TINPLATE TRADITIONS®
By MTH Electric Trains®

www.mth-railking.com

# Tinplate 4696
# Steam Locomotive

OPERATOR'S MANUAL
(3V PS-2)

# Contemporary Version

## Compatibility

This engine will operate on any traditional 42" STD Gauge track system, including M.T.H.'s traditional tubular track. It is also compatible with most standard AC transformers. (See page 19 for a complete list of compatible transformers and wiring instructions.)



Freight Yard Sound


Passenger Station Announcement

PLEASE READ BEFORE USE AND SAVE

# Table of Contents



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 observed, 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 and other electronic equipment 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 train set should not be used until properly repaired.
- Do not operate your layout unattended. Obstructed accessories or stalled trains may overheat, resulting in damage to your layout.
- This train set is intended for indoor use. Do not use if water is present. Serious injury or fatality may result.
- Do not operate the hobby transformer with damaged cord, plug, switches, buttons or case.
- The transformer was designed to operate on regular US household current (120 volt, 50-60 Hertz). Do not connect to any other source of power.
- To avoid the risk of electrical shock, do not disassemble the transformer unit. There are no user-serviceable parts inside. If the unit is damaged contact M.T.H. Service for instructions.
- The transformer is equipped with an internal circuit protector. If the circuit protector trips, unplug the power cord from the electrical wall outlet, check your layout for any short circuits. The circuit breaker will reset automatically when the short is removed from the circuit.
- Unplug the transformer from the electrical wall outlet when not in use.
- Do not use this transformer for other than its intended purpose.

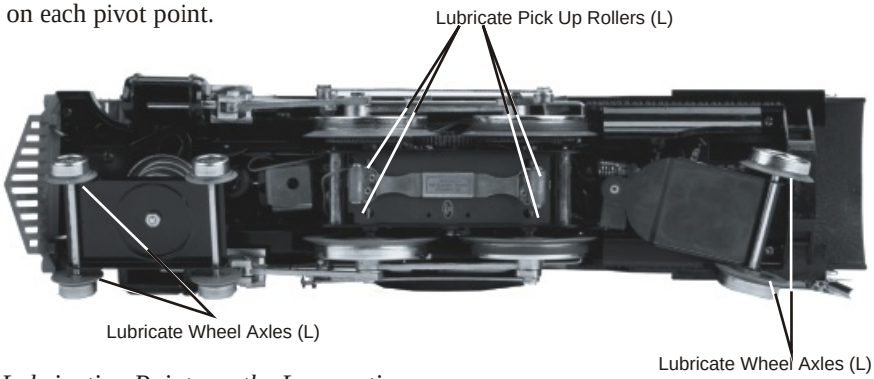
Transformer Ratings:
Input: 120 VAC, 60 Hz Only, Output: Z-750: 21VAC 3.75A 78VA; Z-1000: 14VAC 80W or 18VAC 100W

# Set Up Checklist

- ❒ Lubricate the locomotive
- ❒ Prime the smoke unit
- ❒ Check to see whether the battery needs to be charged for full sound effects
- ❒ Apply power to run as described in the Basic Operating Section of this manual

## Lubrication


You should lubricate the engine and tender to prevent it from squeaking. Use light household oil and follow the lubrication points marked "L" shown below. Do not over-oil. Use only a drop or two on each pivot point.




*Lubrication Points on the Locomotive*


*Lubricating The Side Rods and Linkage and tender wheels and axles*

## Connecting The Engine And Tender

The engine and the tender are connected by a drawbar that is attached to the tender and connects the engine by a drawbar pin that is tethered to the engine cab by a chain.

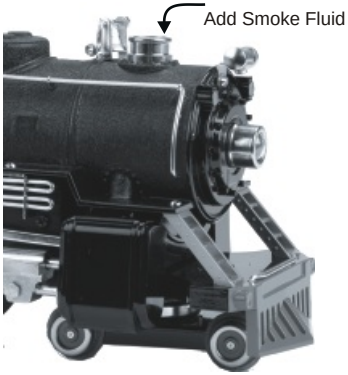
To connect the engine and tender insert the leading end of the drawbar into the slot under the cab floor. Then insert the drawbar pin in the hole at the rear of the cab.

