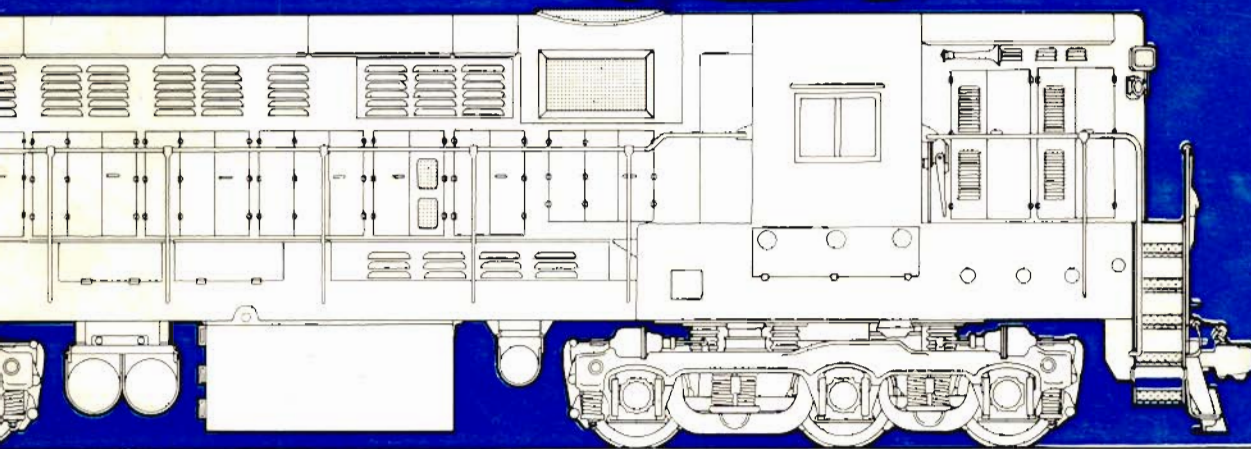


SPECIFICATION

550



FAIRBANKS-MORSE

2400 H.P. TRAIN MASTER LOCOMOTIVE



SPECIFICATION

550

FAIRBANKS-MORSE

2400 HP

TRAIN MASTER

LOCOMOTIVE

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SPEC. 550



general data

model 2400 hp Train Master Locomotive H24-66

type Whyte Symbol 0-6-6-0
AAR Symbol C-C

general design See drawings 10 512 979-4 & 99 LKA5B, pages 3 and 4.

major dimensions

Overall length inside knuckles	66'0"
Overall width	10'4 1/2"
Width of power plant and boiler compartments	7'0"
Overall height above rail	15'0"
Wheelbase each truck	13'0"
Wheelbase total locomotive	49'4"
Distance between truck centers	41'6"

clearance dimensions See drawing 10 516 995-2, page 5.

supplies

Fuel oil	1800 gallons
Lubricating oil	385 gallons
Engine cooling water	250 gallons
Sand	48 cu. ft.

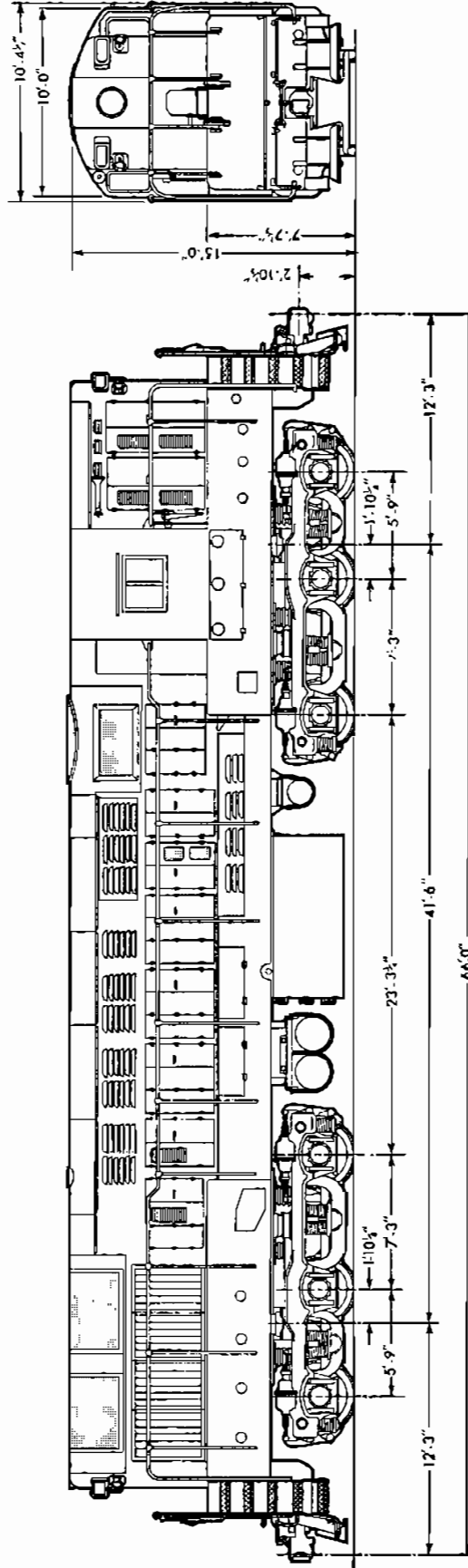
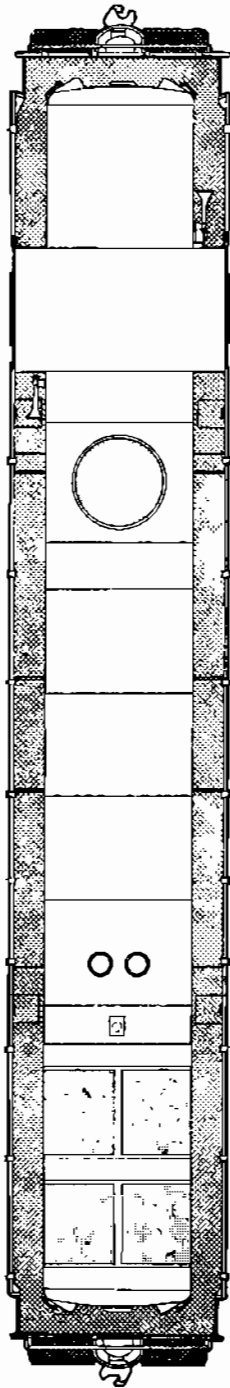
weights

