I. B. 3600-1

RECEIVING • INSTALLATION • MAINTENANCE

INSTRUCTIONS

GEARMOTORS

Horizontal Type

Type A—Single Reduction
Types C and E—Double Reduction

A-C, 208, 220, 440 And 550 Volts, 1 to 75 HP.
D-C, 115 And 230 Volts, 1 to 7½ HP.

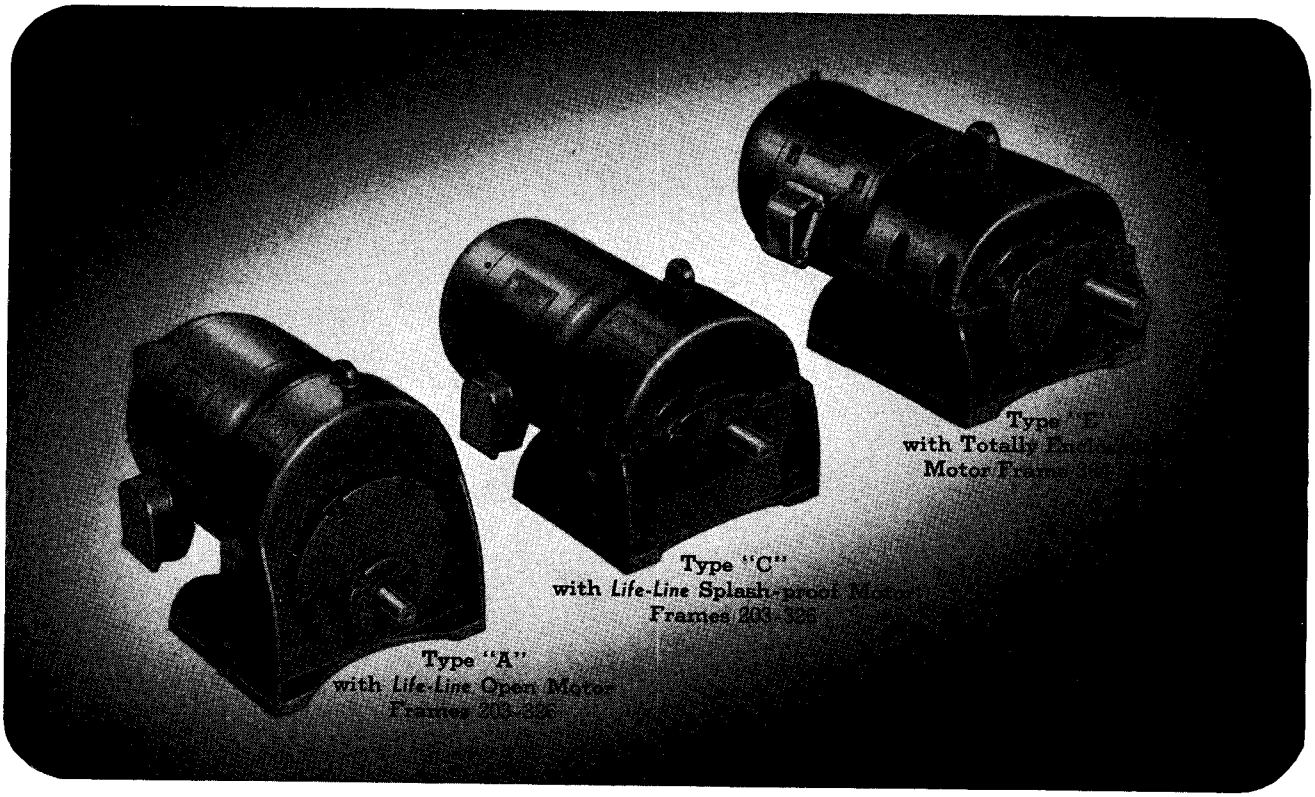
WESTINGHOUSE ELECTRIC CORPORATION
NUTTALL WORKS • GEARING DIVISION • PITTSBURGH 1, PA.

SUPERSEDES I. B. 3600

EFFECTIVE NOVEMBER, 1946
Printed in U.S.A.

WESTINGHOUSE GEARMOTORS

Horizontal Type



SINGLE REDUCTION—Type A*
Standard Ratios 1.22:1 to 6.25:1, inclusive
A-c, 208, 220, 440, 550 Volts—1 to 75 Hp
D-c, 115 and 230 Volts—1 to 7½ Hp

DOUBLE REDUCTION—Type C*
Standard Ratios 7.6:1 to 25.7:1, inclusive
A-c, 208, 220, 440, 550 Volts—1 to 75 Hp
D-c, 115 and 230 Volts—1 to 7½ Hp

DOUBLE REDUCTION—Type E*
Standard Ratios 31.2:1 to 58.3:1, inclusive
A-c, 208, 220, 440, 550 Volts—1 to 75 Hp
D-c, 115 and 230 Volts—1 to 7½ Hp

*For specific identification and operating ratings, refer to nameplates attached to the gearmotor.

These gearmotors are designed and manufactured in accordance with the American Gear Manufacturers Association Standards for Parallel Shaft Type Gearmotors. They are completely self-contained units, combining a standard type Westinghouse a-c or d-c motor with a geared drive specifically designed for a pre-specified requirement.

Important: Each drive, as furnished, has been selected to suit the electrical characteristics, and load conditions for the AGMA Service Class, specified on the order. Satisfactory performance of the gearmotor is dependent on adherence to the operational ratings as stated on the nameplates.

RECEIVING, HANDLING AND STORING

Immediately upon receipt of the gearmotor, examine the crating carefully. If any evidence of damage due to rough handling is apparent, notify the carrier (transportation company) at once, *before unpacking the unit.*

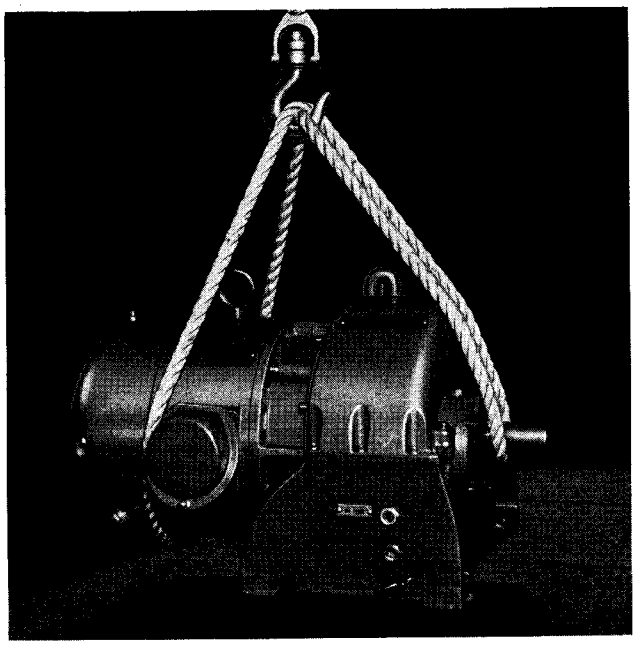


FIG. 1. Correct Method of Attaching Sling for Handling Gearmotor.

UNPACKING AND HANDLING

The gearmotor is usually bolted to a skid which forms the bottom of the crate in which it is shipped. Remove the sides of the crate carefully and then move the unit into convenient position by attaching a tow rope to the skid.

When it is necessary to hoist the gearmotor, use a sling as illustrated in Fig. 1.

Important: Do not attempt to lift the unit by the eyebolt in the motor frame. This eyebolt is designed to support only the weight of the motor and adapter, and is furnished for convenience in removing the motor from the unit.

STORING

When it is necessary to store the unit for any length of time before installation, the storage location should be dry, clean, and as nearly constant in temperature as possible. *Do not remove the crating or the skid.*

If the gearmotor is to be installed when received, but will not be put immediately into actual service, it should be connected to the electrical circuit, properly filled with oil, and turned over by power at least once a week. This procedure maintains an oil film over the working parts of the gear assembly, and prevents corrosion.

INSTALLATION

The continuous efficient operation of a gearmotor depends chiefly on four factors:

1. The proper type of foundation and the correct method of mounting the unit

2. Proper alignment of the unit with the driven equipment

3. Correct lubrication

4. Full consideration of both preventive and operating maintenance

The following instructions are suggested to provide a simple, basic plan for the installation and trouble-free operation of this equipment.

FOUNDATION

A foundation or mounting which provides rigidity and prevents "weaving" or "flexing", with resultant misalignment of the shafts, is essential to the successful operation of a gear drive.

A concrete foundation should be used whenever possible, and should be carefully prepared to conform with data regarding bolt spacing and physical measurements contained in the Identified Dimension Leaflet, supplied prior to delivery of the equipment.

Gearmotors are designed with a tolerance of + 0 and − 1/32 in. between the shaft center and the base. Therefore, shimming may be required. Shims of various thicknesses, slotted to slide around the foundation bolts, should be used. After alignment has been secured through shimming, the gearmotor should be bolted down and grouted in. (See B, Fig. 2.)

When the unit must be installed on structural foundations, a supporting base plate of steel should be provided to obtain proper rigidity. This plate should be of a thickness not less than the diameter of the holding-down bolts. (See A, Fig. 2.)

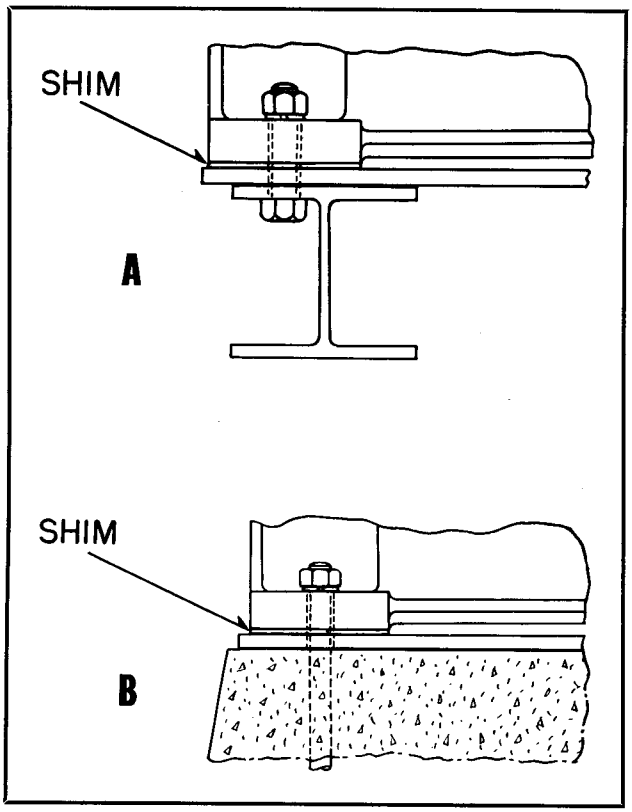


FIG. 2. Typical Foundation Details.

SECURING ALIGNMENT

When the gearmotor is connected to driven equipment by means of a coupling, correct alignment cannot be overemphasized, and becomes of greater importance as speeds are increased or drive is subjected to variations in load conditions. Misalignment, either parallel or angular, is one of the most frequent causes of bearing or shaft failures, noisy operation, or excessive operating temperatures due to the extra load thus imposed.

A simple method of checking the installation for parallel and angular alignment is illustrated in Figs. 3 and 4. A straightedge is laid across the coupling member at the outside diameter and correct parallel alignment is obtained when the straightedge rests on both coupling members for their full length. (See Fig. 3.) As a check for correct angular alignment, the use of feeler gauges between coupling member faces is very common practice (see Fig. 4). The taking of such check at four positions on the coupling faces is strongly recommended.

A more accurate alignment check is obtained by the use of dial indicators. The usual method is to clamp the indicator on one coupling member with indicator stem resting on the other coupling member, and then rotating that member.

MOUNTING

Wall and Ceiling Mountings. Unless otherwise specified when ordered, a gearmotor is supplied for floor mounting.

If wall or ceiling mounting is desired at any time after receipt of the equipment, certain changes in the lubrication system (breather and oil level) will be necessary. Also, for Type E, a unit of the opposite hand of assembly may be necessary and will require a new gear case.

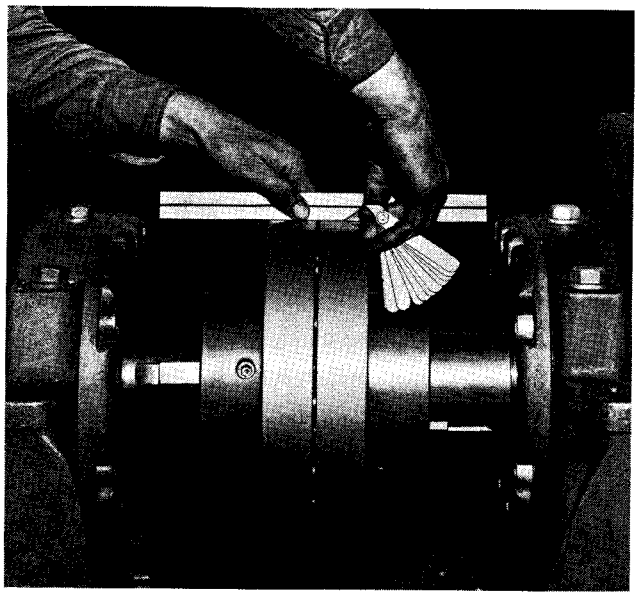


FIG. 3. Checking Parallel Alignment.

