

# **S-1200 Series High Tension Magneto**

**CONTINENTAL<sup>®</sup> IGNITION SYSTEMS**

# **SERVICE SUPPORT MANUAL**



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## Supersedure Notice

This manual revision replaces the front cover and list of effective pages for Publication Part No. X42001, dated January 1990. Previous editions are obsolete upon release of this manual.

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# WARNING

(Please note the following statements from FAA Advisory Circular 20-62C entitled "ELIGIBILITY, QUALITY, AND IDENTIFICATION OF APPROVED REPLACEMENT PARTS"):

3. **BACKGROUND.** An increasing amount of replacement parts (including standard parts), materials, appliances, and instruments are offered for sale as being of aircraft quality when actually the quality and origin of these units are unknown. Users of such units are usually not aware of the potential hazards involved with replacement parts that are **not** eligible for use on certificated aircraft. Frequently such units are deceptively advertised or presented as "unused," "like new," or "remanufactured." This implies that the quality of such units is equal to an original or appropriately repaired or overhauled unit.

The performance rules for replacement of parts and materials used in the maintenance and alteration of U.S. certificated aircraft are specified in Federal Aviation Regulations (FAR) 43.13 and FAR 145.57. The responsibility for the continued airworthiness of the aircraft, which includes the replacement of parts, is the **responsibility** of the owner/operator as outlined in FAR 91.163, FAR 121.363, FAR 123.45, FAR 127.131 and FAR 135.143 (a).

4. **IDENTIFICATION OF THE APPROVED PARTS.** Approved serviceable replacement parts are identified as follows:

- a. By an FAA Form 8130-3 (Formerly FAA Form 186), Airworthiness Approval Tag. An Airworthiness Approval Tag identifies a part or group of parts that have been approved by authorized FAA representatives.
- b. By an FAA Technical Standard Order (TSO) number and identification mark that indicates the part or appliance has been manufactured under the requirements of FAR 37.
- c. By an FAA/PMA symbol, together with the manufacturer's name, trademark or symbol, part number, and the make and model of the type certificated product on which the part is eligible for installation, stamped on the part. An FAA Parts Manufacturer Approval (FAA/PMA) is issued under FAR 21.305. The make and model information may be on a tag attached to the part.
- d. By shipping ticket, invoice, or other document which provides evidence that the part was produced by a manufacturer holding an FAA Approved Production Inspection System issued under FAR 21, Subpart F, or by a manufacturer holding an FAA Production Certificate issued under FAR 21, Subpart G.
- e. By a certificate of airworthiness for export issued by a foreign government under the provisions of FAR 21, Subpart N.

11. **KNOW YOUR SUPPLIER.** It has come to our attention that many reproduced parts and components, particularly instruments which have been manufactured by persons other than the original manufacturer, are available for purchase and installation on U.S. certificated aircraft. Often, an original part is used as a sample to produce duplicates. The reproduced parts appear to be as good as the original part; however, there are many unknown factors to be considered that may not be readily apparent to the purchaser, i.e., heat treating, plating, inspections, tests and calibrations. All too often the faulty part is not discovered until a malfunction or an accident occurs.

12. **SUMMARY.** In accordance with FAR's, certification of materials, parts, and appliances for return to service, for use on aircraft, is the responsibility of the person or agency who signs the approval. The owner/operator, as denoted in paragraph 3 of this advisory circular, is responsible for the continued airworthiness of the aircraft. To assure continued safety in aircraft operation, it is essential that great care be used when inspecting, testing, and determining the acceptability of all parts and materials. Particular caution should be exercised when the identity of materials, parts, and appliances cannot be established or when their origin is in doubt.

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# System Support Manual

## S-1200 MAGNETO IGNITION SYSTEM

### SERVICE BULLETIN LIST

The following is a list of service bulletins which have been incorporated into this manual.

<b>Service Bulletin</b>	<b>Date Incorporated</b>
533A	June 1987
556C	June 1987
560A	June 1987
586A	June 1987
599C	January 1990
608	June 1987
611	June 1987
612	June 1987
613	June 1987
623A	June 1987
624	June 1987
626	June 1987
629	January 1990
630	January 1990
631	January 1990
632A	January 1990

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# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

## SECTION 1. INTRODUCTION AND SPECIFICATIONS

### 1.1 GENERAL

- A. This manual provides complete maintenance instructions with illustrated parts list for S-1200 Series Magnets, manufactured by Teledyne Continental Motors, Aircraft Products, Mobile, Alabama 36601. The S-1200 Series Magneto converts mechanical energy into a sequenced series of high-voltage pulses for reciprocating engine ignition.
- B. This manual is subdivided with sub-heads as listed in the Table of Contents. Revision service will be provided as required.
- C. These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency to be met in connections with installation, operation, or maintenance. Should further information be desired or particular problems arise which are not covered sufficiently for purchaser's purpose, the matter should be referred to Teledyne Continental Motors, Aircraft Products, Mobile, Alabama 36601.
- D. Good standard shop practices and safety precautions should be observed at all times to avoid damage to equipment and/or injury to personnel.
- E. All maintenance instructions in this manual have been shop verified. Shop verified procedures are those by which the manufacturer has accomplished all Disassembly, Assembly, Testing and Troubleshooting by performing the functions described in this manual on equipment identical in configuration to that described.
- F. Dimensions are given in US Standard Units. Abbreviations used are listed for reference in Table 101.
- G. Numbers in parentheses following part nomenclature refer to item numbers in Illustrated Parts List Figure 1 unless otherwise specified.

**Table 101  
Abbreviations**

US Standard Unit	Abbreviation
Degrees Fahrenheit	°F
Inch	in.
Pound Inches	lb. in.
Pound Force	lbf
Pound (Mass)	lb
Pounds per Hour	pph
Pounds per Square Inch, Absolute	psia
Pounds per Square Inch, Gage	psig
Feet	ft
Gallons	gal
Ounces	oz

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### 1.2 SPECIFICATIONS

Table 102  
Table of Leading Particulars

Subject	Data
<b>Lubrication</b>	
Cam Follower Felt	10-86527 Breaker Felt Lubricant
Housing pole shoes, magnet pole pieces	Rust preventative or SAE 30 Oil (Non-Detergent)
Gear Teeth	Magneto Grease, 10-27165
Felt washer	Distributor Block Lubricant 10-391200
Distributor gear shaft	Distributor Block Lubricant 10-391200
Impulse coupling spring	Engine Oil
Stop pins	Magneto Grease, 10-27165
Rotating magnet shaft	TCM 646943 Anti-Seize Lubricant
Cushion drive grommet	Engine Oil
<b>Tolerances</b>	
Capacitor	0.30 to 0.45 microfarads/1.0 ohms Feed-Through/ 8.0 milliamps Leakage at 400VDC
Contact clearance --	
Main (4 and 6 cyl.)	0.016 ± 0.003 in.
Main (8 cyl. with retard contacts)	0.013 ± 0.001 in.
Main (8 cyl. without retard contacts)	0.015 ± 0.001 in.
Retard (4 and 6 cyl.)	0.016 ± 0.006 in.
Retard (8 cyl.)	0.015 ± 0.005 in.
Tachometer	0.018 ± 0.002 in.
"E" Gap (4 and 6 cyl.)	15° ± 2° Main Contact
(8 cyl.)	12° ± 1° Main Contact
Coil resistance	Primary 1.0 - 1.5 ohms Secondary 20,000 - 26,000 ohms
<b>Torques</b>	
Contact support screws	20 to 25 in.-lbs.
Distributor block studs	Start 4 to 8 in.-lbs. Final 18 to 22 in.-lbs.
Cam screw	21 to 25 in.-lbs.
Drive shaft nut	15 to 25 ft.-lbs.
Capacitor screws	8 to 12 in.-lbs.
Flange screws	65 to 85 in.-lbs.
Retard lead screw	24 to 26 in.-lbs.
Cover securing screw	30 to 35 in.-lbs.
Ventilator plug	10 to 15 in.-lbs.
Timing window plug	10 to 15 in.-lbs.
Harness securing nuts	20 in.-lbs.
<b>Miscellaneous</b>	
Internal timing marks	See instructions
Magneto drive speeds	4 cyl. - engine speed 6 cyl. - 1 1/2 engine speed 8 cyl. - engine speed
<b>Testing</b>	
Spark gap setting	7 mm (0.276 in.)

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## S-1200 MAGNETO IGNITION SYSTEM

### SECTION 2. DESCRIPTION AND OPERATION

#### 2.1 GENERAL DESCRIPTION

- A. The S-1200 Series Magnetos, manufactured by Teledyne Continental Motors, Aircraft Products, Mobile, Alabama 36601, are designed to provide ignition for four, six and eight cylinder aircraft engines. These magnetos generate and distribute high tension voltage through high tension leads to the spark plugs. Because of the one-piece housing design these magnetos are easy to maintain and overhaul.
- B. To obtain the retard spark necessary for starting, these magnetos employ either an impulse coupling or an additional contact assembly used in conjunction with a starting vibrator. Figure 201 shows the components used in a typical S-1200 Ignition System incorporating a starting vibrator. This system consists of a single contact assembly magneto, a dual contact assembly magneto (item 1), an ignition harness (item 2), a combination ignition and starter switch (item 3), and a starting vibrator (item 4).

C. The following detailed explanation gives the meaning of the various letters and numbers appearing in the type designations:

- (1) "S" indicates type ignition unit.
- (2) "4", "6" or "8" indicates number of cylinders fired.
- (3) "R" or "L" indicates direction of rotation of rotating magnet viewed from drive end; R for right-hand, L for left-hand.
- (4) "N" indicates manufactured by TCM.
- (5) The dash number (such as -1201) indicates a certain execution of the basic type magneto.

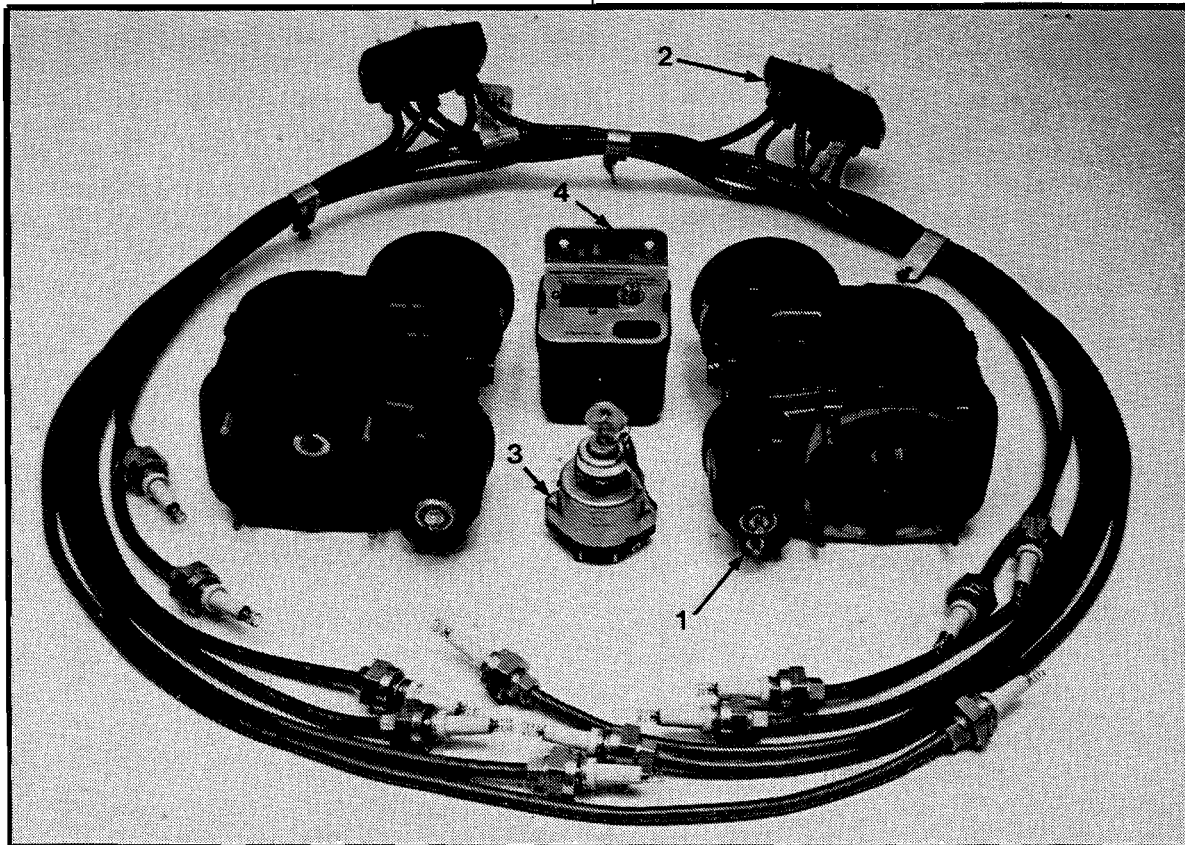


Figure 201. S-1200 Magneto and Associated Components

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### 2.2 DETAILED DESCRIPTION

- A. The magneto is a completely self-contained unit available with either a short or long mounting flange. The rotating magnet turns on two bearings, a roller bearing at the breaker end, and a ball bearing at the drive end. The bearings require no pre-loading or shimming.
- B. In both the four and six cylinder magnetos, a two lobe cam is secured to the contact end of a two pole rotating magnet. Four cylinder magnetos are driven at engine speed, producing four sparks through 720° of crankshaft rotation. In six cylinder magnetos, the rotating magnet is driven at 1 1/2 times engine speed, thereby producing six sparks through 720° of engine crankshaft rotation. Eight cylinder magnetos use a four pole rotating magnet with a four lobe cam and are driven at engine speed, thus eight sparks are produced through 720° of engine crankshaft rotation.
- C. Some of the four and six cylinder magnetos incorporate impulse couplings. The purpose of the impulse coupling is to: (1) rotate the magnet between impulse trips faster than engine cranking speed, thus generating a better spark for starting the engine, (2) automatically retard the spark during engine cranking, and (3) act as a drive coupling for the magneto.
- D. The S-1200 Dual Contact Assembly Magnetos incorporate a retard contact assembly. (See Figure 202.) This contact assembly is actuated by the same cam as the main contact assembly. It is positioned so that its points open a predetermined number of degrees after the main contact points open. A battery-operated starting vibrator used with this magneto provides retarded ignition for starting, regardless of engine cranking speed. The retard ignition is in the form of a shower of sparks instead of a single spark, as obtained from an impulse coupling.
- E. Suppression of contact point arcing and conducted radio interference is accomplished by a feed-thru capacitor.

### 2.3 RECOMMENDED MAINTENANCE AND OVERHAUL PERIODS

#### NOTE:

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

- A. Any time the magneto-to-engine timing is found to be outside the engine manufacturer's limits, the contact assemblies (item 30, Illustrated Parts List Figure 1) should be checked as specified in paragraph 6.2.1 of PERIODIC MAINTENANCE.
- B. Magnetos equipped with impulse couplings (item 45, Illustrated Parts List Figure 1) must be inspected at the first 500 hours in service and every 500 hours thereafter as specified in paragraph 6.2.2 of PERIODIC MAINTENANCE.
- C. Magnetos are subject to the same environmental conditions and wear as the engine. It is therefore recommended that magnetos be overhauled when the engine is overhauled. Engine overspeeds, sudden stoppage or other unusual circumstances may require engine overhaul prior to engine manufacturer's recommendations. In such circumstances the magneto, regardless of "in service time", should also be overhauled with particular attention focused on rotating parts, bearings and electrical components.
- D. In addition, it is recommended that magnetos be overhauled at the expiration of four years, without regard to the accumulated operating hours since new or last overhaul.

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### 2.4 S-1200 MAGNETO OPERATION

#### 2.4.1 General Theory

- A. The rotating magnet is of a two or four pole design. As the magnet is turned the polarity continually changes, thereby producing flux reversals in the magneto coil core. The number of flux reversals during one complete revolution of the magnet is equal to the number of poles on the magnet.
- B. With the contact assembly points closed, the flux reversals cause a current to be generated in the primary winding of the magneto coil. The flow of current through this coil produces a magnetic field around the coil. When the contact assembly points open, the magnetic field around the primary winding collapses, causing a high tension voltage to be induced in the secondary winding of the coil. This high tension voltage is conducted to the distributor gear electrode by means of a carbon brush, to terminals in the distributor block, to high tension contact springs and through high tension leads to the spark plugs.

#### 2.4.2 Operation of Magneto System with Starting Vibrator

- A. Schematic diagrams of the magneto hookup with and without a relay in the starting vibrator are shown in Figures 203 and 204. In Figure 203, the starting vibrator consists of a vibrator and a relay. The starting vibrator with the relay supplies interrupted battery current to the retard contact assembly magneto and grounds the right magneto. This vibrator is used with a standard ignition and starter switch. Figure 204 shows a starting vibrator which does not incorporate a relay. This type of vibrator should be used with one of the TCM combination ignition and starter switches which controls the vibrator current flowing to the retard contact assembly magneto. In Figures 203 and 204, all switches and relays are shown in their normal OFF position. These diagrams are to be used for following the electrical operation of the magneto circuit and *not for installation purposes*.

- B. With the standard switch in its "BOTH" position (Figure 203) and starter switch S1 turned "ON", starter solenoid L3 and L1 are energized closing their relay contacts R4, R1, R2 and R3. Relay contact R3 connects the right magneto to ground, rendering it inoperative during starting procedures. Battery current then flows through relay contact R1, vibrator points V1, coil L2, through retard contact assembly of left magneto to ground as well as through relay contact R2 and through the main contact assembly to ground. The magnetic field around coil L2 produced from this current causes vibrator points V1 to open. Current stops flowing through coil L2, causing the magnetic field to collapse and vibrator points V1 to reclose. This allows coil L2 to energize and vibrator points V1 to again open. This interrupted battery current will be carried to ground through the main and retard contact assemblies.

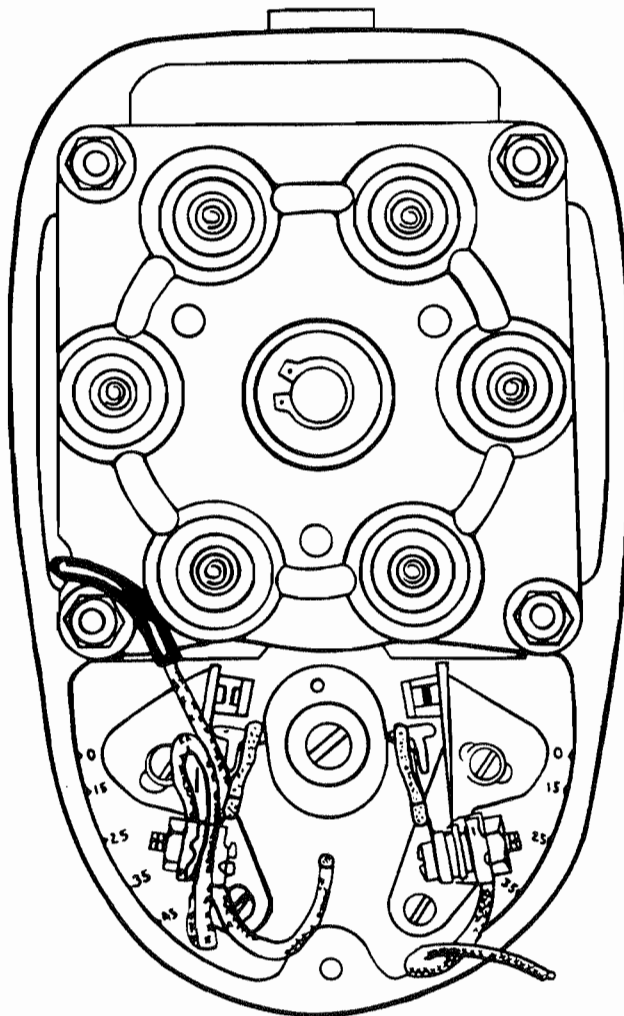


Figure 202. Cam End View of Dual Contact Assembly Magneto

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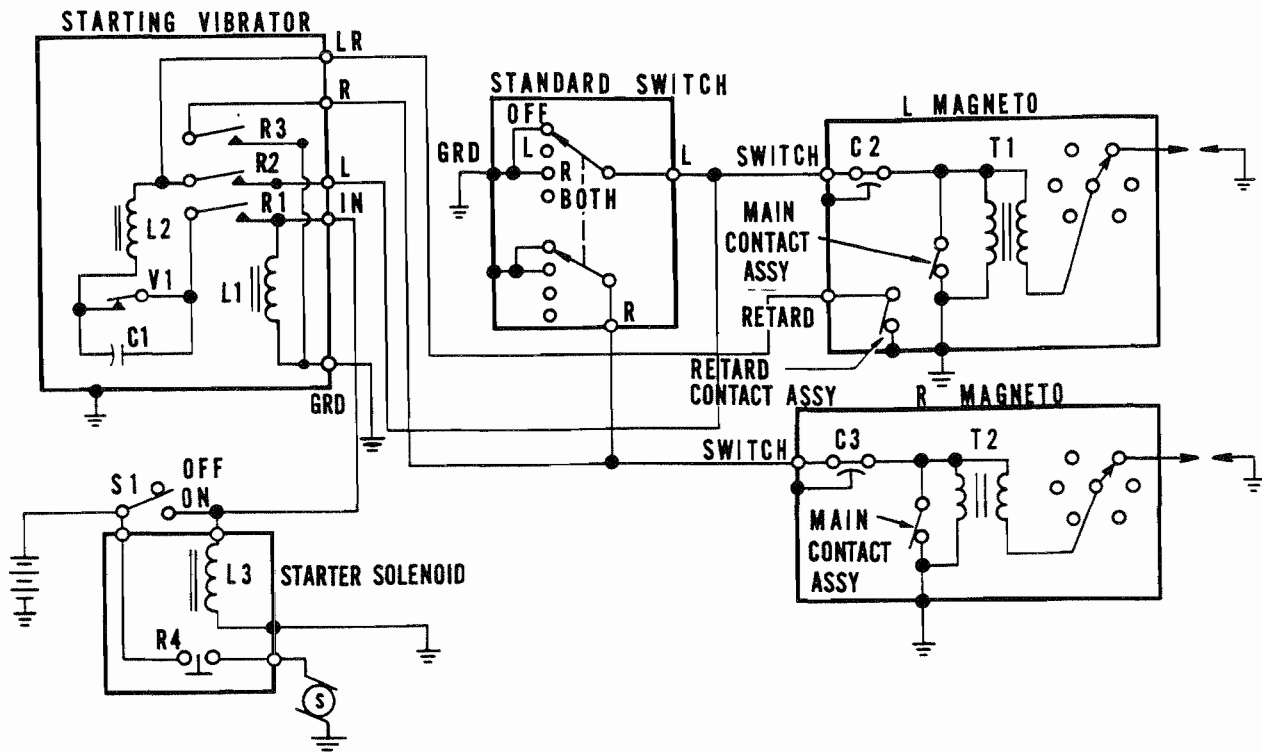
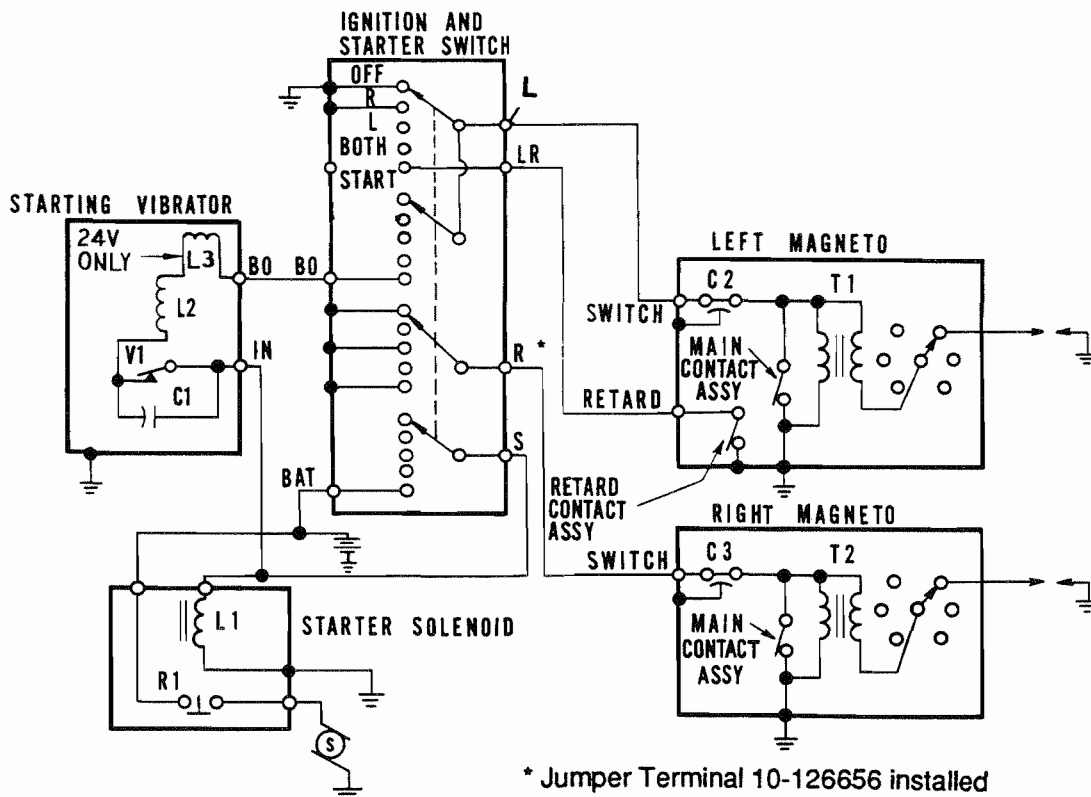


Figure 203. Schematic Diagram of Magneto Circuit and Starting Vibrator Incorporating Relay.



\* Jumper Terminal 10-126656 installed between adjacent R terminals on switch

Figure 204. Schematic Diagram of Magneto Circuit and Starting Vibrator Without Relay.

