

L-1363C

4300/6300 Series

Magneto Maintenance and Overhaul Manual

Technical Aspects
FAA Approved

SCOPE

This Maintenance and Overhaul Manual provides Detailed maintenance, assembly, disassembly and Troubleshooting instructions and technical Information about the design and operation of Slick Magnetos.

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LOG OF REVISIONS

To: Holders of L-1363B, dated September 15, 1994.

Subject: Revision C, dated October 31, 2005.

1. All pages of this manual are new.
2. Changed all references to "Slick Aircraft Products" and "Slick" to "Unison Industries" and "Unison" respectively throughout the manual.
3. Revised pages that have important changes are shown below.

<u>Page Number</u>	<u>Change</u>
Page 0-1	Changed address and added e-mail address to paragraph 0-1.
Page 0-2	In paragraph 0.3, replaced L-1177 and L-1178 with L-1499. In paragraph 0.4, added Factory Technical Assistance.
Page 2-1	Added T-155 Rivet Gauge to list and illustration.
Page 3-1	Deleted last sentence in paragraph 3.2.1.A
Page 3-2	Deleted paragraphs 3.2.1.B through H. Corrected figure numbers to reflect the paragraph they reference.
Page 3-3	Deleted "Maximum" and added tolerance value to paragraph 3.2.9. Corrected figure numbers to reflect the paragraph they reference.
Page 3-4	Revised paragraphs 3.3.4.1 and 2. Inserted new paragraphs 6 through 9 and new Figures 3.3.4A and 3.3.4B. Renumbered remaining paragraphs and figures.
Page 3-5	Revised paragraph 3.3.4.D.2.
Page 3-6	Changed paragraph 3.3.7.B to read "Condenser Inspection". Deleted paragraph 3.3.7.B.1 and renumbered remaining paragraphs. Moved text of paragraph 3.3.7.B.1 to renumbered paragraph 3.3.7.B.3. Added NOTE after renumbered paragraph 3.3.7.B.2. Changed service limits in paragraph 3.3.7.C.1. Revised paragraph 3.3.7.C.2.
Page 3-7	In paragraph 3.3.8.B.3, changed third sentence to read, "If the bushing is gummed, replace distributor block.". Deleted last sentence.
Page 3-8	Added orifice diameter tolerance value to paragraph 3.4.2.
Page 4-2	Added orifice diameter tolerance value to paragraph 4.2.3.
Page 7-2	Added reference to Loctite to paragraph 7.2.F. Added "(If So Equipped)" to paragraph 7.6 title.
Page 7-4	Changed gap opening to ".008 - .010 inches" in paragraph 7.10.1.E.
Page 7-5	Changed tolerance value to "± .002" in paragraph 7.10.3.B.
Page 7-6	Corrected first paragraph 7.14 to read 7.13. Inserted new paragraph 7.13.A and renumbered remaining paragraphs. Revised renumbered paragraph 7.13.C.
Page 8-1	Added "maximum" to RPM values in paragraph 8.3.B. Changed air flow rate in paragraph 8.8.
Page 9-1	Moved paragraph 9.0 from Section 8 to Section 9.

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<u>Page Number</u>	<u>Change</u>
Page 10-5	In Faulty Ignition Lead Remedy, replaced L-1177 with L-1499.
Pages T-2 and T-3	In Table Two, added coverage for 4309, 4310, 4333, and 4392 magnetos. Changed the "M" in item 11 to "K". "M2555" Screw in item 21 has been replaced by "M3021" Screw. Item 28 is deleted.
Page T-4	Updated item 21 in Table Three and removed item 28. Components were rearranged in the illustration for ease of viewing.
Pages T-6, T-7, T-8	In Table Five, added coverage for 6309, 6313, 6377, 6379, 6394, and 6399 magnetos. Under the 6340 and 6391 magneto columns, changed item 11 from "M3801" to M5618". Under the 6365 magneto column, changed item 11 from "M3499" to M5617". "M2555" Screw in item 22 has been replaced by "M3021" Screw. Item 31 is deleted. Changed note at bottom to reflect magnetos using 2 Woodruff Keys.
Page T-9	Updated item 22 in Table Six and removed item 31. Components were rearranged in the illustration for ease of viewing.

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0.0 INTRODUCTION

0.1 COPYRIGHT STATEMENT

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0.2 HOW TO USE THIS MANUAL

The procedures outlined in this manual are generalized for all models of 4300/6300 Series Slick Magnetos, using only genuine Unison manufactured parts. This manual must not be used to maintain or overhaul a Slick Magneto that contains parts not manufactured by Unison Industries. Specific part numbers are detailed in the Tables located after the main text.

Use only genuine Unison manufactured parts obtained from Unison Industries Approved sources.

Slick parts are produced and inspected under rigorous procedures to insure airworthiness and suitability in Slick magnetos. Parts purchased from sources other than Unison Industries, even though outwardly identical in appearance may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in a Slick magneto. Salvaged magneto parts, reworked parts obtained from non-Unison approved sources, or parts the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures, or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render service work with this part, even though originally manufactured by Unison Industries, unsuitable or unsafe for use in a Slick magneto. Slick expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-Unison approved parts.

Slick magnetos are engineered so that mechanical parts wear at a balanced rate. Consistent and complimentary wear patterns establish the recommended maintenance intervals defined in Unison service literature, therefore used, service worn parts should never be used to troubleshoot or repair a magneto, nor should original parts be replaced by used service worn parts on magnetos being returned to service. Further, non-Unison manufactured parts may wear at uneven and different rates than original Unison manufactured parts, making Unison service literature an inappropriate guide to proper maintenance. Parts not manufactured by Unison Industries, even if FAA/PMA Approved may not fit or operate like original Unison manufactured parts. FAA testing of PMA parts does not require operation on an engine or flight tests and does not require the test duration to exceed the maintenance intervals called out in Unison literature. For these reasons, used service worn parts or parts not manufactured by Slick may adversely affect magneto reliability in ways not anticipated by Unison Industries and its service literature.

The information in this manual is divided into 10 sections. Section One provides basic technical reference on the design and operation of Slick Magnetos. Section Two illustrates tools needed to correctly perform inspection and maintenance.

Detailed instructions for removing the magnetos from the engine, magneto disassembly and magneto reassembly are contained in Sections Five, Six and Seven, respectively.

Maintenance and Overhaul schedules and procedures are detailed in Sections Three and Four, respectively. The instructions in Sections Three and Four refer to procedures outlined in the Magneto Disassembly (Section Six) and Magneto Assembly (Section Seven) portions of this manual. It is recommended that this entire manual be thoroughly read before beginning any inspection or maintenance procedure.

After any inspection or maintenance is done on Slick Magnetos, the testing procedures in Section Eight should be performed completely.

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The Maintenance Checklist located in Section Nine provides a summarized schedule for 100 and 500-hour inspections. This checklist should be copied and attached to the engine log book at the 100 and 500-hour inspections.

Section 10, Troubleshooting, is provided as a reference guide for diagnosing ignition problems.

0.3 RELEVANT PUBLICATIONS

Unison Industries L-1499 Ignition Lead Assembly & Maintenance Manual.

Unison Industries L-1318 Consolidated Application Data

0.4 SYSTEM OVERVIEW

Unison Industries has been an innovative leader in the design and manufacture of aircraft ignition systems for over 25 years. Unison manufactures, not merely assembles, a superior FAA PMA Approved product consistently specified by quality conscious OEMs.

VERTICALLY INTEGRATED MANUFACTURING. Unison Industries manufactures nearly every component in its magnetos and harnesses. This in-house manufacturing process allows Unison to control quality to precise tolerances from raw material to finished product, setting industry standards.

DESIGN FEATURES

- Smaller and Lighter
Unison's unique design allows for a dimensionally smaller magneto, resulting in easier installation and lighter weight-as much as one pound lighter than competitive units.
- Radio Noise Suppression
Slick Magnetos feature superior noise suppression, eliminating the need for magneto filters.
- Easy to Maintain
Slick Magnetos use up to 50% fewer parts than competitive units. In addition, almost 70% of the parts in any Slick Magneto are interchangeable with the comparable parts in other current production Slick Magnetos.
- High-Altitude Performance
Slick Pressurized Magnetos maintain low altitude ambient pressure inside the magneto to reduce the likelihood of high altitude misfire.

RELIABILITY

Unison selects materials that are known for their reliability and durability with proper installation and compliance with maintenance procedures. Slick Magnetos should last the life of the engine before overhaul or replacement is required.

A COMPLETE OFFERING

Unison FAA/PMA Approved Magnetos have applications on nearly all piston engines. Unison Ignition Components are available in the following configurations:

- Complete Upgrade Kits: Cost saving kits including two magnetos, a complete harness and all mounting hardware.
- Single magnetos and harnesses. Timing pins and mounting hardware included for easy installation.
- Complete parts supply for all current production Slick and non-Slick Magnetos.

WORLDWIDE NETWORK

Unison Ignition Systems are available through an international network of aircraft distributors that offer outstanding product support, delivery and service. See Unison Distributor List Form L-1051 for details.

COMPLETE AOG INVENTORY

Unison Industries supports its distribution network with complete AOG factory inventory available for next-day delivery.

FACTORY TECHNICAL ASSISTANCE

Unison technical experts are available to assist you. Please contact our Piston Products Support line at 904-739-4081 or pistonhelp@unison.ae.ge.com.

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1.0 TECHNICAL REFERENCE

1.1 GENERAL

Slick 4300/6300 Series Aircraft Magnetos are manufactured by Unison Industries for use on 4- and 6-cylinder aircraft engines. Slick Magnetos are specified as OEM equipment by aircraft engine manufacturers and carry all FAA/PMA approvals from the Federal Aviation Administration.

Each magneto is identified with a data plate affixed to the side of the magneto frame. The data plate contains serial number and model number information, lag angle of the impulse coupling, shaft rotation direction (L indicates counterclockwise shaft rotation; R indicates clockwise shaft rotation). Customer part numbers are also provided on the data plate.

All current production Slick Magnetos are provided as new units, identified by a red data plate.

1.2 THEORY OF OPERATION

The magneto is a completely self-contained ignition generating device. Typically, two magnetos are installed on each aircraft engine for redundancy. When the aircraft engine crankshaft rotates, gears located in the engine accessory case turn the magneto rotor shaft containing permanent magnets. With the rotating shaft, a magnetic field is produced that is transformed into high tension current through primary and secondary coil windings. The high tension current is distributed to the appropriate cylinder through a distributor block assembly and ignition cables.

A two-lobe cam and two-pole rotating magnet assembly are used to generate magnetic flux and trigger the high tension spark energy. Four-cylinder magnetos are driven at engine speed and produce four sparks through 720 degrees of crankshaft rotation. Six-cylinder magnetos are driven at one and one half times engine speed and produce six sparks through 720 degrees of engine crankshaft rotation.

Slick Magnetos are constant timing ignition devices once the engine has started. The magneto is typically timed to fire at an advance timing position for maximum power of the aircraft engine.

A typical Slick Magneto will produce in excess of 25,000V at normal speed and although simple in outward appearance and construction, the magneto is a complicated electromechanical device. The size and shape of the rotating magnet head assembly, magnet material selection, pole lamination design, ignition coil design and capacitor design are all equally important in determining the efficiency of the device. Electrically, the magneto is a balanced LRC circuit which should not be altered from its original condition. Unison Industries goes to great lengths to ensure that product and design improvements are retrofitable to prior magneto models.

1.2.1 LAG ANGLE-IMPULSE COUPLED MAGNETOS

The impulse coupling is a mechanical device to assist in engine starting. At low cranking speed, the magneto impulse coupling retards the magneto ignition timing until the engine crankshaft is at its proper position for starting. The lag angle, noted on the magneto dataplate, is the impulse coupling's retard angle measured in degrees. After engine start, the impulse coupling disengages and returns the magneto to normal engine timing.

1.2.2 LAG ANGLE-RETARD BREAKER MAGNETOS

The retard breaker assembly is an electrical device powered by the aircraft battery, used to aid in starting the engine. At low cranking speed, the retard breaker retards the magneto ignition timing until the engine crankshaft is at its proper position for starting. The lag angle, noted on the magneto dataplate, is the retard breaker's retard angle measured in degrees. When the engine starter disengages, the retard breaker assembly is also disengaged and the magneto returns to normal engine timing.

1.2.3 ROTATION

Rotation specifies the direction that the magneto rotor shaft turns when viewed from the mounting end of the magneto. **Left-Hand Rotation** is counterclockwise when viewed from the magneto mounting end; **Right-Hand Rotation** is clockwise when viewed from the magneto mounting end. Important. Check the dataplate on the magneto being replaced for the shaft rotation. Replace with a magneto with the same rotation.

1.3 MAGNETO PART NUMBERING

Current production magnetos have four digits in the part number and an optional suffix. The first two digits indicate the Series:

43xx - 4300 Series for four-cylinder engines
63xx - 6300 Series for six-cylinder engines

The last two numbers indicate the model number.

Example: 4371 - 4300 Series four-cylinder,
 model number 71
 6310 - 6300 Series six-cylinder,
 model number 10

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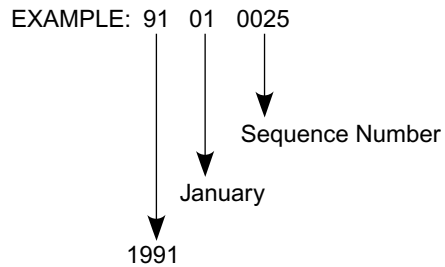
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1.4 MAGNETO SERIAL NUMBERS

Slick Magnetos have an eight-digit serial number. Serial numbers indicate date of manufacture as follows:

Eight-Digit Serial Numbers Slick Magnetos manufactured on or after January 1, 1988 have an 8-digit serial number. The first two digits indicate the year of manufacture, the following 2 digits indicate the month and the remaining digits are the sequence number.



NOTE: SUBSTITUTION OF NON-UNISON PARTS MAY ADVERSELY AFFECT THE PERFORMANCE AND RELIABILITY OF THE MAGNETO.

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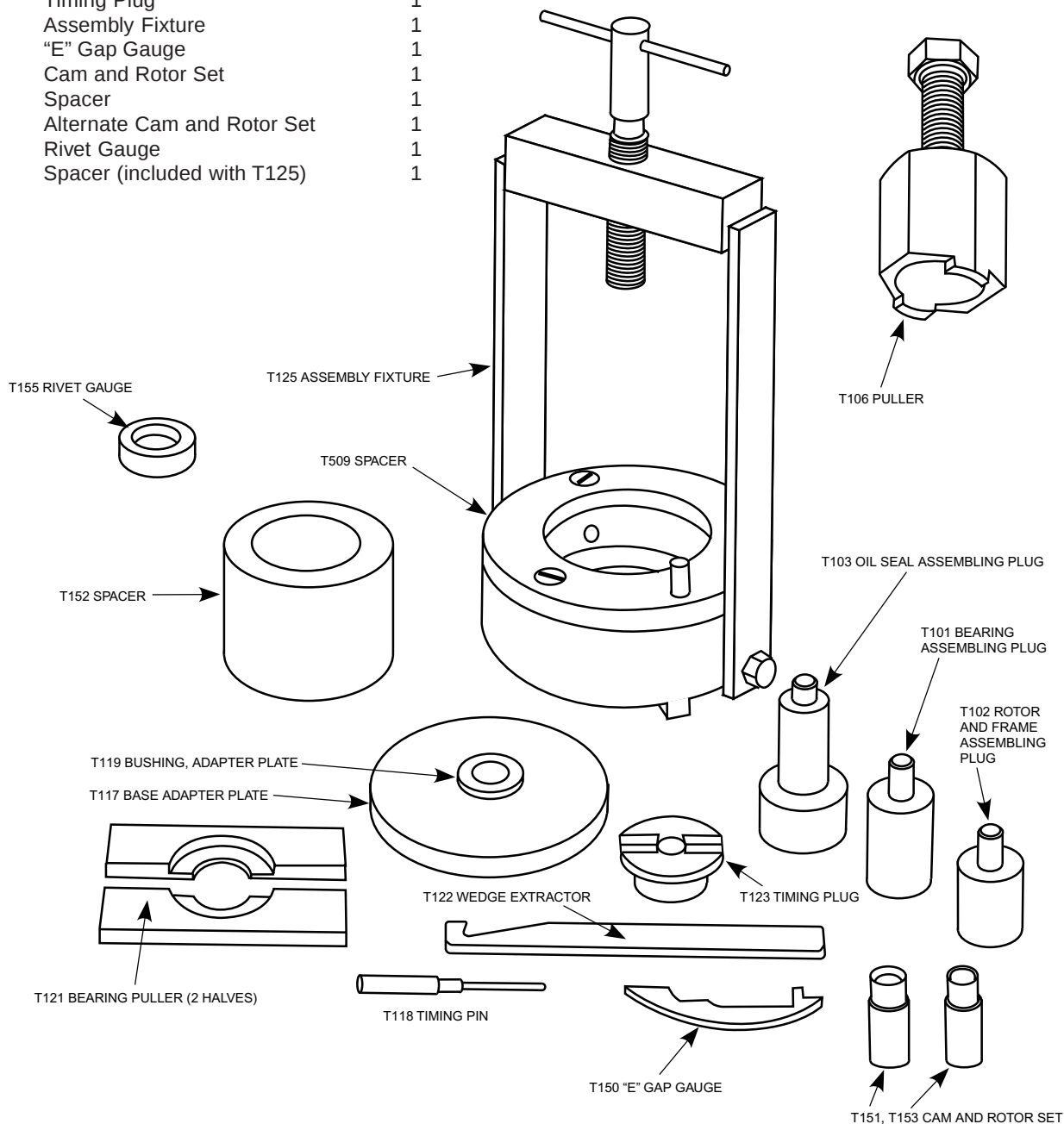
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2.0 TOOLS REQUIRED