To connect the engine and tender properly, the drawbar pin must pass through the top hole, the hole in the drawbar and the lower hole below the engine cab.

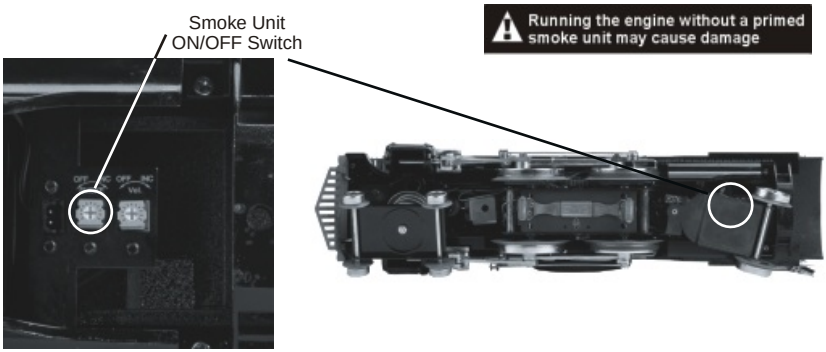
*Drawbar connection*

# Priming the Smoke Unit

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




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 tender(see below). Failure either to add fluid to the unit or to turn it off may damage the smoke unit heating element and/or wicking material.




*Smoke Unit Switch Location*

# Checking the Battery

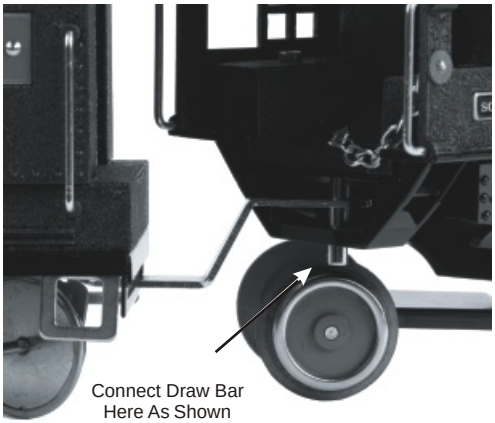
You may find, if your locomotive was built several months before you set it up, that the rechargeable battery has run down and needs to be charged before operating. If you notice that the sounds are garbled, test and charge the engine as described in the "Self-Charging Battery Back-Up" on page 14.

# Placing The Engine On The Track

Place the engine on the track, then connect the draw bar between the engine and tender. (shown below) The draw bar hole located farthest from the tender is for applications such as display. The second hole is for normal operation on the track.

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

WARNING. DO NOT CONNECT THIS BOILER TO A TENDER FROM ANOTHER TYPE OF ENGINE; IT MAY CAUSE SERIOUS DAMAGE.




*Connecting the draw bar*

# Basic Operation

The Throttle knob controls how fast your train will travel.

Turn the throttle knob up ½-way, until the engine headlight shines bright.

Put the engine into motion by pressing the Direction button on your transformer once. (hold it for approximately 1 second)

If the engine does not begin to move as soon as you firmly press the Direction button, you may not have sent enough voltage to the track to make the train move. Turn the throttle up a bit higher until the train begins to move.

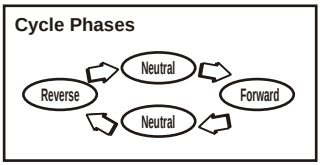
# Activating Features

Throttle To increase or decrease track voltage, and therefore train speed, turn the throttle control knob. Turning clockwise will increase voltage and speed, while turning counterclockwise will decrease voltage and speed. The engine will maintain the speed you set after you release the throttle until you turn it again to change the voltage and speed.

