

TEXTRON Lycoming

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717/323-6181

MANDATORY SERVICE BULLETIN

DATE: March 14, 1997

Service Bulletin No. 425C
(Supersedes Service Bulletin No. 425B)
Engineering Aspects are
FAA Approved

SUBJECT: Reprint of Teledyne Continental Ignition Systems Mandatory Service Bulletin No. MSB645

MODELS AFFECTED: All Textron Lycoming aircraft engines employing TCM and Bendix S-20, S-1200, D-2000 and D-3000 series magnetos with riveted impulse couplings and components.

TIME OF COMPLIANCE: Same as that required for Mandatory Service Bulletin No. MSB645.

Teledyne Continental Ignition Systems Mandatory Service Bulletin No. MSB645 is reprinted in its entirety as follows. Textron Lycoming requires compliance with this Service Bulletin.

This reprint is current at the time Service Bulletin No. 425C is issued. However, when complying with this Service Bulletin, insure that this reprint of Teledyne Continental Ignition Systems Mandatory Service Bulletin No. MSB645 is still current at time of compliance.

TELEDYNE CONTINENTAL[®] IGNITION SYSTEMS
MANDATORY SERVICE BULLETIN

Incorporated In Whole Or In Part In An FAA Airworthiness Directive

CATEGORY 1

MSB645

SUPERSEDES SERVICE BULLETIN 599D
FAA APPROVED

- SUBJECT:** INSPECTION OF RIVETED IMPULSE COUPLINGS AND STOP PINS
- REASON FOR BULLETIN:** To decrease operational wear rate of impulse coupling and to prevent engine stoppage.
- EQUIPMENT AFFECTED:** All TCM & Bendix S-20, S-1200, D-2000 and D-3000 series magnetos with riveted impulse couplings as installed on TCM, Lycoming, Franklin and other manufacturer's engines.
- COMPLIANCE:** NOTE...Affected magnetos with data plates identified with the letter "A" in the lower right quarter have the new snap ring cam assembly installed and do not require recurring 100 hour inspections per this bulletin.
- Service history of magnetos equipped with snap-ring impulse couplings indicates that they must be inspected for wear at 500 hour intervals as specified in the latest revision of the applicable Service Support Manual, PERIODIC MAINTENANCE Section, Paragraph 6.2.2.
- A. On aircraft with affected equipment with less than 100 operating hours since the last impulse coupling wear inspection, perform this inspection at or before the accumulation of 100 hours and each 100 hours thereafter. On aircraft with affected equipment that have accumulated more than 100 hours since the last impulse coupling wear inspection, perform this inspection within the next 10 hours and each 100 hours thereafter.
 - B. Impulse coupling cam assemblies not meeting the criteria of this bulletin must be replaced with new snap ring cam assemblies.
 - C. As an alternative to recurring 100 hour inspections of RIVETED impulse couplings, operators may at any time either install improved snap-ring impulse coupling cam assemblies (see Detailed Instructions, Paragraph 2) or retrofit to Shower-of-Sparks Ignition where possible. Magnetos retrofitted with snap-ring impulse coupling cam assemblies may be identified as shown in Figure 6. Magnetos retrofitted to Shower-of-Sparks may be identified by part number.

GENERAL INFORMATION

- A. Impulse couplings and stop pins are subject to wear during use. Wear may be accelerated by malfunctioning engine counterweights or improper lubrication. Engine failures have occurred on engines operating with impulse couplings worn beyond maximum allowable limits. Inspection in accordance with this bulletin is required of all TCM/Bendix magnetos with RIVETED impulse couplings.

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- B. TCM has redesigned the cam assemblies to include snap ring fastening technology which strengthens the cam axle and reduces wear.

WARNING... The impulse coupling will function adequately during engine start even though the coupling is worn. Starting performance is not an indicator of coupling wear condition. Such wear can only be determined by performing the inspection as described in this service bulletin. If wear is excessive, impulse coupling failure may occur and cause engine failure.

WARNING... Any cam assembly that is found to have been repaired or modified must be replaced.

