General Electric Company
Schenectady, N.Y.

December, 1919 *Bulletin No. 44470*

GE-264 VENTILATED COMMUTATING POLE RAILWAY MOTOR

The GE-264 railway motor is a small light-weight motor of sufficient capacity to handle light-weight cars in average city service.

GE-264 RAILWAY MOTOR

It is manufactured in two forms: Form A suitable for 24-in. or 26-in. wheels with a maximum of 4-in. diameter axle; and Form B for 30-in. or 33-in. wheels and a maximum of 4½-in. axle. The motor is designed so that with the maximum gear ratio the car speed is sufficiently high to maintain the usual city schedules.

Ratings

The hourly rating is 25 horse power on 600 volts with an input of 37 amperes. The continuous rating at 600 volts for a temperature rise of 65 deg. centigrade by thermometer is 35 amperes.

Details of Construction

The motor possesses the advantages of high structural strength for a minimum weight, great durability and low cost of maintenance inherent to the box type of frame.

The frame is provided with bored openings at each end through which the armature, pole pieces and field coils can be inserted or removed. The frame heads are made to a driving fit in these recessed openings and are held in place by tap bolts securely locked. Each frame head is provided with two tapped holes diametrically opposite into which bolts can be screwed for forcing off the heads.

GE-264 RAILWAY MOTOR

The frame has an opening for inspection under the commutator which is covered with a steel plate and gasket. The opening over the commutator is large allowing easy access to the commutator and brush-holders. The cover is held in place by a spring locking device, no part of which projects above the motor.

The armature bearing linings are made of bronze lined with a thin layer of babbitt, and are designed to prevent injury to the armature or pole pieces in case the babbitt runs out from overheating. These bearings are held from turning in the frame heads by keys.

The axle linings are of bronze or malleable iron and babbitt, depending on size of axle, and are held by dowels. A sheet steel cover over the axle is clamped between the axle caps to protect the axle linings from dirt.

Armature

The armature core is built up of soft iron laminations keyed to the armature shaft. The armature is so constructed that the shaft may be removed without disturbing the windings or connections to the commutator. All

armatures are hot banded with the binding bands placed on flat surfaces securely anchored in position. The windings are of rectangular wire with double cotton insulation and the coils are assembled in units or

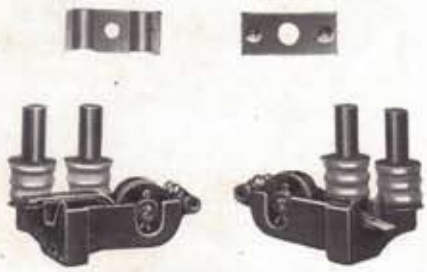
ARMATURE OF GE-264 RAILWAY MOTOR

polycoils which are insulated with varnished cambric and cotton tape. All polycoils are formed to exact size in heated moulds.

The armature shaft is made of high grade steel with rolled bearing surfaces which insures minimum wear. The key is of cold rolled steel, and the thrust collar is a drop forging shrunk on.

Field Coils and Pole Pieces

Laminated pole pieces are used for the exciting fields and the commutating pole pieces are drop forgings. All field coils are carefully insulated and impregnated with insulating



BRUSH-HOLDERS

compound by the vacuum process. The commutating coils are held firmly against finished surfaces on the frame and the exciting coils against sheet steel supports by spring angle flanges which are pressed down by the pole piece tips as shown in the illustration.

Brush-holders

Details of the brush-holders which are of the clock spring type, are shown in the illustration. Various brush pressures can be obtained by the adjustable bronze clock spring.

PRESSED STEEL GEAR CASE

Gear Case

Each half of the gear case is pressed from one piece of sheet steel and is welded to a supporting cradle which furnishes a substantial means of attaching the case to the motor frame.

Ventilation

Very effective ventilation is obtained by a double or multiple fan at the pinion end of the armature. Air is drawn into the frame at the commutator end and passes through the motor in two paths, one over the armature and around the field coils, the other under the commutator and through the armature core.

EXCITING AND COMMUTATING FIELD COILS

At the pinion end the air is expelled through openings in the end of the frame. The screened openings for the entrance of the air are so arranged as to afford protection to the interior of the motor when operating under unfavorable conditions.

Lubrication

Oil and waste lubrication is used in all bearings. Oil is fed into the bearings on the low pressure side by capillary attraction and is thoroughly filtered in passing through the waste. The oil boxes are closed by means of felt-lined covers with deep lips held down by springs. Auxiliary oil wells are provided in the oil boxes for filling the bearings and gauging the depth of oil.

