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Lionel SD-40-2 Diesel Locomotive Owner's Manual

featuring TRAINmaster COMMAND

Rail Sounds™

and

ODYSSEY™ SYSTEM

Congratulations!

You purchased a tough, durable locomotive—the SD-40-2 diesel locomotive built by Lionel. From the crisp detail and expert decoration on the outside to the brute power under the hood, the Lionel SD-40-2 is ready for duty on your model railroad. Experience the superiority of today's Lionel.

Features of the SD-40-2

- **Odyssey System for speed control**
- **Two powerful flywheel-equipped can motors**
- **Digital TrainMaster Command Control system**
- **RailSounds digital sound system**
- **Tire-Traction**
- **Die-cast ElectroCouplers (in Command)**
- **Illuminated headlights and classification lights**
- **CrewTalk (in Command)**
- **TowerCom (in Command)**
- **Diesel smoke generator**
- **Directional lighting**

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Transformer operations

Running your Lionel SD-40-2 with a Lionel transformer

1 *Place your SD-40-2 locomotive on Lionel or Lionel-compatible O gauge track.*

2 *Power up your SD-40-2 with your transformer.*

- **Your SD-40-2 is designed to operate on 8-18 volts alternating current.** Virtually all Lionel and Lionel-compatible alternating-current transformers are suitable.

Caution!

- **Do not power your SD-40-2 with direct current** (DC). Damage to sensitive electronic components may occur.

Note!

- **When you first power up your track, the SD-40-2 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 (non-Command) railroad, the SD-40-2's headlight will illuminate and RailSounds will fire up. At this point, the SD-40-2 is in neutral. (This occurs when placing the SD-40-2 on your railroad for the first time. Thereafter, it will start in forward following every three-second power interruption.)

3 *Move 'em out!*

- **Get your SD-40-2 moving.** Press the DIR button on your CAB-1 remote or Lionel transformer. This sequences the Lionel reverse unit to the next operating state.
- **Adjust track voltage** until your SD-40-2 moves at your desired speed. To increase speed, increase track voltage. To decrease speed, reduce voltage. To stop the locomotive, turn-off track power.
- **See page 5 for information on locking your SD-40-2 in a single operational state.**

Transformer operations

Locking your SD-40-2 into a single operational state

To select a single operational state for your Lionel SD-40-2 (example: forward only), you can deactivate the reverse unit's sequencing function with the reverse unit control switch.

Get your locomotive moving in the desired direction, then *slow it down without stopping.* Set the reverse unit control switch to PRG. Refer to Figure 1 for the location of the switch. The SD-40-2 is now "locked" into your chosen direction.

When you no longer want single-direction operation, just slide the reverse unit control switch back to RUN.

Note! Your locomotive's reverse unit will "reset" to forward after any five second or longer power interruption, regardless of the original locked-out direction.

