

**GENERAL ELECTRIC**

# **U25B**

**DIESEL-ELECTRIC  
LOCOMOTIVE**

**2500 HORSEPOWER  
SPECIFICATION 3030E**



**LOCOMOTIVE & CAR EQUIPMENT DEPARTMENT**

**GENERAL  ELECTRIC**

**ERIE, PENNSYLVANIA**





## MODEL U25B

### Design

The General Electric Model U25B diesel-electric locomotive is especially designed and built to meet the requirements of modern high-speed freight traffic. The design provides for high horsepower per axle with a minimum of equipment and weight. A low nose (short hood) and large windows are provided for maximum visibility.

The operating cab, located between the engine hood and the nose (short) hood, provides optimum visibility for operating in either direction. The control station is at the right side with the nose hood leading.

### Power

The diesel engine is the primary power source. A traction generator is directly connected to the diesel engine and furnishes power to the axle-mounted traction motors. Full utilization of the horsepower output of the engine is available throughout the speed range of the locomotive by means of the electric transmission.

### Operation

Locomotive operation is controlled by a master controller and by independent air brake and automatic air brake handles conveniently located to permit operation with either end leading.

The direction of motion is controlled by a reverse lever. The throttle and reverse levers are interlocked to prevent the reverser from being thrown unless the throttle handle is in the off position.

### Materials

All materials are in accordance with AAR specifica-

tions where they apply. High standards of quality control are maintained. Materials and locomotive specifications are subject to change without notice.

### Safety Appliances

All safety appliances are in accord with the General Electric Company's interpretation of current ICC regulations.

### Testing

All component parts of the locomotive are given standard commercial tests before assembly on the locomotive.

Each complete locomotive is tested as follows:

1. Control wiring is checked by observing sequence of contactor and relay operation and by testing for continuity of circuit between terminals.
2. High-potential tests of traction and control circuits are made in accordance with current A.S.A. standards.
3. Air brake tests are conducted to check pipe leakage and operation of the devices.
4. The power plant is tested at full load to check and adjust generator characteristics and engine performance, including power and speed.

### Painting

Interior: Gray enamel.

Underframe and Running Gear: Black, or customer's color choice.

Interior of Battery Compartment: Special acid resisting paint.

Exterior: Finish painted in customer's color choice.

# SUMMARY | MODEL U25B DIESEL-ELECTRIC LOCOMOTIVE

## Ratings

Continuous horsepower to generator for traction under standard conditions .....	2500 hp
Continuous tractive effort .....	53,000 lb
Maximum locomotive speed with new or worn wheels (74:18 gear ratio, 40" wheels) .....	70 mph

## Weights

Minimum locomotive (fully loaded) .....	252,000 lb
Per axle (fully loaded) .....	63,000 lb
Locomotive weight subject to manufacturing tolerance of $\pm 2\%$ Modifications may increase weight.	

## Wheel Arrangement

..... B-B

## Major Dimensions

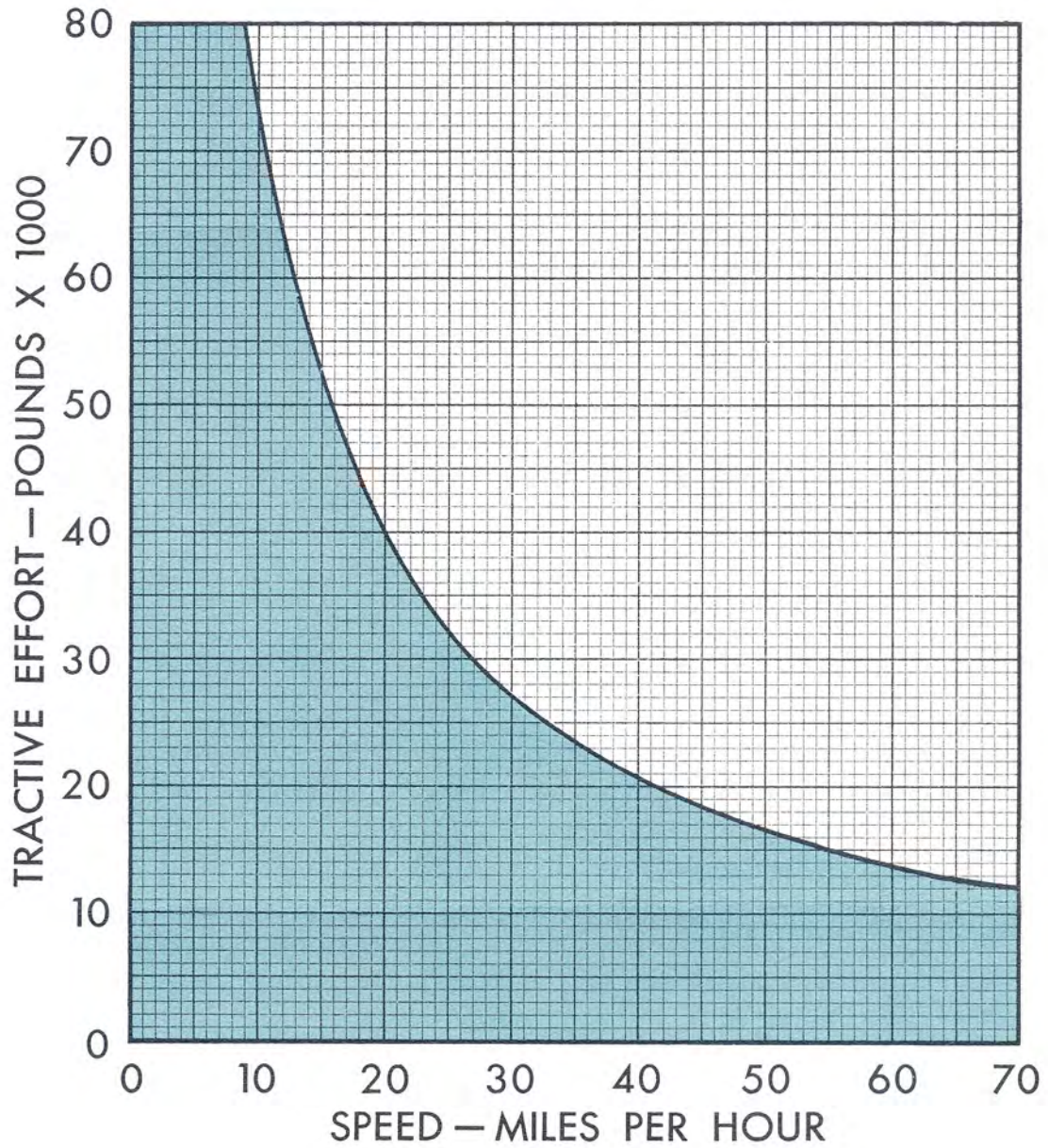
Length inside knuckles .....	60 ft 2 in.
Height .....	14 ft 7 in.
Width over handrails .....	10 ft 6½ in.
Locomotive outline drawing .....	41R971112
Minimum radius of curvature, locomotive alone .....	150 ft (39°)

