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## **Diesel Locomotive Instruction Sheet**

Congratulations on your purchase of this high quality K-LINE Locomotive. Please note that this instruction sheet is for a variety of engines that may include different features. Contact Customer Service or check the Technical Support Section of the K-LINE Web Site for the latest information about your specific engine. While most K-LINE diesels now feature a Lionel Command reverse unit and RailSounds diesel sound system, some feature Signal Sounds and are command-upgradeable. Please check the information on the outside of the box to determine which system you have.

Read this instruction manual thoroughly for important tips on operating and maintaining your diesel locomotive. When properly cared for, it will last a lifetime.

### **QUADRA-GRIP™ Traction System**

Your locomotive is equipped with a Quadra-Grip Traction System. Two of the drive wheels on each motor are fitted with rubber tires, resulting in superior pulling power. For this reason, high speed starts and sudden stops should be avoided to prevent cars from derailing. Smooth throttle control will also result in more realistic operation. K-LINE locomotives with Quadra-Grip achieve maximum traction to pull heavy loads at greater speeds.

### **Non-Command Engine with Signal Sounds**

#### **Operation**

Your diesel features a solid-state, electronic reversing unit (E-unit), utilizing a state of the art, integrated circuit design. The E-unit operates as follows: Each time the power to the locomotive is interrupted, the E-unit changes states. This can be done by moving the transformer control to the off position, or pushing the direction button on your transformer (if the transformer is equipped with a direction button). The sequence of operation is forward-neutral-reverse-neutral-forward.

In addition, the Reversing Unit has a forward-reset feature. Should the engine sit without power from the track for a brief time, operation will resume in the forward direction upon being re-energized.

#### **Signal Sounds**

This locomotive is equipped with a digital horn that operates at the push of the whistle/horn button on most transformers. Running sounds are also activated while the engine is in operation. Contact K-LINE Customer Service for information about upgrading this engine to Lionel TMCC and RailSounds.

### **Command Engine with RailSounds**

#### **Transformer Operation (Non-command)**

Place your engine on the track. This engine is designed to operate on 7-18 volts alternating current. Virtually all alternating current transformer are suitable, as well as the Lionel TrainMaster Command model railroad control system.

NOTE: Do not power your locomotive with direct current (DC). Damage to electronic components may occur.

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

Get your locomotive moving. Press the DIR button on your transformer. This sequences the Lionel Command reverse unit (LCRU) to the next operating state. The LCRU alternates between three states: forward, neutral and reverse.

Adjust track voltage until your locomotive moves at a 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 LCRU's sequencing function. Get your locomotive moving in the desired direction, then slide the PROGRAM / RUN switch on the underside to PROGRAM.

## Lionel RailSounds

Lionel RailSounds is the most realistic model railroad sound system in the world. This diesel features digital samples from authentic diesels for the ultimate in realism.

Begin by installing a 9-volt alkaline battery in the locomotive. Engine sets with multiple units will have the battery clip in the leading A unit. The installation of this battery ensures full feature operation of RailSounds. Most diesels have the battery inside, so you remove the screws and lift off the engine shell. NOTE: The GP38-2 has a removable roof section to hold the battery, and the RS-3 has a place for the battery in the fuel tank. Connect the 9-volt battery to the battery clip and place the battery in the holder. Replace the body shell (or roof section or fuel tank) and reinsert the screws (if applicable). NOTE: Although track voltage powers RailSounds, the battery is required for uninterrupted operation and shutdown sequences. Use only alkaline batteries; do not use heavy duty batteries.

Apply track power and RailSounds system delivers an authentic start-up sequence, followed by the sounds of the locomotive at idle. As the engine speed increases, the sound of the RPMs move through four levels of roar. Sounds return to idle only after the locomotive has come to a complete halt. To silence diesel RPM roar (horn and bell remain unaffected), slide the RailSounds switch from RS (RailSounds) to SS (SignalSounds) before powering the locomotive. To return to the diesel RPM roar, return the switch to the RS position.