DETAILED INSTRUCTIONS

1 Impulse Coupling Inspection

- 1.1 Remove magneto from engine.
- 1.2 Inspect the heel of the flyweight. See Figure 2. A polished area extending from the heel toward the toe of the flyweight is an indicator of severe wear and the cam assembly must be replaced.
- 1.3 Using an inspection light and 4X or greater inspection lens, inspect the stop pins in the magneto flange or housing. A shiny spot on the stop pin at the point of flyweight contact is acceptable. A wear notch at this point is unacceptable. A damaged or worn stop pin requires replacement of the magneto, stop pin housing or flange depending on magneto type and extent of damage. (Refer to the latest revision of the applicable TCM Ignition Systems Service Support Manual.)
- 1.4 Inspect for flyweight and axle wear on each flyweight as follows:

- 1.4.1 Rotate the impulse coupling so the flyweight axles are positioned at the stop pins as shown in Figure 2. Lock rotor in place using rotor holding tool. Use of 11-8465 rotor holding tool or equivalent is necessary.

CAUTION... Rotor is to be locked on drive end only. Do not use distributor gear lock devices. Use of such devices may result in gear tooth damage. See Figure 1.

- 1.4.2 For Type S-25 and S-1225 magnetos (with impulse coupling recessed into the magneto flange) push on flyweight trigger ramp (see Figure 4A) using bent wire as shown in Figure 3A. Ensure that flyweight tail rests against body trip-dog. Proceed to step 1.4.4.
- 1.4.3 For all other affected magneto models, form wire into hook as shown in Figure 3B. 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 4B. Ensure that flyweight tail rests against body trip-dog.
- 1.4.4 Insert feeler gage between the stop pin and flyweight to determine clearance ("X" of Figure 4) while the flyweight is forced outward. Maintain constant outward force on the flyweight while measuring clearance to ensure accuracy.
- 1.4.5 Remove the wire to relax the flyweight. Add .014 in. feeler gauge to your determined "X" value. Attempt to pass "X plus .014" feeler gauges between flyweight and stop pin. See Figure 5. If gauges pass, remove and discard worn cam assembly. Replace the entire impulse coupling assembly or cam assembly with new snap ring impulse coupling or snap ring cam assembly as specified in paragraph 2. If gauges do not pass, coupling may be returned to service or replaced with new snap ring impulse coupling or snap ring cam assembly as specified in Paragraph 2.

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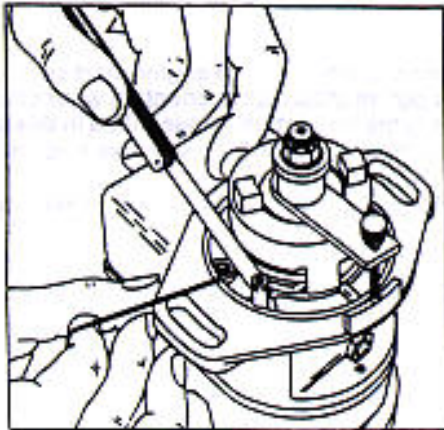


