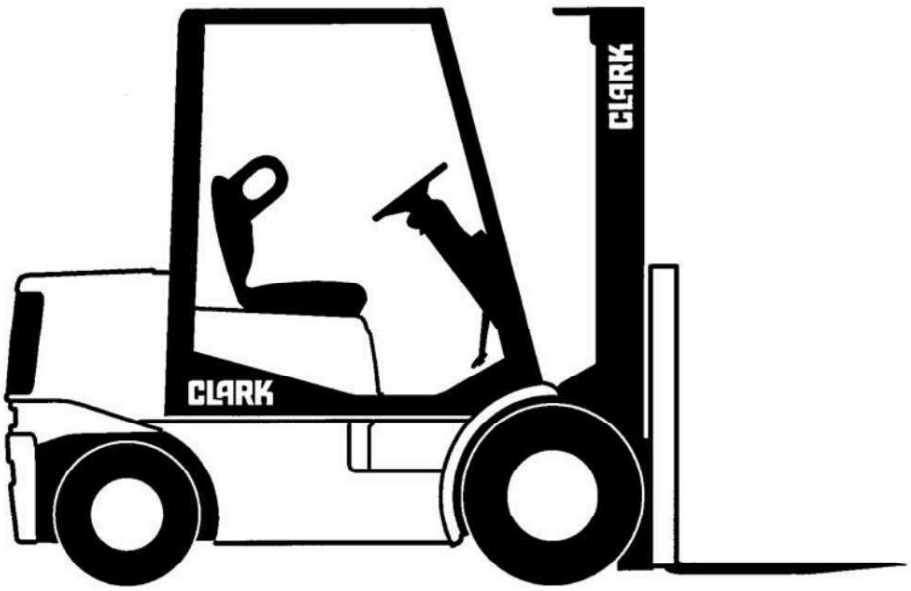
OH-437
NP and NS 300
Lot 3205 and Up



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Lexington, KY
40508

TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
1. Handle is free and does not return to center (neutral).	Probably due to broken return spring.	Replace module (A).
2. Device operates off center and does not have equal travel on either side of neutral.	Stop cam assembled incorrectly to detent module.	Remove detent module assembly (B) and re-assemble, making sure space (C) is equal on either side of center.
3. Device binds when operated in forward or reverse direction.	Assembly screws too tight.	Loosen two assembly screws (J) one half turn and check for binding. Repeat if necessary.
4. Visible arcing on contacts which have a capacitor connected across contact terminals. This may be accompanied by a malfunction of the SCR control.	Capacitor may be faulty. a. Leads broken. b. Open internally. Can be checked as follows: Using a multimeter on the 100K ohms scale, connect meter leads to capacitor leads and see that the needle deflects quickly toward zero, then back toward maximum. Reverse meter connections and repeat. If the meter fails to indicate in this manner, the capacitor is faulty.	Replace capacitor (H).
5. Lack of speed control.	FOR SQUARE "D" CONTROL: a. Check that voltages at control module terminals are: B(+) to N(-) 20-26 VDC L(+) to N(-) 0-1.5 VDC b. Check that the voltage measured from S to N varies from 0 to 8 volts as handle is moved to its maximum position in either direction.	a. If voltages are incorrect, check for loose connections. Then check SCR control for problem. b. Replace module (P).

