#1 Gauge 1:29 SCALE

ARISTO CRAFT TRAINS™

LIVE STEAM MIKADO 2-8-2

INSTRUCTION MANUAL ART-84100-01

ARISTO-CRAFT TRAINS / Polk's Modelcraft Hobbies, Inc.
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10/02/05 NEW

Congratulations!

Dear Model Railroader,

Congratulations on your purchase of the Aristo-Craft 1:29 Live Steam Mikado!

The fun of running a locomotive as they were intended to with real steam power is the key part of this locomotive and the technical hard work is done by the magic of our technology that takes work out of the project and leaves more running time for enjoyment.

Should you have any questions regarding operation, proper usage or maintenance required on this or any other Aristo-Craft product, please do not hesitate to contact us at the following address:

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Our customer service department phones are open from 10:00 AM to 5:00 PM Eastern time, Monday through Friday.

Visit our website: www.aristocraft.com

This locomotive has the following features and accessories which makes it look and operate in a superior manner:

- An integrated radio control system for speed control, reversing, and to activate several sound effects and front lights. This R/C system operates on the universally accepted 49-mhz frequency and is FCC-approved in the U.S.
- A well for a warm water bath for the butane gas.
- Auto-ignition for the flame using the tender control panel.
- Easy-to-use-and-find butane fuel.
- Wide-mouth oil access. (Oil not included)
- D.C. electric motors for radio-controlled reverse and speed controls.
- Two wall chargers for both 110v or 230v depending on the country where you are located. An adaptor plug may be necessary for your country if the supplied plug will not fit your receptacle.
- A NiC_d battery pack to operate these electronic functions.
- Tools such as two syringes for filling and removing the steam oil, a metal funnel to fill the boiler and butane bath, two metal screwdrivers for the live steamer locomotive adjusments and others.
- Insulated wheels for running on powered layouts with other locos.
- A Goodall valve and water bottle to refill the boiler under pressure before the water cools.

Please read all of these warnings very carefully before using your Aristo-Craft Live Steam Mikado for the first time!

- Live Steam Trains should not be used by anyone under the age of 14. This is not a toy, and while not any more dangerous then the use of a stove while boiling water for a cup of tea, it does take some common sense and the ability to make rational actions if something doesn't work as prescribed.

- Hot water is scalding and must be treated as such, so do not open a pressurized locomotive water tank until it has cooled sufficiently. To do so would create a reaction much like opening an auto's radiator cap under full pressure. DON'T do this.

- Do not smoke when filling the butane into the tender. This is a flammable material and is similar to the situation when relighting a gas stove burner when the pilot light goes out.

- Use only distilled water, available at supermarkets and drugstores widely, as regular water has contaminates that could eat away at your copper boiler. This is especially true if you do not thoroughly drain the water from the boiler after each use. The Aristo-Craft Live Steamer has a drain cock to allow you to do just that.

- Do not tighten the hose to the boiler of the locomotive prior to adding the butane material to the input in the tender. Also insure that the butane valve on the tender is closed before adding butane.

- Do not use boiling water in the supplemental hot water bath for the butane tank. It's not necessary and could cause handling problems with the scalding water. If you like you can drain this hot bath water after steam-up and before you actually begin running. This will provide a fresh hot water bath for the running period after the water has reached the starting pressure.

- Do not run your loco without proper steam oil that is formulated for the super-hot conditions of running a steam locomotive. This is not included, but is available from where you purchased your loco.

- Do not overfill your boiler beyond the two cups of distilled water (500 ml total).

- If your auto-igniter does not cause the flame to ignite and the butane container is filled, then send the loco in for service and do not try to adjust the flame yourself.

- We have added spare O-rings that you can replace if the steam releases through those valves. Please write to us for spares rather than continue to operate without O-rings in top shape.

- Please check you loco after 30 minutes of running to see that the water level in the sight glass still indicates that you have sufficient water in the boiler. DO NOT RUN YOUR LOCO WITHOUT WATER IN THE BOILER.

