OH-377
EC-60/80
36/48 Volt

ISO 9001 CERTIFIED CLARK

CLARK Technical Publications Lexington, KY 40508

Check motor installation as follows:

STEP 1. Disconnect battery leads.

STEP 2. If necessary disconnect external motor terminal leads.

C A U T I O N

SEMI-CONDUCTORS, SMALL TRANSFORMERS, VOLTAGE REGULATORS AND OTHER DEVICES THAT MAY BE DAMAGED BY THE HIGH VOLTAGE MUST NOT BE IN THE CIRCUIT.

STEP 3. Connect one lead of 500 volt megger to any motor terminal stud, the other lead to the motor frame and apply the voltage.

STEP 4. A reading of one megohm or greater is usually satisfactory for small motors. Record reading for future reference.

If reading is less than one megohm, the motor should be removed from truck for closer inspection.

STEP 5. Reconnect terminal leads.

N O T E

If the operator has experienced erratic or noticeable changes in truck operation (high current draw, slower acceleration or load lifting) and the cause is not found in the battery or control circuits, it is possible for motor to have SHORTED WINDINGS. Motor must be removed from truck to check for shorts in the windings.

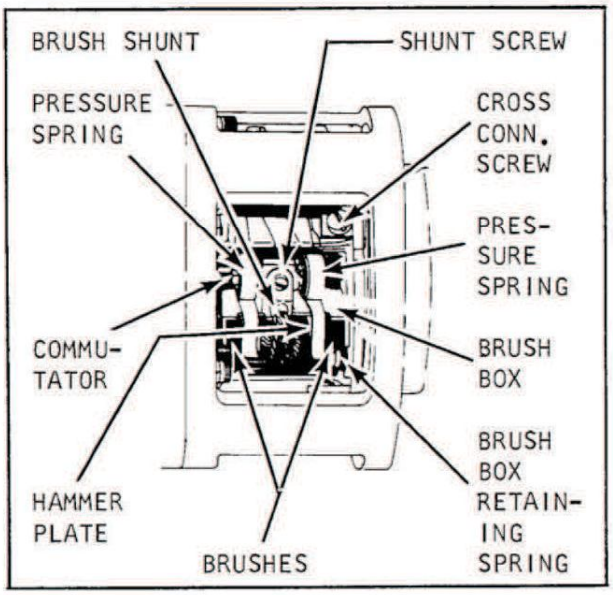

Fig. 11270

BRUSH WEAR (Fig. 11270)

STEP 1. Remove brush covers (band or plates).

STEP 2. Lift brush springs and remove brush from brush box.

N O T E

Do not remove shunt retaining screw, unless new brushes are necessary. (See brush replacement).

STEP 3. Clean brushes, holders and wipe commutator with a dry, lint-free cloth.

C A U T I O N

DO NOT USE A LUBRICANT OF ANY KIND, ON OR AROUND COMMUTATOR.

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STEP 4. Check appearance of commutator and the brush riding surfaces. The best signs of good commutator are dark, brownish, highly polished commutator and uniform glossy brush wearing surfaces.

STEP 5. Check brush wear length. A record of brush length at each inspection is the best indicator of brush wear. (This record will help determine if sufficient wear length is present until the next inspection.)

N O T E

Overloading of the motor will increase brush wear and should be taken into account.

STEP 6. Check brush shunt for good contact with the brush holder. Make certain shunt is not damaged or burned. This may cause pressure spring to carry current and lose tension. Good spring tension is vital to motor operation. (See brush spring pressure.)

STEP 7. If brushes do not need to be replaced, lift brush spring and place brush into brush box.

TERMINALS, BOLTS AND COVERS
(Fig. 11270)

STEP 1. Clean and check brush box and cross-connector screws, tighten if necessary.

STEP 2. Check and tighten, if necessary, all capscrews around motor frame.

STEP 3. Inspect drip-proof type covers for bent or broken spacers. (Damaged or clogged cover openings, reduce air supply, the motor overheats and motor installation life is reduced.)

