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UNION PACIFIC FEF-CLASS 4-8-4 LOCOMOTIVE



Thank you for purchase of this Genesis FEF steam locomotive. Every effort has been made to make it an accurate replica, specific to a particular engine and its time in history. Additionally, we've tried to make sure the engineering of its mechanism and electronics is the best yet from Genesis.

We hope all this hard work brings you hours of pleasure, whether running it on your layout or examining its every detail.

Sincerely,

The Genesis Team

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Of all the thousands upon thousands of mainline steam locomotives that worked for Class I railroads, only one is still on the active roster of its original owner, having never been retired. This extraordinary survivor is Union Pacific class FEF-3 No. 844, the last-built of UP's 45-member fleet of magnificent 4-8-4's. The FEF's were designed to haul heavy passenger trains at high speeds over long distances, and that's what 844, kept on UP's books as a corporate goodwill ambassador and a reminder of the steam age, still occasionally does, although the trains are day-trip excursions, not transcontinental limiteds.

The first 4-8-4 locomotives were built in 1926 for the Northern Pacific Railway. The wheel arrangement became most commonly known as the "Northern" type, although several railroads chose to call their 4-8-4's by other names, including Niagara, Pocono, Greenbrier, and Potomac. The UP did not use any of these monikers, but, in keeping with its practice for other wheel arrangements, called the type "FEF," for Four-Eight-Four. Powerful and fast, Northern were suitable for both heavy passenger and fast freight work, and many roads considered them dual-service engines. The 4-8-4 found wide acceptance, with 1115 being built for nearly three dozen railroads before production ended in 1950.

In 1936, when Union Pacific's passenger 4-8-2's were having trouble keeping time with heavy trains, UP locomotive designer A. H. Fetters and Alco worked together to develop a 4-8-4. Otto Jabelmann, who would soon succeed Fetters as UP's top motive-power design man, also contributed. Classed FEF-1 and carrying road numbers 800-819, UP's first 4-8-4's were delivered in 1937. The 4-8-4's

performed better than anticipated, and soon UP was working on an even better version.

Though broadly similar to the FEF-1, the FEF-2, largely a product of Jabelmann and his design team, was a significant step above its predecessor. Numbers 820-834 arrived from Alco in 1939 sporting larger cylinders, higher drivers, and greater overall length and weight than the earlier 4-8-4's. The FEF-2's were designed for a top speed of 110 mph and developed maximum continuous horsepower at 90 mph. Jabelmann was a great believer in standardization, and the FEF-2's contained many components also used in UP's 4-8-8-4 Big Boys and 4-6-6-4 Challengers.

Water capacity had been a problem for the FEF-1's, so a larger tender was provided for the FEF-2's. The greater weight necessitated more wheels, giving rise to the first "centipede" tender, which

featured a conventional 4-wheel truck followed by 10 wheels in a rigid frame. This design was later applied to UP's Challengers and Big Boys, plus some smaller engines on other roads.

World War II brought tremendous traffic increases to all railroads, and the burden on western carriers increased in 1944 and '45 as the campaign in the Pacific was stepped up. To handle this traffic, UP received from Alco in 1944 what turned out to be its final group of 4-8-4's, FEF-3's 835-844.

The war babies were virtual duplicates of the FEF-2, the main external differences being the FEF-3's double smokestack and cast pilot with enclosed coupler pocket. Material shortages necessitated heavier steel in certain components, resulting in a 7700-lb. increase in weight over the FEF-2.

Outstanding as UP's 4-8-4's were, there was some room for improvement.

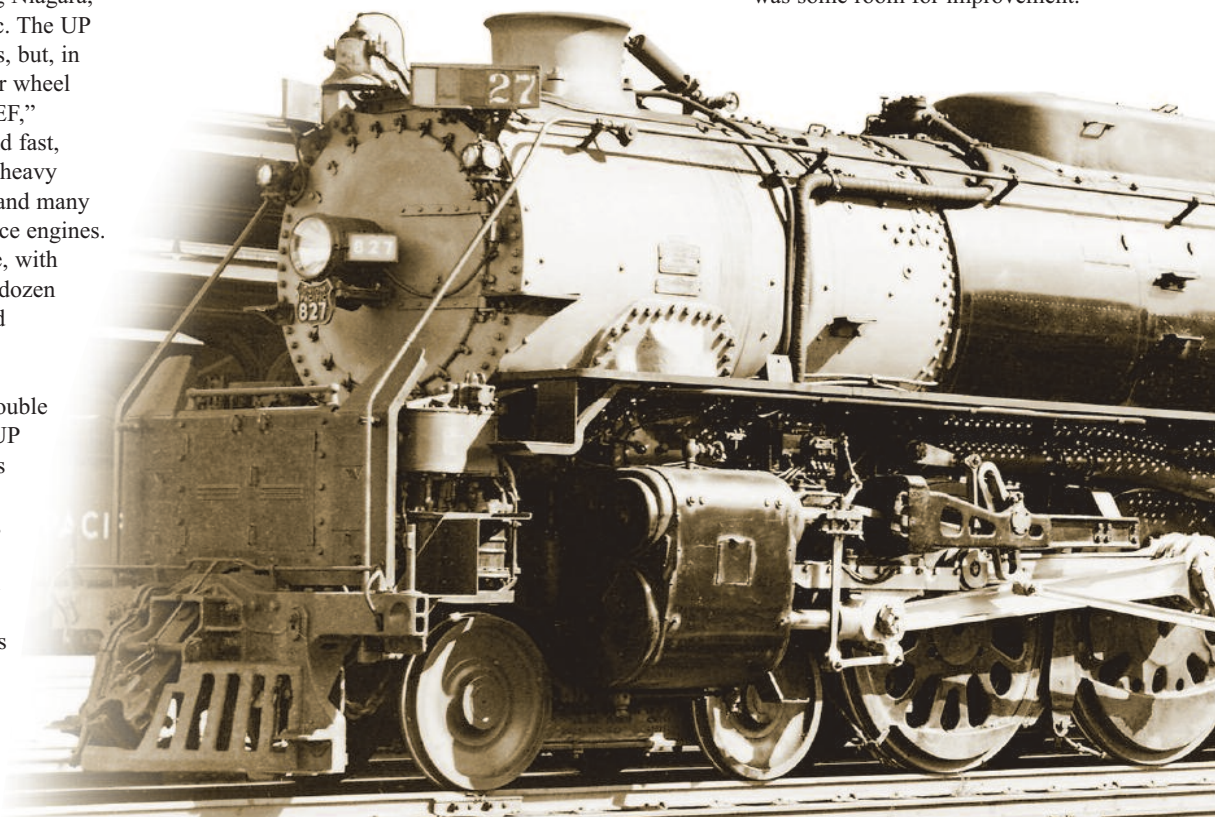


Photo Courtesy of Richard Kindig

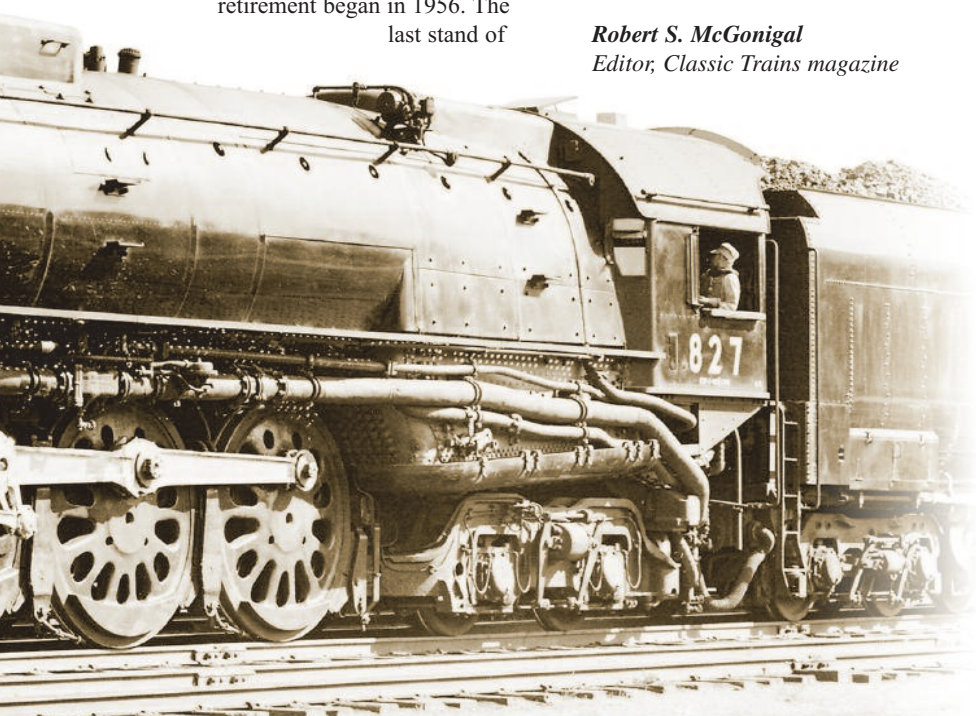
From the start, the FEF-2's and 3's suffered from smoke drifting down around the cab. To cure this, beginning in 1945 the road began installing sheet-metal smoke "wings" to those two classes; eventually the FEF-1's also got the wings. In 1946, the threat of a coal strike prompted the UP to convert its 4-8-4's to oil fuel. Also in '46, the road adopted a two-tone gray livery for its big passenger engines; all the 4-8-4's got this treatment, although on later repaints the accent striping color was changed from a light gray to yellow before all-black was reinstated in 1952. In an effort to improve steaming, triple smoke stacks were applied to an FEF-2 in one case and in three or four cases to FEF-3s. Red oscillating warning lights above the headlight became standard in the late 1940's.

The FEF's remained in passenger service until the mid-1950's, when diesels began bumping them to freight service (and occasional pinch-hits for diesels on passenger trains) on the east end of the UP. General retirement began in 1956. The last stand of

the FEF's was during the busy summer and Christmas seasons of 1958, when a grimy few worked freights between Omaha and North Platte, Nebraska.

Four of the great engines survive. FEF-1 814 and FEF-2 833 are displayed at museums in Council Bluffs, Iowa, and Ogden, Utah, respectively. FEF-3 838 is in UP storage in Cheyenne, Wyoming, which is home base for No. 844. After a January 1960 stint as a snow-melter in UP's Council Bluffs yard, the 844 entered excursion service in November 1960. Since then, she's racked up nearly 300,000 miles as a symbol of the proud railroad's heritage. She was renumbered 8444 in 1962 so a GP30 diesel could carry "844"; when the GP30 left the UP roster in 1989, the 4-8-4 got her number back. She even wore the postwar gray livery for a few years in the late 1980's. Since 1981, she's shared UP heritage duties with Challenger No. 3985. Recently overhauled, No. 844 looks set to carry on the legend of Union Pacific's great 4-8-4's for years to come.

