

The logo for Alco, featuring the word "Alco" in a stylized, cursive script font.The text "DIESEL-ELECTRIC" in a bold, sans-serif font, enclosed in a rectangular box.

Specifications

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DL-304-B

**2000 HP DIESEL ELECTRIC
ROAD PASSENGER LOCOMOTIVE**

A UNIT

*These specifications cover the principal features of the
American Locomotive-General Electric 2000 hp diesel-
electric road locomotive leading, or A unit.*

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*Such A units may be combined with other A units or with
B units to constitute Diesel Locomotives
of greater power.*

AMERICAN LOCOMOTIVE COMPANY
30 CHURCH STREET • NEW YORK 8, N. Y.



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Section 1—General Characteristics

2000 HP ROAD PASSENGER DIESEL LOCOMOTIVE A UNIT

CLASS— AAR Designation A1A-A1A

TRACK GAUGE 4'-8½"

DIESEL ENGINE— One, Vee Type, 16 Cylinders, Turbosupercharged . 2000 HP

GENERAL DESIGN— Shown by Drawing Number 985-N-93901A

MAXIMUM OVERALL LOCOMOTIVE DIMENSIONS (*Drawings*):

| | |
|--|---------|
| Height (<i>Roof</i>) | 14'-0" |
| Height (<i>Maximum</i>) | 14'-11" |
| Width (<i>Inside Cab Sheets</i>) | 9'-9⅛" |
| Width (<i>Maximum</i>) | 10'-6½" |
| Length (<i>Overall</i>) | 66'-2" |
| Length (<i>Inside Knuckles</i>) | 65'-8" |

| | | |
|-----------------------------|---------------------------------------|--------|
| WHEEL BASE | Each Truck (<i>Rigid</i>) | 15'-6" |
| | Total Locomotive Unit | 49'-8" |

DRIVING MOTORS **Four**

| | | |
|-------------------------|----------------------------|--------------|
| WHEELS | Drivers— 4 Pairs | 40" Diameter |
| | Idlers— 2 Pairs | 40" Diameter |

MAXIMUM TRACK CURVATURE 21 Degrees

| | | |
|-------------------------|-----------------------------|--------------|
| WEIGHT | On Driving Wheels | 202,000 lbs. |
| | Total Locomotive | 303,000 lbs. |

SUPPLIES

| | | |
|--------------------------|--------------------------------|---------------|
| Total Capacity | Lubricating Oil | 230 Gallons |
| | Fuel Oil | 1,200 Gallons |
| | Engine Cooling Water | 300 Gallons |
| | Sand | 22 Cu. Ft. |
| | Steam Heat Water | 1,000 Gallons |

CLEARANCES— Maximum Outline, Drawing Dimensions . . . 981-N-94180

SAFETY APPLIANCES— Steps, handrails, safety appliances, etc., applied in accordance with regulations of the Interstate Commerce Commission.



Section 2—Cab

FRAME—Underframe of steel, electrically welded.

Cab side frame of steel, welded truss construction.

Built to meet requirements of AAR Specifications for New Passenger Car Equipment and U. S. Railway Post Office regulations for stress limits.

HATCHES—Large hatch opening, with cover, in engine compartment roof; small covered openings in main hatch cover, over auxiliary apparatus. A separate hatch is provided over steam generator.

SIDES—Side walls of engine compartment are of metal sheathed wood ply panels resting in rubber and mounted on frame by use of metal battens.

CAB—Nose compartment, operating cab and roof of shaped steel plates on welded steel framing. Bulkheads of welded steel construction.

OPERATING CAB—Operating cab at front end of locomotive unit; floor elevated above floor of engine compartment and covered with linoleum; walls and roof lined and insulated.

CENTER PLATES—Cast steel, welded to frame and equipped with hardened steel liners.

CAB SEATS—Two (2) fixed type adjustable seats with upholstered cushions and back rests applied, one on right side of cab for engineman, one on left side for helper. Upholstered arm rest applied on window sill each side.

CONTACTOR COMPARTMENT—Compartment for electrical equipment provided in front end of engine compartment. Doors in operating cab.

WINDOWS—Two windows of fixed type across front of operating cab.

Operating cab side windows are of combination type, having controlled drop sections and pivoted front sections.

Two windows at rear end of engine compartment, one at each side.

All windows are of safety glass. Fixed windows are rubber mounted in separate metal frames.

Both front windows of operating cab equipped with windshield wipers, defrosters and two sun visors each.

COUPLERS—AAR Type E couplers.

DRAFT GEAR—National Malleable Type M-380 rubber draft gear applied at each end.

COUPLER HOUSINGS—Cast steel pocket or housing at each end of locomotive unit.

UNCOUPLING DEVICES—Uncoupling device at each end, operated from each side; uncoupling device concealed at front end.

PILOT—Pilot of welded steel construction applied.

DOORS—Exterior doors are provided in each side of operating cab, at each side and rear end of engine compartment and at front end of nose compartment and are provided with weather strips.

Two (2) interior doors are provided between operating cab and engine compartment and one (1) between operating cab and nose compartment.

Drop sash provided in operating cab side doors. Small windows provided in exterior doors of engine compartment.

Side doors of engine compartment are fitted with locks for coach type keys.