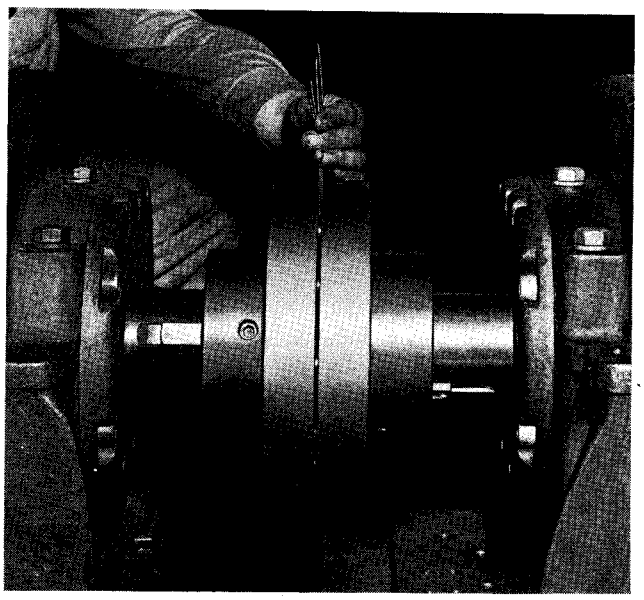


FIG. 4. Checking Angular Alignment.

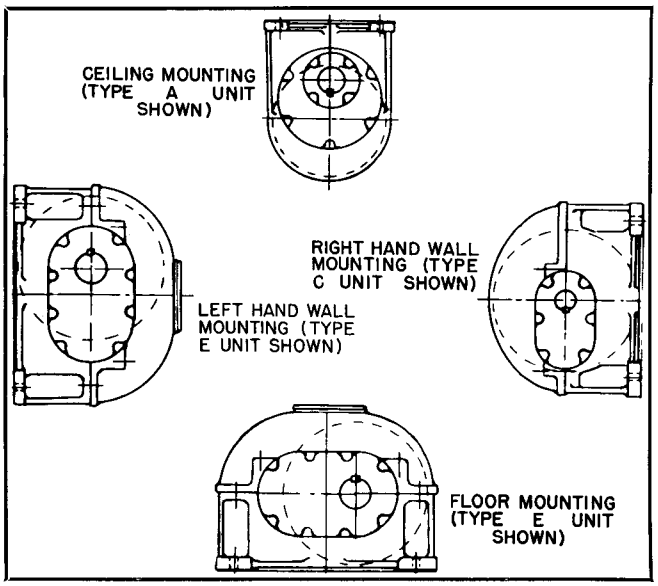


FIG. 5. Horizontal and Vertical Mounting Arrangements.

Details for such changes can readily be obtained from Westinghouse.

It should also be noted that the units as furnished are intended (unless otherwise specified) to be mounted on level foundations. Applications requiring the use of units on angle mounting are always special, and will require changes in the lubrication system. When such changes in mountings are necessary, Westinghouse is to be contacted for detailed data before proceeding.

Fig. 5 illustrates and identifies the various types of mountings most commonly used.

ELECTRICAL CONNECTIONS

All motor leads are located in the conduit box on the side of the motor. Leads are tagged and identified to correspond with the wiring diagram engraved on the nameplate of each unit.

All electrical connections should be installed in accordance with the National Electric Code and local requirements.

OIL SPECIFICATIONS

General. Lubricating oils for use with gearmotors must be high-grade, high-quality, well-refined petroleum oils. They must not be corrosive to gears, or to ball or roller bearings. They must be neutral in reaction, free from grit or abrasives, and have good defoaming properties. For high operating temperatures they must have good resistance to oxidation.

Only lubricants of the straight mineral type are to be used with these gearmotors. For applications where loads, speeds or temperatures are abnormal, Westinghouse should be contacted for specific recommendations.

Viscosity. Lubricating oils should be within the viscosity recommended in the following table for duty and temperature:

VISCOSITY RANGE, S.U.V. SECONDS

AGMA LUBRICANT NO.	AT 100° F	AT 210° F
1	400— 700	.....
2	700—1000	.....
3	.....	75—105
4	.....	105—125
5	.....	125—150
6	.....	150—180

LUBRICATION RECOMMENDATIONS

AMBIENT TEMPERATURE, DEG. F.		
0—40 F	41—100 F	101—150 F
Lubricant #2	Lubricant #4	Lubricant #5

Selection of Oil. A list of approved oils which meet the general specifications (given above) identified by manufacturer's trade name, will be furnished on request.

APPROXIMATE OIL CAPACITY*

TYPE A UNITS		TYPE C UNITS		TYPE E UNITS	
Unit	*Quarts	Unit	*Quarts	Unit	*Quarts
AF	¾	CE	1½	EG	3
AG	1	CF	2	EH	4¾
AH	1½	CG	3½	EJ	5½
AJ	2	CH	4½	EK	7
AK	3	CJ	8½	EL	10
AL	5	..	..	EM	13
		..	..		
AM	7	..	..	EN	17
AN	10	..	..	EP	23
AP	15	..	..	ER	41

*Capacities listed are approximate and will vary with the gear ratios used. Unit should be filled to level indicated on oil level nameplate.

Filling the Unit. In the smaller sizes of gearmotors, the breather pipe must be removed to provide an oil-filling access to the gear case; the larger units are filled through the cover plate.

Important: Never attempt to add or replace oil while the gearmotor is running! Do not fill the unit beyond the indicated oil level. Excess lubricant increases the "churning" effect and will result in overheating with consequent thinning of the oil and leakage.

The oil should be drained and filtered (or replaced) approximately one week after it is placed in service, and the unit refilled to the specified level. This practice helps to remove any foreign material which may have collected in the lubricant during initial operation of the gearmotor.

MAINTENANCE

The care of gearmotor equipment is an important operational function, which should be given every reasonable attention to assure long and efficient service life of the unit. A definite inspection and maintenance program, to cover both the geared drive and its motor, is recommended as follows:

THE GEARED DRIVE

A schedule, based on the check chart given below, should be regularly followed. Intervals between inspections should be determined by the existing atmospheric and operating conditions.

THE MOTOR

Satisfactory operation and length of service of the electric motor as used with the gearmotor depends largely on five general rules for inspection and maintenance:

1. When the gearmotor is installed, make certain that the motor rotor turns freely, particularly if the unit is not installed until some months after being received.

2. Never open the bearing housing under conditions which will permit entrance of dirt.

3. External inspection of the front motor bearing at the time of the first greasing, soon after motor is put into operation, will determine whether or not the bearing is operating quietly and without undue heating. Further inspection will not be necessary except at infrequent intervals, probably at greasing periods.

4. It is desirable, for the most satisfactory service, to open the bearing housing once a year, or after every 5,000 hours operation, to check the condition of the bearing and grease.

NOTE: The procedures given in Paragraphs 3 and 4 apply to all motor types except the Life-Line Series motors which have prelubricated ball bearings and do not require the external inspection described.

5. If grease deterioration has occurred or if grease is dirty, the bearing and housing parts should be thoroughly cleaned out and new grease added.

OPERATING MAINTENANCE CHECK CHART—GEARED DRIVE

TROUBLE	PROBABLE CAUSE	CORRECTION
Noisy operation of the unit	1. Misalignment	1. Check alignment of unit with driven member. Check condition of couplings, if used.
	2. Faulty lubrication	2. Check oil level. Determine if lubricant is of grade recommended.
	3. Excessive tension, if power take off is by belt or chain drive	3. Check tension and alignment of drive auxiliaries; relieve if necessary. (See that driving pulley or sprocket is mounted as close to the unit as possible.)
	4. Worn parts caused by normal length of service, or possibly a result of (1), (2) or (3) above	4. Adjust or replace worn parts as per procedure outlined under Replacement of Parts.
	5. Overloading	
Excessive operating temperature	1. Incorrect lubricant	1. Check oil against specification instructions.
	2. Incorrect amount of lubricant	2. If check shows low oil level, fill to level indicated by nameplate. Drain a portion if level is too high. See that breather is clean and functioning correctly.
	3. Overloading.	
Oil leakage	1. Too much oil in unit	1. Recheck oil level with unit shut down.
	2. Clogged breather	2. Remove and clean breather.
	3. Loose bolts or nuts	3. Tighten all joint and end cap bolts.
Loosened mounting bolts	1. Usually vibration from fluctuating loads or misalignment	1. Check and re-align system. Tighten all bolts.

Do not overlubricate!

Too much grease will cause churning, overheating and grease leakage. If grease leakage occurs, the bearing has been overfilled, or the grease used is not suitable for the particular application.

If high-pressure guns are used, overlubrication should be carefully avoided.

When shipped from the factory, grease-lubricated ball and roller bearing motors have sufficient grease of the right grade to last for a limited period. However, a charge of grease should be added (to all motor types except the Life-Line Series) soon after the motor is put in operation, and thereafter at suitable intervals, as required to keep the bearing housing ⅓ to ½ full.

New grease is introduced at the side of the bearing farthest from the body of the motor. A sufficient charge will force the old grease through the rolling members and out a partially restricted escape port during operation.

When a surplus grease sump below bearing is supplied, it should be kept empty at all times. Excess grease is removed from the sump through pipe plug openings. Periodic greasing and cleaning of the surplus grease sump will prevent damage to the bearings from deteriorated grease and will reduce or eliminate the need for bearing overhaul.

Life-Line Series motors which have prelubricated ball bearings require no lubrication for five years or more. If it is ever necessary to lubricate the bearings after that period, use the following procedure: (1) Remove the snap ring and seal; (2) Clean the bearing thoroughly with carbon tetrachloride to remove all grease and oil; (3) Make certain that all traces of carbon tetrachloride have been removed before lubricating; (4) Repack using Westinghouse grease, S# 1360876, which is available in eight ounce tubes or in cans.

Coils. Do not allow dirt and oil to collect on the stator coils. Inspect the insulation regularly. After a few years service, or oftener for very severe conditions, it is advisable to apply a coat of baking varnish.

Brushes. Good contact should be made (along the whole face of the brush) with the slip rings or commutator. If necessary, seat new brushes in with fine sandpaper. Maintain a free sliding fit between the brushes and the brushholder by cleaning both thoroughly when necessary.

Maintain the brush spring tension at the correct value, which is determined by the grade of brushes and the local service conditions. Make the pressure as low as consistent with good brush slip ring contact. A correct pressure per square inch is between 2 and 3 lbs. for carbon or graphite brushes and between 3 and 5 lbs. for metallic brushes. Each brush should bear equal pressure. Do not use lubricants. Use the correct grade of brushes (which may be obtained from the nearest Westinghouse dealer).

Commutator. Keep the commutator clean, wiping it at frequent intervals with a clean canvas cloth free from all lint.

A commutator that is taking on a polish and shows no signs of wear requires no other attention, but a rough, raw, copper-colored commutator should be smoothed with a piece of sandpaper or sandstone ground to fit, and then polished with No. 00 sandpaper. Always lift brushes when polishing commutator and do not replace them until all grit has been removed. Never use emery cloth or emery paper on the commutator.

REPLACEMENT OF PARTS

DISASSEMBLY OF GEARED DRIVE (See Fig. 6)

In the event of a motor failure, it is usually possible to remove the motor without disturbing the mounting of the geared drive, by removing the bolts connecting the adapter to the gear case and then removing motor and adapter axially, as an assembly.

Similarly, inspection or repairs of geared drive working parts can usually be made without removing the motor-adapter assembly. This is always true of the double reduction type units (Types C and E). First remove all the bolts holding the upper half of the gear housing (including the upper motor adapter bolts). The upper half of the housing should then be tapped lightly to break the cemented joint and dowel fit, and may then be readily removed. This exposes all working parts for inspection. If it is necessary to dismantle the parts, the inner bearing bracket and end plate must be removed; both shaft assemblies may then be lifted out.

On single reduction units (Type A) which are not of the two-piece case construction, it is necessary to remove the drive from foundation. Next remove the main end plate and end cap bolts. Remove end cap carefully to avoid damage to oil seal. The main end plate may then be removed from housing by use of jacking screws which are provided. (This method should always be followed because of the pilot fit between main end plate and gear housing.)

