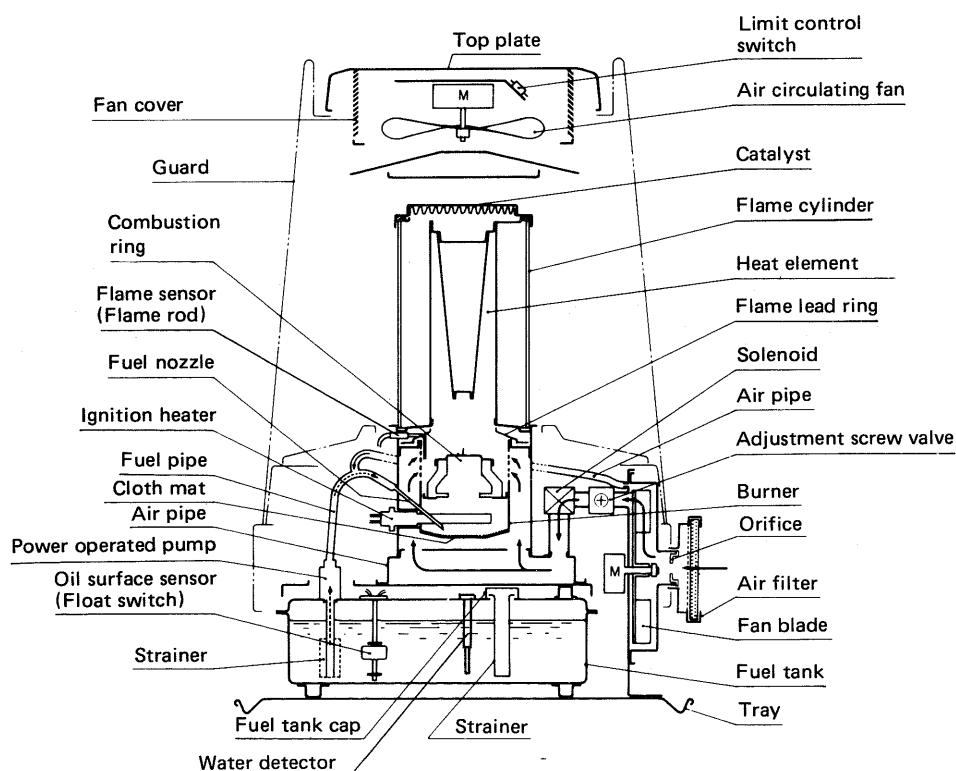
9. STORAGE (LONG TERM STORAGE)

1. Remove kerosene, dust, and water left in the fuel tank to prevent rusting of the tank.
2. Wipe off the dirt on the heater with a wet cloth, and then, clean the heater with a dry cloth.
3. Wrap the heater with plastic, and store it in a dry place. Please keep the manual available for easy access.