All exterior doors may be locked from inside.

Safety drop bars provided at engine compartment side doors and at rear end door.



VENTILATION—Openings for engine room ventilation provided in side walls.
These openings are equipped with air filters.

VESTIBULE—Passageway provided at rear end, fitted with a standard vestibule diaphragm. A light is provided, operated on the engine room light circuit.

STEPS AND HANDRAILS—Steps of cast steel and handrails or grab irons provided at all side doors and both rear corners of the locomotive.
Grab iron located on each side of vestibule at rear end.

ACCESSORIES—Flag brackets, inspection card holders and spare lamp holder.

Section 3—Trucks

TYPE—Two six-wheel, swivel, swing motion, pedestal type motor trucks applied.

CONSTRUCTION—Cast steel construction.

Frame is spring supported on two equalizers on each side, with triple coil springs between the equalizers and the frame. Double elliptic springs are applied between bolster and spring planks. Center plate safety locks applied.

AXLES—Three (3) axles, of forged open hearth steel, per truck.

WHEELS—Six (6) rolled steel wheels, 40" diameter, per truck.

JOURNALS—Journals roller bearing, 6½" diameter.

JOURNAL BOX ALARM—One bomb, of odor type, applied in each box.

MOTOR MOUNTING—Motors applied to end axles on each truck and supported by these axles, to which they are geared and by spring nose suspensions on truck transoms.

Wheel and axle assemblies removable with motors.

Forced ventilation is through flexible connections between ducts in cab underframe and the motor frames.

LINERS—High carbon steel liners on sides and bottoms of center plates; bottom liners removable for shimming.

Hardened spring steel liners on truck pedestal jaws and journal boxes.

CENTER PLATES—Center plates oil-lubricated and protected by dust guards.

SIDE BEARINGS—Plain steel side bearings and swivel limiting devices applied.

SPRINGS—Elliptic and coil springs of open hearth steel tempered in oil.

BRAKES—Clasp brakes on all wheels with two (2) Type G-4630 brake shoes per wheel.

Eight (8) brake cylinders, 11"x10", single acting; four (4) per truck.

Brake rigging equipped with slack adjusters.

BRAKE PINS—Brake pins and bushings hardened and ground.

HAND BRAKE—Located in engine compartment and connected to one truck.



Section 4—Diesel Engine

ENGINE—American Locomotive Company, Series 244, Vee (V) type, sixteen (16) cylinder, four (4) cycle, 9" bore, 10½" stroke, single acting, turbosupercharged Diesel Engine, having two (2) intake and two (2) exhaust valves per cylinder, unit fuel injection, water cooled cylinder liners and heads, trunk type oil cooled pistons, forged steel connecting rods, nine (9) bearing crankshaft and welded base and cylinder block.

REGULATOR—General Electric Company power plant regulator of variable speed type is applied.

Intermediate engine speeds selected with engineman's throttle lever which controls setting of regulator.

Overspeed safety trip is provided.

ENGINE STARTING—The Diesel Engine is started by the main generator acting as a motor, using a special starting field and current from the storage battery.

COOLING SYSTEM—Water is circulated through engine, radiators and lubricating oil cooler by a gear driven centrifugal pump integral with the diesel engine.

Radiator of panel type mounted in roof compartment near rear end of engine compartment.

One (1) mechanically driven fan, revolving in a horizontal plane, draws air through the radiator and exhausts it through a screened opening in the roof.

ENGINE TEMPERATURE CONTROL—Air flow through radiators is controlled by shutters located in air intake openings and by variable speed of radiator fan, which is driven through an electric clutch of the eddy current type. Shutters and clutch controlled automatically.

LUBRICATION—Full pressure system supplied by gear type pump integral with the diesel engine.

Lubricating oil reservoir in engine base.

Filters and strainer of full flow type.

Lubricating oil cooler of single pass type.

Automatic means provided to idle and stop engine in case of low lubricating oil pressure.

FUEL SYSTEM—Electrically driven transfer pump located in the engine compartment for supplying fuel from supply tank to injection pumps. Supply pipe to transfer pump fitted with duplex waste packed filter on suction side, with felt filter provided on the discharge side.

Pressure relief valve and pressure gauge provided in discharge pipe from transfer pump.

Section 5—Mechanical Equipment

ENGINEMAN'S CONTROL STATION—Control stand, conveniently located at engineman's position on right hand side of operating cab, contains: throttle handle, reverser handle and selector handle; circuit breaker type switches for generator field, fuel transfer pump, control circuit and train control (if used); switches for class, number, hood, dome and gauge lights; headlight dimming control switch and control for windshield wipers; controls for engineman's defroster and cab heater; push buttons for engine stop and attendant's call; signal lights for high engine water temperature, low engine lubricating oil pressure, boiler flame out and train control (if used). Other controls conveniently located for the engineman are those for air brake, horn, bell ringer and sanders and switches for gauge panel light and engineman's order light.

Gauge panel located under windshield cowl contains speedmeter, load meter and brake air pressure gauges; also, signal lights for wheel slip and dynamic brake warning (if used). Controls on left side of cab for helper's cab heater, defroster, windshield wiper and dashlight.