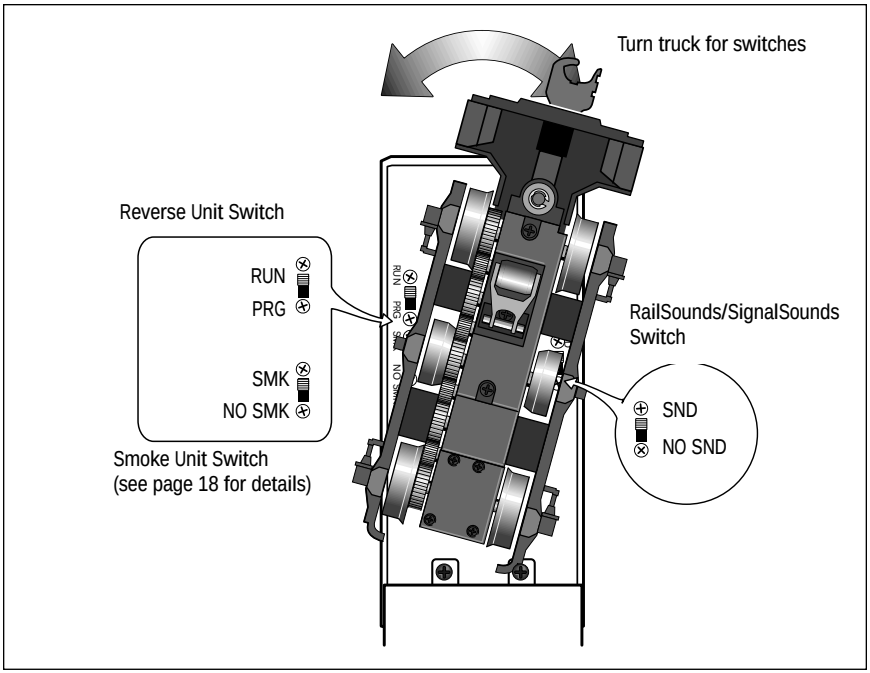


Figure 1. Switch locations

Using your SD-40-2's ElectroCouplers in the non-Command environment

To uncouple rolling stock from your SD-40-2's ElectroCouplers in the non-Command environment, you must rely on a piece of rolling stock equipped with Lionel magnetic couplers coupled directly to your SD-40-2's ElectroCouplers. 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.

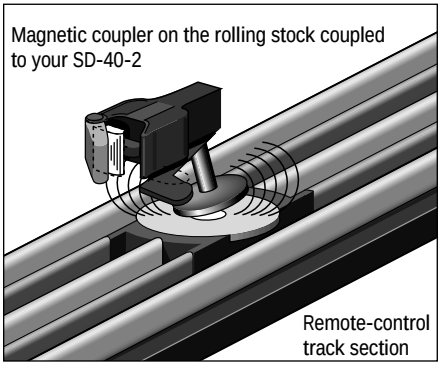


Figure 2. Trigger disc operation

Note! Your SD-40-2's ElectroCouplers will NOT open manually or by using a remote-control track section.

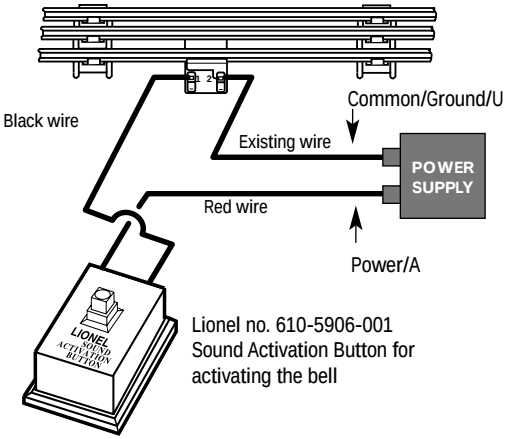
Transformer operations

Installing a Lionel Sound Activation Button

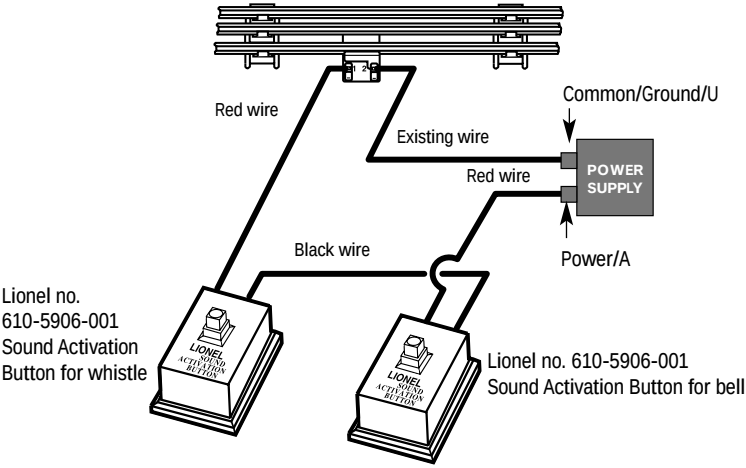
To operate the bell and horn sounds when operating your locomotive with conventional transformers, you'll need to install a Lionel no. 610-5906-001 Sound Activation Button (available separately). Connect the button(s) as shown below.

