

LIONEL SERVICE MANUAL

NO. 2023 UNION PACIFIC DIESEL

Lionel No. 2023 diesel-type locomotive is modeled on the 1500 horse-power freight diesels built by the American Locomotive Company for the Union Pacific Railroad and is designed especially to negotiate the sharp-curved '027' track and switches, although it will operate as well on any three-rail steel track measuring 1-1/4" between the outside rails.

The locomotive consists of two 'A' units coupled together. The two units are identical in outside appearance but only one of them, designated as 2023P, is powered. The non-powered unit is designated as 2023T and does not contain any internal operating parts.

The power unit contains a motor mounted vertically on its front truck which is equipped with Alnico bar magnets and non-magnetic stainless steel axles, the arrangement being similar to that used in the 622 Diesel Switcher. The power car also contains the reversing unit and the warning horn together with the horn relay and size 'D' flashlight dry cell used to supply direct current required for the operation of the horn. While any standard nationally advertised cell can be used for replacement, a 'leak-proof' type is recommended for maximum safety. Both units are equipped with electro-magnetic operating couplers at their outer 'pilot' ends and with non-operating couplers at the inner ends.

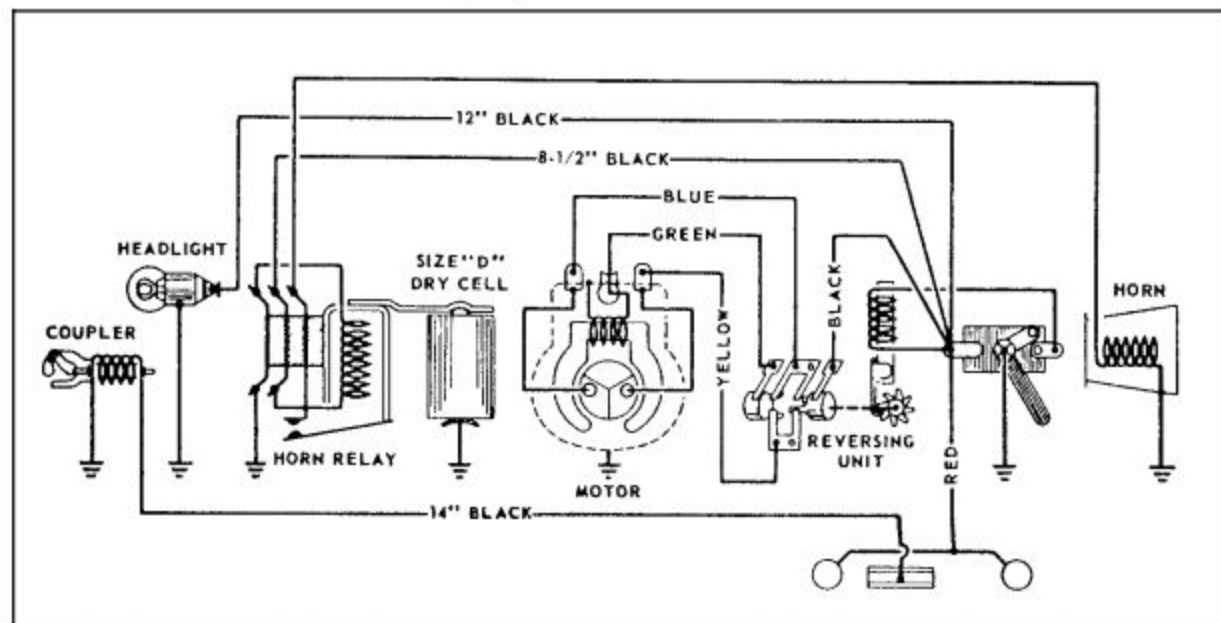
The operating voltage of the No. 2023 locomotive ranges between 10 and 13 volts and its current consumption from 2 to 2.5 amperes.

Union Pacific Diesels were first made in 1950 with orange and red color markings and gray truck sides, while the following year's models were finished in silver and gray with black truck sides. An additional change made in 1951 was in replacing the 2023-29 Dummy Coupler Head with 2023-99 Coupler Head in order to shorten the distance between the two locomotive units.

