



Dash-8 Diesel Locomotive



OPERATOR'S MANUAL



Compatibility

This locomotive is capable of operating with DC or AC power supplies (See page 29 for a complete list of compatible transformers and wiring instructions.) indoors or outdoors. MTH does not recommend operating the locomotive in inclement weather and strongly suggests that it not be left out in the elements. The locomotive will negotiate an R1 G-Gauge curve track or switch when the pilots are mounted to the trucks. Additional features may be utilized when controlling the engine with MTH's Digital Command System (DCS).



PLEASE READ BEFORE USE AND SAVE

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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 or outdoor 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.

Set Up Checklist

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

Installing The Locomotive Couplers

This RailKing One-Gauge locomotive can be equipped with three different types of G-Gauge couplers - an MTH knuckle coupler, an MTH hook & loop coupler or a 1/32nd Kadee coupler. For your convenience, the MTH knuckle and the hook & loop couplers have been included with your locomotive. The Kadee type must be the 1/32nd size and can be purchased from a Kadee coupler retailer.

Both the standard knuckle and the hook and loop coupler designs attach to the locomotive trucks in the same manner as seen in Figure 1.

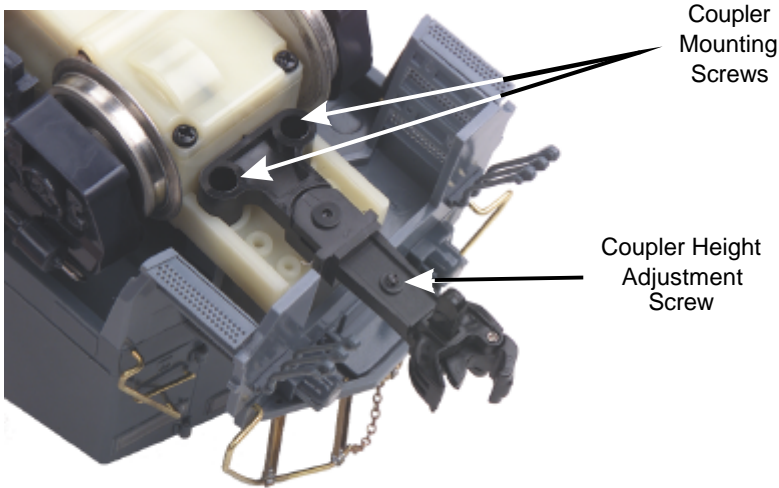


Figure 1: Mounting Position For Knuckle and Hook & Loop Couplers

Installing The Locomotive Couplers (cont'd)

If the locomotive is to be mated up with a different scaled G-Gauge locomotive, freight or passenger car, the knuckle coupler assembly may need to be relocated on the coupler armature as seen in Fig. 2 and 3. The second lower location or position “B” is on the bottom of the armature extending from the truck rather than the default top position “A” which is on top of the armature. Simply unscrew the coupler shaft from the armature, separate the coupler knuckle (attached by screw) from this shaft and relocate to the bottom of the shaft.



Figure 2: Coupler Position A

Note: When the standard knuckle coupler is installed in position B, the knuckle pin must be cut off as shown in Fig. 4. The coupler pin has been “scored” so that it can be easily cut off with a pair of snippers.



Figure 3: Coupler Position B

The Hook and Loop coupler mounts to the truck armature in the same manner as the Knuckle Coupler (see Fig. 1 on page 3).

If a Kadee Coupler is to be installed, remove the MTH knuckle or hook & loop coupler & armature and install the separately purchased Kadee Coupler as seen in Figure 5. Follow the Kadee Coupler’s installation guide for complete details on installing the coupler.

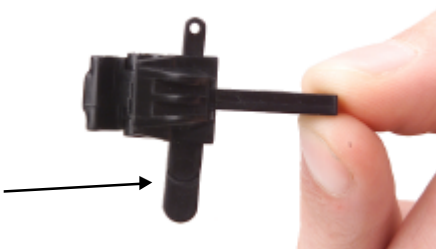


Figure 4: Score Line For Knuckle Coupler Position B



Figure 5

Lubrication



You should lubricate the engine to prevent it from squeaking. Use light household oil and follow the lubrication points marked “L” in Fig. 6. Do not over-oil. Use only a drop or two on each pivot point.