- If your loco falls off the track, then immediately close the butane valve until all butane flow is off and the flame thus shuts off.

- Do not use this loco indoors. It's only for outdoor usage as there is residual oil and water that falls to the track.

- Any modification of the loco will void our warranty and perhaps the safety of the loco. Do not modify the loco at all for proper safety.

Prototype Photo: Michael Hauptmann

The Mikado 2-8-2 steam locomotive was one of the most common of the steam locomotives built and used in the United States and Canada. It was a workhorse, a locomotive that could do it all. Primarily used in freight operations, it was occasionally employed in passenger service, right up to the end of steam operations. Large and small railroads operated Mikados due to their extreme versatility. Some seemed to be light and delicate, treading on small rail, others were plodding behemouths. It depended on the job that needed to be accomplished.

During the age of the Iron Horse, the era of steam, almost 10,000 Mikados were built. The Pennsylvania Railroad alone possessed over 550 of these locomotives.

When the U.S.A. became involved in World War I, the United States Railroad Administration decided to standardize the design and manufacture of locomotives in order to save time and materials. This gave birth to what is known as the USRA Mikado. Over 800 light and heavy USRA Mikados were erected by the 3 major locomotive builders: The American Locomotive Company, Baldwin and Lima.

Some railroads used the boiler, cab and other components from existing Pacific locomotives in order to save time and money in the construction of new Mikados.

fig. #1
Receptacle jack location

fig. #2
Inserting the plug

The very first step is to charge the NiC_d battery pack located inside the tender of the locomotive. There is an included wall pack that must be plugged into a wall outlet first and has a jack plug to insert into a hidden receptacle jack beneath the cylindrical coal pusher on the top of the tender that unscrews **(See fig. #1).**

First remove the decorative coal load on top of the tender, revealing the control panel underneath it. Then move the leftmost slide switch with the tender facing away from you to the “charger” position and then plug the charger lead into the battery charging connection power jack as illustrated **(See fig. #2)**.

The red indicator light located in front of the coal pusher will turn to orange for the approximate two-hour charge time and then the light will go out after the charge is complete. The first charge-up may take overnight, but will recharge faster the second time.

After the LED light goes out, the charge is complete and you can begin the testing phase of operation.

