

# General Electric Company

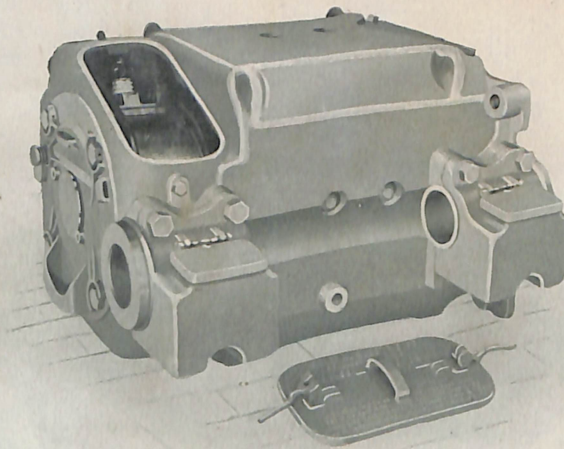
RAILWAY DEPARTMENT

December 2, 1901

Bulletin No. 4273

## THE GE-66 RAILWAY MOTOR. RATING.

The GE-66 motor has a capacity of 125 H.P., based on the usual rise of temperature of  $75^{\circ}$  C. above the surrounding air after one hour's run at full rated load, the temperature of the surrounding air not exceeding  $25^{\circ}$  C.



THE GE-66 RAILWAY MOTOR--BACK VIEW  
Showing Opening for Commutator and Brush Inspection.

## MAGNET FRAME.

The magnet frame is of soft steel, cast in one piece approximately in the form of a cube with well rounded corners. In each end of the magnet frame is an opening bored large enough to allow the removal of the armature, pole pieces, and field coils. Into these openings are bolted frame heads, which carry the armature shaft bearings. The axle bearing caps are bolted to the frame on vertically planed, tongued surfaces.

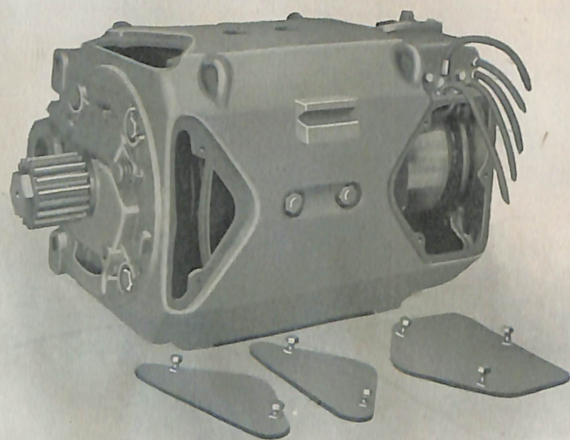
The pole pieces are laminated and are bolted to finished surfaces on the interior top, bottom and sides of the frame by through bolts with nuts on the outside of the frame.

A large opening in the frame just over the commutator affords a means for the inspection of the commutator and brush-holders, and the renewing of brushes. This opening is protected by an easily removable, malleable iron cover, which is held securely in place by an adjustable cam locking device. In the bottom of the frame, directly under the commutator, there is a large hand hole, and in addition, for the purpose of ventilation, large openings with covers are provided at the top, bottom and sides of the frame at the pinion end of the motor, and also on the front side at the commutator end. Covers are provided with which these holes may be closed.



**BEARINGS.**

The armature bearings are supported in the frame heads which extend inside the armature and commutator. By thus utilizing all available space, it is possible to make large bearings. Lubrication is effected by the use of oil and waste in a manner somewhat similar to the ordinary car box bearing. The linings are in the form of a sleeve with the sides cut away so as to expose the shaft to the oily waste which is packed in the oil wells cast in the frame heads. This form of bearing has proven in practice to be remarkably satisfactory. Oil deflectors are provided so that it is practically impossible for any oil to reach the inside of the motor, while under the armature shaft bearings, drip cups are cast in the frame head to catch the waste oil. The commutator end bearing is  $3\frac{3}{4}$ " in diameter by  $6\frac{7}{8}$ " long, and the pinion end bearing 4" in diameter by 10"



THE GE-66 RAILWAY MOTOR--FRONT VIEW  
Showing Some of the Openings in the Frame for Ventilation and Inspection.

long. The axle bearing caps contain oil wells into which are packed oil and waste and the linings are cut away on the underside, leaving an ample surface of the axle exposed to the oily waste. The axle bearings are  $10\frac{3}{4}$ " long.