NOTE: Discontinue locomotive power for 10 seconds before changing the RailSounds RS/SS switch.

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

### Experiencing the range of RailSounds

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 engine speed determines the level of diesel RPM roar - automatically, if you prefer: idle, slow, medium or full-speed output.

**Horn.** Press WSTL/HRN on your CAB-1 or transformer to activate the horn; release it to discontinue.

**Mechanical bell.** Press BELL on your CAB-1 or transformer to begin the sound; again to discontinue.

**Full control of RPMs.** Prefer hands-on control of diesel RPM roar? Want to ramp up RPMs before pulling out, just like real diesels do? It's easy with RailSounds. Place your locomotive in neutral and increase track voltage to maximum. RPMs will continue to increase as long as the engine remains in neutral, eventually reaching their highest level. Now, decrease track voltage to the desired speed level. Press DIR on your CAB-1 remote or transformer, and head out with your engine at full churn, just like the real thing. RPMs will remain at that level until the locomotive has come to a complete halt. Experiment with controllable RPMs.

**Reverse unit reset sound.** Power down your track, wait for 3-5 seconds and listen for the air release sound - that's the locomotive 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 2 seconds to restart the locomotive. If you're done with operations, RailSounds will commence with an authentic shutdown sequence about 2 seconds after the air-release reset occurs.

### Notes on RailSounds

Use the volume control screw knob on the underside of the diesel to adjust sound output.

Listen for incidental locomotive sounds during RailSounds operation. They're automatic and authentic.

The 9-volt alkaline battery you installed ensures continuous diesel roar.

Longer track-power interruptions (including derailments) cause RailSounds to shut down after 7 seconds.

For even more authentic RailSounds effects, operate in TrainMaster Command environment.

# TrainMaster Command Operations

## The Command control environment

Lionel TrainMaster Command is the advanced model railroad control system from Lionel. Your diesel is equipped with the Lionel Command reverse unit and an LCRX for digital RailSounds control. TrainMaster Command 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. These can be purchased from your train retailer.

Place your engine on the track. Make sure track power is OFF before placing them on the track. Make sure your Lionel Command Base is ON and its communications wire is connected to the COMMON post on your 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).

### Address your diesel using the CAB-1:

Press *ENG* and *1* on the numeric keypad of your CAB-1 remote.

This command is sent by the 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 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 engines.

All Command-equipped engines come factory-programmed with an ID# of 1. See page 5 for information on changing this ID#.

Throttle up or press any command button on the CAB-1. Your engine will respond to every command.

Your Command-equipped engine comes factory programmed with an ID# of 1. To get your locomotive 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; your engine is ready for command operations.

## CAB-1 Commands

Press **AUX1** to activate numeric keypad



Press **AUX2** to turn headlight on and off



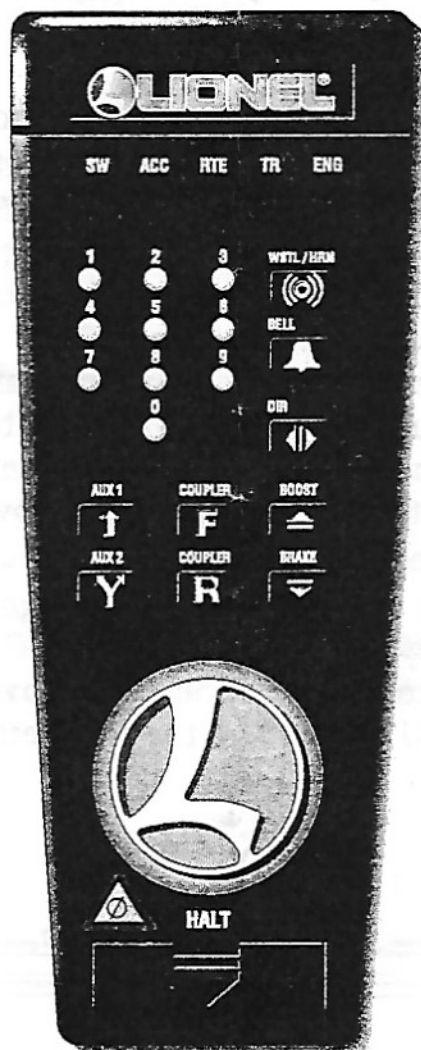
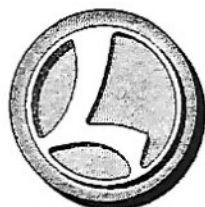
Engine is not factory equipped with Electrocouplers. Please contact Customer Service to purchase. **F / R** Buttons will produce Coupler Release sounds only prior to installation of Electrocouplers.



