LIONEL

LIONEL INSTRUCTION SHEET ®

Lionel Pennsylvania GG1 Owner's Manual

featuring **TRAINmaster** C·O·M·M·A·N·D *and* **RailSounds**™

Congratulations!

The classic Lionel GG-1 is a model of the engine considered by many railroad experts to be the best all around engine ever built.

The GG-1 shape was designed by top industrial designer Raymond Loewy and first put into passenger service in 1935. The GG-1 can run at over 100 miles per hour with little strain.

Lionel's first GG-1 was offered in the 1947 catalog. The first model made with Magne-Traction and twin motors was built in 1950. The best GG-1 is in your hands. Enjoy!

- **Two powerful Lionel Pullmor® motors**
- **Lionel Command™ reverse unit for use with the Lionel TrainMaster® Command™ model railroad control system**
- **Railsounds™ – digital samples from a real GG1**

- **Magne-Traction®**
- **Die-cast ElectroCouplers™**
- **Directional headlights**
- **CrewTalk™ and 2 Part TowerCom™ (in command mode)**

Table of contents

Transformer operations

NOTE! It is very **IMPORTANT** to determine which end of your GG1 is the front. Since it is symmetrical it may start off in the opposite direction you are intending to go! Turn over your GG1 and locate the volume adjustment knob (see page 8) this is what we consider to be the "front" of your GG1. Please run your GG1 the first time by itself just to make sure you know where it's going.

Running your Lionel GG1 set with a Lionel transformer

1 **Place your GG1 set on Lionel or Lionel-compatible O gauge track.**

- **Note the pull of Magne-Traction** between your GG1 and the steel track. Magnetized wheels and axles increase your pulling power (more than 25 cars on straight and level track) and keep your GG1 on track while passing swiftly through curves.

2 **Power up your GG1 set with your transformer.**

- **Your GG1 is designed to operate on 12-18 volts alternating current.** Virtually all Lionel and Lionel-compatible alternating-current transformers are suitable; we recommend the TrainMaster Command model railroad control system.

Note! • **Do not power your GG1 with direct current (DC).** Damage to sensitive electronic components may occur.

- **When you first power up your track, the GG1 will wait between 3 and 8 seconds** as it "listens" for digital language from the TrainMaster Command Base (available separately). When it's determined that it's on a conventional (nonCommand) railroad, the GG1's headlights will illuminate and RailSounds will fire up. At this point, the GG1 is in neutral. (This occurs when placing the GG1 on your railroad for the first time. Thereafter, it starts in forward after every three-second power interrupt.)

3 **Move 'em out!**

- **Get your GG1 moving.** Press the DIR button on your CAB-1 remote or Lionel transformer. This sequences the Liontech Command reverse unit (R2LC) to the next operating state. The R2LC alternates between three states: forward, neutral, and reverse.
- **Adjust track voltage** until your GG1 moves at your desired speed. To increase speed, increase track voltage. To decrease speed, reduce voltage. To stop the locomotive, cut track power.
- **To select a single operating state** (example: forward only), you can deactivate the R2LC's sequencing function. Get your GG1 moving in the desired direction, then slide the reverse unit control switch on the GG1's underside to PROG/LOCK. See page 14 for the switch location and positioning.
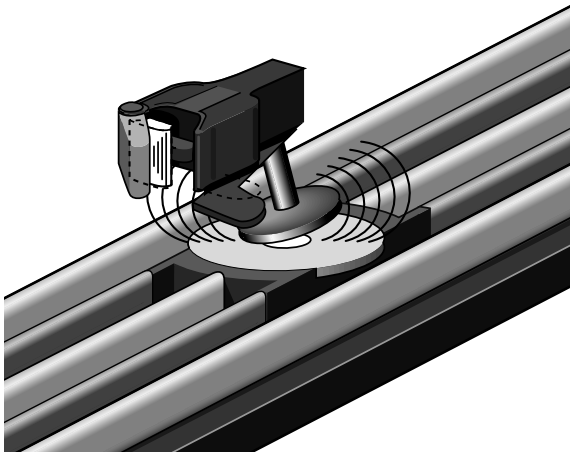
Transformer operations

Using your GG1's ElectroCouplers in the non-Command environment

To use your GG1's ElectroCouplers in the non-Command environment, you must first couple a piece of rolling stock equipped with Lionel magnetic couplers directly to your GG1. The magnetic coupler on the rolling stock will then react to the magnetic field generated by a Lionel remote-control track section (available separately). Place your rolling stock's coupler "trigger disc" over the central coil of a remote-control track section and press uncouple on the controller. The magnetic field pulls the disc downward, and the coupler opens.