STEP 4. Inspect totally enclosed type covers for broken or damaged insulating gaskets.

STEP 5. Reassemble covers and gaskets in the original position supplied.

STEP 6. Check terminals for tight, uncorroded connections.

BRUSH REPLACEMENT

Brushes can be replaced without removing motor from truck.

STEP 1. Disconnect battery cable.

STEP 2. Remove brush covers (band or plates).

STEP 3. Remove shunt retaining screw and remove brush from brush box.

STEP 4. Seat new brush to contour of commutator by sanding on a drum the same diameter as commutator or inserting sandpaper between the brush face and the commutator.

C A U T I O N

NEVER USE EMERY CLOTH OR EMERY

PAPER, THE GRIT IS METALLIC

AND WILL CAUSE DAMAGE.

STEP 5. Final seating of brushes can be achieved by using a fine mesh seating stone compound similar to a product made by Ideal Industries, Inc., Sycamore, Illinois. Follow directions on the box.

BRUSH SPRING PRESSURE (Fig. 11271)

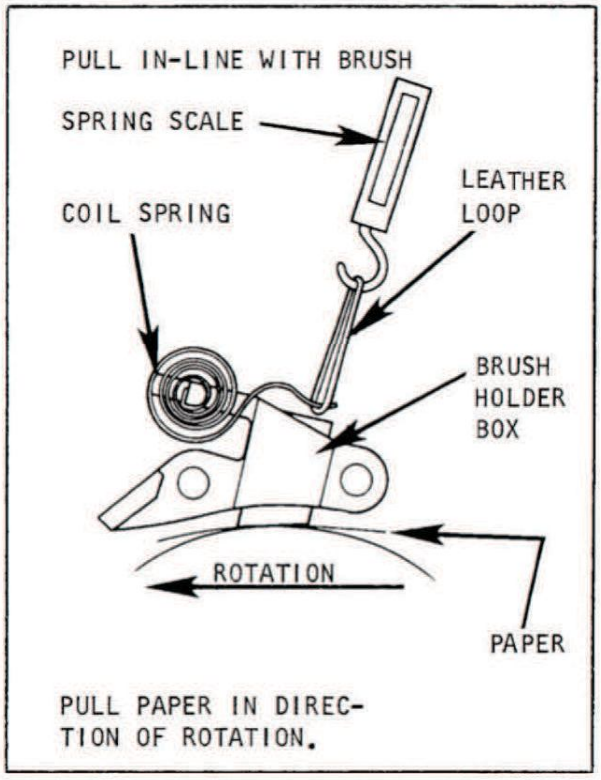

Fig. 11271

STEP 1. Measuring spring pressure.

A. Insert a paper strip between brush and commutator.

B. Place leather loop - or spring scale hook - between pressure spring and brush.

C. With pull in line with center of brush, lift spring scale until paper begins to move free.

STEP 2. The reading on the spring scale is the total spring force. Record reading and compare with specifications. Replace spring if necessary.

BENCH TESTS

CLEANING AND INSPECTION

STEP 1. Clean armature windings, field coils, core and inside of motor frame with an approved nonconducting type of solvent.

N O T E

Do not soak, dip or wash.

UNDERCUTTING MICA (Fig. 11272)

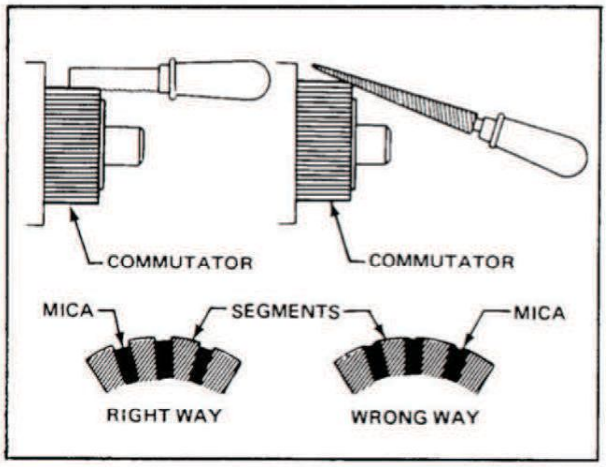

Fig. 11272

Carefully inspect the commutator. If burned, rough or out-of-round, it must be turned and the mica undercut.