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



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



Press **WSTL/HRN** to activate horn. Release it to discontinue.



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



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.



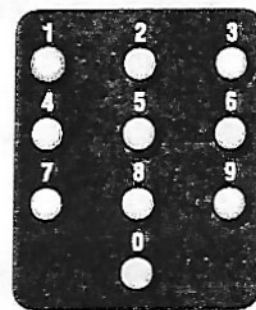
Press and hold **BOOST** for extra power. Release **BOOST** and return to the engine's previous speed.



Press and hold **BRAKE** to slow down or stop. Release **BRAKE** and return to previous speed.

## CAB-1 Numeric Keypad Commands

When you press the 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).



**0** Stops and resets the engine. Resets the direction to FORWARD. Resets RailSounds to automatic RPM. Horn Blows. RPMs return to automatic.

**1** Raises the volume of RailSounds.

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

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

**4** Lowers the volume of RailSounds.

**5** Activates the RailSounds shutdown sequence. Just like the real thing, your locomotive 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. Diesel shutdown commences. Remember, the horn, bell and RPMs will not sound until you restart RailSounds.

**6** Lowers RailSounds RPM level.

**7** TowerCom is an audible announcement from the tower.

**8** Turns the smoke unit off (only diesels with smoke)

**9** Turns the smoke unit on (only diesels with smoke)

## Tuning your locomotive'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 the CAB-1's removable panel) for light, medium or heavy momentum. The LCRU2 remembers the setting until you change it. For delayed response, use H. For quick response use 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 realistic sound of squealing brakes.

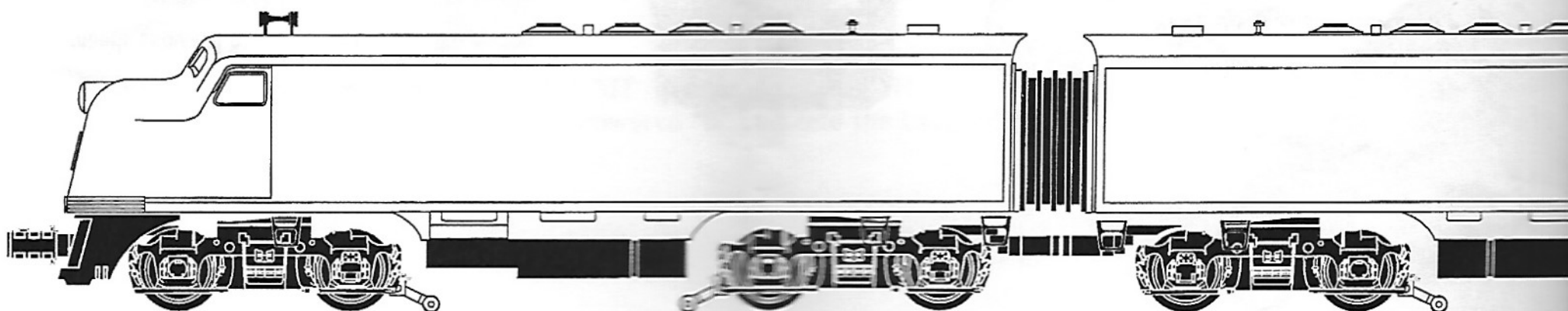
### Sound Quality

To achieve your preferred RailSounds master volume level, we recommend you use your volume control screw knob located on the underside of your engine. Turn the knob 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.