Total fully loaded	375,000 lbs.
Total on drivers	375,000 lbs.
Per axle	62,500 lbs.

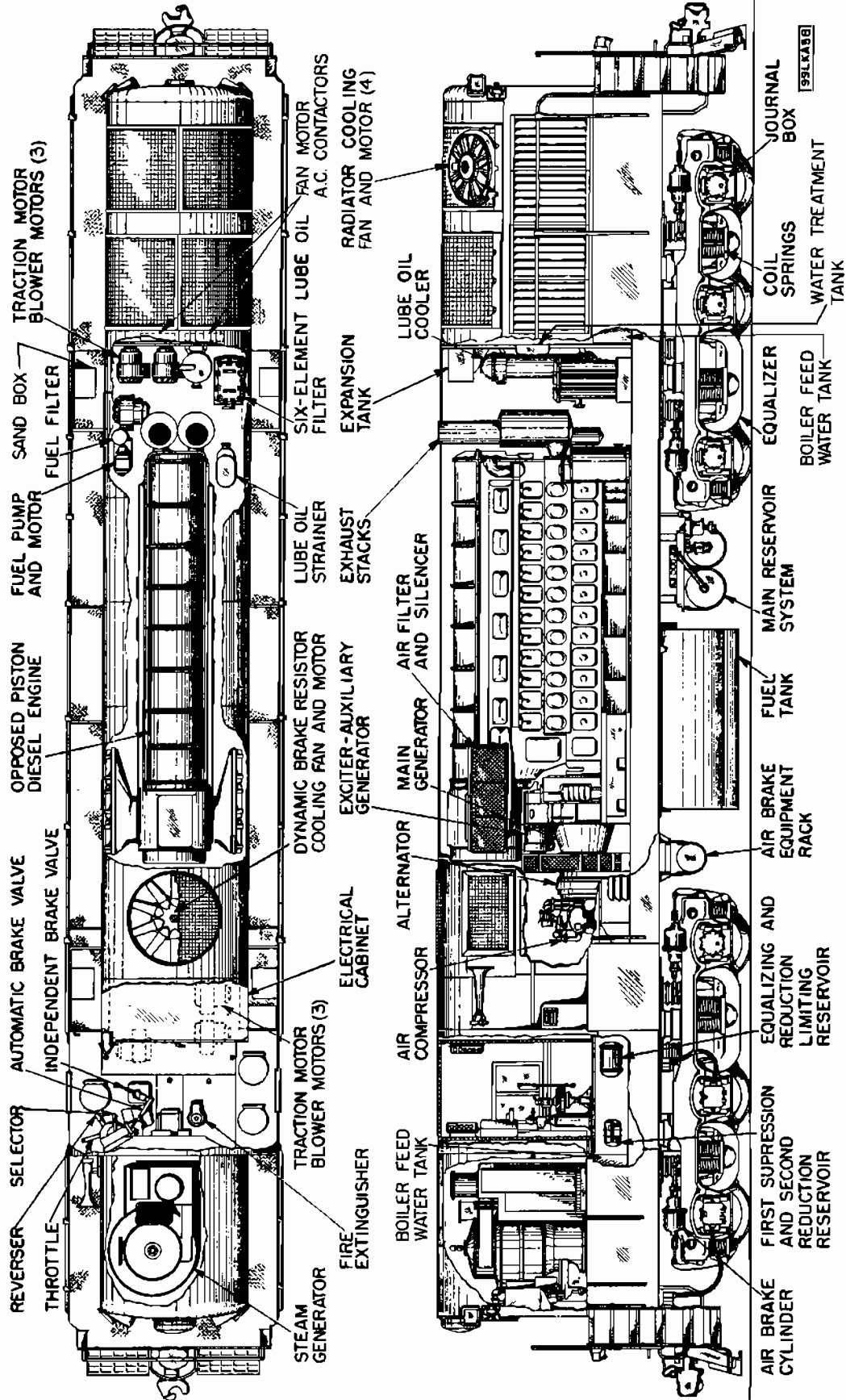
128 HP/Ton adhesion

performance

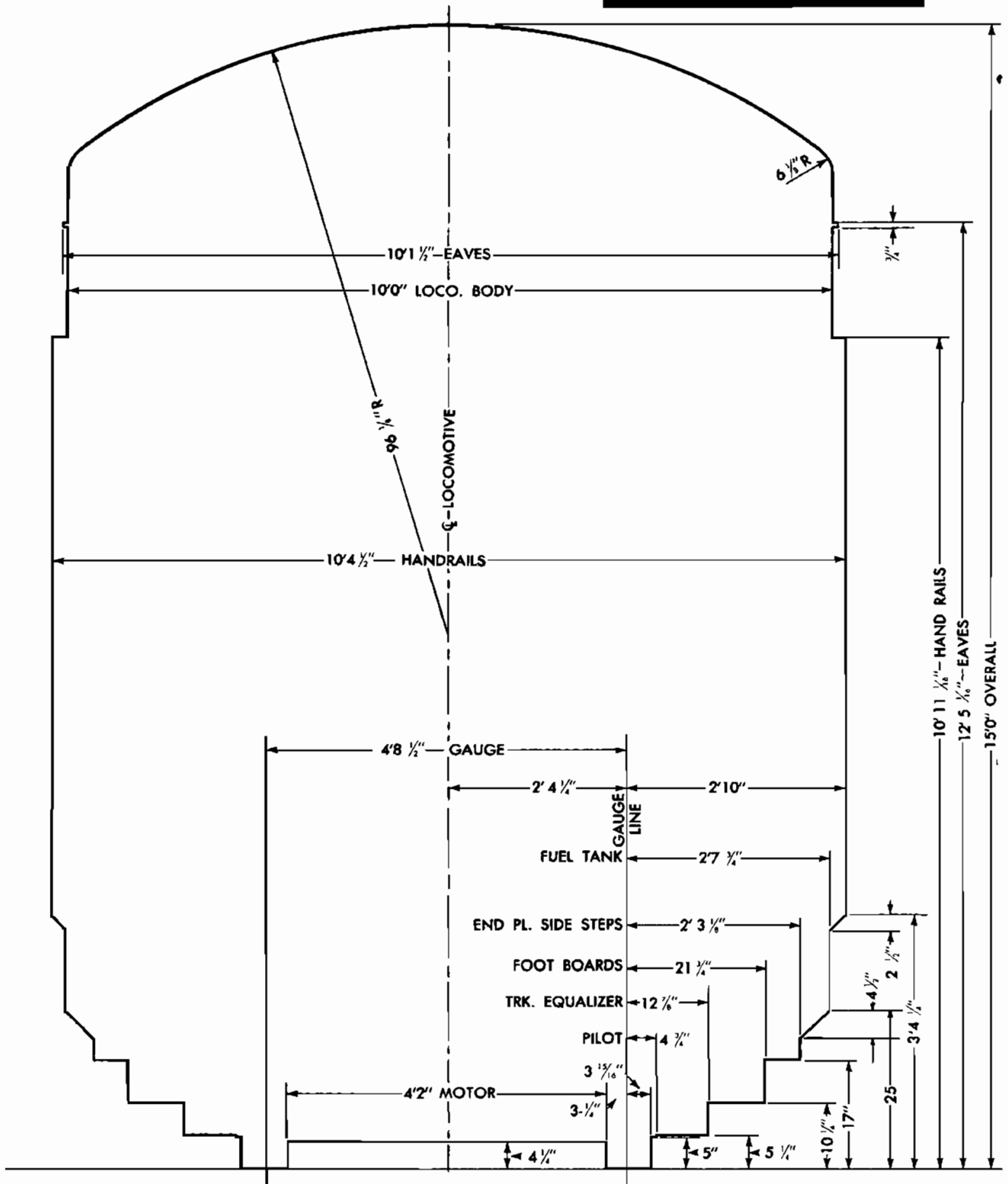
Starting tractive effort at 30% adhesion	112,500 lbs.
Continuous rated tractive effort	See Section 9
Maximum speed	See Section 9
Minimum radius of curvature, locomotive alone	191' (30°)
Minimum radius of curvature, locomotive coupled to AAR 40'6" freight car	212' (27°)



