

PRESTOLITE

MAINTENANCE
PUBLICATIONS

For

**AVCO LYCOMING
AIRCRAFT ENGINES**

SSP-1471-3

March 1, 1985

 **AVCO** LYCOMING WILLIAMSPORT DIVISION
652 Oliver Street, Williamsport, Pennsylvania 17701

 **AVCO** LYCOMING ENGINE GROUP

THE AIRCRAFT STARTING MOTOR USING GEAR REDUCTION DRIVE

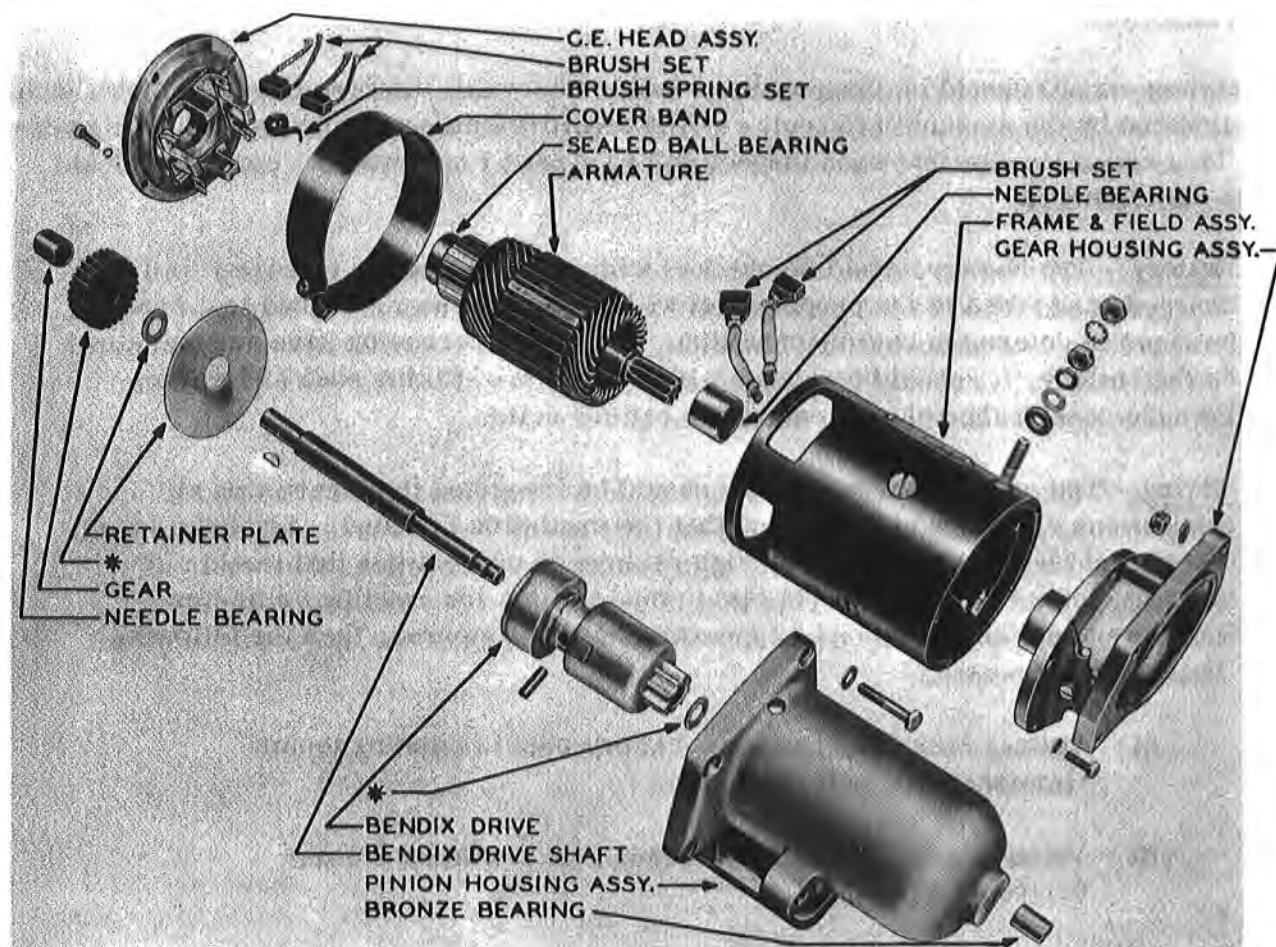
The starting circuit is designed to carry high current with a minimum loss of voltage. This circuit includes the battery, solenoid starting switch, manual starting switch, starting motor, the connecting wiring and the vehicle frame. The starting motor cranks the engine for starting while the battery supplies the power. The manual switch and solenoid starting switch control the operation.

THE STARTING MOTOR

The starting motor must develop a high cranking torque for a limited period of time when the starting switch is closed. The starting motor has designed into it a means of engaging its pinion with the flywheel ring gear on the engine with which it is used, and disengaging the pinion as soon as the engine starts.

DESCRIPTION

The gear reduction starting motor consists of six major components: (1) The Commutator End Head Assembly, (2) The Armature, (3) The Frame and Field Assembly, (4) The Gear Housing, (5) The Pinion Housing, and (6) The Bendix Drive Assembly. See Figure 1.



* THRUST WASHER PKG.

Figure 1 - Exploded View of Gear Reduction Starting Motor

OPERATION

When the starting circuit is energized, battery current is applied to the starting motor terminal. Current flows through the field coils creating a strong magnetic field. At the same time, current flows through the brushes to the commutator, through the armature windings to ground. The magnetic force created in the armature combined with that created in the field windings, begins to turn the armature.

The gear cut on the drive end of the armature shaft extends through the gear housing where it is supported by a roller bearing. The gear mates with the teeth of the reduction gear that drives the Bendix shaft. The shaft is keyed to the reduction gear. The Bendix drive is held in position on the shaft by a "spirol" pin. The shaft is supported in the gear housing by a closed end roller bearing and in the pinion housing by a graphitized bronze bearing.

When the armature turns the reduction gear, the Bendix drive pinion meshes with the flywheel ring gear by inertia and action of the screw threads within the Bendix sleeve. A detent pin engages in a notch in the screw threads which prevents demeshing if the engine fails to start when the starting circuit is de-energized.

When the engine reaches a predetermined speed, centrifugal action forces the detent pin out of the notch in the screw shaft and allows the pinion to demesh from the flywheel.

MAINTENANCE

The starting circuit should be inspected at regular intervals, the frequency of which should be determined by the amount of service and the conditions under which the vehicle is operated. It is recommended that such inspection be made at least twice a year and should include the following:

1. Battery - The battery should be checked with a hydrometer to be sure it is fully charged, and filled to the proper level with approved water. A load test should be made to determine battery condition. If dirt and corrosion have accumulated on the battery, it should be cleaned with a solution of baking soda and water. Be sure none of the solution enters the battery cells.
2. Wiring - The starting circuit wiring should be inspected to be sure that all connections are clean and tight and that the insulation is sound. A voltage loss test should be made to locate any high resistance connections that would affect starting motor efficiency. This test is made with a low reading voltmeter while cranking the engine or at approximately 100 amperes, then the following limits should be used:
 - (A) Voltage loss from insulated battery post to starting motor terminal - 0.3 volt maximum.
 - (B) Voltage loss from battery ground post to starter frame 0.1 volt maximum.

If voltage loss is greater than the above limits, additional tests should be made over each part of the circuit to locate the high resistance connections.

3. Lubrication - No lubrication is required on the starting motor except at the time of overhaul. Then lubricate the entire shaft under Bendix Drive, fill grooves in armature shaft at drive end and pack gear box with 1.3 to 2.0 ounces of Lithium Soap Base Grease #1925 Molytex "O" or equivalent.
4. Drive Operation - The starting motor should be operated for a few seconds with the ignition switch off to make sure that the pinion engages properly and that it turns freely without binding or excessive noise. Then the engine should be started two or three times to see that the pinion disengages properly when the engine is turned off.

OVERHAUL

If, during the above inspection, any indication of starting motor difficulty is noted, the starting motor should be removed from the engine for cleaning and repair.

1. Removal - To remove the starting motor from the engine, first disconnect the ground cable from the battery post to prevent short circuiting. Disconnect the lead from the starting motor terminal, then take out the mounting bolts. The motor can then be lifted off and taken to the bench for overhaul.
2. Disassembly - Remove the frame screws from the commutator end head and pull end head and armature from frame. Lift the brushes and lock in elevated position with brush springs. Use a puller to remove the end head from the armature. Use a special bearing puller to remove the sealed ball bearing from the armature shaft.

Remove the frame screws that secure the gear housing to the frame. Remove bolts and nuts holding the gear housing to the pinion housing and separate the two units. Pull Bendix shaft from pinion housing. Do not lose the steel spacer that is located on the pinion end of the shaft. Remove reduction gear, woodruff key and steel spacer from shaft.

Turn the Bendix pinion until it locks in the extended position. Locate "spiral" pin and use a punch to remove. Slide drive assembly off the shaft. Do not attempt to disassemble the drive and do not dip it in cleaning solvent.

To remove the roller bearings from the gear housing, use an arbor press and the correct bearing arbor. DO NOT HAMMER OUT. Each part should be cleaned and inspected for excessive wear or damage. Bearings should be checked for proper clearance and evidence of roughness or galling. Oil and dirt should be removed from insulation and the condition of the insulation checked.

3. Brushes - Check the brushes to see that they slide freely in their holders and make full contact on the commutator. If worn to half their original length or less, they should be replaced.
4. Armature - Check the commutator for uneven wear, excessive glazing or evidence of excessive arcing. If only slightly dirty, glazed or discolored, the commutator can be cleaned with 00 or 000 sandpaper. If the commutator is rough or worn, it should be turned in a lathe. Figure 2. The armature shaft should be inspected for rough bearing surfaces and rough or damaged splines.

To test the armature for grounds, a set of test probes connected in series with a 110 volt light should be used. Touch one probe to a commutator segment and the other to the armature core. If the test lamp lights, the armature is grounded and should be replaced.

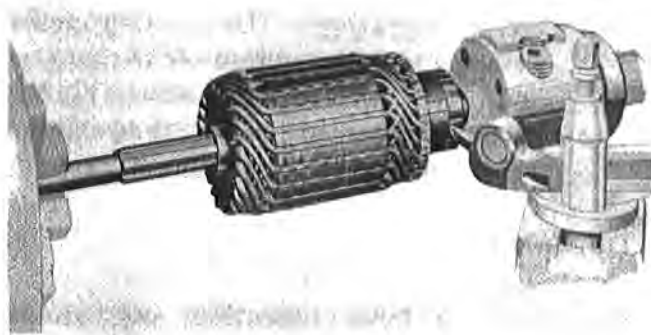


Figure 2 - Turning Starting Motor Commutator

To test for shorted armature coils, a growler is used, Figure 3. The armature is placed on the growler and slowly rotated by hand while a steel strip is held over the core so that it passes over each armature core slot. If a coil is shorted, the steel strip will vibrate.

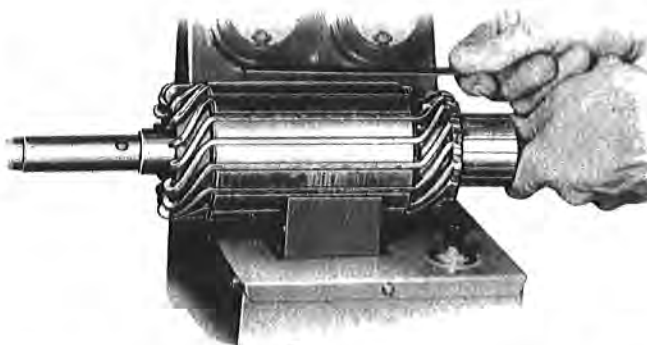


Figure 3 - Testing Motor Armature for Shorts

5. Field Coils - Check the field coils for grounds (Figure 4) by placing one test probe on the frame and the other on the starter terminal. Be sure the brushes are not accidentally touching the frame. If the lamp lights, the fields are grounded. Repair or replace.

Inspect all connections to make sure they are clean and tight and inspect insulation for deterioration.

6. Brush Holders - To test brush holders, touch one test probe to the brush plate and the other to each brush holder.

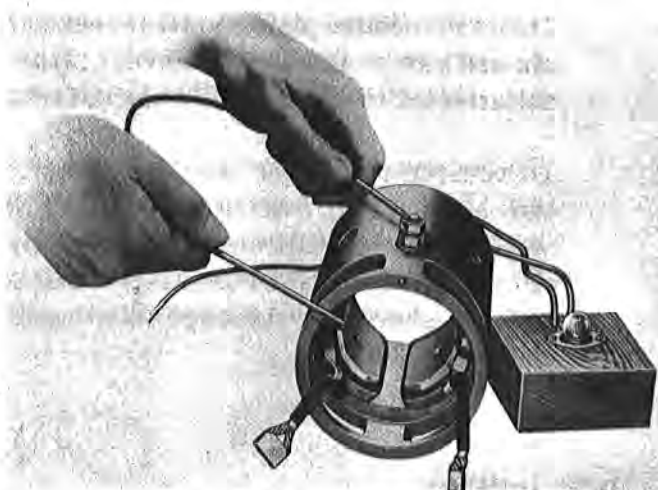


Figure 4 - Testing Motor Fields for Grounds

The test lamp should light when the grounded brush holders are touched and should not light when the insulated brush holders are touched.

7. Gear and Pinion Housing - Inspect housings for cracks and bearings for excessive wear. Remove rust, paint or grease from mounting surfaces.
8. Bendix Drive - The Bendix Drive should be wiped clean with a dry cloth. The pinion should turn smoothly in one direction and should lock in the other direction. Replace drive if it fails to check as above or if the pinion teeth are excessively worn or damaged.
9. Assembly - When assembling the starting motor, always use an arbor press and the proper bearing arbor for installing graphitized bronze and roller bearings. The Bendix shaft should have a thin film of Lubriplate #777 or equivalent on the Bendix portion of the shaft.

New brushes should be properly seated when installing by wrapping a strip of 00 sandpaper around the commutator (with the sanding side out) 1-1/4 to 1-1/2 times maximum. Drop brushes on sandpaper covered commutator and turn the armature slowly in the direction of rotation. Dust should be blown out of the motor after sanding.

Check the position of the pinion to be sure the unit will mesh properly with the flywheel ring gear. See specifications for particular unit for correct dimensions.

BENCH TESTS

After the starting motor is reassembled, it should be tested to see that the no load current at a certain voltage is within specifications. To make this test, connect as shown in Figure 5. If current is too high, check the bearing alignment and end play to make sure there is no binding or interference. Two or three sharp raps on the frame with a rawhide hammer will often help to align the bearings and free the armature.

If no difficulty is indicated in the above test, a stall torque test may be made to see if the starting motor is producing its rated cranking power. Make test connections as shown in Figure 6.

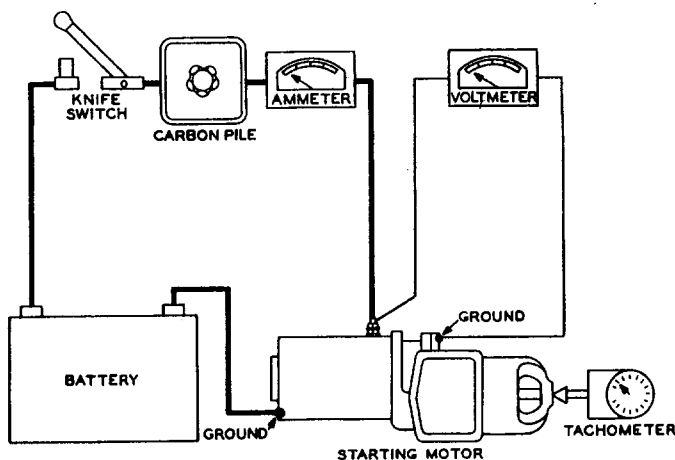


Figure 5 - No-Load Test Hook-up

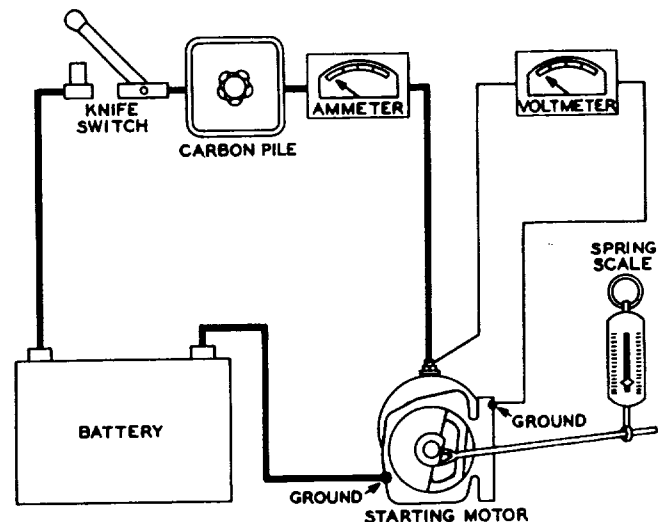


Figure 6 - Stall-Torque Hookup

If torque and current are not within specifications, check the seating of the brushes and internal connections for high resistance. If these checks are made and found to be in good order, replace frame and field assembly and retest starter.

STARTING MOTOR CONTROL CIRCUIT

Inspect the control circuit wiring between the battery, solenoid and manual starting switches for breaks, poor connections and faulty insulation. Tighten all connections and make sure solenoid is firmly mounted and makes a good ground connection.

Check the voltage loss across the switch contacts during normal starting. If loss is in excess of 0.2 volts per 100 amperes, the solenoid should be replaced.

If solenoid fails to operate when the manual switch is turned on or if it fails to release when the manual switch is released, it should be removed and tested to specifications. If either opening or closing voltages are not as specified, replace the solenoid.



prestolite®

SERVICE PARTS LIST

MHB SERIES

STARTING MOTORS

ISSUED: 9-25-79(Rev.)

ORIG.EQUIP. MOTOR

SERVICE MOTOR

PART NUMBER

PART NUMBER

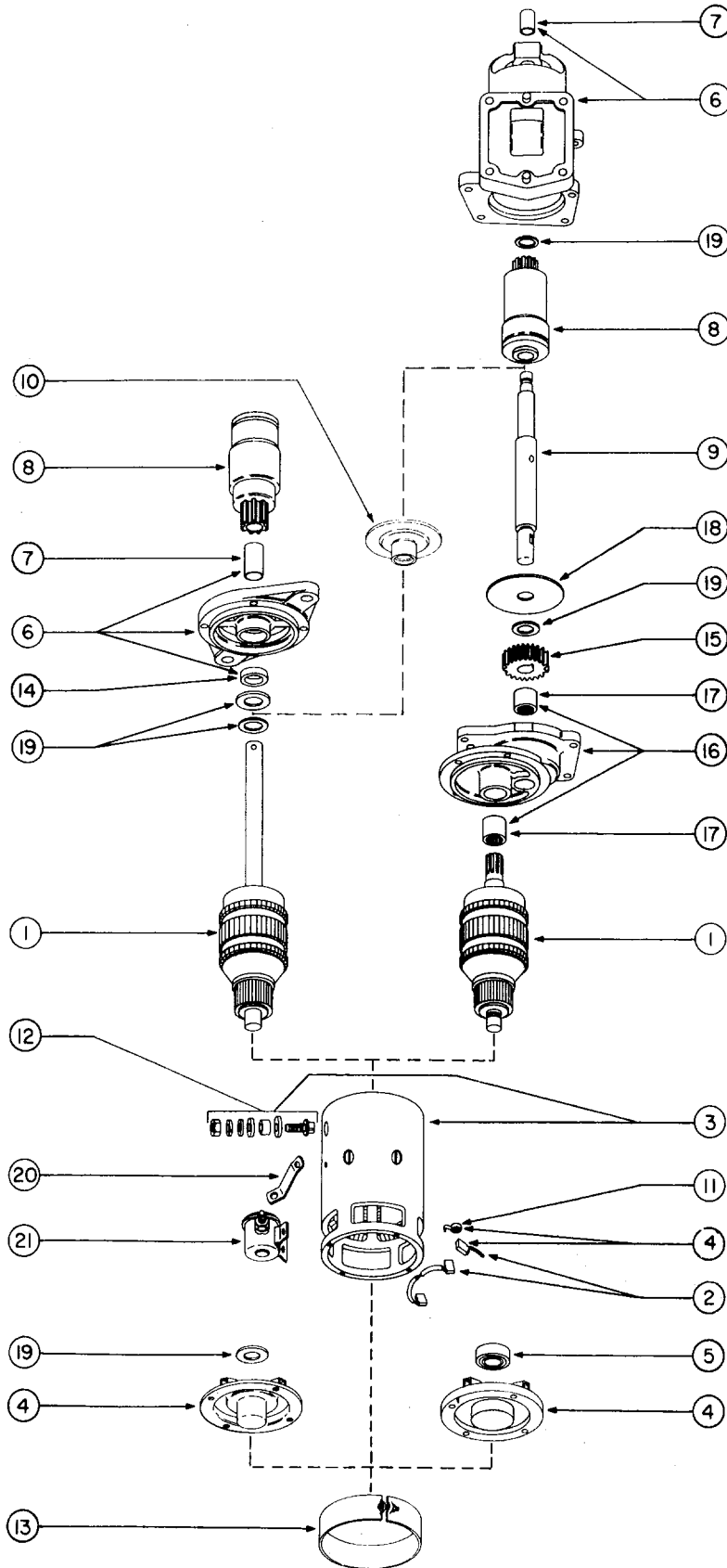
APPLICATION

MHB-4001,R	USE	MHB-4016R	Lycoming
MHB-4002,R	USE	MHB-4017R	Lycoming
MHB-4003,R	USE	MHB-4019R	Lycoming
MHB-4004		MHB-4004	Franklin
MHB-4005,R		[*]	Lycoming
MHB-4006		MHB-4006	Continental
MHB-4007,R	USE	MHB-4018R	Lycoming
MHB-4008,R	USE	MHB-4008R	Lycoming
MHB-4009,R	USE	MHB-4014R	Lycoming
MHB-4010,R	USE	MHB-4016R	Lycoming
MHB-4011,R	USE	MHB-4017R	Lycoming
MHB-4012,R	USE	MHB-4019R	Lycoming
MHB-4013,R	USE	MHB-4018R	Lycoming
MHB-4014,R	USE	MHB-4014R	Lycoming
MHB-4015,R	USE	MMU-4001R	Lycoming
MHB-4016,R	USE	MHB-4016R	Lycoming
MHB-4017,R	USE	MHB-4017R	Lycoming
MHB-4018,R	USE	MHB-4018R	Lycoming
MHB-4019,R	USE	MHB-4019R	Lycoming

[*] Available thru Lycoming only.



MHB-4000 Series Starting Motor Parts List



Exploded View of Typical MHB Starting Motor

Assembly	Armature ①	Brush Set ②	Frame & Field Assembly ③	Comm. End Head Assembly ④	C.E. Bearing ⑤	D.E. Head or Pinion Hsg. ⑥	D.E. Bearing ⑦
MHB-4001,R	MHB-2399S	MHB-2012S	MHB-2397S	MHB-2400	X-3991	[a]	[a]
MHB-4002,R	"	"	"	"	"	[b]	[b]
MHB-4003,R	"	"	"	"	"	[c]	[c]
MHB-4004	MHB-2383	MHB-2012AS	MHB-2384S	MBP-2002CS	[NR]	MZ-1147	MAB-124
MHB-4005,R[*]	MHB-2399S	"	MHB-2418S	MHB-2400A	X-3991	[NR]	[NR]
MHB-4006	MHB-2420	MHB-2012S	MHB-2384AS	MBP-2002CS	[NR]	MHB-2137[e]	90-2118[f]
MHB-4007,R	MHB-2399S	"	MHB-2397S	MHB-2400	X-3991	[d]	[d]
MHB-4008,R	"	"	"	"	"	[NR]	[NR]
MHB-4009,R	"	MHB-2012AS	MHB-2397AS	"	"	[d]	[d]
MHB-4010,R	"	MHB-2012S	MHB-2397S	"	"	PS-1432C	MZ-298
MHB-4011,R	"	"	"	"	"	PS-1437B	"
MHB-4012,R	"	"	"	"	"	PS-2432B	"
MHB-4013,R	"	"	"	"	"	PS-1432E	"
MHB-4014,R	"	MHB-2012AS	MHB-2397AS	"	"	"	"
MHB-4015,R	MMU-2386S	"	MHB-2384BS	MBP-2002D	[NR]	PS-1435	MG-77A
MHB-4016,R	MHB-2399S	MHB-2012S	MHB-2397S	MHB-2400	X-3991	PS-1432C	MZ-298
MHB-4017,R	"	"	"	"	"	PS-1437B	"
MHB-4018,R	"	"	"	"	"	PS-1432E	"
MHB-4019,R	"	"	"	"	"	PS-2432B	"

- [a] PS-1432CS Housing & Shaft Pkg. must be used at time of first repair. Individual components-PS-1432C Pinion Hsg.,MZ-298 Bearing, MZ-326 Bendix Drive Shaft may be replaced thereafter.
- [b] PS-1437BS Housing & Shaft Pkg. must be used at time of first repair. Individual components-PS-1437B Pinion Hsg.,MZ-298 Bearing, MZ-326 Bendix Drive Shaft may be replaced thereafter.
- [c] PS-2432BS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-2432B Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.
- [d] PS-1432ES Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-1432E Pinion Hsg.,MZ-298 Bearing, MZ-326 Bendix Drive Shaft may be replaced thereafter.
- [e] MZ-414S D.E. Mtg. Screw Gasket Pkg.(10Pcs.) and 90-2191 Mtg. Screw Pkg.(20Pcs.)also available.
- [f] Bearing & Seal Pkg.
- [*] Available thru Lycoming only.
- [NR] Not required.



MHB SERIES STARTING MOTOR PARTS LIST

Assembly	Bendix Drive (8)	Bendix Drive Shaft (9)	Intermed. Bearing Assembly (10)	Brush Spring Set (11)	Terminal Stud Package (12)	Cover Band (13)	Oil Seal (14)
MHB-4001,R	EBB-75A[g]	[a]	[NR]	MZ-19S	90-2502	MZ-24A	[NR]
MHB-4002,R	"	[b]	[NR]	"	"	"	[NR]
MHB-4003,R	"	[c]	[NR]	"	"	"	[NR]
MHB-4004	EBB-133[h]	[NR]	[NR]	"	"	"	XA-560
MHB-4005,R[*]	[NR]	[NR]	[NR]	"	"	"	[NR]
MHB-4006	[NR]	[NR]	[NR]	"	"	"	90-2118[f]
MHB-4007,R	EBB-75A[g]	[d]	[NR]	"	"	"	[NR]
MHB-4008,R	[NR]	[NR]	[NR]	"	"	"	[NR]
MHB-4009,R	EBB-142A[g]	[d]	[NR]	"	"	"	[NR]
MHB-4010,R	EBB-75A[g]	MZ-326	[NR]	"	"	"	[NR]
MHB-4011,R	"	"	[NR]	"	"	"	[NR]
MHB-4012,R	"	"	[NR]	"	"	"	[NR]
MHB-4013,R	"	"	[NR]	"	"	"	[NR]
MHB-4014,R	EBB-142A[g]	"	[NR]	"	"	"	[NR]
MHB-4015,R	EBB-724A[h]	[NR]	MZ-1236[j]	"	"	"	[NR]
MHB-4016,R	EBB-131A[h]	MZ-326A	[NR]	"	"	"	[NR]
MHB-4017,R	"	"	[NR]	"	"	"	[NR]
MHB-4018,R	"	"	[NR]	"	"	"	[NR]
MHB-4019,R	"	"	[NR]	"	"	"	[NR]

[a] PS-1432CS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-1432C Pinion Hsg.,MZ-298 Bearing, MZ-326 Bendix Drive Shaft may be replaced thereafter.

[b] PS-1437BS Housing & Shaft Pkg.must be used at time of first repair. Individual Components-PS-1437B Pinion Hsg.,MZ-298 Bearing, MZ-326 Bendix Drive Shaft may be replaced thereafter.

[c] PS-2432BS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-2432B Pinion Hsg., MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[d] PS-1432ES Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-1432E Pinion Hsg., MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[f] Bearing & Seal Pkg.

[g] 90-2140 Bendix Pin Pkg.(25 Pcs.) also available.

[h] 90-2139 Bendix Pin Pkg.(25 Pcs.) also available.

[j] MZ-339 Bushing also available.

[*] Available thru Lycoming only.

[NR] Not required.

MHB SERIES STARTING MOTOR PARTS LIST

ISSUED: 8-3-81 (REV.) SHEET 3

Assembly	Gear (15)	Gear Housing Assembly (16)	Needle Bearing (17)	Retainer Plate (18)	Thrust Washer Package (19)	Switch Connector (20)	Switch (21)
MHB-4001,R	MZ-396	MZ-1390	[k]	MZ-393	90-601	[NR]	[NR]
MHB-4002,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4003,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4004	[NR]	[NR]	[NR]	[NR]	90-2677	MZ-144	[m]
MHB-4005,R[*]	"	MHB-1030[*]	[k]	[NR]	90-601	[NR]	[NR]
MHB-4006	"	[NR]	[NR]	[NR]	90-2232	[NR]	[NR]
MHB-4007,R	MZ-396	MZ-1390	[k]	MZ-393	90-601	[NR]	[NR]
MHB-4008,R	[NR]	"	[k]	[NR]	"	[NR]	[NR]
MHB-4009,R	MZ-396	"	[k]	MZ-393	"	[NR]	[NR]
MHB-4010,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4011,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4012,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4013,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4014,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4015,R	[NR]	[NR]	[NR]	[NR]	90-2677	[NR]	[NR]
MHB-4016,R	MZ-396	MZ-1390	[k]	MZ-393	90-601	[NR]	[NR]
MHB-4017,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4018,R	"	"	[k]	"	"	[NR]	[NR]
MHB-4019,R	"	"	[k]	"	"	[NR]	[NR]

[k] Two used. XA-997 is 1/2" O.D. and XA-998 is 13/16" O.D.
[m] No longer available.
[*] Available thru Lycoming only.
[NR] Not required.





prestolite[®]

SERVICE INFORMATION

MHB

AIRCRAFT STARTING MOTORS

Issued 4/1/83

Page 1 of 5

GENERAL INFORMATION

<u>VOLTAGE</u>	24
<u>ROTATION</u>	Gear Reduction Units Except MHB-4005, R, -4009, R, -4014, R. Motor - CCWDE Drive - CWDE MHB-4005, R -4014, R Motor - CWDE Drive - CWDE MHB-4009, R Motor - CWDE Drive - CCWDE Direct Drive Units - CWDE
<u>BRUSHES</u>	4
<u>POLES</u>	4
<u>SWITCH</u>	Gear Reduction Units - Separate Direct Drive Units - switch mounted on motor
<u>DRIVE ASSEMBLY</u>	Rubber Folo Thru Type
<u>GEAR REDUCTION</u>	3.38 to 1 Gear Ratio (see following note).

DRIVE AND GEAR NOTE

Reduction gears, shafts, and drives used with the MHB-4005, 4005R, and 4006 are not manufactured or supplied by Prestolite.

SERVICE INFORMATION

LUBRICATION

GEAR REDUCTION UNITS Except MHB-4006

Thoroughly clean and repack needle bearings with Shell Alvania #2 or an equivalent bearing lubricant. Pack gear box with 1-1/4 to 2 ounces of Texaco #1925 Molytex "0" or an equivalent Lithium soap base grease. (Also see Drive Assembly servicing.)

MHB-4006

Saturate the felt oiling pad in the commutator end head with SAE 20 oil. Allow excess oil to drain out before installing end head on motor. Thoroughly clean and inspect the two needle bearings in the drive end head for wear or damage. Replace if necessary. Repack needle bearing with Shell Alvania #2 or an equivalent bearing lubricant.



DIRECT DRIVE UNITS

Soak new absorbent bronze bearings in SAE 20 oil before installation. Saturate the felt oiling pad in the commutator end head with SAE 20 oil. Allow excess oil to drain out before installing end head on motor. Put a light film of Lubriplate #777, or equivalent, on the drive end of the armature shaft before installing the drive end head. (Also see Drive Assembly servicing.)

DRIVE ASSEMBLIES

The Drive Assembly should be thoroughly cleaned and re-lubricated when the motor is overhauled. Do Not use carburetor cleaner or any cleaning solution that could damage the rubber block inside the Drive Assembly. Use only clean petroleum base cleaners such as kerosene or "varsol". Thoroughly clean the drive to remove all dirt, grease, and contamination from the screwshaft threads and control nut. The drive cup may also be removed to insure a thorough cleaning job. Do Not attempt to remove the control nut.

After the drive has been cleaned and blown dry with compressed air, lubricate the drive with a spray-on type silicone lubricant. Lubricate the motor shaft with the same silicone lubricant before installing the Drive Assembly. When reassembling the early style drive on the shaft, make sure the spirol pin does not project beyond the outside diameter of the pinion sleeve. When reassembling the late style drive, make sure the head washer covers both ends of the retaining pin.

BEARING REPLACEMENTGEAR REDUCTION UNITS Except MHB-4006

When replacing needle bearings they must be pressed in flush with the edge of the casting. The armature bearing must be flush on the side toward the armature and the Drive Assembly shaft bearing flush on the side toward the Drive Assembly. Press the pinion housing bearing in flush with the outside edge of the casting.

MHB-4006

Press the armature shaft bearing into the housing until it is flush with the bearing bore. Press the oil seal in until it is flush with the edge of the casting. Press the gear reduction shaft bearing in so that the open end is flush with the edge of the casting.

DIRECT DRIVE UNITS

Press the drive end bearing in flush with the outside edge of the casting. Press the oil seal into the casting so that it bottoms against the oil seal counterbore.



prestolite[®]

SERVICE INFORMATION

MHB

AIRCRAFT STARTING MOTORS

Issued 4/1/83

Page 3 of 5

INTERMEDIATE BEARING PLATE MHB-4015, R

Use "Loctite Grade A" on threads of bearing plate retaining screws.
Torque screws to 25 - 35 in./lbs.

BRUSH REPLACEMENT

Brushes must be replaced when they have worn down to a length of 1/4" or less. Refer to service bulletin ASM-1 for brush replacement procedure.

BRUSH SPRING TENSION

32 to 40 ounces with new brushes. Measure with a spring scale hooked under the spring at the brush. Pull on a line opposite the line of force exerted by the spring and take the reading just as the spring leaves the brush.

END PLAY

GEAR REDUCTION UNITS Except MHB-4006

No dimensional specification necessary. Make sure the fiber thrust washer is on the drive end of the armature shaft and that a steel thrust washer is on each end of the Drive Assembly shaft. Refer to Parts List for thrust washer package number.

MHB-4006

Adjust to .005" to .050" with thrust washers on the commutator end of the shaft. Refer to Parts List for thrust washer package number.

DIRECT DRIVE UNITS

Adjust to .005" minimum with thrust washers. Maintain a clearance of 1/64" to 7/64" between the inside edge of the drive pinion and the outside edge of the drive end casting with the drive extended and the armature pushed toward the commutator end head. Refer to Parts List for thrust washer package number.

COMMUTATOR END HEAD

GEAR REDUCTION UNITS Except MHB-4005, R, 4009, R, 4014, R

Assemble the end head on the motor so that the letter "R" is directly in line with the motor terminal.

MHB-4005, R, 4009, R, 4014, R and DIRECT DRIVE UNITS

Assemble the end head on the motor so that the letter "L" is directly in line with the motor terminal.



COMMUTATOR REFINISHING

Minimum Diameter	1.50"
Undercut	.003" max.
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

TEST SPECIFICATION (75°F.)

See Figures 1 and 2 for no load and stall torque test connections.

GEAR REDUCTION UNITS

No Load Test (Motor Only)	20.0 volts, 35 max. amps., 4600 Min. RPM
No Load Test (Complete Unit)	20.0 volts, 35 max. amps., 1300 Min. RPM
Stall Torque Test	14.0 volts, 260 max. amps., 27.0 min. Ft. Lbs.

DIRECT DRIVE UNITS

No Load Test	20.0 volts, 36 max. amps., 4600 min. RPM
Stall Torque Test	14.0 volts, 260 max. amps., 8.0 min. Ft. Lbs.

<u>SHUNT FIELD CURRENT DRAW</u>	8.7 to 10.4 amperes at 24.0 volts
---------------------------------	-----------------------------------

Unit	Drive Type	Internal Wiring	Application
MHB-4001, R	Gear Reduction	Fig. 3	Lycoming
MHB-4002, R	Gear Reduction	Fig. 3	Lycoming
MHB-4003, R	Gear Reduction	Fig. 3	Lycoming
MHB-4004	Direct	Fig. 4	Franklin
MHB-4005, R	Gear Reduction	Fig. 4	Lycoming
MHB-4006	Gear Reduction	Fig. 3	Continental
MHB-4007, R	Gear Reduction	Fig. 3	Lycoming
MHB-4008, R	Gear Reduction	Fig. 3	Lycoming
MHB-4009, R	Gear Reduction	Fig. 4	Lycoming
MHB-4010, R	Gear Reduction	Fig. 3	Lycoming
MHB-4011, R	Gear Reduction	Fig. 3	Lycoming
MHB-4012, R	Gear Reduction	Fig. 3	Lycoming
MHB-4013, R	Gear Reduction	Fig. 3	Lycoming
MHB-4014, R	Gear Reduction	Fig. 4	Lycoming
MHB-4015, R	Direct	Fig. 4	Lycoming
MHB-4016, R	Gear Reduction	Fig. 3	Lycoming
MHB-4017, R	Gear Reduction	Fig. 3	Lycoming
MHB-4018, R	Gear Reduction	Fig. 3	Lycoming
MHB-4019, R	Gear Reduction	Fig. 3	Lycoming



prestolite®

SERVICE INFORMATION

MHB

AIRCRAFT STARTING MOTORS

Issued 4/1/83

Page 5 of 5

No Load

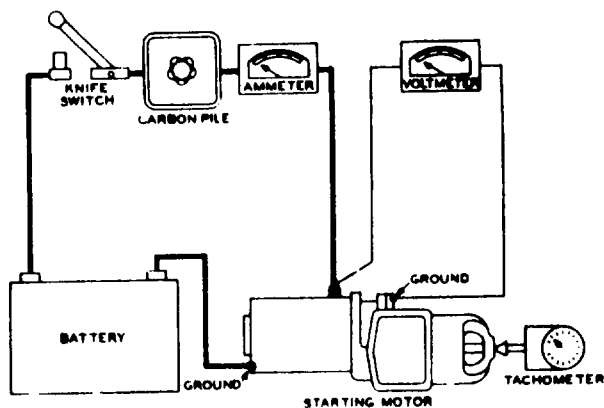


Figure 1

Stall Torque

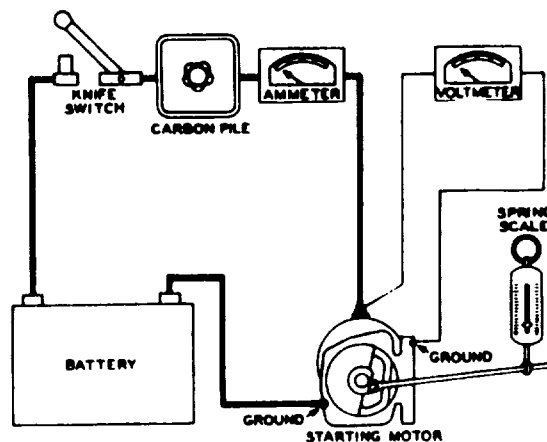


Figure 2

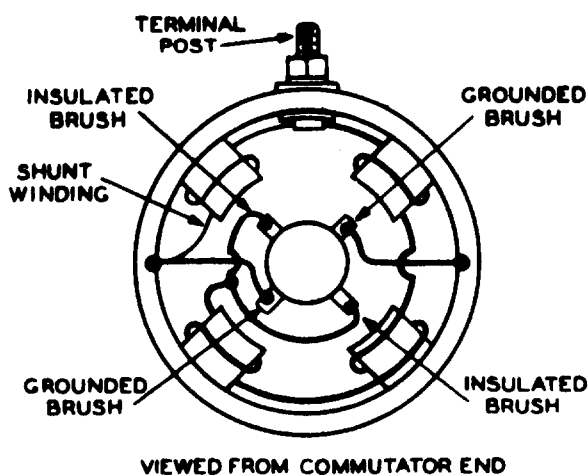


Figure 3

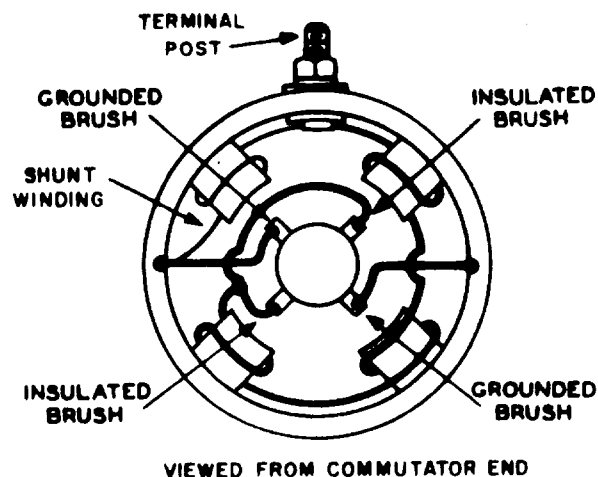


Figure 4





prestolite®

SERVICE PARTS LIST

MHJ SERIES

STARTING MOTORS

ISSUED: 5-15-81 (Rev.)