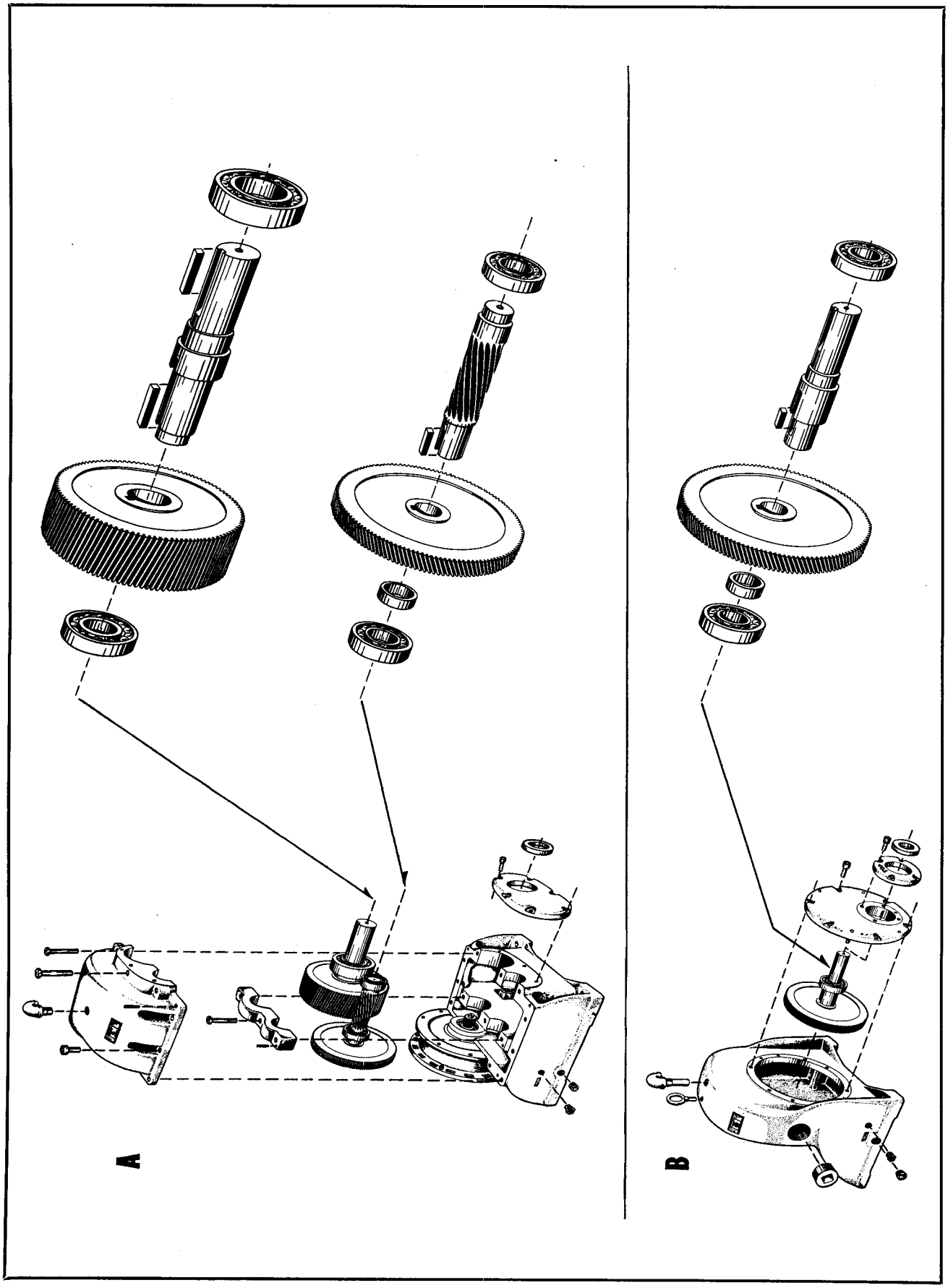


FIG. 6. Arrangement of Parts—(A) Double Reduction Geared Drive, Types C and E; (B) Single Reduction Type A.

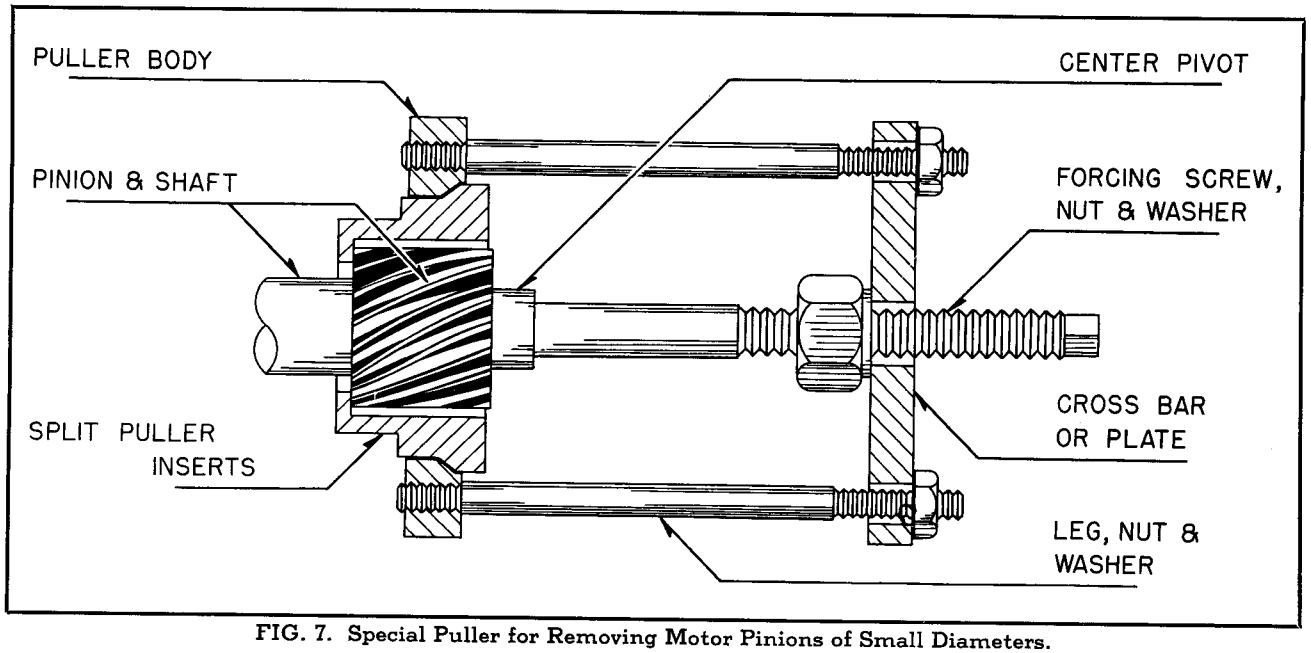


FIG. 7. Special Puller for Removing Motor Pinions of Small Diameters.

The low speed or output shaft assembly can then be readily withdrawn through the large opening in the housing.

The anti-friction type bearings on all shaft assemblies may then be removed either by small press, if available, or with regular commercial bearing-removal tools.

The gear items and motor shaft pinions on these gearmotors are positioned on their shafts by key and press fit. Gears may therefore be readily removed (after bearings are pulled) in an ordinary arbor press. For removal of motor pinions, the ordinary pronged type of puller is usually not satisfactory or adequate. Therefore, on pinions of large diameters, tapped holes are provided for insertion of jacking screws. For smaller pinions, when a press is not available, a puller of sleeve insert design in combination with commercial puller parts will do a very satisfactory job. Such a puller is illustrated in Fig. 7.

Important: Any disassembly of the gearmotor should be done only under conditions which prevent entrance of dirt or dust into the working parts, particularly into the anti-friction bearings.

On reassembly, all cement must be removed from joints, the surface dried, and new cement applied.

DISASSEMBLY OF MOTOR

The motor used with these gearmotors consists of a standard frame (without feet), a standard front end bracket and bearing assembly, and standard rotor construction (with special shaft to suit pinion mounting). The normal rear motor bracket is replaced by an adapter casting with bearing and oil seal assembly; this design is constant regardless of motor type. The front bracket bearing assemblies may be one of three standard types, depending upon motor size and construction: (1) noncartridge type with piston ring seal A-Fig. 8, (2) cartridge types B and C-Fig. 8, and (3) prelubricated bearings D-Fig. 8.

When motor-adapter assembly has been removed from geared drive (see instructions on geared drive disassembly) the procedure for disassembly of motor itself is as follows:

On noncartridge type motors, remove bolts which hold bearing housing covers to bracket, and the bolts securing bracket to the frame. Then remove bolts holding adapter casting to motor frame. The rotor assembly may then be readily removed (from the adapter end) by withdrawing the assembly axially.

On cartridge type motors, the procedure is the same except that the bolts which secure the cartridge to the front bracket must first be removed. Note that on totally-enclosed fan-cooled construction, it is first necessary to remove the hood and exterior blower.

On prelubricated bearing design it is necessary to remove only the bolts securing bracket to frame.

When bearings are being mounted or removed, pressure should be applied only against the inner race. Always use a sleeve or other intermediate piece if mounting or removal is accomplished by hammer blows. Cover bearing carefully during these operations as there is danger of flying particles getting in among the balls or rollers. *Never attempt to remove a ball or roller bearing by exerting pressure against the outer race, as the bearing may be seriously damaged.*

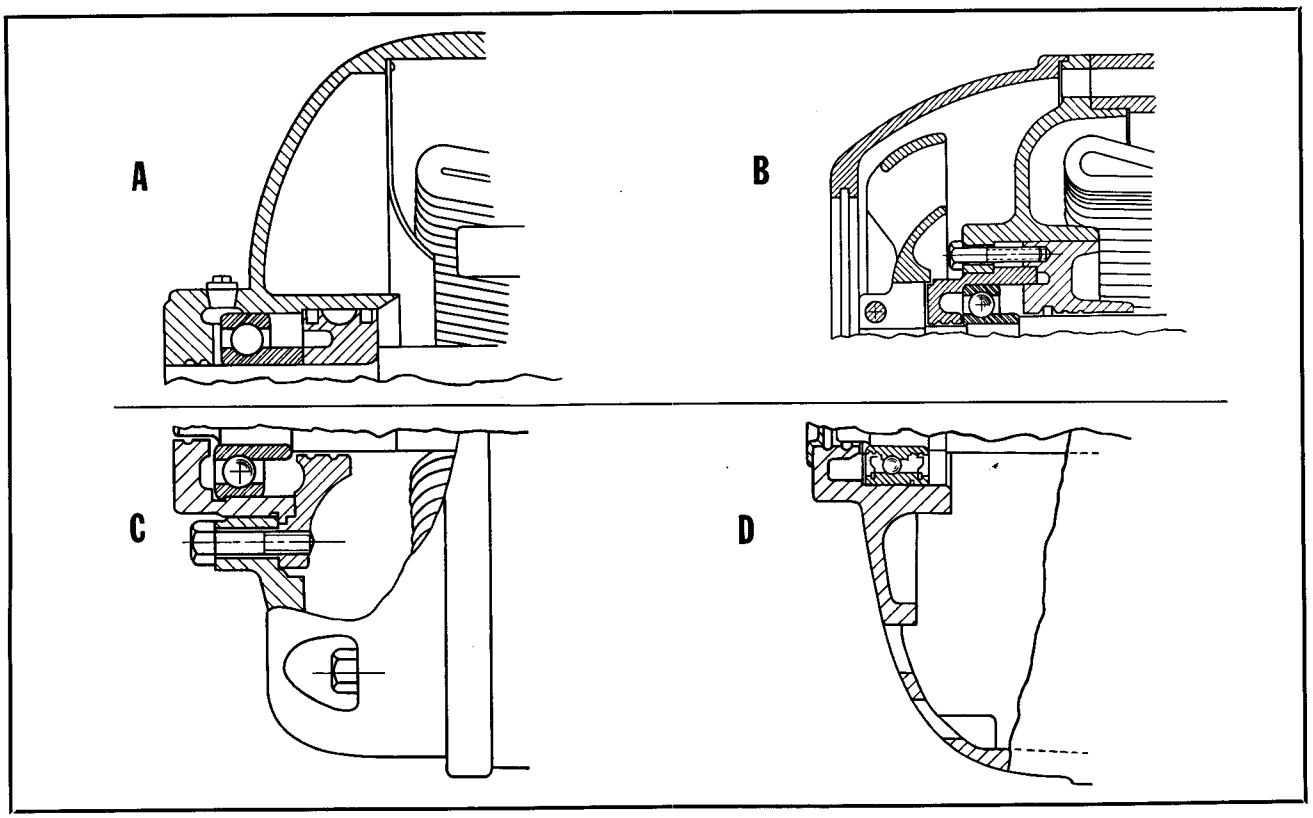
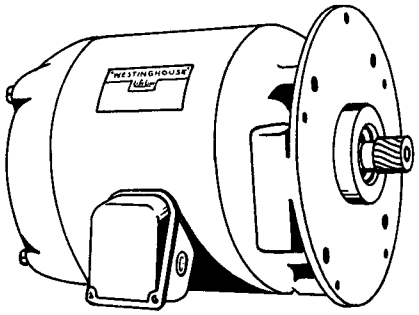


FIG. 8. Types of Front Bracket Bearing Assemblies.