Figure 6. Lubrication Points on the Locomotive

Priming The Smoke Unit

When preparing to run this engine, add 30-40 drops of smoke fluid through the smokestack. We recommend M.T.H. ProtoSmoke, Seuthé, 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), rotate the smoke unit knob located inside the cab front door (see Fig. 7) to the off position (rotate counterclockwise). If you wish to regulate the smoke output intensity, turn the knob between full counterclockwise and full clockwise until the desired smoke output is reached.

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

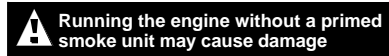


Figure 7: Smoke Unit Switch Location

Filling The Smoke Unit

While MTH does not recommend operating outdoors in inclement weather (in order to prevent possible damage to the electronics), we have included for your convenience, a smoke stack “cap” inside your locomotive packaging. This cap should be inserted into the smoke stack to prevent moisture from entering the smoke unit chamber.

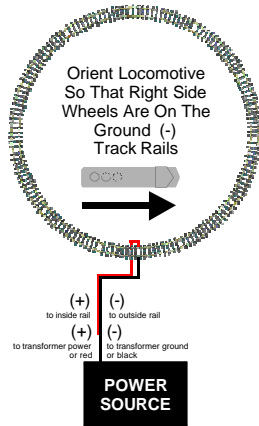


Figure 8 Smoke Unit Cap

(Ensure that the smoke unit is turned off when the cap is in place.)

Placing The Engine On The Track

Like all DC powered locomotives, this engine is polarity sensitive. In general, the locomotive should be placed on the track with the cab facing toward the right if the outside rail is the (-) rail and the inside rail is the (+) rail.



Checking The Battery

You may find, if your locomotive was built several months before you set it up, that the rechargeable batteries have run down and need 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 21.

Installing The Locomotive Pilot Detail Parts

A separately supplied snow plow can be snapped onto the leading locomotive pilot. Before snapping the snow plow in place, insert the brake hoses into the pilot as seen in Figure 29.

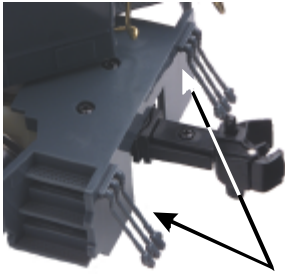


Figure 29: Attaching Brake Hose Details

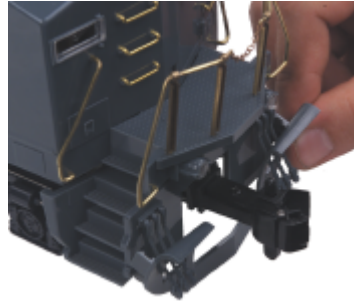


Figure 30: Attaching Snow Plow

Basic Operation

RailKing One-Gauge locomotives can be operated with AC or DC power output transformers. When using DC output power supplies, the user can only control the locomotive speed and direction. The locomotive will still make engine sounds but no bell or whistle control is possible when using a DC output power supply unless the user wishes to hook up the power supply to MTH's separately sold Digital Command System (see below).

As with all G-Gauge locomotives, the Throttle knob or handle controls how fast your train will travel.

Activating Features Using DC Power

Throttle To increase or decrease track voltage, and therefore train speed, turn or slide the throttle control knob. Turning clockwise will increase voltage and speed, while turning counterclockwise will decrease voltage and speed. Because your RailKing One-Gauge locomotive is equipped with M.T.H.'s Proto-Speed Control feature, the engine will maintain the speed you set after you release the throttle until you turn it again to slow down or speed up the locomotive. This feature works very similarly to the cruise control system found in automobiles and allows the engine to maintain its speed even as it enters curves, traverses grades or coasts down inclines.

Direction - There are two ways to change a locomotive's direction when operating the engine with a DC power supply.

1. Slow the locomotive down using the throttle knob until the engine comes to a complete stop but power still remains on the track. Slide the direction switch on the power supply to the opposite direction and increase the throttle setting again to allow the locomotive to begin running in the opposite direction.
2. While the locomotive is running, slide the direction switch on the power supply to the opposite direction. The locomotive will slow to a gradual stop and then reverse direction and slowly gain speed until it is again travelling at its original speed prior to the direction switch change.

Using DCS With DC Power

MTH's revolutionary Digital Command System, or DCS, allows users to control their RailKing One-Gauge locomotives in a command control environment. User's can remotely access hundreds of features inside each RailKing One-Gauge locomotive with the wireless remote control. Digital signalling and an easy-to-use interface make using DCS a snap. More information on DCS can be found on page 26 or by visiting www.protosound2.com.