ORIG. EQUIP. MOTOR

SERVICE MOTOR

VOLTS: 24

PART
NUMBER

PART
NUMBER

APPLICATION

MHJ-4002
MHJ-4003,S
MHJ-4004
MHJ-4004R
MHJ-4005

USE MHP-4101S
USE MHP-4101S
USE MHJ-4004R
MHJ-4004R
USE MHJ-4005R

Teledyne Continental
Teledyne Continental
Lycoming
Service Motor
Lycoming

MHJ-4005R

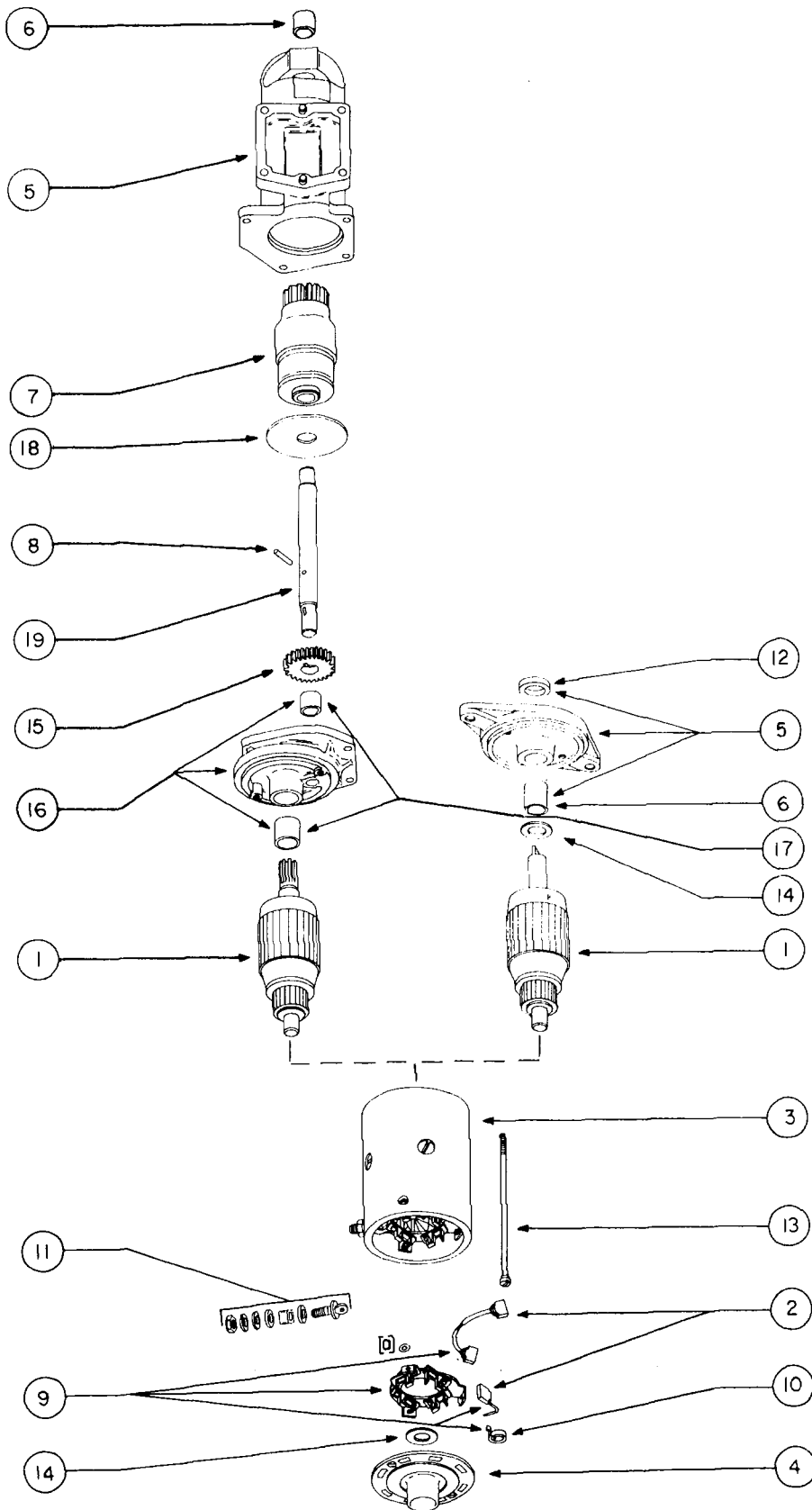
MHJ-4005R

Service Motor

Note:- Due to production design of the assemblies listed here-in the Field Coils being varnished and baked in place within the Frame; we have followed the advice of our Production Engineering Dept. and have recalled the servicing of the individual Field Coils. Commencing immediately, whenever Field Coils are required, the complete Frame & Field Assy. will be supplied.



MHJ Series Starting Motor Parts List



Exploded View of Typical MHJ Starting Motor

Assembly	Armature (1)	Brush Set (2)	Frame & Field Assembly (3)	Comm. End Head Assembly (4)	D.E. Head or Pinion Hsg. (5)	D.E. Bearing (6)	Bendix Drive (7)
MHJ-4002	MHJ-2147S	MDL-2012ES	MEX-2092S	MDL-1002	MCL-2136	ML-18A	[NR]
MHJ-4003,S	"	"	MEX-2092AS	"	MCL-2136A	"	[NR]
MHJ-4004	MHJ-3151S	MDZ-2012CS	MEX-3031S	"	PS-1455	MHJ-36	EBB-124A
MHJ-4004R	"	"	"	"	"	"	"
MHJ-4005	"	"	"	"	PS-1455A	"	"
MHJ-4005R	"	"	"	"	"	"	"

[NR] Not required.

Assembly	Bendix Pin Pkg. (8)	Brush Plate Assembly (9)	Brush Spring Set (10)	Term. Stud Package (11)	Oil Seal (12)	Thru Bolt Package (13)	Thrust Washer Package (14)
MHJ-4002	[NR]	MDL-1064ES	MZ-19S	90-726	XA-1024	GJ-20DS	90-2677
MHJ-4003,S	[NR]	"	"	"	"	"	"
MHJ-4004	90-2139	MDL-1064GS	"	"	[NR]	GJ-20S	90-2232
MHJ-4004R	"	"	"	"	[NR]	"	"
MHJ-4005	"	"	"	"	[NR]	"	"
MHJ-4005R	"	"	"	"	[NR]	"	"

[NR] Not required.

Assembly	Gear (15)	Gear Housing Assembly (16)	Needle Bearing (17)	Retainer Plate (18)	Bendix Drive Shaft (19)	
MHJ-4002	[NR]	[NR]	[NR]	[NR]	[NR]	
MHJ-4003,S	[NR]	[NR]	[NR]	[NR]	[NR]	
MHJ-4004	MZ-396	MHJ-1045	[a]	MZ-393	MHJ-44	
MHJ-4004R	"	"	[a]	"	"	
MHJ-4005	"	"	[a]	"	"	
MHJ-4005R	"	"	[a]	"	"	

[a] Two used (XA-997) 1/2" I.D. and (XA-998) 13/16" I.D.

[NR] Not required.





prestolite[®]

SERVICE INFORMATION

MHJ

Aircraft Starting Motors

Issued: 4/1/83

Page 1 of 4

GENERAL INFORMATION

<u>VOLTAGE</u>	24
<u>ROTATION</u>	MHJ-4002, 4003 - CWDE MHJ-4004, R, 4005, R - Motor CCWDE, Drive CWDE
<u>BRUSHES</u>	4
<u>POLES</u>	4
<u>SWITCH</u>	Separate
<u>DRIVE</u>	MHJ-4004, R, 4005, R - Rubber Folo Thru Type
<u>GEAR REDUCTION</u>	MHJ-4004, R, 4005, R - 3.38 to 1 Gear Ratio

SERVICE INFORMATION

LUBRICATION

MHJ-4002, 4003

Soak new bearings in SAE 20 oil before installation. Saturate the felt oiling pad in the commutator end head with SAE 20 oil. Allow excess oil to drain out before installing end head on motor. Put a light film of Lubriplate #777 on the armature shaft before assembling motor.

MHJ-4004, R, 4005, R

Thoroughly clean and repack needle bearings with Shell Alvania #2 or an equivalent bearing lubricant with 1-1/4 to 2 ounces or Texaco #1925 Molytex "0" or an equivalent Lithium soap base grease. (Also see Drive Assembly servicing).

DRIVE ASSEMBLY

The Drive Assembly should be thoroughly cleaned and relubricated when the motor is overhauled. Do Not use carburetor cleaner or any cleaning solution that could damage the rubber block inside the Drive Assembly. Use only clean petroleum base cleaners such as kerosene or "varsol". Thoroughly clean the Drive Assembly to remove all dirt, grease, and contamination from the screwshaft threads and control nut. The drive cup may also be removed to insure a thorough cleaning job. Do Not attempt to remove the control nut.



MHJ

Aircraft Starting Motors

Issued: 4/1/83

Page 2 of 4

 prestolite.
SERVICE
INFORMATION

After the Drive Assembly has been cleaned and blown dry with compressed air, lubricate the drive with a spray on type silicone lubricant. Lubricate the motor shaft with the same silicone lubricant before installing the Drive Assembly. When reassembling the drive on the shaft, make sure head washer covers both ends of the retaining pin.

BEARING REPLACEMENT

MHJ-4002, 4003

The drive end bearing must be pressed in flush with the oil seal counterbore. The oil seal must bottom against the counterbore.

MHJ-4004, R, 4005, R

Press the armature shaft needle bearing in approximately 3/16" below the edge of the casting on the side toward the armature. Press the Drive Assembly shaft needle bearing in flush with the casting on the side toward the Drive Assembly. Press the pinion housing bearing in flush with the outside edge of the casting.

BRUSH REPLACEMENT

Brushes must be replaced when they have worn down to a length of 1/4" or less. Refer to Service Bulletin ASM-1 for brush replacement procedure.

BRUSH SPRING TENSION

32 to 40 ounces with new brushes. Measure with a spring scale hooked under the spring at the brush. Pull on a line opposite the line of force exerted by the spring and take a reading just as the spring leaves the brush.

END PLAY (Armature Shaft Only)

Adjust to .005" to .050" with thrust washers on the commutator end of the shaft. Refer to Parts List for thrust washer package number.

POLE SHOE INSTALLATION

The pole shoes must be installed so that the longer tip is pointing in the same direction as armature rotation.

COMMUTATOR REFINISHING

Minimum Diameter	1.50"
Undercut	.003" max.
Total Indicator Runout	.002" max. measure from bearing journal
Surface Finish	50 microinch max.

TEST SPECIFICATIONS (75°F)

MHJ-4002, 4003

No Load Test	20.0 volts, 43 max. amps, 6200 min. RPM
Stall Torque Test	8.0 volts, 210 max. amps, 8.0 min. Ft. Lbs.



prestolite®

SERVICE

INFORMATION

MHJ

Aircraft Starting Motors

Issued: 4/1/83

Page 3 of 4

MHJ-4004, R, 4005, R - See Figures 1 and 2 for test connections.

No Load Test (Motor Only) 20.0 volts, 43 max. amps, 6200 min. RPM

No Load Test (Complete Unit) 20.0 volts, 43 max. amps, 1800 min. RPM

Stall Torque Test 8.0 volts, 210 max. amps, 27.0 min. Ft. Lbs.

SHUNT FIELD CURRENT DRAW 4.8 to 6.0 amperes at 24.0 volts.

Unit	Internal Wiring	Application
MHJ-4002	Figure 3	Continental
MHJ-4003,S	Figure 3	Continental
MHJ-4004, R	Figure 4	Lycoming
MHJ-4005, R	Figure 4	Lycoming

INSTALLATION NOTE

Prior to starting motor installation, clean any rust, corrosion or dirt from the mounting surfaces of the starting motor and engine. Also check all ground strap connections to make sure they are clean and tight.

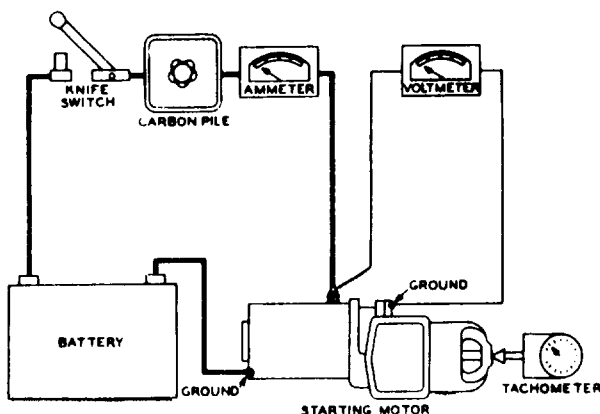


Figure 1

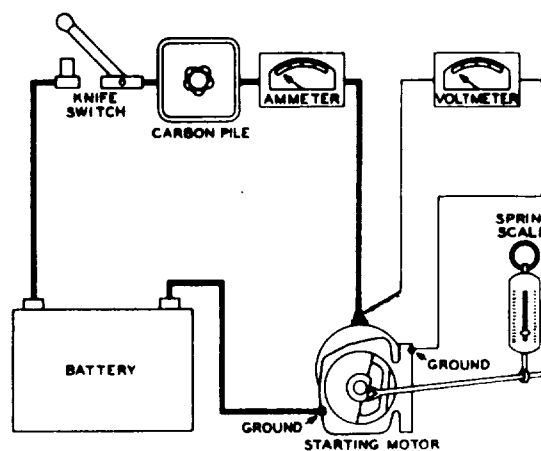


Figure 2



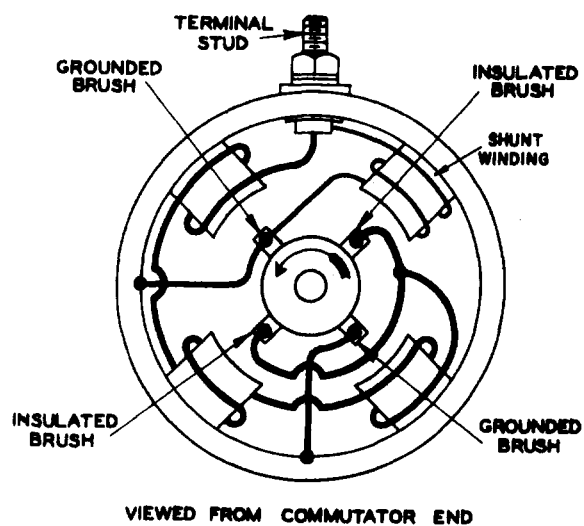


Figure 3

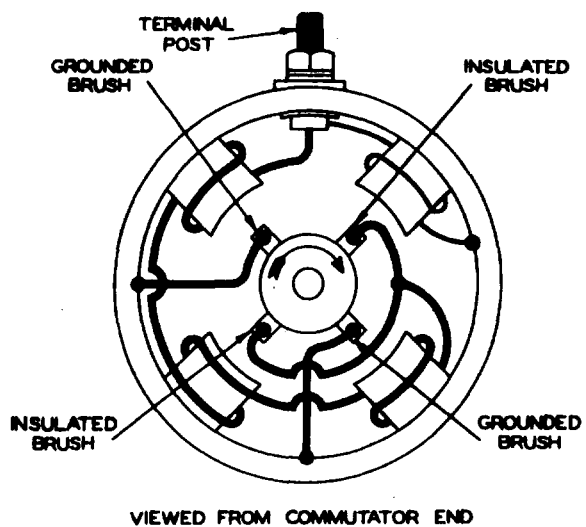


Figure 4



prestolite[®]

SERVICE PARTS LIST

MMU SERIES

STARTING MOTORS

ISSUED: 6-1-79

ORIG. EQUIP. MOTOR

SERVICE MOTOR

PART NUMBER

PART NUMBER

APPLICATION

MMU-4001,R

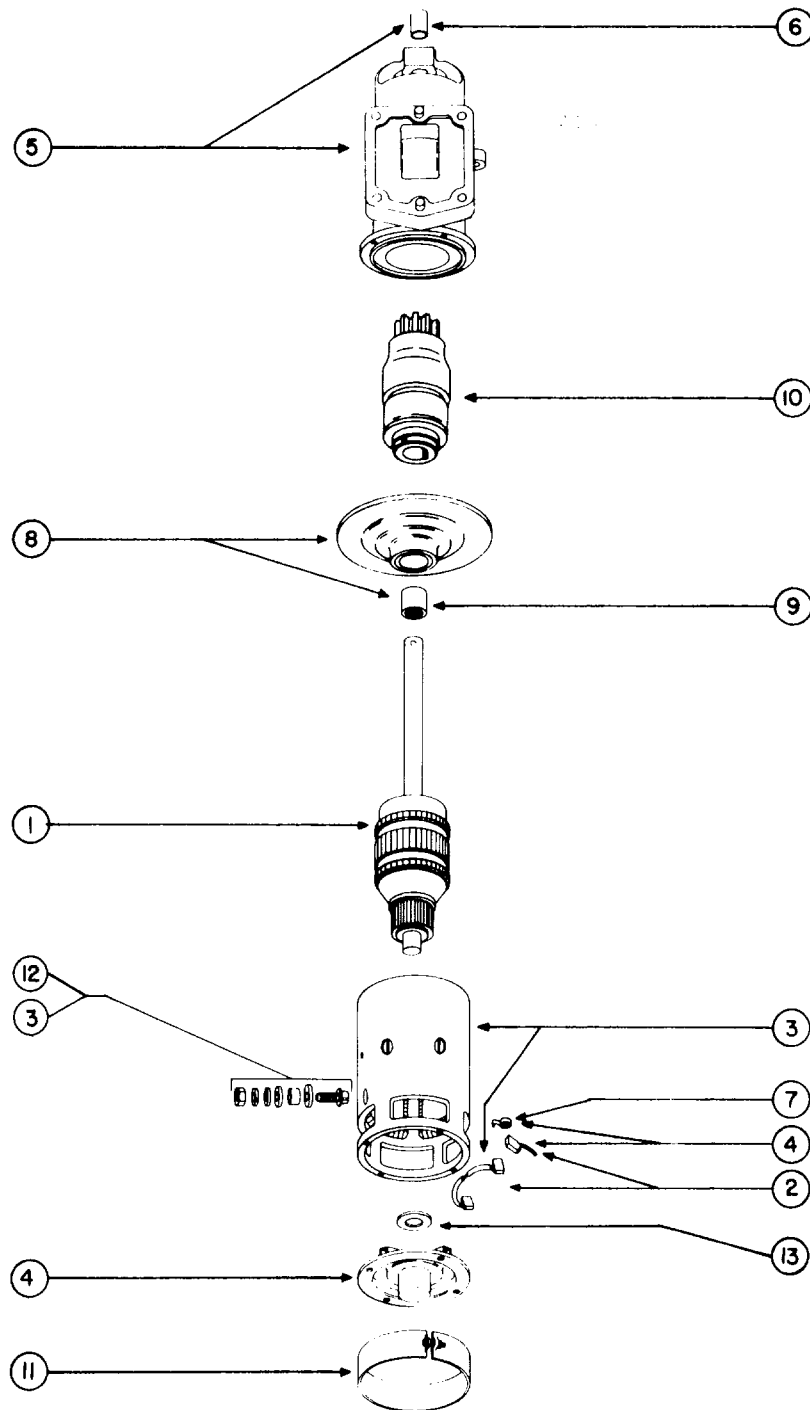
USE

MMU-4001R

Lycoming



MMU Series Starting Motor Parts List



Exploded View of Typical MMU Starting Motor

Assembly	Armature (1)	Brush Set (2)	Frame & Field Assembly (3)	Comm. End Head Assembly (4)	Pinion Housing Assembly (5)	D.E. Bearing (6)	Brush Spring Set (7)
MMU-4001,R	MMU-2386S	MHB-2012AS	MHB-2384BS	MBP-2002D	PS-1435	MG-77A	MZ-19S
Assembly	Intermediate Bearing Assembly (8)	Intermed. Bearing (9)	Bendix Drive (10)	Cover Band (11)	Terminal Stud Package (12)	Thrust Washer Package (13)	
MMU-4001,R	MZ-1236	MZ-339	EBB-124A[a]	MZ-24A	90-2502	90-2677	

[a] 90-2139 Bendix Pin Package(25 Pcs.) also available.





prestolite[®]

SERVICE INFORMATION

MMU

AIRCRAFT STARTING MOTOR

Issued 4/1/83

Page 1 of 3

GENERAL INFORMATION

<u>VOLTAGE</u>	24
<u>ROTATION</u>	CWDE
<u>POLES</u>	4
<u>BRUSHES</u>	4
<u>DRIVE ASSEMBLY</u>	Rubber Folo-Thru Type

SERVICE INFORMATION

LUBRICATION

Soak new absorbent bronze bearings in SAE 20 oil before installation. Saturate the felt oiling pad in the commutator end head with SAE 20 oil. Allow excess oil to drain out before installing end head on motor. Put a light film of Lubriplate #777 on the drive end of the armature shaft before installing the intermediate bearing. (Also see Drive Assembly.)

DRIVE ASSEMBLY

The Drive Assembly should be thoroughly cleaned and re-lubricated when the motor is overhauled. Do not use carburetor cleaner or any cleaning solution that could damage the rubber block inside the Drive Assembly. Use only clean petroleum base cleaners such as kerosene or "Varsol". Thoroughly clean the Drive Assembly to remove all dirt, grease, and contamination from the screwshaft threads and control nut. The drive cup may also be removed to insure a thorough cleaning job. Do not attempt to remove the control nut.

After the Drive Assembly has been cleaned and blown dry with compressed air, lubricate the drive with a spray-on type silicone lubricant. Lubricate the motor shaft with the same silicone lubricant before installing the Drive Assembly. When reassembling the Drive on the shaft, make sure the head washer covers both ends of the retaining pin.

BEARING REPLACEMENT

Press the drive end bearing in flush with the outside edge of the casting. Press the intermediate bearing in flush to the side toward the armature.



INTERMEDIATE BEARING PLATE

Use "Loctite Grade A" on threads of bearing plate retaining screws.
Torque screws to 25 - 35 in/lbs.

BRUSH REPLACEMENT

Brushes must be replaced when they have worn down to a length of 1/4" or less. Refer to service ASM-1 for brush replacement procedure.

BRUSH SPRING TENSION

32 to 40 ounces with new brushes. Measure with a spring scale hooked under the spring at the brush. Pull on a line opposite the line of force exerted by the spring and take the reading just as the spring leaves the brush.

END PLAY

Adjust to .005" minimum with thrust washers on the commutator end of the armature shaft. Refer to Parts List for thrust washer package number.

COMMUTATOR END HEAD

Assemble the end head on the motor so that the letter "L" is directly in line with the motor terminal.

COMMUTATOR REFINISHING

Minimum Diameter	1.50"
Undercut	.003" max.
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

TEST SPECIFICATIONS

No Load Test	20.0 volts, 35 max. amps., 3325 RPM
Stall Torque Test	14.0 volts, 250 max. amps., 10.4 min. Ft. Lbs.

SHUNT FIELD CURRENT DRAW 8.8 to 10.4 amperes at 24.0 volts

Unit	Drive Type	Application
MMU-4001, R	Direct	Lycoming



prestolite[®]

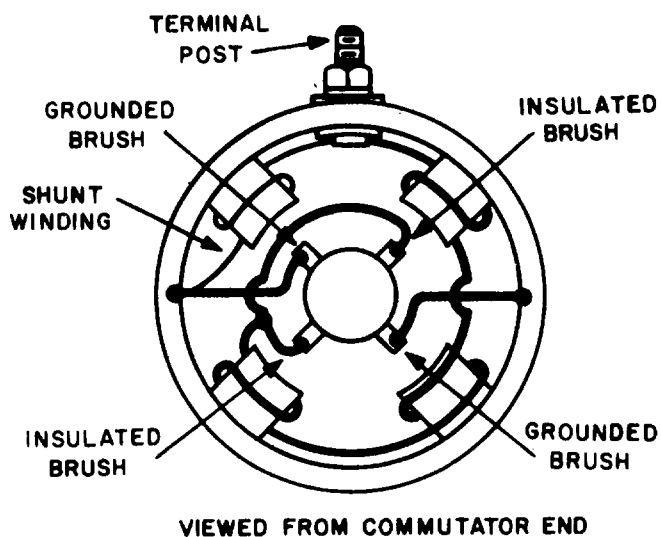
SERVICE INFORMATION

MMU

AIRCRAFT STARTING MOTOR

Issued 4/1/83

Page 3 of 3





prestolite®

SERVICE PARTS LIST

MZ SERIES

STARTING MOTORS

ISSUED:12-31-80 (Rev.)

ORIG. EQUIP. MOTOR

SERVICE MOTOR

PART NUMBER

PART NUMBER

APPLICATION

MZ-4203

MZ-4203

Franklin

MZ-4204,R

USE

MZ-4204R

Lycoming

MZ-4205,R

USE

MZ-4221R

Lycoming

MZ-4206,R

USE

MZ-4222R

Lycoming

MZ-4207,R

USE

MZ-4223R

Lycoming

MZ-4208,R

USE

MZ-4208R

Lycoming

MZ-4214

MZ-4214

Continental

MZ-4216,R

USE

MZ-4220R

Lycoming

MZ-4217,R

USE

MZ-4221R

Lycoming

MZ-4218,R

USE

MZ-4222R

Lycoming

MZ-4219,R

USE

MZ-4223R

Lycoming

MZ-4220,R

USE

MZ-4220R

Lycoming

MZ-4221,R

USE

MZ-4221R

Lycoming

MZ-4222,R

USE

MZ-4222R

Lycoming

MZ-4223,R

USE

MZ-4223R

Lycoming

MZ-4224,R

USE

MZ-4224R

Lycoming

MZ-4225,R

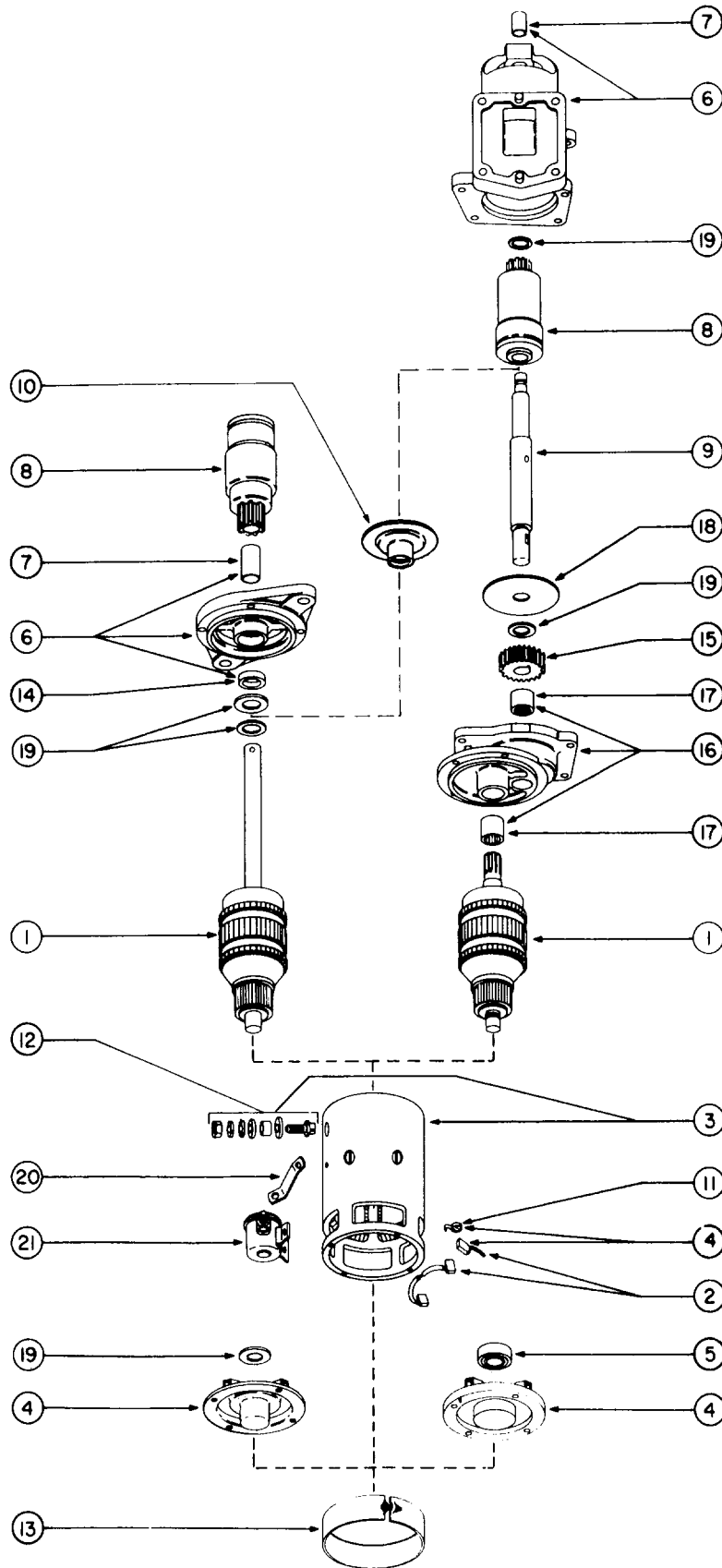
USE

MZ-4225R

Lycoming



MZ Series Starting Motor Parts List



Exploded View of Typical MZ Starting Motor

Assembly	Armature ①	Brush Set ②	Frame & Field Assembly ③	Comm. End Head Assembly ④	C.E. Bearing ⑤	D.E. Head or Pinion Hsg. ⑥	D.E. Bearing ⑦
MZ-4203	MZ-2383	MZ-2012AS	MZ-1005AS[*]	MZ-2002F	[NR]	MZ-1147	MZ-46A
MZ-4204,R	MZ-2386S	MBG-2012S	MZ-2385S	MZ-2002U	[NR]	PS-1435	MG-77A
MZ-4205,R	MZ-2399S	"	MZ-2397S	MZ-2400	X-3991	[a]	[a]
MZ-4206,R	"	"	"	"	"	[b]	[b]
MZ-4207,R	"	"	"	"	"	[c]	[c]
MZ-4208,R	"	"	"	"	"	[NR]	[NR]
MZ-4214	MZ-2412S	MBG-2012CS	MZ-2022DS	MZ-2002VS	[NR]	MZ-2413[d]	90-2018[e]
MZ-4216,R	MZ-2399S	MBG-2012S	MZ-2397S	MZ-2400	X-3991	[b]	[b]
MZ-4217,R	"	"	"	"	"	PS-2432B	MZ-298
MZ-4218,R	"	"	"	"	"	PS-1432C	"
MZ-4219,R	"	"	"	"	"	PS-1437B	"
MZ-4220,R	"	"	"	"	"	PS-1432C	"
MZ-4221,R	"	"	"	"	"	PS-2432B	"
MZ-4222,R	"	"	"	"	"	PS-1432C	"
MZ-4223,R	"	"	"	"	"	PS-1437B	"
MZ-4224,R	"	"	"	"	"	PS-1432C	"
MZ-4225,R	"	"	"	"	"	PS-1432F	"

[*] Field Coil Pkg. Complete Frame & Field Assembly not available.

[a] PS-2432BS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-2432B Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[b] PS-1432CS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-1432C Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[c] PS-1437BS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-PS-1437B Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[d] MZ-414S D.E. Mounting Screw Gasket Package is also available.

[e] Bearing & Seal Package.

[NR] Not required.



MZ SERIES MOTOR PARTS LIST

Assembly	Bendix Drive (8)	Bendix Drive Shaft (9)	Intermed. Bearing Assembly (10)	Brush Spring Set (11)	Terminal Stud Package (12)	Cover Band (13)	Oil Seal (14)
MZ-4203	EBB-133[f]	[NR]	[NR]	MZ-19S	90-716	MZ-24A	XA-560
MZ-4204,R	EBB-124A[f]	[NR]	MZ-1236	"	90-877	"	[NR]
MZ-4205,R	EBB-75A[g]	[a]	[NR]	"	90-876	"	[NR]
MZ-4206,R	"	[b]	[NR]	"	"	"	[NR]
MZ-4207,R	"	[c]	[NR]	"	"	"	[NR]
MZ-4208,R	[NR]	[NR]	[NR]	"	"	"	[NR]
MZ-4214	[h]	[h]	[NR]	"	90-877	"	[NR]
MZ-4216,R	EBB-142A[g]	[b]	[NR]	"	90-876	"	[NR]
MZ-4217,R	EBB-75A[g]	MZ-326	[NR]	"	"	"	[NR]
MZ-4218,R	"	"	[NR]	"	"	"	[NR]
MZ-4219,R	"	"	[NR]	"	"	"	[NR]
MZ-4220,R	EBB-142A[g]	"	[NR]	"	"	"	[NR]
MZ-4221,R	EBB-131A[f]	MZ-326A	[NR]	"	"	"	[NR]
MZ-4222,R	"	"	[NR]	"	"	"	[NR]
MZ-4223,R	"	"	[NR]	"	"	"	[NR]
MZ-4224,R	EBB-131A[j]	"	[NR]	"	"	"	[NR]
MZ-4225,R	"	"	[NR]	"	"	"	[NR]

[a] PS-2432BS Housing & Shaft Pkg. must be used at time of first repair. Individual components-

PS-2432B Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[b] PS-1432CS Housing & Shaft pkg. must be used at time of first repair. Individual Components-

PS-1432C Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[c] PS-1437BS Housing & Shaft Pkg. must be used at time of first repair. Individual Components-

PS-1437B Pinion Hsg.,MZ-298 Bearing,MZ-326 Bendix Drive Shaft may be replaced thereafter.

[f] 90-2139 Bendix Pin Package(25Pcs.) also available.

[g] 90-2140 Bendix Pin Package(25Pcs.) also available.

[h] Not part of this Motor; available thru Continental only #639153.

[j] X-5384 Bendix Pin also available.

[NR] Not required.

Assembly	Gear (15)	Gear Housing Assembly (16)	Needle Bearing (17)	Retainer Plate (18)	Thrust Washer Package (19)	Connector (20)	Switch (21)
MZ-4203	[NR]	[NR]	[NR]	[NR]	90-2677	MZ-144	[n]
MZ-4204,R	[NR]	[NR]	[NR]	[NR]	90-2271	[NR]	[NR]
MZ-4205,R	MZ-396	MZ-1390	[m]	MZ-393	90-601	[NR]	[NR]
MZ-4206,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4207,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4208,R	[NR]	"	[m]	[NR]	"	[NR]	[NR]
MZ-4214	[k]	[NR]	[NR]	[NR]	90-2006	[NR]	[NR]
MZ-4216,R	MZ-396	MZ-1390	[m]	MZ-393	90-601	[NR]	[NR]
MZ-4217,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4218,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4219,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4220,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4221,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4222,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4223,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4224,R	"	"	[m]	"	"	[NR]	[NR]
MZ-4225,R	"	"	[m]	"	"	[NR]	[NR]

[k] Used with but not part of this Motor, available thru Continental #639153.

[m] Two used- XA-997 is 1/2" I.D. & XA-998 is 13/16 I.D.

[n] No longer available.

[NR] Not required.





prestolite[®]

SERVICE INFORMATION

MZ

AIRCRAFT STARTING MOTOR

Issued 4/1/83

Page 1 of 5

GENERAL INFORMATION

<u>VOLTAGE</u>	12
<u>ROTATION</u>	All Gear Reduction units except MZ-4216, R, 4220, R Motor CCWDE, Drive CWDE MZ-4216, R, 4220, R - Motor CWDE, Drive CCWDE. All Direct Drive units - CWDE.
<u>BRUSHES</u>	4
<u>POLES</u>	4
<u>SWITCH</u>	Gear Reduction Units - Separate Direct Drive Units - Switch mounted on motor
<u>DRIVE</u>	MZ-4214 uses a Formsprag, Torque Limiting Drive All others use Rubber Folo Thru Type Drives
<u>GEAR REDUCTION</u>	
	MZ-4214 - 7 to 1 Gear ratio All others 3.38 to 1 Gear ratio

SERVICE INFORMATION

LUBRICATION

GEAR REDUCTION UNITS Except MZ-4214

Thoroughly clean and repack needle bearings with Shell Alvania #2 or an equivalent bearing lubricant. Pack gear box with 1-1/4 to 2 ounces of Texaco #1925 Molytex "0" or an equivalent Lithium soap base grease. (Also see Drive Assembly servicing.)

DIRECT DRIVE UNITS AND MZ-4214

Soak new absorbent bronze bearings in SAE 20 oil before installation. Saturate the felt oiling pad in the commutator end head with SAE 20 oil. Allow excess oil to drain out before installing end head on motor. Put a light film of Lubriplate #777, or equivalent, on the drive end of the armature shaft before installing the intermediate bearing or drive end head. (Also see Drive Assembly servicing.)



**prestolite.****SERVICE****INFORMATION**FORMSPRAG DRIVE

These units are not serviceable. If the drive feels rough when rotated in its free direction, or if the gear rotates in both directions, the drive should be replaced. Never submerge the drive assembly in a cleaning solution. To do so will destroy or contaminate the internal lubrication which cannot be replaced.

DRIVE ASSEMBLY

The Drive Assembly should be thoroughly cleaned and re-lubricated when the motor is overhauled. Do not use carburetor cleaner or any cleaning solution that could damage the rubber block inside the drive assembly. Use only clean petroleum base cleaners such as kerosene or "Varsol". Thoroughly clean the Drive Assembly to remove all dirt, grease, and contamination from the screwshaft threads and control nut. The drive cup may also be removed to insure a thorough cleaning job. Do not attempt to remove the control nut. After the Drive Assembly has been cleaned and blown dry with compressed air, lubricate the drive with a spray-on type silicone lubricant. Lubricate the motor shaft with the same silicone lubricant before installing the drive assembly. When reassembling the early style drive on the shaft, make sure the spiro pin does not project beyond the outside diameter of the pinion sleeve. When reassembling the late style drive, make sure the head washer covers both ends of the retaining pin.

BEARING REPLACEMENTGEAR REDUCTION UNITS

When replacing needle bearings they must be pressed in flush with the edge of the casting. The armature bearing must be flush on the side toward the armature and the Drive Assembly shaft bearing flush on the side toward the Drive Assembly. Press the pinion housing bearing in flush with the outside edge of the casting.

DIRECT DRIVE UNITS

Press the drive end bearing in flush with the outside edge of the casting. Press the oil seal into the casting so that it bottoms against the oil seal counterbore.

INTERMEDIATE BEARING PLATE MZ-4204, R

Use "Loctite Grade A" on threads of bearing plate retaining screws. Torque screws to 25-35 in/lbs.



prestolite[®]

SERVICE INFORMATION

MZ

AIRCRAFT STARTING MOTOR

Issued 4/1/83

Page 3 of 5

BRUSH REPLACEMENT

Brushes must be replaced when they have worn down to a length of 1/4" or less. Refer to Service Bulletin ASM-1 for brush replacement procedure.

BRUSH SPRING TENSION

32 to 40 ounces with new brushes. Measure with a spring scale hooked under the spring at the brush. Pull on a line opposite the line of force exerted by the spring and take the reading just as the spring leaves the brush.

END PLAY

GEAR REDUCTION UNITS Except MZ-4214

No dimensional specification necessary. Make sure the fibre thrust washer is on the drive end of the armature shaft and that a steel thrust washer is on each end of the Drive Assembly shaft. Refer to Parts List for thrust washer package number.

DIRECT DRIVE UNITS

MZ-4203, adjust to .005" minimum with thrust washers. Maintain a clearance of 1/64" to 7/64" between the inside edge of the drive pinion and the outside edge of the drive end casting with the drive extended and the armature pushed toward the commutator end head. Refer to Parts List for thrust washer package number.

MZ-4204 and MZ-4214, adjust to .005" minimum with thrust washers on the commutator end of the armature shaft. Refer to Parts List for thrust washer package number.

COMMUTATOR END HEAD

GEAR REDUCTION UNITS Except MZ-4216, R, 4220, R

Assemble the end head on the motor so that the letter "R" is directly in line with the motor terminal.

DIRECT DRIVE UNITS AND MZ-4216, R, 4220, R

Assemble the end head on the motor so that the letter "L" is directly in line with the motor terminal.



**prestolite.****SERVICE****INFORMATION**COMMUTATOR REFINISHING

Minimum Diameter	1.50"
Undercut	.003" max.
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

TEST SPECIFICATION (75° F.)

(See Figures 1 and 2 for no load and stall torque test connections.)

GEAR REDUCTION UNITS

No Load Test (Motor Only)	10.0 volts, 50 max. amps., 8000 min. RPM
No Load Test (Complete Unit)	10.0 volts, 75 max. amps., 1600 min. RPM
Stall Torque Test	4.0 volts, 560 max. amps., 37.5 min. Ft. Lbs.

DIRECT DRIVE UNITS

No Load Test	10.0 volts, 75 max. amps., 5500 min. RPM
Stall Torque Test	4.0 volts, 560 max. amps., 11.1 min. Ft. Lbs.

MZ-4214 - MOTOR ONLY

No Load Test	10.0 volts, 50 max. amps., 8000 min. RPM
Stall Torque Test	4.0 volts, 560 max. amps., 11.1 min. Ft. Lbs.

Unit	Drive Type	Internal Wiring	Application
MZ-4203	Direct	Fig. 3	Franklin
MZ-4204, R	Direct	Fig. 3	Lycoming
MZ-4205, R	Gear Reduction	Fig. 4	Lycoming
MZ-4206, R	Gear Reduction	Fig. 4	Lycoming
MZ-4207, R	Gear Reduction	Fig. 4	Lycoming
MZ-4208, R	Gear Reduction	Fig. 4	Lycoming
MZ-4214	*	Fig. 4	Continental
MZ-4216, R	Gear Reduction	Fig. 3	Lycoming
MZ-4217, R	Gear Reduction	Fig. 4	Lycoming
MZ-4218, R	Gear Reduction	Fig. 4	Lycoming
MZ-4219, R	Gear Reduction	Fig. 4	Lycoming
MZ-4220, R	Gear Reduction	Fig. 3	Lycoming
MZ-4221, R	Gear Reduction	Fig. 4	Lycoming
MZ-4222, R	Gear Reduction	Fig. 4	Lycoming
MZ-4223, R	Gear Reduction	Fig. 4	Lycoming
MZ-4224, R	Gear Reduction	Fig. 4	Lycoming
MZ-4225, R	Gear Reduction	Fig. 4	Lycoming

*Formsprag Torque Limiting Drive used with, but not a part of, this motor.

