SPECIFICATIONS

GENERAL MOTORS

1200 H.P. DIESEL-ELECTRIC

SWITCHING

LOCOMOTIVE

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS CORPORATION

LA GRANGE, ILLINOIS, U.S.A.

Specification 8035

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SW-1200

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GENERAL MOTORS

1200 H.P. DIESEL-ELECTRIC

SWITCHING LOCOMOTIVE

INDEX

SECTION 1

General Information and Identification

GENERAL MOTORS LOCOMOTIVES

Model SW-1200 (*Type 0440*) 1200 H.P., 125 ton Switcher.

General Dimensions

Track gauge	4′ 8½″
Length over coupler pulling faces	44′ 5″
Width over side sills	10′ 0″
Maximum height above rail	14′ 6½″
Platform height above rail	4′ 7½″
Height of cab floor above rail	6′ 10¾″
Length of operator's cab	6′ 6″
Width of operator's cab	9′ 11½″
Height of power plant hood roof above rail	11′ 9¼″
Width of power plant compartment	7′ 0″
Wheelbase—truck	8′ 0″
Truck centers	22′ 0″
Number of drivers	4 pairs
Diameter of drivers	40″
Size of journals	6½″x12″
Minimum curve radius	100′ 0″

Gear Ratio

Gear ratio	62:15
Locomotive speed corresponding to maximum traction motor speed	65 MPH.

Capacity

Starting T. E. at 25% adhesion (approximately)	62,000 lbs.
30% adhesion (approximately)	74,500 lbs.

Weights (*Approximately*)

Total weight (fully loaded)	248,000 lbs.
Total weight (light)	241,000 lbs.
Weight on drivers	100%
Journal load per driving axle	55,500 lbs.

Supplies (*Approximately*)

Fuel oil	600 gallons
Cooling water	230 gallons
Lubricating oil	165 gallons
Sand	22 cu. ft.

Arrangement The general arrangement and dimensions are shown on the outline drawing included at the rear of this specification.

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

SECTION 2

Construction

GENERAL MOTORS LOCOMOTIVES

Underframe The design and construction of the underframe provides a structure capable of withstanding the most severe buff and drag stresses. Integral with the underframe are the body bolsters, center plates, draft gear pockets, coupler strikers, side bearings, and jacking pads. Push pole pockets are provided at the ends of the side sills.

Center Plates Described under Section 3—Trucks.

Couplers Type "E" of standard length with 6¼" x 8" shank and quadruple shear pin. Maximum swing of coupler is 12" each side of center. Centerline of coupler is 34" above rail.

Coupler Yokes Quadruple shear yoke with a section 6" x 1¼".

Coupler Carriers The coupler carrier is supported by the coupler pocket and held in place with a 1⅛" through-bolt. A wear plate is welded to the top face of the carrier to eliminate excessive wear.

Draft Gear National Malleable M-375 rubber draft gear.

Side Bearings Side bearing clearances of ¼" maximum on the front truck and ½" maximum on the rear truck are provided.

Jacking Pads Four combination jacking pads and cable slings are provided, integral with the side sills opposite front and rear bolster.

Uncoupling Device Each end of the locomotive is provided with a three piece top operating device arranged to operate from either side of the locomotive.

Platform Steps Safe and suitable wide box steps are provided at each corner leading to the locomotive platform. They are recessed three step type.

Footboards Each end of the locomotive is provided with two footboards, mud guards, handrailings and grab irons.

Cab The single operator's cab is of fabricated steel construction providing maximum strength and durability. The main cab floor is elevated 28" above the top of the underframe, and the operator's platform is elevated an additional 8½" which, with the large cab windows and low hood, provides unobstructed vision in all directions. Side windows for operator and helper are the sliding, double sash type, and are fitted with latches. Front and rear doors are provided. A trap door is located in the cab floor which facilitates inspection of piping and electrical apparatus.

Windows All windows and doors are glazed with safety plate glass. The rear windows are protected by guard bars.

Doors A main center door is located at the rear of the cab, and a door at the front left side permits access to the runway around the engine hood. Both doors are of fabricated steel construction.

Door Locks The main cab door is equipped with a Yale lock, and the front door is fitted with an inside latch.

Insulation The ceiling and walls of the cab are lined with a sound-deadening insulating material.

Cab Floor The floor is built of 1" tongue and groove hardwood flooring screwed to steel supports.