MOTOR REPLACEMENT PARTS

DESCRIPTION	SQUIRREL CAGE MOTORS			WOUND-ROTOR MOTORS TYPE CW	DIRECT-CURRENT MOTORS TYPE SK
	OPEN AND ENCLOSED	SPLASH-PROOF	TOTALLY ENCLOSED FAN-COOLED EXPLOSION-PROOF		
Stator Coils	1	1	1	1	
Cut Winding Insulation (Stator)	1	1	1	1	
Front Bracket	1	1	1		
Front Ball Bearing	1	1	1	1	1
Cartridge	1*	1*	1	1*	1†
Cartridge Cap	1*	1*	1	1*	1†
Outer Blower			1		
Outer Blower Guard			1		
Rotor Coils				1	
Collector				1	
Cut Winding Insulation (Rotor)				1	
Front Bracket with Brushholder Rod and Insulation Tube				1	1
Brushes				1	1
Brushholder				1	1
Armature Coils					1
Winding Insulation (Arm)					1
Commutator					1
Field Coils Shunt, Series, Commutating					1

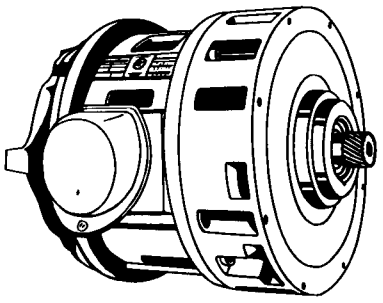
*For Frames 204-225 inclusive, cartridge and cartridge cup type of enclosure on front of motor is used. For Frames 254 and up, piston type seal is used on front end of motor.
†Cartridge and cartridge cup type of enclosure is used up to and including Frame 284; larger sizes use a mechanical seal.



SQUIRREL CAGE
DRIP-PROOF AND SPLASH-PROOF

Frames 203 to 326 inclusive.
Life-Line—Type CSP.

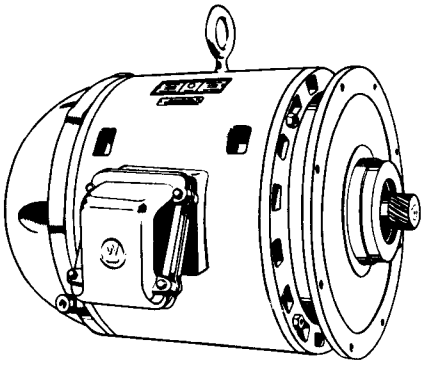
Frames 224 to 326 inclusive can also be furnished totally enclosed, fan-cooled Life-Line—Type CSP.



SQUIRREL-CAGE—OPEN

Frames 254 to 505 inclusive are Type CS as illustrated.

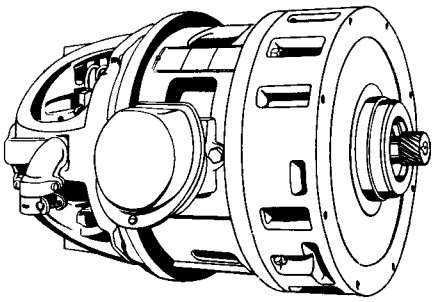
Frames 203 to 225 inclusive are Solid Cast Frame—Type CS or CSP.



SQUIRREL-CAGE
TOTALLY ENCLOSED
FAN-COOLED, EXPLOSION-PROOF

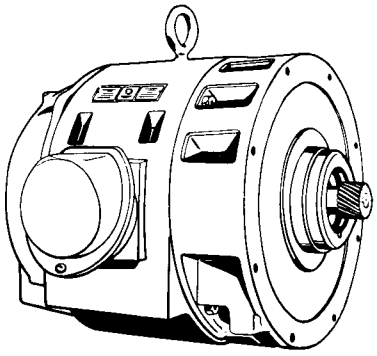
Frames 203 to 224 are totally enclosed, non-ventilated—Type CS or CSP.

Frames 225 to 505 are totally enclosed, fan-cooled—Type CS.



WOUND ROTOR—OPEN

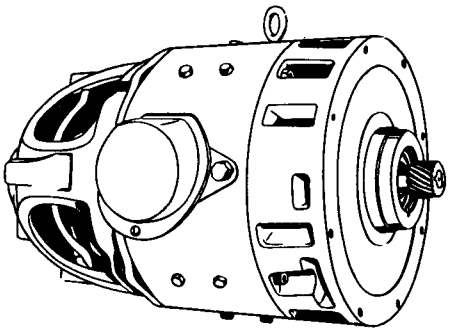
Frames 204 to 505 inclusive—Type CW.



SQUIRREL-CAGE
SPLASH-PROOF

Frames 254 to 504 inclusive are Type CS as illustrated.

Frames 224 and 225 are Cast Frame—Type CSP.



DIRECT CURRENT—OPEN

Frames 204 to 284 inclusive—Type SK.

FIG. 9. Typical Motor-Adapter Assemblies used with Types A, C and E Gearmotors.

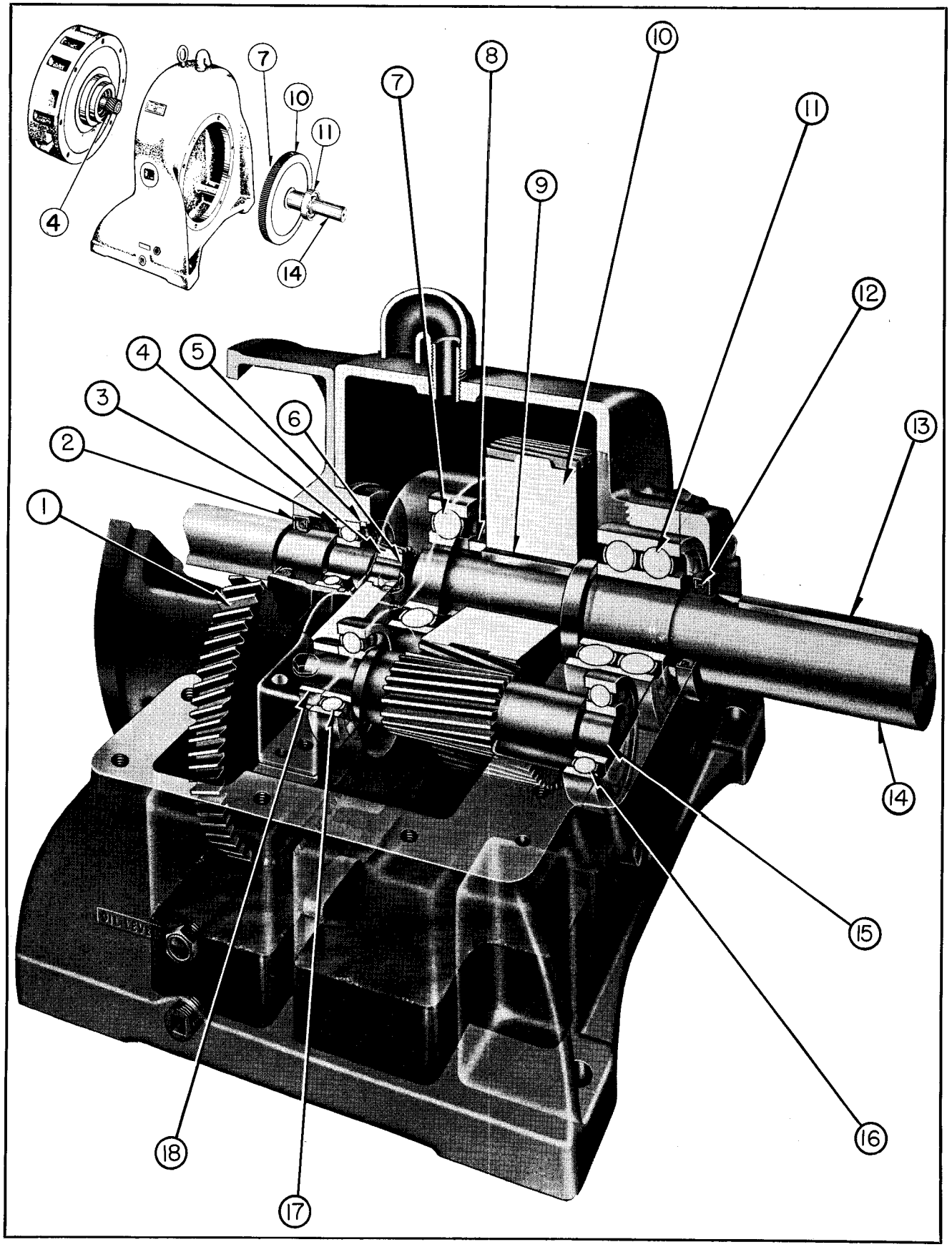


FIG. 10. Cutaway of Double Reduction Geared Drive Type C or E and Sketch of Single Reduction Type A Arrangement.

GEARED DRIVE REPLACEMENT PARTS

Working parts are listed in the following table and identified by circled numerals in Fig. 10 which illustrates complete arrangement of double reduction (Types C & E) geared drive parts. As the same nomenclature and parts numbers are used for comparable replacement parts in the single reduction (Type A) units, a sketch showing the variation in arrangement is included as part of Figure 10. To avoid possible delay or shutdown when replacement is necessary, it is recommended that a complete set of these parts be maintained in stock.

A complete list of renewal parts for Types A, C and E Gearmotors will be supplied if requested. When ordering, please give complete data which appears on the Geared Drive nameplate (see inside front cover) as well as the full name and style number of the part as it appears in the Renewal Parts listing.

COMPONENT PARTS OF THE GEARED DRIVE

IDENTIFICATION AND DESCRIPTION	Type A SINGLE REDUCTION No. Per Unit	Types C and E DOUBLE REDUCTION No. Per Unit
① High-Speed Gear	0	1
② High-Speed Oil Seal	1	1
③ High-Speed Bearing	1	1
④ High-Speed Pinion	1	1
⑤ Retaining Ring	1	1
⑥ High-Speed Pinion Key	1	1
*⑦ Inner Low-Speed Bearing	1	1
⑧ Low-Speed Shaft Spacer	†1	1
⑨ Low-Speed Gear Key	1	1
⑩ Low-Speed Gear	1	1
*⑪ Outer Low-Speed Bearing	1	1
⑫ Low-Speed Oil Seal	1	1
⑬ Low-Speed Key	1	1
⑭ Low-Speed Shaft	1	1
⑮ Intermediate Pinion Shaft	0	1
*⑯ Outer Intermediate Bearing	0	1
*⑰ Inner Intermediate Bearing	0	1
⑱ Intermediate Shaft Spacer	0	1
High-Speed Gear Key	0	1

*Tapered Roller Bearings are standard equipment on the following sizes:
AK to AP Inclusive } Type A with shaft extension diameters from 1¾ in. to 3⅛ in.
CK to CM Inclusive } Types C and E with shaft extension diameters from 2¾ in. to 5½ in.
EK to ER Inclusive }

Ball Bearings are standard on all other sizes.
†One Required Units AF, AH and AJ only.

MEMORANDUM

MEMORANDUM

I. B. 3600-1B

RECEIVING • INSTALLATION • MAINTENANCE

INSTRUCTIONS

GEARMOTORS

Horizontal Type

Type A—Single Reduction
Types C and E—Double Reduction

A-C, 208, 220, 440 And 550 Volts, 1 to 75 HP.
D-C, 115 And 230 Volts, 1 to 7½ HP.

WESTINGHOUSE ELECTRIC CORPORATION
NUTTALL PLANT • GEARING DIVISION • PITTSBURGH 1, PA.