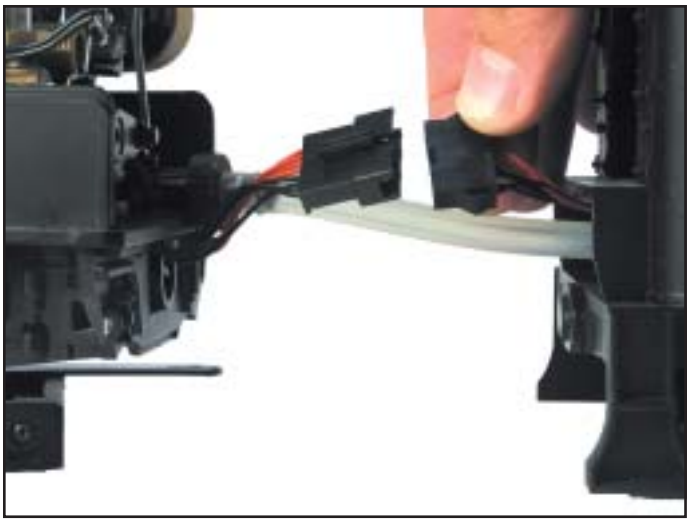

fig. #3
Locomotive-to-tender connection

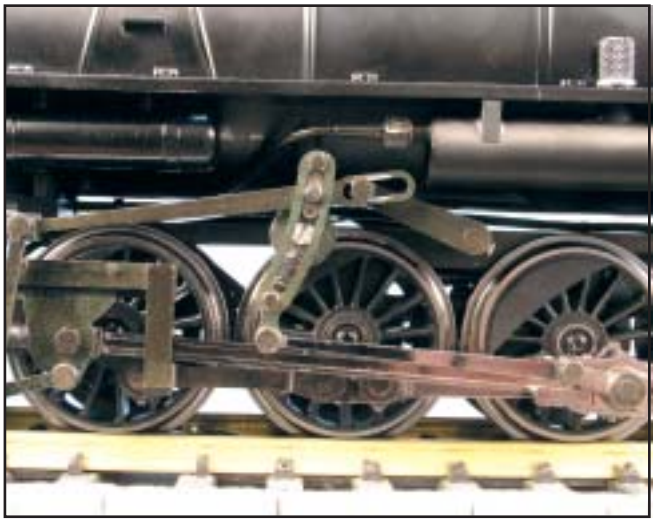

fig. #4
Radius Arm in operation.

To begin the function testing process, link the plug in front of the tender to the socket at the end of the wire coming from the rear of the locomotive **(See fig. #3).** This allows all of the R/C and electronic functions from the control panel of the tender to function in a manual mode without the use of the transmitter.

Manual mode testing

Remove the pressure fit coal load from the top of the tender to expose the control panel.

1) Push the mode switch, located on the lefthand side of the control panel, to the “operation” position. Then push the remote/manual switch next to it to the “manual” position. You will see a red indicator light turn on.

2) Now you can test the sound buttons and the headlight button. These remain in operation until depressed a second time.

3) Next test the forward or reverse direction buttons and you will see the radius rod arm operating **(see fig. #4).**