### Stall

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



## Assigning your locomotive a new ID#

As your fleet of Command-equipped engines grows, new engines require different ID#. Choose from any between 2 and 99. Remember, all Command-equipped engines ship as ID#1.

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. If you like, write the number on a small piece of tape and put this on the bottom of the engine chassis to aid in remembering.

Step 1: Turn the Command Base ON and set the engine on the track.

Step 2: Power up, then slide the PROGRAM / RUN switch to PROGRAM.

Step 3: Turn track power on (PowerMasters).

Step 4: Press BOOST.

Step 5: Press ENG and new ID#.

Step 6: Press SET located under the removable cover.

Step 7: See the headlight flash and hear the horn blow; that's your signal that programming has been accepted.

Step 8: Set the PROGRAM / RUN switch to RUN.

Your engine remembers its ID# forever, change it any time with these steps.

## Reprogramming LCRU circuit boards to restore features

Due to the inevitable derailments, static and the nature of electricity, it is possible that your LCRU could someday lose its setup program. The symptoms of this condition would be unresponsiveness in command mode. This can easily be remedied by "reprogramming" your LCRU 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: Press ENG then input locomotive ID#. Press SET.

Step 5: Press ENG, then the ID#, AUX1, the press 1 for Diesel or 8 for Diesel with smoke.

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 normally.

## Diesels with smoke

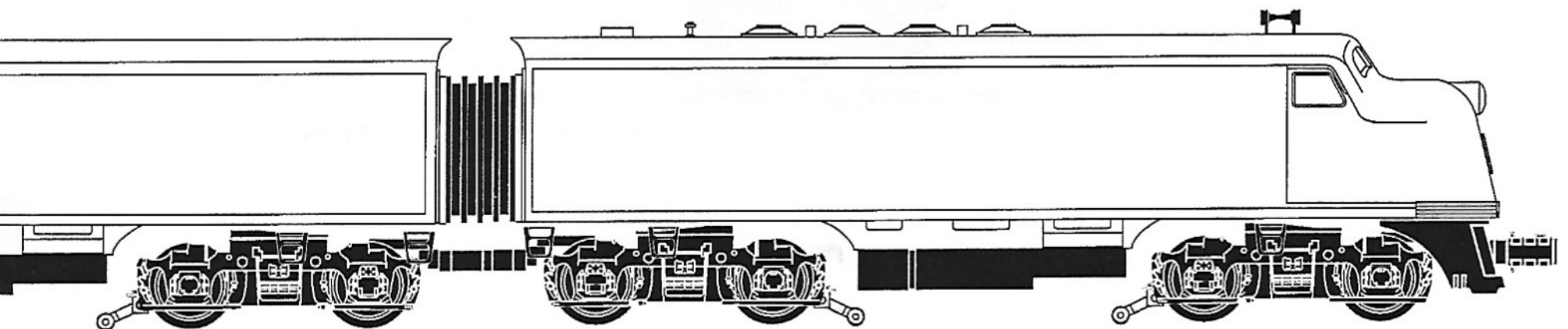
Check the information on the outside of your box to determine if your diesel includes an operating smoke unit. The smoke unit on this locomotive requires only a few drops of K-LINE Smoke Fluid to produce generous puffs of smoke. Add directly to the smoke stack. Do not use too much Smoke Fluid. A smoke unit ON / OFF switch is located underneath the locomotive. Switch to the off position if the locomotive is run without Smoke Fluid.

You can also turn the smoke unit ON and OFF using the CAB-1 Remote when running in command mode. Press AUX1 to turn on the number keypad. Press 8 to turn the smoke unit off. Press 9 to turn the smoke unit on.



