

SLICK SB1-86C

Service Bulletin

TO: Aircraft manufacturers, distributors, dealers, engine overhaul facilities, owners and operators of Slick Aircraft Products aircraft magnetos.

SUBJECT: Impulse Coupling Inspection

BACKGROUND INFORMATION:

The service history of Slick Aircraft Magnetos indicates that the required 500 hour inspection of impulse couplings is not being performed, or is being performed incorrectly. Other factors influencing the airworthiness of Slick impulse couplings are operational inactivity and reinstallation at overhaul resulting in operation beyond TBO.

Slick impulse couplings are manufactured as matched assemblies. Under no circumstances should a subassembly part from one impulse coupling be used with the mating part from another impulse coupling. The maintenance practice of mixing subassembly parts, even within the same impulse coupling assembly model numbers, is not approved and can lead to impulse coupling failure and subsequent magneto and engine stoppage.

Failure to perform the prescribed 500 hour inspections, maintenance, and operating of the magneto beyond the engine TBO voids the Slick warranty and may jeopardize the airworthiness of these components.

This bulletin supersedes SB1-86B, dated 05/10/88.

COMPLIANCE: As required.

PROOF OF COMPLIANCE: Appropriate logbook entries.

MAINTENANCE PARTS AFFECTED: None

PARTS REQUIRED PER BULLETIN:

Magneto Model	Impulse Coupling Assembly	Rotor	Frame
447	M-2374	M-989	M-1202
662	M-2369	M-1310	M-1176
664	M-2370	M-1295	M-1202
667	M-2371	M-1219	M-1202
668	M-2372	M-1936	M-1896
676	M-2373	M-1395	M-1202
680	M-2369	M-1310	M-1896
2316	M-3076	M-3047	M-3888
2370	M-3939	M-3047	M-3888
4201	M-3007	M-3073	M-3095

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**PARTS REQUIRED
PER BULLETIN:
(Continued)**

Magneto Model	Impulse Coupling Assembly	Rotor	Frame
4216	M-3076	M-3047	M-3094
4230	M-3068	M-3065	M-3584
4251	M-3163	M-3158	M-3095
4252	M-3100	M-3158	M-3095
4271	M-3163	M-3158	M-3546
4272	M-3100	M-3158	M-3546
4273	M-3529	M-3158	M-3546
4281	M-3007	M-3158	M-3546
4301	M-3007	M-3073	M-3859
4316	M-3076	M-3047	M-3888
4330	M-3068	M-3065	M-3888
4333	M-3994	M-5000	M-5002
4371	M-3163	M-3158	M-3859
4372	M-3100	M-3158	M-3859
4373	M-3529	M-3158	M-3859
4374	M-3689	M-3786	M-3888
4381	M-3007	M-3158	M-3859
4392	M-3939	M-3047	M-3837
4755	M-3163	M-5212	M-5287
6210	M-3050	M-3047	M-3101
6214	M-3089	M-3093	M-3102
6220	M-3050	M-3047	M-3248
6224	M-3089	M-3093	M-3249
6251	M-3333	M-3327	M-3631
6252	M-3333	M-3416	M-3631
6255	M-3635	M-3416	M-3631
6261	M-3333	M-3327	M-3627
6262	M-3050	M-3047	M-3101
6264	M-3590	M-3496	M-3504
6267	M-3524	M-3499	M-3501
6280	M-3050	M-3047	M-3346
6282	M-3050	M-3047	M-3346
6310	M-3050	M-3047	M-3837
6314	M-3089	M-3093	M-3847
6320	M-3050	M-3047	M-3837
6324	M-3089	M-3093	M-3847
6331	M-3800	M-3792	M-3888
6351	M-3333	M-3327	M-3859
6355	M-3635	M-3416	M-3859
6361	M-3333	M-3327	M-3859
6362	M-3050	M-3047	M-3837
6364	M-3590	M-3496	M-3853
6367	M-3524	M-3499	M-3856
6377	M-5014	M-5015	M-3859
6379	M-5020	M-5015	M-3859
6380	M-3050	M-3047	M-3850
6382	M-3050	M-3047	M-3850
6399	M-3939	M-3948	M-3972
6755	M-3333	M-5496	M-5287

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TOOLS REQUIRED

PER BULLETIN: Slick T-106 impulse coupling hub puller, T-155 Rivet Gage, 0.140 inch feeler gage, 0.150 inch feeler gage, Slick Master Service Manual F-1100 or LASAR Master Service Manual L-1500, standard shop tools.