Robert S. McGonigal
Editor, *Classic Trains* magazine



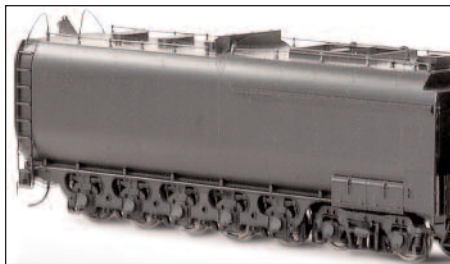
UNION PACIFIC 4-8-4 FAMILY

Class	FEF-1	FEF-2	FEF-3
Road Numbers	800-819	820-834	835-844
Builder, year	Alco, 1937	Alco, 1939	Alco, 1944
Cylinder bore x stroke	24" x 32"	25" x 32"	25" x 32"
Boiler pressure (PSI)	300	300	300
Driver diameter	77	80	80
Tractive effort (lbs.)	63,600	63,800	63,800
Engine weight (lbs.)	465,000	483,000	490,700
Wheelbase	97 ft. 6 in.	98 ft. 5 in.	98 ft. 5 in.
Fuel (all changed to oil, 1946)	Coal	Coal	Coal
Tender type	12-wheel	Centipede	Centipede
Fuel capacity (tons)	25	25	25
Water capacity (gallons)	20,000	23,500	23,500

3 THE FEF-CLASS 4-8-4



Photo Courtesy of George Speir



Tender

The tender is a work of art onto itself. It accurately captures the massiveness of the 14-wheel "centipede" design while housing the DCC board, sound chip and two speakers. It also provides electrical pickup.



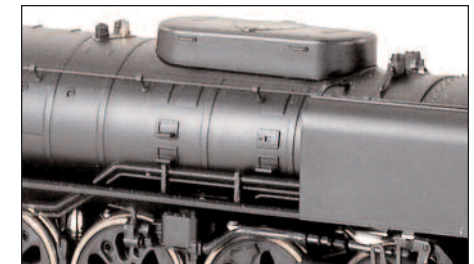
Cab

The vestibule cab is finely detailed with working side windows, operating roof hatch and a spring-loaded rear door revealing interior detail, with engineer and fireman seats, plus complete boilerback detail.



Drivers

The massive 80" Boxpok drivers are all flanged, with the rearmost set using Neoprene traction tires to assure pulling power equal to the real FEF. Highly detailed, all-metal siderods transfer power to all drivers.

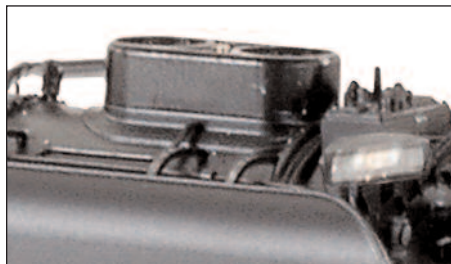


Boiler

While the original FEF was a clean, modern steam locomotive design, it still had an interesting assortment of pipes, handrails, steps and other items on its boiler. Your model has them appropriately added for each road number offered.

The installation of sound in a locomotive adds a new dimension to operation. Sound makes a technically perfect static model come alive and enhances the experience of operation. You will find that you will no longer 'run' the engine but, rather, operate it in the context of your layout. Whether you are using conventional DC control or a DCC system, the incorporation of advanced electronic technology will provide the ultimate railroading experience.

The Genesis™ FEF Locomotive includes a factory installed Dual Function DCC Decoder with speakers. The board is mounted in the tender. The DCC decoder automatically senses the power supply type (either DC or NMRA compliant DCC system) that is being used and will operate without intervention from the user.



Stacks

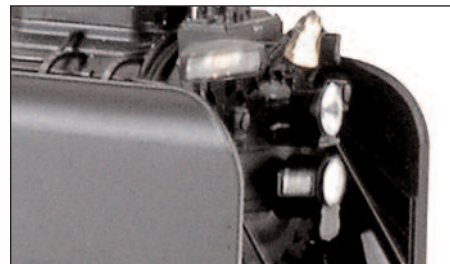
Both the original single stack style and the UP-fitted dual stack version are available, depending on the specific loco being modeled. You can easily install smoke units in either version.

HAND-HELD WIRELESS CONTROLLER FOR DC SYSTEM

Included with the FEF locomotive is a hand-held wireless controller. When operating on conventional DC, this control unit is designed specifically to allow control of the speed and direction of the locomotive as well as bell and whistle, giving you true walk around control.

- Bell • Whistle • Speed up
- Speed down • Stop • Direction

These are more features than have been previously available to the conventional DC user in any format. The Genesis™ FEF Locomotive will operate on DC without the use of this hand held, however, only the steam chuff sounds will be available in this operational mode.



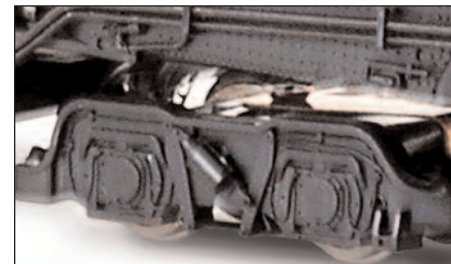
Smokebox

Over their careers, FEF's underwent a number of changes. Nowhere is this more evident than the fronts of the locos. This model sports a turned brass bell, flanked by LED-lighted number boards, above dual headlights. Earlier versions have only one headlight. And depending on the road number and era, "smoke wings" were installed by UP in an ongoing effort to get exhaust smoke up and away from the loco and its train.

DCC FEATURES:

The decoder provided with the Genesis™ FEF Locomotive will operate with any NMRA compatible DCC system. The default setting is address 3. The decoder is rated at 2 amps and will support either 2 or 4 digit addresses. The decoder functions are fully programmable by the adjustment of CVs. A CV table is included in the operating instructions. Either 14 speed steps or 28/128 speed steps are supported by this system. Available accessory and sound functions are as follows:

- Directional lighting • Bell • Whistle
- Mars Light • Air Release • Coupling
- Brake Squeal
- Conductor (or rail clack when moving)
- Fire Box Door • Mute Feature
- Sand Release • Water Injector
- Blower Hiss Cylinder Cock/ Flange Squeal



Trailing Truck

The FEF used a Commonwealth trailing truck with 42" wheels. Your model's trailing truck has a cast metal subframe to give it weight and excellent tracking.

In addition to Function 0 (Directional lighting) there are twenty-eight additional accessory/sound functions to allow the operator to easily utilize the full range of functions of this state-of-the-art decoder, and unique sounds found on an operating steam locomotive. You can now fully immerse yourself in the complexities of prototype operation and add a new level of realism to your railroading experience.

Dual-Function decoder is made by Model Rectifier Corporation for Athearn, Inc.





All photos are pre-production samples.

Your new Genesis™ FEF Locomotive comes factory equipped with a state-of-the-art Dual Function decoder. This means your locomotive will run on any NMRA compatible DCC system or on any regular DC Train Control (HO power pack).

CAUTION:

Do not run your new Genesis™ FEF Locomotive with power packs intended for “G” scale, [Do not exceed 18 V DC], as you may damage the locomotive circuitry. Also, never operate your locomotive with a transformer designed for use with AC powered model trains, [such as O-27 trains or some European HO models]. Some DCC systems also come equipped with a switch for extra voltage for larger scales, [“O” or “G”], if you use your locomotive on this setting damage will occur to the on-board electronics due to the higher constant track voltage, [22 volts].

ATTENTION D.C. POWERPACK USERS

To avoid damaging the decoder in this locomotive, we recommend that once bringing the locomotive to its idle setting, [approx. 50% throttle], wait at least 3 seconds before running the loco at its maximum recommended voltage level. Older power packs can exhibit a “no-load” voltage spike for a few seconds which can damage the circuitry in the decoder.

When running on a DC power pack, this locomotive features a wireless radio control. This makes accessing the sound functions and running the locomotive more convenient when following your train around the layout. The transmitter (battery included) that comes with your locomotive has the following functions:

Button 1: Bell Button

Starts or stops the bell sounds.

Button 2: Whistle Button

Operates the steam whistle.

Button 3: Speed Down Button

Decelerates the locomotive. Press Button 3 when the locomotive is stopped and you will hear an air release sound.

Button 4: Speed Up Button

Accelerates the locomotive. When the locomotive has reached its maximum speed, pressing Button 4 will activate the sound of the fire box door opening and closing.

Button 5: Direction Button

Should be used after bringing the locomotive to a stop. If pressed while the locomotive is moving, the locomotive will slow down to a gradual stop, change its direction and then gradually speed up. This is also a built in safety feature. Press Button 5 when the locomotive is in idle (25% - 35% throttle setting) to activate the blower hiss sound.

Button STP: Stop Button

Brings the locomotive to a gradual stop. This is a built in safety feature. Press Button STP while the locomotive is stopped and you will hear the water injector sound.

A unique feature of some of these locomotives is the Mars Red Light operation while running in the analog/D.C. mode. In real life when the locomotive came to a stop, the Engineer turned on a flashing mars light for safety, and it remained on until the locomotive started moving again. The mars light will automatically come on when the locomotive comes to a stop, and remain on until the locomotive starts to move, without having to press any buttons. In the DCC mode this mars light is activated on/off with the F3 button.

DC OPERATION - ANALOG MODE

To set up your Hand Held Controller and operate your locomotive with a DC power pack, follow these easy directions:

Step 1: Install the battery in the transmitter.

Step 2: Connect the wires from your DC power pack's "variable track terminals" to your track.

Step 3: Place the locomotive on the track making sure all wheels are aligned correctly to avoid short circuits, which can possibly damage your locomotive circuitry and power pack.

Step 4: Turn the switch on the power pack to ON.

Step 5: Slowly adjust the throttle until you hear the locomotive begin to idle. Only during idle can you use the direction switch on the power pack to change the locomotive's direction. Either the headlight or back-up light will illuminate to indicate the locomotive's direction. Once the locomotive begins moving, you cannot use the direction switch on the power pack to change direction. You can only use the transmitter to change the locomotive direction while it is moving. This feature allows you to control another analog locomotive on the same track.

Step 6: Your new Genesis™ FEF Locomotive will always remember its last direction of operation regardless of the position of the direction switch on the power pack.

Step 7: When you use the power pack's throttle to control the locomotive's speed, the top speed will be limited by the transmitter's speed setting.

Step 8: When you use the transmitter to control the locomotive's speed, the top speed will be limited by the power pack's throttle setting.

Step 9: If the locomotive's top speed is too low, do not set the power pack's throttle to maximum. We recommend you set the

throttle to 60%-70% and use the transmitter to control the locomotive speed. This will give you the best operation range.

