CLASS EP-1 LOCOMOTIVES

General Description

The Class EP-1 locomotive is a geared passenger locomotive which has been constructed on the frame of a Class EF-1 freight locomotive. Various modifications have been made, including among others, the change to a passenger gear ratio, the change from No. 14-EL to No. 8-EL brake equipment and the addition of steam generators. Except for these and other items noted hereafter, the Class EP-1 locomotive is the same as a Class EF-1 locomotive, and the description applicable to the latter locomotive will apply to the Class EP-1 locomotive.

The various modifications, additions, etc. are as follows:

OPERATING CABS

The "A" unit operating cab has been altered to provide more room and better vision for the engine crews. Side entrance doors and ladders were provided to permit access to the cab and the roof. A steam heat system has been provided with steam heat coils, shutoff valves and automatic discharge traps. The distributing valve has been mounted below the cab floor and a new instrument panel has been provided.

The "B" unit operating cab has been altered to mount the distributing valve under the cab floor and a new instrument panel has been provided.

In each cab a compartment has been provided to hold the compressor governor, compressor relay, headlight transformer, headlight resistors, headlight fuses and the control transfer switch.

The control transfer switches on the two units should always be thrown to the same control generator to prevent false steam boiler alarms when one M.G. set is shut down.

APPARATUS SECTION

The apparatus section of the locomotive has been divided by a wall and two doors at the rear of the high voltage compartment to provide a compartment for the steam generator, air compressor and fuel oil tank. In the latter compartment are provided a 2500 pound per hour steam generator, a 550 gallon water tank under the compressor, and 2 - 176 gallon fuel tanks along the rear wall.

The high voltage compartment has been modified to provide space for shunting contactors 14A, 14B, 26A and 26B at the rear of the compartment, and for the 60 overload relay at the front of the compartment.

At the rear of the high voltage compartment, accessible from the aisles, are the J.R. breaker compartment and the 3000 volt switch and fuse compartment. The J.R. breaker is mounted crosswise of the locomotive and has been adjusted to operate at 1500 amperes.

The 3000 volt switch compartment can only be opened by using the pantograph handle. The auxiliary switch and main switch should be operated by means of the hot stick provided. The 80 ampere auxiliary fuse is of the type EG-1, 80-E used on the Class EP-4 locomotives.

RUNNING GEAR

The running gear has been modified as follows:

New solid gears have been applied and the gear ratio changed to 71-29. The lateral thrust from the drivers has been transferred from the hubs to the ends of the journals by means of wear plates mounted in the boxes.

An F-7 type roller bearing engine truck has been installed on each unit.

Suitable passenger type buffer plates have been installed over the drawbars on each unit.

AIR BRAKE SYSTEM

The air brake system uses No. 8-EL brake equipment of the type used on the Classes EF-4, EP-4 electric locomotives. Description of this equipment will be found in "Westinghouse Air Brake Company's Instruction Pamphlet No. 5032-1" covering No. 8-ET locomotive brake equipment. Location of the major parts of this equipment are as follows:

The distributing valve, air reservoirs, air filter, the equalizing and reduction limiting reservoir and signal tank are located under the operating cab. The centrifugal dirt collector is located back of the distributing valve and the dead engine cock on top of the distributing valve.

The double heading cock is located on the back of the automatic brake valve and the K-M vent valve is located in front of the fuel oil tank on the engineers side.

AIR SIGNAL SYSTEM

Each cab is equipped with a combination check valve and strainer, cab whistles, cutout cock and signal valve. At the rear of each unit is a brake pipe valve and air signal valve for signaling the operating cab.

INSTRUMENT PANELS

The engineers instrument panels on each unit have the line ammeter, field ammeter, line voltmeter and a group of circuit breaker type switches for control, instrument light, headlight dim, headlight on, cab lights and aisle lights. The J.R. circuit breaker warning lights are also located on this panel.