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

For AC transformers with a horn/whistle button



For AC transformers lacking a horn/whistle button



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

Odyssey System operations

The Odyssey System

The Odyssey System is a "cruise control" for your engine. Once the speed is set (see below), your engine will maintain a constant speed, no matter what loads the locomotive pulls or what grades you have on your layout. This digitally-controlled system also allows for extremely slow movement that will amaze any "scale" enthusiast.

Odyssey System conventional (transformer) operation

Setting Speed Control

1. Run the engine at the desired speed for approximately five seconds.
2. Press and hold the horn button.
3. While holding the horn button, increase the track voltage by at least three volts (at least 1/4 turn).
4. At this point, speed control is set.

Note! Engine speed will increase slightly before returning to the set speed.

Turning Off Speed Control:

1. While the engine is in neutral, turn your controller up to the maximum power (no more than 20 volts), wait one second, then press and hold the horn button.
2. While holding the horn button, slowly reduce track voltage to one-fourth of full power.
3. Release the horn button.
4. Cycle the engine to forward/reverse. The engine is now out of speed control mode.

Caution! In conventional operation, the smoke unit and lights are connected directly to track power. Do not exceed 14-16 volts for extended periods. Doing so will cause damage to the locomotive.

Odyssey System Command operation

While in the Command Control environment, the speed control feature of the Odyssey System is always on. When turning the throttle, the speed of the engine will respond to each signal from the Command Base. Example: Address the engine and slowly turn the throttle. The first light flash corresponds to the first speed step. This is the slowest speed of the locomotive.

RailSounds operations

Your SD-40-2's RailSounds system—the basics

Lionel RailSounds is the most realistic model railroad sound system in the world. Your SD-40-2 features digital samples from real-life diesel locomotives for the ultimate in realism.

You may choose to install a 9-volt *alkaline* battery in your SD-40-2. This ensures interruption-free operation of RailSounds. The battery clip is located inside the body toward the rear of the locomotive. As illustrated in Figure 3, remove the small rectangular cap and carefully unsnap and remove the rear radiator cover.

When you first apply track power, the SD-40-2's RailSounds system produces sounds of the locomotive at rest. As the SD-40-2 moves, the RPM's increase with the locomotive's speed.

To silence the diesel roar (the horn and bell remain unaffected), slide the RailSounds switch on the underside of the locomotive to NO SND (refer to Figure 1 on page 5) *before powering up the locomotive*.

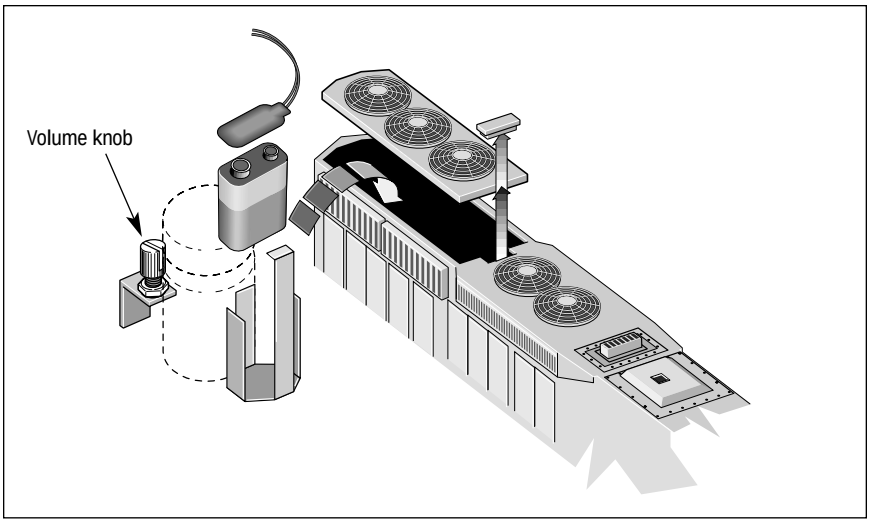


Figure 3. Battery installation

Note! Please remove the protective cover from the battery clip.