ENGINE ROOM CONTROL STATION—Control panel, mounted on cab wall on right side near engine, contains switches for engine starting and control, radiator fan control, fuel transfer pump and panel light; engine tachometer and gauges for fuel transfer pressure, high pressure lubricating oil, intake manifold air pressure and lubricating oil pressure to turbo-supercharger; engine water temperature indicator; signal lights for high engine water temperature, low lubricating oil pressure, ground relay, traction motor blowers, crank-case exhauster and boiler flame out. Control panel also contains a group of control relays and a group of pressure and temperature control switches.
 Battery disconnecting switch is located on cab side wall below control panel.

MECHANICAL DRIVES—Flexible couplings installed between engine and air compressor and between compressor and auxiliary drive shaft.

FUEL TANK—One (1) fuel oil tank, of welded steel construction.
 Capacity 1200 gallons
 Two (2) filling connections applied; two (2) vents applied; fire protection screens provided; glass level indicator and handle for emergency cut-out valve on each side near filling connection; remote reading level indicator applied, with one (1) indicating gauge in engine compartment, near control station. Provision made for draining and cleaning tank.

I.C.C. REQUIREMENTS—Fuel filling stations designed to meet requirements of the Interstate Commerce Commission.

ENGINE WATER TANK—One (1) expansion tank of welded steel construction built integral with hatch cover; sight glass provided.
 Capacity 90 gallons
 Filling connection on right hand side of locomotive.
 Emergency filling connection on top of roof.
 Provision made for draining cooling system.

STEAM GENERATOR—Steam generator installed on floor at rear end of engine compartment.
 Capacity 3000 lbs. steam per hour
 Pressure 225-275 lbs. per square inch

WATER TANKS, STEAM HEAT—Tanks of welded steel construction provided at sides of engine compartment at rear end.
 Capacity, total 1000 gallons
 Filling connections and vents provided.
 Remote reading level indicator applied, with one (1) indicating gauge in engine compartment, near control station.

Section 6—Electrical Equipment

EQUIPMENT LIST—GENERAL ELECTRIC COMPANY

| | <i>Type</i> |
|-----------------------------------|-------------|
| 1—Main Generator | GT-566 |
| 1—Exciter | AM-808 |
| 2—Auxiliary Generators | GY-27 |
| 4—Traction Motors | GE-752 |
| 2—Traction Motor Blowers | GY-26 |
| 1—Radiator Fan, Aphonic Type | |
| 1—Eddy Current Clutch..... | B2 |
| 1—Right Angle Drive Gear Box..... | GA23 |
| 1—Power Plant Regulator..... | MG3 |
| 1—Control Equipment | P |



MAIN GENERATOR—The Main Generator is directly connected to the diesel engine. The exciter is an amplidyne machine designed for use with the power plant regulator. The exciter and the auxiliary generators are mounted on the end of the main generator and are gear driven from it.

AUXILIARY GENERATORS—The Auxiliary Generator supplying power for battery charging, lighting and control circuits operates at constant voltage under control of a regulator. The other Auxiliary Generator supplies power for traction motor blower motors.

TRACTION MOTORS—The Traction Motors are four-pole direct current machines designed for operation with full or shunted fields. Armatures equipped with roller bearings.

TRACTION MOTOR BLOWERS—The Traction Motor Blowers are of the axial-flow type and are motor driven. Each is arranged to supply ventilating air to the motors of one truck through fixed ducts in the cab structure and flexible connections leading to the tops of the motors.

RADIATOR FAN—The Radiator Fan is of the aponic type, 72" in diameter, of welded construction, designed to operate efficiently with varying speed.

EDDY CURRENT CLUTCH AND RIGHT ANGLE DRIVE—The Eddy Current Clutch is installed at the engine side of the Right Angle Drive Gear Box. Slip of the clutch is electrically controlled and is coordinated with radiator shutter control.

POWER PLANT REGULATOR—The power plant regulating system modulates the diesel engine loading by controlling fuel to the diesel engine and adjusting generator demand. It holds constant any preset engine speed by limiting engine torque and adjusting generator demand to the ability of the engine to deliver power at any moment and for any set speed.

CONTROL — HIGH VOLTAGE—Type P Single-End Multiple-Unit Control is used. Reversers and line contactors are electro-pneumatically operated; other contactors are operated magnetically. Traction motor connections are: series parallel full field, series parallel shunt field, parallel full field and parallel shunt field. Transition is automatically controlled. High voltage control apparatus is contained in the lower part of the contactor compartment at front end of engine compartment.

CONTROL — LOW VOLTAGE—The contactor compartment also contains contactors for engine starting, generator field control and battery charging; auxiliary generator control; relays and resistors. Manual low voltage switches, of the circuit breaker type with reset feature, are used on auxiliary circuits wherever overload protection is required.

CONTACTOR COMPARTMENT—Gauges and controls on contactor compartment panel are: auxiliary generator ammeter and battery voltmeter; circuit breaker switches for steam generator, headlight, engine room lights, cab lights and auxiliaries, control feeders, auxiliary generators, auxiliary generator fields, traction motor blowers, alternator for control circuits, fuel transfer pump and crankcase exhauster; and switch for compartment lights. Switches for traction motor cut-out control and ground relay cut-out are mounted inside the contactor compartment at convenient locations.

