General Aviation Division
Rockwell International
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-102 DATE: January 14, 1975

EFFECTIVITY: MODEL 112, SERIAL NO'S 3 THRU 226.

SUBJECT: FAA AIRWORTHINESS DIRECTIVE 74-24-13.

RECOMMENDED COMPLIANCE: AT OWNER'S DISCRETION.

This Service Information Letter is being issued to bring FAA Airworthiness Directive 74-24-13 to the owner's attention.

If any assistance is needed, contact Customer Service Department, General Aviation Division, Rockwell International, Bethany, Oklahoma 73008.

74-24-13 UNITED INSTRUMENTS, INC. : Amendment 39-2028. Applies to P/N 5932 ( ) (Serial Numbers 47851 thru 69000) and P/N 5934 ( ) (Serial Numbers 70,000 thru 100,000, A1 thru A9999, B1 thru B9999, and C1 thru C2860) altimeters installed on various aircraft, such as Piper, Beech, Cessna, Bell, Aero Commander, Schweizer, Enstrom, Helio, American Aviation, Bellanca, et al.

Note 1: United Instruments P/N 5932 ( ) altimeters may be additionally identified as TKK Model LA 4 TSO C-10b. United Instrument P/N 5934 ( ) altimeters may be additionally identified as TKK Model LA 7 TSO C-10b.

Note 2: These altimeters may also be identified by various aircraft manufacturer's part numbers. Some but not all are:

Beech: P/N 50-380094-( ), 50-384119-( ), 58-380011-( ), 58-380012-( ), 58-380041-( ), 100-324056-( ), 169-380073-( )

Cessna: P/N C661011-( ), C661071-( ), C661025-( ), C661014-( )

Piper: P/N 99009-( ), 450-611-( ), 450-694-( ), PS50008-( )-( ), 550-488-( ), 550-489-( ), 550-490-( ), 550-491-( ), 550-492-( ), 550-493-( ), 322-81-03, 322-81-04

Bell: P/N 206-070-263-( ), 47-711-303-( )

Compliance: Required as indicated, unless already accomplished.

To prevent being deprived of altimeter readings during certain aircraft operating conditions, accomplish the following:

A) Within the next 10 hours' time in service after the effective date of this AD, check each altimeter installed in all aircraft or check the aircraft's permanent maintenance record to determine if the altimeter falls within the Part Number and Serial Number designations set forth in the applicability statement. The owner/operator of the aircraft may make these checks.

B) If, as a result of the determinations required by Paragraph A, an altimeter falls within the Part Number and Serial Number designations in the applicability statement, prior to further flight, either comply with Paragraph C or install a placard on the instrument panel in clear view of the pilot which states:

"AIRCRAFT APPROVED FOR DAY VFR FLIGHT ONLY"

and operate the aircraft in accordance with this limitation.

C) On or before November 30, 1976, on any altimeter which falls within the Part Number and Serial Number designations set forth in the applicability statement, either replace the altimeter with an approved replacement part, an altimeter from outside the applicable Serial Numbers, or modify the existing altimeter in accordance with the United Instruments, Inc.,

Service Bulletin No. 1, dated September 19, 1974, or subsequent approved revisions. A modified altimeter will be identified by a 1/4-inch white dot painted alongside the nameplate on the back of the case. Upon compliance with this paragraph, the requirements of Paragraph B are no longer applicable.

D) Any alternate means of compliance with this AD must be approved by the Chief, Engineering and Manufacturing Branch, FAA, Central Region.

E) Compliance with Paragraph B of this AD is not required if the aircraft has two sensitive altimeters installed. In the event of failure of one of the altimeters, where both altimeters are noted in the applicability statement, compliance with Paragraph B and/or C is required.

This amendment becomes effective December 5, 1974.

Service Information

General Aviation Division
Rockwell International
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-105 DATE: March 5, 1975

EFFECTIVITY: MODEL 112 (SEE BENDIX SERVICE BULLETIN NO. RS 43).

SUBJECT: BENDIX SERVICE BULLETIN NO. RS 43.

RECOMMENDED COMPLIANCE: WITHIN NEXT 25 FLIGHT HOURS.

The reason for issuing this Service Information Letter is to recommend compliance with the attached Bendix Service Bulletin No. RS 43.

Service Bulletin

Fuel Systems

Published By Product Support Department

No. RS 43
Rev. No. ____
Issued 12-16-74
Revised ____

SUBJECT: FLOW DIVIDERS FOR BENDIX FUEL INJECTION SYSTEMS, INSPECTION AND MODIFICATION OF

CAUTION

The purpose of this Service Bulletin is to inform operators of Bendix Fuel Injection Systems that there may be a possibility of the Cover Gasket P/N 2537013 (refer to Figure 1, Item No. 3) interfering with flow divider operation. To preclude this possibility the following instructions should be complied with.

The flow dividers listed in 1, A of this Bulletin should be inspected to determine if Cover Gasket P/N 2537013 is installed. This is a solid, red color, fluorosilicone material gasket (reference figure 1, item 3). If the solid red color gasket P/N 2537013 is installed, the provisions of this Bulletin apply.

Should the inspection reveal that Gasket P/N 2523348 (black color, Neoprene material) with center hole is installed, this gasket may remain in service. The reinstallation instructions in Section 2, A,(5) with the exception of "install new Gasket P/N 2538998," (6), (7), and (8) apply.

1. PLANNING INSTRUCTIONS:

A. EFFECTIVITY:

Flow Divider Parts List	Flow Divider Parts List	Flow Divider Parts List
2524218-1	2524225-1	2524342-1
2524219-1	2524227-1	2524397-1
2524220-1	2524232-1	2524416-1
2524221-1	2524240-1	2524421-1
2524222-1	2524248-1	2524571-1
2524223-1	2524265-1	2524583-1
2524224-1	2524327-1	2524610-1

B. REASON: To provide a new gasket between the flow divider body and cover P/N 2523747 (figure 1, item 2).

C. DESCRIPTION: This change consists of a new gasket as used under the cover plate.

D. COMPLIANCE:

Operating Activities: The provisions of this bulletin must be complied with within the next 25 hours time in service.

Overhaul Activities: Compliance must be accomplished on all subject flow dividers listed in 1, A prior to return to service.

E. APPROVAL: None.

F. MANPOWER: Undetermined.

Bendix Energy Controls Division

717 N. Bendix Dr., South Bend, Indiana 46620

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SUBJECT: FLOW DIVIDERS FOR BENDIX FUEL INJECTION SYSTEMS, INSPECTION AND MODIFICATION OF

1. PLANNING INSTRUCTIONS: (Continued)

G. MATERIAL AVAILABILITY:

Part Number	Nomenclature	Availability
2538998	Gasket	Bendix Product Support Centers: 7262 N. W. 54 Street Miami, Florida 33166 Telephone: 305-887-7426 1120 Howell Street North Kansas City, Missouri 64116 Telephone: 816-842-9093 317 Corey Way South San Francisco, California 94080 Telephone: 415-588-5619 130 Finn Court Farmingdale, L.I., New York 11735 Telephone: 516-293-4741
902646K1	Screw	
Product 84	Loctite A or C	Loctite Corporation Newington, Connecticut 06111

H. TOOLING: None.

I. WEIGHT AND BALANCE: No effect.

J. REFERENCES: None.

K. PUBLICATIONS AFFECTED: Overhaul Manual and Illustrated Parts Breakdown Flow Dividers used with the RS-RSA Fuel Injection System, Form 15-540A, 15 July 1974.

2. ACCOMPLISHMENT INSTRUCTIONS:

A. Operating Activities:

(1) Gain access to the flow divider assembly.

(2) Visually check Flow Divider Parts List Number to determine whether the provisions of this bulletin apply.

(3) If applicable, remove all lines from the flow divider assembly. Cap and plug all open lines and fittings with suitable protective coverings. Remove flow divider from engine.

(4) With the flow divider on a suitable work bench, remove the four Countersunk Screws P/N 902646K1, Cover Assembly P/N 2523747 and Gasket P/N 2537013. (Refer to Figure 1, index 1, 2, 3, and 4.)

NOTE

Screws 902646K1 have been installed with Loctite A or C and may need localized heat applied for easy removal. Use a suitable screwdriver to preclude damage to screws and/or flow divider housing.

(5) During reassembly (refer to figure 1), install new Gasket P/N 2538998, Cover P/N 2523747 and new Screws P/N 902646K1 if required. Prior to installation, apply Loctite, Grade A or C, to the first two threads of screws. Tighten screws to 8-11 pound-inches torque.

(6) Reidentify flow divider as follows:

(a) Scribe a dash 2 (-2) after P/L number.

3

SUBJECT: FLOW DIVIDERS FOR BENDIX FUEL INJECTION SYSTEMS, INSPECTION AND MODIFICATION OF

2. ACCOMPLISHMENT INSTRUCTIONS: (Continued)

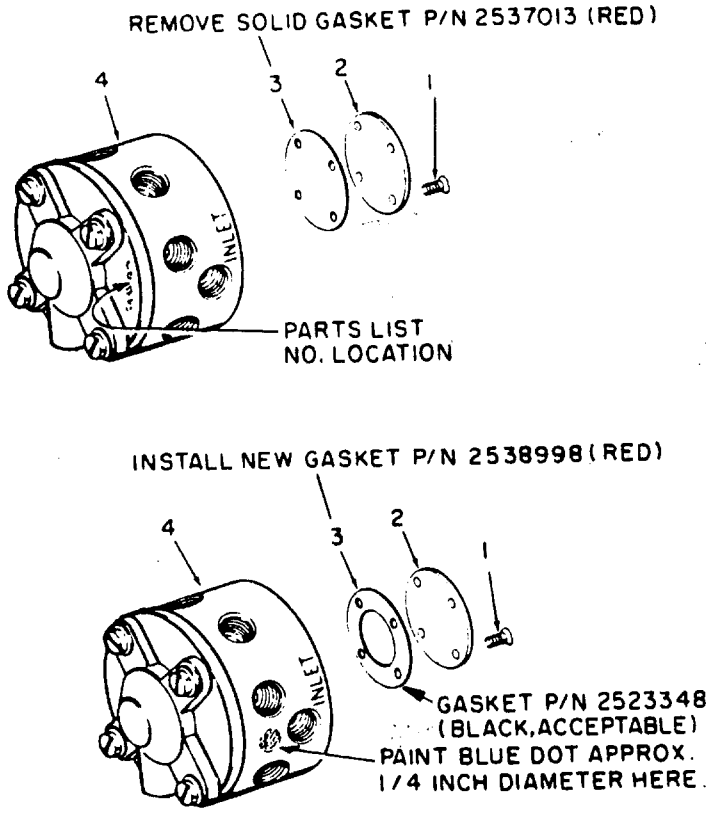

Figure 1.

(b) Paint a blue dot next to flow divider inlet approximately 1/4 inch in diameter.

(7) Reinstall flow divider on engine, remove all caps and plugs from lines and fittings and reconnect. Tighten fittings to 25-30 pound-inches torque. Use care to properly tighten fittings to prevent damage and fuel leaks.

(8) Perform a ground operational check to insure satisfactory engine performance.

CAUTION

After shutdown, examine engine for evidence of fuel leaks. Correct all fuel leaks prior to flight.

B. Overhaul Activities:

(1) Prior to return to service replace solid Gasket P/N 2537013 with new Gasket P/N 2538998.

(2) Reference: Bendix Overhaul Manual, Form 15-540A, dated 15 July 1974.

(3) Reidentify flow divider as follows:

(a) Scribe a dash 2 (-2) after P/L number.

(b) Paint a blue dot next to flow divider inlet approximately 1/4 inch in diameter.

4

SUBJECT: FLOW DIVIDERS FOR BENDIX FUEL INJECTION SYSTEMS, INSPECTION AND MODIFICATION OF

3. MATERIAL INFORMATION:

New Part Number	Quantity	Nomenclature	Old Part Number	Disposition
2538998	1	Gasket	2537013	Scrap
902646K1	4	Screws	902646K1	Replace as necessary.

4. TESTING:

No effect.

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General Aviation Division
Rockwell International
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-106 DATE: March 6, 1975

EFFECTIVITY: MODEL 112 (SEE LYCOMING SERVICE BULLETIN NO. 376).

SUBJECT: LYCOMING SERVICE BULLETIN NO. 376.

RECOMMENDED COMPLIANCE: AT NEXT INSPECTION PERIOD OR AT NEXT MAGNETO OVERHAUL, WHICHEVER OCCURS FIRST.

The reason for issuing this Service Information Letter is to recommend compliance with the attached Lycoming Service Bulletin No. 376.

AVCO LYCOMING DIVISION

WILLIAMSPORT, PENNSYLVANIA 17701

Service Bulletin

L

DATE: November 22, 1974

Service Bulletin No. 376
(Supersedes Service Instructions No. 1269 and 1281)
Engineering Aspects are
FAA (DEER) Approved

SUBJECT: Bendix Service Bulletin No. 556B

MODELS AFFECTED: P/N 10-51360-30 - O-235-C1, -C2A, -E2A, -G2A, -F. O-290-D, -D2, -D2B. O-320-A2A, -A2B, -A3A, -A3B, -B1A, -B2B, -B3B, -D1A, -D2A, -E1A, -E2A. IO-320-B1A, -B1C, -B2A, -C1A. O-360-A1A, -A2A, -A3A, -A4A, -A1H, -A1E6, -B2A, -C1A, -C2A, -C2B, -D2A, -D2C, IO-360-B4A. VO-360-A1A.

