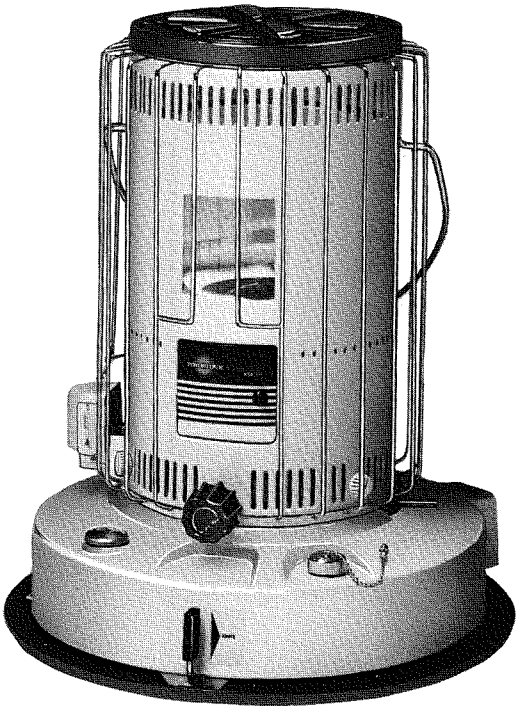
TOYOSTOVE™

PORTABLE KEROSENE HEATER

OPERATION AND MAINTENANCE INSTRUCTION



MODEL **KSA-105** (UL®)

FOR SAFE AND EFFICIENT OPERATION OF YOUR TOYOSTOVE™ PORTABLE HEATER, PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

CONTENTS

SPECIFICATIONS	1	ASSEMBLY AND OPERATION	6
OUTSTANDING FEATURES	1	CARE AND MAINTENANCE	10
SAFETY TIPS	2	REPLACEMENT OF PARTS	11
FUEL GUIDE	4	STORAGE	15
COMPONENT PARTS	5	TROUBLESHOOTING	16

Congratulations, you are ready to begin enjoying the benefits of one of the most popular kerosene heaters ever made. TOYOTOMI, the leader in kerosene heater technology, has tested and refined the KSA-105 to assure you of long term safety and satisfaction. Please study the following instructions, use and care your heater carefully, and it will serve you well for many years.

SPECIFICATIONS

MODEL	KSA-105
HEAT RATING*	17,100 BTU/hr.
FUEL TANK CAPACITY	1.99 Gallons
BURNING TIME/TANK	15 – 21 Hours
SIZE (W x H x D)	18-5/8" x 22" x 18-5/8"
WEIGHT	25.4 Pounds., empty
EXTINGUISHER	Automatic
IGNITER	Automatic, powered by two (2) "D" size batteries

**Matching Room Size to HEAT RATING*

- *Because the "Heat Load" of an area to be heated is influenced by so many factors, it is impossible to specify a heater output to an exact room size.*
- *If you use a heater too large for the area to be heated, the temperature you desire will be reached quickly. In such cases, to avoid overheating the area, the heater must be turned off frequently, or doors opened to other areas of the house, or windows to the outside opened to cool the area.*
- *If you use a heater too small for the area to be heated, it will take much longer to reach the desired temperature, in fact it may not be reached at all depending on the outside weather conditions.*
- *As a "rule of thumb", the following can be given as a guide:*
  If you live in an area of the country exposed to severe winter temperatures, multiply the primary area (in square feet) to be heated by 24 BTU/ft^2/hr, if you live in a moderate climatic area, multiply the primary area (in square feet) by 12 BTU/ft^2/hr.

OUTSTANDING FEATURES AND BENEFITS

- AUTOMATIC EXTINGUISHER: Automatically extinguishes the flame if the heater is jarred or tipped.
- FUEL FEED: Fuel is fed to the flame through the wick. The fuel is not under pressure, therefore, if the flame goes out, the fuel flow stops.
- LOW CENTER OF GRAVITY: The heater is designed such, that the weight is concentrated in the base making accidental tipover difficult, if not impossible.
- HEAVY ZINC COATING OF FUEL TANK: Prevents corrosion when water is present in the fuel.
- EASY MAINTENANCE: No tools are required to change the wick, or perform other maintenance operations.

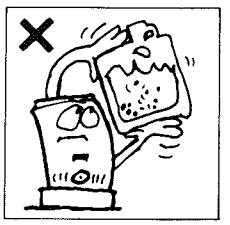
Remember that your portable kerosene heater is a well engineered and crafted heating appliance. Safety, reliability, and convenience have been engineered into the product but, as with any appliance, a common sense approach to its use will assure its maximum benefit to you.

FUEL GUIDE

What to Buy . . .