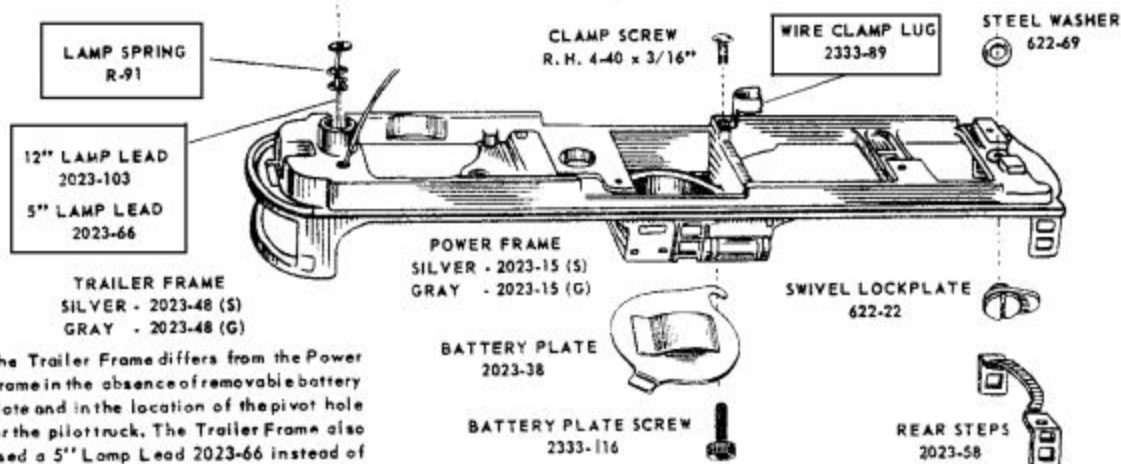
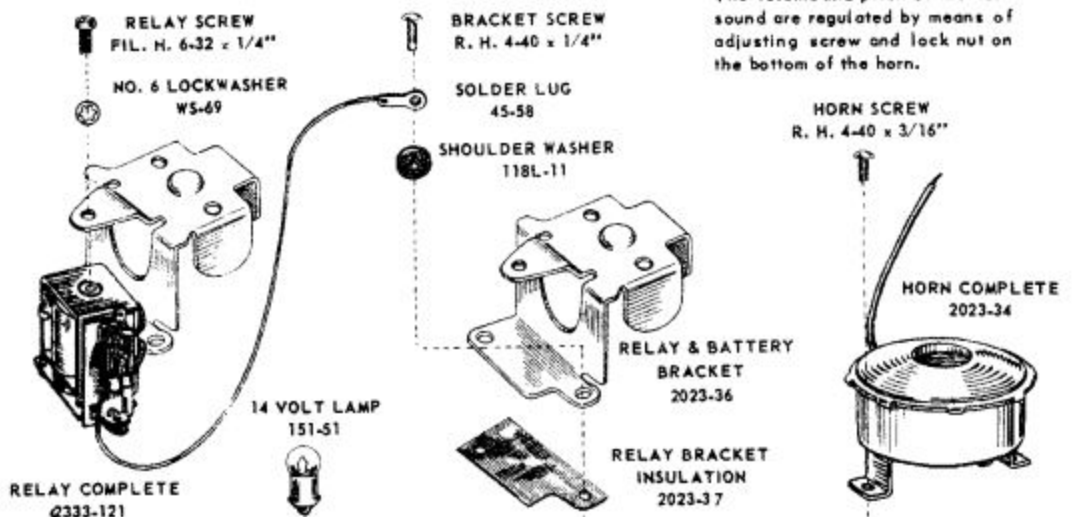
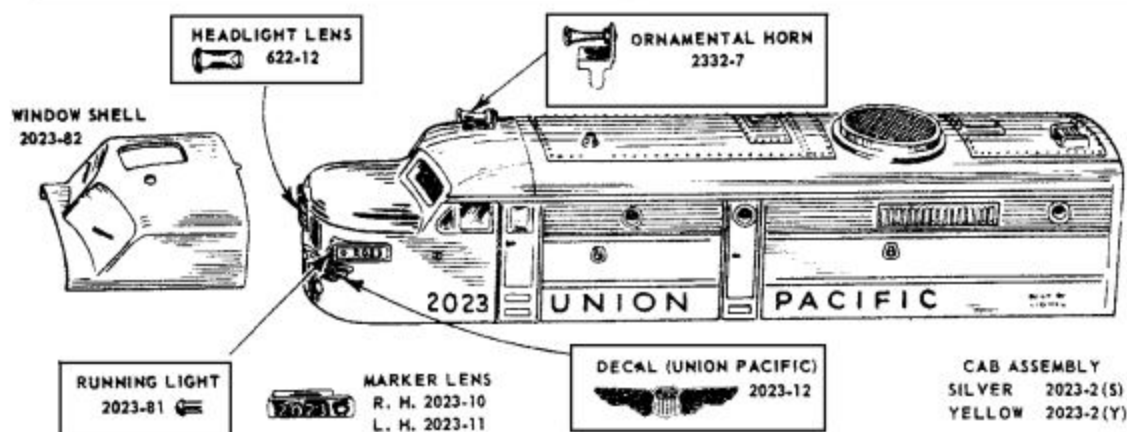
As in 622 Diesel switcher excessive play in the driving wheels of the magnetic truck or a slightly off-center magnet may cause one of the wheels to rub against the magnet, thus acting as a brake. This can be relieved either by inserting a 671M-19 washer between the wheel and the axle bushing, or by grinding off the projecting end of the magnet. Do not attempt to remove the magnet since the cement used requires special factory procedures.