## Capacities

Fuel .....	1700 gal
Engine lubricating oil .....	355 gal
Cooling water .....	290 gal
Sand .....	32 cu ft



### SPEED-TRACTIVE EFFORT





## UNDERFRAME

The underframe is fabricated by welding, using low alloy steel sections and plate, with cast steel centerplate bolster and bolster side members.

Hoods, cab, equipment and tanks are supported by the main frame members. Space between these members is enclosed with plate, top and bottom, to form an air duct.

**Wearplates**—Renewable, wear-resistant hardened steel plates are applied to

the centerplate, side bearing pads and draft gear housing.

**Couplers**—AAR Type E top-operated couplers with M-381 rubber-cushioned draft gear and alignment control are provided at each end of the locomotive.

**Pilots and Side Steps**—A pilot with footboards is provided at each end. Side steps provide access to the platform.

**Lifting and Jacking**—Four jacking pads

in combination with lugs for cable slings are integrally cast in the side bolsters.

**Fuel Tanks**—A heavy gage welded steel fuel tank is bolted to the underframe between the trucks. It is provided with baffle plates, clean-out plugs and water drains. Filler connections, vents, and fuel level gages are furnished on each side of the locomotive. An emergency fuel trip is provided.

## SUPERSTRUCTURE

The superstructure, of welded steel construction, consists of a nose hood, an operator's cab, an engine hood and a radiator compartment. The engine hood is bolted to the underframe and is removable.

**Nose Hood**—The nose (short) hood contains a top-serviced sandbox. A door in the front bulkhead of the operating cab provides access. Classification lights are mounted on this hood. A ventilator is provided.

**Operating Cab**—The sides and roof of the operating cab are insulated and steel lined. The floor, raised above the underframe, is insulated and covered with heavy duty vinyl tile.

The cab has safety glass windows in the front, rear, and on each side, providing maximum visibility in all directions. Two-pane center windows on each side of the cab have sliding sash equipped with latches. All other windows are fixed.

Doors in diagonally opposite corners of the operating cab provide access to walkways along the hoods. The doors

have windows, weather stripping and provision for locking.

Headlights and number boxes are arranged on the outside of the operating cab above the main window.

**Walkways**—Platform walkways with handrails and non-skid treads are provided at each end of the locomotive and along the hoods.

**Engine Hood**—The engine hood encloses the diesel engine, the traction generator and the air compressor.

Full height side access doors extend the length of the engine and generator on both sides of the hood. Doors in the roof provide overhead access to engine cylinders. Detachable roof sections permit removal of equipment.

**Radiator Compartment**—The radiators are roof-mounted. A reinforced screen over the air outlet opening is removable to permit removal of the radiators, fans and gearbox, and the equipment air cleaner. Dynamic braking grids, when provided, are mounted along each side of the radiator compartment.

An end section holds a sandbox, serviced from the roof. Rear headlights, classification lights and number boxes are mounted on this section.

**Equipment Compartments**—Main propulsion control equipment is located on the left side of the locomotive beneath the operating cab. This compartment, maintained under positive air pressure to keep out dirt and water, contains contactors, relays, reverser, braking switch when furnished, resistors and auxiliary electrical devices.

Air brake devices are located in an easily accessible compartment along the right side of the locomotive under the operating cab. Battery trays are located in two boxes before and after the air brake compartment with hinged top doors for servicing.

**Ventilation**—Mechanically filtered air is provided through a large self-cleaning air cleaner in the bottom of the radiator compartment and is delivered under pressure for the engine, for equipment cooling and pressurization, and cab ventilation. Engine air is additionally cleaned by oil-bath air filters.

## RUNNING GEAR

The running gear of the locomotive consists of two, two-axle, side-equalized, swing motion swivel trucks.

The truck frame, bolster, and spring plank are of cast steel. The frame is supported by two equalizers on each side with coil springs between the equalizer and the frame. Elliptic springs are applied between the bolster and spring plank. The spring plank is supported by forged steel swing links pinned to the truck frame.