Bell - To sound the bell, in an engine equipped with a 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.

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.

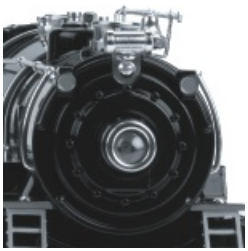
Direction - Your train is programmed to start in neutral. The train will always cycle neutral-forward-neutral-reverse with each press and release of the direction button. The engine is programmed to restart in neutral each time the track voltage is turned off for 25 seconds or more.

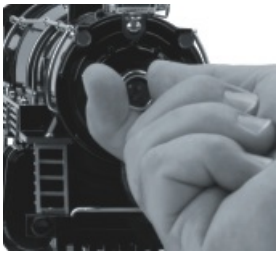


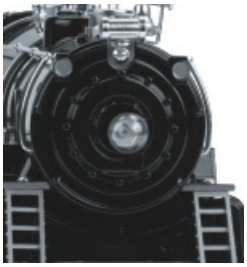

# Headlight Replacement Instruction

The locomotive headlight is controlled by the track voltage.
The brightness will vary with a change in the track voltage.

Should the headlight bulb need to be replaced, access to the bulb is gained by removing the headlight bezel.
Remove the headlight bezel by pulling outward while moving the bezel side-to-side.
Then unscrew the headlight bulb from the socket.
Install the new bulb by following the above instructions in reverse order.

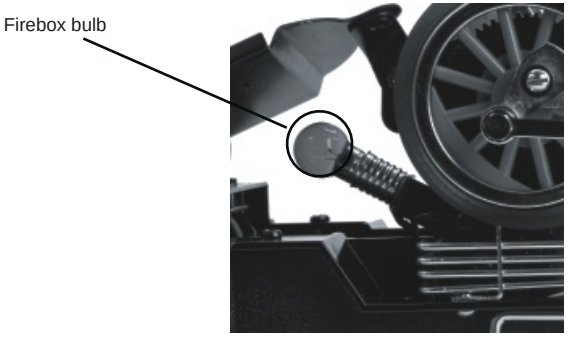






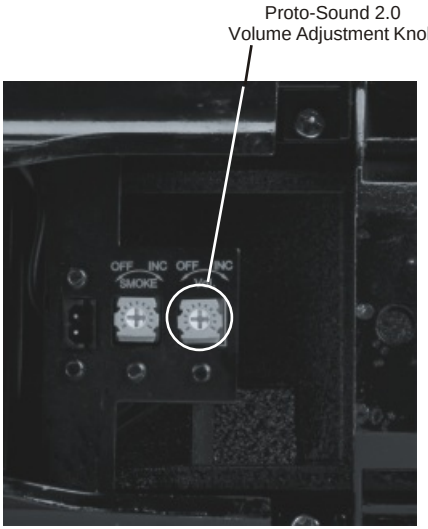
# Firebox Glow Light Bulb

The firebox glow light bulb is accessed from the under side of the engine, behind the motor. Should you need to replace the red bulb, unscrew the bulb by turning counterclockwise. Reverse the procedure for installing a new bulb.




# Manual 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.




*Proto-Sound Manual Volume Adjustment*

# Proto-Sound 2.0 Operating Instructions

This manual contains the operating instructions for Proto-Sound 2.0 in conventional mode only. Instructions for accessing DCS command mode features accompany the DCS Remote Control System equipment. SOLD SEPARATELY

## Activating Proto-Sound 2.0 Conventional Mode Features

Proto-Sound 2.0 features are activated by sequences of Bell and Horn button pushes described below. Please read the full descriptions of each feature before using it. To use these buttons to activate features rather than to blow the horn or ring the bell, you should tap the buttons very quickly with a ½-second pause between button presses. You may need to practice your timing to make this work smoothly.

