



RAILKING L-1 MIKADO STEAM ENGINE OPERATING INSTRUCTIONS



This RailKing L-1 Mikado Steam Engine is produced in detailed Die-Cast Metal and operates on O-31 track. This RailKing Steam Engine contains M.T.H.'s Loco-Sound™ sound and train control system. The locomotive is easy to operate with any compatible standard AC transformer (see the compatibility chart on page 14), and is completely compatible with most other 3-rail locomotives, rolling stock, and accessories.

M.T.H. takes pride in manufacturing high quality products like your RailKing steam engine, and we hope that you will enjoy it for a long time. Please read all the accompanying instructions carefully before setting up and operating your locomotive. With proper care, this engine should yield years of trouble-free performance.



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Set Up

There are a few simple steps you must take before operating this RailKing steamer.

1. You should prime the operating smoke unit with smoke fluid before operating. Add 15-20 drops of smoke fluid through the smokestack, then gently blow into the stack to eliminate any air bubbles in the fluid. See Fig. 4 on pg. 10.
2. If you choose not to prime the unit with fluid, turn the smoke unit switch located under the engine to the OFF position (Fig. 5 on pg 10). Running the engine without a primed smoke unit may cause damage. See the “ProtoSmoke Unit Operation” section of this book for more information on smoke unit maintenance.
3. You should lubricate all side rods and linkage components and pickup rollers to prevent them from squeaking. Use light household oil and follow the lubrication points marked “L” in Fig. 2 on p. 8. Do not over-oil. Use only a drop or two on each pivot point.
4. Put your engine on the track and insert the reverse unit plug that extends out of the tender into the receptacle at the back of the engine. **WARNING: DC NOT CONNECT THIS ENGINE TO A TENDER FROM ANOTHER ENGINE; IT MAY CAUSE SERIOUS DAMAGE.** Look at the bottom of the engine and tender where each will have a color-coded stamp. If they match you may connect those two pieces; if not, don't
5. Connect the draw bar between the engine and tender. If there are two holes in the draw bar, the hole located farthest from the tender is for the minimum track operation, such as O-31 circles of track. The second hole is for O-72 or larger operation.

At this point, you are ready to begin running your engine.

Basic Operation

Transformer Controls

Use the operation controls on your transformer as described below.

Throttle - Throttle up the power to your track. Then put the engine into motion by either firmly pressing the Direction button on your transformer or remote once or dropping and advancing the throttle to put the engine in forward.

Horn/Whistle - To sound the whistle, firmly press the Horn/Whistle button. The whistle will sound for as long as you continue to depress the button. It will stop when you release the button.

Bell - To sound the bell, firmly press and release the Bell button. To turn the bell off, press and release the Bell button again. The bell will continue to ring from the time you turn it on until you press and release the button again to turn it off.

Direction - Your train is programmed to start in neutral. To put the engine into forward and then to change the direction of the train or to put it into neutral, firmly press and release the Direction button on your transformer. Just as you must stop your car between forward and reverse, this engine will not go directly from forward to reverse; it goes into neutral between directions. If the train has been moving forward, the first press of the Direction button will put the train from forward into neutral, the second press into reverse, the third press back into neutral, and the fourth back into forward. To prevent accidental high-speed start-ups, this engine is programmed to restart in neutral each time the track voltage is turned off for 25 seconds or more.

Speed Control:

M.T.H. engines equipped with Loco-Sound have speed control capabilities that allow the engine to maintain a constant speed up and down grades and around curves, much like an automobile cruise control. You can add or drop cars on the run, and the engine will maintain the speed you set.

While the engine is programmed to start with the speed control feature activated, you can opt to turn it off. This means the engine's speed will fall as it labors up a hill and increase as it travels downward. It is also affected by the addition or releasing of cars while on the run.

To turn speed control on and off, put the engine in neutral, then press the transformer's Whistle button firmly but quickly one time then immediately press the Bell button two times. Repeat the 1 whistle, 2 bells code to return it to the other state. **You will want to do this during the initial neutral upon start-up if you ever couple this engine to another engine that is not equipped with speed control to avoid damaging the motors in either engine.** Each time you shut down the engine completely, it will automatically turn speed control on.

Direction Lock:

You can lock your engine into a directional state (forward, neutral, or reverse) so that it will not change directions. To do this, put the engine into the direction you want or into neutral, to lock it into neutral, run it at a very slow speed (< 10 scale mph), and quickly but firmly press your transformer's Whistle button once followed immediately by three presses of the Bell button. The engine will not change direction (including going into neutral) until you repeat the 1 whistle, 3 bells code to return the engine to its normal state.