Note! *Your GG1 ElectroCouplers will NOT open manually or by using a remote-control track section*

Magnetic coupler on the rolling stock coupled to your GG1

Remote-control track section

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Transformer operations

Using your GG1's ElectroCouplers in the TrainMaster Command environment

Your Lionel GG1 is equipped with ElectroCouplers™ that respond to either the COUPLER F (front) or COUPLER R (rear) button on your CAB-1 remote when operated in the Trainmaster Command environment.

COUPLER F

COUPLER R

Simply press either button on your CAB-1 remote, and that coupler opens.

Note! *Your GG1's ElectroCouplers are NOT designed to be opened manually.*

A note on Magne-Traction

Your GG1 is equipped with Lionel Magne-Traction, magnetized wheelsets and axles that help increase tractive effort during operation. Because the wheelsets are magnetized, take care to prevent small metallic objects from attaching to the wheel sets and working their way into the GG1's motor assembly. They can damage your locomotive.

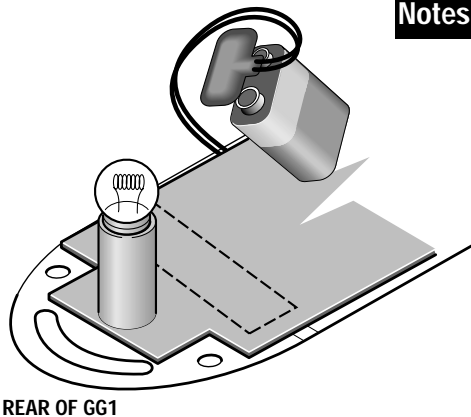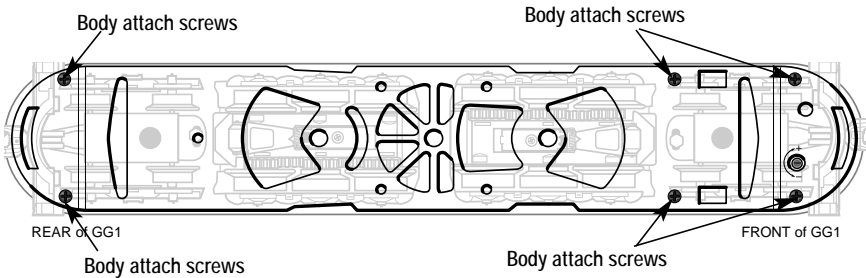**Note!** Magne-Traction is not effective on nonferrous track.

Transformer operations

Your GG1's RailSounds system—the basics

Lionel RailSounds is the most realistic model railroad sound system in the world. Your GG1 features digital samples from an authentic GG1 for the *ultimate* in realism.

Begin by installing a 9-volt *alkaline* battery in your GG1. This ensures interuption free operation of RailSounds. Remove the six screws,(see below for location) and lift off the body. Connect the 9-volt battery to the battery clip (remove the protective cap), and place the battery into the open area on the circuit board. Replace the body and reinsert the six screws.

Apply track power and the GG1's RailSounds system delivers an authentic start-up sequence. As the GG1's speed increases, the RPMs move through six levels of roar. Sounds return to idle only after the locomotive has come to a complete stop. To silence the RPM roar (horn and bell remain unaffected), slide the RailSounds switch to its SIG (signal) position *before powering up the locomotive*. See page 14 for the switch location and positioning. To return to the RPM roar, return the switch to the FULL position.

Body attach screws

Body attach screws

REAR of GG1

FRONT of GG1

Body attach screws

Body attach screws

REAR OF GG1

Notes!

Although track voltage powers RailSounds, *the battery* is required for uninterrupted operation and shutdown sequences. Use only <u>alkaline</u> batteries; do not use "heavy duty" batteries.

Discontinue locomotive power for 10 seconds *before* changing the RailSounds switch position.

If RailSounds "drops out" during track power interrupts, replace the battery.

Transformer operations

Experiencing the range of your GG1's RailSounds system

With RailSounds, you experience the sounds of real railroading like never before. Simply put, it's the most sophisticated, authentic model railroad sound system in the world.