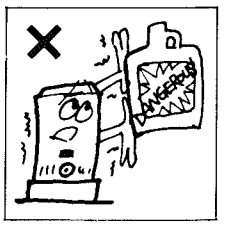
ALWAYS : Crystal clear, colorless, high quality KEROSENE, ASTM 1K or equivalent.

ALWAYS : Kerosene free of contaminants, water or cloudiness.



NEVER : Gasoline, alcohol, white gas, camp stove fuel or additives.

NEVER : Yellow or sour-smelling fuel.

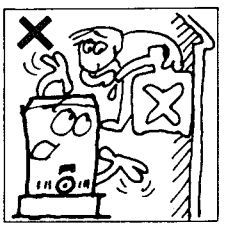


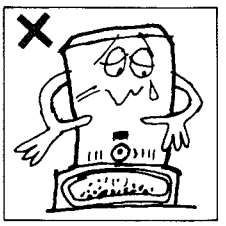
HOW to Use It . . .

ALWAYS : Fill heater away from living quarters when heater is cool; use siphon.

ALWAYS : Check wick frequently for tar build-up. (Rapid, heavy build-up may indicate poor quality or deteriorated fuel.)

ALWAYS : Watch fuel gauge to avoid over-filling heater.





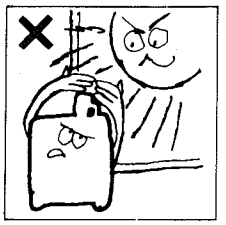
How to Store It . . .

ALWAYS : In a clean container, clearly marked KEROSENE.

ALWAYS : AWAY FROM direct sunlight, heat sources or extreme temperature changes.

NEVER : In glass container, or one that has been used for other fuels.

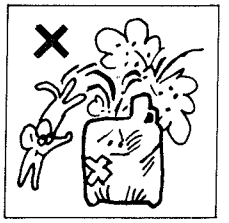
NEVER : For longer than 6 months. (Begin each heating season with fresh kerosene; discard at the end of the season.)



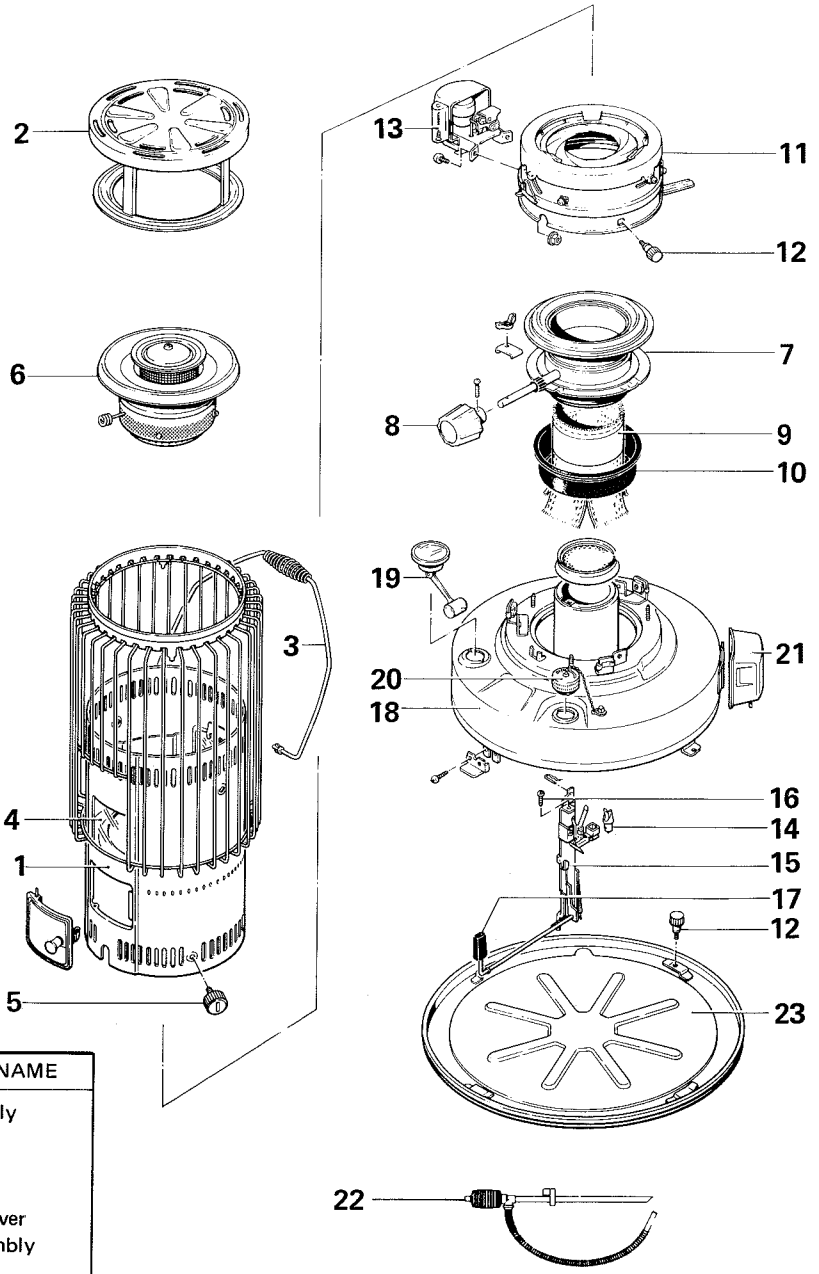
Why is It Important . . .

