1/30 H.P. – 110 VOLT DC DRIVE MOTOR FOR 5-D AND 6-A DISTRIBUTORS REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the 1/30 horsepower type SD, shunt-wound, d-c motor, KS-5039, used primarily for driving No. 5-D and No. 6-A type distributors.

1.02 It is reissued to change the lubrication requirement intervals, to change the temperature requirements from rise above ambient to total, to rearrange and reword the text, and in general bring the section up-to-date. Significant changes are marked by arrows.

1.03 Reference shall be made to Section 020-010-711 covering General Require-

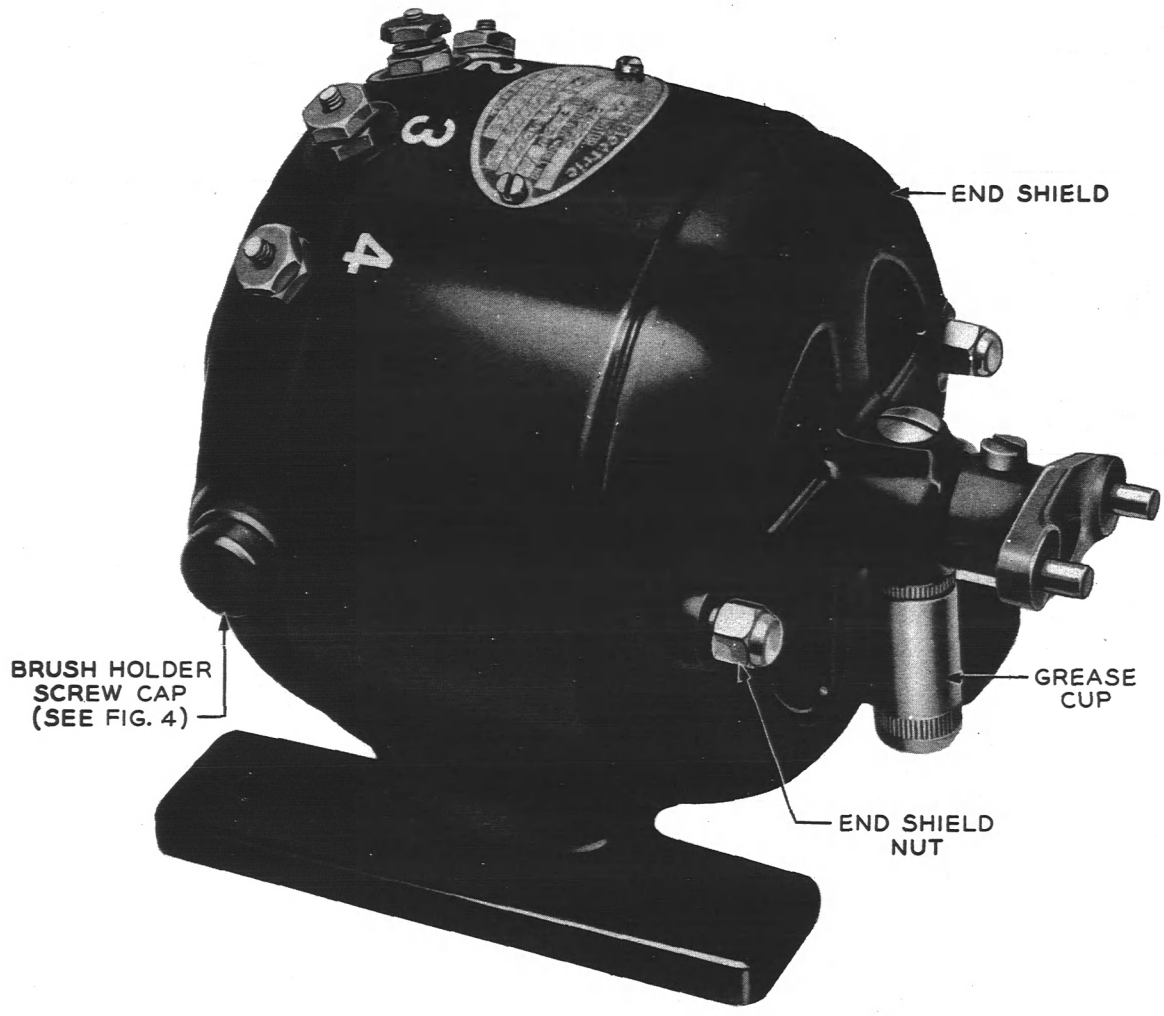

Fig. 1 - General Assembly - KS-5039 Motor

ments and Definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 Requirements and associated procedures marked with an asterisk (*) need not be checked during maintenance unless the apparatus or part is made accessible for other reasons, or performance indicates that such a check is advisable.