Step 10: Never exceed 18 volts D.C. to the track in analog operation. Excessive track voltage may damage the locomotive's circuitry. Never try to operate the locomotive on A.C. power.

Step 11: If the transmitter's range begins to decrease, the battery needs to be replaced. On larger layouts, or if your layout is in a room that has a lot of radio interference, [metal pipes, screen wire scenery, etc.], we recommend that you hold the transmitters antenna wire close to, or touch, the running rails of the layout if the locomotive is traveling far from your position.

Step 12: Whenever you feel that the locomotive is not operating properly you should move the throttle to zero or 25%-35% throttle setting (depending on your power pack) and slowly move the throttle up again to control the locomotive.

Step 13: If you hear the locomotive say "Program" while running in the analog D.C. mode, don't press any buttons on the transmitter. Power down with the power pack's throttle to zero, bringing your train to a gradual stop. Then turn the power pack's on/off switch to off to reset your locomotive. This might occur if you are attempting to use the stop button, [stp] while the locomotive is traversing a long dirty section of track. The locomotive will read this as a power down, power up sequence, while you are depressing the stop button and enter the program mode accidentally. If you press any buttons on the transmitter at this time, you can change some of your settings inadvertently.

PROGRAMMING IN ANALOG MODE

While in analog mode, you can program the chuff rate,[up or down], chuff starting point, and you can also pick different bells or whistles.

**Note: Please wait at least 2 seconds between button presses when in the Program Mode. Multiple, rapid pressing of buttons will confuse the system.*

Step 1: Place the locomotive on track

Step 2: Turn the power switch on the power pack to ON.

Step 3: Slowly turn the throttle until the idle sounds come on. Once the idle sounds steady out, leaving the throttle as is, turn the power pack's power switch to off.

Step 4: Enter the program mode by pressing and holding the Stop Button [STP], while you turn the power switch back on. The locomotive will say "Program", quickly release the stop button. The locomotive will say "Program" a second time, this will confirm that you are now in the Program Mode.

Step 5: Press Button 4 or Button 3 to speed up or reduce the chuff rate, respectively. Each press of the button adjusts the chuff rate up or down by one unit. You will hear a steam release after each press of the button as an audible confirmation.

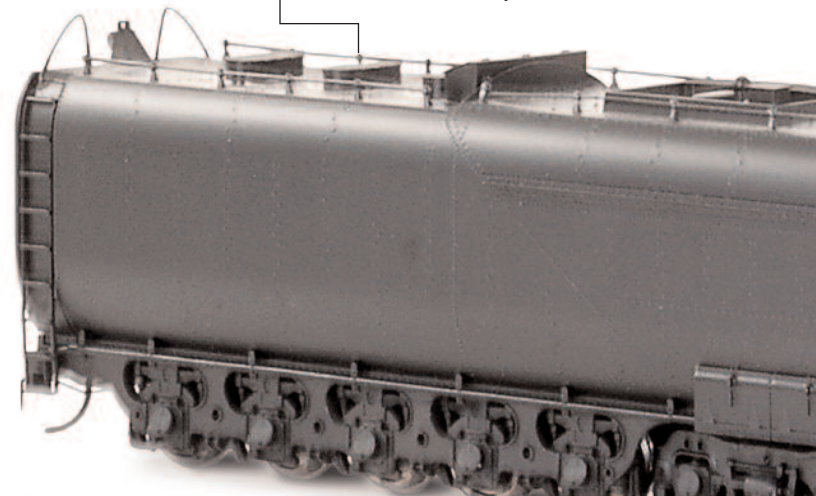
Step 6: Press Button W(2), [Whistle Button], to toggle between the different types of whistles. Once you hear a type of whistle you like, stop pressing the button.

Step 7: Press Button B(1), [Bell Button], to toggle between the different bell types. Once you hear a bell you like, stop pressing the button.

Step 8: To reset the locomotive back to it's factory defaults; Press the Stop Button, [STP], 5 times. Wait at least 2 seconds between presses. After each press the locomotive will say "Program". After the 5th press, you will hear "Program" followed by a steam hiss. This confirms that reset process is completed.

Step 9: Once finished programming, turn the power switch on the power pack to OFF. This will reset the locomotive and lock in your programming. To resume operation, follow the steps under "DC Operation".

Remove Hatch to Adjust Sound



7 OPERATING THE FEF-CLASS 4-8-4 LOCOMOTIVE (CONTINUED)

Note - when programming the chuff rate and chuff starting point, it is recommended that after each press of the buttons, leave the program mode and run the locomotive. If the chuff starting point or chuff rate is still not up to your liking, re-enter the Program Mode and try the next setting. It takes some experimentation on part of the user, to get these rates as close as possible.

TIPS FOR ANALOG OPERATION

Tip 1: Turn up the throttle until sounds start and locomotive idles.

Tip 2: Select the locomotive's direction either by the direction switch on the power pack or by the transmitter.

Tip 3: Slowly start your locomotive moving by using the power pack's throttle to set desired top voltage setting.

Tip 4: Once underway, use the transmitter Button 4 to speed up or Button 3 to slow down. Hold down the button until you reach the desired speed.

Tip 5: If the top voltage setting at maximum speed is too low, use the power pack's throttle to adjust the top voltage setting.

Tip 6: To conserve transmitter battery life, you can use the throttle to control locomotive speed and use the transmitter to activate sounds.

Tip 7: When finished running your locomotive, turn your power pack throttle to OFF and turn off the power pack's power switch. Any programming changes made in DC analog mode will affect any prior DCC mode settings.

MANUAL VOLUME CONTROL

Located on the top of the tender towards the rear, there are 3 oval hatches. Remove the middle hatch and use a small flat-bladed jeweler's screwdriver to adjust the volume. Adjustment of this volume control, lowers or raises the overall volume of the locomotive, not individual sound volumes.

Note - If you know someone with a Digital Command Control, [DCC], System, you can have them program the individual sound volume CV's to your liking.

DCC OPERATION- DIGITAL MODE

Your new Genesis™ FEF Locomotive will operate on any NMRA compatible DCC system. The dual-function decoder has the following features:

- **Synchronized steam chuff with random sounds**
- **2 amp capacity**
- **Programmable for either 2 digit, (1-127) or 4 digit, (1-9,999) addresses**
- **Programmable start voltage**
- **Programmable acceleration rate**
- **Programmable deceleration rate**
- **Programmable top voltage**
- **Programmable chuff rate**
- **Programmable volume**
- **Programmable 14-28/128 speed steps**
- **Directional lighting (F0)**
- **28 accessory sound functions, (F1-F28)**
- **Advanced consisting (CV19)**
- **OPS mode programming**
- **Compatible with NMRA D.C.C. standard**
- **Complies with Part 15 of F.C.C.Rules**

OPERATION

The Genesis™ FEF Locomotive can be operated with the steam sounds on or off. Double clicking your headlight button (F0) will turn the steam sounds on or off. When the steam sounds are turned off, all associated sounds are also turned off.

Your locomotive comes with a factory default address of 3. Before attempting any programming, you should test run your locomotive first on address #3, to make sure it works correctly out of the box. Run it forward and backwards, test the bell and whistle.

Turn the light on and off. If everything works correctly, then you can program the parameters that you want.

To acquire your locomotive, select its current address on your DCC system, [address #3 if it is just out of the box]. Press any function button, other than F1 or F2, or bring the throttle up one click. These steps, after turning on your DCC system, acquire the locomotive's address, and now you can run it.

Once these steps have been done, follow the included CV chart to program any new programming features you want into the locomotive. When you initially program your new FEF locomotive, this step should be done on a program track for best results. You must know how to properly use your DCC system's programming mode to program any decoder, if you are unsure of programming a decoder with your system, please consult your DCC system's instruction book regarding programming or contact the manufacturer of your DCC system for proper guidance.

PROGRAMMING FOR DCC OPERATION - DIGITAL MODE

This decoder supports all program methods including register mode, paged mode, CV programming, direct mode and programming on the main (OPS mode programming). Program the locomotive the same way you would program any other NMRA compatible decoder with your DCC system.

Note - Some DCC systems do not have enough power on the Program Track for programming sound decoders. If your system is one of these, there are Program Track Boosters available from aftermarket DCC suppliers.

Note - Because this locomotive has a dual function sound decoder on-board, it does not support CV read back features.

ADDITIONAL INFORMATION

The dual-function decoder installed in this locomotive should perform well when used with any NMRA compatible DCC system. You should be familiar with your DCC system's programming and operating functions to get the most enjoyment out of any decoder equipped locomotive. For more information about Register/CV's and their functions, please refer to the NMRA DCC standards and recommended practices, RP-9.2.2. This is available directly from NMRA or on their website at www.nmra.org.

FCC COMPLIANCE

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions; 1) This device may not cause harmful interference, and 2) This device must accept any interference received, including interference that may cause undesirable operation.

Battery Type # A23 12 volt

TROUBLE SHOOTING:

Step 1: Make sure the plug between the locomotive and tender are securely connected.

Step 2: When placing the locomotive on the tracks make sure all wheels are properly aligned as not to cause a short circuit.

Step 3: Make sure battery is correctly installed in the transmitter, [D.C. analog use only].

Step 4: Always check the three steps above first if you encounter any trouble with your FEF Locomotive.

ANALOG USE:**Locomotive does not make sounds or does not respond when power is applied to track.**

Check that power pack is plugged in, and that wires to track are connected properly. Turn throttle to zero position, turn the power pack's power switch to off, wait a few seconds, then try again as in the analog operation section of the instructions.

Sounds do not activate with transmitter all the time.

Check battery level, change if needed. Different atmospheric conditions and/or metal pipes, conduits, and screen wire scenery can cause range problems. Try holding the transmitter antenna close to or on one of the running rails if the locomotive is far away from you.

Locomotive does not idle, [starts moving at a low voltage], or locomotive makes idling sounds but does not move.

The decoder has a memory, and may not have been shut down correctly after its last use. Turn the throttle up slowly to place locomotive in "True Idle". You can confirm the "True Idle" setting by changing the direction switch on your power pack. You will hear an audible steam noise and the headlight will change direction. If the headlight does not change direction, you are not in "True Idle". Turn the throttle voltage down slightly and try again. Once you are sure you are in "True Idle", flip the direction switch again to reset the decoder. If you followed these steps the locomotive should run properly.

DCC USE:**Locomotive runs on address #3, but will not take a 4 digit address.**

Some DCC systems do not have enough power on the program Track to program sound decoders. Contact Athearn or Model Rectifier Corp. for instructions on Programming a 4 digit address on the main.

Locomotive responds to Bell/Whistle functions but does not move.

CV #29 is not programmed correctly for either a 2 digit address or a 4 digit address. Input a value of "2" in CV29 for a 2 digit address, or a value of "34" in CV29 for a 4 digit address.

Locomotive idles but does not move or respond to functions.