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- C. When the engine reaches its normal advance firing position, the main contact assembly of the magneto opens. However, the vibrator current is still carried to ground through the retard contact assembly, which does not open until the starting retard position of the engine is reached. When the retard contact assembly opens (main contact assembly is still open), the vibrator current flows through the primary of transformer T1 (magneto coil) producing a magnetic field around the coil. Each time vibrator points V1 open, the current flow through the primary of transformer T1 ceases. This causes a high voltage to be induced in the secondary which fires the spark plug. A shower of sparks is therefore produced at the spark plug due to this opening and closing of vibrator points V1 while the main and retard contact assemblies are both open.
- D. When the engine fires and begins to pick up speed, the starter switch is released which de-energizes relay coil L1 and starter solenoid L3. This opens the vibrator circuit and retard contact circuit, rendering them inoperative. The single contact assembly (right) magneto is no longer grounded, therefore, both magnetos are simultaneously firing in full advance.
- E. With the combination ignition and starter switch in its "START" position, the right magneto is grounded (refer to Figure 204). Starter solenoid L1 is energized, closing its relay contact R1. Battery current flows through vibrator points V1, coil L2 (and L3 in later 24 volt models), through the switch and through main and retard contact assemblies of the left magneto to ground. The magnetic field built up around coil L2 causes vibrator points V1 to open. Current flow ceases through coil L2 causing the magnetic field to collapse and the vibrator points to reclose. This allows coil L2 (and L3 where applicable) to energize and vibrator points V1 to again open. When the engine reaches its normal advance firing position, the main contact assembly opens. However, the vibrator current is still carried to ground through the retard contact assembly, which does not open until the starting retard position of the engine is reached. When the retard contact assembly opens (main contact assembly is still open), the vibrator current flows through the primary of transformer T1, producing a magnetic field around the coil. Each time vibrator points V1 open, the current flow through the primary of transformer T1 ceases. This causes a high voltage to be induced in the secondary, which fires the spark plug. A shower of sparks is thus produced at the spark plug due to the opening and closing of vibrator points V1 while the main and retard contact assemblies are open.
- F. When the engine fires and begins to pick up speed, the switch is released and returns to its "BOTH" position, rendering the vibrator circuit and retard contact assembly circuit inoperative. The single contact assembly (right) magneto is no longer grounded, therefore, both magnetos are simultaneously firing in full advance.

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### SECTION 3. TESTING AND FAULT ISOLATION

#### 3.1 GENERAL

NOTE:

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

Table 301  
Testing and Fault Isolation Materials and Tools

Material/Tool	Description
11-10500 Magneto Test Stand or Equivalent	Used for Off-Engine Magneto Test

- A. If engine operating troubles develop which appear to be caused by the ignition system, it is advisable to check the spark plugs and wiring first before working on the magnetos.

**WARNING:**

Should the propeller be moved by hand during pre-flight inspection or during maintenance procedures and a functional ("hot") magneto condition exists, the engine may fire and cause injury to personnel!

- B. Should the trouble appear definitely associated with the magneto, perform a Magneto RPM drop-off test as outlined in the applicable Pilot-Flight Manual. The purpose of the drop-off test is to determine that the ignition is in satisfactory condition. A drop in RPM is expected when one Magneto in a redundant ignition system is shut off. The absence of an RPM drop may indicate that:

- The magneto timing has been advanced beyond the setting specified, or
- A magneto primary lead is open (Hot Magneto), or
- An Ignition switch is defective, or
- The grounding circuit of the feed-through Capacitor is open, or a combination of these factors.

Any engine which does not exhibit a normal drop-off in RPM when the Magneto is checked should be shut down and the cause for the problem investigated. The normal engine drop-off is specified in the appropriate Pilot Flight Manual and Engine Manufacturer Operator's Manual.

**WARNING:**

During hand propping or manually moving the propeller, do not stand nor allow anyone else to stand within the arc of the propeller. A loose or broken wire or a component malfunction could cause the engine to fire and the propeller to rotate causing injury to personnel.

- (1) As a test precautionary measure, it is recommended that a test of the Magneto grounding circuit be performed prior to shutting down the engine using the following procedure:
  - (a) With the engine at normal idle, rotate the switch key or lever momentarily to the off position.
    - 1 If the engine continues to run with the switch key or lever in the off position, it is an indication that one Magneto is still functioning.
    - 2 If the grounding circuit is working as prescribed, the engine should quit.

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3 If the Magneto did not ground out, the cause should be investigated and corrected prior to continued operation of the engine and before the next flight.

(b) Return the switch key or lever to the "BOTH" position and shut down the engine using normal procedures.

C. If problems persist, install a replacement magneto which is known to be in satisfactory condition and send the suspected unit to the overhaul shop for test and repair.

D. Should this not be possible, a visual inspection may disclose the source of trouble. Inspect as follows:

(1) Remove harness securing nuts and washers and separate outlet plate from magneto. Inspect for presence of moisture and foreign matter on rubber grommets and high tension outlet side of the distributor block. Also check for broken or burned outlet towers. If either is present, remove magneto and replace with one known to be in satisfactory condition.

(2) Check contact springs in block towers for proper height. End of spring shall not be more than 0.422 inch from top of tower. burned or otherwise short springs must be replaced. See ASSEMBLY, paragraph 9.2.12. Check for broken leads or damaged lead insulation. If either is present, replace magneto.

(3) Inspect contact assemblies as specified in PERIODIC MAINTENANCE, paragraph 6.2.1.

### 3.2 POST-OVERHAUL TESTING

A. Mount magneto on a 11-10500 test stand. Connect high tension outlets to spark gaps on test stand using a standard high tension outlet assembly. The spark gaps must be set at 7 mm (0.276 in) as shown in Figure 301.

#### CAUTION:

*Do not operate magneto on test stand unless all high tension leads are connected to spark gaps, since an open secondary circuit would subject magneto parts to possible damage.*

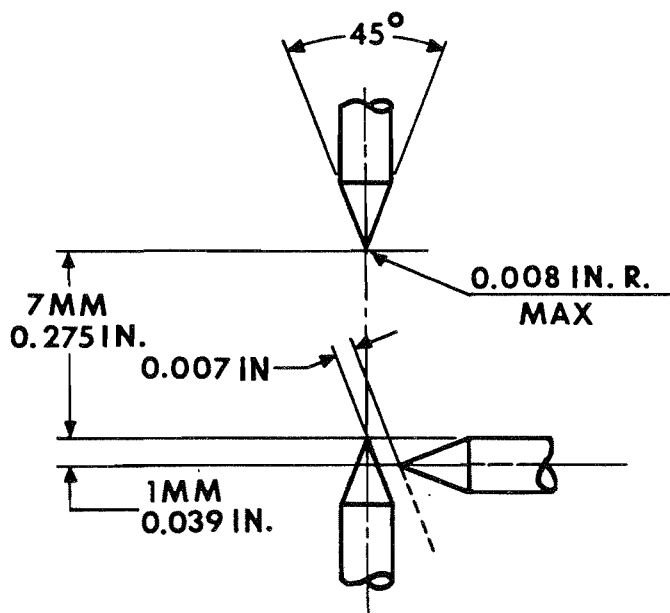


Figure 301. 7 mm Spark Gap Setting

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- B. Determine lowest speed at which rotating magnet can be turned and still spark all gaps without missing (coming-in speed). Magnetos shall spark consistently at 150 RPM. If coming-in speed is above specified RPM, the trouble may be due to dirty contact points, weak coil, weak magnet, defective capacitor, or improperly adjusted contacts. Clean contact assembly, try a new coil or capacitor, recharge magnet, recheck contact assembly adjustment and repeat test.
- C. Observe electrical and mechanical performance at 150 and 1000 RPM. Perform high speed test run at 3500 RPM minimum. Do not exceed 5000 RPM. Magneto shall fire all gaps consistently and operate smoothly throughout its operating range.
- D. Test magnetos equipped with impulse couplings on special gear reduction pad of test stand to assure proper operating characteristics of coupling. At 150 RPM or below, both flyweights should engage the stop pin and impulse coupling should operate. The flyweights may engage or disengage intermittently from 150 RPM up to 450 RPM, at which time the flyweights should be fully disengaged and the impulse coupling acting as a direct drive number.
- E. After testing, check rotating magnet for end play and radial play. None is permissible. Replace parts as necessary and re-test.

### 3.3 FAULT ISOLATION

- A. A fault isolation chart is provided as an aid for locating troubles thought to be in the ignition system.

**Table 303**  
**Fault Isolation Chart**

SYMPTOM:	PROBABLE CAUSE:	TEST:
Hard Starting	<p>Worn or fouled spark plugs. Arcing ignition wire.</p> <p>Mag Impulse Coupling not operating properly.</p> <p>Impulse Coupling is magnetized.</p> <p>Low voltage at vibrator input.</p> <p>Inoperative or defective vibrator.</p> <p>Retard contact assembly in retard (dual contact) magneto not operating electrically. Engine may kick back during cranking due to advance timing of ignition.</p>	<p>Inspect and replace or repair as necessary.</p> <p>Remove and check for binding, worn or broken impulse coupling parts.</p> <p>Remove and demagnetize or replace impulse coupling.</p> <p>Measure voltage between vibrator terminal marked "in" and the ground terminal while operating starter. Must be at least 8 volts on 12 volt systems, or 13 volts on 24 volt systems.</p> <p>If voltage is adequate, listen for buzzing of vibrator during starting. If no buzzing is heard, either the vibrator is defective or the circuit from the "Output" terminal on the vibrator to the retard (dual contact assembly) magneto is open. Check both "Switch" and "Retard" circuits. Also check for good electrical ground.</p> <p>Retard points may not be closing due to improper adjustment, or may not be electrically connected in the circuit due to a poor connection. Inspect retard points to see if they close. Check for proper contact at the "SWITCH" and "RETARD" terminals of retard (dual contact assembly) magneto and at the vibrator. Check wiring.</p>

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**Table 303**  
**Fault Isolation Chart (Continued)**

SYMPTOM:	PROBABLE CAUSE:	TEST:
Hard Starting (continued)	<p>Vibrator-magneto combination not "putting out" electrically.</p> <p>Magneto improperly timed to engine.</p> <p>Advance contact assembly out of adjustment (internal timing off).</p> <p>Retard contacts opening too late.</p>	<p>Turn engine in proper direction of rotation until retard points just open on No. 1 cylinder position. Remove input connection from starter to prevent engine turning, and while holding No. 1 plug lead 3/16 inch from ground, energize vibrator by turning switch to start. Plug lead should throw a 3/16 inch spark. If spark is weak or missing, try new vibrator. If this does not correct trouble, remove magneto and check for improper internal timing or improperly meshed distributor gears.</p> <p>Check magneto-to-engine timing in accordance with Engine Manufacturer's instructions.</p> <p>Check magneto timing per paragraph 9.2.10 of ASSEMBLY</p> <p>Check timing of retard contacts according to paragraph 9.2.10 of ASSEMBLY.</p>
Engine Roughness	<p>Faulty spark plugs. Faulty ignition leads.</p> <p>Faulty magneto contact assemblies</p> <p>Carbon-tracked distributor block (21)</p>	<p>Try new spark plugs. Check plug leads for continuity and breakdown.</p> <p>Check magneto contact assemblies for burning or dirt. (Main and Retard.) See PERIODIC MAINTENANCE, paragraph 6.2.1 steps A, B, and C.</p> <p>Replace distributor block (21)</p>
Magneto Drop-off Check Out of Limits	<p>Magneto out of time</p> <p>Contact assemblies not opening properly.</p> <p>Faulty plugs or leads No drop-off noted -- open capacitor</p> <p>Carbon-tracked distributor block (21)</p>	<p>Check magneto-to-engine timing in accordance with Engine Manufacturer's instructions.</p> <p>Inspect contact assemblies for proper opening. See ASSEMBLY, paragraph 9.2.10.</p> <p>Check plugs and leads. Check capacitor as specified in GENERAL OVERHAUL, paragraph 7.2.5.</p> <p>Replace distributor block (21)</p>

**CAUTION:**

*If self-locking (cam-securing) screw (31) is removed or loosened at any time, always replace with a new self-locking screw and apply torque to 21-25 lb-in.*

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## SECTION 4. DISASSEMBLY

### 4.1 GENERAL

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

Refer to Table 401 for a list of materials and tools required during disassembly.

**NOTE:**

Complete disassembly of magneto is not necessary in all instances. Disassemble magneto only to the extent required for maintenance procedures involved.

**Table 401  
Disassembly Materials and Tools**

Material/Tool	Description
11-1471 Drift	Used to press bearing (59) from flange (56)
11-9815 Drift	Used to remove roller bearing (63)
CG240 Puller	Used to remove drive plate (44a) and cam (48)
No. 2 Retaining Ring Pliers No. 2	Used to remove retaining rings (18, 50)
Pry Bar (locally fabricated)	Used to remove wedges (35) from housing (72)
11-10039-1,-2,-3 Thread Protectors	Used to protect rotating magnet (61) threads during disassembly of drive plate (44a) or cam (48)

### 4.2 DETAILED DISASSEMBLY PROCEDURES

(Numbers listed are indicated on Illustrated Parts List; see IPL Figure 1)

**NOTE:**

Main and retard contact assemblies (30), wedges (35), screws (54), retaining rings (18, 50), washers (55), bearings (59, 63), felt strip (23), felt washer (20), carbon brush (26) and pin (37) shall be replaced at each disassembly with new parts. Also if installed, spring (47), gaskets (7, 58), washer (2), and packing (5) shall be replaced at each disassembly with new parts.

#### 4.2.1 Disassemble Magneto for Initial Inspection

- A. Remove cover retention screw and lock washer (1) and plain washer (2) (if installed) from cover (6). Take off four nuts (3), lockwashers (4) and packing (5) (if installed), and carefully pull cover (6) away from housing (72). Remove and discard gasket (7) if installed. Pry lead terminals of capacitor (10) and retard lead (13) (if installed) from terminals of contact assembly(ies) (30).
- B. Disassemble distributor block (21) and distributor gear assembly (25) from housing (72) by removing four double end studs (16) and washers (4, 17). Pull block (21) and gear assembly (25) from housing (72). Using No. 2 retaining ring pliers, remove retaining ring (18), securing gear (25) to block (21), and discard ring (18). Remove washer (19) and slide gear (25) from block (21). Remove washers (19, 24). Using a pointed tool, remove felt washer (20) and felt strip (23) from block (21). Remove carbon brush (26) from distributor gear (25).

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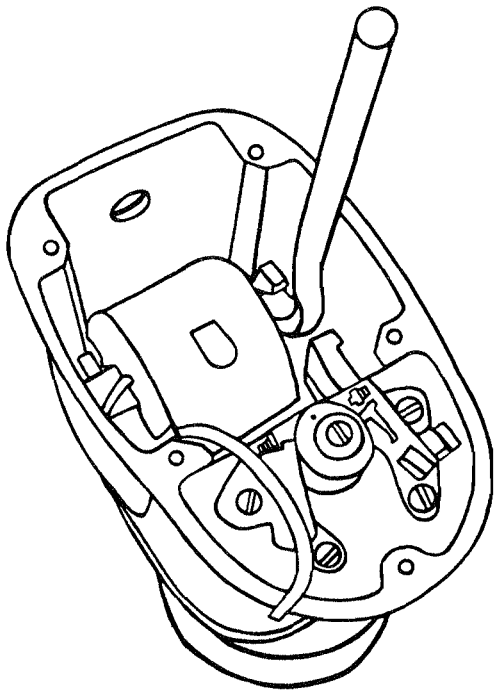


Figure 401. Removing Coil Wedges From Housing

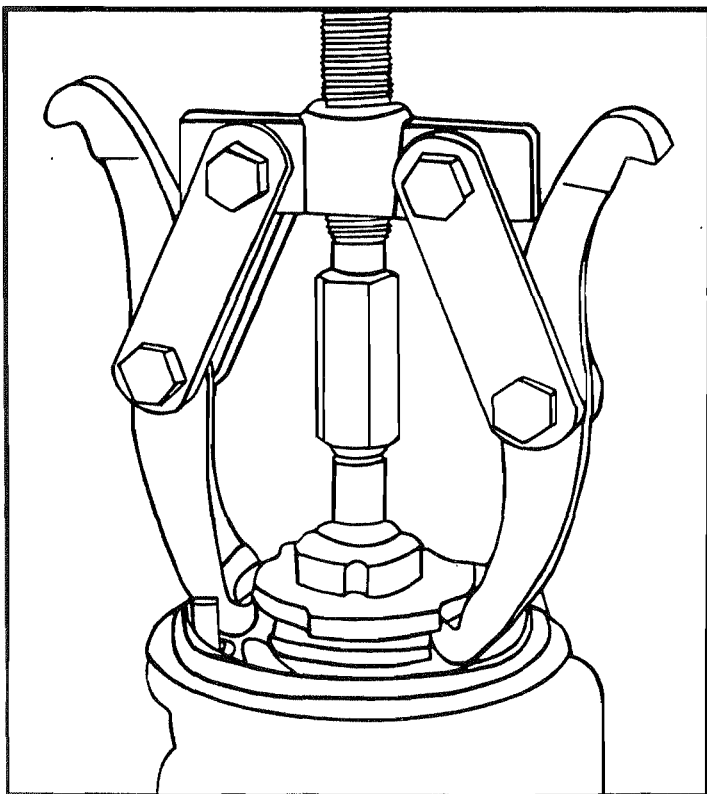


Figure 402. Removing the Impulse Coupling

### 4.2.2 Disassemble Magneto for General Overhaul

- A. Remove screws (9) and lift capacitor (10) from cover (6). Slide packing (11) off capacitor (10). If retard lead (13) is installed, remove screw (12), washer (14), bushing and nut (3), securing lead (13) to cover (6).
- B. Pull out fish paper strip (28) which holds lead of coil (36) away from distributor gear. Remove clip (28), if used. Disconnect terminal of coil lead from main contact assembly (30). Using a pry bar approximately 12 to 16 inches long (similar to the one shown in Figure 401), pry out and discard wedges (35) which secure coil (36) in housing (72). Lift coil (36) from housing (72).

#### CAUTION:

*When prying wedges out of magneto, be sure coil leads are not between wedges or housing and pry bar.*

- C. Remove contact assemblies (30) from magneto by taking out screws (27) and washers (29). Discard contact assemblies.

#### NOTE:

Tachometer contact assembly, identified by smaller (0.125 in diameter) silver contact points, may be reused.

- D. Using a pair of padded jaw pliers, grip drive member on drive end of rotating magnet (52). While holding rotating magnet, loosen cam securing screw (31) and turn out half way. Place the end of a broad-bladed screwdriver between the bottom of cam and housing. Strike handle of screwdriver with a sharp downward blow to pop cam loose from taper of shaft or, as an alternative, use wedge removal pry bar. Remove screw (31), washer (32), and cam (33).

#### CAUTION:

*If self-locking screw (31) is removed or loosened at any time, always replace with a new self-locking screw and torque 21-25 in.-lbs.*

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## S-1200 MAGNETO IGNITION SYSTEM

### 4.2.3 Disassembling Magneto Drive Plate (if used)

Remove cotter pin (37) from magnet shaft. While holding drive member with a pair of padded jaw pliers, remove nut (38). Lift off lockwasher (39), bushing (40) and washer (41), if used. If drive plate (44a) is employed, remove using the CG240 Puller and appropriate thread protector.

### 4.2.4 Disassembling Impulse Coupling (if used)

- A. Using heavy gloves or a cloth, grasp coupling body (46) firmly to prevent the internal spring from unwinding suddenly. Pull outward on coupling body only enough to release it from cam assembly (48). Keep coupling body close against cam and allow body to turn as spring (47) unwinds. After one or two turns, spring coils will wedge against projections on body, restraining spring from further unwinding.
- B. Look into hole in body and note location of inner eye of spring where it engages with mating recess in cam hub. Insert a screwdriver under spring end and pry spring eye out of recess. Remove body and spring together. Uncoil spring from body and pry spring eye from body recess to disengage spring. Discard spring (47).
- C. Thread appropriate protective cap on end of shaft. Engage CG240 puller over protective cap and cam assembly with jaws of puller hooked under cam assembly as shown in Figure 402.

**CAUTION:**

*Do not allow puller jaws to pull against flyweights. This can damage flyweights and will result in having to discard cam assembly.*

- D. Tighten puller handle to remove coupling from shaft. If coupling does not release with maximum hand torque at puller handle, apply penetrating thread release compound between coupling and shaft. Then while puller is still fully tightened, hold tip of hot heavy-duty soldering iron in contact with hub of coupling cam assembly. Solder wetting of the tip at point of contact with cam hub will assist in heat transfer to the parts. Retighten puller after about a minute of heat application.

**CAUTION:**

*Do not strike puller with hammer. If puller is struck with hammer, magneto ball bearings must be replaced.*

**CAUTION:**

*Do not tighten puller handle further after coupling cam releases from shaft. This could damage a flyweight if flyweight is caught under woodruff key.*

- E. Remove puller. Holding toe of flyweights inward, lift cam from shaft. See Figure 605.
- F. Remove woodruff key (49) from rotating magnet shaft.

### 4.2.5 Disassembling Rotor

Remove retaining ring (50) from magnet shaft with the No. 2 Retaining Ring Pliers and discard ring. Pull off flat washer (51) and bowed washer (52). Remove and discard flange securing screws (54) and washers (55). Separate flange (56) and rotating magnet assembly from housing (72) by hand.

**NOTE:**

Retaining ring (50) is not used with the cushion drive mechanism.

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### 4.2.6 Disassemble Flange

- A. Fabricate two support bars as shown in Figure 1002 (Special Tools, Fixtures and Equipment). Position fabricated bars between casting of magnet assembly, and flange (56). Set bars and magnet assembly in one of the recesses in spider or base of an arbor press. Recess should be large enough to allow the magnet casting to pass through, but small enough to hold the fabricated bars. Start nut (38) on shaft to protect end threads. Using arbor press, push rotating magnet from flange. This operation will also remove oil slinger (53) from shaft. Discard slinger (53). Remove retaining plate (60) from rotating magnet.
- B. Position flange (56) over one of the recesses of an arbor press. Recess should be small enough to hold flange but large enough to allow bearing (59) to pass through. Place the 11-1471 Drift or equivalent against inner face of bearing (59). Using arbor press, push bearing (59) from flange (56) and discard bearing (59).

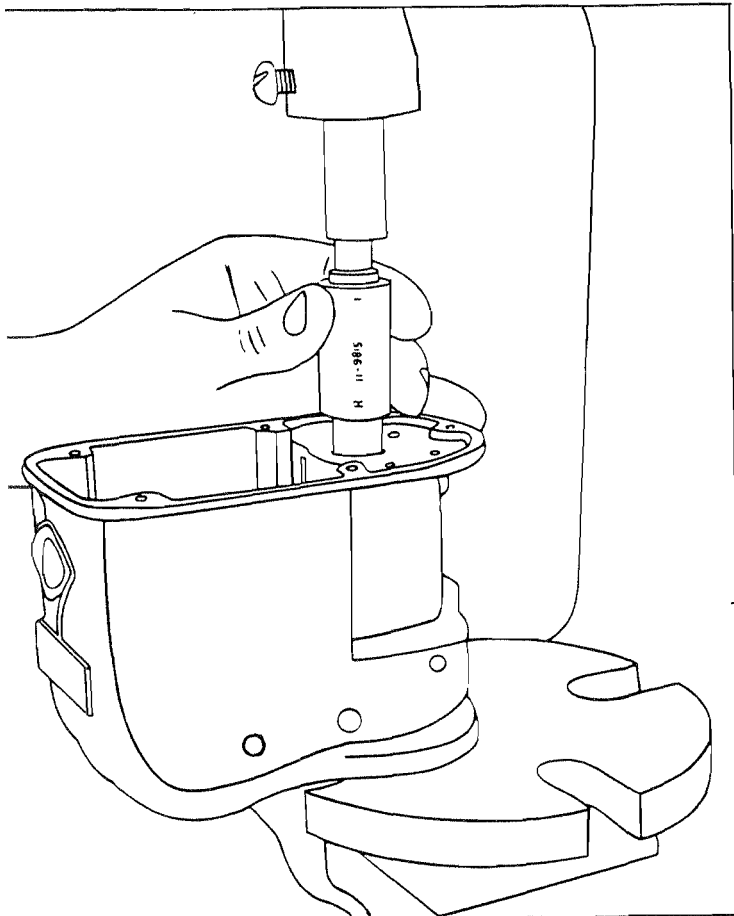


Figure 403. Pressing Roller Bearing Out of Housing

### 4.2.7 Disassemble Pinion Drive

The pinion gear (62) normally does not require replacement at overhaul since it is a sintered iron gear and runs against nylon distributor gear (25). If rotating magnet (61) requires replacement, discard magnet (61) and gear (62). Gear must not be reused after removal from rotating magnet. If teeth of gear (62) are damaged and rotating magnet is to be reused, remove gear as follows:

- A. Fabricate two support bars similar to the ones shown in Figure 1003, Special Tools, Fixtures and Equipment.
- B. Position fabricated bars between casting of magnet assembly, and pinion gear (62).
- C. Position bars and magnet assembly in one of the recesses in the spider or base of an arbor press. Recess of spider should be large enough to allow the casting magnet to pass through, but small enough to hold the fabricated bars.
- D. Using arbor press, remove gear (62) from rotating magnet (61) and discard gear (62).

#### CAUTION:

*A piece of copper or brass (approximately 1/4 inch thick) should be placed between end of shaft and the arbor press ram when removing gear.*

### 4.2.8 Disassembling Housing

- A. Remove ventilator (64) and plug (68) or orifice (65), plug (66, 67), and bushing (69) or plug (73) from housing (72).
- B. Place drive end of housing (72) on a suitable block resting on base plate of an arbor press. Using end stamped R of 11-9815 Drift, press out roller bearing (63) as shown in Figure 403 and discard.



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### SECTION 5. CLEANING

#### 5.1 GENERAL

##### NOTE:

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

- A. Using a clean, dry, lint-free cloth, wipe accessible areas of the housing (72, IPL Figure 1) and other external surfaces free of grease, oil film or other contaminants.

#### 5.2 DETAILED CLEANING PROCEDURES

- A. Clean contact points (30) as follows:

Using any hard finished paper (i.e., a typical business card), close contacts on cleaning paper, then open breakers and remove paper. Do not drag paper through closed breakers. Do not use emery cloth.

- B. All other parts of magneto except capacitor (10), retard lead (13), distributor block (21), cam (33), paper strip (34) and coil (36) may be washed in a standard cleaning solvent and dried with compressed air. Blow out holes in ventilator (64), orifice (65), plugs (66, 67) and screen in cover (6) with compressed air.

- C. Clean capacitor (10), retard lead (13), paper strip (34), and coil (36), and by wiping with a clean dry cloth.