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

- Excess tar deposits on the wick.
- Reduce wick life.
- Odor, smoke.
- Difficulty in igniting or extinguishing flame.
- Use of a highly volatile flammable fuel such as gasoline can produce uncontrollable flame creating a severe fire hazard.



COMPONENT PARTS



REF #	PART #	PART NAME
1.	22741907	Outer cover assembly
2.	22741901	Top plate
3.	22741904	Carrying handle
4.	20451931	Mica window
5.	20451505	Thumbscrew for cover
6.	22741908	Heat chamber assembly
7.	22741911	Wick adjuster
8.	22741912	Wick adjuster knob
9.	20451913	Glass fiber wick
10.	22741915	Rubber packing
11.	22741916	Extinguisher assembly
12.	20451530	Thumbscrew for extinguisher and tray
13.	20450007	Plumb bob
14.	20450018	Igniter coil
15.	22741919	Igniter unit
16.	20450120	Screw for igniter unit
17.	22741917	Igniter lever
18.	22741922	Fuel tank assembly
19.	22741923	Fuel gauge
20.	20450124	Fuel tank cap
21.	22741927	Battery holder
22.	20450028	Manual fuel siphon
23.	22741929	Drip tray

You should register heater's serial number. The serial number is located on the outside surface of fuel tank or cabinet. You need replacement parts or service in the future, reference to this number will assure you of obtaining the proper parts quickly.

Your heater's serial number

SERIAL No.

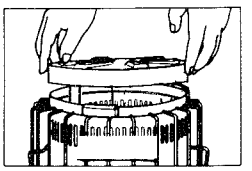
ASSEMBLY AND OPERATION

INSPECTION AND ASSEMBLY

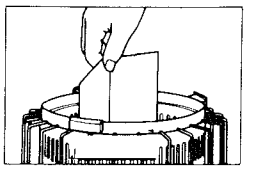
NOTE: Please save the shipping carton and packing materials for future storage of your heater.

1. REGISTRATION CARD
   Take out the registration card from the shipping carton and fill it out and mail it as soon as possible.

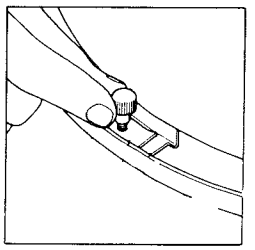
2. REMOVE PACKING MATERIALS
   Lift off the top plate.



   Remove the packing material.



3. INSTALL THE DRIP TRAY

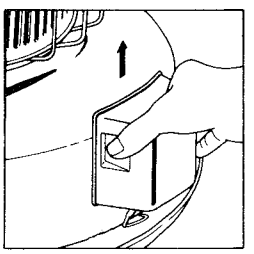


   NOTE: DO NOT operate your heater without the drip tray.

   Place the drip tray on the floor. Remove the thumbscrew:

   - Place the heater onto the drip tray so the four (4) feet of the heater are next to the four (4) tabs on the tray.
   - Turn the heater clockwise until the feet slide into their tabs.
   - Replace the thumbscrew to secure the tray.

4. INSTALL THE BATTERIES



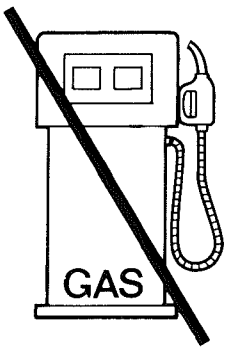
   Locate the battery holder on the back of your heater. Slide it up, slowly — to avoid damaging the igniter wires.

   - Insert the two (2) "D" size batteries acoording to the plus (+) and minus (—) markings inside the holder.
   - Slide the battery holder back in place.

5. CHECK THE THUMBSCREWS
   Make sure that the three (3) LARGE thumbscrews around the outer cover above the fuel tank are tighten.

FUELING

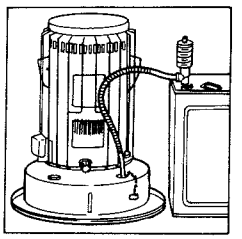
WARNING: Use only water clear kerosene, ASTM 1K or equivalent. Never use gasoline or other flammable liquids.