Activating Features Using AC Power

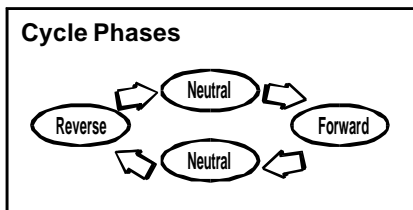
Using an AC output transformer equipped with a whistle and bell button will unlock dozens of features inside your RailKing One-Gauge locomotive. Operation is simple by following the simple steps below and on the following pages.

Start Up - 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.

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.

Manual Volume Adjustment -

To adjust the volume of all sounds made by this engine, turn the master volume control knob located inside the boiler front clockwise to increase the volume and counter-clockwise to decrease the volume.



Figure 9: Manual Volume Adjustment (lower knob)

Proto-Sound 2.0

Operating Instructions

The following pages contain the operating instructions for Proto-Sound 2.0 RailKing One-Gauge locomotives when operated with AC output transformers in conventional mode only. Instructions for accessing DCS command mode features accompany the DCS Remote Control System equipment. These features are only available when using an AC Transformer equipped with a whistle and bell button.

Activating Proto-Sound 2.0 Conventional Mode Features *(AC Operation Only)*

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.

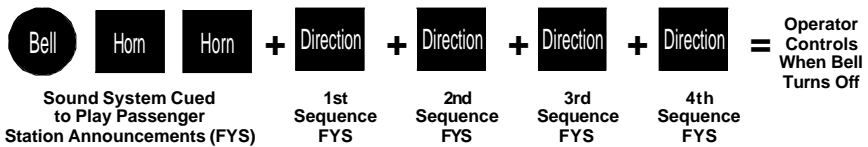
Timing Chart				
Press Horn Short & Firm	½ Sec. Pause	Press Bell Short & Firm	½ Sec. Pause	Press Bell Short & Firm
Total Time Lapse: 1 ½ Seconds				

Feature to Be Activated	Button Code:
Freight Yard Announcements	1 Bell, 2 Horns
Speed Control On/Off	1 Horn, 2 Bells (from Neutral only)
Lock into a Direction	1 Horn, 3 Bells
Reset to Factory Defaults	1 Horn, 5 Bells (from Neutral only)

Freight Yard Sounds (FYS)

Your engine is equipped with a sound package of freight yard sounds that you can play when you pull into a yard. 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 sufficient time to run through each sequence.

- To cue the sound system to play the FYS, 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. 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 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.
- After about 30 seconds, press the Direction button again to trigger the third FYS 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 sequence. The FYS 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

- You can terminate FYS at any time by turning off power to the track for 15 seconds.
- You do not have to be in Forward to use FYS. 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 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. Otherwise, the engine without FYS will begin vibrating on the track as its motors strain to move the train, since they cannot be automatically disabled during the FYS cycle (or if an original Proto-Sound engine, FYS are triggered differently and that engine's motor-disable feature will not be active when you run FYS in Proto-Sound 2.0).
- FYS can be triggered from Neutral. It will operate the same as if triggered while in motion except that, at the conclusion of the FYS, 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

Place the locomotive 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

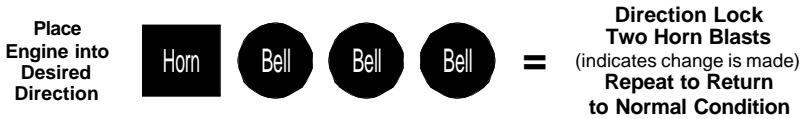


=

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

Locking Locomotive 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.



Reset To Factory Default

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.



Automatic Sound Effects

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 well oiled and greased in order to run properly.

You should regularly lubricate all locomotive axles to prevent them from squeaking and enhance operation. Use light household oil and follow the lubrication points marked “L” in Fig. 10. Do not over-oil. Use only a drop or two on each pivot point.