- **Six RPM-roar levels.** Your GG1's speed determines the level of RPM roar—*automatically, if you prefer:* idle, slow, medium, or full-speed output.
- **MultiHorn™.** A different horn sound *every* time—a RailSounds exclusive.
- **Mechanical bell.** Press BELL on your CAB-1 or transformer to begin the effect; again to discontinue.

- **Reverse unit reset sound.** Power down your track, wait for 3.5 seconds, and listen for the air-release sound—that's the GG1 telling you its Liontech Command reverse unit has just *reset to forward operation.*
- **Shutdown sequence.** No other model railroad sound system shuts down like RailSounds. Turn off track power, and after the air-release reset sound, you have 2 seconds to restart your GG1. If you're done with operations, RailSounds will commence with an authentic GG1 shutdown sequence about 2 seconds after the air-release reset occurs.

Notes on RailSounds

- Use the GG1's frame mounted volume control to adjust sound output. (See below for its location.)
- Listen for incidental locomotive sounds during RailSounds operation. They're automatic and, of course, authentic.
- The 9-volt alkaline battery you installed ensures *continuous* GG1 sounds.

- Longer track-power interruptions (including locomotive derailments) cause RailSounds to shut down after about 7 seconds.
- For even *more* authentic RailSounds effects, operate in the TrainMaster Command environment.

REAR of GG1

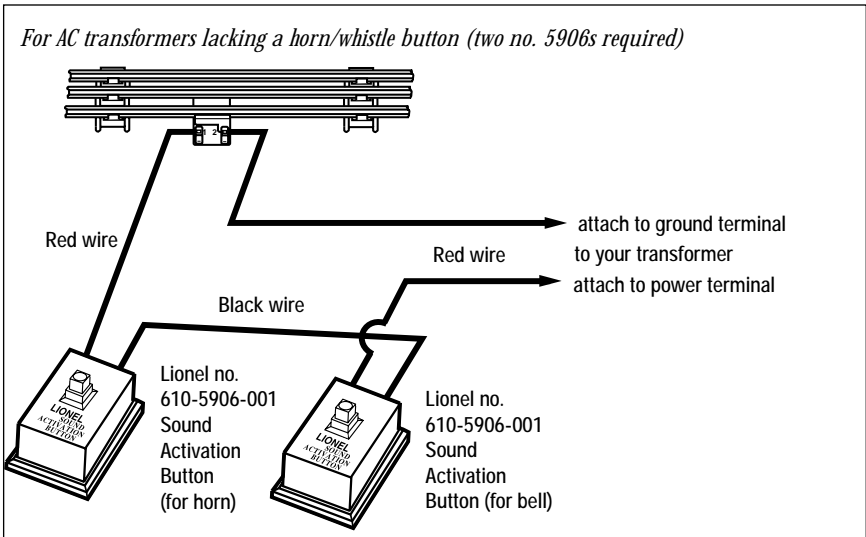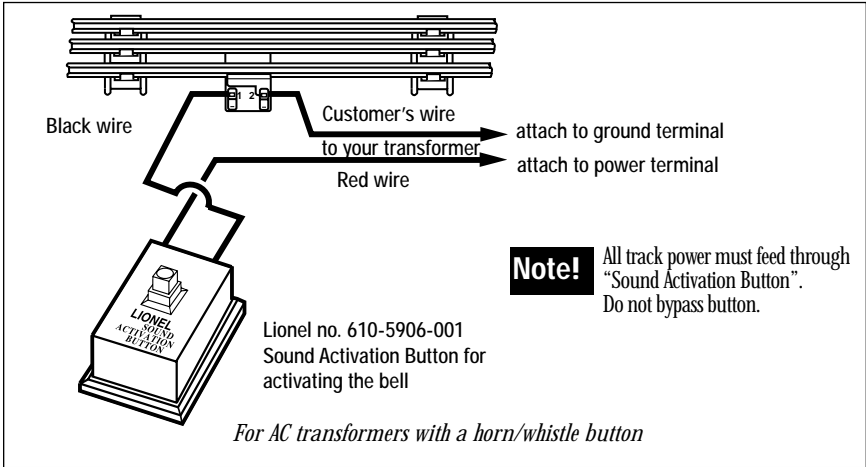Volume adjustment knob   FRONT of GG1
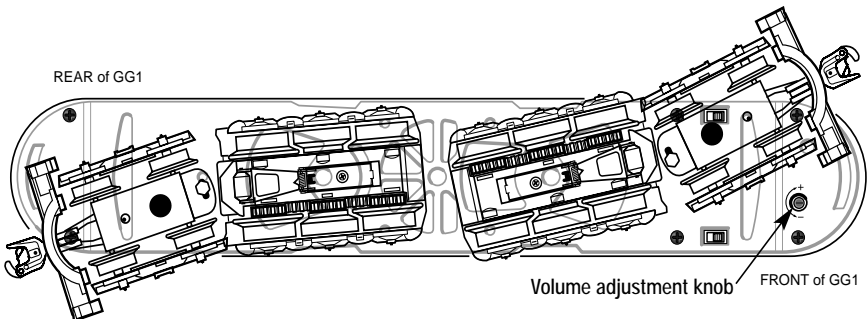
Transformer operations