Note! Although RailSounds is powered by track voltage, the *battery is required* for uninterrupted operation and shutdown sequences. Use only alkaline batteries.

Note! Discontinue locomotive power *for 10 seconds* before changing the RailSounds ON/OFF switch position.

Note! If RailSounds "drops out" during track power interruptions (for example, during a direction change), replace the battery.

RailSounds operations

Experiencing the range of your SD-40-2'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.

- **Four diesel-roar levels.** Your SD-40-2's speed determines the level of diesel RPM roar—*automatically, if you prefer*: idle, half throttle, three quarters or full-speed output.
- **MultiHorn.** A different horn sound at different speeds—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 SD-40-2 telling you its Lionel 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 two seconds to restart your SD-40-2. If you're done with operations, RailSounds will commence with a realistic diesel shutdown sequence about two seconds after the air-release reset occurs. (Battery installation required.)

Notes on RailSounds

- Turn the volume knob clockwise or counter clockwise in the location shown on page 9 to adjust sound output.
- Listen for incidental locomotive sounds during RailSounds operation. They're automatic and, of course, authentic.
- The 9-volt alkaline battery you installed ensures *continuous* SD-40-2 diesel sound.
- Longer track-power interruptions (including locomotive derailments) cause RailSounds to shut down after about seven seconds.
- For even *more* authentic RailSounds effects, operate in the TrainMaster Command environment.

TrainMaster Command operations

The Command Control environment

Lionel TrainMaster Command Control is the advanced model railroad control system from Lionel. TrainMaster Command Control gives you the power to operate multiple Command-equipped locomotives *on the same track, at the same time.*

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

1 Place your SD-40-2 on Lionel or Lionel-compatible O gauge track.

- **Make sure track power is OFF before placing on the track.**
- **Make sure your Lionel Command Base is plugged-in** and its communications wire is connected to the COMMON post on your Lionel transformer *or* the U terminal on any of your installed PowerMasters.
- Once positioned on the track, **increase track voltage to FULL** (no more than 20 volts). On PowerMasters, slide the CMD/CONV switch to CMD.

2 Address your SD-40-2 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 Lionel engines 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 Lionel engines.** 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 locomotives come factory-programmed with an ID# of "1."** To change the ID# of your SD-40-2, see page 15.

3 Move 'em out!

- Throttle up or press any command button on CAB-1. Your SD-40-2 will respond to your every command. Read on.

TrainMaster Command operations

Running your SD-40-2 in the TrainMaster Command environment

Example ***Address Locomotive #1***

PowerMasters set to CMD or traditional power supplies ON FULL (no more than 20 volts)

Press ENG

Press 1 (the ID#)

Throttle up/press any command button

Your Command-equipped SD-40-2 comes factory-programmed with an ID# of "1." To get your SD-40-2 in action, set PowerMasters to CMD or set all power supplies on full (no more than 20 volts). Press ENG and "1" on your CAB-1. Turn the throttle or press any command button; your SD-40-2 is ready for Command operations.

CAB-1 commands for your SD-40-2

Front coupler releases. ***Coupler release sounds.***

Rear coupler releases. ***Coupler release sounds.***

Activates keypad.

Press AUX2 to turn your SD-40-2's headlights on and off.

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

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

Note! Use "Halt" only in "emergency" situations.