| Timing Chart | | | | |
|---|---|---|---|---|
| Press Whistle Short & Firm | ½ Sec. Pause | Press Bell Short & Firm | ½ Sec. Pause | Press Bell Short & Firm |
| Total Time Lapse: 1 ½ Seconds | | | | |

| Feature to Be Activated | Button Code: |
|---|---|
| Freight Yard or Passenger Station Sounds | 1 Bell, 2 Whistles |
| Fire the Rear Coupler | 1 Bell, 3 Whistles |
| Fire the Front Coupler | 1 Bell, 4 Whistless |
| Speed Control On/Off | 1 Whistle, 2 Bells (from Neutral only) |
| Lock into a Direction | 1 Whistle, 3 Bells |
| Reset to Factory Defaults | 1 Whistle, 5 Bells (from Neutral only) |

## Freight Yard Sound(FYS)/ Passenger station announcements (PSA):

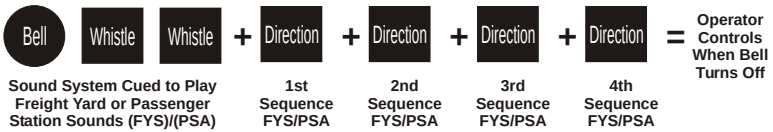
Your engine is equipped with a sound package of passenger station announcements that you can play when you pull into a station. Each sequence described below will play as long as it is left on, randomly generating sounds, but be sure to allow approximately 30 seconds between the button pushes described below to allow the FYS/PSA sufficient time to run through each sequence.

- To cue the sound system to play the FYS/PSA, quickly but firmly tap the Bell button once followed by 2 quick taps of the Horn button while the engine is moving. Tap the buttons quickly but allow approximately ½ second between each press.
- Press the Direction button once to stop the engine. This will trigger the first sequence of FYS/PSA. The reverse unit is temporarily disabled so that the train will not move as you use the Direction button to trigger the sounds, and Proto-Sound 2.0 has disabled operator control over the Horn and Bell buttons until the full FYS/PSA sequence is complete.

- After waiting about 30 seconds for that sequence to run, press the Direction button again to trigger the second sequence of FYS/PSA.
- After about 30 seconds, press the Direction button again to trigger the third FYS/PSA sequence.
- Again, after allowing about 30 seconds for that sequence to run, press the Direction button one more time to trigger the fourth and final FYS/PSA sequence.
- The FYS/PSA will continue, and within a few seconds, the engine and bell will start and move out on its own at the current throttle setting, in the same direction it was traveling when you began the sequence. Once the bell turns off, the operator regains control of the transformer's bell and Horn buttons and can ring the bell or blow the Horn as usual.

## Tips on Using FYS/PSA

- You can terminate FYS/PSA at any time by turning off power to the track for 15 seconds.
- You do not have to be in Forward to use FYS/PSA. At the conclusion of the full sequence, the train will pull away from the station in whatever direction you were going when you activated the feature.
- You can use FYS/PSA even if you are double-heading with another engine. If the second engine is not equipped with Proto-Sound 2.0, you must remember not to leave the throttle at a high voltage level once you have stopped the engine to run the FYS/PSA. Otherwise, the engine without FYS/PSA will begin vibrating on the track as its motors strain to move the train, since they cannot be automatically disabled during the FYS/PSA cycle (or if an original Proto-Sound engine, FYS/PSA are triggered differently and that engine's motor-disable feature will not be active when you run FYS/PSA in Proto-Sound 2.0).
- FYS/PSA can be triggered from Neutral. It will operate the same as if triggered while in motion except that, at the conclusion of the FYS/PSA, the engine will depart in the next direction of travel, as opposed to the direction it was traveling before entering Neutral.




## Speed Control:

M.T.H. engines equipped with Proto-Sound 2.0 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. Because the engine will run more slowly at a given throttle voltage when speed control is on than when it is off, you should adjust the throttle to a lower power level for operation with speed control off to avoid high-speed derailments. When speed control is off, the volume will drop to allow for better low voltage operation.

