

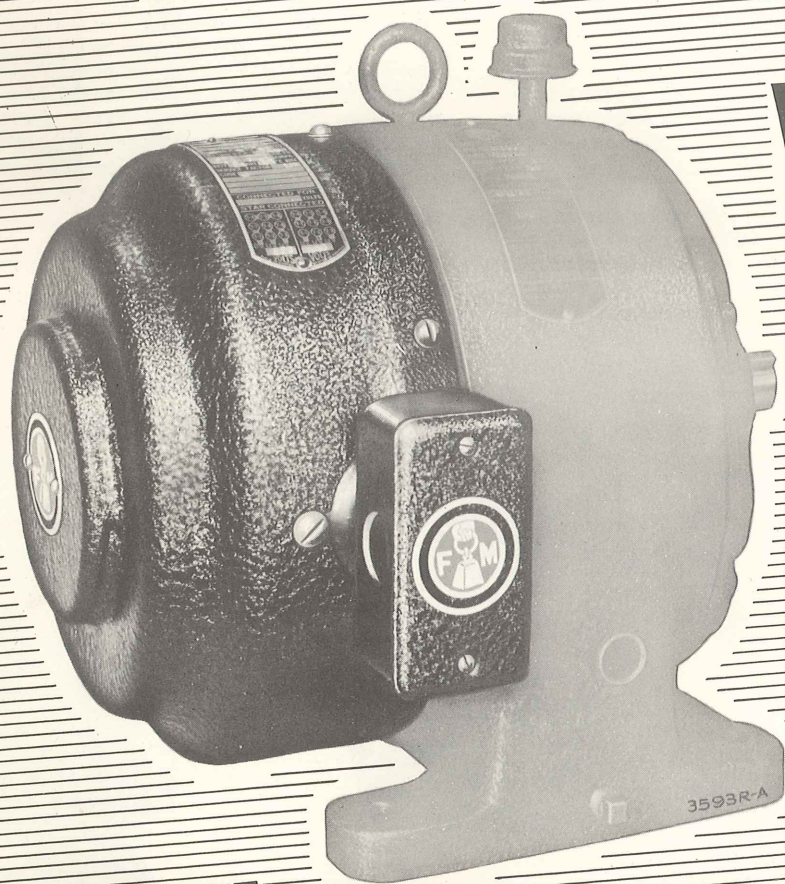
AXIAL AIR GAP

BALL BEARING

HORIZONTAL

and

VERTICAL



ALTERNATING CURRENT

**FAIRBANKS-MORSE
MOTORS**

INSTRUCTIONS NO. 2882B

AXIAL AIR GAP

TYPE QZA - HORIZONTAL OR VERTICAL

TYPE QZAK - HORIZONTAL

TYPE QZAU - VERTICAL

TYPE QZAE - TOTALLY ENCLOSED SQUIRREL CAGE MOTORS

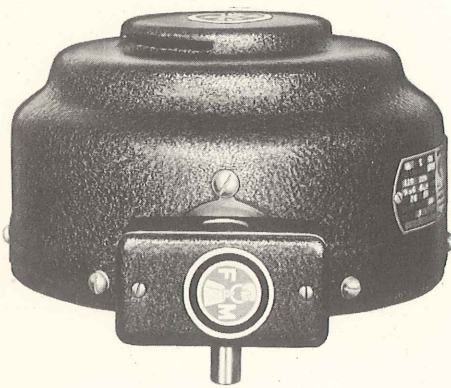
GENERAL

All axial air gap, alternating current, induction motors are manufactured, inspected and tested in accordance with the same rigid standards of materials and workmanship under which all Fairbanks-Morse electrical equipment is built.

Motors are so constructed that they may be mounted in practically any position, and are designed for mounting on the driven member. Deep groove ball bearings are standard equipment.