STORAGE BATTERY—A 32-cell, lead acid type storage battery is installed in two battery boxes under the cab, one on either side, with sixteen cells in each.



LIGHTING—All lights are connected to the storage battery through circuit breaker switches and light switches.

Lights are provided in operating cab at roof, at gauge panels and as engineman's order light; in engine room, including control panel lighting; in contactor compartment; and in nose compartment and rear vestibule.

Receptacles provided for extension light connection.

HEADLIGHT, NUMBER AND SIGNAL LIGHTS—Headlight with 250 watt, 32 volt lamp and 14 inch glass reflector applied in front end hood. Dimming control provided. Lamp removable from inside hood.

Combined signal and number plate lights applied at front end, one on each side of hood.

ELECTRICAL CONNECTIONS— Receptacles installed at rear end for connections to another locomotive unit:

One 21-point and one 12-point receptacle for control jumpers for multiple-unit operation.

ALARM SYSTEM— Alarm bell in engine compartment and buzzer in operating cab, arranged to sound simultaneously with those in other connected locomotive units when any alarm signal light or attendant's call circuit is energized.

Section 7—Air Brakes

BRAKE EQUIPMENT— Brake Schedule *24-RL*, pneumatic type, for road service, with automatic and straight air brakes on all wheels, train air signal equipment and hose connections front and rear.

DEADMAN FEATURE— Deadman safety control, giving service application, applied.

AIR COMPRESSOR— One (1) two-stage, three cylinder, air cooled air compressor applied, direct driven by the diesel engine.

Displacement at full engine speed.....306 CFM

Displacement at idling speed.....107 CFM

Compressor equipped with unloader, controlled by independent governor.

BRAKE AIR COOLERS— Compressor equipped with unit type intercooler.

Aftercoolers installed between compressor and first main reservoir and between first and second main reservoirs.

RESERVOIRS—Two (2) main reservoirs applied, below cab underframe.

Total capacity35,770 cu. ins.

Section 8—Locomotive Equipment

CAB HEATERS— Two (2) cab heaters, using heat from engine cooling water, installed in nose compartment, one on each side, with outlets into operating cab.

DEFROSTERS—Two (2) defrosters applied.

SUN VISORS—Four (4) adjustable sun visors applied.

WARNING SIGNALS— One horn and one locomotive bell with internal ringer provided.

FIRE EXTINGUISHERS— Two (2) fire extinguishers provided, located as follows:

Operating cab

1 — 1½ quart vaporizing liquid type.

Engine Compartment

1 — 1 gallon vaporizing liquid type.



STEAM TRAIN LINE— Steam heat train line, of 2½" extra heavy steel pipe with 2½" metallic connectors, applied.

SANDERS— Sanders provided for sanding in front of each truck, arranged for electric multiple unit operation, in forward movement only.

SAND BOXES— Four (4) sand boxes of welded steel construction provided, all filled from outside cab. Total capacity.....22 cu. ft.

SANITARY FIXTURE— Sanitary fixture located in rear end at right hand side, together with necessary piping, control valves and water storage tank, having capacity of.....20 gallons
Filling connection at right side near rear end.

EXTENSION LIGHT— Extension light, with cord and plug, provided.

Section 9—Optional Equipment

GEARING

Traction Motor Gearing

| | | | | |
|-----------------------------------|--------|--------|--------|--------|
| Gear — Number of Teeth | 64 | 62 | 60 | 58 |
| Pinion -- Number of Teeth | 19 | 21 | 23 | 25 |
| Ratio | 3.368 | 2.952 | 2.609 | 2.320 |
| Continuous Tractive Effort — Lbs. | 35,000 | 30,500 | 27,000 | 24,000 |
| Maximum Speed — MPH | 80 | 90 | 100 | 117 |

Section 10—Modifications

BRAKING—Dynamic Braking Equipment. Additional openings in cab walls with ducts for ventilation of braking resistors; additional control equipment installed in manner provided for in design.

COUPLERS—AAR Tightlock couplers.
Centering device at rear end of unit.
Swing back arrangement of front coupler, with hinged doors in pilot.

WATER TANKS — STEAM HEAT—Additional water storage capacity to provide total of1,300 gallons

ELECTRO-PNEUMATIC BRAKE— Electro-pneumatic equipment for Schedule 24RL, including speed governor.

BACK-UP LIGHT— Portable back-up light with 32 volt, 100 watt lamp; bracket and electrical receptacle on rear bulkhead and storage bracket in engine room.

CHARGING RECEPTACLE— Receptacle for connection to outside source of battery charging current.

STEAM GENERATOR CONTROLS— Equipment for remote control of steam generators from operating cab.

COMPRESSOR SYNCHRONIZING— Control equipment for synchronizing air compressors of connected locomotive units.

LOCKER— Locker, arranged for tools or for clothing, near rear end of engine compartment.



RESERVOIR CAPACITY— Additional air reservoir capacity to provide total of *50,000 cu. ins.*

OVERSPEED CONTROL— Locomotive overspeed control, with pilot light but without time delay feature.

EMERGENCY SANDING— Control equipment to give automatic sanding on emergency air brake operation.

HEADLIGHT – OSCILLATING— Headlight, of Mars Signal Light Company Figure 8 Type applied in front end, with or without automatic emergency feature.
Regular headlight applied below.