STEP 1. Place armature in a lathe and turn down commutator until true. Make certain cut is not made on commutator riser bars as solder will be removed and weaken coil connections. Remain approximately 3/16" from riser bars when cutting.

STEP 2. Undercut mica to a depth not exceeding .030 inch. Undercut must be full width of mica and flat at bottom.

STEP 3. Sand commutator lightly with No. 00 sandpaper to remove any burrs left from undercutting. Clean slots.

STEP 4. Check armature on a growler for short circuits.

CHECK FOR GROUNDS, SHORTS, AND/OR OPEN CIRCUITS.

ARMATURE TESTS

STEP 1. Test for shorts (Fig. 11273)

A. Check armature for shorts by placing it on a "growler" and with a steel strip or hack-saw blade held on armature core, rotate armature. If blade vibrates, armature is shorted in an area of the core below the vibrating blade. Copper or brush dust in slots between commutator bars sometimes causes shorts which can be eliminated by cleaning out slots. Shorts at cross-overs can be eliminated by bending wire slightly and reinsulating exposed bare wire. If short cannot be eliminated armature must be replaced.

STEP 2. Test for open circuits.

A. Open circuits in an armature may be caused by a poor connection of leads in the commutator bars or by a broken wire in an armature coil. Either will cause sparking at the brushes. Poor connections and broken wires can often be detected visually. When this is not possible, test for open circuit as follows:

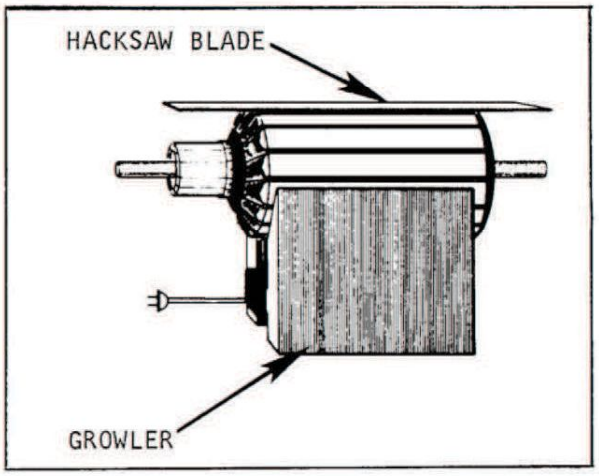

Fig. 11273

(a). Growler test ... Set up the armature on the growler as shown in Fig. 11273. Test the top two adjacent bars with an a-c Millivoltmeter. Rotate the armature and continue testing adjacent bars. When the millivoltmeter bridges the two bars connected to the open coil, the meter pointer will not be defected. All other bars will give a deflection.

STEP 3. Bar-to-meter test. (Fig. 11274)

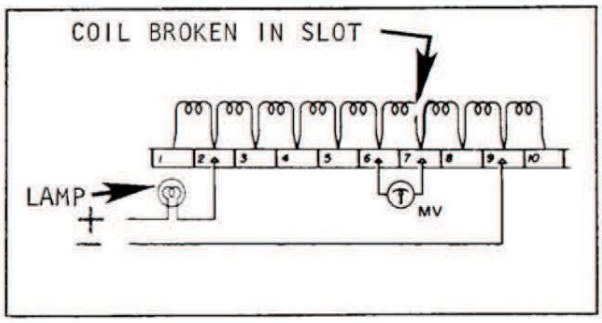

Fig. 11274

A. This method of finding an open coil is more satisfactory and reliable than the growlermeter test and is often used in preference to it. Directions are as follows:

(a). Place the armature on "V" blocks and connect a source of direct current to the commutator, using the circuit of Fig. 11274.