USE KEROSENE ONLY

1. Insert the straight tube of the manual fuel siphon into the kerosene container.
   Remove the fuel tank cap on the heater, and insert the siphon's flexible hose into the fuel tank opening.
   To hold the hose in place, and reduce the possibility of a spill, push it over the wire guide inside the tank.

2. Turn the air vent knob on the top of the siphon clockwise to close the air vent.



3. To start the flow of kerosene, squeeze the bulb of the siphon vigorously six or seven times. Once the flow begins, it is no longer necessary to squeeze the bulb.
   To avoid overfilling the tank, watch the fuel gauge. As the indicator enters the red zone, stop the flow by turning the air vent knob counterclockwise.

NOTE: Be especially careful to avoid overfilling the tank with very cold kerosene; otherwise overflow of the fuel tank might occur when the fuel warms up.

4. Remove the siphon carefully, allowing the excess kerosene to drain from the tube back into container.
   Replace the fuel tank cap and tighten it securely. Be sure to wipe away any spilled kerosene from tank or other parts of heater.

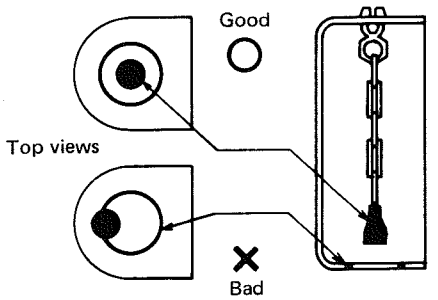
CHECK BEFORE LIGHTING

1. LOCATE YOUR HEATER AWAY FROM WALLS

   Allow at least three (3) feet of clearance between the heater and walls, curtains, shelving or other combustible materials.

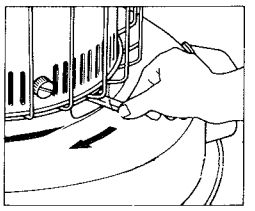
2. LEVEL THE HEATER

   The heater should be operated on a firm, level floor.
   A built-in level indicator is located on the left side of the heater. When the heater is level, the end of the chain will lie approximately in the center of the red circle.

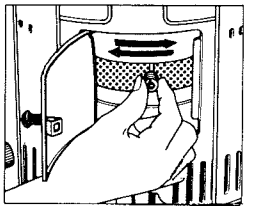


NOTE: If your heater is not level, change locations. Do not prop it with books or other objects.

3. Engage the automatic extinguisher by pulling the set lever untill it locks in the "set" position.



4. Open the access door and center the wire handle in the opening. If the handle is not visible, turn the heat chamber untill you can grasp the handle. Be sure that by moving the wire handle left and right, the heat chamber moves easily. This means that the heat chamber is properly seated.

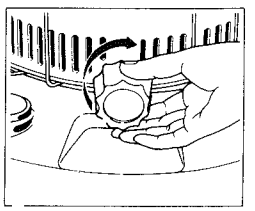


LIGHTING

NOTE: When you first use your new heater, ignite it out of the living area of your house, either in a garage or an area outside protected from strong drafts. Burn it for about 15 minutes to remove all of the protective oil present on the burner parts. If this 15 minute "burn-in" is done inside, some objectionable odor will be observed. This procedure is necessary ONLY THE FIRST TIME you ignite your heater.

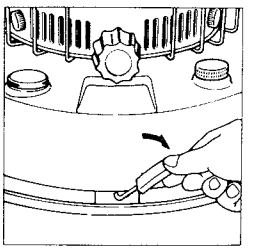
NOTE: If you have fueled your heater for the first time, or if your are refueling it after it has been out of fuel for a long time, you will need to wait about thirty (30) minutes for the wick to become fully saturated.

1. Turn the wick adjuster knob clockwise until it stops.
   This raises the wick to its maximum height.



2. AUTOMATIC LIGHTING

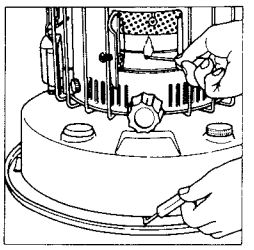
   Open the access door, then push the igniter lever gently to the right and down, the igniter coil should glow and touch the wick.
   When flame appears, release the igniter lever.



NOTE: If you have difficulty igniting wick, let up on the igniter lever very slightly to remove the igniter coil from direct contact with the wick.

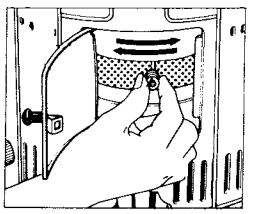
3. LIGHTING WITH A MATCH

   You should not have to light the heater with a match, but should it become necessary, open the access door, push the igniter lever and touch the match to the top of the wick. Do not allow burned parts of the match to fall or remain on the wick.