WEIGHT CHANGE: None.

MAGNETO MODELS

AFFECTED: All Slick impulse coupling equipped 400, 600, 4200, 4300, 4700, 6200, 6300 and 6700 series magnetos.

ENGINE MODELS

AFFECTED: All engines equipped with 400, 600, 4200, 4300, 4700, 6200, 6300 and 6700 series impulsed coupled magnetos.

DETAILED INSTRUCTIONS: 500 HOUR INSPECTION

The following inspection procedures may be used for all 400, 600, 4200, 4300, 4700, 6200, 6300 and 6700 series impulsed coupled magnetos, except where noted.

The 500 hour impulse coupling inspection is to be performed each time the magneto accumulates 500 hours of operation from the time of the last inspection or since new or factory rebuilt. See magneto maintenance and overhaul manuals L-1020, L-1037, L-1363, or L-1503 for overhaul instructions.

WARNING: Slick impulse couplings are manufactured as matched assemblies. Under no circumstances should a subassembly part from one impulse coupling be used with the mating part from another impulse coupling. The maintenance practice of mixing subassembly parts, even within the same impulse coupling assembly model numbers, is not approved and can lead to impulse coupling failure and subsequent magneto and engine stoppage.

1. Pre-Teardown Operation Inspection.
 - A. Prior to removing the impulse coupling from the magneto, spin the impulse coupling in the direction of rotation stated on the magneto dataplate.
 - B. The impulse coupling should engage the stop pin in the magneto below approximately 140 RPM. If the impulse coupling pawls slip past the stop pin or engage intermittently, the impulse coupling is not operating properly.

NOTE: The speed at which the coupling pawls engage or disengage cannot be determined accurately when spinning the coupling by hand. Accurate RPM readings for such coupling engagement or disengagement can only be made when the magneto is driven at a constant speed by an electric motor or similar device.

CAUTION: The magneto will produce spark voltage when impulse coupling is operated. Keep hands away from the distributor block, condenser stud, and high tension leads when impulsing the magneto.

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2. Remove impulse coupling.
 - A. Remove cotter pin, nut, and washer.
 - B. Grasp shell of the impulse coupling assembly and gently pull the assembly outward to clear the unlatching cars of the impulse coupling hub assembly.
 - C. Turn shell to release spring tension.
 - D. Remove impulse shell and attach impulse spring.
 - E. Engage Slick T-106 Impulse Coupling Hub Puller into grooves in the hub assembly. Tighten T-106 Puller Bolt and remove impulse coupling hub assembly.
3. Clean Impulse Coupling.
 - A. All portions of the impulse coupling must be cleaned, exposing bare metal, to ensure reliable inspection.
 - B. Use a suitable grease dissolving solvent to remove all oil or sludge buildups on impulse coupling.
4. Inspect Coupling.

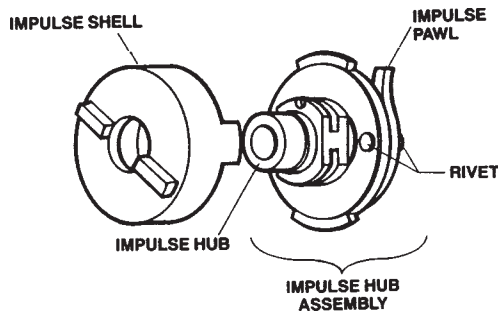


Figure One

NOTE: Impurity stringers, inclusions and heat checks may appear as surface discontinuities on impulse coupling components. These conditions are normal and generally do not, by themselves, require impulse coupling replacement.

- A. Using acceptable procedures, inspect the impulse coupling shell and impulse coupling hub for cracks. Cracks are not acceptable. Replace impulse coupling as necessary.
- B. Inspect the impulse coupling shell and hub for corrosion. Corrosion which impedes or affects impulse coupling operation is not acceptable. Replace impulse coupling as necessary.