Feature to Be Activated:	Button Code:
Speed Control On/Off	1 Whistle, 2 Bells
Lock into a Direction/Unlock	1 Whistle, 3 Bells

Proto-Cast and Proto-Dispatch:

When used with the RailKing Remote Lock-on[™] (sold separately), Loco-Sound-equipped engines gain Proto-Cast[™] and Proto-Dispatch[™] features.

Proto-Cast: This feature allows you to play audio recordings through your engine's speakers. You must supply the audio source (a small portable is sufficient) and a male-to-male mini cable (1/8" plug, like that used for the headset with a portable CD/tape player) to connect your audio source to the remote lock-on. To use Proto-Cast, simply plug the mini-cable into your audio source (usually into the headphone jack) and into the "Audio" port on the right side of the remote lock-on and adjust the volume.

Proto-Dispatch: This feature allows you to broadcast your own voice through your engine's speakers. You must supply the microphone and a mini cable (1/8" plug, like that used for the headset with a portable CD/tape player) to connect your microphone to the remote lock-on. To use Proto-Dispatch, simply plug the mini-cable into the microphone and into the "Mic" port on the left side of the remote lock-on and speak into the microphone.

When these features are in use, the locomotive's own sounds (engine sounds and bells, whistles, and horns) will be muted so that only the sounds you broadcast will be heard. Because these two features are voice activated, there will be a 10-15 second delay after you stop speaking into the microphone or turn off the audio source before the engine sounds resume. To stop using the feature and return to normal operation, unplug the cable from the lock-on jack.

If using parallel tracks with multiple Loco-Sound-equipped engines, Proto-Cast and Proto-Dispatch transmissions from one track may be picked up by the other nearby engines.

If you experience popping and interference, try cleaning the track with denatured alcohol as described in the "Cleaning the Wheels, Tires and Track" section of this booklet.

Note: M.T.H. does not recommend using Proto-Cast and Proto-Dispatch at the same time.

Volume Control – To adjust the volume of all sounds made by this engine, turn the master volume control knob located under the tender clockwise to increase the volume and counter-clockwise to decrease the volume (see Fig. 1).

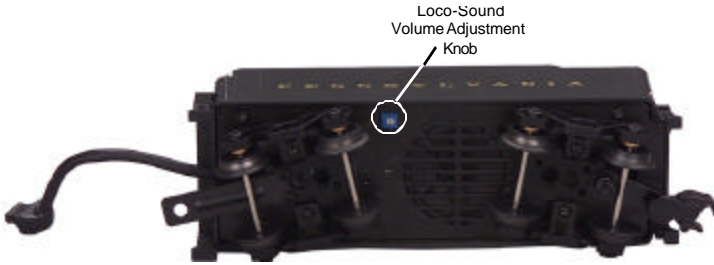


Figure 1. Loco-Sound Volume Adjustment Knob

Maintenance:

Lubrication and Greasing Instructions

The engine should be oiled and greased in order to run properly.

You should regularly lubricate all side rods and linkage components and pickup rollers to prevent them from squeaking. Use light household oil and follow the lubrication points marked “L” in Fig. 2. Do not over oil. Use only a drop or two on each pivot point.

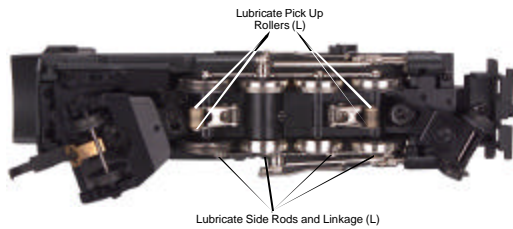


Figure 2. Lubrication Points on the Engine

The locomotive’s internal gearing was greased at the factory and should not need additional grease until after 50 hours of operation or one year, whichever comes first. To access the gear box, do the following:

1. Turn the engine upside down.
2. Remove the Phillips screw (marked “GREASE”) located at the third set of drivers (counting from the front of the engine).
3. Use a grease tube dispenser to put a small amount (approx. 1-2 ml.) of lithium-based grease into the gearbox.
4. Replace the screw.

You should also grease the leading and trailing locomotive truck tongues to enhance their ability to slide on the chassis. Follow the grease points shown on Fig. 3.