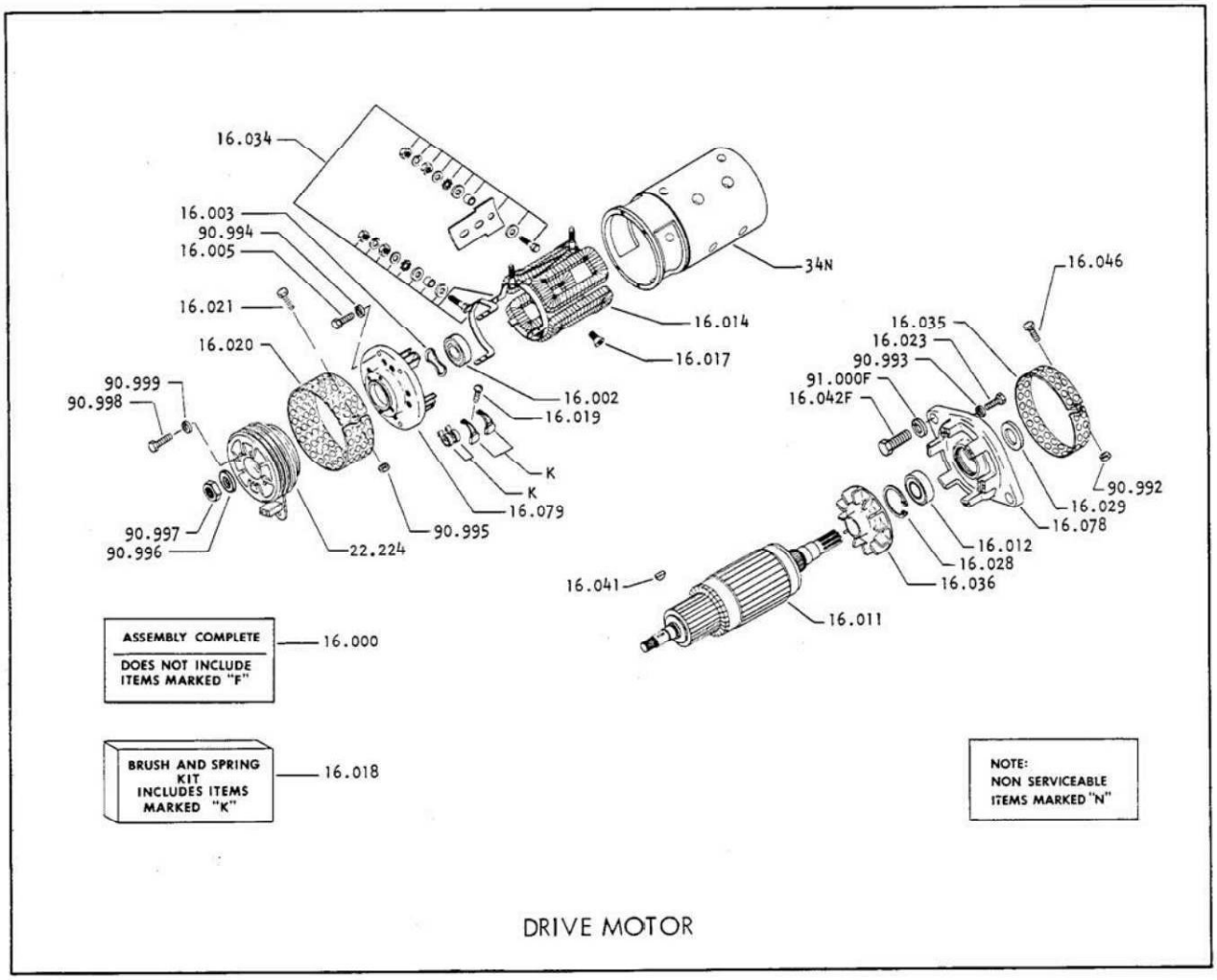
PROBLEM	POSSIBLE CAUSE	REMEDY
	PERFORMANCE REQUIREMENTS FOR G.E CONTROLLED TRANSDUCER:	
5. Lack of speed control.	a. Full "OFF" voltage- measured between the "S" and "N" terminals of the transducer, voltage is to be not less than 3.5 VDC when the control shaft is rotated to the position when the "F" (or "R") switch contacts just close (approximately 10° from neutral position). A voltage in excess of 4.0 VDC is undesirable.	a. If voltages are incorrect, check for loose connections. Then check SCR control for problem.
	b. Full "ON" voltage- measured as above is to be not more than 0.3 VDC when control shaft is rotated to the maximum position. A voltage as low as 0 VDC is acceptable.	b. Replace module (P).
6. Switch contacts do not make, break, or carry the load properly.	a. Contacts may be worn or welded. b. Cam may be deformed.	a. Replace contact module (G) or (F). b. Replace cam (U) or (X).