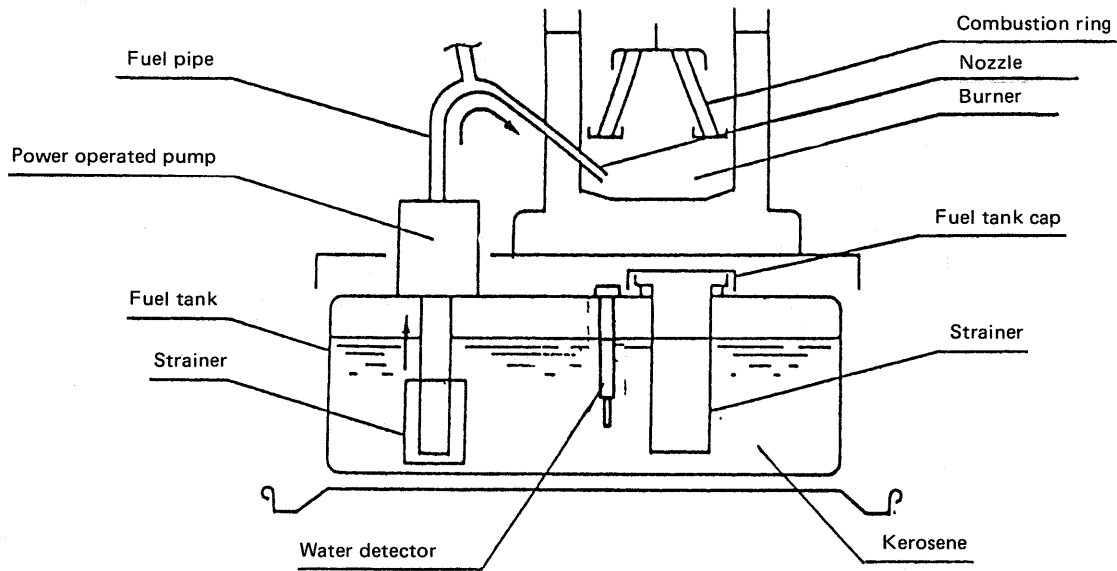
10. SPECIFICATIONS

Model		LS-6
Type		Unvented type (Forced convection type)
Ignition		Electric ignition
Fuel		Kerosene
Heat rating	High	25,000 BTU/h
	Low	12,600 BTU/h
Fuel consumption	High	0.189 gal/h
	Low	0.095 gal/h
Fuel tank capacity		2.0 gallons
Burning duration		11-21 hours
Outer dimensions (including the tray)		Height 25-9/16 in., Width 18-3/8 in., Depth 18-3/8 in.
Weight		45.2 lbs.
Power source		120V 60Hz
Power consumption		Preheating (average) 270W Burning (average) 51W
Accessory		One syringe
Fuse		120V 6A