## Lift Rings

Some engines feature separate lift rings on the roof. These rings are used to remove roof panels to perform maintenance work on real engines. Since these detail parts are delicate and may break, replacement lift rings are included with engines that include these parts. If you need additional lift rings, or you need assistance in removing the rings, contact K-LINE Customer Service.



## Multiple Unit Engines

K-LINE Multiple Unit Diesel Engines are sold in a variety of configurations. The most common are: two Powered "A" Units with one Powered "B" Unit or two Powered "A" Units.

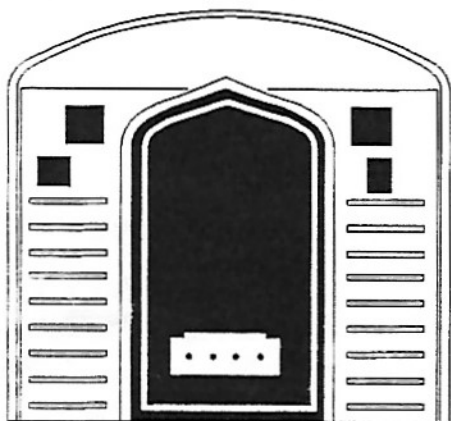
All configurations are completely functional as packaged, however, additional matching engines may be available to create other arrangements. Please follow the instructions below to ensure proper operation of the engines.

The connections between the engines allow the electronics of the Leading "A" engine to control its two motors and the motors of any engine following (most likely the "B" Unit and the Trailing "A"). The engines were designed with six motors for superior pulling power. It is recommended that the linked F-units operate on 42 inch curves, however, if you wish to run the F-Units on 31 inch curves, additional couplers are included to achieve greater clearance of the diaphragms around the sharper curves. E-Unit Diesels require a 54 inch curve for operation.

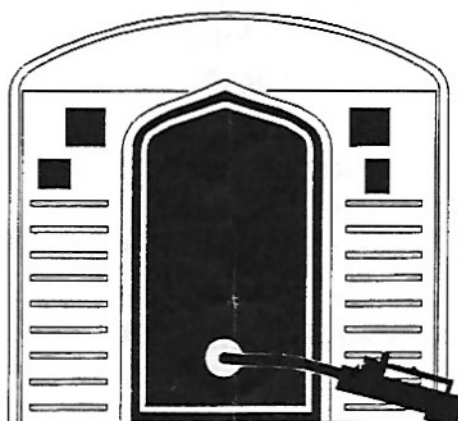
NOTE: If you are running two or more powered units, we recommend using at least a K-951 or a similarly powered transformer.

## CONNECTIONS

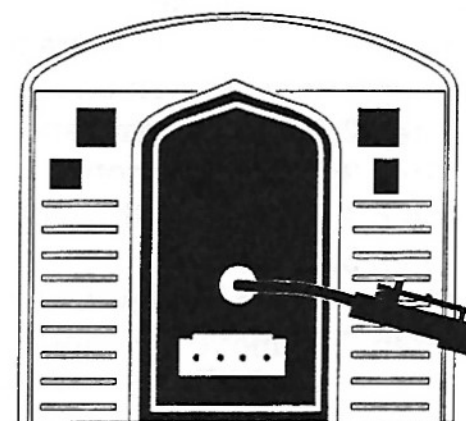
K-LINE Multiple Unit Engines are equipped with PowerLink. This allows the electronics in the lead engine to control the motors of all subsequent engines. It is essential to link the engines in the right order for optimum operation. Use the following diagram of connectors to determine which engine is which. This information will allow you to link the engines properly.



**Receptacle Only**  
Leading "A" / Rear of "B"



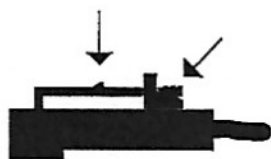
**Plug Only**  
Trailing "A" / Front of "B"



**Receptacle & Plug**  
Bi-modal "A"

## The Plug

Plug Lock    Ridged End



### PLUG ATTACHMENT

Insert plug into receptacle until it clicks and locks into place.