- D. Clean distributor block (21) as follows:

- (1) Using a clean dry lint free cloth, carefully wipe the internal and external surfaces of the distributor block clean and free of all contaminants. If the dry, lint free cloth is insufficient, moisten the cloth with unleaded gasoline and wipe the accessible surfaces of the distributor block free of contaminants. Do not allow gasoline to contact brass bushing.

##### **WARNING**

##### **Unleaded Gasoline**

- Flammable -- do not use near welding areas, near open flames, electrical sparks, or on very hot surfaces.
- Use only with adequate ventilation.
- Do not smoke when using it.

- Do not get in eyes, on skin, or on clothing.
  - Avoid prolonged or repeated breathing of vapors.
  - Store in approved metal safety containers.
- (2) Apply masking tape around and across the nose of the block to cover the end of the distributor block bronze axle bearing. Also mask over the other end of the bearing at the tower side of the block. This masking will prevent contamination of the bearing during the second stage of the cleaning operation.
- (3) Hold the distributor block with the outlet towers in a vertical plane. Using a 1/2 inch bristle brush dipped in unleaded gasoline, clean around the electrodes of the block, allowing the cleaning fluid to flush out any remaining contaminants from the inside of the block. Also clean in and around the block outlet towers.

##### **WARNING**

##### **Cleaning with Compressed Air**

- Use approved personnel protective equipment to protect eyes and face when using compressed air.
  - Maximum allowable air pressure for cleaning operation is 30 psi.
  - Do not direct airstream towards yourself or towards another person.
- (4) Using clean, dry compressed air, blow the block dry and remove the tape from the masked areas.

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INTENTIONALLY

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# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

## SECTION 6. PERIODIC MAINTENANCE

### 6.1 GENERAL

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

Refer to Table 601 for a list of materials and tools required during PERIODIC MAINTENANCE.

- A. The use of a 4 to 5 power glass is recommended for all visual inspections.
- B. Main and retard contact assemblies (30), wedges (35), screws (54), retaining rings (18, 50), washers (55), bearings (59, 63), felt strip (23), felt washer (20), carbon brush (26) and pin (37) shall be replaced after each disassembly with new parts. Also, if installed spring (47), gaskets (7, 58), washers (2), and packing (5) shall be replaced after each disassembly with new parts.

- C. Paragraph 6.2.1 should be performed any time magneto-to-engine timing is found to be outside the engine manufacturer's limits. Paragraph 6.2.2 should be performed at the first 500 hours in service and every 500 hours thereafter for magnetos with impulse couplings (45) installed. Paragraph 6.2.3 should be performed at the first 500 hours in service and every 500 hours thereafter, regardless of engine manufacturer. An appropriate log book entry signifying compliance with paragraphs 6.2.1, 6.2.2 or 6.2.3 and referencing the magneto serial numbers involved should be made after completing paragraphs 6.2.1, 6.2.2 or 6.2.3.

**Table 601  
Periodic Maintenance Materials and Tools**

Material/Tool	Description
10-27165 Magneto Grease	Applied to teeth of distributor gear (25)
10-86527 High Temperature Lubricant	Applied to contact assembly cam follower felt
11-8150-1 Timing Kit	Used to check internal timing
11-8465 Rotor Holding Tool	Used to hold rotor to check internal timing and to check impulse coupling
11-9110-1 Timing Light or suitable equivalent	Used to check magneto-to-engine timing

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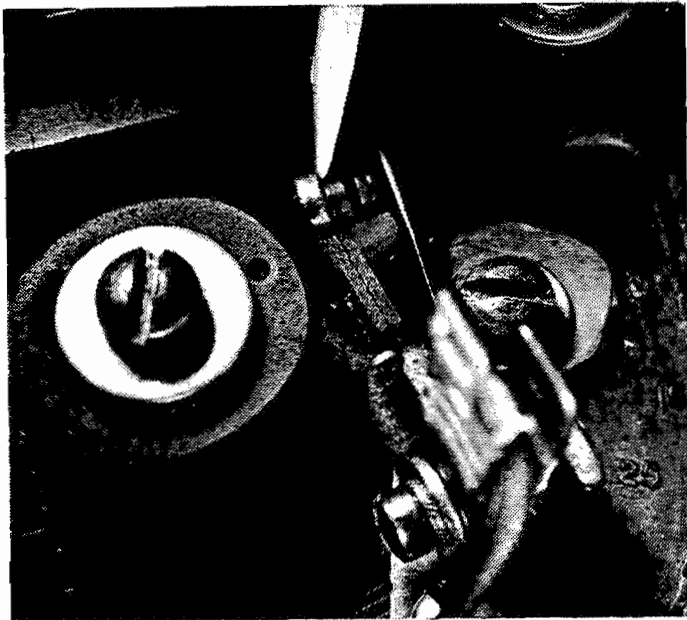


Figure 601. Checking Secureness of Contact Points

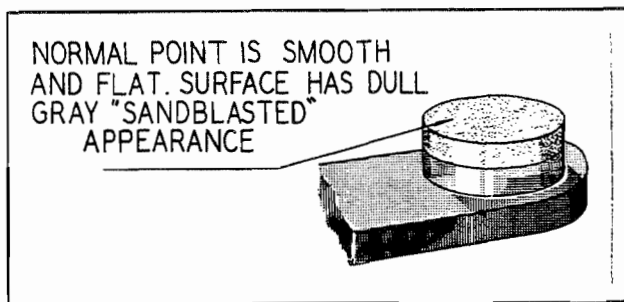


Figure 602. Normal Contact Point

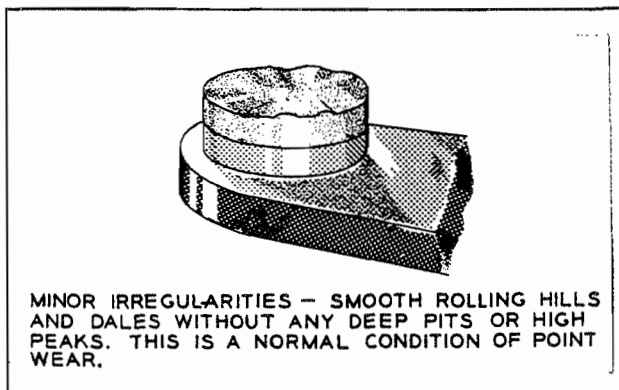


Figure 603. Point with Minor Irregularities, Contact Assembly (30) Usable

### 6.2 DETAILED MAINTENANCE PROCEDURES

#### 6.2.1 Contact Assemblies

Any time magneto-to-engine timing is found to be outside engine manufacturer's limits, inspect contact assemblies (30) as follows:

- A. Remove cover (6) from housing (72) as specified in DISASSEMBLY, paragraph 4.2.1 step A.
- B. Turn magneto drive shaft until cam follower rests on high lobe of cam holding points in their open position. Using a fiber or plastic rod with a screwdriver shaped end, prod contact points as indicated in Figure 601. If any looseness is noted, replace breaker assembly.
- C. Examine contact points for excessive wear or burning. Contact assemblies (30) with points which are deeply pitted or burned must be discarded. Figure 602 shows how the average contact point will look when surfaces are separated for inspection. Desired contact surfaces have a dull gray, sandblasted (almost rough) or frosted appearance, over the area where electrical contact is made. This means that points are worn in and mated to each other, thereby providing the best possible electrical contact and highest efficiency of performance. Minor irregularities or roughness of point surfaces are not harmful (see Figure 603), and neither are small pits or mounds, if not too pronounced. If there is a possibility of pit becoming deep enough to penetrate pad (Figure 604), reject contact assembly.

#### NOTE:

No attempt should be made to stone or dress contact points. Do not clean contact points with emery cloth. Should contact assembly have bad points or show excessive wear, the complete contact assembly should be replaced.

- D. Check condition of cam follower felt. Squeeze felt tightly between thumb and forefinger. If fingers are not moistened with oil, re-oil using 2 or 3 drops of 10-86527 Lubricant. Allow approximately 30 minutes for felt to absorb the oil. Blot off excess with a clean cloth. Too much oil may foul contact points and cause excessive burning.
- E. If necessary, points can be cleaned as specified in paragraph 5.2 step A of CLEANING.

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F. Check magneto-to-engine timing as follows:

- (1) Connect the 11-9110-1 Timing Light or equivalent across the main contact assembly.
- (2) Slowly bring engine up to number one cylinder advance firing position as instructed in engine handbook. At this instant timing light should go out. If it does, the magneto is properly timed to the engine. If the timing light does not go out, remove magneto from engine and perform internal timing check and inspection as specified in paragraph 9.2.10 of ASSEMBLY.

### 6.2.2 Impulse Couplings

Inspect impulse couplings (45) the first 500 hours in service and every 500 hours thereafter as follows:

- A. To determine if flyweight and axle wear is within acceptable limits, perform the wear check on each flyweight as follows:

NOTE:

A polished area on the heel of the flyweight is an indicator of severe wear and is cause for immediate rejection of the cam assembly. See Figure 606.

- (1) Rotate the impulse coupling so the flyweight axles are next to the stop pins. Position flyweight as shown in Figure 607 (stop pin positioned approximately halfway between toe and heel of flyweight). Lock rotor in place using 11-8465 rotor holding tool.

CAUTION:

*Rotor is to be locked on drive-shaft end only. Do not use gear lock devices; use of such devices may result in gear tooth damage.*

- (2) For Model S-1225 magnetos, push on flyweight trigger ramp (See Figure 607A) using bent wire as shown in Figure 609A. Proceed to step (4).
- (3) For Model S-1227 magnetos, form wire into hook as shown in Figure 609B. Reach between the cam and the flyweight with wire hook as near as possible to the stop pin. Pull outward on the flyweight as shown in Figure 607B.

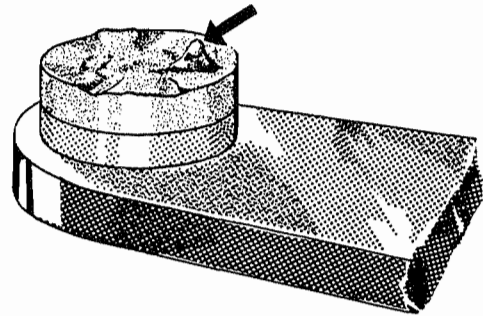


Figure 604. Point with Well Defined Mound. Replace Contact Assembly (30)

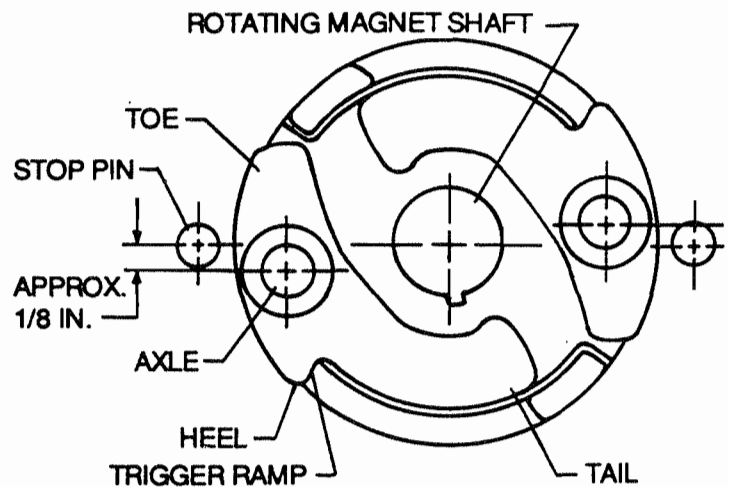


Figure 605. Flyweight Terminology

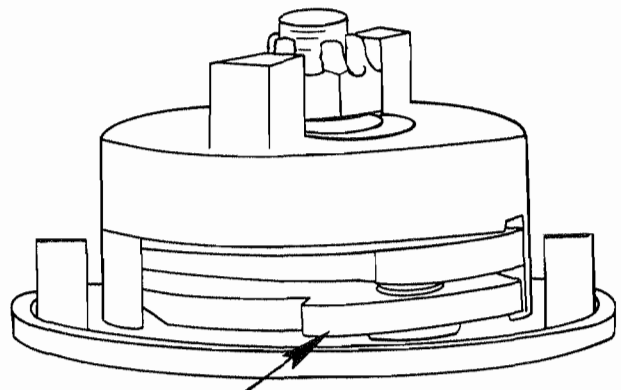


Figure 606. Inspection of Heel

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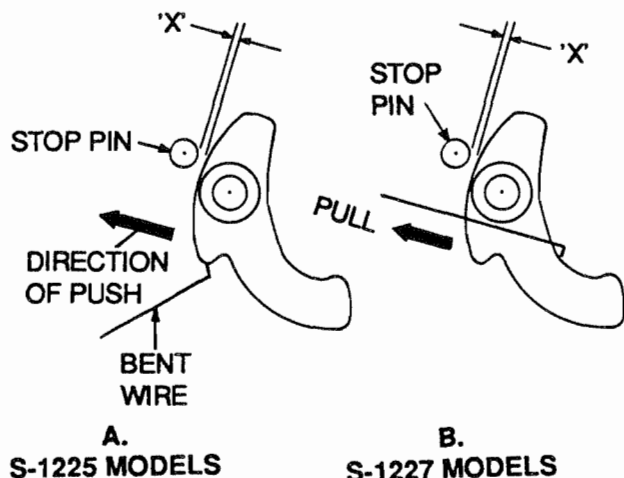


Figure 607. X Value Measurement

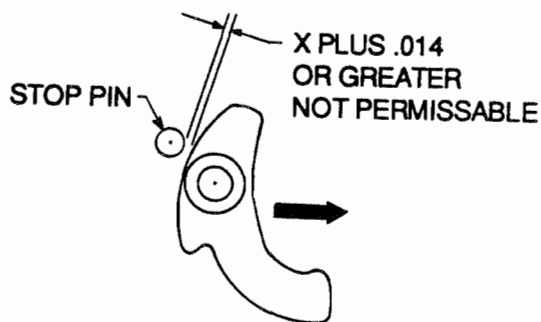


Figure 608. Flyweight To Axle Wear Check

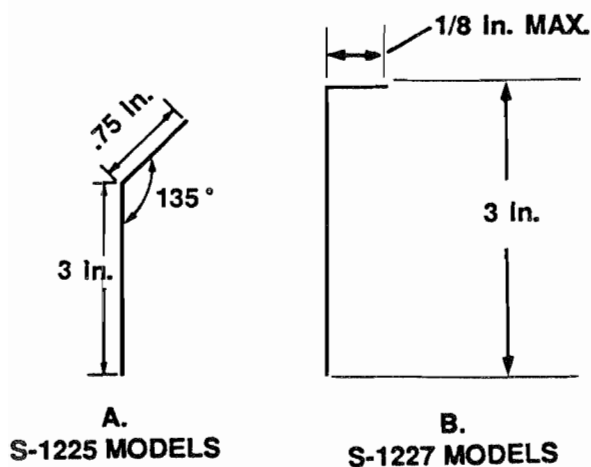


Figure 609. Wire Hook Configurations.  
All Dimensions are Approximate

(4) Insert feeler gage between the stop pin and flyweight to determine clearance ("X" of Figure 607) while the flyweight is forced outward. Maintain constant outward force on the flyweight while measuring clearance to ensure accuracy.

(5) Remove the wire to relax the flyweight. Add .014 feeler gauge to your predetermined "X" value. Attempt to pass "X plus .014" feeler gauges between flyweight and stop pin. If gauges pass, remove and discard worn cam assembly. See Figure 608.

B. If the impulse coupling is found to be unacceptable as a result of any of the preceding checks described, replace the entire impulse coupling assembly or worn parts.

C. When inspection of the impulse coupling assembly is being performed, the stop pins in the magneto flange or housing must also be examined. A shiny spot at the point of flyweight contact is acceptable, a step catch at this point is unacceptable. A damaged or worn stop pin is cause for replacement of the magneto stop pin, or flange, depending on extent of damage or wear.

### 6.2.3 500 Hour Inspection

Perform 500 hour inspection for all magnetos as follows:

A. Disassemble magneto as specified in paragraph 4.2.1 of DISASSEMBLY.

B. Inspect and treat distributor block (21) as specified in General Overhaul, paragraph 7.2.4.

C. Inspect distributor gear assembly (25) and carbon brush (26) as follows:

(1) Wipe distributor gear and axle (25) free of all oil film and other contaminants. Inspect for damage or unusual wear. Replace as necessary.

(2) Remove carbon brush and spring (26) from hole in gear axle (25). Clean hole with a pipe cleaner. Check carbon brush for side loading or unusual wear. Measure carbon brush from spring shoulder to working end of brush. Overall length shall be 0.375 in. minimum. Replace worn brushes as necessary with new brush and spring assembly (26). Seat new brush and spring (26) in gear (25) axle hole and compress brush to within 1/8 in. of gear, then release slowly. Brush shall move freely within hole in axle.

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- (3) Spread a 1/32 in. thick film of 10-27165 Magneto Grease over a flat, non-absorbant surface to produce a grease strip approximately 1 in. wide by 12 in. long. Roll the distributor gear teeth through the length of the grease strip for one complete revolution of the gear. This procedure will provide sufficient grease for the gear. Excess grease will only be thrown off during magneto operation.
  - (4) Ensure washers (19, 24) are in place on gear axle and in good condition. Ensure that nylon washer (24) is positioned against distributor gear. Insert dry distributor gear axle into distributor block bearing. Complete assembly of block (21) and gear (25) using washer (19) and a new retaining ring (18).
- D. Inspect housing (72) for damage. Clean housing (72) with a clean, dry, lint-free cloth.
- E. Inspect coil (36) as follows:
- (1) Clean contaminations from accessible surfaces of coil.
  - (2) Ensure coil outlet tab is parallel with housing to cover mating surface. Bend tab with finger as necessary.
  - (3) If the carbon brush (26) has caused wear in the coil outlet tab, indicated by a visible depression in the tab, disassemble coil (36) from housing (72) as specified in DISASSEMBLY, paragraph 4.2.2, and repair coil (36) as specified in REPAIR, paragraph 8.2.2. Then assemble coil (36) into housing (72) as specified in ASSEMBLY, paragraph 9.2.10.
- F. Assemble distributor block (21) and distributor gear (25) assembly into magneto housing (72) as specified in ASSEMBLY, paragraph 9.2.13. Pay particular attention to proper distributor gear positioning.
- G. Inspect contact assemblies (30) and related components as follows:
- (1) The contact assembly area shall be free of moisture, dirt, oil or grease residue. Clean as necessary.

- (2) Perform inspection per paragraph 6.2.1 steps A. through E.
- (3) Insure breaker cam securing screw (31) is tightened to a torque value of 21-25 in.-lb.
- (4) Check internal timing as follows:
  - (a) Loosen nut securing drive member of magnet shaft sufficiently in order to install the 11-8465 Rotor Holding Tool under nut and flat washer as shown in Figure 906. Tighten nut securely.

### CAUTION:

*When timing magneto no gear holding timing device should be used as hidden gear tooth damage may result.*

- (b) Remove timing inspection plug (68, 69, or 73) from top of magneto. Turn rotating magnet in direction of normal rotation until applicable timing mark on distributor gear is approximately aligned with mark on block. See Figures 909 through 913. Then turn back until magnet locates in its neutral position. Tighten adjusting knob of 11-8465 Holding Tool until pressure is applied on housing flange preventing magnet from turning freely. See Note. With magnet held in this neutral position, install timing plate assembly and pointer assembly of the 11-8150-1 Timing Kit to magneto. (See Figure 907). Align pointer assembly with "0" mark on timing plate.

### NOTE:

Tighten adjusting knob of the 11-8465 Rotor Holding Tool only enough to hold magnet shaft firmly in desired position. Overtightening the adjusting knob may cause damage to drive end bearing.

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- (c) Loosen adjusting knob of the 11-8465 Holding Tool and turn rotating magnet in normal direction of rotation until pointer indexes with respective "E" gap mark. See Table 602. Using the 11-9110-1 Timing Light or equivalent, check that main contact points just open at "E" gap position.
- (d) Turn rotating magnet until cam follower of contact assembly is on high point of cam lobe. Tighten adjusting knob of holding tool and measure contact clearance in accordance with limits given in Table 602. If dimension does not fall within limits, readjust contact points and recheck to be sure points open within "E" gap tolerance. If points do not open within tolerance, re-time magneto as follows:
- 1 Remove timing pointer assembly from cam securing screw.
  - 2 Using a pair of padded jaw pliers or a vise, grip drive member on drive end of rotating magnet. While holding rotating magnet, loosen cam securing screw (31) and turn out half way. Place end of a broad bladed screw driver between bottom of cam (33) and housing (72). Strike handle of screw driver with a sharp downward blow to pop cam loose from taper of shaft.

**CAUTION:**

*If self-locking cam securing screw (31) is removed or loosened at any time, always replace with a new self-locking screw (31) and torque to 21-25 in.-lb.*

- 3 Rotate cam until cam follower of main contact assembly is on high point of cam lobe. Adjust main contact assembly to obtain a clearance as indicated in Table 602. Tighten main contact assembly securing screws to 20-25 in.lb.
- 4 Turn rotating magnet to neutral position and tighten the 11-8465 Rotor Holding Tool.
- 5 With rotating magnet in neutral position, install timing pointer assembly of the 11-8150-1 Timing Kit on cam securing screw. Align pointer with 0° mark on timing plate assembly. Loosen adjusting knob of 11-8465 Rotor Holding Tool and turn rotating magnet in normal direction of rotation until pointer indexes with respective "E" gap mark (15° ± 2° on 4 and 6 cylinder magnetos or 12° ± 1° on 8 cylinder magnetos). Tighten adjusting knob of 11-8465 Tool and remove the Pointer Assembly from magneto.
- 6 Using the 11-9110-1 Timing Light or equivalent, move cam in direction of rotating magnet rotation until timing light indicates contacts just open. This adjustment shall be made by rotating cam, in opposite direction of rotation, a few degrees beyond point where contacts close. Then rotate cam in rotating magnet direction of rotation until contacts just open. While holding cam in this exact position, push cam on magnet shaft as far as possible with fingers. Extreme care must be exercised in this operation. If cam adjustment is changed in the slightest degree, timing of magneto will be thrown off. Do not drive cam on shaft with a mallet or other instrument. Tighten cam securing screw, thereby drawing cam down evenly and tightly. Torque screw to 21-25 in.-lb.

**Table 602**  
**Contact Assembly Settings**

Magneto	"E" Gap	Contact Clearances (inches)	
		Main	Retard
4 and 6 Cyl	15° ± 2°	0.016 ±0.003	0.016 ± 0.006
8 Cyl (with retard contacts)	12° ± 1°	0.013 ±0.001	0.015 ± 0.005
8 Cyl (without retard contacts)	12° ± 1°	0.015 ±0.001	N/A



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### CAUTION:

*If self-locking cam securing screw (31) is removed or loosened at any time, always replace with a new self-locking screw (31) and torque to 21-25 in.-lb.*

- Z Loosen the 11-8465 Rotor Holding Tool adjusting knob and return rotating magnet to neutral position. Reinstall the 11-8149 Pointer Assembly over 0° mark on timing plate. Rotate magnet shaft in normal direction of rotation and check for opening of main contact points at "E" gap setting ( $15^\circ \pm 2^\circ$  on 4 and 6 cylinder magnetos or  $12^\circ \pm 1^\circ$  on 8 cylinder magnetos).
- (e) On a dual contact assembly magnetos, the retard contact assembly is adjusted to open a predetermined number of degrees *after the main contact assembly opens*. The degree of retard for any particular magneto is stamped in the bottom of the contact compartment. At the exact position of rotating magnet that main contact assembly opens, lock the 11-8465 Holding Tool. Move pointer of the 11-8150-1 Timing Kit back to zero. Unlock holding tool and turn rotating magnet in normal direction until pointer of timing kit indexes with required degree of retard. Lock holding tool in this position. Using a timing light, adjust retard contact assembly to just open. Tolerance of retard is  $+2^\circ-0^\circ$ . Unlock holding tool. Turn rotating magnet until cam follower is on high point of cam lobe. Measure point clearance in accordance with limits specified in Table 602. If dimension is not within limits, readjust contact assembly and recheck to be sure that points will open within retard degree tolerance. Replace contact assembly if retard degree tolerance and contact clearance cannot be obtained.
- H. If used, adjust tachometer contacts to maximum opening of  $0.018 \pm 0.002$  in.
- I. Inspect magneto cover (6) for damage. Check capacitor (10) for tightness in cover, case or flange looseness, and for evidence of lead chafing. Using clean, dry compressed air, clean as necessary and replace any component found defective. See appropriate procedures in DISASSEMBLY, paragraph 4.2.2 and ASSEMBLY, paragraph 9.2.15, if capacitor replacement is necessary.

### WARNING:

#### Cleaning with Compressed Air

- Use approved personnel protective equipment to protect eyes and face when using compressed air.
- Maximum allowable air pressure for cleaning operation is 30 psi.
- Do not direct airstream toward yourself or another person.

- J. Form capacitor and coil leads and assemble magneto cover (6), and new gasket (7) if installed, onto magneto housing (72) as specified in ASSEMBLY, paragraph 9.2.17.
- K. Install magneto on engine. Check and adjust "magneto-to-engine" timing to comply with the engine manufacturer's specifications.
- L. Replace any missing terminal eyelets on the harness wires before reinstalling the ignition harness on the magneto. Check the harness grommets for any signs of carbon tracking. Replace as necessary. Refer to High Tension Ignition Harness Service Manual, included in Form X40000.
- M. Reinstall the ignition harness adapter plate to the magneto. Evenly torque four securing nuts (3), initially to 4-8 in.-lb. and then to 18-22 in.-lb.
- N. Complete installation by properly attaching the aircraft primary wiring and any other miscellaneous hardware items removed.

# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

INTENTIONALLY

LEFT

BLANK



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## SECTION 7. GENERAL OVERHAUL

### 7.1 GENERAL

**NOTE:**

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

Refer to Table 701 for a list of materials and tools required during GENERAL OVERHAUL.

- A. The use of a 4 to 5 power glass is recommended for all visual inspections.

- B. Main and retard contact assemblies (30), coil wedges (35), screws (54), retaining rings (18, 50), washers (55), bearings (59, 63), felt strip (23), felt washer (20), carbon brush (26) and pin (37) shall be replaced after each disassembly with new parts. Also, if installed, spring (47), gaskets (7, 58), washers (2), and packing (5) shall be replaced after each disassembly with new parts.
- C. GENERAL OVERHAUL, as specified in paragraph 7.2 should be performed at time of engine overhaul, or in the event of severe environmental effects (engine over-speeds, sudden stoppage or other unusual circumstances, or at the expiration of four years without regard to accumulated operating hours since new or last overhaul.