NOTE: To restore the automatic igniter system to proper operation, replace worn out batteries, or if the igniter coil defective, replace it.

4. Be sure that heat chamber is properly seated by moving the wire handle left and right. If the movement is rough and jerky, it indicates that the heat chamber has not seated properly.



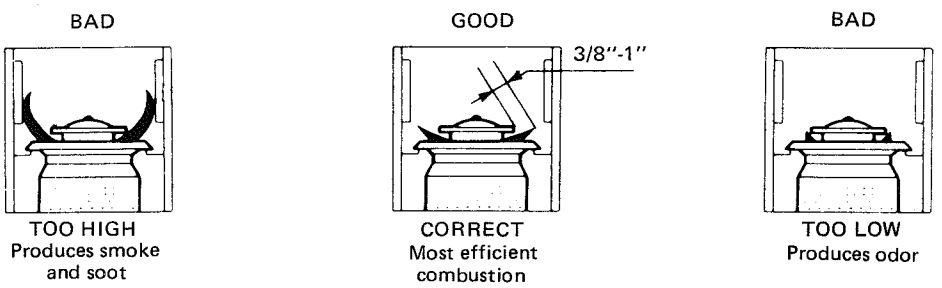
NOTE: An improperly seated heat chamber can cause high flame, smoke, and potential damage to the heater itself. Do not leave the heater until you have determined that the flame is burning normally, which will be described in the following section.

ADJUSTING THE FLAME

1. After lighting wait for the heat chamber to reach operating temperature. This will take ten-fiteen minutes, then the flame will be visible through the mica window.

2. CHECK THE FLAME LENGTH

   Look at the flame and check its length. While the flame length may vary around the circumference of the disk of the heat chamber, the average should be between 3/8 inch to 1 inch.



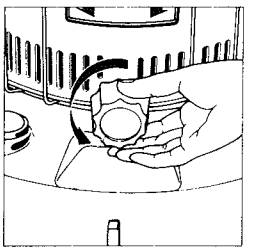
   If necessary, raise or lower the wick by turning the wick adjuster knob to produce the proper flame condition.

NOTE: Do not operate your heater with wick set TOO LOW or TOO HIGH. Doing so will decrease combustion efficiency and increase production of unwanted emissions.

NOTE: The wick-stop serves an important purpose. The wick-stop indicates the lowest level at which the wick should be used. Use of the wick below this wick-stop setting will cause less efficient combustion, possible smoke and odor, and should be carefuly avoided. Do not operate the heater under any circumstances with the wick adjuster knob turned below the wick-stop position.

EXTINGUISHING THE FLAME

1. Turn the wick adjuster knob counterclockwise until it stops (about one-half turn). Pull out on the wick adjuster knob and continue turning counterclockwise until it stops again (about two and one-half turns). At this point the heater is in the off position.



NOTE: DO NOT use the automatic extinguisher to routinely turn off the heater. Automatic extinguishing should occur only when the heater is jarred or tipped.
Using the automatic extinguisher to turn off the heater will cause odor, smoke and soot.

2. Make sure the flame is out completely.

3. Do not try to relight the heater for at least three (3) minutes after extinguishing it off as this may cause smoke and odor.

CARE AND MAINTENANCE

As with any good appliance, preventative as well as corrective maintenance is occasionally required. Please read carefully the following section in order that you may enjoy the greatest benefits from your heater.

INSPECTION OF THE WICK

NOTE: One of the simplest but also the most important components of your heater is the wick. With proper attention, the wick can last at least one heating season and depending on the quality of the fuel used, it can be extended beyond that. It helps to perform routine maintenance operations on the wick.

1. Indications that the wick may need attention are:

- deposits of tars on the top edge of the wick.
- difficulty in turning the wick adjuster knob.
- a flickering, dying or small flame.

2. Clean the wick according to the following procedure of burning dry.

1) When the fuel gauge indicates empty, but the heater is still burning, raise the wick to its highest position and allow the flame to consume the remaining fuel in the tank.

NOTE: Burning the wick dry can at times create odors. During the burning dry procedure, remove your heater from the living area of your house into a well ventilated area such as a garage or even in a sheltered area outside. If you burn the wick dry outside please be sure that the heater is not exposed to strong wind drafts during the procedure.

2) After the heater has cooled completely, remove the outer cover as described in Items 1-3 of the next section.

3) Remove any residue from the wick with a small brush such as an old toothbrush. Cinders or soot in the burner around the wick may be vacuumed away. Be careful when removing such material from the wick with the brush, do so gently and in a way not to tear the top surface of the wick.

