

SPECIFICATIONS

GENERAL MOTORS

1750 H. P. DIESEL-ELECTRIC

ROAD SWITCHING

LOCOMOTIVE



ELECTRO - MOTIVE DIVISION

GENERAL MOTORS CORPORATION

LA GRANGE, ILLINOIS, U. S. A.

Specification 8031
Revised January 2, 1957

GP-9

**GENERAL MOTORS
1750 H. P. DIESEL-ELECTRIC
ROAD SWITCHING LOCOMOTIVE**

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SECTION 1

General Information and Identification



Model GP-9 1750 H.P. Road Switching Locomotive.

Type A.A.R. designation (*B-B*). Common designation (*0440*).

Arrangement The general arrangement of the locomotive is shown on Elevation and Floor Plan Drawing attached.

The locomotive consists of one unit complete with engine, generator, trucks and all necessary accessories for single unit operation, with a control cab between the engine and boiler hoods.

Major Dimensions

Distance, pulling face of front coupler to centerline of truck.....	12' 7"
Distance between bolster centers.....	31' 0"
Truck—rigid wheel base.....	9' 0"
Distance, pulling face front coupler to rear coupler.....	56' 2"
Width over cab sheeting.....	10' 0"
Width over hand rails.....	10' 3½"
Height, top of rail to top of carline in cab.....	14' 6"
Overall height, over horns.....	14' 11½"

Drive

Driving motors.....	Four
Driving wheels.....	4 Pair
Diameter wheels.....	40"

Weights and Supplies

Total loaded weight on rails (approximately).....	240,000 lbs.
Fuel.....	800 gallons
Sand.....	18 cu. ft.
Cooling water.....	227 gallons
Lubricating oil.....	200 gallons

Clearances EMD Clearance Diagram included on outline drawing illustrates clearance conditions. Truck swing designed for 39° curve or 150' radius with 2¼" lateral motion in the truck bolster and ⅜" in Hyatt journal boxes. Two units coupled limited to 21° curve or 274' radius on account of footboard clearance.

Safety Appliances All steps, grab handles and other safety appliances cover EMD interpretation of Interstate Commerce Commission requirements.

SECTION 2

Carbody Construction



- Framing** Underframe consists of two I-beam center sills which serve as main carrying members for hoods, cab, and equipment. Two channel side sills supported by center sills partly support water tanks when used and catwalk along side of hoods. Draft gear pockets are welded to the built-up platform construction between center sills. Push pole pockets are welded to step support at side sill. The structure is all welded construction.
- Flooring** $\frac{1}{4}$ " floor plates with anti-skid surface are welded to underframe on platform and along side of hoods. Cab floor consists of 1" plywood covered with $\frac{1}{8}$ " linoleum.
- Body Center Plates** Cast steel welded to body bolster assembly. Wear plates applied to bottom and outside surfaces.
- Couplers** Type "E", $6\frac{1}{4}$ " x 8" shank, $28\frac{1}{2}$ " long. Quadruple shear pin. Maximum swing of coupler is 12" each side of center.
- Uncoupling Device** Each end of the locomotive is provided with a top operating device arranged to operate from either side of the locomotive.
- Draft Gear** National Malleable M-375 rubber draft gear.
- Jacking Pads** Jacking has been provided for at each bolster on side sill and combination pad and cable sling is located on side sill next to step at all four corners.
- Platform Step** Safe and suitable wide box steps are provided at each corner leading to locomotive platform. They are recessed three step type.
- Footboards and Pilot** Each end of the locomotive is provided with two footboards, mud guards, hand railings, and grab irons.
- Cab** The floor is elevated $28\frac{1}{4}$ " above the top of the underframe. The narrow hood and large cab windows provide good vision in all directions. Trap door is provided in floor to facilitate servicing of traction motor blower. Hinged doors are provided at diagonally opposite corners leading to platforms along side of hoods. Side windows for operator and helper are the sliding double sash type and are fitted with latches. End windows in doors and cab are stationary and set in a special rubber retainer. Cab is of fabricated steel construction.

SECTION 2

Carbody Construction



- Windows** All windows and doors are glazed with safety plate glass.
- Door Locks** The cab doors are fitted with an inside latch and provided with a lock and Railway Coach key.
- Insulation** Ceiling and walls lined with perforated metal backed up by insulation for temperature and sound insulation.
- Battery Box** Two battery boxes, one on each side of the boiler hood, are provided with trap doors in the catwalk for servicing and also drop doors on the side serve for removing batteries. Ventilation and drainage provided.
- Hood** The power plant compartment is designed to a minimum height and width to provide unobstructed vision from within the cab, as well as a walkway around the hood. Doors are provided which give access to power plant equipment and allow removal of pistons and cylinder liners. Hatches supporting cooling fans can be removed separately for removal of radiators. The hood is bolted to the cab and to the deck and can be removed complete with radiators and cooling fans for major repairs. The boiler compartment is also bolted to the cab and deck and is provided with an access hatch to facilitate major repairs to the steam generator.
- Hood Doors** All side doors have suitable outside hinges and latches.
- Filters** Air filters are provided in hoods for generator, engine and traction motors.
- Lifting Eyes** Lifting eyes are provided on hood to facilitate handling with a crane.

SECTION 3

Trucks

GENERAL MOTORS
LOCOMOTIVES

Truck Assemblies Two four-wheel truck assemblies are provided per locomotive and are interchangeable. Improved riding qualities and greater stability are obtained by a new treatment of load suspension, strictly an EMD development.

Fully flexible bolster supported on springs providing lateral movement. The truck frame is supported on each of the four journal boxes by twin group coil springs.

Each of the four motors is supported by the driving axle to which it is geared, and a special suspension on the truck transom provides a flexible support, dampening out the torque shocks of the motor.

Axles Oversize ATEA E-12 with oversize wheel and gear seat and journals to suit Hyatt roller bearings. Axle material conforms to physical properties of current A.A.R. specifications.

Wheels Rolled steel heat treated, 40" diameter, 2½" rim. Wheel tread finished smooth and concentric after assembly on axle.

