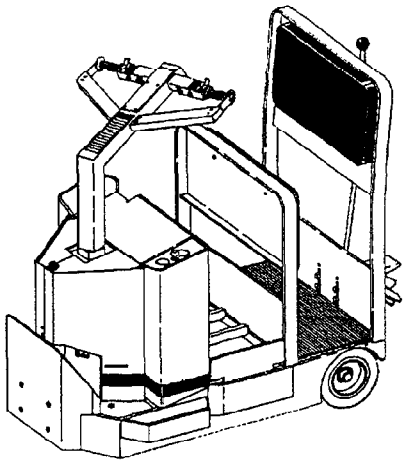
Main Index

Service Manual



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1.0 PRESTOLITE MOTOR SERVICE INSTRUCTIONS

(General Notes)

CLEANING

Prior to any testing or inspection, the motor components, except bearings and armature, should be thoroughly cleaned with a good grade petroleum base cleaning solvent and dried with compressed air.

⚠WARNING Be extremely careful when working with solvent. Even a small explosion or fire could cause injury or death.

⚠WARNING Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

The armature should be blown off with compressed air to remove brush dust and dirt from around the commutator and windings.

Bearings should be wiped clean with a cloth and never submerged in a solvent. Submerging bearings in a solvent will deteriorate internal lubrication which cannot be replaced.

VISUAL INSPECTION

After the motor components have been thoroughly cleaned and dried, they should be inspected for the following:

1. Drive end head
   Check bearings recess for any signs of wear. Check mounting holes for any stripped or crossed threads or broken studs.

2. Commutator end head
   Check bearing recess for any signs of wear. Check bearing holder insulation for cracks or any signs of burning. Check brush holders and springs for wear.

3. Oil seal
   Oil seal, if upon disassembly of the motor, the field coils or cummutator are oily. A faulty oil seal is indicated. A good service practice is to replace the oil seal whenever the motor is overhauled. The oil seal seat on the armature shaft should be checked for rough spots, grooves, or scars.

4. Bearings
   Check bearings by turning them with your fingers. Feel for binding or gritty effects and for excessive looseness or wobble. A good bearing should also have a small amount of drag or stiffness caused by the lubrication. If the bearing turns very freely, it should be replaced.

5. Frame and field assembly
   Check the condition of all insulation. If the insulation on the field coils appears blackened or charred, the serviceability of the coils is questionable. Burned or charred insulation is a result of coils over-heating due to overloading conditions, grounded or shorted coil windings. Check condition of all other insulation such as brush rigging, under coil connections, and around terminal studs.

6. Armature
   Check the shaft bearing journals, splines or keyways for wear. Check windings, commutator connections and commutator bars for any signs of burning. If deep burned sections are evident, either in the brush track or on the rider end of the commutator bars, an open circuit in the armature winding is indicated.

TESTING

Frame and Field Assembly

After thorough inspection, the frame and field assembly should be checked for grounded, open, or shorted circuits. Grounded and open circuits can be checked using 110 volt A.C. test leads with a 50 watt bulb in series.

1. Grounded circuit
   Touch one test lead to a clean bare metal spot on the frame and check all terminals with the other lead. If a grounding condition exists, the test light lights.

2. Open circuit
Check between all connecting terminals with test leads. If the bulb fails to light, an open circuit is indicated.

3. Shorted circuit
Shorted windings in series coils are very difficult to detect. Generally, if the coil insulation is sound there are no signs of overheating, the coil can be presumed good. The individual pages in your Prestolite service manual lists the series winding resistance. The resistance of the series coils is usually so low a special ohmeter or ohmeter attachment is needed to check it.

Shunt coils can be tested with an ohmeter for proper resistance or with a battery, of the specified voltage, for proper current draw.

NOTE: The resistance in shunt field coils may cause the test light to be dimly lit.

ARMATURE

Check the armature for grounded circuits by placing one test lead of the 110 volt A.C. test lamp on the commutator and the other test lead on the armature shaft. If the test light lights, the armature is grounded.

There are two different electrically connected types of armatures used in motors. Each type requires a different method of testing for shorted circuits.

The individual pages in your Presolite Service Manual specify the type of armature used in that particular motor series.

NOTE: If the armature has been turned and undercut prior to testing, check for and remove any copper buildup or filings between commutator bars and the commutator riser. This condition will cause an armature to check shorted and usually results from a dull undercutting tool.