**Wheels**—Wheels are solid multiple-wear rim-treated rolled steel of 40-inch diameter. The wheels have standard AAR tread and flange contour.

**Axles**—Axles are of forged open-hearth steel, conforming to AAR material specifications.

**Journals**—Journals are equipped with sealed grease-lubricated roller bearings. Renewable steel wear plates are on pedestal openings of truck frame.

Equalizer seat surfaces are hardened to

resist wear.

**Center Plates**—Center plates are of liberal dimensions and are equipped with hardened steel liners, arranged for lubrication and protected by dust guards.

**Side Bearings**—Side bearings with renewable wear-resistant steel wear plates are provided.

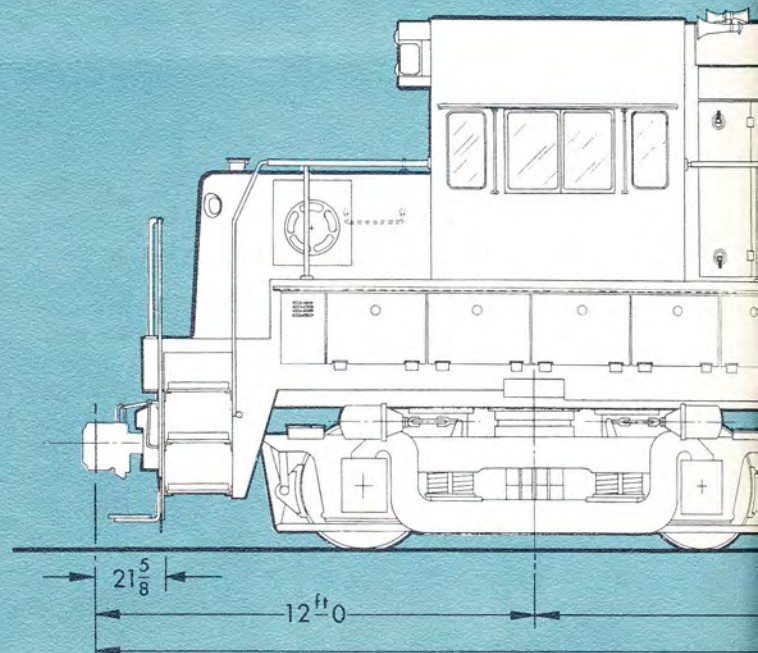
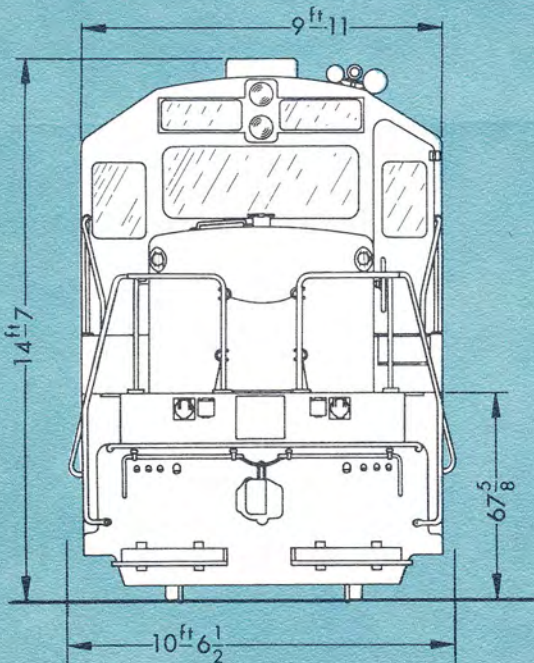
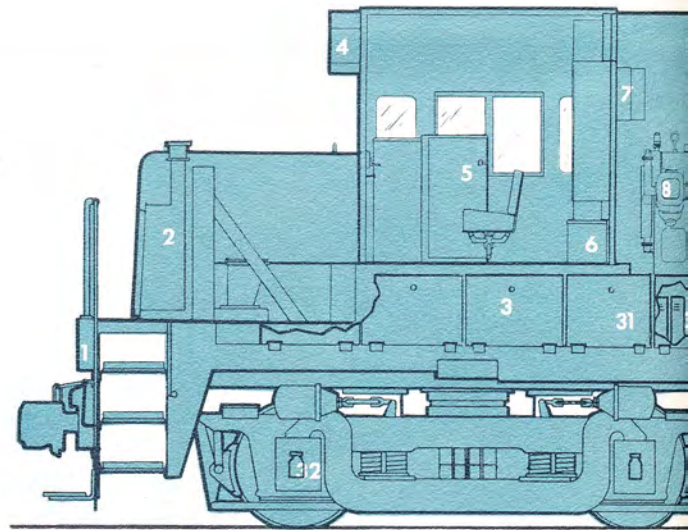
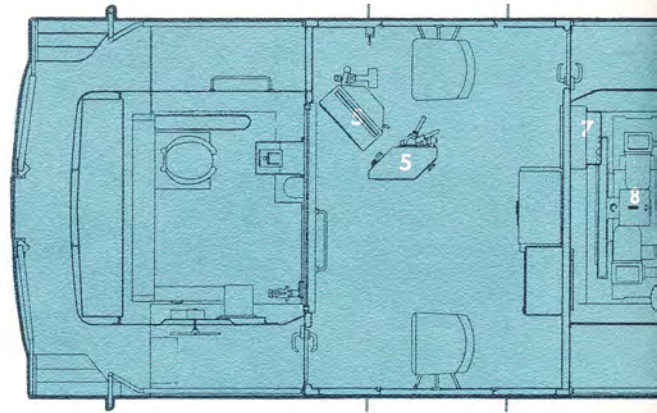
**Safety Hooks**—Truck safety hooks are provided to prevent slewing in case of derailment and to permit the trucks to be lifted with superstructure.