(b). Test by spanning bar with millivoltmeter leads, as shown.

(c). The meter will not show a reading until it bridges bars 6 and 7 as an example shown in Fig. 22374. The meter completes the circuit.

C A U T I O N

METER NEEDLE WILL JUMP WILDLY;

PRECAUTIONS SHOULD BE TAKEN TO

AVOID DAMAGE TO INSTRUMENT.

STEP 4. To test armature for grounds, place one probe of test lamp on armature core or shaft and place other probe on commutator bars. If lamp lights, armature is grounded and must be repaired or replaced.

FIELD COILS

STEP 1. To test for grounded fields, place one probe of test lamp on field frame and other probe on field terminal. If lamp lights, field coils are grounded and must be replaced if ground cannot be located and repaired.

STEP 2. Paint or spray field coils and inside of motor frame with Class "F" air drying varnish. The armature coils, core, the end of commutator bars, and mica cone ring can be sprayed or painted with Class "F" baking varnish. (Bake, per varnish manufacturer's instructions.)

C A U T I O N

DO NOT USE SILICONE BASE

VARNISHES.

CLEANING

Clean motor exterior with a solvent such as Stoddard Solvent and dry with compressed air.

DRIVE MOTOR DISASSEMBLY

STEP 1. Remove seat brake locknut, drum, hub, brake assembly and key from shaft.

STEP 2. Remove band assemblies from around field yoke. Remove brush shunt retaining screws, lift brush retaining springs and withdraw brushes from brush holders.

STEP 3. (Fig. 11275) Place motor on end with drive end up.

STEP 4. (Fig. 11275) Remove capscrews securing drive end housing to yoke. Attach chain to housing and with chain hoist, lift armature, bearings, retainer and housing up and out of field yoke.

C A U T I O N

LIFT ARMATURE STRAIGHT UP CARE-

FULLY TO AVOID DAMAGE TO

COMMUTATOR OR CORE.

STEP 5. Wrap commutator with heavy paper to protect surface. Support armature assembly in "V" blocks to protect from damage.

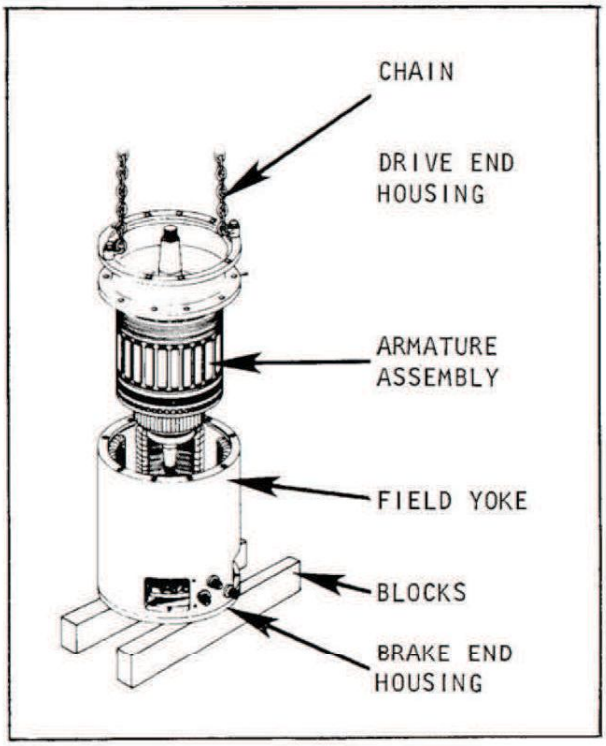

Fig. 11275

STEP 6. Remove bearing retainer bolts from drive end housing; remove housing from armature assembly.

STEP 7. From the brake end housing, remove the capscrews and lockwashers; tag and disconnect field leads from rocker arm and remove housing from field yoke.