GROUP 16

DRIVE MOTOR OVERHAUL

SECTION 10

TABLE OF CONTENTS:



DRIVE MOTOR

16.000	MOTOR ASSEMBLY, DRIVE	16.036	FAN, DRIVE MOTOR ARMATURE
16.002	BEARING, DRIVE MOTOR COMMUTATOR END	16.041	KEY, DRIVE MOTOR ARMATURE SHAFT
16.003	WASHER, DRIVE MOTOR COMMUTATOR END THRUST	16.042	BOLT, DRIVE MOTOR
16.005	BOLT, DRIVE MOTOR COMMUTATOR END FRAME	16.046	BOLT, DRIVE MOTOR FAN HOLE COVER
16.011	ARMATURE, DRIVE MOTOR	16.078	FRAME, DRIVE MOTOR DRIVE END
16.012	BEARING, DRIVE MOTOR DRIVE END	16.079	FRAME ASSEMBLY, DRIVE MOTOR COMMUTATOR END
16.014	COIL SET, DRIVE MOTOR (FIELD)	22.224	BRAKE ASSEMBLY, DRIVE MOTOR
16.017	BOLT, DRIVE MOTOR POLE SHOE	90.992	NUT, DRIVE MOTOR FAN HOLE COVER FASTENER
16.018	BRUSH KIT, DRIVE MOTOR	90.993	LOCKWASHER, DRIVE MOTOR END FRAME FASTENER
16.019	BOLT, DRIVE MOTOR BRUSH LEAD	90.994	LOCKWASHER, D/M COMM END FRAME FAST
16.020	COVER, DRIVE MOTOR BRUSH ACCESS	90.995	NUT, BRUSH HOLDER COVER BAND FASTENER
16.021	BOLT, BRUSH HOLDER COVER BAND	90.996	WASHER, DRIVE MOTOR BRAKE FASTENER
16.023	BOLT, DRIVE MOTOR END FRAME	90.997	NUT, DRIVE MOTOR BRAKE
16.028	RETAINER, DRIVE MOTOR DRIVE END BEARING	90.998	BOLT, DRIVE MOTOR BRAKE
16.029	SEAL, DRIVE MOTOR ARM SHAFT DRIVE END	90.999	LOCKWASHER, DRIVE MOTOR BRAKE
16.034	TERMINAL KIT, DRIVE MOTOR	91.000	LOCKWASHER, DRIVE MOTOR FASTENER
16.035	COVER SET, DRIVE MOTOR FAN HOLE	34N	BODY, DRIVE MOTOR USE 16.000

Fig. 15442

DISASSEMBLY OF DRIVE MOTOR:

STEP 1. After removal of motor brake, as outlined in GROUP 23, matchmark commutator end frame and motor body (Fig. 15451) to avoid repositioning brake mounting plate holes. Also matchmark mounting flange and motor body to avoid changing the relationship of the motor mounting bolt holes to the motor terminals and the brake lever.

N O T E

Motor terminals and brake lever point to rear of truck with motor brake at top and splined end of shaft down. Looking down at mounted motor, left mounting bolt hole is 30 degrees toward the front (at 10:00 o'clock) and right mounting bolt hole is 30 degrees toward the rear (at 4:00 o'clock).