TRUCK DATA

	Form A	Form B
Maximum diameter of axle in linings	4 in.	4½ in.
Clearance under frame with 24-in. wheels	3 5/16 in.	.....
Clearance under gear case with 24-in. wheels (max. red.)	2 23/32 in.	.....
Clearance under frame with 30-in. wheels	.....	6 1/16 in.
Clearance under gear case with 30-in. wheels (max. r l.)	.....	2 5/8 in.
Maximum gear ratio	74/13	100/13

Both forms of motor provided with nose for spring suspension.

WEIGHTS

	APPROXIMATE WEIGHT IN POUNDS	
	Form A 24-in. Wheel Motor	Form B 30-in. Wheel Motor
Motor complete with gear, gear case, pinion and axle linings	1005	1130
Two-motor equipments, complete with two K-63 controllers	2760	3010
Four-motor equipments, complete with two K-35 controllers	5310	5810

SCHEDULE SPEED, GE-264, 600-VOLT MOTOR

The following tables indicate the capacity of the GE-264 motor and will assist materially in determining whether this motor is suitable for the desired schedule. They are based on the following assumptions: Average trolley potential, 500 volts; acceleration and braking, 1.5 miles per hour per second; duration of stops, 10 seconds; coasting for 230 feet on all runs; straight level track, maximum temperature rise not exceeding 65 deg. C. Schedule speeds given are 10 per cent less than theoretical values to allow for delays due to grades, curves, slow downs, or other factors that may affect the schedule.

It is strongly recommended that service data be supplied and the General Electric Company's engineers be consulted before the final selection of a motor and gear ratio, since co-operation has been found to be mutually beneficial.

Read assumptions on which schedule is based before applying table.

GE-264 FORM A MOTOR

500 Volts, 24-in. Wheels, 10-second Stops

Stops per Mile	Gear Ratio	MILES PER HOUR WITH LOAD IN TONS PER MOTOR		
		4	4.5	5
2	5.7	14.8	14.5	14.3
2	4.8	15.8	15.6	15.4
3	5.7	13.2	13.0	12.8
3	4.8	14.4	14.2	14.0
4	5.7	11.9	11.7	11.5
4	4.8	12.2	12.1	12.0
5	5.7	10.7	10.6	10.5
5	4.8	11.1	11.0	10.8
6	5.7	9.8	9.7	9.6
6	4.8	10.1	10.0	9.9
7	5.7	9.1	9.0	8.9
7	4.8	9.4	9.3	9.2
8	5.7	8.5	8.4	8.3
8	4.8	8.7	8.6	8.5
10	5.7	7.7	7.6	7.5
10	4.8	7.8	7.7	7.6
Maximum free running speed 4-motor equipment	5.7	22.6	21.8	21.0
	4.8	25.0	24.3	23.7

GE-264 FORM B MOTOR

500 Volts, 30-in. Wheels, 10-second stops

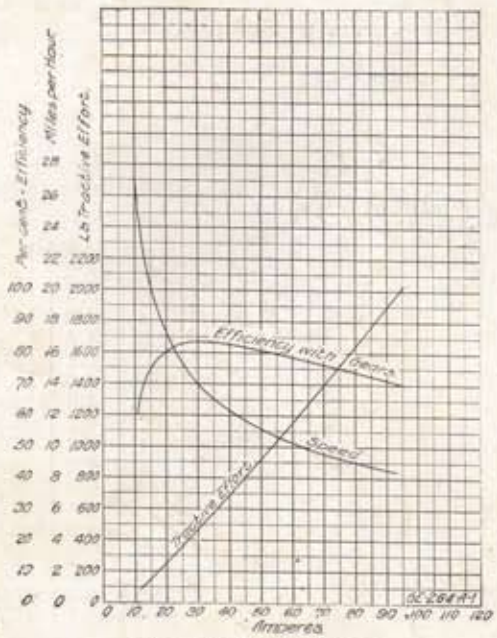
Stops per Mile	Gear Ratio	MILES PER HOUR WITH LOAD IN TONS PER MOTOR		
		4	4.5	5
2	7.7	14.2	13.9	13.7
2	6.5	15.2	14.9	14.7
3	7.7	12.7	12.5	12.3
3	6.5	13.4	13.2	13.0
4	7.7	11.4	11.3	11.2
4	6.5	11.9	11.8	11.7
5	7.7	10.4	10.3	10.3
5	6.5	10.8	10.7	10.6
6	7.7	9.6	9.6	9.5
6	6.5	10.0	9.9	9.8
7	7.7	8.9	8.8	8.7
7	6.7	9.3	9.2	9.1
8	7.7	8.3	8.3	8.2
8	6.5	8.6	8.6	8.5
10	7.7	7.5	7.5	7.4
10	6.5	7.7	7.7	7.6
Maximum free running speed 4-motor equipment	7.7	20.8	20.1	19.5
	6.5	23.5	22.7	22.0

Maximum free running speed of 2-motor equipment approximately 90 per cent of above.