The firemens panel on both units have the number light and marker light switches and the steam generator alarm buzzer. On the "A" unit a modified steam generator remote control panel has been provided. The blue light operates for the "A" unit steam generator and the red light for the "B" unit. The train line shut off switch operates the remote trainline shut off valve on both units, but these valves must be reset manually. The middle switch operates the separator blowdown on the "A" unit and the right switch operates the separator blowdown on the "B" unit.

TERMINAL CONNECTION STRIPS

The terminal connection strips are now located in boxes on the sidewall back of the engineers door and on the brackets attached to the two fuel oil tanks in the rear end of each unit.

WIRING - POWER & CONTROL

All power cables are carried in ducts and cable runways in the floor and sidewalls. All control leads are carried in overhead raceways, or in raceways built within the power cable duct where necessary.

Control between units is carried by six jumpers from receptacles mounted in brackets on the roof, three on each side of the cab centerline. These jumpers are all the same length. There are 2 - "E", 2 - "F" and 2 - "G" jumpers. Control wires 0 and 8 are crossed in the one "E" jumper, and similar placed wires are crossed in the other "E" jumper so that interchanging them will not cause trouble. In the case of the 2nd "E" jumper the two wires in question are connected in parallel and run to the auxiliary power bus to prevent misuse.

LIGHTNING ARRESTERS

Capacitor and horn gap lightning arresters have been provided on the roof of each unit and are connected directly to the 3000 volt roof cables. The horn gap arrester is adjusted to give a 3/4" gap between the large horns and the auxiliary wire should be adjusted to give 5/16" gap.

The pantograph grounding switch should always be closed before going on the roof to guarantee that the capacitor arrester has been discharged.

STEAM GENERATOR INSTALLATION

A Vapor Clarkson Steam Generator, Type No. OK-4625, having a capacity of 2,500 pounds per hour, is installed in the rear of each cab. Fuel tanks having a capacity of 352 gallons are installed in the rear corners of the cab. A 550 gallon water tank is installed under the air compressor, and a 1,450 gallon tank under the motor generator set. Thus the locomotive will have total capacity of 4,000 gallons of water, 704 gallons of fuel oil, and steam generating capacity of 5,000 pounds per hour. Sufficient fuel and water capacity is provided for 8 hours of operation at full capacity.

The motor and control on steam generator require 35 amperes from the auxiliary generator circuit. On each unit the steam generator transfer switch is located on the left wall near the steam generator control and can be used to connect the steam generator to either M.G. set control generator, regardless of the position of the control transfer switch. Normally each steam generator operates from its own M.G. set generator, but both can be operated on one control generator. The steam generator is described in detail in the section on heating.

MOTOR GENERATOR SETS (RMG - No. 103)

The motor generator sets are mounted on shock absorbers to reduce noise and vibration. A flexible shunt grounds the frame of the M.G. set.

The control generators have been rewound to increase their capacity from 62 to 100 amperes so that one control generator can handle the control load and the two steam generators when necessary. Normally one control generator will handle the control load, lights and one steam generator; The other control generator will then handle the other steam generator.

The control generator fuse located at the top of the 102 panel has been increased from 100 to 120 amperes capacity.

FIELD SHUNTS

The inductive field shunts are located under the locomotive floor opposite the center pins.

TRACTION MOTOR CURRENT RATINGS

Continuous - 230 amperes
One hour - 300 amperes
35 minutes - 350 amperes

SHUNT OPERATION

Shunting controller should not be advanced when line ammeter reads more than 250 amperes.

Shunt operation should not be continued, except for short periods, when line current exceeds 300 amperes.

Operation in shunt positions should be limited by line ammeter readings as follows:

Transfer from FS-1 to FS-2 at not more than 250 amperes. Do not operate in FS-2 with less than 90 amperes line current.

Transfer from FS-2 to FS-3 at not more than 225 amperes. Do not operate in FS-3 with less than 90 amperes line current.