Battery Box An all steel box is mounted outside on the platform at the rear of the cab. Construction incorporates proper insulation, supports, ventilation, and drainage. Batteries are easily accessible by means of hinged covers on the boxes.

Hood The power plant compartment has been designed to a minimum height and width to provide unobstructed vision from within the cab, as well as a runway around the hood. The sides are in effect made up of continuous double doors which permit complete accessibility to the power plant equipment by means of the runway. A removable hatch is provided above the auxiliary generator. The hood can be removed as an individual unit.

Engine Hatches Removable covers are located over the engine to facilitate inspection and removal of cylinder heads, liners, pistons and other parts.

Hood Doors All side doors have suitable hinges and latches.

Lifting Eyes Four lifting eye castings are provided on the hood to facilitate handling with a crane.

SECTION 3

Trucks

GENERAL MOTORS LOCOMOTIVES

Truck Assemblies

Two G.M. designed 4-wheel motor trucks are provided per locomotive. The truck frames are cast steel, pedestal type, with integral side frames, hollow bolster, pedestal jaws, side bearings, and center plate. Truck frames are supported on double helical and semi-elliptic springs in parallel, with provision for adjustment of height. The semi-elliptic springs on each side of the truck are supported on hangers mounted between two forged equalizers, which in turn are supported on the journal boxes.

The truck bolsters, which are cast integral with the truck frames, carry unusually large center plates with hollow center to provide for introduction of clean air from within the superstructure to the traction motors.

Four forged equalizers are provided per truck, and are machined at the journal box contacts.

Each of the four traction motors is supported in the trucks between a driving axle and a spring motor nose suspension on the truck bolster.

Axles

The axles conform to physical properties of current A.A.R. material specification and to A.T.E.A. design E-12-X with modifications made possible by the journal box lateral thrust arrangement.

Wheels

All wheels are rolled steel and heat treated. The contour of tread and flange conform with latest A.A.R. standards. Wheel has a diameter of 40" and width of 5½" at the tread.

Journal Boxes

Cast steel journal boxes suitable for 6½" x 12" journals are provided. Construction incorporates special G.M. end thrust arrangement.

Journal Brasses

Suitable journal bearings with deep skirt are provided.

Journal Wedges

Standard for 6½" x 12" journals.

Pedestal Liners

Spring steel of channel section welded to pedestals.

Pedestal Tie Bar

Mild steel with fitted lugs at each end, and attached to pedestals with a bolt at each end.

Side Bearings

The truck side bearings are cast integral with the frame. Special wear plates are provided.

Interlocks Keyed interlocks at the side bearings are provided to hold body and trucks together, and prevent sluing in case of derailment.

Center Plates Each center plate is equipped with suitable wear plates accurately machined to prevent usual center plate "slap". Truck bolster center wear plate is loose, thus permitting replacement.

SECTION 4

Power Plant and Transmission

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Engine G.M. Diesel twelve (12) cylinder, 2 cycle, 45° V, 8½" bore, 10" stroke, unit injection, Root's blower scavenging through cylinder wall intake, and multi-valve exhaust. Water cooled cylinder liners and heads, oil cooled pistons, seven (7) bearing crankshaft, drop forged connecting rods, and floating piston assembly. Isochronous governor speed control and separate overspeed trip.

Main Generator EMD force ventilated, nominal 600 volt direct current. Single bearing direct connected to engine crankshaft through a 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.

Traction Motors EMD direct current, series wound, roller bearings, force ventilated, axle hung motors.

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.

Engine Starting Engine starting accomplished by motoring of the main generator through use of special starting fields energized by the locomotive storage battery.

Cooling System Circulation system consists of two direct driven centrifugal water pumps; forced air circulation through fin tube radiators, and separate water supply tank. Provision made for steam jet heating of cooling water during layover periods. Temperature control by automatically operated shutters.

Engine Lubricating 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.

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

SECTION 4

Power Plant and Transmission

GENERAL MOTORS LOCOMOTIVES

Engine Fuel System — Return flow, with a 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 offer visual indication of system trouble plus protection against excessive pressures.

Engine Exhaust — Dual exhaust mufflers, each with independent exhaust outlets.

Fuel Tank — Tank built of heavy gauge steel, with baffle plates.

Capacity 600 gallons, located underneath the locomotive underframe. Filling station each side. Sump with cleanout plugs and non-removable water drains located at bottom of tank. Flame arrestors provided in vent lines.