1.05 Requirements and associated procedures marked with a number sign (#) need not be checked by the installer unless it is thought that the requirement is not being met or performance indicates that such a check is advisable.

1.06 Successful commutation for the purpose of this section may be said to have been obtained if neither the brushes nor the commutator is injured in normal service to the extent that abnormal maintenance is required. The presence of some visible sparking is not necessarily evidence of unsuccessful commutation.

1.07 Normal operation may be defined as a condition in which the motor is carrying any load from no load to full load, with the input voltage within the limits stamped on the nameplate.

2. REQUIREMENTS

2.01 Lubrication

(a) The grease cups of the bearings shall be inspected every four months and refilled with 310-330P grease if necessary. This interval may be extended if periodic inspections indicate that local conditions are such that the bearings will be adequately lubricated during the extended interval.

(b) The bearings shall be cleaned and relubricated with 310-330P grease once every two years in service, after one or more years in storage, or at any time the motor is dismantled for other reasons.

#2.02 The bearings shall be free from excessive wear. If the motor operates satisfactorily under all conditions of normal operation and with 2.04 and 2.10 met, the bearings shall be considered to be in satisfactory condition.

2.03 Freedom of Rotation: The motor armature shall turn freely in its bearings. Gauge by feel.

2.04 The noise and vibration of the motor under all conditions of normal operation, shall not be excessive. Gauge by sound and feel.

2.05 Motor Speed

(a) With no load, and the input voltage within the limits stamped on the nameplate, the motor speed shall be:

Min. - 3000 rpm
Max. - 3800 rpm

Use speed indicator.

(b) The speed of the d-c motor depends on the input voltage and the load and is not adjustable.

2.06 The commutator surface shall be clean and free from scores, pits or other deformations of the surface or structure except that caused by normal wear. Gauge by eye and feel.

*#2.07 Commutation: The motor shall commutate successfully under all conditions of normal operation.

*#2.08 Brush Holders: The clearance from the edge of the brush holder to the commutator shall be:

Min. - 1/32"
Max. - 5/64"

Gauge by eye.

2.09 Brushes

(a) Brushes shall have a minimum length of 5/16" outside of the brush spring. Use scale.

(b) With the brush holder screw cap removed, and the brush in its holder and resting against the commutator, the brush spring shall extend a minimum of 1/8" outside of its holder. Gauge by eye.

(c) Brushes shall not bind in their holders; neither shall they be loose enough to cause poor commutation. Gauge by eye.

*#2.10 Temperature: Under normal operating conditions the temperature shall not exceed:

	Max.
Bearings	80C(176F)
Motor Frame	90C(194F)