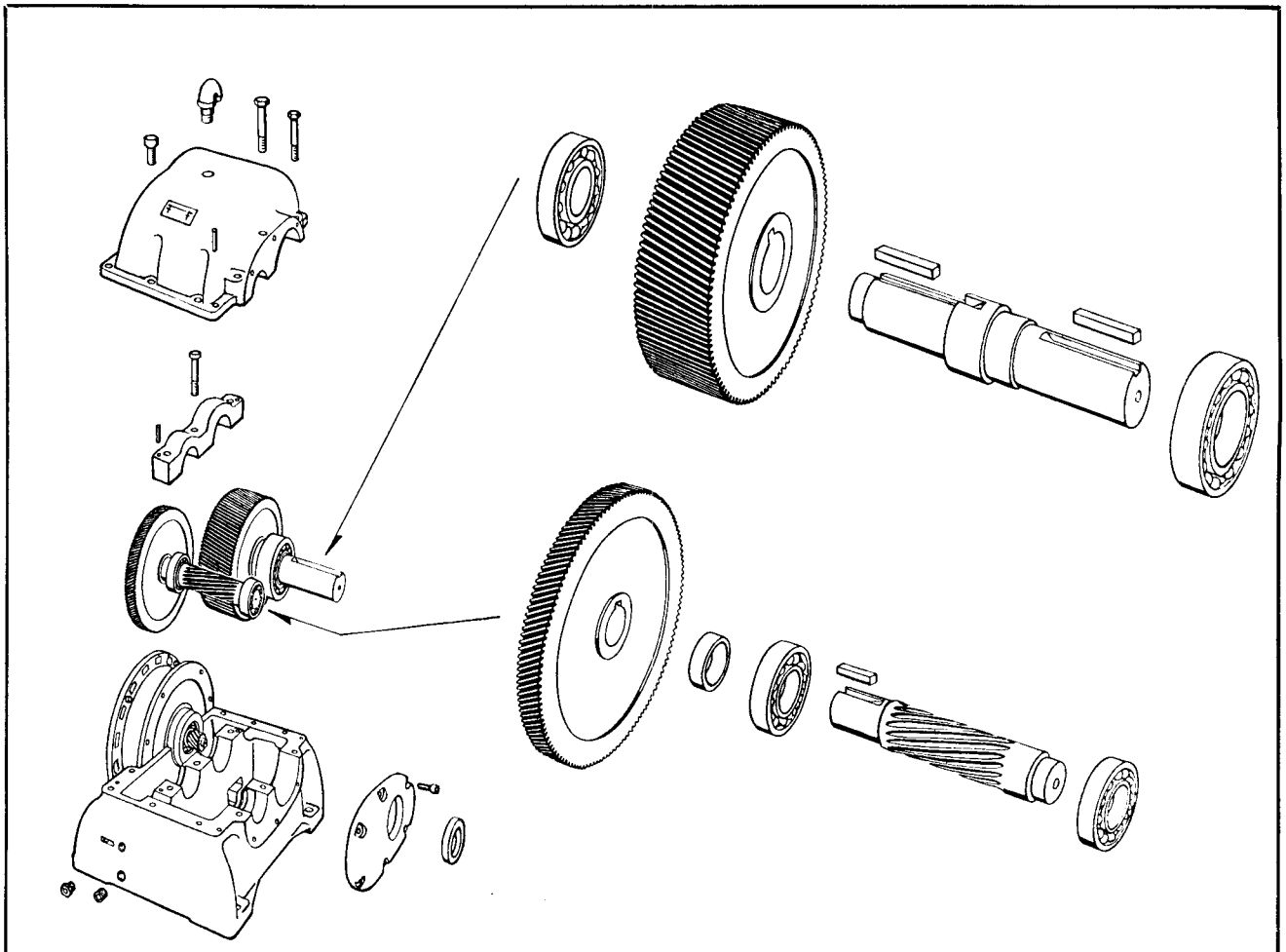
SUPERSEDES I. B. 3600-1A

FEBRUARY, 1950

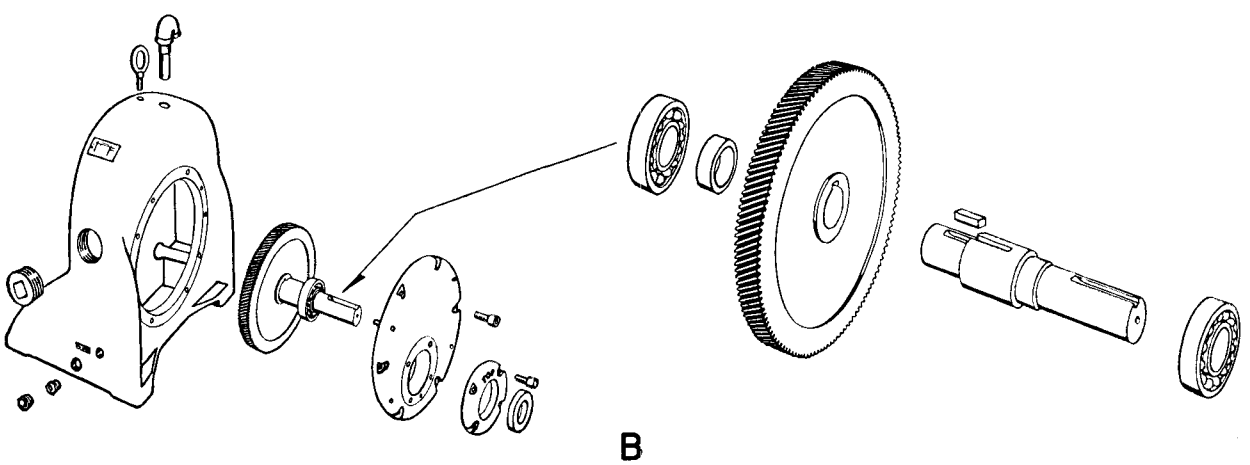
Printed in U.S.A.

(Rep. 2-58)

REPLACEMENT OF PARTS



A



B

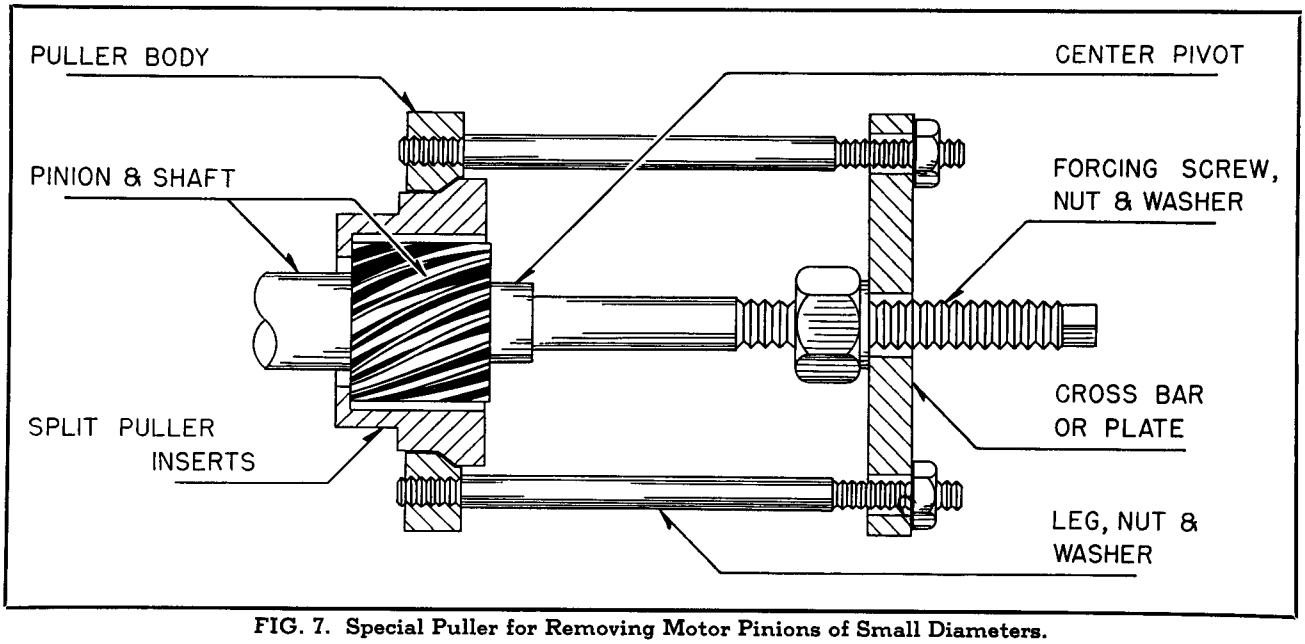


FIG. 7. Special Puller for Removing Motor Pinions of Small Diameters.

The low speed or output shaft assembly can then be readily withdrawn through the large opening in the housing.

The anti-friction type bearings on all shaft assemblies may then be removed either by small press, if available, or with regular commercial bearing-removal tools.

The gear items and motor shaft pinions on these gearmotors are positioned on their shafts by key and press fit. Gears may therefore be readily removed (after bearings are pulled) in an ordinary arbor press. For removal of motor pinions, the ordinary pronged type of puller is usually not satisfactory or adequate. Therefore, on pinions of large diameters, tapped holes are provided for insertion of jacking screws. For smaller pinions, when a press is not available, a puller of sleeve insert design in combination with commercial puller parts will do a very satisfactory job. Such a puller is illustrated in Fig. 7.

Important: Any disassembly of the gearmotor should be done only under conditions which prevent entrance of dirt or dust into the working parts, particularly into the anti-friction bearings.

On reassembly, all cement must be removed from joints, the surface dried, and new cement applied.

DISASSEMBLY OF MOTOR

The motor used with these gearmotors consists of a standard frame (without feet), a standard front end bracket and bearing assembly, and standard rotor construction (with special shaft to suit pinion mounting). The normal rear motor bracket is replaced by an adapter casting with bearing and oil seal assembly; this design is constant regardless of motor type. The front bracket bearing assemblies may be one of three standard types, depending upon motor size and construction: (1) noncartridge type with piston ring seal A-Fig. 8, (2) cartridge types B and C-Fig. 8, and (3) prelubricated bearings D-Fig. 8.

When motor-adapter assembly has been removed from geared drive (see instructions on geared drive disassembly) the procedure for disassembly of motor itself is as follows:

On noncartridge type motors, remove bolts which hold bearing housing covers to bracket, and the bolts securing bracket to the frame. Then remove bolts holding adapter casting to motor frame. The rotor assembly may then be readily removed (from the adapter end) by withdrawing the assembly axially.

On cartridge type motors, the procedure is the same except that the bolts which secure the cartridge to the front bracket must first be removed. Note that on totally-enclosed fan-cooled construction, it is first necessary to remove the hood and exterior blower.

On prelubricated bearing design it is necessary to remove only the bolts securing bracket to frame.

When bearings are being mounted or removed, pressure should be applied only against the inner race. Always use a sleeve or other intermediate piece if mounting or removal is accomplished by hammer blows. Cover bearing carefully during these operations as there is danger of flying particles getting in among the balls or rollers. *Never attempt to remove a ball or roller bearing by exerting pressure against the outer race, as the bearing may be seriously damaged.*

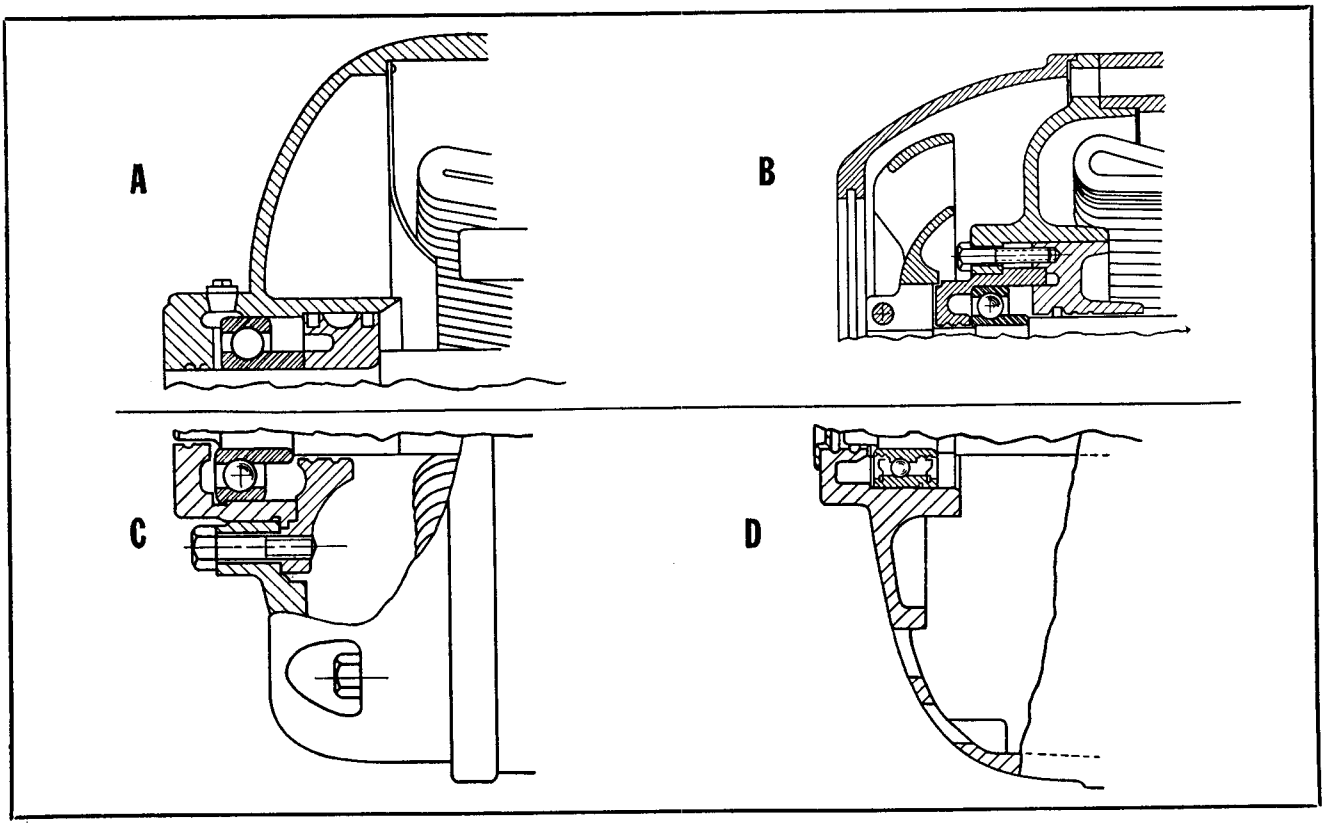
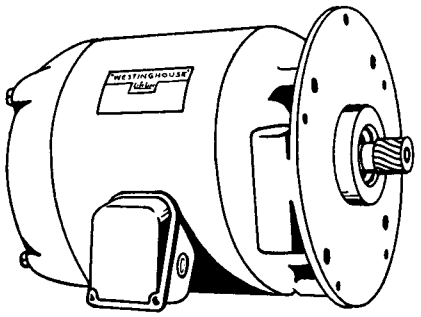


FIG. 8. Types of Front Bracket Bearing Assemblies.