### PLUG RELEASE

Depress ridged end of lever with fingernail and pull gently. Do not pull out the the plug without releasing lock or you may damage the connecting wires.

## LINKING MULTIPLE ENGINE UNITS

Linking the engines together allows the Leading "A" E-unit to control the two motors of each unit.

### TRAILING "A" UNIT - POWERED "B" UNIT - LEADING "A" UNIT (A-B-A)

Insert the plug of the "B" Unit into Leading "A" and insert the plug of the Trailing "A" Unit into the "B" Unit to connect all engines.

### TRAILING "A" UNIT OR POWERED "B" UNIT - LEADING "A" UNIT

Insert the plug of the Trailing "A" Unit or Powered "B" Unit into the Leading "A" to connect the two engines.

## BI-MODAL ENGINE OPERATION

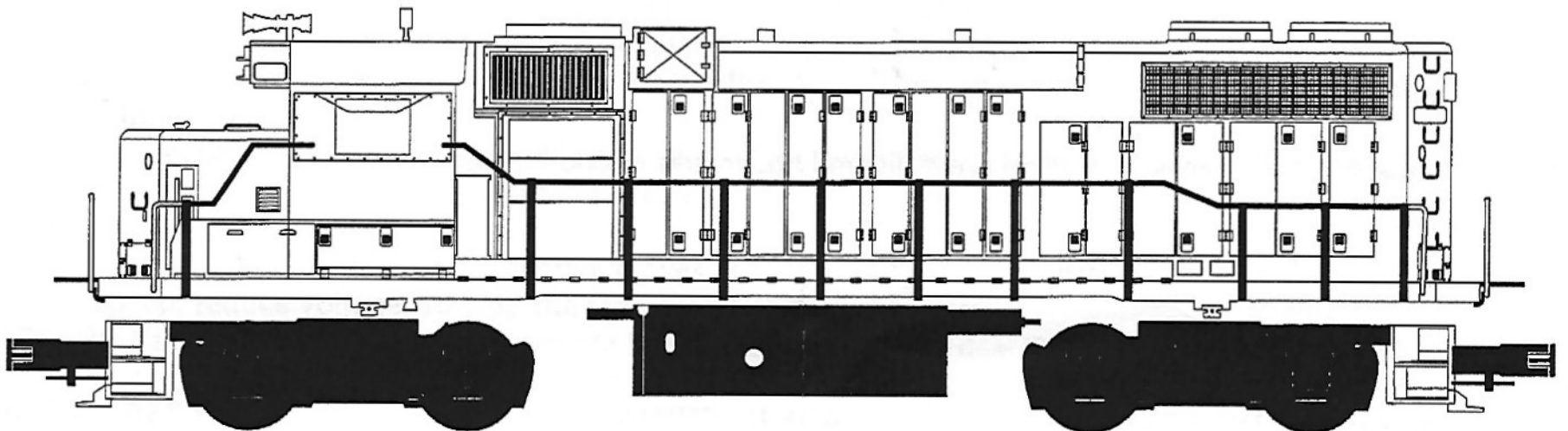
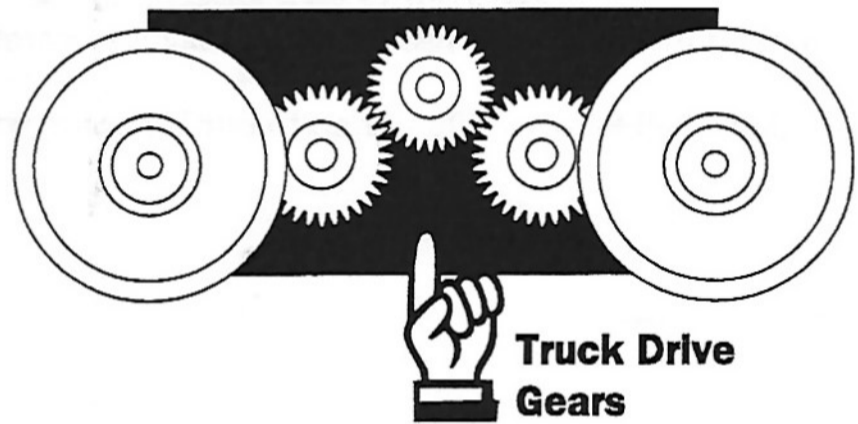
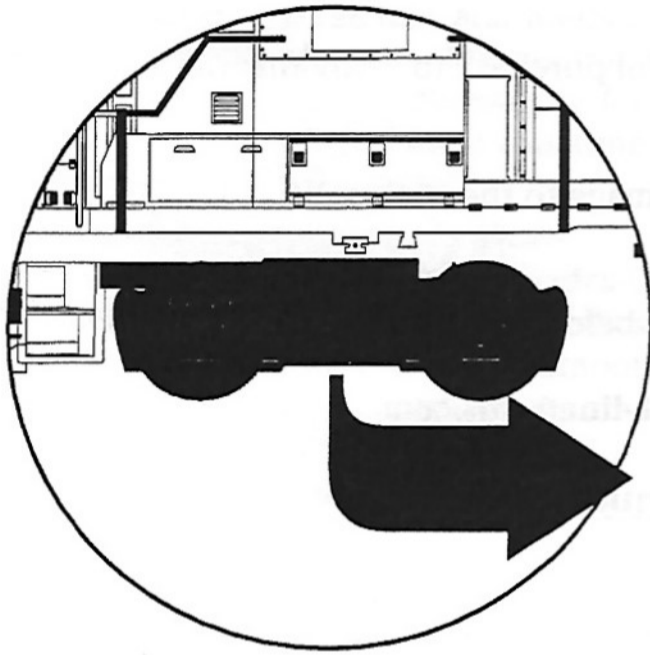
A single "A" Unit (sold separately) may be a Bi-Modal "A" Unit. This means that the engine can run by itself or can be connected to an A-B pair as the Trailing "A." In this second instance, the engine functions as a Trailing Unit whose two motors are controlled by the E-Unit in the Leading "A" Unit.