P/N 10-349365-2 - O-235-C2B, -F2B. O-360-D1F, -D2F, -D2C, -E1C, -E1F, -E2E, -E2F, -E2C, (Wide deck). IO-320-B1A, -D1A, -D1B, AIO-320-A1B, -B1B, -C1B. O-360-A1F, -A2F, -A1F6, -A1G, -A2G, -A1G6, -A2F, -C2A, -D2A. AIO-360-A1B, -B1B. IO-360-A1B, -A1B6, -A2B, -B1E, -B1F, -B2E, -B2F, -C1C, -C1D6, -C1E6, -F1A.

TIME OF COMPLIANCE: As required by subject bulletin.

Bendix Service Bulletin No. 556B reprinted herewith in its entirety, pertains to removal of a sintered iron magneto drive shaft bushing and replacement with a machined steel bushing. Owners and operators of applicable Avco Lycoming aircraft engines must comply with this bushing replacement within the time limitations specified in Bendix Bulletin No. 556B.

Bendix Electrical Components Division
Sidney, N.Y. 13838

SERVICE BULLETIN 556B
Engineering Aspects
are FAA Approved

Printed August 1974
Page 1 of 2 Pages

AIRCRAFT

SUBJECT: Shouldered magneto drive shaft bushing, change from sintered iron to machined solid steel.

REASON FOR BULLETIN: To inform users of subject change required on certain magnetos to reduce the possibility of bushing flange failure during service.

EQUIPMENT AFFECTED:

S4LN-21	P/N 10-51360-25	S4LN-1208	P/N 10-349285-2
S4LN-21	P/N 10-51360-26	S4LN-1208	P/N 10-349285-4
S4LN-21	P/N 10-51360-30	S4LN-1209	P/N 10-349305-2
S4LN-21	P/N 10-51360-31	S4LN-1227	P/N 10-349365-1
S4LN-21	P/N 10-51360-45	S4LN-1227	P/N 10-349365-2
S4LN-21	P/N 10-51360-46	S4LN-1227	P/N 10-349365-6
S6RN-21	P/N 10-51365-35	S6RN-1208	P/N 10-349290-6
S6LN-21	P/N 10-51365-39	S6LN-1208	P/N 10-349290-7
S6LN-21	P/N 10-51365-42	S6LN-1209	P/N 10-349310-5
S4LN-200	P/N 10-163005-3	S6RN-1209	P/N 10-349310-6
S4LN-200	P/N 10-163005-5	S6RN-1227	P/N 10-349370-5
S4LN-200	P/N 10-163005-7	S6LN-1227	P/N 10-349370-6
S4LN-204	P/N 10-163045-1		
S6LN-200	P/N 10-163010-3		
S6RN-200	P/N 10-163010-7		
S6LN-200	P/N 10-163010-11		
S6LN-204	P/N 10-163050-2		
S6LN-204	P/N 10-163050-6		

Maintenance (Spare) Parts Affected:
10-51659 Bushing, sintered iron.
10-51655 Bushing, sintered iron.
10-56591 Bushing, sintered iron.

Compliance:

At next inspection period or at next magneto overhaul period, whichever is scheduled first.

Detailed Instructions:

Field reports indicate that the sintered iron bushing now installed on the listed part number magnetos are breaking away at the bushing flange. For this reason, replacement of all sintered iron bushings now in use with the machined solid steel bushing (See Fig. 1) is strongly recommended.

If the magneto name plate Part Number appears in the above EQUIPMENT AFFECTED listing, inspect the magneto name plate first to determine the bushing type currently installed.

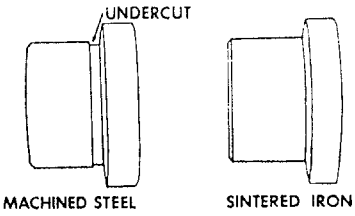

Figure 1

All magnetos having Black name plate must be visually checked for the type of bushing used regardless of name plate data other than the part number.

TABLE 1

Magneto P/N	Bushing P/N	Alpha/ Numerical Change Designation	Magneto P/N	Bushing P/N	Alpha/ Numerical Change Designation	Magneto P/N	Bushing P/N	Alpha Numerical Change Designation
10-51360-25	10-163049	G1	10-163005-5	10-163049	E1	10-349305-2	10-163049	D1
10-51360-26	10-163049	F1	10-163005-7	10-163049	F1	10-349365-1	10-163049	D1
10-51360-30	10-163049	*	10-163045-1	10-163049	E1	10-349365-2	10-163049	*
10-51360-31	10-163049	F1	10-163010-3	10-357193	F1	10-349365-6	10-163049	B1
10-51360-45	10-163049	C1	10-163010-7	10-357193	F1	10-349290-6	10-357193	D1
10-51360-46	10-163049	B1	10-163010-11	10-357193	E1	10-349290-7	10-357193	D1
10-51365-35	10-357193	G1	10-163050-2	10-357193	F1	10-349310-5	10-357193	D1
10-51365-39	10-357193	G1	10-163050-6	10-357193	F1	10-349310-6	10-357193	D1
10-51365-42	10-391421	G1	10-349285-2	10-163049	D1	10-349370-5	10-357193	D1
10-163005-3	10-163049	E1	10-349285-4	10-163049	D1	10-349370-6	10-357193	D1

*Becomes new part number. See paragraph (a) under Part Identification Required.

All magnetos with a red name plate having the alpha/numerical change designation listed in Table 1 have the solid bushing. Magnetos having name plates with a change designation higher than the table listing (i.e.: Table 1 listing F1; name plate designation F2, G1, etc.) also have the solid steel bushing. Magnetos with name plates having a designation lower than that listed in Table 1 must be visually checked for bushing type actually on the magneto in question.

All magnetos with a Blue name plate (Bendix Remanufactured) magnetos having Serial Number 349001 or above have the new bushing. All below this S/N must be visually checked for bushing type.

The machined solid steel bushing P/N 10-163049 has been available as a replacement part for some time. (Reference Bendix Service Bulletin 556 issued May 1972, also printed as Avco/Lycoming Service Instruction 1269 issued December 1972 and Bendix revision 556A printed April 1974.) Therefore, some magnetos below the listed serial numbers or change designations may have had the 10-163049 bushing previously installed as a field replacement.

Figure 1 illustrates the two different types of bushings involved. Definite identification is possible by checking for the existance of, or lack of, the approximately .062 x .005 deep undercut immediately behind the flange of the bushing.

If examination reveals the presence of the sintered iron bushing, it must be replaced immediately with the machined solid steel bushing as specified in Table 1.

After assembly of the new bushing on the magneto, torque the assembly nut to 15-25 lb. ft. and install a new cotter pin.

Part Identification Required:

All magnetos below the specified Serial Numbers or change designations modified in compliance with this bulletin, or checked and found already in compliance, must be reidentified as follows:

(a) Magnetos P/N 10-51360-30 and 10-349365-2 become new part numbers 10-51360-37 and 10-349365-3 respectively. Overstamp the magneto name plate with the new part number suffix, -37 or -3 as applicable.

(b) All other magnetos specified in the EQUIPMENT AFFECTED listing shall be identified by stamping the lower left corner of the name plate with a 1/8" high letter "B".

As soon as compliance with this bulletin is accomplished make the appropriate entry in the Engine Log Book.

Part Required Per Article:

10-163049 Bushing, machined steel, replaces 10-51659.
10-357193 Bushing, machined steel, replaces 10-51655.
10-391421 Bushing, machined steel, replaces 10-56591.

Special Tools Required:

None

Man Hours Required:

½ Hr. per magneto

Weight Change:

Negligible

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Service Information

General Aviation Division
Rockwell International
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-108
20 June 1975

LYCOMING SERVICE BULLETIN NO. 385

MODELS AFFECTED: MODEL 112 (SEE LYCOMING SERVICE BULLETIN NO. 385 FOR ENGINE SERIAL NUMBERS AFFECTED).

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH THE ATTACHED LYCOMING SERVICE BULLETIN NO. 385.

COMPLIANCE: ENGINES WITH 400 HOURS OR MORE THAN 400 HOURS TIME IN SERVICE.

BY WHOM WORK WILL BE ACCOMPLISHED: APPROVED SERVICE CENTER.

APPROVAL: SEE LYCOMING SERVICE BULLETIN NO. 385.

ESTIMATED MAN HOURS: SEE LYCOMING SERVICE BULLETIN NO. 385.

PARTS DATA: SEE LYCOMING SERVICE BULLETIN NO. 385.

SPECIAL TOOLS: SEE LYCOMING SERVICE BULLETIN NO. 385.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Lycoming Service Bulletin No. 385.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NO CHANGE TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Lycoming Service Bulletin No. 385, dated April 4, 1975, entitled "Oil Pump Impeller and Drive Replacement", accomplished _____(date)_____.

AVCO LYCOMING DIVISION
WILLIAMSPORT, PENNSYLVANIA 17701

Service Bulletin

(L)

DATE: April 4, 1975

Service Bulletin No. 385
Engineering Aspects are
FAA (DEER) Approved

SUBJECT: Oil Pump Impeller and Drive Replacement

MODELS AFFECTED AND TIME OF COMPLIANCE:

*Engine Model	**Serial Numbers of Applicable Engines	Serial Numbers of Engines Not Applicable to this Bulletin	Time of Compliance
O-235 Series	11268-15 thru 12098-15 and 12100-15	12099-15, 12101-15 and up	During engine overhaul; if engine has been operated beyond normal overhaul period, as specified in S. I. 1009V the modification must be accomplished before any additional time is accumulated.
O-320 Series	33329-27 thru 41054-27	41055-27 and up O-320-E2D: 41029-27 and up O-320-E3D: 41017-27, 41021-27 and up	
O-320-B and -D	6809-39 thru 6971-39	6972-39 and up	
IO-320-B1A	4953-55 thru 5270-55	5271-55 and up	
LIO-320 Series	292-66 thru 296-66	297-66 and up	
O-360 Series	18550-36 thru 19846-36	19817-36 19818-36 19847-36 and up	
IO-360-B, -E, -F	10146-51 thru 13540-51	13541-51 and up	
AEIO-360-B	10179-51 thru 13616-51	13617-51 and up	
IO-360-A, -C, -D	10146-51 thru 13540-51	13541-51 and up	Engines that have accumulated 400 or more hours of service since new, remanufactured or overhauled must be modified in accordance with this bulletin within next 50 hours of operation.
IO-360-A1B6D	9598-51 thru 13529-51	13530-51 and up	
AEIO-360-A	10179-51 thru 13616-51	13617-51 and up	
AIO-360 Series	171-63 thru 208-63	209-63 and up	
LIO-360	634-67 thru 1059-67	1060-67 and up	
TIO-360	116-64 thru 145-64	146-64 and up	
O-540 Series	15327-40 thru 17105-40	17106-40 and up 17098-40, 17103-40 and engines modified in accordance with Service Bulletin No. 381.	
IO-540 Series	10536-48 thru 12896-48	12897-48 and up Engines modified in accordance with Service Bulletin No. 381.	

* - All of the engines listed in this column that were remanufactured at Avco Lycoming and shipped between December 21, 1972 and December 10, 1974 are subject to the modification described in this bulletin. However, during remanufacture many of these engines were built with oil pump drive components that are satisfactory for continued service and not subject to the modification herein required, see inspection paragraph to determine if compliance is required.

** - In addition to the engines listed by serial numbers in this column, all engines modified to incorporate hardened impellers in accordance with Service Instruction No. 1272, including O-235, O-290, O-320, IO-320, LIO-320, O-340, O-360, HIO-360, VO-360, IO-360, TIO-360, LIO-360, O-540 and IO-540 are subject to compliance with this bulletin. Serial numbers of many engines shown in this list have the suffix "A"; this letter suffix has no significance insofar as this bulletin is concerned and therefore has been omitted.

REFERENCE: During April, 1970 newly designed oil pump impellers, made of sintered iron and featuring a Woodruff key in the drive shaft were introduced in production of some four and six cylinder Avco Lycoming engines: this change was offered to owners of earlier built engines by Service Instruction No. 1230. However, it became evident that although not subject to failure, the wear characteristics of the new drive were not comparable to the earlier design and a further change was introduced in December, 1972 to provide a hardened drive impeller; this is described in Service Instruction No. 1272. In addition to the hardened sintered iron drive impeller, a steel impeller was also used in some engines. It is now evident that the area of the Woodruff keyway in the hardened drive impeller and the steel impeller is subject to severe wear and eventual failure and consequently the drive components are now further modified as herein described.

This modification consists of replacing the oil pump drive shaft and drive impeller to eliminate the Woodruff key drive which has proven to be the cause of excessive wear in the keyway of the hardened drive impeller. Therefore, it is recommended that all of the applicable engines listed above, as well as any others that may have been modified in accordance with Service Instruction No. 1272, use the following procedure for parts replacement.

NOTE

The modifications shown in Service Instruction No. 1272 are no longer recommended and the instruction may be considered as inactive and non-applicable. Actually, engines that were never modified to incorporate the hardened sintered iron impellers as described in Service Instruction No. 1272, are not subject to the modification required by this bulletin.

INSPECTION: Applicable remanufactured engines shipped after December 21, 1972 should be inspected to determine if this modification is required: first of all, if the engine log book indicates the engine has not been modified in accordance with Service Instruction No. 1230 or No. 1272, proceed to remove the accessory drive cover from the mounting pad at the lower right side of the accessory housing to obtain access to the area between the crankcase and the accessory housing. On some engines this accessory drive pad is not machined, in this event it will be necessary to remove either the left magneto or the *fuel pump to obtain access to the area between the crankcase and the accessory housing. Regardless of which accessory pad is used, determine if the oil pump idler gear is secured with a cotter pin at the location shown in figure 1. This can be accomplished using an inspection mirror, preferably an illuminated one. If the cotter pin is visible, it is unnecessary to perform the modification required by this bulletin.