FIGURE 1. INSPECTION SET-UP

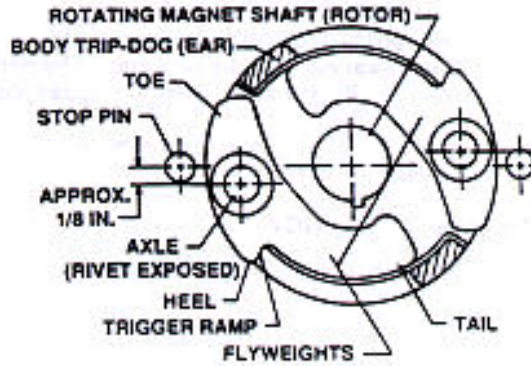


FIGURE 2. FLYWEIGHT TERMINOLOGY AND POSITIONING

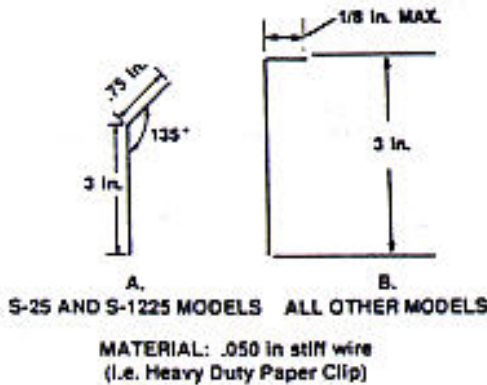


FIGURE 3. WIRE HOOK CONFIGURATIONS
ALL DIMENSIONS ARE APPROXIMATE

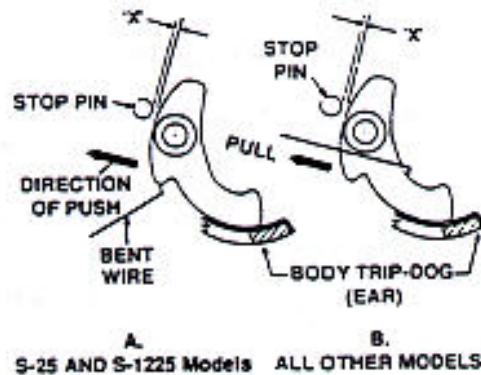


FIGURE 4. "X" VALUE MEASUREMENT



FIGURE 5. FLYWEIGHT TO AXLE WEAR CHECK

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NOTE... Main spring must always be replaced when coupling is disassembled.

- 1.5 Make an engine logbook entry indicating compliance with the inspection portion of Service Bulletin. If coupling is returned to service, record "X" values for each flyweight in logbook entry.
- 2 Replacement of Riveted Cam Assembly With Snap-Ring Cam Assembly
 - 2.1 If not already accomplished, remove magneto from engine.
 - 2.2 Remove impulse coupling from magneto following disassembly instructions specified in the applicable magneto manual included in TCM Ignition Systems Master Service Manual, Form X40000. If not already accomplished, inspect stop pins as described in paragraph 1.3 of this bulletin.
 - 2.3 Using Table 1 select the correct new impulse coupling part number for the part number magneto being worked on.
 - 2.3.1 At customer's option, a new cam assembly may be selected from Table 1 and field assembled into a serviceable used body. For body inspection criteria and impulse coupling assembly instructions, refer to General Overhaul and Assembly sections of the applicable TCM Ignition Systems Service Support Manual.

NOTE... Impulse coupling main spring must be replaced with a new part any time coupling body and cam assembly are separated all impulse couplings use spring 10-51324 except those marked with a triangle in table 1.

- 2.4 Assemble impulse coupling and related drive parts onto magneto, following assembly instructions in the applicable magneto service manual.
- 2.5 Mark magneto data plate with letter "A" in lower right quarter to indicate snap ring cam assembly has been installed.
- 2.6 Install magneto onto engine and adjust timing as per engine manufacturer's latest published instructions.
- 2.7 Make an engine logbook entry indicating compliance with the replacement portion of this Service Bulletin. Include magneto part number and serial number in logbook entry.

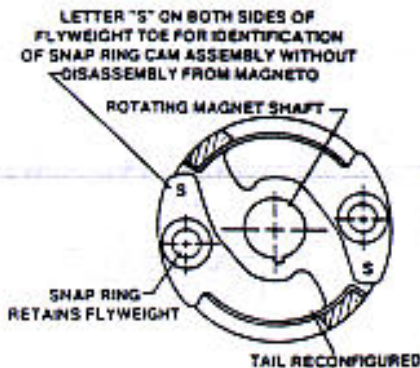


FIGURE 6. SNAP-RING CAM ASSEMBLY IDENTIFICATION

TABLE 2
SNAP RING IMPULSE COUPLING TEST LIMITS

MAGNETO TYPE	FULL ENGAGEMENT SPEED (RPM)	FULL DISENGAGEMENT SPEED (RPM)
O6LN-3000 O6LN-2031	0-75 Minimum	450 Maximum
All others.	0-125 Minimum	450 Maximum

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2.8 When testing snap ring impulse coupling operation, couplings shall perform within limits as shown in Table 2. Remove and replace any coupling which does not meet this test.