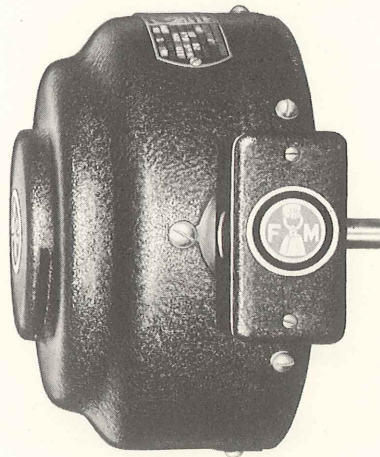
Mounting

All axial air gap motors are suitable for either vertical, horizontal or pivot base mounting, after minor modifications are made. For installations where a belt drive is required, the pivot base illustrated in Fig. 3 is recommended since the base is designed to provide belt tension adjustment.



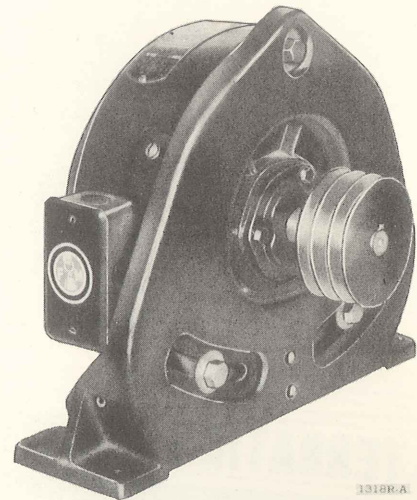
3474R-A

Fig. 1—Axial Air Gap Motor Adapted to Vertical Shaft Installation



3474R-A

Fig. 2—Axial Air Gap Motor Adapted to Horizontal Shaft Installation



1318R-A

Fig. 3—Axial Air Gap Motor with Pivot Base for Belted Service

Storage

When machines are received they should be put in a dry clean place. If the machine is stored temporarily, special attention should be given to the heat, humidity and dust content of the air. If stored for any length of time, finished surfaces should be greased and inspected periodically to prevent rusting.

INSTALLATION

All axial air gap motors have a mounting fit on the outside diameter of the stator frame that is concentric and square with the shaft. This design feature facilitates mounting the motor on a machine or base, and assures a true running pulley pinion or coupling.

Mounting the Motor

The mounting holes are located in the stator frame, therefore it will be necessary to remove the cover to gain access to them.

Pulley, Pinion or Coupling

The pulley, pinion or coupling should be located as close to the bearing as possible and should not be driven on or off the shaft as this is injurious to the bearings. If a tight fit on the shaft is required, it is advisable to employ a shrink fit to avoid pounding on the shaft. By heating the drive member in oil at 150° F. to 200° F., it will have expanded sufficiently to slide it onto the shaft.

When removing a tight pulley, pinion or coupling, always use a suitable puller.

Alignment

It is extremely important that the motor shaft be carefully leveled. Also, a careful check should be made as to the alignment of the pulley, pinion or coupling since any misalignment will cause excessive load on the bearings.

WIRING

Single Speed Motors

All motor and control wiring should be carefully

installed in accordance with the National Electric Code and any local requirements. The frames of all motors and starting devices should be grounded.

Instructions for wiring and installation of starting device are furnished with that equipment.

To reverse rotation of any polyphase motor, interchange line leads L1 and L3.

Motors for 220/440 volt service are usually furnished with nine leads.

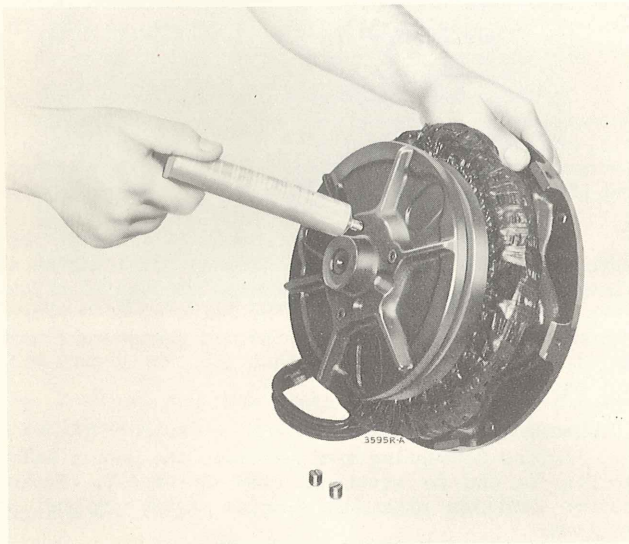


Fig. 4—Method of Lubricating Rotor Bearing. Both Plugs Removed, Old Grease Being Forced Out

BE SURE THE MOTOR IS CONNECTED FOR THE PROPER VOLTAGE. SEE DIAGRAM ON MOTOR NAMEPLATE.