To turn speed control on and off, put the engine in neutral, then quickly tap the transformer's Horn button one time then quickly tap the Bell button two times, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change. Repeat the 1 horn, 2 bells code to return it to the other condition. 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.

**Place Engine into Neutral**

Horn Bell Bell = **Speed Control**
**Two Horn Blasts**
(indicates change is made)
**Repeat to Return to Normal Condition**

Lock into a Direction:

You can lock your engine into a direction (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 crawl (as slowly as it will move without halting), and quickly but firmly tap the Horn button once followed by three quick taps of the Bell button, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change. The engine will not change direction (including going into neutral) until you repeat the 1 horn, 3 bells code to return the engine to its normal condition, even if the engine is kept without power for extended periods of time.

**Place Engine into Desired Direction**

Horn Bell Bell Bell = **Direction Lock**
**Two Horn Blasts**
(indicates change is made)
**Repeat to Return to Normal Condition**

Reset to Factory Defaults:

To override the settings you currently have assigned to the engine and reset it to its factory defaults, while in Neutral tap the Horn button quickly once, followed by five quick taps of the Bell button, allowing approximately ½ second to lapse between each quick button press. Two horn blasts will indicate that the engine has made the change.

**Place Engine in Neutral**

Horn Bell Bell Bell Bell Bell = **Reset**
**Two Horn Blasts**
(indicates change is made)
**Repeat to Return to Normal Condition**

Automatic Sounds

Certain Proto-Sound 2.0 sound effects automatically play in programmed conventional mode conditions:

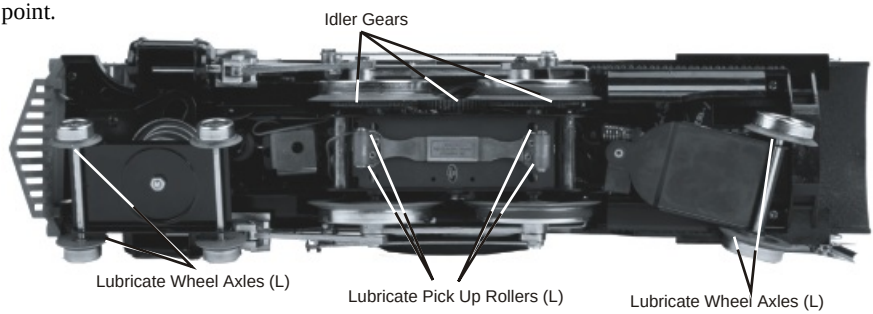
- Squealing Brakes play any time the engine's speed decreases rapidly.
- Cab Chatter plays at random intervals when the engine idles in neutral.
- Engine Start-up and Shut-down sounds play when the engine is initially powered on or is powered off for five seconds or more

# Maintenance

## Lubricating and Greasing Instructions

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


Regularly lubricate all engine and tender axles and linkage components, including pickup roller axles, to prevent squeaking. Use light household oil, such as that found in M.T.H.'s maintenance kit. Do not over oil. Use only a drop or two on each pivot point.

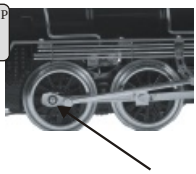



The locomotive's internal gearing was greased at the factory. Grease engine every 50 hours of use or at least once yearly if engine is not run. Use a lithium based grease and follow the greasing instructions.

# 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, they may occasionally need to be replaced.

STEP 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. These bolts can be loosened with a Flat Blade Screwdriver.*
- *Clean the groove using a cotton swab and denatured alcohol.*

STEP 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.*
- *Clean the groove using a cotton swab and denatured alcohol.*
- *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.*
- *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.*
- *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.*

# 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 as well as prematurely wear out the neoprene traction tires.

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 (not rubbing) alcohol applied with a cotton swab.

To clean the track, use RailKing Track Cleaning Fluid and a clean rag or denatured (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. Thereafter, keep an eye on the track and clean it when it gets dirty to ensure good electrical contact and to lengthen the life of the tires.