Make sure you did not program the locomotive into an advanced consist, [CV #19]. In your DCC system's "Program CV Mode", input a value of "0" into CV #19.

Any misguided programming of values in the DCC mode can cause a decoder to malfunction.

Always try to first set the decoder back to its factory defaults by using CV #125. If this does not work, try programming the following CV's with the following values: CV1=3, CV17=0, CV18=0, CV19=0, CV29=2. If this does not work, try running the locomotive in the Analog D.C. Mode. If the locomotive runs in analog, chances are it will run in the DCC Mode, but the programming of the decoder is way off. Reset the decoder in the Analog D.C. Mode. Perform the following steps using a D.C. power pack:

Step 1: Turn power pack's on/off switch to on.

Step 2: Slowly bring up throttle until you hear hissing/idling sounds.

Step 3: Leaving throttle in its position, turn power switch off.

Step 4: Hold down program button, [#6/STP], on transmitter while turning power switch back on. You will hear decoder say "Program". Release transmitter button, decoder will say "Program" again. This confirms you are in the analog D.C. program mode.

Step 5: Wait 2 seconds, press the program button, [#6/STP], again and listen for "Program".

Step 6: Perform step #5 four more times, [total of 5 times].

Step 7: After you hear the decoder say "Program" after the 5th time, you will hear a steam release. This will confirm that the decoder has been reset to its factory defaults, [for both D.C. and DCC modes].

Step 8: Try running the locomotive again on DCC.

Step 9: Sometimes you may simply turn your power supply off and on again, and the locomotive will run again

Step 10: If you are still having trouble with your FEF locomotive, contact Athearn Trains for further assistance.



All photos are pre-production samples.

9 FEATURES

Dual Stack

Can be fitted with two optional working smoke units.

Headlights

Controllable in both DC and DCC modes



Lead Truck

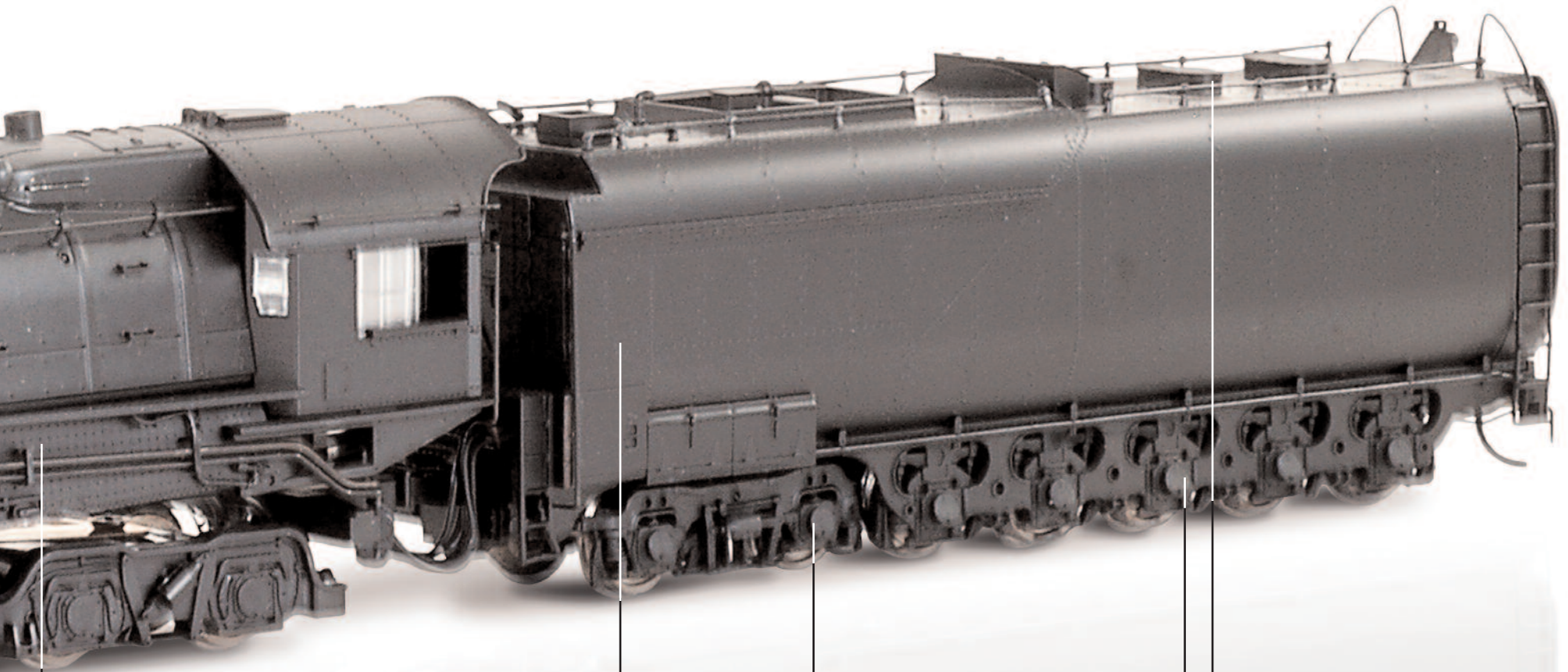
Turned metal wheels with RP25 flanges

Valve Gear and Side Rods

Fully functioning with both metal and Celcon components

Drivers

Nickled RP25 flanged wheels with rearmost set using Neoprene traction tires

**Firebox**

Appropriately detailed for either coal or oil-fired versions

Tender

Outfitted for coal or oil per the specific locomotive modeled

Tender Lead Truck

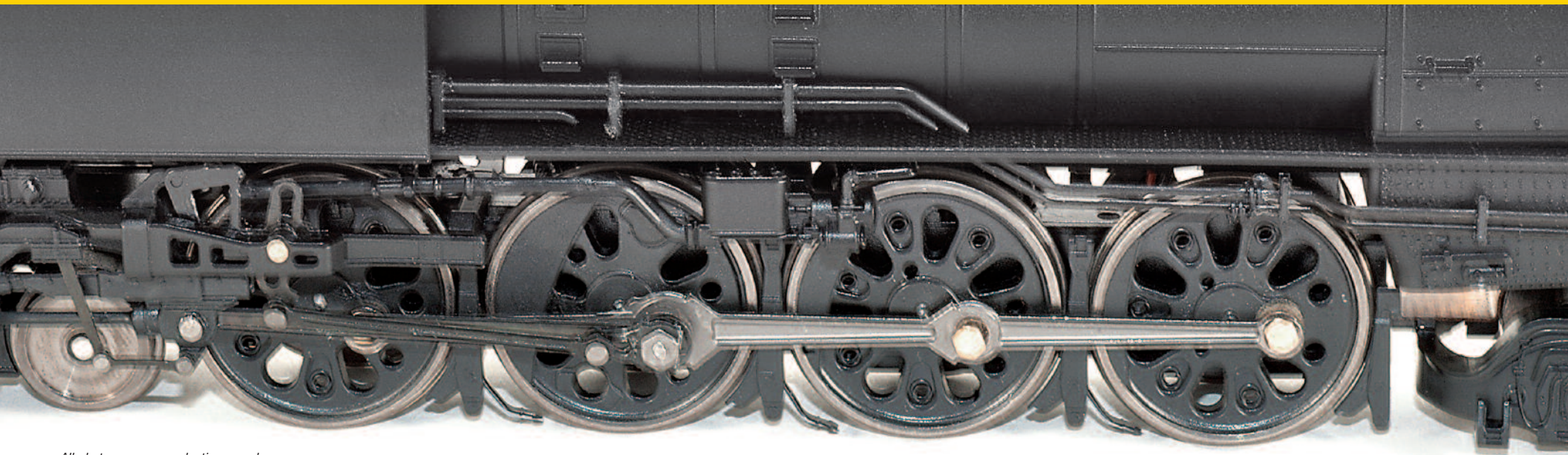
Turned metal wheels with RP25 flanges; replicates GSC design

Volume Control

Located under center hatch on top of tender.

“Centipede” Tender Chassis

Turned metal wheels with RP25 flanges. Unique design allows lateral play for accommodating curves and turnouts.



All photos are pre-production samples.

LUBRICATION AND MAINTENANCE OF THE GENESIS™ FEF 4-8-4

The Genesis™ FEF Locomotive has been carefully engineered to provide years of trouble free operation. However, as with all things mechanical, a small amount of care and maintenance is required to insure the flawless operation of this fine model. Following these simple procedures will give you years of trouble-free enjoyment.

CARE, CLEANING AND STORAGE

Dust and debris are among the leading contributors to poor operation of any model locomotive mechanism. To maintain quality performance of your locomotive, inspection and cleaning should be performed on a regular basis. A soft bristle brush should be used to remove dust from the superstructure. The use of soaps, solvents or detergents is not recommended for this purpose as they may mar the finish.

When not in use it is recommended that the locomotive and tender be stored in the protective clear plastic wrapper and sleeve in which it was originally packed. Also, when storing the wireless controller always remove the battery.

WHEEL CLEANING

The Genesis™ FEF locomotive receives electric power from both rails through all drivers and tender wheels. This, coupled with the long overall wheelbase, provides for excellent electrical contact. However, over time, dirt from the rails will accumulate on the wheel surfaces and will need to be removed to assure consistently satisfying operation. Inspect the underframe regularly, and make sure all lint and dust are removed from the back of all wheel sets. Dirt build up in this area will foul the pick-up wipers and prevent proper electrical contact.

Use a cotton swab to apply either alcohol or a good quality track cleaning solution. Carefully apply the solvents, taking care not to spill any on painted surfaces. Alternatively, either an ink eraser or 'Bright Boy' abrasive block can be used to remove dirt deposits by carefully burnishing the wheel surfaces.

LUBRICATION

This locomotive will arrive pre-lubricated from the factory and will not need additional lubrication until it has been run for many, many hours. When it comes time to lubricate the locomotive, use only light weight oil and gear grease that is plastic compatible. Use a minimum amount. The plastic used for the gears and drive line make them inherently self lubricating.

Remember that too much lubrication can be more detrimental to the locomotive than too little.

The main points of lubrication, and type of lubricant are as follows:

- Axle bearings on the drivers: *Light oil*
- Armature bearings on motors: *Light oil*
- Bearings on worm gear shafts: *Light oil*
- Bearings on tender wheels: *Light oil*
- Side rods at the crank pins: *Light oil*
- Gear tower: *Light gear grease*

You can access each of these areas by following the exploded drawings. If you are not comfortable with disassembling this locomotive for lubrication, take it to the hobby shop where you purchased it, or any other hobby store that sells Genesis™ models.

SMOKE UNIT INSTALLATION

The Genesis™ FEF locomotive is designed to accept Seuthe #9 or #10 smoke generator units. These are not provided with the locomotive. If you decide to install a smoke unit, carefully follow the instructions provided by the smoke unit manufacturer. Genesis™ does not warranty any defects in these smoke units or damage that may occur to the locomotive through their installation and use.