PROCEDURE:

Essentially this modification consists of replacing the oil pump drive shaft and drive impeller; since this necessitates removal of the accessory housing the procedure varies by engine model and airframe installation. Usually, this can be accomplished by removing only the accessory housing; however, on engines where the accessory housing is attached to the sump with studs and nuts instead of capscrews it will be necessary also to remove the sump.

*1. Unless the entire sump is to be removed it is very important during removal of the accessory housing to not damage the gasket between the sump and the accessory housing; if it is damaged, the partial gasket supplied with the kit may be installed as described in step 4.

2. After the accessory housing has been removed, disassemble the oil pump and carefully inspect both the housing and oil pump cover for damage.

3. Reassemble the oil pump using the new drive shaft and drive impeller supplied with the kits shown in the following "Parts Data" section. See figure 2. Be sure all of the parts are lubricated thoroughly during assembly. After assembly, turn the drive

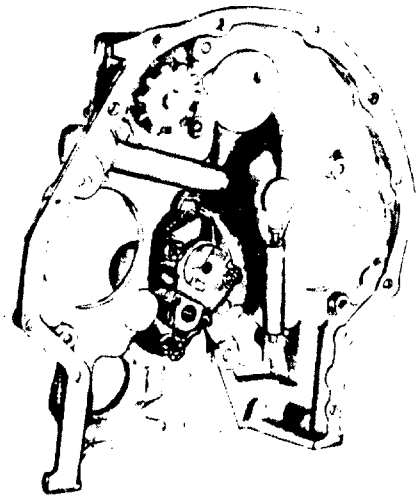

Figure 1. Interior View of Accessory Housing Showing Location of Cotter Pin in Oil Pump Idler Shaft

* - Before removing the fuel pump, be sure the cam on the hub of the idler gear is not in position to exert force on the arm of the fuel pump; if it is, damage to the mounting threads will occur when the fuel pump is removed.

3

shaft several revolutions to determine if it moves freely; if not, open the pump and correct the cause before the unit is reassembled on the engine.

4. Before returning the accessory housing to the engine it is necessary to replace the gasket on the mating flange between the sump and the accessory housing if it has been damaged. (If the sump has been removed the entire sump gasket is replaced.) To replace the rear portion of the sump gasket, lay the gasket on the sump flange and cut it diagonally with a sharp knife to obtain a line to line match between the ends of the old and new gaskets. Use POB gasket compound for sealant.

5. When reassembling the accessory housing align the idler gears in their exact position for engagement with the timing gear on the camshaft. See no. 60294-7 overhaul manual for assembly procedure.

6. After reassembly, time the magnetos to the engine and run the engine to check oil pressure and magneto drop-off; check for any noticeable variance from normal oil pressure and significant change from normal magneto drop-off.

7. Compliance with this modification should be noted in the aircraft records.

Full credit allowance for parts and labor will be made in accordance with the following schedule for compliance with this bulletin. Claims must be filed with nearest Avco Lycoming Distributor and be accompanied with engine serial numbers.

Engines with 0 to 400 hours service time	$50.00
Engines with 400 to 800 hours service time	$35.00
Engines with 800 to 1200 hours service time	$20.00
Engines with 1200 or more hours service time	materials only

PARTS DATA:

LW-14129	Gasket Kit, Oil Pump Shaft Replacement (4 cylinder engines) consists of: (1) 60096 fuel pump gasket, (3) 62224 magneto gasket, (1) 73818 accessory housing gasket, (2) LW-12681, -1200 series magneto gasket, (1) LW-13353 oil sump gasket.
LW-14130	Gasket Kit, Oil Pump Shaft Replacement (6 cylinder engines) consists of: (1) 60096 fuel pump gasket, (3) 62224 magneto gasket, (1) 73818 accessory housing gasket, (2) LW-12681, -1200 series magneto gasket, (1) LW-14128 oil sump repair gasket.
LW-14131	Oil Pump Shaft Replacement Kit (4 cylinder engines) consists of: (1) 61174 oil pump drive shaft, (1) LW-14038 drive impeller.
LW-14132	Oil Pump Shaft Replacement Kit (4 cylinder, dual drive magneto engines) consists of: (1) LW-14040 oil pump drive gear, (1) LW-14038 drive impeller.
LW-14133	Oil Pump Shaft Replacement Kit (6 cylinder engines) consists of: (1) 74641 oil pump drive shaft, (1) LW-14038 drive impeller.

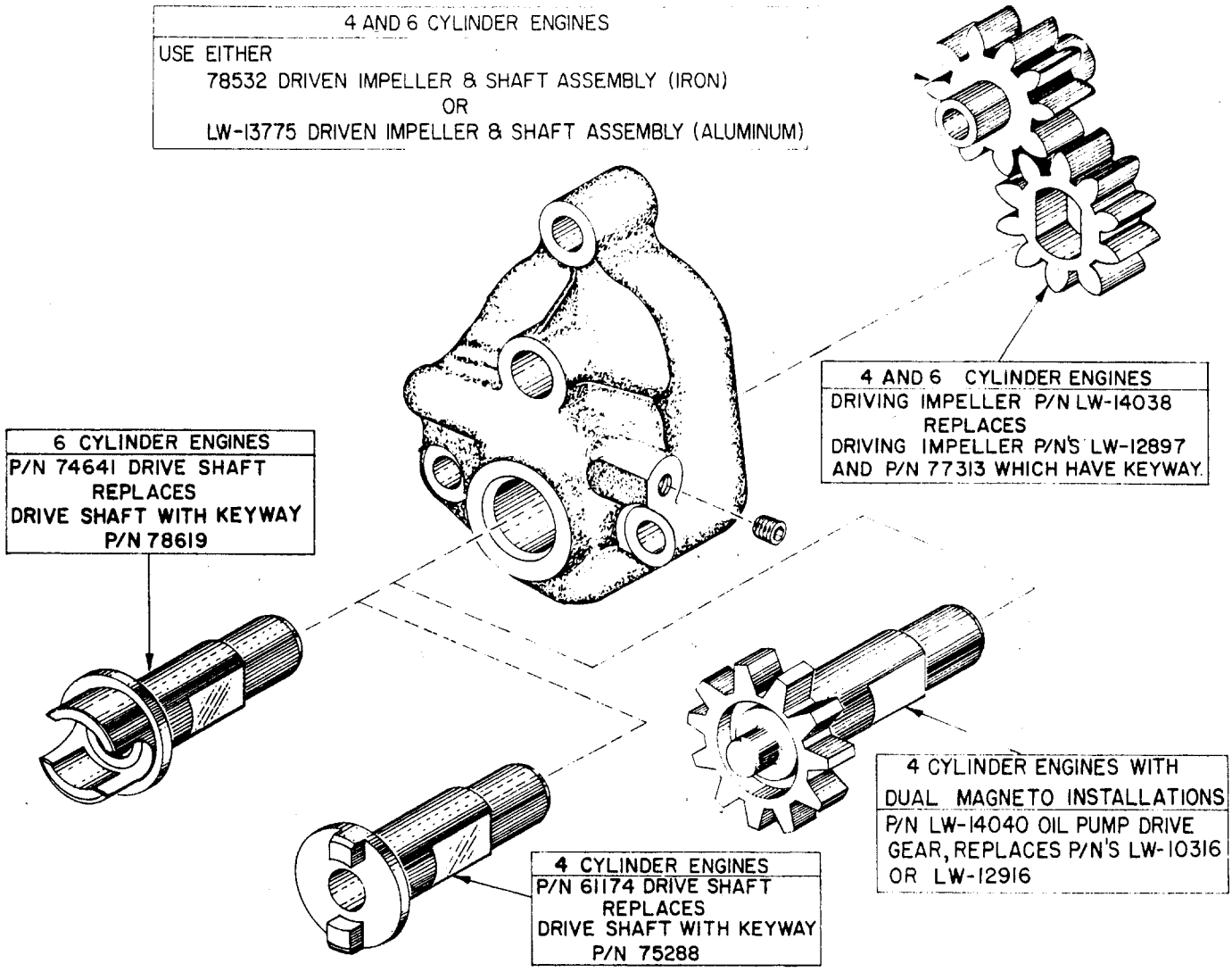

Figure 2. Oil Pump Drive Assembly

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General Aviation Division
Rockwell International
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-112
25 July 1975

BENDIX SERVICE BULLETIN NO. 580

MODELS AFFECTED: MODELS 500, 500A, 500B, 500S, 500U, 560A, 560E, 560F, 680, 680E, 680F, 680FL, 680FL(P), 680F(P), AND 720, SERIAL NO'S 231 AND SUBS, MODEL 685, SERIAL NO'S 12000 THRU 12066, AND MODEL 112, SERIAL NO'S 3 AND SUBS.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH THE ATTACHED BENDIX SERVICE BULLETIN NO. 580.

COMPLIANCE: SEE BENDIX SERVICE BULLETIN NO. 580.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: SEE BENDIX SERVICE BULLETIN NO. 580.

PARTS DATA: 1 ea. Bendix Service Bulletin No. 580.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Bendix Service Bulletin No. 580 whenever screws are loosened on magnetos.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NO CHANGE TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: NOT APPLICABLE.

Bendix Electrical Components Division
Sidney, N. Y. 13838

SERVICE BULLETIN NO. 580

Printed February 1975

AIRCRAFT

SUBJECT: Breakage of Captive Lockwashers.

REASON FOR BULLETIN: To recommend inspection of Captive Lockwasher whenever a screw 10-35936-7 is loosened or removed.

EQUIPMENT AFFECTED: All S-20, S-200, S-600, S-1200 and D-2000 Series Magnetos.

Maintenance (Spare) Parts Affected:
10-35936-7 Screw with lockwasher.

Compliance:
Any time the screws are loosened or removed.

Application of Parts:
S-20 Series - breaker contact securing screws and capacitor securing screw.

S-200, S-600, D-2000 Series - breaker contact securing screws.

S-1200 - breaker contact securing screws and coil lead clamp securing screw.

Detailed Instructions:
The captive lockwasher on some screws 10-35936-7 is breaking or cracking after the screw is tightened. This breakage is due to hydrogen embrittlement of a certain group of parts. For all practical purposes the lockwasher will perform normally until the screw is loosened or removed.

Whenever a 10-35936-7 screw is loosened or removed for any reason, carefully inspect lockwasher for breakage or cracking (as evidenced by loss of normal offset).

If the lockwasher is intact, the screw may be retightened to 20-25 lb.-in. of torque.

NOTE

All screws with lockwashers must be replaced at overhaul.

If the lockwasher is missing, broken or cracked, replace the screw with a new 10-35936-7 screw with captive lockwasher and tighten to 20-25 lb.-in. of torque.

CAUTION

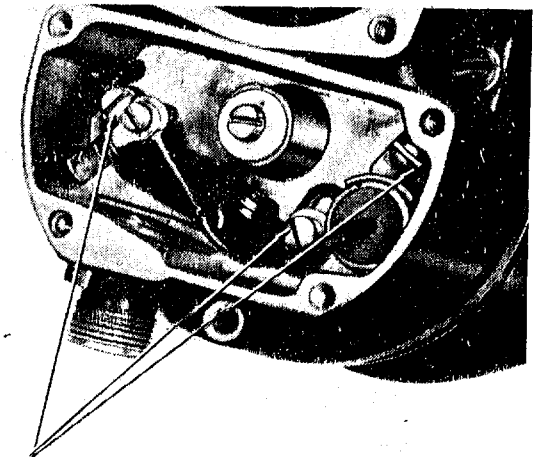
Be sure all pieces of a broken washer are removed from the inside of the magneto.

Parts Required Per Article:
Not applicable.

Special Tools Required:
None.

Man Hours Required:
Negligible.

Weight Change:
Not applicable.



Typical S-20 Series Magneto
Figure 1

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-128
12 March 1976

LYCOMING SERVICE INSTRUCTIONS NO. 1325

MODELS AFFECTED: MODEL 112 (SEE LYCOMING SERVICE INSTRUCTIONS NO. 1325 FOR ENGINE SERIAL NUMBERS AFFECTED).

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH LYCOMING SERVICE INSTRUCTIONS NO. 1325.

COMPLIANCE: AT OWNER'S DISCRETION.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: SEE LYCOMING SERVICE INSTRUCTIONS NO. 1325.

ESTIMATED MAN HOURS: TWO (2) HOURS.

PARTS DATA: SEE LYCOMING SERVICE INSTRUCTIONS NO. 1325.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with the attached Lycoming Service Instructions No. 1325.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NO CHANGE TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Lycoming Service Instructions No. 1325, dated October 3, 1975, entitled "Timing Change for IO-360 Series Engines", accomplished _____(date)_____.

AVCO LYCOMING DIVISION

WILLIAMSPORT, PENNSYLVANIA 17701

Service Instruction

L

DATE: October 3, 1975

Service Instruction No. 1325
Engineering Aspects are
FAA (DEER) Approved

SUBJECT: Timing Change for IO-360 Series Engines

MODELS AFFECTED: IO-360-A series (not -A1B6D), -C, -D series, HIO-360-C1A, -C1B, AEIO-360-A1B6 with serial numbers prior to 14435-51; IO-360-C1D6 with serial numbers prior to 14445-51; LIO-360-C1E6 with serial numbers prior to 1063-67; and AIO-360-A1A, -A1B, -B1B with serial numbers prior to 219-63; TIO-360-A1B with serial numbers prior to 145-64. See Service Bulletin No. 380 for IO-360-C1C and -C1F models.