Track Cleaning Block (40-1099)

Maintenance Kit (30-50010)

# Self Charging Battery Back-Up

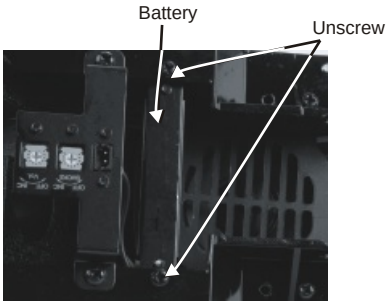
The special NiCad 2.4v self-charging battery recharges continuously during train operation and should last for up to five years. The battery is a dry battery that should not leak or cause any damage to your engine. Depending upon when your engine was built, it may need to be charged right out of the box. If engine sounds seem distorted or garbled at low voltages or become silent when power from the transformer is turned off, test the battery to determine whether it should be recharged or replaced.

- Leave the engine in neutral with track voltage at 10-12 volts for 6-7 hours so the battery can fully recharge (if your engine has a smoke unit, be sure it is turned off).
- Use M.T.H.'s battery recharger (Item No. 50-1019) (sold separately) that plugs into a wall outlet and a special port under the engine to recharge the battery overnight without leaving it on the track.

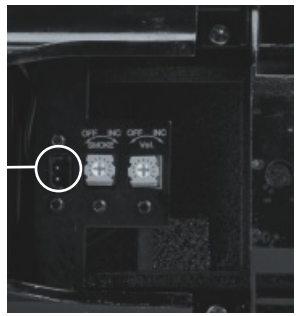
Replace: If the sounds are not improved at the end of the 15-minute test charge, it is time to replace the battery. Available through M.T.H. Parts:
(Item No. 50-1024) AA NiCad Proto-Sound® Battery

DO NOT substitute alkaline batteries for these NiCad batteries. Using alkaline batteries in this system can result in damage to the PS 2.0 circuit board and/or the batteries.

**Do not use alkaline batteries for testing or checking purposes for the 3-Volt PS2 boards. Using alkaline batteries will damage the 3-Volt battery charging circuit.**




*Battery Location*

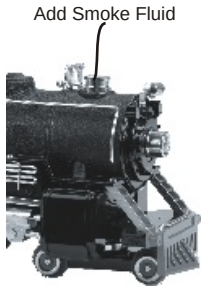



If you experience poor or no smoke output when the smoke unit is on and has fluid. This may mean that the wick has become charred and hardened.

To remove the smoke unit for inspection requires extensive disassembly of the engine and boiler assembly. If you are not familiar with this engine and are not mechanically inclined is recommended that the engine be returned to M.T.H. Service Department or the near M.T.H. Authorized Service Center.

# ProtoSmoke® Unit Operation

This Tinplate locomotive contains a Proto-Sound 2.0 controlled smoke unit that outputs smoke through the smokestack on the roof 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. Smoke volume is controlled by the Proto-Sound 2.0 system.




*Filling The Smoke Unit*

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. Above). We recommend M.T.H. ProtoSmoke, Seuthe, LGB, or LVTS fluids. Do not overfill the unit or the fluid may leak out and coat the interior engine components.

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 tender (see page 4). Failure either to add fluid to the unit or to turn it off may damage the smoke unit heating element and/or wicking material.

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.

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. To do this, you will need to remove the boiler and smoke unit inspection cover from inside the locomotive's body (follow the disassembly instructions on page 12). Once freed from the boiler, remove the smoke unit inspection cover screws (see below), lift the inspection plate away and inspect the wick. If it is darkly discolored and hard, it should be replaced.

Replacement parts and wick replacement instructions are available directly from the M.T.H. Parts Department
(Order online: www.mth-railking.com,
e-mail: parts@mth-railking.com,
Fax: 410-423-0009, Phone: 410-381-2500, Mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, ).