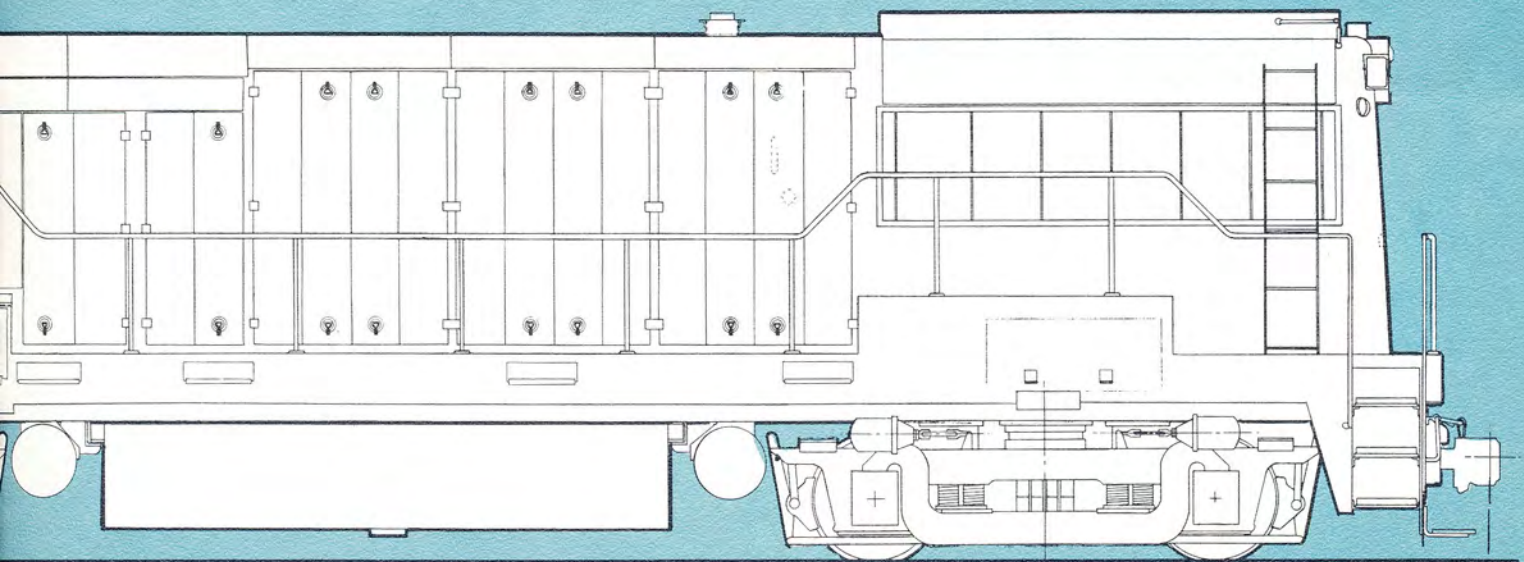
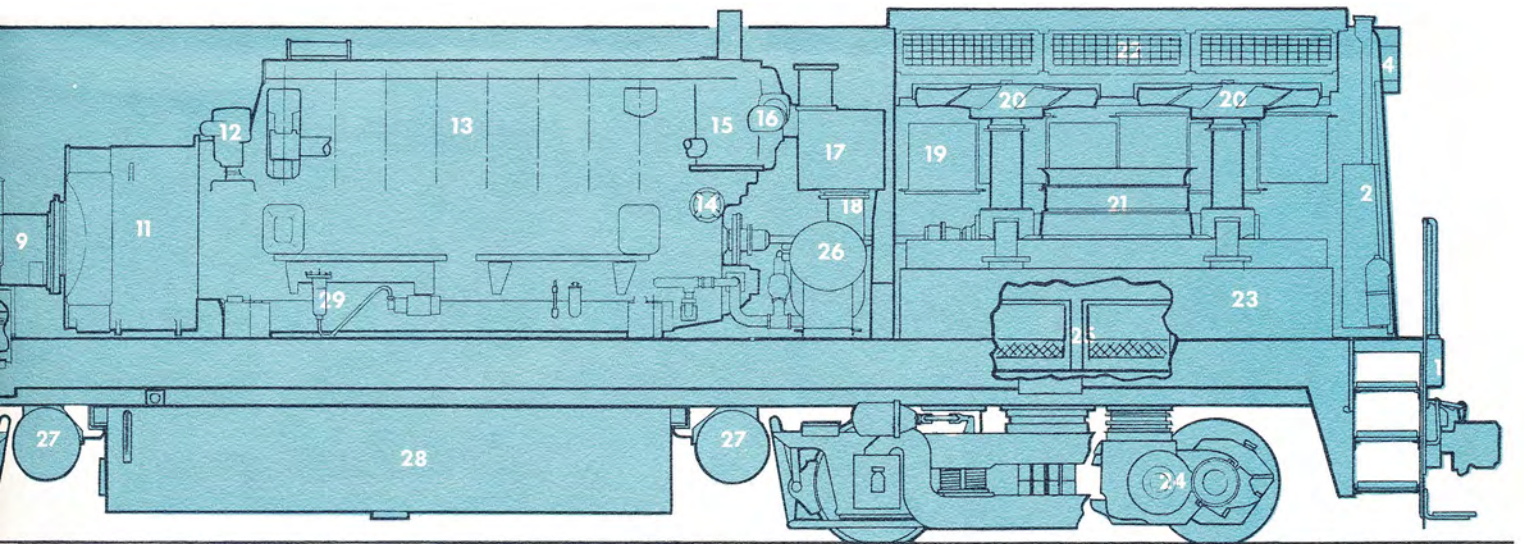
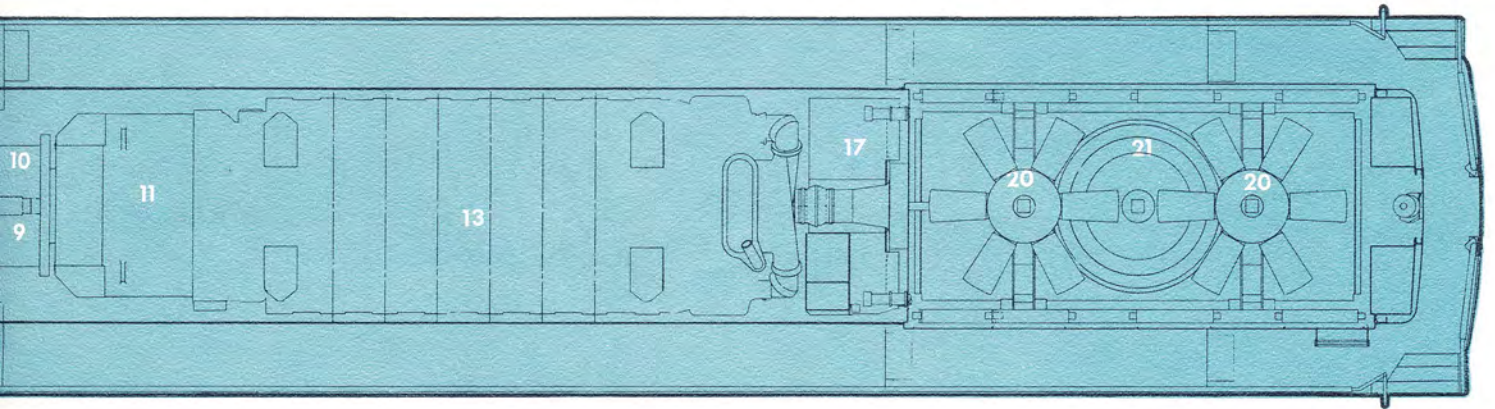
# DRAWINGS