TABLE 1: IMPULSE COUPLING APPLICATIONS

MAGNETO P/N	MAGNETO TYPE	RIVETED IMPULSE COUPLING P/N	SNAP RING IMPULSE COUPLING P/N	LAG ANGLE	BODY P/M	OLD RIVETED CAM ASSY P/N	NEW SNAP RING CAM ASSY P/N
10-51360-26	S4LN-21	10-59474	10-400313	25	10-52903	10-59437	10-400167-4
10-51360-28	S4RN-21	10-59473	10-400302	25	10-51333	10-59436	10-400166-2
10-51360-37	S4LN-21	10-59474	10-400313	25	10-52903	10-59437	10-400167-4
10-51360-41	S4RN-21	10-160862	10-400301	25	10-51395	10-59436	10-400166-2
10-51360-45	S4LN-21	10-59474	10-400313	25	10-52903	10-59437	10-400167-4
10-51360-46	S4RN-21	10-59473	10-400302	25	10-51333	10-59436	10-400166-2
10-51360-47	S4LN-21	10-59474	10-400313	25	10-52903	10-59437	10-400167-4
10-51360-54	S4LN-21	10-357265	10-400321	15	10-52903	10-85231	10-400167-1
10-51360-55	S4LN-21	10-357265	10-400321	15	10-52903	10-85231	10-400167-1
10-51365-32	S6LN-21	10-70370	10-400315	45	10-70371	10-59472	10-400167-10
10-51365-34	S6RN-21	10-89137	10-400305	35	10-76232	10-59439	10-400166-6
10-51365-35	S6RN-21	10-157164	10-400306	45	10-51333	10-102079	10-400166-9
10-51365-39	S6LN-21	10-59479	10-400314	45	10-52903	10-59472	10-400167-10
10-51365-40	S6RN-21	10-59478	10-400304	35	10-51395	10-59439	10-400166-6
10-51365-43	S6LN-21	10-70370	10-400315	45	10-70371	10-59472	10-400167-10
10-51365-47	S6LN-21	10-70370	10-400315	45	10-70371	10-59472	10-400167-10
10-51365-48	S6RN-21	10-59476	10-400303	35	10-51333	10-59439	10-400166-6
10-51365-54	S6RN-21	10-59478	10-400304	35	10-51395	10-59439	10-400166-6
10-51365-57	S6LN-21	10-70370	10-400315	45	10-70371	10-59472	10-400167-10
10-52350-19	S6RN-23	10-59476	10-400303	35	10-51333	10-59439	10-400166-6
10-52350-20	S6LN-23	10-70370	10-400315	45	10-70371	10-59472	10-400167-10
10-79020-6	S6LN-25	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-10	S6RN-25	10-160892	10-400307	30	10-76232	10-160893	10-400166-4
10-79020-11	S6LN-25	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-16	S6LN-25	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-17	S6LN-25	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-18	S6LN-25	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-19	S6RN-25	10-160892	10-400307	30	10-76232	10-160893	10-400166-4
10-79020-118	S6LN-25P	10-102053	10-400316	30	10-70371	10-102052	10-400167-6
10-79020-119	S6RN-25P	10-160892	10-400307	30	10-76232	10-160893	10-400166-4
10-500556-101	S6RSC-25P	10-160892	10-400307	30	10-76232	10-160893	10-400166-4
10-500556-901	S6RSC-25P	10-160892	10-400307	30	10-76232	10-160893	10-400166-4
10-349350-4	S6RN-1225	10-349367	10-400309	30	10-76232	10-349354-2	10-400166-5
10-349350-5	S6RN-1225	10-349367	10-400309	30	10-76232	10-349354-2	10-400166-5
10-349350-6	S6LN-1225	10-349368	10-400319	30	10-70371	10-349357-3	10-400167-7
10-349350-7	S6LN-1225	10-349368	10-400319	30	10-70371	10-349357-3	10-400167-7
10-349365-1	S4LN-1227	10-349383	10-400318	35	10-52903	10-349357-4	10-400167-8
10-349365-3	S4LN-1227	10-349359	10-400317	25	10-52903	10-349357-2	10-400167-5
10-349365-5	S4RN-1227	10-349358	10-400308	25	10-51333	10-349354-2	10-400166-5
10-349365-6	S4RN-1227	10-349358	10-400308	25	10-51333	10-349354-2	10-400166-5
10-349365-9	S4LN-1227	10-391429	10-400327	15	10-52903	10-349357-7	10-400167-2
10-349365-10	S4RN-1227	10-391427	10-400312	15	10-51333	10-349354-7	10-400166-1
10-349370-4	S6LN-1227	10-349371	10-400320	35	10-70371	10-349357-4	10-400167-8