Installing the Lionel no. 610-5906-001 Sound Activation Button

To operate the bell and horn sounds when operating your GG1 with conventional transformers, you'll need to install the Lionel no. 610-5906-001 Sound Activation Button (available separately). Connect the button(s) as shown below.

Black wire

Customer's wire
to your transformer

attach to ground terminal

attach to power terminal

Red wire

Note! All track power must feed through "Sound Activation Button". Do not bypass button.

Lionel no. 610-5906-001 Sound Activation Button for activating the bell

For AC transformers with a horn/whistle button

For AC transformers lacking a horn/whistle button (two no. 5906s required)

Red wire

attach to ground terminal
to your transformer

Red wire

attach to power terminal

Black wire

Lionel no. 610-5906-001 Sound Activation Button (for horn)

Lionel no. 610-5906-001 Sound Activation Button (for bell)

Note! The no. 610-5906-001 sound activation button (available separately) works with any Lionel AC transformer *except no. 6-4690 Type MW.* Transformers made by other manufacturers may not be compatible with RailSounds.

TrainMaster Command operations

The Command control environment

Lionel TrainMaster Command is the fun and sophisticated model railroad control system from Lionel. Your GG1 features the Lionel Command reverse unit, which acts as both a conventional reverse unit as well as the key to unlocking many extra features when you operate in Command mode.

TrainMaster Command gives you the power to operate multiple Command-equipped locomotives o*n the same track, at the same time*. It's the most fun you can have with electric trains, and it's incredibly easy too! Just follow the directions below and you'll be on your way.

To operate in Command, you need a Command Base and a CAB-1 remote. Find them both at your authorized Lionel retailer.

1 **Place your GG1 on Lionel or Lionel-compatible O gauge track.**
- **Make sure track power is OFF before placing it on the track.**
- **Make sure your Lionel Command Base is ON** and its communications wire is connected to the COMMON post on your Lionel transformer or the U on any of your installed PowerMasters.
- Once positioned on the track, increase track voltage to FULL (on PowerMaster, slide the CMD/CONV switch to CMD).

2 **Address your GG1 using CAB-1.**
- **Press ENG and 1** on the numeric keypad of your CAB-1 remote. This command is sent by CAB-1 to the Command Base, which then translates your command into digital code. That code is sent around your railroad's outside rails in the form of a digital "halo." All Command-equipped Lionels listen to this digital communication, but they do not respond until they hear their individual ID number—in this case, "1."
- The digital language of TrainMaster Command—and not track power—controls the actions of Command-equipped Lionels. Track power is simply like gasoline in the tank of your car—it gives you the power to go places, but it doesn't tell you where to go or how fast to get there.
- **All Command-equipped Lionels come factory-programmed with an ID# of "1."** To change the ID# of your GG1 (equipped with an R2LC) see page 14.

3 **Move 'em out!**
- Throttle up or press any command button on CAB-1. Your GG1 will respond to your every command. Read on.

TrainMaster Command operations

Running your GG1 in the TrainMaster Command environment

Example	address Locomotive #1

PowerMasters set to CMD or traditional power supplies ON FULL

ENG   Press ENG

1   Press 1 (the ID#)

Throttle up/press any command button

Your Command-equipped GG1 comes factory-programmed with an ID# of "1." To get your GG1 in action, set PowerMasters to CMD or set all power supplies on full. Press ENG and "1" on CAB-1. Turn the throttle or press any command button; RailSounds starts up. Your GG1 is ready for Command operations.

CAB-1 commands for your GG1

COUPLER F GG1 front coupler releases. ***Coupler release sounds.***

COUPLER R GG1 rear coupler releases. ***Coupler release sounds.***

Activates keypad.

Press AUX2 to turn your GG1's headlight on and off.