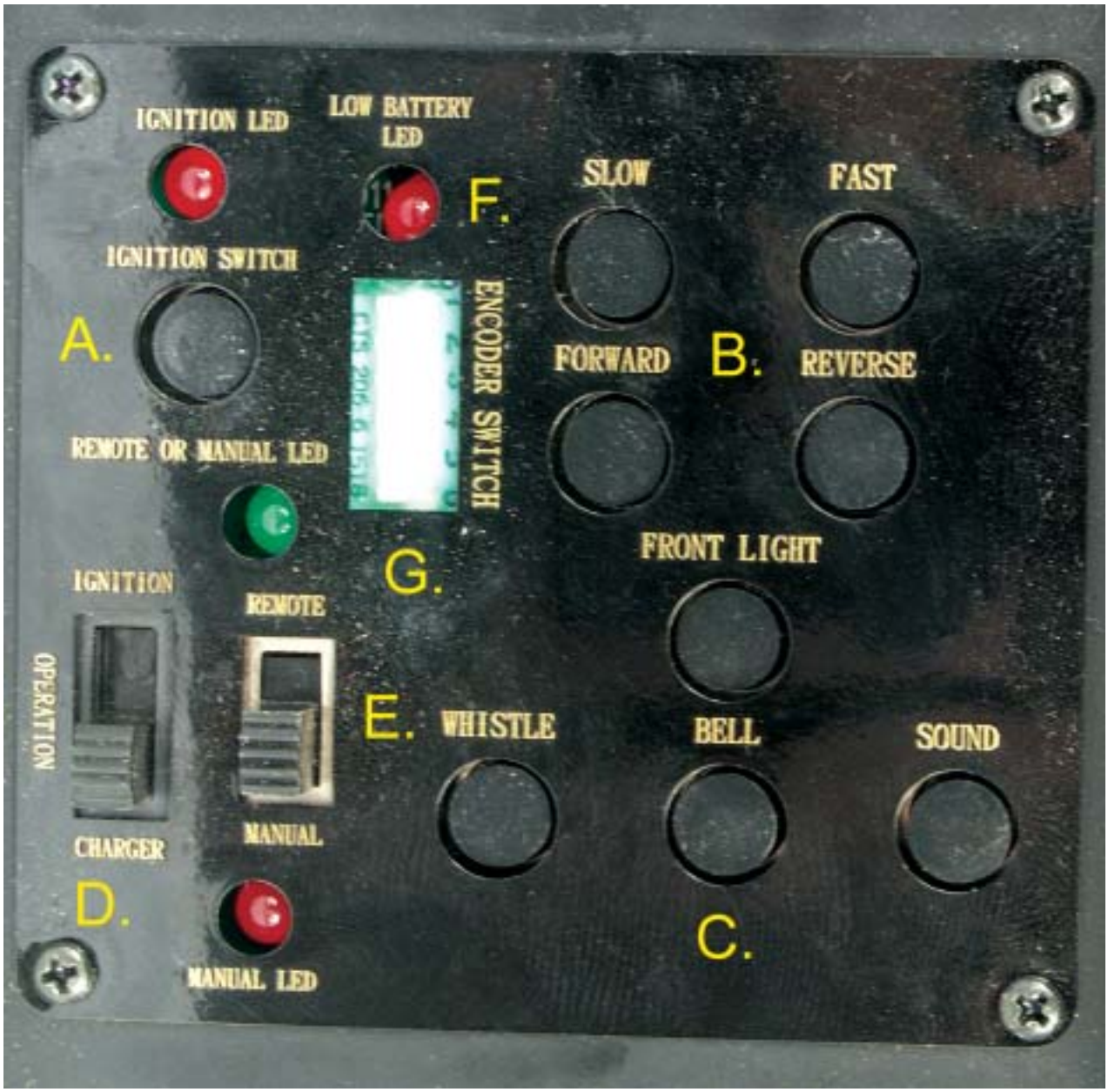

Fig. 5 Tender Manual Control Panel

A. Ignition Button - Press to ignite engine flame. Ignition LED will light when button is pressed.

B. Speed and Directional Controls - Press to make your engine speed up or slow down or change direction

C. Special Effects Controls - Press to active loco sound effects or front lights

D. Mode Switch - Switches your loco to three different phases - ignition, charger, and operation

E. Remote/Manual Switch - Switches your loco from manual control to R/C control.

F. Low Battery LED - Signals when your battery power is running low.

G. Encoder Switch - Dipswitch location, must match with dipswitch in transmitter.

Remote Mode Testing

Now it is time to test the R/C system transmitter and functions...

fig. #6
Inside the R/C transmitter or "throttle"

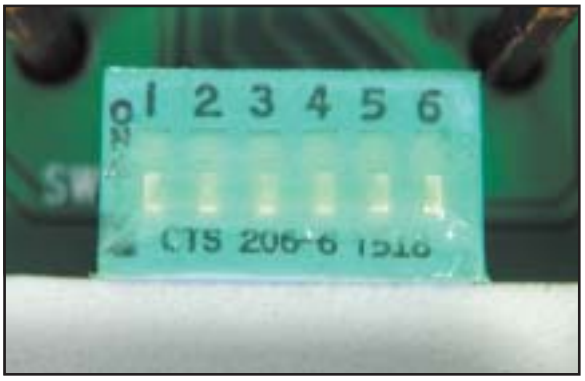

fig. #7
Close-up of transmitter dipswitch panel

1) Take your R/C transmitter, open it by removing the installed screws, and insert the provided 9v alkaline battery **(See fig. #6).**

2) The extendable antenna needs to be screwed into the transmitter through the opening on the top right of the transmitter. The antenna should be extended when using during the test as well as during regular operation.

3) There is a six-position dip switch on the tender that must be matched to the dip switch that is located on the inside of your transmitter. This dip switch allows for up to 64 people operating their Live Steam Train simultaneously without one interfering with the other. Obviously, only several people are likely to operate at the same time, but the procedure is the same regardless of the number running **(See fig. #7).**

4) Double-check that your mode switch is located in the "operation" position. Then slide the remote/manual switch from manual to remote and you will see the indicator light turn green. The R/C hand-held transmitter will take over control of your locomotive, allowing you to perform the same functions you just tested manually.

5) Repeat the same testing functions that you performed in the manual mode.

NOTE! The ignition switch for the butane is not on the transmitter for safety reasons, so that you do not ignite the flame unintentionally. Please use the switch on the tender's control panel for ignition.