10 512 979-4 PLAN & ELEVATION OF EXTERIOR OF LOCOMOTIVE
MODIFICATIONS SHOWN ARE AVAILABLE AT EXTRA COST



99LKA5B—PLAN & ELEVATION OF INTERIOR OF LOCOMOTIVE
MODIFICATIONS SHOWN ARE AVAILABLE AT EXTRA COST



CLEARANCE DIAGRAM MODEL H24-66
DRAWING #10 516 995-2
MODIFICATIONS SHOWN ARE AVAILABLE AT EXTRA COST



underframe

general

The underframe is a unit fabricated steel construction with jacking pads, draft gear pockets and striking plates as integral parts.

steps

Ladder type safety tread steps leading to locomotive platform are provided at each corner.

floor plates

Safety tread steel floor plates are used for exterior flooring along both sides of the hood and across the front and rear ends.

draft gear

Rubber cushioned draft gear provided at each end.

couplers

AAR type E, swivel shank, steel yoke, top operating coupler provided at each end, with uncoupling levers that operate independently from either side.

fuel oil tank

An 1800 gallon welded construction fuel oil tank is located beneath underframe between the trucks. Filling station on either side, vent equipped with flame arrestor. Three sight gauges on each side. Baffle plates, clean-out plugs, and water drains provided.

lifting and jacking

Four lifting and jacking pads are provided, one at each end of the body bolsters. Two lifting locations are also provided in each end plate, one on either side of the coupler.

footboards and pilot

Each end of the locomotive has two steel grating footboards and a steel pilot securely fastened to the underframe.

loading point liners

Two loading pins at each end are capped with a graphite impregnated material. A further description of the loading system is given in Section 4, Trucks.



superstructure

cab

The cab is located near the front of the locomotive between the power plant and boiler compartments providing excellent visibility to front and rear. It is of welded steel construction, roof and sides insulated and lined with steel, floor made of linoleum covered plywood. Positive ventilation is provided.

cab doors

Cab doors are of plymetal construction; located at front leading to forward hood compartment, at right rear, and at left front of cab. Exterior doors have safety glass windows in fixed sashes. Left front door provided with builder's standard lock and key; other doors have inside operated deadlocks.

cab windows

Side windows provided with sliding sash, overhead gutters, and hinged retractable arm rests; front and rear windows of fixed type. Safety glass in all windows.

cab control station

The cab control station, located conveniently to the left of the engineer's position, incorporates the following controls: Master controller with eight-step electric throttle, reverser, and selector levers; automatic and independent air brake valves; sander and bell ringer valves; and windshield wiper valve.

engineer's control switches

Control and lighting switches are within reach of the engineer, and include the following switches: Engine control switch; control breaker; locomotive run (exciter field); fuel oil pump; front and rear headlight bright, medium, and dim; and cab, power plant and boiler compartment, control panel gauge and ground, number, classification, train order, and gangway light switches.

Engine stop and attendant call buttons are also mounted on the control panel.



superstructure (continued)

engineer's instrument panel

At the left of the engineer is a lighted instrument panel containing two duplex air brake gauges, and a load ammeter.

The instrument panel also contains warning lights for the following conditions: wheel slip, high engine temperature, low lubricating oil pressure, ground relay, and loss of a-c voltage.

A warning buzzer operates in conjunction with the wheel slip warning light. An alarm bell sounds when any of the four following circuits is energized: electrical ground, high engine temperature, low lubricating oil pressure and a-c voltage loss.

engine gauge panel

Mounted in the cab directly above the electrical cabinet is a panel containing the following gauges: Lubricating oil pressure, fuel oil pressure, engine cooling water temperature, control air pressure, and battery charging ammeter.

front hood

Accessible from cab or right side of hood; roof section removable. Provides space for the steam generator, when specified, and certain other accessory equipment.

rear hood

Houses power plant, including engine, main generator, exciter, auxiliaries, air compressor, engine cooling system. Construction includes removable roof sections over engine, main generator, and air compressor. Steel doors on each side and rear end provide access for servicing. Vertical columns and doors at engine section removable.

ventilation

Air is admitted to the power plant compartment for the self blown main and auxiliary generators, traction motor blowers, air compressor, and for other ventilation through removable metallic oil-coated impingement type air filter panels.



trucks

general

Two six wheel trucks having cast steel frames with integral center bearings and pedestals. Trucks are provided with single drop equalizers, coil springs, snubbers, clasp brake rigging, and lateral cushioning.