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- C. Inspect the hub shaft and keyway for deformation or damage. Replace impulse coupling as necessary.
- D. Inspect impulse coupling pawls. If the latching end that contacts the stop pin in the magneto frame is rounded, peened, flared, or excessively worn, replace the impulse coupling.
- E. Inspect the impulse coupling hub and pawl plate for looseness. The hub and plate interface should be tight with no movement between the parts. Replace impulse coupling if hub to pawl plate fit is loose.
- F. Inspect pawl retaining rivets. The rivets should not be loose or show evidence of movement.
- G. Inspect upset end of pawl retaining rivets as detailed in Figure One. The outer diameter (O.D.) of the upset rivet head should be $.282 \pm .010$. Replace impulse coupling if O.D. is undersize or oversize to diameter requirements.
- H. Install the T-155 Rivet Gage over the rivet head as detailed in Figure Two.

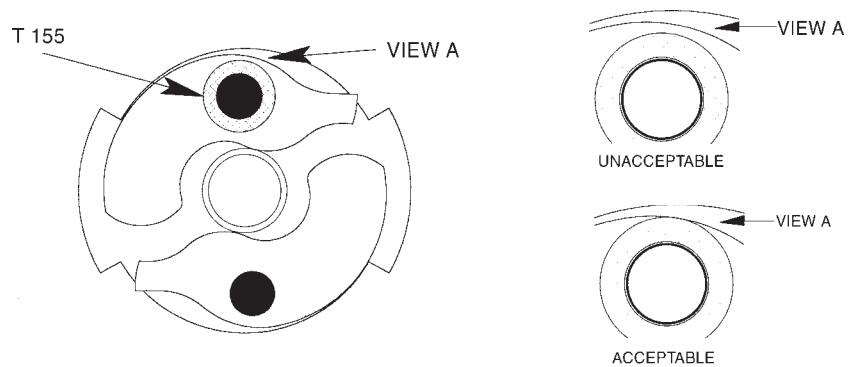


Figure Two

- G. Align the outer edge of the pawl with the outer edge of the impulse coupling plate. Lift the inner edge of the pawl upward and push the pawl outward. If the inner edge of the pawl is not lifted when the pawl is pushed outward, the gaging will not be accurate. Refer to Figure Three.

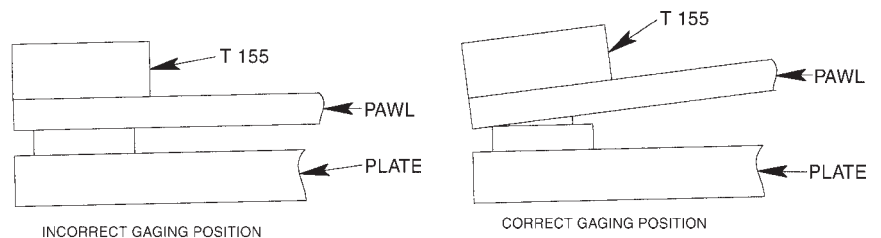


Figure Three

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- H. Rotate the pawl in an arc while pushing upward and outward on the pawl. Refer to Figure Three.
- I. If the edge of the pawl is visible beyond or can be felt to extend beyond the edge of the T-155 Rivet Gage, then replace the coupling. Refer to Figure Two.
- J. Measure the clearance between the boss on the underside of each impulse pawl and the pawl plate using a feeler gage. Position the latching end of the impulse pawl over the pawl plate as shown in Figure Four.