The next step is adding steam oil to the loco...

fig. #8
Removing the oil valve

fig. #9
Inserting the oil with a syringe

This locomotive is a steam vapor-propelled device and as such **REQUIRES A HIGH-TEMPERATURE LUBRICATING STEAM OIL ONLY!** The steam oil is not included in the package, but should be found at the same retailer that has sold you the locomotive and/or from Aristo-Craft itself**.**

Two syringes are included with this locomotive for fill and removal of steam oil. Ignore the one-time use label as this note is for medical use only**.**

Looking down on the locomotive with front facing away from you, on the left side on the running board you will see a master valve for the oil. Unscrew the master valve in order to fill the oil **(See fig. #8)**.

Filling one of the syringes with 8ml of oil, you then insert the tip of the syringe into the hole where you removed the master valve from **(See fig. #9).** As you release the oil make sure to move the locomotive, by hand, slowly forward to push the oil into the cylinders and valves. **DO NOT MOVE THE LOCOMTIVE BACKWARDS DURING THIS PROCESS, FOR IT WILL CAUSE THE OIL TO COME OUT INSTEAD OF BEING PUSHED THROUGH.**

A total of 8ml of oil, as indicated on the syringe side, is the most oil that should be added every 3-4 runs depending on the lengths of the runs. NOTE! The fill of the oil is done in stages and the cover of the master valve needs to be screwed closed after the oil is inserted each time the process is done.

The lubrication, after the fill, is continuous and automatic during the operation of the locomotive. This oil remainder needs to be sucked out via the same type of syringe used to fill the oil reserve shown and needs to be refilled at least every four runs.

DO NOT RUN WITHOUT THE REQUIRED STEAM CYLINDER OIL! DO NOT USE MOTOR OIL! DO NOT USE THREE-IN-ONE OIL!

The next step is adding water into the boiler. At this point, your locomotive should already be placed on the track. Please drain all leftover water so that your new fill can be precise.

fig. #10
Bottle of distilled water

fig. #11
Metal funnel placed in locomotive

NOTE! ONLY DISTILLED WATER IS PERMITTED TO BE USED OR YOU WILL DAMAGE YOUR 100% COPPER BOILER! Distilled water is easily found at most drugstores and supermarkets **(See fig. #10).**

Unscrew and remove the cover of the water inlet and add 500 ml of the distilled water with a measuring cup. Measured out, 500ml will normally be two cups worth if the boiler is empty. Rescrew back the filler cap and tighten with a wrench until the cap is secure.

We recommend you use a clear water cup with measurements indicated. This fill should be done while the locomotive is already on the tracks and should be done using the supplied metal funnel into the opening **(SEE FIG. #11). Do not use a plastic funnel as it may melt if the engine is warm!**

As you add water to your Live Steam Mikado, the indicator on the inside of the cab, the sight glass **(See fig. #12)**, will rise as well. Always make sure to monitor the water levels of your Live Steam Mikado as you can seriously damage your unit if you run it dry.

Please check the sight glass to make sure the water level is no more than two-thirds filled. If you have added too much water or a residual amount had remained, causing an overfill, the drain cock valve should be used to bring the water in the boiler to a correct level **(See fig. #13).**