STEP 8. Remove rocker arm assembly from the brake end housing. Mark the two assemblies to assure correct alignment for reassembly.

STEP 9. Fig. 11276. Field coils should not be removed unless replacement is required.

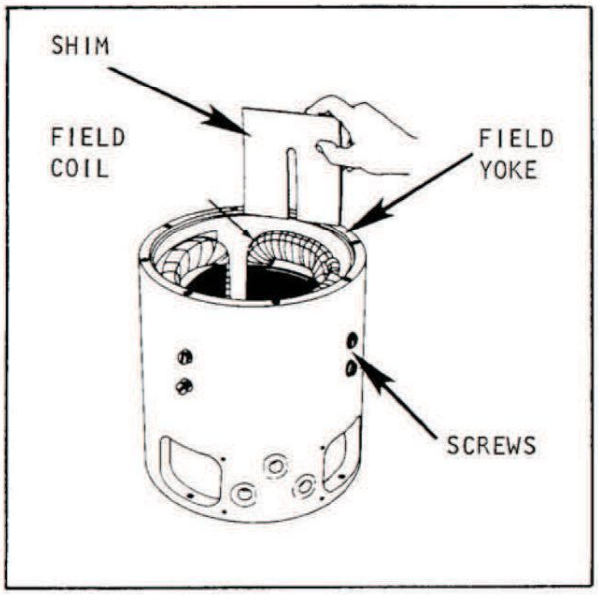

Fig. 11276

A. To remove, loosen slotted screws securing pole shoes to yoke, remove shims behind pole shoes, noting quantity and location of the shims and remove screws, pole shoes and coils.

C A U T I O N

HANDLE FIELD COILS CAREFULLY

TO AVOID DAMAGING INSULATION.

STEP 10. Clean all parts, except armature and field coils, with clean Stoddard Solvent. Inspect for signs of unusual wear, broken or damaged parts. Replace all broken, damaged, or excessively worn parts.