- |                                               |                                                                            |
|-----------------------------------------------|----------------------------------------------------------------------------|
| 1. Multiple-Unit Connectors                   | 19. Dynamic Brake Grids<br>(when furnished)                                |
| 2. Sand Box                                   | 20. Radiator Fan                                                           |
| 3. Control Equipment Compartments (left side) | 21. Equipment Blower                                                       |
| 4. Headlight and Number Boxes                 | 22. Radiator                                                               |
| 5. Operating Controls                         | 23. Equipment Air Cleaner                                                  |
| 6. Cab Heater                                 | 24. Traction Motor                                                         |
| 7. Engine Control Panel                       | 25. Engine Air Filters<br>(both sides)                                     |
| 8. Air Compressor                             | 26. Lube Oil Filter                                                        |
| 9. Auxiliary Generator                        | 27. Air Reservoir                                                          |
| 10. Exciter                                   | 28. Fuel Tank                                                              |
| 11. Traction Generator                        | 29. Fuel Oil Strainer, Transfer<br>Pump (left side)<br>Filter (right side) |
| 12. Governor                                  | 30. Battery (right side)                                                   |
| 13. Diesel Engine                             | 31. Air Brake Equipment<br>(right side)                                    |
| 14. Lube Oil Strainer                         | 32. Speed-Sensing Alternator<br>(one per axle)                             |
| 15. Intercooler                               |                                                                            |
| 16. Turbocharger                              |                                                                            |
| 17. Cooling Water Storage Tank                |                                                                            |
| 18. Lube Oil Cooler                           |                                                                            |

MADE FROM 41R971112  
AND  
41R971061







36<sup>ft</sup>2

60<sup>ft</sup>2

56      56      12<sup>ft</sup>0      21<sup>5</sup>/<sub>8</sub>

CLEARANCE UNDER MOTOR      4<sup>1</sup>/<sub>2</sub> CLEARANCE UNDER GEAR CASE



## POWER PLANT

### Diesel Engine—

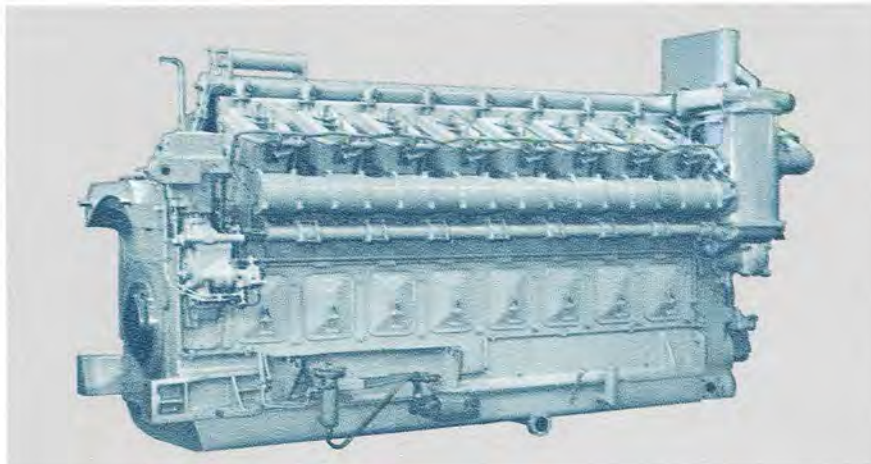
Type . . . One, General Electric FDL-16  
Number of cylinders . . . . . 16  
Cylinder arrangement . . . . . 45° V  
Stroke cycle . . . . . 4  
Bore & Stroke . . . 9 inches x 10½ inches  
Full load speed . . . . . 1000 RPM  
Turbocharger . . . . . One

**Governor**—The Woodward PG engine governor is of the self-contained, electro-hydraulic type. It automatically regulates the horse power output at each throttle setting.