Multi-Speed Motors

Connect motor leads in accordance with diagram on motor nameplate, together with diagram furnished with control device for proper installation and wiring.

Fuses

Starting fuses should be approximately two and one-half times the ampere rating of the motor.

The running fuses, if used, or the overload relay setting, should be one and one-fourth times the ampere rating of the motor and must not exceed one and one-half times this rating. It is very important to use only the proper running fuses since if one fuse blows and the other fuses are too large, the motor may continue to run single phase until it burns out.

Conduit Box

The pressed steel conduit box is fastened to a separate mounting bracket with a nipple and locknut permitting removal of the one piece sheet steel cover without disconnecting the motor leads. In assembling the conduit box to the bracket the head of the nipple is placed inside the bracket, the locknut and bushing are then put inside the conduit box.

OPERATION

Before Starting

(1) Check voltage stamped on nameplate to see that it corresponds with line voltage.

(2) Check all connections to the motor with starter wiring diagram.

(3) See if rotor turns freely.

Starting

Before putting the motor into service, it is desirable to run it without load long enough to determine that the wiring is correct and the motor has no undue heating.

If the motor starts slowly, either the voltage may be low or the motor may be overloaded.

If the motor hums, but does not start, or slows down under load, it may be due to low voltage or an open circuit. An open circuit may be a blown fuse, or a burned or poor contact in starting device.

An open circuited line may be located by checking the voltage on the line side of the motor terminals with a voltmeter or test light, the motor being disconnected. Do this with the starting device on both the "Start Position" and "Run Position". If one line is dead in either position, it would indicate either a blown fuse or burned contact in that line.

MAINTENANCE

Cleanliness

Keep the motor free from water, oil and dirt. Wipe the exterior and clean the interior by compressed air or bellows. It is an excellent plan to give the

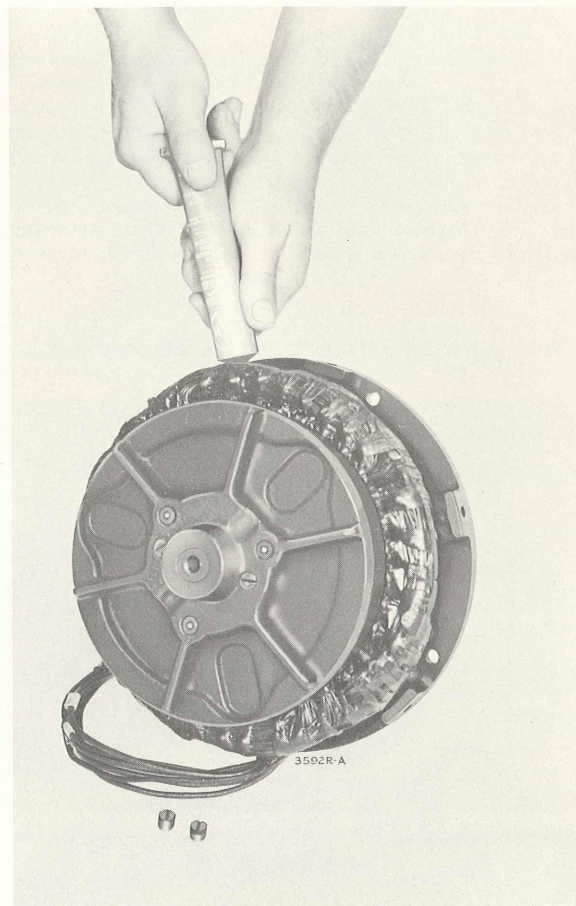


Fig. 5—Method of Lubricating Stator Bearing. Plugs Removed from Both Lubrication Fittings

motor a thorough cleaning once a year, at which time the windings should be cleaned and painted with a good

grade of insulating varnish and the bearings cleaned and regreased.