SPEED RECORDER— Combination speedometer and recorder.

DRINKING WATER COOLER— Electric cooler with water bottle.

CAB SEAT— Additional seat in operating cab.

Section 11—Painting and Miscellaneous

PAINTING— Outside finish applied as follows:

- Primer
- Surfacer
- Glazing
- Wet Sanding
- Surfacer, intermediate
- Surfacer, final
- Lacquer finish

Lettering, numbering and color scheme as specified by the Railroad Company.

Interior of operating cab and engine compartment painted suede grey.

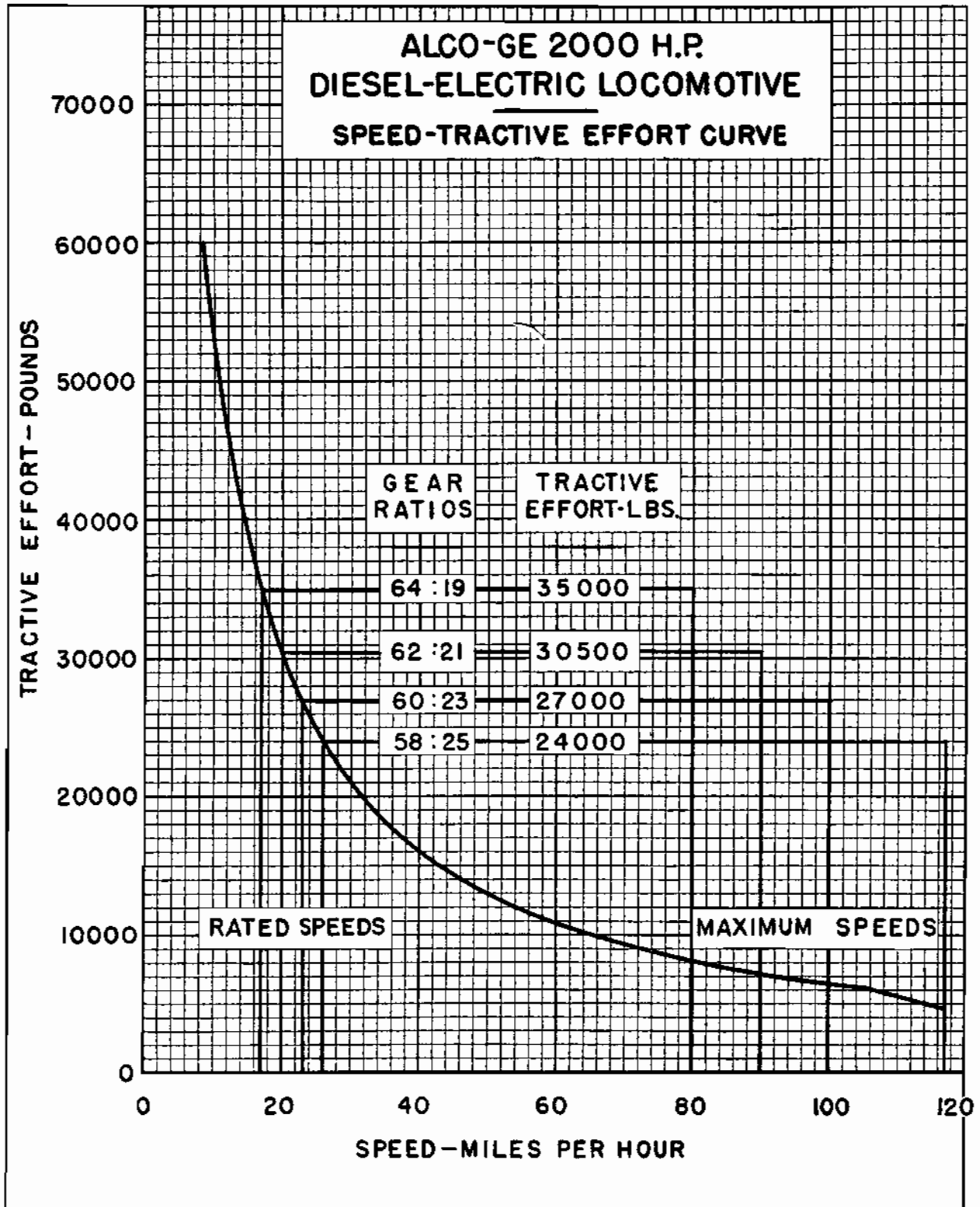
Interior of battery compartment painted with special acid-resisting paint.

Interior of radiator compartment painted with asphalt paint.

Cab underframe and trucks painted black.

MATERIALS— All materials are in accordance with standard material specifications of the American Locomotive Company and of the apparatus manufacturers.

PATENTS— All patent fees not covered by this specification excepted.