**Table 701  
General Overhaul Materials and Tools**

Material/Tool	Description
10-21765 Magneto Grease	Applied to teeth of large gear (25)
10-70506-10S Protective Caps (2 required)	Used to protect bushing during coating of block (21)
10-86527 High Temperature Lubricant	Applied to contact assembly cam follower felt
10-391200 Distributor Block Lubricant	Applied to provide proper lubrication for distributor shaft
10-391400 Distributor Block Coating	Applied to black blocks (21) to prevent moisture from collecting on dielectric surface
Yellow Dykem Local Purchase	Used to mark capacitors with good series resistance
Fluke 8840A Digital Multimeter	Used to test series resistance of capacitor (10)
11-1767-3 Condenser Tester (or Equivalent)	Used to test capacitor (10)
11-8950-2 High Tension Lead Tester	Used to test distributor block (21)

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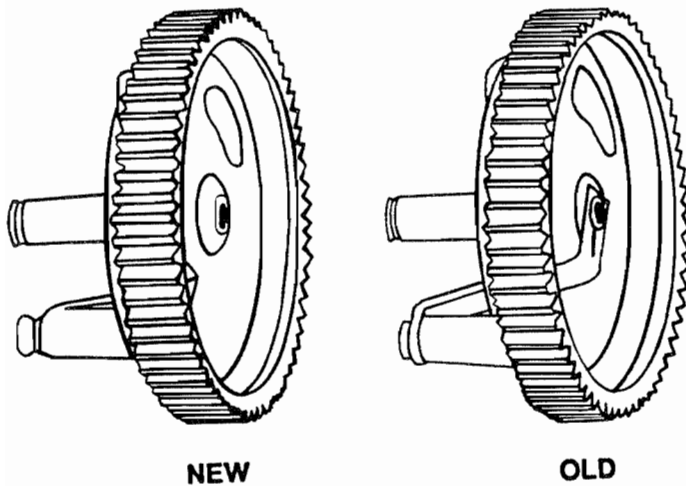


Figure 701. Old and New Distributor Gears

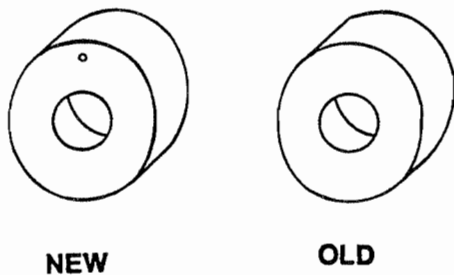


Figure 702. Old and New Cams

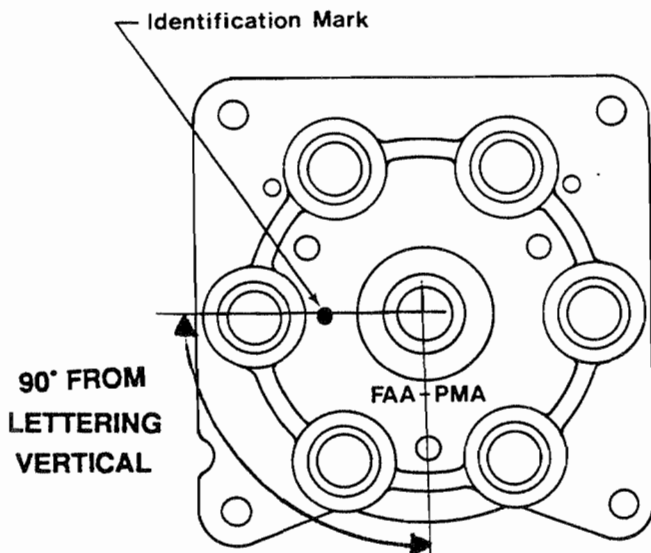


Figure 703. Location of Identification Mark on Green Distributor Blocks

### 7.2 DETAILED OVERHAUL PROCEDURES

#### 7.2.1 Disassemble Magneto

Completely disassemble magneto as specified in DISASSEMBLY.

#### 7.2.2 Inspect Distributor Gear (25)

- A. Determine if gear is of old or new design. The new gear has a narrow stainless steel strap connected to the electrode in place of a wide copper strap. (See Figure 701.) If gear is of old design, discard gear and replace with new type.
- B. If distributor gear (25) is of new design, inspect gear for excessive wear or damage. If gear teeth, axle or electrode are excessively worn or damaged, or there is any evidence of looseness between axle and gear or strap and gear, gear shall be replaced. If electrode surface is slightly carbonized, smooth off with a fine file.
- C. Wipe gear (25) free of all oil film and other contaminants.

#### 7.2.3 Inspect and Treat Cam (33)

- A. Determine if cam (33) is of old or new design. The new design cam can be identified by a 0.06 in. indent on face of cam. (See Figure 702.) Old design cams must be replaced with new style.
- B. If cam is of new design, inspect cam (33) for scratches or other damage which would cause wear of breaker cam follower. Replace cam if necessary.
- C. Cam shall be submerged in 10-391200 Distributor Block Lubricant held at 200°F for 30 minutes. While still submerged in oil, cam and oil shall be allowed to cool to room temperature. After cooling, remove cam from oil, wipe with lint free cloth and put into service or store in a sealed plastic bag until needed.

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### 7.2.4 Inspect Distributor Block (21)

#### NOTE:

Currently manufactured distributor block (21) is brown in color and made from polyester material. These "brown" distributor blocks supersede the black and green blocks on a use stock basis.

- A. Green distributor blocks which do not display identification mark shown in Figure 703 must be discarded and replaced at overhaul. Make appropriate engine log book entry, referencing magneto serial number, and stamp a letter R in the lower left hand corner of the name plate.
- B. Insert gear (25) into distributor block (79). Apply light hand pressure to first one side of gear, then the other. If any play can be felt as gear is "rocked" manually, block bushing is worn excessively. Replace block (21).
- C. Examine distributor block (21) for cracks, particularly around high tension terminal towers, mounting ears and nose in center of electrode side. Reject any cracked blocks (21).
- D. Clean distributor block as specified in CLEANING, paragraph 5.2, step D.
- E. With block thoroughly cleaned, inspect for carbon tracking, which appears as a thin wavy line across dielectric surface. If any suspicious areas are noted check with the 11-8950-2 High Tension Lead Tester Kit as follows:
  - (1) Use a medium test clip to ground tester to an electrode of the block.
  - (2) With high tension lead of tester, probe electrode adjacent to grounded one.
  - (3) Tester high voltage will follow a carbon track. Complete test of all interelectrode spaces. Also test between grounded center bushing and all electrodes. Temporarily assemble block (21) into housing (72) and test for carbon tracking between electrodes and housing ground. Reject any carbon tracked blocks (21).

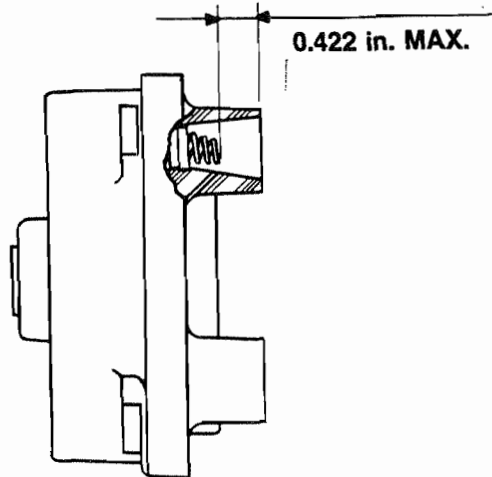


Figure 704. Measuring Contact Spring Height

- F. Inspect contact springs (22), on tower side of block (21). If any look fuzzy or white, or show evidence of burning, rust or corrosion, remove with needle nose pliers and discard. Check springs for proper height by measuring down from top of tower. If measurement exceeds the .422 inch dimension shown in Figure 704 spring may be improperly installed. Using a scribe, or similar pointed instrument, wiggle top of spring in a circular motion to be sure only bottom turn of spring is captivated in groove of block insert. Recheck spring height and if measurement still exceeds .422 inch, remove and replace spring.
- G. Using a small scraper or knife, clean electrodes of distributor block (21) to remove any carbonized deposits. Do not attempt to grind or machine electrodes.
- H. Impregnate bronze bushing and coat distributor block as follows:

#### NOTE:

Only black phenolic type distributor blocks (21) must be coated at each 500 hour inspection and at each overhaul period. Bronze bushings in all types of distributor blocks (21) must be oil impregnated at each 500 hour inspection and at each overhaul period. The bronze bushing in the distributor block (21) is impregnated with oil to provide proper lubrication for distributor shaft. The dielectric surfaces are coated to prevent moisture from collecting and possibly causing electrical failure. Care should be taken to keep coating away from bronze bushing and to keep oil from coated surfaces.

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- (1) Install a 10-70506-10S Protective cap over each end of bronze bushing in block. Brushcoat all surfaces of the distributor block insulating material with 10-391400 Distributor Block Coating. Do not apply the coating to any exposed surface of the bronze bushing. Allow the block coating to dry for a minimum of 30 minutes before reassembling the block (21) to the gear assembly (25).
- (2) Remove 10-70506-10S Protective Cap from electrode side of block and fill bushing with 10-391200 Distributor Block Lubricant.
- (3) Using care not to spill oil on coated surfaces, place block in oven. Bake block at 190°F to 210°F (88°C to 99°C) for 2 to 3 hours.
- (4) Remove block from oven and allow it to cool to room temperature. (Oil is absorbed into bushing during cooling).
- (5) Carefully remove remaining 10-70506-10S Protective Cap and allow excess oil to drain from bushing.

For all blocks, install a new dry felt strip (23) in groove on electrode side of distributor block. When strip is properly installed, approximately 1/16 inch of bushing shall be exposed above the strip.

### NOTE:

Felt strip (23) must not be lubricated.

- J. For all blocks, before installing new felt washer (20) into the distributor block (21), saturate washer with 10-391200 Distributor Block Lubricant. Blot excess oil from washer until flat surfaces take on a "frosted" appearance, and seat washer in recess of block.

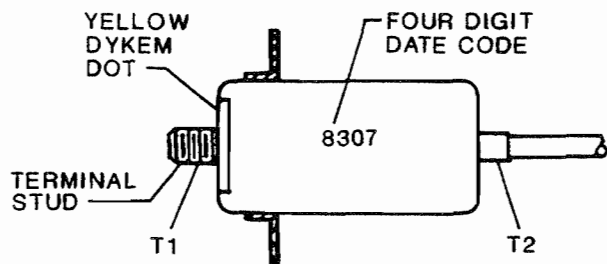


Figure 705.

### 7.2.5 Inspect Capacitor (10)

Check mounting brackets of capacitor (10) for cracks or looseness. Check capacitor lead for damaged insulation and loose terminal connection. If any damage is found, discard capacitor. Test capacitor for series resistance, leakage, and capacitance using 11-1767-3 Condenser Tester or equivalent. Capacitance must be 0.30 to 0.45 microfarads. Series resistance and leakage must be within their respective acceptable ranges. (Series resistance shall be less than 1.0 ohm. Leakage shall be less than 8.0 milliamps at 400 vdc. In addition, if capacitor does not display yellow dykem dot or four digit date code 8307 or higher as shown in Figure 705, check for grounding resistance as follows:

- A. Using a fluke 8840A digital multimeter, measure resistance between points T1 and T2 on capacitor. (See Figure 704.)

### NOTE:

Do not connect to the flag terminal.

- B. Maximum resistance shall be 0.1 milliohm. Capacitors with greater resistance shall be discarded. Identify serviceable capacitors with a dot of yellow dykem as shown in Figure 705.

### 7.2.6 Inspect Coil (36)

- A. Ensure coil is of current design. Old design coils which exhibit a ground lead externally swaged or crimped into one end of the coil core should be replaced. All coils which do not display P/N 10-391088 molded into coil should be replaced. (NOTE: -1 suffix is added to coil part number for aftermarket sales.)
- B. Check coil by measuring resistance of primary and secondary windings with an ohmmeter. Measure primary resistance between lead and coil core, and secondary resistance between coil core and high tension terminal. Primary resistance shall be 1.0-1.5 ohms and secondary resistance shall be 20,000 to 26,000 ohms. Replace coils that exceed either of these limits.
- C. Inspect terminal on coil lead for tightness and properly crimped connection. Inspect high tension tab for wear caused by carbon brush, indicated by a visible depression in the tab. If tab is worn, repair coil as specified in REPAIR section of this manual.

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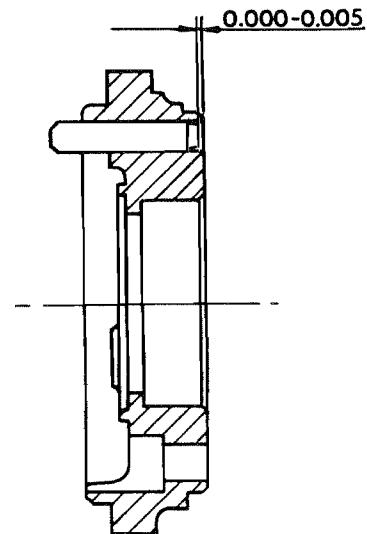
### 7.2.7 Inspect Impulse Coupling (45) and Related Components

- A. Inspect impulse coupling stop pins (49) in flange (48). If stop pins are bent, damaged or show signs of wear, remove pins from flange by using a suitable drift and an arbor press. Press new pins into flange to dimension shown in Figure 706.
- B. Sintered iron bushings with shoulders should be replaced with machined steel bushings (40a). The machined steel bushings have an undercut 0.062 x 0.005 in. immediately behind the bushing shoulder. (See Figure 707) See Illustrated Parts List for correct part numbers. After compliance with this step, Magneto P/N 10-349365-2 becomes new part number 10-349365-3. Overstamp the magneto name plate with the new part number. All other part number magnetos complying with this step shall be identified by stamping a 1/8 in. high letter "B" in the lower lefthand corner of the name plate.
- C. Inspect the parts of impulse coupling separately as follows:
  - (1) Ensure that impulse coupling cam flyweights have been properly heat treated as follows:

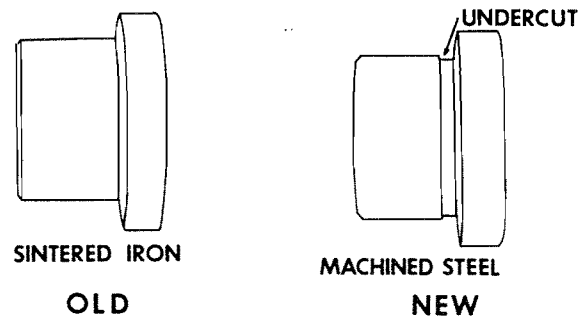
**NOTE:**

Cam assemblies with yellow paint (dykem or lacquer) on the heel of each flyweight or with stamped numbers on flyweight as shown in Figure 708 or with more than 300 hours service are not subject to this test. Proceed to step (b).

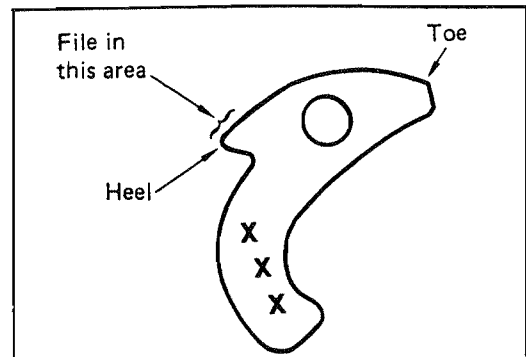
- (a) Use finger pressure to push inward on the toe of a flyweight so that the heel points outward. Then, using a fine #1, double cut, 1/2 in. wide file at least 3/32 in. thick, pass the file across the heel of the flyweight and attempt to remove material. Repeat for other flyweight. File should "glide" smoothly over the heel of the flyweight and remove no material. If the flyweight is soft, the file will not "glide" easily and material will be removed. Impulse coupling cams with soft flyweight(s) should be discarded and replaced with a cam with flyweights marked as specified in above Note.
- (b) Make an appropriate log book entry signifying compliance with this step, mark flyweights on heel with yellow dykem or lacquer, and stamp a 1/16 in. high letter F in the upper right-hand corner of the identification plate.



**Figure 706. Installing Stop Pins in Flange**



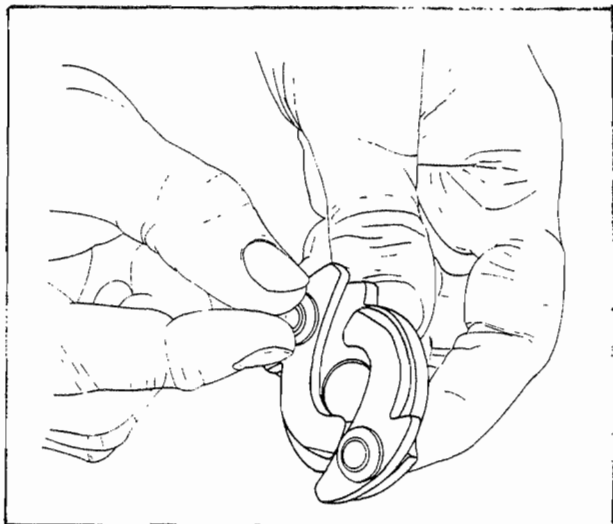
**Figure 707. Drive Bushings**



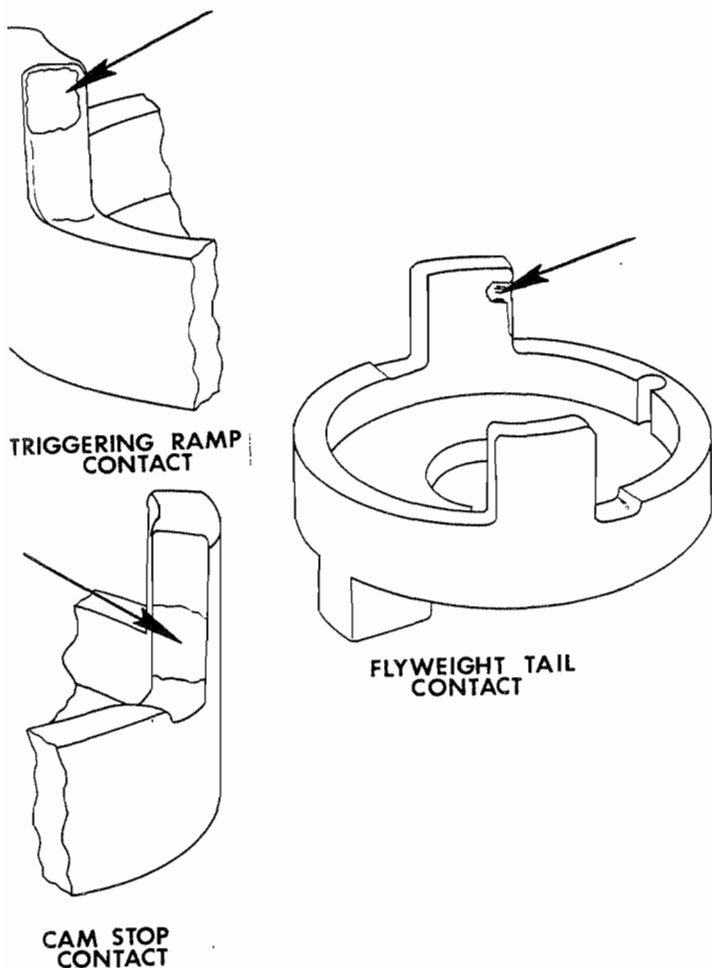
**Figure 708. Soft Flyweight Check**  
**NOTE: XXX Indicates heat treated flyweight lot number.**

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**Figure 709. Inspection of Flyweight Securing Washers**



**Figure 710. Points of Coupling Body Wear**

- (2) Visually inspect flyweight securing washers and flyweights, particularly in area around axle hole, for cracks. Grip washer with fingers as shown in Figure 709, and exert a turning force in each direction attempting to move the washer. If washer moves or any cracks are found, reject and replace the cam assembly.

**CAUTION:**

*Never attempt to repair any part of a rejected cam and flyweight assembly.*

- (3) Inspect ears of coupling body (46) for grooves worn by tail of flyweight and wear at triggering ramp and cam stop contact areas. (See Figure 710.) If either ear shows a perceptible groove or a ridge can be felt when fingernail is drawn across surface, reject body (46).
- (4) Inspect drive lugs of body, if incorporated. If wear is noted, measure difference between worn and unworn areas on drive lug surface. If difference is in excess of 0.015 in., reject body (38).

### 7.2.8 Inspect Magneto Housings (72), Cover (6), and Flange (56)

- A. Flow lines, stress relief fissures and cracks may be noted on some housings (72), cover (6), and flange (56). Exhaustive vibration tests have been conducted on magnetos exhibiting the characteristic lines. In no instance did the initial lines or fissures progress. These particular lines, fissures and cracks should be judged for acceptability using Figures 711 through 718.
- B. Flow lines may appear in various areas of the housing (72) as illustrated in Figures 711 through 713.
- C. Housing (72) is acceptable if stress relief fissures or cracks do not extend beyond the limits shown in Figure 714 or no more than one fissure or crack appears at any particular screw hole as in Figure 715.
- D. Housing is not acceptable if it displays stress relief fissures or cracks extending into the flange as shown in Figure 716 or beyond the limits illustrated in Figure 716, cracks extending completely through the housing as shown in Figures 716 and 717, or holes in housing as shown in Figure 718.
- E. Inspect housing for stripped threads. Replace housing if necessary.



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F. For covers (6) installed on magnetos part numbers 10-349220-1, 10-349220-2, 10-349260-1, 10-349260-2, 10-349350-1 and 10-349350-2 which do not display a letter M stamped on the nameplate after the part number, modify the magneto cover (6) as specified in REPAIR, paragraph 8.2.1.

### 7.2.9 Inspect Rotating Magnet (61) and Gear (62) Assembly

- A. Inspect rotating magnet for cracks or stripped threads. Replace as necessary.
- B. Using firm hand pressure, attempt to twist gear (62) on magnet (61) shaft. No rotational play is permissible.

### 7.2.10 Assemble Magneto

Assemble magneto as specified in ASSEMBLY.

### 7.2.11 Test Magneto

Test magneto as specified in TESTING AND FAULT ISOLATION.

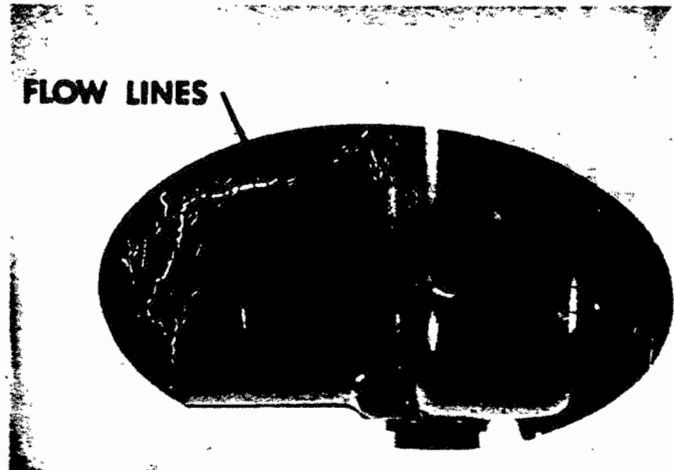


Figure 711. Acceptable Flow Lines



Figure 712. Acceptable Flow Lines

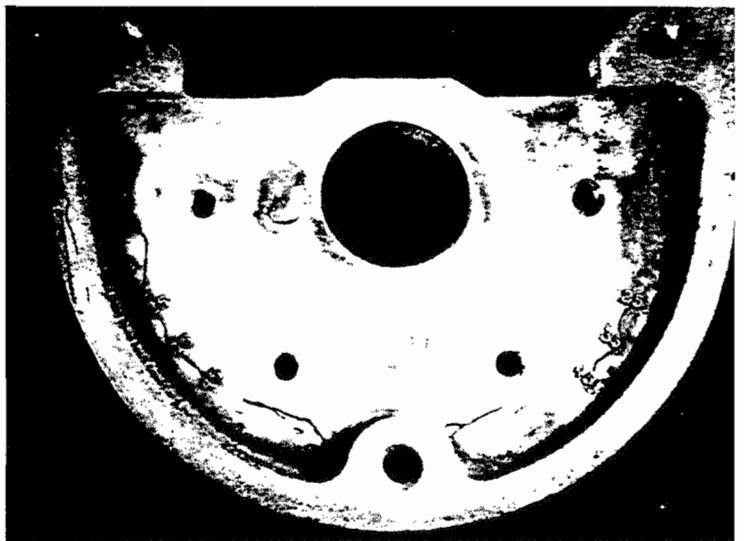


Figure 713. Acceptable Flow Lines

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Figure 714. Acceptable Stress Relief Fissure



Figure 717. Not Acceptable Crack

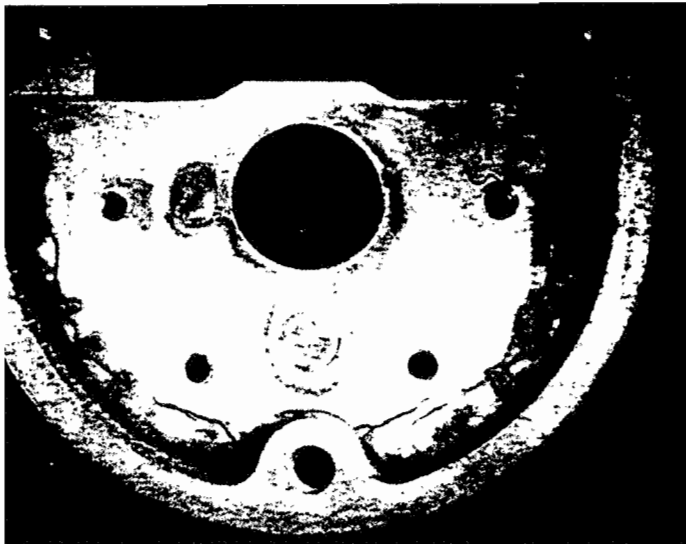


Figure 715. Acceptable Crack Near Screw Hole

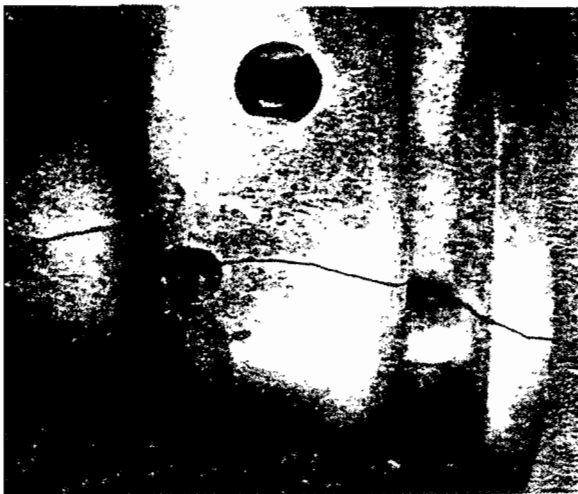


Figure 716. Not Acceptable Crack



Figure 718. Not Acceptable Hole

# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

## SECTION 8. REPAIR

### 8.1 GENERAL

Refer to ILLUSTRATED PARTS LIST Figure 1 for Magneto Exploded View.