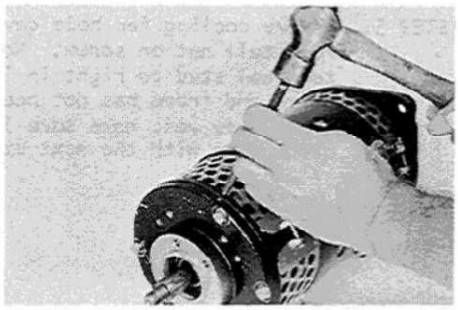


Fig. 15451

STEP 2. Loosen and remove screw and nut from brush hole cover plate and lift off cover plate. (Fig. 15452) For convenience of reassembly, reinstall nut on screw after removing cover plate.

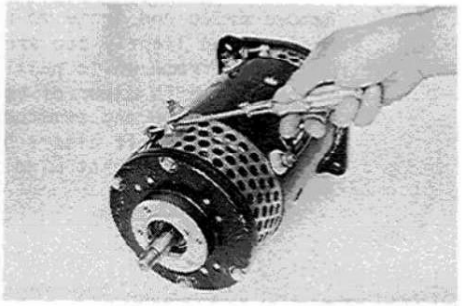


Fig. 15452

STEP 3. Lift brush springs off brushes with screwdriver (Fig. 15453) and remove brushes from commutator. If desired, loosen and remove brush lead terminal screws from brush lead frames as shown.

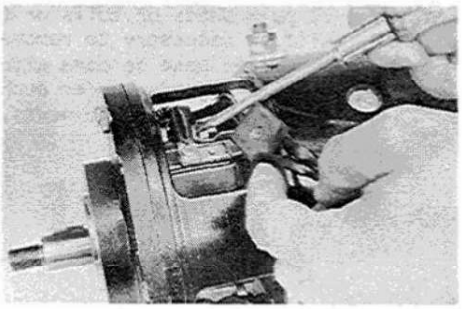


Fig. 15453

STEP 4. Loosen and remove screws and lockwashers and tap commutator end frame with soft hammer while pulling end frame back off commutator end bearing. (Fig. 15454). Note order of assembly of spring washer and shims and remove, making sure all shims and washer are reinstalled during assembly.

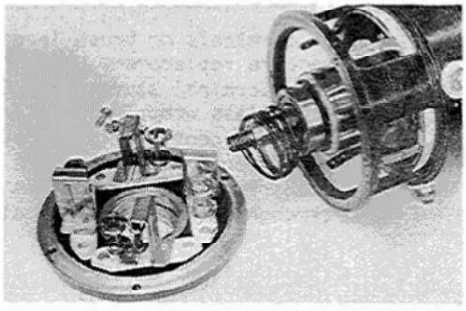


Fig. 15454

STEP 5. Remove cooling fan hole cover band (Fig. 15455) and reinstall nut on screw. Note matchmarks near terminal stud to right in illustration. If the drive end frame has not been matchmarked with the motor body yet, make sure it is done before proceeding with the next step.

Fig. 15455

STEP 6. Remove drive end frame mounting bolts and lockwashers and lightly tap around the edges of the drive end frame while pulling straight up until lip of end frame is clear of motor body (Fig. 15456). Raise end frame and armature assembly straight up until end of shaft clears body, then lay it on wood blocks with care that windings are not distorted or nicked.

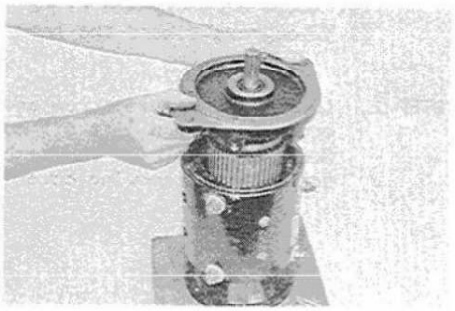


Fig. 15456

STEP 7. If pole shoes or coils or terminals are damaged, it will be necessary to remove the pole shoe screws, which can best be done with a pole shoe screwdriver, using a spreader under each shoe while working on it to prevent damage to parts. (Fig. 6994)