**Overspeed Protection**—The engine is automatically shut down if the speed exceeds maximum rated rpm by 10 percent.

**Cooling System**—Water is circulated through the engine, turbocharger, air intercoolers, self-draining radiator, lubricating-oil cooler, air compressor, and cab heater by a gear-driven centrifugal pump integral with the diesel engine. A tank is provided with sight gages to indicate water level. Abnormally low water pressure automatically shuts down the engine.

**Engine Temperature Control**—A flow control valve, thermostatically operated, automatically maintains temperature



by regulating the flow of cooling water through the radiator sections.

**Fuel System**—A motor-driven pump transfers fuel from the tank through a strainer and filters to the injection pumps.

Each cylinder is equipped with high pressure fuel injection pump and injector.

**Lubricating System**—A single pressure-regulated system is supplied by a gear-type pump integral with the diesel engine.

A lubricating-oil reservoir is located in

the engine sub-base. Lubricating oil filters, strainer, and water-cooled oil cooler are provided. Abnormally low lubricating oil pressure automatically shuts down the engine.

**Engine Starting**—The diesel engine is cranked by the traction generator from storage battery power.

**Horsepower Output**—2500 hp input to generator for traction is provided under AAR standard conditions and with specification fuel and lubricating oil.

## ELECTRIC TRANSMISSION



GE-752 TRACTION MOTOR

**Traction Generator**—One General Electric GT-598 traction generator is mounted directly on the engine. It is a direct-current, single anti-friction bearing, separately-excited machine and is equipped with windings to permit starting the engine by storage battery power.

**Traction Motors**—Four General Electric GE-752 traction motors are furnished. The traction motor is direct current,

series wound, separately ventilated by the cleaned-air system. The armature is mounted in anti-friction bearings.

Motors drive through single-reduction spur gearing. They are supported by the axles to which they are geared and by resilient nose suspensions on truck transoms.

**Control**—The locomotive is equipped with General Electric railway-type single end—single unit control as basic equipment. Control devices are grouped in a pressurized steel compartment, fitted with access doors. The reverser and line contactors are electro-pneumatically operated. Other contactors are magnetically operated. Circuit breaker-type switches are used in control circuits where overcurrent protection is required.

Transition is automatic.

**Exciter**—One General Electric, Type GY50 is provided. It is gear-driven from the traction generator and provides controlled excitation of the traction generator field.

**Battery-Charging Generator**—One General Electric, Type GY-27 battery-charging generator is provided.

It is gear-driven from the traction generator and furnishes power at regulated potential for battery-charging, lighting and control.

**Storage Battery**—A 32-cell lead acid type, 420 ampere hour 19-plate storage battery is furnished for starting the engine and to furnish power for lights and other auxiliaries when the engine is shut down.

**Wheel Slip Correction**—Wheel slip is automatically detected by comparison of output signals from alternators mounted on each axle. Slip is automatically corrected by a light application of locomotive brakes followed by the automatic application of sand and reduction of power if the slip persists.

**Ground Relay Protection**—If a ground occurs, engine speed returns to idle, power is removed, the alarm bell rings and visual indication is given to the operator.



## LOCOMOTIVE BRAKES

**Air Brakes**—Schedule 26L with 26F control valve, air brake equipment is furnished.

Locomotive brakes may be operated either independently or with train brakes. Connections for furnishing compressed air to the train brakes are provided at each end of the locomotive.

**Compressor**—One 3-cylinder, 2-stage, water-cooled engine-driven air com-

pressor furnishes air for the locomotive and train braking systems.

Compressed air displacement:

Idle engine speed..... 113 cfm

Full engine speed..... 307 cfm

**Reservoirs**—Reservoir capacity of 56,000 cu in. is furnished for storing and cooling air for the brake system.

**Brake Equipment**—Brake cylinders are mounted on the truck frames and

operate fully equalized clasp brake rigging, which applies two brake shoes to each wheel. Brake rigging is furnished with hardened steel bushings, and adjustment is provided to compensate for wheel and shoe wear.

**Hand Brake**—A hand brake located on the outside of the nose compartment is provided for holding the locomotive at standstill.

## OPERATING CONTROLS

Controls and instruments for operating the locomotive are grouped at the operator's station and at auxiliary panels in the operator's cab.