MOTOR REPLACEMENT PARTS

DESCRIPTION	SQUIRREL CAGE MOTORS			WOUND-ROTOR MOTORS TYPE CW	DIRECT-CURRENT MOTORS TYPE SK
	OPEN AND ENCLOSED	SPLASH-PROOF	TOTALLY ENCLOSED FAN-COOLED EXPLOSION-PROOF		
Stator Coils	1	1	1	1	
Cut Winding Insulation (Stator)	1	1	1	1	
Front Bracket	1	1	1		
Front Ball Bearing	1	1	1	1	1
Cartridge	1*	1*	1	1*	1†
Cartridge Cap	1*	1*	1	1*	1†
Outer Blower			1		
Outer Blower Guard			1		
Rotor Coils				1	
Collector				1	
Cut Winding Insulation (Rotor)				1	
Front Bracket with Brushholder Rod and Insulation Tube				1	1
Brushes				1	1
Brushholder				1	1
Armature Coils					1
Winding Insulation (Arm)					1
Commutator					1
Field Coils Shunt, Series, Commutating					1

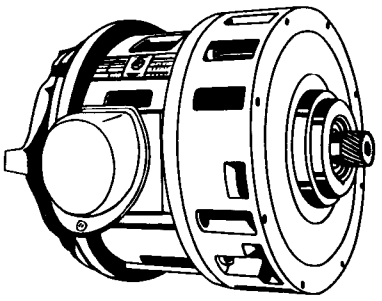
*For Frames 204-225 inclusive, cartridge and cartridge cup type of enclosure on front of motor is used. For Frames 254 and up, piston type seal is used on front end of motor.
†Cartridge and cartridge cup type of enclosure is used up to and including Frame 284; larger sizes use a mechanical seal.



SQUIRREL CAGE
DRIP-PROOF AND SPLASH-PROOF

Frames 203 to 326 inclusive.
Life-Line—Type CSP.

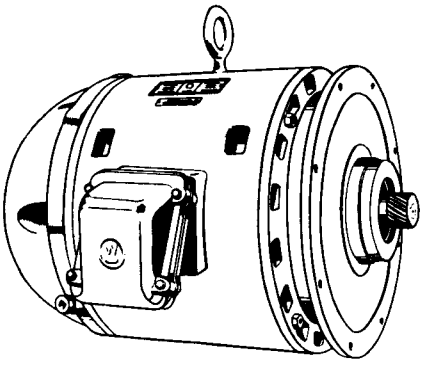
Frames 224 to 326 inclusive can also be furnished totally enclosed, fan-cooled Life-Line—Type CSP.



SQUIRREL-CAGE—OPEN

Frames 254 to 505 inclusive are Type CS as illustrated.

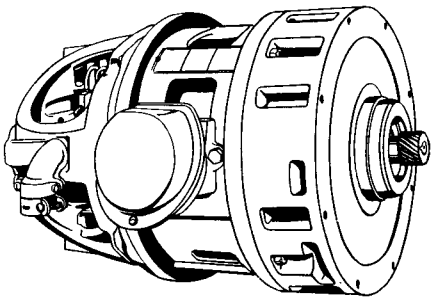
Frames 203 to 225 inclusive are Solid Cast Frame—Type CS or CSP.



SQUIRREL-CAGE
TOTALLY ENCLOSED
FAN-COOLED, EXPLOSION-PROOF

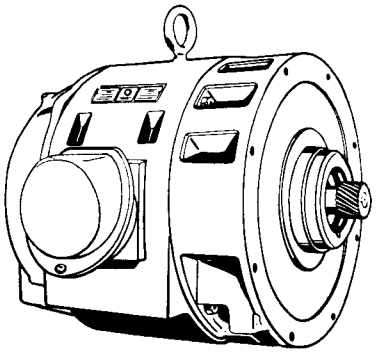
Frames 203 to 224 are totally enclosed, non-ventilated—Type CS or CSP.

Frames 225 to 505 are totally enclosed, fan-cooled—Type CS.



WOUND ROTOR—OPEN

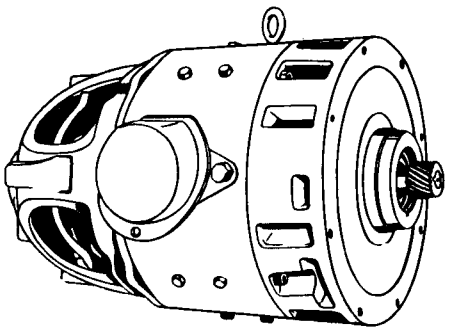
Frames 204 to 505 inclusive—Type CW.



SQUIRREL-CAGE
SPLASH-PROOF

Frames 254 to 504 inclusive are Type CS as illustrated.

Frames 224 and 225 are Cast Frame—Type CSP.



DIRECT CURRENT—OPEN

Frames 204 to 284 inclusive—Type SK.

FIG. 9. Typical Motor-Adapter Assemblies used with Types A, C and E Gearmotors.

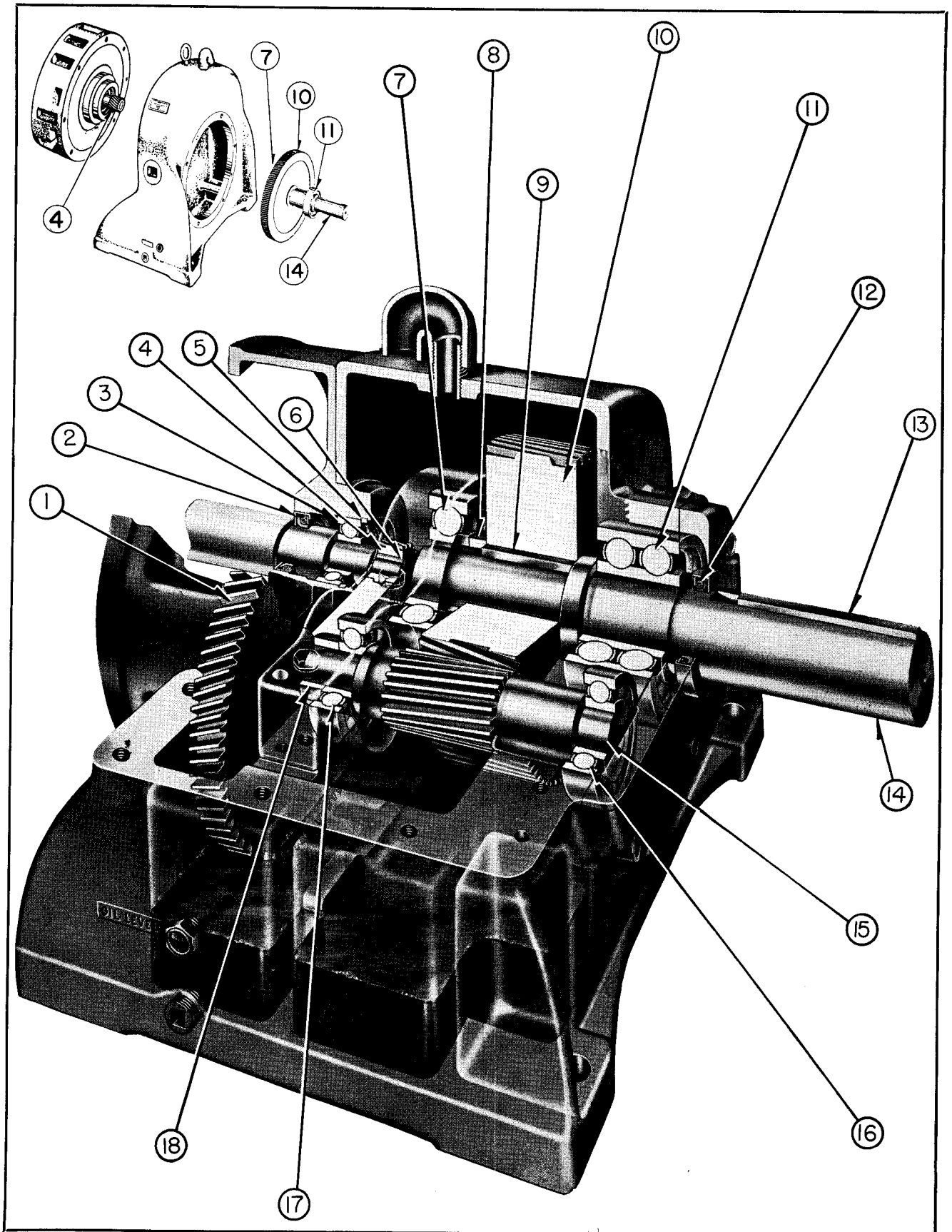


FIG. 10. Cutaway of Double Reduction Geared Drive Type C or E and Sketch of Single Reduction Type A Arrangement.

I. L. 7460
Filing Nos. 3600 and 3700

INSTRUCTIONS

RECOMMENDED LUBRICANTS

For Gearmotors, Speed Reducers, and High Speed Gear Drives

THE FOLLOWING LIST contains the trade names of typical oils meeting the recommendations of the American Gear Manufacturers Association for lubricating parallel shaft type gear drives of the types specified.

This list is to be used in selecting lubricants for the following Westinghouse unit types in line with the instruction books and lubrication instructions referred to:

Types A, C, E and M Gearmotors (I.B. 3600-1B)
Types SH, DH, SVR and DVR Speed Reducers (I.B. 3700-SR-1)
Type SU High Speed Gear Drives (I.B. 3700-SU-1)

LIST OF RECOMMENDED LUBRICANTS

NAMES	AGMA #1	AGMA #2	AGMA #3
American Oil Co. Anderson Co. F.E. Arkansas Fuel Oil Co. Associated Oil Co. (Cal.) Atlantic Refining Co.	2903 Amolite #21 Penna. Turbex Med. (E) Pacemaker #2 (B) Cycol Med. Turbine Atlantic H.F.S. #2	2906 Amolite #35 Penna. Turbex Heavy Med. (E) Pacemaker #3 (B) Cycol Heavy Turbine Atlantic H.F.S. #3	2930 Amolite #510 Penna. Turbex Ex. Heavy (E) Pacemaker #5 (B) Cycol Motor Oil SAE 30 Atlantic H.F.S. #7
Carter Oil Co. (Oklahoma) Cities Service Oil Co. (Del.) Cities Service Oil Co. (Penn.) Colonial Beacon Oil Co. Continental Oil Co.	..... Pacemaker #2 (B) Penn-Pacemaker #2 (C) Teresso 47 (B) Dectol Lt. Med. (A)	Teresstic 52 (B) Pacemaker #3 (B) Penn-Pacemaker #3 (C) Teresso 52 (B) Dectol Med. (A)	Teresstic 65 (B) Pacemaker #5 (B) Penn-Pacemaker #6 (C) Teresso 65 (B) Dectol Heavy (A)
Fiske Bros. Refining Co. Gulf Refining Co. Houghton & Co., E.F. Humble Oil Co. Keystone Lubricating Co.	Empire Engine Oil 10 Lt. (E) Harmony B (B) Hydrodrive MIH-10 (B) Velvet CC 47 (B) AG #1	Empire Engine Oil 20 Med. (E) Harmony C (B) Hydro-Drive MIH-20 Velvet CC 58 SAE 20 (A) AG #2	Empire Engine Oil 30 Hvy. (D) Harmony Oil E (A) Hydro-Drive MIH-30 Velvet CC 65 SAE 30 (A) AG #3
National Refining Co. New York-New Jersey Lub. Co. Ohio Oil Co. Pennzoil Co. Penola, Inc.	Enarco White Rose Oil A-20 #2002 Non-Fluid Oil #465 Marathon Darol (C) Pennzoil Motor SAE 10 Teresstic 47 (B)	Enarco White Rose Oil AA-35 #1003 Non-Fluid Oil #468 Marathon Darol (D) Pennzoil Motor SAE 20 Teresstic 52 (B)	Enarco White Rose Oil AA-65 (E) #1005 Non-Fluid Oil (A) #469 Marathon Darol (D) Pennzoil Motor SAE 30 (D) Teresstic 65 (B)
Phillips Petroleum Co. Pure Oil Company, The Richfield Oil Corp. Shell Oil Corp. (California) Shell Oil Corp., Inc. (New York)	Condor 1006 (A) Puritan C.T. Med. Eagle Oil Ex. Lt. Latus #29 Albus Oil #29	Condor 1008 (A) Puritan C.T., Heavy Med. Eagle Oil Medium (B) Carnea Oil #34 Albus Oil #34	Condor 1010 (A) Puritan Heavy (D) Richfield Eagle Oil Med. Hvy. (B) Carnea Oil #41 Albus #41
Sinclair Refining Co. Skelly Oil Co. Standard Oil of Calif. Standard Oil of Ind. Standard Oil of Kentucky	Cordymo (B) Skelco SAE 10 Calol Turbine Oil 9 Stanoil #18	Rubilene Lt. (B) Skelco SAE 20 Calol Turbine Oil 15 Stanoil #31 Teresso 52 (B)	Rubilene Med. Hvy. (B) Skelco SAE 30 (B) Calol Turbine Oil 19 Stanoil #51 Teresso 65 (B)
Standard Oil of N. J. Standard Oil of Penn. Sun Oil Co. Swan-Finch Oil Corp. Texas Company	Teresso 47 (B) Teresso 47 (B) Solnus Lt. Med. Safco Ambient C Texaco Regal Oil B (R & O) (D)	Teresso 52 (B) Teresso 52 (B) Solnus Medium Safco Ambient C Texaco Regal Oil P.C. (R & O) (D)	Teresso 65 (B) Teresso 65 (B) Solnus Heavy Medium Safco Ambient D Texaco Regal Oil F (R & O)
Tidewater Associated Oil Co. (N.Y.) Union Oil Co. of California United Oil Co. of Pittsburgh, Pa. Valvoline Oil Co. Waverly Oil Co.	Tycol Med. Turbine (E) Unacal Turbine Oil Lt. Oil #210 E.T.C. #10 Gearoil #661	Tycol #520 Unacal Truck Oil 20 (A) Oil #1693 (A) E.T.C. Extra Med. A.G.M.A. #2	Tycol Heavy (C) Unacal Truck Oil #30 Zero Oil #903 (A) Valvoline E.T.C. Hvy. Med. (B) A.G.M.A. #3 (A)
Socony-Vacuum Freedom Oil D. A. Lubricants Co. Quaker State	Gargoyle Arctic Oil C Gear Oil #10-A D. A. Motor SAE 10 #00 Quadrolube #75	Gargoyle D.T.E. Oil Hvy. Med. (B) Gear Oil #20 A D. A. Motor SAE 20 Motor Oil 20 W	Gargoyle D.T.E. Oil Ex. Hvy. (D) Gear Oil #30 A D. A. Lub. #80 #0 Quadrolube SAE 80