Transfer from FS-3 to FS-4 at not more than 200 amperes. Do not operate in FS-4 with less than 90 amperes line current.

REGENERATION

Do not start regeneration at speed of more than 40 M.P.H. Maximum speed for regeneration, 45 M.P.H.

MAXIMUM PERMISSIBLE SPEED

Until further notice, maximum permissible speed of EP-1 locomotive will be 70 M.P.H.

TONNAGE RATING

(Tonnage on mountain grades)

EASTBOUND	GRADE	TRAILING TONNAGE
Avery to East Portal	1.7	1250
Alloy to Donald	1.66	1400
Cardinal to Loweth	1.00	1600

WESTBOUND	GRADE	TRAILING TONNAGE
Bruno to Loweth	2.00	1200
Piedmont to Donald	2.00	1050
Haugen to East Portal	1.70	1250

MECHANICAL DATA

Diameter of driving wheels	52"
Number of driving wheels	16
Total wheel base	102'8"
Rigid wheel base	10'6"
Width overall	10'0"
Length over couplers	112'6"
Height	15'0"

Gear Ratio - 71:29 = 2.45

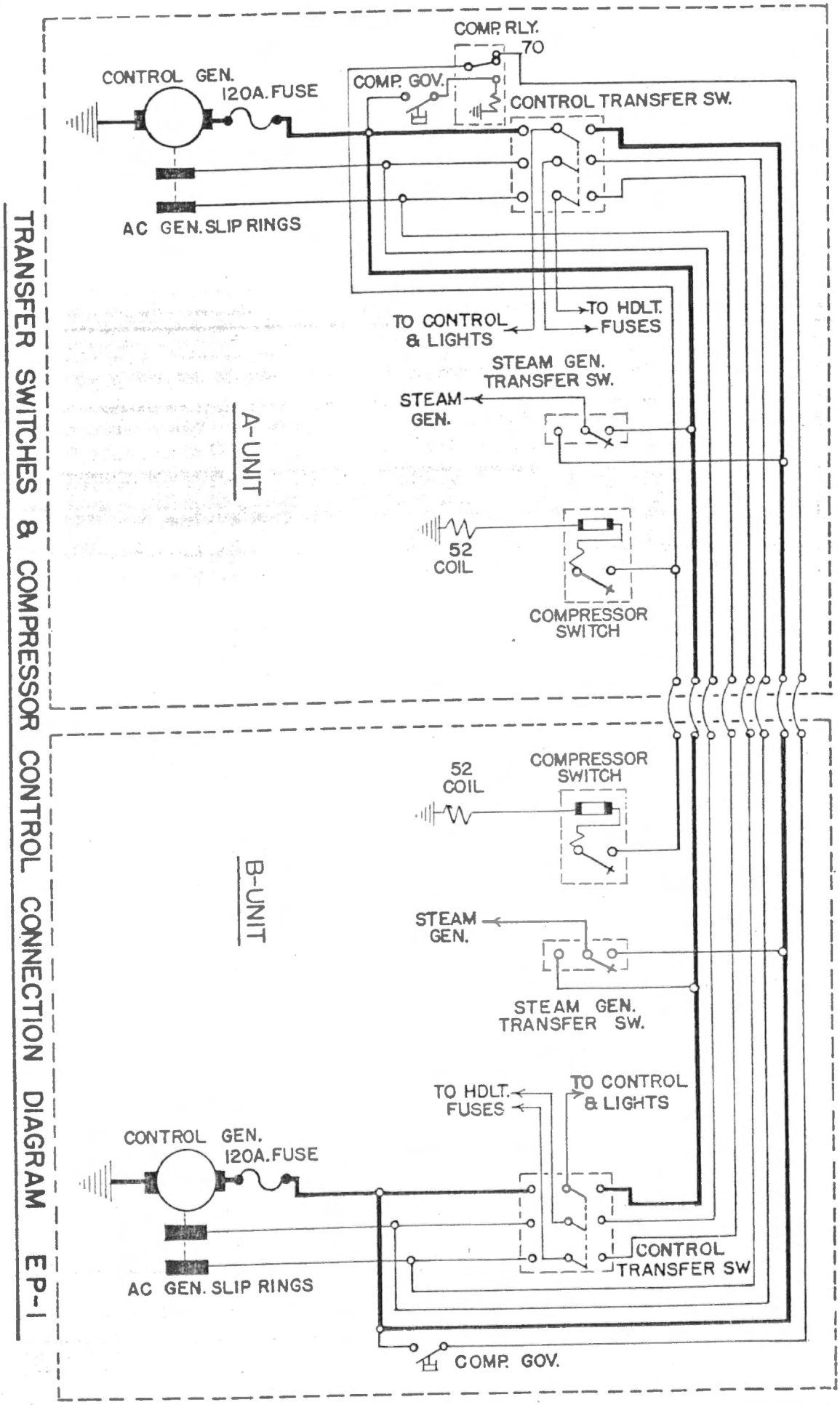
Maximum tractive effort at 25% coefficient of adhesion - 150,000#