Three point loading, at the center bearing and two loading pads, is utilized. The center bearing is located in the middle of one transom, the two loading pads are located near the junction of the other transom with the side frames. The space between the three loading points is provided for ready access to the center traction motor for inspection and servicing.

loading point liners

The center bearing is fitted with horizontal and vertical graphite impregnated wear liners. The loading pads are fitted with carbon steel wear plates welded to the truck frame.

pedestal liners

Pedestals are fitted with hardened spring steel wear liners.

lateral motion

Journal boxes and pedestals are arranged to provide controlled lateral motion by rubber mounting of the pedestal liners.

springs

The truck frame is supported by 12 large capacity $9\frac{1}{2}$ " O.D. alloy steel double coil springs. Four friction type spring snubbers provide controlled vertical ride.

axles

Forged open hearth steel AAR material Spec. M-126-52 Grade F. Wheel, journal, and gear seats finished by grinding.

wheels

AAR M-107-52 Class B rim quenched rolled steel, with $2\frac{1}{2}$ " rims and $5\frac{1}{2}$ " tread.

journal bearings

Roller bearings, $6\frac{1}{2}$ " x 12". Pedestal jaw bearing surfaces of journal boxes provided with hardened spring steel wear plates. Journal boxes are fitted with rubber cushioned equalizer seats.

equalizers

Single drop type equalizers are flame cut from ASTM A-201 Grade A steel annealed and shot blasted or equal, with case hardened steel shoes at journal bearing locations.

interlock

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

**diesel engine**

type Fairbanks-Morse & Co.
Model 38D 8 $\frac{1}{8}$ "
12 cylinders
10" stroke (each piston)

Opposed Piston Engine
2 cycle
8 $\frac{1}{8}$ " bore

rating 2400 hp for traction
Idle speed

850 rpm
300 rpm

main frame and cylinder block The main frame and cylinder block is of welded steel construction, stress relieved.

pistons Two alloy cast iron trunk type pistons in each cylinder, cooled by circulating lubricating oil, and equipped with cast iron rings and piston pin carrier inserts.

cylinder liners Cast iron cylinder liners with pressed on steel water jacket forming one replaceable unit.

crankshafts Two high strength alloy cast iron crankshafts with precision finished bearing surfaces, mounted on precision type removable bearings between each cylinder and at each end.

fuel system Consists of two injection pumps and two nozzles per cylinder. Fuel oil supplied to injection pump header by motor driven fuel pump through a replaceable cartridge type cotton waste packed filter and a replaceable cartridge type paper element filter in series. A by-pass valve is in parallel with the paper element filter. Metal strainer located in suction fuel line.

scavenging system Positive displacement blower, gear driven from upper crankshaft, provides scavenging air for cylinders. Intake air cleaned by removable oil coated impingement type air filter panels of 20" x 20" x 4" dimension.

lubricating system Positive displacement engine driven gear pump supplies continuous flow of oil to all bearings and pistons through a by-pass valve, a water cooled heat exchanger and a strainer assembly in series. A waste-pack type filter containing six 6 $\frac{1}{2}$ " diameter by 30" long replaceable filter elements is connected in parallel with the by-pass valve. The strainer assembly contains two screen type strainers in parallel.



diesel engine (continued)

cooling system

Cooling water is circulated by engine driven pump through the engine, radiators, and lubricating oil heat exchanger.

Engine jacket, radiators, and oil cooler have approximately the same water level with engine shut down. Expansion tank located above engine jacket and radiator level.

A water treatment tank, suitable for liquid or pellet type treatment, is connected in parallel with the radiators.

Radiator shutters and motor driven fans are thermostatically controlled.

engine control

Electric throttle selects speed setting in a General Electric power plant regulator which in turn maintains the desired engine speed. Balanced engine loading and fuel input for each speed setting are maintained by automatic regulation of main generator excitation.

engine starting

Cranking is accomplished by motoring of the main generator energized by the locomotive storage batteries.

protective devices

Low lubricating oil pressure alarm and shutdown switch provided. Switch operation indicated by bell and amber light on instrument panel at cab control station.

Engine water high temperature switch provided which gives red light indication on instrument panel and sounds alarm bell at cab control station.

Engine equipped with separate mechanical overspeed governor set for approximately 950 rpm. Manually operated engine stop device mounted on engine above governor.



electrical equipment

main generator

General Electric shunt wound commutating pole type generator with armature directly connected to engine crankshaft through a flexible coupling. Roller type anti-friction bearing supports commutator end and absorbs armature thrust.

traction motors

Six General Electric series wound force ventilated type supported by sleeve bearings on driving axles and spring loaded nose supports. Armatures supported by roller bearings; single reduction gearing provided between motors and axles. Traction motors are top blown through flexible ducts.

exciter

A General Electric Amplidyne exciter, mounted on main generator and belt driven from generator shaft, provides controlled excitation to the main generator.

auxiliary generator

A General Electric auxiliary generator, rated 25 kw, provides power for battery charging, controls, lighting, and alternator excitation. Mounted on main generator and belt driven from main generator shaft. Output regulated to 72 volts at idle and 75 volts at full speed by voltage regulator.

alternator

A Fairbanks-Morse alternator provides a-c power for radiator fan motors and traction motor blower motors. Mounted on air compressor shaft extension, located between main generator and air compressor, driven by flexible coupling.

traction motor blowers

Six provided, driven by Fairbanks-Morse a-c axial air-gap motors; blower rotor mounted on motor shaft.

radiator fans

Four provided, driven by Fairbanks-Morse a-c axial air-gap motors; fan mounted on rotor.

control equipment

Main and auxiliary switch gear located in fully accessible cabinet in cab assembly. Main power contactors and reversers equipped with electro-pneumatic control. Automatic motor control sequence:

- (1) Three parallel groups of two in series.
- (2) One step of field shunting.
- (3) Six motors in parallel.
- (4) One step of field shunting.