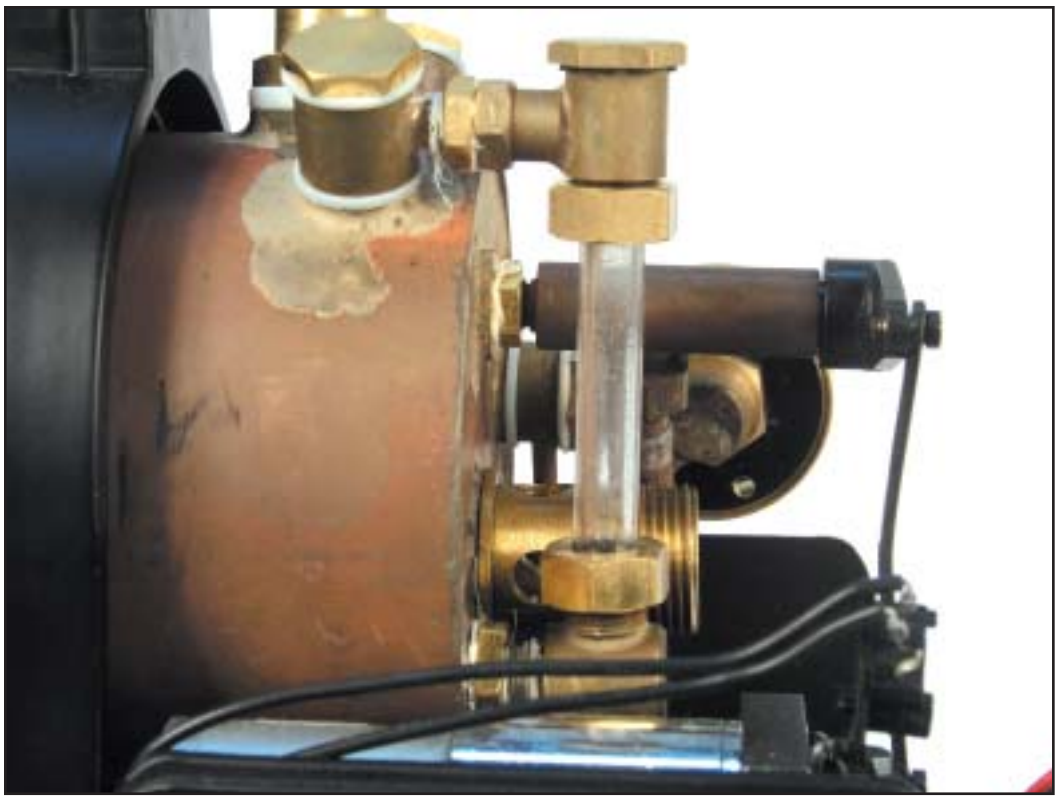

fig. #12
Sight Glass

fig. #13
Engine Drain Cock Valve

Well, the water is loaded, and the next thing we need to do is put in the butane gas. But where does it go? On a Live Steam Mikado from Aristo-Craft, the butane gas goes in the tender.

WARNING! Butane is an extremely flammable gas. The content of the can is under pressure and the vapors are harmful. Read warnings on the back panel of your can before use. Do not fill your gas tender around any open flame or while smoking. Use only Butane gas for cigarette lighters found at most drugstores or general stores. **DO NOT USE PROPANE OR PROPANE & BUTANE MIXTURES AS THE TANK HAS BEEN PRESET FOR BUTANE ONLY!**

Adding the butane gas is easy. At the front of the tender, you'll notice a small valve. This is the place where the butane can is applied to fill the 150-milliliter butane gas tank. Just align the valves, press the can down, and hold **(See fig. #14).**

Fill using the stem valve on the tender and do not YET open the butane flow valve. Insert the hose's nozzle from the tender into the locomotive's boiler **(See fig. #14a)**. Screw the nozzle into the loco, so it does not separate accidentally. **WARNING!! DO NOT FILL WHILE SMOKING OR NEAR A FLAME!**