Approximate weight

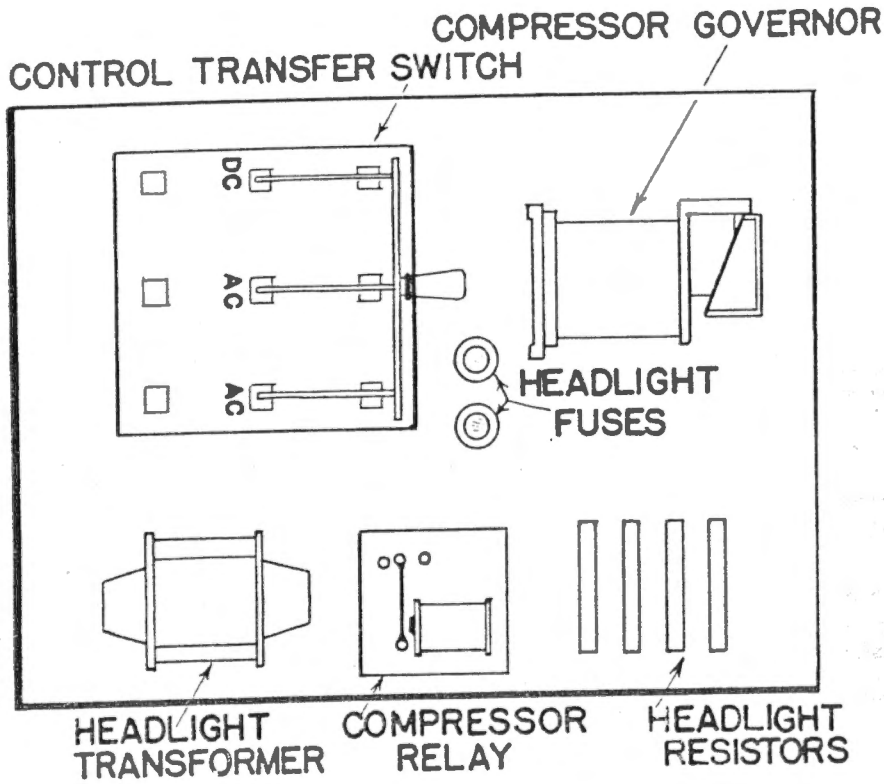
Total	650,000#
On drivers	500,000#
Per driver axle	62,500#
Per engine truck	75,000#

Horsepower Rating (Input to traction motors @ 3000 V.)