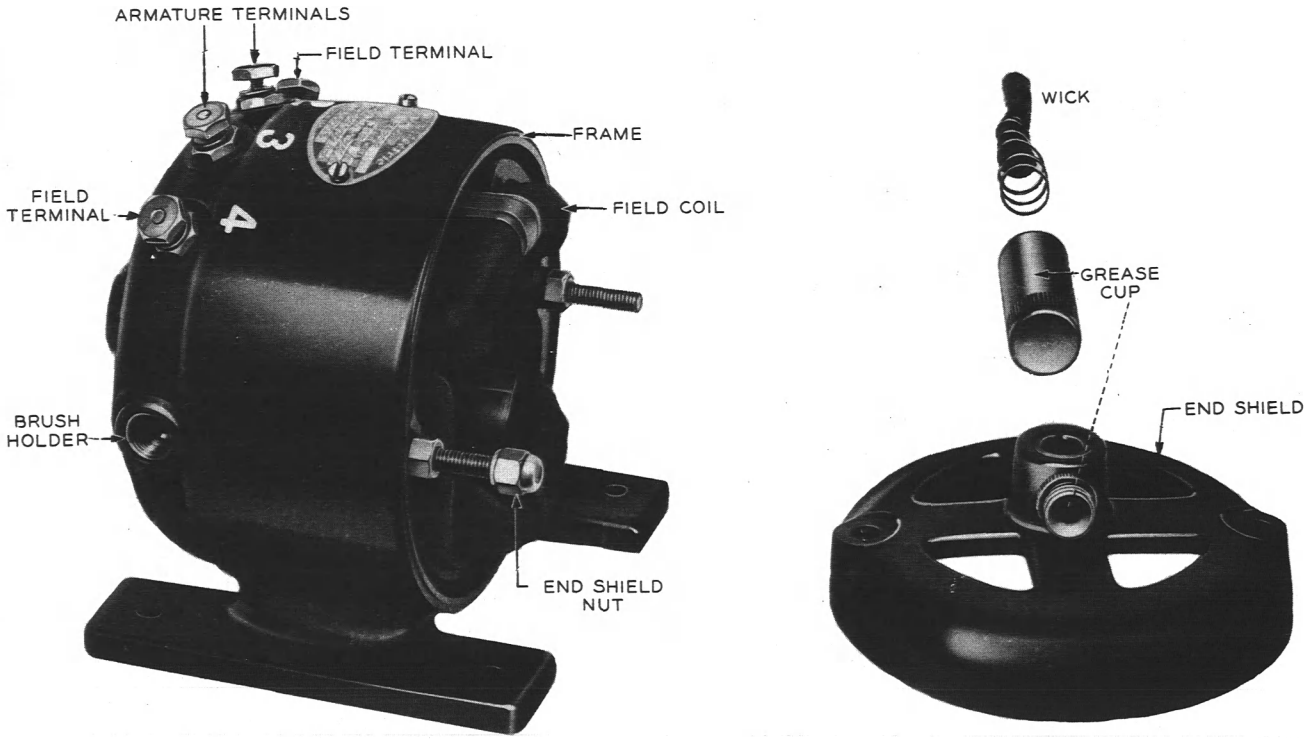

Fig. 2 - Motor Frame and End Shield Details

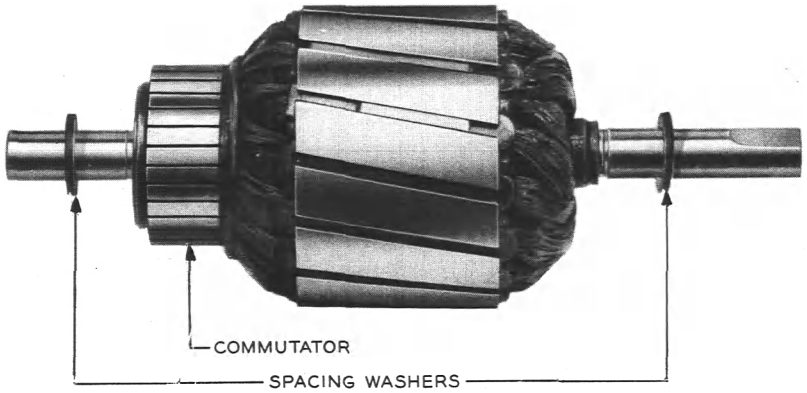

Fig. 3 - Motor Armature

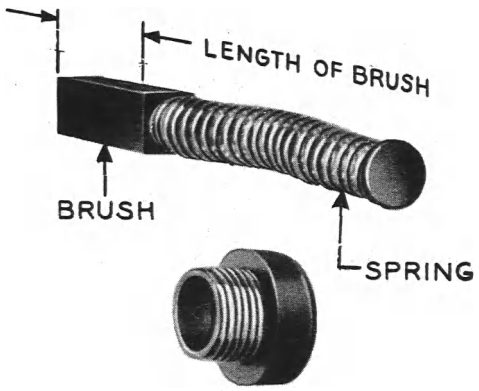

Fig. 4 - Brush Details

3. ADJUSTING PROCEDURES

3.001 List of Tools, Gauges and Materials (Equivalents may be substituted)

Tools

→Screwdriver, cabinet, 3"
→Screwdriver, regular, 5"
→Stick, orange, KS-6320
Wrench, hex., single end socket, 5/16", 45B Tool

Gauges

Indicator, Speed, Hasler Style A or Jones 5B
Scale, steel, 6", R-8550
Thermometer, R-1032, Detail 1
Voltmeter, d-c, Weston Model 280, Range 150 - 60-3 volts

Materials

→Cloth, cleaning, Twill Jean, D-98063
→Grease, 310-330P
Pad, felt
Sandpaper, 4/0
→Spirits, petroleum

3.002 Before making any tests or adjustments not requiring power, be sure to open the circuit so that the motor cannot be started and cause personal injury while it is being worked on.

3.003 In removing brushes note the position of each brush in its holder and put it back in the same position and the same holder to insure that the contact will be the same as before removal. In replacing a brush holder cap screw see that the inside of the cap is smooth and clean so that there is no possibility of the pigtail becoming twisted as the cap is screwed into place.