**ARMATURE, COMMUTATOR AND FIELD COILS.**

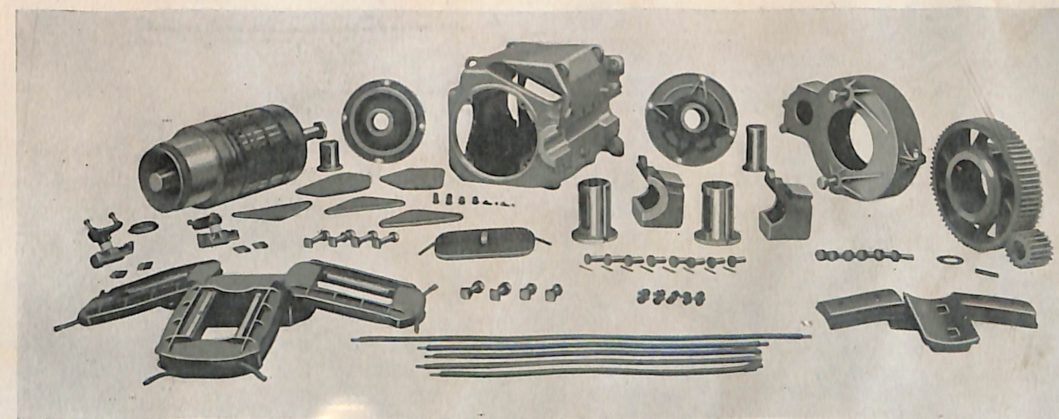
The armature has a series drum barrel winding with armature conductors made of copper bars specially constructed for preventing eddy currents. The conductors are connected up in 39 quintuple coils, each consisting of five single coils of one turn each. The conductors are separately insulated in sets of five, with mica, the set as a whole having an outside protection insulation of mica with an external covering of specially prepared tape which has high insulating qualities and affords protection against both mechanical injury and moisture. This method of insulating conductors renders the windings semi-fireproof, and able to withstand a high temperature without injury to the insulation.

The conductors are soldered directly into ears forming a part of the commutator segments, thus avoiding entirely the use of connecting leads. At the back of the armature, the top and bottom bars are connected together with tinned copper clips, riveted and soldered, but easily removable in case it should be desired to replace top bars without disturbing those at the bottom.

The conductors are held in the slots by tinned steel wire bands imbedded in the core. The wires are soldered together and held by tinned clips. The portion of the windings projecting over the core heads is protected from mechanical injury by a dressing of mica and canvas securely bound in place.

The commutator contains 195 segments of the best hard drawn copper, insulated entirely with mica, and clamped between mica cones on cast steel shells.

There are four field coils, one at the top, one at the bottom and one on each side wound on metal spools which are held in place by the laminated pole pieces. The spools are wound with strip copper, thoroughly insulated from the spools with mica, asbestos, and cloth, and between turns with asbestos. This construction makes a spool practically fireproof and impervious to moisture. It is not easily injured mechanically and is especially well adapted to radiate heat.



PARTS OF THE GE-66 RAILWAY MOTOR.

All motor leads to car wiring are brought out through rubber bushed holes in the magnet frame in such a way as to be easily removable.

**BRUSH-HOLDERS.**

The brush-holders, two in number, are of cast brass and have two carbon brushes per holder. The brushes slide in finished ways and are pressed against the commutator by independent fingers, which give a practically uniform pressure throughout the working range of the brushes. The brush-holders are adjustable and are clamped on mica insulated studs sliding in finished supports which are bolted to the frame.