Journal Boxes Locomotive equipped with Hyatt Roller Bearings 6½" journals of special EMD design. Lateral thrust is taken through a cushioning arrangement directly by the box. Journal box pedestal guides provided with spring steel wear plates.

Truck Frame and Bolster EMD design, fully flexible. Bolster stops provided on all units with 62:15 or 61:16 gear ratio.

Pedestals Lined with spring steel plates bolted to frame.

Pedestal Tie Bars Fitted and applied at the lower end of the pedestal legs, held in position by bolts.

Truck Center Plates Truck center plate provided with wear plates and dust guard.

Side Bearings Friction type side bearings.

Interlocks Body and truck interlocks provided each side of the center plate, serving as anti-sluing device in case of derailment.

Trucks



- Truck Brakes** Clasp brake rigging provided on each wheel, operated by individual brake cylinders.
- Brake Pins** All pins and bushings hardened and ground, large size. All holes in brake rigging bushed.
- Hand Brake** Hand brake provided for the locomotive connected to one brake cylinder lever only. All trucks provided with lever for hand brake connection, making trucks interchangeable.

SECTION 4

Power Plant and Transmission

GENERAL MOTORS
LOCOMOTIVES

- Engine** G.M. Diesel sixteen (16) cylinder, 2-cycle, 45°V, 8½" bore, 10" stroke, with unit injection, Roots blower scavenging through cylinder wall intake, and multi-valve exhaust. Water cooled cylinder liners and heads, oil cooled pistons, ten (10) bearing crankshaft, drop forged connecting rods, and floating piston assembly. Isochronous governor speed control, separate overspeed trip.
- Main Generator** EMD, nominal 600 volt direct current, ventilated by blower. Single bearing direct connected to engine crankshaft through alternator rotor and flexible coupling. Capacity suitable to continuously transmit to traction motors the rated output of the engine under all conditions for which the locomotive is offered.
- Alternator** EMD A.C. 170V, 3 phase, 16 pole, built integral with main generator, to supply A.C. power to induction motors driving engine cooling fans and traction motor blowers.
- Traction Motors** Four EMD direct current, series wound, forced ventilated, axle hung motors with roller bearings.
- Auxiliary Generator** A direct current generator with direct drive from the engine gear train, provides current for control circuits, lighting, battery charging, and separate excitation of main generator. The voltage is automatically controlled by a voltage regulator.
- Load Regulator** A load regulator is provided which automatically maintains a constant horsepower output, corresponding to each throttle position, over the entire range of locomotive speeds.
- Engine Starting** By motoring of the main generator through use of special starting fields energized by the locomotive storage battery.
- Engine Cooling** Consisting of two direct driven centrifugal water pumps on the engine, radiators and A.C. motor driven cooling fans located above radiators. Water cooled oil cooler and water tank, mounted as a unit directly in rear of the governor end of engine. Automatic water temperature control and hot engine alarm.
- Engine Lubrication** The engine lubricating oil system is a pressure system using two positive displacement gear type pumps combined in a single unit. One pump delivers oil for the pressure lubricating system, the other for piston cooling. The oil supply to these pumps is drawn from the oil strainer chamber through a common suction pipe.

SECTION 4

Power Plant and Transmission

GENERAL MOTORS
LOCOMOTIVES

Engine Lubrication (Cont'd)

A scavenging oil pump is used to draw oil from the engine oil pan through a strainer, pump it through the lube oil filter to the cooler core section of the oil cooler tank and return it to the strainer chamber. Low oil pressure and high suction protection are provided.

Engine Fuel System

Return flow, single D.C. motor driven gear pump, protected by suction filter in addition to discharge filters to insure clean fuel for the engine. An assembly of sight glasses and relief valves offers visual indication of any system trouble plus protection against excessive pressures.

Engine Exhaust

Two sets of dual fabricated chambers, each set with an independent exhaust.

Engine Air Intake Filters

Filters provide for engine air intake air.

Fuel Tank

Tank built of heavy gauge steel, with baffle plates.

Capacity 800 gallons, located underneath the locomotive body. Filling station each side, vent equipped with flame arrestors. Sump with cleanout plug and non-removable water drain located at bottom of tank.

Direct reading type fuel sight glasses with gallonage calibration plates on both sides of tank.

Each filling station fitted with pull ring for emergency fuel cut-off. Similar pull cord located at operator's control station.

Electrical Control Cabinet

One cabinet houses the following locomotive high and low voltage control equipment—

- 1) High and low voltage control for Main Generator and Traction Motors.
- 2) Battery charging control.
- 3) Engine starting.

The cabinet is ventilated and readily accessible for servicing or unit replacement.

An additional cabinet houses the control equipment for the radiator cooling fan motors.

Power Plant and Transmission



Motor Control Fully automatic 4-step transition forward and backward. High voltage circuits safeguarded by ground protective relay. Full range wheel slip control with automatic sanding under wheel slip conditions.

Storage Battery 32 cell, 64 volt, 426 ampere hour capacity—(8 hour rating) battery located in two boxes under catwalk at boiler hood.

Engineer's Control Station Engineer's control station located conveniently to the left of the engineer's seat, includes the engine speed throttle, locomotive reverse lever. The lever arrangement is such that the throttle must be in idle before the reverse lever can be removed to isolate the controller.

Engineer's Control Switches Control and lighting switches located within reach of the engineer, including switches for automatic sand, control and fuel pump, generator field, engine run, number lights, gauge lights, classification lights, headlight bright front and rear, headlight dim front and rear. Engine start and stop, and isolation switches located on rear cab wall. Cab heater switches on cab heaters.

Engineer's Instrument Panel At the left of the engineer is a lighted instrument panel having air brake gauges and wheel slip light. Traction motor ammeter provided for load indication. A panel mounted on the rear cab wall contains the electrical air pressure gauge.

Speedometer A combination speedometer, recorder and odometer is located at the left of the engineer.