Heating

Do not depend upon the hand to determine the temperature of a motor. Motors are rated on the basis of degrees Centigrade rise above the temperature of the surrounding air. This temperature rise is stamped on the motor nameplate. If the temperature rise exceeds this value or becomes excessively high, take the temperature of the motor and surrounding air and if possible, a reading of voltage, amperes and kilowatt input to motor. Submit this data to the nearest branch office.

Lubrication

The high grade, deep groove ball bearings used on axial air gap motors should be greased at regular intervals. It is important to use a chemically neutral grease with a sodium soap base, made from pure paraffin mineral oils and free from graphite. The main purpose of grease is to protect the highly finished surfaces and to provide an oil film between surfaces to reduce friction.

Fairbanks-Morse grease meets this specification and is made especially for anti-friction bearings. Fairbanks-Morse grease is available in convenient size tubes for all sizes of bearings. Fairbanks-Morse grease specification FMC08 will operate satisfactory from -20° F. to 250° F. When ordering grease tubes, give motor frame size.

When to lubricate a motor depends on the length of time a motor is operated and the type of installation. As they leave the factory, motors are supplied with sufficient grease in the bearings for one year's service, based on 8 hours a day operation, for most applications. Special applications for unusually severe service will require more frequent greasing. All motors are shipped from the factory with Fairbanks-Morse FMC08 grease in bearings unless ordered otherwise.

When greasing a bearing, it is recommended that

the bearing and bearing housing be filled approximately $1/2$ full. Care should be taken to avoid over greasing the bearing. **EXTREME CARE MUST BE TAKEN TO SEE THAT NO DIRT BE ALLOWED TO GET INTO THE BEARING AT ANY TIME.** Before the bearings are opened, or before removing the plugs to add grease, the outside of the closures should be wiped clean. The bearings should not be pressure lubricated unless a pressure relief plug is used.

As shown in Fig. 4, the free end bearing is lubricated through either of two holes provided in the rotor spider. Similarly, the pulley end bearing is provided with two pipe connections to facilitate lubrication. When greasing, both plugs should be removed so that the new grease can force the old grease out.

It is recommended that the bearings be flushed out occasionally and new grease added. Alcohol, spindle oil, or flushing oil are good flushing mediums. Carbon tetrachloride is an excellent solvent of caked grease, but if used should always be followed with flushing oil.

To flush out a bearing, proceed as follows: remove one of the pipe plugs, pour in a small amount of flushing liquid, run the motor a few minutes to circulate the solvent, then drain by removing both plugs. Repeat this process until all the old grease and flushing liquid are removed, so that the new grease will not become diluted.

To Dismantle the Motor

Before attempting to disassemble the motor, refer to Fig. 6, and to sectional view on page 7. Having become familiar with the machine parts, proceed as follows:

Step No. 1 - Remove cover.

Step No. 2 - Remove the capscrews or nuts which hold the motor to the machine or base, lift off the motor, then proceed to remove the pulley, pinion or coupling as explained under "INSTALLATION".

Step No. 3 - Remove the pulley end bearing closure (Pc. S6) and closure gasket (Pc. S7).