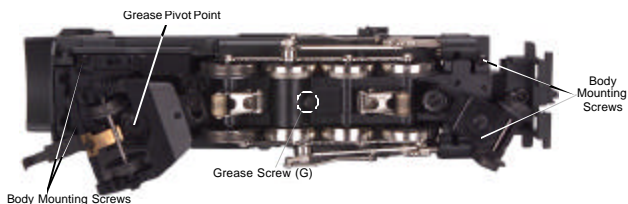


Figure 3. Greasing Points on the Engine and Body Mounting Screws

Cleaning the Wheels, Tires and Track

Periodically check the locomotive wheels and pickups for dirt and buildup, which can cause poor electrical contact and traction and prematurely wear out the neoprene traction tires. Wheels and tires can be cleaned using denatured alcohol (not rubbing alcohol), which can be found in home improvement stores, applied with a cotton swab.

Occasional cleaning of the track will also help to ensure good electrical contact and to prolong the life of your engine's tires. To clean the track, use a clean rag and denatured alcohol (not rubbing alcohol). Unplug the transformer and wipe the rails of the track, turning the rag frequently to ensure that you are using clean cloth on the rails.

Traction Tire Replacement Instructions

Your locomotive is equipped with two neoprene rubber traction tires on the rear set of flanged drivers. While these tires are extremely durable, you may need to replace them at some point.

1. Remove the side rods (the rods that connect each drive wheel to the other) from the wheels in order to slip the new tire over the grooved drive wheel. This screw can be loosened with a 5mm nutdriver.
2. Make sure the old tire has been completely removed from the groove in the drive wheel, using a razor blade or small flathead screwdriver to pry away any remains.
3. Slip the new tire onto the wheel. You may find it useful to use two small flathead screwdrivers to stretch the tire over the wheel.
4. If you twist the tire while stretching it over the wheel, you will need to remove and reinstall the tire. Otherwise your engine will wobble while operating.
5. Make sure the tire is fully seated inside the groove. Use a razor blade to trim away any excess tire that doesn't seat itself inside the groove properly.

One set of replacement tires is included with the model. Additional tires are available directly from the M.T.H. Parts Department (phone: 410-381-2580; fax: 410-423-0009; e-mail: parts@mth-railking.com; mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532).

ProtoSmoke® Unit Operation

This steam locomotive contains a smoke unit that outputs smoke through the smokestack on the boiler of the engine. The smoke unit is essentially a small heating element and wick that soaks up and then heats a mineral oil-based fluid that emits a harmless smoke. The smoke is then forced out of the stack by a small electric fan.

With a few easy maintenance steps, you should enjoy trouble-free smoke unit operation for years.

- When preparing to run this engine, add 15-20 drops of smoke fluid through the smokestack (see Fig. 4). We recommend M.T.H. ProtoSmoke, Seuthe, LGB, or LVTS fluids (a small pipette of ProtoSmoke fluid is included). Do not overfill the unit or the fluid may leak out and coat the interior engine components.

Add Smoke Fluid
Through Smokestack



Figure 4. Add Smoke Fluid

- If you choose not to add the fluid (or have already added the fluid but choose to run smoke-free), turn off the smoke unit switch located under the engine body (see Fig. 5). Failure either to add fluid to the unit or to turn it off may damage the smoke unit heating element and/or wicking material.

Proto-Smoke
ON/OFF Switch



Figure 5. Smoke Switch

- When the smoke output while running the engine begins to diminish, add another 10-15 drops of smoke fluid or turn the smoke unit off.

- When storing the unit for long periods of time, you may want to add about 15 drops of fluid to prevent the wick from drying out.

- After removing the engine from storage, add another 25 drops of fluid, letting the wick soak up the fluid for 15 minutes prior to operation.

Inspection
Cover Screws



Figure 6. Smoke Unit
Inspection Cover

If you experience poor or no smoke output when the smoke unit is on and has fluid, check the wick to see if it has become hard, blackened, and unabsorbent around the heating element. Remove

the smoke unit inspection cover from the smoke unit's body (see Fig.6). After removing the chassis and inspection cover screws, lift the inspection plate away and inspect the wick. If it is darkly discolored and hard, it should be replaced.

You can obtain replacement wicks directly from the M.T.H. Parts Department.

Locomotive Light Bulb Replacement

To replace the light bulb in the locomotive, follow these instructions and see the diagrams below:

Remove the locomotive boiler from its chassis as shown in Figure 3 on pg. 8. Once the body has been removed, rotate the headlight bulb counter-clockwise as seen in Figure 7 to remove.