1. Standard winding connections --
These armatures are tested on a growler using a steel strip or hacksaw blade to locate any shorted windings. Rotate the armature in the growler while holding the strip or blade over the armature so that it passes over each armature core slot.

If a winding is shorted, the strip or blade will vibrate.

2. Equalizer winding connections
This type of armature cannot be tested on a growler like the standard winding connection armatures. The equalizer connections are made between commutator bars and will cause the armature to test shorted.

The only practical method of testing these armatures is to perform a light load test after the motor has been completely assembled. If the motor does not meet or exceed all parts of the light load specification, replace the armature.

FRAME AND FIELD SERVICE NOTES

If the inside of the motor is exceptionally dirty and there is evidence of a grounding condition caused by dirt, the inside of the motor can be given an additional cast of insulating varnish. Red glyptol can be used if a better material is not available, however, we recommend using a Class "F" Polyurethane air drying insulating varnish. This is readily available under various brand names from electrical repair or parts houses in aerosal type dispensers.

Before spraying field coils, make sure they are absolutely clean and dry. Keep varnish off of brush rigging, pole shoe faces, and end head seats.

FIELD COIL INSTALLATION

Good solder connections are important due to the vibration characteristics encountered by these motors which can cause cold or poorly soldered connections to break. Prior to installing the field coils, the connections which

require soldering should be buffed or wire brushed clean to remove any oxidization. The connections should then be tinned with a 90% tin solder using a soldering iron.

NOTE: We do not recommend using a soldering gun or torch. Soldering guns cannot provide the heat concentration required and soldering torches can damage the insulation.

After field coil installation, connect the solder joint, making sure the solder is flowing properly to avoid a cold soldered joint.

There is an optional method of connecting field coils which provides a mechanical connection prior to soldering. This method facilitates soldering and results in a stronger connection for added vibration protection.

After tinning and installing the field coils in the frame, align the coil straps and drill an 11/64" hole (#18 Drill) thru both straps. Insert a #8-32 brass screw and nut or a brass pop rivet and solder the connection. After the connection has been made, check the clearance between it and the end head to prevent grounding the connection when the end head is installed.

ASSEMBLY AND TESTING

After the motor components have been thoroughly cleaned, tested, and repaired or replaced, assemble the unit. Refer to the individual motor page of your Prestolite Service Manual for specific assembly information.

After assembly, the motor should be connected as specified in test connections, and tested to the specifications contained on the Presolite service individual motor page.

Some motors are tested at a voltage different from the specified or routed voltage of the motor. This is done to avoid excessive current draw and, or excessive free running R.P.M.

When testing motors, the voltmeter connections must be made at the motor terminals.

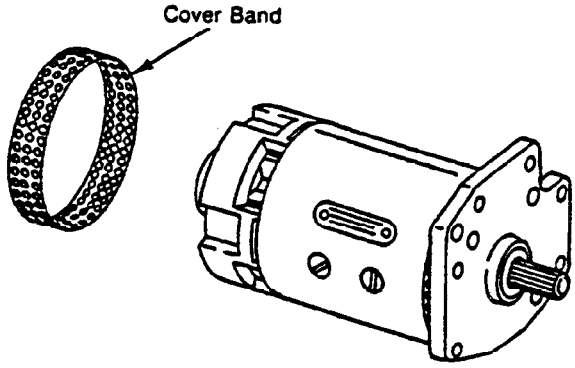
ELECTRIC MOTOR REPAIR

SERVICE PROCEDURES

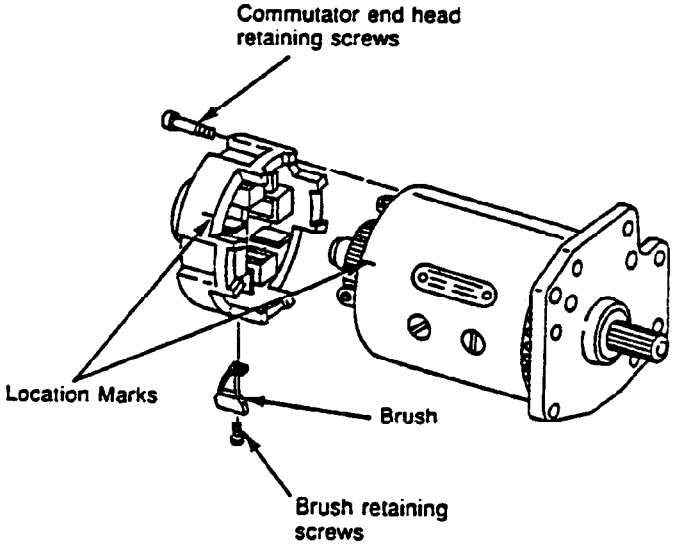
The service procedures are basically the same for all motors regardless of size.