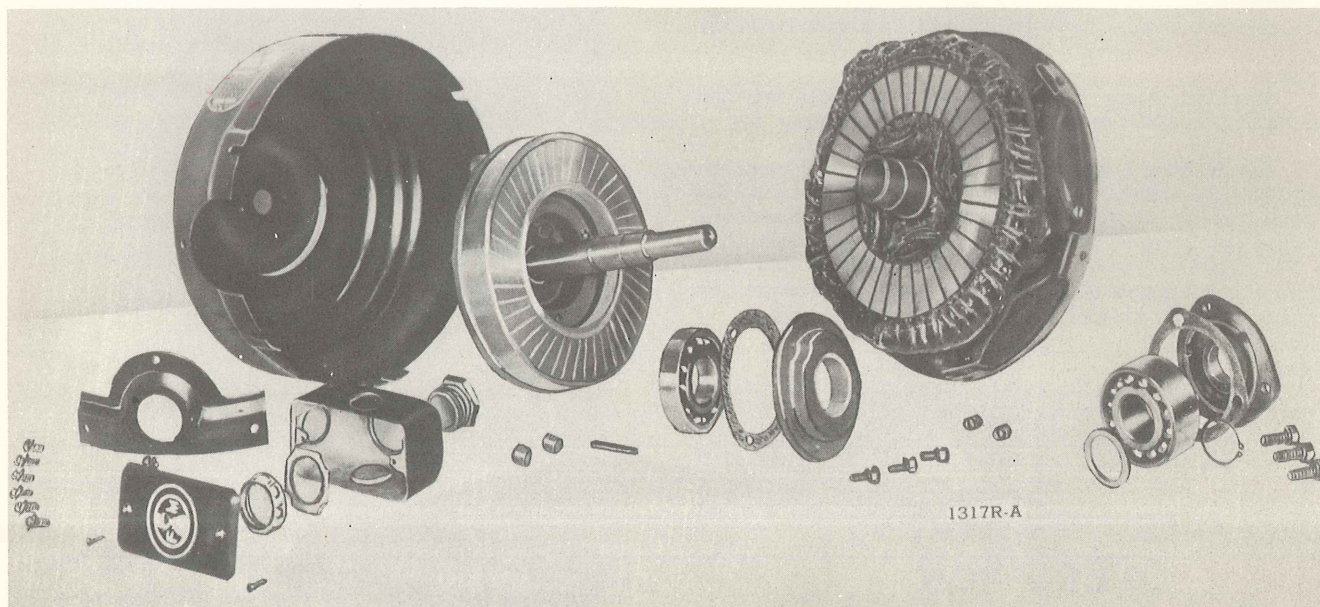


Fig. 6 - Axial Air Gap Motor, Disassembled

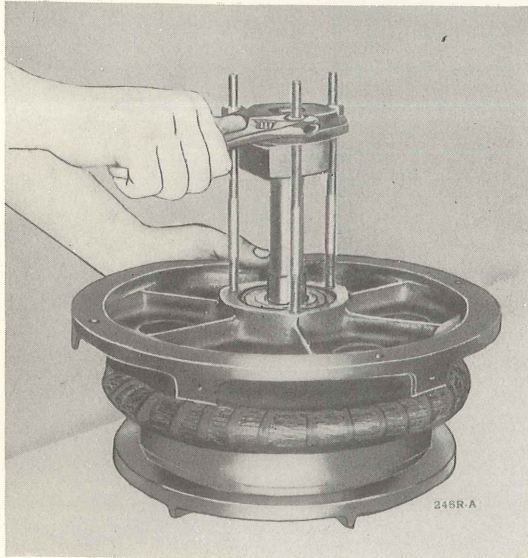


Fig. 7—Removing the Stator Bearing, Puller Consisting of Bearing Closure, Flat Plate and Through Bolts

Step No. 4 - Remove bearing retaining ring.

Step No. 5 - By setting up the special bearing puller as shown and turning the screw, the rotor and shaft can be pressed free of the stator frame and bearing. When this is done, the pulley end bearing and the shaft collar can be taken out of the stator by hand. The bearing puller can be furnished on special order.

Step No. 6 - After having completed step 1 through 5, the free end bearing can be removed. First, remove the inner closure (Pc. H4A) and gasket by taking out the closure capscrews. Before removing this bearing closure, scribe a mark on the closure and the spider so that it can be reassembled in the same position and thus will not destroy the balance. Then, remove the pipe plugs from the two holes in the motor spider (Pc. C1) through which the bearing is lubricated. By carefully inserting drift pins into the holes, and tapping on the outer race of the bearing, it can be driven out of the rotor spider. See Fig. 8.

Step No. 7 - If it should be necessary to press the shaft out of the rotor spider, the pin which locks the shaft in position must be driven out first. Upon reassembly, the shaft must be drilled after it is pressed in, and dowel fitted securely.