Installation is easily accomplished: Slide the smoke unit down the smoke stack until it engages the electric contacts inside the boiler. Add a minimal amount of smoke fluid to the unit and operate the locomotive normally. It may take a short amount of time when running to heat up the smoke unit before smoke is produced.

COUPLER INSTALLATION

The Athearn Genesis™ FEF locomotive comes with a swivel coupler installed on the pilot. As on the prototype engines, you can have the coupler exposed on the pilot, or swing it around so that the pilot has no coupler in use. The "coupler" on this part is a non-operating coupler.

An operating front coupler is provided, and can be installed on the pilot. Refer to the exploded view drawings in this manual and simply unscrew and remove the non-operating coupler. Once removed, you will see there are two threaded nuts. The operating coupler provided should fit in the rear most hole with no clearance problems, and the coupler and its box can be attached using the supplied screw (part #212, see drawing). If you have clearance problems with the coupler mounted in the rear threaded nut, simply mount it to the forward threaded nut.

REPLACING THE TRACTION TIRE

To provide tractive effort that rivals the prototype, one traction tire set is factory installed on the last set of drivers. The tire is made of neoprene, and should last for many, many hours of operation. Replacement traction tires are available from your local hobby shop.

To replace a worn or loose traction tire:

Step 1: Remove the crank pin nuts from the traction tire equipped driver.

Step 2: Loosen the remaining crank pin screws from the other drivers.

Step 3: Remove the eccentric crank, main rods, bushing and drive rod from the crank pin on the traction tire equipped driver.

Step 4: Slide off the traction tire and replace with a new tire.

Step 5: Reverse the procedure of disassembly.

Use of the exploded drawings in this booklet will greatly assist in the above listed procedures.

Replacement parts are available from Athearn Trains to the original purchaser for warranty repairs only. A warranty registration form must be on file at Athearn Trains to honor any requests for repair parts.

FEF FUNCTION TABLE

Function	Idle/Moving
F0	Light on/off, press once. Double click F0 = Master volume control
F1	Bell on/off
F2	Whistle
F3	Mars light on/off
F4	2 types of coupling/uncoupling sounds
F5	Brake squeal (repeat press will increase length)
F6	Conductor while idle / toggle chuff or 2 types of rail clack while moving
F7	Fire box door open and close
F8	Whistle type select (19 versions)
F9	Metal crank on/off while moving, steam associated sound while idle
F10	Water
F11	Blower hiss
F12	Master volume control
F13	Coal auger
F14	Air hose firing
F15	Associated locomotive sounds
F16	Shoveling
F17	Crash sound
F18	Injector
F19*	Bell type select (4 versions)
F20*	Bell ring rate
F21*	Bell volume
F22	Whistle volume control
F23	Chuff volume control
F24	Chuff type (4 versions)
F25	Air brake release
F26	Associated locomotive sounds
F27	Associated locomotive sounds
F28	Scraping coal shovel

Note: There are only a few DCC Systems on the market that can access functions higher than F12.

**Note:* F1 [Bell] does not have to be activated when using F19, F20, and F21. The Bell will come on automatically.

FEF CV CHART

CV	Register	Description	Range	Default
CV1	R1	Short address	1-127	3
CV2	R2	Start voltage	0-32	0
CV3	R3	Acceleration	0-32	8
CV4	R4	Deceleration	0-32	8
CV5	---	Top voltage	0-32	32
---	R6	Page number	---	---
CV29	R5	Basic Configuration	---	2
CV7	R7	Manufacturer version number	---	32
CV8	R8	Manufacturer ID	---	143
CV17	---	Long address upper byte	192-231	192
CV18	---	Long address lower byte	0-255	3
CV19	---	Advanced consist address	0-127	0
CV21	---	When CV-21=0, all accessory functions will follow their own address. When CV-21=1 all functions will follow the consist address	0-1	0
CV49	---	Master Volume Control 0 = off, 1 = low, 2 = mid, 3 = max	0-3	2
CV50	---	Whistle type (19 versions)	0-18	5
CV51	---	Whistle volume	0-3	3
CV52	---	Bell type (4 versions)	0-3	0
CV53	---	Bell volume	0-3	3
CV54	---	Bell ring rate	0-50	10
CV55	---	Chuff type (4 versions)	0-3	0
CV56	---	Chuff volume	0-3	3

FEF CV CHART (CONTINUED)

CV	Register	Description	Range	Default
CV57	---	Brake squeal volume	0-3	1
CV58	---	Air release volume	0-3	3
CV59	---	Blower hiss volume	0-3	3
CV60	---	Fire box door volume	0-3	3
CV61	---	Injector volume	0-3	3
CV62	---	Coupling volume	0-3	3
CV63	---	Air pump volume	0-3	0
CV64	---	Rail clack volume	0-3	3
CV105	---	User identification number	0-255	0
CV106	---	User identification number	0-255	0
CV112	---	Conductor volume	0-3	3
CV113	---	Directional light enable	0-1	1(enable)
CV114	---	Air pump type	0-3	1
CV118	---	Shoveling volume	0-3	3
CV119	---	Coupling fire volume	0-3	3
CV120	---	Chuff rate	0-30	12
CV121	---	Chuff start point adjustment	0-7	3
CV123	---	Load Control on/off (1=on)	0-1	0 (disable)
CV124	---	Speed curve select 0 = linear, 1 = slow increase at slow speed, 2 = fast increase at slow speed	0-2	0
CV125	---	Factory default setting: Program it to 1 will restore all the CV to default setting	---	0