# Troubleshooting Proto-Sound® 2.0 Problems

Although Proto-Sound 2.0 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 (e-mail: service@mth-railking.com; telephone: 410-381-2580; fax: 410-423-0009; mail: 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. | This is normal behavior. To prevent accidental high-speed start-ups, Proto-Sound 2.0 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. |
| The engine will not start after I press the Direction button. | You may not be sending enough power to the track to power the engine. Press the throttle up for a few more seconds to increase track power. |
| My engine sounds are distorted and garbled. | The battery may have run down, especially if the engine has been in storage for some time. See the "Self-Charging Battery Back-Up" section of these instructions for how to test, recharge, and (if necessary) replace the battery. |
| **Whistle** | **Remedy** |
| I can't get the whistle 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. |
| **Coupler** | **Remedy** |
| When I try to fire the coupler, FYS/PSA starts. | You are waiting too long between whistle button presses. See the timing instructions located at the beginning of the "Proto-Sound 2.0 Operating Instructions" section. |
| The Proto-Coupler won't let the engine uncouple on the fly. | Try lubricating the coupler knuckle and rivet with a dry graphite lubricant. |
| The coupler does not fire or stay coupled. | The coupler needs to be cleaned. Wipe with denatured alcohol (not rubbing alcohol) and let dry. |
| **Cab Chatter** | **Remedy** |
| Sometimes the Cab Chatter sounds don't play. | Cab Chatter plays only in neutral at random intervals. |
| **Lock-out** | **Remedy** |
| I can't get the engine to run after I power up the transformer. It sits still with the diesel and compressor sounds running. The engine won't lock into forward, neutral, or reverse. | The engine maybe locked into the neutral position. Follow the procedure in the "Lock into a Direction" section to unlock the engine's direction. 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. | Proto-Sound 2.0 volume is set too high. Turn the volume control knob on the bottom of the tender counter-clockwise to reduce the volume. |
| No Sound | Volume is set too low, adjust volume control knob on the bottom of the tender clockwise to increase the volume or check connector to speaker. |
| **Battery** | **Remedy** |
| The engine will not leave the initial neutral setting. | Check to be sure the battery is installed and fully charged. See the "Self-Charging Battery Back-Up" section. |
| I get no sounds when the engine shifts between directions. | The battery may be dead or need to be charged. See the "Self-Charging Battery Back-Up" section. |
| After I turn off my transformer, my engine continues to make sounds before quitting. | Proto-Sound 2.0 is designed to continue to sound for a few seconds after power to the track has been shut off to allow for a more realistic shut-down. |
| **FYS/PSA** | **Remedy** |
| The FYS/PSA sounds occasionally repeat themselves. | Proto-Sound 2.0 has a built-in random number generator that randomly selects each sound clip to play. Because there are a limited number of sound clips available in each FYS/PSA sequence, it is probable that some of these sound clips will be repeated from time to time. |
| Once in FYS/PSA, the engine doesn't go into reverse. | So that FYS/PSA effects can be as realistic as possible, Proto-Sound 2.0 disables the reversing unit whenever FYS/PSA is enabled. This way the engine remains still at its stop as the operator cycles through the FYS/PSA sequences. |
| When the FYS/PSA enters its last sequence the bell automatically comes on | FYS/PSA is programmed to start ringing the bell at that point. After approximately 12 seconds, it will automatically turn off. |
| When FYS/PSA is enabled, pressing the whistle and bell has no effect | Because FYS/PSA must control various effects in each sequence, Proto-Sound 2.0 takes control of these sound effects until you exit FYS/PSA |
| I push the direction button but the next sound clip in the sequence does not play or the engine does not come out of FYS/PSA after fourth press of the direction button. | Each FYS/PSA clip must play for aprox. 30 seconds before FYS/PSA will advance to the next step in the FYS/PSA cycle. Wait at least 30 seconds in each FYS/PSA sound clip before pressing the direction button. |