### DEVICES AND INSTRUMENTS IN OPERATOR'S CAB

#### Operating Controls:

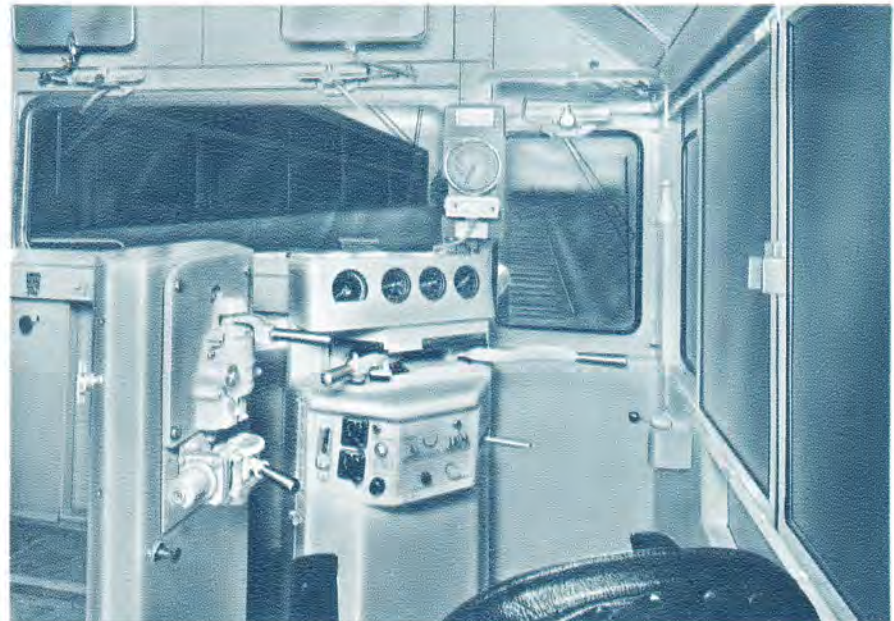
- Controller with throttle, reverser, and selector levers
- Engine start push button • Engine stop push button and emergency fuel shutoff
- Brake valves • Sander valve • Bell ringer valve
- Air horn valve • Window wiper
- Circuit breakers and switches
- Emergency multiple unit engine stop switch

#### Instruments:

- Brake gages • Load meter • Speed recorder and odometer • Fuel oil, lubricating oil and manifold air pressure gages

#### Warning Indicators:

- Low engine lubricating oil or water pressure—alarm bell and warning light



- High engine water temperature—alarm bell and warning light
- Wheel slip—warning light. Ground

- relay—alarm bell and red indicator
- No battery charge—alarm bell and warning light

## LOCOMOTIVE ACCESSORIES

**Battery Charging Receptacle**—One 150 ampere receptacle for external charging of battery.

**Bell**—One, stationary, cast iron bell with air-operated ringer and operating valve.

**Cab Heater**—One, supplied with cleaned air from the main air duct and including a radiator core through which the flow of engine cooling water is controlled as desired to regulate cab temperature. Ducts extending from the heater provide window defrosting.

**Classification Lights**—Two, three-aspect electric lights at each end of the locomotive.

**Conductor's Emergency Valve**—Located at fireman's station.

**Emergency Fuel Shutoff**—Three push buttons, one on each side of the underframe and one in the operating cab.

**Engine Water Temperature Gage**—The engine cooling water temperature gage is located in the engine compartment.

**Fire Extinguishers**—Two, ten-pound dry chemical, one at each end of locomotive.

**Fuel Gages**—Four sight glasses, two on each side of the fuel tank.

**Headlights**—At each end of the locomotive, each consisting of two, 200-watt, 30-volt, sealed-beam lamps. Dimming control is provided.

**Horn**—One, three tone horn with two bells forward and one to the rear.

**Interior Lights**—For illuminating the

operating cab, hoods and instruments.

**Marker Flag Brackets**—Four standard combination flag and light brackets, two at each end.

**Step Platform Lights**—Four step lights, one for each side step. Lights to illuminate inter-unit walkway when furnished.

**Sanders**—Eight, pneumatically operated, arranged to sand ahead of the lead wheels of each truck in each direction.

**Seats**—Two wall-mounted seats, adjustable for height and for operating in either direction. Cushioned arm rests are provided at side windows.

**Sun Visors**—Six, adjustable-type.

**Window Wipers**—Six, air-operated, mounted on front and rear windows of operating cab.



# MODIFICATIONS

The following modifications may increase locomotive weight, dimensions, and price.

**Additional Fuel**—1200 gallons additional fuel capacity.

**Automatic Sanding**—In addition to manually operated valve, sanding in either direction is automatically initiated in event of emergency brake application.

**Awnings**—Metal awnings provided over window on each side of operator's cab.

**Battery Charging Ammeter**—Mounted on wall of operating cab.

**Bell Ringer**—Additional pneumatic bell ringer valve at fireman's station.

**Brake Shoes**—To meet customer's requirements.

**Break-in-Two Protection**—To provide against the loss of main reservoir air and the possible release of brakes from an emergency application initiated in the train or by pull-apart, with the brake valve handle in its release position.

**Cab Signal Equipment**—Train control cab signal or train speed control equipment as now used on various railroads can be furnished.

**Clothes Locker**—Located in the operator's cab. When two-station control is provided, the locker will be in the nose hood.

**Coupler**—AAR Type "F" Coupler in place of type "E". M-380 draft gear required.

**Deluxe Cab Seats**—Upholstered cab seats with armrests.

**Draft Gear**—M-380 equipment in place of basic M-381 draft gear.

**Dynamic Braking**—Equipment for braking the locomotive electrically, using the traction motors as generators and dissipating the electrical power in resistors. Interlock included to prevent application of air brakes on locomotive while in dynamic braking, when automatic air is applied to the train.

**Extra Cab Seat**—Third seat in operating cab.

**Field Loop Braking**—Equipment provided with dynamic braking modification so that units can lead units equipped with field loop braking circuit.