To Assemble the Motor

Step No. 1 - Press the free end bearing into the rotor spider, replace gasket and inner closure in the same position it was when the motor was dismantled, and tighten the closure capscrews.

Step No. 2 - Carefully lower the stator assembly (without the stator bearing) onto the rotor shaft as shown in Fig. 9.

Step No. 3 - Place the shaft collar (Pc. B9) over the end of the shaft and into the stator frame. It is important that the collar be properly installed since it controls the air gap and limits the end play.

Step No. 4 - Press the bearing onto the shaft as shown in Fig. 10. Assemble bearing with ball loading notches facing out. Use a sleeve or section of pipe which will engage evenly all around on the inner race of the bearing, and apply pressure.

Step No. 5 - Replace bearing retaining ring.

Step No. 6 - Replace the closure gasket, outer closure, and tighten the capscrews. It is extremely important to use only the proper gasket and that the capscrews be kept tight at all times since these factors also control the air gap.

Step No. 7 - Replace the pulley, pinion or coupling on the shaft as recommended under "INSTALLATION",

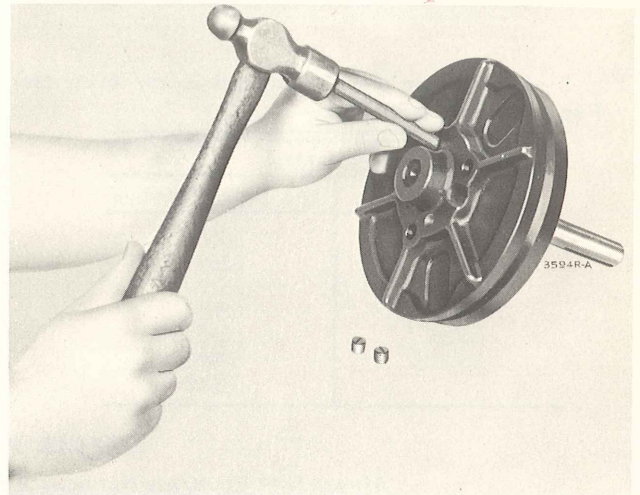


Fig. 8—Driving the Free End Bearing Out of the Rotor Assembly

place in position on base or driven machine, and tighten the mounting nuts or capscrews as the case may be.

Step No. 8 - Before replacing the cover, check both bearings to see that they are properly lubricated. Prescribed method of greasing can be found under "Lubrication".

When Requesting Information or Parts

To facilitate and expedite the furnishing of service parts, it is important that both the machine which is being serviced and the part required, be properly identified. Therefore, when requesting information, always specify the serial number of the motor and, if available, complete nameplate data. When ordering service parts, give the information listed above along with the "REPAIR NUMBER" and the "NAME OF PART" as listed on page 6 and illustrated on page 7.