Figure 10: Lubricating The Chassis

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 and axles, do the following:

1. Turn the engine upside down and remove the truck bottom plate mounting screws as seen in Figure 11.

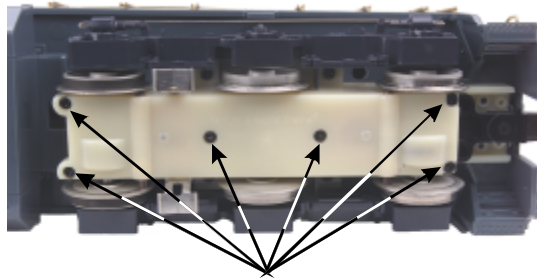


Figure 11: Truck Bottom Plate Mounting Screw Locations

2. After removing the truck bottom plate mounting screws, liberally apply grease to the gears attached to both the outside axles as seen in Figure 12.

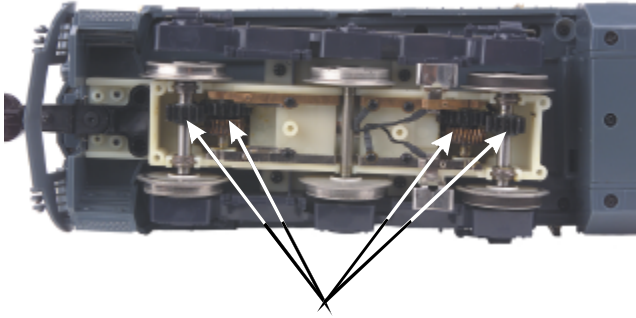


Figure 12: Grease Points Inside Power Truck

Traction Tire Replacement Instructions

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

1. Remove the truck sides from the truck block in order to slip the new tire over the grooved drive wheel. Each truck side is attached to the truck block via (2) screws as noted in Figure 13.

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.

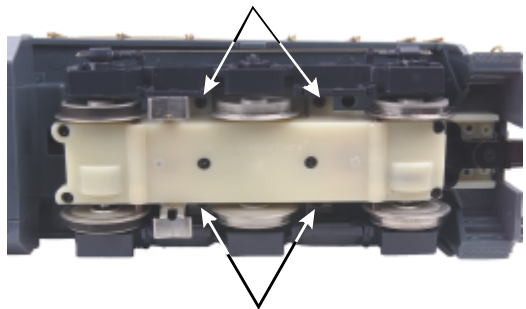


Figure 13: Truckside Mounting Screw Locations

Traction Tire Replacement Instructions

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.
6. Reinstall the truck sides and operate as usual.

One set of replacement tires is packaged with your model. Additional sets are available directly from the M.T.H. Parts Department (order online: www.mth-railking.com, e-mail: parts@mth-railking.com; mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, FAX: 410-381-6122).

Light Bulb Replacement Instructions

The locomotive lights are controlled by a constant voltage circuit in the engine. They can be removed and replaced when they burn out by separating the body from the chassis as seen on the following pages. Once the body has been separated, see the illustrations below to remove the lights.

You can obtain replacement bulbs directly from the M.T.H. Parts Department (order online: www.mth-railking.com, e-mail: parts@mth-railking.com; mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, FAX: 410-381-6122).

To Remove The Body From The Chassis

1. Turn the locomotive over and locate and remove the truck side screws as detailed in Figure 13.
2. Next, locate and remove the body mounting screws as seen in Figure 14.



Figure 14: Body Mounting Screw Locations

Light Bulb Replacement Instructions

3. Once the body screws have been removed, separate the handrails from the cab area of the body as seen in Figures 15 and 16.



Figure 15: Handrail Separation From Cab



Figure 16: Handrail Separation From Cab

4. Next, remove the handrails from the pilot area as seen in Figure 17.

5. Once all the handrails are freed from the body around the cab and front of the locomotive, gently lift the body from the chassis to expose the light and smoke unit harnesses. There are two wire harnesses that connect lights inside the locomotive body that must be removed before the body can be completely separated from the chassis as seen in Figure 18 and 19.