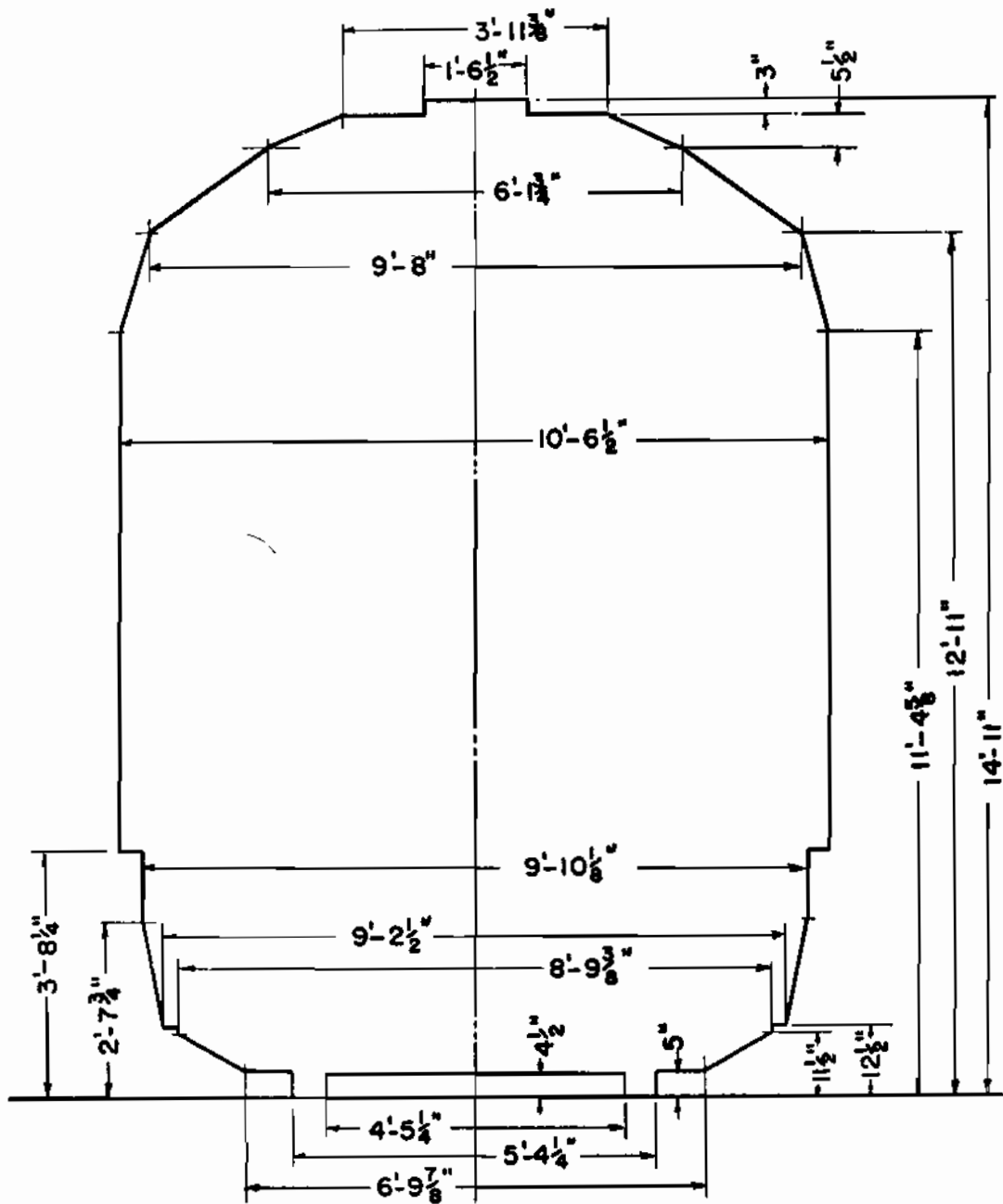


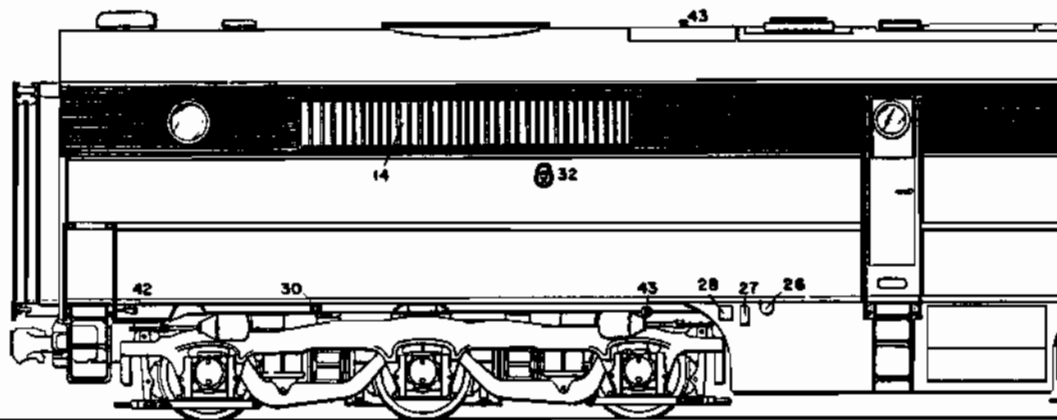
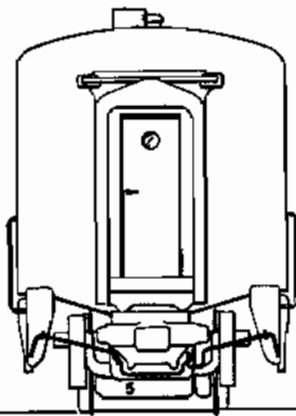
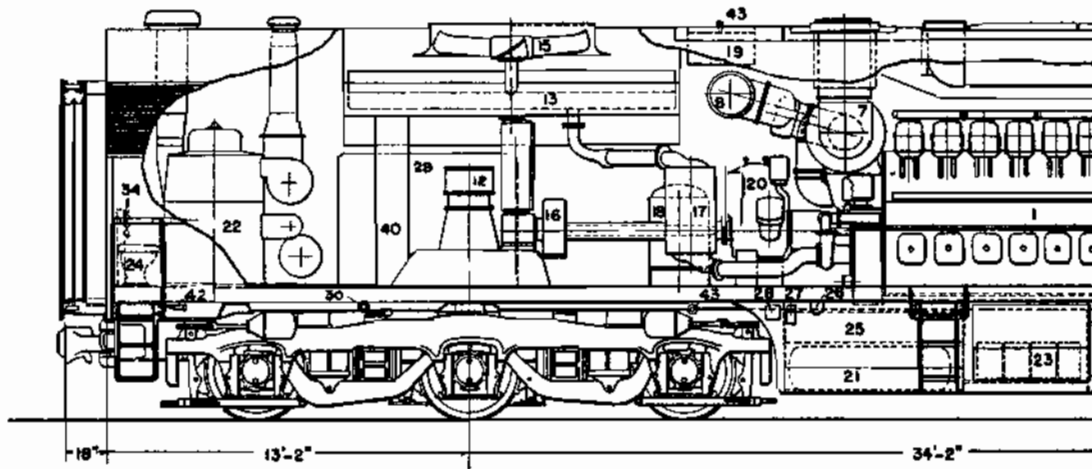
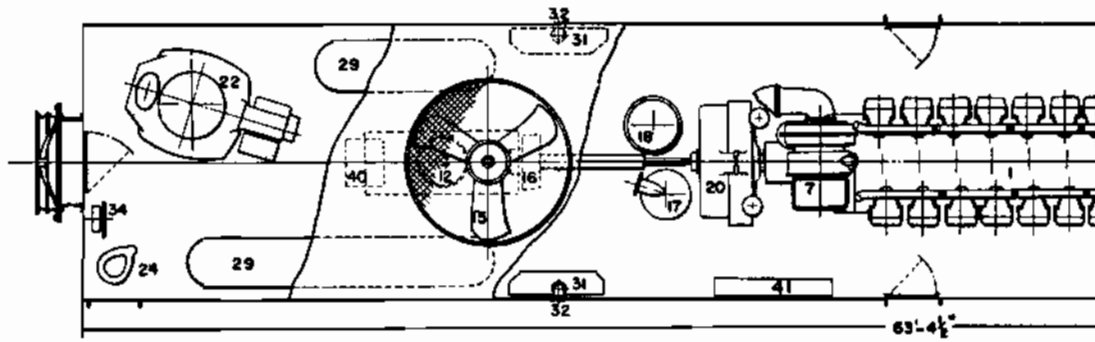
MAXIMUM OUTLINE