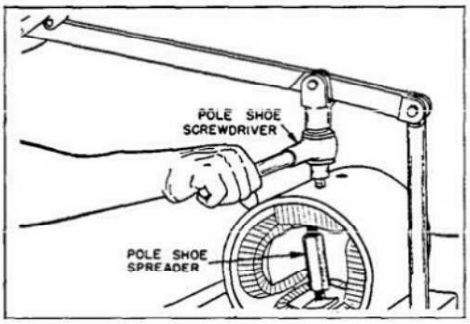


Fig. 6994

STEP 8. If terminals or brush lead frames are damaged and require replacement, loosen and remove brass nuts from terminal studs. (Fig. 15457). Slit the fiberglass wrappings (or unwrap and reuse if you can) and gently press in terminal studs until cardboard terminal hole liners can be removed with the studs to protect the brass threads being drawn through the holes in the steel motor body.

Fig. 15457

STEP 9. Block drive end frame and drive out shaft, using soft hammer (Fig. 15458), or use a puller. Be sure to avoid any procedure which might nick or damage armature or commutator parts.

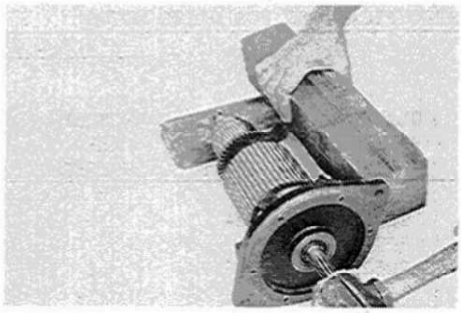


Fig. 15458

STEP 10. If further disassembly is required, press or drive bearings off ends of armature. Note recess in drive end edge of race on bearing at drive end (near cooling fan) for ease of reassembly. Support cooling fan end of armature assembly up on blocks under edges of fan with an inch or so clearance between bottom of shaft and a wooden block. Apply heat of a torch to aluminum fan blades (but not to the shaft) until metal of fan expands and armature shaft slips out. (Fig. 13925)

N O T E

Figure shows typical armature and shaft assembly.

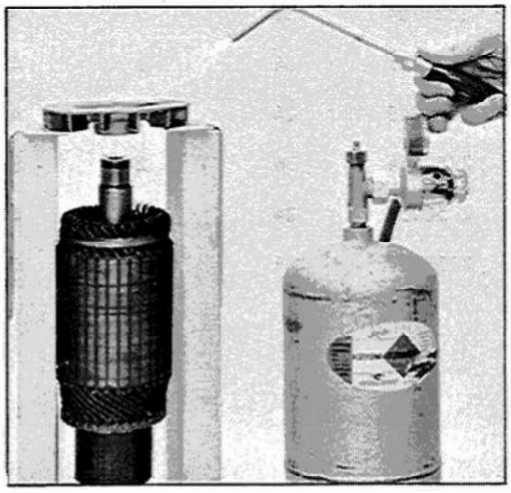


Fig. 13925

STEP 11. CLEANING AND INSPECTION -- Blow off dust and loose dirt with air hose. Inspect all parts for distortion, abnormal wear, nicking or discoloration indicating possible arcing. Use a straight edge to check brush holders for alignment. Realign with a screwdriver as necessary. Examine armature windings and core for signs of rubbing against pole shoes; check faces of pole shoes also. Minor problems can be corrected with shellac or insulating varnish; replace the armature in all cases of serious damage. Check all connections for poor solder work or broken wires. Examine all insulation for cracks or damage, including inner surface of motor body, and nomex nylon paper insulation strip through which the terminal studs are installed. Check coils for damaged wrappings and repair with fiber glass wrapping material and insulating varnish. Examine bearings.

STEP 12. Visually check surfaces of field coils and armature for damage, nicks or thrown windings, then use an ohmmeter to check for continuity between all commutator segments and between the field terminals (zero ohms resistance on the R x 1 scale). Use the ohmmeter, set on the R x 10,000 scale, to check for infinite resistance between the commutator bars and the shaft and between the field terminals and the motor body after reassembly of coils and terminals in body. These checks will insure against grounds.