The above tables are based on motors having the characteristics given on the following page.

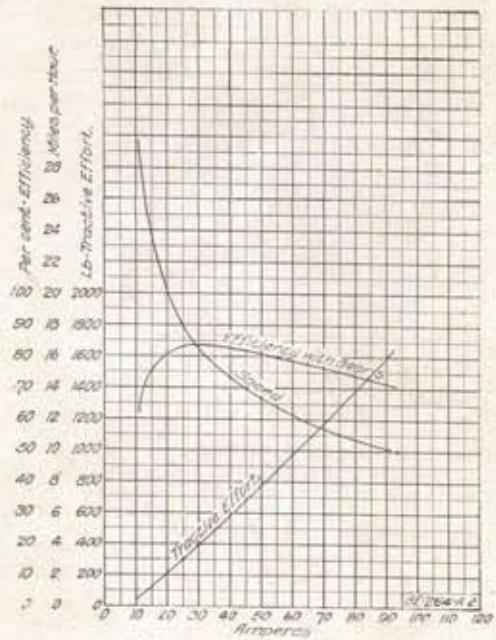
44470–4 GE-264 Ventilated Commutating Pole Railway Motor

GE-264-A 24-IN. WHEEL MOTOR
Characteristic Curves on 500 Volts, Diameter of Car Wheels, 24 inches; Gear, 74 Teeth; Pinion, 13 Teeth; Ratio, 5.7; Maximum Gear Ratio
Armature 4 turn—Field 130 Turns



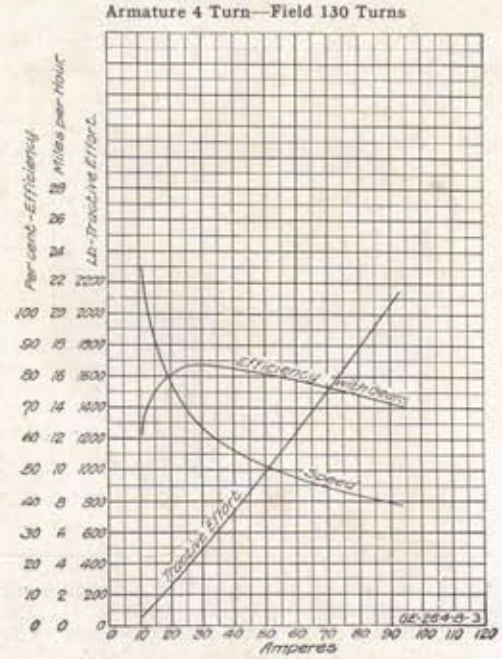
Characteristic Curve No. 334

GE-264-A 24-IN. WHEEL MOTOR
Characteristic Curves on 500 Volts, Diameter of Car Wheels, 24 inches; Gear, 72 Teeth; Pinion, 15 Teeth; Ratio, 4.8
Armature 4 Turn—Field 130 Turns



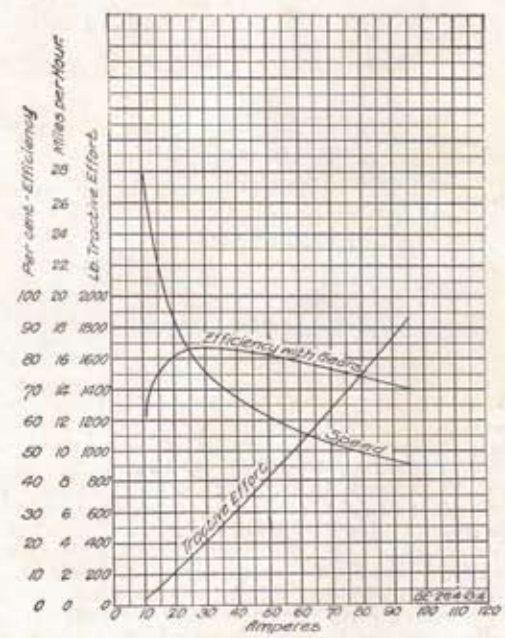
Characteristic Curve No. 335

GE-264-B 30-IN. WHEEL MOTOR
Characteristic Curves on 500 Volts, Diameter of Car Wheels, 30 inches; Gear, 100 Teeth; Pinion, 13 Teeth; Ratio, 7.7; Maximum Gear Ratio
Armature 4 Turn—Field 130 Turns



Characteristic Curve No. 336

GE-264-B 30-IN. WHEEL MOTOR
Characteristic Curves on 500 Volts, Diameter of Car Wheels, 30 inches; Gear, 98 Teeth; Pinion, 15 Teeth; Ratio, 6.5
Armature 4 Turn—Field 130 Turns



Characteristic Curve No. 337