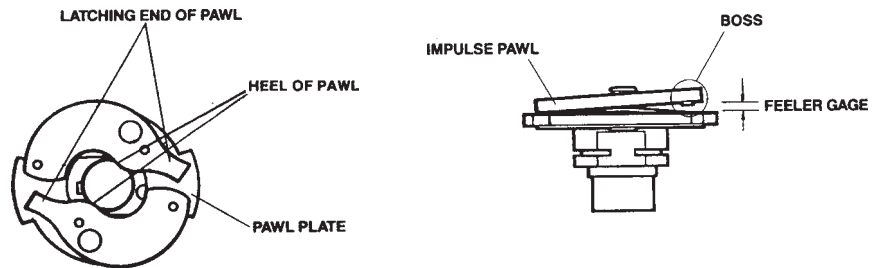


Figure Four

- K. Maximum clearance for pawls with one (1) boss is 0.150 inch. Maximum clearance for pawls with two bosses is 0.150 inch for left hand rotation couplings and 0.140 inch for right hand rotation impulse couplings. If the feeler gage can pass between the full width of the boss and the pawl plate, replace the impulse coupling. See Figure Four. For coupling rotation, see magneto dataplate.
5. Reassemble Impulse Coupling.
- A. Lubricate the pawl assembly with aircraft engine oil. Ensure that the pawls move freely.
 - B. Lubricate the hub and spring with aircraft engine oil.
 - C. Assemble the inner eye of the spring into the groove in the hub. Set the shell on the hub. There should be no spring tension in this position.
 - D. Hold the shell in one hand and the pawls with the thumb and forefinger of the other hand.
 - E. Pull the hub straight back slowly and far enough to clear the projections on the shell.
 - F. Hold the shell stationary and rotate the hub to wind the spring until the projections on the outer section of the pawl plate pass the projections on the shell. (Approximately one quarter revolution, 90°.) **DO NOT WIND SPRING MORE THAN 1/4 TURN.**
 - G. Make sure that the shell is seated on the hub and that it turns freely.

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6. Inspect Stop Pin.
 - A. 400/600 Series Magnets.

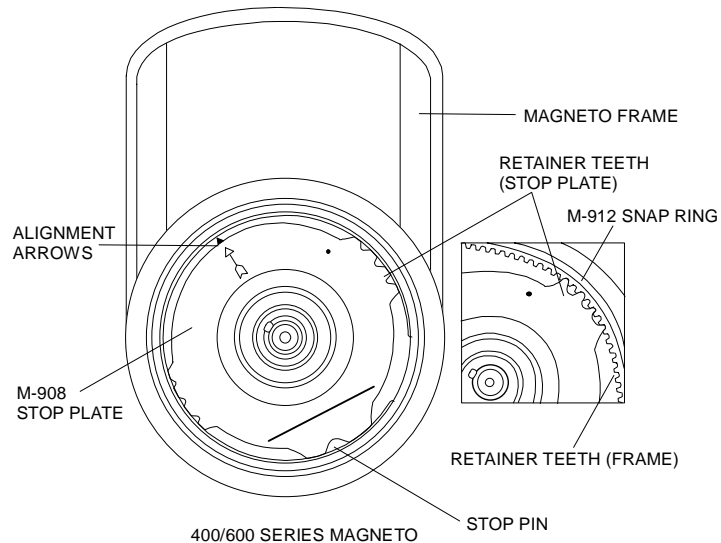


Figure Five

- (1) Verify that the stop plate is held securely by the M-912 Snap Ring.
- (2) Remove M-908 Stop Plate by prying M-912 Snap Ring from the magneto frame retaining groove using a small screwdriver.
- (3) Inspect the M-908 Stop Plate for cracks or corrosion. Replace as necessary.
- (4) Inspect the snap ring for deformation. Replace as necessary.
- (5) Inspect the snap ring groove in the magneto frame. The groove must be intact and unbroken. Replace magneto frame as necessary.
- (6) Inspect the retaining teeth of the stop plate and mating magneto frame. All eight (8) retaining teeth must be engaged in the magneto frame. No broken, missing, or deformed teeth in the magneto frame are allowed within four (4) teeth either side of the stop plate. If teeth are broken, missing, or deformed, the magneto frame must be replaced.
- (7) Reinstall M-908 Stop Plate and M-912 Snap Ring into magneto frame.

NOTE: The correct orientation of the stop plate is shown with matching arrows.

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B. 4200/4300/4700/6200/6300/6700 Series Magnets.

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

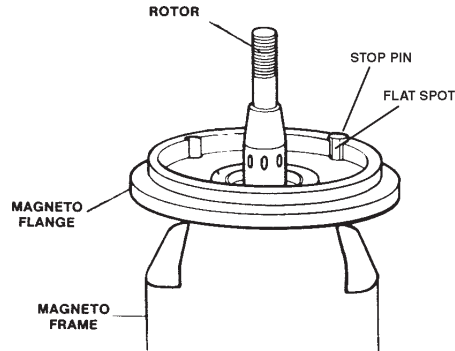


Figure Six

- (2) Inspect the stop pin for flat spots. Flat spots are a normal sign of wear and do not, by themselves, require corrective action. If the flat spots are excessive and cause the impulse coupling pawl to slip past the stop pin, either the impulse coupling, magneto frame, or both components need replacement. Refer to Section 1 for operation inspection and Section 4 for impulse coupling inspection.