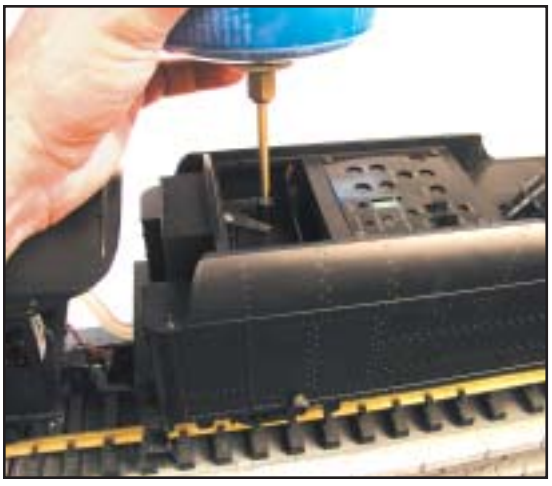

fig. #14
Adding butane gas to tender

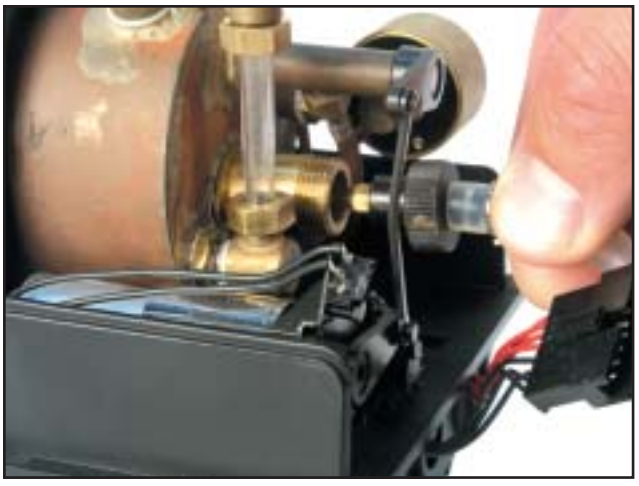

fig. #14a
Connecting butane hose into the locomotive boiler

There is an enclosed and hidden water well surrounding the butane tank and this must be filled with warm water to help rapidly vaporize the butane. Please do not use boiling water, but rather bathtub temperature water.

It is recommended that you use a thermos bottle of water, easily brought to the running site, and this water need not be distilled and can come right from a tap. The warm water needs to be filled in to the warm water bath area with a funnel after removing the screw in the corner of the depression at the front of the tender, near the butane insert nozzle **(See fig. #15).**

fig. #15
Filling the warm water bath with a funnel

Reinserting the screw is optional, but if you are going to transport the tender without draining the water from the side cock, then you need to reinsert the screw and close it using a flat-head screwdriver (not included). This will keep the water from spilling out and possibly damaging the electronics. However, we really recommend draining the water thoroughly before transport **(See fig. #16).**

fig. #16
Location of tender side cock for draining of water

The fill needs to be done while on the track, rather than filling elsewhere and then carrying to the track. You can remove the cooled water through the release valve before refilling with warm water again before actually running and after the steam pressure has indicated that the train is ready to go.

With all the required liquids in place and your locomotive on the track, it is time to spark the ignition flame...

Please be sure first that the gas jet tube is placed in the boiler of the locomotive from the rear of the tender. The tender should be attached by the drawbar at the back of the locomotive and the front of the tender to make sure the hose does not pull out of the locomotive **(See fig. #17)**. Also, remember to screw the hose to the boiler with the supplied connection. **(See fig. #18)**

fig. #17
Attaching tender drawbar to locomotive

fig. #18
Attaching butane hose to boiler

To start your Live Steam Mikado, put the mode switch in the ignition position. Open the butane flow valve on the tender slightly to release the butane and then press the ignition button manually. You will hear the rush of the flame ignition. Then you will hear a thump and a steady whistle once the flame is in progress **(See fig. #19)**.

Open the butane valve further and slowly until a steady flame is in use and this can only be determined by trial and error.

fig. #19
Opening the butane valve

Next, turn the mode switch to the “operation” position. Turn on the remote control, and replace the cab cover and the tender as your engine warms up.

The heating process will take about 10 to 15 minutes. If you’ve put too much water in or there was a residual amount added to in full, the extra water will flow through a drain cock valve and exit on to the ground **(See fig. #20)**. NOTE! Please use a wrench and gloves or a rag while handling this valve as the hot water is boiling, not just warm. **Never leave your Mikado unattended while it is warming up and getting up to pressure!**

After this point, close the drain cock valve. Continue to heat the water and you will notice the pressure gauge going up. When it rises to 25 psi (pounds per square inch) or 0.25 MPA and the front cylinder valves begin to release steam vapor, the heating process is complete and your train is ready to run **(See fig. #20a)**.

fig. #20
Drain cock valve

fig. #20a
Locomotive pressure gauge

When the pressure gauge indication shows that the loco is ready to start, move the left slide switch on the tender's control panel to "operation" and you will see the indicator light change from red to green.