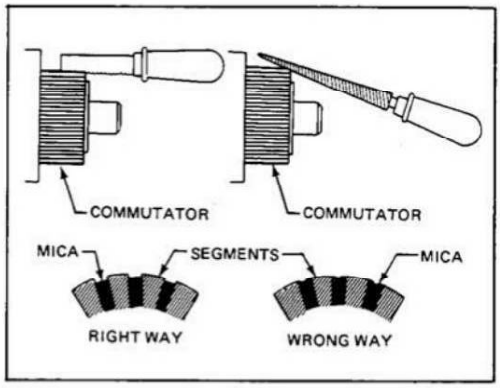


Fig. 11272

STEP 13. If necessary, place the armature in a lathe and turn down the commutator until true.

C A U T I O N

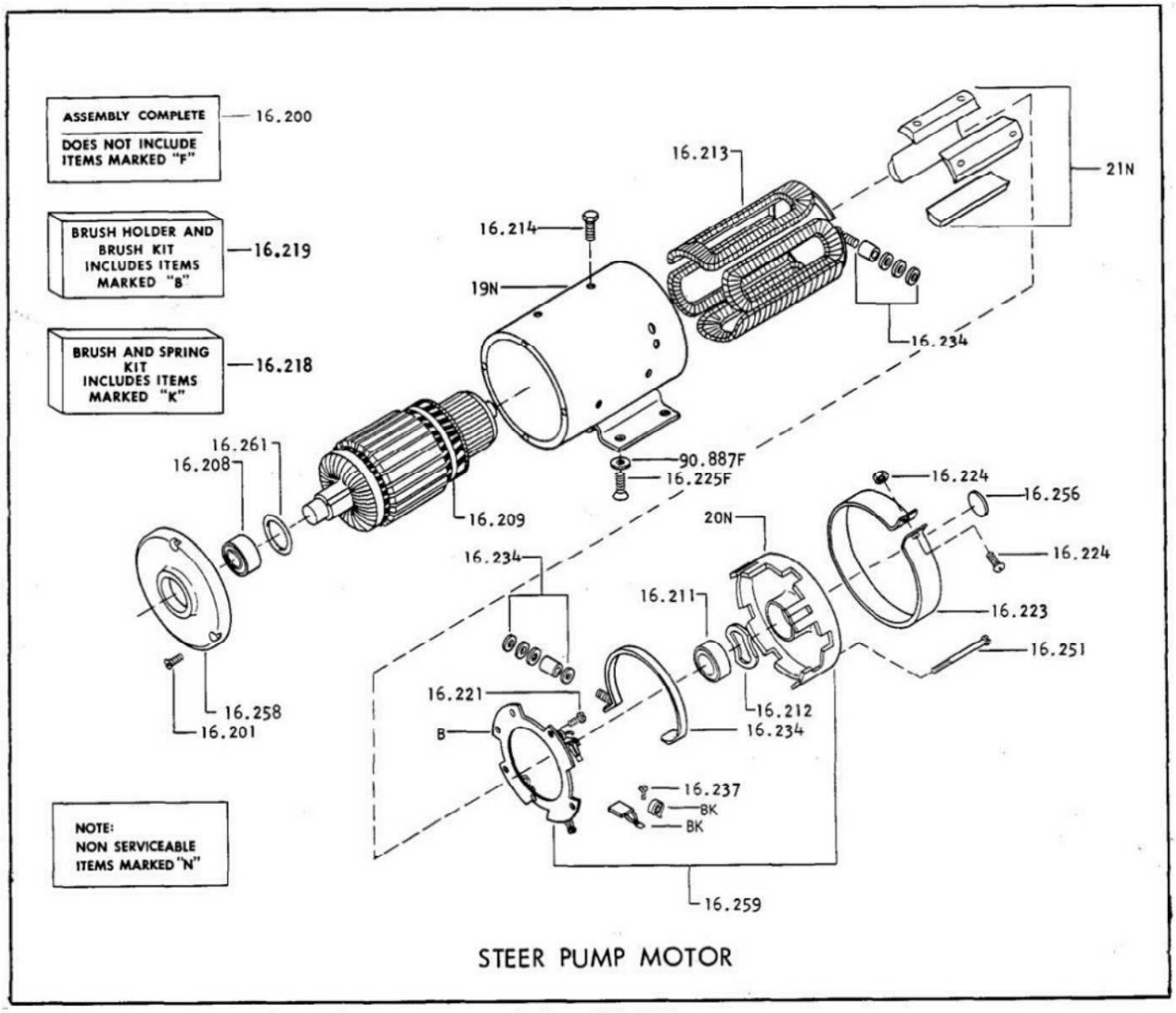
DO NOT CUT CLOSER THAN 3/16 INCH FROM COMMUTATOR RISER BARS: MAKE SURE NO SOLDER IS REMOVED, WEAKENING COIL CONNECTIONS. UNDERCUT MICA (FIG. 11272) TO A DEPTH NOT EXCEEDING .030 INCH, FULL WIDTH OF MICA AND FLAT AT BOTTOM.