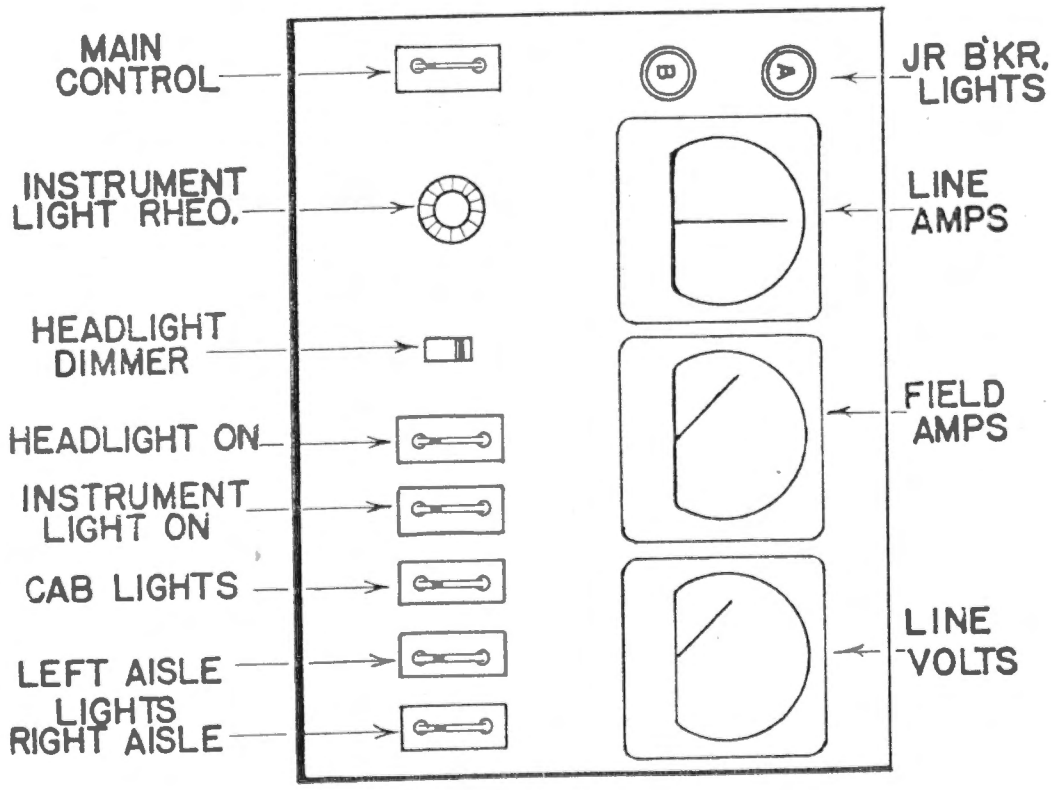
	Continuous	One Hour	35 Minutes
Traction motor current	230	300	350
Tractive effort - pounds	43,100	60,000	73,500
Speed - M.P.H.	29.0	26.5	25.5
Coefficient of adhesion	8.6%	12.0%	14.7%
Horsepower input to traction motors	3,700	4,800	5,600