To replace the light in the lantern on the front of the engine, first remove the boiler from its chassis, unplug the wire from its harness, unscrew the lantern from the front of the engine (as seen in Fig. 8), and pull the wires from the lantern casing. Replace the light and reassemble.

You can obtain replacement bulbs directly from the M.T.H. Parts Department.

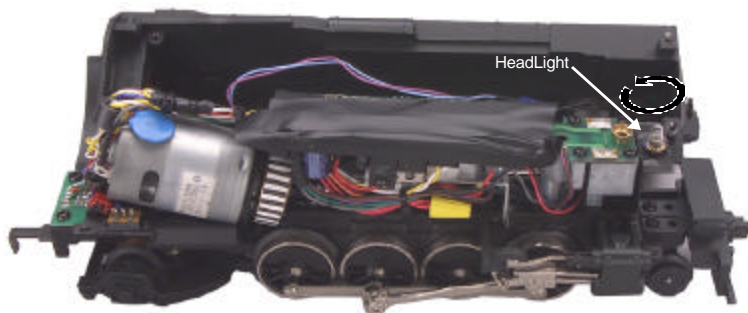


Figure 7. Replacing the Headlight

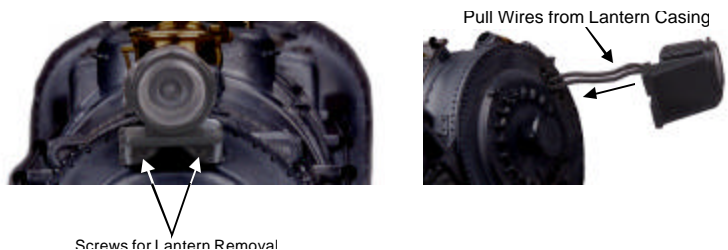


Figure 8. Replacing the Lantern Light on the Front of the Boiler

Troubleshooting Loco-Sound™ Problems

Although Loco-Sound has been designed and engineered for ease of use, you may have some questions during initial operation. The following table should answer most questions. If your problem cannot be resolved with this table, contact M.T.H. for assistance (telephone: 410-381-2580; fax: 410-423-0009; service@mth-railking.com, 7020 Columbia Gateway Drive, Columbia MD 21046-1532).

Starting Up	Remedy
When I first turn the power on, the engine will not begin to run. I have to turn the throttle off and then on again to get the engine to operate.	This is normal behavior. To prevent accidental high-speed start-ups, Loco-Sound is programmed to start up in neutral anytime track power has been turned off for several seconds. See the "Basic Operation" section for more details.
Horn	Remedy
I can't get the horn to blow when I press the whistle button.	You may be pressing the button too quickly. Try pressing the whistle button more slowly, taking approximately one full second to fully depress the button.
Bell	Remedy
I can't get the bell to ring when I press the bell button.	You may be pressing the button too quickly. Try pressing the bell button more slowly, taking approximately one full second to fully depress the button.
Lock-out	Remedy
I can't get the engine to run after I power up the transformer. It sits still with the engine sounds running.	The engine is locked into the neutral position. Follow the procedure in the "Lock into a Direction" section.
The engine won't lock into forward, neutral, or reverse.	Engine speed must be below 10 scale mph (approx. 10 volts or less in conventional mode).

Volume	Remedy
The sounds seem distorted, especially when the whistle or bell is activated.	Loco-Sound volume is set too high. Turn the volume control knob on the bottom of the chassis counter-clockwise to reduce the volume.

Compatibility

This engine will operate on any traditional O-31 or larger O Gauge track system, including M.T.H.'s RealTrax[®] or ScaleTrax[™] or traditional tubular track. It is also compatible with most standard AC transformers. (See page 14 for a complete list of compatible transformers and wiring instructions.)

Transformer Compatibility and Wiring Chart

Note that many of the operational commands described in these instructions require a bell button, so if your transformer does not have its own bell button, you should consider adding one to get the full benefit of the system.