3.004 When the motor is disassembled blow it out with air and wipe off the armature with a clean dry cloth; also wipe out the machine frame removing dust and accumulated dirt. The metal parts of some motors are protected against rusting by a thin film of antirust compound which is an oil that dries semihard. It is desirable that removal of this film be avoided as much as practicable

3.01 Lubrication (Rq. 2.01)

(1) To inspect the grease cups of the bearings, unscrew the cups below the bearings and remove the cups and wicks. Add grease to the cups if required. To clean and relubricate a bearing moisten a cloth with petroleum spirits, place the cloth over an orange stick, and dig out all the old and hardened grease from the hole under the bearing from which the grease cups and wicks were removed. Using the orange stick dig out all the old grease in the grease cup, clean the interior of the cup with petroleum spirits and wipe it dry with a clean cloth. Fill the grease cup with fresh grease. During either inspection or cleaning examine the wicks to see that they have not hardened. If the wicks are hard, tap them all around with a screwdriver handle and then apply a small quantity of light mineral oil. If the wick has lost its shape replace it. In replacing the grease cup and wick make certain that the wick does not bind and that it presses against the shaft. Tighten the grease cup securely.

#3.02 Bearings (Rq. 2.02)

(1) Before reporting a motor for defective bearings see that requirements 2.03, 2.04, 2.05, and 2.10 are met. If these requirements are not met, the matter should be referred to the supervisor.

3.03 Freedom of Rotation (Rq. 2.03)

(1) Examine the motor and remove any foreign matter. See that the end shields are properly seated against the frame. Also, check to see that all bolts and screws are firm. Tighten if necessary. See that the brushes are free in their holders. If after the above procedure the armature continue to bind the trouble is probably due to worn bearings.

3.04 Noise and Vibration (Rq. 2.04)

→ (1) See that all bolts and nuts are firm. Realign the motor with the distributor if necessary by loosening the mounting screws or bolts and shifting the motor until the armature turns without binding and there is slight end play in the coupling between the two machines.

(2) If excessive noise and vibration continue, the trouble is probably due to worn bearings which should be replaced or the matter referred to the supervisor.

3.05 Motor Speed (Rq. 2.05)

(1) If the motor speed is not within the required limits, check the supply voltage to the motor, the condition of the brushes, temperature, and test for freedom of rotation. If these requirements are met and the motor speed is still outside the specified limits the matter should be referred to the supervisor.

3.06 Commutator Surface (Rq. 2.06)

(1) A rough commutator surface will necessitate the dismantling of the motor and the removal of the armature for the resurfacing of the commutator. To remove an armature first remove the brushes, grease cups and bearing wicks. Remove the nuts from the end shield on the coupling end using the No. 45 socket wrench. Remove the end shield. If it sticks, pry it off by inserting a screwdriver in the small opening on the side between the frame and the end shield. Note the location of all parts which may be removed so that they may be replaced in their proper position. Slide the armature out taking care not to lose any spacing washers which may be on the shaft. Minor cleaning or resurfacing (see Section 171-110-801) may now be done using sandpaper. If such action does not remove the roughness, the matter should be referred to the supervisor. Reassemble the motor in the reverse order from that in which it was dismantled.

(2) When dismantling the motor observe the position of the shims under the feet of the motor as nearly as possible so as to aid in obtaining the correct alignment when reassembling.

*#3.07 Commutation (Rq. 2.07)

(1) If the commutation is not satisfactory see that 2.06, 2.08, and 2.09 are met.

(2) Slight visible sparking is not necessarily an indication of unsatisfactory commutation. Where the commutator is enclosed and cannot be observed in operation, commutation should be judged by the condition of the commutator surface.

*#3.08 Brush Holders (Rq. 2.08)

(1) To adjust the clearance of a brush holder, loosen the associated locking screw with a screwdriver and move the holder to the desired position. Be sure that the alignment of the brush holder is not changed when adjusting the clearance. Tighten the locking screw after an adjustment has been made.

3.09 Brushes (Rq. 2.09)

(1) Replace brushes as necessary to maintain at least the minimum length specified.

(2) Replace loose brushes. Brushes which are too tight can usually be fitted by cleaning the brush and brush holder. Remove any burrs or rough places in the brush holders.

(3) Brushes are generally furnished with their faces curved to the approximate curvature of the commutator. After inserting new brushes run the motor for a few hours without load so they may be seated properly.

(4) If the coil spring of a brush is found short, untwist the pigtail if required. If, however, the pigtail is not limiting the length of the spring, the latter should be stretched to increase its length and pressure. If the spring itself is soft or the pigtail is found loose at either end, replace the brush.

*#3.10 Temperature (Rq. 2.10)

(1) The temperature of any accessible part of the motor can be measured by holding the bulb of the thermometer against that part, the temperature of which is desired; covering with a piece of felt that portion of the bulb which does not touch the part, and observing the maximum temperature reading.

(2) If the temperature exceeds the specified limits refer the matter to the supervisor.