SECTION 5

Air Brakes

GENERAL MOTORS
LOCOMOTIVES

- Air Brakes** 6-BL Brake schedule including self-lapping independent and standard H-6 automatic valve portions. Sander and bell ringer valves incorporated in pipe bracket.
- Foundation Brakes** 9" x 8" cylinders, 5.65:1 lever ratio, 14" brake shoes, 290,000 lbs. braking force @ 100 lb. cylinder pressure.
- Brake Piping** Wrought steel pipe with A.A.R. fittings are used. All piping $\frac{5}{8}$ " O.D. and under uses nominal size copper tubing with S.A.E. tube fittings.
- Main Reservoir** Two (2) 22 $\frac{1}{2}$ " Dia. x 102" steel reservoirs mounted beneath the underframe. Total capacity: 74,150 cubic inches.
- Air Compressor** Two stage, three cylinder, water cooled direct coupled compressor having displacement of 235 cu. ft. per minute at 835 RPM.
Air compressor governor adjusted to provide main reservoir pressure with 10 lbs. differential.
- Sanding** Manual sander valve or automatic sanding in power operates eight single line sand traps, four traps for forward movement and four traps for reverse movement.
- Sand Capacity** Two sand boxes with a capacity of approximately 9 cu. ft. each, total 18 cu. ft. Sand boxes are filled from the outside of locomotive at the top of hood.
- Air Signal Line** Air signal line provided for trainlining.

SECTION 6

Equipment

GENERAL MOTORS
LOCOMOTIVES

Cab Heating and Ventilating

Two combination hot water cab heaters and defrosters with fan driven air circulating system, and selective outside air intake. Each heater is provided with rheostat for control of fan speed.

Window Wipers

Four extra heavy "Jumbo" air push window wipers are provided for operator and helper, front and rear windows.

Sun Visors

Adjustable metal sun visors at each windshield.

Cab Seats

The two wall mounted upholstered cab seats have forward and backward as well as height adjustments. Both the helper's and the engineer's seat and back rest can be turned 180°. Upholstered arm rests are provided at both side windows.

Fire Extinguishers

Two (2) 1-gallon carbon tetrachloride, one located in cab, the other in the power compartment.

Headlight

Twin sealed-beam headlights, front and rear, are equipped with two 200 watt, 30 volt sealed beam units. Bright and dimmer switch for each light in operator's cab.

Warning Devices

One 2-chime horn facing forward and one single chime horn facing to the rear with individual modulating valves. One 12" bell operated by internal pneumatic type ringer.

Locomotive Lighting

Lamps and outlets are as follows:

- a) 2—Cab Lights.
- b) 8—Engine Room Lights.
- c) 2—Ground Lights.
- d) 4—Number Lights.
- e) 4—Gauge Lights.
- f) Outlet Receptacles:
 - 2—In Engine Room.
 - 1—In Boiler Room.
- g) 1—Boiler Room Light.
- h) 4—Classification Lights.

SECTION 6

Equipment



**Charging
Receptacle**

One 100 ampere receptacle is provided for external charging of battery.

**Marker and
Flag Brackets**

Four standard combination flag and light brackets are provided, two each are located at front and rear of locomotive.

Number Lights

Number lights are built into each corner of front and rear hoods. Four-digit 8" numbers at an angle for forward and side visibility.

**Classification
Lights**

Classification lights are also built into each corner of front and rear hood.

**Steam Heating
Line**

A $\frac{3}{4}$ " line provided for layover steam heating of engine cooling system.

SECTION 7

Locomotive Modifications



GENERAL MOTORS
LOCOMOTIVES

The following modifications can be supplied on request to satisfy various operating requirements. The base price of the locomotive which is described in this specification does not include any of these modifications.

- Air Brakes** 24-RL brake schedule and additional features can be applied.
- Multiple Control** Multiple control equipment available to allow for operating two or more units from one cab.
- Draft Gear** National-malleable high capacity M-380 rubber draft gear. (Recommended when 3 or four units are operated in multiple regularly.)
- Steam Generator** 2750 \pm steam generator with 800 gallon water supply. 2" or 2 $\frac{1}{2}$ " steam end connectors. Modification includes 18 KW auxiliary generator and may be expanded to include standby arrangement.
- Awnings** Cloth or metal awnings over cab windows.
- Wind Deflectors** Wind deflectors front and rear of both cab side windows.
- Air Compressor** Two stage, six cylinder air compressor, either air or water cooled, having a displacement of 371 cu. ft. per minute at 835 RPM.
- Toilet** Toilet, either dry hopper or with water tank, can be provided.
- Fuel Tank** 1700 gallon fuel tank can be furnished when no steam generator is provided.
- Cab Seat** Third cab seat same as fireman's seat.
- Clothes Locker** Located in boiler compartment.
- Dynamic Brakes** Variable dynamic brakes use the traction motors as generators with the power being dissipated through force ventilated grid resistors located in the engine hatch.
- Winterization** Winterization arrangement available to facilitate locomotive operation under extreme cold weather conditions.

SECTION 8

Painting



General Only the best quality materials available are used, with special attention given to both the selection of materials and methods of application to insure a maximum of protection and durability.

Cab Inside finished in green.

Engine Room Inside finished in suede gray.
All air, fuel, water and lube oil piping color coded at points of connection.

Outside Finish Color arrangement and design to agree with railroad's requirement.

Under Carriage Black unless otherwise specified.

Trucks & Tanks Black unless otherwise specified.

SECTION 9

Performance Data

**Gear Ratio:**

<i>Option</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
GEARS	65:12	62:15	61:16	60:17	59:18	58:19
RATIO	5.416	4.135	3.81	3.53	3.28	3.05
MAX. SPEED	55	65	71	77	83	89