Turn the THROTTLE to the right to accelerate, left to decelerate.

Press HALT to shut down all Power-Master electrical output on your railroad. Stops all Command-equipped Lionels in operation.

Press WSTL/HRN to activate the GG1 horn, release it to discontinue. ***MultiHorn horn sound.***

Press BELL once to activate the bell, again to discontinue. ***Mechanical bell sound.***

Press DIR—the locomotive decelerates to a complete stop; turn the throttle up, and the locomotive will accelerate in the new, opposite direction. There is no neutral state. ***Air-release sound.***

Press and hold BOOST for extra power. Release BOOST and return to the GG1's previous speed.

Press and hold BRAKE to slow down or stop. Release BRAKE and return to the previous speed. ***Squealing brake sounds.***

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TrainMaster Command operations

CAB-1 numeric keypad commands for your GG1

When you press AUX1 on CAB-1, you turn the numeric keypad into 10 command buttons. The keypad lets you control extra command features (until you press any top-row button like SW, ACC, RTE, TR, or ENG). The CAB-
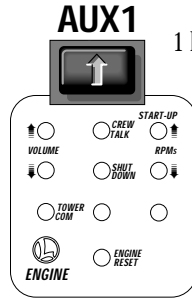
AUX1

1 keypad overlays included with your GG1 are designed to help you learn the auxiliary features specific to this locomotive. ***RailSounds sounds in bold italic.***

0 Stops and resets the GG1's. Resets the GG1's direction to FORWARD. Resets RailSounds to automatic RPM operation. ***Horn blows. RPMs return to automatic.***

1 Raises the volume of RailSounds. ***Sound volume increases.***

2 CrewTalk™ is the sound of inaudible walkie-talkie communication.

NEW!

3 Raises RailSounds RPM level. Starts up RailSounds. ***RPMs increase. Startup sequence commences.***

4 Lowers the volume of RailSounds. ***Sound volume decreases.***

5 Activates the RailSounds shut down sequence. Just like the real thing, your GG1's RPMs must be at idle for shutdown to occur. Press 6 repeatedly to lower RPMs until they won't descend further. Your locomotive is now at idle. Press 5 to initiate the shutdown sequence. ***Shutdown commences.*** Remember, the horn, bell, and RPMs will not sound until you restart RailSounds. ***CrewTalk.***

6 Lowers RailSounds RPM level. ***RPMs decrease.***

7 TowerCom™ is an audible announcement that includes that engine's road number and/or name. Your locomotive features the ***NEW TWO PART*** TowerCom announcement. By following these simple steps you will trigger a unique standby or departure message. There will be a 4 second delay before the message plays. This allows for interactive audio between two TowerCom equipped units. After pressing AUX-1, pressing 7 produces the standby announcement. If you press 7 a second time, you will get the departure announcement. Also, by inserting any command between AUX-1 and 7, you will get the departure announcement. We suggest BRAKE, since while stationary, this has no function.

NEW!

8 Not used on GG1.

9 Not used on GG1.

TrainMaster Command operations

Tuning your GG1's performance

Momentum

TrainMaster Command's momentum feature simulates the labored performance of a locomotive pulling a heavy load. Press L, M, or H (located under CAB-1's removable panel) for light, medium, or heavy momentum. The GG1's R2LC remembers this setting until you change it. For quick locomotive response, choose L.

Braking and Boosting

There's more to starting and stopping than just turning the CAB-1 throttle. Use the BOOST and BRAKE command buttons—they give you incremental control of speed and are the superior way to handle grades, gradual stops-and-starts, and more. Plus, using BRAKE in the Command environment gives you a bonus RailSounds effect—the ultrarealistic sound of squealing brakes.

Sound Quality

To achieve your preferred RailSounds master volume level, we recommend you use your GG1 volume control dial (see page 8 for location). Turn the dial left or right to adjust the volume to your liking.

For quick remote-control of volume below the master setting—for example, muting—use the CAB-1 numeric keypad's volume control. Press AUX1 and then 4 on the numeric keypad to lower overall RailSounds output.

High Voltage Setting

Press SET, headlight will flash. Get your locomotive moving to the maximum speed you want it to run, press BOOST. Use this to keep your locomotive from excess-speed derailing. Turn off the high voltage setting by pressing SET, then BOOST, holding each for one second.