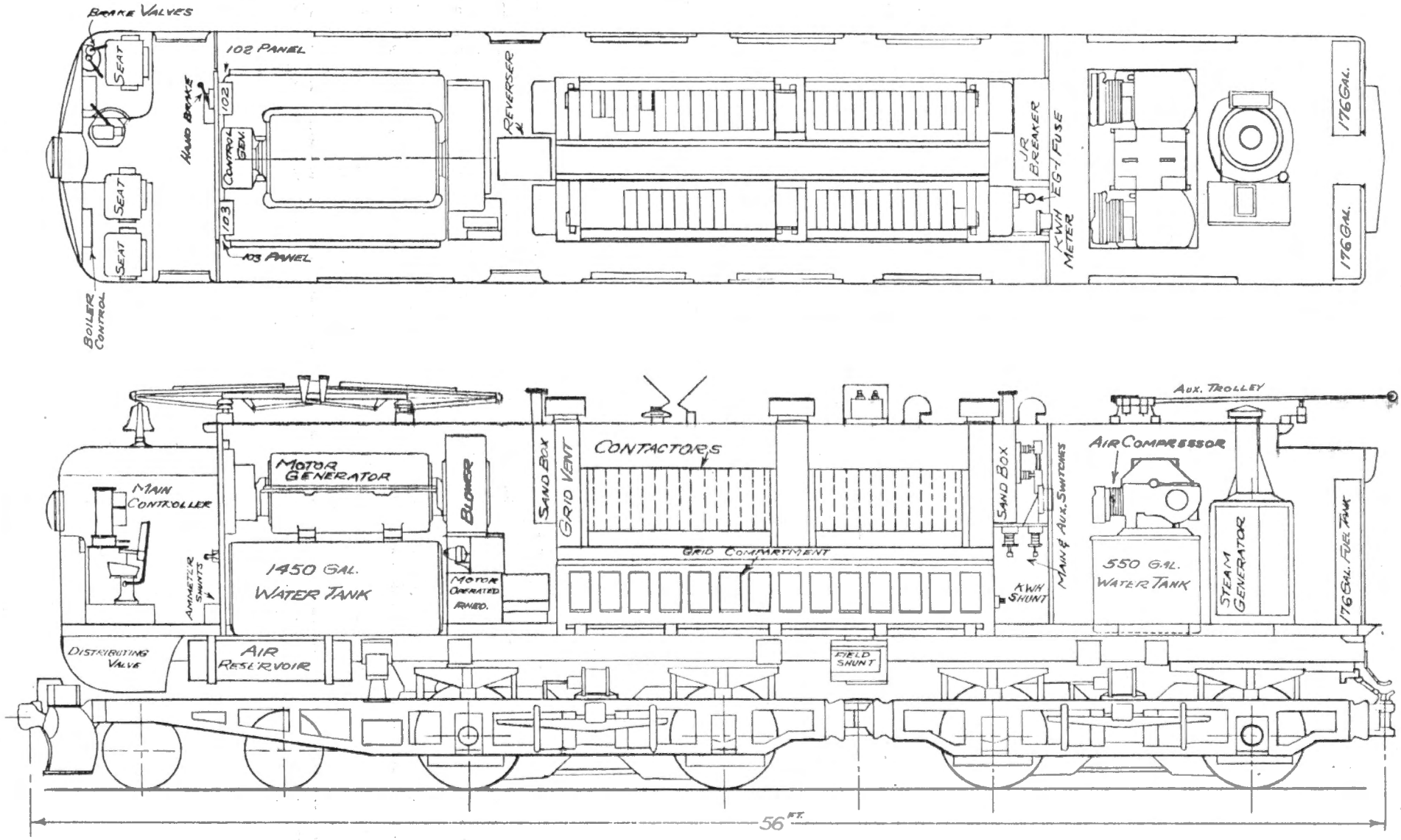

TRANSFER SWITCHES & COMPRESSOR CONTROL CONNECTION DIAGRAM EP-1
A-UNIT
B-UNIT
COMP. RLY. 70
CONTROL GEN.
120A. FUSE
COMP. GOV.
CONTROL TRANSFER SW.
AC GEN. SLIP RINGS
TO CONTROL & LIGHTS
TO HDLT. FUSES
STEAM GEN. TRANSFER SW.
STEAM GEN.
52 COIL
COMPRESSOR SWITCH
52 COIL
COMPRESSOR SWITCH
STEAM GEN.
STEAM GEN. TRANSFER SW.
TO HDLT. FUSES
TO CONTROL & LIGHTS
CONTROL GEN.
120A. FUSE
AC GEN. SLIP RINGS
CONTROL TRANSFER SW
COMP. GOV.

SWITCHING PANEL UNDER HEADLIGHT



ENGINEERS CONTROL PANEL





EP-1 LOCOMOTIVE APPARATUS ARRANGEMENT A-UNIT