**GEAR AND PINION.**

The gear is made of cast steel and the pinion of hammered steel with a taper fit on the armature shaft.

**SUSPENSION.**

The motor is hung by a nose suspension. A cast lug on the front of the frame rests directly on a bracket secured to the transom, and a strap is carried across the top of the lug on the motor frame to prevent the motor from rising.







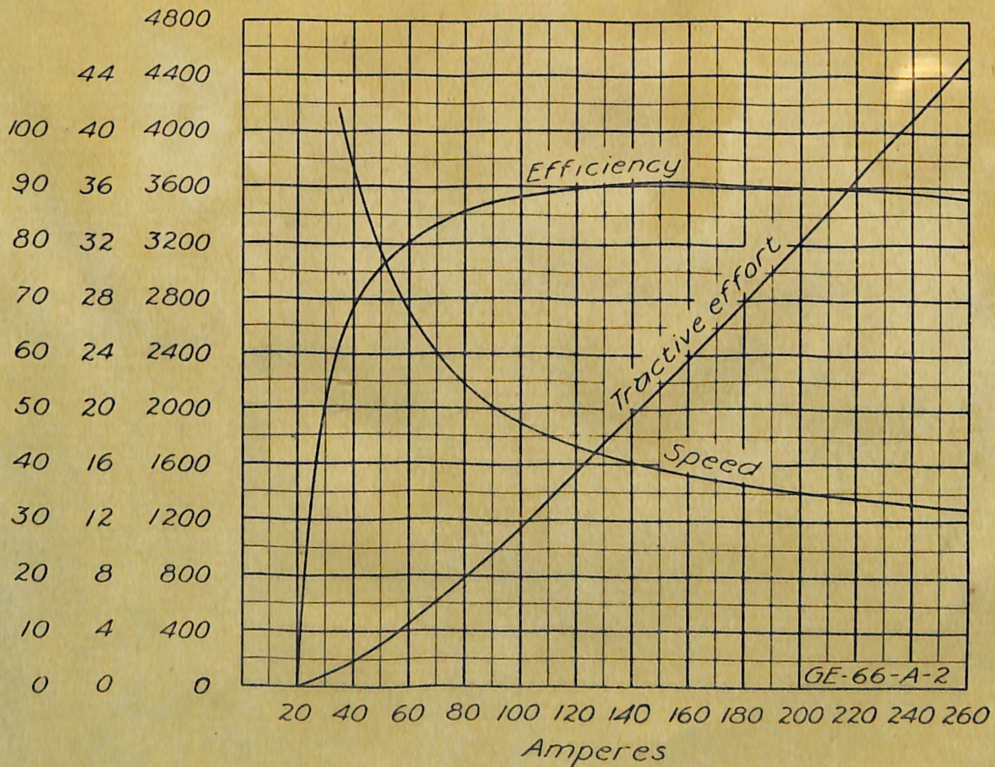
General Electric Co.  
Engineering Dept.

Railway Motor  
Characteristic No. 109

GE-66-A-2

Per cent efficiency  
Miles per hour  
Lbs tractive effort

125 H.P. output at 208 Amp input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 18, Gear 71, Ratio 394



21 Mar. 1904



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Engineering Dept.