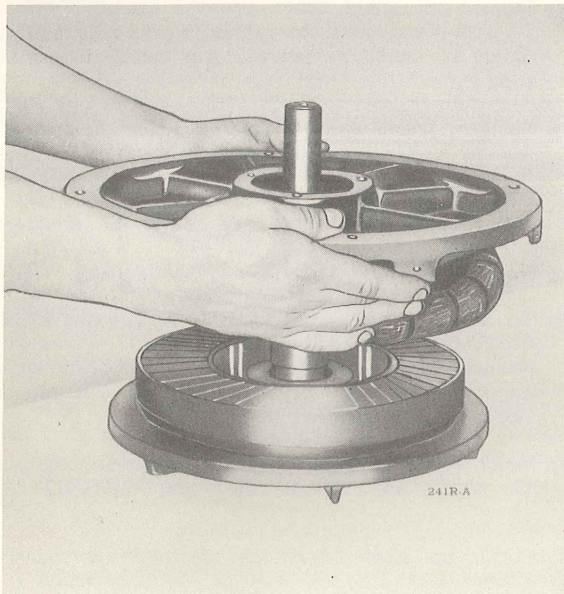


Fig. 9—Assembling the Stator and Rotor After the Rotor Bearing is in Place

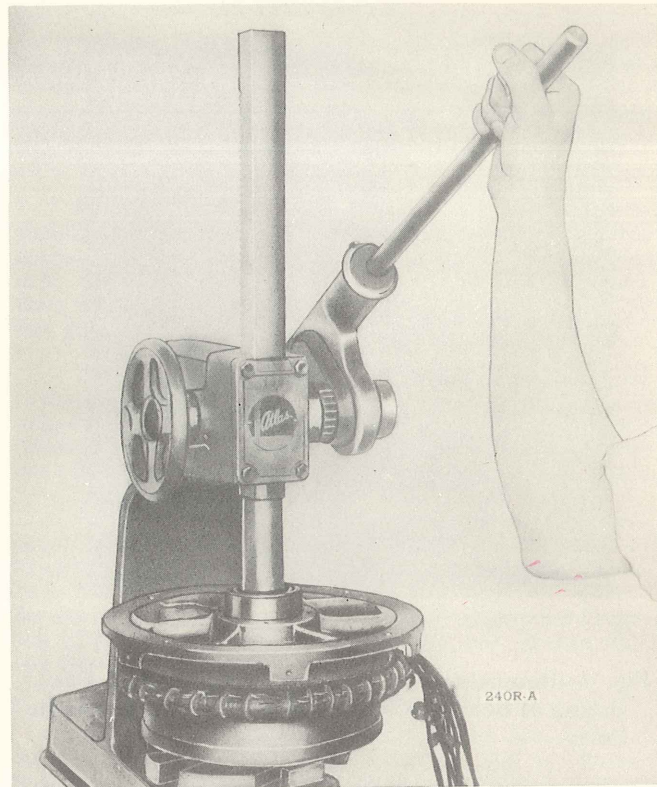


Fig. 10—Pressing the Stator Bearing into the Stator. Hollow Sleeve On Shaft Engages the Inner Race of the Bearing