Stall

Make your GG1 feel more responsive by setting a "stall" voltage. Get your locomotive moving, then press SET; the GG1 will stop. Turn the throttle clockwise to get the locomotive moving, then decrease speed until the locomotive just stops. Then press SET again; the R2LC remembers the stall setting until you change it. To clear stall, press SET twice, holding it for one second each time.

Note! These settings will be lost when you assign a new engine ID number.

TrainMaster Command operations

Assigning your GG1 a new ID#

Example   **Assign a new I D# to your Command-equipped GG1**

Command Base ON

Place the GG1 on track

PowerMasters set to CMD or traditional power supplies on full

Set the GG1 reverse unit control switch to PROGRAM (PROG)

Turn track power on (PowerMasters):

    ⬒ **Press BOOST**

Program the GG1 with a new ID#:

    ENG **Press ENG**

    ? ? **Press a number you choose (the ID#)**

    SET **Press SET**

Set reverse unit control switch to RUN

Your GG1 remembers its ID# forever; change it any time with these steps

As your fleet of Command-equipped Lionels grows, give your GG1 its own ID#. Choose from any between 1 and 99. Turn the Command Base ON and place the GG1 on track. Power up, then slide GG1's reverse unit control switch to PROGRAM (PROG).

Using CAB-1, press ENG, the locomotive ID# (you select), then press the SET button located under CAB-1's removable panel. See the GG1's headlight flash and hear the horn blow; that's your signal that the programming has been accepted. Slide the control switch to RUN. Your GG1 is now programmed to respond to the number you entered.

*We recommend that you chose an easy to remember ID# for your engine. Some possibilities are part of the engine road number, your age, any two digit number that is **not used by another engine**. If you like write the number on a small piece of tape and put this on the bottom of the frame to aid in remembering.*

PROG   RUN

FRONT of GG1

GG1 reverse unit control switch   SIG   FULL
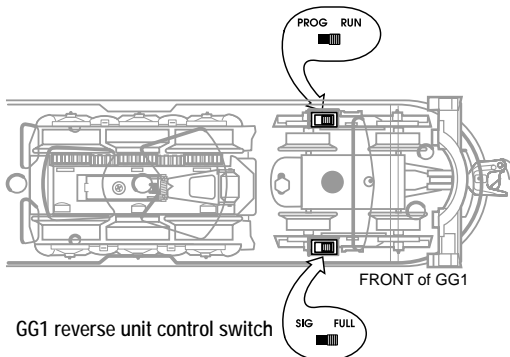
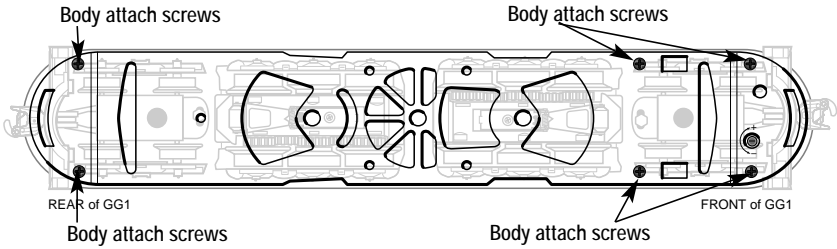# TrainMaster Command operations

Replacing your GG1 lamps

Your GG1 is illuminated by two 14-volt lamps. During the course of normal operation, they may require replacement.

Start by separating the die-cast body from the frame; remove the six screws on the underside of the frame and lift the body up slightly.
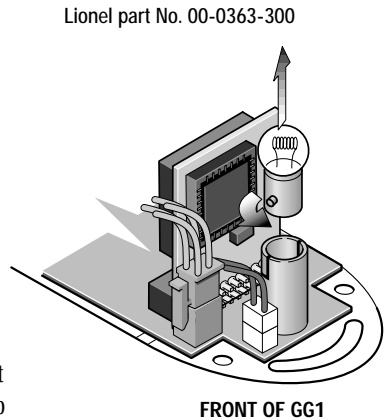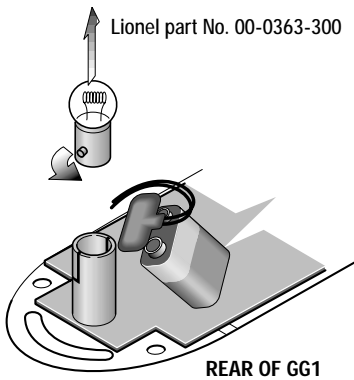
Both lamps are "bayonet" style. To remove, push down and turn counterclockwise to disengage the bulb from the socket.