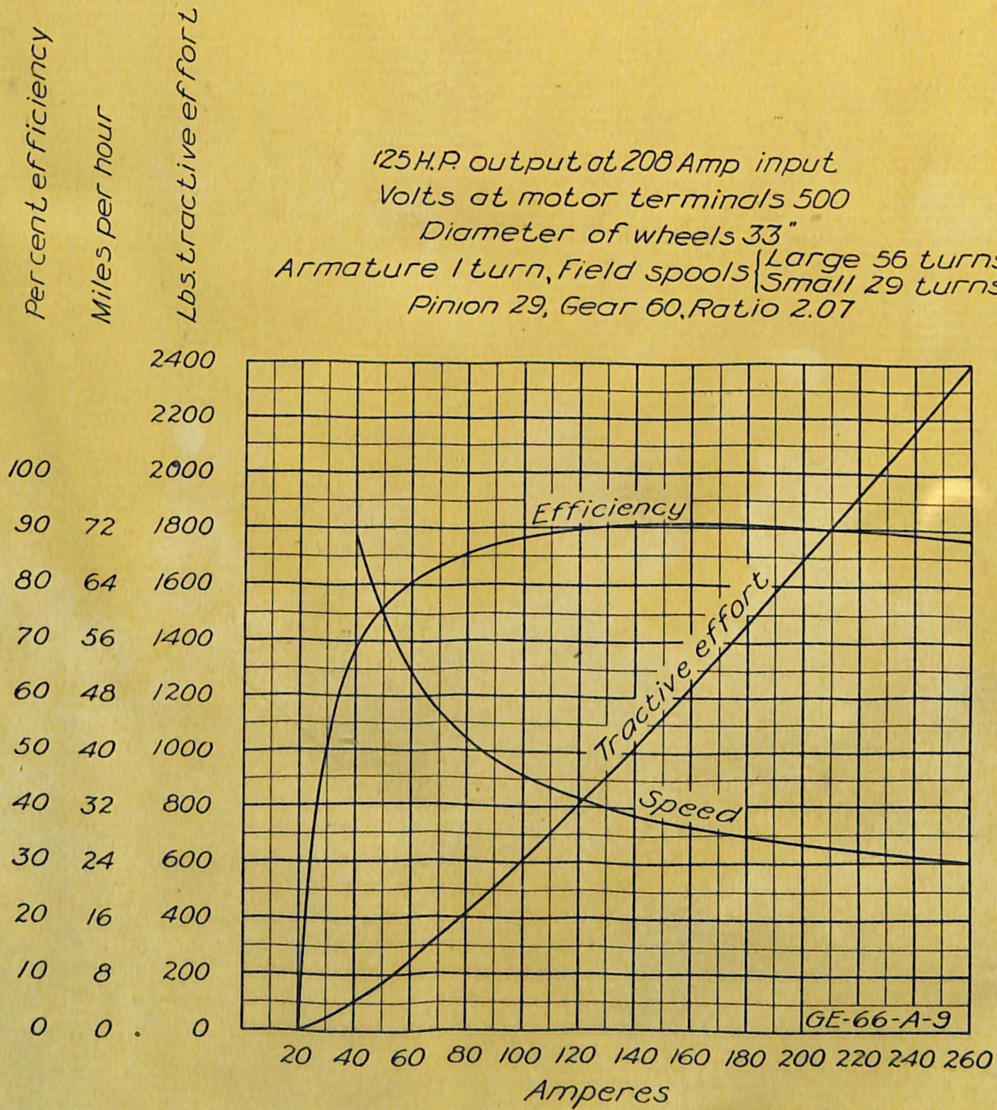
Railway Motor  
Characteristic No. 110

GE-66-A-9

125 H.P. output at 208 Amp input  
Volts at motor terminals 500

Diameter of wheels 33"

Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 29, Gear 60, Ratio 2.07



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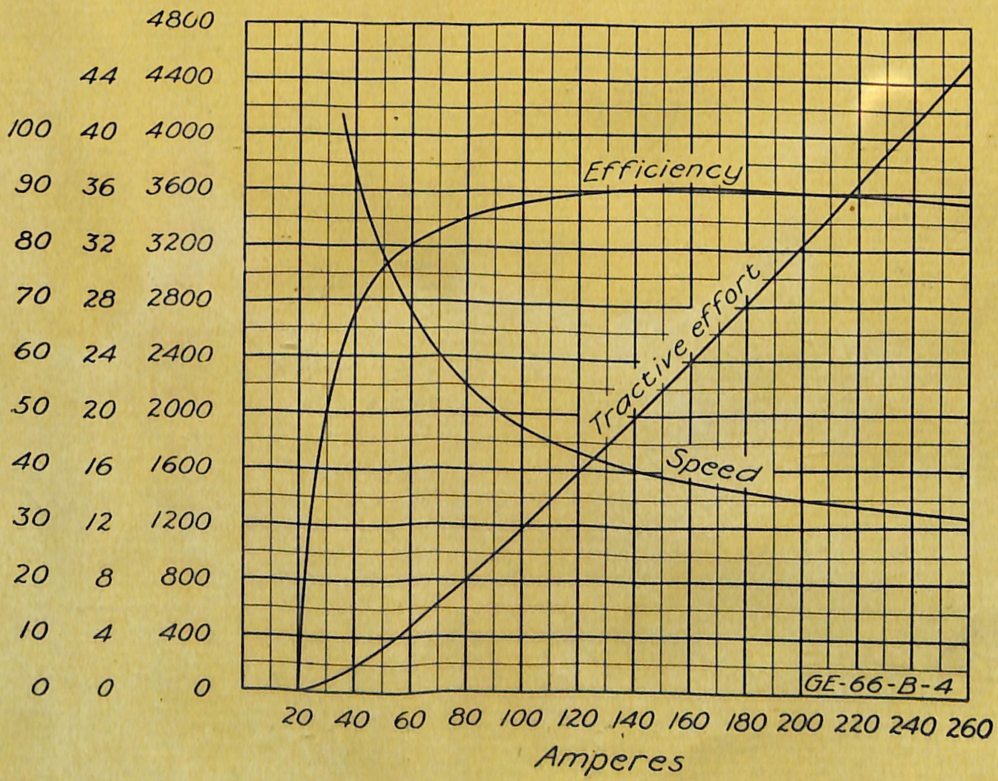
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Engineering Dept

Railway Motor  
Characteristic No. 112

GE-66-B-4

Per cent efficiency  
Miles per hour  
Lbs. tractive effort

125 H.P. output at 208 Amp. input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 19, Gear 75, Ratio 3.94



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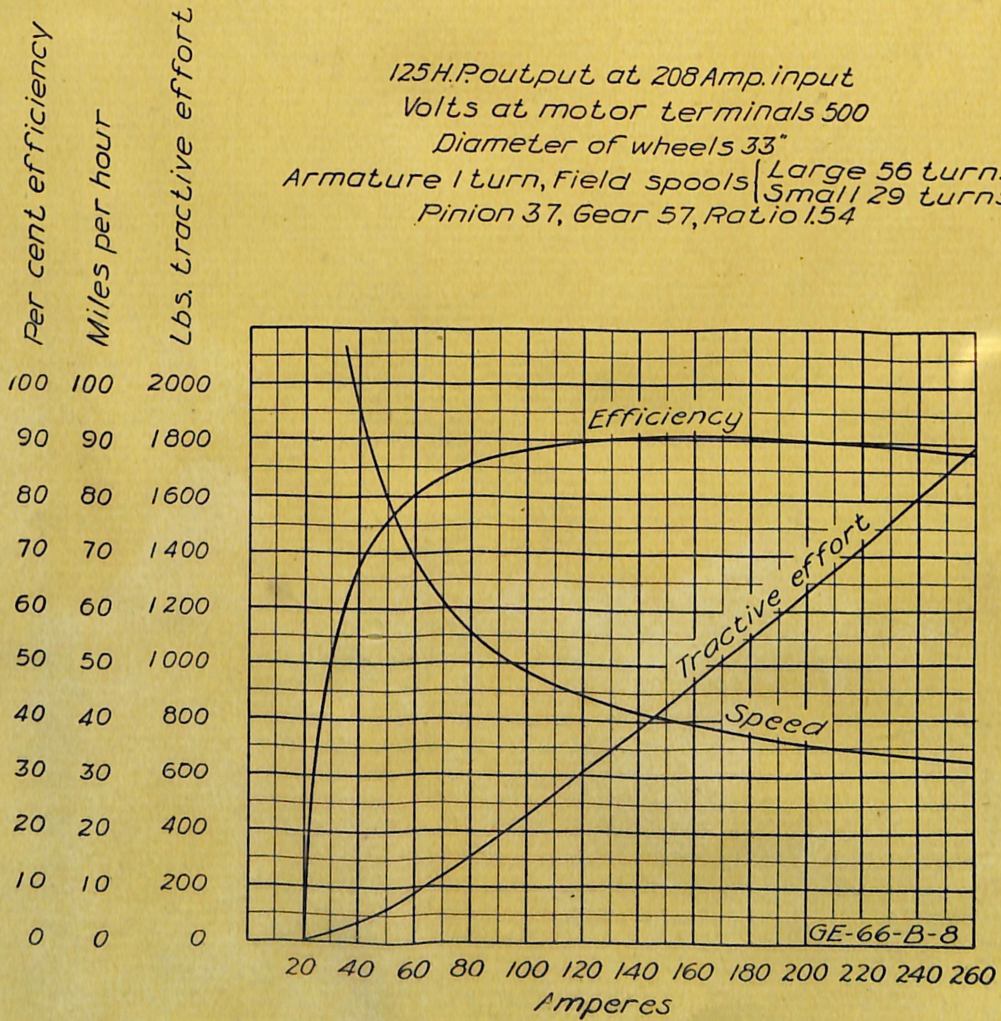