For this reason also a worn-out worm wheel cannot simply be dropped out of the motor truck frame but must be removed by drilling out a portion of the casting as described and illustrated on Page 2, LOC-622 (1950).

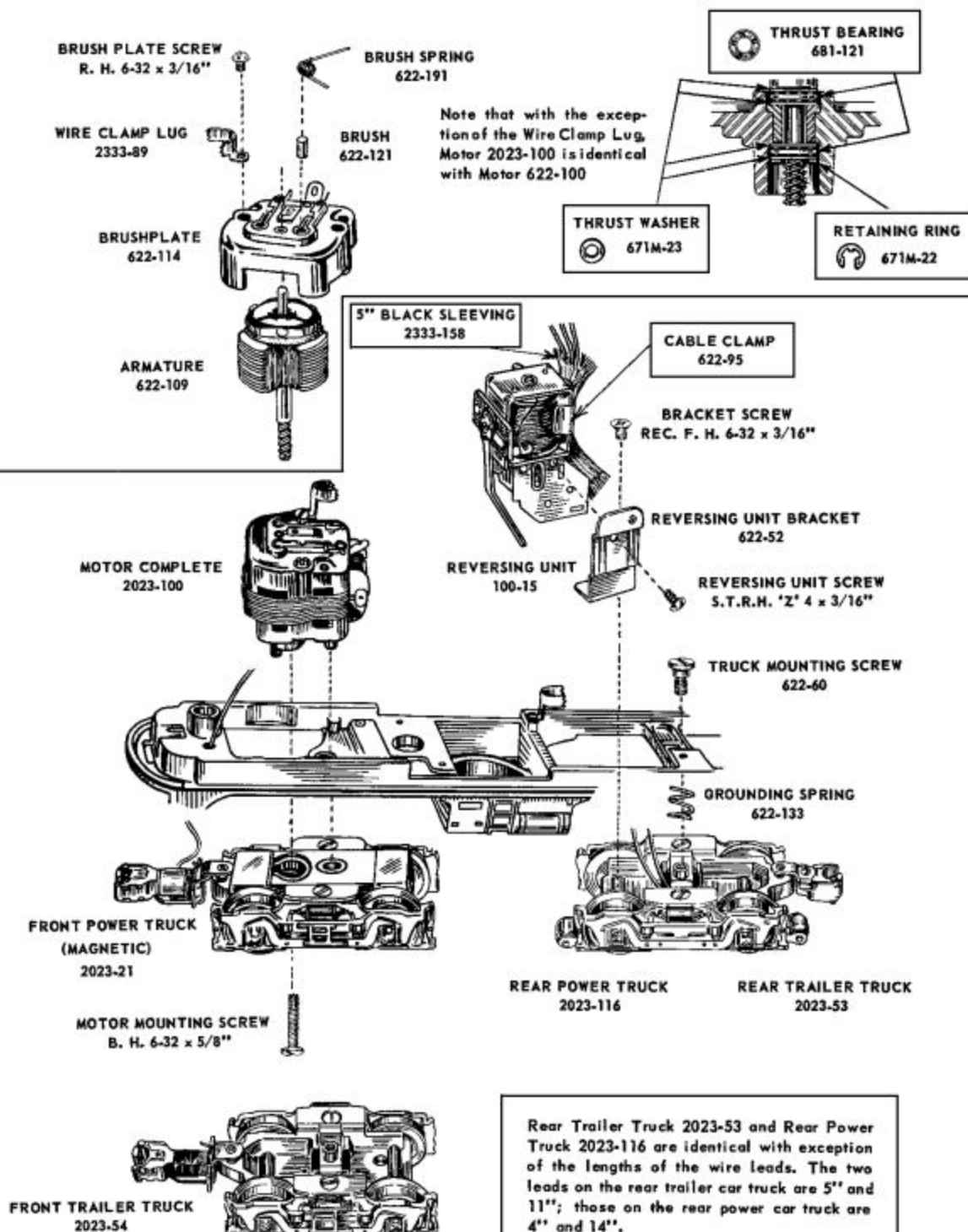
Wiring Diagram of No. 2023 Locomotive



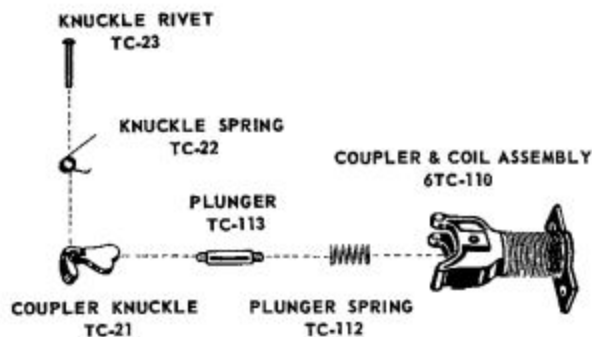
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Dummy Coupler Head 2023-99 is slightly shorter than Dummy Coupler Head 2023-29 in order to reduce distance between the locomotive units.

COUPLER PIVOT RIVET
622-56

DRIVE SCREW
202-9

DUMMY COUPLER HEAD
2023-99 or 2023-29

COUPLER & DRAWBAR
COMPLETE
622-58

CENTERING SPRING
622-57

Truck sides used on front trucks of both the power and the trailer unit are equipped with Truck Steps 2023-59, while sides used on rear trucks have no steps. Note that black truck sides are available with or without the steps while gray sides are