INSTALLATION NOTE

Prior to starting motor installation, clean any rust, corrosion or dirt from the mounting surfaces of the starting motor and engine. Also check all ground connections to make sure they are clean and tight.



prestolite®

SERVICE INFORMATION

MZ

AIRCRAFT STARTING MOTOR

Issued 4/1/83

Page 5 of 5

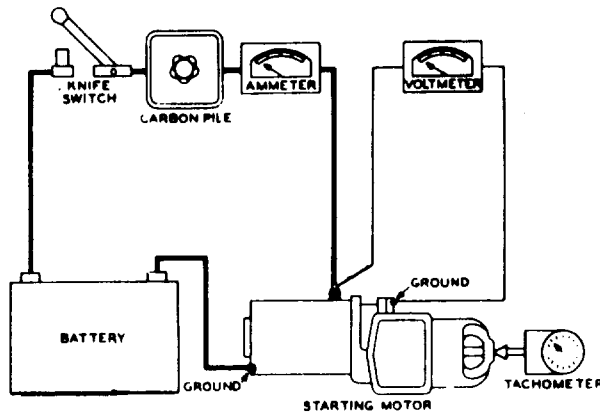


Figure 1

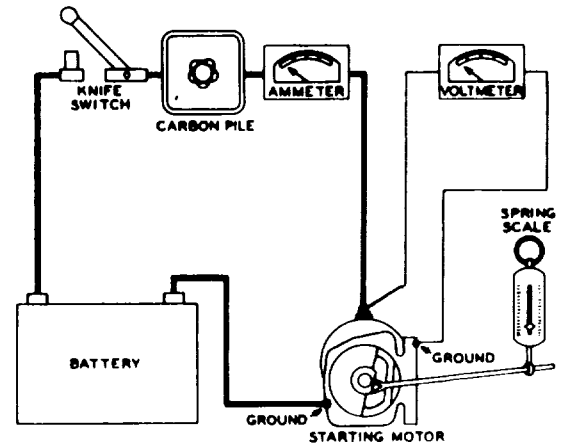


Figure 2

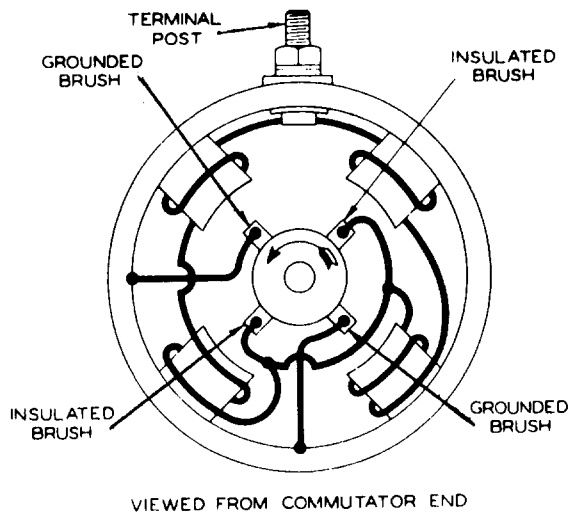


Figure 3

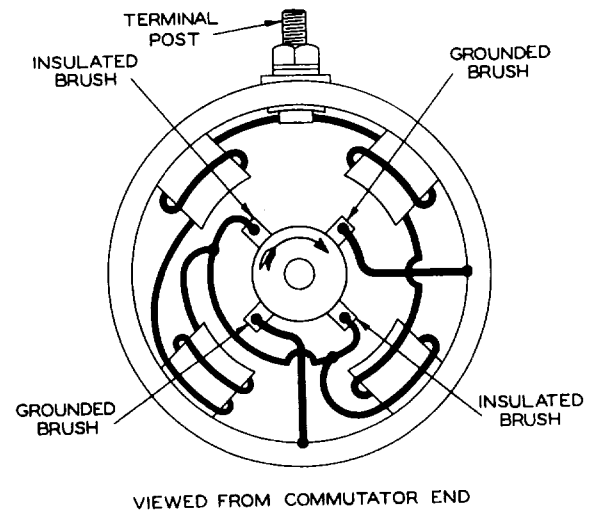


Figure 4





prestolite[®]



(Early Production Type)

**BELT DRIVEN
AIRCRAFT
ALTERNATORS**

BELT DRIVEN AIRCRAFT ALTERNATOR

Prestolite Belt Driven Aircraft Alternators (Figure 1) have been designed and constructed to provide extended periods of trouble-free operation with a minimum amount of maintenance. They have also been designed and constructed to withstand the vibration and extreme temperature changes encountered in aircraft applications.

DESCRIPTION

The principal components (Figure 2) of the alternator are (1) the stator, (2) the rotor, (3) the slip ring end head, (4) the drive end head and (5) the rectifiers.



Figure 1

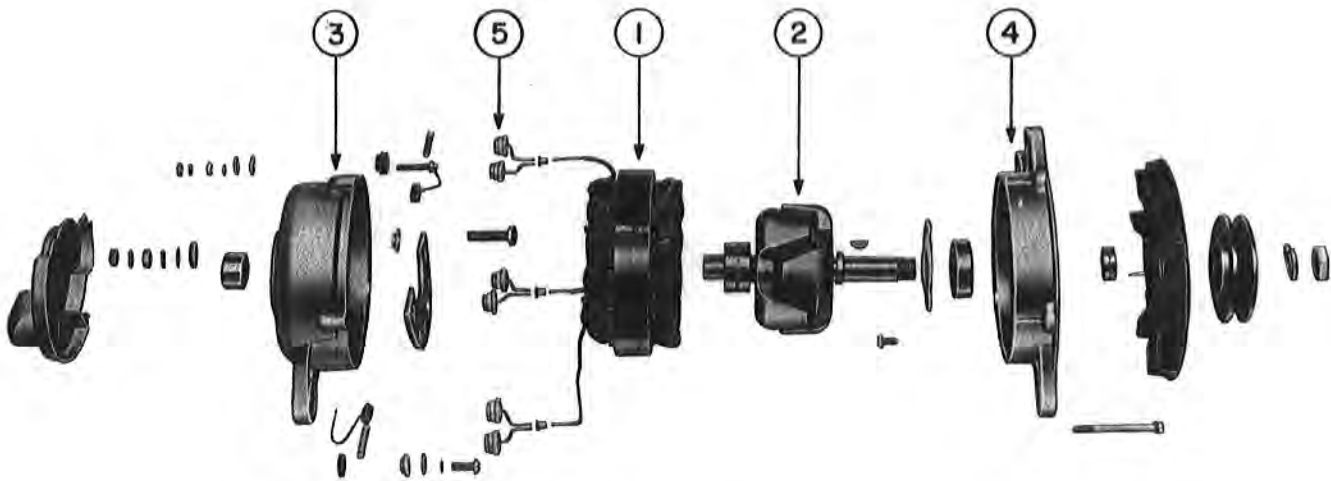


Figure 2

1. The stator consists of a laminated iron core on which the three phase windings are wound in slots around the inside circumference. Leads are connected to each of the three points of the phase windings and each lead is connected to a pair of rectifiers, one negative and one positive.
2. The rotor consists of a single field coil encased between two four-poled, interleaved iron sections assembled on the shaft. The ends of the field coil are connected to a pair of slip rings which are insulated from each other and from the shaft.
3. The slip ring end head supports the rectifier mounting plate and rectifiers, a pre-lubricated bearing in which the rotor shaft rotates, the brush holders and brushes, the field and output terminals, and a blast tube assembly.

4. The drive end head supports a sealed, prelubricated ball bearing in which the drive end of the rotor shaft rotates.
5. The negative rectifiers are pressed into the slip ring end head and the positive rectifiers are pressed into the rectifier mounting plate and are connected to the stator leads. The rectifiers are rated at 150 PIV minimum for transient voltage protection.

OVERHAUL

When repairing the alternator, complete disassembly may not be required. In some cases it will only be necessary to perform those operations which are required to effect the repair.

However, in this section, the complete overhaul is covered step by step to provide detailed information on each operation. In actual service practice, these operations may be used as required.

DISASSEMBLY

CAUTION: To prevent damage to the blast tube assembly, it should be removed before any servicing is attempted.

1. Using a strap wrench, remove the pulley nut. The pulley must be removed with a puller. Remove the fan, woodruff key, and spacer from the shaft. Now remove the four through bolts. Tap the drive end head lightly with a rawhide hammer and separate the end head and rotor assemblies from the stator and slip ring end head. Be careful not to lose the brush springs when separating the assemblies.
2. Remove the nuts, lockwashers, and flatwashers from the output terminal and remove the rectifier mounting plate mounting screw. Note carefully the correct assembly of the insulator washers and bushings. Using the same special tools shown in Figure 3, support the end head and press out the three negative rectifiers. The stator can now be separated from the slip ring end head.
3. To remove the slip ring bearing, support the end head and press bearing out, using the proper tools shown in Figure 4.



Figure 3



Figure 4

4. If necessary, press the rectifiers out of the rectifier mounting plate as shown in Figure 3. To disconnect the rectifier from the stator leads, use pliers to grip the rectifier leads and touch the soldered end of the connector with a hot soldering iron. Pull the connector off the three leads when the solder is melted.

5. To remove the drive end head from the rotor shaft, use a puller that grips on the bearing retainer plate as shown in Figure 5. Do not attempt to remove by supporting the end head and pressing on the shaft, as this may result in distortion of the end head or stripping of the retainer plate screws. Remove the three retainer plate screws and press the bearing out of the end head. Figure 6.



Figure 5



Figure 6

INSPECTION AND TESTING OF COMPONENTS

Upon completion of the disassembly, all parts should be cleaned and visually inspected for cracks, wear or distortion and any signs of overheating or mechanical interference.

1. Rotor - The rotor should be tested for grounded or shorted windings. The ground test can be made with test probes, connected in series with a 110 volt test lamp, an ohmmeter or any type continuity tester. Figure 7. There must not be any continuity between the slip rings and the rotor shaft or poles.

To test for shorted turns in the rotor winding, connect a voltmeter, ammeter and rheostat as shown in Figure 8, or use an ohmmeter. Rotor current draw and resistance are listed on individual specification pages. Excessive current draw or a low ohmmeter reading indicates shorted windings. No current draw or an infinite ohmmeter reading would indicate an open winding.

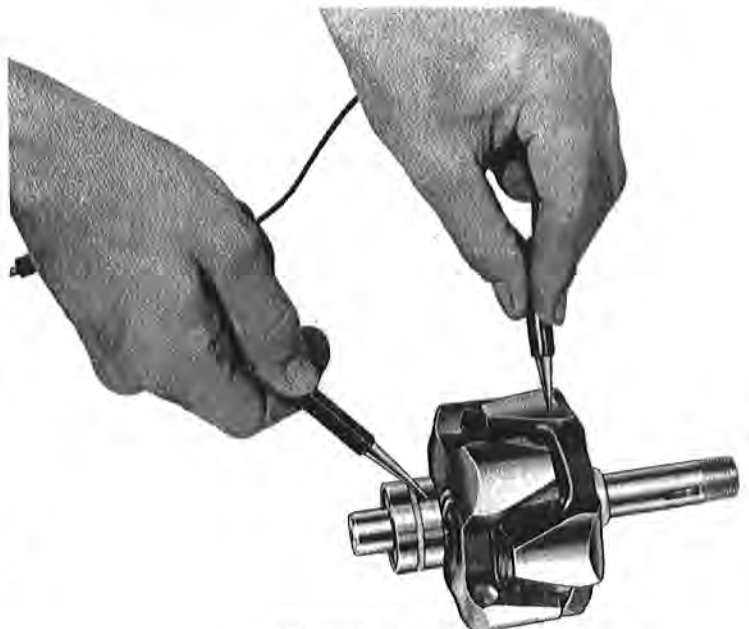


Figure 7

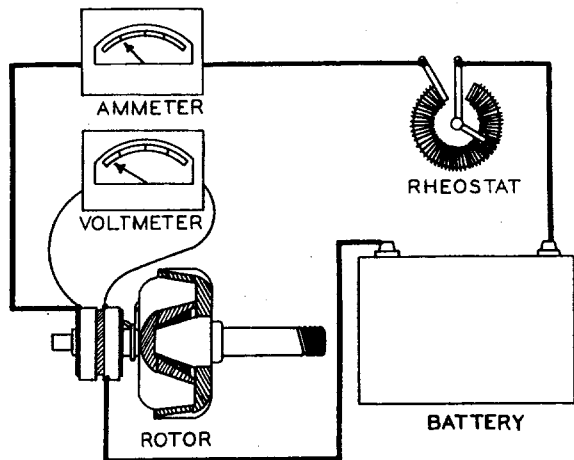


Figure 8

2. Rectifiers - A diode rectifier tester will detect and pinpoint open or shorted rectifiers without going through the operation of disconnecting the stator leads. However, if a tester is not available, test probes and a #57 bulb, connected in series with a 12 volt battery, can be used in the following manner. Touch one test probe to a rectifier heat sink and the other test probe to a lead from one of the rectifiers in that heat sink. Then reverse the position of the leads. The test bulb should light in one direction and not light in the other direction. If the test bulb lights in both directions, one or more of the rectifiers in that heat sink is shorted. To pinpoint the defective rectifier, the stator leads must be disconnected and the above test repeated on each rectifier. Open rectifiers can only be detected, when using the test bulb, by disconnecting the stator leads. The test bulb will fail to light in either direction if the rectifier is open.

3. Stator - The stator can be tested for open or grounded windings with a 12 volt test bulb, described in the rectifier section, or an ohmmeter, in the following manner. Separate the stator from the slip ring end head just far enough to insert a couple of rags or blocks of wood. In other words, insulate the stator from the end head. To test for grounded windings, touch one test bulb or ohmmeter probe to any stator lead, and the other test bulb or ohmmeter probe to the stator frame. If the test bulb lights, or the ohmmeter indicates continuity, the stator is grounded. To test for open windings, connect one test probe to the stator winding center connection and touch each of the three stator leads. The test bulb must light, or the ohmmeter must show continuity.

Due to the low resistance in the stator windings, shorted windings are almost impossible to locate. However, shorted stator windings will usually cause the alternator to "growl" or be noisy during operation and will usually show some signs of overheating.

If all other electrical checks are normal and the alternator fails to supply its rated output, the stator should be replaced to determine whether or not it is the faulty component.

Check the bearings for roughness or excessive clearance to determine if they should be replaced. Note: New bearings are prelubricated; additional lubrication is not required.

If excessively dirty, the end housings may be wiped clean with a cloth dampened in solvent.

ASSEMBLY

1. Press the ball bearing into the drive end head using a flat block approximately 2" square so that the pressure is exerted on the outer race of the bearing. Install the

retainer plate. With the snap ring and retainer cup in place on the rotor shaft, use a tool that fits over the shaft and against the inner bearing race, and press until the inner bearing race is against the snap ring retainer cup. Figure 9.

2. To install the rectifiers in the slip ring end head or rectifier mounting plate, support the end head or mounting plate and press the rectifiers in with a special driver tool. Figure 10. (Use arbor press - do not hammer.)



Figure 9



Figure 10

Strip the insulation back approximately 1/4" on the stator leads and reconnect them to the rectifiers. The connector sleeves should be soldered on the rectifier and stator leads. WHEN SOLDERING THESE CONNECTIONS, USE PLIERS AS A HEAT-DAM ON THE LEAD BETWEEN THE SOLDER JOINT AND THE RECTIFIER. TOO MUCH HEAT WILL DAMAGE THE RECTIFIERS.

3. To spread the brushes when installing the rotor, use an Allen wrench or equivalent to hold insulated brush. (Use hole in the end head just below the field terminal.) The ground brush is held with a hook made out of stiff wire. Figure 11.

4. Spread the brushes and manually press the stator and slip ring end head assemblies and the drive end head and rotor assemblies together. Be sure the through bolt holes line up. (There are no locator pins used.) Install and tighten through bolts. After releasing brushes, check to be sure that the rotor does not rub the stator or brush leads and that the rotor turns freely when rotated by hand.

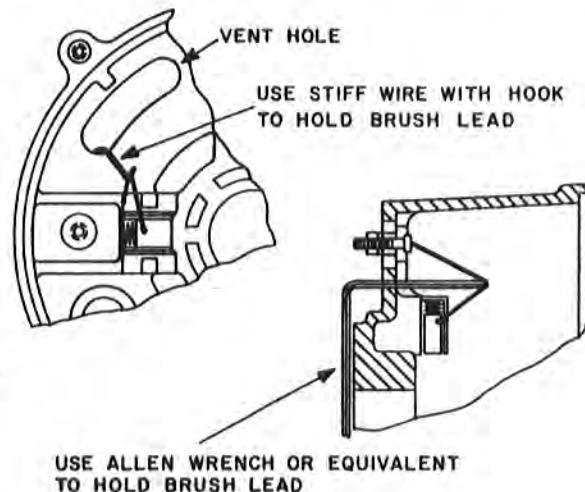


Figure 11

5. Install spacer, woodruff key, fan, pulley, lockwasher and nut. Tighten nut using a strap wrench. (Do not install blast tube assembly on the alternator until after the unit has been bench tested.)

ALTERNATOR BENCH TEST

Upon completion of assembly, the alternator should be tested for output. This test is made to determine whether the alternator is capable of delivering rated output. The alternator must meet output specifications before regulator tests are attempted.

Wiring connections for bench testing the alternator are shown in Figure 12. Refer to the individual specification pages for output test figures. Adjust the carbon pile, if necessary, to obtain the specified voltage.

After bench testing the alternator, install the safety wire in the through bolts and install the alternator on the engine.

Note: Always refer to the airframe manufacturers wiring diagram when installing the alternator or testing the alternator on the aircraft.

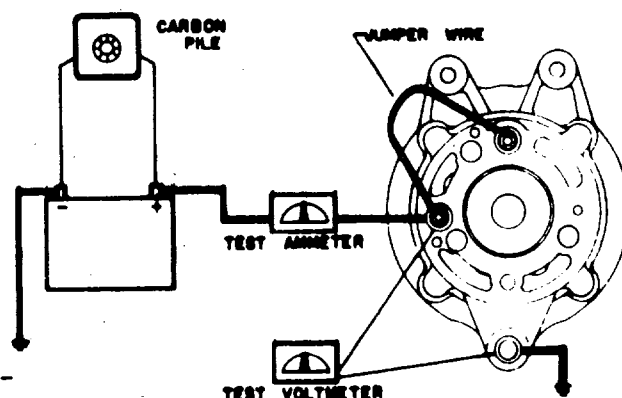


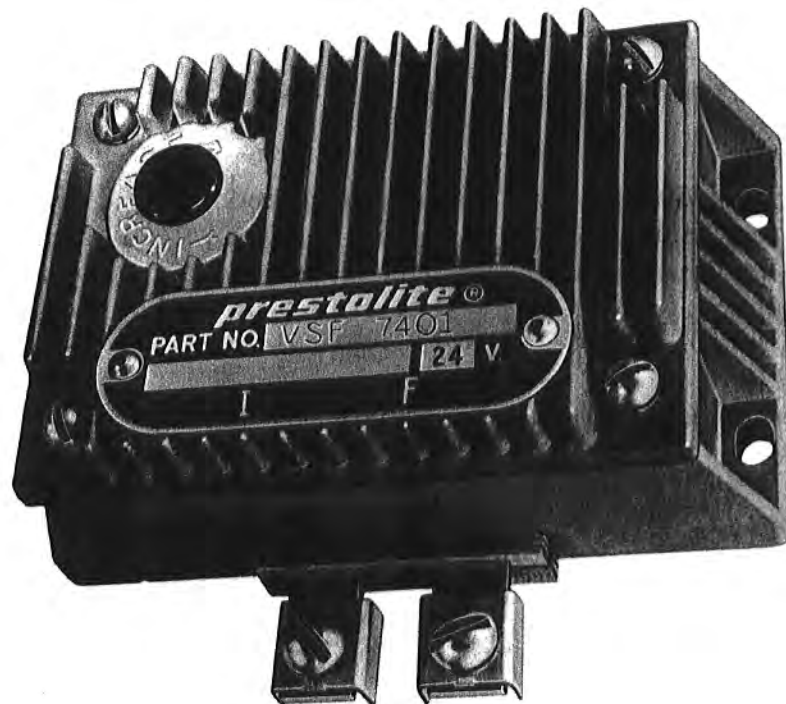
Figure 12

PRECAUTIONS TO BE OBSERVED WHEN TESTING OR SERVICING THE ELECTRICAL SYSTEM

1. DISCONNECT THE BATTERY, before connecting or disconnecting test instruments (except voltmeter) or before removing or replacing any unit or wiring. Accidental grounding or shorting at the regulator, alternator, ammeter or accessories, will cause severe damage to the units and/or wiring.
2. THE OUTPUT LEAD MUST NOT BE REMOVED FROM THE ALTERNATOR WHILE THE ROTOR WINDING IS ENERGIZED AND THE ALTERNATOR IS OPERATING
3. DO NOT ATTEMPT TO POLARIZE THE ALTERNATOR. No polarization is required. Any attempt to do so may result in damage to the alternator, regulator or circuits.
4. GROUNDING OF THE ALTERNATOR OUTPUT TERMINAL MAY DAMAGE THE ALTERNATOR AND/OR CIRCUIT AND COMPONENTS.
5. REVERSED BATTERY CONNECTIONS MAY DAMAGE THE RECTIFIERS, VEHICLE WIRING OR OTHER COMPONENTS OF THE CHARGING SYSTEM. Battery polarity should be checked with a voltmeter before connecting the battery. MOST VEHICLES ARE NEGATIVE GROUND.
6. IF A BOOSTER BATTERY OR FAST CHARGER IS USED, ITS POLARITY MUST BE CONNECTED CORRECTLY TO PREVENT DAMAGE TO THE ELECTRICAL SYSTEM COMPONENTS.



prestolite®



**SOLID STATE
AIRCRAFT ALTERNATOR
REGULATOR**

THE AIRCRAFT ALTERNATOR REGULATOR

Alternator output voltage can, within the limits of the design capability of the alternator, be controlled by properly varying the average level of current flow in the rotor winding and the PRESTOLITE full electronic solid state regulator is well suited for this purpose.

The Prestolite alternator, due to its design, has self-limiting current characteristics and needs no current-limiting unit in the regulator.

THE REGULATOR COMPONENTS

THE TRANSISTOR

The transistor is an electronic switch which can turn on and turn off the flow of current in an electric circuit. It has no mechanical or moving parts to wear out.

THE RECTIFIER DIODE

The rectifier diode will pass current in one direction only (forward direction); and in this respect, it may be compared to a one-way check valve.

THE ZENER DIODE

The Zener diode, in addition to passing current in the forward direction, will pass current in the reverse direction only when a particular value of voltage is applied in the reverse direction. It is this Zener action which makes it adaptable for use as a voltage sensing device in the regulator.

THE RESISTOR

The resistor is a device which is used to limit current flow.

HOW THE REGULATOR OPERATES

When ignition switch is turned on, battery voltage is applied to the "I" (ignition) terminal of the regulator.

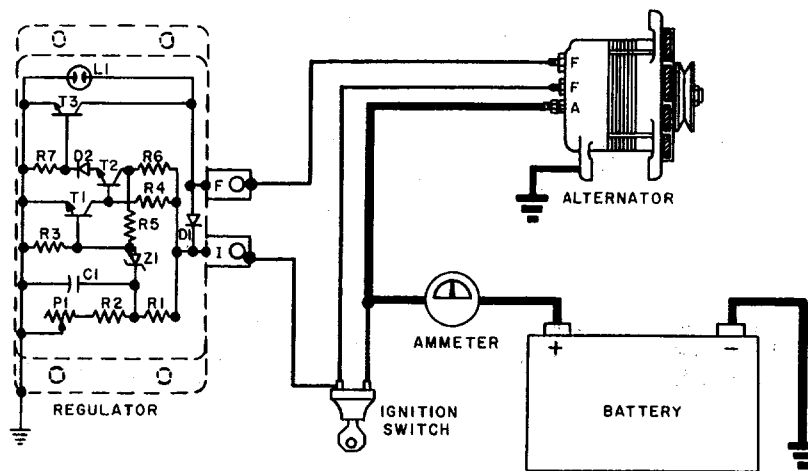


Figure 1.

The NPN power transistor, T3, is turned on by current flow from the ignition terminal through R-6 and the collector emitter junction of T2 through D2 through the base emitter junction of T3 to ground.

Whenever the power transistor, T3, is on, T2 is also on and T1 is off, current will flow from the ignition terminal, through the field winding, through the collector - emitter of T3 to ground.

With the ignition switch on, current will flow from the "I" terminal regulator ground through a voltage dividing network consisting of R-1, R-2 and P-1. This network determines the system operating voltage relative to the Zener diode, Z1, reverse conducting voltage.

When the system voltage connected to "I" terminal reaches a value at which the Zener diode connected to the divider network conducts, current will flow from the "I" terminal through R-1 through Z1 and through the base emitter junction of T1 to ground. This causes the collector emitter junction of T1 to conduct which diverts the base current of T2 flowing from "I" terminal through R-4 to ground, turning off T2 which turns off T3, de-energizing the rotor winding; then, when the alternator output voltage falls to a value which permits Z1 to cease conduction, T1 will turn off which turns on T2 and T3, re-energizing the rotor winding.

This sequence is performed so rapidly that the rotor current average appears as a value usually less than full rotor current depending on rotor RPM and system load connected.

Each time the power transistor, T3, is turned off, current flow in the rotor winding is reduced. This causes the rotor magnetic field to collapse which would generate high voltage at the power transistor, T3, if a path were not provided so that the field current can decay at a slower rate, field suppression diode, D1, provides this path, thus protecting the system and regulator from possible damage.

Temperature compensation is flat which means the regulator will hold the alternator output voltage constant with temperature increase or decrease after initial warm-up.

The PRESTOLITE solid state regulator uses three NPN silicon transistors.

Capacitor, C1 is used to filter ripple and alternator diode switching spike when operating batteryless.

Neon lamp, L-1, provides transient voltage protection acting as a surge suppressor.

Control P1 is used to provide a limited range of voltage adjustment.

PREPARATION FOR TESTING

Caution: Do Not Interchange Regulator Leads. This will destroy regulator and void warranty.

1. The aircraft technician or other electrical systems specialist, must disconnect the battery ground cable at the battery before connecting or disconnecting a test ammeter or other test equipment or before making wiring changes in the electrical system.
2. When a voltmeter only is to be used for circuit testing, the battery need not be disconnected, provided caution is used when connecting or disconnecting the voltmeter.
3. When installing a battery in a vehicle, be sure that the battery negative terminal is in a position so that this terminal can be connected to the battery ground cable for negative ground systems.
4. The regulator, when installed in a vehicle, should be mounted on a metal area, and in a place where it will not be subjected to excessive temperature.
5. To insure a good regulator ground, a permanent ground lead should be connected between the regulator mounting bolt and the alternator frame.
6. The alternator does not need to be polarized; therefore, never connect ground, even momentarily, to either the regulator field terminal or to the alternator field terminals. Do not interchange I and F leads to regulator as this will destroy the regulator.
7. The alternator should be in good condition and capable of producing full output, and the alternator drive belt must be adjusted tight enough to prevent slippage.
8. The battery must be in good condition and should be fully charged.
9. The voltmeter and the ammeter should be of the best quality and should be accurate.
10. A carbon-pile connected across the battery may be used to load the charging circuit while testing the regulator.

TESTING THIS REGULATOR

1. The procedure for testing this regulator, whether on the vehicle or on the test bench, remains the same. Connect test meters as shown in Fig. 2.
2. All circuit connections should be clean and tight. This includes the test instrument connections which must not come loose or open the charging circuit at any time while the system is operating.

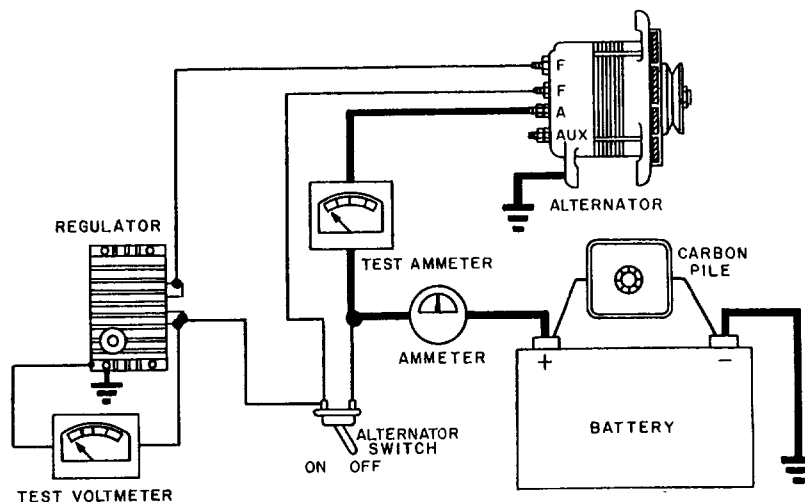


Figure 2.

3. The voltmeter will not indicate the true regulator setting until the regulator has been operating in the charging system or on the test bench for at least 1 minute, at a charge rate of from 10 to 15 amperes.
4. Connect the voltmeter and the ammeter as shown in Figure 2. Start the engine and adjust its speed to obtain 3,000 to 4,000 alternator RPM. Turn on accessories as needed to establish 10 to 15 ampere electrical load, or use a carbon-pile across the battery to obtain this charge rate.
5. After 1 minute operating time, check the regulator operating voltage as indicated by the voltmeter. SEE THE SERVICE SPECIFICATIONS for the correct operating voltage. The operating voltage is shown for the ambient temperature in which the regulator is operating.
6. If the voltmeter reading indicates that the operating voltage is not within limits, lift the plastic plug from top of regulator and adjust the voltage to the desired value. Replace the plug after adjustment. Before condemning the regulator, recheck the alternator and the battery; making sure that they are in good condition. Recheck all circuit connections and all wiring for unwanted resistance (voltage drop test). Recheck the voltmeter for accuracy and repeat the entire operating test.



prestolite®



**BELT DRIVEN
AIRCRAFT
ALTERNATORS**

BELT DRIVEN AIRCRAFT ALTERNATOR

Prestolite Belt Driven Aircraft Alternators (Figure 1) have been designed and constructed to provide extended periods of trouble-free operation with a minimum amount of maintenance. They have also been designed and constructed to withstand the vibration and extreme temperature changes encountered in aircraft applications.

DESCRIPTION

The principle components (Figure 2) of the Aircraft Alternator are (1) the Brush Holder Assembly, (2) the Slip Ring End Head, (3) the Rectifiers, (4) the Stator, (5) the Rotor and (6) the Drive End Head.



Figure 1

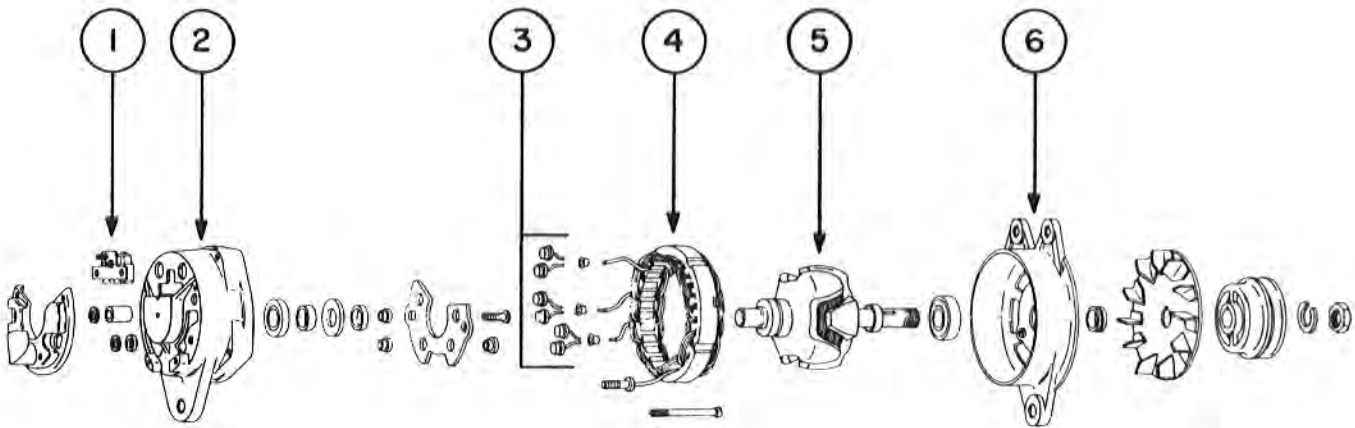


Figure 2

1. The brush and holder assembly contains two brushes, two brush springs, a brush holder and insulators. Each brush is connected to a separate terminal stud and is insulated from ground. The brush and holder assembly can easily be removed for inspection or brush replacement purposes.

2. The slip ring end head provides the mounting for the rectifiers and rectifier mounting plate, output and auxiliary terminal studs, and the brush and holder assembly. The slip ring end head contains a roller bearing and outer race assembly and a grease seal.

3. The rectifiers used in these units are rated at 150 P.I.V. minimum for transient voltage protection. Three positive rectifiers are mounted in the rectifier mounting plate while the three negative rectifiers are mounted in the slip ring end head. Each pair of rectifiers is connected to a stator lead with high temperature solder. The stator leads are anchored to the rectifier mounting plate with epoxy cement for vibration protection.
4. The stator contains a special lead which is connected to the center of the three phase windings and is used to activate low voltage warning systems or relays. The stator has been treated with a special epoxy varnish for high temperature resistance.
5. The rotor contains the slip ring end bearing inner race and spacer on the slip ring end of the shaft. The rotor winding and winding leads have been specially treated with a high temperature epoxy cement to provide vibration and temperature resistance characteristics. High temperature solder is used to secure the winding leads to the slip rings.
6. The drive end head supports a sealed, prelubricated ball bearing in which the drive end of the rotor shaft rotates.

OVERHAUL

When repairing the alternator, complete disassembly may not be required. In some cases it will only be necessary to perform those operations which are required to effect the repair.

However, in this section, the complete overhaul is covered step by step to provide detailed information on each operation. In actual service practice, these operations may be used as required.

DISASSEMBLY

1. Remove the two #10-24 screws holding the brush holder assembly in the slip ring end head. Remove the brush and holder assembly from the end head.
2. Remove the safety wire from the through bolts. Hold the pulley with a strap wrench and remove the pulley nut. The pulley must be removed with a puller. Remove the fan, woodruff key and spacer from the shaft.
3. Remove the four through bolts and tap the drive end head lightly to separate the drive end head and rotor, as a unit, from the stator and slip ring end head.
4. Remove the nuts, lock washers, flatwashers and insulators from the output and auxiliary terminal studs. Note carefully the correct assembly of the insulator washers and bushings. Using the special tools shown in Figure 3, support the end head and press out the three negative rectifiers. The end head can now be separated from the stator assembly.
5. To remove the slip ring end bearing and grease seal, it will be necessary to have a hook type or impact type bearing puller as shown in Figure 4. Do not remove the bearing unless replacement is necessary.



Figure 3

The inner race of the slip ring end bearing is pressed onto the rotor shaft. When bearing replacement is necessary, always replace the complete bearing assembly, including the inner race.

6. To remove the drive end head from the rotor shaft, use a puller that grips on the bearing retainer plate as shown in Figure 5. Do not attempt to remove by supporting the end head and pressing on the shaft, as this may result in distortion of the end head or stripping of the retainer plate screws. Remove the three retainer plate screws and press the bearing out of the end head. Figure 6.



Figure 4



Figure 5



Figure 6

INSPECTION AND TESTING OF COMPONENTS

Upon completion of the disassembly, all parts should be cleaned and visually inspected for cracks, wear or distortion and any signs of overheating or mechanical interference.

1. **Rotor** - The rotor should be tested for grounded or shorted windings. The ground test can be made with test probes, connected in series with a 110 volt test lamp, an ohmmeter or any type of continuity tester. Figure 7. There must not be any continuity between the slip rings and the rotor shaft or poles.

To test for shorted turns in the rotor winding, connect a voltmeter, ammeter and rheostat as shown in Figure 8, or use an ohmmeter. Rotor current draw and resistance are listed on the individual specification pages. Excessive current draw or a low ohmmeter reading indicates shorted windings. No current draw or an infinite ohmmeter reading would indicate an open winding.

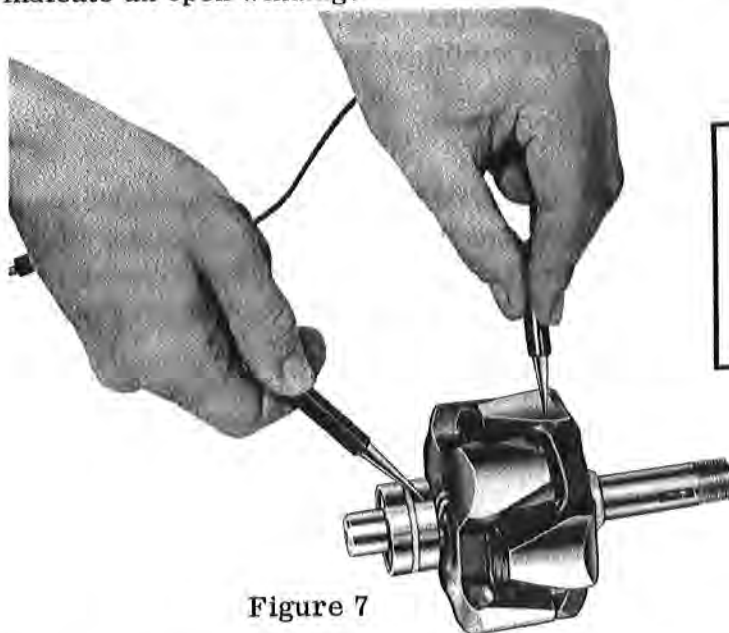


Figure 7

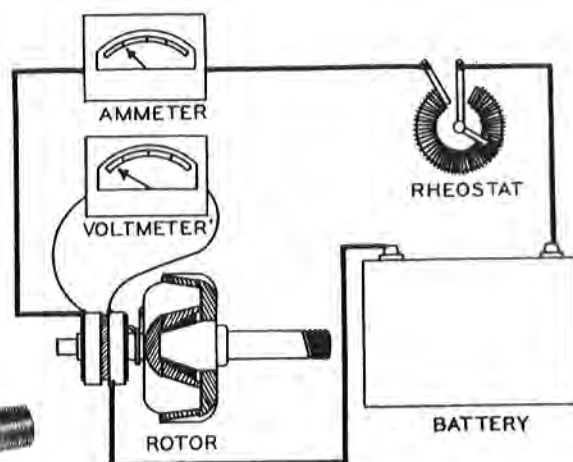


Figure 8

2. **Rectifiers** - A diode rectifier tester will detect and pinpoint open or shorted rectifiers without going through the operation of disconnecting the stator leads. However, if a tester is not available, test probes and a #57 bulb, connected in series with a 12 volt battery, can be used in the following manner. Touch one test probe to a rectifier heat sink and the other test probe to a lead from one of the rectifiers in that heat sink. Then reverse the position of the leads. The test bulb should light in one direction and not light in the other direction. If the test bulb lights in both directions, one or more of the rectifiers in that heat sink is shorted. To pinpoint the defective rectifier, the stator leads must be disconnected and the above test repeated on each rectifier. Open rectifiers can only be detected, when using the test bulb, by disconnecting the stator leads. The test bulb will fail to light in either direction if the rectifier is open.

3. **Stator** - The stator can be tested for open or grounded windings with a 12 volt test bulb, described in the rectifier section, or an ohmmeter, in the following manner. Separate the stator from the slip ring end head just far enough to insert a couple of rags or blocks of wood. In other words, insulate the stator from the end head. To test for grounded windings, touch one test bulb or ohmmeter probe to the auxiliary terminal or any stator lead, and the other test bulb or ohmmeter probe to the stator frame. If the test bulb lights, or the

ohmmeter indicates continuity, the stator is grounded. To test for open windings, connect one test probe to the auxiliary terminal or the stator winding center connection and touch each of the three stator leads. The test bulb must light, or the ohmmeter must show continuity.

Due to the low resistance in the stator windings, shorted windings are almost impossible to locate. However, shorted stator windings will usually cause the alternator to "growl" or be noisy during operation and will usually show some signs of overheating.

If all other electrical checks are normal and the alternator fails to supply its rated output, the stator should be replaced to determine whether or not it is the faulty component.

4. Bearings and Seals - Whenever the alternator is overhauled, new bearings and oil or grease seals are recommended, even though the bearings and seals appear to be in good condition. A faulty seal can cause an alternator to fail within a very short period of time.

ASSEMBLY

1. Press the ball bearing into the drive end head using a flat block approximately 2" square so that the pressure is exerted on the outer race of the bearing. Install the retainer plate. With the snap ring and retainer cup in place on the rotor shaft, use a tool that fits over the shaft and against the inner bearing race, and press until the inner bearing race is against the snap ring retainer cup. Figure 9.

2. Carefully install the rectifiers in the slip ring end head or rectifier mounting plate by supporting the unit and using the special tools illustrated in Figure 10.



Figure 9



Figure 10

(Use arbor press - do not hammer.) Reconnect the stator leads to the rectifiers. WHEN SOLDERING THESE CONNECTIONS, USE PLIERS AS A HEAT DAM ON THE LEAD BETWEEN THE SOLDER JOINT AND THE RECTIFIER. TOO MUCH HEAT WILL DAMAGE THE RECTIFIERS.

Reassemble the rectifier mounting plate studs and insulators, making sure they are in the correct order. See Figure 11.

After the slip ring end head is completely assembled, the stator and rectifier leads must be secured to the rectifier mounting plate with epoxy. Make sure the stator leads are positioned so that they do not interfere with the rotor.

3. Install the slip ring end bearing and oil seal. Make sure the lip of the oil seal is toward the bearing. Correct assembly of bearing, seal, inner race and spacer is shown in Figure 12.