TIME OF COMPLIANCE: At overhaul or at owner's discretion.

Certain advantages in engine operation have been found by changing engine timing from 25° BTC to 20° BTC and reducing the lag angle to 15° on impulse coupling magnetos and 15° retard angle on retard breaker magnetos whichever is applicable. Significant improvements in engine operating characteristics are achieved in above listed aircraft engine installations particularly in the areas of normal operation and cold weather starting. During cruise operation, cooler cylinder head temperatures can be expected resulting in improved service life of intake and exhaust valves. During full throttle operation the new spark setting will reduce possibility of detonation during extreme cold weather operation. Consequently this modification has been incorporated in the production of new engines. This modification may be incorporated in engines in service as follows:

Remove the left magneto from the engine and ascertain if it is an impulse coupling or retard breaker magneto. If the magneto has an impulse coupling proceed as follows:

1. With the left magneto removed from the engine, remove the impulse coupling. Replace it with a new coupling LW-391429. See the latest revision of Bendix Electrical Components Division publication L-645 for impulse coupling replacement procedure. Use only the proper Bendix puller for removing coupling.

2. Reinstall the magneto on the engine and retime both magnetos using the 20° timing mark on the starter ring gear instead of the 25° mark. See Avco Lycoming Operator's Manual No. 60297-12 for ignition timing procedure.

3. Replace the engine nameplate with a new one, Avco Lycoming P/N 61548 which indicates new timing angle. Also restamp the magneto nameplate to indicate the magneto is -9, -10, or -55 instead of -3, -6 or -45.

NOTE

The new magneto impulse coupling, LW-391249 is available through all Avco Lycoming distributors.

PARTS DATA:

15° Lag Angle Magneto P/N	Replaces Magneto P/N	Mag. Model	Engine Application
LW-349365-9	LW-349365-3	S4LN-1227	IO-360-A1B, -A1B6, -C1C, -C1F, -C1D6, -C1E6, AIO-360-A1A, -A1B, -B1B, AEIO-360-A1B6
LW-349365-10	LW-349365-6	S4RN-1227	LIO-360-C1E6
LW-51360-55	LW-51360-45	S4LN-21	IO-360-A1D

LW-391429 15° lag angle magneto impulse coupling (replaces LW-349359 coupling).

61548 Engine nameplate (replaces nameplate with 25° BTC timing). See Avco Lycoming Service Instruction No. 1304 for procurement procedure.

If the left magneto was a retard breaker magneto, proceed as follows:

NOTE

Do not perform this procedure on LIO-360-C1E6 engines equipped with LW-349285-8 or LW-163005-12 magnetos inasmuch as these have the 15° retard angle.

1. When left magneto has been removed from the engine and has been identified as a retard breaker magneto, consult the latest revision of Bendix Electrical Components Division publication No. L-526 for the proper method of reducing the retard angle of the magneto to 15°.

2. When this has been accomplished replace the magneto on the engine and retime both magnetos using the 20° timing mark on the starter ring gear instead of the 25° mark. See Avco Lycoming Operator's Manual No.60297-12 for timing procedures.

3. Replace engine nameplate with a new one, P/N 61548 which indicates new timing angle. Also, restamp the magneto nameplate the magneto is -7 or -11 instead of -1 or -2.

PARTS DATA:

15° Retard Angle Magneto P/N	Replaces Magneto P/N	Mag. Model	Engine Application
LW-349285-7	LW-349285-1	S4LN-1208	IO-360-A1C, -C1C, -D1A, HIO-360-C1B, AIO-360-A1A, TIO-360-A1B
LW-349285-8		S4RN-1208	LIO-360-C1E6
LW-163005-11	LW-163005-2	S4LN-200	IO-360-A1A, -C1A, HIO-360-C1A, AEIO-360-A1A
LW-163005-12		S4RN-200	LIO-360-C1E6

61548 Engine nameplate (replaces nameplate with 25° BTC timing). See Avco Lycoming Service Instruction No. 1304 for procurement procedure.

18484, 18485 - These numbers for Avco Lycoming reference only.

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Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-132
11 May 1976

BENDIX SERVICE BULLETIN NO. 583

MODELS AFFECTED: MODELS 500, 500A, 500B, 500U, 500S, 520, 560, 560A, 560E, 560F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), AND MODEL 720, SERIAL NO'S 1 THRU 1876, MODEL 500S, SERIAL NO'S 3050 THRU 3275, MODEL 685, SERIAL NO'S 12000 THRU 12066, MODEL 112, SERIAL NO'S 1 THRU 473, MODEL 114, SERIAL NO'S 14000 THRU 14016, AND MODEL S-2R, SERIAL NO'S 1416R THRU 2173R AND 5000R THRU 5082R.

REASON FOR PUBLICATION: RECOMMEND COMPLIANCE WITH PARTS II AND III OF BENDIX SERVICE BULLETIN NO. 583.

NOTE

FAA AIRWORTHINESS DIRECTIVE 76-07-12
PERTAINS TO THIS SAME SUBJECT.

COMPLIANCE: SEE AIRWORTHINESS DIRECTIVE 76-07-12.

BY WHOM WORK WILL BE ACCOMPLISHED: PART II - PILOT
PART III - A & P MECHANIC OR EQUIVALENT

APPROVAL: SEE BENDIX SERVICE BULLETIN NO. 583.

ESTIMATED MAN HOURS: SEE BENDIX SERVICE BULLETIN NO. 583.

PARTS DATA: SEE BENDIX SERVICE BULLETIN NO. 583.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Parts II and III of the attached Bendix Service Bulletin No. 583.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NO CHANGE REQUIRED TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make appropriate entry in aircraft maintenance records as follows: Bendix Service Bulletin No. 583, dated April 1976, entitled "Ignition Switches, Rotary Action, Key or Lever Actuated, Twist-To-Start, Push-To-Start, Twist-To-Start/Push-To-Prime Types", accomplished _____(date)_____.

Bendix **Electrical Components Division**

Sidney New York 13838

SERVICE BULLETIN NO. 583

Printed April 1976

AIRCRAFT

SUBJECT: Ignition Switches, Rotary Action, Key or Lever Actuated, Twist-To-Start, Push-To-Start, Twist-To-Start/Push-To-Prime Types.

REASON FOR BULLETIN:

I To alert all users of above Bendix Switch Types of possible personnel hazard.

II To provide a check procedure to detect a faulty Switch.

III To provide Field Repair and Replacement Instructions and Identification.

EQUIPMENT AFFECTED: Ignition Switches; Refer to Table I.

TABLE I. BENDIX AIRCRAFT IGNITION SWITCHES, ROTARY ACTION, KEY OR LEVER ACTUATED.

Switch Function	Key	Lever	Switch Part Number
Twist-To-Start	X		10-357200-1
		X	10-357230-1, -2, 10-357260-1 10-126630-1
	X		10-126690-1
Push-To-Start	X		10-357210-1
		X	10-357240-1, 10-357270-1
	X		10-126680-2
		X	10-157440-1, -2, -3, -4, -21
Twist-To-Start	X		10-357220-1
		X	10-357250-1, 10-357280-1
Push-To-Prime	X		10-126680-1
		X	10-126660-1, -4

NOTE: "SWITCH FUNCTION," TABLE I ABOVE, IS USED AS AN APPLICABLE MEANS FOR INITIAL FRONT VIEW SWITCH IDENTIFICATION SINCE ACTUAL PART NUMBERS ARE ON THE SWITCH HOUSING AND BECOME VISIBLE ONLY AFTER SWITCH BECOMES ACCESSIBLE FOR EXAMINATION.

Maintenance (Spare) Parts Affected:

Same as in Table I above.

Compliance:

Parts I and II Immediate

Part III – As soon as practicable after accomplishment of Part II.

Detailed Instructions:

This bulletin (I) alerts all users and holders of Bendix Aircraft Ignition Switches listed by function and Part Numbers in Table I to a possible personnel hazard, (II) provides a way by which a faulty switch can be detected and (III) provides instructions to cover field repair/replacement of the switch and identification of switches once repaired or replaced.

PART I. Possible Hazard Description.

Field reports indicate that occasionally switches performing the "Switch Function" listed in Table I have been found to leave the right magneto "Live" or "Hot."

2

The condition may exist when the switch Key/Lever is rotated slightly past the normal indicated "OFF" position. It has also been reported that the switch may stick in this position.

WARNING

Should the propeller be moved by hand (as during pre-flight) and a "Hot" magneto condition exist, the engine may fire and cause injury to personnel.

All appropriate precautions shall be exercised by all personnel associated with an aircraft having the switch condition described until the switch has been replaced or repaired.

As an added precautionary measure, positive ignition grounding prior to correction of a switch fault can be accomplished by fabricating a jumper lead and temporarily installing it between the magneto primary ground outlet or terminal of the magneto to a clean engine ground point.

Using the applicable primary grounding terminal kit selected from Table II, assemble a grounding lead.

TABLE II. APPLICABLE PRIMARY GROUNDING TERMINAL KITS.

Magneto Series	Repair Kit Part Number or Wire.
S-20 Series	Use Kit P/N 10-52305 for magneto P/N's 10-51365-1, -2, -7, -13, -14, -15, -16, -17, -20, -25, -26, -27, -28, -29, -30, -31, -32, -33, -34, -35, -40, -42, -43, -44, -46, -47, -48, -53, -54. 10-79020-5, -6. -8. -10, -13, -14, -16.
	Use Kit P/N 10-52305-1 for magnetos P/N's 10-51360-1, -10, -11, -25, -26, -29.
	Use Kit P/N 10-52306 for magnetos P/N's 10-51365-2, -5, -6, -7, -8, -15, -17, -18, -19, -20, -21, -22, -23. -24, -25, -41.
	Use Kit P/N 10-157209 for magneto P/N's 10-51360-45, -47, -48, -49. 10-51365-57. 10-79020-11, -17, -18, -19.
S-200, S-600 Series	Use Kit P/N 10-157209 all magneto P/N's.
S-700 Series	Use Kit P/N 10-171192 all magneto P/N's.
S-1200 Series	Use jumper wire with No. 10 eyed terminal at magneto end, alligator clip at engine ground end.
D-2000 Series	Use Kit P/N 10-382698 all magneto P/N's.

Remove the regular aircraft switch lead at the magneto. Install the jumper lead to the magneto and connect the other end to a convenient clean engine grounding point. The engine will now be inoperative until the jumper leads are removed and the regular switch leads reinstalled.

A log book entry must then be made signifying that the condition has been corrected.

PART II. Switch Fault Detection Procedures.

Procedure to accomplish compliance and detection of the problem described in Part I is as follows. Procedure A may be accomplished by observing engine operation during switch positioning. Procedure B may be accomplished by checking, using a continuity device such as an ohmmeter or timing light.

Procedure A – Check using engine reactions.

1. Observing the engine manufacturers ground run-up procedures allow the engine to reach operating temperatures and perform a normal magneto check.
2. With the engine at normal idle, rotate the switch key or lever through the "OFF" detent to the extreme limit of its travel in the "OFF" position direction.
3. If the engine continues to run with the switch manually held in the "Past OFF" position, it is an indication that one magneto is still "Hot" or ungrounded.
4. When the switch key or lever is released from the manually held "Past OFF" position, it should automatically return to the normal "OFF" position where the "Hot" magneto condition should no longer exist and the engine should die.
5. Any switch exhibiting a "Hot" magneto condition when in the "Past OFF" position should be repaired or replaced (Ref: Part III) at the earliest possible opportunity.

Procedure B – Using Continuity Device.

1. Remove the switch (magneto primary) leads from both magnetos.

WARNING

During switch continuity checks, removal, repair, or replacement, both magnetos are "Hot." Should the propeller be moved by hand during this time, the engine may fire and cause injury to personnel.

2. Connect a continuity device between each switch (magneto primary) lead at the magneto end and a good ground on the engine.
3. Rotate the switch key or lever to the extreme limit of its travel in the "OFF" position direction. (This may be slightly past the normal "OFF" position of the switch.) Manually hold the switch control there and observe the continuity device indication.
4. Reaction of the continuity device should indicate that continuity exists between ground and each individual switch (magneto primary) lead.
5. When the switch key or lever is released from the manually held "Past OFF" position, it should automatically return to the normal "OFF" position. Each switch (magneto primary) lead should indicate continuity from the lead to ground.

Any switch exhibiting a "Hot" magneto condition detected using either Procedure A or B, should be repaired or replaced at the earliest opportunity.

Light Aircraft Ignition Switches of the rotary action type are primarily mechanical in construction, consisting of springs, contactors, a contact plate and rotating parts within a housing. As is true with most mechanical assemblies, switches are subject to wear. Use of either Procedure A or B will detect a switch wear malfunction as well as provide a check on switch-to-magneto circuitry. The procedures therefore would be appropriate for inclusion in aircraft operating routines at periodic check periods.

Part III. Repair or Replacement.

A. Switches identified by 10-126XXX and 10-157XXX Series Part Numbers are no longer manufactured and are superseded by the 10-357XXX series switches.

Field repair of any of these series switches is not recommended beyond replacement of the support plate and switch contacts. It is also recommended that if a new support plate is installed, new contacts (3 required per switch) also be installed at the same time.

Table III provides superseding Switch Assembly Part Numbers as well as Repair Kit Numbers.

Each Repair Kit contains a new support plate and three new contacts.