stocked without steps only. Front power truck uses one Gear Truck Side and one Plain Truck Side while the other trucks use two Plain Truck Sides.

DUMMY COUPLER & DRAWBAR
ASSEMBLY
2023-26

CENTERING SPRING
622-57

PLAIN TRUCK SIDE (BLACK)
(Without Step) 622-41
(With Step) 2023-111

PLAIN TRUCK SIDE (GRAY)
(Without Step) 2023-18

FRONT POWER TRUCK



TRUCK SIDE SCREW
F. H. 6-32 x 3/8"

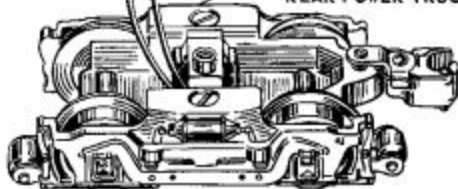
TRUCK STEP
2023-59



PLAIN TRUCK SIDE (BLACK)
(Without Step) 622-41

PLAIN TRUCK SIDE (GRAY)
(Without Step) 2023-18

REAR POWER TRUCK

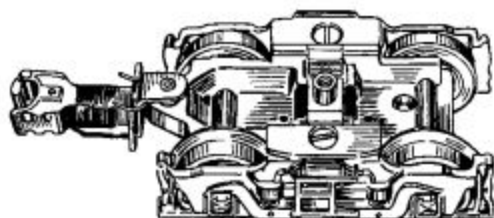


GEAR TRUCK SIDE (BLACK)
(Without Step) 622-85
(With Step) 2023-110

GEAR TRUCK SIDE (GRAY)
(Without Step) 2023-19

PLAIN TRUCK SIDE (BLACK)
(Without Step) 622-41

PLAIN TRUCK SIDE (GRAY)
(Without Step) 2023-18



FRONT TRAILER TRUCK

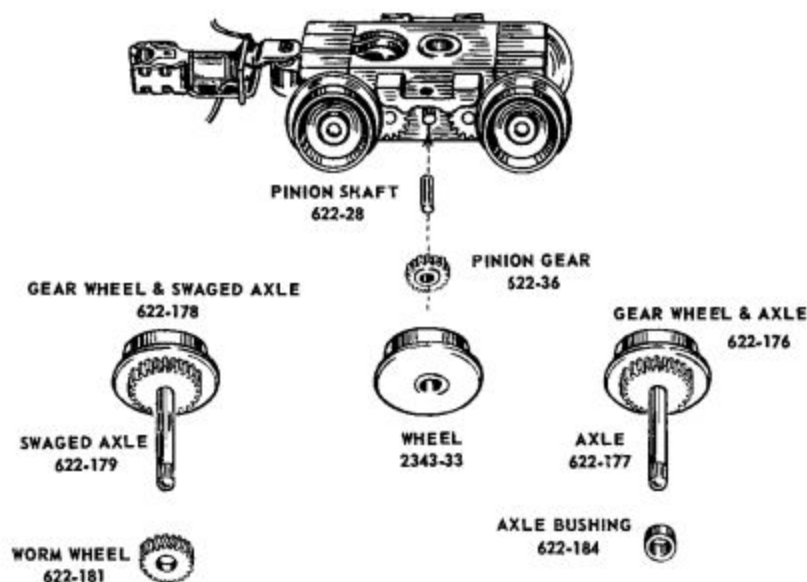
NAMEPLATE SCREW
R. H. 4-40 x 1/8"