T-100 Assembly and Timing Kit includes:

P/N	Description	Qty
T101	Bearing Assembling Plug	1
T102	Rotor and Frame Assembling Plug	1
T103	Oil Seal Assembling Plug	1
T106	Puller	1
T117	Base Adapter Plate	1
T118	Timing Pin	1
T119	Bushing, Adapter Plate	1
T121	Bearing Puller (2 Halves)	1
T122	Wedge Extractor	1
T123	Timing Plug	1
T125	Assembly Fixture	1
T150	"E" Gap Gauge	1
T151	Cam and Rotor Set	1
T152	Spacer	1
T153	Alternate Cam and Rotor Set	1
T155	Rivet Gauge	1
T509	Spacer (included with T125)	1



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3.0 MAINTENANCE

3.1 MAINTENANCE SCHEDULE

3.1.1 100-HOUR INSPECTION

- A. Adjust timing to engine
- B. Inspections
 - 1. Wiring connections and conditions
 - 2. Vent holes (non-pressurized magnetos)
 - 3. P-lead attachment
 - 4. Retard breaker switch wire (retard breaker magnetos)
 - 5. Inspect tachometer drive wire (tachometer drive magnetos)
 - 6. Turbo filter used with pressurized magnetos
 - 7. Inlet nozzle (pressurized magnetos)
 - 8. Orifice vent (pressurized magnetos)
 - 9. Pressure check

3.1.2 500-HOUR INSPECTION - DIRECT DRIVE MAGNETOS

- A. Cleaning
- B. Ball bearing assembly
- C. Coil
- D. Contact points
- E. Condenser
- F. Carbon brush
- G. Lubrication

3.1.3 500-HOUR INSPECTION - IMPULSE COUPLED MAGNETOS

- A. Cleaning
- B. Ball bearing assembly
- C. Impulse coupling
- D. Coil
- E. Contact points
- F. Condenser
- G. Carbon Brush
- H. Lubrication

3.1.4 500-HOUR INSPECTION - RETARD BREAKER MAGNETOS

- A. Cleaning
- B. Ball bearing assembly
- C. Impulse coupling
- D. Coil
- E. Primary contact points
- F. Retard breaker contact points
- G. Condenser
- H. Carbon brush
- I. Lubrication

3.1.5 ADDITIONAL 500-HOUR INSPECTION PROCEDURES FOR PRESSURIZED MAGNETOS

- A. Inlet nozzle, orifice vent and turbo filter
- B. Inspect inside of magneto for turbocharger contaminants
- C. Frame gasket and screw gasket
- D. Harness cap O-Ring
- E. Pressure testing

3.1.6 500-HOUR INSPECTION - TACHOMETER DRIVE MAGNETOS ONLY

- A. Cleaning
- B. Ball bearing assembly
- C. Impulse coupling
- D. Coil
- E. Primary contact points
- F. Tachometer drive points
- G. Condenser
- H. Carbon brush
- I. Lubrication

3.1.7 OPERATIONAL CHECK - ALL MAGNETOS

- A. Before flight or after routine maintenance observe engine operation while running on both magnetos and left or right magneto individually. Both magnetos should demonstrate normal operation and engine should operate within parameters outlined in the engine manufacturer's operating manual. DO NOT FLY AIRCRAFT IF MAGNETOS ARE NOT FUNCTIONING NORMALLY.
- B. Postflight magneto operational check should be performed after each flight. Observe engine operation while running on both magnetos and left or right individually. Both magnetos should demonstrate normal operation and engine should operate within the parameters outlined in the engine manufacturer's operating manual. DO NOT FLY AIRCRAFT IF MAGNETOS ARE NOT FUNCTIONING NORMALLY.

3.2 100-HOUR INSPECTION

The following maintenance procedures should be followed every 100 hours of service or at annual inspection, whichever comes first. Perform maintenance on each magneto.

3.2.1 ADJUST TIMING TO ENGINE

CAUTION: BE SURE IGNITION SWITCH IS IN "OFF" POSITION AND THE CONDENSER LEAD IS GROUNDED.

- A. Turn the engine crankshaft in the normal direction of rotation until the No. 1 cylinder is in the full-advance firing position, following engine manufacturer's procedure for timing of magnetos.

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3.2.2 INSPECT WIRING CONNECTIONS AND CONDITIONS

Refer to Harness Maintenance Manual L-1177 for complete wiring inspection instructions.

3.2.3 INSPECT VENT HOLES - NON-PRESSURIZED MAGNETOS

Vent holes must be clean and clear of any obstruction. Correct as necessary.

3.2.4 INSPECT P-LEAD ATTACHMENT

The P-lead connects the magneto primary circuit to the airframe ignition switch. If the P-lead is disconnected, the magneto will be "ON" and will fire the spark plug if the propeller is rotated. Possible fatal injury can result. Confirm that the P-lead is securely attached to the condenser stud. Torque P-lead nut to 13-15 in-lbs.

CAUTION: IF 13-15 IN-LBS TORQUE LIMIT IS EXCEEDED, CONDENSER PERFORMANCE MAY BECOME INTERMITTENT OR TOTALLY INOPERATIVE. REPLACE CONDENSER IF TORQUE LIMIT IS EXCEEDED, FOLLOWING INSTRUCTIONS IN SECTIONS 6.5 AND 7.12 OF THIS MANUAL.

Follow airframe manufacturer's recommendations to ensure the ignition switch and P-lead are operating properly.

3.2.5 INSPECT SWITCH WIRE - RETARD BREAKER MAGNETOS ONLY

The retard breaker lead connects the retard contact points to the ignition vibrator. If this lead is disconnected the starting circuit will become inoperative.

CAUTION: IF 13-15 IN-LBS TORQUE LIMIT IS EXCEEDED, STARTING CIRCUIT MAY BECOME INOPERATIVE.

Follow the airframe manufacturer's recommendations to ensure that the ignition switch and retard breaker lead are operating properly.

3.2.6 INSPECT TACHOMETER DRIVE CONTACT WIRE - TACHOMETER DRIVE MAGNETOS ONLY

The tachometer lead connects the tachometer drive contact points to the tachometer. If this lead is disconnected, the tachometer will become inoperative. Follow the airframe manufacturer's recommendations to ensure that the tachometer drive lead is attached properly.

3.2.7 INSPECT TURBO FILTER - PRESSURIZED MAGNETOS ONLY

Inspect for yellow or red color, condensation or free standing water or foreign matter in the filter element. (See Figure 3.2.7). If the filter is contaminated, reference the engine and/or airframe manufacturer's literature for pressurization system corrective action. Replace turbo filter. If filter shows contamination, the magneto must be removed and inspected for contaminant damage. Follow procedures in Section 3.3 of this manual.

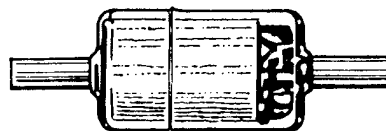


Figure 3.2.7

3.2.8 INSPECT INLET NOZZLE - PRESSURIZED MAGNETOS ONLY

Inspect and clean inlet nozzle to insure it is clean and free of obstruction. (See Figure 3.2.8). Yellow or white particles or any oily film in the inlet nozzle indicates moisture contamination and possible lack of pressurization. Reference the engine and/or airframe manufacturer's literature for pressurization system corrective action.

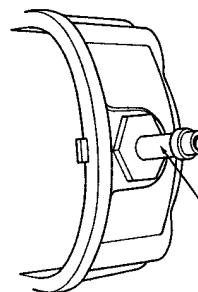


Figure 3.2.8

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3.2.9 INSPECT ORIFICE VENT - PRESSURIZED MAGNETOS ONLY

Inspect and clean orifice vent to insure it is clean and free of obstruction. Orifice diameter is $.025 \pm .005$ inch. (See Figure 3.2.9.)

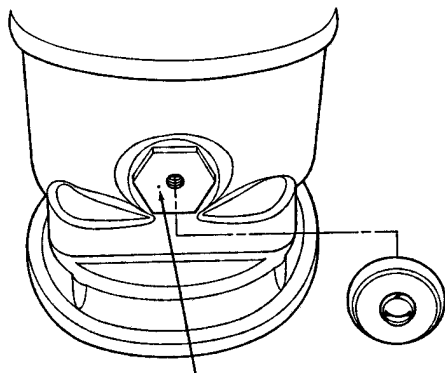


Figure 3.2.9

3.3 500-HOUR INSPECTION

Follow instructions in Section 5.0, Removing Magneto from Engine. All procedures needed to perform the 500-hour inspections are detailed in Section 6.0, Magneto Disassembly and Section 7.0, Magneto Assembly.

3.3.1 DISASSEMBLY AND CLEANING

Proceed with magneto disassembly, following instructions in Section 6.0, Magneto Disassembly. When disassembled, return to Section 3.3.2.

3.3.2 INSPECT BALL BEARING ASSEMBLY

- A. Inspect ball bearing assembly by rotating rotor shaft. Check for free movement. If rotor shaft binds, sticks or feels loose in bearing cap, replace ball bearing assembly following instructions in Section 7.0, Magneto Assembly.

NOTE: IF BEARINGS ARE REMOVED FROM SHAFT, BEARINGS MUST BE DISCARDED AND REPLACED.

3.3.3 INSPECT ROTOR

Inspect rotor for damaged or worn keyway. Check rotor bearing surfaces for wear.

A. Inspect Oil Seal

Inspect oil seal location on shaft

B. Assemble Bearings and Rotor

Assemble bearings and rotor following instructions in Sections 7.1 and 7.2, Magneto Assembly.

C. Inspect Magneto Rotor Shaft

Inspect magneto rotor shaft at impulse coupling location. If the heel of the pawl has struck the shaft and caused the shaft to dimple in excess of $.006$ inch per side, the rotor shaft must be replaced. (See Figure 3.3.3).

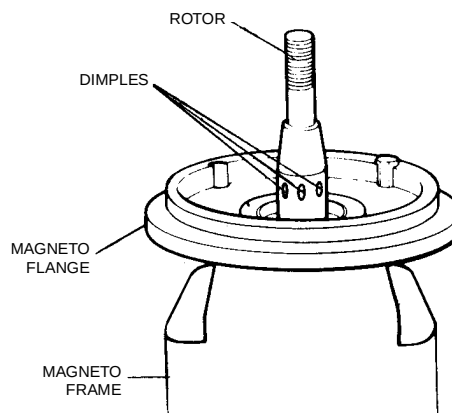


Figure 3.3.3

3.3.4 INSPECT IMPULSE COUPLING - IMPULSED COUPLED MAGNETOS ONLY

A. Clean Impulse Coupling

1. All portions of the impulse coupling must be cleaned, exposing bare metal, to ensure a reliable inspection.
2. Use a suitable grease dissolving solvent to remove all oil or sludge buildups on impulse coupling.

B. Inspect Coupling

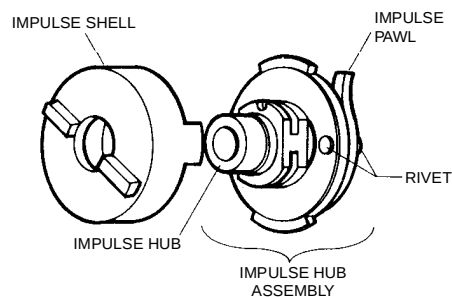


Figure 3.3.4

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NOTE: IN MANY CASES, STRINGERS, INCLUSIONS AND HEAT CHECKS MAY APPEAR AS SURFACE DISCONTINUITIES ON IMPULSE COUPLING COMPONENTS. THESE CONDITIONS ARE NORMAL AND GENERALLY DO NOT, BY THEMSELVES, REQUIRE IMPULSE COUPLING REPLACEMENT.

1. Using acceptable procedures, inspect the impulse coupling shell for cracks, rust or signs of corrosion. None of these conditions are acceptable. Minor cleaning to remove surface rust is acceptable. Replace impulse coupling as necessary.
2. Inspect the impulse coupling hub for cracks, rust or signs of corrosion. None of these conditions are acceptable. Minor cleaning to remove surface rust is acceptable. Replace impulse coupling as necessary.
3. Inspect the hub shaft and keyway for deformation or damage. Replace impulse coupling as necessary.
4. Inspect impulse coupling pawls. If the latching end that contacts the stop pin in the magneto frame is rounded, peened or excessively worn, replace the impulse coupling.
5. Inspect pawl retaining rivets. If the rivets are loose or show indications of movement, then replace the impulse coupling.
6. Install the T155 Rivet Gauge over the rivet head. (See Figure 3.3.4A.)

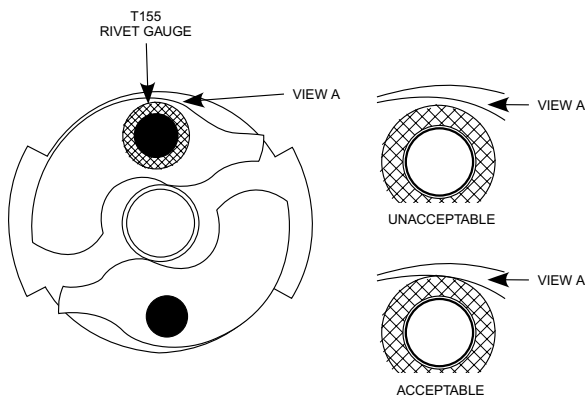


Figure 3.3.4A

7. Align the outer edge of the pawl with the outer edge of the impulse coupling plate. Lift the inner edge of the pawl upward and push the pawl outward. If the inner edge of the pawl is not lifted when the pawl is pushed outward, the gaging will not be accurate. (See Figure 3.3.4B.)

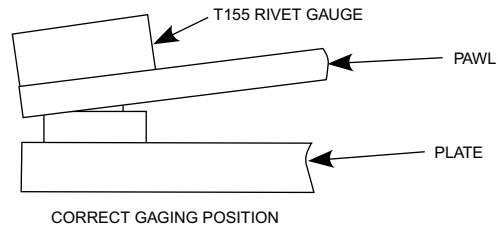
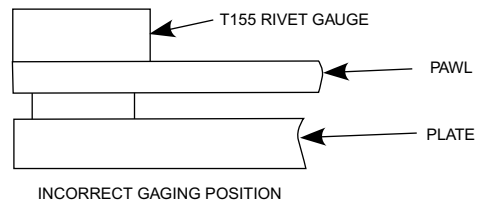


Figure 3.3.4B

8. Rotate the pawl in an arc while pushing upward and outward on the pawl.
9. If the edge of the pawl is visible beyond or can be felt to extend beyond the edge of the T155 Rivet Gauge, then replace the coupling. (See Figure 3.3.4A.)
10. Measure the clearance between the boss on the underside of each (2) impulse pawl and the pawl plate using a feeler gage. Position the latching end of the impulse pawl over the pawl plate as shown in Figure 3.3.4C.

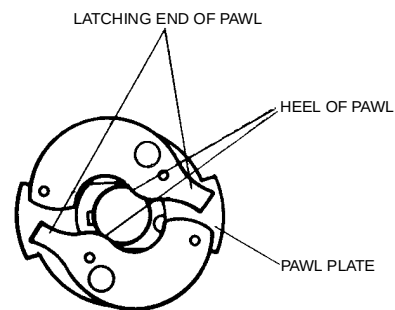


Figure 3.3.4C

11. Maximum clearance for pawls with one (1) boss is 0.150 inch. Maximum clearance for pawls with two bosses is 0.150 inch for left-hand rotation couplings and 0.140 inch for right-hand rotation impulse couplings. If the feeler gauge can pass between the full width of the boss and the pawl plate, replace the impulse coupling. See Figure 3.3.4D. For coupling rotation, see magneto data plate.

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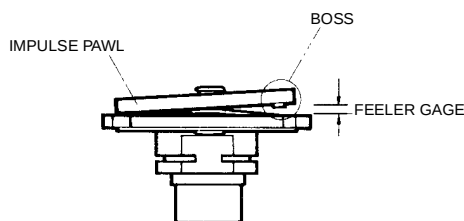


Figure 3.3.4D

C. Reassemble Impulse Coupling

1. Lubricate the pawl assembly with aircraft engine oil. Ensure that the pawls move freely.
2. Lubricate the hub and spring with aircraft engine oil.
3. Follow reassembly instructions, Section 7.5 of this manual.

D. Inspect Stop Pin

1. Inspect the stop pin for looseness, cracks or corrosion. None of these conditions are acceptable. Replace magneto frame as necessary. (See Figure 3.3.4E.)

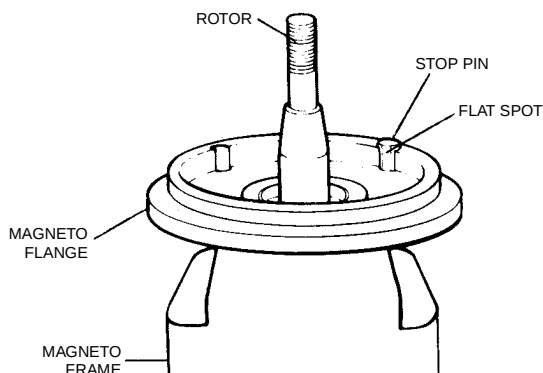


Figure 3.3.4E

2. Inspect the stop pin for flat spots. Flat spots should be measured using a dial caliper or similar measuring device. If the stop pin is worn, with a flat spot larger than .050 inches across, the magneto frame must be replaced.

E. Install Impulse Coupling.

Follow instructions in Section 7.6 of this manual to install impulse coupling in magneto.

3.3.5 INSPECT COIL

- A. Inspect coil for visible radial cracks. If any cracks are evident, replace coil. (See Figure 3.3.5).
- B. Inspect coil for primary and secondary circuit resistance and continuity. Coil must be replaced if resistance is outside of tolerances or an open exists. Refer to Table Seven for tolerances.