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TABLE 1: IMPULSE COUPLING APPLICATIONS (continued)

MAGNETO P/N	MAGNETO TYPE	RIVETED IMPULSE COUPLING P/N	SNAP RING IMPULSE COUPLING P/N	LAG ANGLE	BODY P/N	OLD RIVETED CAM ASSY P/N	NEW SNAP RING CAM ASSY P/N
10-382555-11	D4LN-2021	10-382753	10-400323	25	10-382747	10-349357-6	10-400167-9
10-382555-12	D4RN-2021	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-382555-13	D4LN-2021	10-382752	10-400322	15	10-382748	10-349357-3	10-400167-7
10-382555-14	D4RN-2021	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-382555-15	D4LN-2021	10-382756	10-400324	20	10-382767	10-349357-4	10-400167-8
10-382555-16	D4RN-2021	10-382754	10-400310	15	10-382749	10-349354-2	10-400165-5
10-382555-141	D4RN-2021	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-382555-151	D4LN-2021	10-382756	10-400324	20	10-382767	10-349357-4	10-400167-8
10-382560-11	D6LN-2031	10-382953 Δ	10-400325 Δ	15	10-382952	10-349357-8	10-400167-13
10-382560-13	D6LN-2031	10-382962 Δ	10-400326 Δ	10	10-382961	10-349357-9	10-400167-12
10-682555-11	D4LN-3000	10-382753	10-400323	25	10-382747	10-349357-6	10-400167-9
10-682555-12	D4RN-3000	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-682555-13	D4LN-3000	10-382752	10-400322	15	10-382748	10-349357-3	10-400167-7
10-682555-14	D4RN-3000	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-682555-15	D4LN-3000	10-382756	10-400324	20	10-382767	10-349357-4	10-400167-8
10-682555-16	D4RN-3000	10-382754	10-400310	15	10-382749	10-349354-2	10-400165-5
10-682555-141	D4RN-3000	10-382758	10-400311	20	10-382768	10-349354-3	10-400166-7
10-682555-151	D4LN-3000	10-382756	10-400324	20	10-382767	10-349357-4	10-400167-8
10-682560-11	D6LN-3000	10-382953 Δ	10-400325 Δ	15	10-382952	10-349357-8	10-400167-13
10-682560-13	D6LN-3000	10-382962 Δ	10-400326 Δ	10	10-382961	10-349357-9	10-400167-12
10-682560-131	D6LN-3000	10-382962 Δ	10-400326 Δ	10	10-382961	10-349357-9	10-400167-12

Δ Use Spring P/N 10-400042.

PARTS REQUIRED:

As determined by inspection or replacement.

SPECIAL TOOLS REQUIRED:

For Inspection:
Rotor holding tool 11-8465
Stiff wire (.050 Dia. Heavy Paper Clip)

For Replacement:
Refer to TCM Ignition Systems Master Service Manual, Form X40000.

MANHOURS REQUIRED:

For impulse coupling inspection, approximately 1 hour.
For replacement of impulse coupling or cam assembly approximately 1 hour.

WEIGHT CHANGE:

None

WARRANTY CONSIDERATION:

The standard ignition systems warranty will apply to those units with less than 12 months or 1000 hours time in service (whichever comes first) since initial installation, but limited to 24 months since manufacture. One (1) hour labor will be authorized per coupling installation.

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