# Transformer Compatibility and Wiring Chart

Proto-Sound 2.0 is designed to work with most standard AC transformers. The chart below lists the many compatible transformers. 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. In addition, the chart details how the terminals on these transformers should be attached to your layout.

| RECOMMENDED AC TRANSFORMERS | | | | | |
|---|---|---|---|---|---|
| **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-1000 | Red Terminal | Black Terminal | 0-21v | 100-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 |
| Lionel LW | A | U | 8-18v | 75-Watt | Standard |
| Powermaster | U | A | 8-18v | 135VA | Electronic |
| 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**

# Additional Features Accessible with the DCS Remote Control System: **(additional equipment required)**

While conventional mode operation of a Proto-Sound 2.0 engine yields wonderfully realistic sound and several train control features, command mode operation allows the user to access a world of command functions never before accessible to O Gauge railroaders. With the addition of the DCS Remote Control System (including a DCS remote handheld and Track Interface Unit) users gain many advanced features, including:

- DCS Proto-Speed Control - Establishes desired locomotive speed in scale miles per hour increments via a thumbwheel control and allows operator to set maximum speed and acceleration/deceleration rates
- ProtoSmoke® Variable Output Control - Controls how much smoke each engine outputs and matches smoke to locomotive speed
- Locomotive Lighting Control - Controls locomotive headlights, marker and interior lights, beacon lights, ditch lights, and MARS lights
- Emergency Stop-Single button push stops all Proto-Sound 2.0 trains but does not turn off the power
- One Touch Global Mute/UnMute-Single button mutes or unmutes all DCS-controlled locomotives' user-defined actions, including sound, lights, and smoke
- Proto-Dispatch Operation-Public Address-like feature allows users to speak through locomotive speaker during operation
- Proto-Cast-Allows users to play audio recordings through locomotive speaker during operation
- Proto-Doppler Sound Effects Set Up-Users can configure locomotive for Doppler Operation, including setting distance points for Doppler start, repeat, and stop modes
- Independent Volume Control of Engine Sounds, Bell, Horn & Whistle for each Locomotive
- Control up to 99 different DCS-Equipped Locomotives at one time with multiple TIUs
- Proto-Effects™ Set Up-User can select individual Proto-Effects™ operations to be active or inactive, including cab chatter, train wreck sounds, coupler sounds, and wheel clickety-clack sounds
- Direction Control Set Up-User can set initial individual start-up direction (start in forward or reverse) for double-heading operations
- Locomotive Consist Set-up-User can determine locomotive values for consist make-ups, allowing multiple locomotives belonging to a consist to operate together
- Query Locomotive Information-User can query locomotive programming to learn locomotive address and engine data information, including scale miles traveled
- User Can Query, Set and Operate Track and Accessory Interface Units for Programming Digital Command Operations for up to 250 Accessories and 250 Individual Switches
- User Can Script, Record and Playback Train Routes

Operating instructions for all DCS Command features will accompany the DCS remote control equipment.

# 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 MTH Electric Trains, 7020 Columbia Gateway Drive, Columbia, MD 21046, 410-381-2580 (FAX No. 410-381-6122), 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 that 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 it be insured. A cover letter, including your name, address, daytime phone number, Return Authorization Number, a copy of your sales receipt and a full description of the problem, must be inluded to facilitate the repairs. Please include the description regardless of whether you discussed the problem with one of our service technicians when contacting MTH for your Return Authorization Number.

3. Please make sure you have followed the instruction 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 410-381-2580 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 wear items such as light bulbs, pick-up rollers, batteries, smoke unit wicks, 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 an M.T.H. Authorized Service Center (ASC) or M.T.H. National Authorized Service Center (NASC) 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. If you are sending this product to an Authorized Service Center, contact that Center for their return authorization.

This warranty gives you specific legal rights, and you may have other rights that vary from state to state. Specific questions regarding the warranty may be forwarded to M.T.H. directly.

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