DISASSEMBLY

1. Remove the cover band from the commutator end of the motor (if equipped).



2. Use a brush hook to reach into the motor and lift the brush springs. Pull the brushes out of the brush holders. Either position the brushes outside the motor or remove the brush retaining screws and remove the brushes from the motor.

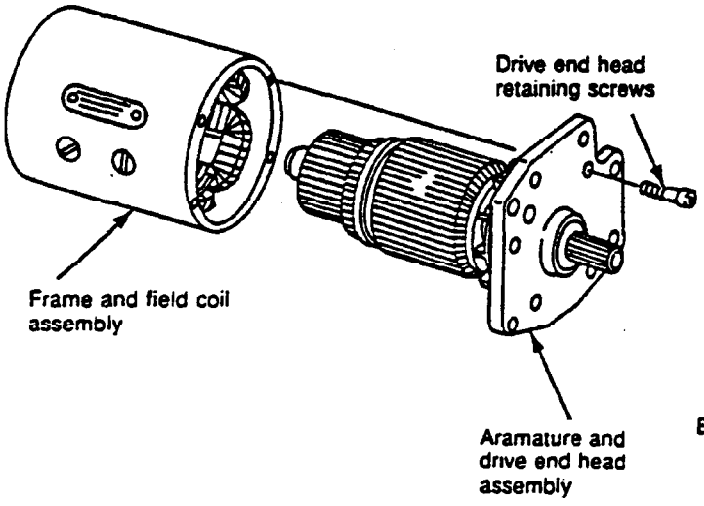


3. Scribe or center punch locating marks in the end head and the frame. Although locating marks are not always necessary because of locating pins in some motors, they can save a lot of time when the motor does not have locating pins.

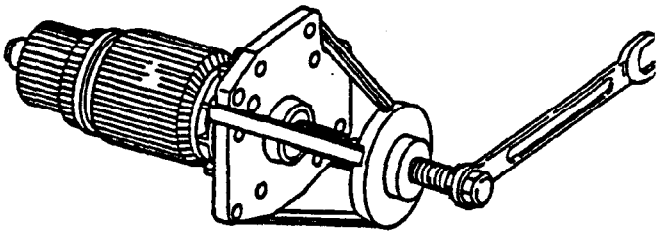
4. Remove the commutator end head retaining screws. Almost all motors have a slip fit bearing at the commutator end, and the end head can be removed with very little trouble.

   On motors that have a shaft extension on both ends of the armature, the attachment on the commutator end of the shaft must be removed before the end head can be separated from the motor.

5. Remove the drive end head retaining screws, if necessary. Some of the smaller pump motors retain the drive end head with the motor through bolts. Separate the armature and drive end head as an assembly from the frame and field coil assembly.

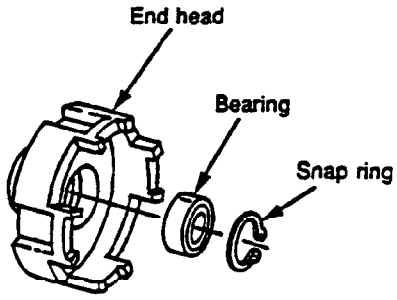


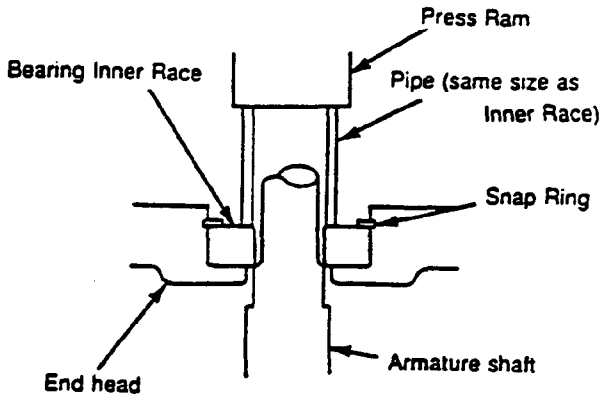
6. Separate the armature from the drive end head. This operation is usually done by pressing the armature out of the drive end bearing. On some of the larger motors, the end head and bearing will have to be removed with a puller.