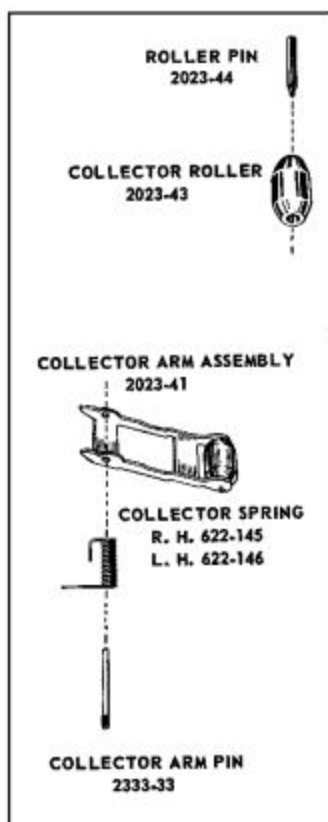
NAMEPLATE
2333-72

Front Trailer Truck uses an operating Coupler and Drawbar Complete 622-58, two Plain Truck Sides 2023-111 (with steps) and an identifying Nameplate. Construction of the wheels and axles is identical with the two rear trucks.

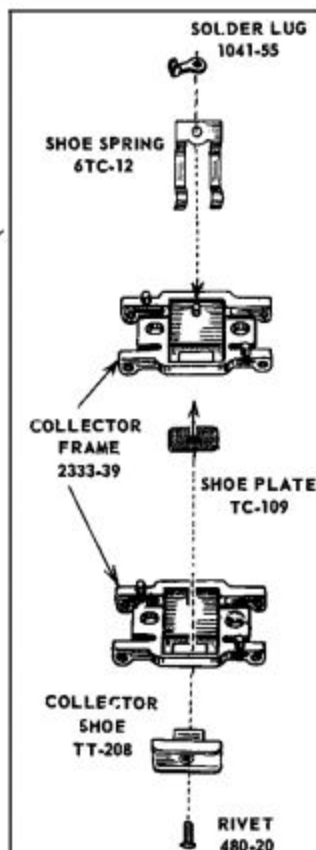
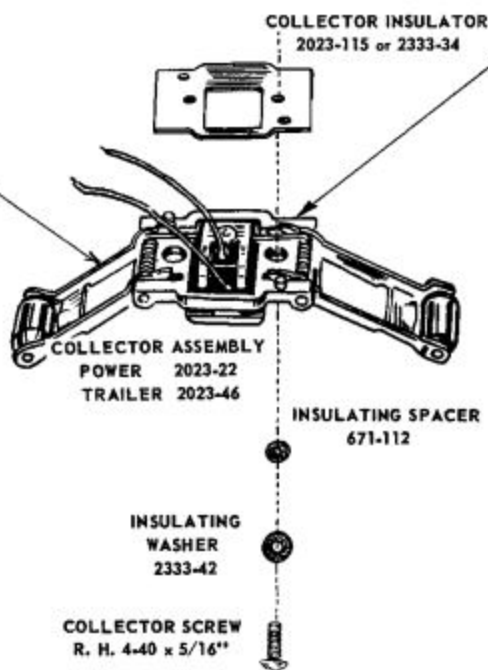
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The frame of the magnetic front power truck is die-cast from zinc alloy and is equipped with stainless steel axles running in bushings. The other three trucks used in this locomotive are die-cast from aluminum alloy and do not use axle bushings. The axles are ordinary steel.



Collector Assembly 2023-22 used in rear power truck differs from Collector Assembly 2023-46 used in rear trailer truck only in the length of wires.