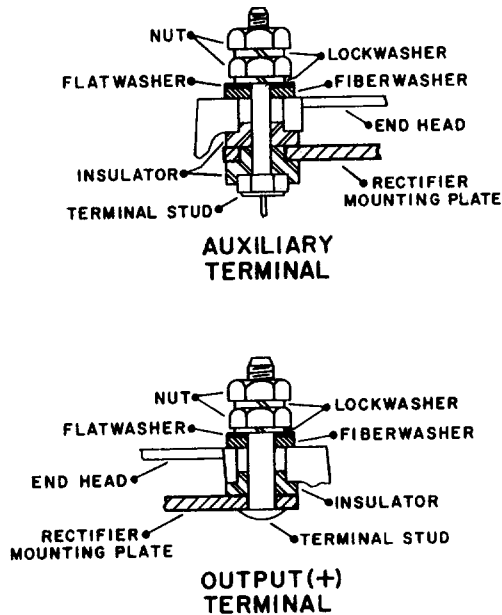


Figure 11

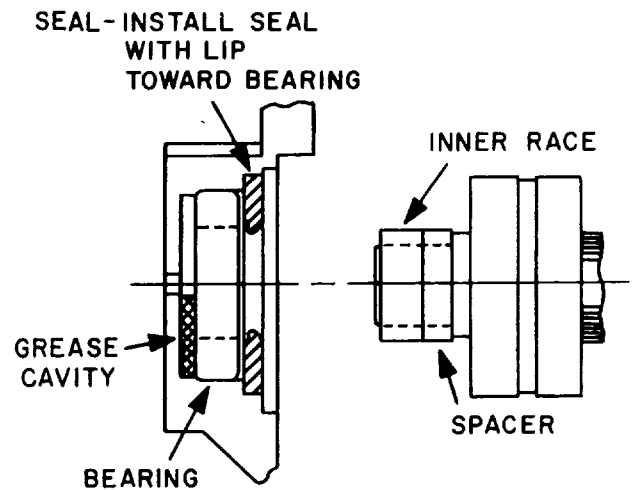


Figure 12

4. Assemble the alternator and install the through bolts. Spin the rotor to make sure there is no mechanical interference. Torque the through bolts to 30 to 35 in. lbs. Safety wire should be installed after the unit has been bench tested for output. Install spacer, woodruff key, fan, pulley, lockwasher and nut. Torque the nut to 35 Ft. Lbs. using a strap wrench to hold the pulley. Do not install the blast tube assembly until after the unit has been bench tested.

5. Install the brush and holder assembly and retaining screws. Spin the rotor and check for interference between the brush holder and rotor. Check across the field terminals with an ohmmeter. The ohmmeter must indicate the amount of rotor resistance listed on the individual specification page.

TESTING

Wiring connections for bench testing the alternator are shown in Figure 13. Refer to the individual specification pages for output test figures. Adjust the carbon pile, if necessary, to obtain the specified voltage.

After bench testing the alternator, install the safety wire and blast tube and install the alternator on the engine.

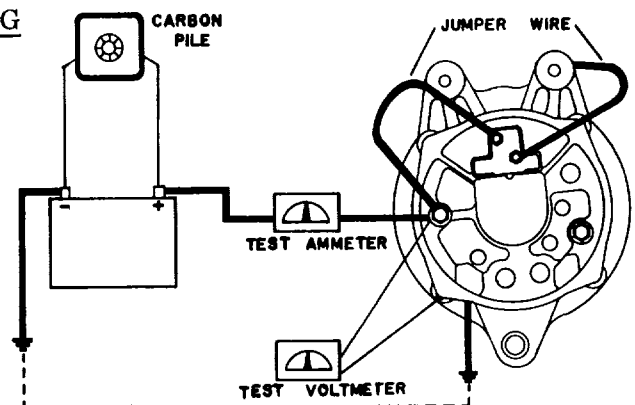


Figure 13

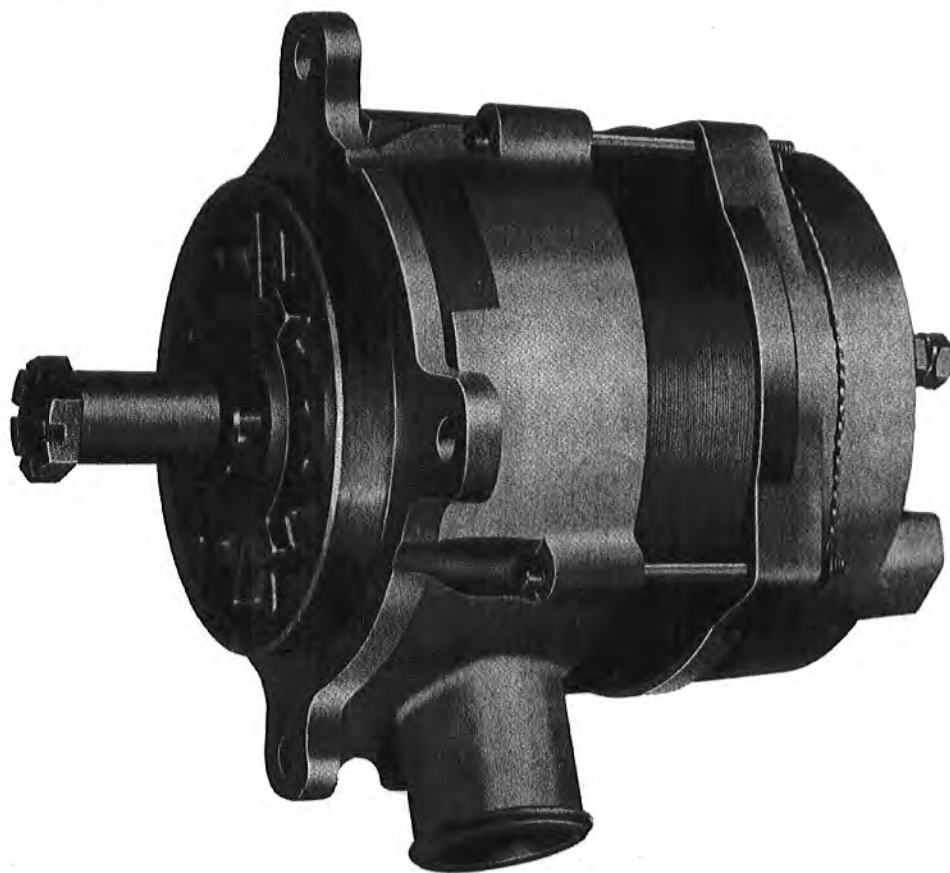
Note: Always refer to the airframe manufacturers wiring diagram when installing the alternator or testing the alternator on the aircraft.

PRECAUTIONS TO BE OBSERVED WHEN TESTING OR SERVICING THE ELECTRICAL SYSTEM

- 1. DISCONNECT THE BATTERY, before connecting or disconnecting test instruments (except voltmeter) or before removing or replacing any unit or wiring. Accidental grounding or shorting at the regulator, alternator, ammeter or accessories, will cause severe damage to the units and/or wiring.**
- 2. THE OUTPUT LEAD MUST NOT BE REMOVED FROM THE ALTERNATOR WHILE THE ROTOR WINDING IS ENERGIZED AND THE ALTERNATOR IS OPERATING**
- 3. DO NOT ATTEMPT TO POLARIZE THE ALTERNATOR. No polarization is required. Any attempt to do so may result in damage to the alternator, regulator or circuits.**
- 4. GROUNDING OF THE ALTERNATOR OUTPUT TERMINAL MAY DAMAGE THE ALTERNATOR AND/OR CIRCUIT AND COMPONENTS.**
- 5. REVERSED BATTERY CONNECTIONS MAY DAMAGE THE RECTIFIERS, VEHICLE WIRING OR OTHER COMPONENTS OF THE CHARGING SYSTEM. Battery polarity should be checked with a voltmeter before connecting the battery. MOST VEHICLES ARE NEGATIVE GROUND.**
- 6. IF A BOOSTER BATTERY OR FAST CHARGER IS USED, ITS POLARITY MUST BE CONNECTED CORRECTLY TO PREVENT DAMAGE TO THE ELECTRICAL SYSTEM COMPONENTS.**



prestolite®



**4 BOLT FLANGE MOUNT
AIRCRAFT
ALTERNATORS**

FLANGE MOUNTED AIRCRAFT ALTERNATOR

Prestolite Flange Mounted Aircraft Alternators (Figure 1) have been designed and constructed to provide extended periods of trouble-free operation with a minimum amount of maintenance. They have also been designed and constructed to withstand the vibration and extreme temperature changes encountered in aircraft applications.

DESCRIPTION

The principle components (Figure 2) of the Aircraft Alternator are (1) The drive end head, (2) The rotor, (3) The stator, (4) The rectifiers, (5) The slip ring end head and (6) The brush and holder assembly.



Figure 1

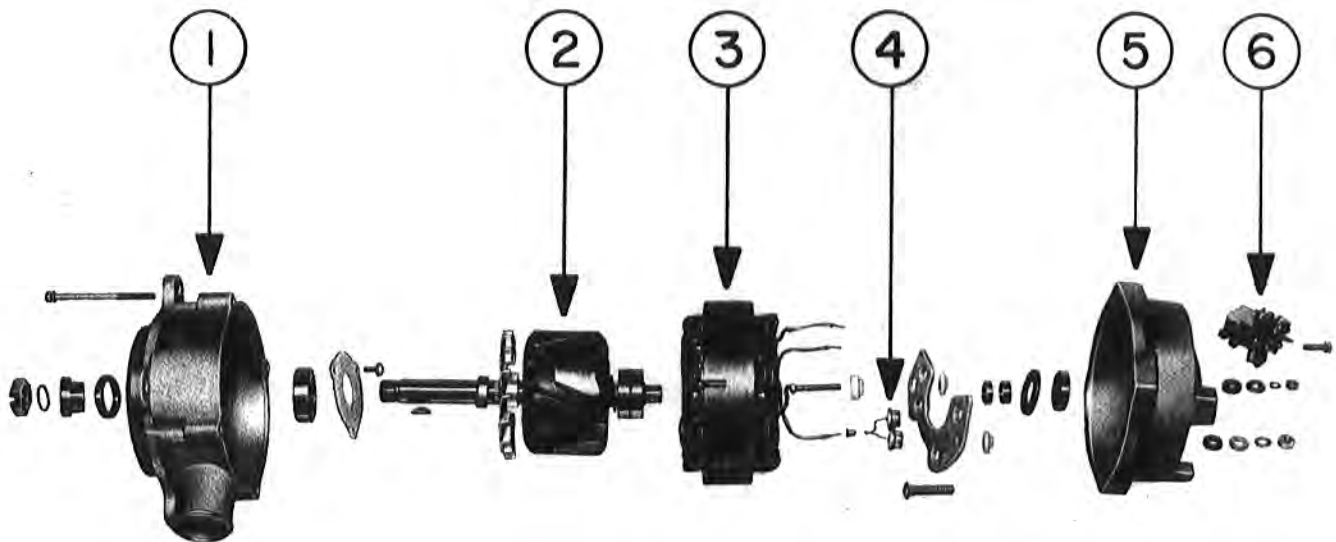


Figure 2

1) The drive end head contains a prelubricated bearing, an oil seal, collar and shaft seal and a blast tube connection for ventilation.

2) The rotor contains a ventilating fan on the drive end of the shaft (ALX series only) and the slip ring end bearing inner race and spacer on the other end of the shaft. The rotor

winding and winding leads have been specially treated with a high temperature epoxy cement to provide vibration and temperature resistance characteristics. High temperature solder is used to secure the winding leads to the slip rings.

- 3) The stator contains a special lead which is connected to the center of the three phase windings and is used to activate low voltage warning systems or relays. The stator has been treated with a special epoxy varnish for high temperature resistance.
- 4) The rectifiers used in these units are rated at 150 P.I. V. minimum for transient voltage protection. Three positive rectifiers are mounted in the rectifier mounting plate while the three negative rectifiers are mounted in the slip ring end head. Each pair of rectifiers is connected to a stator lead with high temperature solder. The stator leads are anchored to the rectifier mounting plate with epoxy cement for vibration protection.
- 5) The slip ring end head provides the mounting for the rectifiers and rectifier mounting plate, output and auxiliary terminal studs, and the brush and holder assembly. The slip ring end head contains a roller bearing and outer race assembly and a grease seal.
- 6) The brush and holder assembly contains two brushes, two brush springs, a brush holder and insulators. Each brush is connected to a separate terminal stud and is insulated from ground. The brush and holder assembly can easily be removed for inspection or brush replacement purposes.

OVERHAUL

When repairing the alternator, complete disassembly may not be required. In some cases it will only be necessary to perform those operations which are required to effect the repair.

However, in this section, the complete overhaul is covered step by step to provide detailed information on each operation. In actual service practice, these operations may be used as required.

DISASSEMBLY

1. Remove the two #10-24 screws holding the brush holder assembly in the slip ring end head. Remove the brush and holder assembly from the end head.
2. Remove the safety wire from the thru bolts and remove the thru bolts.
3. Tap the drive end head lightly and separate the drive end head and rotor, as a unit, from the stator and slip ring end head.
4. Remove the nuts, lock washers, flatwasher and insulators from the output and auxiliary terminal studs. Note carefully the correct assembly of the insulator washers and bushings. Using the special tools shown in Figure 3, support the end head and press out the three negative rectifiers. The end head can now be separated from the stator assembly.



Figure 3

5. To remove the slip ring end bearing and grease seal, it will be necessary to have a hook type or impact type bearing puller as shown in Figure 4. Do not remove the bearing unless replacement is necessary.

The inner race of the slip ring end bearing is pressed onto the rotor shaft. When bearing replacement is necessary, always replace the complete bearing assembly, including the inner race.



Figure 4

6. Clamp the rotor in a vise and remove the cotter pin, nut, drive gear assembly and woodruff key. Note: The drive gear assembly is not a Prestolite part and is serviced by the engine manufacturer. Support the drive end head and carefully press out the rotor assembly. Remove the retainer plate screws and retainer plate. Support the drive end head and press out the bearing. Once the bearing is removed, the oil seal can be knocked or pressed out from the inside of the housing.

INSPECTION AND TESTING OF COMPONENTS

Upon completion of the disassembly, all parts should be cleaned and visually inspected for cracks, wear or distortion and any signs of overheating or mechanical interference.

1. Rotor - The rotor should be tested for grounded or shorted winding. The ground test can be made with test probes, connected in series with a 110 volt test lamp, an ohmmeter

or any type of continuity tester. Figure 5. There must not be any continuity between the slip rings and the rotor shaft or poles.

To test for shorted turns in the rotor winding, connect a voltmeter, ammeter and rheostat as shown in Figure 6, or use an ohmmeter. Rotor current draw and resistance are listed on

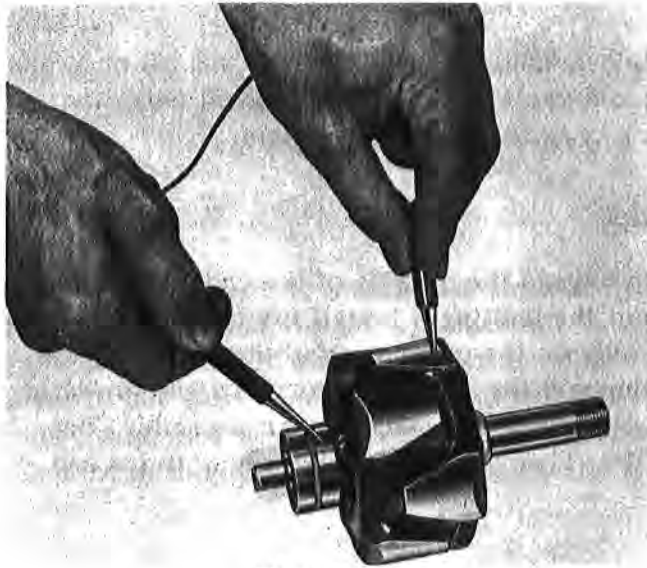


Figure 5

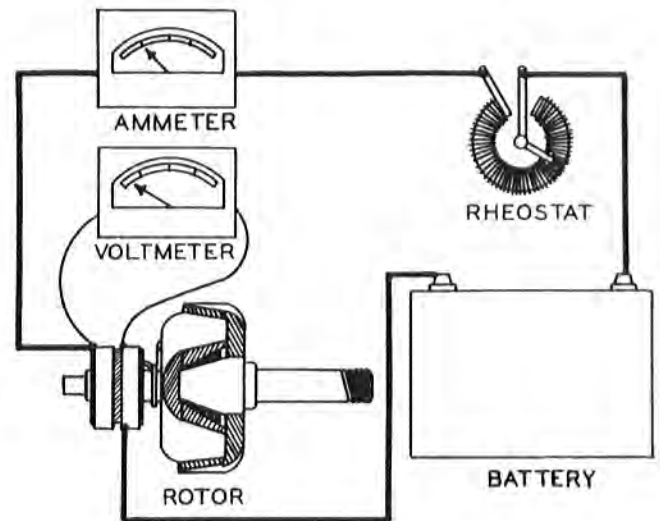


Figure 6

individual specification pages. Excessive current draw or a low ohmmeter reading indicates shorted windings. No current draw or an infinite ohmmeter reading would indicate an open winding.

2. Rectifiers - A diode rectifier tester will detect and pinpoint open or shorted rectifiers without going through the operation of disconnecting the stator leads. However, if a tester is not available, test probes and a #57 bulb, connected in series with a 12 volt battery, can be used in the following manner. Touch one test probe to a rectifier heat sink and the other test probe to a lead from one of the rectifiers in that heat sink. Then reverse the position of the leads. The test bulb should light in one direction and not light in the other direction. If the test bulb lights in both directions, one or more of the rectifiers in that heat sink is shorted. To pinpoint the defective rectifier, the stator leads must be disconnected and the above test repeated on each rectifier. Open rectifiers can only be detected, when using the test bulb, by disconnecting the stator leads. The test bulb will fail to light in either direction if the rectifier is open.

3. Stator - The stator can be tested for open or grounded windings with a 12 volt test bulb, described in the rectifier section, or an ohmmeter, in the following manner. Separate the stator from the slip ring end head just far enough to insert a couple of rags or blocks of wood. In other words, insulate the stator from the end head. To test for grounded windings, touch one test bulb or ohmmeter probe to the auxiliary terminal or any stator lead, and the other test bulb or ohmmeter probe to the stator frame. If the test bulb lights, or the ohmmeter indicates continuity, the stator is grounded. To test for open windings, connect one test probe to the auxiliary terminal or the stator winding center connection and touch each of the three stator leads. The test bulb must light, or the ohmmeter must show continuity.

Due to the low resistance in the stator windings, shorted windings are almost impossible to locate. However, shorted stator windings will usually cause the alternator to "growl" or be noisy during operation and will usually show some signs of overheating.

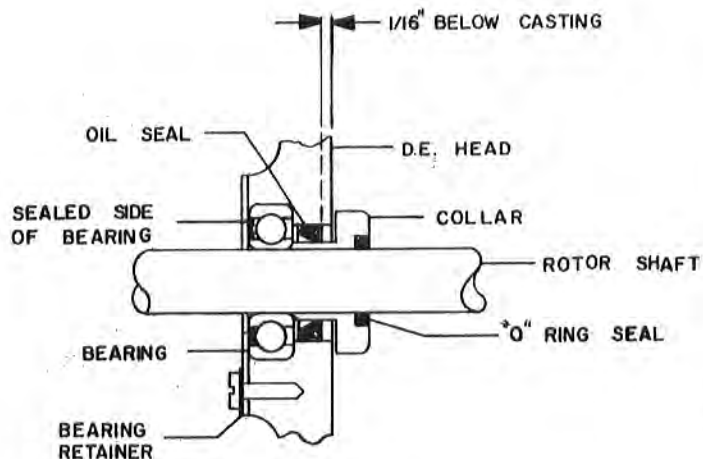
If all other electrical checks are normal and the alternator fails to supply its' rated output, the stator should be replaced to determine whether or not it is the faulty component.

4. Bearings and Seals - Whenever the alternator is overhauled, new bearings and oil or grease seals are recommended, even though the bearings and seals appear to be in good condition. A faulty seal can cause an alternator to fail within a very short period of time.

ASSEMBLY

1. Drive End Head - Install the oil seal with the lip toward the outside of the end head. Press the oil seal in approximately 1/16" below the edge of the casting. Install the ball bearing with the seal toward the inside of the end head. Press only on the outer race of the bearing when installing. Install bearing retainer and screws. Support the bearing inner race and press in rotor. Reassemble oil seal collar, "O" ring seal, woodruff key, drive gear assembly, nut and cotter pin. Torque rotor shaft nut to 37 to 41 Ft. Lbs. Correct assembly of drive end oil seals is shown in Figure 7.

2. Carefully install the rectifiers in the slip ring end head or rectifier mounting plate by supporting the unit and using the special tools illustrated in Figure 8.



CORRECT ASSEMBLY OF OIL SEALS

Figure 7

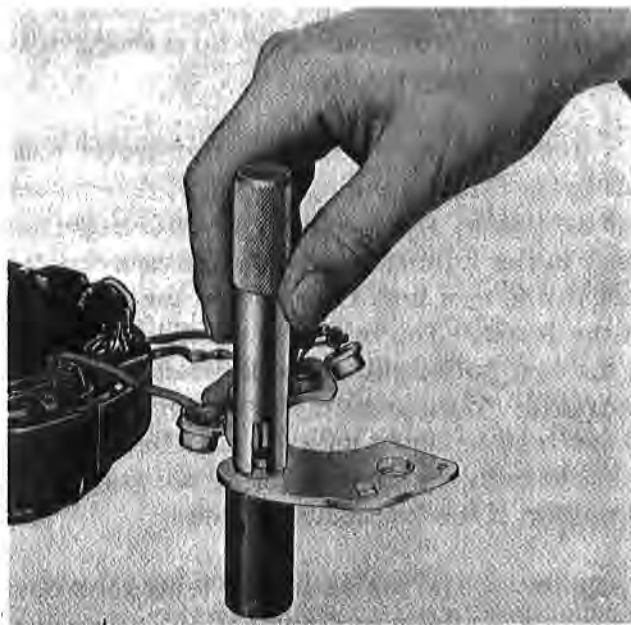


Figure 8

(Use arbor press -- do not hammer.) Reconnect the stator leads to the rectifiers. WHEN SOLDERING THESE CONNECTIONS, USE PLIERS AS A HEAT DAM ON THE LEAD BETWEEN THE SOLDER JOINT AND THE RECTIFIER. TOO MUCH HEAT WILL DAMAGE THE RECTIFIERS.

Reassemble the rectifier mounting plate studs and insulators, making sure they are in the correct order. See Figure 9.

After the slip ring end head is completely assembled, the stator and rectifier leads must be secured to the rectifier mounting plate with epoxy. Make sure the stator leads are positioned so that they do not interfere with the rotor.

Install the slip ring end bearing and oil seal. Make sure the lip of the oil seal is toward the bearing. Correct assembly of bearing, seal, inner race and spacer is shown in Figure 10.

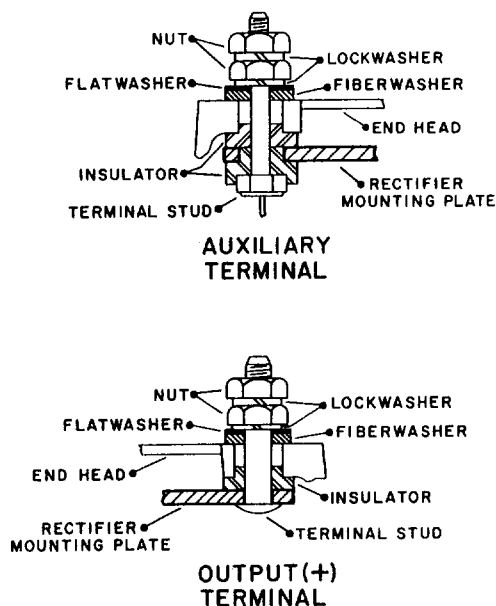


Figure 9

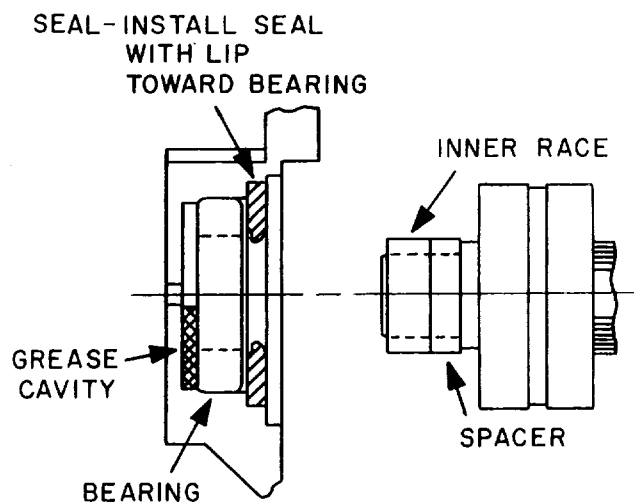


Figure 10

Assemble the alternator and install the through bolts. Spin the rotor to make sure there is no mechanical interference. Torque the through bolts to 30 to 35 in. lbs. Safety wire should be installed after the unit has been bench tested for output.

Install the brush and holder assembly and retaining screws. Spin the rotor and check for interference between the brush holder and rotor.

Check across the field terminals with an ohmmeter. The ohmmeter must indicate the amount of rotor resistance listed on the individual specification page.

TESTING

Upon completion of assembly, the alternator should be tested to determine if it is capable of delivering its full rated output. Caution: All flange mounted alternators require a source of ventilation. Do not test these alternators at full rated output for more than 30 seconds unless adequate air pressure for cooling is supplied.

The internal fan used on the ALX series provides some ventilation; however, the same rule applies to these units.

Wiring connections for bench testing the alternator are shown in Figure 11. Refer to the individual specification pages for output test figures. Adjust the carbon pile, if necessary, to obtain the specified voltage.

After bench testing the alternator, install the safety wire in the through bolts and install the alternator on the engine.

Note: Always refer to the airframe manufacturers wiring diagram when installing the alternator or testing the alternator on the aircraft.

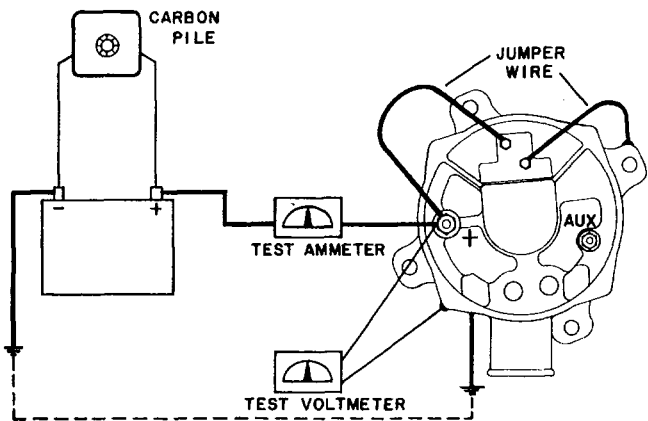


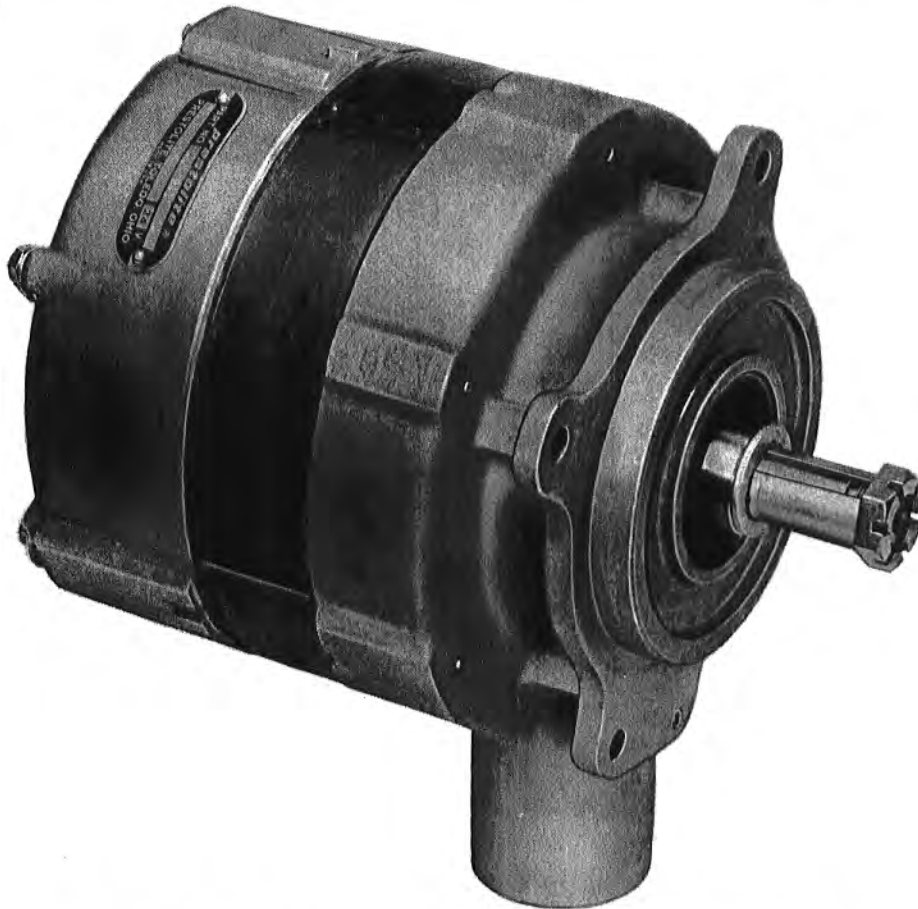
Figure 11

PRECAUTIONS TO BE OBSERVED WHEN TESTING OR SERVICING THE ELECTRICAL SYSTEM

1. DISCONNECT THE BATTERY, before connecting or disconnecting test instruments (except voltmeter) or before removing or replacing any unit or wiring. Accidental grounding or shorting at the regulator, alternator, ammeter or accessories, will cause severe damage to the units and/or wiring.
2. THE ALTERNATOR MUST NOT BE OPERATED ON OPEN CIRCUIT WITH THE ROTOR WINDING ENERTIZED.
3. DO NOT ATTEMPT TO POLARIZE THE ALTERNATOR. No polarization is required. Any attempt to do so may result in damage to the alternator, regulator or circuits.
4. GROUNDING OF THE ALTERNATOR OUTPUT TERMINAL MAY DAMAGE THE ALTERNATOR AND/OR CIRCUIT AND COMPONENTS.
5. REVERSED BATTERY CONNECTIONS MAY DAMAGE THE RECTIFIERS, VEHICLE WIRING OR OTHER COMPONENTS OF THE CHARGING SYSTEM. Battery polarity should be checked with a voltmeter before connecting the battery. MOST VEHICLES ARE NEGATIVE GROUND.
6. IF A BOOSTER BATTERY OR FAST CHARGER IS USED, ITS POLARITY MUST BE CONNECTED CORRECTLY TO PREVENT DAMAGE TO THE ELECTRICAL SYSTEM COMPONENTS.



prestolite®



**24 VOLT 100 AMPERE
AIRCRAFT
ALTERNATOR**

The Prestolite 24 volt, 100 ampere aircraft alternators (Figure 1) are manufactured for both flange mounting and double foot, hinge mounting, belt-driven applications. Both types are designed and constructed to provide heavy duty service for extended periods of trouble-free operation with a minimum amount of maintenance. They are constructed to withstand the vibration and extreme temperature changes encountered in aircraft applications.

DESCRIPTION

All 100 amp, 24 volt aircraft alternators are identified by the prefix ALV in the part number. The 8000 series identifies the double



Figure 1

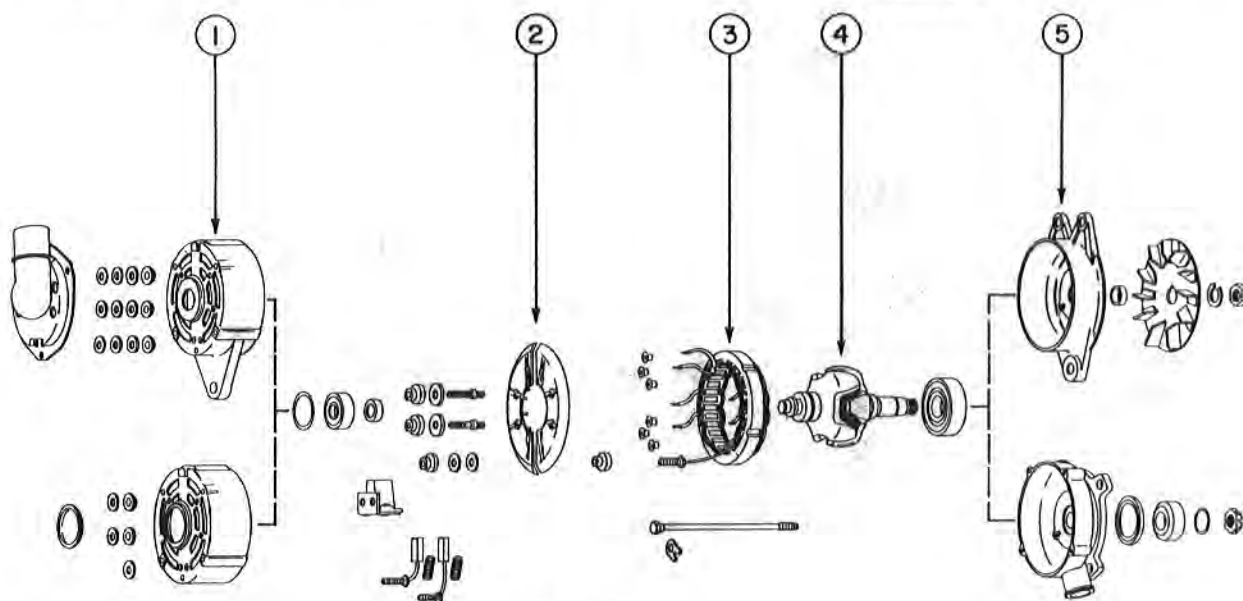


Figure 2

foot, hinge mounted, belt-driven units, while the 9000 series identifies the flange mounted, gear-driven units.

The principle components (Figure 2) of these alternators are (1) the slip ring head, (2) the heat sink and rectifier assemblies, (3) the stator, (4) the rotor and (5) the drive end head assembly.

(1) The slip ring end head provides the mounting for the rectifier-heat sink assemblies, the output, auxiliary and ground terminal studs, brush holder and brush assemblies and the slip ring end bearing. The 8000 series units attach the blast tube assembly to the slip ring end head.

(2) The rectifier and heat sink assemblies (Figure 3), used in these units, are different in construction from those used in any other Prestolite aircraft alternator. Each heat sink has six (6) rectifiers of one polarity attached to it. Each stator lead connects to four

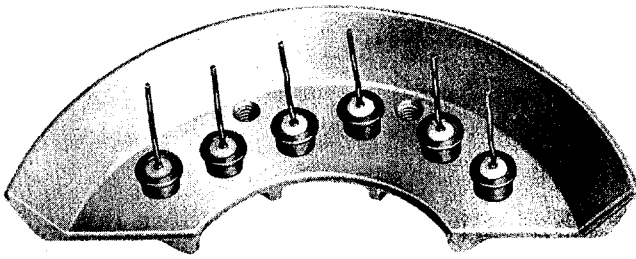


Figure 3

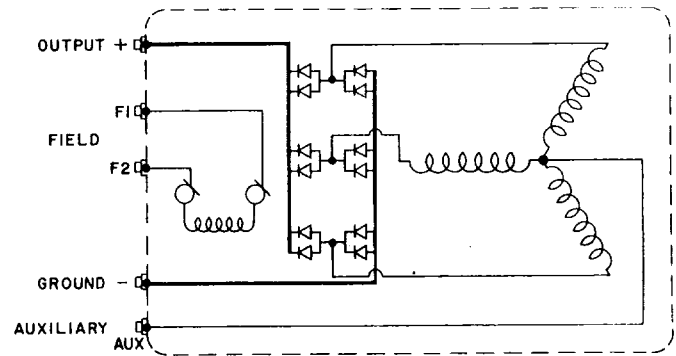


Figure 4

rectifiers (two positive and two negative). This can best be illustrated with an internal wiring diagram. (Figure 4). Each rectifier is rated at 150 P.I. V. minimum for transient voltage protection. All soldered connections are made with high temperature solder. The stator and rectifier leads are anchored to the heat sink with epoxy cement to provide vibration protection. Because of this construction, special service procedures must be followed. Refer to the rectifier section of Inspection and Testing of Components.

(3) The stator contains a center tap lead which is connected to the center of the three phase windings and is used to activate low voltage warning systems or relays. The stator has been treated with a special epoxy varnish for high temperature resistance and vibration protection.

(4) The rotor winding and winding leads have been specially treated with a high temperature varnish and epoxy cement to provide vibration and temperature resistant characteristics. High temperature solder is used to secure the winding leads to the slip rings.

(5) The drive end head, on both series, contains a prelubricated bearing. The 9000 series end head also contains an oil seal, collar and shaft seal, and a blast tube connection for ventilation.

OVERHAUL

When repairing the alternator, complete disassembly may not be required. In some cases, it will be necessary to perform only those operations which are required to effect the repair. However, in this section, the complete overhaul is covered step by step to provide detailed information on each operation. In actual service practice, these operations may be used as required.

OVERHAUL NOTE

When overhauling the alternator, we recommend the following components be replaced:

1. Brushes.
2. Drive end bearing.
3. Slip ring end bearing.
4. Oil seal (9000 Series).
5. Shaft seal "O" ring (9000 Series).
6. Lock tab washers.

DISASSEMBLY

(1) (8000 Series) Straighten the ears on the lock tab washers and remove the three through bolts and blast tube assembly.

(2) (9000 Series) Straighten the ears on the lock tab washers and remove the six through bolts.

(3) Remove the slip ring end bearing cover. This can be accomplished by wedging a small, sharp object, such as a small, sharp chisel or knife blade, between the cover and the slip ring end head.

(4) Use a puller, as shown in Figure 5, to press the rotor shaft out of the slip ring end bearing. Separate the drive end head and rotor, as a unit, from the stator and slip ring end head, being careful not to lose the brush springs while separating the units.

(5) Remove the nuts, lockwashers, flat washers and insulators from the output, ground, and auxiliary terminal studs. The end head can now be separated from the stator and heat sink assemblies. The slip ring end bearing can be pushed out from the inside of the end head.



Figure 5

(6) Each brush is connected to a terminal stud that is insulated and mounted through the slip ring end head. Service brushes come attached to terminal studs. The brush holder is attached to the slip ring end head with two screws and can be easily serviced once the alternator is disassembled.

(7) Clamp the rotor in a vise, being careful not to distort the rotor poles, and remove the drive components from the rotor shaft.

NOTE: The pulley, used on the 8000 series units, and the drive assembly, used on the 9000 series units, are not manufactured or serviced by Prestolite but are available from the engine manufacturer.

The drive end head and rotor on the 8000 series units must be separated with a puller as shown in Figure 6. Do not attempt to press the rotor out of the end head or the end head may be damaged. The drive end head and rotor on the 9000 series units can be separated by supporting the end head and pressing out the rotor.

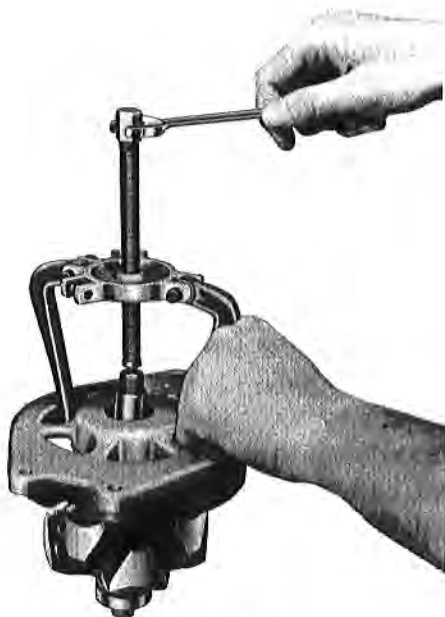


Figure 6

Remove the bearing retainer plate screws and retainer. Support the end head and carefully press out the bearing. The oil seal, on the 9000 series units, can then be knocked or pressed out from the inside of the end head.

INSPECTING AND TESTING COMPONENTS

Upon completion of disassembly, all parts should be thoroughly cleaned and visually inspected for cracks, wear or distortion, and any signs of overheating or mechanical interference.

(1) Rotor - The rotor should be tested for a grounded, shorted, or open winding. The ground test can be made with a 110 volt test lamp, an ohmmeter, or any type of continuity tester. (Figure 7). There must not be any continuity from the slip rings to the rotor shaft or poles.

To test for shorted turns in the rotor winding, connect an accurate voltmeter, ammeter and rheostat as shown in Figure 8, or use an accurate ohmmeter. Rotor current draw and resistance are listed on the individual specification page. Excessive current draw or a low ohmmeter reading would indicate shorted windings. No current draw or an infinite ohmmeter reading would indicate an open winding.

(2) Rectifiers - A rectifier tester can be used to detect shorted rectifiers and open pairs of rectifiers. The construction of the alternator (two rectifiers connected to one stator lead) makes it impossible to check for a single open rectifier without going through the operation of unsoldering and separating the rectifier leads.

When soldering and unsoldering the rectifier connections, use pliers as a heat dam on the rectifier leads, between the solder joint and rectifier. Too much heat will damage rectifiers.

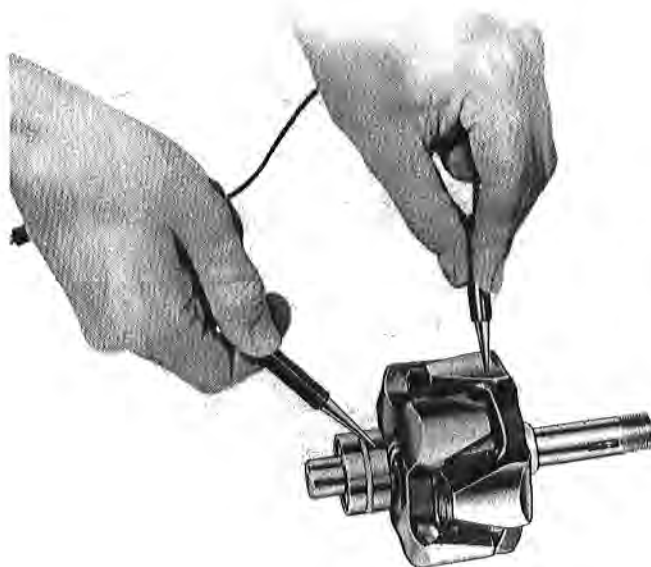


Figure 7

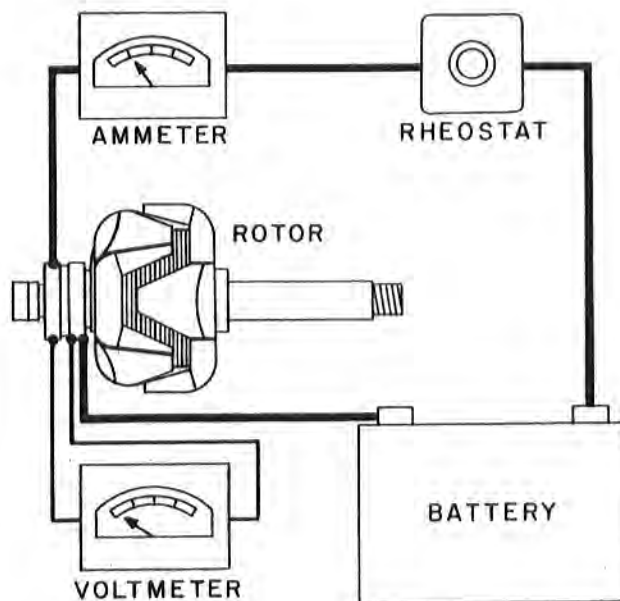


Figure 8

If a shorted or open rectifier is located, the heat sink assembly containing that rectifier must be replaced. The individual rectifiers are not replaceable and no attempt should be made to unsolder them from the heat sink.