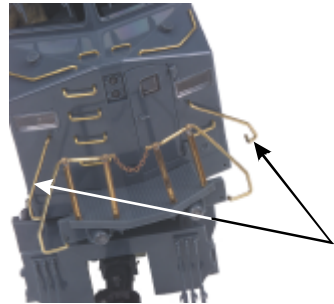


Figure 17: Handrail Separation From Cab

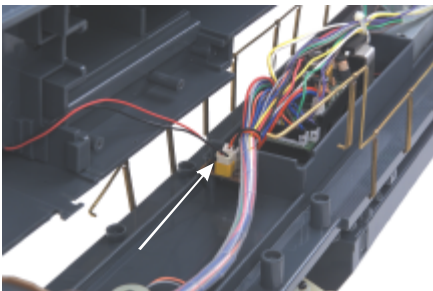


Fig. 18: Battery Charger Harness Connection

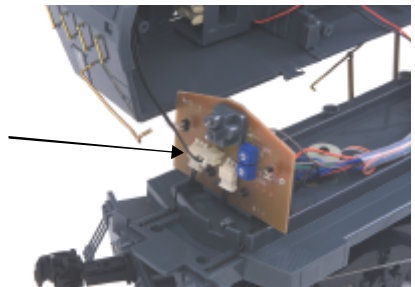


Figure 19: Cab Interior Light Harness Location

Light Bulb Replacement Instructions

6. Lights are located at the front and rear of the cab as seen in Figure 20 and 21. Burned out bulbs can be removed by unplugging the light and replacing. Additional bulbs are installed under the cab roof of the body. Figure 21 shows the low number board bulb location. Engines utilizing high number boards will have a set of connectors in place of the bulbs. The bulbs will be located above the cab windshield and will require that the cab interior be removed in order to gain access to the bulbs. The interior is held in place by clearly visible phillips screws.

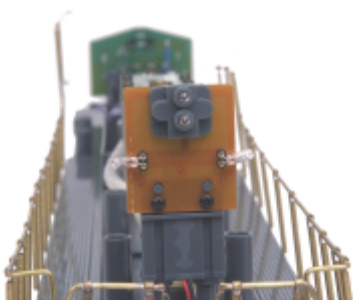


Figure 20: Rear Locomotive Light Location



Figure 21: Front Locomotive Light Location

To Replace:

Gently pull the wires until the bulb comes free of the housing. Push the new bulb into place and reconnect the wires.

Self Charging Battery Back-Up

The special NiCad AA self-charging batteries recharge continuously during train operation and should last between one and five years. The batteries 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.



Figure 22: Battery Compartment

Self Charging Battery Back-Up

Test: Put the engine in neutral and leave the track voltage at 10-12 volts (high enough for the lights to shine brightly and the engine to move steadily) for 15 minutes.

Recharge: If the sounds are improved at the end of the 15-minute test charge, the battery charge has run down and can be recharged. There are a number of ways you can do this:

- 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).
- Remove the batteries and recharge them in a NiCad battery charger.
- Charge the battery using the M.T.H. Battery Charger (M.T.H. Item #50-1019). A battery charging port is located inside the rear of the locomotive cab on the engine's right side. The port is accessible when the rear cab door is opened as seen in Figure 23.

Replace: If the sounds are not improved at the end of the 15-minute test charge, it is time to replace the batteries. Replacement batteries can be ordered through MTH. The batteries are located inside the locomotive's fuel tank.



Figure 23: Battery Recharging Port

ProtoSmoke® Unit Operation

This RailKing One-Gauge steam locomotive contains a self-powered 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.

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

When preparing to run this engine, add 30-40 drops of smoke fluid through the smokestack (see Fig. 24). Be sure to remove smoke unit cap during operation with smoke unit running. 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.



Figure 24

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 inside the body front door (see Fig. 25). **Failure either to add fluid to the unit or to turn it off may damage the smoke unit heating element and/or wick 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.



Figure 25

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.

ProtoSmoke® Unit Maintenance

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 inspect the smoke unit you will need to remove the body from the chassis in order to gain access to the unit. Follow the body removal instructions found earlier in this manual.

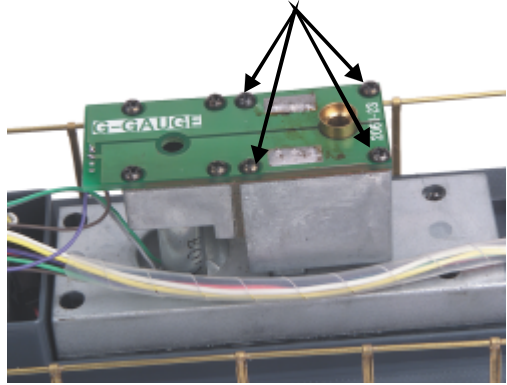


Figure 25

Once the body has been removed, you can remove the smoke unit circuit board from the smoke unit fluid reservoir by removing the four screws as seen in Figure 25. 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; mail: 7020 Columbia Gateway Drive, Columbia MD 21046-1532, FAX: 410-381-6122).