**Fire Extinguishers**—To meet customer's requirements.

**Fuel Level Gages**—Dial type gages provided on both sides of the tank near the filler openings.

**Gear Ratios**—Optional gear ratios, to be chosen in accord with proposed service, are available as follows:

<b>GEARS</b> .....	74:18	65:18	64:19
<b>RATIO</b> .....	4.11	3.61	3.37
<b>MAX. MPH</b> .....	70	80	85

**Hand Brake**—On two axles to provide 25% braking for parking in place of hand brake on one axle.

**Locomotive Overspeed Protection**—Returns engine to idle, cuts off power, makes automatic brake application.

**Long-Hood-Leading Control**—The control station can be mounted on the left side for operation with the long hood leading.

**Multiple-Unit Control**—To enable the operation of two or more locomotive units from operating station; includes remote control of headlights and call button between units.

**Power-Matching Control**—Permits operation with units having lower horsepower per axle without overloading the U25B unit.

**Safety Control**—Safety deadman control including foot pedal valve, time delay, warning whistle and service brake application.

**Sanding Control**—Pneumatic control provided instead of electric control for multiple-unit control of manual sanding.

**Toilet**—Dry type sanitary fixture or a flush type with water tank and protection against freezing can be furnished in the short hood.

**Tool Box**—Can be provided.

**Train Communication**—Train communication equipment as now used by various railroads can be furnished.

**Two-Station Control**—Two control stations for operating the locomotive from either one of two diagonally opposite positions in the operating cab.

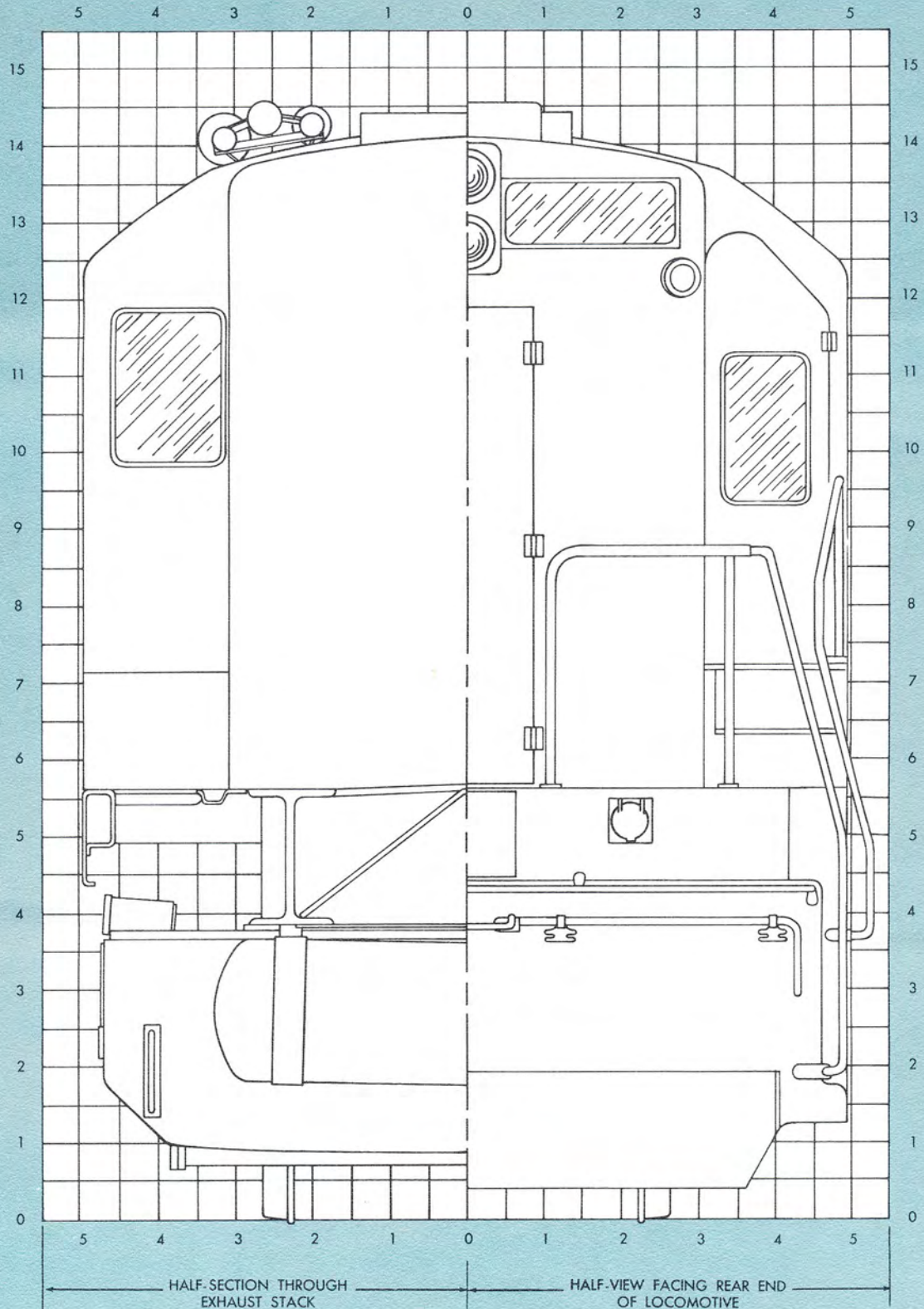
**Visual Warning Signal Lights**—At each end of the locomotive.

**Water Cooler**—Electric floor-mounted water cooler.

**Windshield Wings**—Wind deflectors; one in front and rear of each side window.



# MAXIMUM EQUIPMENT DIAGRAM





*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

**ERIE, PENNSYLVANIA, U. S. A.**