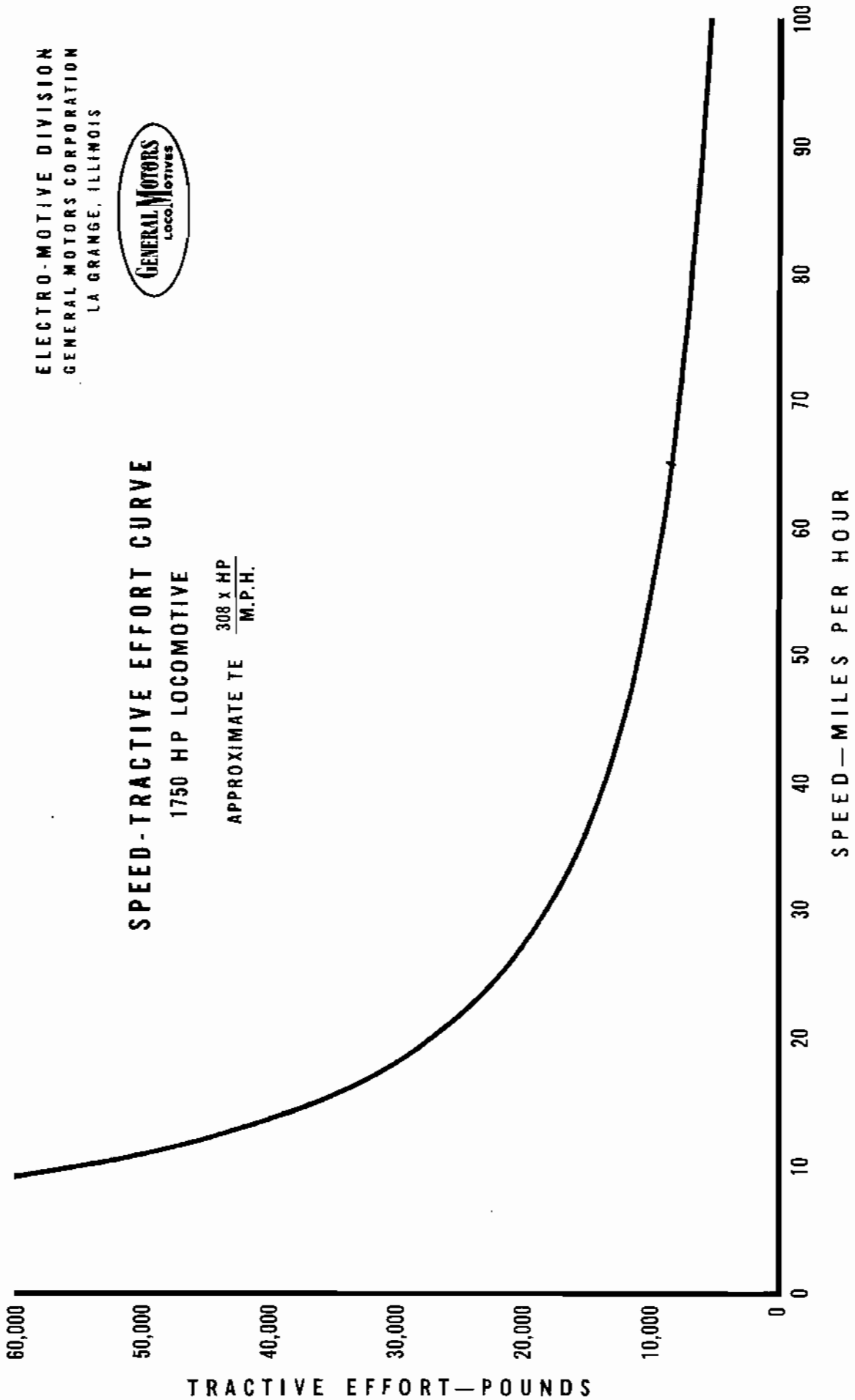
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ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS



SPEED-TRACTIVE EFFORT CURVE
1750 HP LOCOMOTIVE

APPROXIMATE $TE = \frac{308 \times HP}{M.P.H.}$



SECTION 10

Warranty and Patents

The logo for General Motors Locomotives, featuring the words "GENERAL MOTORS" in a large, bold, serif font above the word "LOCOMOTIVES" in a smaller, bold, sans-serif font, all enclosed within an oval border.

GENERAL MOTORS
LOCOMOTIVES

Warranty: "The manufacturer warrants each locomotive manufactured or rebuilt by it, including all equipment and accessories, and replacement parts therefor, except tools or facilities, supplied by the manufacturer in accordance with its specifications, to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory, any part or parts thereof which shall, within one year after being placed in service by the original purchaser or before being operated 100,000 miles, whichever event shall first occur, be returned to it upon request with transportation charges prepaid and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and all other obligations or liabilities on its part and it neither assumes nor authorizes any other person to assume for it any other liability in connection with its products.