Installing The Fixed Locomotive Pilot

If desired, your locomotive can be outfitted with pilots that are fixed to the chassis for a more realistic appearance. An extra set of pilots has been included with your engine for such a configuration. Note:

Installing the fixed pilots will decrease the locomotive's minimum turning diameter. With fixed pilots your locomotive will be restricted to 8' diameter curves.

Removing the "Floating" Pilots

To remove the factory installed floating pilots, locate and remove the mounting screws as seen in Figure 26.

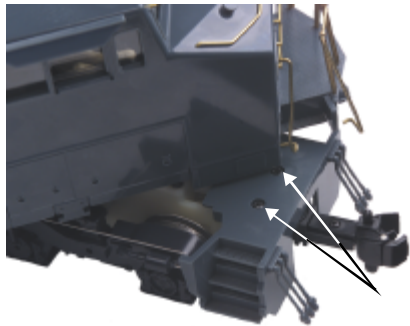


Figure 26

Installing The Fixed Locomotive Pilot

Installing The Fixed Pilot

Once the floating pilot has been removed, slide the fixed pilot into position between the truck and the chassis. The pilot will seat itself onto a set of screw bosses as seen in Figure 27. Once in place, use the screws that held the floating pilot in place to secure the fixed pilot to the chassis as seen in Figure 28.

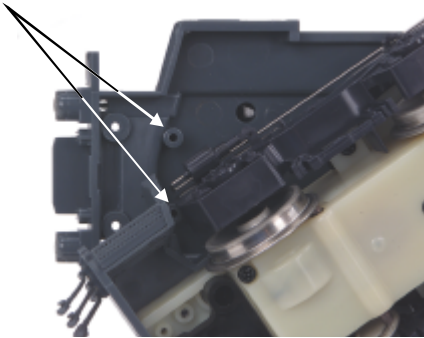


Figure 27: Fixe Pilot Mounting Bosses

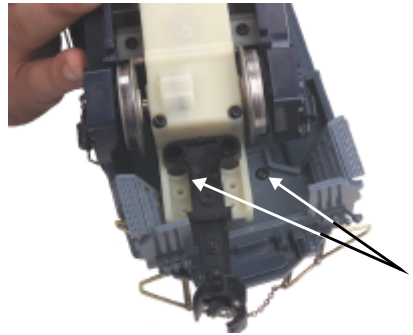


Figure 28: Fixed Pilot Mounting Screws

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 (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, 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.
Horn	Remedy
When I press the whistle button, the bell comes on instead.	Reverse the transformer leads.
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
When I press the whistle button, the bell sounds.	Reverse the transformer leads.
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.
The bell won't work on a separate bell button.	Check the wiring of the separate button.

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 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.	Proto-Sound 2.0 volume is set too high. Turn the volume control knob on the bottom of the chassis counter-clockwise to reduce the volume.
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.
FYS	Remedy
The FYS 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 sequence, it is probable that some of these sound clips will be repeated from time to time.

FYS	Remedy
Once in FYS, the engine doesn't go into reverse.	So that FYS effects can be as realistic as possible, Proto-Sound 2.0 disables the reversing unit whenever FYS is enabled. This way the engine remains still at its stop as the operator cycles through the FYS sequences.
When the FYS enters its last sequence the bell automatically comes on.	FYS is programmed to start ringing the bell at that point. After approximately 12 rings of the bell, it will automatically turn off.
When FYS is enabled, pressing the whistle and bell buttons has no effect.	Because FYS must control various effects in each sequence, Proto-Sound 2.0 takes control of these sound effects until you exit FYS.
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 after fourth press of the direction button.	Each FYS clip must play for approx. 30 seconds before FYS will advance to the next step in the FYS cycle. Wait at least 30 seconds in each FYS sound clip before pressing the direction button.

Transformer Compatibility and Wiring Chart

Proto-Sound 2.0 is designed to work with most standard DC power supplies and AC transformers. The following charts lists the recommended DC and AC transformers. Note that many of the AC operational commands described in these instructions require a bell button, so if your AC 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. DC transformers employing PWM (pulse width modulation) should not be used with the separately sold DCS system.