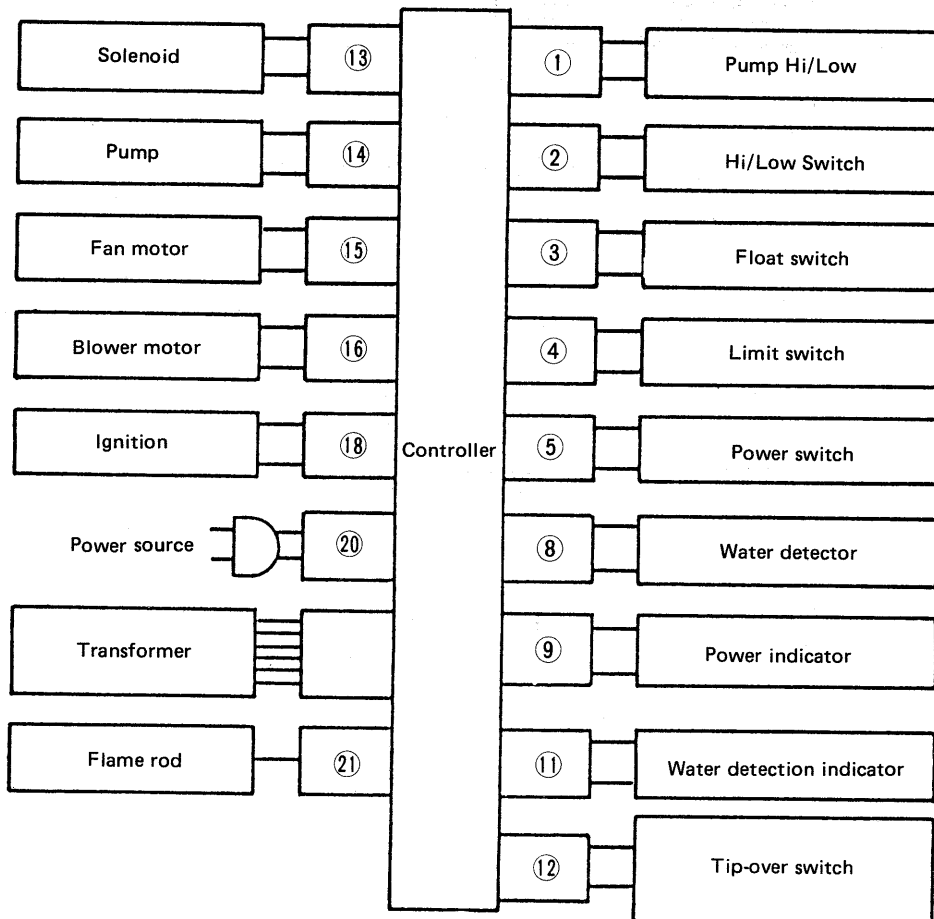
■ CONSTRUCTION

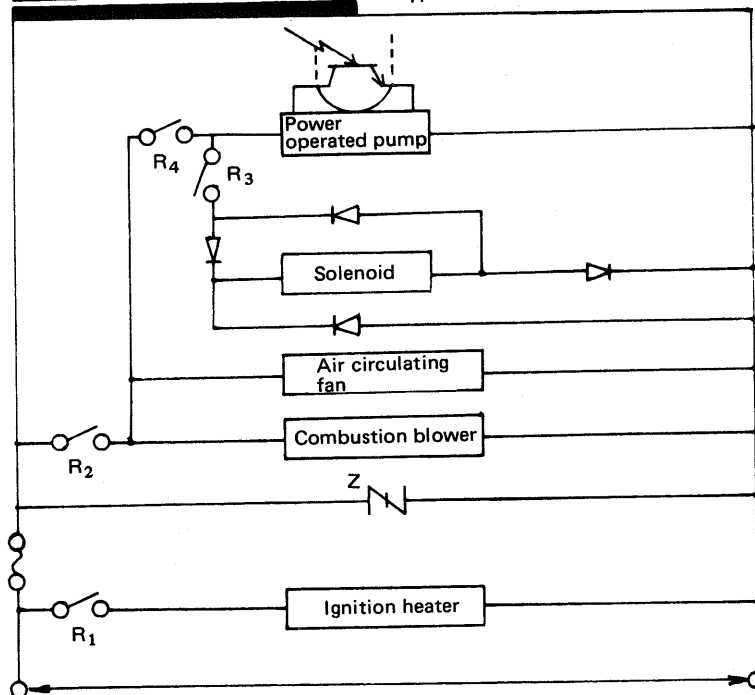
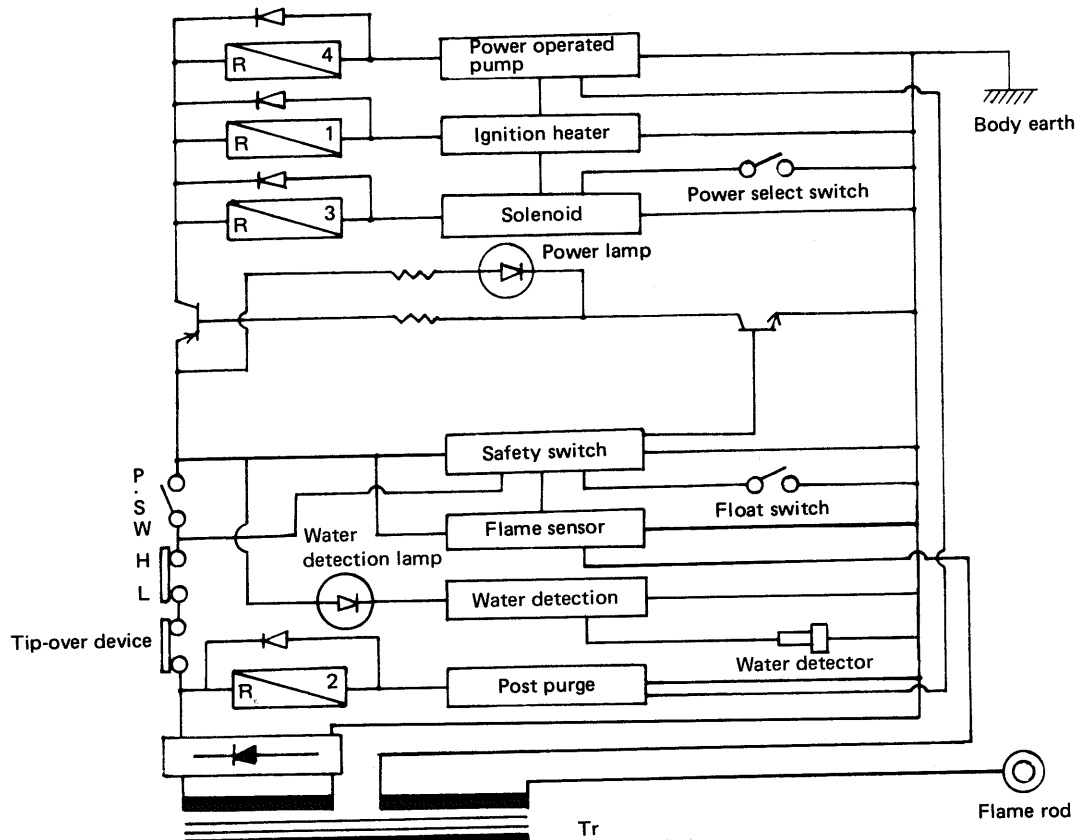


■ FUEL SUPPLY



■ CONNECTION DIAGRAM





Z : Surge absorber
 HL : Limit control
 P SW : Power switch

LIMITED WARRANTY

TOYOTOMI AMERICA INC. ("TOYOTOMI") warrants each heater (the "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:

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

WHAT IS NOT COVERED:

(1) Product which has been subjected to abuse, accident, alteration, modification, tampering, negligence, misuse including improper or contaminated fuels, repair using improper parts, or repair by anyone other than a service facility specified by TOYOTOMI;

(2) Normal wear and tear parts, including wicks, batteries, igniter coils and siphons.

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 WARRANTY 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.
604 Federal Road
Brookfield, CT 06804
(203) 775-1909

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