When a puller is used, protect the end of the armature shaft with a nut or a thick flat washer. If the shaft, coupling, or spline is damaged when removing the end head, the armature or the drive spline usually has to be replaced. Use caution and do not damage the armature.

7. Separate the bearing from the end head. On larger motors, the bearing is retained with a snap ring. Remove the snap ring. Then press the bearing out of the end head.

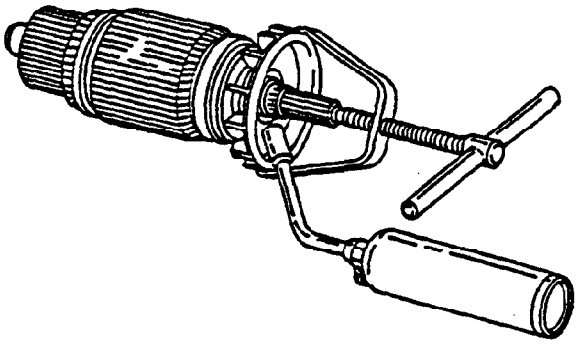




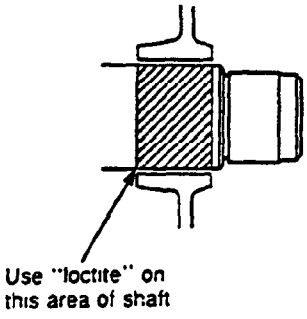
PRESSING END HEAD BACK ON ARMATURE SHAFT

8. The ventilating fans are cast aluminum. Once these fans have been pressed onto the armature, they must be heated to be removed without damage.

   A puller is installed and a slight pressure exerted against the fan. Use a small propane torch to heat the area of the fan around the shaft. When the fan becomes loose on the shaft, as evidenced by the puller becoming loose, it should be removed as quickly as possible.



9. When the fan is reassembled on the shaft, make sure it is a tight fit. Use "Loctite Retaining Compound 40" or equivalent on the inside of the fan hub when reassembling fan.



10. After the motor has been separated into all its major subassemblies, the components should be cleaned and inspected for wear or damage.

CLEANING

Prior to any testing or inspection, the motor components, except bearings and armature, should be throughly cleaned with a good grade petroleum base cleaning solvent and dried with compressed air.

⚠WARNING Be extremely careful when working with solvent. Even a small explosion or fire could cause injury or death.

⚠WARNING Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

The armature should be blown off with compressed air to remove the brush dust and dirt from around the commutator and windings.

Bearing should be wiped clean with a cloth and never submerged in a solvent. Submerging bearings in a solvent will deteriorate internal lubrication which cannot be replaced.

VISUAL INSPECTION

After the motor components have been thoroughly cleaned and dried, they should be inspected for the following:

1. Drive end head
   Check bearing recess for any signs of wear. Check mounting holes for any stripped or crossed threads or broken studs.

2. Commutator end head
   Check bearing recess for any signs of wear. Check bearing holder insulation for cracks or any signs of burning. Check brush holders and springs for wear.

3. Oil seal
   If upon disassembly of the motor, the field coils or cummutator are oily. A faulty oil seal is indicated. A good service practice is to replace the oil seal whenever the motor is overhauled. The oil seal seat on the armature shaft should be checked for rough spots, grooves, or scars.

4. Bearings

Check bearings by turning them with your fingers. Feel for binding or gritty effects and for excessive looseness or wobble. A good bearing should also have a small amount of drag or stiffness caused by the lubrication. If the bearing turns very freely, it should be replaced.

Ball bearings that have been pulled off of shafts, pressed out of end head, or side loaded in such a way as to apply pressure on the balls and races must be replaced. Although the bearing may appear to feel good, the bearing races have been brinelled and will fail within a relatively short period of service.

5. Frame and field assembly

Check the condition of all insulation. If the insulation on the field coils appears blackened or charred, the serviceability of the coils is questionable. Burned or charred insulation is a result of coils over-heating due to overloading conditions, grounded or shorted coil windings. Check condition of all other insulation such as brush rigging, under coil connections, and around terminal studs.