Replace the expired lamp with Lionel part no. 00-0363-300, available from your local Lionel Authorized Service Center or Lionel Service. (For more information, see Lionel Service on page 20.)

Insert the replacement lamp's prongs into the socket, making sure of a tight connection. To reinstall the shell, reverse the process. Make sure all of the wires are inside the body before you tighten the screws.

Body attach screws

Body attach screws

REAR of GG1

FRONT of GG1

Body attach screws

Body attach screws

Underside of the GG-1 showing screw locations.

Lionel part No. 00-0363-300

Lionel part No. 00-0363-300

REAR OF GG1

Note! Press Aux2 to make sure headlamp was not accidently turned off, before replacing bulb

FRONT OF GG1

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Maintaining and servicing your GG1

Lubricating your GG1's Pullmor motor armatures

Your GG1 will require occasional lubrication of its Pullmor motor armatures. If you hear excess noise during operation, or if the locomotive slows down intermittently, you may need to oil the top armature bearings.

Start by separating the body from the frame (see page 15 for screw locations). Apply a small amount of Lionel oil (2-3 drops) into the oil wick hole.

Finish the job by reinstalling the body shell. Line up the screw holes and reinsert the screws.

Note! The Liontech Command reverse unit is a sophisticated electronic device and is extremely sensitive to static electricity. Please avoid all physical contact with the R2LC.

Oil Wick
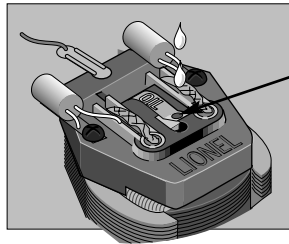
Place a small amount of oil (2-3 drops maximum) in the hole marked OIL.

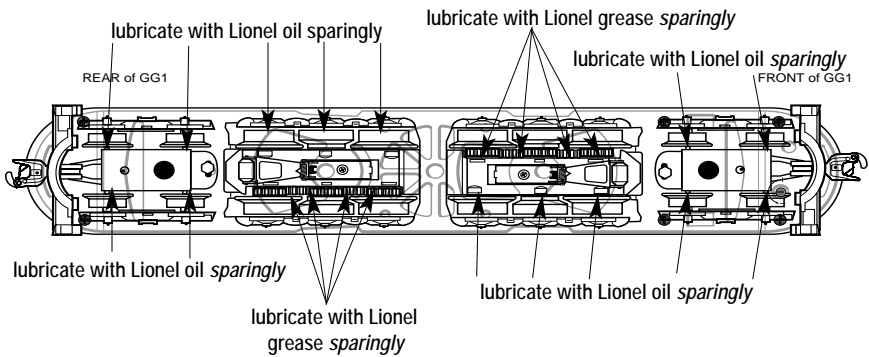# *Maintaining and servicing your GG1*

Lubricating your GG-1

Help your Lionel GG-1 lead a long and productive life on your railroad by maintaining it properly.

We recommend you purchase a Lionel Lubrication and Maintenance kit (no. 6-62927), available from your Lionel dealer. Two basic rules to keep in mind: never over-lubricate (a small amount will do), and avoid getting grease or oil on the GG-1's wheels or your track.

You'll know your GG-1 requires lubrication when visual inspection reveals dryness on the parts indicated in the illustration. Remove accumulated dirt and dust before lubricating, and always lubricate any locomotive emerging from prolonged storage.

lubricate with Lionel oil sparingly

lubricate with Lionel grease *sparingly*

lubricate with Lionel oil *sparingly*

REAR of GG1

FRONT of GG1

lubricate with Lionel oil *sparingly*

lubricate with Lionel grease *sparingly*

lubricate with Lionel oil *sparingly*

Maintaining and servicing your GG1

Reprogramming R2LC circuit boards to restore features

Due to the inevitable derailments, static, and the nature of electricity, it is possible that your R2LC could someday lose its setup program.The symptoms of this condition would be unresponsiveness in command mode. This can be easily remedied by "reprogramming" your R2LC using the following steps

Step 1: Move switch on locomotive from run to program.

Step 2: Turn on Command Base.

Step 3: Place locomotive on track, then turn on power to track.

Step 4: Pres "ENG" then input locomotive's ID#. Press "SET"

Step 5: Press "ENG", then the ID#, "AUX1", then press #6 for your GG1.

Step 6: Turn off power to track, wait ten seconds.

Step 7: Remove locomotive from track, move switch from program to run.

Step 8: Place locomotive back on track, turn power on to track.