To operate the Bi-Modal Unit by itself, insert the plug into its own receptacle. This engages the E-Unit. To operate this engine as the Trailing Unit in an A-B-A, follow the instructions above.

## Engine Maintenance

### Lubricating your diesel

K-LINE Diesels are designed to prove years of quality operation with very little maintenance required. Periodically apply gear lubricant to the truck drive gears. Turn over the engine to locate these behind the truck side frames. The wheel hubs should be lubricated occasionally with light machine oil. Remove any excess oil or grease, especially if it has come in contact with the traction surfaces of the wheels. Do not overlubricate.



## ONE YEAR LIMITED WARRANTY

This engine is warranted for one year from the date of purchase against defects in material and workmanship. We will repair or replace at our option, the defective part without charge for parts or labor, if it is received within one year from the date of purchase. This warranty does not cover items that have been abused or damaged by careless handling. Transportation cost, if any, incurred by you are not covered by this warranty.

1. Should service be required during the warranty period, return the defective engine POST PAID to

If you are sending by US Mail:  
K-LINE Customer Service  
PO Box 2831  
Chapel Hill, NC 27515

If you sending by UPS or RPS:  
K-LINE Customer Service  
6909 Dodsons Crossroads  
Hillsborough, NC 27278

Be sure to include a copy of your sales receipt or other form of proof of purchase to verify that the engine qualifies for complete service at no charge.

2. CAUTION: Make sure the engine is well packed to prevent damage to the engine. We recommend that the package be insured.
3. Please make sure that all instructions were followed carefully before returning any merchandise for service.

For questions, call **800-866-9986** or go to our Web Site: **[www.k-linetrains.com](http://www.k-linetrains.com)**

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