General Electric Co.  
Engineering Dept.

Railway Motor  
Characteristic No. 113

GE-66-B-8

125 H.P. output at 208 Amp. input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 37, Gear 57, Ratio 1.54



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Engineering Dept.

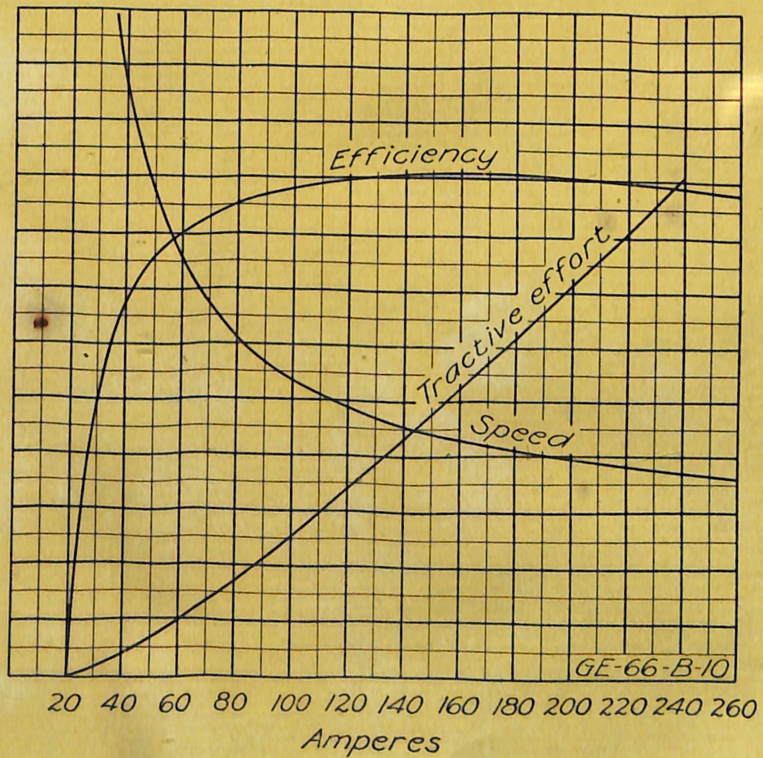
Railway Motor  
Characteristic No. 114

GE-66-B-10

Per cent efficiency  
Miles per hour  
Lbs. Tractive effort

48		
44		
100	40	3600
90	36	3200
80	32	2800
70	28	2400
60	24	2000
50	20	1600
40	16	1200
30	12	800
20	8	400
10	4	0
0	0	0