Full length direct reading fuel sight glasses are provided on each side of locomotive.

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

Electrical Control Cabinet — Cabinet at front of cab houses the locomotive control equipment.

Locomotive Control — Automatic forward transition of motor connections between Series and Series-Parallel. Backward transition is manual between Series-Parallel and Series.

Truck Cutout — Switches are provided to cutout the traction motors by truck.

Storage Battery — 32 cell, 64 volt, 284 ampere hour—(*8 hour rating*) battery located back of cab.

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 and four position selector lever (off, switching, series and automatic). The lever arrangements are such that the throttle must be in idle before the reverse lever can be removed to isolate the controller.

Engineer's Control Switches — Multiple control and lighting switches are located within reach of the engineer.

Control	*Lights*
1. Master control	1. Headlight dim (*front*)
2. Generator field	2. Headlight dim (*rear*)
3. Fuel pump	3. Number lights
4. Engine starting	4. Gauge lights
5. Cab heater	5. Cab lights

Engineer's Instrument Panels — Lighted instrument panels are located on the forward cab wall for:

1. Air brake gauges.
2. Engine water temperature indicators.
3. Wheel-slip indicator.

SECTION 5

Air Brake Equipment

GENERAL MOTORS LOCOMOTIVES

General — The latest schedule 6-BL air brake equipment is provided, including self lapping independent and standard H-6 automatic portions.

Air Reservoirs — Two 22½"x84" steel reservoirs mounted beneath the underframe between the trucks, provide more than 60,000 cubic inches capacity.

Brake Cylinders — Four 11"x6" double-acting cylinders of the latest type are provided per locomotive.

Brake Rigging — Clasp type with two shoes per wheel.

Brake Shoes — Standard A.A.R. "A-28" brake shoes provided.

Air Compressor — Three cylinder, two stage, water cooled, direct coupled compressor having a displacement of 225 cubic feet per minute at 800 RPM.

Hand Brake — One staffless hand brake (52:12 ratio) is furnished and arranged for braking on one pair of wheels.

Sanding Equipment — One sander valve operates eight single line sand traps, four traps for forward movement and four traps for reverse movement, thus providing sand on all eight wheels. Four sand boxes with a total capacity of 22 cubic feet are provided, thus eliminating necessity for frequent filling. All sand boxes are filled from the outside of the locomotive.

SECTION 6

Equipment

GENERAL MOTORS LOCOMOTIVES

Cab Heater — One large motor-blown hot water heater with 3-speed switch and deflectors is provided. Hot water for the heater is taken from engine cooling system.

Window Wipers — Four extra heavy "Jumbo" Air Push window wipers are provided for operator's and helper's front and rear windows, giving maximum visibility under all weather conditions.

Sun Visors — Four adjustable sun visors are provided, located at operator's and helper's front and rear windows.

Cab Seats — Two cab seats are provided. The operator's upholstered seat is adjustable for height. An upholstered auxiliary seat serves as a cover for the tool box located next to the left side cab window. Upholstered arm rests are provided at both side windows.

Fire Extinguishers — Two (2) one-gallon CTC fire extinguishers are provided, one located in the cab and one in the power plant compartment.

Locomotive Lighting — The full voltage locomotive lighting system provides the following number of lamps and outlets:

a) Cab Lights, two

b) Engine Room Lights, six

c) Ground Lights, two

d) Number Lights, two

e) Gauge Lights, three

f) Outlet Receptacles, one in cab, two in engine room

Headlights — Twin sealed-beam headlights, front and rear, are equipped with 200 watt, 30 volt sealed-beam lamps and three-point dimming device. Locomotive number boxes are built integral with the headlight and independently illuminated.

Charging Receptacle — One 100 ampere receptacle is provided for external charging of the battery. It is conveniently located outside the battery box at the rear of the cab.

Warning Signals

Consist of:

a) One 12″ bell operated by internal pneumatic type ringer.

b) One diaphragm type air horn.

Marker and Flag Brackets

Four standard combination flag and light brackets are provided, two each are located at front and rear of the locomotive. All flags and oil marker and classification lights to be furnished by the railroad.

Ground Lights

One ground light on each side of locomotive under cab.