Press WSTL/HRN to activate the SD-40-2's horn, release it to discontinue. ***MultiHorn diesel horn sound.***

Press BELL once to activate the bell, again to discontinue. ***Diesel 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. ***Diesel air-release sound.***

Press and hold BOOST for extra power. Release BOOST and return to the SD-40-2's previous speed.

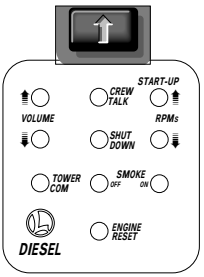
Press and hold BRAKE to slow down or stop. Release BRAKE and return to the previous speed. ***Squealing brake sounds.***

Beneath this panel

TrainMaster Command operations

CAB-1 numeric keypad commands for your SD-40-2

AUX1



When you press AUX1 on your 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). ***RailSounds sounds in bold italic.***

0 Stops and resets the SD-40-2. Resets the SD-40-2's direction to FORWARD. Resets RailSounds to automatic RPM operation. ***Horn blows. RPM's return to automatic.***

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

2 ***CrewTalk*** is the sound of unintelligible walkie-talkie communication.

3 Raises the RailSounds RPM's level. Starts up RailSounds. ***RPM's increase. Start-up sequence commences.***

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

5 Activates the RailSounds shutdown sequence. Just like the real thing, *your SD-40-2's RPM's must be at idle for shutdown to occur.* Press 6 repeatedly to lower RPM's until they won't descend further. Your locomotive is now at idle. Press 5 to initiate the shutdown sequence, following the CrewTalk sound. ***CrewTalk sounds, Diesel shutdown commences.*** Remember, the horn, bell, and RPM's will not sound until you *restart* RailSounds.

6 Lowers RailSounds RPM level. ***RPM's decrease.***

7 ***TowerCom*** is an audible announcement that includes that engine's road number and/or name. *There is a four second delay in this function.*

8 Turns smoke off. ***CrewTalk sounds.***

9 Turns on the smoke generator. Press and hold 9 (ten seconds maximum) to initiate Smoke Boost™ — this superheats the smoke generator and enhances smoke output when you start running your diesel locomotive. See notes on filling or turning off the smoke generator on page 18. ***CrewTalk sounds.***

Note! AUX1, 8 and 9 only works if the smoke unit switch is in the ON position. The CAB-1 will not operate the smoke unit when the switch is in the OFF position.

TrainMaster Command operations

Tuning your SD-40-2'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 SD-40-2's Command reverse unit 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 ultra-realistic sound of squealing brakes.

SOUND QUALITY

To achieve your preferred RailSounds master volume level, we recommend that you adjust your SD-40-2 volume control adjustment screw (see page 9 for the location). Turn the adjustment screw left or right to reach the desired volume level.

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 the overall RailSounds output.

HIGH VOLTAGE SETTING

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

STALL

Make your SD-40-2 feel more responsive by setting a "stall" voltage. Get your locomotive moving, then press SET; the SD-40-2 will stop. Turn the throttle clockwise to get the locomotive moving, then decrease speed until the locomotive just stops. Press SET again; the Command reverse unit remembers the stall setting until you change it. To clear the stall setting, 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 SD-40-2 a new ID#

Example ***Assign a new ID# to your Command-equipped SD-40-2***

Set the SD-40-2 reverse unit control switch to PRG

Command Base plugged in

Place the SD-40-2 on track

PowerMasters set to CMD or traditional power supplies ON FULL (no more than 20 volts)

Turn track power on (PowerMasters):

Press BOOST

Program the SD-40-2 with a new ID#:

Press ENG

Press a number you choose (the ID#)

Press SET

Set the reverse unit control switch to RUN

Your SD-40-2 remembers its ID# forever; change it any time with these steps

As your fleet of Command-equipped Lionel locomotives grows, you'll want to give your SD-40-2 a more individualized number. Choose from any between 1 and 99. To make things easy, use a portion of your SD-40-2's cab number.