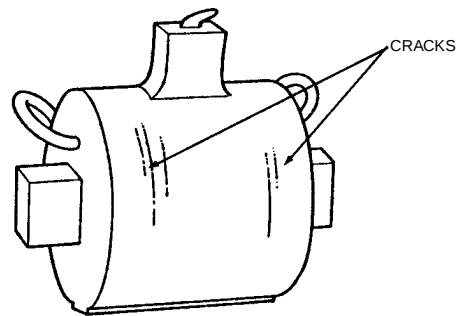


Figure 3.3.5

3.3.6 INSPECT CONTACT POINTS

A. Primary Contact Points (All Magnetos)

NOTE: In a retard breaker magneto, the primary contact points are secured by a **BLACK** anodized screw.

1. Inspect primary contact points for signs of pitting and discoloration. If points are not discolored and have a white, frosty surface around the edges, points are functioning properly and can be reused.
2. If points are blue (indicating excessive arcing) or pitted, they should be discarded. Replace primary contact point assembly, condenser and cam.

B. Retard Breaker Contact Points (Retard Breaker Magnetos Only)

NOTE: In a retard breaker magneto, the retard breaker contact points are secured by a **SILVER** screw.

1. Inspect retard breaker contact points for signs of pitting and discoloration. If points are not discolored and have a white, frosty surface around the edges, points are functioning properly and can be reused.
2. If points are blue (indicating excessive arcing) or pitted, they should be discarded. Replace retard breaker contact point assembly and cam.

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C. Tachometer Drive Contact Points (Tachometer Drive Magnetos Only)

1. Inspect tachometer drive contact points for signs of pitting and discoloration. If points are not discolored and have a white, frosty surface around the edges, points are functioning properly and can be reused.
2. If points are blue (indicating excessive arcing) or pitted, they should be discarded. Replace tachometer drive contact point assembly and cam.

3.3.7 INSPECT CONDENSER

A. Clean Condenser

1. If the external surfaces of the condenser are dirty, clean with light soapy water.
2. Rinse soapy water and dirt from condenser surfaces with clear water and pat dry before reinstallation into the magneto housing.

B. Condenser Inspection

1. Inspect the condenser for signs of corrosion. This condition is cause for component rejection. (See Figure 3.3.7).

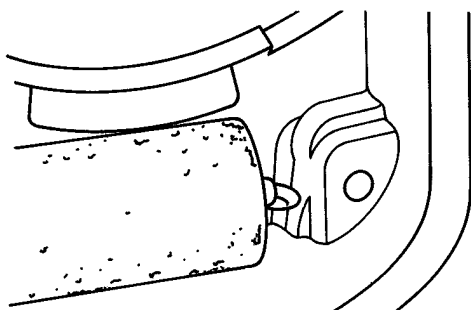


Figure 3.3.7

2. Inspect the condenser wire for chafing, frayed insulation, or exposed wires that could contact frame. Replace as necessary.

NOTE: Current condensor design utilizes a D shaped insulator to prevent damage from Over-Torquing of P-lead stud.

3. Inspect the condenser P-lead stud for twisting or "pulled" condition. Using a magnifying lens, examine the glass bead end seals of the capacitor for broken glass or for glass separation from the retaining steel rings. Either of these conditions is cause for component rejection. (See Figure 3.3.7A.)

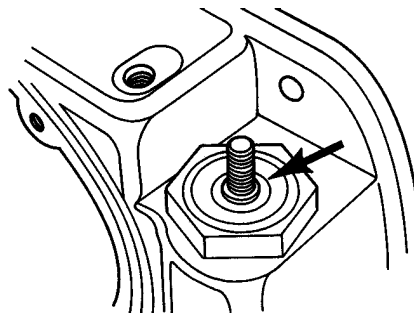


Figure 3.3.7A

C. Test Capacitor.

Test the electrical properties of the capacitor using the GenRad Digibridge 1157 component analyzer and a megohmmeter, or equivalent test equipment.

1. Capacitance value should be measured at room temperature, and 1 khz frequency. The service limit of the capacitor is .315 to .385 microfarad.
2. Test the insulation resistance of the capacitor using a megohmmeter. The resistance measured between the capacitor stud and shell should be 50 Gigohms minimum at 135 VDC.

NOTE: NO FIELD REPAIRS OF THE CONDENSER ARE APPROVED. UNDER NO CIRCUMSTANCES SHOULD THE CONDENSER LEAD BE RESOLDERED TO THE CONDENSER STUD IF IT BECOMES DETACHED. SOLDERING THIS LEAD CAN RESULT IN ELECTRICAL BREAKDOWN INSIDE THE CAPACITOR AND/OR LOSS OF HERMETIC INTEGRITY.

D. Install Condenser.

Install condenser following instructions in Section 7.12 of this manual.

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3.3.8 INSPECT DISTRIBUTOR BLOCK ASSEMBLY

A. Clean block assembly.

1. Disassemble and clean the distributor block bearing bar using standard non-filming, nonconductive cleaner. Clean distributor gear with soapy water and rinse with clear water.

CAUTION: DO NOT PUT CLEANER IN EITHER BRONZE OILITE BUSHING. THESE BUSHINGS ARE IMPREGNATED AT THE FACTORY AND CLEANER WILL DRAW THE LUBRICANT OUT OF THE BUSHING.

2. Using a cotton swab or "Q-Tip", clean all surfaces free of dirt, oil, carbon dust and other contaminants.

B. Inspect Distributor Block.

1. Visually inspect the block for cracks or other physical damage. Replace block assembly as necessary.
2. Inspect the brass electrode posts for signs of physical wear. Replace block assembly as necessary. During normal operation, the post will experience an electrical-metal transfer with the distributor gear electrode. This condition is normal and not cause for rejection. (See Figure 3.3.8.)

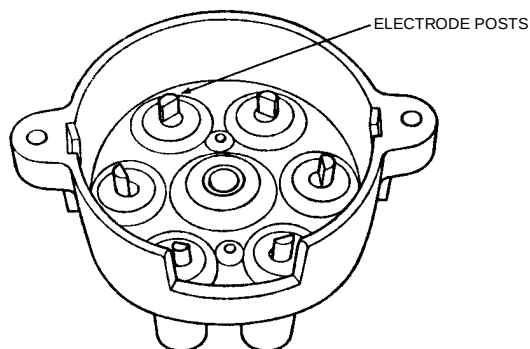


Figure 3.3.8

3. Inspect oilite bushing for gumming oil condition. The bushing should be free of contamination and the gear should turn freely in the distributor block with no appreciable drag. If the bushing is gummed, replace distributor block.
4. Make sure the distributor block surfaces are free of all oil and carbon dust prior to reassembly.

C. Inspect Distributor Gear

1. Inspect gear teeth for wear and general integrity. Replace block assembly as necessary.

2. Inspect the electrode finger for looseness. The electrode should be held securely to the shaft when tested with light finger pressure. Loose condition requires block and gear replacement. (See Figure 3.3.8A.)

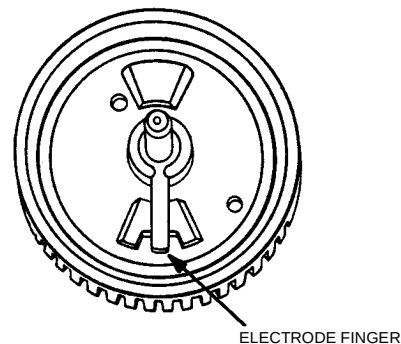


Figure 3.3.8A

3. Clean the end of the electrode to remove electrical deposits.

D. Inspect Bearing Bar.

1. Visually inspect for cracks or other physical damage. Replace assembly as necessary.
2. Make sure the bearing bar is free of all oil and carbon dust prior to reassembly.

3.3.9 INSPECT CARBON BRUSH

- A. Visually inspect the carbon brush. Overall length of the carbon brush must be greater than 19/64 inch and the OD of the brush diameter must be uniform. (See Figure 3.3.9). Carbon brushes that do not meet these limits must be replaced. Reference Section 7.13 of this manual.

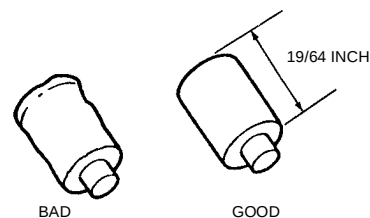


Figure 3.3.9

- B. Visually inspect the loading spring. Overall free standing length should be greater than 19/32 inch. (See Figure 3.3.9A.) Look for flat spots on the spring windings. Springs that appear worn or do not meet the overall length requirements must be replaced. Reference Section 7.13 of this manual.

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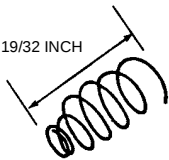


Figure 3.3.9A

C. Reinstall following Section 7.13B.

3.3.10 INSPECT FOR STRUCTURAL DAMAGE

Check magneto frame and distributor housing for cracks or other damage. Inspect threaded areas to ensure threads are intact and not damaged. Replace as necessary, following instructions in Assembly Section of this manual. Complete magneto reassembly, Section 7.

3.4 ADDITIONAL 500-HOUR INSPECTION PROCEDURES FOR PRESSURIZED MAGNETOS

3.4.1 INLET NOZZLE

Inspect and clean inlet nozzle to insure it is clean and free of obstruction. (See Figure 3.4.1). Yellow or white particles or an oily film in the inlet nozzle indicates moisture contamination and possible lack of pressurization. Reference engine and/or airframe manufacturer's literature for pressurization system corrective action.

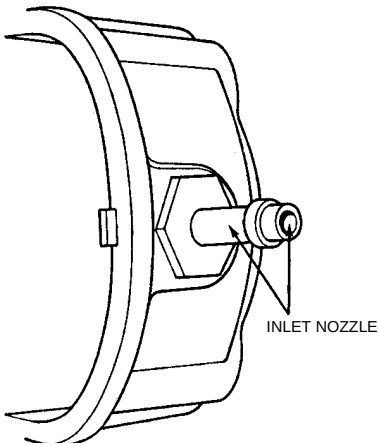


Figure 3.4.1

3.4.2 ORIFICE VENT

Inspect and clean orifice vent to insure it is clean and free of obstruction. Orifice diameter is .025 ± .005 inch. (See Figure 3.4.2).

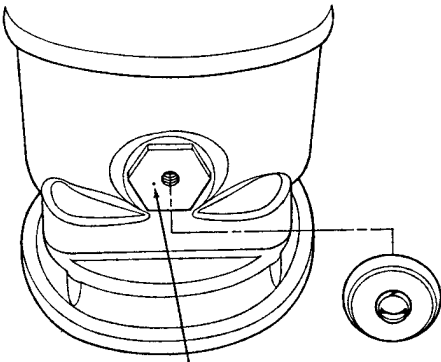


Figure 3.4.2

3.4.3 TURBO FILTER

Inspect for yellow or red color, condensation or free standing water or foreign matter in the filter element. (See Figure 3.4.3.) If the filter is contaminated, reference the engine and/or airframe manufacturer's literature for pressurization system corrective action. Replace turbo filter. If filter shows contamination, the magneto must be removed and inspected for contaminant damage. Follow procedures in Section 3.3 of this manual.



Figure 3.4.3

3.4.4 GASKETS

Inspect frame gasket for wear and replace as necessary. Replace ONLY with Unison Replacement Gaskets. Inspect screw gaskets for wear and replace as necessary. Replace ONLY with Unison Replacement Gaskets and Unison Mounting Screws. For latest configuration of housing gasket, screws, and O-ring, consult Table Five.

3.4.5 O-RING

Inspect harness cap O-ring for wear and replace as necessary.

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4.0 OVERHAUL

Slick 4300/6300 Series Magnetos should be completely overhauled when conditions indicate. Magnetos must be overhauled at every engine overhaul. In no case should magnetos have in-service times greater than the TBO hour limit for the engine on which it is installed.

Magnetos must be overhauled after a lightning strike on the aircraft and following a sudden engine stoppage.

The following parts *must* be replaced at overhaul.

Additional parts may require replacement depending on conditions as determined during magneto inspection. Install only Unison Replacement Parts.

ALL MAGNETOS

- Condenser
- Double Sealed Bearing
- Bearing Cap Assembly
- Coil
- Impulse Coupling
- Oil Seal
- Contact Point Kit
- Rotor Gear
- Distributor Block and Gear

PRESSURIZED MAGNETOS:

In addition to above parts, the following components must be replaced at every overhaul.

- Frame Gasket
- Housing Screw
- Harness Cap 'O' Ring

A complete list of parts that must be replaced at overhaul can be found in Table One (4300 Series) and Table Four (6300 Series). Refer to tables One through Seven as you overhaul your Slick Magneto.

Use only genuine Unison Industries manufactured parts obtained from Unison approved sources. Genuine Unison parts are produced and inspected under rigorous procedures to insure airworthiness and suitability in Slick magnetos. Parts purchased from sources other than Unison Industries, even though outwardly identical in appearance may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in a Slick magneto. Salvaged magneto parts, reworked parts obtained from non-Unison approved sources, or parts the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures, or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render service work with this part, even though originally manufactured by Unison Industries, unsuitable or unsafe for use in a Slick magneto. Unison Industries expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-Unison approved parts

Slick magnetos are engineered so that mechanical parts wear at a balanced rate. Consistent and complimentary wear patterns establish the recommended maintenance intervals defined in Unison service literature, therefore used, service worn parts should never be used to troubleshoot or repair a magneto, nor should original parts be replaced by used service worn parts on magnetos being returned to service. Further, non-Unison manufactured parts may wear at uneven and different rates than original Unison manufactured parts, making Unison service literature an inappropriate guide to proper maintenance. Parts not manufactured by Unison Industries, even if FAA/PMA Approved may not fit or operate like original Unison manufactured parts. FAA testing of PMA parts does not require operation on an engine or flight tests and does not require the test duration to exceed the maintenance intervals called out in Unison literature. For these reasons, used service worn parts or parts not manufactured by Unison Industries may adversely affect magneto reliability in ways not anticipated by Unison Industries and its service literature.

NOTE: AN ALTERNATIVE TO OVERHAUL IS COMPLETE MAGNETO REPLACEMENT WITH A NEW SLICK MAGNETO. NEW SLICK MAGNETOS INCORPORATE ALL THE LATEST DESIGN FEATURES AND ARE A COST EFFECTIVE ALTERNATIVE TO OVERHAUL.

4.1 OVERHAUL PROCEDURE - ALL MODEL MAGNETOS

4.1.1 REMOVE MAGNETO FROM ENGINE

Follow procedures in Section 5.0, Removing Magneto from Engine.

4.1.2 DISASSEMBLE MAGNETO

Proceed with magneto disassembly, following instructions in Sections 6.0.

4.1.3 DISCARD PARTS TO BE REPLACED

Reference Table One, 4300 Series Overhaul Parts Replacement List of Table Two, 6300 Series Overhaul Parts Replacement List. Discard all parts removed for overhaul replacement and REPLACE WITH NEW UNISON PARTS.

Slick does not authorize the use of "used" parts as replacement parts for other magnetos. In many cases, subcomponent parts are matched at the factory and will function improperly if used in conjunction with other similar parts.

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NOTE: UNISON INDUSTRIES AUTHORIZES THE USE OF ONLY UNISON REPLACEMENT PARTS IN THE MAINTENANCE AND/OR OVERHAUL OF UNISON INDUSTRIES EQUIPMENT. USE OF PARTS OR FASTENERS NOT MANUFACTURED OR APPROVED BY UNISON VOIDS ANY AND ALL WARRANTIES AND MAY ADVERSELY AFFECT THE PERFORMANCE AND JEOPARDIZE THE AIRWORTHINESS OF THE MAGNETO.

4.1.4 MAGNETO REASSEMBLY

Proceed with magneto reassembly, following instructions in Section 7.0 of this manual.

4.2 ADDITIONAL PROCEDURES - PRESSURIZED MAGNETOS

In addition to the overhaul procedures outlined above, the following must be performed.

4.2.1 DISCARD PARTS TO BE REPLACED

Discard parts as listed in Table Four.

4.2.2 INLET NOZZLE

Inspect and clean inlet nozzle to ensure it is clean and free of obstruction. Presence of dirt or other contaminants indicates that the magneto pressurization system is not functioning properly. Consult engine manufacturer's manuals for corrective action.

4.2.3 ORIFICE VENT

Inspect and clean orifice vent to ensure it is clean and free of obstruction. Orifice diameter is .025 ± .005 inch.

4.2.4 INSPECT INTERIOR OF MAGNETO

Inspect inside of magneto for corrosion, oil and other turbocharger contaminants. Clean if necessary and inspect aircraft pressurization system according to the engine and/or airframe manufacturer's recommended procedures.

4.2.5 HARNESS CAP O-RING

Inspect O-ring in harness cap for cuts or other conditions that would inhibit a proper seal. Replace O-ring as necessary.

4.2.6 PRESSURE TEST MAGNETO

Pressure test magneto using instructions in Section 8.0 of this manual.

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5.0 REMOVING MAGNETO FROM ENGINE

- A. To remove magneto, proceed as if you were timing the magneto to the engine. Follow the engine manufacturer's procedure to set the engine to fire cylinder number one, at the timing setting shown on the engine data plate.
- B. Remove the harness cap from the magneto by removing the 3 screws that secure it to the magneto. When removing the cap, place a visible mark on the harness cap and an adjacent mark on the distributor housing. Use this mark to ensure that the cap is properly oriented upon reassembly.
- C. To remove the magneto from the engine, proceed as follows:

1. Remove the P-lead wire that connects the ignition switch to the magneto condenser.

Retard breaker magnetos only - Remove the lead that connects the retard contact points to the starting circuit.

Pressurized magnetos only - Disconnect pressurization tube from magneto.

Tachometer drive magnetos only - Disconnect tachometer lead or pickup device.

2. Remove the 2 nuts, washers and clamps that secure the magneto to the engine.

NOTE: THE MAGNETO MUST BE REMOVED FROM THE ENGINE FOR DISASSEMBLY AND INSPECTION.