6. Armature

Check the shaft bearing journals, splines or keyways for wear. Check windings, commutator connections and commutator bars for any signs of burning. If deep burned sections are evident, either in the brush track or on the rider end of the commutator bars, an open circuit in the armature winding is indicated.

Loose commutator bars will usually be indicated by excessive wear or burning on one bar. The commutator can be checked for loose bars by lightly tapping all of the bars with the handle of a plastic or wooden handle screwdriver. A contrasting dull thud or vibration will indicate a loose bar in which case the armature must be replaced.

Place the armature in lathe and clean the commutator with #000 or finer sandpaper to determine whether or not the commutator needs resurfacing. Light pitting and wear can be removed with the sandpaper. Excessive pitting and wear will have to be removed by turning and undercutting the commutator.

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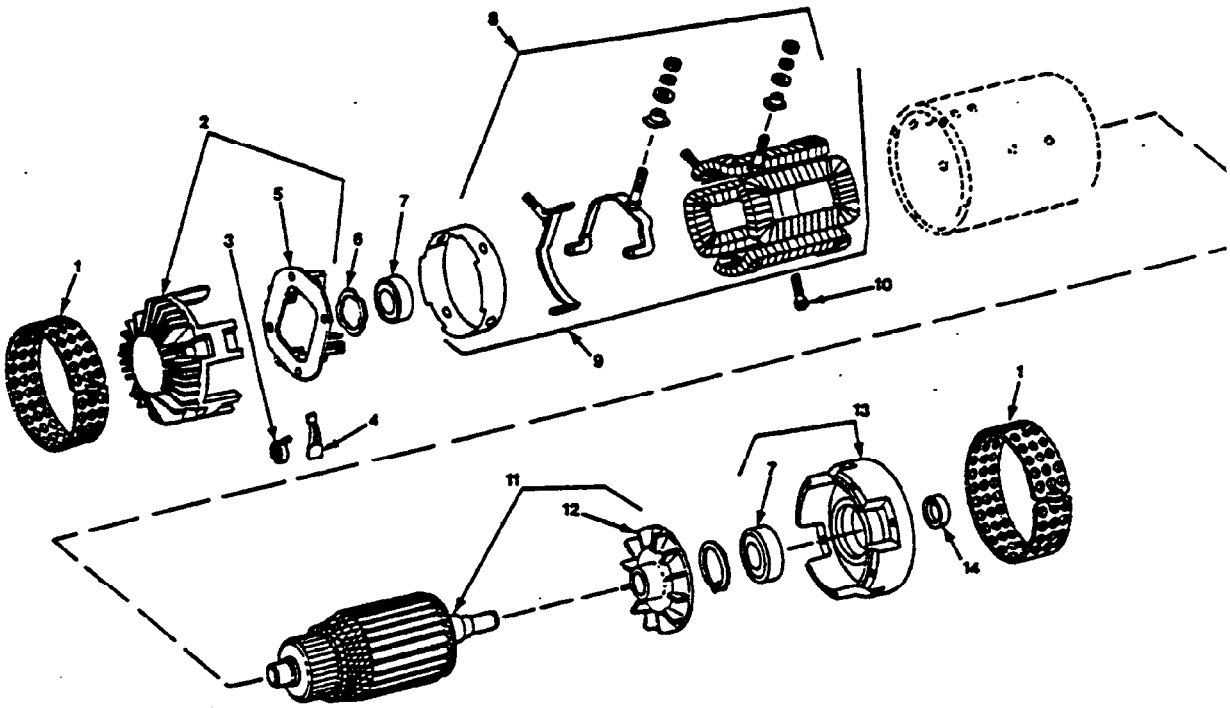
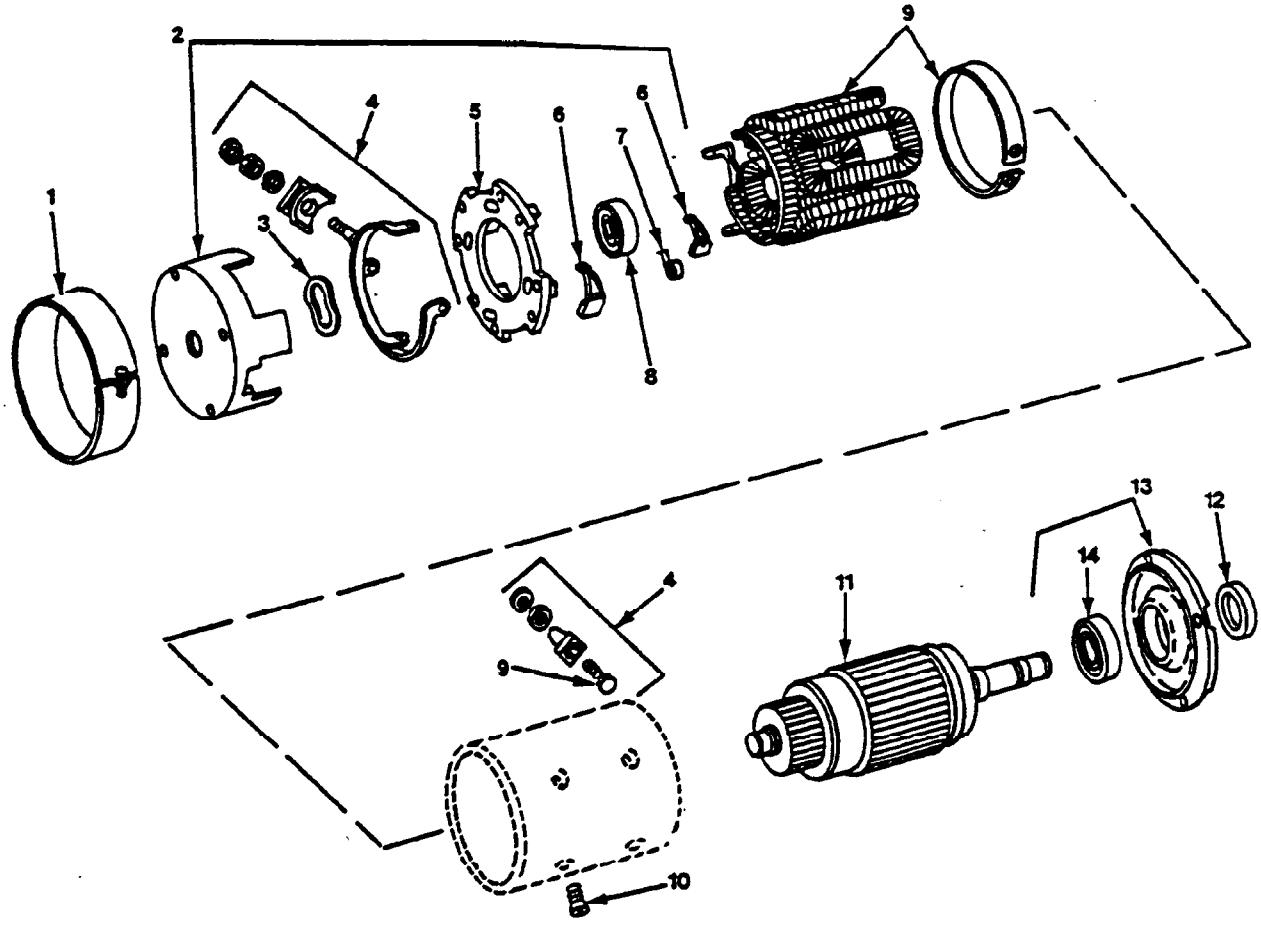
PT & PTT-5 DRIVE (TRACTION) MOTOR ~ 24 VOLT



Item #	Name	# for Assy.
1	Band, Cover	2
2	Head Assembly	1
3	Spring Set, Brush	1
4	Brush Set, Service	1
5	Holder, Brush	1
6	Washer, Spring	1
7	Bearing, Ball	2
8	Terminal Stud Package	1
9	Coil, Field Package	1
10	Screw, Pole Shoe Package	1
	Screw, Pole Shoe Package	1
11	Armature	1
12	Fan	1
13	Head Assembly	1
14	Seal, Oil	1