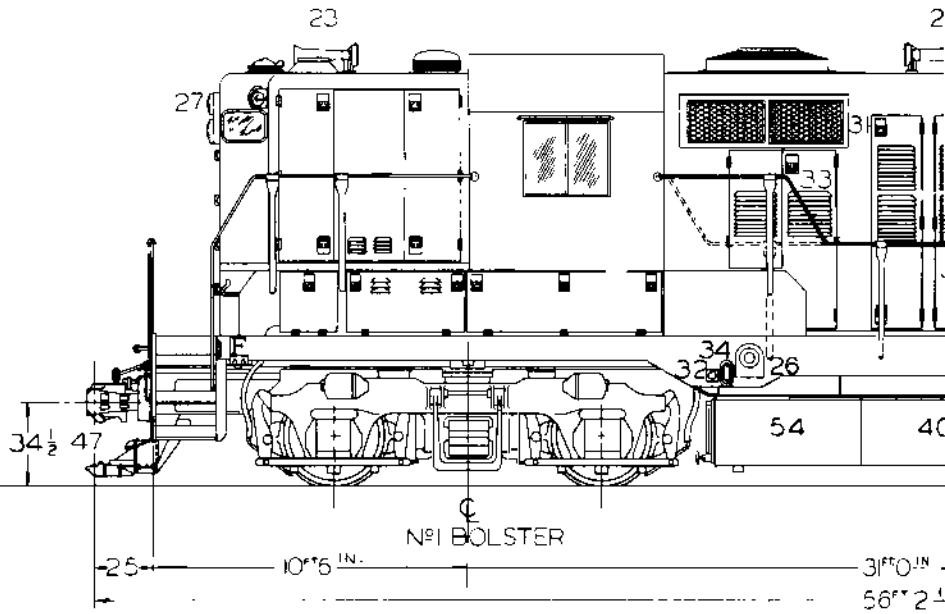
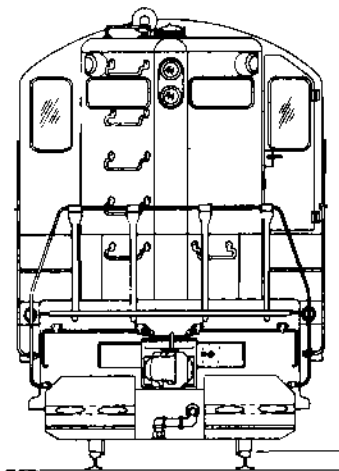
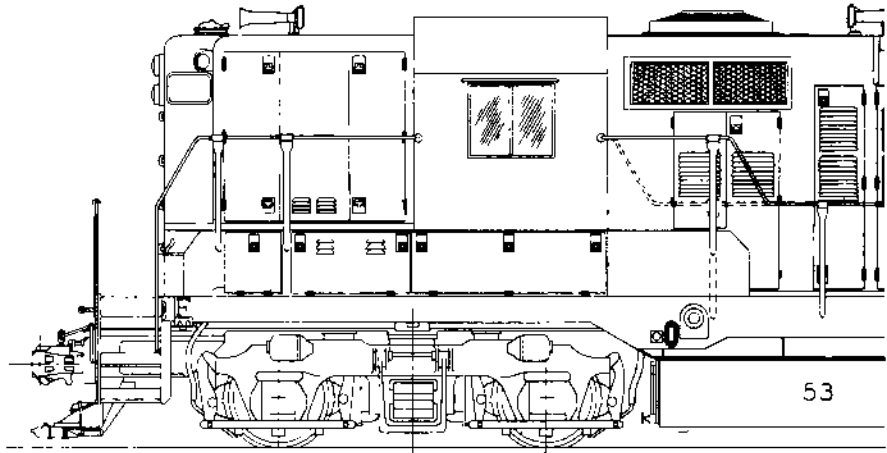
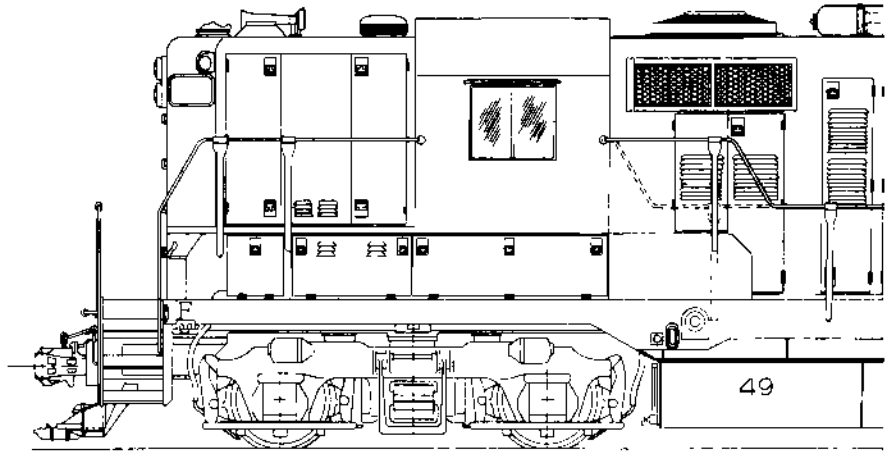
"This warranty shall not apply to any locomotive or component thereof which shall have been repaired or altered by other than an authorized Electro-Motive representative in any way so as in the judgment of the manufacturer to affect its stability and reliability nor which has been subject to misuse, negligence, or accident.

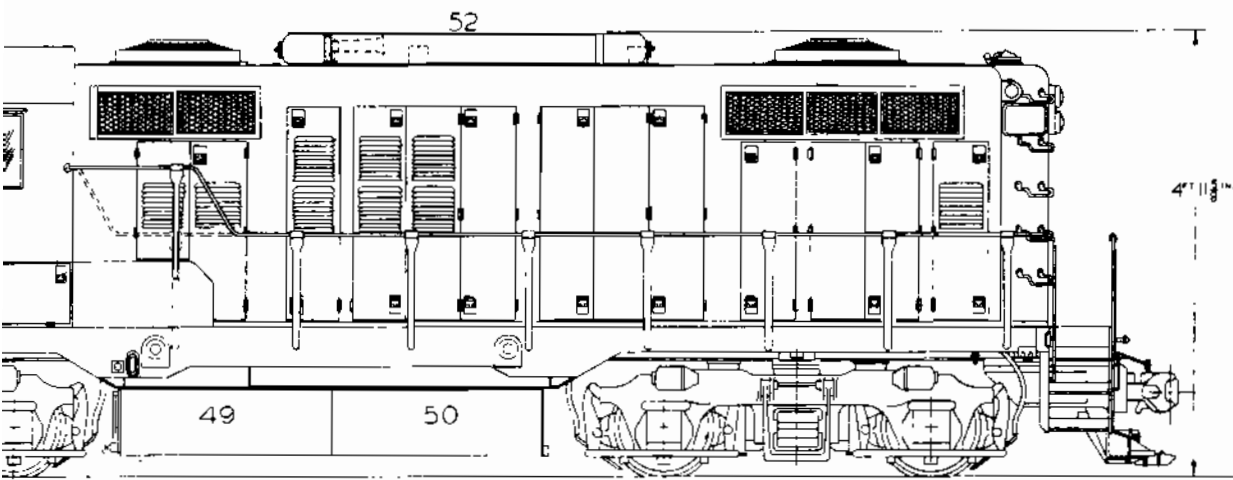
"The manufacturer reserves the right to make any changes in design or add improvements to equipment at any time, without incurring any obligation to install same on locomotives previously sold and delivered by it."

Patents: The Electro-Motive Division, General Motors Corporation, will not assume liability for patent infringement by reason of purchase, manufacture, sale, or use of devices or equipment not included in and covered by this Specification.