TABLE III. PART NUMBER APPLICABILITY.

Switch Function	Switch P/N	Superseded By	Repair Kit P/N
Twist-To-Start	10-357200-1	-------	10-357510
	10-357230-1, -2	-------	
	10-357260-1	-------	
	10-126690-1	10-357200-1	
	10-126630-1	10-357230-1	
Push-To-Start	10-357210-1	-------	10-357515
	10-357240-1	-------	
	10-357270-1	-------	
	10-126680-2	10-357210-1	
	10-157440-1	10-357270-1	
	10-157440-2	10-357270-2	
	10-157440-3	10-357270-2	
	10-157440-4	10-357240-1	
	10-157440-21	10-357270-1	
Twist-To-Start Push-To-Prime	10-357220-1	-------	10-357510
	10-357250-1	-------	
	10-357280-1	-------	
	10-126680-1	10-357220-1	
	10-126660-1	10-357250-1	
	10-126660-4	10-357280-2	

B. To install a new Support Plate and Contacts, proceed as follows using Figure 1 as a guide for parts identification.

1. Disassembly and Inspection.
   a. Hold switch in a vertical position, support plate up.
   b. Using firm finger pressure, hold the support plate against the switch housing while removing the two self tapping screws. Retain screws for use during reassembly.
   c. Directly beneath the support plate are three contacts, spring loaded against the support plate. Carefully separate the support plate from the main switch assembly and remove the three contacts and springs (3 or 9).
   d. Retain the springs for use during reassembly. Discard old support plate and contacts.
   e. Inspect remainder of switch assembly for smoothness of operation

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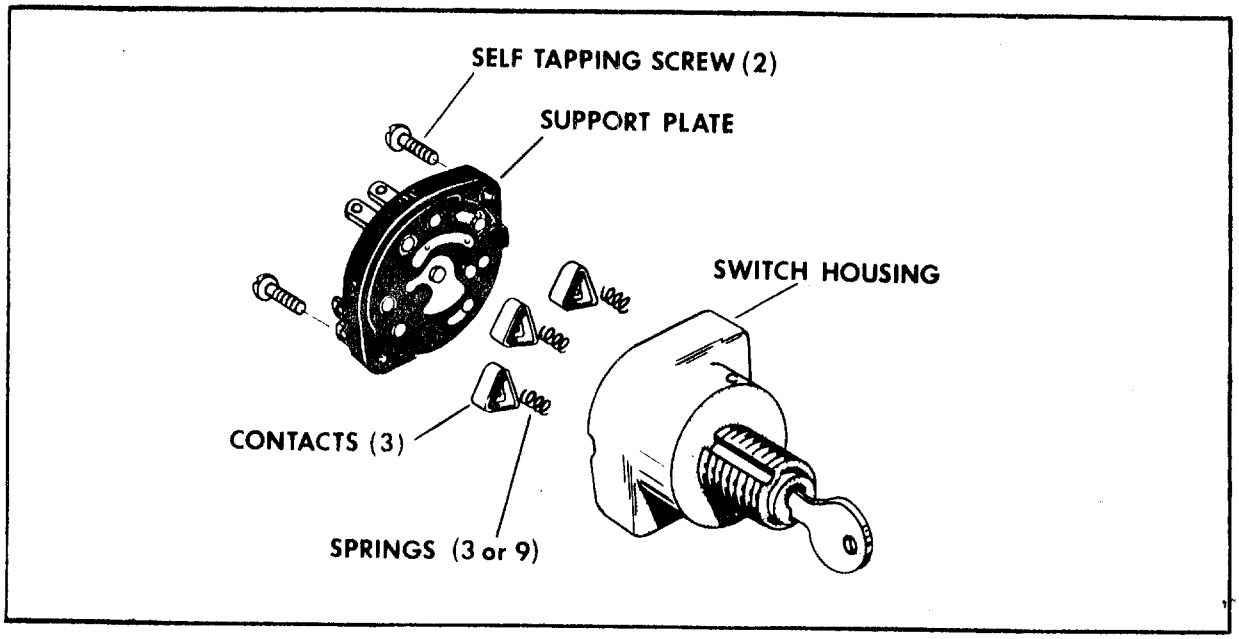


Figure 1. Identification of Switch Parts.

and check the rotor for any visible defects. If any faults are found, replacement of the complete switch assembly is recommended using Table III for replacement part number information.

2. Reassembly.
   a. Apply a light coating of Beacon P-290* non-conductive grease or equivalent to contact surfaces, contact wells in rotor and insulating surfaces over which contacts slide.
   b. Reinstall contact loading springs (3 or 9) in rotor. Position new contacts over springs so contacts will move into triangular recesses when pressure is applied.
   c. Locate boss on new support plate over locating slot in switch housing and carefully install support plate to housing, observing that contacts move into recesses.
   d. Holding plate against housing, turn key or lever through all switch positions. If it does not turn freely through the detent positions, recheck contact, springs, and support assembly.
   e. Once switch operation is satisfactory, reinstall and tighten self tapping screws holding support plate to switch housing.
   f. After switch has been completely reassembled, check it for ease of operation. There shall be little or no drag between stops. Check for positive stops in all positions. Check switch action for a positive and free spring return from the "START" position to the "BOTH" position. The switch shall not

* Available from Esso Standard Oil Co., Johnson City, N. Y. 13790.

spring back beyond or "overtravel" the "BOTH" position.

g. For switches with "Push" features, check lever or key for a free pushing action in proper switch positions and for proper spring return from pushed position.

3. Testing.
   a. Remove any wires or jumpers which may be present on the terminals at the rear of the switch.
   b. Using an ohmmeter, timing light or other suitable electrical continuity indicating device, check the switch for proper electrical operation. Refer to Table IV, V, or VI for the switch type being tested. There must be a continuity indication between the terminals listed for each switch position. There must be **NO** continuity between these terminals and any other terminal, between any other terminals or between any terminal and the switch housing.

TABLE IV. CONTINUITY TEST, TWIST TO START.

Switch Position	Continuity Only Between Terminals
OFF	R and GRD L and GRD L and R S and PR
R	L and GRD R and unmarked
L	R and GRD R and unmarked GRD and unmarked
BOTH	R and unmarked
START (twist and hold)	GRD and unmarked S and BAT L and BO L and LR BO and LR

TABLE V. CONTINUITY TEST, PUSH TO START.

Switch Position	Continuity Only Between Terminals
OFF	R and GRD L and GRD
R	L and GRD R and unmarked next to R
L	R and GRD R and unmarked next to R GRD and unmarked next to R
BOTH	R and unmarked next to R
START (twist and hold, do not push)	GRD and unmarked next to R L and BO L and LR BO and LR
START (twist, push and hold)	Same as above, plus BAT and unmarked next to BO.

TABLE VI. CONTINUITY TEST, TWIST TO START—PUSH TO PRIME.

Switch Position	Continuity Only Between Terminals
OFF	R and GRD L and GRD L and R S and PR
R	L and GRD R and unmarked
L	R and GRD R and unmarked GRD and unmarked
BOTH	R and unmarked
START (twist and hold, do not push)	GRD and unmarked S and BAT L and BO L and LR BO and LR
PRIME (twist, push and hold)	Same as above, plus BAT and PR

4. Identification.
   a. Switches checked and found satisfactory for continued use; make log book entry signifying compliance with this bulletin.
   b. Switches repaired under Part III utilizing Repair Kits, P/N 10-357510 or 10-357515 which have a white dot on the plate adjacent to the Bendix marking will be in compliance with this Bulletin and a log book entry signifying Bulletin compliance shall be made.
   c. New replacement switches are identified by a four digit date code stamped on the switch housing under the Bendix part number. Installation of a switch so identified should be noted by an accompanying log book entry as being in compliance.

Parts Required Per Article:
As required, Part III, Table III.

Special Tools Required:
None.

Man Hours Required:
1. Check Procedure – Negligible.
2. Repair Procedure– 1/2 Hour

Weight Change:
None.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-134
14 May 1976

ASSURE GROUNDING OF VHF COMM ANTENNA

MODELS AFFECTED: MODEL 112, SERIAL NO'S 167 THRU 369 AND 399 THRU 474 EQUIPPED WITH THE DORN AND MARGOLIN TYPE DM C70-1 VHF COMMUNICATIONS ANTENNAS.

REASON FOR PUBLICATION: MOVEMENT OF THE VOR/ILS OR ADF INDICATOR NEEDLE DURING OPERATION OF THE VHF TRANSMITTER ON LOWER FREQUENCIES MAY BE DUE TO INSUFFICIENT GROUNDING OF THE VHF COMMUNICATIONS ANTENNA. THIS SERVICE INFORMATION LETTER IS BEING ISSUED TO ASSURE PROPER GROUNDING OF THE ANTENNA.

COMPLIANCE: AT OWNER'S DISCRETION.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: TWO (2) HOURS.

PARTS DATA: NOT APPLICABLE.

SPECIAL TOOLS: LOW SCALE TORQUE WRENCH WITH 3/8 INCH SOCKET. OHMMETER TO CHECK CONTINUITY BETWEEN ANTENNA BASE PLATE AND FUSELAGE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Remove center headliner panels as necessary to gain access to antenna base plates.

2. To assure positive base plate grounding of the antennas, torque base plate mounting screws (4 places), in a criss cross pattern, not to exceed 20 inch pounds or until continuity can be read between antenna base plate and aircraft with antenna cable removed from the antenna.

CAUTION

Do not over-torque the mounting screws as physical damage may result to the antenna.

3. Reinstall center headliner panels.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: NOT APPLICABLE

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-135
6 October 1976

EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12

MODELS AFFECTED: MODEL 112, SERIAL NO'S. 3 THRU 470 EQUIPPED WITH EDO-AIRE MITCHELL'S CENTURY I, CENTURY IIB OR CENTURY III AUTOPILOT KIT.

REASON FOR PUBLICATION: RECOMMEND COMPLIANCE WITH EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12.

COMPLIANCE: SEE EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12.

BY WHOM WORK WILL BE ACCOMPLISHED: APPROVED EDO-AIRE MITCHELL OR ROCKWELL COMMANDER DISTRIBUTORS.

APPROVAL: SEE EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12.

ESTIMATED MAN HOURS: SEE EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12.

PARTS DATA: SEE EDO-AIRE MITCHELL SERVICE BULLETIN NO. MB-12.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Edo-Aire Mitchell Service Bulletin No. MB-12.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: NO CHANGE REQUIRED TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make appropriate entry in aircraft maintenance records as follows: Edo-Aire Mitchell Service Bulletin No. MB-12, dated June 11, 1976, entitled "Roll Servo Installation", accomplished _____(date)_____.

SERVICE BULLETIN

NO MB-12

FAA-DER APPROVED

DATE 6-11-76

EDO-AIRE MITCHELL

TO Edo-Aire Mitchell Distributors, Rockwell International, and Owners of Rockwell Commander Model 112 Aircraft, having installed one of the Autopilot Kits listed below.

SUBJECT Roll Servo Installation

This Service Bulletin affects the Rockwell Commander Model 112 aircraft which have the following EAM Autopilot Kits installed:

STC NO:	AUTOPILOT MODEL NO:	AUTOPILOT TYPE:
STC SA1502SW	AK364	Century I
STC SA1503SW	AK363	Century IIB
STC SA1504SW	AK362	Century III

All of the affected autopilot installations use an identical roll servo installation. A report has been received from the field that for these installations, it may be possible for the aileron balance cable to become sufficiently slack so as to allow the roll servo bridle cable clamp to contact the right rudder cable and thereafter to cause a restriction in the aileron control system. To date, there have been no reports of such an event actually occurring.

A thorough inspection and analysis has been conducted, with the inspections involving several aircraft. During these inspections no evidence was found to indicate that for these aircraft any control cable interference had ever occurred. The subsequent analysis of data resulting from the investigations did not determine that an operational aileron control restriction was actually possible.

During the inspections, however, it was observed a possibility does exist for the aileron balance cable, if sufficiently slack, to get under the servo cable guard. This condition will not result in a control system restriction, but it is undesirable because of the resulting increased wear. Edo-Aire Mitchell believes these aircraft should be retrofitted with cable guard bracket, P/N 7A1696-2, the result of a recent and unrelated product improvement.

The purpose of this Service Bulletin is to retrofit the affected aircraft installations with the current production cable clamp bolts and servo cable guards.

2

EDO-AIRE MITCHELL • P. O. BOX 610 • MUNICIPAL AIRPORT • MINERAL WELLS, TEXAS 76067 • (817) 325-2517

MANDATORY AT THE NEXT 100 HOUR OR ANNUAL INSPECTION:

For the Rockwell Commander Model 112 aircraft which have installed one of the listed Autopilot Models, it is mandatory during the next 100 Hour or Annual Inspection, to accomplish the following:

1. Inspect the roll servo installation to determine if the bridle cable clamps, P/N 42A184-1, use Bolts, P/N 3S215 (AN3-5A, 10-32 x 5/8L). The longer bolts used in earlier installations were P/N 3S106 (AN3-6A, 10-32 x 25/32L). The roll servo installation is located under the cabin floor, just aft of the main wing spar between the aircraft centerline and the right side of the fuselage.

2. If it is determined the AN3-5A, 10-32 x 5/8L bolts are not used on the 42A184-1 cable clamp, the existing bolts are to be replaced with the 5/8 inch long bolts. The bolts should be replaced, using the procedure given in Paragraph 3 below.