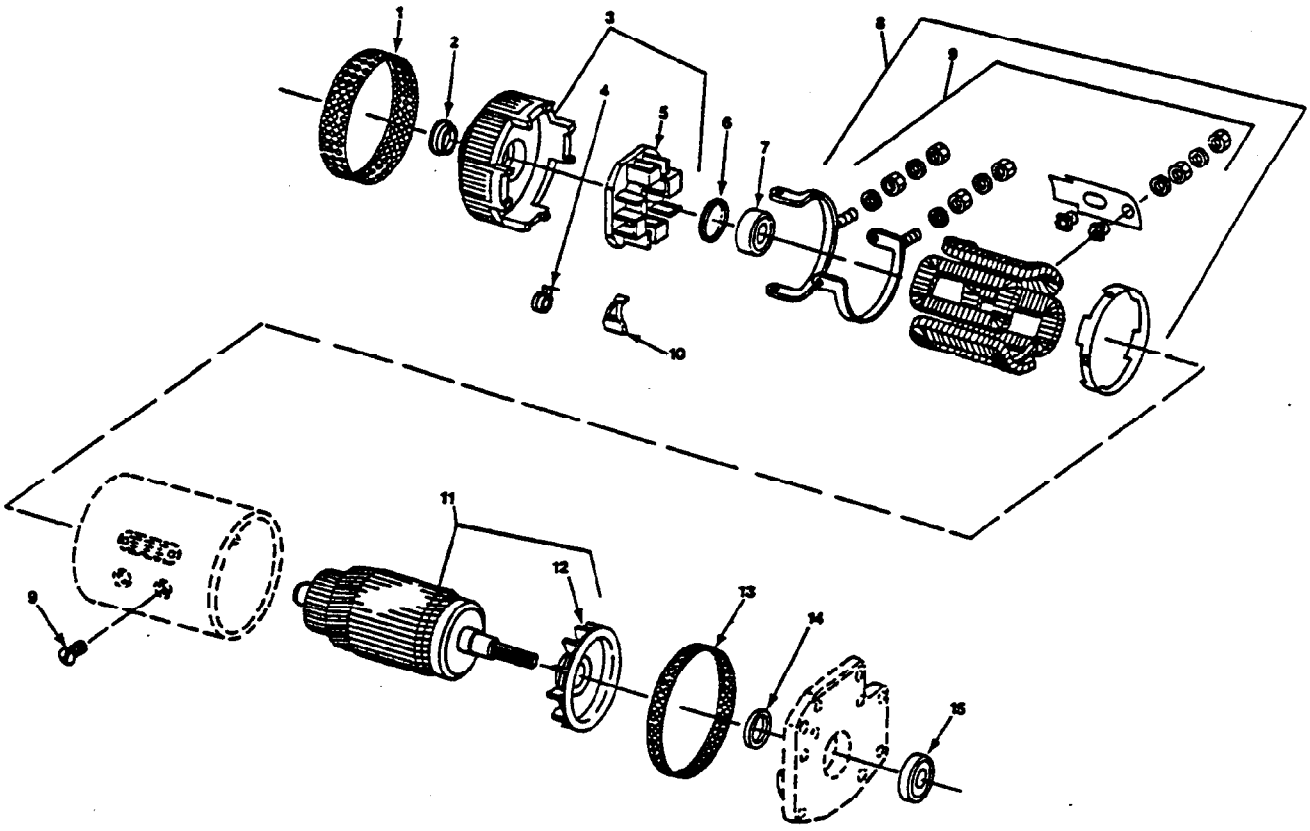
Main Index

PT & PTT-5 DRIVE (TRACTION) MOTOR ~ 12 VOLT



Item #	Name	# for Assy.
1	Band, Cover	1
2	Head Assembly	1
3	Washer, Spring	1
4	Terminal Stud Pkg.	1
5	Plate, Brush	1
6	Brush Set	1
7	Spring Set, Brush	1
8	Bearing	1
8A	Cover, Bearing	1
9	Coil Field Package	1
10	Screw, Poleshoe Pkg.	1
11	Armature	1
12	Seal, Oil	1
13	Head Assembly	1
14	Bearing	1

PT & PTT-7 DRIVE (TRACTION) MOTOR - 24 VOLT



Item #	Name	# for Assy.
1	Cover, band	1
2	Cover	1
3	End head assembly	1
4	Spring, brush	1
5	Brush holder	1
6	Washer, spring	1
7	Bearing	1
8	Field coil package	1
9	Terminal stud package	1
10	Brush set	1
11	Armature and fan	1
12	Fan	1
13	Cover, band	1
14	Seal, oil	1
15	Bearing	1