DATA REFERENCES

(A) — Pour Point 5 Deg. F.
(B) — " " 10 Deg. F.
(C) — " " 15 Deg. F.
(D) — " " 20 Deg. F.
(E) — Pour Point 25 Deg. F.
(F) — " " 30 Deg. F.
(G) — " " 35 Deg. F.
(H) — " " 40 Deg. F
(K) — Pour Point 45 Deg. F.
(L) — " " 50 Deg. F.
(M) — " " 60 Deg. F.
(R & O)—Contains Oxidation and Rust Inhibitor

RECOMMENDED LUBRICANTS

NAMES	AGMA #4	AGMA #5	AGMA #6
American Oil Co. Anderson Co F.E. Arkansas Fuel Oil Co. Associated Oil Co. (Cal.) Atlantic Refining Co.	2908 Amolite #95 (B) Penna. Turbex AA (E) Pacemaker #6 (B) Cycol Motor Oil SAE 40 Atlantic H.F.S. Oil #10	2909 Amolite #121 (C) Penna. Turbex AA (E) Pacemaker #7 (B) Veedol Trans. Gear SAE 90 (B) Atlantic H.F.S. Oil #13	2933 Amolite #1500 Penna. Turbex BB (E) Pacemaker #8 (B) Veedol Trans. Gear SAE 140 (A) Atlantic H.F.S. Oil #18 (A)
Carter Oil Co. (Oklahoma) Cities Service Oil Co. (Del.) Cities Service Oil Co. (Penn.) Colonial Beacon Oil Co. Continental Oil Co.	Teresstic 85 (C) Pacemaker #6 (B) Penn-Pacemaker #7 (C) Teresso 85 (C) Dectol HH (A)	Teresstic 100 (A) Pacemaker #7 (B) Penn-Pacemaker #7 (C) Teresso 100 (A) Dectol Sp. Hvy. (A)	Teresstic 120 (C) Pacemaker #8 (B) Penn-Pacemaker #8 (C) Teresso 120 (C) Dectol X Hvy. (A)
Fiske Bros. Refining Co. Gulf Refining Co. Houghton & Co., E.F. Humble Oil Co. Keystone Lubricating Co.	Empire Engine Oil 40 Ex. Hvy. (D) Parvis Oil A (B) Hydro-Drive MIH-40 Velvet CC 75 SAE 40 (B) AG #4	Empire Engine Oil 50 A (D) Parvis Oil A (B) Hydro-Drive MIH-50 Velvet CC 85 SAE 50 (B) AG #5	Empire Engine Oil 60 AA (D) 1—C Oil A (B) Hydro-Drive MIH-60 (A) Velvet CC 120 SAE 60 (B) AG #6
National Refining Co. New York-New Jersey Lub. Co. Ohio Oil Co. Pennzoil Co. Penola, Inc.	Enarco White Rose Oil A-78 #1007 Non-Fluid Oil (A) 472 Marathon Darol (D) Pennzoil Motor SAE 40 (D) Teresstic 85 (C)	Enarco White Rose Oil A-093 (E) A #110 Non-Fluid Oil (H) 474 Marathon Darol (D) Pennzoil Motor SAE 50 (D) Teresstic 100 (A)	Enarco White Rose Oil A-108 (E) #1030 Non-Fluid Oil (B) 475 Marathon Darol (D) Pennzoil Motor SAE 60 (D) Teresstic 120 (C)
Phillips Petroleum Co. Pure Oil Company, The Richfield Oil Corp. Shell Oil Corp. (California) Shell Oil Corp., Inc. (New York)	Condor 1012 (A) Puritan Spl. Hvy. (D) Richfield Eagle Oil Hvy. (B) Carnea Oil #46 Albus Oil #69	Condor 1014 (A) Puritan Ex. Hvy. (E) Richfield Eagle Oil Ex. Hvy. (A) Carnea Oil #72 Albus Oil #72	Condor 1016 Puritan Super Hvy. (D) Richlube Motor Oil SAE 60 (A) Golden Shell Motor Oil SAE 60 Albus Oil #74
Sinclair Refining Co. Skelly Oil Co. Standard Oil of Calif. Standard Oil of Ind. Standard Oil of Kentucky	Rubilene Heavy Skelco SAE 40 (B) Calol Diesel Eng. Oil #65 Stanoil #95 (A) Teresso 85 (C)	Rubilene X Hvy. (A) Skelco SAE 50 Zeroline Gear Oil 90 (A) Stanoil #120 (B) Teresso 100 (A)	Rubilene Super Hvy. (B) Skelco SAE 60 (B) Calol Deterbo Lub. Oil #60 (D) Stanoil #200 (D) Teresso 120 (C)
Standard Oil of N. J. Standard Oil of Penn. Sun Oil Co. Swan-Finch Oil Corp. Texas Company	Teresso 85 (C) Teresso 85 (C) Solnus Heavy Safco Ambient (E) Texaco Regal Oil G (R & O) (C)	Teresso 100 (A) Teresso 100 (A) Solnus Ex.Hvy. Safco Ambient F Texaco Regal Oil H (R & O) (A)	Teresso 120 (C) Teresso 120 (C) Sunvis 150 Safco Dytac G (C) Texaco Regal Oil J (B)
Tidewater Associated Oil Co.(N.Y.) Union Oil Co. of California United Oil Co. of Pittsburgh, Pa. Valvoline Oil Co. Waverly Oil Co.	Tycol Spl. Hvy. (E) Unacal Truck Oil #40 (A) Oil #1274 (E) Valvoline E.T.C. Hvy. (B) A. G. M. A. #4 (B)	Veedor T & T Gear 90 Unacal Truck Oil #50 (A) Oil #910 (E) Valvoline E.T.C. Spl. Hvy. (C) A.G.M.A. #5 (D)	Tycol Ex. Hvy. (E) Motoreze #60 (C) Oil #1058 (E) Valvoline E.T.C. Ex. Hvy. (C) A. G. M. A. #6 (F)
Socony-Vacuum Freedom Oil D. A. Lubricants Co. Quaker State	Gargoyle D.T.E. Oil BB (H) Gear Oil #40 A (A) D. A. Motor SAE 40 (C) #1 Quadrolube SAE 90	Gargoyle D.T.E. Oil BB (H) Gear Oil #50A (A) D. A. Lub. #000 #1 Quadrolube SAE 90	Gargoyle D.T.E. Oil AA (H) Gear Oil #60B (B) D. A. Motor SAE 60 (E) #120 Aero Oil SAE 60 (D)

DATA REFERENCES

(A) — Pour Point 5 Deg. F.
(B) — " " 10 Deg. F.
(C) — " " 15 Deg. F.
(D) — " " 20 Deg. F.
(E) — Pour Point 25 Deg. F.
(F) — " " 30 Deg. F.
(G) — " " 35 Deg. F.
(H) — " " 40 Deg. F.
(K) — Pour Point 45 Deg. F.
(L) — " " 50 Deg. F.
(M) — " " 60 Deg. F.
(R & O)—Contains Oxidation and Rust Inhibitor

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NUTTALL PLANT • GEARING DIVISION • PITTSBURGH 1, PA.
(Rep. 10-57) Printed in U.S.A.

GEARED DRIVE REPLACEMENT PARTS

Working parts are listed in the following table and identified by circled numerals in Fig. 10 which illustrates complete arrangement of double reduction (Types C & E) geared drive parts. As the same nomenclature and parts numbers are used for comparable replacement parts in the single reduction (Type A) units, a sketch showing the variation in arrangement is included as part of Figure 10. To avoid possible delay or shutdown when replacement is necessary, it is recommended that a complete set of these parts be maintained in stock.

A complete list of renewal parts for Types A, C and E Gearmotors will be supplied if requested. When ordering, please give complete data which appears on the Geared Drive nameplate (see inside front cover) as well as the full name and style number of the part as it appears in the Renewal Parts listing.

COMPONENT PARTS OF THE GEARED DRIVE

IDENTIFICATION AND DESCRIPTION	Type A SINGLE REDUCTION No. Per Unit	Types C and E DOUBLE REDUCTION No. Per Unit
① High-Speed Gear	0	1
② High-Speed Oil Seal	1	1
③ High-Speed Bearing	1	1
④ High-Speed Pinion	1	1
⑤ Retaining Ring	1	1
⑥ High-Speed Pinion Key	1	1
*⑦ Inner Low-Speed Bearing	†1	1
⑧ Low-Speed Shaft Spacer	1	1
⑨ Low-Speed Gear Key	1	1
⑩ Low-Speed Gear	1	1
*⑪ Outer Low-Speed Bearing	1	1
⑫ Low-Speed Oil Seal	1	1
⑬ Low-Speed Key	1	1
⑭ Low-Speed Shaft	0	1
⑮ Intermediate Pinion Shaft	0	1
*⑯ Outer Intermediate Bearing	0	1
*⑰ Inner Intermediate Bearing	0	1
⑱ Intermediate Shaft Spacer	0	1
High Speed Gear Key		

* Tapered Roller Bearings are standard equipment on the following sizes:
AK to AP Inclusive } Type A with shaft extension diameters from 1¾ in. to 3⅛ in.
CK to CM Inclusive } Types C and E with shaft extension diameters from 2¾ in. to 5½ in.
EK to ER Inclusive }

Ball Bearings are standard on all other sizes.
† One Required Units AF, AH and AJ only.

CN 50847

TF-C-162

I.B. 3600-1B
SUPPLEMENT

Type T - Triple Reduction Horizontal Type Gearmotors.

The type "T" triple reduction gearmotor consists of a single reduction gear box integrally attached to and driving a type "E" double reduction gear box, thus making a compact triple reduction gearmotor. Figure 11 shows a cross sectional plan view of the gearmotor.

Receiving, handling, storing, installation, electrical connections, oil specifications and maintenance are the same as given on pages 2 to 7 of I.B. 3600-1B with the following exceptions:

Filling Unit with Oil

The design of the unit is such that the lubricating system of the single reduction gear box is entirely independent from that of the type "E" double reduction low speed end gear box necessitating that there be two different oil levels, one for each gear box. To fill unit with oil remove both breathers from respective gear cases and pour oil into each gear case until it is up to the proper level as indicated on the side of the gear cases; do not overfill. When changing the oil be sure to drain and refill both gear cases. The total * quantity of oil required for the unit is shown on the nameplate so care should be exercised not to put it all in one gear box.

* Stop when level has been attained as this is a nominal figure.

Replacement of Parts

Disassembly of Geared Drives (See Figure 11). In the event of a motor failure, it is possible to remove the motor without disturbing the mounting of the geared drive, by removing the bolts connecting the adapter to the gear case and then removing motor and adapter axially, as an assembly.

To inspect or make repairs of the gearing parts, first remove the bolts holding the high speed reduction gear case to the low speed type "E" gear case and remove the motor adapter and high speed reduction gear case from the type "E" gear case. Then if the type E low speed double reduction gearing is to be checked remove all bolts holding the upper half of its gear housing. The upper half of the housing should then be tapped lightly to break the cemented joint and dowel fit, and may then be readily removed. This exposes its working parts for inspection. If it is necessary to dismantle its gearing parts, the inner bearing cap and end plate must be removed; both shaft assemblies may then be lifted out.

The high speed single reduction unit is similar to the type "A" in construction. To check or repair its parts remove the main end plate and end cap bolts. Remove end cap carefully to avoid damage to oil seal. The main end plate may then be removed from the housing by using two of the bolts which hold it in the jack screw holes which are provided. (This method should always be followed because of the pilot between main end plate and gear housing.)

The gear and shaft assembly can then be readily withdrawn through the large opening in the housing.