- D. To prevent any contaminant from entering the magneto accessory hole, cover the hole with a suitable material while the magneto is removed from the engine.

CAUTION: EXTRA CARE MUST BE TAKEN TO PREVENT ANY FOREIGN OBJECT FROM PASSING INTO THE ENGINE THROUGH THE MAGNETO ACCESSORY HOLE ON THE ENGINE WHEN THE MAGNETO IS REMOVED.

- E. Remove Drive Gear/Lug.

In certain applications, it will be necessary to remove the drive gear/lug from the magneto. If applicable, remove drive gear/lug and save for reinstallation. Inspect drive gear/lug according to the engine manufacturer's recommended procedures.

NOTE: DO NOT STRIKE OR EXERT CRUSHING FORCE AGAINST END OF ROTOR SHAFT TO REMOVE DRIVE GEAR.

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6.0 MAGNETO DISASSEMBLY

Following are disassembly instructions for Slick 4300/6300 Series Magnetos. The directions are generalized and refer to both 4300/6300 Series Magnetos unless specifically noted. Refer to Table Two for specific part numbers and to Table One, Exploded Assembly Diagram.

The following parts must be replaced at overhaul. Additional parts may require replacement depending on conditions as determined during magneto inspection. Install only Unison Replacement Parts.

ALL MAGNETOS

Condenser
Double Sealed Bearing
Bearing Cap Assembly Coil
Impulse Coupling (where applicable)
Oil Seal
Contact Point Kit
Rotor Gear
Distributor Block and Gear

PRESSURIZED MAGNETOS:

In addition to above parts, the following components must be replaced at every overhaul.

Frame Gasket
Housing Screw
Harness Cap 'O' Ring

A complete list of parts that must be replaced at overhaul can be found in Table One (4300 Series) and Table Four (6300 Series). Refer to tables One through Seven as you overhaul your Slick Magneto.

Use only genuine Unison Industries manufactured parts obtained from Unison approved sources. Genuine Unison parts are produced and inspected under rigorous procedures to insure airworthiness and suitability in Slick magnetos. Parts purchased from sources other than Unison, even though outwardly identical in appearance may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in a Slick magneto. Salvaged magneto parts, reworked parts obtained from non-Unison approved sources, or parts the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures, or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render service work with this part, even though originally manufactured by Unison Industries, unsuitable or unsafe for use in a Slick magneto. Unison Industries expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-Unison approved parts.

Slick magnetos are engineered so that mechanical parts wear at a balanced rate. Consistent and complimentary wear patterns establish the recommended maintenance intervals defined in Unison service literature, therefore used, service worn parts should never be used to troubleshoot or repair a magneto, nor should original parts be replaced by used service worn parts on magnetos being returned to service. Further, non-Unison manufactured parts may wear at uneven and different rates than original Unison manufactured parts, making Unison service literature an inappropriate guide to proper maintenance. Parts not manufactured by Unison Industries, even if FAA/PMA Approved may not fit or operate like original Unison manufactured parts. FAA testing of PMA parts does not require operation on an engine or flight tests and does not require the test duration to exceed the maintenance intervals called out in Unison literature. For these reasons, used service worn parts or parts not manufactured by Unison Industries may adversely affect magneto reliability in ways not anticipated by Unison Industries and its service literature.

NOTE: AN ALTERNATIVE TO OVERHAUL IS COMPLETE MAGNETO REPLACEMENT WITH A NEW SLICK MAGNETO. NEW SLICK MAGNETOS INCORPORATE ALL THE LATEST DESIGN FEATURES AND ARE A COST EFFECTIVE ALTERNATIVE TO OVERHAUL.

6.0.1 GENERAL ORDER OF DISASSEMBLY

Remove: Impulse Coupling
Woodruff Key
Distributor Housing Assembly
Condenser
Rotor Gear
Contact Breaker Assembly
Rotor Assembly
Bearings from Shaft
Coil
Oil Seal

6.1 REMOVE IMPULSE COUPLING

- A. Remove cotter pin, nut, washer, bushing and drive gear where applicable. (Section 5.0E.)
- B. Grasp shell of impulse coupling assembly and gently pull the assembly outward to clear the latching ears of the impulse hub assembly. (See Figure 6.1.)

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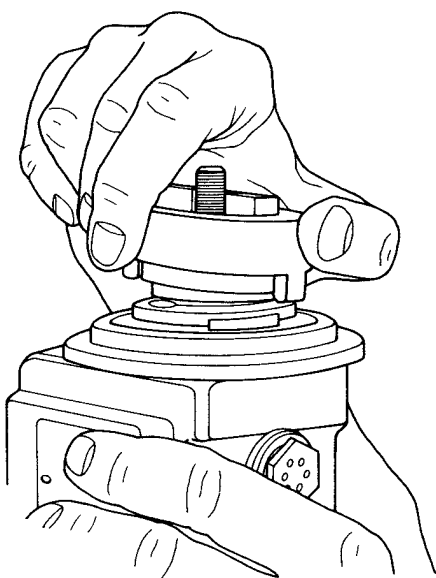


Figure 6.1

CAUTION: STRONG SPRING TENSION

- C. Turn shell to release spring tension.
- D. Remove impulse shell and attached impulse spring.
- E. Engage Slick T-106 hub puller into grooves in the hub assembly. Tighten T-106 puller bolt and remove impulse coupling hub assembly. (See Figure 6.1A.)

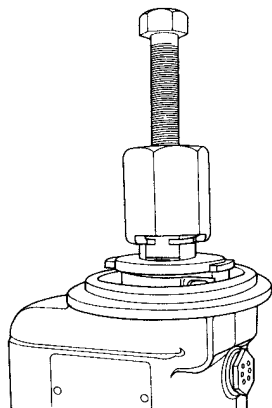


Figure 6.1A

6.2 REMOVE WOODRUFF KEY

Pry woodruff key from rotor shaft using pliers. (See Figure 6.2.)

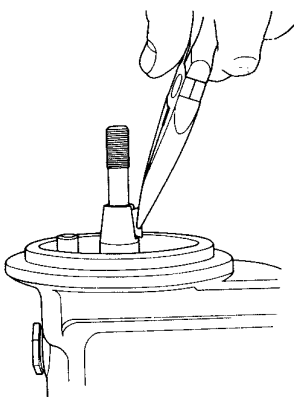


Figure 6.2

6.3 REMOVE DISTRIBUTOR HOUSING ASSEMBLY

- A. Remove three long screws and single short screw from distributor housing.
- B. Separate distributor housing from magneto frame.
- C. Disconnect condenser lead from contact breaker assembly.
- D. Retard breaker magnetos only - Disconnect retard breaker switch lead from contact breaker assembly.
- E. Tachometer drive magnetos only - Disconnect lead wire from contact points.

6.4 REMOVE DISTRIBUTOR BLOCK ASSEMBLY

Remove two screws and remove distributor bearing bar, distributor gear, distributor block, and spacers from the frame.

6.5 REMOVE CONDENSER

When removing the condenser from the distributor housing, carefully rotate the condenser wire counterclockwise in the same direction as the condenser to eliminate twisting the condenser lead. (See Figure 6.5.)

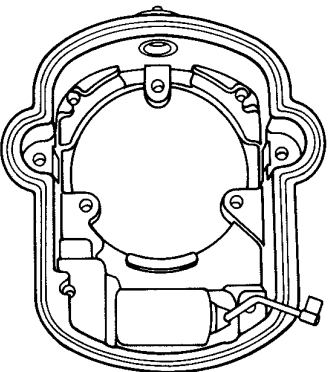


Figure 6.5

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6.6 REMOVE ROTOR GEAR

Pry rotor gear out of the end of the rotor assembly using two flat-blade screwdrivers.

6.7 REMOVE CONTACT BREAKER ASSEMBLY

6.7.1 IMPULSE COUPLED AND DIRECT DRIVE MAGNETOS

- A. Disconnect coil lead wire from contact breaker assembly.
- B. Remove screws and washers from breaker assembly.
- C. Remove contact breaker assembly from bearing cap.
- D. Remove cam by prying straight up with a screwdriver blade. (See Figure 6.7.1.)

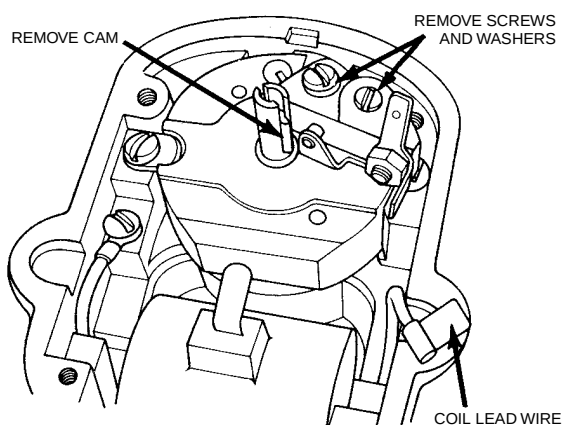


Figure 6.7.1

6.7.2 RETARD BREAKER MAGNETOS

NOTE: In a retard breaker magneto, the primary contact points are secured by a **BLACK** anodized screw. The retard breaker contact points are secured by a **SILVER** screw. (See Figure 6.7.2.)

- A. Disconnect coil lead wire from primary contact breaker assembly.
- B. Remove cam by prying straight up with a screwdriver blade.
- C. Remove screws and washers from primary contact breaker assembly.
- D. Remove primary contact breaker assembly.
- E. Remove screws and washers from retard breaker contact breaker assembly.

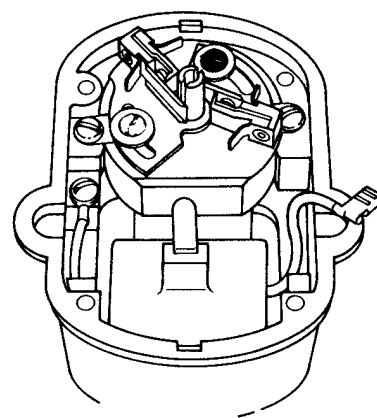


Figure 6.7.2

- F. Remove retard breaker contact breaker assembly and spacer.

6.7.3 TACHOMETER DRIVE MAGNETOS

- A. Disconnect tachometer lead wires from tachometer contact point assembly.
- B. Remove cam by prying straight up with screwdriver blade.
- C. Remove screws and washers from tachometer contact point assembly.
- D. Remove tachometer contact point assembly and spacers.

6.8 REMOVE ROTOR ASSEMBLY

- A. Remove two screws and two bearing plate clamps.
- B. Press against the drive end of the rotor shaft and withdraw the rotor and bearing cap assembly from the drive frame. (See Figure 6.8.)

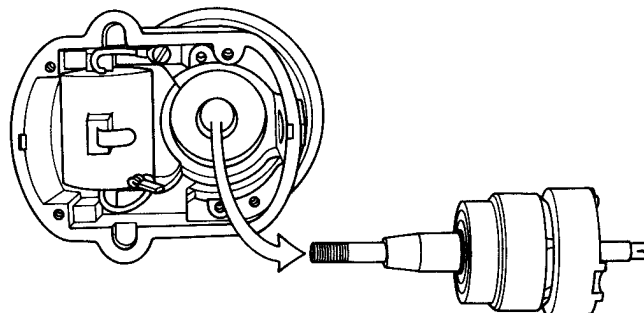


Figure 6.8

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6.9 REMOVE BEARINGS FROM SHAFT

- A. Place rotor on T-152 spacer. (See Figure 6.9.)

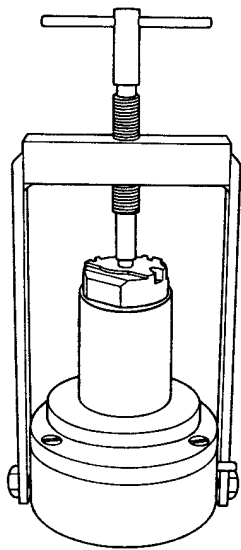


Figure 6.9

CAUTION: BEARING CAP ASSEMBLY HOLDS A DOUBLE-SEALED BEARING CAPTIVE IN THE BEARING CAP. THIS ASSEMBLY IS PRE-LUBRICATED AT THE FACTORY WITH SPECIAL GREASE THAT TOLERATES THE OZONE RICH ENVIRONMENT WITHIN THE MAGNETO. THE BEARING CAP AND BEARING ASSEMBLY SHOULD NEVER BE DISASSEMBLED.

- B. Press rotor shaft and remove bearing cap assembly. (See Figure 6.9A.)

CAUTION: ROTOR IS MAGNETIZED. DO NOT ALLOW ROTOR TO COME INTO CONTACT WITH METAL.

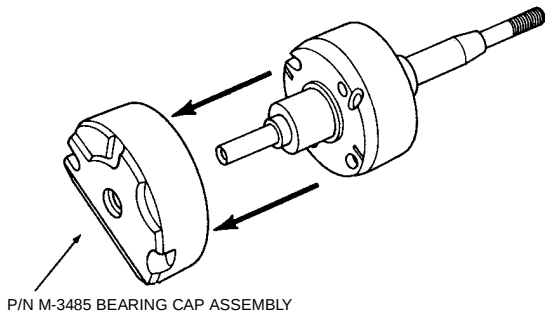


Figure 6.9A

- C. Insert Slick T-121 bearing puller (both halves) between drive end bearing and rotor magnet head.
- D. Place rotor and T-121 bearing puller on T-152 spacer.
- E. Press rotor shaft and remove drive end bearing.

6.10 REMOVE COIL

- A. Remove coil primary ground screw.
- B. Using coil wedge extractor T-122, remove coil wedges and lift out coil. (See Figure 6.10.)

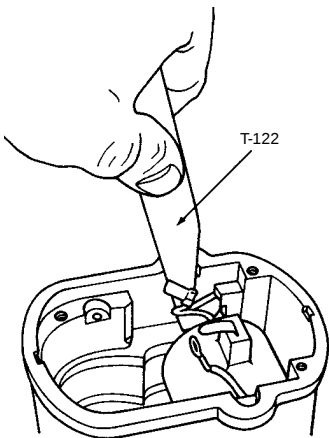


Figure 6.10

6.11 REMOVE AIR VENTS

Remove air vents from magneto.

6.12 REMOVE OIL SEAL

Remove oil seal from magneto.

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7.0 MAGNETO ASSEMBLY

7.0.1 GENERAL ORDER OF ASSEMBLY

Assemble Bearings onto Shaft
 Install Rotor Shaft Assembly
 Install Oil Seal
 Install Woodruff Key
 Assemble Impulse Coupling
 Install Impulse Coupling
 Install Coil
 Install Contact Point Assembly
 Install Rotor Cam
 Install Rotor Gear
 Timing the Magneto
 Install Retard Breaker Lead Wire
 (Retard Breaker Magneto Only)
 Install Condenser
 Install Distributor Gear Assembly
 Install Distributor Block
 Connect Condenser Wire
 Align Rotor Gear
 Align Distributor Gear
 Attach and Secure the Distributor Housing

7.1 ASSEMBLE BEARINGS ONTO SHAFT

- A. Insert the base plate (T-117) and adapter plate bushing (T-119) into the T-100 tool kit base.
- B. Place one ball bearing and bearing cap assembly onto the rotor shaft.
- C. Insert the rotor shaft into the adapter plate bushing (threaded end down).
- D. Place the bearing assembly plug (T-101) onto the exposed end of the rotor shaft. (See Figure 7.1.)

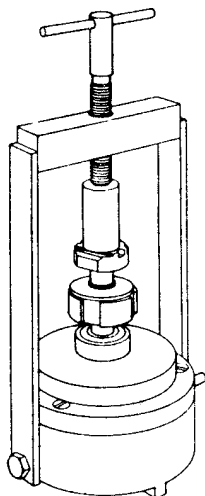


Figure 7.1

- E. Turn T-handle screw to seat the bearings against the bearing shoulders on the rotor shaft.

- F. Remove the rotor shaft, adapter bushing, adapter plate and bearing assembly plug from the T-100 tool base.

7.2 INSTALL ROTOR SHAFT ASSEMBLY

- A. Place magneto frame in T-100 base (flange down).
- B. Position rotor shaft assembly in the magneto frame.
- C. Insert rotor and frame assembly plug (T-102) into the T-100 fixture T-handle. (See Figure 7.2.)

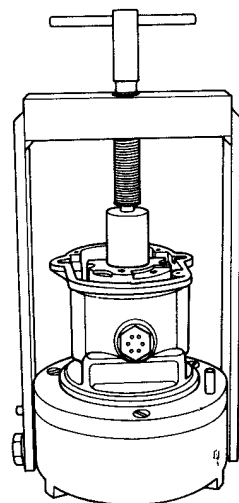


Figure 7.2

- D. Turn T-handle until the bearing cap bottoms in the frame.
- E. Place T-151 cam and rotor set onto the end of the rotor shaft and turn T-handle until the shaft bottoms in magneto frame. (See Figure 7.2.1.)

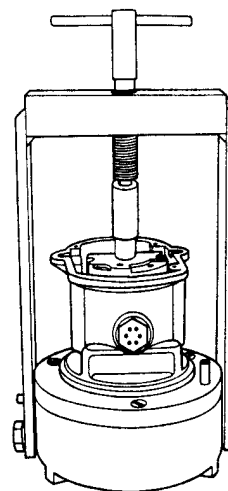


Figure 7.2.1

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- F. Install bearing clamps and the hold-down screws using loctite thread locker.
- G. Torque screws to 20-24 in-lbs.

7.3 INSTALL OIL SEAL

- A. Lubricate oil seal with engine oil.
- B. Reverse the magneto on the T-100 base so the flange is facing up.
- C. Insert the oil seal over the rotor shaft. The convex center of the seal should face outward from the magneto.

CAUTION: ENSURE THAT THE OIL SEAL IS NOT NICKED OR DAMAGED BY THE EDGES OF THE WOODRUFF KEY SLOT.