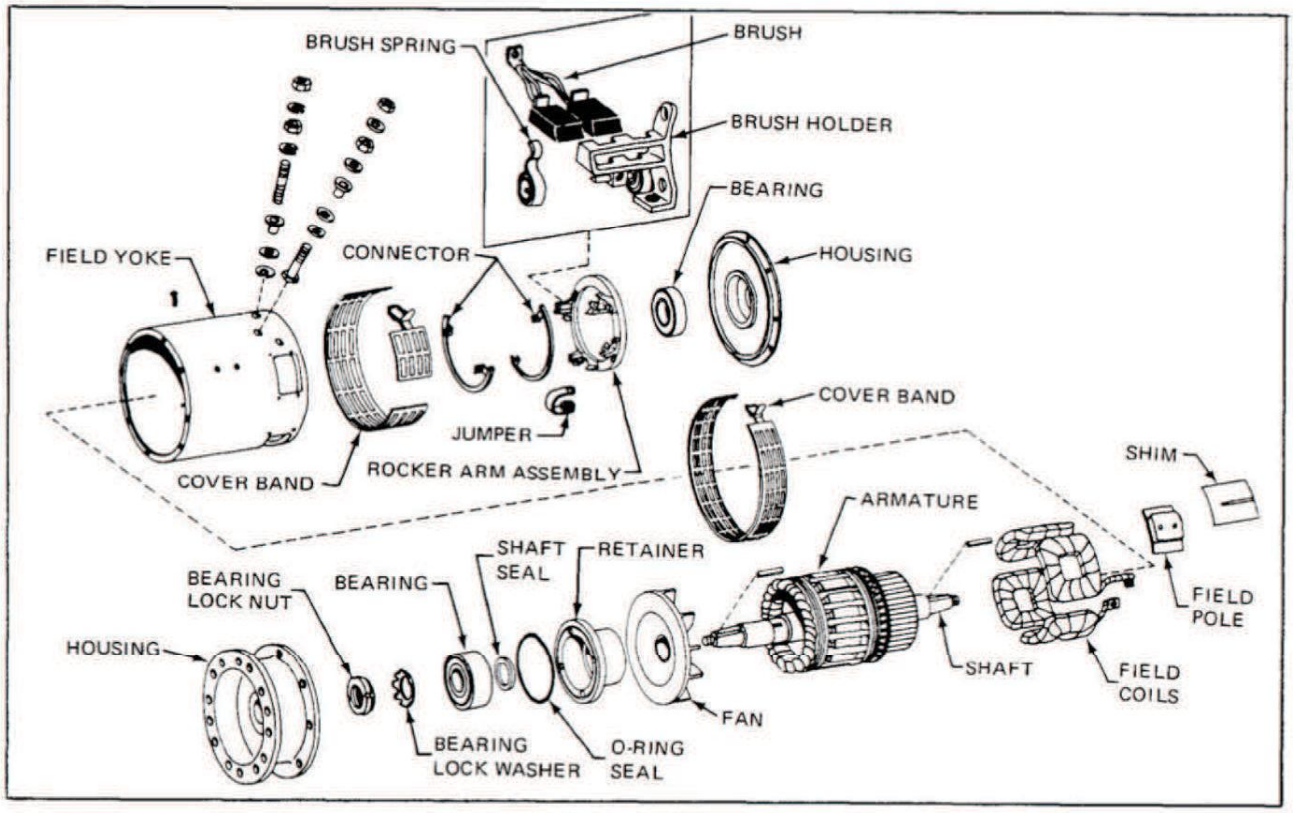

Fig. 11277 Typical Drive Motor - Exploded View

BEARING REPLACEMENT

STEP 1. Bend tabs of lockwasher, located behind bearing locknut, clear of the nut.

A. Use spanner wrench to remove the bearing locknut.

STEP 2. Using a bearing puller, remove the retainer from the armature shaft. The oil seal and bearing will come off with the retainer.

CAUTION

USE EXTREME CARE WHENEVER USING PULLER; CENTER OF SHAFT MAY BE DAMAGED. USE A SHAFT PROTECTOR IN CONJUNCTION WITH THE PULLER (FIG. 11278).

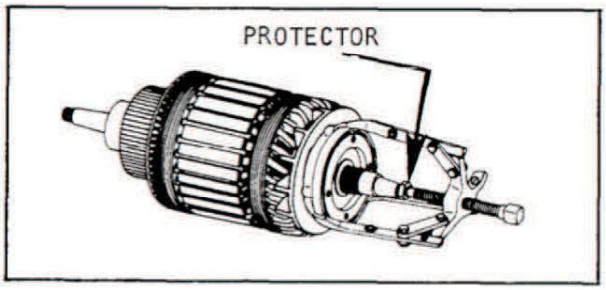

Fig. 11278

STEP 3. Remove the bearing from the retainer.

STEP 4. Examine bearing surfaces and shaft shoulders for nicks or burrs and remove if necessary.

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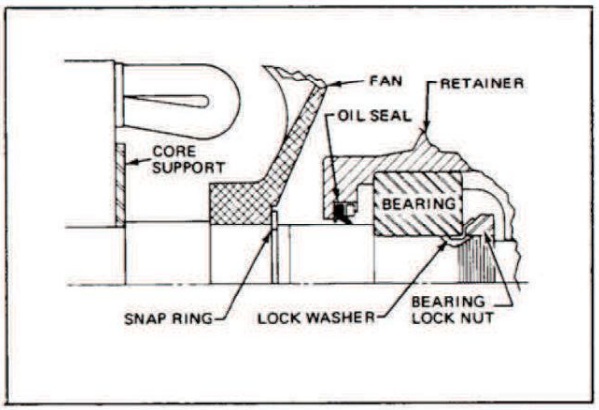

Fig. 11279

STEP 5. (Fig. 11279) Remove and inspect "O" ring, replace oil seal if worn or damaged, seal is a light press fit. Clean out old grease from retainer, place retainer on shaft, press seal in place.