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REPLACEMENT PARTS FOR NO. 2023 LOCOMOTIVE

Part No.	Part Name	List Price	Part Name	List Price	
6TC-10	Coupler Coil Assembly	.60	2023-43	Collector Roller	.15
6TC-12	Shoe Spring	.05	2023-44	Roller Pin	.02
45-58	Solder Lug	.05	2023-46	Trailer Collector Assembly	1.50
100-15	Reversing E-Unit	2.75	2023-48 (G)	Trailer Frame (Gray)	2.50
118L-11	Shoulder Washer	.02	2023-48 (S)	Trailer Frame (Silver)	2.50
151-51	14 Volt Lamp	.30	2023-53	Rear Trailer Truck	4.75
202-9	Drive Screw	.05	2023-54	Front Trailer Truck	4.00
480-20	Rivet	.02	2023-58	Rear Step	.10
622-12	Headlight Lens	.10	2023-59	Truck Step	.10
622-22	Swivel Lockplate	.10	2023-66	5" Lamp Lead	.10
622-28	Pinion Shaft	.05	2023-70	Wheel	.25
622-36	Pinion Gear	.20	2023-81	Running Light	.10
622-41	Plain Truck Side (Black)	.50	2023-82	Window Shell	.25
622-52	Reversing Unit Bracket	.10	2023-99	Dummy Coupler Head	.25
622-56	Coupler Pivot Rivet	.05	2023-100	Motor Complete	5.00
622-57	Coupler Centering Spring	.05	2023-103	12" Lamp Lead	.10
622-58	Coupler & Drawbar Complete	.75	2023-110	Gear Truck Side & Step (Black)	.60
622-60	Truck Mounting Screw	.05	2023-111	Plain Truck Side & Step (Black)	.60
622-69	Steel Washer	.05	2023-115	Collector Insulator	.05
622-85	Gear Truck Side (Black)	.50	2023-116	Rear Power Truck	5.50
622-95	Cable Clamp	.05	2332-7	Ornamental Horn	.15
622-109	Armature	2.50	2333-33	Collector Arm Pin	.05
622-114	Brushplate	.75	2333-34	Collector Insulator (Alternate)	.05
622-121	Brush	(Pair) .60	2333-39	Collector Frame	.30
622-133	Grounding Spring	.05	2333-42	Collector Insulating Washer	.05
622-145	Collector Spring R. H.	.05	2333-72	Nameplate	.05
622-146	Collector Spring L. H.	.05	2333-89	Wire Clamp Lug	.05
622-176	Gear Wheel & Axle	.40	2333-116	Battery Plate Screw	.05
622-177	Axle	.10	2333-121	Relay Complete	2.00
622-178	Gear Wheel & Swaged Axle	.50	2333-158	5" Black Sleeving	.10
622-179	Swaged Axle	.10	2343-33	Plain Wheel	.25
622-181	Worm Wheel	.50	R-91	Lamp Spring	.05
622-184	Axle Bushing	.10	TC-21	Coupler Knuckle	.10
622-191	Brush Spring	(Pair) .10	TC-22	Knuckle Spring	.02
671-25	Axle	.05	TC-23	Knuckle Rivet	.02
671-112	Insulating Spacer	.02	TC-109	Shoe Plate	.02
671M-22	Retaining Ring	.03	TC-112	Plunger Spring	.02
671M-23	Thrust Washer	.02	TC-113	Plunger	.05
681-121	Thrust Bearing	.15	TT-208	Collector Shoe	.05
1041-55	Solder Lug	.02	WS-69	No. 6 Lockwasher	.02
2023-2 (S)	Body (Silver)	5.00	2023-63	Pivot Bracket	
2023-2 (Y)	Body (Yellow)	5.00			
2023-10	Marker Lens R. H.	.20			
2023-11	Marker Lens L. H.	.20			
2023-12	Decal (Union Pacific)	.05			
2023-15 (G)	Power Frame (Gray)	2.50			
2023-15 (S)	Power Frame (Silver)	2.50			
2023-18	Plain Truck Side (Gr.) Order 622-41	.50			
2023-19	Gear Truck Side (Gr.) Order 622-85	.50			
2023-21	Front Power Truck (Magnetic)	4.50			
2023-22	Power Collector Assembly	1.50			
2023-26	Dummy Coupler & Drawbar Assy.	.45			
2023-29	Dummy Coupler Head (Order 2023-99)	.25			
2023-34	Horn Complete	2.00			
2023-36	Relay & Battery Bracket	.25			
2023-37	Relay Bracket Insulation	.02			
2023-38	Battery Plate	.35			
2023-41	Collector Arm Assembly	.30			

SCREWS			
Description	Where Used	List Price	
4 x 3/16" S.T.R.H. 'Z'	E-Unit	.02	
4-40 x 1/8" R.H.	Nameplate	.02	
4-40 x 3/16" R.H.	Wire Clamp Lug	.02	
4-40 x 3/16" R.H.	Hom Mounting	.02	
4-40 x 1/4" R.H.	Relay Bracket	.02	
4-40 x 5/16" R.H.	Collector Mounting	.02	
6-32 x 3/16" Rec. F.H.	E-Unit Bracket	.02	
6-32 x 1/4" Fil. H.	Relay	.02	
6-32 x 3/16" R.H.	Brushplate	.02	
6-32 x 3/8" F.H.	Truck Side	.02	
6-32 x 5/8" B.H.	Motor Mounting	.02	