(3) Stator - The stator can be tested for open or grounded windings with test probes and a #57 bulb connected in series with a 12 volt battery, an ohmmeter, or any type continuity tester except 110 volt test bulb.

To test for grounded windings, connect one test probe to the auxiliary terminal stud or any stator lead. Connect the other test probe to the stator frame. If the test bulb lights or any continuity is indicated, the stator is grounded and must be replaced.

To test for open windings, connect one test probe to the auxiliary terminal stud and touch each stator connection with the other test probe. The test bulb must light or continuity must be indicated between all connections. If the stator is open, it must be replaced. Check flexible leads for possible opens before replacing the stator.

Due to the low resistance of the stator windings, shorted windings are almost impossible to locate. However, shorted stator windings will usually cause the alternator to be noisy or "growl" during operation and will usually show signs of overheating.

If all other electrical checks are normal and the alternator fails to supply its rated output, the stator should be replaced to determine whether or not it is the faulty component.

(4) Stator And/Or Rectifier Heat Sink Replacement - When soldering or unsoldering the rectifier connections, pliers should be used as a heat dam between the solder joint and the rectifiers. Too much heat will damage rectifiers.

ASSEMBLY

After thoroughly cleaning, inspecting, testing, and replacing any faulty components, re-assemble and test the unit. Reassembly is, basically, the reverse of disassembly.

However, the following assembly procedures must be observed to obtain a properly assembled unit.

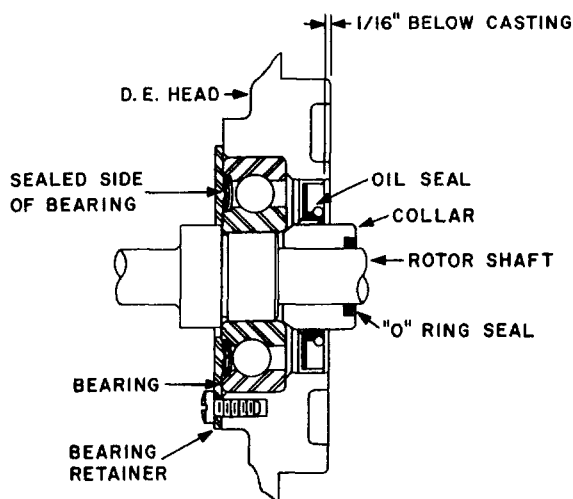
Drive End Head-8000 Series Units - Install the bearing with the sealed side toward the rotor by pressing on the outer race only.

Install the bearing retainer and screws. Support the rotor shaft and press the end head onto the shaft using the tool shown in Figure 9. Do not attempt to press the rotor into the end head without supporting the bearing inner race or the end head and bearing may be damaged. Install the spacer, fan, woodruff key, pulley, lockwasher, and nut. Torque the pulley retaining nut to 35 to 45 Ft. Lbs.



Figure 9

Drive End Head-9000 Series Units - Install the oil seal with the lip toward the outside of the end head. Press the oil seal in approximately 1/16" below the outside edge of the casting. Install the bearing with the sealed side toward the rotor. When installing the bearing, press only on the outer race. Install the bearing retainer and screws. Support the rotor shaft and press the end head assembly onto the shaft, using the same tool shown in Figure 9 and being careful not to damage the oil seal.



CORRECT ASSEMBLY OF OIL SEALS

Figure 10

Reassemble the oil seal collar, being careful not to fold the oil seal lip under. A small amount of oil on the collar will make installation easier. Install the "O" ring seal, being careful not to cut the "O" ring on the shaft keyway. Use a small, blunt instrument to push the "O" ring seal into the shaft collar. A small amount of oil on the "O" ring seal will make installation easier. Make certain the "O" ring seal is fully installed before assembling the remainder of the drive assembly. Figure 10 shows the correct assembly of the drive end head components. Torque the drive retaining nut to 37 to 42 Ft. Lbs.

Slip Ring End Assembly - Assemble the brush and terminal stud assemblies in the end head prior to assembling the heat sinks and stator. Make sure brush holder retaining screws are tight.

A small amount of Lock-Tite on the retaining screw threads, prior to assembly, will provide additional vibration protection.

Assemble the stator and rectifier heat sink assemblies in the end head, making certain the insulators are correctly assembled as shown in Figures 11 and 12.

Position the stator leads so they will not interfere with the rotor.

NOTE: If it was necessary to replace the stator or either rectifier heat sink, position the stator leads so they will not interfere with the rotor and secure the leads to the heat sinks with epoxy cement.

Position the snap ring, in the end head, so that one of the holes is directly in line with the brushes. Install the brush springs and brushes in the brush holder. Insert a small drill

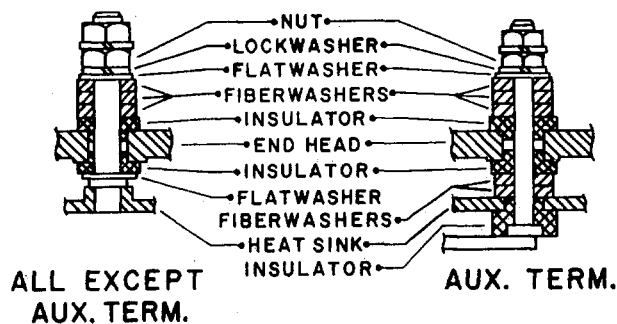


Figure 11 (8000 Series)

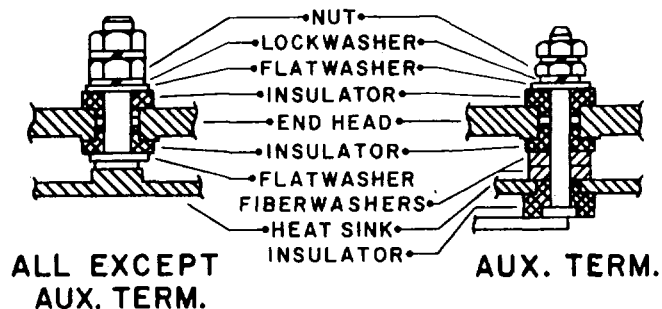


Figure 12 (9000 Series)

or metal rod through the snap ring hole to hold the brushes in place.

Assemble the alternator and install a couple of through bolts to hold the unit together. Remove the brush holding tool and make sure the brushes are contacting the slip rings. Visually check to make sure the brush leads are free and cannot bind against anything. Make sure the shaft snap ring retainer is in place and install the slip ring end bearing. The bearing must be installed with the sealed side toward the rotor. Use a tool that fits against the bearing inner race and press the bearing onto the rotor shaft while supporting the drive end of the shaft.

Install the remaining through bolts. Do not install the blast tube assembly on the 8000 Series Units, or secure the lock tab washers until the unit has been tested.

Torquing Specifications - After the alternator is fully assembled, the components should be torqued to the listed specifications:

Through Bolts	30-35 In. Lbs.
1/4 Inch Term. Stud Nuts	70-85 In. Lbs.
#10-32 Term. Stud Nuts	30-35 In. Lbs.
9000 Series Coupling Retaining Nut	37-42 Ft. Lbs.
8000 Series Pulley Retaining Nut	35-45 Ft. Lbs.

TESTING

Upon completion of assembly, the alternator should be tested to determine if the unit is capable of delivering its full rated output.

CAUTION: The 9000 Series, flange mounted units, require a source of ventilation. Do Not test these units at full rated output for more than 20 seconds unless adequate air pressure for cooling is supplied.

Wiring connections for bench testing the alternator are shown in Figure 13. The alternator must meet or exceed the specifications listed below. Adjust carbon pile, if necessary, to obtain the specified voltage.

<u>Volts</u>	<u>Output</u>	<u>RPM</u>
25.8	10.0 Amps. Min.	2000
28.4	100.0 Amps. Min.	5000

After bench testing the alternator, install the blast tube on the 8000 Series Units and secure the lock tab washers.

Install the alternator on the engine, making sure all mounting surfaces, especially on the 9000 Series, are free of corrosion or foreign materials. Torque the alternator retaining bolts to the specifications listed in the engine manufacturer's manual.

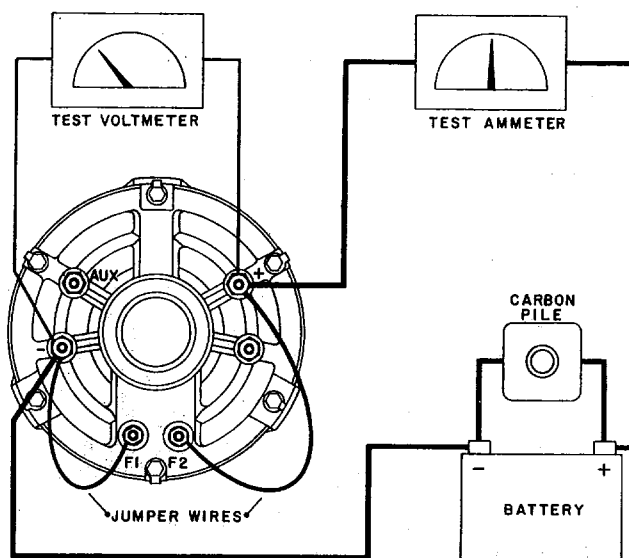


Figure 13

NOTE: Always refer to the airframe manufacturer's wiring diagram when installing or testing the alternator on the aircraft.

PRECAUTIONS TO BE OBSERVED WHEN TESTING OR SERVICING THE ELECTRICAL SYSTEM

1. DISCONNECT THE BATTERY, before connecting or disconnecting test instruments (except voltmeter) or before removing or replacing any unit or wiring. Accidental grounding or shorting at the regulator, alternator, ammeter, or accessories, will cause severe damage to the units and/or wiring.
2. THE ALTERNATOR OUTPUT LEAD MUST NOT BE REMOVED FROM THE ALTERNATOR WITH THE FIELD CIRCUIT ENERGIZED AND THE ALTERNATOR OPERATING.
3. DO NOT ATTEMPT TO POLARIZE THE ALTERNATOR. No polarization is required. Any attempt to do so may result in damage to the alternator, regulator or circuits.
4. GROUNDING OF THE ALTERNATOR OUTPUT TERMINAL MAY DAMAGE THE ALTERNATOR AND/OR CIRCUIT AND COMPONENTS.
5. REVERSED BATTERY CONNECTIONS MAY DAMAGE THE RECTIFIERS, VEHICLE WIRING OR OTHER COMPONENTS OF THE CHARGING SYSTEM. Battery polarity should be checked with a voltmeter before connecting the battery. MOST VEHICLES ARE NEGATIVE GROUND.
6. IF A BOOSTER BATTERY OR FAST CHARGER IS USED, ITS POLARITY MUST BE CONNECTED CORRECTLY TO PREVENT DAMAGE TO THE ELECTRICAL SYSTEM COMPONENTS.
7. WHEN USING AN AUXILIARY POWER UNIT, MAKE SURE THE VOLTAGE AND POLARITY ARE SET TO CORRESPOND WITH THE VEHICLE SYSTEM VOLTAGE AND POLARITY.



prestolite®

AIRCRAFT ALTERNATOR



ALV-9400 SERIES
24 VOLT, 100 AMPERE
— OVERHAUL PROCEDURES —

Section 1 INSPECTION AND ELECTRICAL CHECKS

1.1 Visual and Mechanical Inspection

- 1.1.1 **Housings and Shaft** — Verify no damage. Replace any damaged housings and rotor (if shaft damaged).
- 1.1.2 **Thru-Bolts and Lock Tabs** — Verify installation of six thru-bolts and lock tabs. See Figure 2-12 for installation at one place and Figure 2-13 for the other five places. Bolt torque value is 30-35 inch-pounds. Bolts are high strength type (120,000 psi) which can be identified by a raised "Y" mark on heads as shown in Figure 2-13.
- 1.1.3 **Terminals and insulators** — Verify no damage and installation as per Figures 2-10 and 2-11. Refer to paragraph 2.5.10 for terminal mounting nut torque values. Replace damaged parts.
- 1.1.4 **Shaft Spacer and O-Ring Seal** — Verify no damage/wear to shaft spacer surface finish (20 micro-inch maximum) and O-ring seal. Replace damaged or worn parts.
- 1.1.5 **Oil Seal** — Verify no damage or wear to oil seal. See Figure 1-1 for typical installation. Replace damaged or worn parts.



Figure 1-1

1.1.6 Slip Ring End Bearing, Housing and Shaft End Condition —

- 1. Remove bearing cover from end head as shown in Figure 1-2. CARE MUST BE TAKEN NOT TO DAMAGE END HEAD. IF COVER IS DAMAGED A NEW COVER MUST BE INSTALLED.
- 2. Inspect cover for rust accumulation on inside surface and if so, replace with new cover, bearing and housing.
- 3. Inspect end housing bearing bushing for signs of corrosion, gouges, scratches and burrs and if so, replace housing and bearing. (New bushing has 30 micro-inch surface finish).

- 4. Inspect bearing and shaft end for discoloration indicating overheating or wear (See Figure 1-3) and if so, replace bearing and rotor.
- 5. Inspect bearing inner race for evidence of turning on shaft (See Figure 1-3) and if so, replace bearing and rotor.

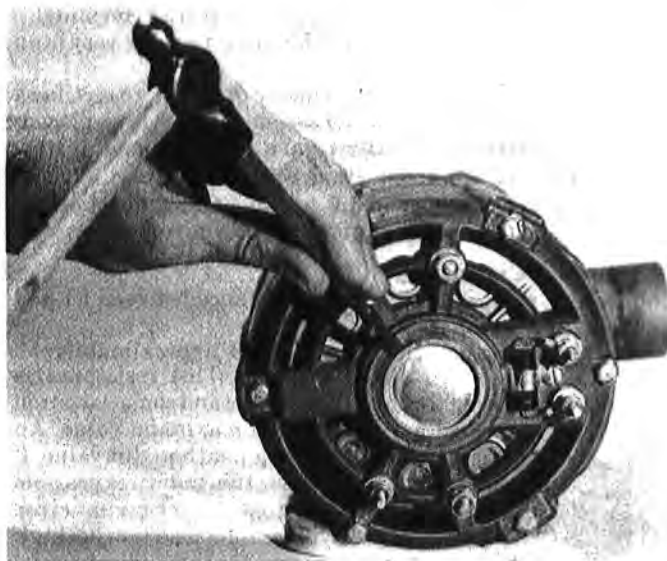


Figure 1-2



Figure 1-3

- 6. Inspect bearing outer race for evidence of turning in housing bushing (See Figure 1-3) and if so, replace bearing and housing.
- 7. Inspect bearing for wear and grease contamination as indicated by darkening or change in original grease color and presence of dirt or metal particles. The original Chevron SRI #2 grease has a dark green color. Replace bearing and housing if bearing grease is so contaminated.

- 1.1.7 **Bearing Check** — Hand spin the rotor shaft. A defective bearing may be heard or felt. To determine which bearing is defective will require disassembly of alternator to separate the drive end head and rotor assembly from the slip ring end head and stator assembly. The check can then be repeated with the drive end head and rotor assembly to determine which bearing is defective and should be replaced.

1.2 Electrical Checks

1.2.1 Positive Rectifier Heat Sink Assembly:

1. Using a VOM on the RX1 range, make forward and reverse rectifier resistance measurements between the (+) terminal and the AUX terminal.
2. One reading should be low and the other very high (no meter movement).
3. Abnormal readings indicate one or more rectifiers are defective and the assembly must be replaced. **Individual rectifiers are not replaceable.**

1.2.2 Negative Rectifier Heat Sink Assembly:

1. Repeat test as in 1.2.1 with VOM connections to the (-) terminal and the AUX terminal.

1.2.3 Field Circuit:

1. Using VOM, measure resistance between F1 and F2 terminals.
2. Resistance should be 9.9 to approximately 15 ohms at 20-27°C (70°-80°F). This resistance is measured through the brushes and some variation is expected for the specified maximum value. An open circuit will be much higher than this value. If measured resistance is less, this indicates possible shorted rotor, slip rings or RFI capacitor (ALV-9407 only, disconnect one lead for check). If measured resistance is greater this indicates possible dirty slip rings, bad brushes or open rotor. Replace defective parts or clean slip rings as indicated.

1.2.4 Ground Checks:

1. Using VOM on RX100 range, make resistance measurements between the slip ring end housing and the AUX, (+), (-), F1, and F2 terminals. Meter should indicate infinite resistance (no meter movement).
2. Abnormal readings indicate a fault condition at the housing — terminal mounting interface or internal to the alternator.

1.2.5 Performance Test:

Using a test stand, verify alternator output performance of 28.0 volts at 6000 r/min for minimum output

current of 83.0 amperes. Alternator must be connected as shown in Figure 1-4 for full field operation, i.e. — field terminals F1 and F2 jumpered to the (+) and (-) output terminals (use #16 or #18 AWG wire for the 2-3 ampere field current and a field control switch). Approximately 6 hp will be required to drive the alternator at the specified load condition. Prepare test setup so that operation time at the loaded condition does not exceed 20 seconds. This is required for two reasons. The stated performance is based on room temperature and extended test time will increase winding resistance, due to temperature increase, and prevent proper check to the stated limits. Also, the alternator must not be operated without required air cooling for more than 20 seconds at the loaded condition or damage will result. Therefore, to minimize operation time required at the loaded condition, the following test sequence is suggested —

1. With field control switch open, adjust speed to specified value.
2. Close field switch, adjust load to give specified output voltage at specified speed, record load current, open field switch and decrease load and speed to zero.
3. Refer to Page 9, Table 1-1 as required for trouble analysis.

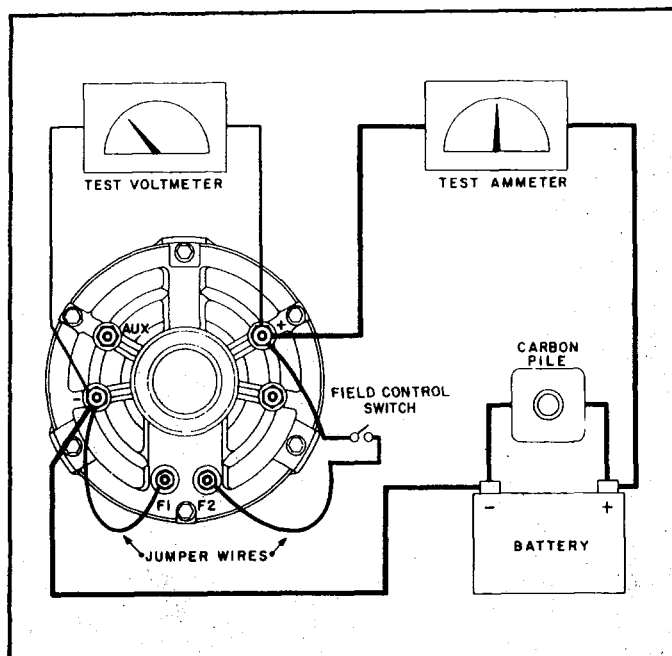


Figure 1-4

Section 2 OVERHAUL PROCEDURE

2.1 General

This section contains information required to completely disassemble and reassemble the alternator. In addition, this section includes inspection and test procedures for the individual components and subassemblies.

When repairing the alternator, complete disassembly may not be required. In some cases, it will be necessary to perform only those operations which are required to effect the repair.

2.2 Recommended Replacement Parts

It is recommended that original equipment service parts be used for parts replacement. Refer to the Prestolite OE-A1 Aircraft Manual Alternator Section for available service parts.

2.3 Disassembly

2.3.1 Remove Rear Housing — Stator and Rectifier Heat Sinks Assembly from Rotor Drive End Housing Assembly.

1. Place the alternator on a wood "V" block stand.

2. Straighten the lock tabs on each of the six (6) thru bolts. (Use new lock tabs when reassembling.)
3. Using a socket wrench, remove the six (6) thru bolts and lock tabs. Inspect bolts for any damage. Replace if required at reassembly.

NOTE

Verify removed thru-bolts are high strength bolts as identified by the raised "Y" mark on the heads. (See Figure 2-13.) If not, the bolts must be replaced at reassembly with the required bolts.

4. Remove the slip ring end head bearing cover (see paragraph 1.1.6).
5. Place alternator on wood holding block having a clearance hole for the shaft diameter (including shaft spacer) and shaft length so that it rests on the front surface of the machined circular part of drive end housing. Scribe mark across housings and stator to indicate alignment for ease of reassembly.
6. Using a puller (Proto Co. #4029 recommended, other may cause spine damage) installed on the slip ring end head housing as shown in Figure 2-1 to prevent damage to housing, separate the slip ring end housing and stator-rectifier assembly. Retrieve brush springs if they fall out during this operation. Place the removed slip ring end head and stator assembly on a pad to protect exposed stator winding pending further disassembly.

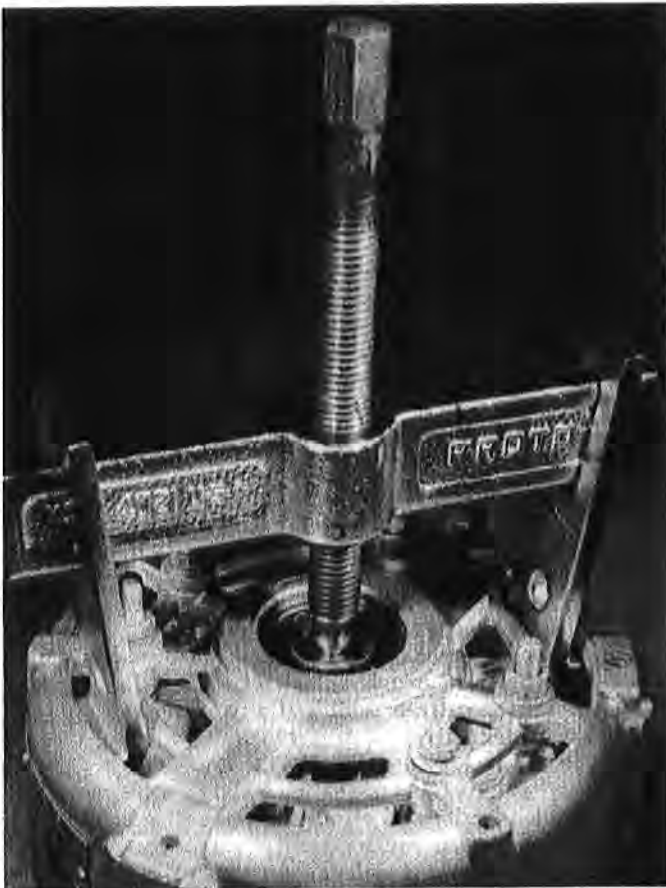


Figure 2-1

2.3.2 Remove Stator and Rectifier — Heat Sinks Assembly From Slip Ring End Head.

1. Position the assembly on holding block.
2. Using socket wrench, remove nuts, washers and insulators from the (+) output terminal, (-)

ground terminal, AUX terminal and the other auxiliary terminal. Note location to facilitate reassembly.

3. Separate rectifier-stator assembly from the slip ring end housing, pushing terminals (step 2) through the housing and remove housing.
4. Remove remaining insulators and washers from terminals and housing. Note location to facilitate reassembly.

2.3.3 Remove Brush Holder, Brushes and Capacitor (ALV-9407 only) from Slip Ring End Housing.

1. Using socket wrench, remove nuts, washers and insulators from field terminals. Note location to facilitate reassembly.
2. Remove terminals with integral brushes.
3. Remove internal insulators from brush terminals. Note location for reassembly.
4. On ALV-9407, remove capacitor clamp screw, clamp and capacitor.
5. Remove brush holder fastening hardware, including brush springs if not removed.

2.3.4 Remove Slip Ring End Head Bearing

1. Remove bearing snap ring retainer using required removal pliers.
2. Position end housing in a press with rear of housing towards press table. Using a 1½ inch diameter × 8 inch long bar on inner race of bearing and with the end housing bearing boss area supported by a tube 2½ inch O.D. × 1½ inch I.D. × 2 inch long, press bearing from housing (DO NOT HAMMER). Discard bearing.
3. Remove bearing O-ring seal from housing and discard seal.

2.3.5 Separate Rotor and Drive End Housing

1. Remove shaft cotter key and nut.
2. Remove shaft shipping sleeve and shipping washer or drive gear assembly if installed.
3. Remove woodruff key.
4. Remove rotor shaft spacer and O-ring seal. Discard seal.
5. Position assembly vertically in a press with slip ring end towards press table and housing supported above press table by two/three vertical support plates between housing and press table.
6. Apply press ram to shaft end and press rotor out of housing (DO NOT HAMMER), being careful not to allow housing or rotor to drop and be damaged.

2.3.6 Remove Drive End Bearing

1. Remove three screws that secure bearing retainer and remove retainer.
2. Place housing in press as shown in Figure 2-2 and using the bearing removal tools shown, press bearing from housing (DO NOT HAMMER). Discard bearing.

2.3.7 Remove Oil Seal from Drive End Housing

1. Position housing in press with front of housing towards press table and supported on a 2½ inch I.D. pipe at housing oil seal pocket.
2. Using a 1½ inch diameter bar between press ram and rear of oil seal, press oil seal from housing (DO NOT HAMMER). Discard oil seal.

2.3.8 Remove Rectifier — Heat Sinks from Stator Assembly

This procedure applies to removal of either heat sink assembly from the stator assembly as required for replacement or testing of individual assemblies. Figure 2-3 shows one of the rectifier heat sinks as wired to the stator leads. The other heat sink has similar type connections.

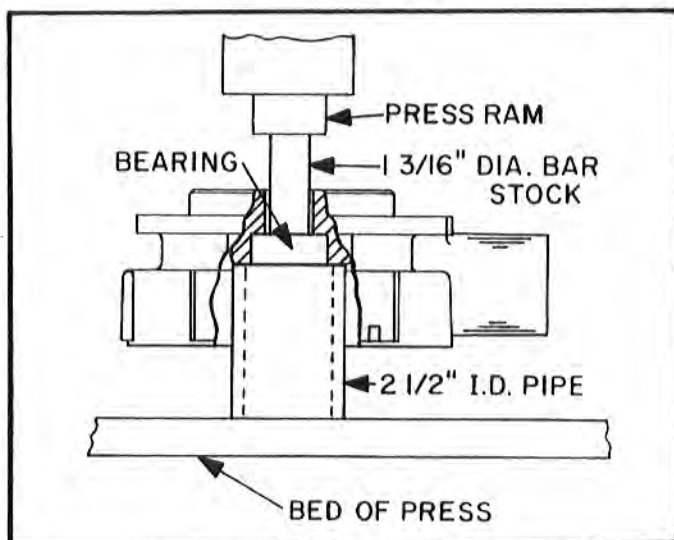


Figure 2-2



Figure 2-3

NOTE

Too much heat can damage rectifiers or shorten their service life. Use long nose pliers between rectifiers and solder joint as a heat sink during soldering or unsoldering operations. Complete operation as quickly as possible. A 100 watt soldering iron with clean tip is adequate.

1. Unsolder all stator leads from both rectifier-heat sink assemblies. Tag stator leads and rectifier connection point to facilitate reassembly.
2. Remove and discard metal tubing used over each rectifier pair leads and stator lead.

3. Remove epoxy cement holding each stator lead to heat sink.
4. Remove the AUX output terminal and spacer from the negative heat sink assembly.

2.4 Inspection and Testing of Removed Components

Refer to paragraph 2.6 for alternator servicing and testing precautions.

2.4.1 Front and Rear Housing

1. Clean both housings using Dow Chemical-Chloro-thene VG solvent to remove grease and dirt.
2. Air dry with filtered low pressure compressed dry air or wipe dry with clean cloth.
3. Inspect both housings for stripped threads, cracks on exterior and interior surfaces, and wear and corrosion in the bearing mounting area.
4. Replace housing at reassembly if any of the above faults are noted.

2.4.2 Mounting Hardware

1. Inspect any removed metallic hardware, i.e., screws, lockwashers, flatwashers, nuts, bearing retainer plate, bearing snap ring retainer, shaft spacer, bearing cover, shaft key, etc., for any damage, wear, corrosion or distortion. Replace any faulty parts at reassembly.
2. Hardware that will be reused shall be cleaned as required, using Dow Chemical-Chlorothene VG. Air dry parts using filtered low pressure compressed dry air or wipe dry with clean, lint free, cloth.

2.4.3 Insulators — (Washers and Spacers)

1. Inspect parts for cracks, deformation and burn marks.
2. Parts that are suitable for reuse, shall be cleaned as required using isopropyl alcohol. (CAUTION: ANY OTHER CLEANER MAY DAMAGE INSULATORS). Air dry parts with filtered low pressure compressed dry air or wipe dry with clean lint free cloth.

2.4.4 RFI Capacitor (ALV-9407 only)

1. Inspect capacitor for cracks in insulation and broken/damaged leads. Replace capacitor at reassembly if any faults are noted.
2. Test capacitor for a short or leakage condition using an ohmmeter. Use meter RX100 scale and check from lead to lead. Replace capacitor if it is shorted/leaky.

2.4.5 Brushholder, Brushes and Springs

1. Inspect brushholder for cracks and breaks in plastic and bent metal bracket. Replace if damaged, at reassembly.
2. Inspect the two brush and terminal assemblies for damaged terminals, insulation damage, broken/cracked or oil soaked brush material and minimum brush length of 0.45 inch. Replace brushes at reassembly if any of the above faults are noted.

NOTE

It is advisable to change brushes if length is 0.5 inch or less to eliminate later disassembly for brush wear replacement.

3. Inspect two stainless steel brush springs for any deformation, change in length or spring force. Service springs have a free length of about 1.2 inches, 0.29 inch maximum diameter and a spring force of 0.54 pounds at compressed length of 0.87 inches. Replace springs if they are damaged.

2.4.6 Rotor Assembly

1. Inspect rotor for any of the following faults and replace rotor if any are detected (with the exception of the slip ring repair noted in step G). **ROTOR IS NOT SERVICEABLE IN PARTS AND MUST BE REPLACED AS A WHOLE.**
 - A. Stripped shaft threads.
 - B. Worn key slots/holes (woodruff and cotter).
 - C. Worn and/or corroded bearing journal surfaces drive end and slip ring end.
 - D. Loose slip ring assembly or pole pieces on shaft.
 - E. Gouged, bent, cracked or excessive corrosion of pole pieces.
 - F. Bent, gouged or excessive corrosion of shaft.
 - G. Slip rings which are rough or out of round may be trued in a lathe (do not chuck shaft on bearing journals). Concentricity of slip rings, with respect to bearing journal, must not exceed 0.001 inch total indicator reading. Remove only enough material to make slip rings smooth and round. Final surface finish shall be 50 micro-inches maximum. The finished slip ring diameter must not be less than 1.350 inches, otherwise rotor must be replaced. Insure there are no burrs or metal particles on or between slip rings.

NOTE:

Clean dirty slip ring using Dow Chemical Chlorothene VG and wipe residue away with a clean lint free cloth.

- H. Burned/discolored coil (insulation will flake off burned coil). Damaged varnish coating is not repairable.

2. Rotor Resistance Test

- A. Using a VOM measure resistance between slip ring terminals, point A and B of Figure 2-4. **DO NOT CONNECT TO SLIP RING SURFACE.** Coil resistance should be 9.9 to 11.8 ohms at 20°-27°C (70°-80°F).
- B. If resistance is higher, inspect soldered connections at slip ring terminals. Repair if necessary using a high temperature solder per the specification shown in Figure 2-5 with rosin and alcohol flux. Repeat test of Part A.
- C. Replace rotor if coil fails resistance test.

3. Rotor Ground Test

- A. Using a VOM on RX100 range, measure resistance between slip ring terminal and pole piece, points A and C of Figure 2-4. No meter movement should occur (infinite resistance).

NOTE:

Inspect slip ring and solder connections to make certain they are not touching shaft. Repair and retest as required.

- B. Replace rotor if any meter movement is detected.

2.4.7 Rectifier-Heat Sinks and Stator Assembly

1. Inspect terminals for stripped threads bent/burnt shafts. Faulty terminals require replacement.
2. Inspect for broken rectifier leads, damaged stator leads, loose or cracked epoxy (securing stator leads to heat sinks) and discoloration of stator windings. See following list for action required if faults are detected.
 - A. Broken rectifier leads require replacement of the associated rectifier-heat sink assembly. **RECTIFIERS ARE NOT SERVICEABLE INDIVIDUALLY.**



Figure 2-4

Size:	$\frac{1}{16}$ Diameter $\times$ Spool
Contents:	95.35% Tin 4.65% Silver (Minimum)
Plastic Temperature:	232°C approx.
Liquid Temperature:	238°C approx.
Vendor Source:	J. W. Harris Co. Cincinnati, Ohio or Equivalent

Figure 2-5

- B. Loose/cracked epoxy, securing stator leads, may be removed and new epoxy (3M Co. Scotchcast #10 resin) applied.
- C. Damaged stator leads require stator replacement and electrical testing as specified in step 3 to determine possible damage to rectifiers.
- D. Discoloration of stator windings indicates overheating that may be caused by shorted coils or grounded winding. Perform electrical tests on stator as specified in step 4.
- E. If stator shows wear or damage to epoxy coating of windings, the stator must be replaced.
3. Perform electrical tests of the Positive and Negative Rectifier-Heat Sink Assemblies as noted in paragraphs 1.2.1 and 1.2.2.
4. Stator testing can be performed as follows after disassembly per paragraph 2.3.8:
 - A. Using a VOM on RX100 range, measure resistance between a stator lead and bare metal surface of stator core. No meter movement should occur (infinite resistance). If a slight movement is detected or if meter indicates full scale, the stator must be replaced.
 - B. Using VOM on RX1 range, measure resistance (continuity) between AUX terminal and each stator lead (6 total). Resistance should be 0.5 ohm or less otherwise replace stator. Check flexible leads for possible opens before replacing stator.

2.5 Assembly

2.5.1 Install Drive End Oil Seal

1. Position drive end housing on press with front of housing on press table.
2. Position new oil seal squarely in housing with lip towards outside of end head.
3. Using a length of $1\frac{1}{8}$ inch diameter bar stock, **press** oil seal squarely into end head to a distance of approximately $\frac{1}{16}$ inch from outside face of casting. **DO NOT HAMMER.**

2.5.2 Install Drive End Bearing

1. Position drive end housing on press with front of housing on press table.
2. Position new bearing squarely into bearing pocket of housing with **SEALED SIDE OF BEARING TOWARDS INSIDE OF HOUSING**. CARE MUST BE TAKEN TO PREVENT CONTAMINATION OF BEARING.
3. Using a $2\frac{7}{16}$ inch O.D. pipe with $\frac{5}{32}$ inch wall, **press** bearing into housing up to the housing bearing stop. **Apply pressure to outer race only. Pressure on inner race will damage bearing. DO NOT HAMMER.**
4. Install bearing retainer and screws. Torque 25-30 inch-pounds.

2.5.3 Install Drive End Housing to Rotor Assembly

1. Lubricate oil seal lip with Chevron SRI #2 grease.
2. Position rotor assembly in press with flat surface at slip ring end of shaft against a flat and true surface of press.
3. Position drive end housing and bearing assembly on rotor shaft. The bearing must be square with rotor shaft. **Take care not to damage oil seal as shaft passes through oil seal.**
4. Install the shaft oil seal spacer (collar) on shaft, being careful not to fold the oil seal lip under, up to contact with the bearing inner race. The collar O-ring groove should be on the outside. **SURFACE DAMAGE NOT TOLERABLE, SURFACE HAS 10-20 MICRO-INCH FINISH.**
5. Position bearing installation tool ($1\frac{3}{16}$ inch O.D. pipe $\times$ $\frac{1}{4}$ inch wall $\times$ $2\frac{1}{2}$ inch long) on shaft in contact with end of shaft collar as shown in Figure 2-6 and press bearing onto the shaft up to shaft stop.



Figure 2-6

6. Install a new O-ring seal onto shaft and position into groove of shaft collar. Use a small blunt instrument to push O-ring into groove. A small amount of Dow Corning DC4 grease on the O-ring seal will make installation easier. Make certain the seal is fully installed before assembling the remainder of the drive assembly. Figure 1-1 and 2-7 show correct assembly of oil seal and drive end head components.

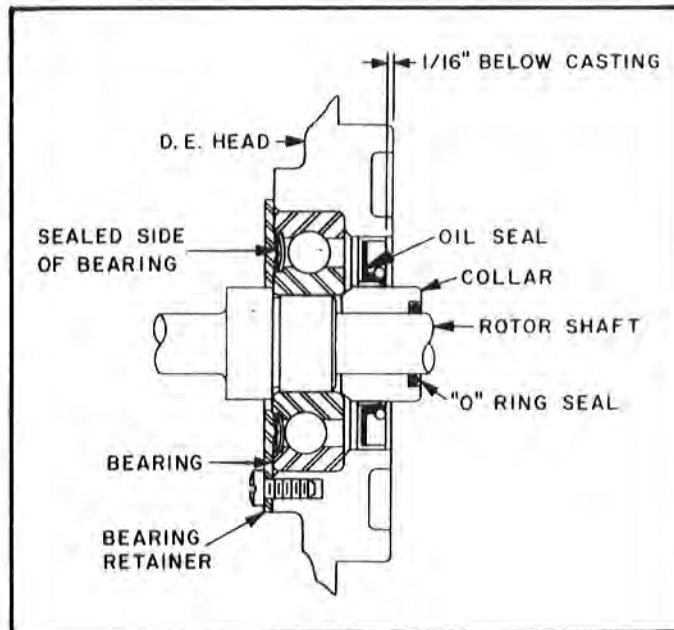


Figure 2-7

2.5.4 Assemble Rectifier-Heat Sink Assemblies and Stator Assembly

This procedure applies when replacing the rectifier-heat sink assemblies and/or the stator assembly. Applicable steps should be used if only one of the rectifier-heat sinks is being replaced. Figure 2-3 shows typical completed assembly. Use previous tagged connecting points to insure proper wiring of stator leads to rectifiers. **INDIVIDUAL RECTIFIERS ARE NOT SERVICEABLE.**

NOTE:

Too much heat can damage rectifiers or shorten their service life. Use long nose pliers between rectifiers and solder joint as a heat sink during soldering operations. Complete the operation as quickly as possible consistent with producing a good solder connection. A 100 watt soldering iron with clean tip is adequate. Use a high temperature solder as per Figure 2-5 with rosin and alcohol flux. **NEVER USE ACID CORE SOLDER FOR ELECTRICAL CONNECTIONS. THE USE OF ANY OTHER FLUX OTHER THAN ROSIN IS PROHIBITED.**

1. With reference to Figure 2-3, form stator leads and rectifier-heat sink rectifier leads (minimum of $\frac{1}{4}$ inch bend radius) as shown, (pre-tin stator leads) install new solder tubing over leads (apply heat sink pliers between rectifier and joint to be soldered) and solder. Repeat this until all stator leads have been connected to the positive and negative heat sink rectifiers.

NOTE:

The stator leads will be cemented to the heat sinks using 3M Company Scotchcast #10 resin, at assembly to the slip ring end housing, with heat sinks in position in the end head.

2.5.5 Assemble Slip Ring End Head, Brush Holder and Brushes

1. Install brushholder in end head using screws and lockwashers. Tighten screws to 15-20 inch pounds.
2. Install bearing snap ring retainer, positioning gap in retainer relative to brushholder as shown in Figure 2-8.

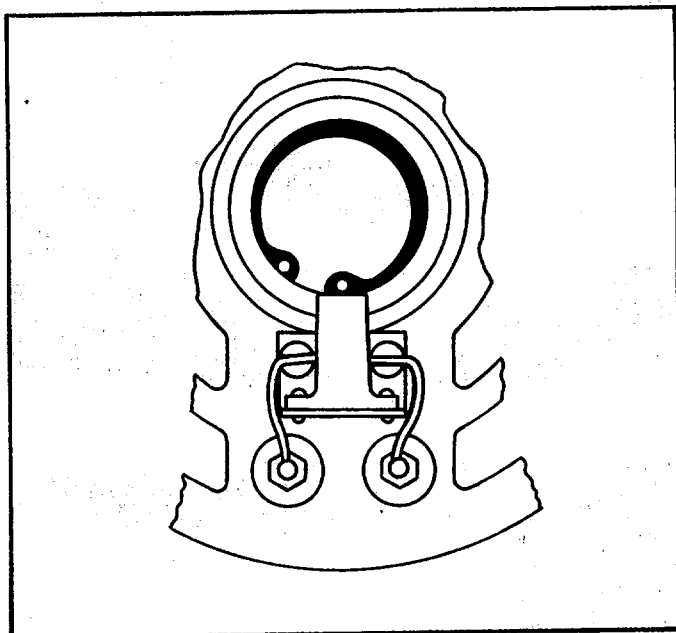


Figure 2-8

3. Install two brush springs and brushes into holder. Depress brushes (with leads in holder slots) and insert a small drill or metal rod through the snap ring hole to hold the brushes in place (see Figure 2-9).