3. After removing the existing bolts, check to see that the aileron cables are clean and free of dirt, grease, or oil at the point of clamp contact. Check the aileron control cable tension and adjust as necessary to within the manufacturers specification for this aircraft. Adjust the bridle cable tension to ten pounds, plus or minus two pounds, and tighten the 3S215 clamp bolts and 2S38 nuts (AN365-1032, Steel) to 55 ± 5 inch pounds of torque with a minimum gap remaining between clamp halves of .005 inch after torquing.

4. The roll servo cable guards, P/N 7A1696-2, are to be installed on the roll servo. There are three of these guards, to be located in place of the existing guards, and as shown on Drawing No. 69D943. After installation of the 3S215 clamp bolts, and adjustment of cable tension as given above, adjust the cable guard brackets to within 1/32" of the capstan O.D. and secure with the 6-32 screws provided.

5. After the above is accomplished, operate the aileron controls through their complete range of travel. Check to see that no binding or restrictions exist due to this servo installation.

6. After the completion of the inspection and parts replacement, as required, this service bulletin shall be replaced with the aircraft service records and a log book entry made to reflect compliance with Edo-Aire Mitchell Service Bulletin MB-12.

Parts Kit, PK MB-12 should be ordered to comply with this Service Bulletin. The Parts Kit will be furnished at no charge. For owners whose autopilot, or Model 112 aircraft is in warranty, Edo-Aire Mitchell will pay an additional allowance for labor.

Approved Edo-Aire Mitchell Distributors and Dealers, or Rockwell International Distributors and Dealers may apply for labor reimbursement for the inspection and installation of the required parts. This labor reimbursement is for a maximum of $20.00 per aircraft installation, and is available only through approved Edo-Aire Mitchell or Rockwell International Distributors and Dealers. Flight Adjustment should not be required as a result of this replacement.

When ordering the Parts Kit and/or submitting claims for labor reimbursement under this Service Bulletin, MB-12, the following information must be included:

1. Aircraft Model and Serial Number.

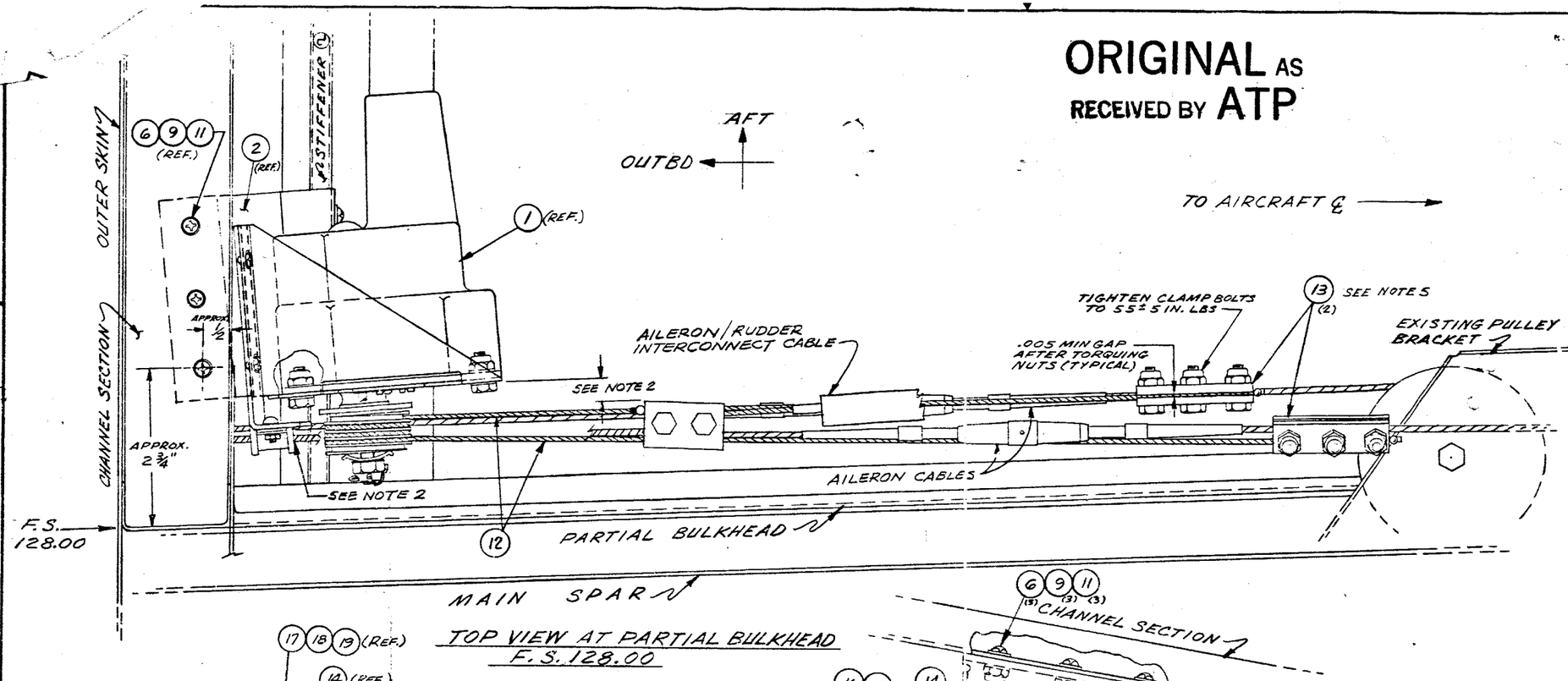
2. Autopilot Model (AK Number).

3. Autopilot Serial Number.

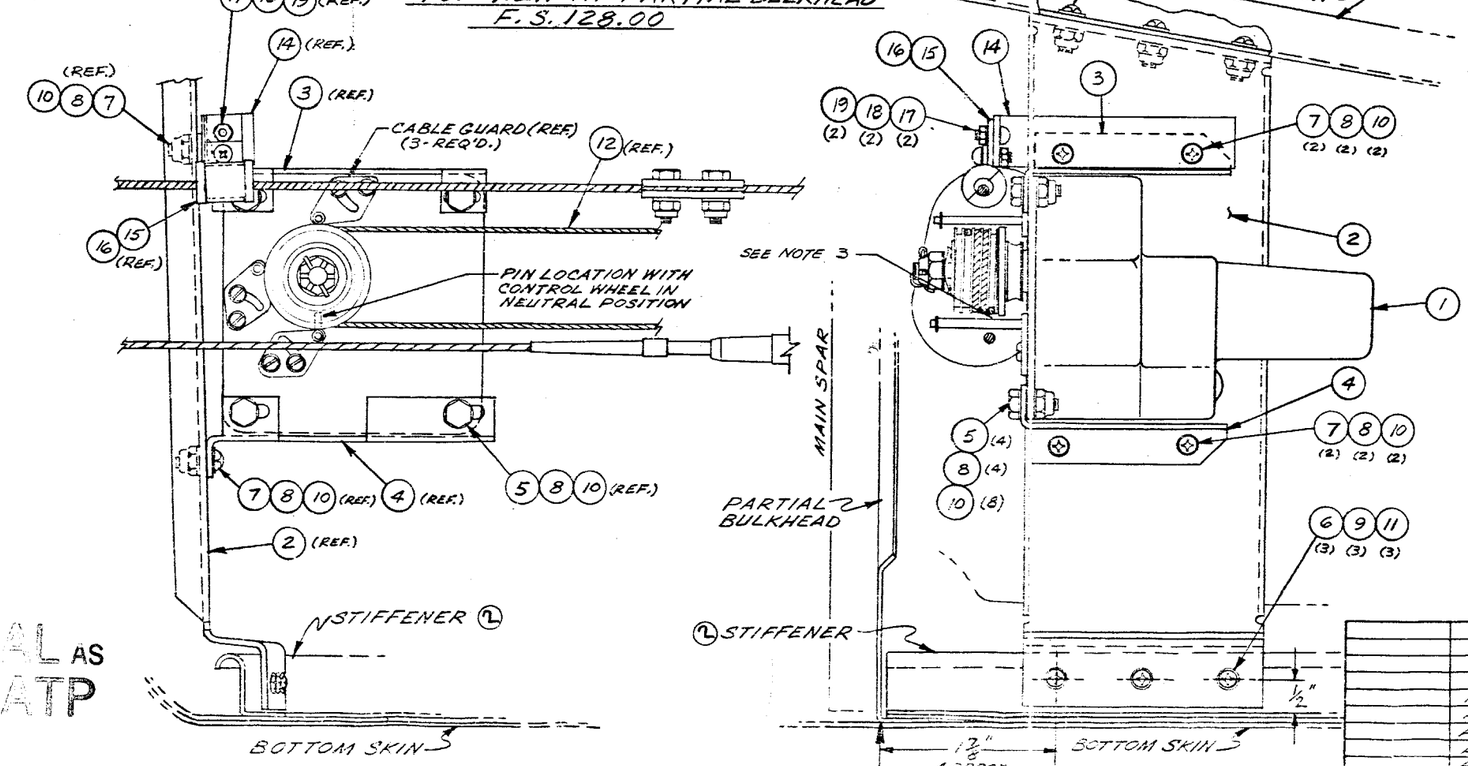
Carl J. Swift
Director, Products and Service
EDO-AIRE MITCHELL

ORIGINAL AS RECEIVED BY ATP

REVISIONS			
LTR	DESCRIPTION	DATE	APPR'D
–	RELEASED PER E.O		
A	REVISED PER F.E.C.O. # 421	1-10-75	ACK
B	REVISED PER F.E.C.O. # 612	2-26-76	ACK
C	REVISED PER FECO # 844	4-21-76	ACK



TOP VIEW AT PARTIAL BULKHEAD F.S. 128.00



NOTES:

1. TO REVERSE SERVO CAPSTAN ROTATION, REMOVE COVER AND REVERSE MOTOR LEADS ON TERMINAL STRIP.
2. ADJUST THE (ITEM 16) FAIRLEAD AND/OR THE AILERON/RUDDER INTERCONNECT CABLE SYSTEM TO PROVIDE A MINIMUM OF 1/8" CLEARANCE BETWEEN THE INTERCONNECT CABLE CLAMP AND THE SERVO BASE PLATE. REFER TO THE AIRCRAFT MANUFACTURERS SERVICE INFORMATION FOR DETAILS ON AILERON/RUDDER INTERCONNECT ADJUSTMENT. (APPLIES TO MOD. 114 & 112TC)
3. POSITION THE CAPSTAN CABLE GUARDS TO WITHIN 1/32" ± 1/64" OF THE CAPSTAN O.D.
4. ADJUST THE AILERON CABLE TENSION TO WITHIN THE TOLERANCE CALLED OUT BY THE AIRCRAFT MANUFACTURER AND TENSION THE SERVO BRIDLE CABLE TO 10 ± 2 LBS.
5. WHEN AIRCRAFT IS EQUIPPED WITH OPTIONAL 5/32" DIA. STAINLESS STEEL AILERON CONTROL CABLES, USE TWO (ITEM 20) 42A184-1 CABLE CLAMPS IN PLACE OF THE (ITEM 13) 42A173-1. POSITION CLAMP BOLTS AS SHOWN.

	QTY	ITEM	PART NUMBER	DESCRIPTION
SEE NOTE 5 →	2	20	42A184-1	CABLE CLAMP
	2	19	2530	NUT, AN364-632
	2	18	45218	WASHER, AN960-6
	2	17	35182	SCREW, ANS15-632R8
	1	16	48A350	BUSHING
	1	15	42A203	CLAMP
	1	14	7B1729	BRACKET
SEE NOTE 5 →	2	13	42A173-1	CABLE CLAMP
	1	12	30B269-4	BRIDLE CABLE
	6	11	45205	WASHER, #8, .174IDX 3/8OD, AN960-8
	12	10	45134	WASHER, .203 IDX .438OD, AN960-C10
	6	9	2534	NUT, #8-32 ESNA, AN365-832
	8	8	2538	NUT, #10-32 ESNA, AN365-1032
	4	7	35471	SCREW, #10-32X1/2L., AN525-1032R8
	6	6	35464	SCREW, #8-32X1/4L., AN525-832R8
	4	5	35215	BOLT, #10-32X5/8L., AN3-5A
	1	4	7B835-1	BRACKET
	1	3	7B835	BRACKET
	1	2	7C1321	BRACKET
	1	1	1C363-1-362R	ROLL SERVO

LIST OF MATERIALS

AK572	
AK573	
AK574	
AK364	
AK363	
AK362	
NEXT ASSY	USED ON
APPLICATION	

MATERIAL: NOTED

DRAWN: T. Swinson 6-27-72
CHECKED: [illegible] 6-30-72
ENGINEER:
APPROVED: [illegible] 6-30-72

EDO-AIRE MITCHELL
MINERAL WELLS, TEXAS

TITLE: ROLL SERVO INSTALLATION

SIZE: D | DWG NO: 690943 | REV:
SCALE: FULL | SHEET 1 OF 1

ORIGINAL AS RECEIVED BY ATP

6

PK-MB-12

Parts List for Mitchell Service Bulletin No. MB-12 covering Roll Servo Installation for Rockwell Commander Model 112

Qnty.	Part No.	Description
3	7A1696-2	Cable Guard
3	3S215	Bolts

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-137
20 October 1976

ENGINE OPERATING TIPS

MODELS AFFECTED: MODEL 112TC, SERIAL NO'S 13000 AND SUBS.

REASON FOR PUBLICATION: PROVIDE OPERATING TIPS TO PILOTS FOR LYCOMING TO-360-C1A6D ENGINE.

COMPLIANCE: DURING ALL ENGINE OPERATIONS.

BY WHOM WORK WILL BE ACCOMPLISHED: OWNER/OPERATOR.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: NOT APPLICABLE.