Set the SD-40-2's reverse unit control switch to PRG (see the illustration on page 5). Plug in the Command Base and place the SD-40-2 on track, then power up. Using CAB-1, press ENG, the locomotive ID# that you select and then press the SET button located under CAB-1's removable panel. Hear the horn blow (or see the headlight flash if RailSounds is off); that's the Command reverse unit confirming the new ID#. Set the reverse unit control switch to RUN. Your SD-40-2 is ready for operations with its all-new ID#.

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

TrainMaster Command operations

Reprogramming Command reverse unit circuit board to restore features

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

STEP 1: Move the switch on your locomotive from RUN to PRG.

STEP 2: Plug in your Command Base.

STEP 3: Place the locomotive on track, then turn on power to your track.

STEP 4: Press "ENG" then input the locomotive's ID#. Press "SET."

STEP 5: Press "ENG," the ID#, "AUX1," then press **8** for your locomotive.

STEP 6: Turn off power to your track and wait ten seconds.

STEP 7: Remove the locomotive from your track, and move the switch from PRG to RUN.

STEP 8: Place the locomotive back on track, then turn power on to the track.

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

Maintaining and servicing your SD-40-2

Lubricating your SD-40-2

Help your Lionel SD-40-2 lead a long and productive life on your railroad by maintaining it properly.

We recommend that 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 SD-40-2's wheels *or* your track. You'll know your SD-40-2 requires lubrication when visual inspection reveals dryness on the parts indicated in Figure 4. Remove accumulated dirt and dust before lubricating, and always lubricate any locomotive emerging from prolonged storage.