- D. Press the oil seal flush into the frame using the oil seal assembly plug (T-103) and the T-handle screw. (See Figure 7.3.)

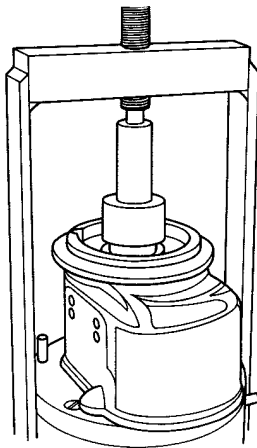


Figure 7.3

7.4 INSTALL WOODRUFF KEY

Press woodruff key into the key slot of the rotor shaft.

7.5 ASSEMBLE IMPULSE COUPLING

Retard Breaker Magnetos-Proceed to 7.7

- A. Assemble the inner eye of the impulse spring into the grooves in the impulse hub.
- B. Set the impulse shell on the hub. There is no tension in the coupling in this position.
- C. Hold the shell in one hand and the pawls the thumb and forefinger of the other hand.

- D. Pull the hub straight back slowly far enough to clear the projections on the shell.
- E. Hold the shell stationary and rotate the hub to wind the spring until the projections on the other section of the pawl plate pass the projections on the shell. (Approximately one-quarter revolution; 90 degrees.)

CAUTION: DO NOT WIND COUPLING MORE THAN 1/4 TURN.

- F. Make sure the shell is seated squarely on the hub and turns freely.

7.6 INSTALL IMPULSE COUPLING (If So Equipped)

- A. Install impulse coupling assembly on to the rotor shaft.
- B. Install impulse washer.
- C. Install coupling nut and torque to 120-320 in-lbs to seat coupling onto the rotor shaft. If cotter pin will not align with pin hole within the specified torque range, remove nut and lightly lap the bottom surface of the nut with a piece of emery cloth.

NOTE: ON SOME MAGNETOS, IT WILL BE NECESSARY TO REMOVE THE IMPULSE COUPLING NUT AND WASHER DURING DRIVE GEAR INSTALLATION. LEAVE THE NUT AND WASHER INSTALLED AS IN STEP C, UNTIL AFTER POST-INSPECTION TESTING.

- D. Check to see that the coupling is free by snapping it through 3 or 4 times.

7.7 INSTALL COIL

- A. Place the frame on the T-100 assembly and timing tool. Insert the coil into the frame, making sure that it is back against the stops. Insert the coil wedges between the bridge and the frame.
- B. Drive the two wedges tight, using a hammer and flat punch. Attach the ground wire of the coil to the frame, using screw. Torque to 20 in-lbs.
- C. Position the coil high tension lead flush to 1/32 inch below the parting surface of the magneto frame. (See Figure 7.7.)

CAUTION: IF THE HIGH TENSION LEAD PROTRUDES ABOVE THE MAGNETO FRAME, IT CAN MAKE DIRECT CONTACT WITH THE DISTRIBUTOR GEAR AND CAUSE THE MAGNETO TO MALFUNCTION.

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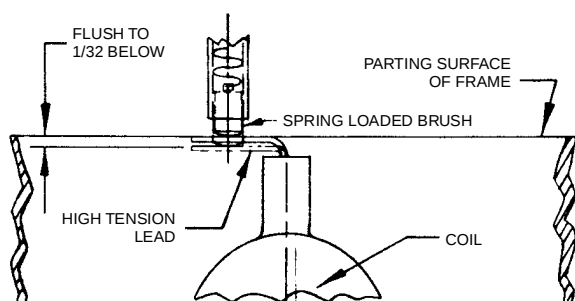


Figure 7.7

7.8 INSTALL CONTACT POINTS

7.8.1 PRIMARY CONTACT POINTS - ALL MAGNETOS

- A. Attach contact point assembly on the bearing cap using appropriate screw.

NOTE: ON RETARD BREAKER MAGNETOS, THE PRIMARY POINTS ARE SECURED WITH A BLACK ANODIZED SCREW.

CAUTION: RETARD BREAKER MAGNETOS USE DIFFERENT LENGTH SCREWS TO SECURE THE CONTACT BREAKER ASSEMBLIES. USE OF INCORRECT MOUNTING SCREWS WILL DAMAGE UPPER MAGNETO BEARING AND CAUSE POSSIBLE MAGNETO FAILURE.

7.8.2 RETARD BREAKER CONTACT POINTS - RETARD BREAKER MAGNETOS ONLY

NOTE: INSTALL PRIMARY POINT ASSEMBLY BEFORE INSTALLING RETARD POINT ASSEMBLY.

- A. Place spacer on bearing cap and attach retard contact points assembly using silver screw and plain washer.
- B. Do not tighten screws until magneto is timed.

7.8.3 TACHOMETER DRIVE CONTACT POINTS - TACHOMETER DRIVE MAGNETOS ONLY

NOTE: INSTALL PRIMARY POINT ASSEMBLY BEFORE INSTALLING TACHOMETER POINT ASSEMBLY.

- A. Place tachometer contact points on bearing cap and secure using two screws and plain washers.
- B. Do not tighten screws until magneto is timed.

7.9 INSTALL ROTOR CAM

- A. Install cam using a light hammer and T-151 cam and rotor set.

- B. Drive the cam until it bottoms in the rotor cam slot. (See Figure 7.9.)

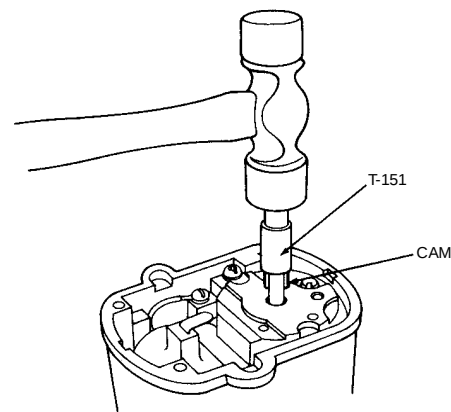


Figure 7.9

7.10 TIME THE MAGNETO

NOTE: FOR RETARD BREAKER MAGNETOS, THE PRIMARY POINTS MUST BE SET FIRST. THE RETARD (SECONDARY) POINTS ARE SET IN REFERENCE TO THE PRIMARY POINTS AND THE PRIMARY POINTS MUST BE SET CORRECTLY TO ENSURE ACCURACY OF RETARD CONTACT SETTINGS.

7.10.1 SET PRIMARY POINTS - ALL MAGNETOS

- A. Place the magneto on the T-125 base, flange down.

6300 Series Magnetos - Remove T-509 timing base adapter.

Retard Breaker Magnetos - Install the T-123 timing plug on the rotor shaft before placing the magneto on the T-125 rotor base.

Impulse Coupled Magnetos - Do not use T-123 timing plug.

Direct-Drive Magnetos - Install the T-123 timing plug on the rotor shaft before placing the magneto on the T-125 base.

- B. Looking directly down on the magneto, align the magneto so that the coil is oriented in the 12 o'clock position.
- C. Insert T-150 "E" Gap Gauge (Figure 7.10.1) between the pole laminations in the rotor shaft and the pole laminations in the frame.

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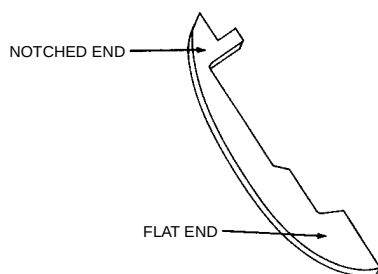


Figure 7.10.1

Insert flat end of T-150 when using old style rotor (no slots on the magnet head). See Figure 7.10.2. Reference the magneto data plate for magneto rotation. Insert the "E" Gap Gauge against the right lamination for right-hand rotation magnetos and against the left laminations for left-hand rotation magneto.

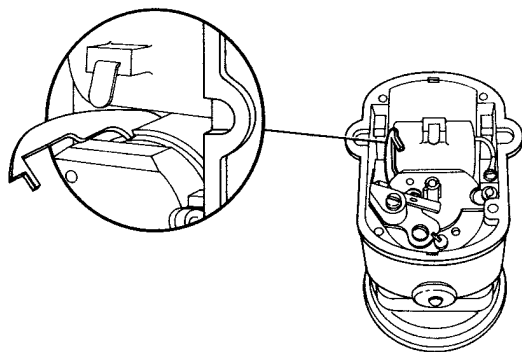


Figure 7.10.2

Insert notched end of T-150 when using new style rotors (with slots on magnet head). See Figure 7.10.3. Locate the appropriate "L" or "R" timing slot on the rotor magnet head and insert the notched end of the "E" gap gauge. Use the "L" slot for left-hand rotation magnetos and the "R" slot for right-hand rotation magnetos.

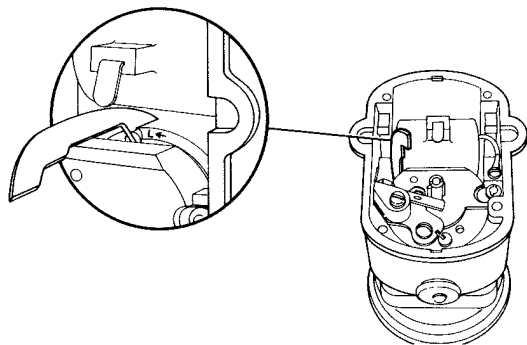


Figure 7.10.3

- D. Rotate the magneto frame on the T-100 base until the T-150 "E" gap gauge rests against the pole lamination in the magneto frame. Rotate the magneto frame clockwise for left-hand rotation magnetos and counterclockwise for right-hand rotation magnetos. The magneto rotor shaft is now in "E" gap position.

- E. Using a timing light, adjust the contact points to be just opening when the frame is against the T- 150 gauge. This will provide a point gap opening of .008-.010 inches.
- F. Impulse Coupled and Direct Drive Magnetos: Secure the points in this position by tightening the screws. Torque adjusting screw to 18-20 in-lbs. Torque the pivot screw to 15-18 in- lbs.

Retard Breaker Magnetos: Secure primary points by tightening the adjusting screw. Torque to 15-18 in-lbs. Proceed to 7.10.2.

Tachometer Drive Magnetos: Secure primary points by tightening the adjusting screw. Torque to 15-18 in-lbs. Proceed to 7.10.3.

- G. Apply cam grease sparingly to each lobe of the cam. (See Figure 7.10.4.)

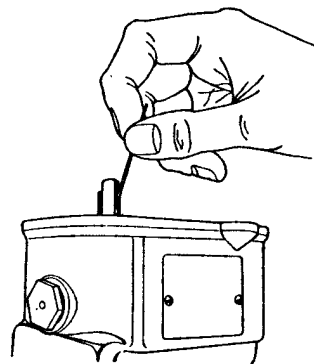


Figure 7.10.4

- H. Attach coil lead wire to the vertical bronze male terminal of the primary point assembly.

7.10.2 SET SECONDARY POINTS - RETARD BREAKER MAGNETOS ONLY

NOTE: FOR RETARD BREAKER MAGNETOS, THE PRIMARY POINTS MUST BE SET FIRST. THE RETARD (SECONDARY) POINTS ARE SET IN REFERENCE TO THE PRIMARY POINTS, AND THE PRIMARY POINTS MUST BE SET CORRECTLY TO ENSURE ACCURACY OF RETARD CONTACT SETTINGS.

- A. Set primary points according to instructions in Section 7.1 0.1 above. Do not remove T- 1 50 " E " gap gauge, and do not remove magneto frame from T-125 base.

NOTE: RETARD POINTS ARE SET IN REFERENCE TO PRIMARY POINT SETTINGS. THE LAG ANGLE ON THE MAGNETO DATAPLATE IS THE RETARD BREAKER'S RETARD ANGLE MEASURED IN DEGREES. THE FOLLOWING PROCEDURE WILL SET THE RETARD POINTS THE REQUIRED NUMBER OF DEGREES FROM THE PRIMARY POINTS.

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- B. Holding magneto securely in base (in "E", gap position), tip magneto and T-125 base and loosen timing disk retaining screws. Timing disk should rotate freely.
- C. Ensure that the T-150 "E" gap gauge is still positioned against the correct lamination. Rotate magneto frame until it contacts the pin in the T-125 base. Rotate the magneto frame clockwise for left-hand rotation magnetos, counterclockwise for right-hand rotation magnetos.
- D. Hold magneto securely in base and tip magneto and T-125 base. Tighten one timing disk retaining screw to hold the timing disk in place. Remove magneto from T-125 base.
- E. Turn T-125 base over so that timing disk is facing you. Loosen timing disk retaining screw. Scribe a mark on the timing disk corresponding to the index mark on the T-125 base. This represents a point-of-reference for primary point "E" gap. (See Figure 7.10.5.)

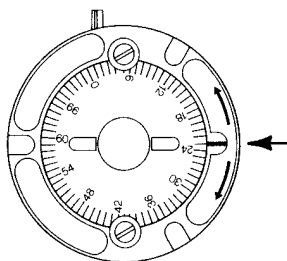


Figure 7.10.5

NOTE: THE ACTUAL NUMBER AT THE TIMING DISK INDEX MARK IS NOT CRITICAL. THIS INDEX MARK WILL BE USED AS A POINT OF REFERENCE FOR SETTING THE RETARD POINTS A SPECIFIED NUMBER OF DEGREES FROM THE PRIMARY POINTS.

- F. Note the lag angle from the magneto dataplate.
- G. The ticks on the timing disk each represent 5 degrees. To set the timing disk in the proper position, rotate the timing disk counterclockwise for left-hand rotation magnetos and clockwise for right-hand rotation magnetos. Rotate the disk according to the following chart:

Magneto Retard Angle	Number of Ticks on Timing Disk
5°	1
10°	2
15°	3
20°	4
25°	5
30°	6
35°	7
40°	8

EXAMPLE:

Lag angle as noted from dataplate: 25°

Rotation as noted from dataplate: L

To set timing disk, turn the timing disk 5 ticks ($5 \times 5^\circ = 25$) counterclockwise using scribed mark as reference point.

- H. Tighten timing disk retaining screws. Reverse T-125 base and place magneto in it, flange down (use T-123 timing plug). Remove T-150 "E" gap gauge from magneto.
1. Rotate magneto against the direction of normal rotation (clockwise for left-hand rotation magnetos and counterclockwise for right-hand rotation magnetos) until the magneto bumps against the pin in the T-125 base. The magneto rotor shaft is now retarded from E-gap position the number of degrees indicated on the magneto data plate.
- J. Using a timing light, adjust the retard contact points to where they are just opening. Tighten the adjusting screws to secure the retard points in this position. Torque adjusting screws to 18 - 20 in-lbs.
- K. Apply cam grease sparingly to each lobe of the cam. (See Figure 7.10.6.)

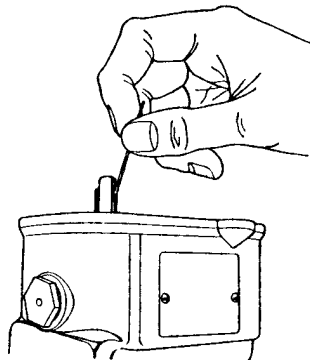


Figure 7.10.6

- L. Attach coil lead wire to the male terminal of the primary point assembly.

7.10.3 SET TACHOMETER DRIVE POINTS - TACHOMETER DRIVE MAGNETOS ONLY

- A. Set primary points according to instructions in Section 7.10.1 above.
- B. Adjust tachometer drive points to have an opening of .013 ($\pm .002$) with the rotor oriented to the position of maximum cam lift.
- C. Tighten the adjusting screws to secure the points in this position. Torque adjusting screws to 18-20 in-lbs.
- D. Apply cam grease sparingly to each lobe of the cam. (See Figure 7.10.6.)

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7.11 INSTALL CONDENSER

- A. Assemble the condenser into the distributor housing, being sure to rotate the condenser wire the same rotation as the condenser is tightened in the housing. (See Figure 7.11.)

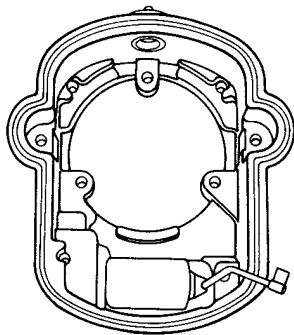


Figure 7.11

Retard Breaker Magnetos Only - Ensure retard breaker contact lead is channeled underneath condenser. See Figure 7.11.1.

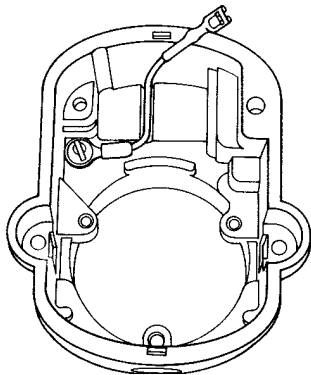


Figure 7.11.1

CAUTION: RETARD BREAKER LEAD WIRE MUST BE CHANNELED SECURELY UNDER CONDENSER. FAILURE TO DO SO MAY CAUSE THE LEAD WIRE TO INTERFERE WITH ROTOR GEAR MOVEMENT OR POINT OPERATION.

7.12 DISTRIBUTOR GEAR ASSEMBLY

- A. Install carbon brush into spring.
 - 1. Insert small end of carbon brush into tapered end of spring.
 - 2. Turn carbon brush clockwise until the shoulder of carbon brush seats on the spring.

- B. Install carbon brush assembly into the distributor gear.
 - 1. Insert the open end of the spring into the open end of the distributor gear shaft.
 - 2. Gently press the carbon brush and spring assembly into the shaft until the spring seats on the bottom of the shaft. The top of the carbon brush should protrude from the top of the shaft approximately 1/4 inch. (See Figure 7.12.)