PARTS DATA: NONE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Leaning is permissible during taxi.
2. The mixture must be full rich for all takeoffs regardless of field elevation.
3. Never use full throttle for takeoff. It may be necessary to retard the throttle slightly during the takeoff roll to avoid overshooting the desired manifold pressure.
4. The pop off valve will NOT prevent the manifold pressure from exceeding red line.
5. Peak E.G.T. and the red line on the E.G.T. gauge are NOT the same. The red line is the maximum allowable Turbine Inlet Temperature.
6. For different power settings, altitudes, and outside air temperatures, peak EGT will occur at a different temperature each time the engine is leaned.
7. It is recommended that cruise power be maintained during the descent. Just prior to initiating the descent, and again at 2000 foot intervals during the descent, enrichen the mixture by 50-100 degrees on the E.G.T. gauge.
8. The mixture should be full rich during approach and landing.
9. Every effort should be made to keep the manifold pressure and R.P.M. within their green arcs during all flight operations.
10. Allow the engine to idle for 5 minutes prior to engine shut down. Usually taxiing back to the ramp will fulfill this requirement.
11. Make all throttle movements smoothly and carefully.
12. When using 42 inches of manifold pressure for climb out, a climb speed of 86 knots may be used if engine is cooling properly. Increase speed as required to 100 knots for cooling in warmer ambient temperatures.

ELECTRICAL LOAD: NO CHANGE.
WEIGHT AND BALANCE: NO CHANGE.
PUBLICATIONS AFFECTED: NONE.
RECORD COMPLIANCE: NOT APPLICABLE.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-138
11 April 1977

LOWER BAFFLE ASSEMBLY MODIFICATION

MODELS AFFECTED: MODELS 112TC AND 112TCA, SERIAL NO'S 13001 THRU 13169.

REASON FOR PUBLICATION: TO PREVENT THE LOWER BAFFLE ASSEMBLY FROM COMING IN CONTACT WITH THE LANDING LIGHT. THIS COULD POSSIBLY CRACK THE LANDING LIGHT OR CAUSE AN ELECTRICAL SHORT.

COMPLIANCE: AT OWNER'S DISCRETION.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER DISTRIBUTOR OR YOUR ROCKWELL COMMANDER REGIONAL SERVICE MANAGER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: TWO (2) HOURS.

PARTS DATA: NOT APPLICABLE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Remove upper and lower engine cowling as outlined in the Airplane Maintenance Manual, Section IV.
2. Remove staples through seal and baffle plate on lower baffle assembly in area to be trimmed (see Figure 1.).
3. Trim lower left baffle plate as shown in Figure 1.
4. Reinstall upper and lower engine cowling as outlined in the Airplane Maintenance Manual, Section IV.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

PUBLICATIONS AFFECTED: The Illustrated Parts Catalog change required by this document will be incorporated at the next scheduled change/revision.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Service Information No. SI-138, dated 11 April 1977, entitled "Lower Baffle Assembly Modification", accomplished ____(date)____.

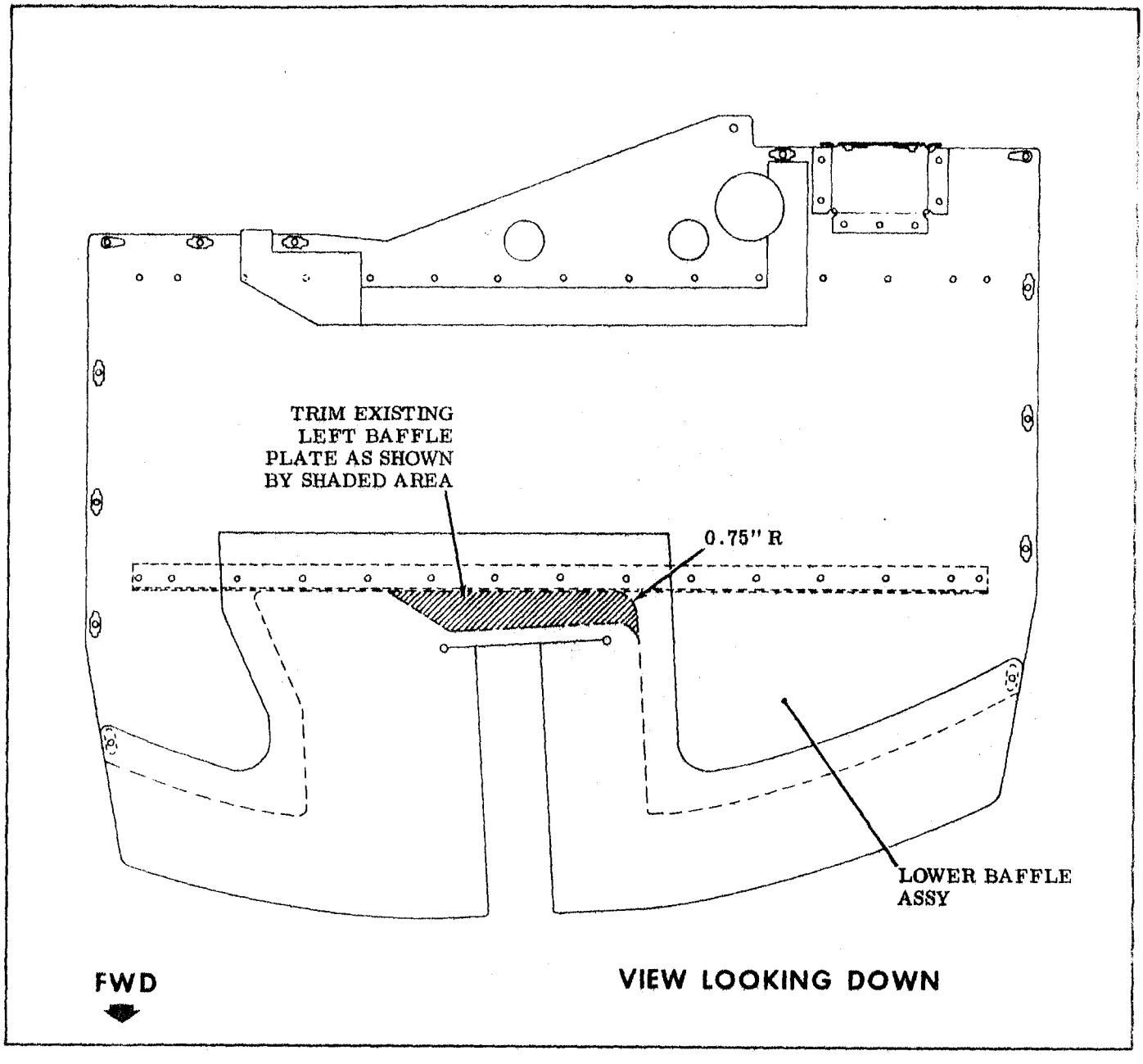

TRIM EXISTING
LEFT BAFFLE
PLATE AS SHOWN
BY SHADED AREA
0.75" R
LOWER BAFFLE
ASSY
FWD
VIEW LOOKING DOWN

Figure 1.

SERVICE PUBLICATIONS
revision notice

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-142
REVISION NO. 1
7 August 1987

FUEL VENT CHECK VALVE BALL INSPECTION

This Revision Notice is being issued to delete Model 112, Serial Nos. 4 thru 380. Model and Serial No. effectivities are changed to read as follows:

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 3 AND 381 THRU 536 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13166.
MODEL 114, SERIAL NOS. 14001 THRU 14226.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-142
15 September 1977

FUEL VENT CHECK VALVE BALL INSPECTION

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NO'S 3 THRU 536, MODELS 112TC AND 112TCA, SERIAL NO'S 13000 THRU 13166 AND MODEL 114, SERIAL NO'S 14000 THRU 14226.

REASON FOR PUBLICATION: POSSIBLE LEAKAGE OF FUEL VENT CHECK VALVES.

COMPLIANCE: AT OWNER'S DISCRETION.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER DEALER/DISTRIBUTOR OR YOUR ROCKWELL COMMANDER REGIONAL SERVICE MANAGER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: FOUR (4) HOURS.

PARTS DATA: Contact your nearest Rockwell Commander Dealer/Distributor for 3/8-inch Type 5052 hollow aluminum balls (Code 5486401).

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. If fuel leakage is evident at lower fuselage fuel vent outlet, proceed to step 3.

NOTE

Fuel leakage may be observed at lower fuselage fuel vent outlet particularly when the tanks are full.

2. If no leaks are evident at lower fuselage fuel vent outlet, disregard this Service Information Letter.
3. Defuel airplane as outlined in the Airplane Maintenance Manual, Section II.
4. Remove outboard fuel cell access plate to gain access to fuel vent check valve.
5. Remove outboard wing access plate to facilitate removal of fuel vent check valve.
6. Disconnect left and right fuel vent tube assemblies from left and right fuel vent check valves.
7. Remove screws attaching fuel vent check valves to left and right wing ribs at W.S. 142.40 and remove check valves from airplane.
8. Remove cotter pin and ball from fuel vent check valves.
9. Place check valve balls in a small container of Avgas.
10. If check valve balls float, reinstall in existing fuel vent check valves using new AN380-2-6 cotter pins (see Figure 1.).

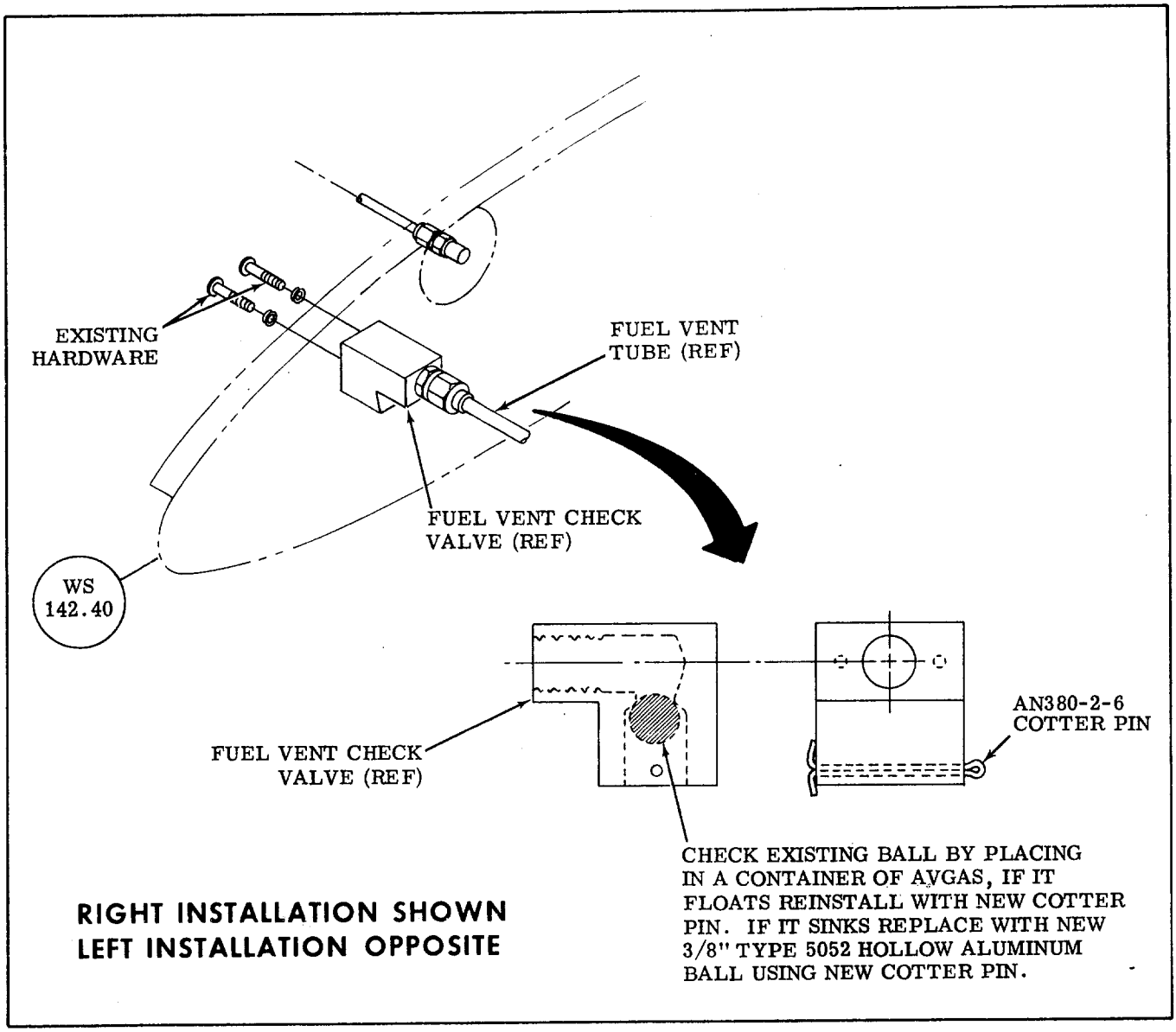


Figure 1.

11. If check valve balls do not float, discard existing balls and install new 3/8-inch balls using new AN380-2-6 cotter pins (see Figure 1.).

12. Reinstall existing fuel vent check valves in airplane using existing hardware.

13. Reconnect left and right fuel vent tube assemblies to fuel vent check valves.

14. Thoroughly clean all surfaces, to which sealing compound is to be applied, around fuel vent check valve and valve attaching screws with Methyl Ethyl Ketone (MEK) using clean paper towels or small paint brush and wipe clean.