SECTION 7

Modifications

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Awnings	Cloth or metal awnings over cab side windows.
Wind Deflectors	Wind deflectors front and rear of side windows on each side.
Carbody Air Filters	Air filters can be provided in engine hood for generator, engine, and traction motor air.
Air Compressor	Two stage, six cylinder air compressor having a displacement of 356 cubic feet of free air at 800 RPM of the engine.
M.U. Control	Equipment provided for M.U. operation of units.
Air Brakes	EMD designed 6-BLC air brake modification: Type I provides for M.U. with other units equipped with 6-BL, 6-BLC or 24-RL. Type II provides for M.U. with other units equipped with 6-BLC or 24-RL.
P.C. Switch	A pneumatic control (P.C.) switch may be provided to reduce the power output of the locomotive during a safety control or emergency air brake application.
Cooling Water By-Pass	Thermostatically controlled valve for automatically maintaining engine water temperature at a safe level during extended periods of idling in cold weather.
Speed Recorder	Speed recorder or speed indicator available with splined axle drive and special friction journal bearing box.
Hump Control	Infinitely variable push button control for slow speed heavy duty operation.
Flexible Trucks	Cast steel flexible trucks with "Flexicoil" bolster suspension providing both lateral and vertical travel.
Roller Bearing Journals	Roller bearing journals available.
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.
Oversize Fuel Tank	930 gallon fuel tank with full length sight glass.
Layover Protection	Layover protection available using oil fired hot water heater or electric immersion heating element.
Motor Shunting	Traction motor field shunting to extend speed range over which full horsepower is available.

SECTION 8

Painting

GENERAL MOTORS LOCOMOTIVES

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.
Engine Compartment	Inside finished in suede gray.
Outside Finish	Color arrangement and design to agree with railroad's requirement.
Under Carriage, Trucks & Tanks	Black.
Cab Interior	The cab ceiling and walls finished in green. Floor and wood trim are varnished.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS

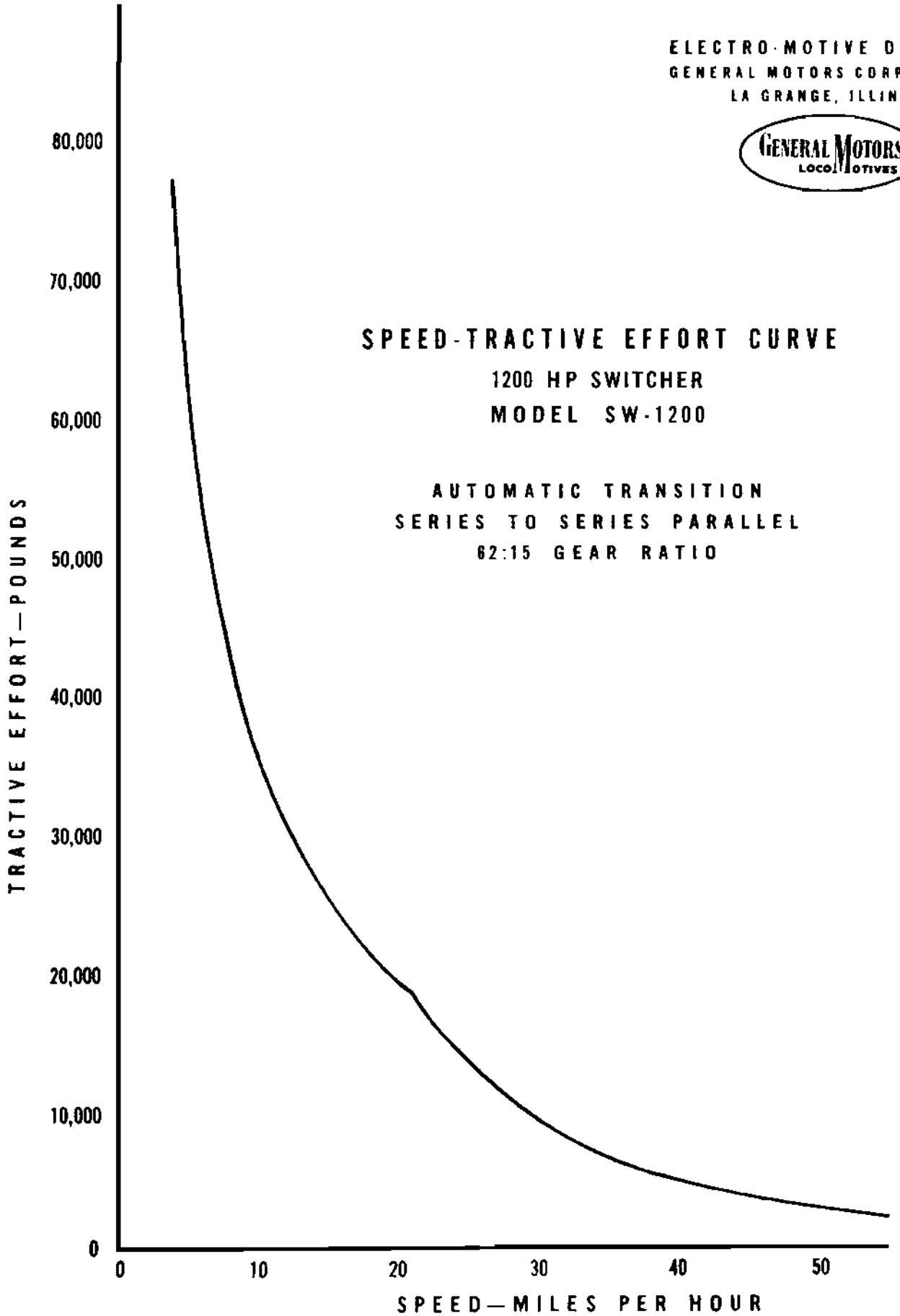
GENERAL MOTORS LOCOMOTIVES

SPEED-TRACTIVE EFFORT CURVE

1200 HP SWITCHER

MODEL SW-1200

AUTOMATIC TRANSITION
SERIES TO SERIES PARALLEL
62:15 GEAR RATIO



SECTION 10

Warranty and Patents

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.