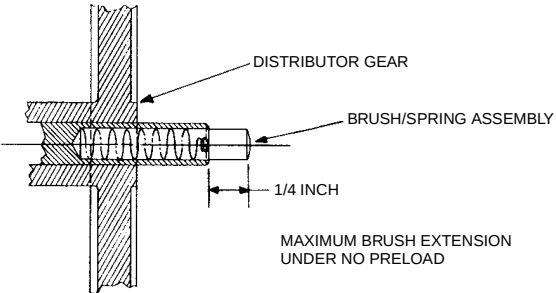


Figure 7.12

7.13 ASSEMBLE DISTRIBUTOR BLOCK

- A. Using a clean cotton swab, lubricate bearing bar bushing and distributor block bushing with a small amount of clean engine oil.
- B. Assemble the distributor gear in the distributor block with the L&R facing you.
- C. Assemble the bearing bar to the distributor block with the brush shield facing the notch in the distributor block as shown in Figure 7.13.

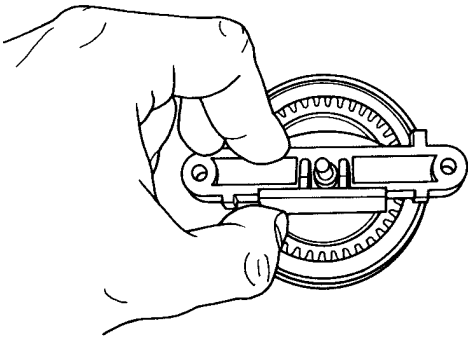


Figure 7.13

7.14 ALIGN ROTOR GEAR

- A. Install rotor gear onto end of rotor shaft.
- B. Align the "L" or "R" (depending on the rotation of the magneto - look at data plate) on the rotor gear so that it points up, toward the high tension lead of the coil. Secure rotor shaft to prevent rotation during assembly. Alignment of rotor gear is critical. See Figure 7.14.)

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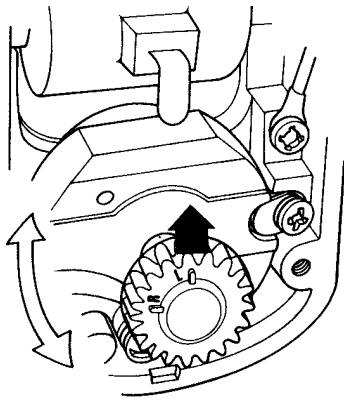


Figure 7.14

7.15 ALIGN DISTRIBUTOR GEAR

- A. Align the “L” or “R” hole in the distributor gear with the “L” or “R” in the distributor block. Use “L” for left-hand rotation and “R” for right-hand rotation magnetos.
- B. Lock the distributor gear in place with the T-118 timing pin through the appropriate hole in the block and gear.
- C. Place distributor block spacers on magneto frame. (See Figure 7.15.)

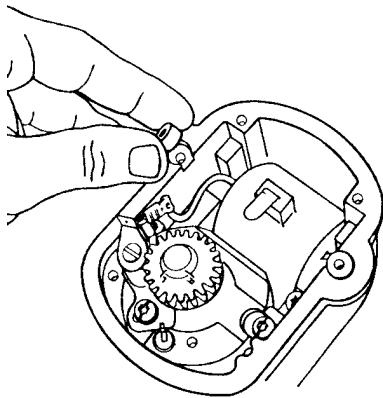


Figure 7.15

- D. Place the distributor block on magneto frame. The distributor gear and rotor gear are properly meshed when the index mark on the rotor gear aligns with the reference mark on the distributor block. (See Figure 7.15.A.)

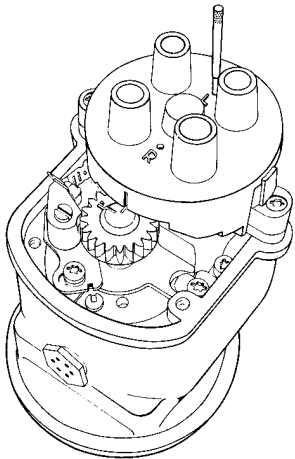


Figure 7.15.A

- E. Secure the distributor block to frame using screws provided.

7.16 CONNECT CONDENSER WIRE

- A. Connect condenser wire to the primary terminal of the contact assembly.
- B. Attach the terminal with the lead pointing left. (See Figure 7.16.)

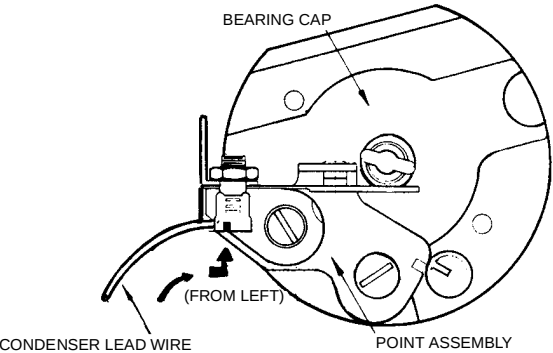


Figure 7.16

7.17 CONNECT RETARD CONTACT WIRE

- A. Connect retard terminal wire to retard contact points. (See Figure 7.17.)

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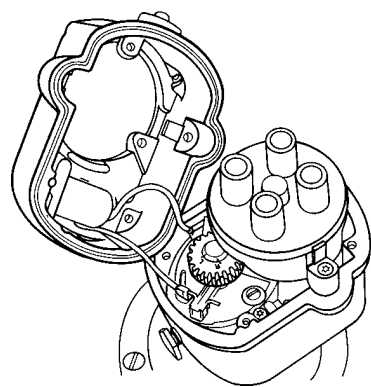


Figure 7.17

7.18 CONNECT TACHOMETER CONTACT WIRE

- A. Connect wires to tachometer contact points. (See Figure 7.18)

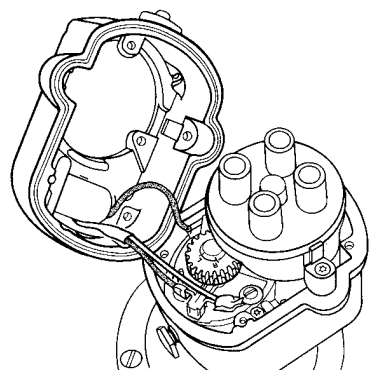


Figure 7.18

7.19 ATTACH THE DISTRIBUTOR HOUSING - NON PRESSURIZED MAGNETOS

- A. Place the distributor housing onto the magneto frame.

7.20 ATTACH THE DISTRIBUTOR HOUSING - PRESSURIZED MAGNETOS

- A. Install housing gasket.
- B. Place the distributor housing onto the magneto frame.

CAUTION: MAKE SURE THE CARBON BRUSH IS CONTAINED IN THE DISTRIBUTOR SHAFT DURING ASSEMBLY. IF THE CARBON BRUSH CATCHES ON THE SIDE OF THE DISTRIBUTOR SHAFT, THE COIL STRAP WILL BE BENT INTO THE WRONG POSITION DURING ASSEMBLY.

7.21 SECURE DISTRIBUTOR HOUSING

- A. Secure the housing with three screws and one screw. Torque to 24 in-lbs.
- B. Remove T-118 timing pin.

CAUTION: DO NOT ROTATE MAGNETO ROTOR SHAFT WITH THE T-118 TIMING PIN INSERTED IN THE DISTRIBUTOR BLOCK. IF ROTOR SHAFT IS ROTATED WITH TIMING PIN INSERTED, THE MAGNETO MUST BE DISASSEMBLED AND INSPECTED FOR DISTRIBUTOR BLOCK AND GEAR DAMAGE.

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8.0 POST-ASSEMBLY TESTING

Complete Magneto Reassembly, Section 7.0. Ensure that the T-118 Timing Pin has been removed.

8.1 PRE-TEST PREPARATION

- A. Mount the magneto on a suitable test stand in the same position as installed on the engine.
- B. Install a Slick High-Temperature Ignition Harness on the magneto and connect each output led to a 5mm spark gap.

CAUTION: DO NOT OPERATE THE MAGNETO UNLESS THE IGNITION HARNESS IS INSTALLED AND THE OUTPUT LEADS ARE CONNECTED TO THE 5mm GAP.

8.2 IMPULSE COUPLING

- A. Rotate the test stand drive pulley in the same direction of rotation as stated on the magneto data plate.
- B. The impulse coupling should engage the stop pin in the magneto frame below approximately 200 RPM. If the impulse coupling pawls slip past the stop pin or engage intermittently, the impulse coupling is not operating properly,

8.3 COMING-IN SPEED

- A. Determine the lowest speed at which the magneto can be turned and still spark all 5mm gaps without missing.
- B. The test gap must fire consistently at 200 RPM maximum on non-impulse magnetos and 350 RPM maximum on impulse coupled magnetos.

8.4 HIGH-SPEED TEST

- A. 4300 Series Magnetos
 1. Operate the magneto at 1000, 2000 and 3000 RPM for five minute at each speed setting.
 2. Observe sparking regularity at the spark gaps. Magneto must produce a consistent spark at all speed settings.

8.5 LONG TERM TEST (OPTIONAL)

- A. 4300 Series Magnetos
 1. Test run the magneto for a minimum of three hours. Operate the magneto at 1725 RPM for the first two hours and 3400 RPM for the remaining hour.
 2. Regular and consistent firing of the spark gaps is required during the entire test.
- B. 6300 Series magnetos
 1. Test run the magneto for a minimum of three hours. Operate the magneto at 3000 RPM for the first two hours and 4500 RPM for the remaining hour.
 2. Regular and consistent tiring of the spark gaps is required during the entire test.

8.6 TEMPERATURE TEST

Measure the temperature on the outside surface of the magneto frame during the long-term test at the highest RPM setting. The magneto will generate heat during normal operation. Maximum temperature on the outside surface of the magneto frame is 175°F when tested at room temperature.

8.7 PRESSURE TESTING - PRESSURIZED MAGNETOS ONLY

After magneto assembly, install a pressurized harness cap and apply 15 psi filtered air to the inlet nozzle of the magneto. Air flow at 15 psi is 11-40 standard cubic feet per hour (SCFH). If flow is excessive, reposition gaskets and retorquing housing and harness cap screws. Screws should be torqued to 21-25 in. lbs. (See Figure 8.8 for Test Apparatus Details.) Testing should be conducted with magneto at room temperature.

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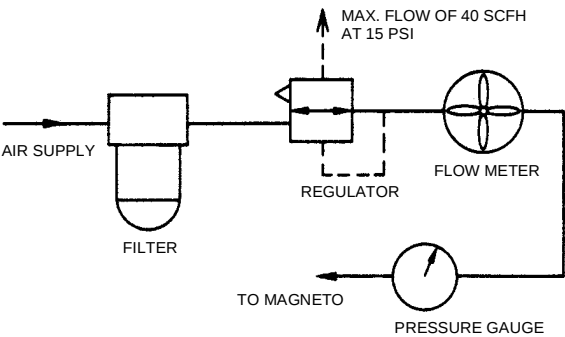


Figure 8.8

Note: Flow meter may be obtained from:
Dwyer Instruments, Inc.
PO Box 373
Michigan City, IN 46360
(219-879-8868)
Order Model MMA-7

8.8 PREFLIGHT OPERATIONAL CHECK

Before flight or after magneto maintenance, observe engine operation while running on both left or right magnetos individually. Both magnetos should operate normally and engine should operate within parameters outlined in the engine manufacturer's operating manual.

WARNING: DO NOT FLY AIRCRAFT IF BOTH MAGNETOS ARE NOT FUNCTIONING PROPERLY.

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9.0 POSTFLIGHT OPERATIONAL CHECK

After flight, observe engine operation while running on both left or right magnetos individually. Both magnetos should operate normally and engine should operate within parameters outlined in the engine manufacturer's operating manual.

WARNING: DO NOT ATTEMPT FURTHER FLIGHT IF BOTH MAGNETOS ARE NOT FUNCTIONING NORMALLY.

9.1 MAINTENANCE CHECKLIST

A/C Type _____	Engine Make/Model _____
N# _____	Total Time on Engine _____
Magneto P/N _____	Total Time on Magneto _____
Magneto S/N _____	Date _____

EVERY 100 HOURS

- ☐ **ADJUST TIMING TO ENGINE** Sec. 3.2.1

- ☐ **INSPECTIONS**
 - ☐ Wiring Conditions and Connections Sec. 3.2.2
 - ☐ Vent Holes-Non-Pressurized Magnetos Sec. 3.2.3
 - ☐ P-Lead Attachment Sec. 3.2.4
 - ☐ Turbo Filter (Pressurized Mags Only) Sec. 3.2.7
 - ☐ Inlet Nozzle (Pressurized Magnetos Only) Sec. 3.2.8
 - ☐ Orifice Vent (Pressurized Magnetos Only) Sec. 3.2.9

- ☐ **EVERY 500 HOURS**

- ☐ **GENERAL CLEANING** Sec. 3.3.1

- ☐ **INSPECTIONS-ALL MAGNETOS**
 - ☐ Ball Bearing Assembly Sec. 3.3.2
 - ☐ Impulse Coupling Sec. 3.3.4
 - ☐ Coil Sec. 3.3.5
 - ☐ Condenser Sec. 3.3.7
 - ☐ Contact Points Sec. 3.3.6
 - ☐ Carbon Brush Assembly Sec. 3.3.9
 - ☐ Distributor Block Assembly Sec. 3.3.8

- ☐ **INSPECTIONS-PRESSURIZED MAGNETOS** Sec. 3.4
 - ☐ Inlet Nozzle Sec. 3.4.1
 - ☐ Orifice Vent Sec. 3.4.2
 - ☐ Turbo Filter Sec. 3.4.3
 - ☐ Frame Gasket Sec. 3.4.4
 - ☐ Screw Gaskets Sec. 3.4.4
 - ☐ Harness Cap O-Ring Sec. 3.4.5
 - ☐ Magneto Interior-Check for Turbocharger Contaminants Sec. 3.3.3 - 3.3.10
 - ☐ Pressure Testing Sec. 8.8

- ☐ **LUBRICATION**

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10.0 TROUBLESHOOTING GUIDE

The following charts are intended to be used as a guide only. Many non-ignition factors influence the performance of aircraft ignition systems and the replacement or repair of ignition components may not remedy problems in all cases. After verifying that all non-ignition related causes for possible problems have been explored, then proceed to use this troubleshooting guide.

10.1 TROUBLESHOOTING GUIDE

I. OPERATIONAL PROBLEMS

PROBLEM	POSSIBLE CAUSE	REMEDY
HARD STARTING	Incorrect external timing to engine.	Consult engine manufactures specification for ignition timing. Correct as required
	Incorrect internal timing.	Consult Unison Manual L-1363, Section 7.10 for internal timing specifications. Correct as required.
	Point gap setting incorrect.	Consult Unison Manual L-1363, Section 7.10 for point gap specifications. Correct as required.
	Faulty impulse coupling.	Consult Unison Manual L-1363, Section 3.3.4, for impulse coupling specifications and inspection procedures.
	Overtorqued impulse coupling nut.	Torque nut to 120-320 in-lbs on magnetos with attached drive gears. There must be .010 to .020" play between drive gear and impulse coupling. Correct as necessary.
	Worn pawls or stop pin.	Inspect pawls and stop pin for wear. Correct as necessary.
	Impulse coupling fails to return to unwound position.	Inspect impulse coupling nut for torque.
	Fouled spark plugs.	Clean spark plugs according to manufacturer's specification.
	Incorrect spark plug gap.	Re-gap spark plug to manufacturer's specifications.
	Faulty ignition switch.	Inspect ignition switch for possibility of intermittent grounding and proper operation. Repair or replace as necessary.
	Corrosion on harness lead contacts.	Consult manual L-1177 for proper cleaning and inspection procedures. Correct as required.

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PROBLEM	POSSIBLE CAUSE	REMEDY
HARD STARTING	Magneto Internal Component Failure:	Consult Unison Manual L-1363, Section 3, for specifications and inspection procedures.
	Points	Inspect for excessive burning, pitting, corrosion gap setting and general operation. Replace as necessary
	Cam	Inspect cam for excessive wear or unevenness that could cause "point spread." Correct as necessary.
	Condenser	Inspect for faulty P-lead connection, P-lead stud for over-torqued condition, damaged pigtail connector and damaged grounding. Replace as necessary.
	Coil	Inspect for cracks, damage to high tension strap or pigtail connector and integrity of windings. Replace as necessary
	Distributor gear	Inspect electrode finger for looseness, gear teeth, shaft. Inspect carbon brush for damage. Replace as necessary.
	Distributor Block	Inspect distributor towers for evidence of abrasion or excessive burning. Examine rotor gear bushings for wear. Replace as necessary.
PROPELLER KICKBACK DURING STARTING	Incorrect or nonstandard starting procedures	Consult engine manufacturers operation manual for proper operation and performance. Correct as required.
	Faulty fuel delivery system.	Consult engine manufacturer's manual for specifications and operation. Correct as required.
	Inoperative retard contact point circuit.	Inspect wiring connections and operation of points. Correct as required.
	Impulse coupling not staying engaged while starter engaged	Inspect impulse coupling for operation. Correct as required.
ROUGH RUNNING	Inoperative retard contact point circuit.	Inspect for faulty wiring, timing, or inoperative contact points. Correct as required.
	Non-impulse magneto not grounded while starter engaged.	Inspect and correct as required.
ROUGH RUNNING	Incorrect external timing to engine	Consult engine manufacturer's manual for specifications of ignition timing. Correct as required.
	Incorrect internal timing	Consult Unison Manual L-1363, Section 7.10, for internal timing specifications. Correct as required.
	Fouled spark plugs.	Clean spark plugs according to manufacturer's specifications.