Traction motor cutout switch provided to cut out three motors in one truck and connect remaining motors in parallel.



electrical equipment (continued)

multiple unit control

Equipment for the operation of two or more like units in multiple from a single operating station is provided. Trainline connections for this purpose are provided at both ends of the locomotive.

protective devices

Relay provided to indicate loss of alternating current voltage by blue light and alarm bell at cab control station. Relay interlocked to reduce engine speed to idle at no load.

Wheel slip relays reduce power on unit affected until slippage stops. Relay operation indicated by white light and buzzer at cab control station.

Ground relay unloads main generator and idles engine in event of a ground in the main power circuits. Relay operation indicated by white light at alarm bell at cab control station. Relay reset by push button located in electrical cabinet.

All control and lighting circuits protected by circuit breakers. Auxiliary generator protected by fuse.

storage battery

32 cell, 64 volt lead acid type arranged in two ventilated welded steel compartments located on either side of rear hood.

headlights

Flush mounted at each end; equipped with dual 30 volt 200 watt sealed beam lamps. Switches provided to give bright, medium, and dim control for each headlight.

classification lights

Four provided, two at each end, to display white, green, amber, and red aspects.

illuminated number boxes

Four provided, two at each end, each displaying six inch numerals.

marker light brackets

Four provided, two at each end, suitable for flags or portable oil marker lights.

general lighting

Lights provided for cab, power plant compartment, boiler compartment, radiator compartment, control panel gauges, train order reading, gangway lighting in multiple unit operation, and ground illumination under engineer's window. Outlets provided in power plant compartment for extension inspection lights.



air brake equipment

air brakes

Schedule 24-RL independent and automatic air brake basic equipment as follows:

Brake valve	D-24
Feed valve	D-24-B or F-6
Independent brake valve	S-40-F
Rotair valve	K-2-A
Control valve	D-24
Relay valve	B-3-A
Main res. cutoff valve	C-1
Main res. safety valve	2" 150 psi
Compressor safety valve	E-7-C 170 psi
Control air reducing valve	NS-1

air compressor

Type 3CD, air cooled with one high pressure and two low pressure cylinders and intercooler. Suitable for operation against 140 psi with displacement of 260 cfm at 850 rpm and 92 cfm at 300 rpm, displacements at other speeds being proportional. Driven through flexible coupling from main generator shaft. Compressor governors electrically synchronized in MU operation.

main reservoir system

Two main reservoirs having combined capacity of 60,000 cu. in. located beneath underframe between trucks. Safety valve between reservoirs. Aftercooler connected between compressor and first main reservoir.

brake rigging

Clasp brake rigging with four 10" x 8" brake cylinders per truck. Pins are case hardened, and pin holes are bushed with case hardened bushings. Flangeless brake shoes provided.



accessories

warning devices

One non-swinging type bell with quick acting pneumatic ringer mounted under the underframe near the front end.

Two vibrating diaphragm type air horns with separate operating valves; one pointing forward and one pointing to the rear. Horns mounted ahead of and to rear of cab respectively.

window wipers

Four pneumatic type; one each front and rear of engineer's and helper's positions.

sun visors

Four; one each front and rear of engineer's and helper's positions.

cab heaters

Two provided; one water core type with variable speed blower at rear of helper's position, and one electric resistance type at engineer's position.

seats

Two swivel type upholstered seats, with vertical adjustment, back rest; one at engineer's position and one at helper's position.

speed recorder

Mechanical type recording speedometer located in cab facing engineer's position. Driven from end of axle in forward truck.

fire extinguishers

One 1 gallon carbon tetrachloride type in engine compartment on right side adjacent to main generator, and one 15 pound carbon dioxide type in cab.

hand brake

Along right side of front hood having a 24" hand lever; connected to two axles of #1 truck.

sanding provisions

Four sand boxes with total capacity of 48 cu. ft. Eight sand traps arranged to sand ahead of leading wheels of each truck in either direction.

engineroom air filters

Air admitted to engine compartment through removable 20" x 20" x 2" oil coated impingement type air filter panels.

toilet

One toilet with 20 gallon water tank.