125 H.P. output at 208 Amp input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 21, Gear 73, Ratio 3.48



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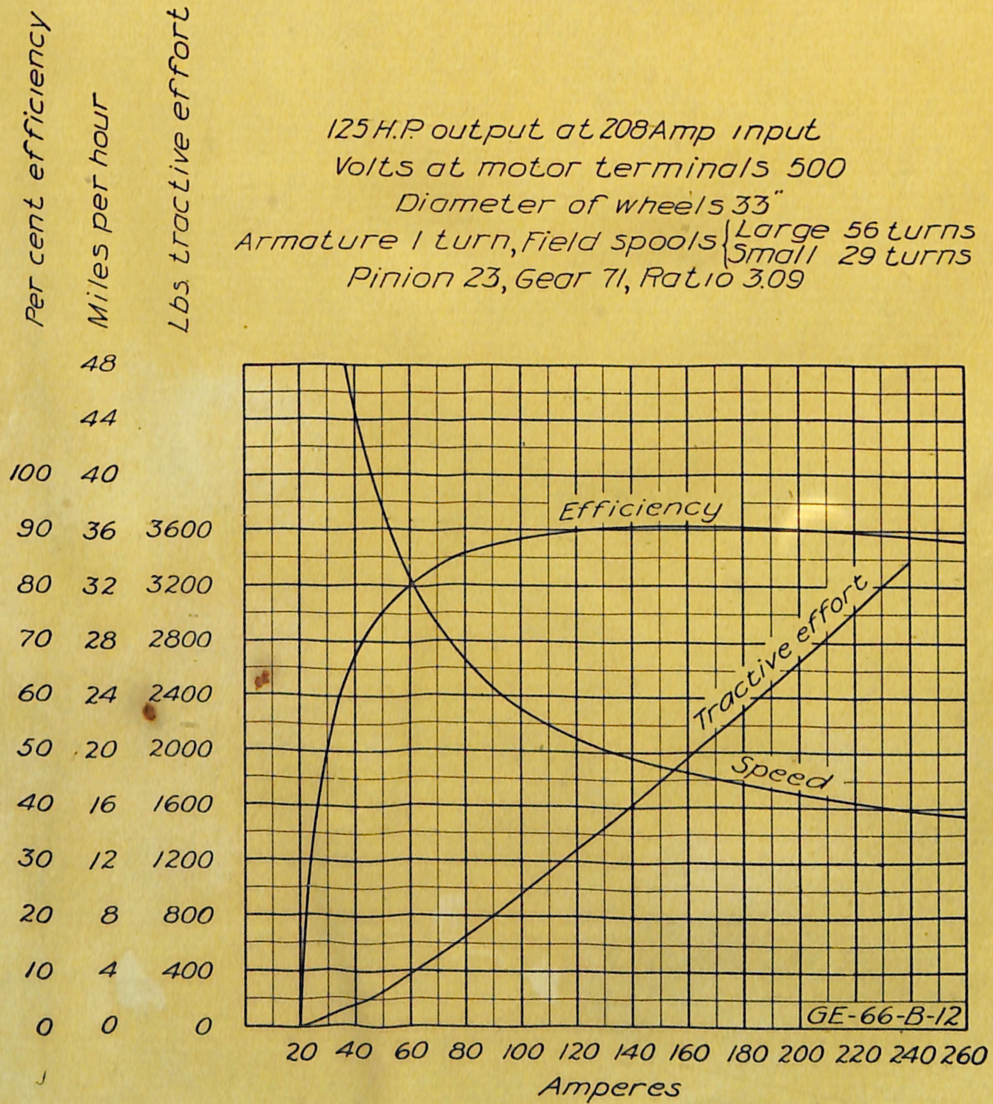


General Electric Co.  
Engineering Dept

Railway Motor  
Characteristic No. 115

GE-66-B-12

125 H.P. output at 208 Amp input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
  Small 29 turns  
Pinion 23, Gear 71, Ratio 3.09