Replace the decorative coal load into position over the control panel **(See fig. #21)**. Now press the speed-up button on the transmitter and the locomotive will begin to run. See below for the functions available on the transmitter.

fig. #21
Replacing the coal load

This locomotive can pull up to several freight cars at a high speed and go up moderate grades without impairment of the pulling power of the locomotive. However, the running time may be shortened from the normal 40 minutes with heavier loads.

The radio control transmitter can do the following functions wirelessly:

a) Fast— Increase loco speed
b) Slow— Decrease loco speed
c) Forward / Reverse— Directional control
d) Headlight & Class lights— On/Off
e) Bell sound
f) Whistle sound
g) Chuff sound

To add more water after your butane and water are depleted, you must use the supplied Goodall valve or you will have the same dangerous reaction as removing a radiator cap from an overheated radiator instead of refilling the water through an overflow container.

There is a water bottle with a nozzle that will allow you to put cold water into the boiler and the special valve will open slightly to allow the cold water in and then reseal itself when the flow of cold water stops. **DO NOT BYPASS THIS STEP IF REFILLING COLD WATER! (See fig. #22)**

fig. #22
Adding water through the Goodall valve

The butane can be refilled at any time before or when your engine slows down or stops due to running out of water or gas. Please insure that you close the butane valve before filling. **(See fig. #22a)**

fig. #22a
Butane valve must be closed before filling

If you need further assistance with your new Live Steam engine, we have many ways to get your questions answered!

Included with this Aristo-Craft Live Steam Engine is a helpful CD with video demonstrations for set-up, operation, and maintenance of your new engine.

Also included are videos of the Mikado Engine in operation!

Visit the Aristo-Craft Trains web site at http://www.aristocraft.com and connect with other live steamers from around the world!

A special section of our Aristo-Craft Trains Forum is devoted to live steam where you can get help from Aristo-Craft staff and other live steam railroaders.

Contact us directly at:

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e-mail: scottp@polkshobby.com

Our customer service department phones are open from 10:00 AM to 5:00 PM Eastern time, Monday through Friday.

LIMITED WARRANTY

All ARISTO-CRAFT TRAINS products are under warranty for one (1) year from the date of purchase against defects in workmanship and/or materials. Proof of purchase *may be required* by ARISTO-CRAFT TRAINS.

This warranty is void and does not apply to any product and/or parts and components which have been improperly installed by the purchaser/owner, abused or damaged in any way through improper operation such as but not limited to derailment, repairs or modifications performed by non-authorized service centers or technicians.

SERVICING

Should your ARISTO-CRAFT TRAINS product require warranty service, please return it in the original box, if possible, protected by a proper shipping carton. Send the product fully insured and prepaid. ARISTO-CRAFT TRAINS will not be responsible for any loss or damage incurred during shipping.

Be sure to include a brief, but thorough explanation of the problem, together with your name, street address (no Post Office box please), city state or province and country, if outside of the United States. Also include a daytime telephone number so that we may contact you if necessary. Your return address should be clearly marked on the outside of the shipping carton.

Payment for shipping and handling, in U.S. funds, is $20.00 and should be included.Your check or money order should be made payable to: Polk's Modelcraft Hobbies, Inc. Do not send cash.

If your item is not covered by warranty service, you will be contacted and a repair estimate given before any work commences. Warranty covers manufacturer defects, not normal wear and tear.

The shipping address to be used for returns is as follows:
ARISTO-CRAFT TRAINS / Polk's Modelcraft Hobbies, Inc.
Customer Service Department
698 South 21st Street
Irvington, NJ 07111 USA
Tel: (973) 351-9800

Written confirmation of receipt of returned items will be sent with estimated repair time by the ARISTO-CRAFT TRAINS Customer Service Department.

Warning:
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reorient or relocate the receiving antenna.
- ☐ Increase the separation between the equipment and receiver.
- ☐ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ☐ Consult the dealer or an experienced radio/TV technician for help.

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