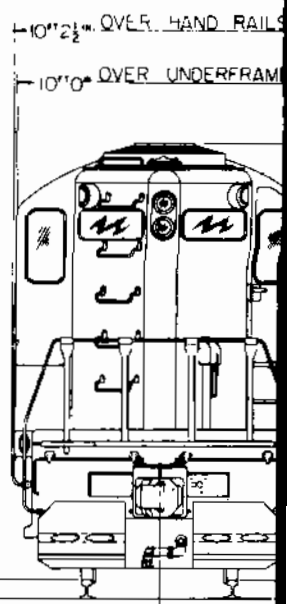
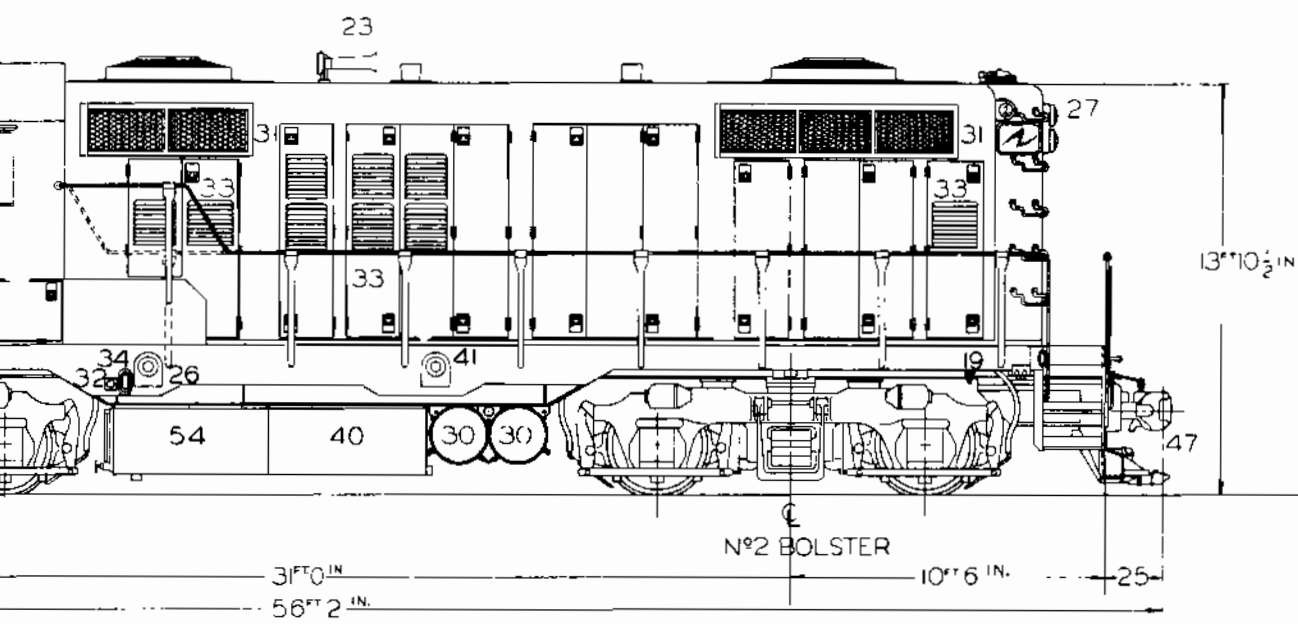
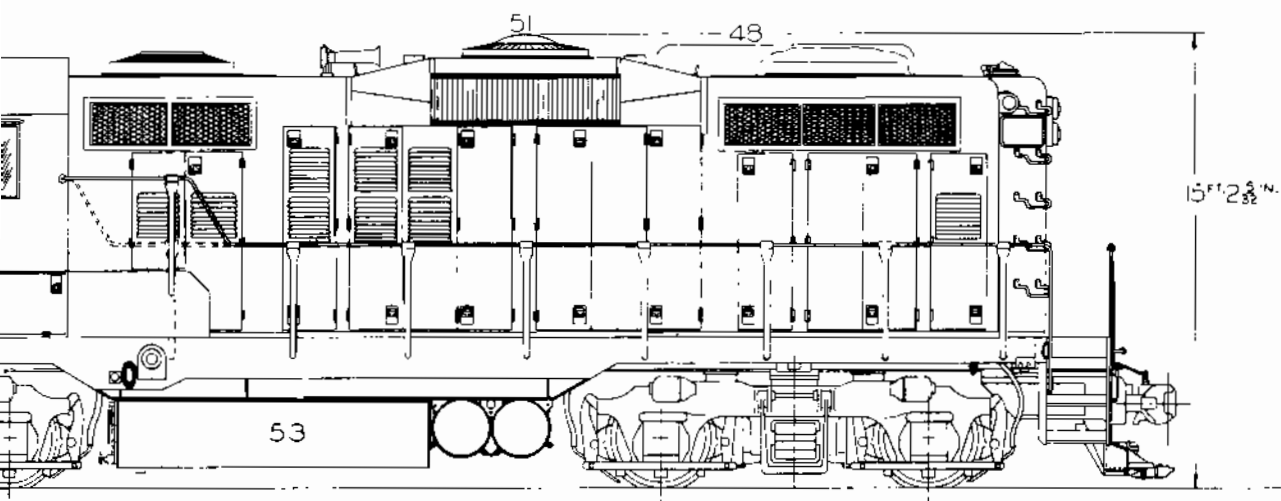


ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS, U.S.A.