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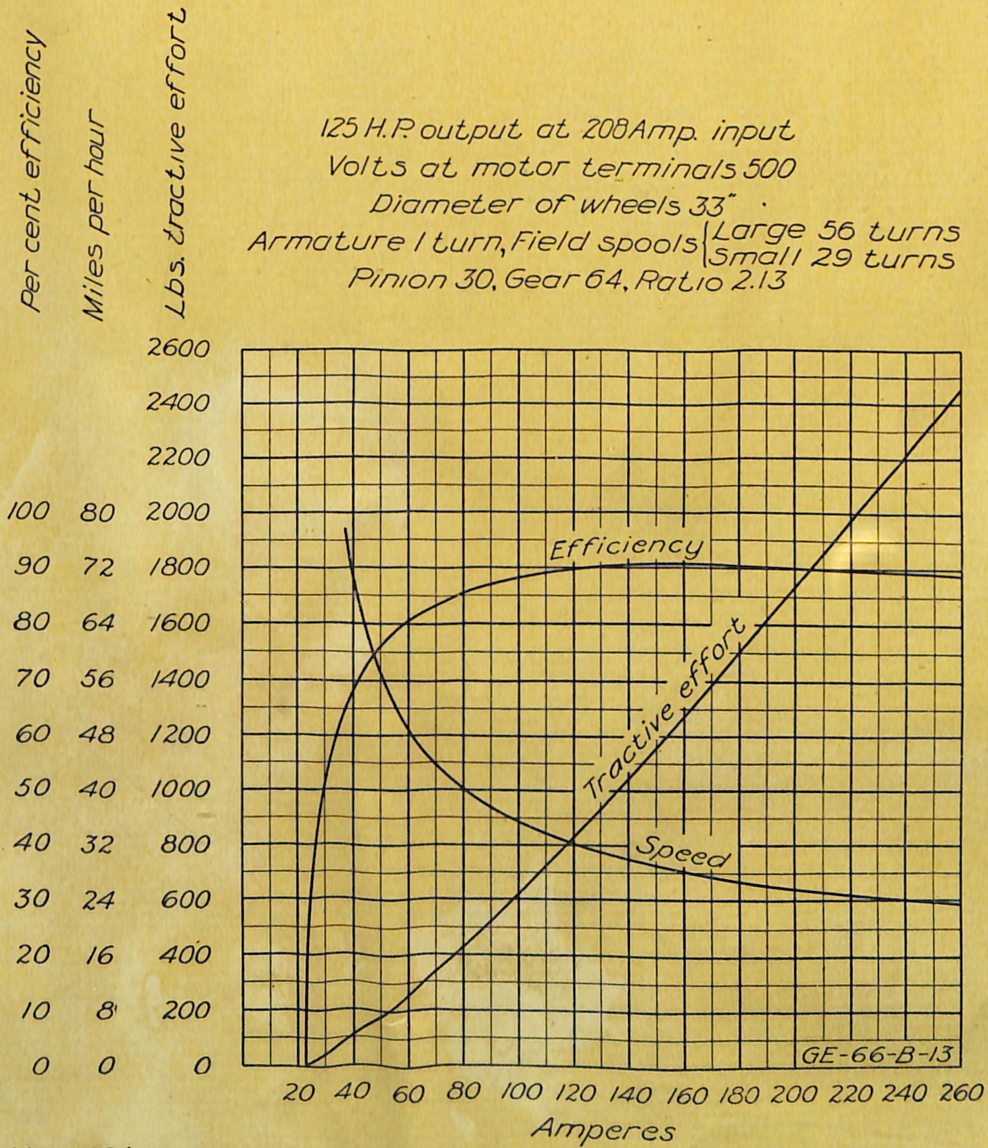


General Electric Co.  
Engineering Dept.

Railway Motor  
Characteristic No. 116

GE-66-B-13

125 H.P. output at 200 Amp. input  
Volts at motor terminals 500  
Diameter of wheels 33"  
Armature 1 turn, Field spools { Large 56 turns  
Small 29 turns  
Pinion 30, Gear 64, Ratio 2.13



21 Mar 1904