GENERAL MOTORS
LOCOMOTIVES

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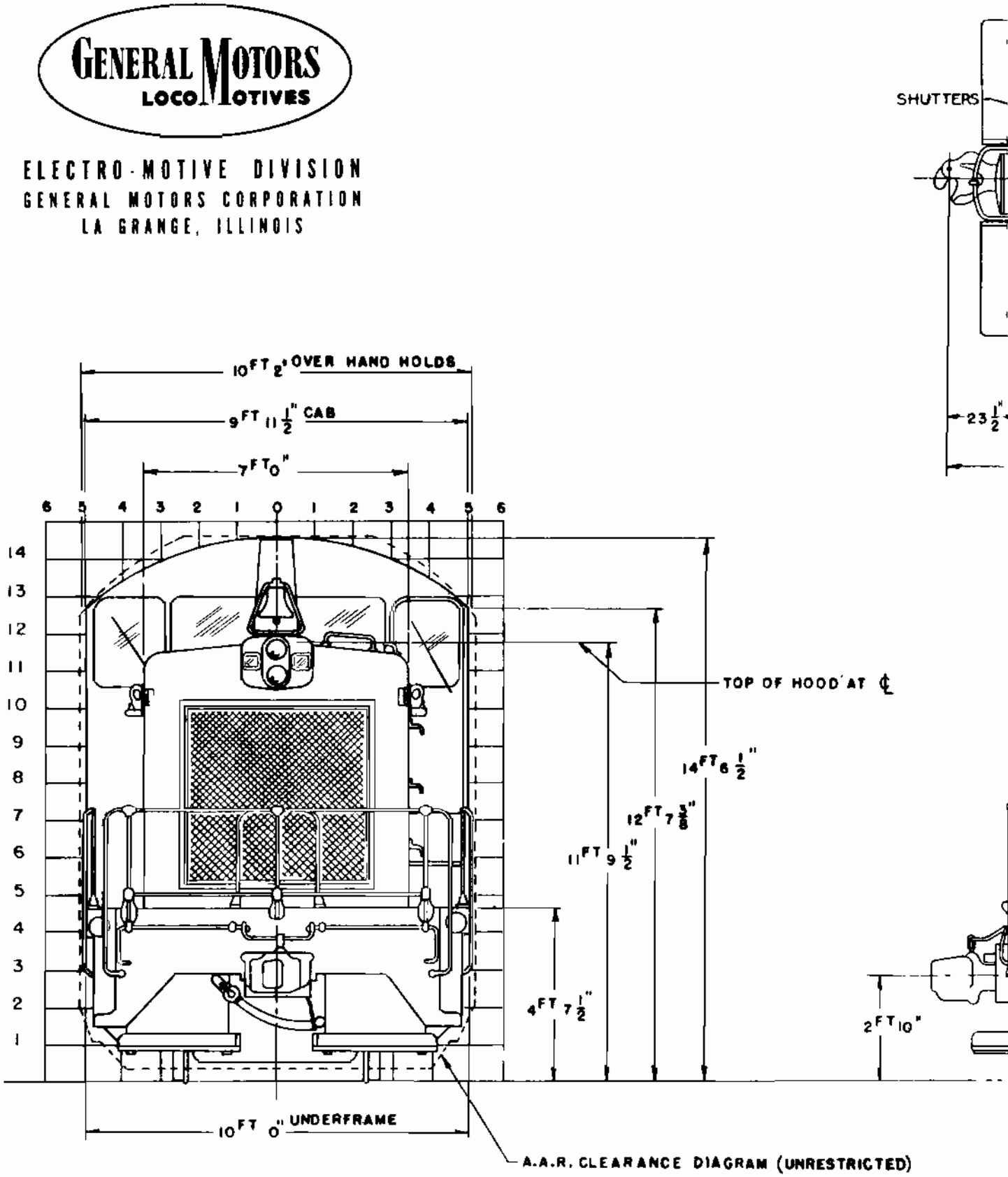
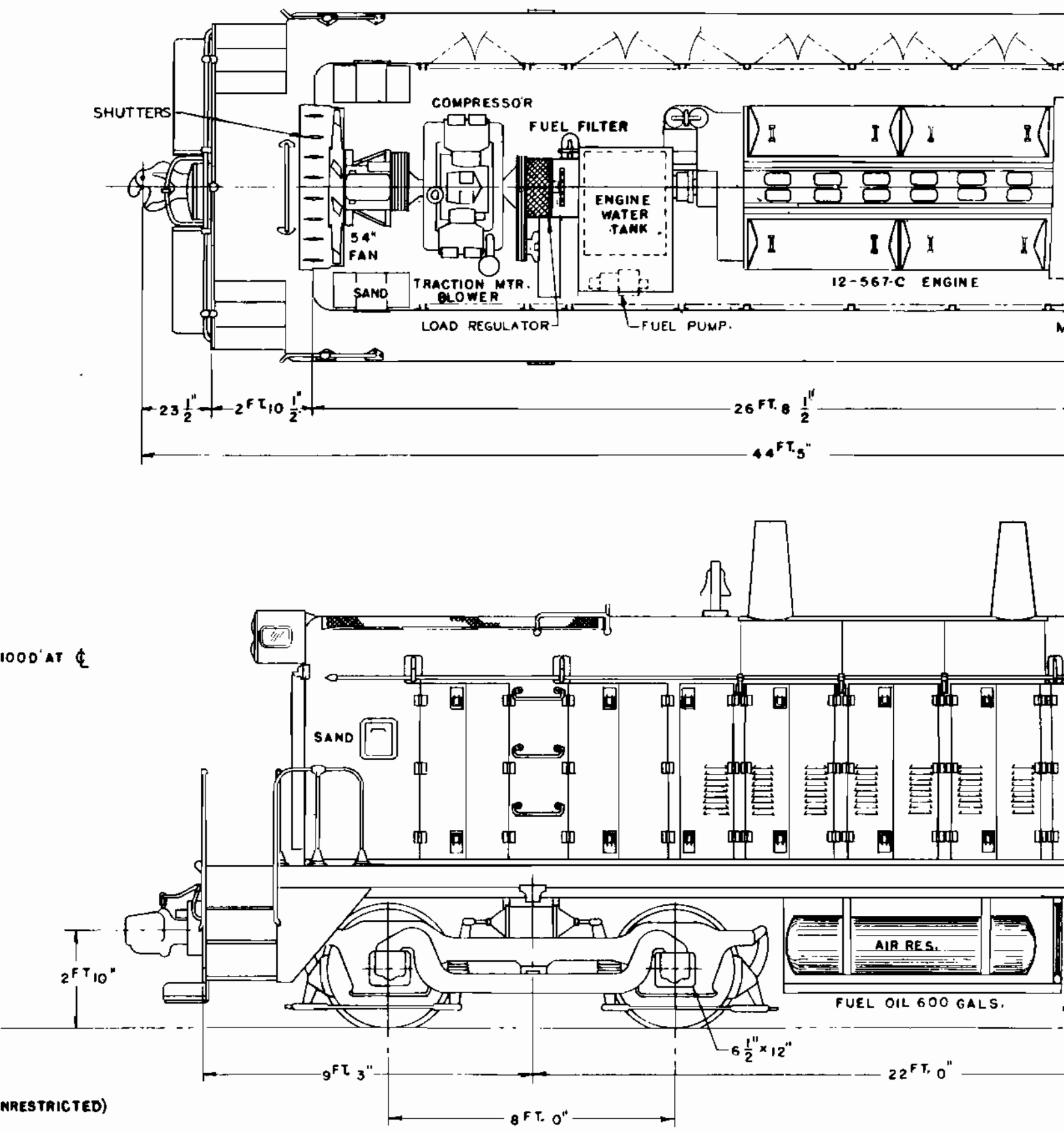
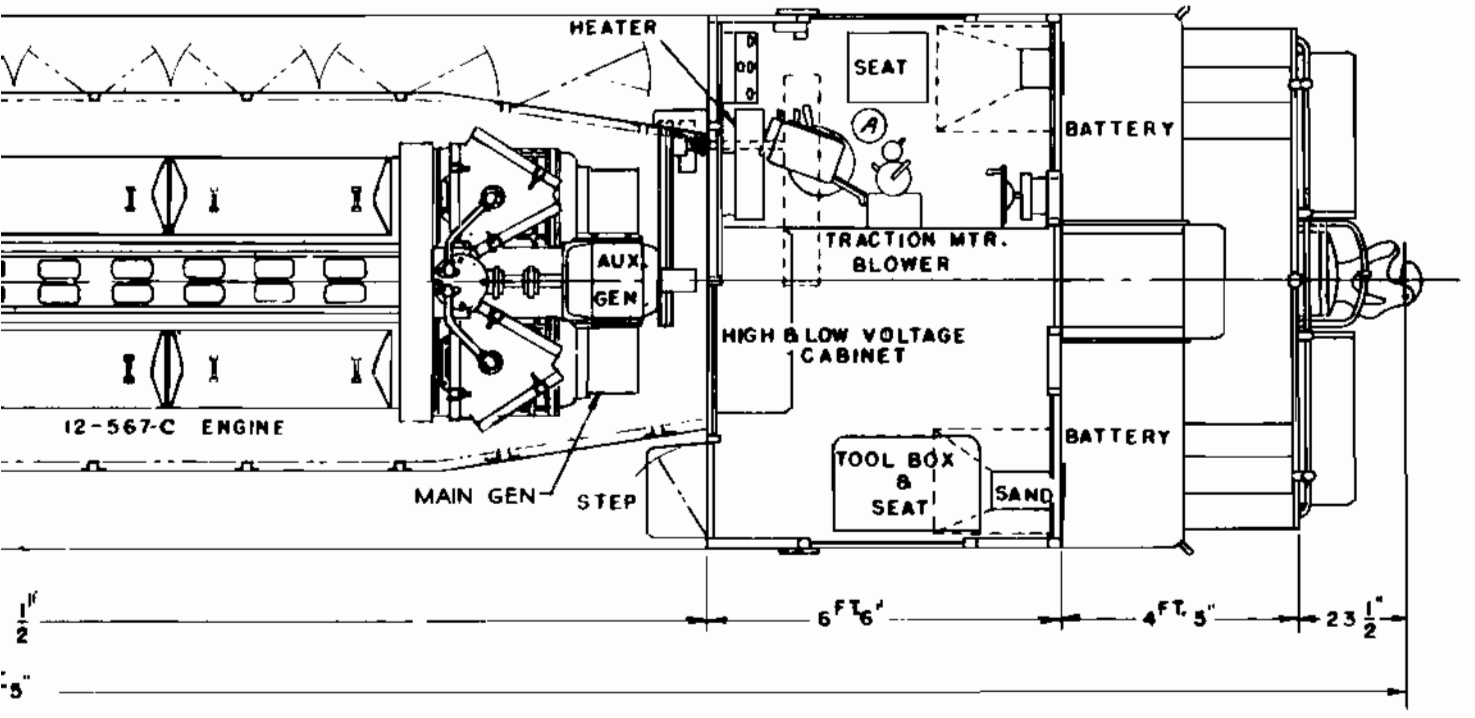