Transformer Model	Center Rail	Outside Rail	Min/Max. Voltage	Power Rating	Transformer Type
MTH Z-500	Red Terminal	Black Terminal	0-18v	50-Watt	Electronic
MTH Z-750	Red Terminal	Black Terminal	0-21v	75-Watt	Electronic
MTH Z-4000	Red Terminal	Black Terminal	0-22v	390-Watt	Electronic
Lionel 1032	U	A	5-16v	90-Watt	Standard
Lionel 1032M	U	A	5-16v	90-Watt	Standard
Lionel 1033	U	A	5-16v	90-Watt	Standard
Lionel 1043	U	A	5-16v	90-Watt	Standard
Lionel 1043M	U	A	5-16v	90-Watt	Standard
Lionel 1044	U	A	5-16v	90-Watt	Standard
Lionel 1053	U	A	8-17v	60-Watt	Standard
Lionel 1063	U	A	8-17v	60-Watt	Standard
All-Trol	Left Terminal	Right Terminal	0-24v	300-Watt	Electronic
Dallee Hostler	Left Terminal	Right Terminal			Electronic
Lionel LW	A	U	8-18v	75-Watt	Standard
Lionel KW	A or B	U	6-20v	190-Watt	Standard
Lionel MW	Outside Track Terminal	Inside Track Terminal	5-16v	50V.A.	Electronic
Lionel RS-1	Red Terminal	Black Terminal	0-18v	50V.A.	Electronic
Lionel RW	U	A	9-19v	110-Watt	Standard
Lionel SW	U	A	Unknown	130-Watt	Standard
Lionel TW	U	A	8-18v	175-Watt	Standard
Lionel ZW	A,B,C or D	U	8-20v	275-Watt	Standard
Lionel Post-War Celebration Series ZW	A,B,C or D	Common	0-20v	135/190 Watt	Electronic

* Conventional Mode Only

CAUTION: Electrically Operated Product:

Not recommended for children under 10 years of age. M.T.H. recommends adult supervision with children ages 10 - 16. As with all electric products, precautions should be observed during handling and use to reduce the risk of electric shock.

WARNING: When using electrical products, basic safety precautions should be followed including the following:

Read this manual thoroughly before using this device.

M.T.H. recommends that all users and persons supervising use examine the hobby transformer periodically for conditions that may result in the risk of fire, electric shock, or injury to persons, such as damage to the primary cord, plug blades, housing, output jacks or other parts. In the event such conditions exist, the transformer should not be used until properly repaired.

As with all electrical appliances, this product should not be left in operation when unattended

Service & Warranty Information

How to Get Service Under the Terms of the Limited One-Year Warranty

For warranty repair, do not return your product to the place of purchase. Instead, follow the instructions below to obtain warranty service as our dealer network is not prepared to service the product under the terms of this warranty.

1. First, write, call or FAX M.T.H. Electric Trains, 7020 Columbia Gateway Drive, Columbia, MD 21046, (Tel 410-381-2580; FAX No.: 410-423-0009; e-mail: service@nth-Railking.com), stating when it was purchased and what seems to be the problem. You will be given a return authorization number to assure that your merchandise will be properly handled upon its receipt.
2. CAUTION: Make sure the product is packed in its original factory packaging including its foam and plastic wrapping material so as to prevent damage to the merchandise. The shipment must be prepaid and we recommend that it be insured. A cover letter including your name, address, daytime phone number, e-mail address (if available), Return Authorization number, a copy of your sales receipt and a full description of the problem must be included to facilitate the repairs. Please include the description regardless of whether you discussed the problem with one of our service technicians when contacting M.T.H. for your Return Authorization number.
3. Please make sure you have followed the instructions carefully before returning any merchandise for service.

Limited One-Year Warranty

All M.T.H. products purchased from an Authorized M.T.H. Train Merchant are covered by this warranty.

See our website at www.mth-railking.com or call 1-888-640-3700 to identify an Authorized M.T.H. Train Merchant near you.

M.T.H. products are warrantied for one year from the date of purchase against defects in material or workmanship, excluding light bulbs and traction tires. We will repair or replace (at our option) the defective part without charge for the parts or labor, if the item is returned to M.T.H. Electric Trains within one year of the original date of purchase. This warranty does not cover damages caused by improper care, handling, or use. Transportation costs incurred by the customer are not covered under this warranty.

Items sent for repair must be accompanied by a return authorization number, a description of the problem, and a copy of the original sales receipt from an Authorized M.T.H. Train Merchant, which gives the date of purchase. Call 410-381-2580, fax 410-423-0009, or e-mail the Service Department at Service@mth-railking.com to obtain a return authorization number.

This warranty gives you specific legal rights, and you may have other rights that vary from state to state.

Service Department
M.T.H. Electric Trains
7020 Columbia Gateway Drive
Columbia MD 21046-1532