SCREWS

Description	Where Used	List Price
4 x 3/16" S.T.R.H. 'Z'	E-Unit	.02
4-40 x 1/8" R.H.	Nameplate	.02
4-40 x 3/16" R.H.	Wire Clamp Lug	.02
4-40 x 3/16" R.H.	Horn Mounting	.02
4-40 x 1/4" R.H.	Relay Bracket	.02
4-40 x 5/16" R.H.	Collector Mounting	.02
6-32 x 3/16" Rec. F.H.	E-Unit Bracket	.02
6-32 x 1/4" Fil. H.	Relay	.02
6-32 x 3/16" R.H.	Brushplate	.02
6-32 x 3/8" F.H.	Truck Side	.02
6-32 x 5/8" B.H.	Motor Mounting	.02

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Part Number	Location	Unit Price	Min. Quan.	Description
6TC-10	P-61	.75		Coupler & Coil Assem.
6TC-12	P-71	.05	12	Shoe Spring
45-58	H-95	.02	12	Solder Lug (Relay)
100-15	C-11	3.50		Reversing Unit
118L-11	A-71	.02	25	Shoulder Fibre Washer (Relay)
202-9	A-71	.05	25	Drive Screw (Coupler Bracket)
363-300	LC	.30	10	Lamp
480-20	P-72	.02	50	Rivet (Shoe Plate)
622-12	B-71	.15	4	Headlight Lens
622-22	B-57	.15	4	Swivel Lockplate
622-28	B-71	.05	12	Pinion Shaft
622-36	Sub. 2023-117			Pinion Gear
622-41	B-57	.75		Plain Truck Side (Black)
622-52	P-57	.20		Reversing Unit Bracket
622-56	B-47	.05	12	Coupler Pivot Rivet
622-57	B-47	.05	12	Coupler Centering Spring
622-58	B-47	1.25		Coupler & Drawbar Assem.
622-60	B-73	.10	6	Truck Mtg. Screw
622-69	B-73	.05	12	Steel Washer
622-85	B-37	.75		Gear Side Truck Side
622-95	B-74	.05	12	Cable Clamp
622-109	A-44	3.00		Armature
622-114	A-45	1.25		Brushplate
622-121	B-77	pr .60	6 pr	Brush
622-133	B-77	.05	12	Grounding Spring
622-145	F-56	.05	12	Collector Spring RH
622-146	F-56	.05	12	Collector Spring LH
622-176	M-32	.50		Gear Wheel W/Axle
622-177	M-32	.10	6	Axle (Motor Truck)
622-178	M-22	.50		Gear Wheel W/Swaged Axle
622-179	M-62	.10	6	Swaged Axle
622-181		.75		Worm Wheel
622-184	B-75	.15	4	Axle Bushing
622-191	B-74	pr .10	6 pr	Brush Spring
622-193		2.00		Collector Assem.
623-7		7.00		Truck (Magnetized)
623-10	D-97	1.25		Gear Wheel W/Magnetized Axle
623-13	D-107	1.25		Gear Wheel W/Magnetized Axle
623-20	D-97	.10	6	Bearing
623-22	D-97	.50		Worm Wheel

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NOS. 2023A, 2031A, 2032A & 2033A - DIESEL LOCOMOTIVE