Refer to Table 801 for a list of materials and tools required for repair.

**Table 801  
Repair Materials and Tools**

Material/Tool	Description
Alcohol Local Purchase	Used to repair coil tab
Non-Corrosive Flux Local Purchase	Used to repair coil tab
Sealants, See paragraph 8.2 step E.	Used to seal cover vent
50/50 Solder Local Purchase	Used to repair coil tab
10-76257Contact	Used to repair coil tab

**NOTE:**

Equivalent substitutes may be used for listed items.

### 8.2 DETAILED REPAIR PROCEDURES

#### 8.2.1 Cover Modification Procedure

Follow the cover modification procedure below for magneto part numbers 10-349220-1, 10-349220-2, 10-349260-1, 10-349260-2, 10-349350-1 and 10-349350-2 which do not display a letter "M" stamped on the nameplate after the part number.

- A. Disassemble cover (6) from housing (72) as specified in DISASSEMBLY, paragraph 4.2.1.
- B. Using Figure 801 as a guide, lay out the positions for the moisture drains. Positions 1 and 2 are in line with the stud holes in the cover and position 3 is centered between 1 and 2. Using a small round file, create the three semi-circular recesses as detailed in view A, Figure 801.

**NOTE:**

The moisture drains must be on the lower side of each cover when it is reinstalled on its related magneto assembly on the engine.

- C. Lay out the position for drilling a 0.094 in.  $\pm$  0.005 in. hole in the center in the ledge area of the cover and drill one hole in cover using a 3/32 in. or No. 42 drill, as shown in Figure 801.

**CAUTION:**

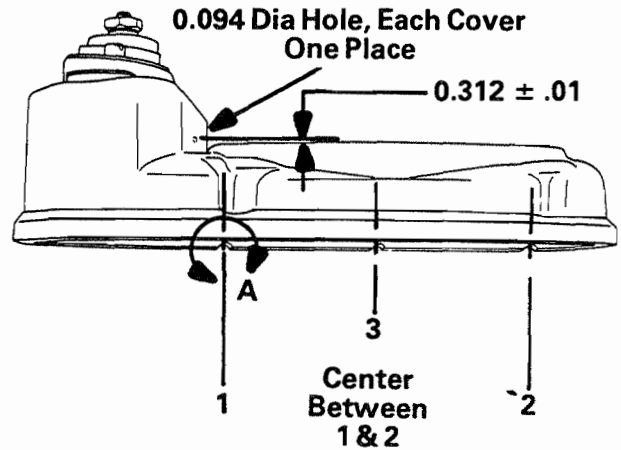
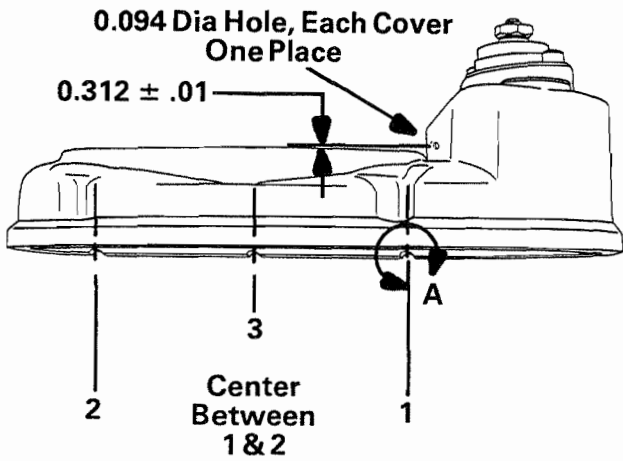
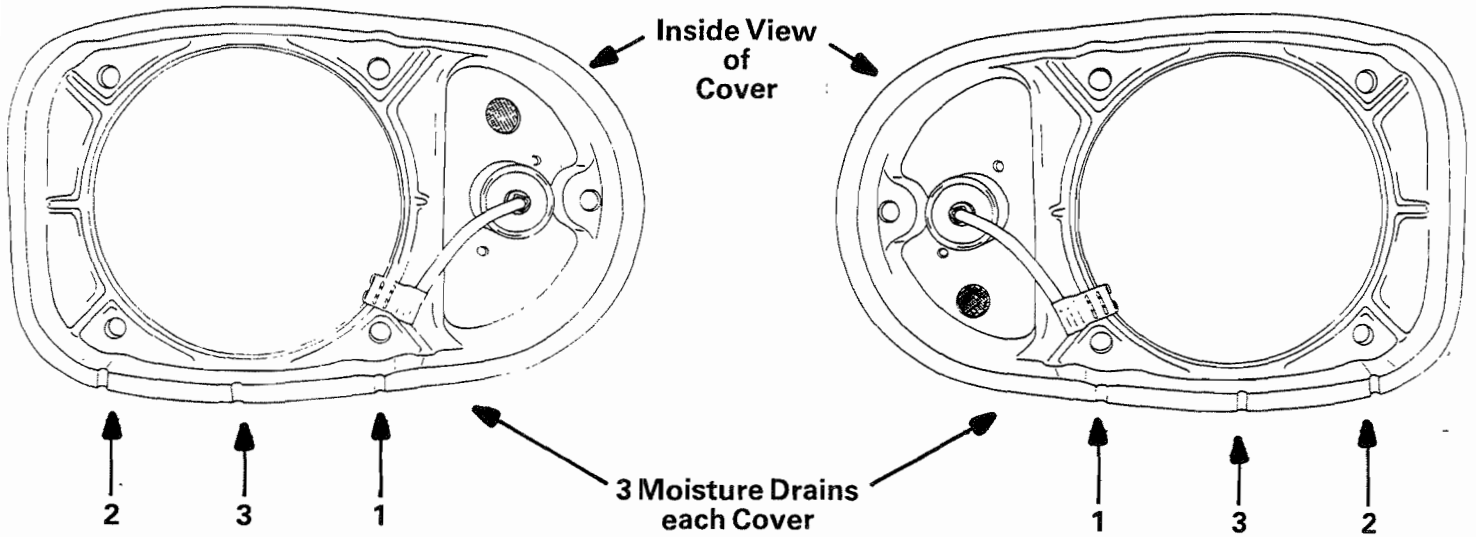
*Do not allow the drill to penetrate through the cover and hit the housing of the capacitor which is directly in line with the hole being drilled. Mask drill bit for maximum allowable depth of 1/4 in.*

- D. Remove any burrs left during the filing and drilling operations on the covers and clean the covers of any metal shavings. Apply a thin coat of black enamel to the bare metal exposed during the filing of the moisture drains. Avoid getting paint on the adjacent cover-to-magneto mounting surface.

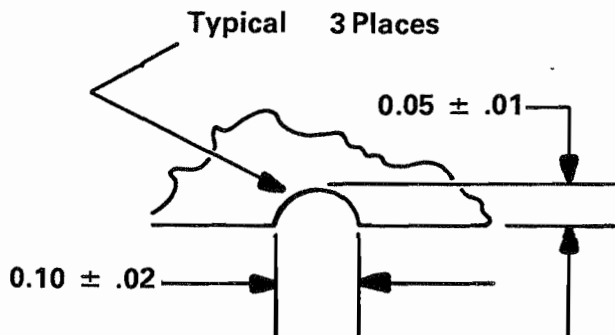
# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

LEFT MAGNETO COVER

RIGHT MAGNETO COVER



VIEW A



MOISTURE DRAIN SLOT CONFIGURATION

Figure 801. Location of Drain Holes

# System Support Manual

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- E. With a putty knife, spatula or similar tool, apply a sufficient amount of sealant to the outside of the vent screen to fill the vent screen recess flush with the adjacent cover surface. Acceptable sealants are listed below:
- (1) Dow Corning Sealant No. 3145
  - (2) Permatex No. 1
  - (3) Hi-Sol Epoxy Patch, Kit 1C
  - (4) G.E. Silicone Sealant (Automotive type)
- F. After adding moisture drains and sealing vent screen, identify the magnetos by stamping the letter "M" on the magneto nameplate after the magneto part number (i.e.10-349XXX-XM).

### 8.2.2 Repair of High Tension Pad of Coil (36)

- A. Place a piece of phenolic or metal between the terminal pad and coil to prevent drill damage to coil. Drill a 1/8 inch hole through center of high tension terminal pad.
- B. Clean face of terminal and pretin with 50/50 solder and non-corrosive flux. Then pretin entire protrusion side of 10-76257 contact.
- C. Position contact so protrusion extends through 1/8 inch hole in terminal pad. Flow solder between pretinned parts with a suitable soldering iron to make a good electrical joint.
- D. After contact and terminal have cooled, clean with alcohol. Check the  $90^\circ \pm 2^\circ$  angle as indicated in Figure 802. Dimension A shall be 1.720 inch.
- E. Inspect coil as specified in GENERAL OVERHAUL, paragraph 7.2.6.

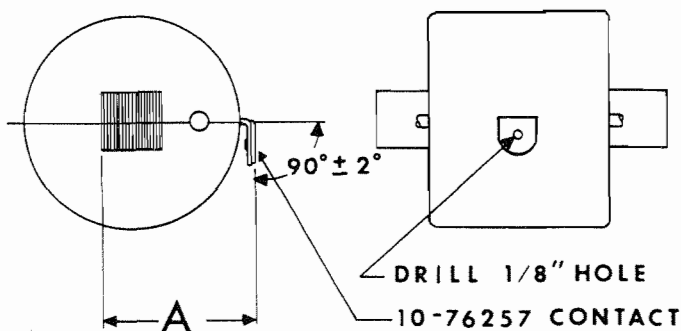


Figure 802. Correct Terminal Angle

# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

INTENTIONALLY

LEFT

BLANK



# System Support Manual S-1200 MAGNETO IGNITION SYSTEM

## SECTION 9. ASSEMBLY

### 9.1 GENERAL

Refer to Table 901 for a list of materials and tools required during assembly.

**NOTE:**

Main and retard contact assemblies (30, IPL Figure 1), wedges (35), screws (54), retaining rings (18, 50), washers (55), bearings (59, 63), felt strip (23), felt washer (20), carbon brush (26), screw (31) and pin (37) shall be replaced after each disassembly with new parts. Also, if installed, spring (47), gaskets (7, 58), washers (2), and packing (5) shall be replaced after each disassembly with new parts.

**Table 901  
Assembly Materials and Tools**

Material/Tool	Description
646943 Anti-Seize Lubricant Teledyne Continental Motors P.O. Box 90, Mobile, AL 36601	Used to prevent drive members from locking onto rotating magnet shaft taper
Loctite Grade B Compound -- Item No 8531 Loctite Corporation, 705 N. Mountain Road, Newington, CT 06111	Used to seal bearing (59) in flange (56)
MS122 Fluorocarbon Spray Miller-Stephenson Chemical Company P. O. Box 950, Danbury, CT 06813	Used to coat harness grommets to prevent sticking to distributor block (21)
1-1-1 Trichlorethane Local Purchase	Used to clean bearing (59) and flange (56)
10-86527 Breaker Felt Lubricant	Used to lubricate felt of contact assembly (30)
No. 2 Retaining Ring Pliers Waldes-Kohinoor Long Island City, NY 11101	Used to install retaining rings (18,50)
11-1471 Drift	Used to press gear (62) onto rotor shaft (61)
11-8150-1 Timing Kit	Used to aid magneto internal timing
11-8465 Rotor Holding Tool	Used to install cushion drive mechanism and as aid in magneto internal timing
11-8627 Spring Seating Kit	Used to seat springs (22) in distributor block (21)
11-8822 Drift	Used to seat snap ring (50) onto rotor shaft (61)
11-9110-1 Timing Light	Used as aid in magneto internal timing
11-9815 Drift	Used to press roller bearing (63) into housing (72)
11-10600 Magnet Charger	Used to charge rotor (61)

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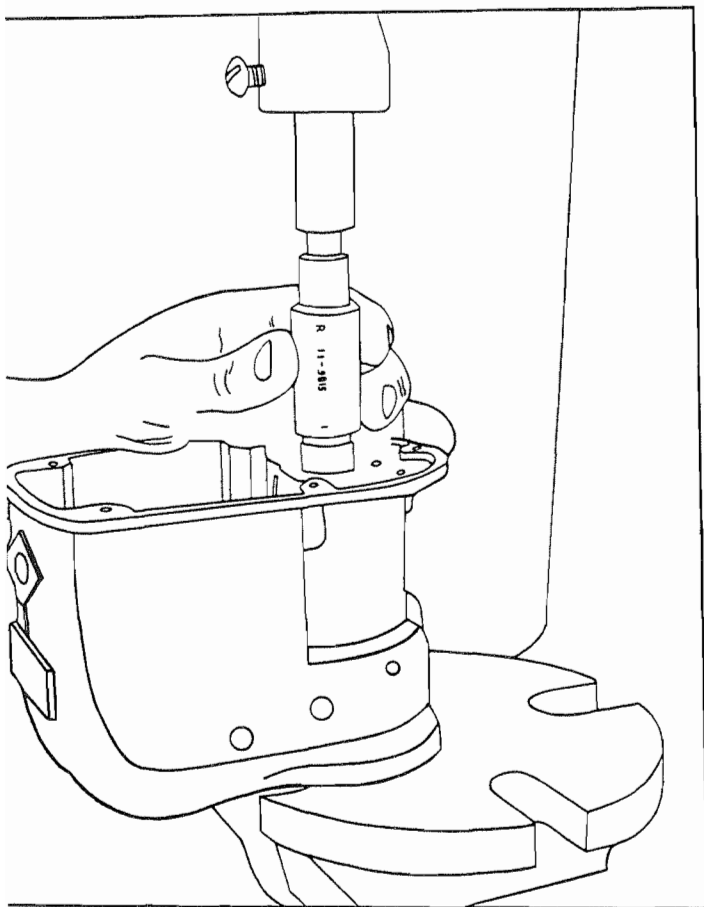


Figure 901. Pressing Roller Bearing Into Housing

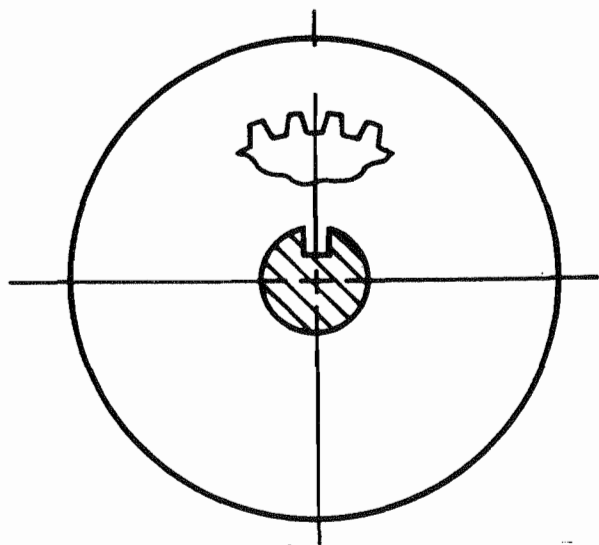


Figure 902. Aligning Pinion Drive Gear on Shaft

### 9.2 DETAILED ASSEMBLY PROCEDURES

#### 9.2.1 Assembly of Roller Bearing

Place drive end of housing (72) on base plate of arbor press. Place roller bearing (63) on pilot diameter with lettered side up. Insert end stamped "I" of the 11-9815 Drift into bearing (63). Holding tool straight, evenly press roller bearing into housing as shown in Figure 901.

#### NOTE:

Bearings are lubricated at the factory and require no further lubrication before installing in the magneto housing.

#### 9.2.2 Assembly of Rotor

- A. If necessary, remagnetize rotating magnet (61) using the 11-10600 Magnet Charger.
- B. If pinion drive gear (62) was removed, press new gear on cam end of rotating magnet (61) as follows:

#### CAUTION:

*Pinion drive gears (62) removed from rotating magnet (61), whether damaged or not, must not be reused.*

- (1) Position gear on cam end of shaft so any tooth space aligns with keyway in shaft. (See Figure 902.)
- (2) Using the 11-1471 Drift and an arbor press, press gear over shaft and seat flush with shoulder on shaft. (See Figure 903).

#### 9.2.3 Assembly of Front Bearing

Assemble bearing (59) into flange (56) as follows:

- A. Visually inspect the lip of new bearing (59) seals for evidence of nicks or roll-over and discard bearing (59) if seals show damage.

#### CAUTION:

*Use extreme care when working with bearing (59) to avoid disturbing lip of seals where they wipe on face of inner race.*



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## S-1200 MAGNETO IGNITION SYSTEM

- B. Using a clean cloth saturated with 1-1-1 trichloroethane or equivalent, clean bearing (59) outside diameter only, and bearing bore in magneto flange (56).
- C. Allow cleaning solvent to evaporate completely. Apply a light coat of Loctite Grade B (Bearing Mount) Compound to outer race of bearing (59) and to bearing bore in magneto flange (56). Carefully wipe any excess compound from edge of bearing or flange bore.
- D. Place flange (56) (drive end down) on base of arbor press. Position bearing (59) in recess of flange. Using a copper or brass drift with a diameter large enough to press against outer race of bearing (59), evenly press bearing into flange. After assembly remove any excess compound, being careful not to allow any compound or solvent to enter the bearing.

**CAUTION:**

*Loctite should cure at room temperature for 2 hours before running magneto.*

**CAUTION:**

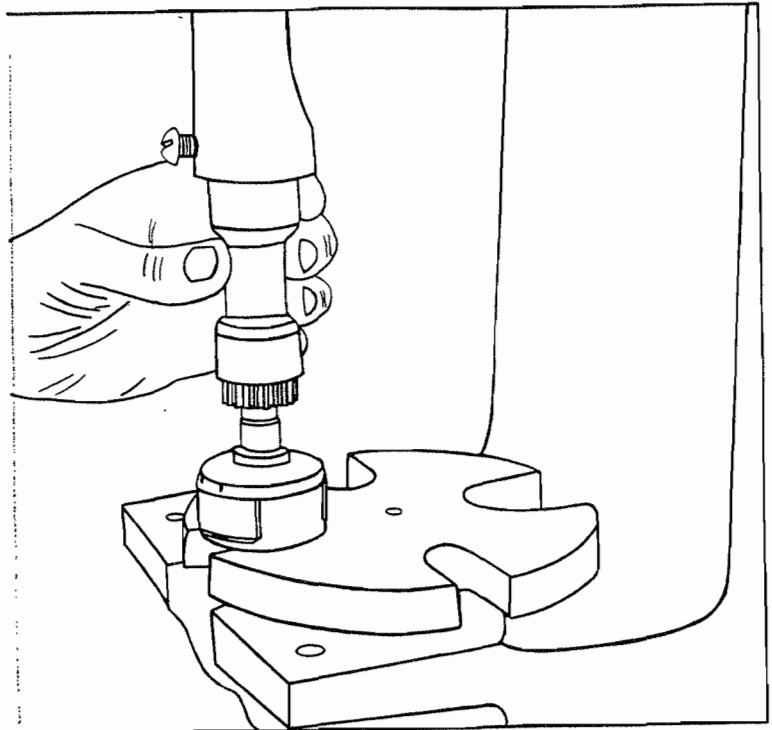
*Do not install bearing by pressing on inner race, to do so will damage bearing races.*

### 9.2.4 Assembly of Flange and Bearing to Rotating Magnet

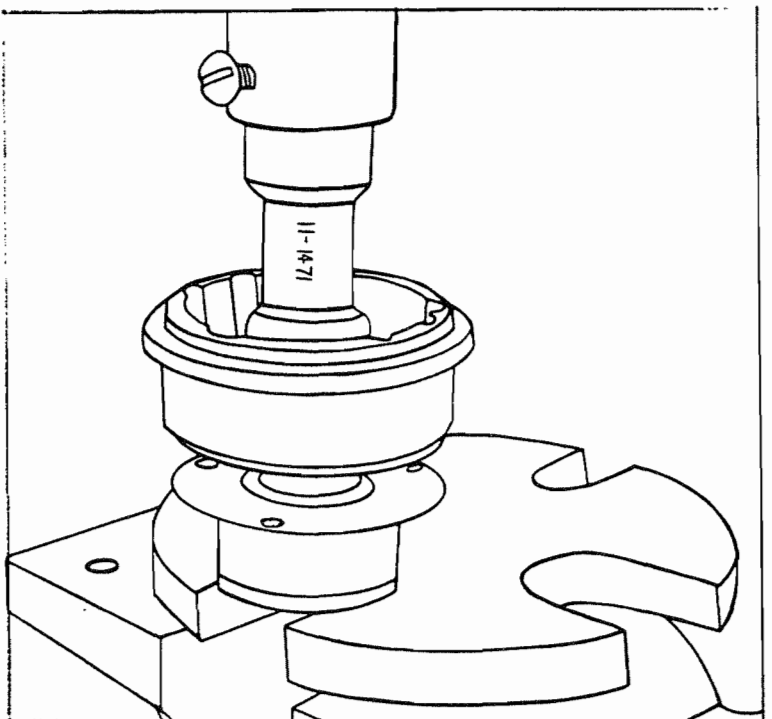
- A. Position plate (60) and new gaskets (58) (if used) over drive end of magnet shaft (61). Place magnet shaft (61) in arbor press with drive end up. Using the 11-1471 Drift, evenly press bearing (59) and flange (56) on drive end of magnet shaft (61) and seat flush against shoulder. (See Figure 904.)

**CAUTION:**

*Press only against inner race; if load is applied to outer race, for this operation, bearing races will be damaged.*



**Figure 903. Pressing Small Gear on Shaft**



**Figure 904. Pressing Bearing and Flange on Shaft**

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## S-1200 MAGNETO IGNITION SYSTEM

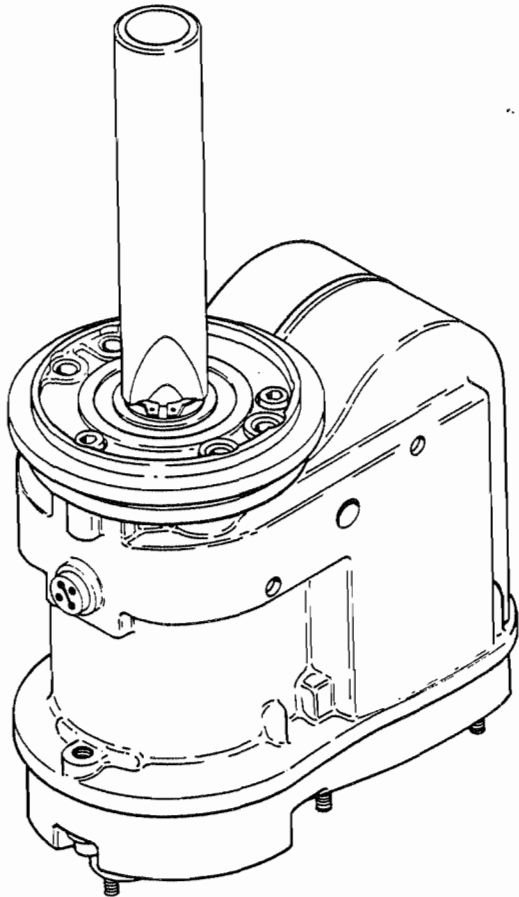


Figure 905. Installing Retaining Ring

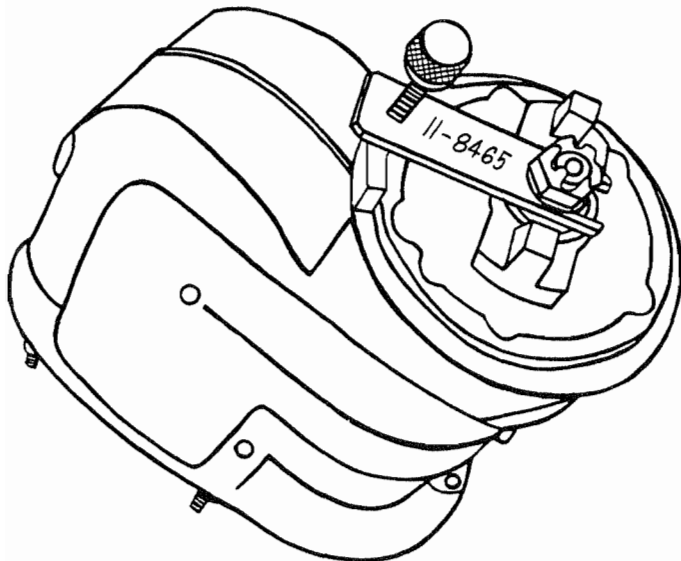


Figure 906. 11-8465 Rotor Holding Tool Installed

### 9.2.5 Assembly of Oil Slinger

Install oil slinger (53), over drive end of rotating magnet shaft (61) and flush against magneto mounting flange (56). Check to be sure slinger fits tightly on rotating magnet shaft. If slinger does not fit tightly, replace with new slinger. Slide bowed washer (52) (concave side towards slinger), flat washer (51), and new retaining ring (50) letter side up onto shaft. Compress bowed washer and seat retaining ring in recess of rotating magnet shaft using the 11-8822 Drift as shown in Figure 905. Install woodruff keys (49) into slots in shaft.

### 9.2.6 Assembly of Flange and Rotating Magnet Into Housing

Coat housing pole shoes and rotating magnet pole pieces with rust preventative or SAE 30 nondetergent oil. Insert cam end of magnet shaft into drive end of housing. Install shaft so plate (60) seats against drive end of housing and holes in plate (60) and flange (56) line up with screw holes in housing. Secure flange to housing with new screws (59) and new washers (55). Torque screws to 65 to 85 in.-lbs. Rotating magnet must turn freely after screws are tightened.