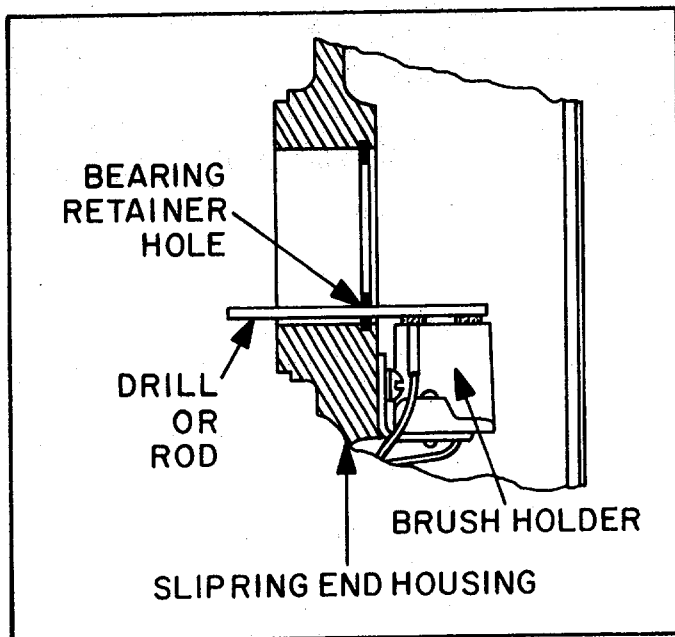


Figure 2-9

4. With reference to Figures 2-10A and B, assemble brush terminal insulators and install to housing using insulators and hardware shown. The RFI capacitor used on the ALV-9407 only, should also be installed at this time, as shown in Figures 2-10A and B.

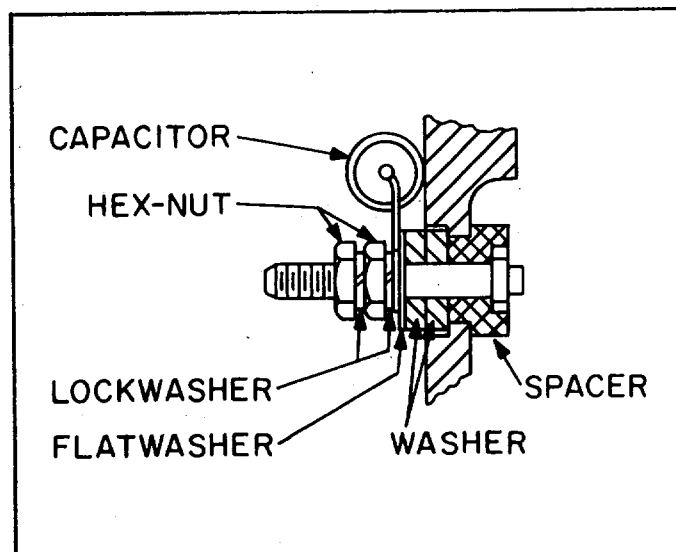


Figure 2-10A

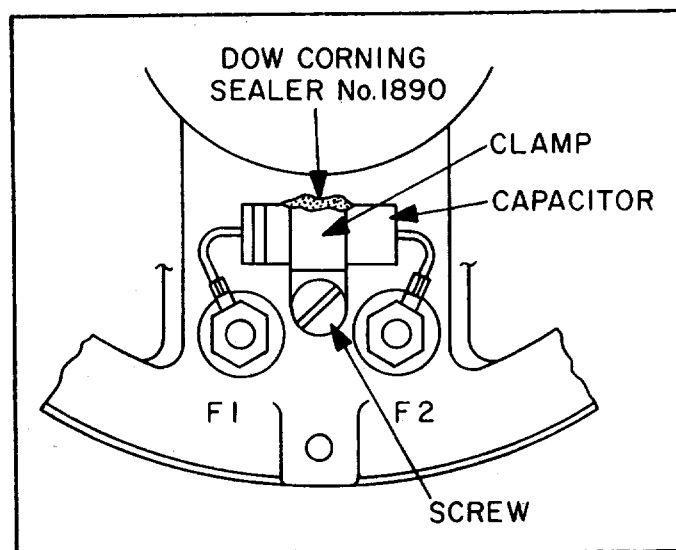


Figure 2-10B

5. (ALV-9407) — Install capacitor clamp and mounting screw. Torque screw to 15-20 inch pounds.
6. (ALV-9407) — Apply Dow Corning #1890 sealer to clamp as shown to secure capacitor to clamp. Follow manufacturers instructions for sealer application.
7. Torque field (brush) terminal stud nuts to 25-30 inch pounds.

2.5.6 Install Stator and Rectifier-Heat Sink Assemblies to Slip Ring End Housing

1. Assemble the stator and rectifier heat sink assemblies into the end head assembly of paragraph 2.5.5 making certain terminals, insulators and hardware are correctly assembled as shown in Figure 2-11. Align housing and stator with previous scribe marks to insure alignment of thru-bolt holes. Final torque of terminal nuts will be done at complete assembly of alternator.

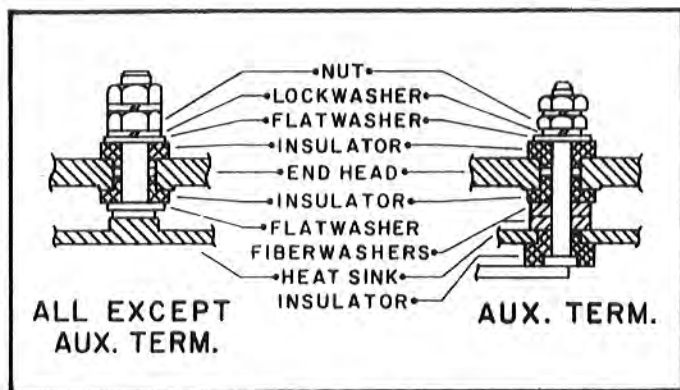


Figure 2-11

NOTE:

- A. Insure that the mating surfaces of housing and stator are clean and free of any dirt, burrs or foreign material.
- B. If it was necessary to replace the stator/rectifier heat sink(s), position the stator leads so that they will not interfere with the rotor and secure leads at six places to heat sinks with 3M Company Scotchcast #10 Resin, following manufacturers instructions. See Figure 2-3 for typical epoxy application points.

2.5.7 Assemble Rear Housing-Stator Assembly to Drive End Housing and Rotor Assembly

1. Assemble the rear housing-stator assembly to the drive end housing and rotor assembly, aligning the sections with previous scribe marks on sections.

NOTE:

Insure that the mating surfaces of housing and stator are clean and free of any dirt, burrs or foreign material.

2. Temporarily install two thru-bolts to hold unit together.
3. Remove the brush retraction tool and verify brushes seat against slip rings. Visually check that brush leads are free and cannot bind against anything.
4. Install bearing O-ring seal into the rear housing bearing sleeve groove. Lubricate O-ring with Dow Corning DC-4 grease before installation.

2.5.8 Install Slip Ring End Bearing.

1. Position assembly of paragraph 2.5.7 in arbor press with flat surface of drive end shaft against a flat and true surface of press.
2. Position new bearing squarely into bearing pocket of housing with SEALED SIDE OF BEARING TOWARDS ROTOR. CARE MUST BE TAKEN TO PREVENT CONTAMINATION OF BEARING.
3. Use a length of $\frac{3}{8}$ inch diameter bar stock to press bearing into housing onto shaft and up to shaft stop. Apply pressure to inner race only. Pressure on outer race will damage bearing. (DO NOT HAMMER.)
4. Install slip ring end bearing cover.

2.5.9 Install Thru-Bolts and Lock Tabs

1. Install the six thru-bolts and new lock tabs. Figure 2-12 shows lock tab installation at depressed position on end head. Figure 2-13 shows lock tab installation at the five other points. The longest thru-bolt is installed in the hole between F1 and



Figure 2-12



Figure 2-13

F2 and passes through the blast tube of the drive end housing.

2. Tighten bolts evenly, while maintaining lock tab orientation, each a little bit at a time in sequence until all are tight and torqued to 30-35 inch pounds.
3. Bend six (6) lock tabs as shown in Figure 2-12 and 2-13 as applicable.

2.5.10 Terminal Torquing

1. Tighten the terminal mounting nuts to the following torque values:

Terminal	Screw Size	Torque (inch-pounds)
F1	#10-32	25-30
F2	#10-32	25-30
AUX	#10-32	25-30
(-)	$\frac{1}{4}$ "-28	70-85
(+)	$\frac{1}{4}$ "-28	70-85
AUX (+)	$\frac{1}{4}$ "-28	70-85

- 2.5.11 **Post Assembly Test**
Perform test on completed assembly as outlined in section 1, paragraph 1.2.5.
- 2.5.12 **Installation of Drive Shaft Shipping Hardware**
1. Install #5 woodruff key on shaft.
 2. Install shipping washer (ALK-50) on shaft and flush to shaft collar.
 3. Install shipping spacer (GJT-40C) to shaft so spacer passes over and covers key.
 4. Install retaining nut on shaft hand tight.
- 2.5.13 **Installation of Drive Coupling**
1. Refer to engine manufacturer's specifications.
Note that shipping washer and shipping spacer must be removed.
- 2.5.14 **Installation of Alternator to Engine**
Follow engine manufacturer's instructions.
- 2.6 **Alternator Servicing and Testing Precautions**
1. Always refer to airframe manufacturer's wiring diagram when installing or testing the alternator on the aircraft.
 2. Disconnect the battery, before connecting or disconnecting test instruments (except voltmeter) or replacing any unit or wiring. For negative ground applications, disconnect the negative lead first.
CAUTION: ALWAYS RECONNECT BATTERY PRIOR TO OPERATING ALTERNATOR.
3. Alternator output lead **MUST NOT** be removed from alternator with field circuit energized and unit operating.
 4. Do not attempt to polarize the alternator. No polarization is required. **ANY ATTEMPT TO DO SO MAY RESULT IN DAMAGE TO ALTERNATOR, REGULATOR OR CIRCUITS.**
 5. Grounding alternator output terminal may damage alternator and/or circuit and components.
 6. Reversed battery connections will damage the rectifiers, wiring or other components of charging system. Battery polarity must be checked with a voltmeter before connecting battery. Most systems are negative ground.
 7. If a booster battery or fast charger is used, its polarity must be connected correctly to prevent damage to the battery and electrical system. Provide adequate ventilation around battery and keep sparks and flame away from batteries.
 8. When using auxiliary power unit, make sure voltage and polarity are set to correspond with vehicle system voltage and polarity.
 9. Never use acid solder for electrical connections. Rosen flux is only type permitted.

TABLE 1-1 TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE
LOW/NO ALTERNATOR OUTPUT	1. Loose terminal connections. 2. Worn/broken brush. 3. Dirty/worn rotor slip rings. 4. Short/leakage from field terminals to housing. 5. Shorted/open rotor field. 6. Shorted/open stator windings. 7. Shorted/open rectifiers on positive and/or negative rectifier-heat sinks. 8. Shorted/leaky RFI capacitor (on ALV-9407 only).
NOISY ALTERNATOR	1. Defective bearings at drive end and/or slip ring end. 2. Loose frame thru-bolts. 3. Shorted rectifiers (magnetic noise).
INTERMITTENT OUTPUT	1. Worn brushes/dirty slip rings. 2. Loose connections/corroded terminals.

**prestolite®****SERVICE PARTS LIST****ALE SERIES**

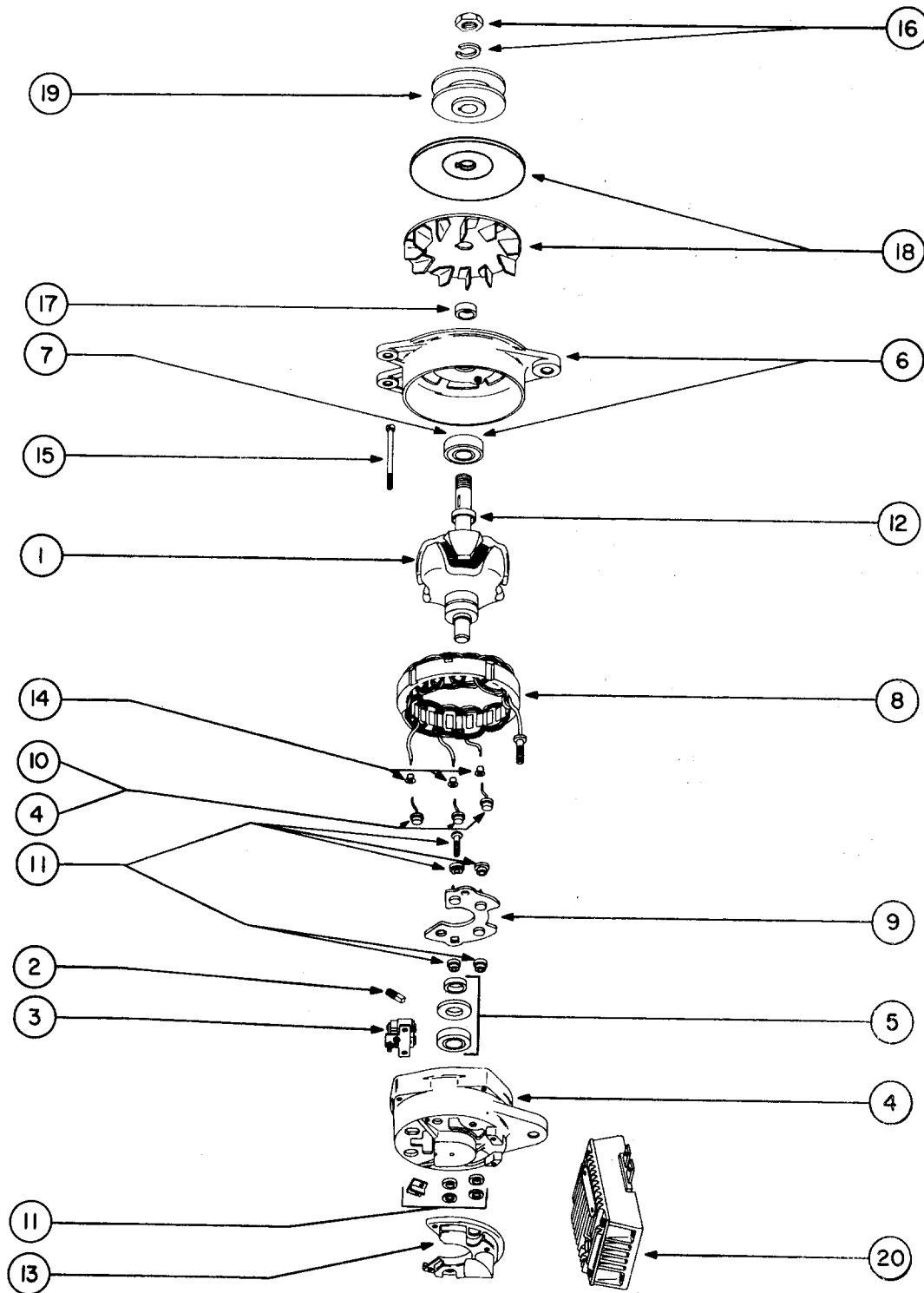
ALTERNATOR

ISSUED: 2-18-75(Rev.)

<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-12</u>
<u>ENG. NUMBER</u>		<u>ENG. NUMBER</u>	<u>APPLICATION</u>
ALE-6406	USE	ALE-6406R	Lycoming
ALE-6406G	USE	ALE-6406R	Lycoming
ALE-6406R		ALE-6406R	Service
ALE-6406RG	USE	ALE-6406R	Service
ALE-6420	USE	ALE-6420R	Lycoming
ALE-6420G	USE	ALE-6420R	Lycoming
ALE-6420R		ALE-6420R	Service
ALE-6420RG	USE	ALE-6420R	Service
ALE-8105A	USE	ALE-8408R	Lycoming
ALE-8406	USE	ALE-8406R	Lycoming
ALE-8406G	USE	ALE-8406R	Lycoming
ALE-8406R		ALE-8406R	Service
ALE-8406RG	USE	ALE-8406R	Service
ALE-8408	USE	ALE-8408R	Lycoming
ALE-8408R		ALE-8408R	Service
ALE-8420	USE	ALE-8420R	Lycoming
ALE-8420G	USE	ALE-8420R	Lycoming
ALE-8420R		ALE-8420R	Service
ALE-8420RG	USE	ALE-8420R	Service
ALE-8421	USE	ALE-8421R	Lycoming
ALE-8421R		ALE-8421R	Service



ALE Series Alternator Parts List



Exploded View of Typical ALE Alternator

ALE SERIES ALTERNATOR PARTS LIST

ISSUED: 3-5-79 (REV.)

SHEET 2

Assembly	Rotor Assembly (1)	Brush Set (2)	Brush, Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALE-6406,R	90-2396[d]	- - - -	ALU-1045BS[b]	90-2396[d]	90-2014[a]	ALE-1003K	X-3416
ALE-6406G,RG	"	- - - -	"	"	"	"	"
ALE-6420,R	ALE-2173S-1	ALE-1013AS	ALU-1045BS	ALK-1132BS-1	"	"	"
ALE-6420G,RG	"	"	"	"	"	"	"
ALE-8105A	ALE-2016	ALE-1012LS[c]	- - - -	ALE-1002LS	X-3417	"	"
ALE-8406,R	90-2396[d]	- - - -	ALU-1045BS[b]	90-2396[d]	90-2014[a]	"	"
ALE-8406G,RG	"	- - - -	"	"	"	"	"
ALE-8408,R	"	- - - -	ALE-1045BS[b]	"	"	"	"
ALE-8420,R	ALE-2173S-1	ALE-1013AS	ALU-1045BS	ALK-1132BS-1	"	"	"
ALE-8420G,RG	"	"	"	"	"	"	"
ALE-8421,R	"	"	ALE-1045BS	"	"	"	"

- [a] Bearing & Seal Pkg. also included with Rotor & S.R.E. Head Assy.
 [b] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.
 [c] Brush Set only; Brush Spring Set ALA-19S also available.
 [d] S.R.E. Head & Rotor Pkg. Complete Package must be used at time of first repair. Individual Components (See Sheet #3 for contents of Pkg.) may be used thereafter.
 [*] 35-781 (GJC-498S) Cover Pkg. (10 Pcs.) also available.



ALE SERIES ALTERNATOR PARTS LIST

Assembly	Stator Assembly 8	Pos. Rectifier & Plate Assembly 9	Negative Rectifier (Pkg. of 3) 10	Term. Stud Package 11	D.E. Retainer 12	Slip Ring End Cover 13	Eyelet Package 14
ALE-6406,R	ALE-2008AD	ALE-1054A	XA-944JS	90-2030	GR-32	- - - -	90-818
ALE-6406G,RG	"	"	"	"	"	- - - -	"
ALE-6420,R	"	"	"	"	"	- - - -	"
ALE-6420G,RG	"	"	"	"	"	- - - -	"
ALE-8105A	ALE-2008Z	ALE-1004	"	90-2359	"	ALE-1062	"
ALE-8406,R	ALE-2008AD	ALE-1054A	"	90-2030	"	ALU-1062A	"
ALE-8406G,RG	"	"	"	"	"	"	"
ALE-8408,R	"	"	"	"	"	"	"
ALE-8420,R	"	"	"	"	"	"	"
ALE-8420G,RG	"	"	"	"	"	"	"
ALE-8421,R	"	"	"	"	"	"	"

ALE SERIES ALTERNATOR PARTS LIST

ISSUED: 3-5-79 (Rev.)

SHEET 3

Assembly	Thru Bolt Package (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent Fan (2 Pc.) (18)	Drive Pulley (19)	Regulator (20)	
ALE-6406,R	ALA-20JS	90-33	ALD-21	90-2241	PU-672A	VSF-7203S	
ALE-6406G,RG	"	"	"	"	"	FVR-4011A	
ALE-6420,R	"	"	"	"	"	VSF-7203S	
ALE-6420G,RG	"	"	"	"	"	FVR-4011A	
ALE-8105A	ALA-20FS	"	"	"	"	- - - -	
ALE-8406,R	ALA-20JS	"	"	"	"	VSF-7203S	
ALE-8406G,RG	"	"	"	"	"	FVR-4011A	
ALE-8408,R	"	"	"	"	"	- - - -	
ALE-8420,R	"	"	"	"	"	VSF-7203S	
ALE-8420G,RG	"	"	"	"	"	FVR-4011A	
ALE-8421,R	"	"	"	"	"	- - - -	

[d] Contents of S.R.E. Head & Rotor Pkg.

90-2396	S.R.E. Hd. & Rotor Pkg.
90-2014	Bearing Pkg.
ALK-1132BS-1	Head Assy. S.R.E.
ALE-2173S-1	Rotor





prestolite[®]

SERVICE INFORMATION

ALE

AIRCRAFT ALTERNATORS

Issued 4/1/83

Page 1 of 4

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	12	<u>RATED OUTPUT</u>	40 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly, and bench testing, are contained in the service publications in the front of the Alternator Section. Refer to the following service publications when detailed service information is required.

<u>ALTERNATOR SERIES</u>	<u>SERVICE PUBLICATION</u>
ALE 8100	L-651A
ALE 6400 - 8400	L-655A

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALE series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as a 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.



ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 3.0 to 5.0 ohms.

ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰ F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 12.0 volts - 2.4 to 4.0 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰ F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

All units except the 6400 series, use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.



prestolite[®]

SERVICE INFORMATION

ALE

AIRCRAFT ALTERNATORS

Issued 4/1/83

Page 3 of 4

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALE 6400, 8100, and 8400	14.0 14.0	19 32	2000 4000

Alternator	Approx. Weight	Internal Wiring	Orig. Equip. Regulator	Replacement Regulator
ALE-6406, R	10 Lb. 6 Oz.	Figure 1	VSF-7201 or 7203	VSF-7203S
ALE-6406G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	-----
ALE-6420, R	10 Lb. 6 Oz.	Figure 1	VSF-7203	VSF-7203S
ALE-6420G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	-----
ALE-8105A	10 Lb.	Figure 2	-----	-----
ALE-8406, R	10 Lb. 12 Oz.	Figure 1	VSF-7201 or 7203	VSF-7203S
ALE-8406G, RG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	-----
ALE-8408, R	10 Lb. 12 Oz.	Figure 3	-----	-----
ALE-8420, R	10 Lb. 12 Oz.	Figure 1	VSF-7203	VSF-7203S
ALE-8420G, RG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	-----
ALE-8421, R	10 Lb. 12 Oz.	Figure 3	-----	VSF-7203S

* Same as Figure 1 except field terminal F-2 externally grounded with a strap connector. Lycoming applications only.

+ Wico - Prestolite part number.

File in the
OE-A1 AIRCRAFT MANUAL



Tech.
Data **ALTERNATORS**

ALE

AIRCRAFT ALTERNATOR

Issued 4/1/83

Page 4 of 4



prestolite.

**SERVICE
INFORMATION**

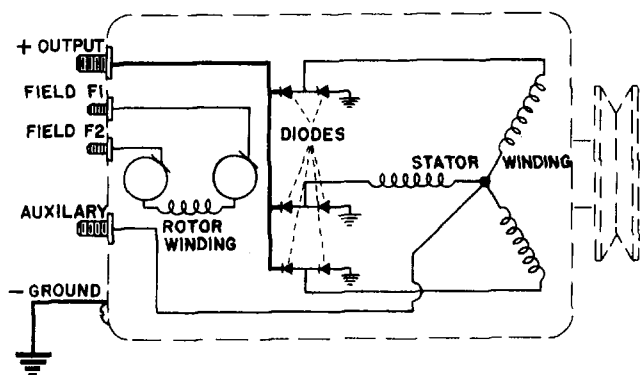


Figure 1

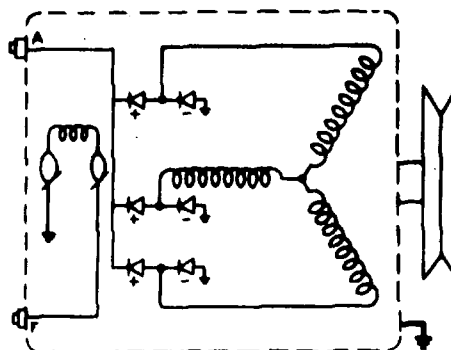


Figure 2

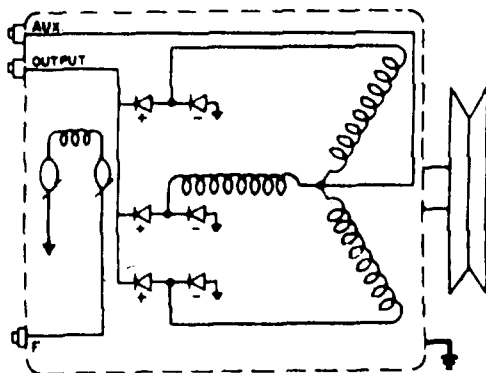


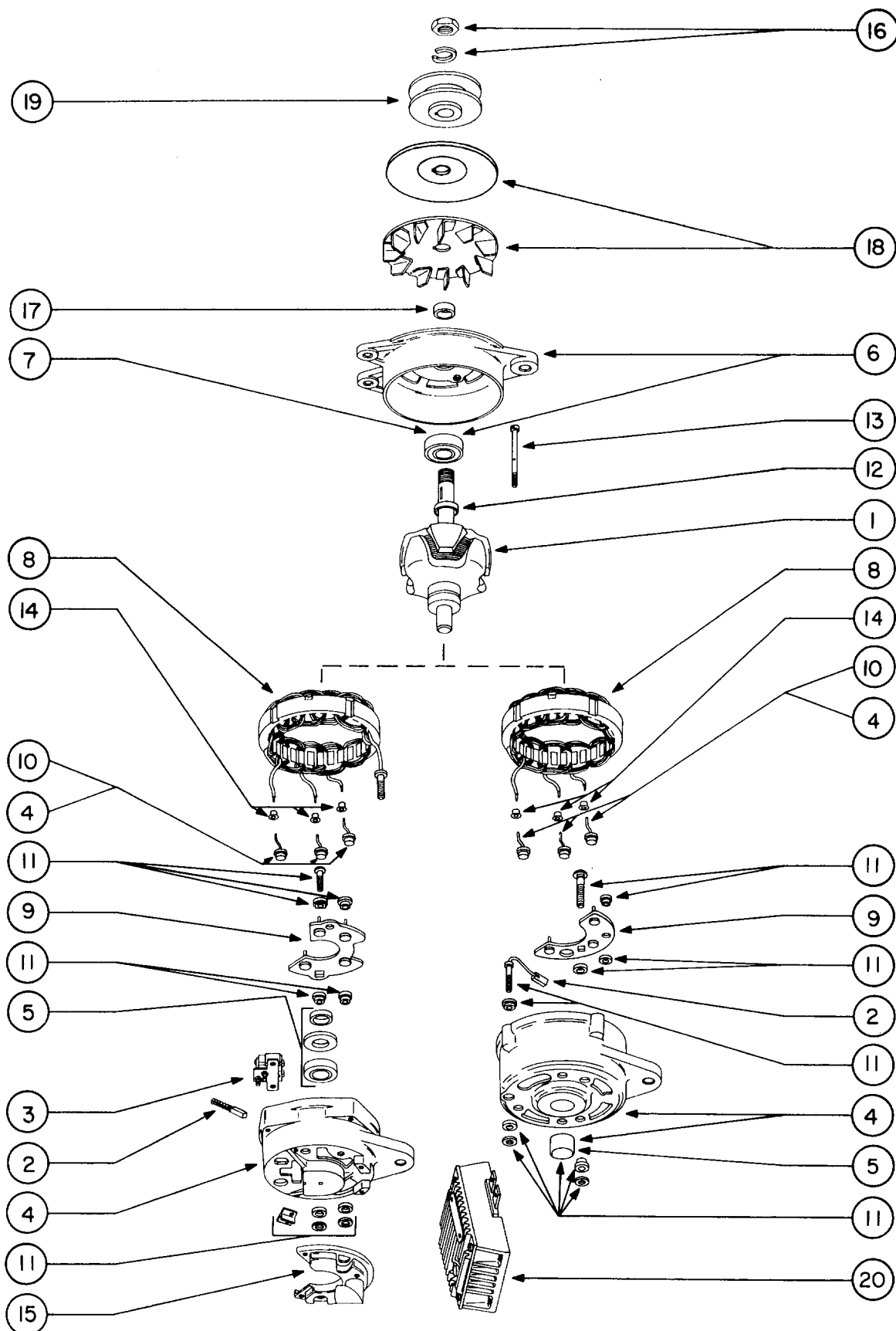
Figure 3

**prestolite®****SERVICE PARTS LIST****ALT SERIES****ALTERNATOR****ISSUED: 10-19-79(Rev.)**

<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-24</u>
<u>ENG. NUMBER</u>		<u>ENG. NUMBER</u>	<u>APPLICATION</u>
ALT-5101A		ALT-5101A	Franklin
ALT-5102S		ALT-5102S	Franklin
ALT-8403	USE	ALT-8420	Teledyne Continental
ALT-8404	USE	ALT-8421R	Lycoming
ALT-8404LS	USE	ALT-8421RS	Lycoming
ALT-8404R	USE	ALT-8421R	Service
ALT-8404RS	USE	ALT-8421RS	Service
ALT-8407	USE	ALT-8420	Teledyne Continental
ALT-8420		ALT-8420	Teledyne Continental
ALT-8421	USE	ALT-8421R	Lycoming
ALT-8421LS	USE	ALT-8421RS	Lycoming
ALT-8421R		ALT-8421R	Service
ALT-8421RS		ALT-8421RS	Service
ALT-9405	USE	ALT-9422	Teledyne Continental
ALT-9422		ALT-9422	Teledyne Continental



ALT Series Alternator Parts List



Exploded View of Typical ALT Alternator

ALT SERIES ALTERNATOR PARTS LIST

ISSUED:10-19-79 (REV.) SHEET 2

Assembly	Rotor Assembly ①	Brush Set ②	Brush, Holder & Spring Assembly ③	Slip Ring End Head Assembly ④ *	S.R.E. Bearing ⑤	Drive End Head Assembly ⑥	D.E. Bearing ⑦
ALT-5101A	ALT-2006	ALE-1012LS[b]	[NA]	ALH-1002CS	X-3417	ALE-1033	X-5077
ALT-5102S	"	ALB-1013BS[b]	[NA]	ALH-1002DS	"	"	"
ALT-8403	90-2397[e]	[c]	ALU-1045BS[c]	90-2397[e]	90-2014[a]	ALE-1003K	X-3416
ALT-8404,R	"	[c]	"	"	"	"	"
ALT-8404LS,R	"	[c]	"	"	"	"	"
ALT-8407	"	[c]	"	"	"	"	"
ALT-8420	ALU-2128S-1	ALE-1013AS	ALU-1045BS	ALK-1132AS-1	"	"	"
ALT-8421,R	"	"	"	"	"	"	"
ALT-8421LS,RS	"	"	"	"	"	"	"
ALT-9405	90-2398[e]	[c]	ALU-1045BS[c]	90-2398[e]	"	ALU-1043[d]	X-4087
ALT-9422	ALU-2138S-1	ALE-1013AS	ALU-1045BS	ALE-1142AAS-1	"	"	"

[*] 35-781(GJC-49BS) Cover Pkg. (10 Pcs.) Also available.

[a] Bearing & Seal Pkg. ; also included with Rotor & Slip Ring End Head Assy.

[b] ALA-19S Brush Spring Set Also available.

[c] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.

[d] XA-1026 D.E. Oil Seal also available.

[e] S.R.E.Head & Rotor Pkg. Complete Package must be used at time of first repair.

Individual Components(See Sheet #3 for contents of Pkg.)may be replaced thereafter.

[NA] Not Available.

File in the
OE-A1 AIRCRAFT MANUAL

ALTERNATOR SECTION

ALT SERIES ALTERNATOR PARTS LIST

Assembly	Stator Assembly (8)	Pos. Rectifier & Plate Assembly (9)	Negative Rectifier (Pkg. of 3) (10)	Terminal Stud Package (11)	D.E. Retainer (12)	Thru Bolt Package (13)	Eyelet Package (14)
ALT-5101A	ALE-2008R	ALE-1004	XA-944JS	90-2359	GGW-91	ALA-20ES	90-818
ALT-5102S	"	"	"	90-990	"	"	"
ALT-8403	ALE-2008AA	ALE-1054A	"	90-2043	GR-32	ALA-20GS	"
ALT-8404,R	"	"	"	90-2030	"	"	"
ALT-8404LS,RS	"	"	"	"	"	"	"
ALT-8407	"	"	"	90-2043	"	"	"
ALT-8420	"	"	"	"	"	"	"
ALT-8421,R	"	"	"	90-2030	"	"	"
ALT-8421LS,RS	"	"	"	"	"	"	"
ALT-9405	"	"	"	90-2043	"	"	"
ALT-9422	"	"	"	"	"	"	"

Assembly	S.R.E. Cover (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent Fan (2 PC.) (18)	Drive Pulley (19)	Regulator (20)	
ALT-5101A	[NA]	90-33	ALH-21A	90-2241	PU-598E	VSB-7401C	
ALT-5102S	[NA]	"	"	"	[NA]	VSF-7403S	
ALT-8403	ALU-1062	"	ALC-21F	90-2259	[NA]	"	
ALT-8404,R	ALU-1062A	"	ALD-21	90-2241	PU-672A	"	
ALT-8404LS,RS	"	"	"	"	[NA]	"	
ALT-8407	ALU-1062	"	ALC-21F	90-2259	[NA]	"	
ALT-8420	"	"	"	"	[NA]	"	
ALT-8421,R	ALU-1062A	"	ALD-21	90-2241	PU-672A	"	
ALT-8421LS,RS	"	"	"	"	[NA]	"	
ALT-9405	[NA]	8X-4075[g]	ALU-23[f]	[NA]	[NA]	"	
ALT-9422	[NA]	"	"	[NA]	[NA]	"	

[e] Contents of S.R.E. Head & Rotor Pkg.

S. R. E. Head & Rotor Pkg.	90-2397	90-2398
Bearing Pkg.	90-2014	90-2014
Head Assy., S.R.E.	ALK-1132AS-1	ALE-1142AAS-1
Rotor	ALU-2128S-1	ALU-2138S-1

[f] XA-744AZ Shaft Spacer O-Ring Seal available.

[g] Nut only; Washer not required.

[NA] Not available.





prestolite **SERVICE INFORMATION**

ALT

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 4

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	24	<u>RATED OUTPUT</u>	50 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly and bench testing are contained in the service publications in the front of the Alternator Section. Refer to the following service publication when detailed service information is required.

<u>ALTERNATOR SERIES</u>	<u>SERVICE PUBLICATION</u>
ALT 5100	L-651A
ALT 6400 - 8400	L-655A
ALT 9400	L-663

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALT series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as a 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.



ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 10.5 to 12.5 ohms.

ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 24.0 volts - 1.9 to 2.3 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.

The 9400 series alternators are cooled entirely by air pressure through a hose type connection on the drive end head. When bench testing this type of alternator, make output tests as short as possible unless adequate air pressure for cooling is supplied.



prestolite

SERVICE INFORMATION

ALT

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 3 of 4

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALT 5100, 6400, and 8400	28.0 28.0	20 43	3000 6000
ALT 9400	28.0 28.0	17 43	3000 6000

Alternator	Approx. Weight	Internal Wiring	Orig. Equip. Regulator	Replacement Regulator
ALT 5101A, S	12 Lb. 2 Oz.	Figure 1	VSB-7401C	-----
ALT 5102S	12 Lb. 2 Oz.	Figure 2	VSF-7401	VSF-7403S
ALT 6408	11 Lb. 12 Oz.	Figure 3	VSF-7404	VSF-7403S
ALT 8403	12 Lb. 2 Oz.	Figure 3	VSF-7402S or VSF-7404	VSF-7403S
ALT 8404, LS, R, RS, S	12 Lb. 2 Oz.	Figure 3	VSF-7401 or VSF-7403	VSF-7403S
ALT 8407	12 Lb. 2 Oz.	Figure 3	VSF-7404	VSF-7403S
ALT 8420	12 Lb. 2 Oz.	Figure 3	VSF-7404	VSF-7403S
ALT 8421, LS, R, RS, S	12 Lb. 2 Oz.	Figure 3	VSF-7403	VSF-7403S
ALT 9405	11 Lb. 6 Oz.	Figure 3	VSF-7401 or VSF-7403S	VSF-7403S
ALT 9422	11 Lb. 6 Oz.	Figure 3	VSF-7404	VSF-7403S



ALT

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 4 of 4



prestolite.

SERVICE

INFORMATION

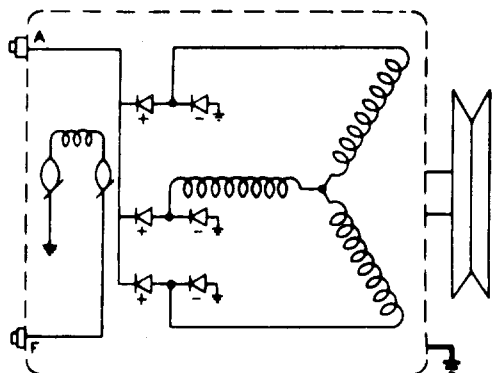


Figure 1

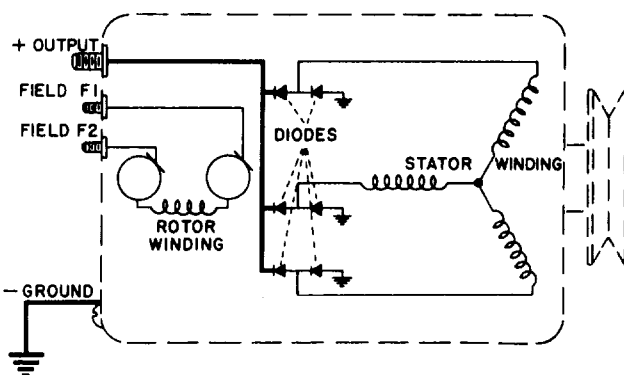


Figure 2

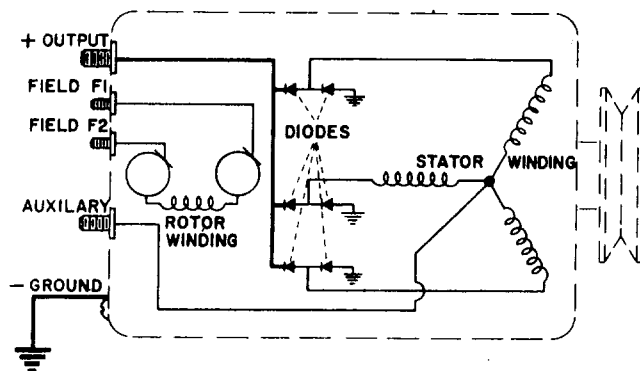


Figure 3



prestolite[®]

SERVICE PARTS LIST

ALU SERIES

ALTERNATOR

ISSUED: 2-27-75(Rev.)

ORIG. EQUIP. ALTERNATOR

SERVICE ALTERNATOR

VOLTS-24

ENG.
NUMBER

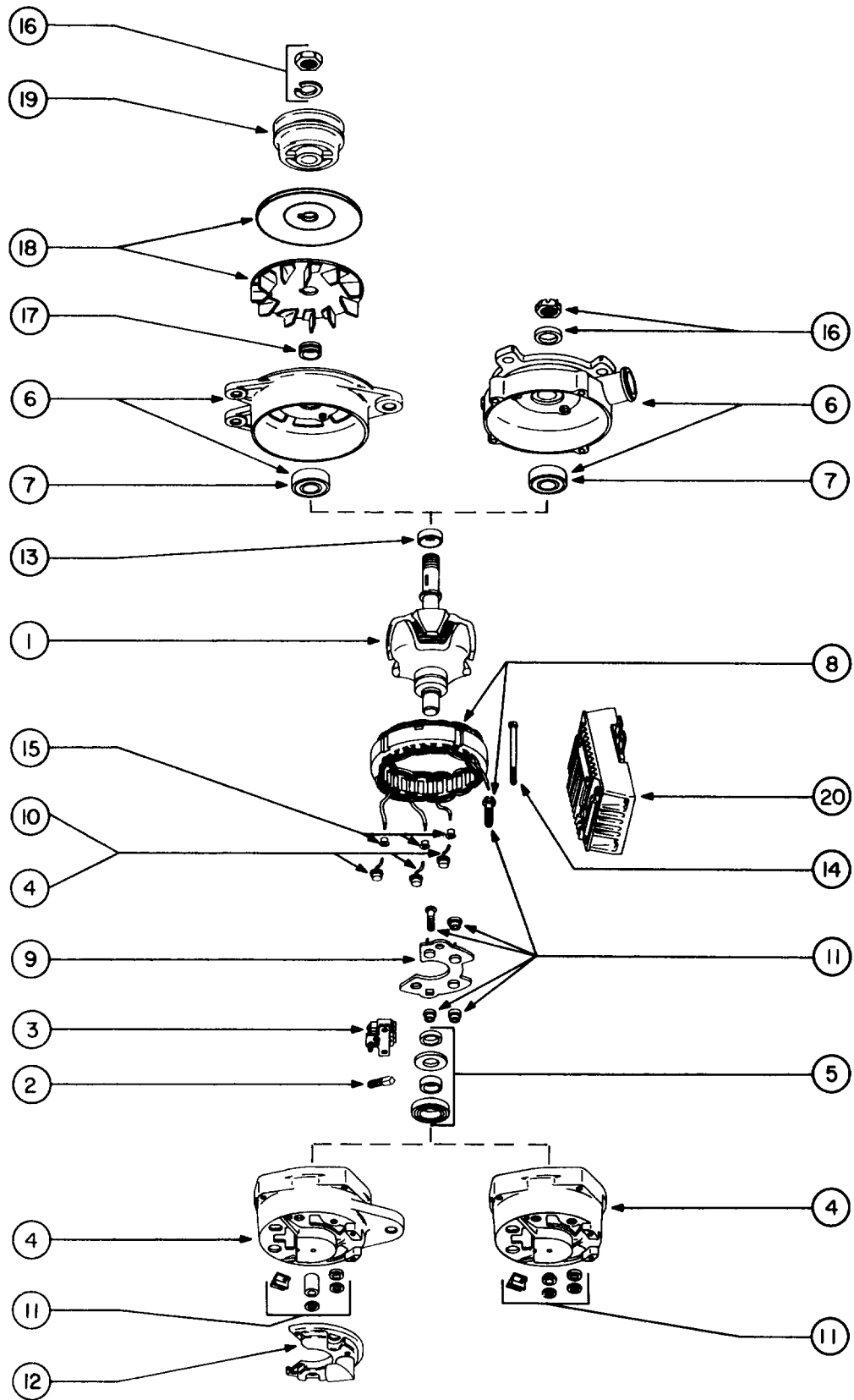
ENG.
NUMBER

APPLICATION

ALU-8403	USE	ALU-8421R	Lycoming
ALU-8403LS	USE	ALU-8421RS	Lycoming
ALU-8403R	USE	ALU-8421R	Service
ALU-8403RS	USE	ALU-8421RS	Service
ALU-8421	USE	ALU-8421R	Lycoming
ALU-8421LS	USE	ALU-8421RS	Lycoming
ALU-8421R		ALU-8421R	Service
ALU-8421RS		ALU-8421RS	Service
ALU-9404L	USE	ALU-9404R	Lycoming
ALU-9404R		ALU-9404R	Service
ALU-9422L	USE	ALU-9422R	Lycoming
ALU-9422R		ALU-9422R	Service



ALU Series Alternator Parts List



Exploded View of Typical ALU Alternator

ALU SERIES ALTERNATOR PARTS LIST

ISSUED: 3-5-79 (REV.)