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PROBLEM	POSSIBLE CAUSE	REMEDY
ROUGH RUNNING (cont.)	Incorrect spark plug gap	Regap spark plug to manufacturer's specifications.
	Faulty spark plug.	Test spark plug according to manufacturer's specifications.
	Faulty ignition lead.	Consult Unison Harness Maintenance Manual L-1499, for ignition lead troubleshooting information.
	Faulty ignition switch	Inspect ignition switch for possibility of intermittent grounding and proper operation. Repair or replace as necessary.
	Magneto Internal Component Failure:	Consult Unison Manual L-1363, Section 3, for specifications and inspection procedures.
	Points	Inspect for excessive burning, pitting, corrosion, gap setting and general operation. Replace as necessary.
	Cam	Inspect cam for excessive wear or unevenness that could cause "cam spread." Correct as necessary.
	Condenser	Inspect for faulty P-Lead connection, P-lead stud for overtightened condition, damaged pigtail connector and damaged grounding. Replace as necessary.
	Coil	Inspect for cracks, damage to high tension strap or pigtail connector and integrity of windings. Replace as necessary.
	Distributor Gear	Inspect electrode finger for looseness, gear teeth, shaft. Inspect carbon brush for damage. Replace as necessary.
	Distributor Block	Inspect distributor towers for evidence of abrasion or excessive burning. Examine rotor gear bushings for wear. Replace as necessary.
	Excessive heat.	Inspect baffling or cooling air duct. Correct as necessary.
	Faulty fuel delivery system.	Consult engine manufacturer's operations manual for proper operation and performance. Correct as required.
	Faulty induction system	Inspect for leaks and faulty valve operation. Consult engine manufacturer's specifications for proper operation and performance.
	Faulty exhaust system.	Inspect for obstructions in exhaust pipes and mufflers, faulty valve operation. Consult engine manufacturer's specifications for proper operation and performance.

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PROBLEM	POSSIBLE CAUSE	REMEDY
ROUGH RUNNING OR VIBRATION IN SPECIFIC RPM RANGE	Propeller out of track or unbalanced.	Consult propeller manufacturer's manual for specifications. Correct as necessary.
	Propeller imbalanced or installed incorrectly.	Correct as necessary
	Propeller/Engine harmonic resonance.	Consult airframe manufacturer's operations manual. Correct as necessary.
	Magneto Internal Component Failure:	Consult Unison Manual L-1363, Section 3 for specifications and inspections procedures.
	Points	Inspect for excessive burning, pitting, corrosion, gap setting and general operation. Replace as necessary.
	Cam	Inspect cam for excessive wear or unevenness that could cause "cam spread." Correct as necessary.
	Condenser	Inspect for faulty P-lead connection, P-lead stud for overtightened condition, damaged pigtail connector and damaged grounding. Replace as necessary.
	Coil	Inspect for cracks, damage to high tension strap or pigtail connector and integrity of windings. Replace as necessary.
	Distributor Gear	Inspect electrode finger for looseness, gear teeth, shaft. Inspect carbon brush for damage. Replace as necessary.
	Distributor Block	Inspect distributor towers for evidence of abrasion or excessive burning. Examine rotor gear bushings for wear. Replace as necessary.
	Faulty fuel delivery system.	Consult engine manufacturer's manual for specifications and operation. Correct as required.
	Faulty induction system	Inspect for leaks and faulty valve operation. Consult engine manufacturer's specifications for proper operation and performance. Correct as required.
	Faulty exhaust system.	Inspect for obstructions in exhaust pipes and mufflers, faulty valve operation. Consult engine manufacturer's specification for proper operation and performance.

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PROBLEM	POSSIBLE CAUSE	REMEDY
EXCESSIVE RPM DROP DURING MAGNETO CHECK	Incorrect external timing to engine.	Consult engine manufacturer's manual for specifications of ignition timing. Correct as necessary.
	Incorrect internal timing.	Consult Unison Manual L-1363, Section 7.10, for internal timing specifications. Correct as required.
	Fouled spark plugs.	Clean spark plugs according to manufacturer's specifications.
	Incorrect spark plug gap.	Re-gap spark plug to manufacturer's specifications.
	Faulty spark plug.	Test spark plug according to manufacturer's specifications
	Faulty tachometer.	Confirm tachometer accuracy at RPM where magneto drop noted. Correct as necessary
	Faulty ignition lead.	Consult Unison Harness Maintenance Manual L-1499 for ignition lead troubleshooting information. Correct as required
	Corrosion on harness lead contacts.	Consult Unison Harness Maintenance Manual L-1499 for proper cleaning and inspection procedures. Correct as required.
MAGNETO WILL NOT FIRE	Faulty ignition switch.	Inspect ignition switch for possibility of intermittent grounding and proper operation. Repair or replace as necessary
	Faulty condenser.	Consult Unison Manual L-1363, Section 3.3.7. Inspect for faulty P-lead connection, broken P-lead stud, damaged pigtail connector, and damaged grounding. Replace as necessary.
	Point gap setting incorrect.	Consult Unison Manual L-1363, Section 7.10, for point cap specifications. Correct as required.
	Retard contact point circuit inoperative.	Inspect and correct as required.
MAGNETO "HOT"	Faulty ignition switch.	Inspect ignition switch for possibility of intermittent grounding and proper operation. Repair or replace as necessary.
	Broken "P" lead wire.	Repair as necessary.
POWER LOSS	Incorrect external timing to engine.	Consult engine manufacturer's manual for specifications of ignition timing. Correct as required.
	Faulty Tachometer	Consult engine manufacturer's manual for specifications of ignition timing. Correct as required.

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II. PHYSICAL DAMAGE

PROBLEM	POSSIBLE CAUSE	REMEDY
MOUNTING FLANGE BROKEN	Hold down clamp over torqued. Hold down clamps torqued unevenly. Magnetos gasket residue on accessory case mounting pad.	Torque hold-down clamps to 190-220 in-lbs. When magnetos is reinstalled, be sure clamps are tightened with even pressure. Be sure mounting face is free of gasket residue.
POINTS BURNED EXCESSIVELY	Faulty condenser.	Consult Unison Manual L-1363, Section 3.3.7, for testing procedure. Replace as necessary.
	Improper spark plug gap.	Re-gap plugs according to manufacturer's specifications.
	Fouled spark plug.	Clean spark plug according to manufacturer's specifications.
	Excessive heat.	Inspect baffling or cooling air duct. Correct as necessary.
HIGH TENSION LEAD ON COIL WORN OR BURNED THROUGH	Improper tension between high tension lead and carbon brush.	Consult Unison Manual L-1363, Section 7.7, for high tension lead loading specifications.
COIL CRACKED OR ARCING IN CASE	Faulty coil.	Consult Unison Manual L-1363, Section 3.3.5, for specifications and inspection procedures. Replace as necessary.
	Improper spark plug gap.	Re-gap spark plug to manufacturer's specifications.
	Fouled spark plug.	Clean spark plug according to manufacturer's specifications.
	Faulty spark plug	Inspect spark plug according to manufacturer's specifications.
	Excessive heat	Inspect baffling or cooling air duct. Correct as necessary.
ELECTRODE FINGER LOOSE ON DISTRIBUTOR GEAR	Timing pin wedged between electrode and distributor block during timing process.	Consult Unison Manual L-1363 for proper timing procedures. Replace block and gear assembly.
DISTRIBUTOR BLOCK TOWERS SCORED OR EXCESSIVELY BURNED	Electrode finger contacting towers.	Inspect and replace as necessary.
DISTRIBUTOR GEAR BUSHINGS EXCESSIVELY WORN	Improper lubrication of bushing.	Consult Unison Manual L-1363, Section 3.3.8, for proper maintenance procedures.
BEARING BAR BURNED	Carbon tracking due to excessive carbon brush wear.	Consult Unison Manual L-1363, Section 7.7, for high tension lead loading specifications.

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PROBLEM	POSSIBLE CAUSE	REMEDY
SPUN BEARING	Bearing not updated to correct configuration.	Consult Unison Manual L-1363, Section 3.3.2 and 7.1, for proper maintenance procedure.
	Improper bearing installation.	Consult Unison Manual L-1363, Section 3.3.2 and 7.1, for proper maintenance procedure.
PRESSURIZED MAGNETOS ONLY: INTERNAL CONTAMINATION AND CORROSION	Faulty pressurization or filtration system.	Consult engine manufacturer's manual for pressurization system specifications.
ALL MAGNETOS: INTERNAL CONTAMINATION AND CORROSION	Excessive or improper solvents or cleaning agents	Consult Unison Manual L-1363 for proper cleaning procedures. Correct as necessary.

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TABLE ONE 4300 SERIES OVERHAUL PARTS REPLACEMENT LIST

The following parts must be replaced at overhaul. Additional parts may require replacement depending on conditions as determined during magneto inspection. Install only Unison Replacement Parts.

Use only genuine Unison manufactured parts obtained from Unison approved sources. Genuine Unison parts are produced and inspected under rigorous procedures to insure airworthiness and suitability in Slick magnetos. Parts purchased from sources other than Unison Industries, even though outwardly identical in appearance may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in a Slick magneto. Salvaged magneto parts, reworked parts obtained from non-Unison approved sources, or parts the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures, or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render service work with this part, even though originally manufactured by Unison Industries, unsuitable or unsafe for use in a Slick magneto. Unison Industries expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-Unison approved parts.

Slick magnetos are engineered to that mechanical parts wear at a balanced rate. Consistent and complimentary wear patterns establish the recommended maintenance intervals defined in Unison service literature, therefore used, service worn parts should never be used to troubleshoot or repair a magneto, not should original parts be replaced by used service worn parts on magnetos being returned to service. Further, non-Unison manufactured parts may wear at uneven and different rates than original Unison manufactured parts, making Unison service literature an inappropriate guide to proper maintenance. Parts not manufactured by Unison Industries, even if FAA/PMA Approved may not fit or operate like original Unison manufactured parts. FAA testing of PMA parts does not require operation on an engine or flight tests and does not require the test duration to exceed the maintenance intervals called out in Unison literature. For these reasons, used service worn parts or parts not manufactured by Unison Industries may adversely affect magneto reliability in ways not anticipated by Unison Industries and its service literature.

<u>Description</u>	<u>Qty</u>
Condenser	1
Double Sealed Bearing	1
Bearing Cap Assembly	1
Coil	1
Impulse Coupling	1
Oil Seal	1
Contact Point Kit	1
Rotor Gear	1
Distributor Block & Gear	1

Reference Table Two "Parts Listing" for correct part number for a specified model magneto

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TABLE TWO
4300 SERVICE PARTS LIST
 (Sheet 1 of 2)

Ref No.	Description	4301	4302	4303	4309	4310	4316	4330	4331	4333	4342	4344	4345	Qty. Used
1	Cotter Pin	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	1
2	Nut	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3492	M3019	M3019	M3019	1
3	Washer	M3172	M3172	M3172	M5372	M5372	M3172	M3172	M3172	-	M3172	M3172	M3172	1
4	Impulse Coupling Assy.	M3007	-	-	-	-	M3076	M3068	-	M3994	-	-	-	1
5	Oil Seal	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	1
6	Air Vent	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	1
7	Frame	M3859	M3900	M3859	M3900	M3900	M3888	M3888	M3900	M5002	M3900	M3900	M3900	1
8	Rotor	M3073	M3513	M3338	M3073	M3073	M3047	M3065	M3065	M5000	M3548	M3513	M3548	1
9	Bearing Kit	K3318-4	K3318-4	K3318-4	K3318-4	K3301	K3318-4	K3318-4	K3318-4	K3318-4	K3301	K3301	K3301	1
10	Ball Bearing	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	1
11	Bearing Cap Assy.	K3485	K3485	K3485	K3485	K3630	K3485	K3485	K3485	K3485	K3630	K3630	K3630	1
12	Bearing Cap Clamp	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	2
13	Screw	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	2
14	Contact Point Primary	M3081	M3081	M3081	M3081	M3637	M3081	M3081	M3081	M3081	M3637	M3637	M3637	1
15	Contact Point Secondary	-	-	-	-	M3637	-	-	-	-	M3740	M3740	M3637	1
16	Rotor Gear	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	1
17	Woodruff Key	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	1
18	Coil Wedge	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	2
19	Screw	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	1
20	Coil	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	1
21	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	1
22	Air Vent with Hood	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	1
23	Screw	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	3
24	Housing, Distirbutor	M3902	M3902	M3902	M3902	M3832	M3902	M3902	M3902	M3902	M3784	M3784	M3832	1
25	Capacitor	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	1
26	Dist. Block & Gear Assy.	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	1
27	Carbon Brush	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	1
28	Deleted													
29	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	2
30	Spacer	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	2

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4300 SERVICE PARTS LIST
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Ref. No.	Description	4347	4348	4353	4354	4370	4371	4372	4373	4374	4381	4392	Qty. Used
1	Cotter Pin	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	1
2	Nut	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	1
3	Washer	M3172	M3172	M3172	M3172	M3172	M3172	M3172	M3172	M3172	M3172	M3172	1
4	Impulse Coupling Assy.	-	-	-	M3529	-	M3163	M3100	M3529	M3689	M3007	M3939	1
5	Oil Seal	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	M3062	1
6	Air Vent	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	M1077	1
7	Frame	M3900	M3900	M3900	M3859	M3900	M3859	M3859	M3859	M3888	M3859	M3888	1
8	Rotor	M3548	M3512	M3548	M3158	M3548	M3158	M3158	M3158	M3065	M3158	M3065	1
9	Bearing Kit	K3301	K3301	K3301	K3301	K3318-4	K3318-4	K3318-4	K3318-4	K3318-4	K3318-4	K3318-4	1
10	Ball Bearing	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	1
11	Bearing Cap Assy.	K3630	K3630	K3630	K3630	K3485	K3485	K3485	K3485	K3485	K3485	K3485	1
12	Bearing Cap Clamp	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	2
13	Screw	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	2
14	Contact Point Primary	M3637	M3637	M3637	M3637	M3081	M3081	M3081	M3081	M3081	M3081	M3081	1
15	Contact Point Secondary	M3637	M3637	M3637	M3637	-	-	-	-	-	-	-	1
16	Rotor Gear	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	M3827	1
17	Woodruff Key	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	1
18	Coil Wedge	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	2
19	Screw	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	1
20	Coil	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	1
21	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	1
22	Air Vent with Hood	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	M3084	1
23	Screw	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	M3015	3
24	Housing, Distributor	M3832	M3832	M3832	M3832	M3902	M3902	M3902	M3902	M3902	M3902	M3902	1
25	Capacitor	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	1
26	Dist. Block & Gear Assy.	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	K3822	1
27	Carbon Brush	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	1
28	Deleted												
29	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	2
30	Spacer	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	2

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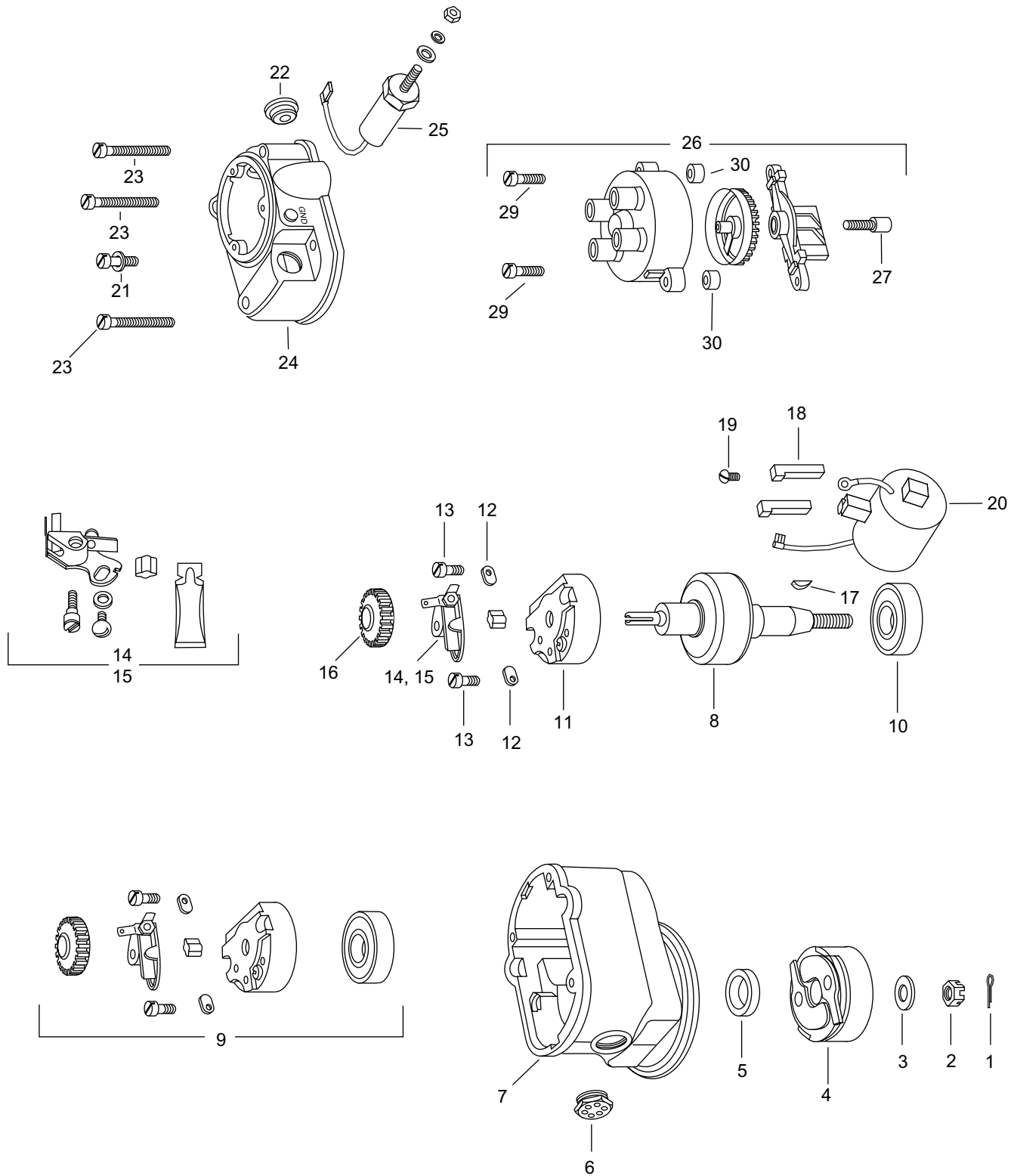
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TABLE THREE

EXPLODED PARTS DIAGRAM

4300 SERIES MAGNETO



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TABLE FOUR
6300 SERIES OVERHAUL PARTS
REPLACEMENT LIST

The following parts must be replaced at overhaul.