DRAWING DIMENSIONS

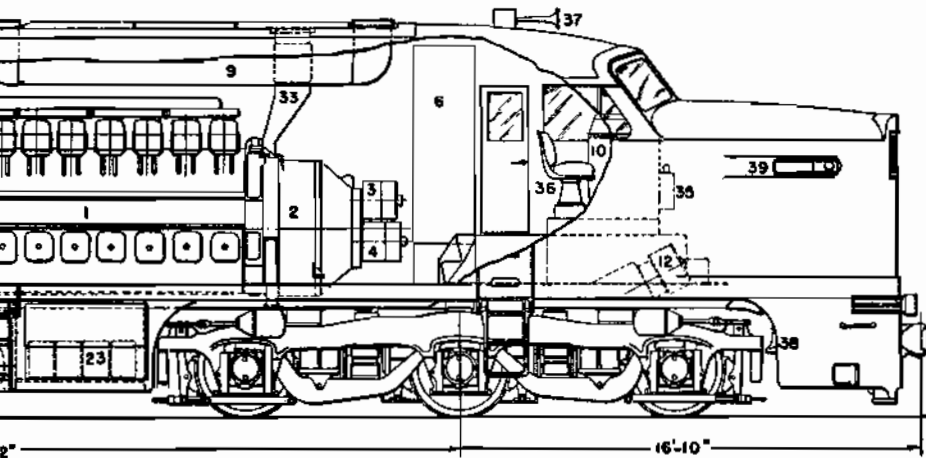
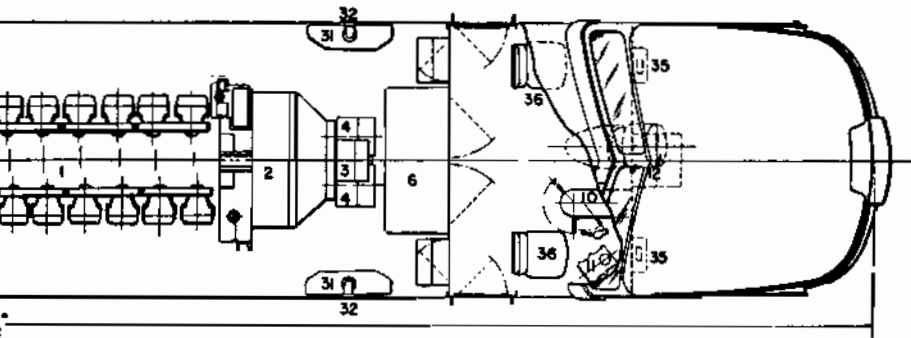
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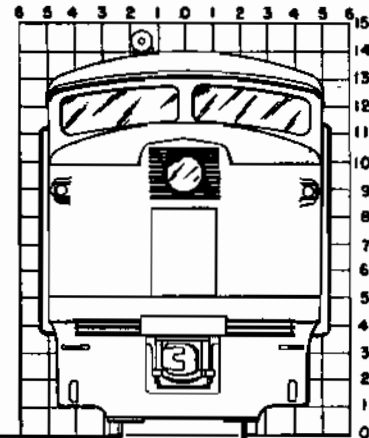
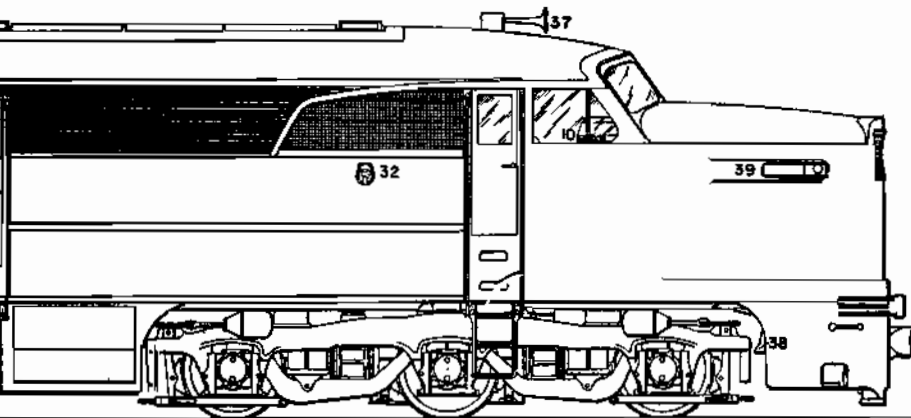