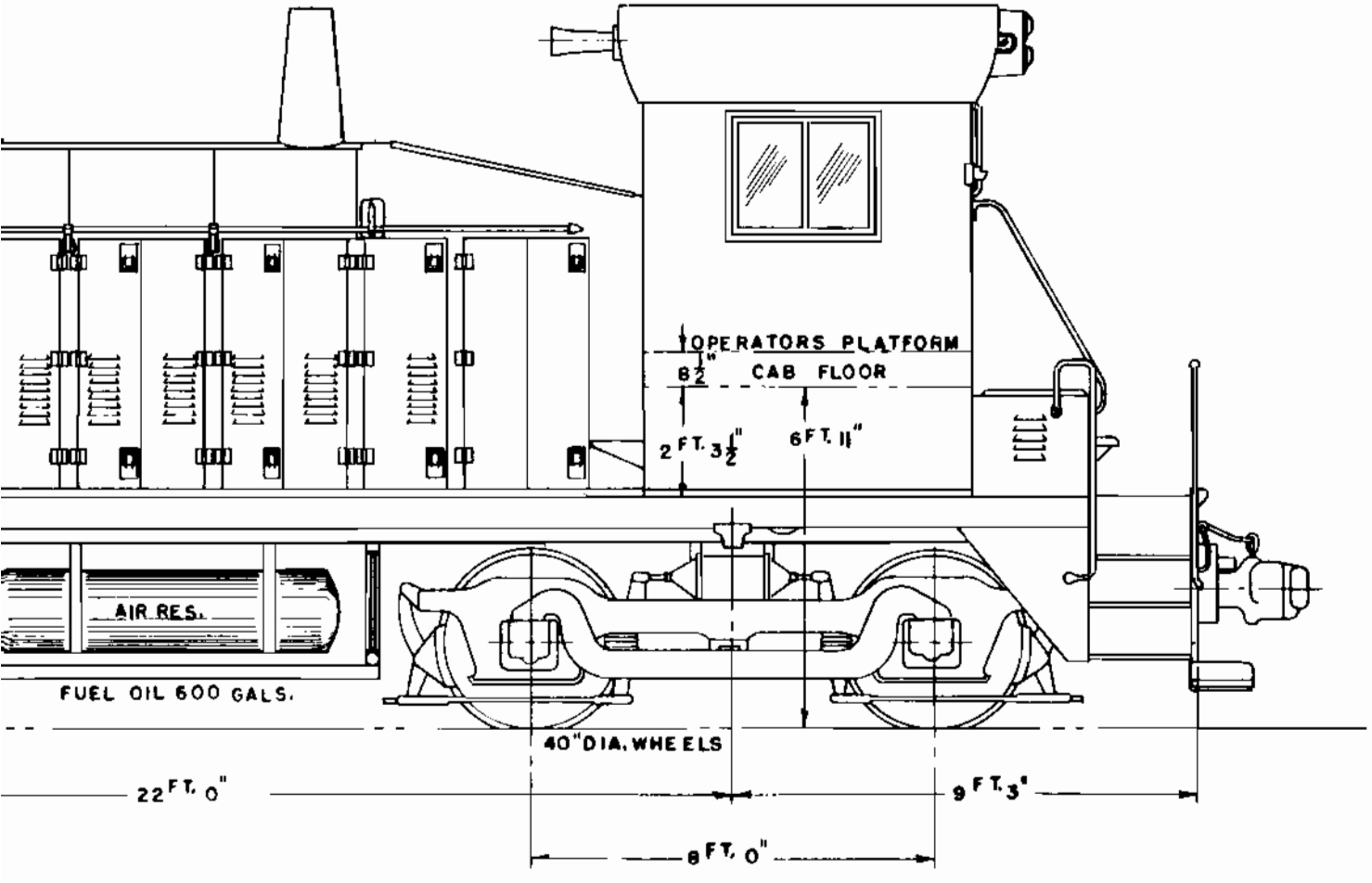


1200 H.P.



1200 H.P. SWITCHING LOCOMOTIVE—MODEL SW-1200


HEATER
SEAT
BATTERY
TRACTION MTR. BLOWER
AUX. GEN
HIGH & LOW VOLTAGE CABINET
12-567-C ENGINE
BATTERY
TOOL BOX & SEAT
SAND
MAIN GEN
STEP
6FT. 6"
4FT. 5"
23 1/2"


OPERATORS PLATFORM
8 1/2" CAB FLOOR
2FT. 3 1/2"
6FT. 11"
AIR RES.
FUEL OIL 600 GALS.
40" DIA. WHEELS
22FT. 0"
9FT. 3"
8FT. 0"

EL SW-1200