### 9.2.7 Installation of Cam

Prior to installing cam (33), wipe cam with clean, dry cloth. Position cam on contact assembly end of rotating magnet. Install new cam securing washer (32) and new screw (31) but do not tighten screw. Cam must turn freely on magnet shaft until timing is adjusted.

### 9.2.8 Installation of Contact Assemblies

Before installing new contact assemblies (30), check cam follower felt for adequate lubrication by squeezing felt tightly between thumb and forefinger. If fingers are moistened with oil, felt is adequately lubricated and no more oil is needed. If not, apply three drops of 10-86527 Breaker Felt Lubricant to felt pad. Allow approximately 30 minutes for oil to penetrate into felt and for its thinner to evaporate. Avoid getting oil on contacts. Blot off excess oil with a clean cloth. Position new contact assemblies (30) in housing and secure with screw (27) and washer (29) in elongated hole of contact assembly bracket. Secure other end of bracket with screw (27) only.

#### NOTE:

When looking in breaker compartment, the main contact assembly of a clockwise rotating magneto is on the left hand side, while for counterclockwise magnetos, the main contact assembly is on right hand side.

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### 9.2.9 Setting Internal Timing

Set magneto internal timing as follows:

- A. Turn rotating magneto to proper neutral position. This position is determined by locating keyway(s) on drive end of rotating magnet shaft at 12 o'clock with nameplate on housing up. If necessary, temporarily install drive member (44a) on drive end of rotating magnet for timing.
- B. Position the 11-8465 Rotor Holding Tool on shaft and secure in place using applicable bushing (40), washer (41), washer (39) and nut (38). Tighten nut (38) only enough to hold tool securely. See Figure 906. Tighten adjusting knob of 11-8465 Rotor Holding Tool until pressure is applied on housing flange preventing magnet from turning.

#### CAUTION:

*When timing magneto to engine no gear holding timing device should be used as hidden gear tooth damage may result.*

- C. Rotate cam (23) until cam follower of main contact assembly rests on highest point of cam lobe and tighten cam screw (31) finger tight. Adjust main contact assembly to obtain clearance indicated in Table 102. Tighten main contact assembly securing screws to 20 to 25 in.-lbs.

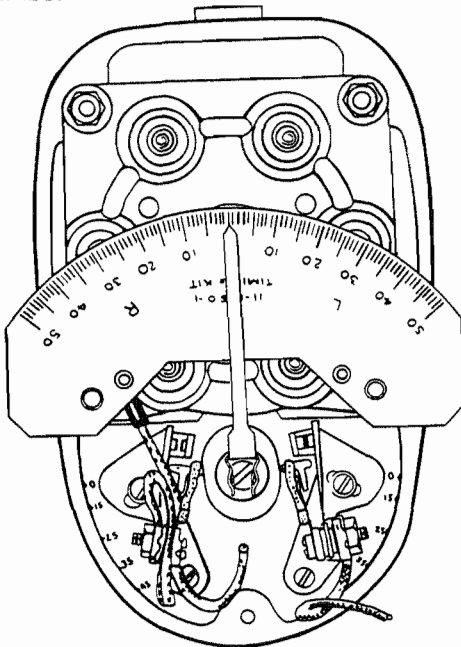


Figure 907. 11-8150-1 Timing Kit Installed on Magneto

- D. Assemble two studs (16) in lower distributor block retention holes of housing (72). (Refer to Figure 907). Install the 11-8693 Timing Plate Assembly and the 11-8149 Pointer Assembly of the 11-8150-1 Timing Kit to breaker compartment of magneto. See Figure 910. Align pointer assembly with 0° mark on timing plate. Loosen adjusting knob of 11-8465 Rotor Holding Tool and turn rotating magnet in normal direction of rotation until pointer indexes with respective E gap mark ( $15^\circ \pm 2^\circ$  on 4 and 6 cylinder or  $12^\circ \pm 1^\circ$  on 8 cylinder magnetos). Tighten adjusting knob of 11-8465 Tool and remove the 11-8149 Pointer Assembly from magneto. Using the 11-9110-1 Timing Light, adjust main contact points to just open by rotating cam. This adjustment shall be made by rotating cam in opposite direction of normal rotating magnet rotation a few degrees beyond point where contacts close. Then rotate cam in normal direction of rotating magnet rotation until contacts just open. While holding cam in this exact position, push cam on magnet shaft as far as possible with fingers. Extreme care must be exercised in this operation. If cam adjustment is changed in the slightest degree, the timing of the magneto will be thrown off. Do not drive cam on shaft with a mallet or other instrument, to do so can harm bearings. Tighten screw (31), thereby drawing cam down evenly and tightly. Torque screw to 21 to 25 in.-lbs. Loosen the 11-8465 Rotor Holding Tool adjusting knob and return rotating magnet to neutral position. Re-install the 11-8149 Pointer Assembly over 0° mark on timing plate. Rotate magnet shaft in normal direction of rotation and check for opening of main contact points at E gap setting ( $15^\circ \pm 2^\circ$  on 4 and 6 cylinder or  $12^\circ \pm 1^\circ$  on 8 cylinder magnetos) using 11-9110-1 Timing light (light should go out at  $15^\circ \pm 2^\circ$  or  $12^\circ \pm 1^\circ$ ).

#### CAUTION:

*If self-locking cam securing screw (31) is removed or loosened at any time, always replace with a new self-locking screw (31) and torque 21 to 25 in.-lbs. (2.4 to 2.8 Nm).*

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- E. On dual contact assembly magnetos, the retard contact assembly is adjusted to open a predetermined number of degrees *after the main contact assembly opens*. The degree of retard for any particular magneto is stamped in the circle at the bottom of the breaker compartment. Locate exact point of main contact assembly opening and set the 11-8149 Pointer Assembly over 0° mark on the 11-8693 Timing Plate Assembly. Turn rotating magnet in direction of normal rotation until pointer indexes with degree of retard. Tighten adjusting knob of 11-8465 Holding Tool and set retard contact assembly to just open, within +2°-0°. Tighten securing screws to 20 to 25 in.-lbs. Loosen adjusting knob of holding tool and turn rotating magnet until cam follower is on high point of cam lobe. Contact clearance of retard breaker shall be within limits listed in Table 102. If clearance is out of limits, recheck main contact timing, adjust as necessary, and reset timing of retard contacts. Replace retard contact assembly if timing and clearance cannot be brought within limits. Remove the 11-8150-1 Timing Kit, 11-8465 Holding Tool, and two studs (16) from magneto.

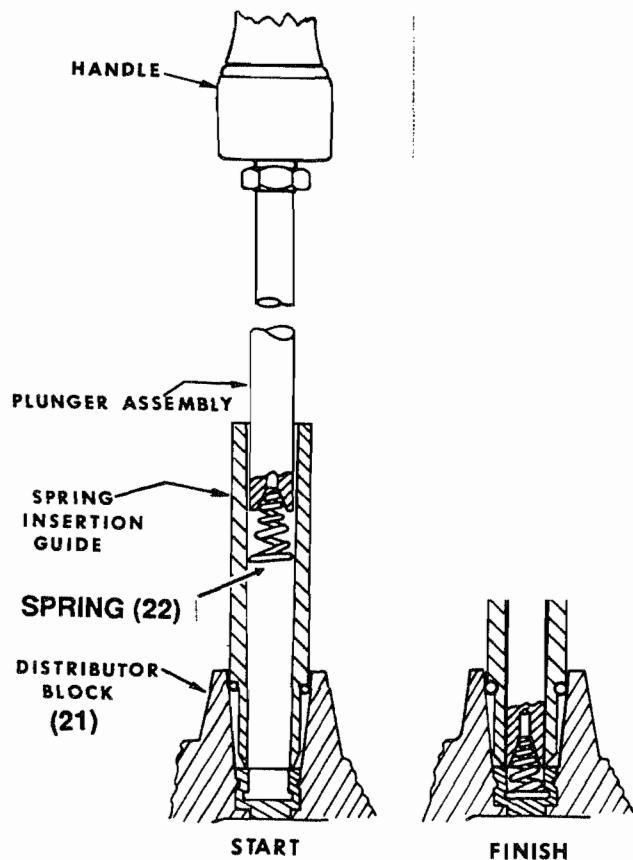


Figure 908. Installing Contact Springs

### 9.2.10 Installation of Coil

Position coil (36) in housing (72) with high tension terminal pointing toward rotating magnet. Coil must seat squarely and centered on pole shoes. Position new wedges (35) between coil core and magneto housing as shown in Figure 401. Using a brass drift and hammer, alternately drive in wedges until by sound and feel, wedges are known to be tightly seated. Form coil lead at right angle to coil and press lead into groove provided in housing. Install fish paper strip (34) (small end first) into recess along side of housing to retain coil lead between strip and housing. End of strip must bottom against end of recess.

### 9.2.11 Installing Contact Springs

If new contact springs (22) are to be installed in distributor block (21), use the 11-8627 Spring Seating Kit. Insert the Spring Insertion Guide of the 11-8627 Kit in cable outlet hole of distributor block as shown in Figure 908. Place contact spring (22) (large end first) in top of the Spring Insertion Guide and position the Handle attached over small end of spring. With a firm counterclockwise pushing motion, seat spring in recess of distributor block. Spring is properly installed when bottom turn is caught in groove of block and top turn is approximately centered in outlet. Check height of springs per Figure 704. Replace springs as required.

### 9.2.12 Assembly of Distributor Gear to Block

- A. Spread a 1/32 in. thick film of 10-27165 Magneto Grease over a flat, non-absorbant surface to produce a grease strip approximately 1 in. wide by 12 in. long. Roll the distributor gear teeth through the length of the grease strip for one complete revolution of the gear. This procedure will provide sufficient grease for the gear. Excess grease will only be thrown off during magneto operation.
- B. Slide nylon washer (24) and steel washer (19) onto gear shaft. Position nylon washer next to plastic gear.
- C. Ensure dry felt strip (23) and felt reservoir washer (20) are assembled into block (21). Insert shaft of gear through distributor block and position washer (19) on shaft. Using No. 2 Ring Pliers, install new retaining ring (18) on shaft, sharp side of lock ring to face out. Rotate gear to ensure there is no interference between gear electrode and block electrodes.
- D. Install new carbon brush (26) in hole in center of distributor gear (25). Brush should slide freely in and out of hole.

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### 9.2.13 Install Block and Gear

Assemble block (21) and gear (25) assembly into housing (72) as follows:

- A. Connect 11-9110-1 Timing Light between main contact assembly (30) and ground. Set rotating magnet (61) in keyway-up neutral position. Slowly turn rotating magnet (61) in normal direction of rotation until timing light goes out. This is No. 1 firing position (E gap). Tighten adjusting knob of 11-8465 Rotor Holding Tool.
- B. All 4 and 8 cylinder magneto distributor gears (25) incorporate four timing marks, an L for counterclockwise rotating magnet rotation and R for clockwise rotating magnet rotation for 4 cylinder, and a separate L and R for 8 cylinder magnetos. Six cylinder magneto distributor gears (25) incorporate four timing marks, L and LB for counterclockwise rotating magnet rotation, and R and RB for clockwise rotating magnet rotation. Before installing distributor gear in magneto, paint applicable mark, depending on direction of rotation and number of cylinders, with red Dykem. As an example, a 4 cylinder counterclockwise rotating magneto would have the L (4 cyl.) mark painted red (See Figure 909) while a 6 cylinder clockwise rotating magneto would have both the R and RB marks painted red (See Figure 910).

#### NOTE:

L, left hand (counterclockwise), and R, right hand (clockwise), refer to direction of rotation of rotating magnet (61) as viewed from the drive end of the magneto.

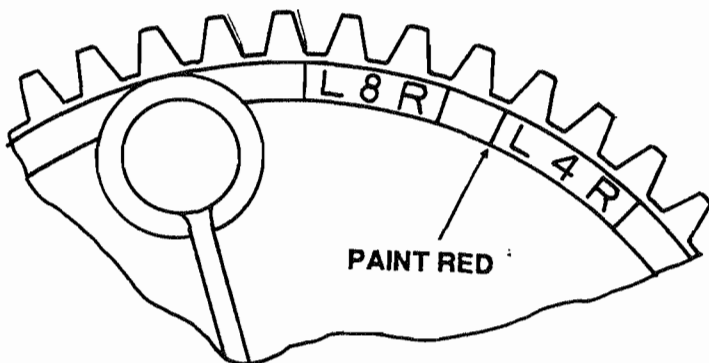


Figure 909. Timing Marks Painted for 4 Cylinder CCW Magneto

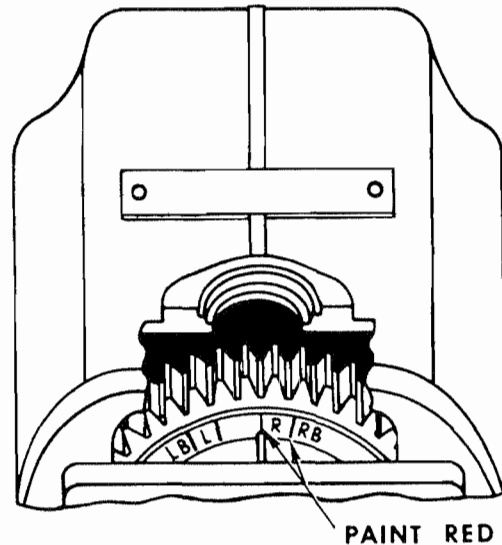


Figure 910. Alignment of Timing Marks on Distributor Gear - 6 Cylinder, no Retard Contacts, Right Hand Rotation

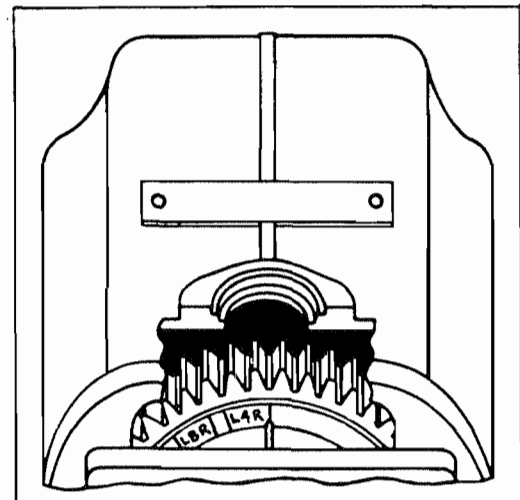


Figure 911. Alignment of Timing Marks on Distributor Gear - 4 Cylinder, Right Hand Rotation

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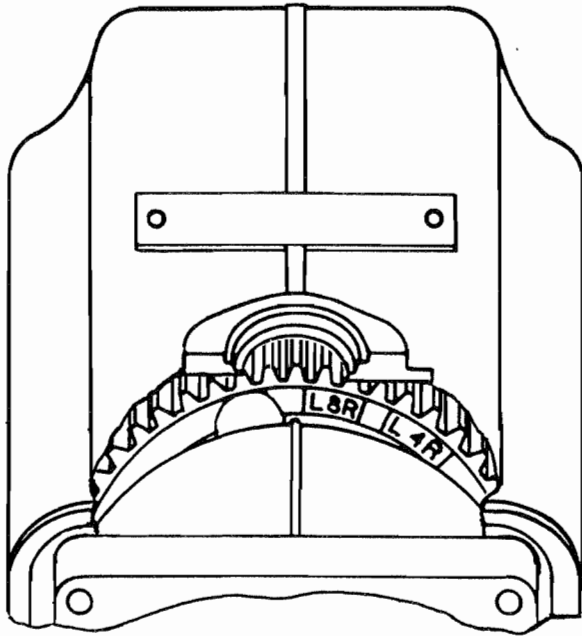


Figure 912. 8-Cylinder with Retard Contacts, Left Hand Rotation

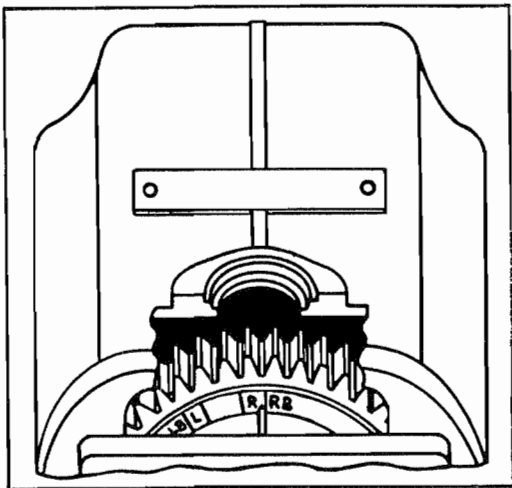


Figure 913. Alignment of Timing Marks on Distributor Gear - 6-Cylinder with Retard Contacts, Right Hand Rotation

- C. With distributor gear (25) assembled to block (21), turn gear until rib on block is aligned as follows:
- (1) 4 and 8 cylinder all types: rib to line up with Red L or R mark, depending on rotation and 4 or 8 cylinder.
  - (2) 6 cylinder with retard contact assembly types: rib to line up LB or RB depending on rotation.
  - (3) All other 6 cylinder types: rib to line up with L or R depending on rotation.
- D. Holding the distributor gear (25) and block (21) timing marks aligned, assemble block and gear into housing, meshing distributor and drive gears together. It may be impossible to mesh the gears to timing rib on the block and distributor gear timing marks line up exactly. The acceptable misalignment is as follows:
- (1) 4 cylinder, all types and 8 cylinder without retard contracts: the timing rib on the distributor block must align  $\pm 1/2$  tooth of the L or R mark, depending on magneto rotation. (See Figure 911).
  - (2) 8 cylinder retard contact type: The timing rib on the distributor block must fall within one tooth to the left of the L8 mark. See Figure 912.
  - (3) 6 cylinder with retard contacts assembly types, the timing rib on the distributor block must lie between the L and LB or the R and RB marks on the gear and should be nearer to the LB or RB mark, depending on magneto rotation (See Figure 913).
  - (4) All other 6 cylinder types, the timing rib on the distributor block must lie between the L and LB or the R and RB marks on the gear and should be nearer to the L or R mark, depending on magneto rotation. (See Figure 910).

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- E. Secure distributor block (21) to housing with studs (16) and washers (4 and 17). Tighten studs fingertight. Loosen the 11-8465 Rotor Holding Tool and turn rotating magnet in reverse direction of rotation to neutral position. Turn rotating magnet back in forward direction until 11-9110-1 timing light indicates main contact assembly has just opened and check to make certain timing marks align within tolerance indicated in step D. Remove 11-8465 rotor holding tool and 11-9110-1 timing light. Tighten block securing studs, first to 4 to 8 in.-lbs. of torque and then to final torque to 18 or 22 in.-lbs.
- F. Insert suitable tool (such as 11-9596 tube) through timing hole in housing and against distributor gear teeth. Rock distributor gear back and forth slightly. There must be perceptible movement (backlash) between the teeth of the distributor gear and pinion drive gear. This check should be made at three different points, 120° apart, on the distributor gear. If backlash is not evident, replace distributor gear.

### 9.2.14 Assembly of Retard/Tach Lead

On dual contact assembly magnetos, assemble lead (13) to cover (6) using screw (12), washer (14), bushing (15) and nut (3). Torque screw to 24 to 26 in.-lbs.

### 9.2.15 Installation of Capacitor

Slide new packing (11) on capacitor (10) until it is seated against capacitor mounting bracket. Assemble capacitor in hole of cover (6), threaded post toward outside of cover, and secure with screws (9) torqued to 8 to 12 in.-lbs.

### 9.2.16 Installation of Coil and Capacitor Leads

Connect coil lead and capacitor lead to main contact assembly terminals, and retard/tach lead to retard or tach contact assembly terminal (if applicable). Form leads in contact compartment as shown in Figures 914 through 917 as applicable.

#### NOTE:

L, left hand and counterclockwise, and R, right hand and clockwise, refer to the direction of rotation of the rotating magnet (61) as viewed from the drive end of the magneto.

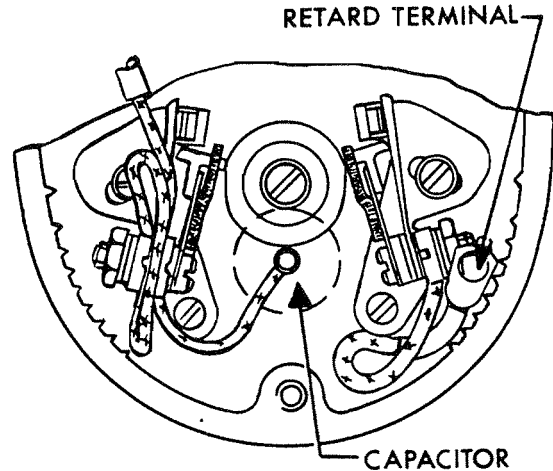


Figure 914. Lead Positioning - Dual Contact Assemblies, Right Hand Rotation

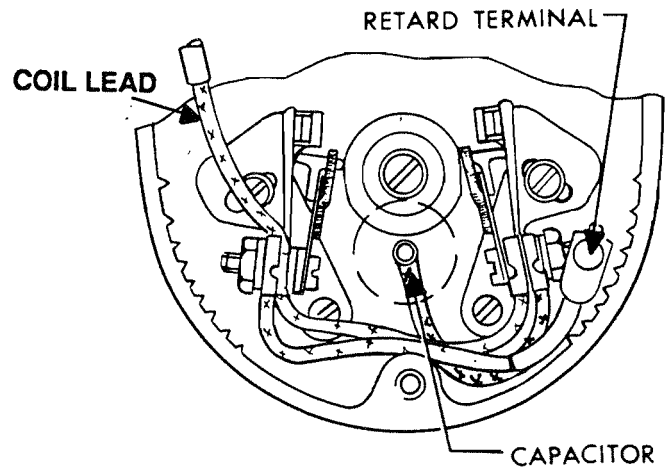


Figure 915. Lead Positioning - Dual Contact Assembly, Left Hand Rotation

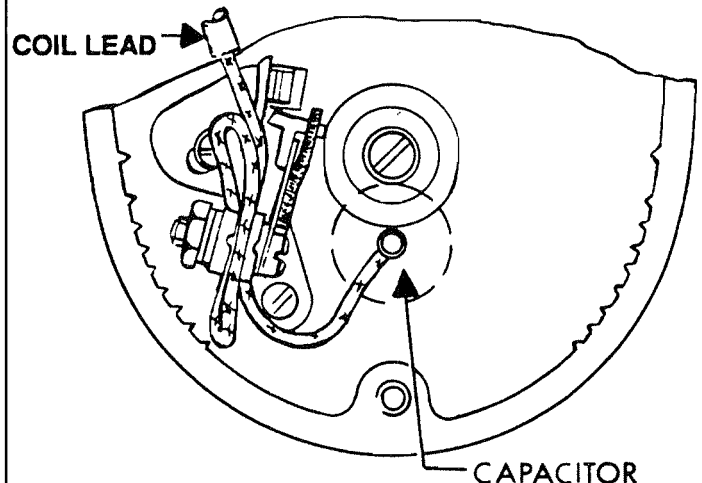


Figure 916. Lead Positioning - Single Contact Assembly, Right Hand Rotation.



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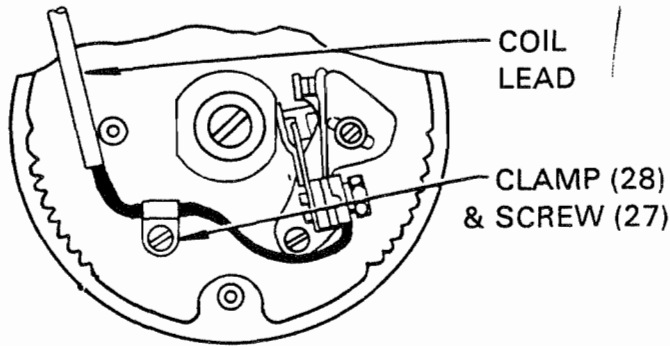


Figure 917. Lead Positioning - Single Contact Assembly, Left Hand Rotation

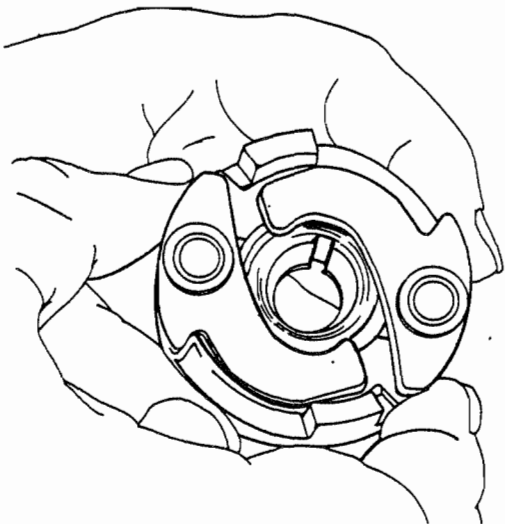


Figure 918. Checking Impulse Coupling for Magnetization

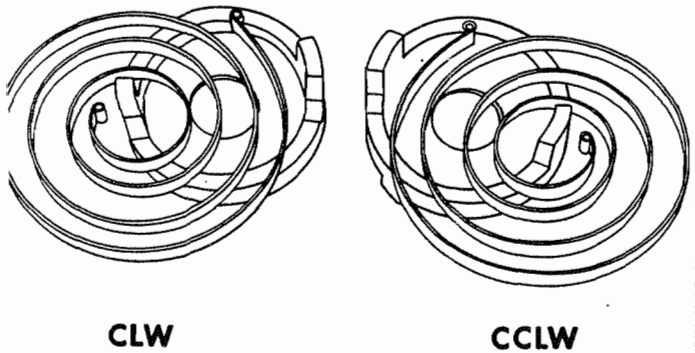


Figure 919. Orientation of Spring In Coupling Body

### 9.2.17 Installation of Housing Cover

Assemble cover (6) to housing (72) and secure with screw and lockwasher (1), tubing (8) and packing (2), where applicable. Torque screw to 30 to 35 in.-lbs.