Transformer Model	Min/Max. Voltage	Power Rating	Transformer Type
MRC Controlmaster 20	0-20v	100 Watt	Electronic
PH Hobbies PS5	0-20v	100 Watt	Electronic
PH Hobbies PS10G	0-20v	180 Watt	Electronic
BridgeWorks Mag-15	0-24v	300 Watt	Electronic
BridgeWorks Magnum 200	0-24v	300 Watt	Electronic
BridgeWorks Magnum 400	0-24v	300 Watt	Electronic
BridgeWorks Magnum 1000	0-24v	300 Watt	Electronic
LGB Jumbo 50101	0-24v	240 Watt	Electronic

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-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

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 available to G 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 50 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

Service & Warranty Information

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

For warranty repair, follow the instructions below to obtain warranty service.

First, e-mail, write, call or fax an Authorized M.T.H. Service Center in your area or M.T.H. Electric Trains to obtain Repair Authorization. You can find the list of Authorized Service Centers on the M.T.H. website, www.mth-railking.com. Authorized Service Centers are required only to make warranty repairs on items sold from that store; all other repairs may or may not be done at the store's own discretion. Otherwise, contact M.T.H. (fill out the Service Contact form in the Service Section of www.mth-railking.com; send US mail to the address listed below; tel: 410-381-2580; fax: 410-423-0009), stating when the item was purchased and describing the problem. If you contact M.T.H., you will be given a return authorization number to assure that your merchandise will be properly handled upon its receipt.

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 a service technician when contacting the Service Center or M.T.H. for your Return Authorization.*

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 warranted 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 Authorized M.T.H. Service Center or 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. If you are sending the item to M.T.H., 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. 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.

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



PARTICIPATING A.S.C. RETAILER LIST

ALABAMA

SOUTHERLAND STATION
HUNTSVILLE
256-533-4720

ARIZONA

ARIZONA TRAIN DEPOT
MESA
480-833-9486

CALIFORNIA

CENTRAL COAST TRAINS
ATASCADERO
805-466-1391

TRAIN SHACK
BURBANK
818-842-3330

REED'S HOBBY SHOP
LA MESA
619-464-1672

ROUNDHOUSE
NORTH HOLLYWOOD
818-769-0403

DOLLHOUSES, TRAINS &
MORE
NOVATO
415-883-0388

TIN PLATE JUNCTION
OAKLAND
510-444-4780

RON'S WORLD
SAN CLEMENTE
949-361-5596

BLACK NIGHT TRAINS &
HOBBIES
SANTA ROSA
707-523-3522

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CUSTOM RAILWAY SUPPLY
COLORADO SPRINGS
719-634-4616

CABOOSE HOBBIES, INC.
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303-777-6766

MIZELL TRAINS
WESTMINSTER
303-429-4811

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TIME MACHINE HOBBY, L L C
MANCHESTER
860-646-0610

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AMHERST DEPOT
ENGLEWOOD
941-475-2020

DEPOT HOBBY SHOP
IANTANA
561-585-1982

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HOLLYWOOD
954-921-2700

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305-688-8868

COLONIAL PHOTO & HOBBY
ORLANDO
407-841-1485

WARRICK CUSTOM HOBBIES
PLANTATION
954-370-0708

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PORT ORANGE
386-304-7002

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MODELS
BERWYN
708-484-4384

CHICAGOLAND HOBBY
CHICAGO
773-775-4848

BILL'S ENGLEWOOD STATION
ORLAND PARK
708-460-4906

BIKE & CHOO CHOO
CONNECTION
SCHAUMBURG
847-882-7728

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MUNSTER
219-838-9999

SAMUELSON'S TRAIN SHOP
VALPARAISO
219-462-2708

IOWA

CABOOSE STOP HOBBIES
CEDAR FALLS
800-642-7012

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L & N TRAINS & THINGS
LOUISVILLE
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KANSAS

HOBBY HAVEN
OVERLAND PARK
913-381-3111

LOUISIANA

AMERICA'S TRAIN YARD
BATON ROUGE
225-926-5592

MAINE

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LUDLOW
207-532-6277

MARYLAND

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FREDERICK JUNCTION
FREDERICK
301-694-3434

ENGINE HOUSE HOBBIES
GAITHERSBURG
301-590-0816

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HAGERSTOWN
240-420-4930

THE TRAIN ROOM
HAGERSTOWN
301-745-6681

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SYKESVILLE
410-549-6061

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& HOBBIES
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413-732-5531

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TRAINS INC.
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FAIRCHANCE
724-564-7817

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LOCUST GROVE
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