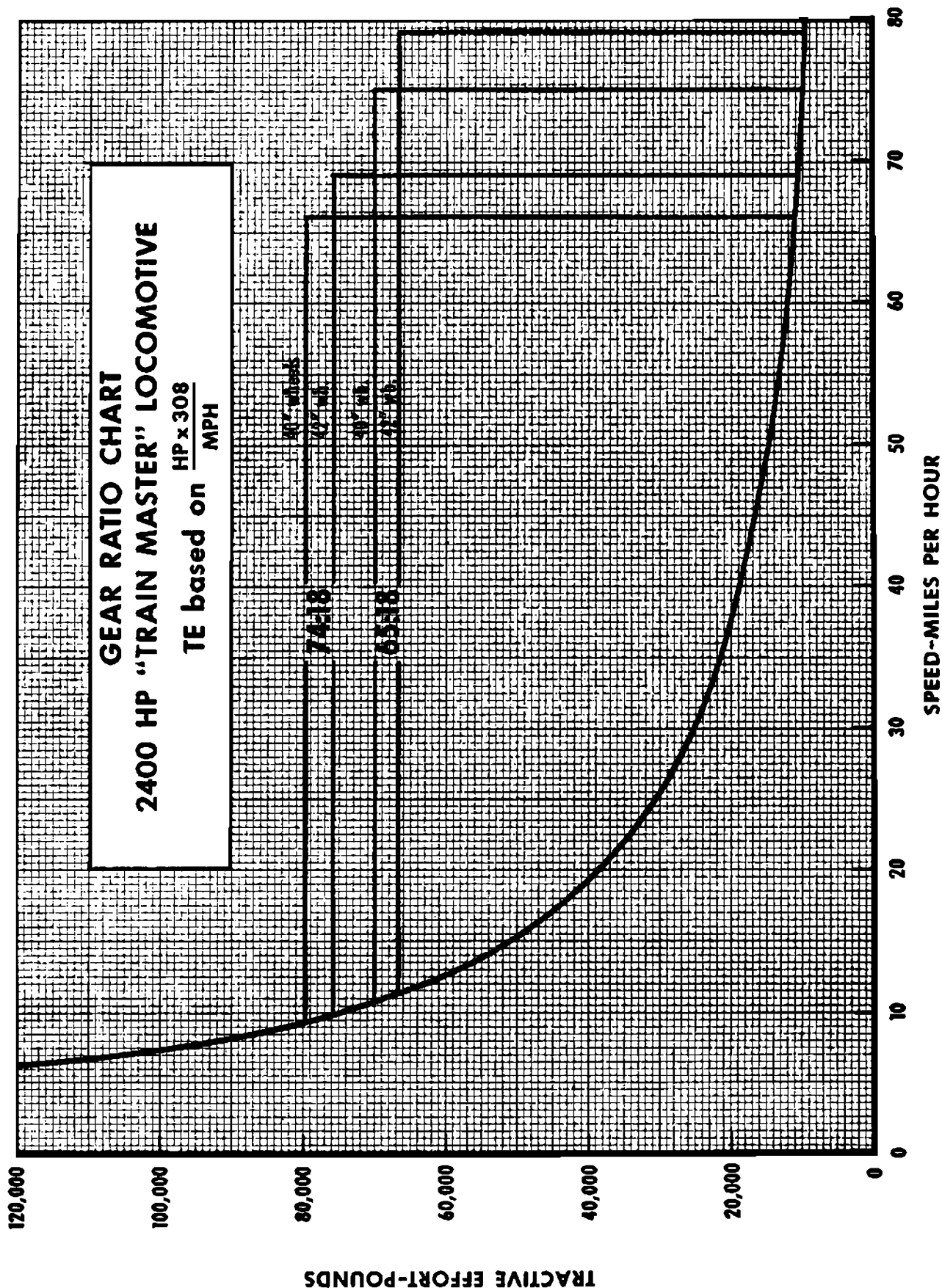
options

wheel diameter 40" or 42" diameter wheels.

gear ratios	Gear Ratio	Wheel Diameter	Max. M.P.H.	Max. Cont. T.E.—Lbs.	M.P.H. at Max. Cont. T.E.
	74:18	40"	66	79,500	8.6
	74:18	42"	69	75,700	9.0
	65:18	40"	75	69,800	9.8
	65:18	42"	79	66,500	10.3

See curve No. 1036-TE, page 17.

headlight 32 volt, 250 watt headlight or 64 volt, 250 watt headlight, prefocused, instead of standard.



**general****safety appliances**

Steps, handrails, and safety appliances provided in accordance with Fairbanks, Morse & Co. standard method for complying with Interstate Commerce Commission regulations.

painting

All surfaces properly prepared for painting. Interior finished in grey enamel. Exterior finished with a color arrangement as specified by railroad; special attention being given to insure maximum durability and protection. Lettering and numbering applied with paint materials.

**material
specifications**

All materials entering into the construction of the equipment of this locomotive are in accordance with the materials specifications of the manufacturers thereof.