SHEET 2

Assembly	Rotor Assembly (1)	Brush Set (2)	Br., Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing & Seal Pkg. (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALU-8403,R	90-2397[d]	- - - -	ALU-1045BS[b]	90-2397[d]	90-2014[a]	ALE-1003K	X-3416
ALU-8403LS,RS	"	- - - -	"	"	"	"	"
ALU-8421,R	ALU-2128S-1	ALE-1013AS	ALU-1045BS	ALK-1132AS-1	"	"	"
ALU-8421LS,RS	"	"	"	"	"	"	"
ALU-9404L,R	90-2398[d]	- - - -	ALU-1045BS[b]	90-2398[d]	"	ALU-1043[c]	X-4087
ALU-9422L,R	ALU-2138S-1	ALE-1013AS	ALU-1045BS	ALE-1142AAS-1	"	"	"

[*] 35-781 (GJC-49BS) Cover Pkg. (10 Pcs.) Also available.

[a] Bearing & Seal Pkg. also included, with Rotor & Slip Ring End Head Assy.

[b] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.

[c] XA-1026 D.E.Oil Seal also available.

[d] S.R.E. Head & Rotor Pkg. Complete Package must be used at time of first repair. Individual components (See Sheet #3 for contents of Pkg.) may be replaced thereafter.



ALU SERIES ALTERNATOR PARTS LIST

Assembly	Stator Assembly (8)	Pos. Rect. & Plate Assembly (9)	Negative Rectifier Package (10)	Term Stud Package (11)	S.R.E. Cover (12)	D.E. Retainer (13)	Thru Bolt Package (14)
ALU-8403,R	ALE-2008AB	ALE-1054A	XA-944JS	90-2030	ALU-1062A	GR-32	ALA-20GS
ALU-8403LS,RS	"	"	"	"	"	"	"
ALU-8421,R	"	"	"	"	"	"	"
ALU-8421LS,RS	"	"	"	"	"	"	"
ALU-9404L,R	"	"	"	90-2043	- - - -	"	"
ALU-9422L,R	"	"	"	"	- - - -	"	"

ALU SERIES ALTERNATOR PARTS LIST

ISSUED:2-27-75(Rev.)

SHEET 3

Assembly	Eyelet Package (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent. Fan (2 Pc.) (18)	Drive Pulley (19)	Regulator (20)	
ALU-8403,R	90-818	90-33	ALD-21	90-2241	PU-672A	VSF-7403S	
ALU-8403LS,RS	"	"	"	"	- - - -	"	
ALU-8421,R	"	"	"	"	PU-672A	"	
ALU-8421LS,RS	"	"	"	"	- - - -	"	
ALU-9404L,R	"	8X-4075[f]	ALU-23[e]	- - - -	- - - -	"	
ALU-9422L,R	"	"	"	- - - -	- - - -	"	

[d] Contents of S.R.E. Head & Rotor Pkg.

S.R.E.Head & Rotor Pkg.	90-2397	90-2398
Bearing Pkg.	90-2014	90-2014
Head Assy.,S.R.E.	ALK-1132AS-1	ALE-1142AAS-1
Rotor	ALU-2128S-1	ALU-2138S-1

[e] XA-744AZ Shaft Spacer O-Ring also available.
[f] Nut only; Washer not required.





prestolite[®]

SERVICE INFORMATION

ALU

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 3

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	24	<u>RATED OUTPUT</u>	70 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly, and bench testing are contained in the service publications in the front of the Alternator Section. Refer to the following service publication when detailed service information is required.

<u>ALTERNATOR SERIES</u>	<u>SERVICE PUBLICATION</u>
ALU 6400 - 8400	L-655A
ALU 9400	L-663

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALU series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.



ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 10.5 to 12.5 ohms.

ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 24.0 volts - 1.9 to 2.3 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.

The 9400 series alternators are cooled entirely by air pressure through a hose type connection on the drive end head. When bench testing this type of alternator, make output tests as short as possible unless adequate air pressure for cooling is supplied.



prestolite[®]

SERVICE INFORMATION

ALU

AIRCRAFT ALTERNATORS

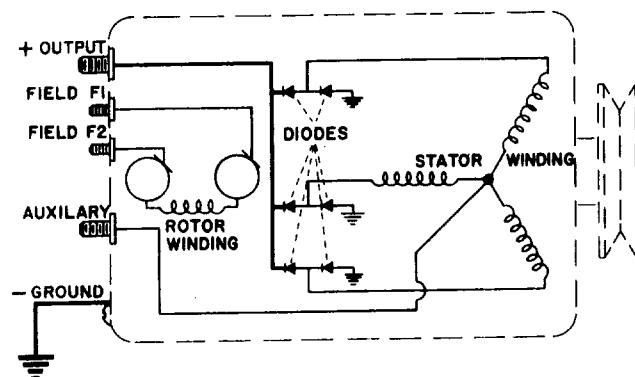
Issued: 4/1/83

Page 3 of 3

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALU 6400, 8400	28.0	23.0	4000
	28.0	61.0	8000
ALU 9400	28.0	21.0	4000
	28.0	60.0	8000

Alternator	Approx. Weight	Orig. Equip. Regulator	Replacement Regulator
ALU-6404	11 Lb. 12 Oz.	VSF-7404	VSF-7403S
ALU-8401	12 Lb. 2 Oz.	VSF-7401	VSF-7403S
ALU-8403, LS, R, RS, S	12 Lb. 2 Oz.	VSF-7403	VSF-7403S
ALU-8421, LS, R, RS, S	12 Lb. 2 Oz.	VSF-7403	VSF-7403S
ALU-9404, L, R	11 Lb. 6 Oz.	VSF-7403	VSF-7403S
ALU-9422, L, R	11 Lb. 6 Oz.	VSF-7403	VSF-7403S



Internal Wiring Diagram

File in the
OE-A1 AIRCRAFT MANUAL



Tech.
Data

ALTERNATORS



prestolite®

SERVICE PARTS LIST

ALV SERIES

ALTERNATORS

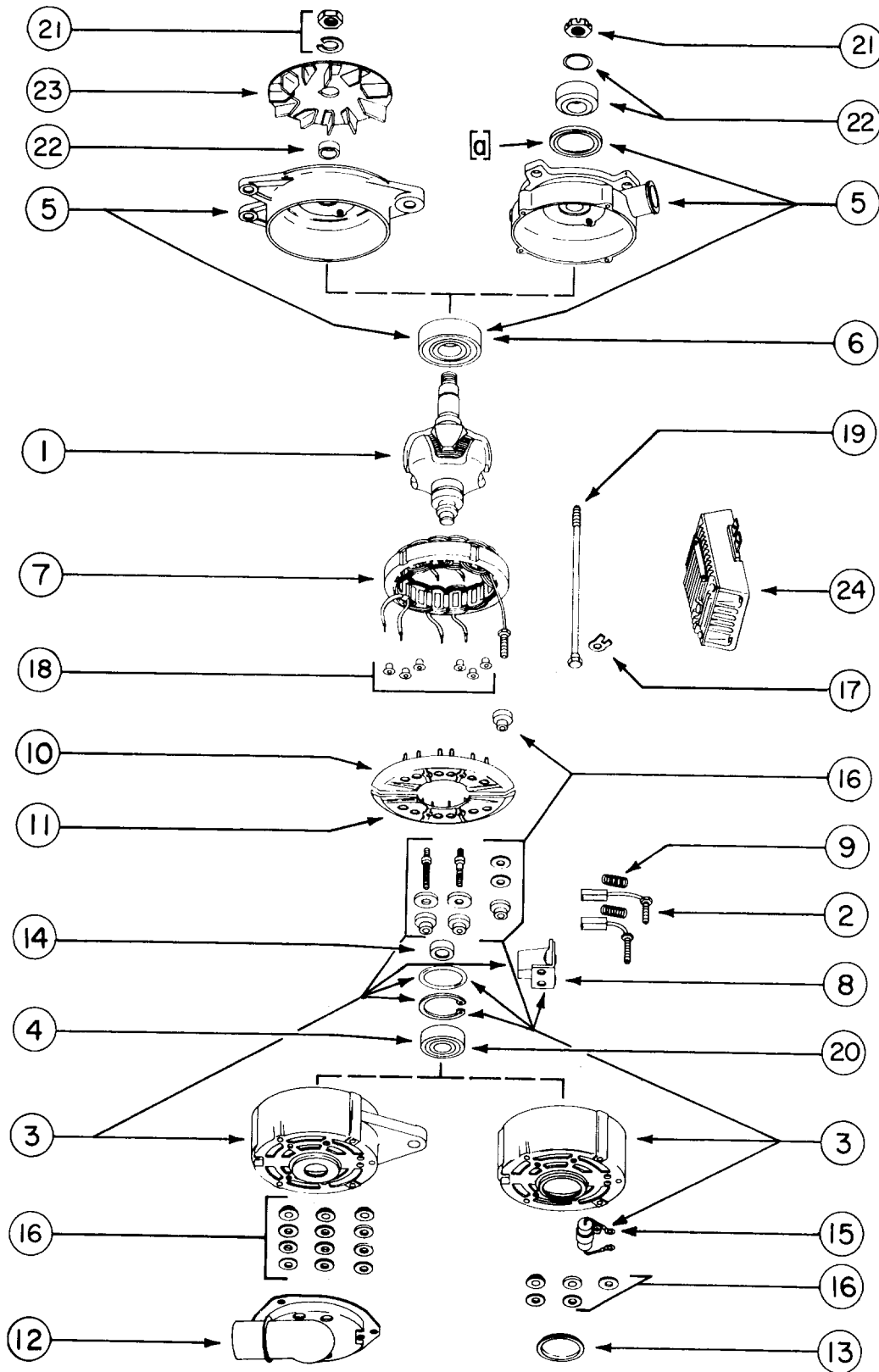
ISSUED: 11-10-82 (Rev.)

<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-24</u>
<u>PART NUMBER</u>		<u>PART NUMBER</u>	<u>APPLICATION</u>
ALV-6403LS	USE	ALV-8512R	Lycoming
ALV-6403RS	USE	ALV-8512R	Service Alternator
ALV-8402	USE	ALV-8511R	Teledyne Cont., Service
ALV-8402L	USE	ALV-8511R	Lycoming
ALV-8511	USE	ALV-8511R	Lycoming
ALV-8511R		ALV-8511R	Service Alternator
ALV-8512	USE	ALV-8512R	Lycoming
ALV-8512R		ALV-8512R	Service Alternator
ALV-9401	USE	ALV-9510R	Teledyne Cont.
ALV-9401L	USE	ALV-9510R	Lycoming
ALV-9401R	USE	ALV-9510R	Service Alternator
ALV-9405L	USE	ALV-9405R	Lycoming
ALV-9405R		ALV-9405R	Service Alternator
ALV-9406L	USE	ALV-9406R	Lycoming
ALV-9406R		ALV-9406R	Service Alternator
ALV-9407	USE	ALV-9510R	Teledyne Cont.
ALV-9407S	USE	ALV-9510R	Service Alternator
ALV-9510	USE	ALV-9510R	- - -
ALV-9510L	USE	ALV-9510R	Lycoming
ALV-9510R		ALV-9510R	Service Alternator

NOTE: SEE TABLE FOR ALTERNATOR BEING SERVICED
WHEN COMPONENT PARTS ARE REQUIRED.



ALV Series Alternator Parts List



Exploded View of Typical ALV Alternator

ALV SERIES ALTERNATOR PARTS LIST

ISSUED: 11-10-82 (REV.)

SHEET 2

Assembly	Rotor Assembly ①	Brush Set ②	Slip Ring End Head Assembly ③	S.R.E. Bearing ④	Drive End Head Assembly ⑤	D.E. Bearing ⑥	Stator Assembly ⑦
ALV-6403LS	ALV-2026AS	ALV-1012S	ALV-1022S	X-4087	ALB-2003A	X-4086	ALV-2008AS
ALV-6403RS	"	"	"	"	"	"	"
ALV-8402	"	"	"	"	"	"	"
ALV-8402L	"	"	"	"	"	"	"
ALV-8511	"	"	ALV-1022BS	X-3626A	ALB-2003B	"	"
ALV-8511R	"	"	"	"	"	"	"
ALV-8512	"	"	"	"	"	"	"
ALV-8512R	"	"	"	"	"	"	"
ALV-9401	ALV-2006AS	"	ALV-1002S	X-4087	ALV-1003[a]	"	"
ALV-9401L	"	"	"	"	"	"	"
ALV-9401R	"	"	"	"	"	"	"
ALV-9405L	"	"	"	"	ALV-1003A[a]	"	"
ALV-9405R	"	"	"	"	"	"	"
ALV-9406L	"	"	"	"	ALV-1003[a]	"	"
ALV-9406R	"	"	"	"	"	"	"
ALV-9407	"	"	ALV-1002AS	"	"	"	"
ALV-9407S	"	"	"	"	"	"	"
ALV-9510	"	"	ALV-1102AS	X-3626A	ALV-1003[a]	"	"
ALV-9510L	"	"	"	"	"	"	"
ALV-9510R	"	"	"	"	"	"	"

[a] XA-1441 D.E. Oil Seal also available.



ALV SERIES ALTERNATOR PARTS LIST

Assembly	Br. Holder & Bkt. Assembly (8)	Brush Spring Set (9)	Pos. Rect. & Plate Assembly (10)	Neg. Rect. & Plate Assembly (11)	Vent. Cover Assembly (12)	S.R.E. Bearing Cover (13)	S.R.E. Retainer (14) [b]
ALV-6403LS	ALV-1015	AMA-19S	ALV-1004	ALV-1004A	[NR]	GJT-47	GR-32
ALV-6403RS	"	"	"	"	[NR]	"	"
ALV-8402	"	"	"	"	ALV-1031	"	"
ALV-8402L	"	"	"	"	"	"	"
ALV-8511	"	"	"	"	"	"	[NR]
ALV-8511R	"	"	"	"	"	"	[NR]
ALV-8512	"	"	"	"	[NR]	"	[NR]
ALV-8512R	"	"	"	"	[NR]	"	[NR]
ALV-9401	"	"	"	"	[NR]	"	GR-32
ALV-9401L	"	"	"	"	[NR]	"	"
ALV-9401R	"	"	"	"	[NR]	"	"
ALV-9405L	"	"	"	"	[NR]	"	"
ALV-9405R	"	"	"	"	[NR]	"	"
ALV-9406L	"	"	"	"	ALV-1031	"	"
ALV-9406R	"	"	"	"	"	"	"
ALV-9407	"	"	"	"	[NR]	"	"
ALV-9407S	"	"	"	"	[NR]	"	"
ALV-9510	"	"	"	"	[NR]	"	[NR]
ALV-9510L	"	"	"	"	[NR]	"	[NR]
ALV-9510R	"	"	"	"	[NR]	"	[NR]

[b] Used only on Early Production units having Snap Ring at Slip Ring End of Rotor Shaft.
 [NR] Not required.

Assembly	Capacitor Assembly (15)	Term. Stud Package (16)	Lock Tab Package (17)	Eyelet Package (18)	Thru Bolt Package (19)	Bearing O Ring Seal (20)	Nut & Washer Package (21)
ALV-6403LS	[NR]	90-2040	MES-98S	90-818	ALB-20AS	XA-744AB	90-33
ALV-6403RS	[NR]	"	"	"	"	"	"
ALV-8402	[NR]	"	"	"	"	"	"
ALV-8402L	[NR]	"	"	"	"	"	"
ALV-8511	[NR]	"	"	"	"	XA-1540S	"
ALV-8511R	[NR]	"	"	"	"	"	"
ALV-8512	[NR]	"	"	"	"	"	"
ALV-8512R	[NR]	"	"	"	"	"	"
ALV-9401	[NR]	90-2046	"	"	ALB-20AS-1	XA-744AB	8X-4075[c]
ALV-9401L	[NR]	"	"	"	"	"	"
ALV-9401R	[NR]	"	"	"	"	"	"
ALV-9405L	[NR]	"	"	"	"	"	"
ALV-9405R	[NR]	"	"	"	"	"	"
ALV-9406L	[NR]	90-2040	"	"	"	"	"
ALV-9406R	[NR]	"	"	"	"	"	"
ALV-9407	ALV-1038S	90-2046	"	"	"	"	"
ALV-9407S	"	"	"	"	"	"	"
ALV-9510	ALV-1038S	"	"	"	"	XA-1540S	"
ALV-9510L	"	"	"	"	"	"	"
ALV-9510R	"	"	"	"	"	"	"

[c] Nut only; Washer not required.
 [NR] Not required.



ALV SERIES ALTERNATOR PARTS LIST

Assembly	Rotor Shaft Spacer (22)	Vent. Fan (23)	Regulator (24)	
ALV-6403LS	ALB-21 *	PU-1609A	VSF-7403S	
ALV-6403RS	"	"	"	
ALV-8402	"	"	"	
ALV-8402L	"	"	"	
ALV-8511	"	"	"	
ALV-8511R	"	"	"	
ALV-8512	"	"	"	
ALV-8512R	"	"	"	
ALV-9401	ALV-21[d] *	[NR]	"	
ALV-9401L	"	[NR]	"	
ALV-9401R	"	[NR]	"	
ALV-9405L	"	[NR]	"	
ALV-9405R	"	[NR]	"	
ALV-9406L	"	[NR]	"	
ALV-9406R	"	[NR]	"	
ALV-9407	"	[NR]	"	
ALV-9407S	"	[NR]	"	
ALV-9510	90-2822[e]	[NR]	"	
ALV-9510L	"	[NR]	"	
ALV-9510R	"	[NR]	"	

* Spacer only.

[d] XA-744AZ Shaft Spacer O-Ring Seal is also available.

[e] Includes XA-744AZ Shaft Spacer O-Ring Seal.

[NR] Not required.



prestolite[®]

SERVICE INFORMATION

ALV

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 3

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	24	<u>RATED OUTPUT</u>	100 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Insulated System
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedure covering disassembly, component testing, component replacement, assembly, and bench testing, are contained in the service publications in the front of the Alternator Section. Refer to the following service publications when detailed service information is required.

<u>ALTERNATOR SERIES</u>	<u>SERVICE PUBLICATION</u>
ALV-6400 - 8400	L-664
ALV-9400	L-670
ALV-9500	L-680

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALV series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 45 Ft. Lbs. maximum.

DRIVE GEAR Torque the drive gear retaining nut to 37 Ft. Lbs. minimum to 42 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as a 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.



ROTOR OHMMETER TEST CONDITIONS CONT'D.

4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.

ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 9.9 to 11.8 ohms.

ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 24.0 volts - 2.03 to 2.42 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.

The 9400 and 9500 series alternators are cooled entirely by air pressure through a hose type connection on the drive end head. When bench testing this type of alternator, make output tests as short as possible unless adequate air pressure for cooling is supplied.



prestolite

SERVICE INFORMATION

ALV

AIRCRAFT ALTERNATORS

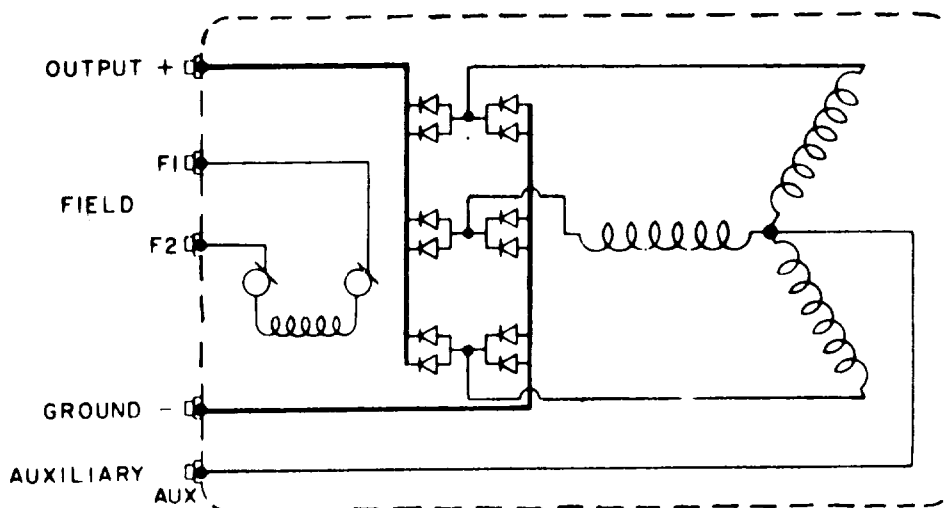
Issued: 4/1/83

Page 3 of 3

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALV 6400-8400-8500	28.0	53.0	3000
	28.0	88.0	6000
ALV 9400 & 9500	28.0	48.0	3000
	28.0	83.0	6000

Alternator	Approx. Weight	Orig. Equip. Regulator	Replacement Regulator
ALV-6403LS, RS	20 Lb.	VSF-7403	VSF-7403S
ALV-6404	20 Lb.	VSF-7404	VSF-7403S
ALV-8402, L	21 Lb.	VSF-7403 or 7404	VSF-7403S
ALV-8511, R	21 Lb.	VSF-7403	VSF-7403S
ALV-8512, R	20 Lb.	VSF-7403	VSF-7403S
ALV-9401, L, R	21 Lb. 10 Oz.	VSF-7403 or 7404	VSF-7403S
ALV-9405L, R	21 Lb. 10 Oz.	VSF-7403	VSF-7403S
ALV-9406L, R	22 Lb. 10 Oz.	VSF-7403	VSF-7403S
ALV-9407, S	21 Lb. 10 Oz.	VSF-7404	VSF-7403S
ALV-9510, L, R	21 Lb. 10 Oz.	VSF-7403 or 7404	VSF-7403S



Internal Wiring Diagram

File in the
OE-A1 AIRCRAFT MANUAL



Tech.
Data

ALTERNATORS

**prestolite®****SERVICE PARTS LIST****ALX SERIES**

ALTERNATOR

ISSUED:10-19-79 (Rev.)

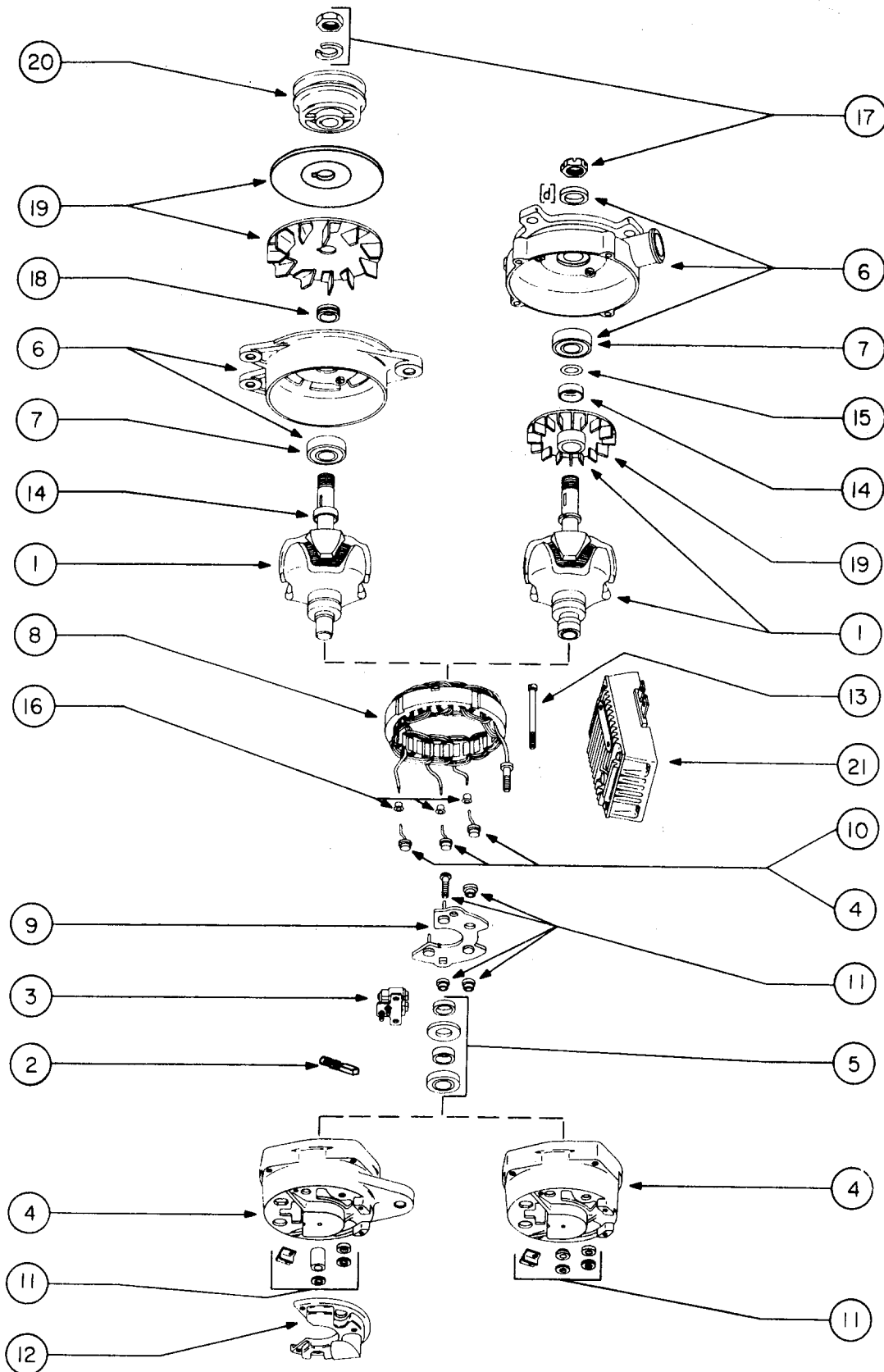
<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-12</u>
<u>ENG. NUMBER</u>		<u>ENG. NUMBER</u>	<u>APPLICATION</u>
ALX-6408	USE	ALX-6423	Teledyne Continental
ALX-6423		ALX-6423	Teledyne Continental
ALX-8403	USE	ALX-8421R	Lycoming
ALX-8403G	USE	ALX-8421R	Lycoming
ALX-8403LS	USE	ALX-8421RS	Lycoming
ALX-8403LSG	USE	ALX-8421RS	Lycoming
ALX-8403R	USE	ALX-8421R	Service
ALX-8403RG	USE	ALX-8421R	Service
ALX-8403RS	USE	ALX-8421RS	Service
ALX-8403RSG	USE	ALX-8421RS	Service
ALX-8421	USE	ALX-8421R	Lycoming
ALX-8421G	USE	ALX-8421R	Lycoming
ALX-8421LS	USE	ALX-8421RS	Lycoming
ALX-8421LSG	USE	ALX-8421RS	Lycoming
ALX-8421R		ALX-8421R	Service
ALX-8421RG	USE	ALX-8421R	Service
ALX-8421RS		ALX-8421RS	Service
ALX-8421RSG	USE	ALX-8421RS	Service
ALX-9402	USE	ALX-9425B	Teledyne Continental
ALX-9404L	USE	ALX-9422R	Lycoming
ALX-9404LG	USE	ALX-9422R	Lycoming
ALX-9404R	USE	ALX-9422R	Service
ALX-9404RG	USE	ALX-9422R	Service
ALX-9405	USE	ALX-9424	Teledyne Continental
ALX-9422L	USE	ALX-9422R	Lycoming
ALX-9422LG	USE	ALX-9422R	Lycoming
ALX-9422R		ALX-9422R	Service
ALX-9422RG	USE	ALX-9422R	Service
ALX-9424		ALX-9424	Teledyne Continental
ALX-9425	USE	ALX-9425B	Teledyne Continental
ALX-9425A	USE	ALX-9425B	Teledyne Continental
ALX-9425B		ALX-9425B	Teledyne Continental



File in the
OE-A1 AIRCRAFT MANUAL

**ALTERNATOR SECTION**

ALX Series Alternator Parts List



Exploded View of Typical ALX Alternator

Assembly	Rotor Assembly (1)	Brush Set (2)	Brush, Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing & Seal Pkg. (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALX-6408	90-2399[e]	ALE-1013AS	ALU-1045BS	90-2399[e]	90-2014[a]	ALE-1003R	X-3416
ALX-6423	ALH-2128S-1	"	"	ALK-1132AS-1	"	"	"
ALX-8403,R	90-2399[e]	[c]	ALU-1045BS[c]	90-2399[e]	"	ALE-1003K	"
ALX-8403G,RG	"	[c]	"	"	"	"	"
ALX-8403LS,RS	"	[c]	"	"	"	"	"
ALX-8403LSG	"	[c]	"	"	"	"	"
ALX-8403RSG	"	[c]	"	"	"	"	"
ALX-8421,R	ALH-2128S-1	ALE-1013AS	ALU-1045BS	ALK-1132AS-1	"	"	"
ALX-8421G,RG	"	"	"	"	"	"	"
ALX-8421LS,RS	"	"	"	"	"	"	"
ALX-8421LSG	"	"	"	"	"	"	"
ALX-8421RSG	"	"	"	"	"	"	"
ALX-9402	90-2409[e]	"	"	90-2409[e]	"	ALU-1003	"
ALX-9404L,R	90-2400[e]	[c]	ALU-1045BS[c]	90-2400[e]	"	ALU-1043[d]	X-4087
ALX-9404LG,RG	"	[c]	"	"	"	"	"
ALX-9405	90-2401[e]	[c]	"	90-2401[e]	"	"	"
ALX-9422L,R	ALH-2138S-1	ALE-1013AS	ALU-1045BS	ALE-1142AAS-1	"	"	"
ALX-9422LG,RG	"	"	"	"	"	"	"
ALX-9424	ALX-2138S-1	"	"	"	"	"	"
ALX-9425	ALH-2206S-1[b]	"	"	"	"	ALU-1003	X-5398
ALX-9425A	"	"	"	"	"	"	"
ALX-9425B	"	"	"	"	"	"	"

[a] Bearing & Seal Pkg. also included with Rotor & S.R.E. Head Assy.

[b] Rotor, Bearing & Fan Assembly.

[c] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.

[d] XA-1026 D.E. Oil Seal also individually available if required.

[e] S.R.E. Head & Rotor Pkg. Complete Package must be used at time of first repair. Individual Components (See Sheet #3 for Contents of Pkg.) may be replaced thereafter.

[*] GJC-49BS Cover Pkg. (10 Pc.) Also available.



ALX SERIES ALTERNATOR PARTS LIST

Assembly	Stator Assembly (8)	Pos. Rect. & Plate Assembly (9)	Negative Rectifier (Pkg. of 3) (10)	Term. Stud Package (11)	S.R.E. Cover (12)	Thru Bolt Package (13)	D.E. Retainer (14)
ALX-6408	ALE-2008AB	ALE-1054A	XA-944JS	90-2043	[NA]	ALA-20GS	GR-32
ALX-6423	"	"	"	"	[NA]	"	"
ALX-8403,R	"	"	"	90-2030	ALU-1062A	"	"
ALX-8403G, RG	"	"	"	"	"	"	"
ALX-8403LS, RS	"	"	"	"	"	"	"
ALX-8403LSG	"	"	"	"	"	"	"
ALX-8403RSG	"	"	"	"	"	"	"
ALX-8421,R	"	"	"	"	"	"	"
ALX-8421G, RG	"	"	"	"	"	"	"
ALX-8421LS, RS	"	"	"	"	"	"	"
ALX-8421LSG	"	"	"	"	"	"	"
ALX-8421RSG	"	"	"	"	"	"	"
ALX-9402	"	"	"	90-2043	ALX-1062S	"	"
ALX-9404L,R	"	"	"	"	[NA]	"	"
ALX-9404LG, RG	"	"	"	"	[NA]	"	"
ALX-9405	"	"	"	"	[NA]	"	"
ALX-9422L,R	"	"	"	"	[NA]	"	"
ALX-9422LG, RG	"	"	"	"	[NA]	"	"
ALX-9424	"	"	"	"	[NA]	"	"
ALX-9425	"	"	"	"	ALX-1062S	"	"
ALX-9425A	"	"	"	"	"	"	"
ALX-9425B	"	"	"	"	"	"	"

[NA] Not Available.

ALX SERIES ALTERNATOR PARTS LIST

ISSUED: 10-19-79(Rev.) SHEET 3

Assembly	"O" Ring Seal (15)	Eyelet Package (16)	Nut & Washer Package (17)	Rotor Shaft Spacer (18)	Vent Fan (19)	Drive Pulley (20)	Regulator (21)
ALX-6408	[NA]	90-818	90-33	ALC-21F	90-2259[f]	[NA]	VSF-7203S
ALX-6423	[NA]	"	"	"	"	[NA]	"
ALX-8403,R	[NA]	"	"	ALD-21	90-2241[f]	PU-672A	"
ALX-8403G,RG	[NA]	"	"	"	"	"	FVR-4011A
ALX-8403LS,RS	[NA]	"	"	"	"	[NA]	VSF-7203S
ALX-8403LSG	[NA]	"	"	"	"	[NA]	FVR-4011A
ALX-9403RSG	[NA]	"	"	"	"	[NA]	"
ALX-8421,R	[NA]	"	"	"	"	PU-672A	VSF-7203S
ALX-8421G,RG	[NA]	"	"	"	"	"	FVR-4011A
ALX-8421LS,RS	[NA]	"	"	"	"	[NA]	VSF-7203S
ALX-8421LSG	[NA]	"	"	"	"	[NA]	FVR-4011A
ALX-8421RSG	[NA]	"	"	"	"	[NA]	"
ALX-9402	[NA]	"	[NA]	[NA]	ALP-1034[g]	[NA]	VSF-7204
ALX-9404L,R	XA-744AZ	"	8X-4075[h]	ALU-23	[NA]	[NA]	VSF-7203S
ALX-9404LG,RG	"	"	"	"	[NA]	[NA]	FVR-4011A
ALX-9405	"	"	"	"	ALP-1034[g]	[NA]	VSF-7203S
ALX-9422L,R	"	"	"	"	[NA]	[NA]	"
ALX-9422LG,RG	"	"	"	"	[NA]	[NA]	FVR-4011A
ALX-9424	"	"	"	"	ALP-1034[g]	[NA]	VSF-7203S
ALX-9425	[NA]	"	[NA]	[NA]	"	[NA]	"
ALX-9425A	[NA]	"	[NA]	[NA]	"	[NA]	"
ALX-9425B	[NA]	"	[NA]	[NA]	"	[NA]	"

[e] Contents of S.R.E. Head & Rotor Pkg.

S. R. E. Head & Rotor Pkg.	90-2399	90-2400	90-2401	90-2409
Bearing Pkg.	90-2014	90-2014	90-2014	90-2014
Head Assy., S.R.E.	ALK-1132AS-1	ALE-1142AAS-1	ALE-1142AAS-1	ALE-1142AAS-1
Rotor	ALH-2128S-1	ALH-2138S-1	ALX-2138S-1	ALH-2206S-1

[NA] Not Available.

[f] Two(2) Piece Fan Assy.

[g] Also included with Rotor.

[h] Nut only; Washer not required.





prestolite[®]

SERVICE INFORMATION

ALX

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 4

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	12	<u>RATED OUTPUT</u>	70 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly and bench testing are contained in the service publications in the front of the Alternator Section. Refer to the following service publication when detailed service information is required.

<u>ALTERNATOR SERIES</u>	<u>SERVICE PUBLICATION</u>
ALX 6400 - 8400	L-655A
ALX 9400	L-663

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALX series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.

ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 3.5 to 5.0 ohms.



ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 12.0 volts - 2.4 to 4.0 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.

The 9400 series alternators are cooled entirely by air pressure through a hose type connection on the drive end head. When bench testing this type of alternator, make output tests as short as possible unless adequate air pressure for cooling is supplied.

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALX 6400-8400	14.0	33.0	3000
and 9400	14.0	57.0	6000



prestolite[®]

SERVICE INFORMATION

ALX

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 3 of 4

Alternator	Approx. Weight	Orig. Equip. Regulator	Replacement Regulator
ALX 6406	11 Lb. 12 Oz.	VSF-7203S or VSF-7204	VSF-7203S
ALX 6408	11 Lb. 12 Oz.	VSF-7204	VSF-7203S
ALX 6423	11 Lb. 12 Oz.	VSF-7204	VSF-7203S
ALX 8403, LS, R, RS	12 Lb. 2 Oz.	VSF-7201 or VSF-7203	VSF-7203S
*ALX 8403G, LSG, RG, RSG	12 Lb. 2 Oz.	FVR-4004+	FVR-4011+
ALX 8421, LS, R, RS	12 Lb. 2 Oz.	VSF-7201 or VSF-7203	VSF-7203S
*ALX 8421G, LSG, RG, RSG	12 Lb. 2 Oz.	FVR-4004+	FVR-4011+
ALX 9402	11 Lb. 6 Oz.	VSF-7204	VSF-7203S
ALX 9404L, R	11 Lb. 6 Oz.	VSF-7201 or VSF-7203	VSF-7203S
*ALX 9404LG, RG	11 Lb. 6 Oz.	FVR-4004+	FVR-4011+
ALX 9405	11 Lb. 6 Oz.	VSF-7203 or VSF-7204	VSF-7203S
ALX 9422L, R	11 Lb. 6 Oz.	VSF-7203	VSF-7203S
*ALX 9422LG, RG	11 Lb. 6 Oz.	FVR-4004+	FVR-4011+
ALX 9424	11 Lb. 6 Oz.	VSF-7204	VSF-7203S
ALX 9425, A, B	11 Lb. 6 Oz.	VSF-7204	VSF-7203S

* Internal wiring same as shown. Field terminal F-2 externally grounded with a strap connector. Lycoming applications only.

+ Wico - Prestolite part number.



ALX

AIRCRAFT ALTERNATORS

Issued: 4/1/83

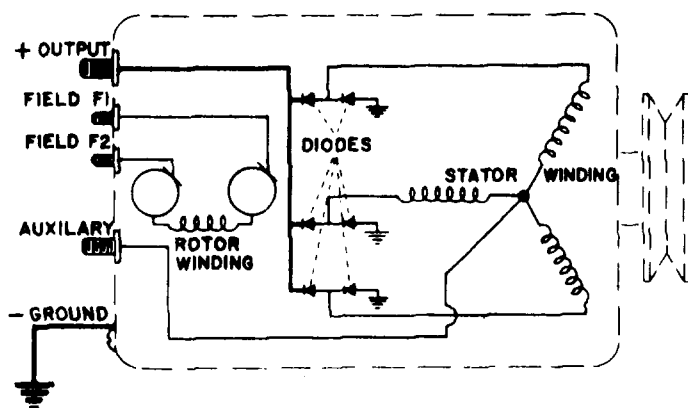
Page 4 of 4



prestolite.

SERVICE

INFORMATION



Internal Wiring Diagram



prestolite®

SERVICE PARTS LIST

ALY-6403 to 6427RG

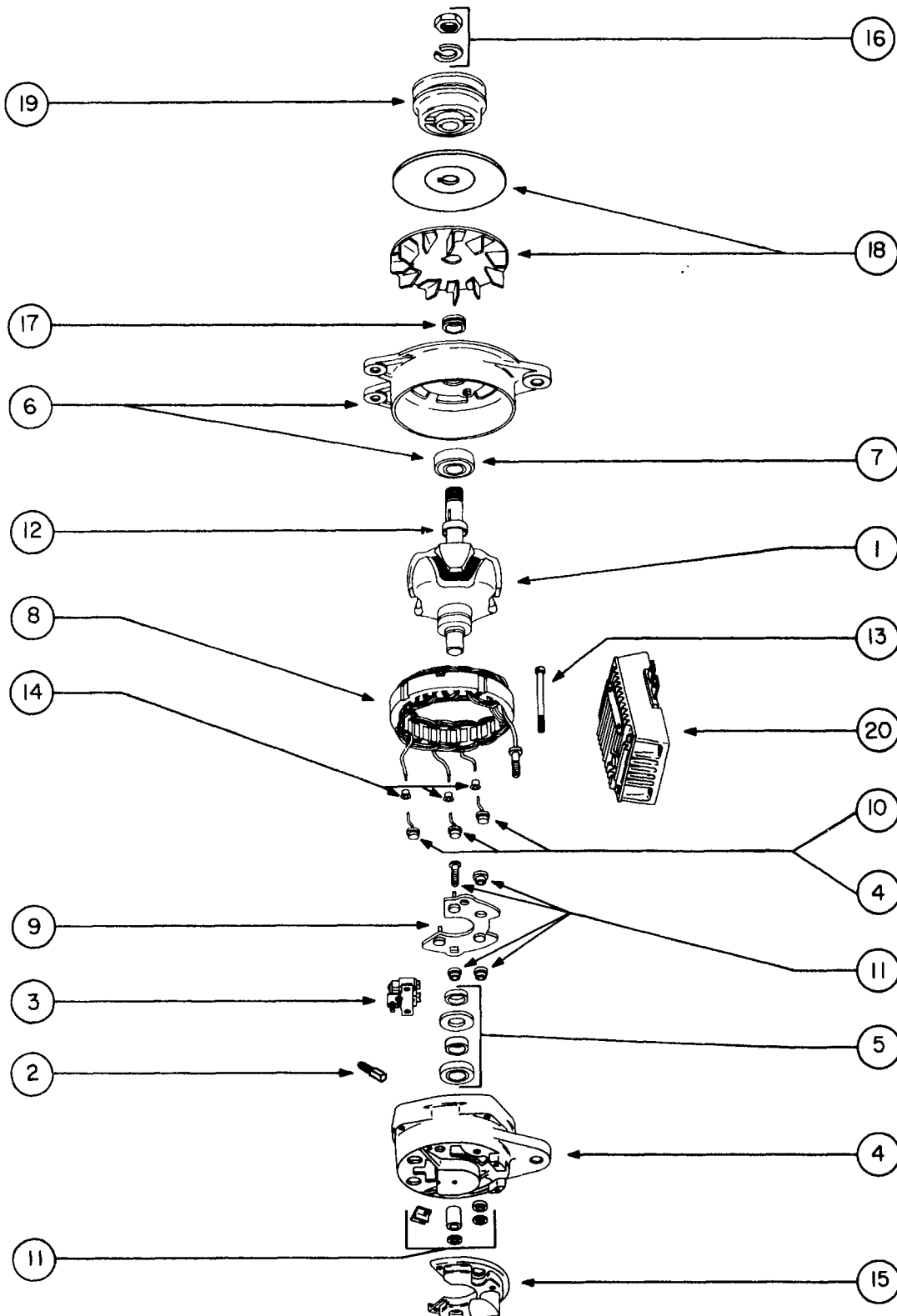
ALTERNATOR

ISSUED: 3-3-75(Rev.)