1. Engine - EM
2. Main Gener
3. Generator B
4. Auxiliary G
5. Control Cab
6. Air Compre
7. Traction Mo
8. Engineer's C
9. Fuel Pump
10. Speed Recor
11. Air Brake V
12. Cab Heater
13. Sliding Seat
14. Hand Brake
15. Gauge Panel
16. Lube Oil Fi
17. Lube Oil Co
18. Engine Water



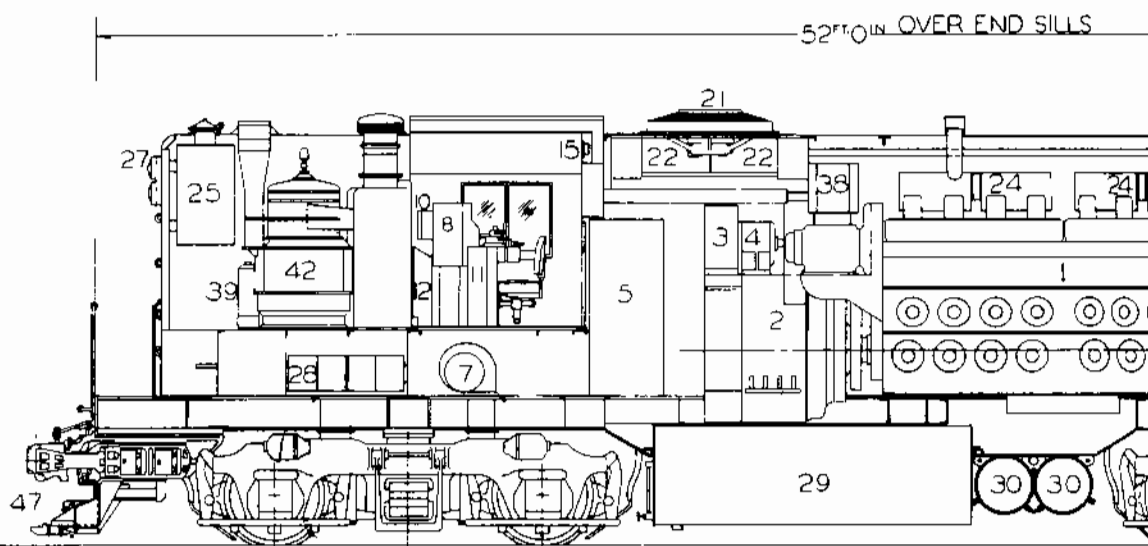
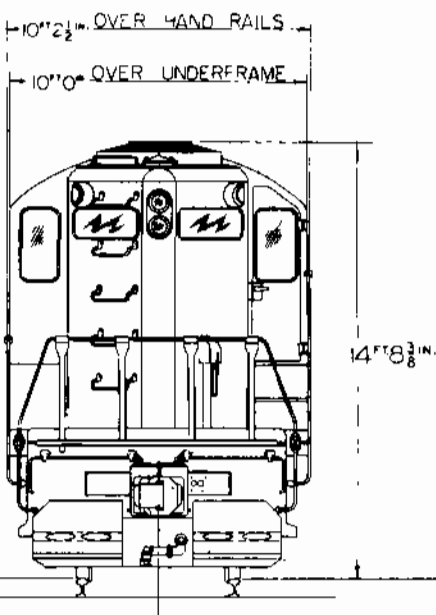
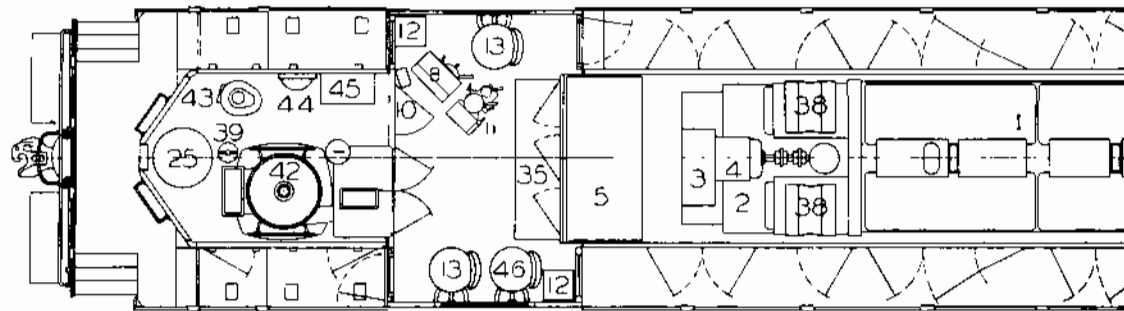
1750 H.P. ROAD SWITCHING LOCOMOTIVE - MODEL G

1. Engine - EMD Model 16-567C
2. Main Generator And Alternator EMD Model
3. Generator Blower
4. Auxilliary Generator
5. Control Cabinet
6. Air Compressor
7. Traction Motor Blower
8. Engineer's Control Stand
9. Fuel Pump
10. Speed Recorder
11. Air Brake Valve
12. Cab Heater
13. Sliding Seat
14. Hand Brake
15. Gauge Panel
16. Lube Oil Filler
17. Lube Oil Cooler
18. Engine Water Tank

19. Engine Water Filler
20. Load Regulator
21. 48" Fan And Motor
22. Radiator
23. Horns
24. Exhaust Manifold
25. Sand Box - 9 Cu. Ft.
26. Fuel Filler
27. Headlight - Twin Sealed Beam
28. Batteries
29. Fuel Tank - 800 Gal.
30. Main Air Reservoir
31. Air Intake And Shutters
32. Emergency Fuel Cutoff
33. Engine Room Air Intake
34. Fuel Tank Gauge
35. Trap Door
36. Lube Oil Filter

37. Dual Fuel
38. Engine A
- 39. Water Tr
- 40. Boiler W
- 41. Boiler W
- 42. Steam Ge
- 43. Toilet
- 44. Wash Star
- 45. Clothes L
- 46. Third Cal
- 47. Steam En
- 48. Winteriza
- 49. Fuel Tank
- 50. Boiler Wa
- 51. Dynamic
- 52. Main Air
- 53. Fuel Tank
- 54. Fuel Tank