For removal of bearings, gears, and pinions from their shafts, disassembly of motor and for reassembly procedure, refer to page 9 of I.B. 3600-1B.

Geared Drive Replacement Parts

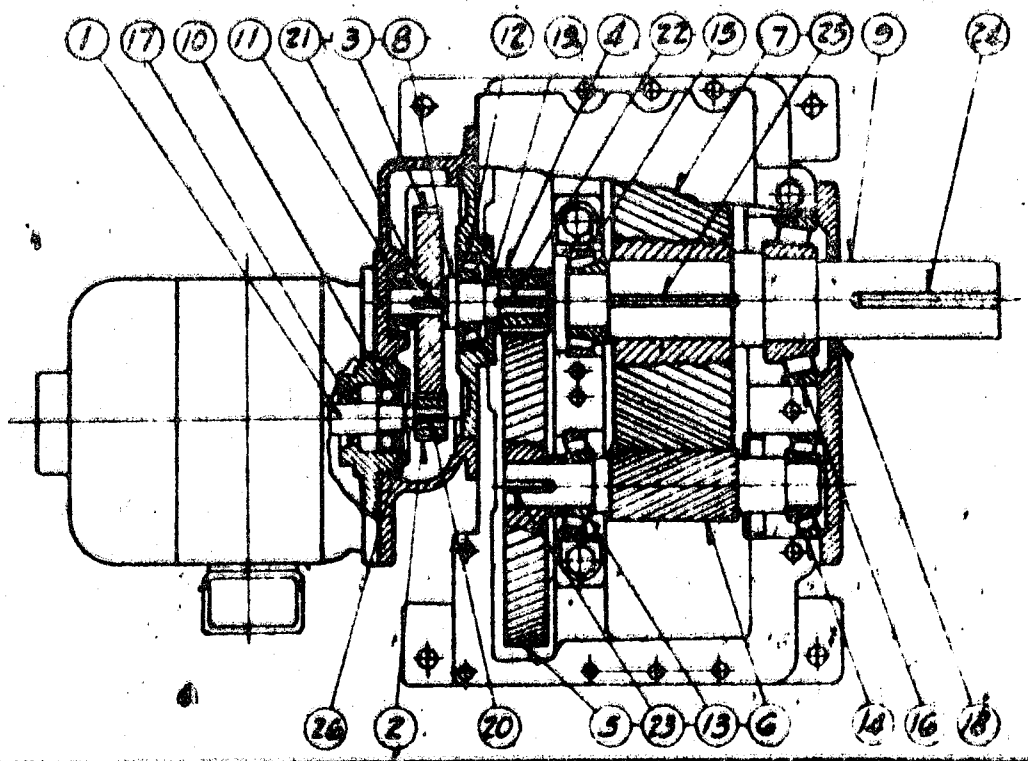
Working parts are listed in the table and identified by circled numerals in Figure 11 which illustrates complete arrangement of the triple reduction type "T" gearing parts.

A complete list of renewal parts will be supplied if requested. When ordering, please give complete data which appears on the Geared Drive nameplate as well as the full name and style number of the part as it appears in the Renewal Parts listing.

WESTINGHOUSE ELECTRIC CORPORATION NUTTALL WORKS. PITTSBURGH. PA. U.S.A.

DWG. NO.

DIMENSIONS IN INCHES



COMPONENT PARTS OF THE GEARED DRIVE

ITEM	DESCRIPTION	PER UNIT
1	MOTOR SHAFT	
2	HIGH-SPEED PINION	
3	HIGH-SPEED GEAR	
4	INTERMEDIATE PINION	
5	INTERMEDIATE GEAR	
6	LOW SPEED PINION SHAFT	
7	LOW SPEED GEAR	
8	INTERMEDIATE SHAFT	
9	LOW SPEED SHAFT	
10	HIGH SPEED BEARING	
11	INTERMEDIATE SHAFT BEARING	
12	INTERMEDIATE SHAFT BEARING	
13	LOW SPEED PINION SHAFT BEARING	
14	LOW SPEED PINION SHAFT BEARING	
15	LOW SPEED SHAFT BEARING	
16	LOW SPEED SHAFT BEARING	
17	HIGH SPEED OIL SEAL	
18	LOW SPEED OIL SEAL	
19	INTERMEDIATE OIL SEAL	
20	HIGH SPEED PINION KEY	
21	HIGH SPEED GEAR KEY	
22	INTERMEDIATE PINION KEY	
23	INTERMEDIATE GEAR KEY	
24	LOW SPEED SHAFT KEY	
25	LOW SPEED GEAR KEY	
26	RETAINING RING	
27		
28		
29		

FIGURE 11 TRIPLE REDUCTION GEARMOTOR TYPE T

SUB	S.O.
1	D 3322 0100

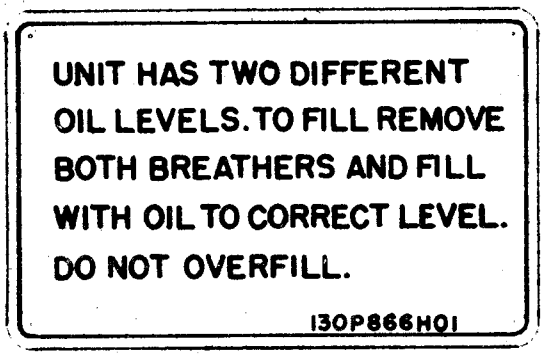
HHM 12-21

KMP 12/21/

WESTINGHOUSE ELECTRIC CORPORATION – DIVISION NUTTALL PLANT LOCATION PGH. PA.

TITLE SKETCH OF OIL FILL "DECAL" FOR TYPE "T" GEARMOTORS

DWG 130P866 SUB 1



SCALE :- FULL SIZE

130P866

I.B. 3600-1B
SUPPLEMENT

Type T - Triple Reduction Horizontal Type Gearmotors.

The type "T" triple reduction gearmotor consists of a single reduction gear box integrally attached to and driving a type "E" double reduction gear box, thus making a compact triple reduction gearmotor. Figure 11 shows a cross sectional plan view of the gearmotor.

Receiving, handling, storing, installation, electrical connections, oil specifications and maintenance are the same as given on pages 2 to 7 of I.B. 3600-1B with the following exceptions:

Filling Unit with Oil

The design of the unit is such that the lubricating system of the single reduction gear box is entirely independent from that of the type "E" double reduction low speed end gear box necessitating that there be two different oil levels, one for each gear box. To fill unit with oil remove both breathers from respective gear cases and pour oil into each gear case until it is up to the proper level as indicated on the side of the gear cases; do not overfill. When changing the oil be sure to drain and refill both gear cases. The total * quantity of oil required for the unit is shown on the nameplate so care should be exercised not to put it all in one gear box.

* Stop when level has been attained as this is a nominal figure.

Replacement of Parts

Disassembly of Geared Drives (See Figure 11). In the event of a motor failure, it is possible to remove the motor without disturbing the mounting of the geared drive, by removing the bolts connecting the adapter to the gear case and then removing motor and adapter axially, as an assembly.

To inspect or make repairs of the gearing parts, first remove the bolts holding the high speed reduction gear case to the low speed type "E" gear case and remove the motor adapter and high speed reduction gear case from the type "E" gear case. Then if the type E low speed double reduction gearing is to be checked remove all bolts holding the upper half of its gear housing. The upper half of the housing should then be tapped lightly to break the cemented joint and dowel fit, and may then be readily removed. This exposes its working parts for inspection. If it is necessary to dismantle its gearing parts, the inner bearing cap and end plate must be removed; both shaft assemblies may then be lifted out.

The high speed single reduction unit is similar to the type "A" in construction. To check or repair its parts remove the main end plate and end cap bolts. Remove end cap carefully to avoid damage to oil seal. The main end plate may then be removed from the housing by using two of the bolts which hold it in the jack screw holes which are provided. (This method should always be followed because of the pilot between main end plate and gear housing.)

The gear and shaft assembly can then be readily withdrawn through the large opening in the housing.

For removal of bearings, gears, and pinions from their shafts, disassembly of motor and for reassembly procedure, refer to page 9 of I.B. 3600-1B.

Geared Drive Replacement Parts

Working parts are listed in the table and identified by circled numerals in Figure 11 which illustrates complete arrangement of the triple reduction type "T" gearing parts.

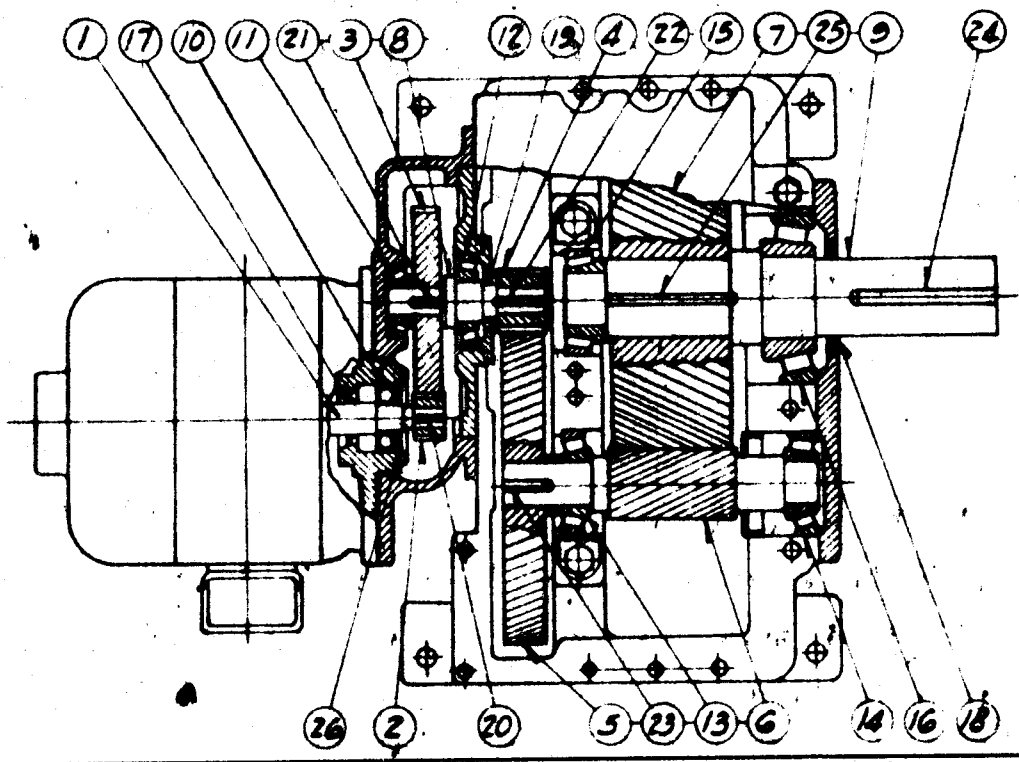
A complete list of renewal parts will be supplied if requested. When ordering, please give complete data which appears on the Geared Drive nameplate as well as the full name and style number of the part as it appears in the Renewal Parts listing.

Date 3/11/63

WESTINGHOUSE ELECTRIC CORPORATION NUTTALL WORKS, PITTSBURGH, PA., U.S.A.

DWG. NO.

DIMENSIONS IN INCHES



COMPONENT PARTS OF THE GEARED DRIVE

ITEM	DESCRIPTION	PER UNIT
1	MOTOR SHAFT	1
2	HIGH-SPEED PINION	1
3	HIGH-SPEED GEAR	1
4	INTERMEDIATE PINION	1
5	INTERMEDIATE GEAR	1
6	LOW SPEED PINION SHAFT	1
7	LOW SPEED GEAR	1
8	INTERMEDIATE SHAFT	1
9	LOW SPEED SHAFT	1
10	HIGH SPEED BEARING	1
11	INTERMEDIATE SHAFT BEARING	1
12	INTERMEDIATE SHAFT BEARING	1
13	LOW SPEED PINION SHAFT BEARING	1
14	LOW SPEED PINION SHAFT BEARING	1
15	LOW SPEED SHAFT BEARING	1
16	LOW SPEED SHAFT BEARING	1
17	HIGH SPEED OIL SEAL	1
18	LOW SPEED OIL SEAL	1
19	INTERMEDIATE OIL SEAL	1
20	HIGH SPEED PINION KEY	1
21	HIGH SPEED GEAR KEY	1
22	INTERMEDIATE PINION KEY	1
23	INTERMEDIATE GEAR KEY	1
24	LOW SPEED SHAFT KEY	1
25	LOW SPEED GEAR KEY	1
26	RETAINING RING	1
27		
28		
29		

FIGURE 11 TRIPLE REDUCTION GEARMOTOR TYPE T

WESTINGHOUSE ELECTRIC CORPORATION - DIVISION NUTTALL PLANT LOCATION PGH. PA.

TITLE SKETCH OF OIL FILL "DECAL" FOR TYPE "T" GEARMOTORS

DWG 130P866 SUB 1

UNIT HAS TWO DIFFERENT
OIL LEVELS. TO FILL REMOVE
BOTH BREATHERS AND FILL
WITH OIL TO CORRECT LEVEL.
DO NOT OVERFILL.

130P866H01

SCALE :- FULL SIZE

130P866