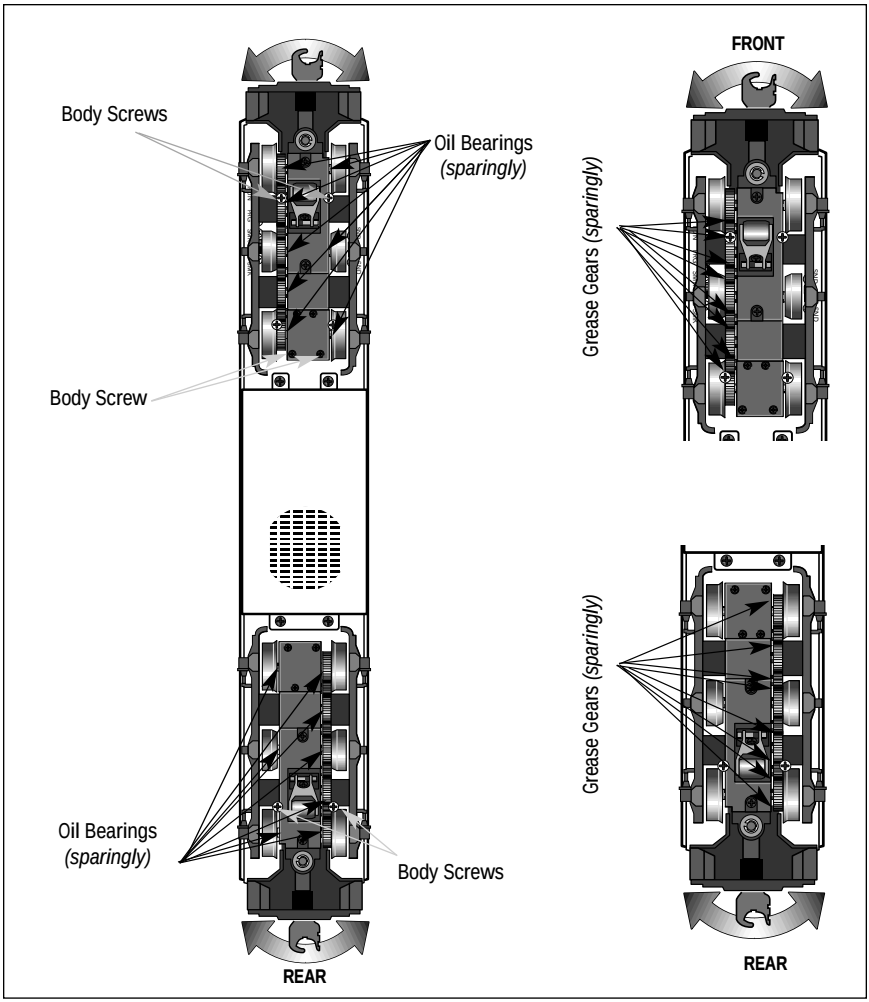


Figure 4. Underside details and lubrication points

Maintaining and servicing your SD-40-2

Adding fluid to your SD-40-2's smoke generator

Your locomotive is equipped with a smoke generator that produces safe, clean, white smoke during operation.

The smoke generator requires the periodic addition of Lionel smoke fluid in order to function. Pierce the tube end with a pin, then add 10-15 drops of fluid into the locomotive's stack. See Figure 5 for the location of the smoke stack. Smoke production will commence momentarily, faster if you run your locomotive at speed. When smoke production wanes, add more fluid (four to eight drops).

If you prefer to have a *smoke-free* locomotive, there is a switch located on the bottom of the engine under the cab marked SMK/NO SMK (see page 5 for the location). Move the switch to NO SMK and your locomotive will stop smoking.

When the smoke unit is on, *always* keep a small amount of smoke fluid in the locomotive's smoke generator; the generator's element can become damaged if operated without fluid. Smoke production is greater at higher voltages and when the locomotive is pulling a heavy load or long consist.

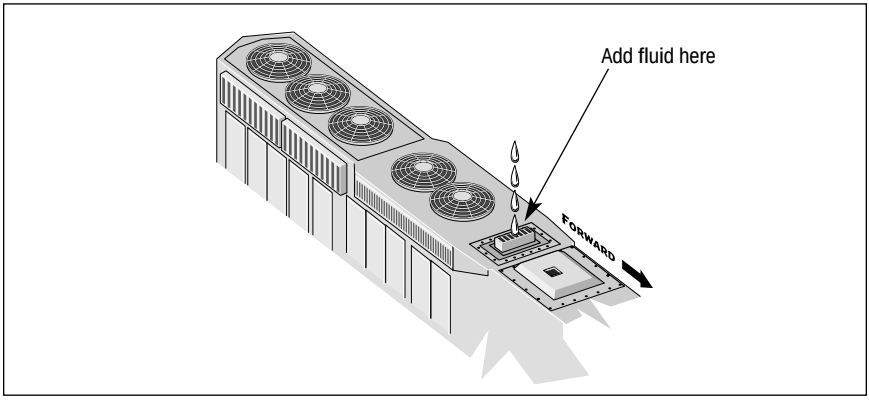


Figure 5. Stack location

Maintaining and servicing your SD-40-2

Replacing the Traction Tires

Your locomotive is equipped with four Traction Tires. These rubber treads increase the tractive effort of your locomotive, allowing it to pull more cars at once. During the course of normal operation, the Traction Tires may become worn out. Because you must remove the trucks and the side frames to access the wheels, we recommend that you have the Traction Tires replaced by your authorized Lionel Service Center.

Replacing your SD-40-2's LEDs and Lamps

Your SD-40-2 is illuminated by several LEDs and 18-volt lamps. During the course of normal operation, they may require replacement.

For expert LED and lamp replacement, we recommend that you have this done at a Lionel Service Station. See the Lionel Service Section on page 20 for more information.

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 accessing our Website at www.lionel.com.

If you prefer to send your product back to Lionel L.L.C. for repair in Michigan, you must first call 586-949-4100 or FAX 586-949-5429, 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 ensure 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. You may choose to have your product repaired by one of our Authorized Lionel Service Centers after its warranty has expired. A reasonable service fee will be charged.

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 _____

_____