### 9.2.18 Assembly & Installation of Impulse Coupling

If impulse coupling (45) is used, assemble coupling as follows:

- A. Check cam assembly (48) and body (46) for magnetization which would prevent flyweights from engaging. Hold assembly as shown in Figure 918 and push upper position flyweight tail against body (46). When released, flyweight tail must drop down. If flyweight tail sticks to body, parts are magnetized and coupling may not function. Perform test on both flyweights.
- B. To demagnetize, place body (46) over shaft of a charged rotating magnet and spin body rapidly by hand. While body is still spinning, invert rotating magnet so body falls off. Catch body in hand and repeat test for magnetization.
- C. Clamp one drive lug of body (46) in a padded jaw vise with the spring recess side up.
- D. Orient spring (47) with body (46) for correct rotation. On clockwise couplings, spring must coil in a clockwise direction from the outside toward the center when viewed from the spring recess side of body. On counterclockwise couplings, spring must coil in a counterclockwise direction when viewed from spring recess side. Insert eye of outer end of spring (47) into hole drilled in inner rim of body (46). See Figure 919.
- E. Using heavy gloves to protect the hands, wind spring (47) into body (46) manually, lifting spring coils one at a time over projections on body. Extreme care should be used to avoid scratching or nicking the spring. After winding spring, brush a coating of light oil (such as clean engine oil) over spring coils.
- F. Pry up one and one half turns at inner end of spring with a small screwdriver and support in position as shown in Figure 920.



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- G. Engage recess in hub on cam assembly (48) with eye at inner end of spring. With eye engaged, rotate cam assembly slightly in direction to unwind spring to permit hub of cam to slip into inner turn of spring. Rotate cam in opposite direction, winding spring slightly, until projections on edge of cam (48) clear over projections on body (46). Push cam assembly down into body, at the same time taking the screwdriver out.
- H. Turn magnet slightly in direction of coupling rotation (to wind spring). Carefully lift cam only enough to clear projections on body. Wind spring one half turn and re-engage cam assembly into body.
- I. To install the impulse coupling on the magneto shaft, first apply a thin coating of 646943 Anti-Seize Lubricant to the taper of the rotating magnet shaft. (See Figure 921.) This reduces seizure of the cam assembly to the shaft. Install woodruff key (49) in tapered portion of shaft, install coupling assembly (45) and washer (41), if applicable, install drive member woodruff key (49), and bushing (40). Install lockwasher (39) if used, and thread nut (38) onto shaft. Using torque wrench, tighten nut (38) to 15 ft.-lbs. and install new cotter pin (37). If unable to install pin, tighten nut to next castle not to exceed 25 ft.-lbs. and install pin.

### CAUTION:

*If the impulse coupling cam (48) cracks during this procedure, an audible cracking noise is evident and nut torque reduces immediately. (See Figure 922.) Cam must be discarded and replaced.*

### NOTE:

Do not reuse removed cotter pin.

Bushing (40) must be machined steel type. See GENERAL OVERHAUL, paragraph 7.2.7 step B. (2) and Figure 707.

- J. Inspect impulse coupling as specified in PERIODIC MAINTENANCE, paragraph 6.2.2.
- K. Test impulse coupling as specified in TESTING AND FAULT ISOLATION, paragraph 3.2 step H.

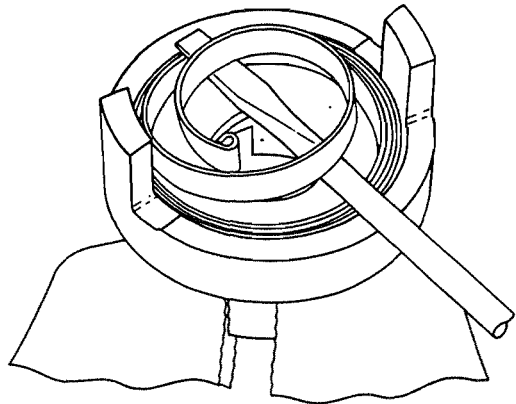


Figure 920. Lifting Inner End of Spring

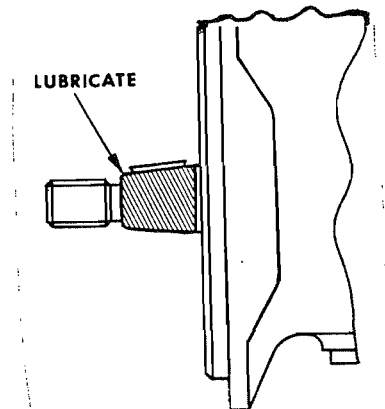


Figure 921. Applying Compound to Magnet Shaft

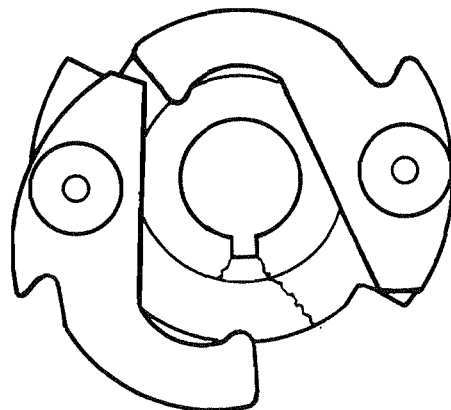


Figure 922. Typical Crack (Either Corner of Keyway)

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### 9.2.19 Installation of Drive Member

Apply thin coating of 646943 Anti-Seize Lubricant on taper of rotating magnet shaft (See Figure 921). Install woodruff key (49) and the drive member (44a). Install lockwasher (39), and nut (38) onto rotor (61). Torque nut to 15 ft.-lbs. and install cotter pin (37). If pin (37) cannot be installed, torque nut (38) not to exceed 25 ft.-lbs. and install pin (37).

### 9.2.20 Installation of Ventilator/Plugs

Install ventilator (64) and plug (68) or orifice (65), plug (66, 67), bushing (69), or plug (73) as required. Torque to 10 to 15 in.-lbs.

### 9.2.21 Install Nameplate (71)

- A. Type data onto nameplate. Coat with clear spray paint and allow to dry.
- B. Prepare surface of housing (72) by wiping with cloth moistened with isopropyl alcohol.
- C. Transfer nameplate (71) onto housing (50). Press firmly across entire surface.

### 9.2.22 Test magneto as specified in paragraph 3.2 of TESTING AND FAULT ISOLATION.

### 9.3 INSTALLATION ON ENGINE

- A. Set rotating magnet in number 1 cylinder firing position. Remove timing inspection plug (68, 69 or 73) from top of magneto. Turn magneto shaft in direction of normal rotation until applicable timing mark on distributor gear is approximately aligned with mark on distributor block. See Figures 913 through 916. The magneto is now approximately in number one cylinder firing position.

#### NOTE:

The timing marks on the rotating magnet are for reference only. They should not be used to adjust contact point opening or to determine proper internal timing of magneto.

- B. Turn engine to number one cylinder full advance firing position, as instructed in engine handbook. Install magneto on engine and tighten mounting bolts sufficiently to hold magneto in position and yet allow it to be rotated.

#### CAUTION:

*When installing magneto on engine, no gear holding device should be used since hidden gear damage may result.*

- C. Connect positive lead of the 11-9110-1 Timing Light or equivalent to switch terminal (capacitor stud) of magneto. Secure common lead of timing light to a good ground.
- D. If timing light is out, rotate magneto housing in direction of its rotating magnet's rotation a few degrees beyond point where light comes on. Then slowly turn magneto in opposite direction until light just goes out. Secure magneto housing in this position and recheck adjustment.
- E. Apply MS-122 spray to harness grommets and assemble gasket P/N 10-391391 (if used) and harness outlet plate to magneto. Install nuts (3) and lockwashers (9). Evenly apply 20 lb.-in. torque to outlet plate nuts.
- F. Disconnect timing light from magneto and make connections to magneto switch and, if applicable, retard/tach terminals. Wiring between switch starting vibrator and magneto shall be made using 18 gage, wire (or larger size). Crimp and solder terminals to magneto end of wires. Secure terminals to switch and retard studs on magneto using 10-32 nuts and lockwashers. Torque nuts to 17-19 in.-lb.

#### **WARNING**

**The magneto is in a switch "ON" condition until connection between switch and magneto is made and the switch is placed in the "OFF" position. Refer to appropriate engine maintenance manual for precautionary procedures.**

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### SECTION 10. SPECIAL TOOLS, FIXTURES AND EQUIPMENT

Refer to Table 1001 for a list of special tools, fixtures and equipment. Figures 1001 through 1003 illustrate fabrication of special tools required for assembly and disassembly.

**Table 1001**

Tool No.	Nomenclature	Application
11-1471	Drift Kell-Strom Tool Co., Inc. 214 Church Street Wethersfield, CT 06102	Used to remove and install bearing (59) and to install gear (62)
11-1767-3	Condenser Tester Kell-Strom Tool Co., Inc.	To test capacitor (10)
11-8150-1	Timing Kit Kell-Strom Tool Co., Inc.	To time magneto
11-8465	Rotor Holding Tool Kell-Strom Tool Co., Inc.	To hold rotor in desired position when timing magneto
11-8822	Drift Kell-Strom Tool Co., Inc.	To compress bowed washer and seat retaining ring (50)
11-9110-1	Timing Light Kell-Strom Tool Co., Inc.	To adjust contact point opening
11-9815	Drift Kell-Strom Tool Co., Inc.	To remove and install roller bearing (63)
11-10039-1	Thread Protector .375-16 UNC Kell-Strom Tool Co., Inc.	Used to protect rotating magnet (61) threads during removal of impulse coupling cam assembly (48) or drive plate (44a)
11-10039-2	Thread Protector .375-24 UNF Kell-Strom Tool Co., Inc.	Used to protect rotating magnet (61) threads during removal of impulse coupling cam assembly (48) or drive plate (44a)
11-10039-3	Thread Protector .437-20 UNF Kell-Strom Tool Co., Inc.	Used to protect rotating magnet (61) threads during removal of impulse coupling cam assembly (48) or drive plate (44a)
11-10500	Magneto Test Stand Kell-Strom Tool Co., Inc.	Used to test magneto
11-10600	Magnet Charger Kell-Strom Tool Co., Inc.	Used to charge rotating magnet (61)
CG420	Puller Snap-On Tools 2611 Commerce Blvd. Birmingham, Al	Used to remove drive plate (44a) or impulse coupling cam assembly (48)
No. 2	Retaining Ring Pliers TRU-ARC Division, Waldes Kohinoor, Inc., Long Island City, N.Y. 11101	To remove and install retaining rings (18, 50)
8840A	Digital Multimeter John Fluke Mfg. Co. P. O. Box C-9090 Everett, WA 98206	Used to check coil (36) and capacitor (10)

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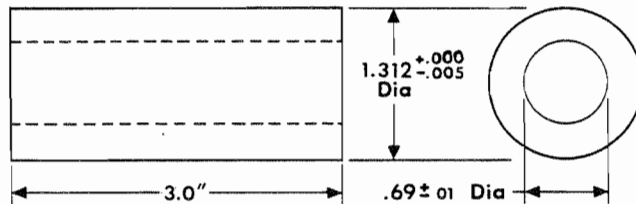


Figure 1001. 11-1471 Drift

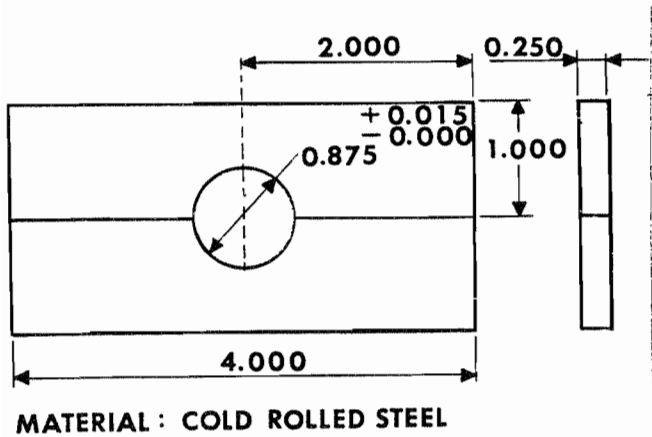


Figure 1002. Fabricated Support Bars -- Drive End Bearing

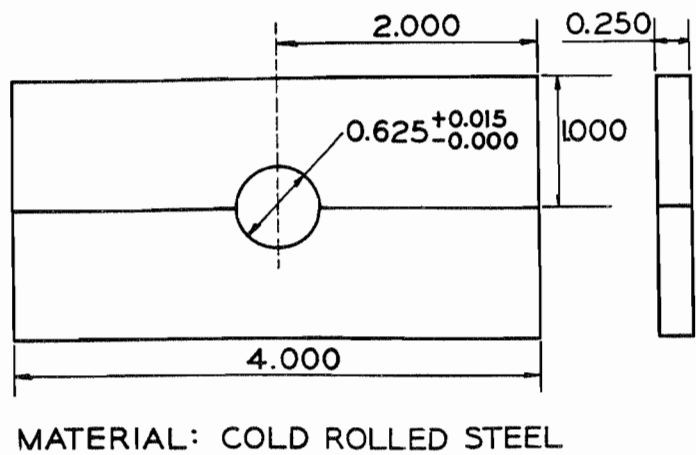


Figure 1003. Fabricated Support Bar--Small Gear

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### SECTION 11: ILLUSTRATED PARTS LIST

#### TABLE 1101: EQUIPMENT COVERED

PART NO.	MODELS NUMBER	DEGREES LAG OR RETARD	SEE PARTS LIST TABLE	PART NO.	MODELS NUMBER	DEGREES LAG OR RETARD	SEE PARTS LIST TABLE
10-349220-4	S6LN-1201	30	1103	10-349350-5	S6RN-1225	30	1103
10-349220-5	S6RN-1201	30	1103	10-349350-6	S6LN-1225	30	1103
10-349260-6	S6RN-1205	-	1103	10-349350-7	S6LN-1225	30	1103
10-349260-7	S6LN-1205	-	1103	10-349365-1	S4LN-1227	35	1102
10-349285-1	S4LN-1208	25	1102	10-349365-3	S4LN-1227	25	1102
10-349285-7	S4LN-1208	15	1102	10-349365-5	S4RN-1227	25	1102
10-349290-1	S6LN-1208	37.5	1103	10-349365-6	S4RN-1227	25	1102
10-349290-2	S6LN-1208	30	1103	10-349365-9	S4LN-1227	15	1102
10-349290-3	S6RN-1208	30	1103	10-349365-10	S4RN-1227	15	1102
10-349290-4	S6RN-1208	25	1103	10-349370-1	S6LN-1227	45	1103
10-349290-9	S6LN-1208	25	1103	10-349370-2	S6RN-1227	35	1103
10-349290-17	S6RN-1208	37.5	1103	10-349370-4	S6LN-1227	35	1103
10-349300-4	S8LN-1208	15	1104	10-349420-1	S6RN-1251	30	1104
10-349305-1	S4LN-1209	-	1102	10-349420-2	S6LN-1251	30	1104
10-349305-3	S4RN-1209	-	1102	10-349460-1	S6RN-1255	-	1104
10-349305-5	S4LN-1209	-	1102	10-349460-2	S6LN-1255	-	1104
10-349310-1	S6LN-1209	-	1103	10-349490-1	S6LN-1258	25	1104
10-349310-2	S6LN-1209	-	1103	10-349490-2	S6LN-1258	25	1104
10-349310-4	S6RN-1209	-	1103	10-349490-3	S6RN-1258	25	1104
10-349310-8	S6LN-1209	-	1103	10-349500-1	S8LN-1258	15	1104
10-349310-14	S6RN-1209	-	1103	10-349510-1	S6RN-1259	-	1104
10-349320-4	S8LN-1209	-	1104	10-349510-2	S6LN-1259	-	1104
10-349320-5	S8LN-1209	-	1104	10-349510-3	S6RN-1259	-	1104
10-349350-4	S6RN-1225	30	1103	10-349520-1	S8LN-1259	-	1104

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### TABLE 1102: S4LN, S4RN-1208, -1209, -1227 MAGNETOS

Ref. No.	Description	Part No.	10-349285-1	10-349285-7	10-349305-1	10-349305-3	10-349305-5	10-349365-1	10-349365-3	10-349365-5	10-349365-6	10-349365-9	10-349365-10
1-1	SCREW W/LOCK WASHER (Cover Securing)	10-35937-24	1	1	1	1	1	1	1	1	1	1	1
-3	NUT	10-92873-302	5	5	4	4	5	4	4	4	4	4	4
-4	WASHER, Lock	10-92879-43	8	8	8	8	8	8	8	8	8	8	8
-6	COVER - Magneto	10-349393-1 10-349393-2 10-349393-3	1	1	1	1		1	1	1	1	1	1
-8	TUBING	10-180046-28	1	1			1						
-9	SCREW (Capacitor Securing)	10-35935-6	2	2	2	2	2	2	2	2	2	2	2
-10	CAPACITOR	10-349276	1	1	1	1	1	1	1	1	1	1	1
-11	PACKING (Capacitor Mounting)	10-349263	1	1	1	1	1	1	1	1	1	1	1
-12	SCREW (Lead Securing)	10-35937-12	1	1			1						
-13	LEAD - Retard/Tach	10-400050	1	1			1						
-14	WASHER (Retard Lead Securing Screw)	10-16092	1	1			1						
-15	BUSHING (Retard Lead Securing Screw)	10-125996	1	1			1						
-16	STUD - Double End	10-349221	4	4	4	4	4	4	4	4	4	4	4
-17	WASHER (Stud Securing)	10-78655	4	4	4	4	4	4	4	4	4	4	4
-18	RING - Retaining (Gear Axle)	10-92815-37	1	1	1	1	1	1	1	1	1	1	1
-19	WASHER	10-349511	2	2	2	2	2	2	2	2	2	2	2
-20	WASHER - Felt (Gear Axle)	10-50752	1	1	1	1	1	1	1	1	1	1	1
-21	BLOCK - Distributor	10-391584	1	1	1	1	1	1	1	1	1	1	1
-22	. SPRING -- Helical (Distributor Block)	10-50737	4	4	4	4	4	4	4	4	4	4	4
-23	. STRIP - Felt (Distributor Block)	10-163374	1	1	1	1	1	1	1	1	1	1	1
-24	WASHER -- Nylon (Gear Assembly)	10-391309	1	1	1	1	1	1	1	1	1	1	1
-25	GEAR ASSEMBLY -- Distributor	10-349234	1	1	1	1	1	1	1	1	1	1	1
-26	BRUSH -- Carbon	10-160844	1	1	1	1	1	1	1	1	1	1	1
-27	SCREW	10-35936-7	4	4	3	2	4	3	3	2	2	3	2
-28	CLIP -- Cable	10-5752			1			1	1			1	
-29	WASHER (Contact Assembly Securing Screw)	10-14268	2	2	1	1	2	1	1	1	1	1	1
-30	CONTACT ASSEMBLY - RH (Tungsten)	10-382585	1	1	1		1	1	1			1	
	CONTACT ASSEMBLY - LH (Tungsten)	10-382584	1	1		1				1	1		1
	CONTACT ASSEMBLY - LH (Tachometer)	10-349970					1						
-31	SCREW (Cam Securing)	10-391213	1	1	1	1	1	1	1	1	1	1	1
-32	WASHER (Cam Securing Screw)	10-51354	1	1	1	1	1	1	1	1	1	1	1
-33	CAM (4 and 6 Cylinder)	10-349243-1	1	1	1	1	1	1	1	1	1	1	1
-34	STRIP - Fish Paper	10-349326	1	1	1	1	1	1	1	1	1	1	1
-35	WEDGE (Coil)	10-349219	2	2	2	2	2	2	2	2	2	2	2
-36	COIL - Magneto (High Tension)	10-391088-1	1	1	1	1	1	1	1	1	1	1	1
-37	PIN - Cotter	10-90751-18	1	1	1	1	1	1	1	1	1	1	1
-38	NUT - Castellated (Drive Shaft)	10-51652Y								1			
-38a	NUT - Castellated (Drive Shaft)	10-163151	1	1	1	1	1						
-38b	NUT - Castellated (Drive Shaft)	10-51643						1	1		1	1	1
-39	WASHER - Lock (Drive Shaft Nut)	10-3793						1	1		1	1	1
-40	BUSHING - Impulse Coupling	10-51651								1			
-40a	BUSHING - Impulse Coupling	10-163049						1	1		1	1	1
-41	WASHER (Drive Shaft Nut)	10-4093	1	1	1	1	1						
-41a	WASHER (Drive Shaft Nut)	10-51370						1	1		1	1	1
-41c	WASHER (Drive Shaft Nut)	10-51613								1			

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**TABLE 1102: S4LN, S4RN-1208, -1209, -1227 MAGNETOS (Continued)**

Ref. No.	Description	Part No.	10-349285-1	10-349285-7	10-349305-1	10-349305-3	10-349305-5	10-349365-1	10-349365-3	10-349365-5	10-349365-6	10-349365-9	10-349365-10
-45	IMPULSE COUPLING, 35° CCW IMPULSE COUPLING, 25° CCW IMPULSE COUPLING, 25° CW IMPULSE COUPLING, 15° CCW IMPULSE COUPLING, 15° CW	10-349363 10-349359 10-349358 10-391429 10-391427						1	1	1	1	1	1
-46	. BODY - Impulse Coupling . BODY - Impulse Coupling	10-52903 10-51333						1	1	1	1	1	1
-47	. SPRING (Impulse Coupling)	10-51324						1	1	1	1	1	1
-48	. CAM ASSEMBLY - Impulse Coupling . CAM ASSEMBLY - Impulse Coupling . CAM ASSEMBLY - Impulse Coupling . CAM ASSEMBLY - Impulse Coupling . CAM ASSEMBLY - Impulse Coupling	10-349357-2 10-349357-4 10-349357-7 10-349354-2 10-349354-7						1	1	1	1	1	1
-49	KEY - Woodruff	10-90788-5	1	1	1	1	1	2	2	2	2	2	2
-50	RING - Retaining (Drive Shaft End)	10-92815-62	1	1	1	1	1	1	1	1	1	1	1
-51	WASHER - Flat	10-349328	1	1	1	1	1	1	1	1	1	1	1
-52	WASHER - Bowed	10-349249	1	1	1	1	1	1	1	1	1	1	1
-53	SLINGER - Oil	10-349248	1	1	1	1	1	1	1	1	1	1	1
-54	SCREW (Flange Securing)	10-349652	3	3	3	3	3	3	3	3	3	3	3
-55	WASHER (Flange Securing Screw)	10-53397	3	3	3	3	3	3	3	3	3	3	3
-56a	FLANGE - Short Round (Without Stop Pins) FLANGE - Short Round (With 2 Stop Pins) FLANGE - Short Round (With 2 Stop Pins)	10-349392-2 10-349392-5 10-349392-6	1	1	1	1	1			1	1		1
-57	. STOP PIN	10-349438R						2	2	2	2	2	2
-59	BEARING (Magneto Drive End)	10-353056	1	1	1	1	1	1	1	1	1	1	1
-60	PLATE (Bearing Retaining)	10-349247	1	1	1	1	1	1	1	1	1	1	1
-61	MAGNET - Rotating MAGNET - Rotating MAGNET - Rotating	10-349351-1 10-349351-3 10-349351-4	1	1	1	1	1	1	1	1	1	1	1
-62	GEAR - Pinion Drive	10-349241	1	1	1	1	1	1	1	1	1	1	1
-63	BEARING - Roller	10-353060	1	1	1	1	1	1	1	1	1	1	1
-64	VENTILATOR	10-157134	1	1	1	1	1	1	1	1	1	1	1
-68	PLUG - Timing	10-157135	1	1	1	1	1	1	1	1	1	1	1
-71	PLATE IDENTIFICATION	10-400009	1	1	1	1	1	1	1	1	1	1	1
-72	HOUSING HOUSING HOUSING	10-349394-2 10-349394-3 10-349394-16	1		1	1	1	1	1	1	1	1	1

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## S-1200 MAGNETO IGNITION SYSTEM

### TABLE 1103: S6LN, S6RN-1201, -1205, -1208, -1209, -1225, -1227 MAGNETOS

Ref. No.	Description	Part No.																								
			10-349220-4	10-349220-5	10-349260-6	10-349260-7	10-349290-1	10-349290-2	10-349290-3	10-349290-4	10-349290-9	10-349290-17	10-349310-1	10-349310-2	10-349310-4	10-349310-8	10-349310-14	10-349350-4	10-349350-5	10-349350-6	10-349350-7	10-349370-1	10-349370-2	10-349370-4		
-1	SCREW W/LOCK WASHER	10-35937-24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-3	NUT	10-92873-302	5	5	4	4	5	5	5	5	5	5	4	4	4	5	4	4	4	4	4	4	4	4	4	
-4	WASHER	10-92879-43	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
-6	COVER - Magneto COVER - Magneto COVER - Magneto COVER - Magneto	10-349393-1 10-349393-2 10-349393-3 10-349393-4	1*	1*	1*	1*	1	1	1					1	1	1		1	1*	1*	1*	1*	1	1	1	
* Field modify as specified in REPAIR																										
-8	TUBING	10-180046-28	1				1	1				1	1													
-9	SCREW (Capacitor Securing)	10-35935-6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
-10	CAPACITOR	10-349276	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-11	PACKING (Capacitor Mounting)	10-349263	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-12	SCREW (Lead Securing)	10-35937-12	1	1			1	1	1	1	1	1				1										
-13	LEAD - Retard/Tach	10-400050	1	1			1	1	1	1	1	1				1										
-14	WASHER (Lead Securing Screw)	10-16092	1	1			1	1	1	1	1	1				1										
-15	BUSHING (Lead Securing Screw)	10-125996	1	1			1	1	1	1	1	1				1										
-16	STUD - Double End	10-349221	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
-17	WASHER (Stud Securing)	10-78655	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
-18	RING - Retaining (Gear Axle)	10-92815-37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-19	WASHER	10-349511	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
-20	WASHER - Felt (Gear Axle)	10-50752	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-21	BLOCK - Distributor	10-391586	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-22	. SPRING - Helical (Distributor Block)	10-50737	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
-23	. STRIP - Felt (Distributor Block)	10-163374	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-24	WASHER - Nylon (Gear Assembly)	10-391309	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-25	GEAR ASSEMBLY - Distributor	10-349237	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-26	BRUSH - Carbon	10-160844	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-27	SCREW	10-35936-7	4	4	2	3	4	4	4	4	4	4	3	3	2	4	3	2	2	3	3	3	2	3	3	
-28	CLIP - Cable	10-5752				1							1	1			1			1	1	1		1		
-29	WASHER	10-14268	2	2	1	1	2	2	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	
-30	CONTACT ASSEMBLY - RH (Tungsten)	10-382585	1	1		1	1	1	1	1	1	1	1	1		1				1	1	1		1		
	CONTACT ASSEMBLY - LH (Tungsten)	10-382584	1	1	1		1	1	1	1	1	1			1		1	1					1			
	CONTACT ASSEMBLY - LH (Tachometer)	10-349970													1											
-31	SCREW (Cam Securing)	10-391213	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-32	WASHER (Cam Securing Screw)	10-51354	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-33	CAM (4 and 6 Cylinder)	10-349243-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-34	STRIP - Fish Paper	10-349326	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-35	WEDGE (Coil)	10-349219	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
-36	COIL - Magneto (High Tension)	10-391088-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-37	PIN - Cotter	10-90751-18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-38a	NUT - Castellated (Drive Shaft)	10-163151							1	1	1	1			1	1										
-38b	NUT - Castellated (Drive Shaft)	10-51643	1	1	1	1												1	1	1	1	1	1	1		
-38c	NUT - Castellated (Drive Shaft)	10-163178					1						1	1			1	1							1	
-39	WASHER - Lock (Drive Shaft Nut)	10-3793	1	1	1	1												1	1	1	1	1	1	1		