All materials entering into the construction of running gear and superstructure of this locomotive are in accordance with A.S.T.M. or A.A.R. specifications where they apply.

testing

In addition to standard tests on individual pieces of apparatus, final tests including running test are made to insure proper working conditions of all parts.



standard provisions

guarantee of material and workmanship

Fairbanks, Morse & Co., (hereinafter referred to as the "Company") guarantees that each Fairbanks-Morse Diesel Locomotive furnished pursuant hereto will be well made, of good material and in a workmanlike manner, and agrees that if, while in normal use and service and within one year after delivery to original purchaser or before said locomotive shall have operated 100,000 miles in service (which-ever may first occur), any part of any unit or assembly of such locomotive should fail because of defective material or workmanship in the manufacture thereof, and, unless return is waived, be returned to the Company's factory with all transportation charges thereon prepaid, the Company will, at its election, give its customary credit for such part or repair the part free of charge, f.o.b. its factory, and return the part freight collect; but the Company shall not be liable for expense or otherwise with respect to alterations, repairs, or replacements made without its express written authorization, or for any damages whatsoever, whether direct or consequential, for delay or otherwise, its entire liability (other than that of its express guaranty with respect to patent infringement) being strictly limited to the aforesaid repair or giving of credit for defectively manufactured parts failing within the period specified. Having no control over the quality of engine cooling water or its treatment, the Company assumes no responsibility for any damage caused by pitting or corrosion or scale or other deposits.

**standard provisions (continued)****respective
indemnity clauses**

(A) The Company agrees to indemnify the Buyer and hold the Buyer harmless for and from any liability, loss, cost, damage, or expense suffered or incurred by Buyer by reason of any threat or claim of or action for patent infringements, actual or alleged, in respect of any part, appliance, or matter of construction or design of said locomotive, other than parts, appliances, or matters of construction or design specified or required by Buyer and not regularly manufactured by or originating with the Company; provided, that, promptly upon becoming aware of any claim or threat of or institution of action for such infringement, actual or alleged, Buyer shall notify the Company thereof and shall afford the Company an opportunity to conduct (at the Company's expense) the defense against the same and shall otherwise render all friendly and needed assistance.

(B) Buyer agrees, on behalf of itself and each user (whether as transferee, lessee, or otherwise) of each locomotive furnished hereunder, that it and they will indemnify the Company and hold the Company harmless for and from any claims, demands, actions, or causes of action, other than in respect of patent infringement, arising out of or in connection with the use or operation of such locomotive after delivery thereof; but this clause shall not serve to relieve the Company from its aforesaid express agreement to replace defectively manufactured parts.

**improvements
and variations**

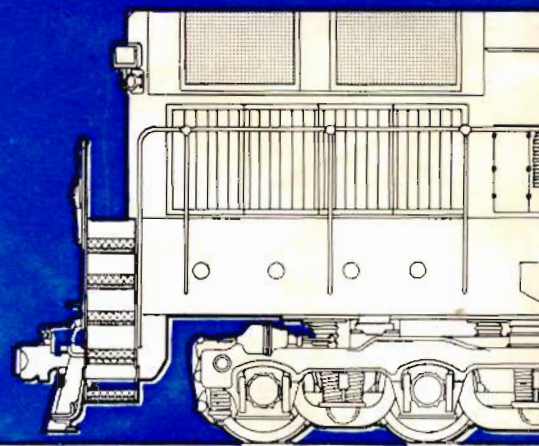
All specifications herein are subject to variations in design and construction, except such as would substantially affect installation or matters of performance otherwise expressly guaranteed.



modifications

The following modifications may be added at an increase in price. Certain of these modifications will involve an increase in weight.

train heating	Up to 4500 lb/hr steam generator capacity with 2400 gallons feedwater tank capacity. Steam trainline, end valves, and end connectors included. Water tanks fitted with direct reading gauge.
train air signal	Train air signal equipment including signal valve and whistle.
additional fuel capacity	When train heating equipment is not provided, additional tanks may be provided for a total fuel capacity of 4200 gallons.
dynamic brake	Dynamic braking with variable braking effort including interlock with respect to certain air brake applications.
train control or cab signal equipment	Train control, cab signal, or train speed control equipment can be furnished as specified by the purchasing railroad.
train communications	Train communications equipment as specified by the purchasing railroad.
locomotive over-speed control	Overspeed control including time delay, warning whistle, and service brake application.
safety "deadman" control	Safety "deadman" control including foot pedal valve, time delay, warning whistle, and service brake application.
warning signal lights	Oscillating red and/or white warning signal light can be located in the front hood directly above the standard headlight. Control switch provided to permit the use of fixed beam in any angle of its normal traverse and for color selection when dual color lights are installed.
dual control stations	Certain engineer's control station equipment can be duplicated at the helper's station for the purpose of "right hand" operation with #2 end of locomotive leading.



FAIRBANKS-MORSE

a name worth remembering when you want the best

**DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES •
ELECTRICAL MACHINERY • PUMPS • SCALES • RAIL CARS •
HOME WATER SERVICE AND FARM EQUIPMENT • MAGNETOS**

All specifications herein are subject to variations in design and construction, except such as would substantially affect installation or matters of performance otherwise expressly guaranteed.