4) Remove any tar deposits on the top of wick adjuster and primary air tube by a scraper.

NOTE: When good wick performance is no longer achieved by the burning dry process, it may be necessary to replace the burned wick with a new one.

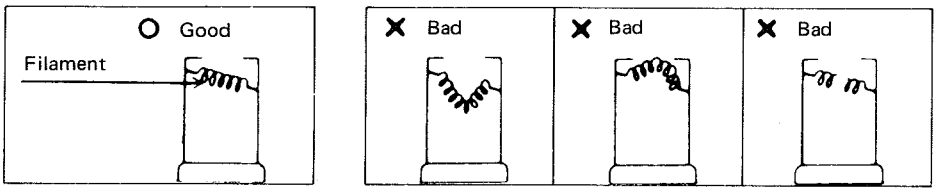
5) Before reassembling the heater, take a few minutes to wipe the parts with a soft cotton cloth or paper towels.

6) Reassemble the heater following directions in Items 11 and 12 of the next section.

NOTE: If the flame still remains small after cleaning the wick, the wick may contain some water. It is then necessary to remove the wick to replace or dry while emptying all kerosene from the fuel tank.
Dry the tank throughly.

INSPECTION OF THE IGNITER COIL

If the wick does not ignite or it is hard to ignite, check if the igniter filament is broken.



If the igniter coil is found to be defective, replace it as described on page 14.

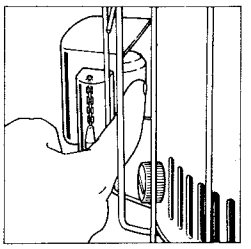
REPLACEMENT OF PARTS

REPLACING THE WICK

USE ONLY GENUINE TOYOSTOVE™ "KSA-105" REPLACEMENT WICK.
SUBSTITUTE WICKS CAN SEVERELY REDUCE PERFORMANCE.

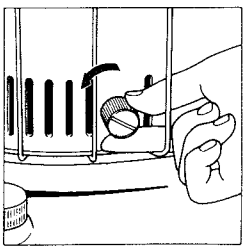
WARNING: Before disassembling your heater, allow it to cool completely.

1. To release the automatic extinguisher, push the pendulum in the pendulum cover.

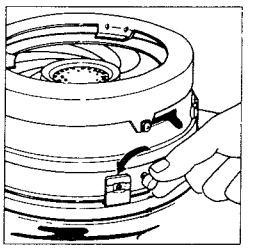


WARNING: Keep hands away from the automatic extinguisher reset lever.

2. Remove the three (3) LARGE thumbscrews holding the outer cover. Lift off the cover with the carrying handle.
   Remove the batteries from the battery holder.

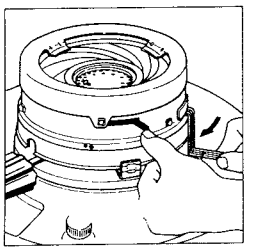


3. Remove the three (3) SMALL thumbscrews holding the extinguisher assembly.



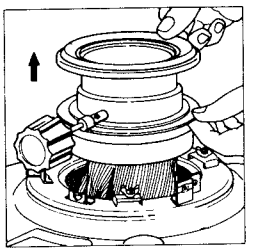
WARNING: When removing or replacing the automatic extinguisher assembly, keep hands and fingers away from the shutter.

Pull the reset lever toward you about two (2) inches. This opens the extinguisher shutter enough to clear the igniter cover.
Lift off the extinguisher assembly.

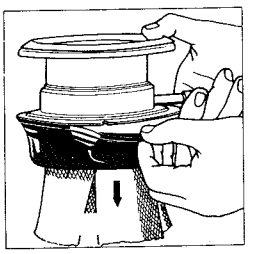


WARNING: DO NOT attempt to use a screwdriver or other tool to remove the automatic extinguisher assembly.

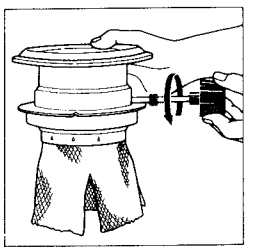
4. Loosen the three (3) wing nuts around the wick adjuster and turn the retainer until you can lift the entire wick adjuster assembly out of the fuel tank. Then lift it out.



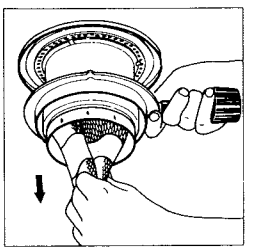
5. Slide the rubber packing off the wick. If the rubber packing remains on the tank, remove the packing from the tank.