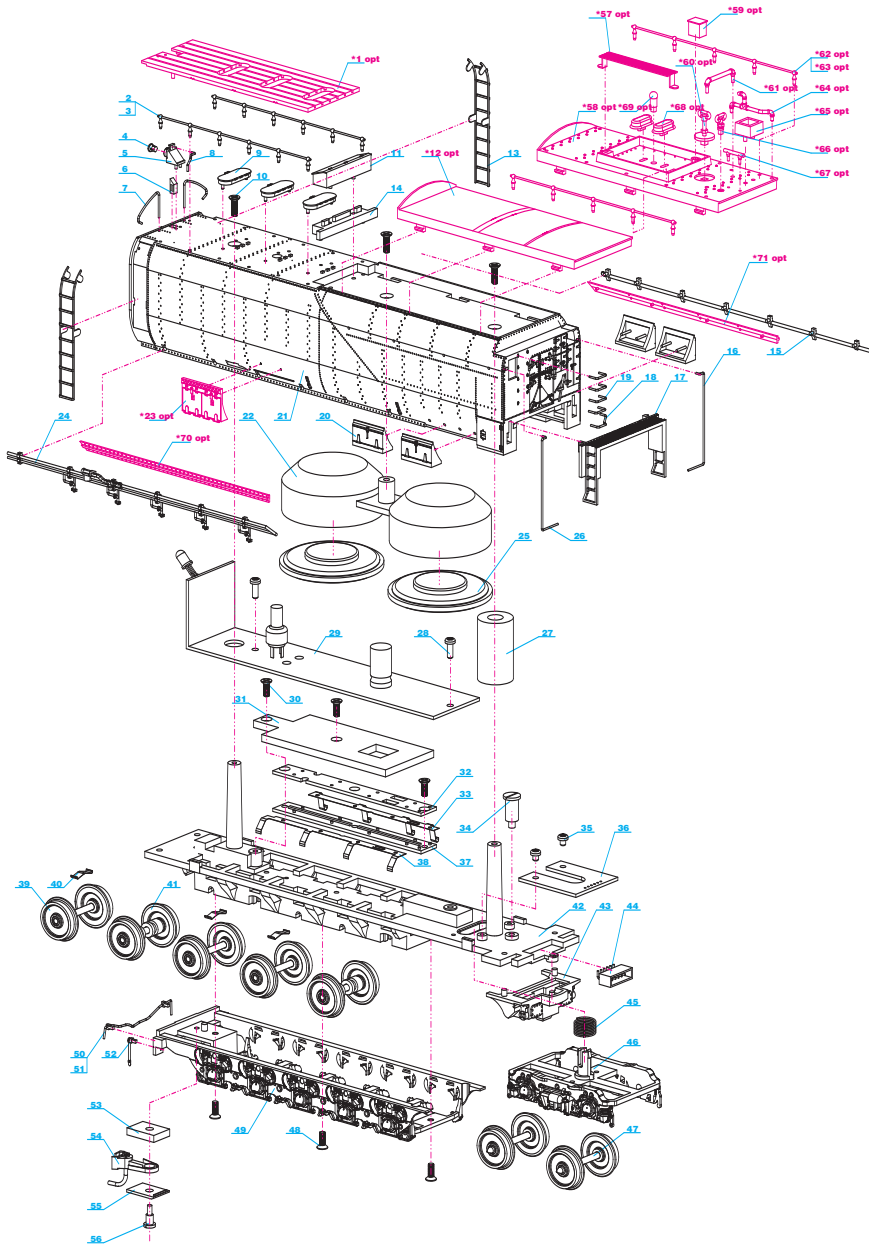
FEF 2 & 3 TENDER PARTS LIST

NO DESCRIPTION QTY NO DESCRIPTION QTY

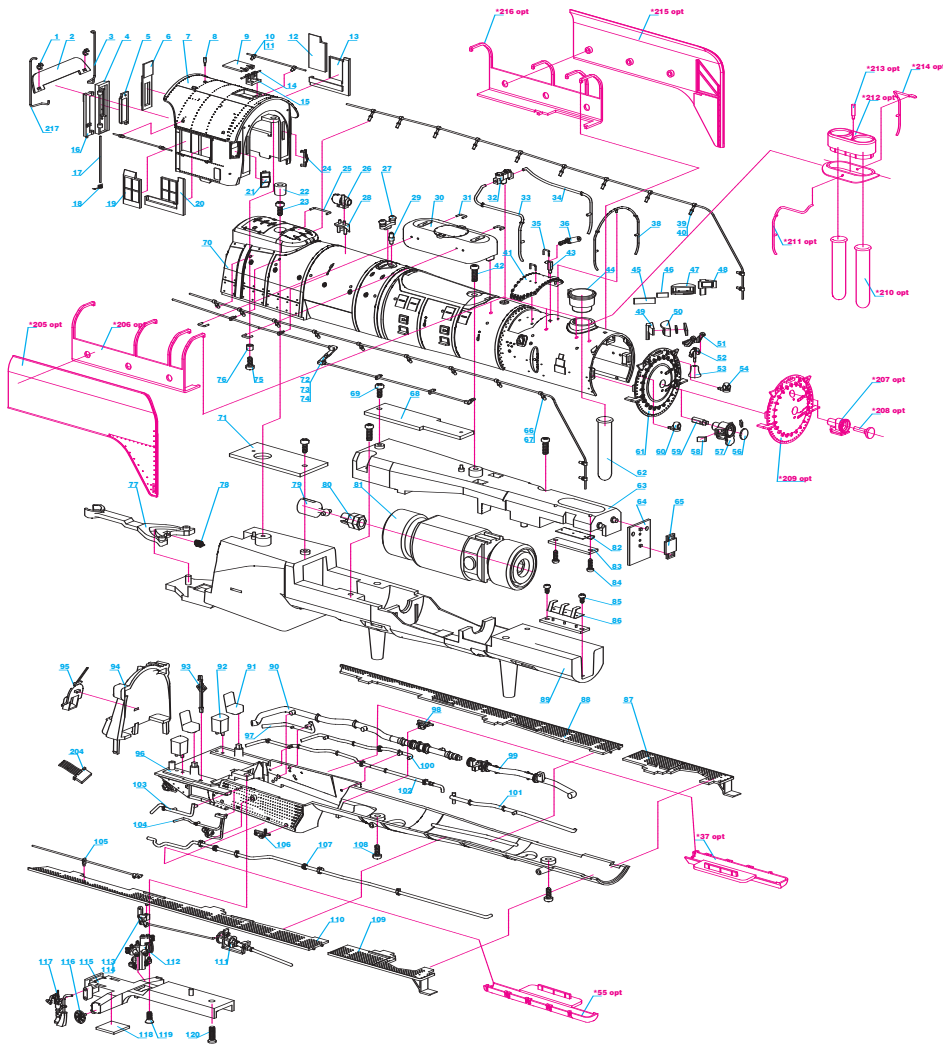
1	WOOD DECK	1
2	TENDER TOP HANDRAIL	2
3	HANDRAIL #3	2
4	TENDER LIGHT GLASS (TOP)	1
5	TOP LIGHT BASE	1
6	TENDER LIGHT BAR	4
7	WIRE #3 FOR TENDER	2
8	HANDRAIL #7	1
9	TOP COVER 2	3
10	SCREW	3
11	TOOL BOX(TOP)	1
12	COAL (2) CENTIPEDE (NO BRACKET)	1
13	REAR LADDER	2
14	TOOL BOX SUPPORT	1
15	RIGHT SIDE PIPE	1
16	WIRE #3 FOR TENDER	1
17	FRONT PLATFORM	1
18	HANDRAIL #1	1
19	HANDRAIL #2	4
20	LEFT TOOL BOX (LONG)	1
21	TENDER BODY FOR ENGINE	1
22	SPEAKER SUPPORT	1
23	MIDDLE TOOL BOX	1
24	LEFT SIDE PIPE	1
25	SPEAKER	2
26	WIRE #2 FOR TENDER	1
27	WEIGHT 2	1
28	SCREW	2
29	PCB #3 (TENDER)	1
30	SCREW	3

31	WEIGHT 3	1
32	INSULATE PLATE #2 (TENDER)	1
33	PICK UP SHEET FOR TENDER LEFT	1
34	SCREW 5 (TENDER)	1
35	SCREW	2
36	PCB #7 (TENDER)	1
37	INSULATE PLATE #1 (TENDER)	1
38	PICK UP SHEET FOR TENDER RIGHT	1
39	CENTIPEDE WHEEL ASSEMBLY	3
40	SPRING PIECE	3
41	CENTIPEDE WHEEL WITH BEARINGS ASSEMBLY	2
42	TENDER CHASSIS	1
43	CHASSIS END PART	1
44	SOCKET (8 WIRE)	1
45	SPRING (TENDER)	1
46	TENDER TRAIL TRUCK DETAIL	1
47	TENDER LEAD TRUCK WHEEL & AXLE ASSEMBLY	3
48	SCREW	3
49	SIDE TRUCK DETAIL	1
50	LIFT BAR FOR TENDER	1
51	LIFT BAR WIRE	1
52	TENDER END HOSE	1
53	FRONT COUPLER BOX COVER	1
54	REAR COUPLER	1
55	FRONT COUPLER BOX	1
56	SCREW 4	1
57	TOP NET	1
58	OIL TOP	1
59	OIL TOP PART #9	1
60	OIL TOP PART #4	1
61	OIL TOP PART #3	1
62	HANDRAIL #6	2
63	OIL TOP HANDRAIL	2
64	OIL TOP PART #6	1
65	OIL TOP PART #5	1
66	OIL TOP PART #1	1
67	OIL TOP PART #2	1
68	OIL TOP PART #7	2
69	OIL TOP PART #8	1
70	TENDER SIDE L-SHAPED LEDGE (RIGHT)	1
71	TENDER SIDE L-SHAPED LEDGE (LEFT)	1

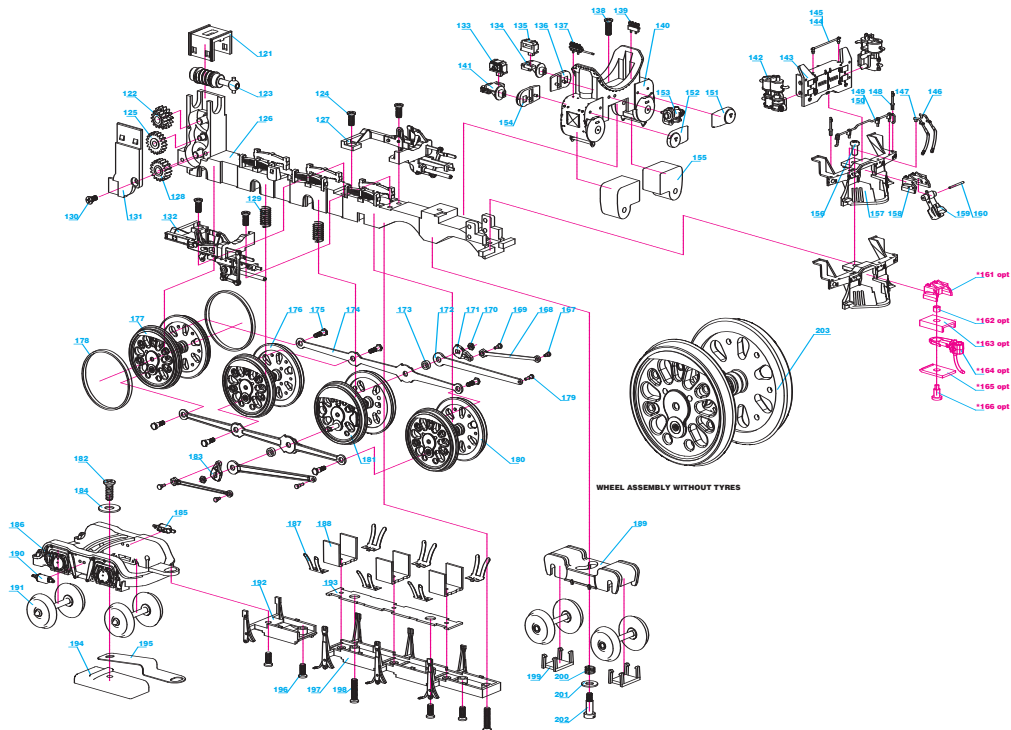
*Optional Parts Listed In Red



15 FEF 2 EXPLODED VIEW



NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
1	DROP STEP SUPPORT	2	15	ROOF HATCH SUPPORT	1
2	DROP STEP	1	16	CAB DOOR SUPPORT	1
3	CABIN HANDRAIL LH	1	17	CAB DOOR SHAFT	1
4	CAB DOOR	1	18	CAB DOOR SPRING	1
5	CAB DOOR GLASS (RIGHT)	1	19	SLIDING WINDOW GLASS RIGHT (FEF-2)	1
6	CAB DOOR GLASS (LEFT)	1	20	WINDOW SIDE GLASS FOR CABIN (R-1) (FEF-2)	1
7	CABIN (END FIN ONLY)	1	21	WINDOW FRONT GLASS FOR CABIN L	1
8	ANTENNA	1	22	SMALL PART	1
9	ROOF HATCH	1	23	SCREW	1
10	CABIN TOP HANDRAIL	1	24	WINDOW FRONT GLASS FOR CABIN R	1
11	WIRE FOR CABIN TOP HANDRAIL	2	25	SMALL HANDRAIL	1
12	SLIDING WINDOW GLASS LEFT (FEF-2)	1	26	GENERATOR	1
13	WINDOW SIDE GLASS FOR CABIN (L-1) (FEF-2)	1	27	DOUBLE WHISTLE	1
14	HATCH SHAFT	2	28	GENERATOR BASE (SINGLE)	1