<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-12</u>
<u>ENG. NUMBER</u>		<u>ENG. NUMBER</u>	<u>APPLICATION</u>
ALY-6403	USE	ALY-6420R	Lycoming
ALY-6403G	USE	ALY-6420R	Lycoming
ALY-6403R	USE	ALY-6420R	Service
ALY-6403RG	USE	ALY-6420R	Service
ALY-6406	USE	ALY-6406R	Lycoming
ALY-6406G	USE	ALY-6406R	Lycoming
ALY-6406R		ALY-6406R	Service
ALY-6406RG	USE	ALY-6406R	Service
ALY-6408	USE	ALY-6421	Piper
ALY-6409	USE	ALY-6422	Piper
ALY-6412	USE	ALY-6425	Teledyne Continental
ALY-6420	USE	ALY-6420R	Lycoming
ALY-6420G	USE	ALY-6420R	Lycoming
ALY-6420R		ALY-6420R	Service
ALY-6420RG	USE	ALY-6420R	Service
ALY-6421		ALY-6421	Piper
ALY-6422		ALY-6422	Piper
ALY-6425		ALY-6425	Teledyne Continental
ALY-6427	USE	ALY-6427R	Lycoming
ALY-6427G	USE	ALY-6427R	Lycoming
ALY-6427R		ALY-6427R	Service
ALY-6427RG	USE	ALY-6427R	Service



ALY-6403 to 6427RG Alternator Parts List



Exploded View of Typical ALY Alternator

Assembly	Rotor Assembly (1)	Brush Set (2)	Br., Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing & Seal Pkg. (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALY-6403,R	90-2396[c]	ALE-1013AS	ALU-1045BS	90-2396[c]	90-2014[a]	ALE-1003K	X-3416
ALY-6403G,RG	"	"	"	"	"	"	"
ALY-6406,R	"	[b]	ALU-1045BS[b]	"	"	"	"
ALY-6406G,RG	"	[b]	"	"	"	"	"
ALY-6408	"	[b]	ALE-1045BS[b]	"	"	"	"
ALY-6409	90-2402[c]	[b]	"	90-2402[c]	"	"	"
ALY-6412	90-2396[c]	[b]	ALU-1045BS[b]	90-2396[c]	"	ALE-1003R	"
ALY-6420,R	ALE-2173S-1	ALE-1013AS	ALU-1045BS	ALK-1132BS-1	"	ALE-1003K	"
ALY-6420G,RG	"	"	"	"	"	"	"
ALY-6421	"	"	ALE-1045BS	"	"	"	"
ALY-6422	ALE-2177S-1	"	"	"	"	"	"
ALY-6425	ALE-2173S-1	"	ALU-1045BS	"	"	ALE-1003R	"
ALY-6427,R	"	"	"	"	"	ALE-1003K	"
ALY-6427G,RG	"	"	"	"	"	"	"

- [*] 35-781 (GJC-49BS) Cover Pkg. (10 Pcs.) Also available.
[a] Bearing & Seal Pkg. also included with Rotor & S.R.E.Hd. Assy.
[b] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.
[c] S.R.E.Head & Rotor Pkg. complete Package must be used at time of first repair. Individual Components(See Sheet #3 for contents of Pkg.) may be replaced thereafter.



ALY-6403 TO 6427RG ALTERNATOR PARTS LIST

Assembly	Stator Assembly ⑧	Pos.Rect. & Plate Assembly ⑨	Negative Rectifier (Pkg.of 3) ⑩	Terminal Stud Package ⑪	D.E. Retainer ⑫	Thru Bolt Package ⑬	Eyelet Package ⑭
ALY-6403,R	ALE-2008AE	ALE-1054A	XA-944JS	90-2030	GR-32	ALA-20JS	90-818
ALY-6403G,RG	"	"	"	"	"	"	"
ALY-6406,R	"	"	"	"	"	"	"
ALY-6406G,RG	"	"	"	"	"	"	"
ALY-6408	"	"	"	90-2043	"	"	"
ALY-6409	"	"	"	"	"	"	"
ALY-6412	"	"	"	"	"	"	"
ALY-6420,R	"	"	"	90-2030	"	"	"
ALY-6420G,RG	"	"	"	"	"	"	"
ALY-6421	"	"	"	90-2043	"	"	"
ALY-6422	"	"	"	"	"	"	"
ALY-6425	"	"	"	"	"	"	"
ALY-6427,R	"	"	"	90-2030	"	"	"
ALY-6427G,RG	"	"	"	"	"	"	"

Assembly	S.R.E. Cover (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent. Fan (2 Pc.) (18)	Drive Pulley (19)	Regulator (20)	
ALY-6403,R	[NA]	90-33	ALD-21	90-2241	PU-672A	VSF-7203S	
ALY-6403G,RG	[NA]	"	"	"	"	FVR-4011A	
ALY-6406,R	[NA]	"	"	"	PU-676A	VSF-7203S	
ALY-6406G,RG	[NA]	"	"	"	"	FVR-4011A	
ALY-6408	[NA]	"	"	"	PU-672A	FVR-4024	
ALY-6409	[NA]	"	ALD-21A	"	PU-692A	FVR-4324	
ALY-6412	[NA]	"	ALC-21F	90-2259	[NA]	VSF-7203S	
ALY-6420,R	[NA]	"	ALD-21	90-2241	PU-672A	VSF-7203S	
ALY-6420G,RG	[NA]	"	"	"	"	FVR-4011A	
ALY-6421	[NA]	"	"	"	"	FVR-4024	
ALY-6422	[NA]	"	ALD-21A	"	PU-692A	FVR-4324	
ALY-6425	[NA]	"	ALC-21F	90-2259	[NA]	VSF-7203S	
ALY-6427,R	[NA]	"	ALD-21	90-2241	PU-676A	VSF-7203S	
ALY-6427G,RG	[NA]	"	"	"	"	FVR-4011A	

[c] Contents of S.R.E. Head & Rotor Pkg.

S.R.E.Head & Rotor Pkg.	90-2396	90-2402
Bearing Pkg.	90-2014	90-2014
Head Assy.,S.R.E.	ALK-1132BS-1	ALK-1132BS-1
Rotor	ALE-2173S-1	ALE-2177S-1

[NA] Not Available.



**prestolite®****SERVICE PARTS LIST****ALY-8402 To 8426RG**

ALTERNATOR

ISSUED: 3-3-75(Rev.)

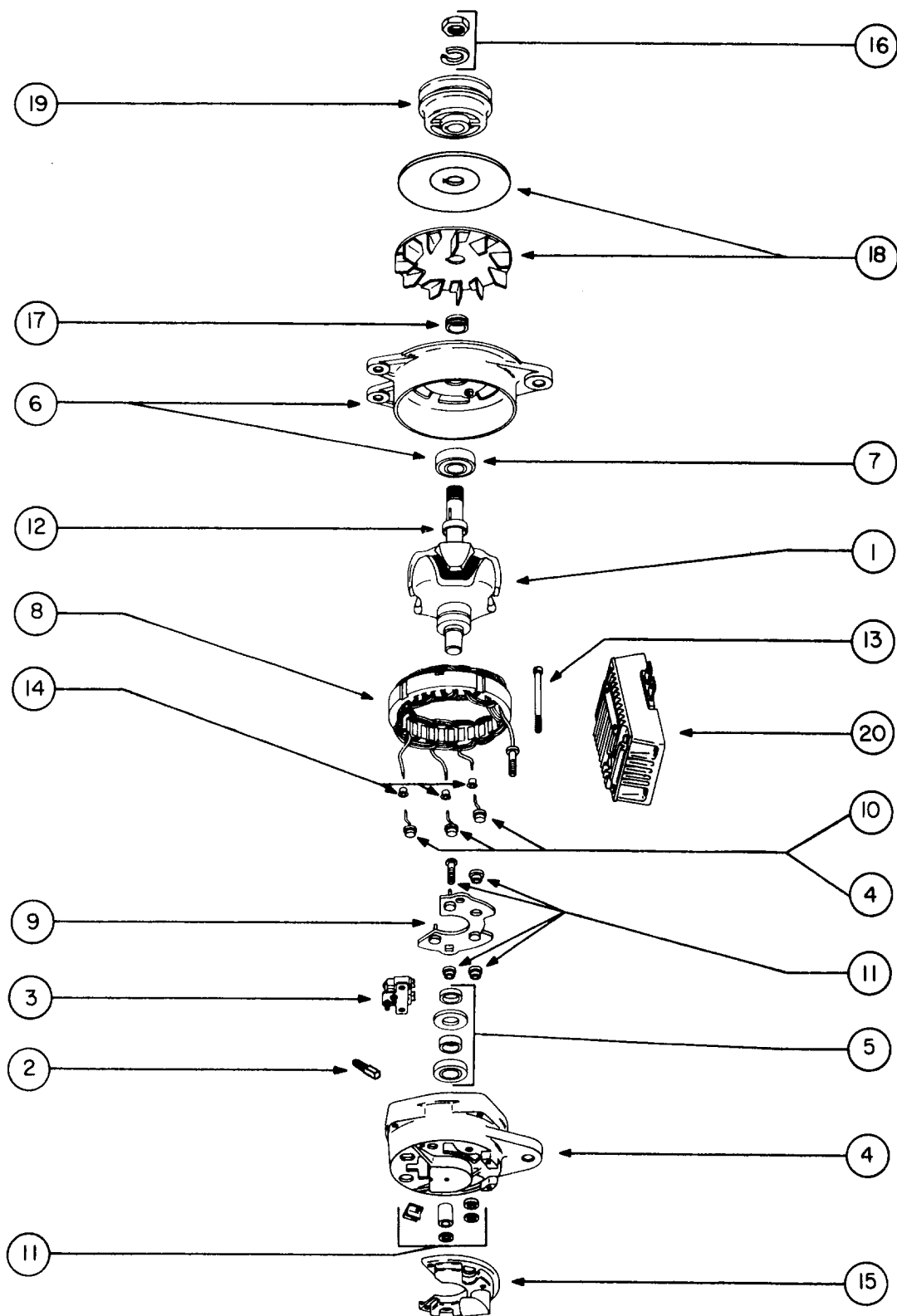
<u>ORIG. EQUIP. ALTERNATOR</u>		<u>SERVICE ALTERNATOR</u>	<u>VOLTS-12</u>
<u>ENG. NUMBER</u>		<u>ENG. NUMBER</u>	<u>APPLICATION</u>
ALY-8402	USE	ALY-8411	Teledyne Continental
ALY-8403	USE	ALY-8420R	Lycoming
ALY-8403G	USE	ALY-8420R	Lycoming
ALY-8403LS	USE	ALY-8403RS	Lycoming
ALY-8403LSG	USE	ALY-8403RS	Lycoming
ALY-8403R	USE	ALY-8420R	Service
ALY-8403RG	USE	ALY-8420R	Service
ALY-8403RS		ALY-8403RS	Service
ALY-8403RSG	USE	ALY-8403RS	Service
ALY-8405	USE	ALY-8426R	Lycoming
ALY-8405G	USE	ALY-8426R	Lycoming
ALY-8405R	USE	ALY-8426R	Service
ALY-8405RG	USE	ALY-8426R	Service
ALY-8410	USE	ALY-8423R	Lycoming
ALY-8410R	USE	ALY-8423R	Service
ALY-8411		ALY-8411	Teledyne Continental
ALY-8420	USE	ALY-8420R	Teledyne Continental
ALY-8420G	USE	ALY-8420R	Lycoming
ALY-8420LS	USE	ALY-8420RS	Lycoming
ALY-8420LSG	USE	ALY-8420RS	Lycoming
ALY-8420R		ALY-8420R	Service
ALY-8420RG	USE	ALY-8420R	Service
ALY-8420RS		ALY-8420RS	Service
ALY-8420RSG	USE	ALY-8420RS	Service
ALY-8423	USE	ALY-8423R	Lycoming
ALY-8423R		ALY-8423R	Service
ALY-8424		ALY-8424	Teledyne Continental
ALY-8426	USE	ALY-8426R	Lycoming
ALY-8426G	USE	ALY-8426R	Lycoming
ALY-8426R		ALY-8426R	Service
ALY-8426RG	USE	ALY-8426R	Service



File in the
OE-A1 AIRCRAFT MANUAL

**ALTERNATOR SECTION**

ALY-8402 to 8426RG Alternator Parts List



Exploded View of Typical ALY Alternator

Assembly	Rotor Assembly (1)	Brush Set (2)	Br., Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing & Seal Pkg. (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALY-8402	90-2396[c]	[b]	ALU-1045BS[b]	90-2396[c]	90-2014[a]	ALE-1003K	X-3416
ALY-8403,R	"	[b]	"	"	"	"	"
ALY-8403G,RG	"	[b]	"	"	"	"	"
ALY-8403LS,RS	"	[b]	"	"	"	"	"
ALY-8403LSG	"	[b]	"	"	"	"	"
ALY-8403RSG	"	[b]	"	"	"	"	"
ALY-8405,R	"	[b]	"	"	"	"	"
ALY-8405G,RG	"	[b]	"	"	"	"	"
ALY-8410,R	"	[b]	ALE-1045BS[b]	"	"	"	"
ALY-8411	"	[b]	ALU-1045BS	"	"	"	"
ALY-8420,R	ALE-2173S-1	ALE-1013AS	"	ALK-1132BS-1	"	"	"
ALY-8420G,RG	"	"	"	"	"	"	"
ALY-8420LS,RS	"	"	"	"	"	"	"
ALY-8420LSG	"	"	"	"	"	"	"
ALY-8420RSG	"	"	"	"	"	"	"
ALY-8423,R	"	"	ALE-1045BS	"	"	"	"
ALY-8424	"	"	ALU-1045BS	"	"	"	"
ALY-8426,R	"	"	"	"	"	"	"
ALY-8426G,RG	"	"	"	"	"	"	"

- [*] 35-781 (GJC-49BS) Cover Pkg. (10 Pcs.) Also available.
[a] Bearing & Seal Pkg. also included with Rotor & S.R.E.Hd.Assy.
[b] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy. if Brushes or Springs are required.
[c] S.R.E.Head & Rotor Pkg. Complete Package must be used at first repair. Individual components(See Sheet #3 for contents of Pkg.)may be replaced thereafter.



ALY-8402 TO 8426RG ALTERNATOR PARTS

Assembly	Stator Assembly (8)	Pos.Rect. & Plate Assembly (9)	Negative Rectifier (Pkg.of3) (10)	Terminal Stud Package (11)	D.E. Retainer (12)	Thru Bolt Package (13)	Eyelet Package (14)
ALY-8402	ALE-2008AE	ALE-1054A	XA-944JS	90-2043	GR-32	ALA-20JS	90-818
ALY-8403,R	"	"	"	90-2030	"	"	"
ALY-8403G,RG	"	"	"	"	"	"	"
ALY-8403LS,RS	"	"	"	"	"	"	"
ALY-8403LSG	"	"	"	"	"	"	"
ALY-8403RSG	"	"	"	"	"	"	"
ALY-8405,R	"	"	"	"	"	"	"
ALY-8405G,RG	"	"	"	"	"	"	"
ALY-8410,R	"	"	"	"	"	"	"
ALY-8411	"	"	"	90-2043	"	"	"
ALY-8420,R	"	"	"	90-2030	"	"	"
ALY-8420G,RG	"	"	"	"	"	"	"
ALY-8420LS,RS	"	"	"	"	"	"	"
ALY-8420LSG	"	"	"	"	"	"	"
ALY-8420RSG	"	"	"	"	"	"	"
ALY-8423,R	"	"	"	"	"	"	"
ALY-8424	"	"	"	90-2043	"	"	"
ALY-8426,R	"	"	"	90-2030	"	"	"
ALY-8426G,RG	"	"	"	"	"	"	"

Assembly	S.R.E. Cover (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent. Fan (2 Pc.) (18)	Drive Pulley (19)	Regulator (20)	
ALY-8402	ALU-1062	90-33	ALC-21F	90-2259	[NA]	VSF-7203S	
ALY-8403,R	ALU-1062A	"	ALD-21	90-2241	PU-672A	VSF-7203S	
ALY-8403G,RG	"	"	"	"	"	FVR-4011A	
ALY-8403LS,RS	"	"	"	"	[NA]	VSF-7203S	
ALY-8403LSG	"	"	"	"	[NA]	FVR-4011A	
ALY-8403RSG	"	"	"	"	[NA]	"	
ALY-8405,R	ALU-1062D	"	"	"	PU-672A	VSF-7203S	
ALY-8405G,RG	"	"	"	"	"	FVR-4011A	
ALY-8410,R	ALU-1062A	"	"	"	"	FVR-4324	
ALY-8411	ALU-1062	"	ALC-21F	90-2259	[NA]	VSF-7203S	
ALY-8420,R	ALU-1062A	"	ALD-21	90-2241	PU-672A	VSF-7203S	
ALY-8420G,RG	"	"	"	"	"	FVR-4011A	
ALY-8420LS,RS	"	"	"	"	[NA]	VSF-7203S	
ALY-8420LSG	"	"	"	"	[NA]	FVR-4011A	
ALY-8420RSG	"	"	"	"	[NA]	"	
ALY-8423,R	"	"	"	"	PU-672A	FVR-4324	
ALY-8424	ALU-1062	"	ALC-21F	90-2259	[NA]	VSF-7203S	
ALY-8426,R	ALU-1062D	"	ALD-21	90-2241	PU-672A	VSF-7203S	
ALY-8426G,RG	"	"	"	"	"	FVR-4011A	

[c] Contents of S.R.E. Head & Rotor Pkg.

S.R.E.Head & Rotor Pkg.	90-2396
Bearing Pkg.	90-2014
Head Assy.,S.R.E.	ALK-1132BS-1
Rotor	ALE-2173S-1

[NA] Not Available.





prestolite[®]

SERVICE INFORMATION

ALY

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 4

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	12	<u>RATED OUTPUT</u>	60 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	See Tabulation		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly and bench testing are contained in the service publications in the front of the Alternator Section. Refer to the following service publication when detailed service information is required.

ALTERNATOR SERIES

ALY 6400 - 8400

SERVICE PUBLICATION

L-655A

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALY series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.

ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 3.5 to 5.0 ohms.



ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 12.0 volts - 2.4 to 4.0 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.

ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALY 6400-8400	14.0	13.0	2000
	14.0	47.0	4000



prestolite[®]

SERVICE INFORMATION

ALY

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 3 of 4

Alternator	Approx. Weight	Internal Wiring	Orig. Equip. Regulator	Replacement Regulator
ALY 6403, R	10 Lb. 6 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 6403G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 6406, R	10 Lb. 6 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 6406G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 6408	10 Lb. 6 Oz.	Figure 2	X18150+	X18150+
ALY 6409	10 Lb. 6 Oz.	Figure 2	X16300B+	X16300B+
ALY 6412	10 Lb. 6 Oz.	Figure 1	VSF-7204	VSF-7203S
ALY 6420, R	10 Lb. 6 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 6420G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 6421	10 Lb. 6 Oz.	Figure 2	X18150+	X18150+
ALY 6422	10 Lb. 6 Oz.	Figure 2	X16300B+	X16300B+
ALY 6425	10 Lb. 6 Oz.	Figure 1	VSF-7204	VSF-7203S
ALY 6427, R	10 Lb. 6 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 6427G, RG	10 Lb. 6 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 8402	10 Lb. 12 Oz.	Figure 1	VSF-7204	VSF-7203S
ALY 8403, LS, R, RS	10 Lb. 12 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 8403G, LSG, RG, RSG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 8405, R	10 Lb. 12 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 8405G, RG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 8410, R	10 Lb. 12 Oz.	Figure 2	X16300B+	X16300B+
ALY 8411	10 Lb. 12 Oz.	Figure 1	VSF-7204	VSF-7203S
ALY 8420, LS, R, RS	10 Lb. 12 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 8420G, LSG, RG, RSG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	FVR-4011+
ALY 8423, R	10 Lb. 12 Oz.	Figure 2	X16300B+	X16300B+
ALY 8424	10 Lb. 12 Oz.	Figure 1	VSF-7204	VSF-7203S
ALY 8426, R	10 Lb. 12 Oz.	Figure 1	VSF-7203	VSF-7203S
ALY 8426G, RG	10 Lb. 12 Oz.	Figure 1*	FVR-4004+	FVR-4011+

* Same as Figure 1 except field terminal F-2 externally grounded with a strap connector. Lycoming applications only.

+ Wico - Prestolite part number.



ALY

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 4 of 4

 prestolite.
SERVICE
INFORMATION

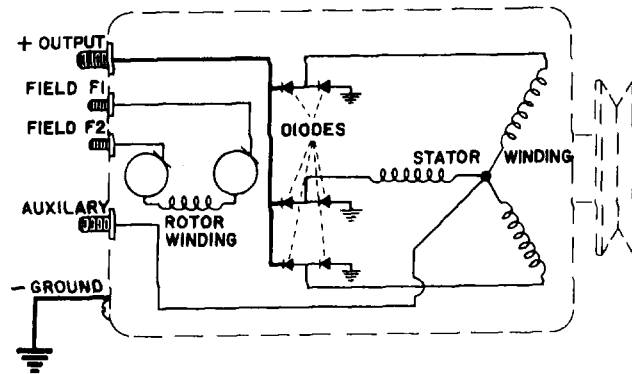


Figure 1

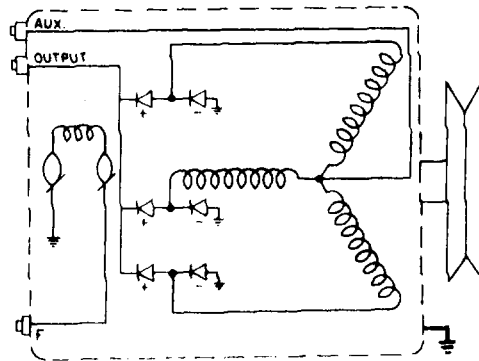


Figure 2



prestolite®

SERVICE PARTS LIST

ALZ SERIES

ALTERNATOR

ISSUED: 3-4-75 (Rev.)

ORIG. EQUIP. ALTERNATOR

SERVICE ALTERNATOR

VOLTS-12

ENG.
NUMBER

ENG.
NUMBER

APPLICATION

ALZ-8401
ALZ-8401G
ALZ-8401R
ALZ-8401RG
ALZ-8423

USE
USE
USE
USE
USE

ALZ-8423R
ALZ-8423R
ALZ-8423R
ALZ-8423R
ALZ-8423R

Lycoming
Lycoming
Service
Service
Lycoming

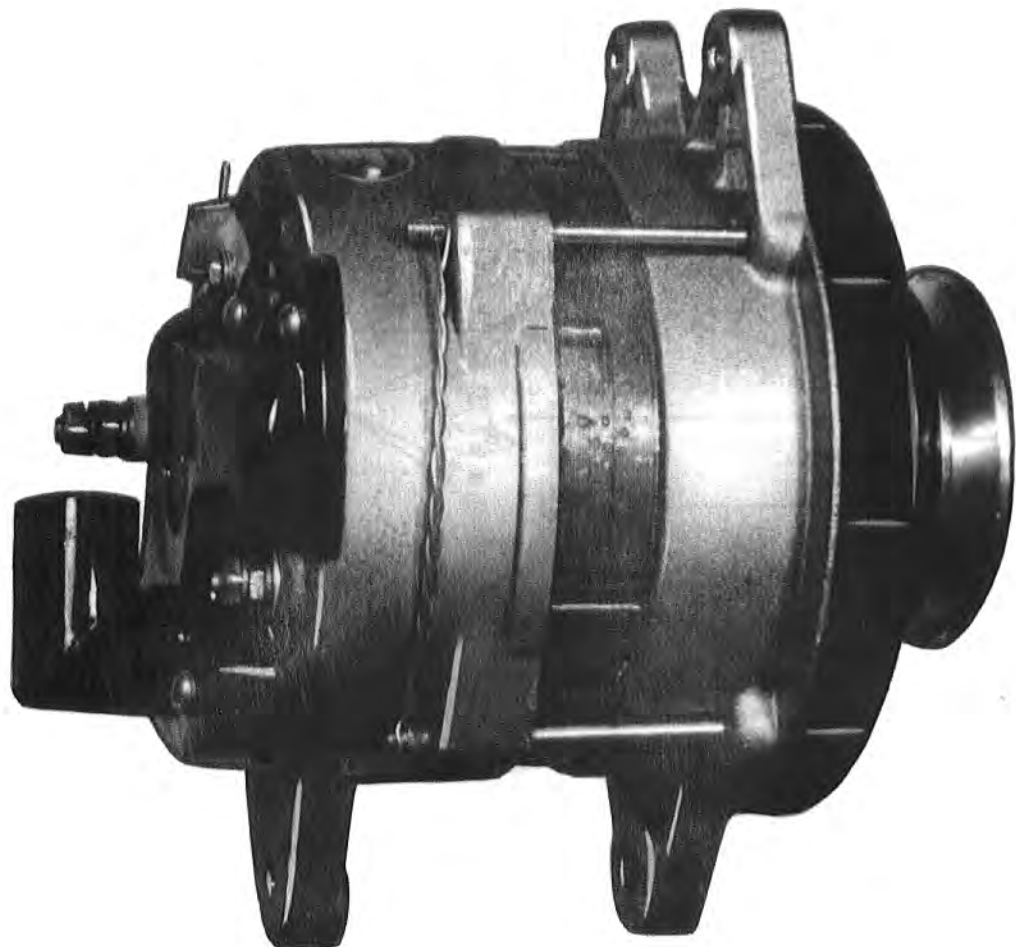
ALZ-8423G
ALZ-8423R
ALZ-8423RG

USE

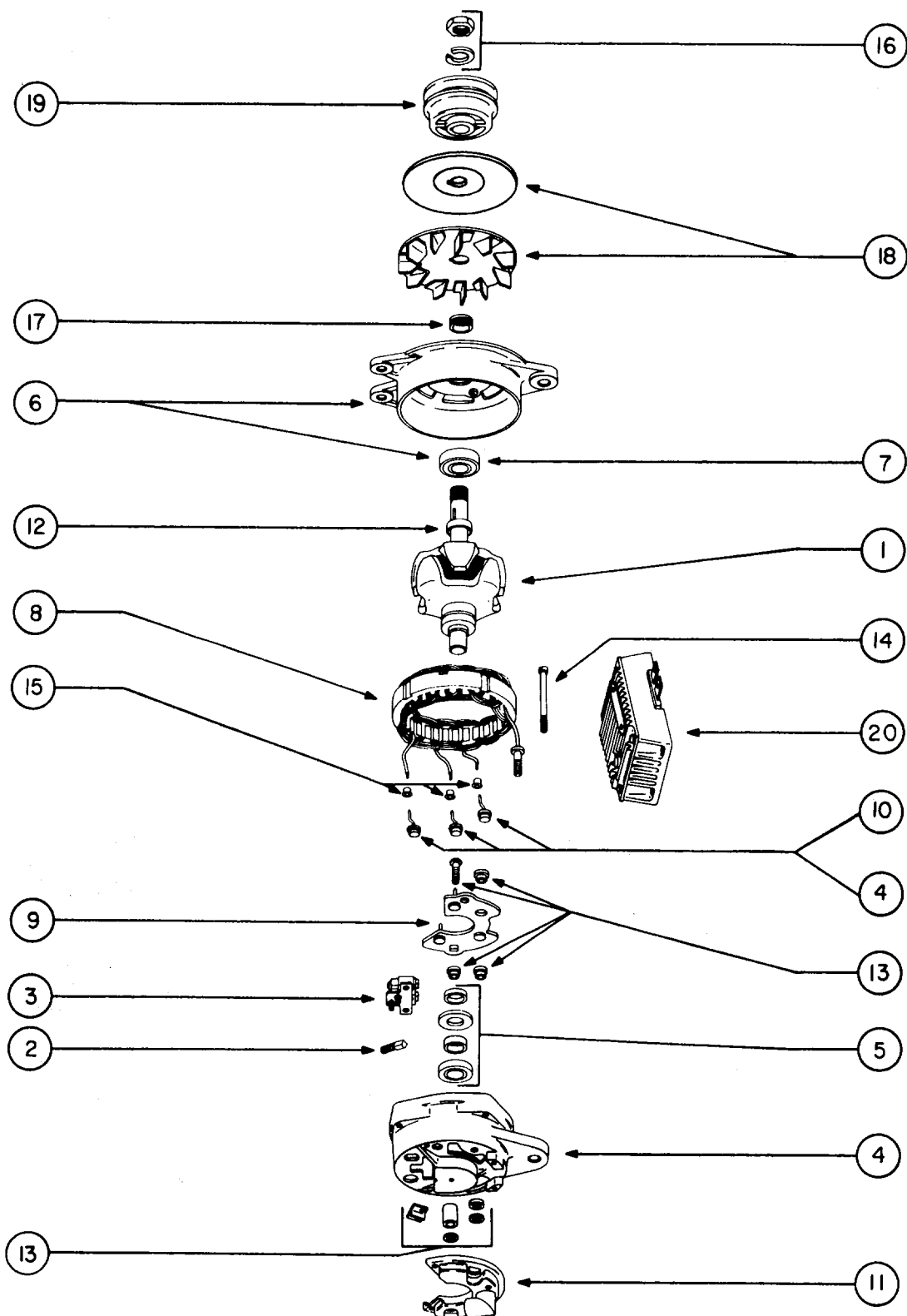
USE

ALZ-8423R
ALZ-8423R
ALZ-8423R

Lycoming
Service
Service



ALZ-8000 Series Alternator Parts List



Exploded View of Typical ALZ Alternator

ALZ SERIES ALTERNATOR PARTS LIST

ISSUED: 3-5-79 (REV.)

SHEET 2

Assembly	Rotor Assembly (1)	Brush Set (2)	Br., Holder & Spring Assembly (3)	Slip Ring End Head Assembly (4) *	S.R.E. Bearing & Seal Package (5)	Drive End Head Assembly (6)	D.E. Bearing (7)
ALZ-8401	90-2396[c]	- - - -	ALU-1045BS[a]	90-2396[c]	90-2014[b]	ALE-1003K	X-3416
ALZ-8401G	"	- - - -	"	"	"	"	"
ALZ-8401R	"	- - - -	"	"	"	"	"
ALZ-8401RG	"	- - - -	"	"	"	"	"
ALZ-8423	ALE-2173S-1	ALE-1013AS	ALU-1045BS	ALK-1132BS-1	"	"	"
ALZ-8423G	"	"	"	"	"	"	"
ALZ-8423R	"	"	"	"	"	"	"
ALZ-8423RG	"	"	"	"	"	"	"

- [*] 35-781 (GJC-49BS) Cover Pkg. (10 Pcs.) Also available.
 [a] ALE-1013AS Captive Brush & Spring Set also individually available for units already having this design. Earlier units must replace the Complete Brush Holder Assy., if Brushes or Springs are required.
 [b] Bearing & Seal Pkg. also included with Rotor & S.R.E. Hd. Assy.
 [c] S.R.E. Head & Rotor Pkg. Complete Package must be used at time of first repair. Individual components (See Sheet #3 for contents of Pkg.) maybe replaced thereafter.



ALZ SERIES ALTERNATOR PARTS LIST

Assembly	Stator Assembly ⑧	Pos. Rect. & Plate Assembly ⑨	Negative Rectifier (Pkg. of 3) ⑩	S.R.E. Cover ⑪	D.E. Retainer ⑫	Term. Stud Package ⑬	Thru Bolt Package ⑭
ALZ-8401	ALE-2008AG	ALE-1054A	XA-944JS	ALU-1062A	GR-32	90-2030	ALA-20JS
ALZ-8401G	"	"	"	"	"	"	"
ALZ-8401R	"	"	"	"	"	"	"
ALZ-8401RG	"	"	"	"	"	"	"
ALZ-8423	"	"	"	"	"	"	"
ALZ-8423G	"	"	"	"	"	"	"
ALZ-8423R	"	"	"	"	"	"	"
ALZ-8423RG	"	"	"	"	"	"	"

Assembly	Eyelet Package (15)	Nut & Washer Package (16)	Rotor Shaft Spacer (17)	Vent. Fan (2 Pc.) (18)	Drive Pulley (19)	Regulator (20)	
ALZ-8401	90-818	90-33	ALD-21	90-2241	PU-672A	VSF-7203S	
ALZ-8401G	"	"	"	"	"	FVR-4011A	
ALZ-8401R	"	"	"	"	"	VSF-7203S	
ALZ-8401RG	"	"	"	"	"	FVR-4011A	
ALZ-8423	"	"	"	"	"	VSF-7203S	
ALZ-8423G	"	"	"	"	"	FVR-4011A	
ALZ-8423R	"	"	"	"	"	VSF-7203S	
ALZ-8423RG	"	"	"	"	"	FVR-4011A	
[c] Contents of S.R.E. Head & Rotor Pkg.							
S.R.E.Hd. & Rotor Pkg.		90-2396					
Bearing Pkg.		90-2014					
Head Assy., S.R.E.		ALK-1132BS-1					
Rotor		ALE-2173S-1					





prestolite

SERVICE INFORMATION

ALZ

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 1 of 3

ALTERNATOR DESCRIPTION

<u>RATED VOLTAGE</u>	12	<u>RATED OUTPUT</u>	50 Amperes
<u>ROTATION</u>	Bi-Directional	<u>GROUNDING POLARITY</u>	Negative
<u>APPROXIMATE WEIGHT</u>	10 Lb. 12 Oz.		

SERVICE INFORMATION

Detailed service procedures covering disassembly, component testing, component replacement, assembly, and bench testing are contained in the service publications in the front of the Alternator Section. Refer to the following service publication when detailed service information is required.

ALTERNATOR SERIES

ALZ 8400

SERVICE PUBLICATION

L-655A

SERVICE BULLETINS

Refer to the Service Bulletin Section of this manual for bulletins pertaining to the ALZ series alternators.

SERVICE SPECIFICATIONS

DRIVE PULLEY

Torque the drive pulley retaining nut to 35 Ft. Lbs. minimum to 40 Ft. Lbs. maximum.

ROTOR OHMMETER TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Ohmmeter must be accurate and batteries must be fresh. Frequently check ohmmeter accuracy by measuring a known resistance such as 10.0 ohm resistor.
3. Ohmmeter must be checked to zero before and after rotor test.
4. Slip rings and ohmmeter test probes must be clean. Ohmmeter test probe leads must be in good condition.





ROTOR OHMMETER TEST SPECIFICATION

Rotor winding resistance - 3.5 to 5.0 ohms.

ROTOR CURRENT DRAW TEST CONDITIONS

1. Rotor to be room temperature 70⁰ to 80⁰F.
2. Voltmeter and ammeter must be accurate.
3. Refer to service publication for test wiring diagram.

ROTOR CURRENT DRAW TEST SPECIFICATION

Current draw at 12.0 volts - 2.4 to 4.0 amperes.

SLIP RING REFINISHING

Minimum Diameter	1.350"
Total Indicator Runout	.002" max. measure from bearing journals
Surface Finish	50 microinch max.

ALTERNATOR OUTPUT TEST CONDITIONS

1. Alternator to be room temperature 70⁰ to 80⁰F. before beginning test.
2. Alternator connected so it is supplying its own field current. Refer to service publication for bench test wiring diagram.
3. Output voltage to be controlled by an adjustable load.
4. Alternator not to be run more than 2 minutes for each test point.

VENTILATION

The 8400 series alternators use a slip ring end cover that has a hose type connection for air pressure ventilation. Remove this cover when bench testing the alternator.



prestolite®

SERVICE INFORMATION

ALZ

AIRCRAFT ALTERNATORS

Issued: 4/1/83

Page 3 of 3

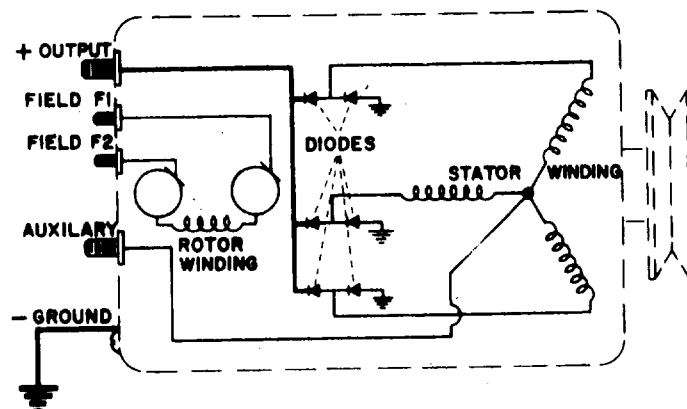
ALTERNATOR OUTPUT TEST SPECIFICATIONS (Without Regulator)

Alternator Series	Output Voltage	Output Amperage	Minimum Alternator RPM
ALZ 8400	14.0 14.0	17.0 41.0	2000 4000

Alternator	Orig. Equip. Regulator	Replacement Regulator
ALZ 8401, R	VSF-7203	VSF-7203S
*ALZ 8401G, RG	FVR-4004 ⁺	FVR-4011 ⁺
ALZ 8423, R	VSF-7203	VSF-7203S
*ALZ 8423G, RG	FVR-4004 ⁺	FVR-4011 ⁺

* Internal wiring same as shown. Field terminal F-2 externally grounded with a strap connector. Lycoming applications only.

+ Wico - Prestolite part number.



Internal Wiring Diagram

File in the
L-600 SERVICE MANUAL



Tech.
Data **ALTERNATORS**



prestolite

SERVICE INFORMATION

VSF-7200

AIRCRAFT VOLTAGE REGULATOR

Issued: 10-5-72

Page 1 of 1

VOLTS 12

GROUND POLARITY Negative

ADJUSTMENT

These units have an external adjustment located under the plastic plug on top of the regulator. The regulator has an adjustment spread ranging from 13.0 volts to 15.0 volts. Output is increased by turning the adjustment clockwise.

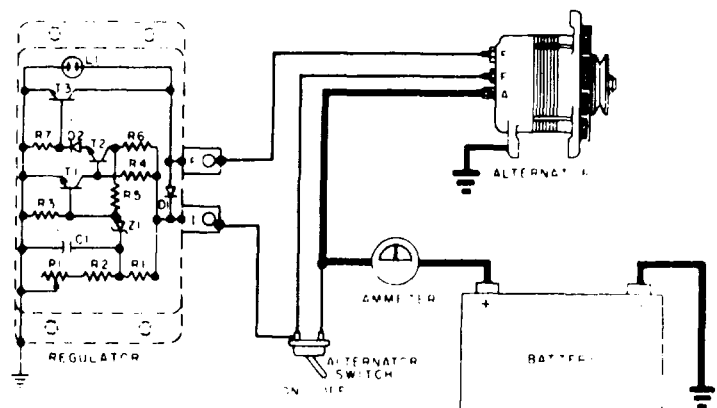
OPERATING VOLTAGE

The regulator should be adjusted to 14.2 volts when controlling a load of 10 to 15 amps after 1 minute operation. These units are not affected by ambient temperatures. The voltmeter must be connected from the "I" or ignition terminal to ground.

CAUTION NOTES

1. Use only with insulated (ungrounded) field alternators.
2. Regulator base must have a good ground connection.
3. Do not (even momentarily) connect the two voltage regulator terminals together.
4. Do not connect battery into system with polarity reversed.
5. Do not force the voltage adjustment screw.
6. This is a sealed unit and not repairable. Replace with a new unit.

Unit
VSF-7201
VSF-7202
VSF-7203,S
VSF-7204



Typical Schematic Circuit of Regulator





prestolite

SERVICE INFORMATION

VSF-7400

AIRCRAFT VOLTAGE REGULATOR

Issued: 10-5-72

Page 1 of 1

VOLTS 24

GROUND POLARITY Negative

ADJUSTMENT

These units have an external adjustment located under the plastic plug on top of the regulator. The regulator has an adjustment spread ranging from 26.0 volts to 30.0 volts. Output is increased by turning the adjustment clockwise.

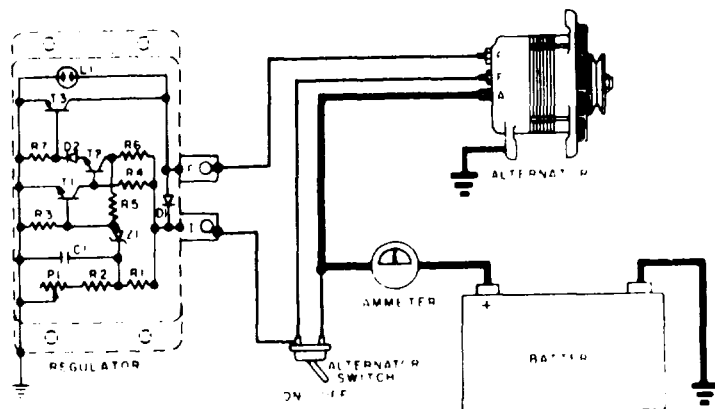
OPERATING VOLTAGE

The regulator should be adjusted to 28.4 volts when controlling a load of 10 to 15 amps after 1 minute operation. These units are not affected by ambient temperatures. The voltmeter must be connected from the "I" or ignition terminal to ground.

CAUTION NOTES

1. Use only with insulated (ungrounded) field alternators.
2. Regulator base must have a good ground connection.
3. Do not (even momentarily) connect the two voltage regulator terminals together.
4. Do not connect battery into system with polarity reversed.
5. Do not force the voltage adjustment screw.
6. This is a sealed unit and not repairable. Replace with a new unit.

Unit
VSF-7401
VSF-7402
VSF-7403,S
VSF-7404



Typical Schematic Circuit of Regulator