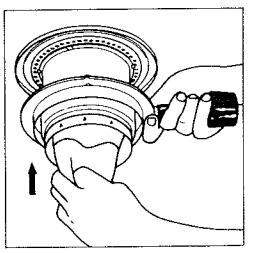
6. Turn the wick adjuster knob counterclockwise until it stops. Then gently pull the knob and continue turning counterclockwise to the lowest wick position.



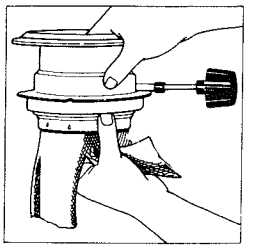
7. Fold the wick in towards the center to free it from the wick adjuster and then remove the old wick.



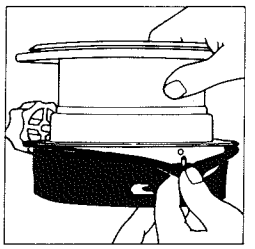
8. Fold the new wick and insert it into the wick adjuster. Align the bottom of the orange guide strip on the outside of the wick with the bottom of the wick adjuster.



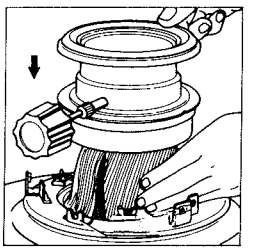
Finally, gently press the wick, all along its circumference, against the adjuster to insure that it is firmly in place.



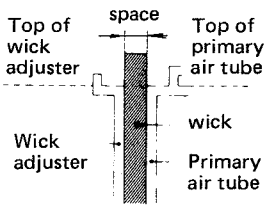
9. Slide the rubber packing over the bottom of the wick and install it on the wick adjuster. Insert the projection on the packing into the hole on the rear of the adjuster. Be sure the four (4) tails of the wick extend downward.



10. Lower the wick adjuster assembly into the fuel tank, guiding the four (4) tails of the wick so it fits over the primary air tube and evenly into place. Position the wick adjuster shaft in the U-shaped guide at the front of the tank.

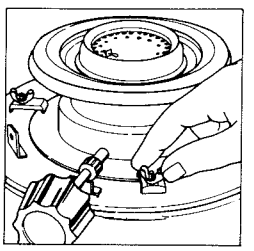


The space between the wick adjuster and the primary air tube should be even all around.
Make certain that the top of the wick adjuster and the top of the primary air tube are the same height.

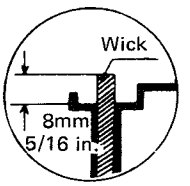


Re-position the three (3) retainers and tighten the three (3) wing nuts around the wick adjuster assembly.

Operate the wick adjuster knob to be sure the wick moves smoothly up and down.



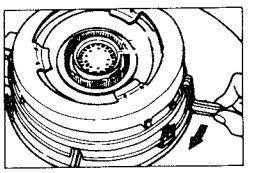
Wick height should be 8 mm (5/16 in.) when wick adjuster knob is fully clockwise. Be sure to check.

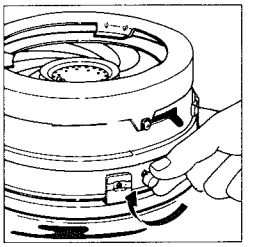


NOTE: If wick does not move smoothly and easily, or wick height is more or less than 8 mm (5/16 in.), disassemble and repeat Items 8-10.

NOTE: If any ragged edges appear on the top of the wick, trim them with a scissors carefully.
DO NOT cut the body of the wick.

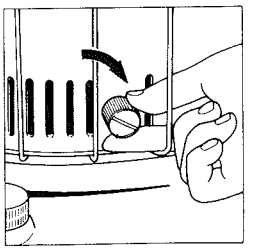
11. Open the extinguisher shutter slightly by pulling the reset lever toward you. This allows the extinguisher assembly to fit back over the igniter cover.
Seat the extinguisher assembly by placing the notch at the bottom over the wick adjuster shaft. Replace and tighten the three (3) SMALL thumbscrews.





12. Replace the outer cover on the fuel tank and secure it into position with three (3) LARGE thumbscrews. Replace the batteries in the battery holder.

AFTER REPLACING THE WICK, CHECK THE OPERATION OF THE AUTOMATIC EXTINGUISHER.



NOTE: Before lighting a new wick for the first time, turn the wick to its lowest position, and allow the wick to saturate with kerosene for about thirty (30) minutes.

REPLACING THE IGNITER COIL

WARNING: Before replacing the igniter coil, allow the heater to cool completely.

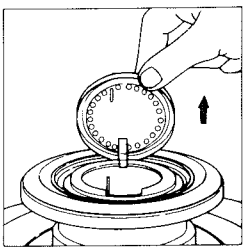
1. FIRST CHECK THE BATTERIES

When the igniter coil no longer glows sufficiently to light the wick, replace the batteries. If proper glow is not restored, the igniter coil may be defective.