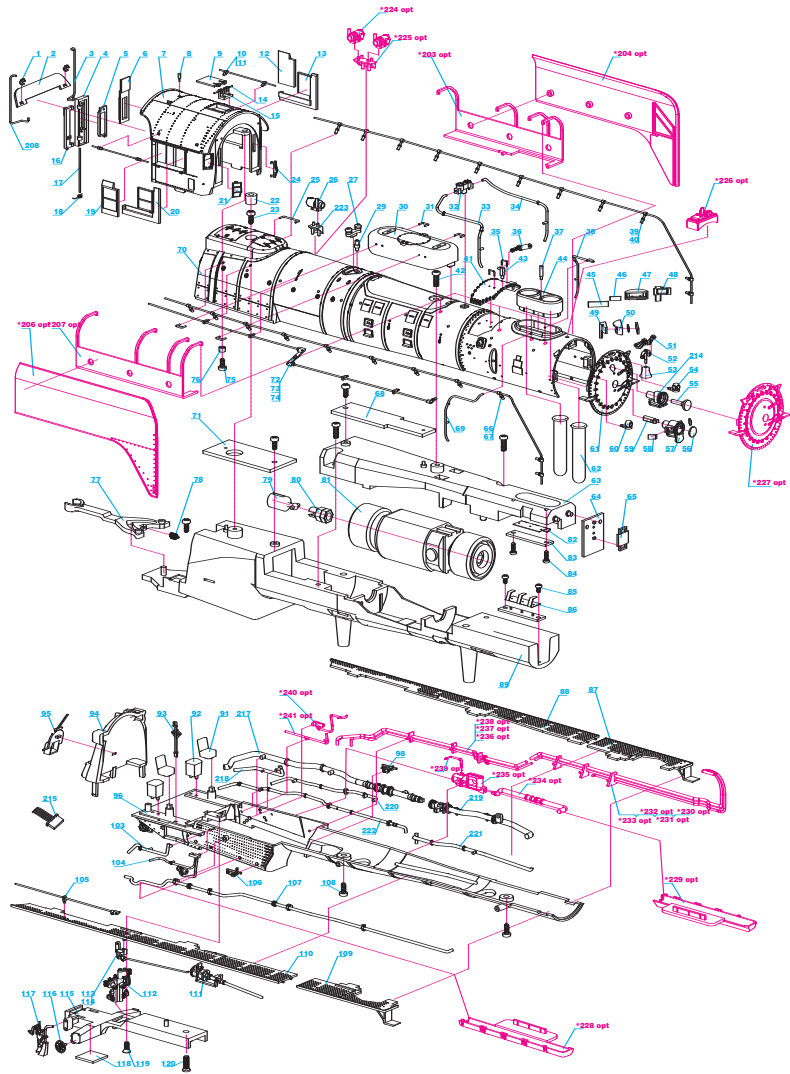
WHEEL ASSEMBLY WITHOUT TYRES

FEF 2 PARTS LIST

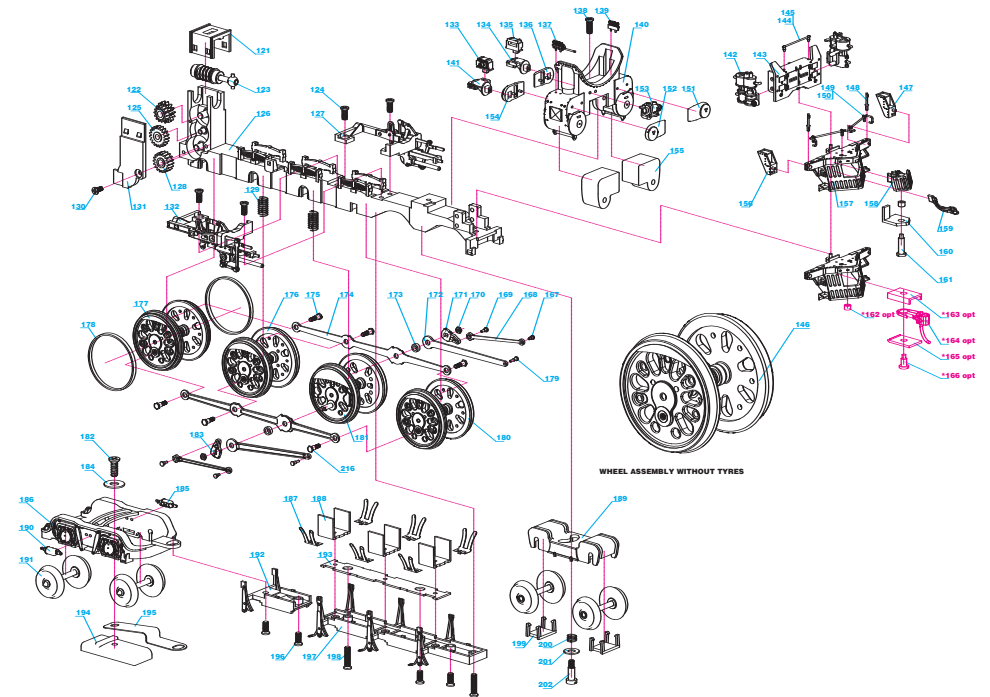
NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
29	WHISTLE #2	1	76	BRASS SLEEVE #1	2	123	WORM GEAR ASSEMBLY	1	170	NUT #1	2
30	MIDDLE SAND DOME	1	77	DRAW BAR	1	124	SCREW	4	171	LEFT CRANK	1
31	SMALL HANDRAIL ON MIDDLE SAND DOME	4	78	DRAW BAR SPRING	1	125	IDLER GEAR (Z19)	2	172	MAIN ROD	2
32	BOILER TOP PART #1	1	79	LINK ROD	1	126	GEAR BOX	1	173	SCREW-BAR-BUSH	2
33	PIPING (B-2)	1	80	JOIN HEAD FOR MOTOR (HEXAGON HEAD)	1	127	FRONT ENGINE VALVE GEAR ASSEMBLY - LEFT	1	174	SIDE LONG ROD	2
34	PIPING (B-1)	1	81	MOTOR/FLYWHEEL ASSEMBLY	1	128	IDLER GEAR #3	1	175	SCREW	6
35	SMALL HANDRAIL	2	82	SMOKE UNIT CONTACT PLATE	1	129	SPRING #1	2	176	ENGINE WHEEL ASSEMBLY #2	1
36	SAFETY VALVE	1	83	INSULATE PLATE FOR SMOKE UNIT	2	130	SCREW	1	177	ENGINE WHEEL ASSEMBLY #1	1
37*	ASH PANS (1-LEFT)	1	84	SCREW	2	131	GEAR BOX SIDE PLATE	1	178	TRACTION TIRE	2
38	PIPING #7	1	85	SCREW	2	132	FRONT ENGINE VALVE GEAR ASSEMBLY - RIGHT	1	179	RIVET #7 (FOR PISTON-MAIN ROD)	2
39	BODY HANDRAIL (FEF-2) L	1	86	PIECE FOR SMOKE UNIT	1	133	LUBRICATOR (R)	1	180	ENGINE WHEEL ASSEMBLY #4	1
40	WIRE FOR LONG HANDRAIL L (2SER)	1	87	WALKWAY LEFT (SHORT) #3	1	134	CYLINDER REAR PART (L)	1	181	ENGINE WHEEL ASSEMBLY #3	1
41	BOILER TOP PART #4 (FEF-3)	1	88	WALKWAY LEFT (SHORT)	1	135	LUBRICATOR (L)	1	182	SCREW	1
42	SCREW	3	89	DOWN MAIN FRAME	1	136	CYLINDER PART 4	1	183	RIGHT CRANK	1
43	SAFETY VALVE SUPPORT	1	90	LEFT PUMP REAR PIPING (UP 821 VERSION)	1	137	VALVE RIGHT	1	184	WASHER	1
44	SINGLE SMOKE STACK	1	91	CAB SEAT-1	2	138	SCREW	2	185	LEFT BRAKE CYLINDER	1
45	BOILER TOP NUMBER BOARD GLASS	2	92	CAB SEAT-2	2	139	VALVE LEFT	1	186	TRAILING TRUCK	1
46	PCB #1	2	93	BRAKE LEVER	1	140	CYLINDER LEVER	1	187	PICK SHEET FOR DRIVER	6
47	NUMBER BOARD PART 4	1	94	CONTROL PANEL INSIDE CAB	1	141	CYLINDER REAR PART (R)	1	188	INSULATE PLATE	3
48	NUMBER BOARD PART 3	1	95	COAL OPENING COVER	1	142	COMPRESSOR	2	189	LEADING TRUCK	1
49	NUMBER BOARD PART 2	1	96	BOILER BOTTOM (FEF-2)	1	143	PILOT SHIELD (FEF-2)	1	190	RIGHT BRAKE CYLINDER	1
50	NUMBER BOARD PART 1	1	97	PIPING #4	1	144	PILOT SHIELD TOP HANDRAIL	1	191	PILOT TRUCK WHEELS AND AXLE	1
51	BELL SUPPORT	1	98	FIREBOX FRONT SIDE DETAIL L	1	145	WIRE FOR PILOT SHIELD TOP HANDRAIL	1	192	SHORT BOTTOM COVER	1
52	BELL SUPPORT PIN	1	99	LEFT PUMP FRONT PIPING (UP 821 VERSION)	1	146	PILOT HOSE #2	1	193	PCB #2	1
53	BELL	1	100	LEFT FIRE BOX BOTTOM PIPING (UP 821 VERSION)	1	147	PILOT HOSE #1	1	194	WEIGHT	1
54	MARKER LIGHT LEFT	1	101	LEFT PUMP PIPING (RR VERSION)	1	148	PILOT TOP PART	2	195	BROAD SPRING	1
55*	ASH PANS (1-RIGHT)	1	102	LEFT FIRE BOX TOP PIPING (UP 821 VERSION)	1	149	LIFT BAR	1	196	SCREW	4
56	HEAD LIGHT GLASS	1	103	PIPING #5	1	150	LIFT BAR WIRE #1 (PILOT)	1	197	WHEEL SHAFT COVER	1
57	HEAD LIGHT BASE (FEF-2)	1	104	PIPING #6	1	151	CYLINDER PART 2	1	198	SCREW	2
58	HEAD LIGHT NUMBER GLASS	2	105	PIPING #2	1	152	CYLINDER PART 1	1	199	FRONT LEAD TRUCK COVER	2
59	HEAD LIGHT BAR	1	106	FIREBOX FRONT SIDE DETAIL R	1	153	CAB UNDER PART	1	200	TRAILING TRUCK SPRING	1
60	MARKER LIGHT RIGHT	1	107	PIPING #1	1	154	CYLINDER PART 3	1	201	WASHER	1
61	SMOKE BOX DOOR (WITHOUT MARS LIGHT)	1	108	SCREW	2	155	CYLINDER WEIGHT	2	202	SCREW FOR LEADING TRUCK	1
62	SMOKE UNIT	2	109	WALKWAY LEFT (SHORT) #4	1	156	SCREW	1	203	WHEEL ASSEMBLY WITHOUT TRACTION TIRES	1
63	UPPER MAIN FRAME	1	110	WALKWAY RIGHT (SHORT)	1	157	PILOT (FEF-2)	1	204	PLUG	1
64	PCB #4	1	111	REVERSE CYLINDER (FEF-2)	1	158	COUPLER SUPPORT #1	1	205*	SMOKE DEFLECTOR (RIGHT)	1
65	LED COVER	1	112	EXHAUST STEAM INJECTOR	1	159	DROP COUPLER	1	206*	SMOKE DEFLECTOR SUPPORT (R)	1
66	BODY HANDRAIL (FEF-2) R	1	113	REVERSE CYLINDER PIPE	1	160	SHAFT FOR DROP COUPLER	2	207*	RED LIGHT BASE	1
67	WIRE FOR LONG HANDRAIL R (2SER)	1	114	WIRE #11 FOR 24313102	1	161*	COUPLER SUPPORT #2	1	208*	RED LIGHT	1
68	PCB #1	1	115	FRAME	1	162*	BRASS SLEEVE #1	1	209*	SMOKE BOX DOOR (WITH MARS LIGHT)	1
69	SCREW	2	116	HAND WHEEL	1	163*	FRONT COUPLER BOX	1	210*	SMOKE UNIT	2
70	BOILER TOP (FEF-2 SINGLE SMOKE STACK)	1	117	PIPING UNDER CABIN (C-1)	1	164*	MC HENRY	1	211*	PIPING (A-R)	1
71	PCB #3	1	118	FRAME COVER	1	165*	FRONT COUPLER BOX COVER	1	212*	DOUBLE SMOKE STACK	1
72	LEVER	1	119	SCREW	1	166*	SCREW 4	1	213*	WHISTLE #1	1
73	WIRE #9 FOR 24313101	1	120	SCREW	1	167	RIVET #3 (FOR LINK)	2	214*	PIPING (A-L)	1
74	WIRE #10 FOR 24313101	1	121	WORM COVER	1	168	SIDE ROD	2	215*	SMOKE DEFLECTOR (LEFT)	1
75	SCREW	1	122	COMPOUND GEAR	1	169	RIVET #1 (FOR CRANK)	2	216*	SMOKE DEFLECTOR SUPPORT (L)	1
									217	CABIN HANDRAIL RH	1