SPECIFICATIONS FOR DRIVE MOTOR

CLARK PART NUMBER	VOLTS	BRUSH SPECIFICATIONS: NUMBER PER HOLDER	NUMBER PER MOTOR	LENGTH WORN (LONGEST SIDE)	SPRING PRESSURES (OUNCES) MAX. NEW	SPRING PRESSURES (OUNCES) MIN. WORN	RESISTANCE IN OHMS AT 25° CELSIUS: ARMATURE	FIELD @ S1-S2 TERMINALS
905254	24	1	4	0.62 INCH	25	13	0.0040	0.0045
905256	36	2	8	0.62 INCH	36	16	0.0068	0.0051
994833	36	2	8	0.62 INCH	36	16	0.0068	0.0051
997101	24	1	4	0.62 INCH	25	13	0.0040	0.0045
2324104	36	2	8	0.62 INCH	36	16	0.0068	0.0051
2337792	24	1	4	0.57 INCH	36	26	0.0040	0.0047
2342849	24	1	4	0.57 INCH	36	26	0.0040	0.0047
2750254	36	2	8	0.62 INCH	36	16	0.0068	0.0051
2750256	24	1	4	0.62 INCH	25	13	0.0040	0.0045
2750257	24	1	4	0.62 INCH	25	13	0.0040	0.0045

NOTES:

1. Motor brake information given in GROUP 23, Section 8 and Section 19.



STEER PUMP MOTOR

Fig. 16-321

16.200	MOTOR ASSEMBLY, STEER PUMP	16.224	FASTENER, BRUSH HOLE COVER
16.201	FASTENER, DRIVE END FRAME	16.225	CAPSCREW
16.208	BEARING, DRIVE END	16.234	TERMINAL KIT
16.209	ARMATURE	16.237	FASTENER, BRUSH
16.211	BEARING, COMMUTATOR END	16.251	FASTENER, COMMUTATOR END FRAME
16.212	WASHER, COMMUTATOR END BRG.	16.256	COVER, COMMUTATOR END BEARING
16.213	COIL SET, FIELD	16.258	FRAME, DRIVE END
16.214	FASTENER, POLE SHOE	16.259	FRAME ASSEMBLY, COMM. END
16.218	BRUSH KIT	16.261	SEAL, DRIVE END BEARING
16.219	BRUSH HOLDER KIT	90.887	WASHER, STEER PUMP FASTENER
16.221	FASTENER, BRUSH HOLDER	19N	BODY
16.223	COVER SET, BRUSH HOLE	20N	FRAME, COMMUTATOR END
		21N	POLE SHOE