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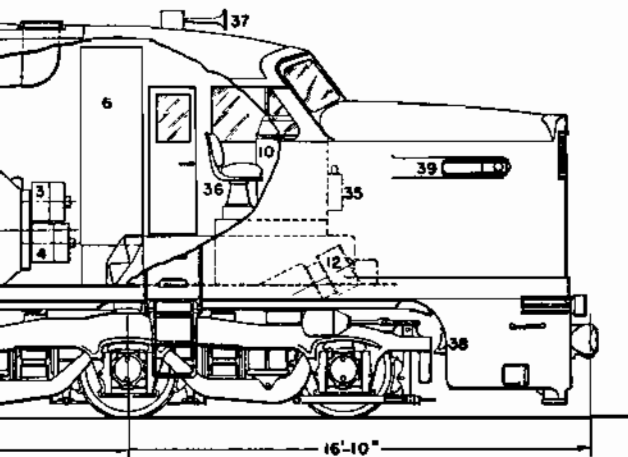
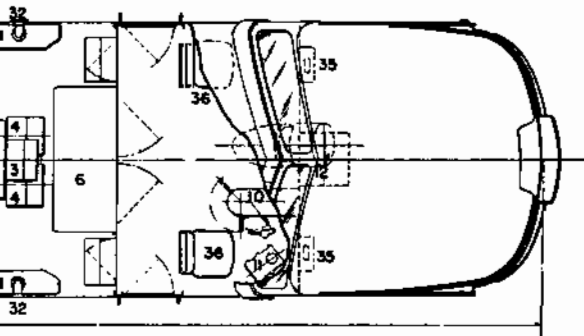


- 1-ENGINE
- 2-MAIN GENERATOR
- 3-EXCITER
- 4-AUXILIARY GENERATORS
- 5-TRACTION MOTORS
- 6-CONTACTOR COMPARTMENT
- 7-TURBOSUPERCHARGER
- 8-TURBOSUPERCHARGER FILTERS & SILENCERS
- 9-DYNAMIC BRAKE GRIDS & BLOWERS (MODIFICATION)
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- 11-BRAKE VALVES
- 12-TRACTION MOTOR BLOWERS
- 13-RADIATORS
- 14-RADIATOR SHUTTERS
- 15-RADIATOR FAN
- 16-RADIATOR FAN CLUTCH
- 17-LUBRICATING OIL COOLER
- 18-LUBRICATING OIL FILTERS
- 19-ENGINE WATER TANK
- 20-AIR COMPRESSOR
- 21-MAIN AIR RESERVOIRS

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- 23-BATTERIE
- 24-SANITARY
- 25-FUEL TA
- 26-FUEL TAN
- 27-FUEL TAN
- 28-EMERGEN
- 29-WATER T
- 30-WATER TA
- 31-SAND BO
- 32-SAND BO
- 33-GENERAT
- 34-HAND BR
- 35-CAB HEA
- 36-SEAT
- 37-HORN
- 38-BELL
- 39-NUMBER
- 40-TOOL BO
- 41-ENGINE C
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- FILLING



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- 43-ENGINE COOLING WATER
FILLING CONN'S.