Additional parts may require replacement depending on conditions as determined during magneto inspection. Install only Unison Replacement Parts.

Use only genuine Unison manufactured parts obtained from Unison approved sources.

Genuine Unison parts are produced and inspected under rigorous procedures to insure airworthiness and suitability in Slick magnetos. Parts purchased from sources other than Unison Industries, even though outwardly identical in appearance may not have had the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in a Slick magneto. Salvaged magneto parts, reworked parts obtained from non-Unison approved sources, or parts the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures, or have other hidden damage, not discernible through routine visual or usual nondestructive testing techniques. This may render service work with this part, even though originally manufactured by Unison Industries, unsuitable or unsafe for use in a Slick magneto. Unison Industries expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-Unison approved parts.

Slick magnetos are engineered to that mechanical parts wear at a balanced rate. Consistent and complimentary wear patterns establish the recommended maintenance intervals defined in Unison service literature, therefore used, service worn parts should never be used to troubleshoot or repair a magneto, not should original parts be replaced by used service worn parts on magnetos being returned to service. Further, non-Unison manufactured parts may wear at uneven and different rates than original Unison manufactured parts, making Unison service literature an inappropriate guide to proper maintenance. Parts not manufactured by Unison Industries, even if FAA/PMA Approved may not fit or operate like original Unison manufactured parts. FAA testing of PMA parts does not require operation on an engine or flight tests and does not require the test duration to exceed the maintenance intervals called out in Unison literature. For these reasons, used service worn parts or parts not manufactured by Unison Industries may adversely affect magneto reliability in ways not anticipated by Unison Industries and its service literature.

<u>Description</u>	<u>Qty</u>
Condenser	1
Double Shielded Bearing	1
Bearing Cap Assembly	1
Coil	1
Impulse Coupling	1
Oil Seal	1
Contact Point	1
Rotor Gear	1
Distributor Block & Gear	1

PRESSURIZED MAGNETOS:

In addition to above parts, the following components must be replaced at every overhaul.

Pressurized Magneto Kit	1
Round Head Screw	1
Round Head Screw	3
Frame Gasket	1
Housing Screw	4
Harness Cap 'O' Ring	1

Reference Table Five "Parts Listing" for correct part number for a specified model magneto.

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TABLE FIVE
6300 SERVICE PARTS LIST
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Ref. No.	Description	6309	6310	6313	6314	6320	6324	6331	6340	6350	6351	6355	Qty. Used
1	Cotter Pin	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	1
2	Nut	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	M3019	1
3	Washer	M3172	M3172	M3172	M3172	M3172	M3172	-	-	-	-	-	1
4	Impulse Coupling Assy.	-	M3050	-	M3089	M3050	M3089	M3800	-	-	M3333	M3635	1
5	Oil Seal	M3062	M3062	M3062	M3062	M3062	M3062	M3331	M331	M3331	M3331	M3331	1
6	Pressure Vent Plug	-	-	-	-	M3179	M3179	M3179	M3179	-	-	-	1
7	Air Vent	M1077	M1077	M1077	M1077	-	-	-	-	M1077	M1077	M1077	1
8	Frame	M3946	M3837	M3946	M3847	M3837	M3847	M3888	M3900	M3900	M3859	M3859	1
9	Gasket Pressure kit	-	-	-	-	K3307	K3307	K3307	K3307	-	-	-	1
10	Ball Bearing	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	1
11	Rotor	M3914	M3047	M3914	M3093	M3047	M3093	M3792	M5618	M5617	M3327	M3416	1
12	Bearing Cap Assy.	M3630	M3485	M3485	M3485	M3485	M3485	M3485	M3485	M3485	M3485	M3485	1
13	Bearing Cap Clamp	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	2
14	Screw	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	2
15	Contact Point Primary	M3637	M3081	M3081	M3081	M3081	M3081	M3081	M3081	M3081	M3081	M3081	1
16	Contact Point Secondary	M3637	-	-	-	-	-	-	-	-	-	-	1
17	Rotor Gear	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	1
18	Woodruff Key	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	1*
19	Coil Wedge	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	2
20	Screw	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	1
21	Coil	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	1
22	Screw	M3021	M3021	M3021	M3021	-	-	-	-	M3021	M3021	M3021	1
23	Adapter	-	-	-	-	-	-	-	-	-	-	-	1
24	Screw	-	-	-	-	-	-	-	-	-	-	-	3
25	Pressure Tube Fitting	-	-	-	-	M3180	M3180	M1280	M1280	-	-	-	1
26	Air Vent with Hood	M3084	M3084	M3084	M3084	-	-	-	-	M3084	M3084	M3084	1
27	Screw	M3015	M3015	M3015	M3015	-	-	-	-	M3015	M3015	M3015	3
28	Housing, Distributor	M3832	M3902	M3902	M3902	M3902	M3902	M3902	M3902	M3902	M3902	M3902	1
29	Capacitor	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	1
30	Dist. Block & Gear Assy.	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	1
31	Deleted												
32	Bearing Kit	K3630	K3320	K3320	K3320	K3320	K3320	K3319	K3319	K3319	K3319	K3319	1
33	Carbon Brush	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	1
34	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	2
35	Spacer	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	2

* Models 6331, 6340, 6350, 6351, 6355, 6360, 6361, 6363, 6365, 6371, 6390, 6391, and 6394 use Qty 2 Woodruff Keys.

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TABLE FIVE
6300 SERVICE PARTS LIST
 (Sheet 2 of 3)

Ref. No.	Description	6360	6361	6362	6363	6364	6365	6367	6371	6377	6379	6380	Qty. Used
1	Cotter Pin	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	M2556	1
2	Nut	M3019	M3019	M3019	M3019	M3492	M3019	M3492	M3019	M3019	M3019	M3019	1
3	Washer	-	-	M3172	-	-	-	-	-	M3172	M3172	M3172	1
4	Impulse Coupling Assy.	-	M3333	M3050	-	M3590	-	M3524	-	M5014	M5020	M3050	1
5	Oil Seal	M3331	M3331	M3062	M3331	M3062	M3331	M3062	M3331	M3062	M3062	M3062	1
6	Pressure Vent Plug	M3179	M3179	-	M3179	-	M3179	-	-	-	-	-	1
7	Air Vent	-	-	M1077	-	M1077	-	M1077	M1077	M1077	M1077	M1968	1
8	Frame	M3900	M3859	M3837	M3900	M3853	M3900	M3856	M3900	M3859	M3859	M3850	1
9	Gasket Pressure kit	K3307	K3307	-	K3307	-	K3307	-	-	-	-	-	1
10	Ball Bearing	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	M3006	1
11	Rotor	M5617	M3327	M3047	M5617	M3496	M5617	M3499	M5617	M5015	M5015	M3047	1
12	Bearing Cap Assy.	M3485	M3485	M3485	M3630	M3485	M3630	M3485	M3630	M3485	M3485	M3485	1
13	Bearing Cap Clamp	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	M3018	2
14	Screw	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	M3221	2
15	Contact Point Primary	M3081	M3081	M3081	M3637	M3081	M3637	M3081	M3637	M3081	M3081	M3081	1
16	Contact Point Secondary	-	-	-	M3637	-	M3637	-	M3637	-	-	-	1
17	Rotor Gear	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	M3828	1
18	Woodruff Key	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	M2536	1*
19	Coil Wedge	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	M3040	2
20	Screw	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	M3020	1
21	Coil	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	K3975	1
22	Screw	-	-	M3021	-	M3021	-	M3021	M3021	M3021	M3021	M3021	1
23	Adapter	-	-	M3154	-	-	-	-	-	-	-	-	1
24	Screw	-	-	M3125	-	-	-	-	-	-	-	-	3
25	Pressure Tube Fitting	M1280	M1280	-	M1280	-	M1280	-	-	-	-	-	1
26	Air Vent with Hood	-	-	M3084	-	M3084	-	M3084	M3084	M3084	M3084	M3084	1
27	Screw	-	-	M3015	-	M3015	-	M3015	M3015	M3015	M3015	M3015	3
28	Housing, Distributor	M3902	M3902	M3902	M3832	M3902	M3832	M3902	M3902	M3902	M3902	M3902	1
29	Capacitor	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	K3984	1
30	Dist. Block & Gear Assy.	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	K3823	1
31	Deleted												
32	Bearing Kit	K3319	K3319	K3320	K3302	K3320	K3302	K3320	K3302	K3320	K3320	K3320	1
33	Carbon Brush	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	M3215	1
34	Screw	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	M3021	2
35	Spacer	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	M3826	2

* Models 6331, 6340, 6350, 6351, 6355, 6360, 6361, 6363, 6365, 6371, 6390, 6391, and 6394 use Qty 2 Woodruff Keys.

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TABLE FIVE
6300 SERVICE PARTS LIST
 (Sheet 3 of 3)

Ref. No.	Description	6382	6390	6391	6393	6394	6399	Qty. Used
1	Cotter Pin	M2556	M2556	M2556	M2556	M2556	M2556	1
2	Nut	M3019	M3019	M3019	M3019	M3019	M3019	1
3	Washer	M3172	-	-	-	-	M3172	1
4	Impulse Coupling Assy.	M3050	-	-	-	-	M3939	1
5	Oil Seal	M3062	M3331	M3331	M3331	M3331	M3062	1
6	Pressure Vent Plug	-	-	M3179	-	M3179	-	1
7	Air Vent	M1968	M1077	-	M1077	-	M1077	1
8	Frame	M3850	M3900	M3900	M3900	M3900	M3972	1
9	Gasket Pressure kit	-	-	K3307	-	K3307	-	1
10	Ball Bearing	M3006	M3006	M3006	M3006	M3006	M3006	1
11	Rotor	M3047	M5617	M5618	M5617	M5618	M3948	1
12	Bearing Cap Assy.	M3485	M3630	M3630	M3630	M3630	M3485	1
13	Bearing Cap Clamp	M3018	M3018	M3018	M3018	M3018	M3018	2
14	Screw	M3221	M3221	M3221	M3221	M3221	M3221	2
15	Contact Point Primary	M3081	M3637	M3637	M3637	M3637	M3081	1
16	Contact Point Secondary	-	M3740	M3637	M3637	M3637	-	1
17	Rotor Gear	M3828	M3828	M3828	M3828	M3828	M3828	1
18	Woodruff Key	M2536	M2536	M2536	M2536	M2536	M2536	1*
19	Coil Wedge	M3040	M3040	M3040	M3040	M3040	M3040	2
20	Screw	M3020	M3020	M3020	M3020	M3020	M3020	1
21	Coil	K3975	K3975	K3975	K3975	K3975	K3975	1
22	Screw	M3021	M3021	-	M3021	-	M3021	1
23	Adapter	M3154	-	-	-	-	-	1
24	Screw	M3125	-	-	-	-	-	3
25	Pressure Tube Fitting	-	-	M1280	-	M1280	-	1
26	Air Vent with Hood	M3084	M3084	-	M3084	-	M3084	1
27	Screw	M3015	M3015	-	M3015	-	M3015	3
28	Housing, Distributor	M3902	M3874	M3832	M3832	M3832	M3902	1
29	Capacitor	K3984	K3984	K3984	K3984	K3984	K3984	1
30	Dist. Block & Gear Assy.	K3823	K3823	K3823	K3823	K3823	K3823	1
31	Deleted							
32	Bearing Kit	K3320	K3302	K3302	K3302	K3302	K3320	1
33	Carbon Brush	M3215	M3215	M3215	M3215	M3215	M3215	1
34	Screw	M3021	M3021	M3021	M3021	M3021	M3021	2
35	Spacer	M3826	M3826	M3826	M3826	M3826	M3826	2

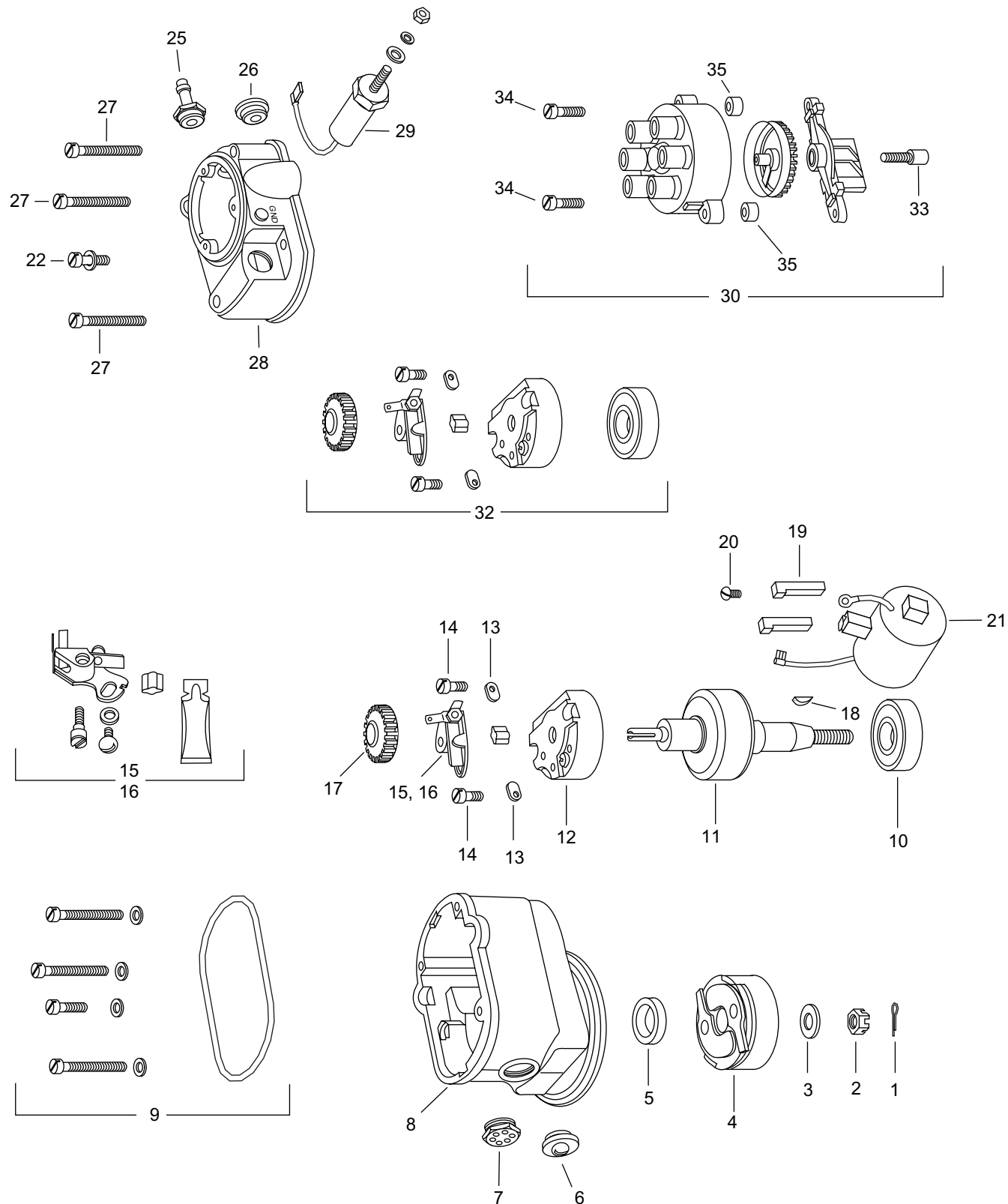
* Models 6331, 6340, 6350, 6351, 6355, 6360, 6361, 6363, 6365, 6371, 6390, 6391, and 6394 use Qty 2 Woodruff Keys.

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TABLE SIX
EXPLODED PARTS DIAGRAM
6300 SERIES MAGNETO



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TABLE SEVEN

SERVICE LIMITS

SERVICE TORQUE SPECIFICATIONS

M-3614	Primary/Retard Point	15 - 18 in.-lbs
M-3081	Contact Point	15 - 18 in.-lbs
M-1053	P-Lead Nut	13 - 15 in.-lbs
M-1077	Air Vent Body	80 - 90 in.-lbs
M-1343	Air Vent Body	80 - 90 in.-lbs
M-1553	Harness Cap Screw	18 - 28 in.-lbs
M-1723	Magneto Mounting Clamp	190 - 220 in.-lbs
M-2550	Air Vent Hood Screw	5 - 7 in.-lbs
M-2555	Housing Screw	18 - 28 in.-lbs
M-3015	Housing Screw	18 - 28 in.-lbs
M-3019	Impulse Coupling Nut	120 - 320 in.-lbs
M-3020	Contact Point / Coil Ground	20 - 24 in.-lbs
M-3021	Distributor Block Screw	18 - 28 in.-lbs
M-3125	Harness Adapter Screw	18 - 28 in.-lbs
M-3180	Air Inlet Nozzle	80 - 90 in.-lbs
M-3984	Capacitor	150 - 160 in.-lbs
M-3221	Bearing Cap Screw	20 - 24 in.-lbs

* If cotter pin will not align with pin hole within the specified torque range, remove nut and lightly lap the bottom surface of the nut with a piece of emery cloth.

LUBRICATION

M-1827	Cam Grease - For Rotor Cam
	SAE 50 Wt Engine Oil - For Distributor Block and Gear assembly Oilite Bearings

TOLERANCES

Primary Coil	.50 - 1.2 Ohms
Secondary Coil	13,000 - 20,500 Ohms
Condenser	.35 MFD $\pm$ 10%

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