Part Number	Location	Unit Price	Min. Quan.	Description
671-25	B-107	.10	6	Axle
671-112	C-57	.02	25	Insulating Spacer (Collector)
671M-22	C-75	.05	12	Retaining Ring
671M-23	C-75	.02	25	Thrust Washer
681-121	F-94	.25		Thrust Bearing
1041-55		.02	25	Solder Lug (Collector)
2023-4 (S)	G-44	5.00		Cab (Silver) "Union Pacific"
2023-4 (Y)	Obsolete			Cab (Yellow) "Union Pacific"
2023-10	F-97	.20		Marker Lens RH
2023-11	F-55	.20		Marker Lens LH
2023-12	F-96	.05	12	Decal (Union Pacific)
2023-15 (G)	Obsolete			Power Frame (Gray)
2023-15 (S)	A-33	3.00		Power Frame (Silver)
2023-18	Obsolete			Plain Truck Side (Gray)
2023-19	Obsolete			Gear Truck Side (Gray)
2023-21	Obsolete			Front Power Truck (Magnetized)
2023-26	Obsolete			Dummy Coupler & Drabar Assem.
2023-29	Sub. 2023-99			Dummy Coupler Head
2023-34	L-34	2.50		Horn Complete
2023-36	E-24	.50		Relay & Battery Bracket
2023-37	F-96	.02	25	Relay Bracket Insulation
2023-38	Q-84	.50		Battery Plate
2023-41	Sub. 2343-94			Collector Arm Assem.
2023-43	F-56	.15	4	Collector Roller
2023-44	F-96	.05	12	Roller Pin
2023-46		1.50		Trailer Collector Assem.
2023-48 (G)	M-41	2.50		Trailer Frame (Gray)
2023-48 (S)	Sub. 2033-12			Trailer Frame (Silver)
2023-53		6.00		Rear Trailer Truck
2023-54	L-15	5.00		Front Trailer Truck
2023-58	M-41	.15	4	Rear Step
2023-59	F-97	.15	4	Truck Step
2023-70	L-16	.30		Wheel
2023-81		.10	6	Running Light
2023-82	M-22	.25		Window Shell
2023-99		.30		Dummy Coupler Head
2023-100	F-35	6.50		Motor Complete
2023-110	M-13	.60		Gear Truck Side & Step (Black)
2023-111	Obsolete			Plain Truck Side & Step (Black)
2023-115	M-31	.05	12	Collector Insulator

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NOS. 2023A, 2031A, 2032A & 2033A - DIESEL LOCOMOTIVE

Part Number	Location	Unit Price	Min. Quan.	Description
2023-116	M-36	6.00		Rear Power Truck
2023-117	M- 21	.25		Pinion Gear
2031-4	M-16	5.00		Cab "Rock Island"
2031-6	M-18	3.00		Power Frame
2031-10	M-38	.20		Marker RH
2031-11	M-38	.20		Marker LH
2031-12	M-38	.05	12	Decal (Rock Island)
2032-2	F-43	5.00		Cab "Erie"
2032-6	E-15	3.00		Power Frame
2032-10	M-88	.20		Marker RH
2032-11	M-88	.20		Marker LH
2032-12	M-88	.05		Decal (Erie)
2033-4	M-41	6.00		Cab "Union Pacific"
2033-6		3.00		Power Frame
2033-10	M-88	.20		Marker RH
2033-11	M-88	.20		Marker LH
2033-12	E-15	3.00		Frame (Silver)
2332-7	E-87	.20		Ornamental Horn
2333-33	Obsolete			Collector Arm Pin
2333-34	F-52	.05	12	Collector Insulator (Alternate)
2333-39	F-52	.30		Collector Frame
2333-42	F-52	.05	12	Insulating Washer (Collector)
2333-72	F-92	.05	12	Nameplate
2333-89	F-92	.05	12	Wire Clamp Lug
2333-116	F-57	.10	6	Battery Plate Screw
2333-121	F-53	3.00		Relay Complete
2333-168	Obsolete			Collector Pivot Pin
2343-33	L-17	.30		Plain Wheel
2343-94	A-51	.40		Collector Arm Assem.
R-91	N-55	.05	12	Lamp Spring
TC-21	P-71	.15	4	Coupler Knuckle
TC-22	P-93	.02	25	Knuckle Spring
TC-23	P-61	.02	25	Knuckle Rivet
TC-109	P-63	.02	25	Collector Shoe Plate
TC-112	P-63	.02	25	Plunger Spring
TC-113	P-73	.10	6	Plunger
TT-208	P-93	.10	6	Collector Shoe
WS-69	G-62	.02	25	#6 Lockwasher

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<u>Part Number</u>	<u>Location</u>	<u>Unit Price</u>	<u>Min. Quan.</u>	<u>Description</u>
4 x 3/16"		.02	25	RHST "Z" Reversing Unit Screw
4-40 x 1/8"		.02	25	RH Nameplate Screw
4-40 x 3/16"		.02	25	RH Wire Clamp Lug Screw
4-40 x 3/16"		.02	25	RH Horn Mtg. Screw
4-40 x 1/4"		.02	25	RH Relay Bracket Screw
4-40 x 5/16"		.02	25	RH Collector Mtg. Screw
6-32 x 3/16"		.02	25	Rec. FH Rev. Unit Bracket Screw
6-32 x 1/4"		.02	25	Fil. H. Relay Screw
6-32 x 3/16"		.02	25	RH Brushplate Screw
6-32 x 3/8"		.02	25	FH Truck Side Screw
6-32 x 5/8"		.02	25	BH Motor Mtg. Screw