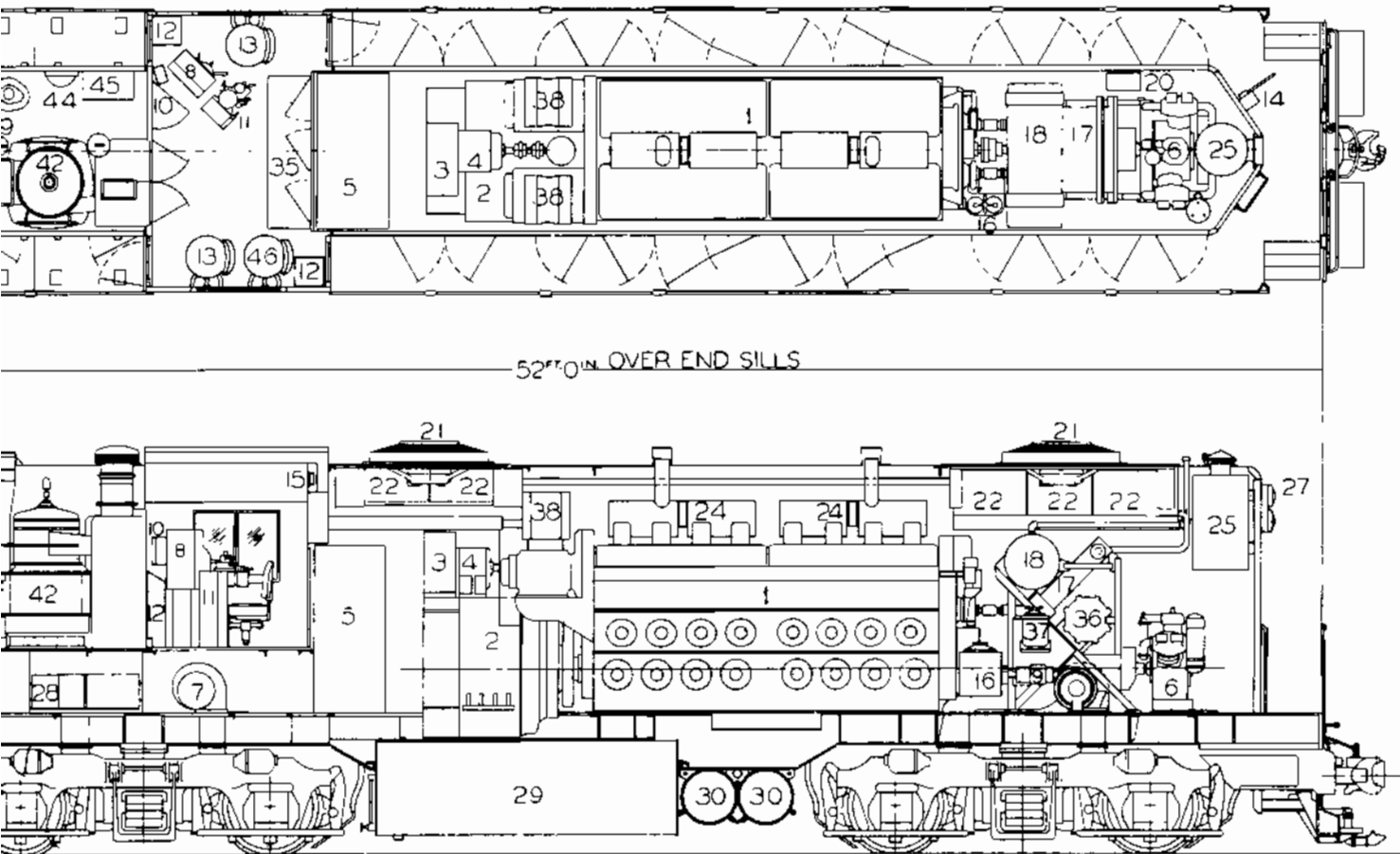
● Modifications

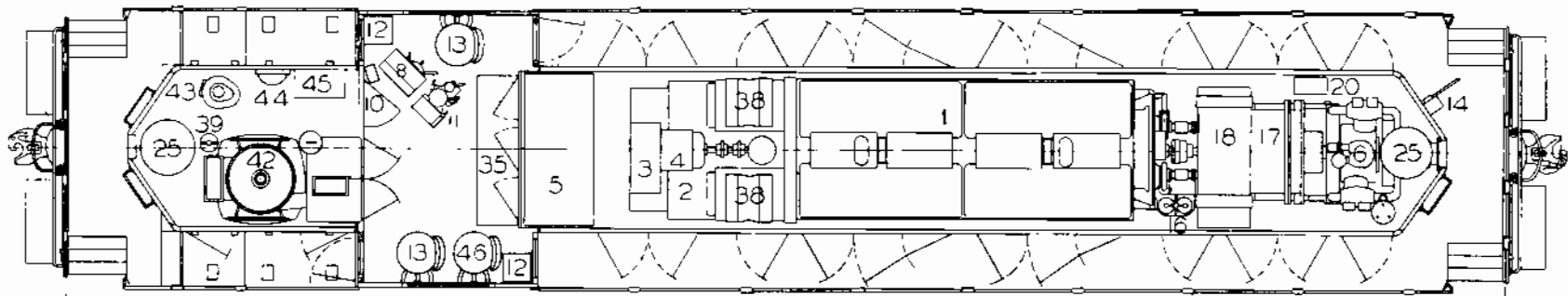


SWITCHING LOCOMOTIVE - MODEL GP-9

- 19. Engine Water Filler
- 20. Load Regulator
- 21. 48" Fan And Motor
- 22. Radiator
- 23. Horns
- 24. Exhaust Manifold
- 25. Sand Box - 9 Cu. Ft.
- 26. Fuel Filler
- 27. Headlight - Twin Sealed Beam
- 28. Batteries
- 29. Fuel Tank - 800 Gal.
- 30. Main Air Reservoir
- 31. Air Intake And Shutters
- 32. Emergency Fuel Cutoff
- 33. Engine Room Air Intake
- 34. Fuel Tank Gauge
- 35. Trap Door
- 36. Lube Oil Filter
- 37. Dual Fuel Filter
- 38. Engine Air Intake Silencer
- 39. Water Treatment Tank
- 40. Boiler Water Tanks - 900 Gal.
- 41. Boiler Water Filler
- 42. Steam Generator
- 43. Toilet
- 44. Wash Stand
- 45. Clothes Locker
- 46. Third Cab Seat
- 47. Steam End Conn.
- 48. Winterization Air Duct
- 49. Fuel Tank - 1150 Gal.
- 50. Boiler Water Tanks - 1200 Gal.
- 51. Dynamic Brake Hatch
- 52. Main Air Reservoir - Roof Mounted
- 53. Fuel Tank - 1700 Gal.
- 54. Fuel Tank - 800 Gal.

● Modifications





52'10" OVER END SILLS