FRAME SIZES	
2 - POLES	4 - POLES OR MORE
L4060	4060
L4267	4267
L4570	4570
L5285	5285
L6095	6095
L60105	60105
	65117

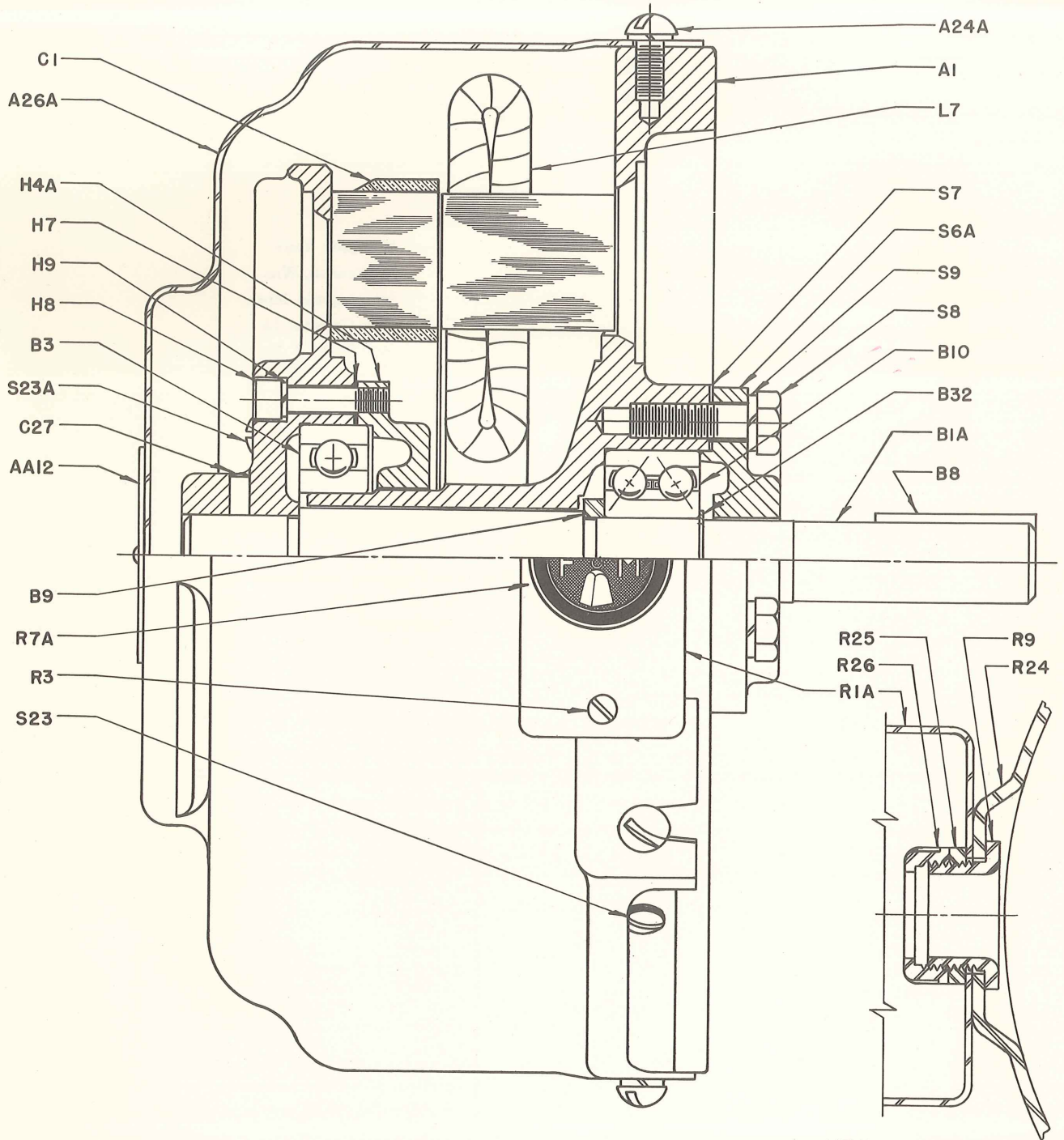
REPAIR PARTS LIST

Always Give Complete Nameplate Reading When Ordering Repair Parts

Repair Number	NAME OF PART	Repair Number	NAME OF PART
A1	Stator Frame - includes: Stator Frame and Stator Core Welded Together. Furnished with Complete Set of Coils, Winding, Slot Insulation and Wedges, Inserted and Connected.	H8	Rotor Bearing Closure Capscrews
A12	Nameplate (Data) - Not Illustrated	H9	Rotor Bearing Closure Lockwashers
AA12	Trademark Plate	L7	Set of Coils
A20	Lead Markers - Not Illustrated	N20	Angle Pivot Base
A24A	Conduit Bracket and Cover Screws and Lockwashers	N21	Angle Pivot Base Capscrews
A26A	Sheet Metal Cover	N22	Angle Pivot Base Washer (Special)
B1A	Shaft	N23	Angle Pivot Base Lockwasher
B3	Rotor or Free End Bearing (Single Row)	R1A	Conduit Box
B8	Pulley Key	R3	Conduit Box Cover Screws
B9	Shaft Collar	R7A	Conduit Box Cover
B10	Stator or Drive End Bearing (Double Row)	R24	Conduit Box Bracket
B32	Bearing Retaining Ring	R9	Chase Nipple
C1	Rotor Assembly - Always includes: Rotor Spider, Rotor Shaft and Laminations, Copperspun and Welded Together	R25	Conduit Locknut
C27	Rotor Pin	R26	Conduit Bushing
H4A	Rotor Bearing Closure	S6A	Stator Bearing Closure
H7	Rotor Bearing Closure Gasket	S7	Stator Bearing Closure Gasket
		S8	Stator Bearing Closure Capscrews
		S9	Stator Bearing Closure Lockwashers
		S23	Lubrication Plugs (Stator Bearing)
		S23A	Lubrication Plugs (Rotor Bearing)

Not Illustrated

ALWAYS GIVE MOTOR SERIAL NUMBER



F 65420-A

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All specifications herein are subject to variations in design and construction, except such as would substantially affect installation or matters of performance otherwise expressly guaranteed.