N O T E

Bearing retainer with seal, must be installed on shaft before installing bearing.

STEP 6. Heat the new bearing in an oven (200 deg. F.). While it is hot, slide the bearing onto shaft - make certain that the inner race makes a firm even contact with shaft shoulder.

C A U T I O N

DO NOT SUBJECT BEARING TO

IMPACT.

STEP 7. Remove and replace bearing on commutator end if worn or damaged.

DRIVE MOTOR SHAFT REMOVAL AND REPLACEMENT

W A R N I N G

PRESSURE TO REMOVE OR INSTALL

SHAFT MAY EXCEED 20 TONS.

STEP 1. Remove fan snap ring located on shaft in front of fan. Remove fan by applying steady pressure against back side of fan. The fan is hand pressed against a shoulder which prevents fan from being pressed on too far and causing possible damage to armature windings.

STEP 2. Place the drive end of the shaft in a heavy duty pipe approximately 2-1/4" I.D. and at least 18" long.

N O T E

Make certain the top end of the pipe makes complete contact with the core from above shaft, but within a radius of the core rivets.

STEP 3. Apply vertical pressure on pipe, commutator end, and press shaft from armature.

SHAFT REPLACEMENT

STEP 1. Replace shaft.

A. Place a pipe 1-1/2" I.D., 2-1/4" O.D. by 6" long against commutator sleeve and with assembly vertical, insert shaft as far as it will go. Using a 1-5/8" I.D. pipe against bearing shoulder, apply exact vertical pressure until shaft bottoms against core support.

STEP 2. Heat the aluminum fan to approximately 200 deg. F. Prevent scraping the bore when pressing the fan on the shaft.

STEP 3. Replace snap ring.

DRIVE MOTOR REASSEMBLY

The reassembly of this unit is a reversal of the disassembly procedure with the following recommendations.

STEP 1. Oil seal lip must be per Fig. 11279. Bearing must be half full of grease. Shield facing outward. "O" ring inside bearing retainer.

STEP 2. Reassemble rocker arm to brake end housing.

STEP 3. Align and bolt brake end housing to field yoke. Connect armature lead jumpers as marked.

STEP 4. Align and bolt bearing retainer to drive end housing.

STEP 5. Place field yoke in vertical position. With chain hoist, lower armature assembly, carefully to avoid damage to commutator or core, into field yoke assembly. Remove paper covering on commutator.

STEP 6. Replace brake assembly. Replace pinion gear assembly. Replace brushes.

STEP 7. Make sure all electrical connections are clean and tight. Check insulation resistance, using a 500 volt megger.

SPECIFICATION CHART

MOTOR MODEL	NORMAL APPLICATION	RATING DATA					BRUSHES TOTAL SPRING PRESSURE ± 20% (OUNCES)	COMMUTATOR MINIMUM WEAR DIAMETER (INCHES)	MAXIMUM TORQUE TERMINAL LEADS (INCH-OUNCES)
		H.P.	R.P.M.	VOLTS	AMPS	DUTY (HOURS)			
725 ADJV	Drive	7.0	855	36	180	1	40	4-3/8	
725 B4V	Drive	6.7	960	36	158	1	40	4-3/8	
725 D9V	Drive	8.4	920	36	180	1	40	4-3/8	
725 AEV	Drive	8.35	1110	36	212	1	40	4-3/8	192
725 F1V	Drive	10.7	920	36	270	1	58	4-3/8	
725 F12V	Drive	11.7	1120	36	340	1	58	4-3/8	
725 DV8	Drive	7.0	840	36	180	1	40	4-3/8	
450 C5V	Pump	11.5	2015	36	294	1/12	25	3	107
450 A3	Power Steering	1.2	2270	36	34	Cont.	25	3	
575 C3V	Pump	10.4	1500	36	275	1/12	40	3-3/4	192
575 C4V	Pump	10.4	1660	36	270	1/12	40	3-3/4	