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**TABLE 1103: S6LN, S6RN-1201, -1205, -1208, -1209, -1225, -1227  
MAGNETOS (Continued)**

Ref. No.	Description	Part No.																						
			10-349220-4	10-349220-5	10-349260-6	10-349260-7	10-349290-1	10-349290-2	10-349290-3	10-349290-4	10-349290-9	10-349290-17	10-349310-1	10-349310-2	10-349310-4	10-349310-8	10-349310-14	10-349350-4	10-349350-5	10-349350-6	10-349350-7	10-349370-1	10-349370-2	10-349370-4
-40c	BUSHING - Impulse Coupling	10-163048					1					1	1			1	1							1
-41	WASHER (Drive Shaft Nut)	10-4093	1	1	1	1		1	1	1	1			1	1									
-41b	WASHER (Drive Shaft Nut)	10-116860																						1
-41d	WASHER (Drive Shaft Nut)	10-52307																1	1	1	1	1	1	
-44a	PLATE (Magneto Drive)	10-163003	1	1	1	1																		
-45	IMPULSE COUPLING, 30° CW	10-349367																1	1					
	IMPULSE COUPLING, 30° CCW	10-349368																			1	1		
	IMPULSE COUPLING, 45° CCW	10-349372																					1	
	IMPULSE COUPLING, 35° CW	10-349369																						1
	IMPULSE COUPLING, 35° CCW	10-349371																						1
-46	. BODY - Impulse Coupling	10-76232																1	1					1
	. BODY - Impulse Coupling	10-70371																		1	1	1		1
-47	. SPRING (Impulse Coupling)	10-51324																1	1	1	1	1	1	1
-48	. CAM ASSEMBLY - Impulse Coupling	10-349354-2																1	1					
	. CAM ASSEMBLY - Impulse Coupling	10-349354-4																					1	
	. CAM ASSEMBLY - Impulse Coupling	10-349357-3																		1	1			
	. CAM ASSEMBLY - Impulse Coupling	10-349357-4																						1
	. CAM ASSEMBLY - Impulse Coupling	10-349357-5																					1	
-49	KEY - Woodruff	10-90788-5	1	1	1	1	2	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	1	2
-50	RING - Retaining (Drive Shaft End)	10-92815-62	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-51	WASHER - Flat	10-349328	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-52	WASHER - Bowed	10-349249	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-53	SLINGER - Oil	10-349248	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-54	SCREW (Flange Securing)	10-349652	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
-55	WASHER (Flange Securing Screw)	10-53397	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
-56a	FLANGE - Short Round (Without Stop Pins)	10-349392-2						1	1	1	1	1	1	1	1	1	1							
	FLANGE - Short Round (With 2 Stop Pins)	10-349392-5																					1	
	FLANGE - Short Round (With 2 Stop Pins)	10-349392-6																				1		1
-56b	FLANGE - Long Round (Without Stop Pins)	10-349392-1	1	1	1	1																		
	FLANGE - Long Round (With 2 Stop Pins)	10-349392-3																1	1					
	FLANGE - Long Round (With 2 Stop Pins)	10-349392-4																		1	1			
-57	. STOP PIN - Flange	10-349438R																2	2	2	2	2	2	2
-59	BEARING (Magneto Drive End)	10-353056	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-60	PLATE (Bearing Retaining)	10-349247	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-61	MAGNET - Rotating	10-349351-1						1					1	1			1	1						1
	MAGNET - Rotating	10-349351-2	1	1	1	1												1	1	1	1	1	1	
	MAGNET - Rotating	10-349351-3						1	1	1	1			1	1									
-62	GEAR - Pinion Drive	10-349242	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-63	BEARING - Roller	10-353060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-64	VENTILATOR	10-157134	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-68	PLUG - Timing	10-157135	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-71	PLATE - Identification	10-400009	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-72	HOUSING - Magneto	10-349394-2									1	1												
	HOUSING - Magneto	10-349394-3	1	1	1	1			1	1				1	1	1	1	1	1	1	1	1	1	1
	HOUSING - Magneto	10-349394-4						1					1											

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**TABLE 1104: S6LN, S6RN-1251, -1255, -1258, -1259  
& S8LN-1208, -1209, -1258, -1259 MAGNETOS**

Ref. No.	Description	Part No.																
			10-349300-4	10-349320-4	10-349320-5	10-349420-1	10-349420-2	10-349460-1	10-349460-2	10-349490-1	10-349490-2	10-349490-3	10-349500-1	10-349510-1	10-349510-2	10-349510-3	10-349520-1	
1-1	SCREW W/LOCK WASHER (Cover Securing)	10-35937-24	1	1	1													
-1	SCREW - Self Locking Fil-hd (Cover Securing)	10-391392				1	1	1	1	1	1	1	1	1	1	1	1	
-2	WASHER - Plain (Cover Screw)	10-55501				1	1	1	1	1	1	1	1	1	1	1	1	
-3	NUT	10-92873-302	5	4	5	5	5	4	4	5	5	5	5	4	4	4	4	
-4	WASHER, Lock	10-92879-43	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
-5	PACKING (Stud Outside)	10-90351-9				8	8	8	8	8	8	8	8	8	8	8	8	
-6	COVER - Magneto	10-349393-1	1															
	COVER - Magneto	10-349393-2		1														
	COVER - Magneto	10-349393-3			1													
	COVER - Magneto	10-391514-1				1	1			1	1	1	1					
	COVER - Magneto	10-391514-2						1	1					1	1	1	1	
-7	GASKET (Magneto Cover)	10-391389				1	1	1	1	1	1	1	1	1	1	1	1	
-8	TUBING	10-180046-28	1		1	1	1		1	1			1					
-9	SCREW (Capacitor Securing)	10-35935-5				2				2			2	2			2	
	SCREW (Capacitor Securing)	10-35935-6	2	2	2		2	2	2		2	2			2	2		
-10	CAPACITOR	10-349276	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-11	PACKING (Capacitor Mounting)	10-349263	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-12	SCREW (Lead Securing)	10-35937-12	1		1	1	1			1	1	1	1					
-13	LEAD - Retard/Tach	10-400050	1		1	1	1			1	1	1	1					
-14	WASHER (Lead Securing Screw)	10-16092	1		1	1	1			1	1	1	1					
-15	BUSHING (Lead Securing Screw)	10-125996	1		1	1	1			1	1	1	1					
-16	STUD - Double End (Distributor Block Securing)	10-349221	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
-17	WASHER (Stud Securing)	10-78655	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
-18	RING - Retaining (Gear Axle)	10-92815-37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-19	WASHER	10-349511	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
-20	WASHER - Felt (Gear Axle)	10-50752	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-21	BLOCK - Distributor (6 Cylinder)	10-391586				1	1	1	1	1	1	1		1	1	1		
	BLOCK - Distributor (8 Cylinder)	10-391588	1	1	1								1				1	
-22	SPRING - Helical (Distributor Block)	10-50737	8	8	8	6	6	6	6	6	6	6	8	6	6	6	8	
-23	STRIP - Felt (Distributor Block)	10-163374	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-24	WASHER - Nylon (Gear Assembly)	10-391309	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-25	GEAR ASSEMBLY - Distributor (6 Cylinder)	10-349237				1	1	1	1	1	1	1		1	1	1		
	GEAR ASSEMBLY - Distributor (8 Cylinder)	10-349234	1	1	1								1				1	
-26	BRUSH - Carbon	10-160844	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-27	SCREW	10-35936-7	4	3	4	4	4	2	3	4	4	4	4	2	3	2	3	
-28	CLIP - Cable	10-5752		1					1								1	
-29	WASHER (Contact Assembly Securing Screw)	10-14268	2	1	2	2	2	1	1	2	2	2	2	1	1	1	1	
-30	CONTACT ASSEMBLY - RH (Tungsten)	10-382585	1	1	1	1	1		1	1	1	1	1		1		1	
	CONTACT ASSEMBLY - LH (Tungsten)	10-382584	1			1	1	1		1	1	1	1	1		1		
	CONTACT ASSEMBLY - LH (Tachometer)	10-349970			1													
-31	SCREW (Cam Securing)	10-391213	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-32	WASHER (Cam Securing Screw)	10-51354	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-33	CAM (6 Cylinder)	10-349243-1				1	1	1	1	1	1	1		1	1	1		
	CAM (8 Cylinder)	10-349293-1	1	1	1								1				1	
-34	STRIP - Fish Paper	10-349326	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-35	WEDGE (Coil)	10-349219	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
-36	COIL - Magneto (High Tension)	10-391088-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
-37	PIN - Cotter	10-90751-18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

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**TABLE 1104: S6LN, S6RN-1251, -1255, -1258, -1259  
& S8LN-1208, -1209, -1258, -1259 MAGNETOS (Continued)**

Ref. No.	Description	Part No.																
			10-349300-4	10-349320-4	10-349320-5	10-349420-1	10-349420-2	10-349460-1	10-349460-2	10-349490-1	10-349490-2	10-349490-3	10-349500-1	10-349510-1	10-349510-2	10-349510-3	10-349520-1	
-38a	NUT - Castellated (Drive Shaft)	10-163151	1	1	1								1	1				1
-38b	NUT - Castellated (Drive Shaft)	10-51643				1	1	1	1									
-38c	NUT - Castellated (Drive Shaft)	10-163178										1	1			1	1	
-39	WASHER	10-3793				1	1	1	1									
-40c	BUSHING	10-163048										1	1			1	1	
-41	WASHER (Drive Shaft Nut)	10-4093	1	1	1	1	1	1	1	1	1			1	1			1
-44a	PLATE (MAGNETO DRIVE)	10-163003				1	1	1	1									
-49	KEY - Woodruff (Drive Shaft)	10-90788-5	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	1
-50	RING - Retaining (Drive Shaft End)	10-92815-62	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-51	WASHER - Flat	10-349328	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-52	WASHER - Bowed	10-349249	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-53	SLINGER - Oil	10-349248	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-54	SCREW (Flange Securing)	10-349652	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
-55	WASHER (Flange Securing Screw)	10-53397	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
-56a	FLANGE - Short Round (Without Stop Pins)	10-349392-2	1	1	1							1	1	1	1	1	1	1
-56b	FLANGE - Long Round (Without Stop Pins)	10-349392-1				1	1	1	1									
-58	GASKET (Flange)	10-391401				2	2	2	2	2	2	2	2	2	2	2	2	2
-59	BEARING (Magneto Drive End)	10-353056	1	1	1	1			1		1	1	1		1	1	1	
	BEARING (Magneto Drive End)	10-353059						1		1				1				1
-60	PLATE (Bearing Retain)	10-349247	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-61	MAGNET - Rotating	10-349351-1										1	1					
	MAGNET - Rotating	10-349351-2				1	1	1	1									
	MAGNET - Rotating	10-349351-3									1				1			
	MAGNET - Rotating	10-349351-7	1	1	1									1				1
-62	GEAR - Pinion Drive	10-349241	1	1	1									1				1
	GEAR - Pinion Drive	10-349242				1	1	1	1	1	1	1	1		1	1	1	
-63	BEARING - Roller	10-353060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-64	VENTILATOR	10-157134	2	2	2													
-65	ORIFICE - Threaded	10-382861				1	1	1	1	1	1	1			1	1	1	
-66	PLUG - Bleeder	10-391422													1			1
-67	PLUG - Hex, Threaded	10-391399													1			1
-69	BUSHING - Hex, Threaded	10-382815				1	1	1	1	1					1			
	BUSHING - Hex, Threaded	10-391398													1			1
	PLUG - Timing	10-157135	1	1	1													
-71	PLATE - Identification	10-400009	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-72	HOUSING - Magneto	10-391513-2										1	1	1				
	HOUSING - Magneto	10-391513-3				1	1	1	1						1	1	1	
	HOUSING - Magneto	10-391513-7													1			1
	HOUSING - Magneto	10-349394-7	1	1	1													
-73	PLUG	10-51391										1	1			1	1	

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**TABLE 1105: PRESSURIZED MAGNETO SYSTEMS**

Description		Part No.	10-349610-1	10-349610-2	10-349610-3	10-349620-1	10-349640-1	10-349640-2
Magneto	S6RN-1251	10-349420-1					1	
Magneto	S6LN-1251	10-349420-2						1
Magneto	S6RN-1255	10-349460-1					1	
Magneto	S6LN-1255	10-349460-2						1
Magneto	S6LN-1258	10-349490-1	1					
Magneto	S6LN-1258	10-349490-2		1				
Magneto	S6RN-1258	10-349490-3			1			
Magneto	S8LN-1258	10-349500-1				1		
Magneto	S6RN-1259	10-349510-1	1					
Magneto	S6LN-1259	10-349510-2		1				
Magneto	S6RN-1259	10-349510-3			1			
Magneto	S8LN-1259	10-349520-1				1		
Gasket		10-391391	2	2	2	2	2	2
Harness, Custom *		10-720095-118					1	
		10-720420-113						1
		10-720515-203		1	1			
		10-720570-14				1		
		10-720580-11	1					

\* For service information regarding harnesses, refer to latest revision of form X43001.

# System Support Manual

## S-1200 MAGNETO IGNITION SYSTEM

### TABLE 1106: NUMERICAL PARTS LIST

**NOTE:** The "Qty. 100 Unit Overhaul" column contains the estimated quantity required for 100 overhauls of S-1200 series magnetos. This column is included to provide the operator and/or overhaul activity with a guide for procurement of parts for stock.

Part No.	Description	Fig. & Index No.	Qty. 100 Unit Overhaul (See Note)	Part No.	Description	Fig. & Index No.	Qty. 100 Unit Overhaul (See Note)
10-3793	WASHER - Lock	1-39	100	10-157134	VENTILATOR	-64	5
10-4093	WASHER	-41	10	10-157135	PLUG - Timing	-68	5
10-5752	CLIP - Cable	-28	75	10-160844	BRUSH - Carbon	-26	100
10-14268	WASHER	-29	20	10-163003	PLATE	-44a	2
10-16092	WASHER	-14	25	10-163048	BUSHING	-40c	5
10-35935-5	SCREW	-9	50	10-163049	BUSHING	-40a	5
10-35935-6	SCREW	-9	50	10-163151	NUT - Castellated	-38a	10
10-35936-7	SCREW	-27	75	10-163178	NUT - Castellated	-38c	10
10-35937-12	SCREW	-12	25	10-163374	STRIP - Felt	-23	100
10-35937-24	SCREW	-1	100	10-180046-28	TUBING	-8	100
10-50737	SPRING - Helical	-22	60	10-349219	WEDGE, Coil	-35	200
10-50752	WASHER, Felt	-20	100	10-349221	STUD - Double End	-16	40
10-51324	SPRING	-47	100	10-349234	GEAR (4 & 8 Cyl.)	-25	5
10-51333	BODY	-46	2	10-349237	GEAR (6 Cyl.)	-25	5
10-51354	WASHER	-32	10	10-349241	GEAR - Pinion Drive	-62	2
10-51370	WASHER	-41a	10	10-349242	GEAR - Pinion Drive	-62	2
10-51391	PLUG	-73	1	10-349243-1	CAM (4 & 6 Cylinder)	-33	5
10-51613	WASHER	-41c	10	10-349247	PLATE	-60	5
10-51643	NUT - Castellated	-38b	10	10-349248	SLINGER - Oil	-53	5
10-51651	BUSHING	-40	5	10-349249	WASHER - Bowed	-52	20
10-51652y	NUT - Castellated	-38	10	10-349263	PACKING	-11	35
10-52307	WASHER	-41d	10	10-349276	CAPACITOR	-10	10
10-53397	WASHER	-55	300	10-349293-1	CAM (8 Cylinder)	-33	5
10-55501	WASHER	-2	100	10-349326	STRIP - Fish Paper	-34	20
10-70371	BODY	-46	2	10-349328	WASHER	-51	5
10-76232	BODY	-46	2	10-349351-1	MAGNET - Rotating	-61	2
10-78655	WASHER	-17	10	10-349351-2	MAGNET - Rotating	-61	2
10-90351-9	PACKING	-5	800	10-349351-3	MAGNET - Rotating	-61	2
10-90751-18	PIN - Cotter	-37	100	10-349351-4	MAGNET - Rotating	-61	2
10-90788-5	KEY - Woodruff	-49	30	10-349351-7	MAGNET - Rotating	-61	2
10-92815-37	RING - Retaining	-18	100	10-349354-2	CAM ASSEMBLY	-48	2
10-92815-62	RING - Retaining	-50	100	10-349354-4	CAM ASSEMBLY	-48	2
10-92873-302	NUT	-3	10	10-349354-7	CAM ASSEMBLY	-48	2
10-92879-43	WASHER	-4	125	10-349357-2	CAM ASSEMBLY	-48	2
10-116860	WASHER	-41b	10	10-349357-3	CAM ASSEMBLY	-48	2
10-125996	BUSHING	-15	25	10-349357-4	CAM ASSEMBLY	-48	2

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### TABLE 1106: NUMERICAL PARTS LIST (Continued)

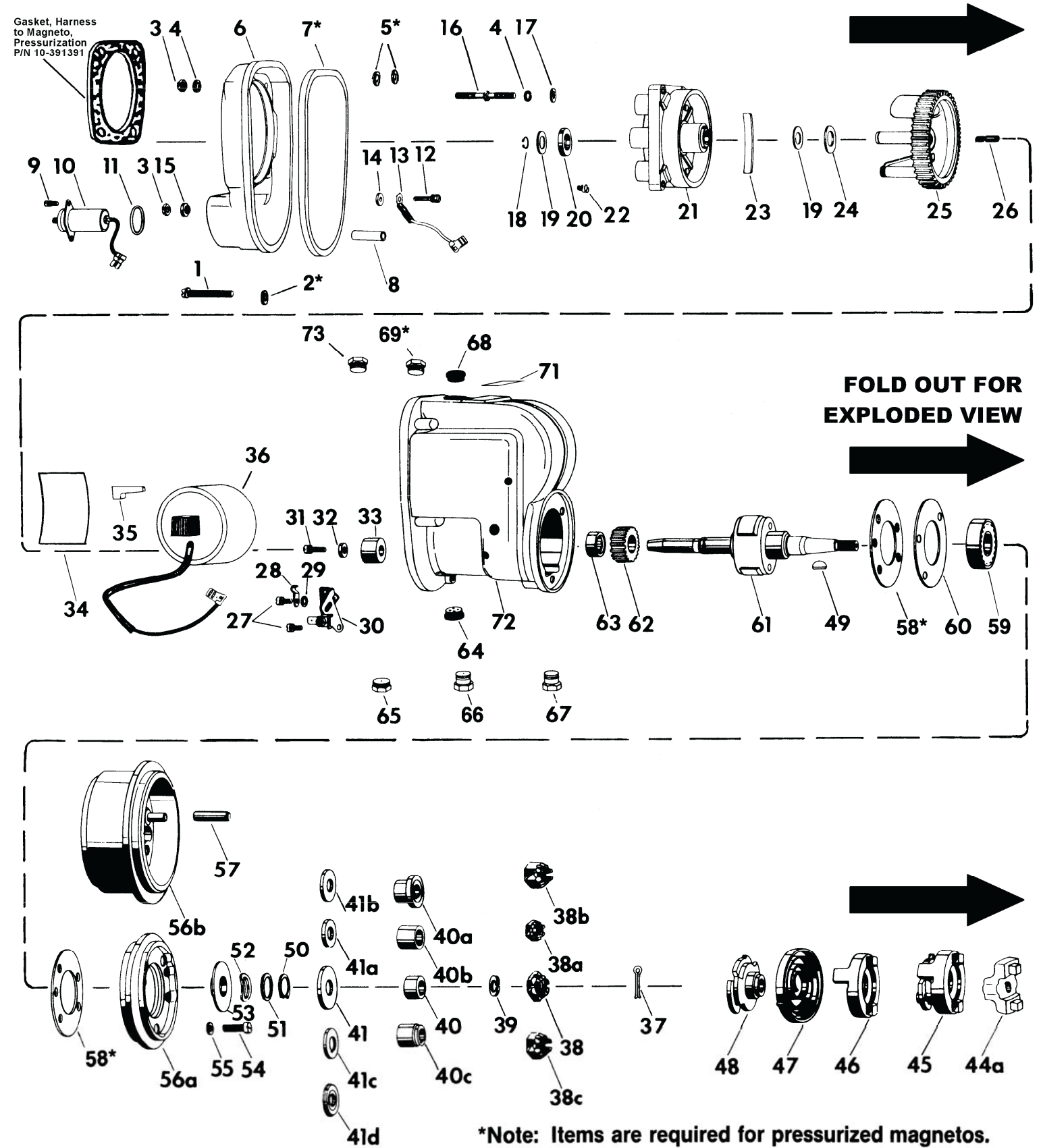
Part No.	Description	Fig. & Index No.	Qty. 100 Unit Overhaul (See Note)	Part No.	Description	Fig. & Index No.	Qty. 100 Unit Overhaul (See Note)
10-349357-5	CAM ASSEMBLY	-48	2	10-382815	BUSHING - Hex	-69	5
10-349357-7	CAM ASSEMBLY	-48	2	10-382861	ORIFICE	-65	5
10-349358	IMPULSE COUPLING	-45	2	10-391088-1	COIL - Magneto	-36	10
10-349359	IMPULSE COUPLING	-45	2	10-391213	SCREW	-31	100
10-349363	IMPULSE COUPLING	-45	2	10-391309	WASHER - Nylon	-24	10
10-349367	IMPULSE COUPLING	-45	2	10-391389	GASKET - Cover	-7	100
10-349368	IMPULSE COUPLING	-45	2	10-391391	GASKET - Harness	-	100
10-349369	IMPULSE COUPLING	-45	2	10-391392	SCREW	-1	25
10-349371	IMPULSE COUPLING	-45	2	10-391398	BUSHING - Hex	-69	5
10-349372	IMPULSE COUPLING	-45	2	10-391399	PLUG - Hex	-67	5
10-349392-1	FLANGE - Long	-56b	2	10-391401	GASKET - Flange	-58	200
10-349392-2	FLANGE - Short	-56a	2	10-391422	PLUG - Bleeder	-66	5
10-349392-3	FLANGE - Long	-56b	2	10-391427	IMPULSE COUPLING	-45	2
10-349392-4	FLANGE - Long	-56b	2	10-391429	IMPULSE COUPLING	-45	2
10-349392-5	FLANGE - Short	-56a	2	10-391513-2	HOUSING - Magneto	-72	1
10-349392-6	FLANGE - Short	-56a	2	10-391513-3	HOUSING - Magneto	-72	1
10-349393-1	COVER - Magneto	-6	2	10-391513-7	HOUSING - Magneto	-72	1
10-349393-2	COVER - Magneto	-6	2	10-391514-1	COVER - Magneto	-6	2
10-349393-3	COVER - Magneto	-6	2	10-391514-2	COVER - Magneto	-6	2
10-349393-4	COVER - Magneto	-6	2	10-391584	BLOCK - Dist. (4 Cyl.)	-21	5
10-349394-2	HOUSING - Magneto	-72	1	10-391586	BLOCK - Dist. (6 Cyl.)	-21	5
10-349394-3	HOUSING - Magneto	-72	1	10-391588	BLOCK - Dist. (8 Cyl.)	-21	5
10-349394-4	HOUSING - Magneto	-72	1	10-400009	PLATE, Identification	-71	100
10-349394-7	HOUSING - Magneto	-72	1	10-400050	LEAD, Retard/Tach	-13	10
10-349394-16	HOUSING - Magneto	-72	1				
10-349438R	STOPPIN	-57	10				
10-349511	WASHER	-19	10				
10-349652	SCREW	-54	300				
10-349970	CONTACTS(Tach)	-30	100				
10-353056	BEARING, Ball	-59	100				
10-353059	BEARING, Ball	-59	100				
10-353060	BEARING - Roller	-63	100				
10-382584	CONTACT ASS'Y	-30	100				
10-382585	CONTACT ASS'Y	-30	100				

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**TABLE 1107: SUPERSEDED AND DISCONTINUED MAGNETOS**

OLD PART NUMBER	SUPERSEDED BY	OLD PART NUMBER	SUPERSEDED BY
10-349215-1	*	10-349310-3	*
10-349215-2	*	10-349310-5	*
10-349220-1	10-349220-5	10-349310-6	*
10-349220-2	10-349220-4	10-349310-7	*
10-349235-1	*	10-349310-10	*
10-349235-2	*	10-349310-11	10-349310-4
10-349235-3	10-349285-7***	10-349320-6	10-349320-4
10-349235-4	10-349285-7***	10-349345-1	*
10-349235-5	10-349285-7***	10-349350-1	10-349350-4 Left ** or 10-349350-5 Right **
10-349235-6	10-349285-7***	10-349350-2	10-349350-6 Left** or 10-349350-7 Right **
10-349255-1	*	10-349365-2	10-349365-3
10-349255-2	*	10-349370-3	*
10-349260-1	10-349260-6	10-349370-5	*
10-349260-2	10-349260-7	10-349370-6	*
10-349260-3	*	10-349370-7	*
10-349260-4	*	10-349370-11	*
10-349285-2	*		
10-349285-3	*		
10-349285-4	*		
10-349285-5	10-349285-7		
10-349285-6	*		
10-349290-6	*		
10-349290-7	*		
10-349290-8	*		
10-349300-3	*		
10-349300-6	10-349300-4		
10-349305-2	*		
10-349305-4	*		
10-349305-6	*		

\* Superseding part number will be supplied upon request.  
 \*\* Position on engine  
 \*\*\* Reference Lycoming Service Letter 1346A for additional information.



IPL Figure 1. S-1200 Series Magneto Exploded View







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