7. Inspect Rotor Shaft.

- A. Inspect magneto rotor shaft. Remove burrs and chips from shaft with a fine abrasive cloth and clean all surfaces. Chips and other abrasives must not contact oil seal. Dimples or indentation in the rotor shaft are not to exceed .006 inch depth. Replace the rotor shaft if the dimples exceed .006 inch depth. See Figure Seven.

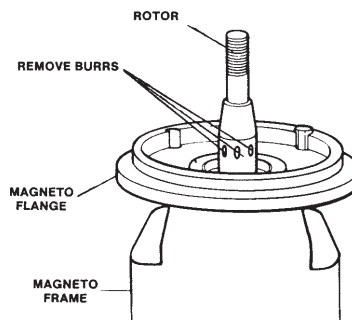


Figure Seven

8. Install Impulse Coupling.

- A. Install impulse coupling assembly onto the rotor shaft.
- B. Install magneto drive gear onto the magneto impulse coupling where applicable.

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- C. Place the removed impulse coupling washer onto the shaft or magneto drive gear and washer as required.
- D. Place the removed impulse coupling nut onto the rotor shaft and torque to 120-320 in./lbs.
- E. Insert a cotter pin through the nut castellations and rotor shaft and secure appropriately.

NOTE: If the cotter pin will not align with the pin hole in the specified torque range, remove the nut and lightly lap the bottom of the nut with a piece of emery cloth and repeat steps E and F.

- F. Grasp the magneto impulse coupling and "snap" through several times to ensure impulse coupling functions properly and does not bind. The couplings should return freely to the relaxed position.

CAUTION: The magneto will produce spark voltage when impulse coupling is operated. Keep hands away from the distributor block and condenser stud when impulsing the magneto.

9. Post-Teardown Operation Inspection.

- A. After installing the impulse coupling on the magneto, spin the impulse coupling in the direction of rotation stated on the magneto dataplate.
- B. The impulse coupling should engage the stop pin in the magneto below approximately 200 RPM. If the impulse coupling pawls slip past the stop pin or engage intermittently, the impulse coupling is not operating properly.

NOTE: The speed at which the coupling pawls engage or disengage cannot be determined accurately when spinning the coupling by hand. Accurate RPM readings for such coupling engagement or disengagement can only be made when the magneto is driven at a constant speed by an electric motor or similar device.

CAUTION: The magneto will produce spark voltage when impulse coupling is operated. Keep hands away from the distributor block, condenser stud, and high tension leads when impulsing the magneto.

**GENERAL
MAINTENANCE:**

Slick Impulse couplings are designed to last to the TBO of the aircraft engine. However, several non-magneto related factors affect and reduce the impulse coupling's operational life. To ensure consistent and reliable operation, these guidelines should be followed.

- 1. Perform 500 hour inspection.
- 2. Relubricate the coupling at the 500 hour inspection and each time the magneto is removed from the engine.

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3. Exercise the engine once a week or according to the engine manufacturer's specifications.
4. Change engine oil according to engine manufacturer's specifications.
5. No attempt should be made to repair impulse couplings.

MAGNETO

OVERHAUL: Magneto impulse couplings must be removed and discarded at engine overhaul or recommended engine TBO. Magneto impulse couplings that are currently in service that were not replaced at magneto overhaul must be removed and discarded. Install replacement Slick impulse couplings.

WARRANTY: Void if prescribed maintenance schedules are not followed.

THIS SERVICE BULLETIN IS A SUPPLEMENT TO SLICK MAINTENANCE AND OVERHAUL MANUALS L-1020, L-1037, L-1363, AND L-1503. CHECK WITH SLICK TO BE SURE YOU HAVE THE MOST CURRENT REVISION OF SLICK MANUALS L-1020, L-1037, L-1363, AND L-1503 AND PERTINENT SERVICE LETTERS AND BULLETINS BEFORE PERFORMING MAINTENANCE OR OVERHAUL.

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