Step 9: Press "ENG" and ID#, then operate as normal.

Maintaining and servicing your GG1

Installing the pantograph on your GG1

Although your engine is wired to operate on a three-rail track, it is equipped with operating pantographs which can be wired into the power circuit by any model railroader whose layout works with a catenary, or overhead power line.

The pantographs are held in place with a spring catch and can be removed simply by pulling the base frame upward. This is a very important feature as it prevents damage to the pantograph in the event of a derailment or catching on a catenary. To replace, open the pantograph and snap into place by pushing in the center portion.

The four insulation pieces are packaged separately and need to be installed. Simply snap them into the four supports as shown here.
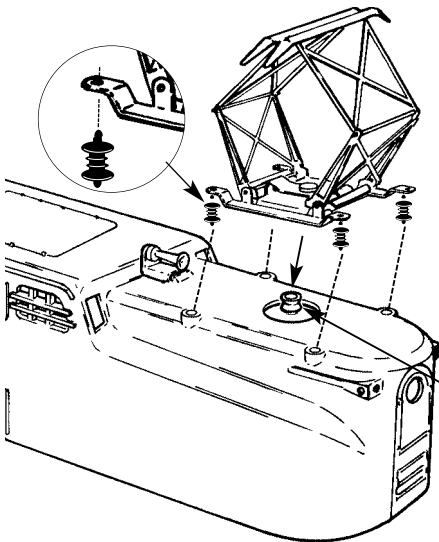
Catenary Operation
First remove the body from the frame of your GG1. (see page 7) For prototypical operation, (raised pantograph in the rear) it will be necessary to switch the order of connections to the pantographs. To do this you will need to unsolder the antenna lead from the rear pantograph pick-up, splice about 6" of wire to the antenna lead, and solder it to the front pantograph pick-up. Next establish a wire from the rear pantograph pick-up to one of the collector leads (cut and splice).

Pantograph pick-ups located here inside body

Note! One of the pantographs acts as the antenna. Your GG1 may not respond to command control without the pantographs installed

Note! If you do wire power to the pantograph, you absolutely must fold down and secure the other pantograph so that it does not accidentally pop up and touch the power line.

Limited Warranty/Lionel Service

This Lionel product, including all mechanical and electrical components, moving parts, motors and structural components, except for light bulbs, is warranted to the original consumer-purchaser, for one year against original defects in materials or workmanship when purchased through an authorized Lionel merchant.

This warranty does NOT cover normal wear and tear, light bulbs, defects appearing in the course of commercial use, or damage resulting from abuse or misuse of the product by the purchaser. Transfer of this product by the original consumer-purchaser to another person voids this warranty. Modification of this product voids this warranty.

Any warranted product which is defective in original materials or workmanship and is delivered by the original consumer-purchaser to Lionel L.L.C. or an Authorized Lionel L.L.C. Service Center, together with proof of original purchase, will at the option of Lionel L.L.C. be repaired or replaced, without charge for parts or labor. In the event the defective product cannot be repaired, and a replacement is not available, a refund of the original purchase price will be granted. Any products on which warranty service is sought must be sent freight or postage prepaid, as transportation and shipping charges are not covered by the warranty.

In no event shall Lionel L.L.C. be liable for incidental or consequential damages.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

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

Instructions for Obtaining Service

If service for this Lionel L.L.C. product is required, bring the item, along with your dated sales receipt and completed warranty information to the nearest Authorized Lionel Service Center. Your nearest Lionel Service Center can be found by calling 1-800-4-Lionel, or by contacting our Website at www.lionel.com

If you prefer to send it back to Lionel L.L.C. for factory repair, you must first call 810-949-4100 or FAX 810-949-5429 or write to Customer Service, P.O. Box 748, New Baltimore, MI 48047-0748 stating what the item is, when it was purchased and what seems to be the problem. You will be sent a return authorization letter and label to assure your merchandise will be properly handled upon receipt.

Once you have received your return authorization and label, make sure that the item is packed to prevent damage during shipping and handling. We suggest that you use the product's original packaging. This shipment must be prepaid and we recommend that it be insured.

Please make sure you have followed all of the above instructions carefully before returning any merchandise for service.

Warranty Information

Please complete the information below and keep it, along with your dated sales receipt. You must present this and your dated sales receipt when requesting warranty service.

Name _____

Address _____

Place of Purchase _____

Date of Purchase _____

Product Number _____

Product Description _____

_____