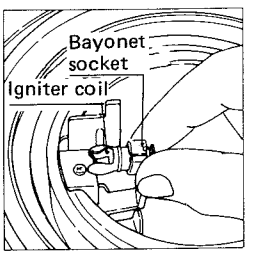
2. CHANGE THE IGNITER COIL

Remove the batteries from the battery holder.
Disassemble the heater as described in Items 1-3 of the preceding section.

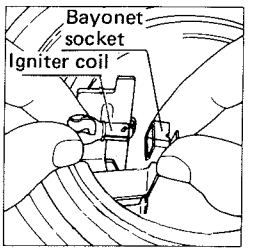
Remove the small spring clip on top of the igniter cover, lift the cover out of the way.



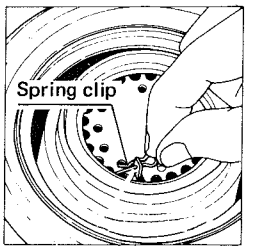
Push the Igniter lever to raise the igniter coil into view.



Note that the igniter coil fits into the bayonet socket the same way a flashlight bulb fits into its holder. To remove the igniter coil, push it in and twist it in either direction while holding the sides of the socket with your other hand. Install the new igniter coil by pressing it into the socket and turning.



Replace the igniter cover and small spring clip. Reassemble the heater as described in Item 12 of the preceding section.

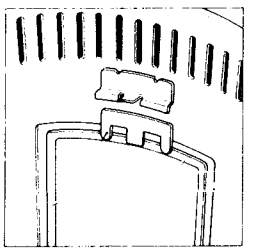


REPLACING THE MICA WINDOW

WARNING: Before replacing the mica window, allow the heater to cool completely.

1. Lift off the top plate.

2. Raise the bent tabs on inside of outer cover. Remove the old mica window and replace with new mica window by bent tabs.



STORAGE

At the end of each heating season, or when you do not plan to use your heater for an extended period of time, the following Items are recommended:

1. CLEAN THE WICK AND HEATER

   Follow directions in Item 2 under "INSPECITON OF THE WICK".

2. DRAIN THE FUEL TANK

   After you have burned your heater dry, a small amount of kerosene will remain in the fuel tank. It should be removed in order to avoid contamination when the heater is refueled at a later date. To do this, remove the fuel cap, tip the heater toward you and insert a small syringe into the bottom-most portion of the fuel tank. Empty the tank completely before storing.

3. REMOVE THE BATTERIES FROM THE BATTERY HOLDER.

4. STORE THE HEATER.

   The original shipping carton is the best place to store your heater. If you do not have the original packing materials, cover the heater with a large plastic bag and store in a place that is low in humidity.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION	PAGE
Wick will not ignite.	Out of fuel.	Check fuel gauge; add fuel if necessary.	7
	Igniter coil will not glow.	Replace batteries. Replace igniter coil, if necessary	6 14
	Water in Kerosene.	Drain tank. Remove, dry and reinstall wick. Refill with fresh, clean kerosene.	11 7
Smoke or odor.	Heat chamber tilted and not properly seated.	Move wire handle until heat chamber is properly seated and moves smoothly left and right.	8
	Flame too high.	Reduce wick height by turning wick adjuster knob counterclockwise.	9
	Dirty wick.	Clean wick as described under "Care and Maintenance."	10
	Drafts.	Relocate heater.	7
	Contaminated fuel.	Drain tank and rinse it with clean kerosene. Install new wick and refill with fresh, clean kerosene.	10 7
Flickering, dying or low flame.	Dirty wick.	Clean wick as described under "Care and Maintenance". If necessary, install new wick.	10 11
	Water in kerosene.	Drain tank. Remove, dry and reinstall wick. Refill with clean kerosene.	11 7
	Wick installed too low	Remove wick. Reinstall according to directions under "Replacing the Wick".	11
Wick adjuster knob is hard to turn.	Dirty wick.	Clean wick as described under "Care and Maintenance".	10
	Water in kerosene.	Drain tank. Remove, dry and reinstall wick. Refill with fresh, clean kerosene.	10 7
	Damaged mechanism.	Contact your dealer for service.	
Flame too high and cannot be adjusted using normal procedure.	Fuel contaminated with gasoline, paint thinner, denatured alcohol or other volatile substance.	IMMEDIATELY shut off heater. Drain tank and rinse it with clean kerosene. Install new wick, refill with fresh clean kerosene.	9 10 11 7
	Wick installed too high.	Remove wick. Reinstall wick according to directions under "Replacing the Wick".	11

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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