*Optional Parts Listed In Red

17 FEF 3 EXPLODED VIEW



NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
1	DROP STEP SUPPORT	2	15	ROOF HATCH SUPPORT	1
2	DROP STEP	1	16	CAB DOOR SUPPORT	1
3	CABIN HANDRAIL LH	1	17	CAB DOOR SHAFT	1
4	CAB DOOR	1	18	CAB DOOR SPRING	1
5	CAB DOOR GLASS (RIGHT)	1	19	SLIDING WINDOW GLASS RIGHT (FEF-3)	1
6	CAB DOOR GLASS (LEFT)	1	20	WINDOW SIDE GLASS FOR CABIN (R-1) (FEF-3)	1
7	CABIN (END FIN ONLY)	1	21	WINDOW FRONT GLASS FOR CABIN L	1
8	ANTENNA	1	22	SMALL PART	1
9	ROOF HATCH	1	23	SCREW	4
10	CABIN TOP HANDRAIL	1	24	WINDOW FRONT GLASS FOR CABIN R	1
11	WIRE FOR CABIN TOP HANDRAIL	2	25	SMALL HANDRAIL	1
12	SLIDING WINDOW GLASS LEFT (FEF-3)	1	26	GENERATOR	1
13	WINDOW SIDE GLASS FOR CABIN (L-1) (FEF-3)	1	28	GENERATOR BASE (DOUBLE)	1
14	HATCH SHAFT	2	29	WHISTLE #2	1



WHEEL ASSEMBLY WITHOUT TYRES

FEF 3 PARTS LIST

NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY	NO	DESCRIPTION	QTY
30	MIDDLE SAND DOME	1	80	JOIN HEAD FOR MOTOR (HEXAGON HEAD)	1	136	CYLINDER PART 4	1	187	PICK SHEET FOR DRIVER	6
31	SMALL HANDRAIL ON MIDDLE SAND DOME	4	81	MOTOR/FLYWHEEL ASSEMBLY	1	137	VALVE RIGHT	1	188	INSULATE PLATE	3
32	BOILER TOP PART #1	1	82	SMOKE UNIT CONTACT PLATE	1	138	SCREW	2	189	LEADING TRUCK	1
33	PIPING (B-2)	1	83	INSULATE PLATE FOR SMOKE UNIT	2	139	VALVE LEFT	1	190	RIGHT BRAKE CYLINDER	1
34	PIPING (B-1)	1	84	SCREW	2	140	CYLINDER	1	191	PILOT TRUCK WHEELS AND AXLE	1
35	SMALL HANDRAIL	2	85	SCREW	2	141	CYLINDER REAR PART (R)	1	192	SHORT BOTTOM COVER	1
36	SAFETY VALVE	1	86	PIECE FOR SMOKE UNIT	1	142	COMPRESSOR	2	193	PCB #2	1
37	WHISTLE #1	1	87	WALKWAY LEFT (SHORT) #3	1	143	PILOT SHIELD (FEF-2)	1	194	WEIGHT	1
38	PIPING (A-L)	1	88	WALKWAY LEFT (SHORT)	1	144	PILOT SHIELD TOP HANDRAIL	1	195	BROAD SPRING	1
39	BODY HANDRAIL (FEF-2) L	1	89	DOWN MAIN FRAME	1	145	WIRE FOR PILOT SHIELD TOP HANDRAIL	1	196	SCREW	4
40	WIRE FOR LONG HANDRAIL L(2SER)	1	91	CAB SEAT - 1	2	147	STEP FOR PILOT L (FEF-3)	1	197	WHEEL SHAFT COVER	1
41	BOILER TOP PART #4 (FEF-3)	1	92	CAB SEAT - 2	2	148	PILOT TOP PART	2	198	SCREW	2
42	SCREW	3	93	BRAKE LEVER	1	149	LIFT BAR (1)	1	199	FRONT LEAD TRUCK COVER	2
43	SAFETY VALVE SUPPORT	1	94	CONTROL PANEL INSIDE CAB	1	150	LIFT BAR WIRE #1 (PILOT)	1	200	TRAILING TRUCK SPRING	1
44	DOUBLE SMOKE STACK	1	95	COAL OPENING COVER	1	151	CYLINDER PART 2	1	201	WASHER	1
45	BOILER TOP NUMBER BOARD GLASS	2	96	BOILER BOTTOM (FEF-2)	1	152	CYLINDER PART 1	1	202	SCREW FOR LEADING TRUCK	1
46	PCB #1	2	98	FIREBOX FRONT SIDE DETAIL L	1	153	CAB UNDER PART	1	203*	SMOKE DEFLECTOR SUPPORT (L)	1
47	NUMBER BOARD PART 4	1	103	PIPING #5	1	154	CYLINDER PART 3	1	204*	SMOKE DEFLECTOR (LEFT)	1
48	NUMBER BOARD PART 3	1	104	PIPING #6	1	155	CYLINDER WEIGHT	2	206*	SMOKE DEFLECTOR (RIGHT)	1
49	NUMBER BOARD PART 2	1	105	PIPING #2	1	156	STEP FOR PILOT R (FEF-3)	1	207*	SMOKE DEFLECTOR SUPPORT (R)	1
50	NUMBER BOARD PART 1	1	106	FIREBOX FRONT SIDE DETAIL R	1	157	PILOT (A)	1	208	CABIN HANDRAIL RH	1
51	BELL SUPPORT	1	107	PIPING #1	1	158	DUMMY SWIVEL COUPLER	1	214	RED LIGHT BASE	1
52	BELL SUPPORT PIN	1	108	SCREW	2	159	PILOT HOSE	1	215	PLUG	1
53	BELL	1	109	WALKWAY LEFT (SHORT) #4	1	160	COUPLER SUPPORT #2	1	216	SCREW	2
54	MARKER LIGHT LEFT	1	110	WALKWAY RIGHT (SHORT)	1	161	SCREW 1	1	217	LEFT PUMP REAR PIPING (UP 821 VERSION)	1
55	RED LIGHT	1	111	REVERSE CYLINDER (FEF-2)	1	162	BRASS SLEEVE #1	1	218	PIPING #4	1
56	HEAD LIGHT GLASS	1	112	EXHAUST STEAM INJECTOR	1	163	FRONT COUPLER BOX	1	219	LEFT PUMP FRONT PIPING (UP 821 VERSION)	1
57	HEAD LIGHT BASE (FEF-2)	1	113	REVERSE CYLINDER PIPE	1	164	MC HENRY	1	220	LEFT FIRE BOX BOTTOM PIPING (UP 821 VERSION)	1
58	HEAD LIGHT NUMBER GLASS	2	114	WIRE #11 FOR 24313102	1	165	FRONT COUPLER BOX COVER	1	221	LEFT PUMP PIPING (RR VERSION)	1
59	HEAD LIGHT BAR	1	115	FRAME	1	166	SCREW 4	1	222	LEFT FIRE BOX TOP PIPING (UP 821 VERSION)	1
60	MARKER LIGHT RIGHT	1	116	HAND WHEEL	1	167	RIVET #3 (FOR LINK)	2	223	GENERATOR BASE (SINGLE)	1
61	SMOKE BOX DOOR (WITH MARS LIGHT)	1	117	PIPING UNDER CABIN (C-1)	1	168	SIDE ROD	2	224*	GENERATOR	2
62	SMOKE UNIT	2	118	FRAME COVER	1	169	RIVET #1 (FOR CRANK)	2	225*	GENERATOR BASE (DOUBLE)	1
63	UPPER MAIN FRAME	1	119	SCREW	1	170	NUT #1	2	226*	FEEDWATER HEATER	1
64	PCB #4	1	120	SCREW	1	171	LEFT CRANK	1	227*	SMOKE BOX DOOR (WITHOUT MARS LIGHT)	1
65	LED COVER	1	121	WORM COVER	1	172	MAIN ROD	2	228*	ASH PANS (1-RIGHT)	1
66	BODY HANDRAIL (FEF-2) R	1	122	COMPOUND GEAR	1	173	SCREW BAR BUSH	2	229*	ASH PANS (1-LEFT)	1
67	WIRE FOR LONG HANDRAIL R (2SER)	1	123	WORM GEAR ASSEMBLY	1	174	SIDE LONG ROD	2	230*	WIRE #6 FOR 24311603	1
68	PCB #1	1	124	SCREW	4	175	SCREW	6	231*	WIRE #8 FOR 24311603	1
69	PIPING (A-R)	1	125	IDLER GEAR (Z19)	2	176	ENGINE WHEEL ASSEMBLY #2	1	232	WIRE #7 FOR 24311603	1
70	BOILER TOP (FEF-3 DOUBLE SMOKE STACKS)	1	126	GEAR BOX	1	177	ENGINE WHEEL ASSEMBLY #1	1	233	LEFT PIPING #2 (BELOW WALKWAY) (3SER)	1
71	PCB #3	1	127	FRONT ENGINE VALVE GEAR ASSEMBLY - LEFT	1	178	TRACTION TIRE	2	234	LEFT PUMP FRONT PIPING (RR VERSION)	1
72	LEVER	1	128	IDLER GEAR #3	1	179	RIVET #7 (FOR PISTON-MAIN ROD)	2	235	LEFT PUMP #1 (MIDDLE)	1
73	WIRE #9 FOR 24313101	1	129	SPRING #1	2	180	ENGINE WHEEL ASSEMBLY #4	1	236	LEFT PIPING #1 (BELOW WALKWAY)	1
74	WIRE #10 FOR 24313101	1	130	SCREW	1	181	ENGINE WHEEL ASSEMBLY #3	1	237	WIRE #1 FOR 24311602	1
75	SCREW	1	131	GEAR BOX SIDE PLATE	1	182	SCREW	1	238	WIRE #2 FOR 24311602	1
76	BRASS SLEEVE #1	1	132	FRONT ENGINE VALVE GEAR ASSEMBLY - RIGHT	1	183	RIGHT CRANK	1	239	LEFT PUMP TOP PIPING	1
77	DRAW BAR	1	133	LUBRICATOR (R)	1	184	WASHER	1	240	PIPING UNDER CABIN (D-1)	1
78	DRAW BAR SPRING	1	134	CYLINDER REAR PART (L)	1	185	LEFT BRAKE CYLINDER	1	241	PIPING (L SHAPE)	1
79	LINK ROD	1	135	LUBRICATOR (L)	1	186	TRAILING TRUCK	1			

*Optional Parts Listed In Red