NOTE

Clean an area longer and wider than the width of the finally applied sealant to provide maximum bonding.

15. Brush fuel vent check valve attaching screw heads and area around check valves with 1422, Class A sealant.

16. Reinstall and reseal lower wing access covers, using PRC-1321, Class B sealant, as outlined in the applicable Airplane Maintenance Manual, Section V.

17. Inspect and pressure check the tanks after sealing compound has cured (approximately 8 to 10 hours) and check for possible leaks.

CAUTION

Do not attempt to apply pressure to the tanks without first sealing off all lines and vents, and without an adequate regulator to control pressure. Do not pressurize the tank in excess of 1/2 PSI (13.8 inches of water manometer) or structural damage may occur.

18. Refuel airplane as outlined in the applicable Airplane Maintenance Manual, Section II.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: YES.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: NOT APPLICABLE.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-144
2 November 1977

ENGINE MUFFLER MODIFICATION

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NO'S 3 THRU 544.

REASON FOR PUBLICATION: TO EXTEND ENGINE MUFFLER LIFE.

COMPLIANCE: AT OWNER'S DISCRETION.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION LETTER, CONTACT YOUR NEAREST ROCKWELL COMMANDER DEALER/DISTRIBUTOR OR SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT AND A CERTIFIED HELI ARC WELDER.

APPROVAL: NOT APPLICABLE.

PARTS DATA: Procure locally 20 gauge (0.0375-inch) 321 stainless steel sheet MIL-S-6721.

SPECIAL TOOLS: HELI ARC WELDING MACHINE.

ACCOMPLISHMENT INSTRUCTIONS:

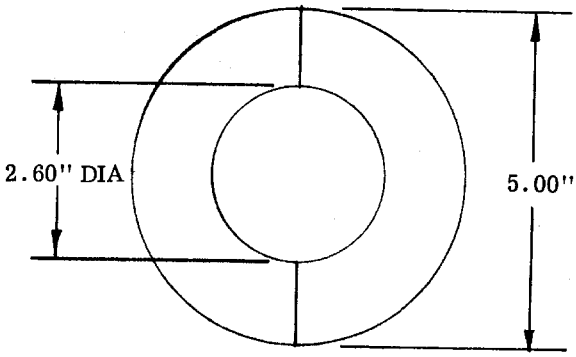
1. Remove upper and lower cowling from engine as outlined in the Airplane Maintenance Manual, Section IV.
2. Remove muffler from engine and inspect for cracks.
3. If cracks are found, install a new muffler and proceed to step 6.
4. If no cracks are found, fabricate two (2) doublers from 20 gauge (0.0375-inch) 321 stainless steel sheet MIL-S-6721 as shown in Figure 1.
5. Install doublers, fabricated in step 4., on existing muffler by Heli Arc welding around the inside diameter, the outside diameter and between the two doublers (see Figure 1.).
6. Install modified muffler or a new muffler on the engine.
7. Reinstall upper and lower cowling on the engine as outlined in the Airplane Maintenance Manual, Section IV.

ELECTRICAL LOAD: NO CHANGE.

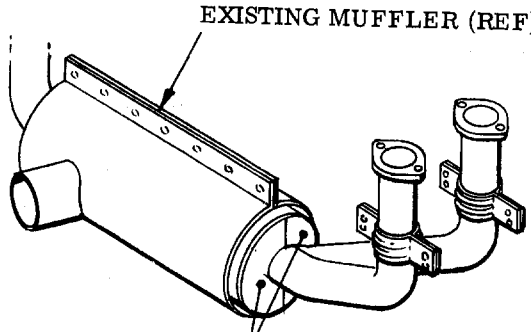
WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: YES.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Service Information No. SI-144, dated 2 November 1977, entitled "Engine Muffler Modification", accomplished ____(date)____.



MAKE TWO DOUBLERS FROM 20 GAUGE (0.0375") 321 STAINLESS STEEL MIL-S-6721 AS SHOWN ABOVE



INSPECT THIS AREA AND IS NO CRACKS ARE FOUND INSTALL TWO DOUBLERS AS SHOWN BY HELI ARC WELDING AROUND INSIDE AND OUTSIDE DIAMETERS OF DOUBLERS AND AT THE TWO PLACES WHERE THEY JOIN.

Figure 1.

R1 0031

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-145
7 November 1977

IMPROVED INDUCTION AIR BOX INSTALLATION

MODELS AFFECTED: MODELS 112TC AND 112TCA, SERIAL NO'S 13000 THRU 13249.

REASON FOR PUBLICATION: TO PROVIDE INSTALLATION INSTRUCTIONS FOR AN IMPROVED INDUCTION AIR BOX ASSEMBLY.

COMPLIANCE: WHEN REPLACING EXISTING P/N 615042-1 INDUCTION AIR BOX ASSEMBLY WITH IMPROVED P/N 615042-501 INDUCTION AIR BOX ASSEMBLY.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION LETTER, CONTACT YOUR NEAREST ROCKWELL COMMANDER DEALER/DISTRIBUTOR OR SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: FOUR (4) HOURS.

PARTS DATA: Contact your nearest Rockwell Commander Dealer/Distributor for P/N 615042-501 Induction Air Box Assembly.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Remove upper and lower cowling from engine as outlined in the Airplane Maintenance Manual, Section IV.
2. Disconnect flex duct from elbow on top of induction air box assembly.
3. Disconnect controls from induction air box assembly.
4. Disconnect clamp attaching defroster flex duct to clip on top of induction air box assembly.
5. Remove cover assembly from top of existing induction air box assembly and remove filter.

NOTE

Retain filter for later installation.

6. Remove existing screws (4 places) attaching cowl flap control support assembly to bottom of induction air box assembly.
7. Remove insulation from aft side of firewall, as necessary, to expose rivets attaching induction air box assembly to firewall.
8. Drill out rivets attaching induction air box assembly to firewall and remove induction air box assembly from airplane.

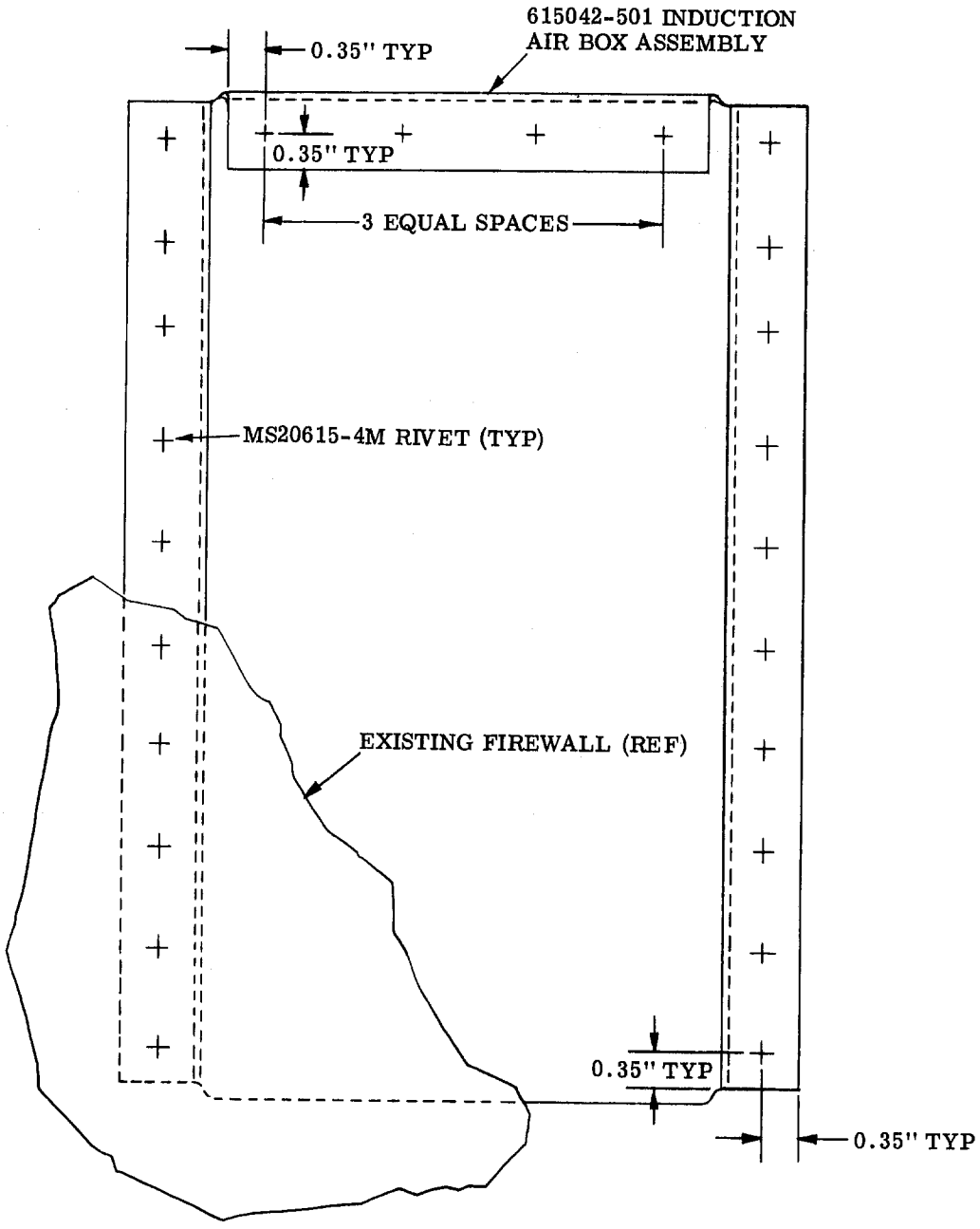

615042-501 INDUCTION
AIR BOX ASSEMBLY
0.35" TYP
0.35" TYP
3 EQUAL SPACES
MS20615-4M RIVET (TYP)
EXISTING FIREWALL (REF)
0.35" TYP
0.35" TYP
VIEW LOOKING FWD

Figure 1.

9. Locate, drill and install 615042-501 induction air box assembly on firewall using MS20615-4M rivets (see Figure 1.).

NOTE

Back drill through existing holes on firewall and add four (4) holes in upper flange of box assembly, firewall and firewall channel.

10. Apply Coast Proseal 700, MIL-S-38249, Type 1 (or equivalent) sealant on upper and lower edges and side flanges of induction air box assembly.

11. Reinstall cowl flap control support on bottom of induction air box assembly using existing hardware.

12. Remove cover assembly from top of new induction air box assembly, install existing filter and reinstall cover assembly.

13. Reinstall existing clamp on defroster duct and attach to clip on top of induction air box assembly using existing hardware.

14. Reconnect controls to induction air box assembly using existing hardware.

15. Reinstall flex duct on elbow located on top of induction air box assembly.

16. Check rigging of the induction air box assembly to assure that the door is closed when the control lever, located on the control pedestal, is in the COLD position.

17. Reinstall the upper and lower cowling as outlined in the Airplane Maintenance Manual, Section IV.

18. Reinstall existing insulation on aft side of firewall with EC 1403 adhesive.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: YES.

PUBLICATIONS AFFECTED: The Illustrated Parts Catalog change required by this document will be incorporated at the next scheduled change/revision.

RECORD COMPLIANCE: NOT APPLICABLE.

SERVICE PUBLICATIONS
revision notice

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-147
REVISION NO. 1
7 August 1987

SPARES REPLACEMENT FUEL VENT CHECK VALVE INSTALLATION

This Revision Notice is being issued to delete Model 112, Serial Nos. 4 thru 380. Model and Serial No. effectivities are changed to read as follows:

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 3 AND 381 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13270.
MODEL 114, SERIAL NOS. 14001 THRU 14407.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-147
21 July 1978

SPARES REPLACEMENT FUEL VENT CHECK VALVE INSTALLATION

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NO'S 3 THRU 544 AND 13000, MODELS 112TC AND 112TCA, SERIAL NO'S 13001 THRU 13270, AND MODEL 114, SERIAL NO'S 14000 THRU 14407.

REASON FOR PUBLICATION: TO PROVIDE INSTALLATION INSTRUCTIONS FOR AN IMPROVED FUEL VENT CHECK VALVE.

COMPLIANCE: WHEN REPLACING EXISTING PART NO. 48538 FUEL VENT CHECK VALVE WITH NEW REPLACEMENT PART NO. 35C6A FUEL VENT CHECK VALVE.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION LETTER, CONTACT YOUR NEAREST ROCKWELL COMMANDER AUTHORIZED SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: FAA DOA SW-2 Approved.

ESTIMATED MAN HOURS: FOUR (4) HOURS.

PARTS DATA: Contact your nearest Rockwell Commander Authorized Service Facility for the new substitution/ replacement fuel vent check valve kit Part No. 48509-450.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Defuel airplane as outlined in the Airplane Maintenance Manual, Section II.
2. Remove left and right outboard fuel cell access plates to gain access to fuel vent check valves.
3. Remove left and right outboard wing access plates to facilitate removal of fuel vent check valves.
4. Disconnect left and right fuel vent tube assemblies from left and right fuel vent check valves.
5. Remove screws attaching fuel vent check valves to left and right wing ribs at W.S. 142.40 and remove and discard check valves.
6. Plug holes in wing ribs with MS20470AD6 rivets and seal as outlined in the applicable Airplane Maintenance Manual, Section II under Sealing Procedures.
7. Disassemble 35C6A fuel vent check valve as follows (see Figure 1.):
   a. Loosen jamb nut on elbow.
   b. Remove B-nut from elbow.
   c. Remove jamb nut from elbow.
   d. Remove and discard large washer.

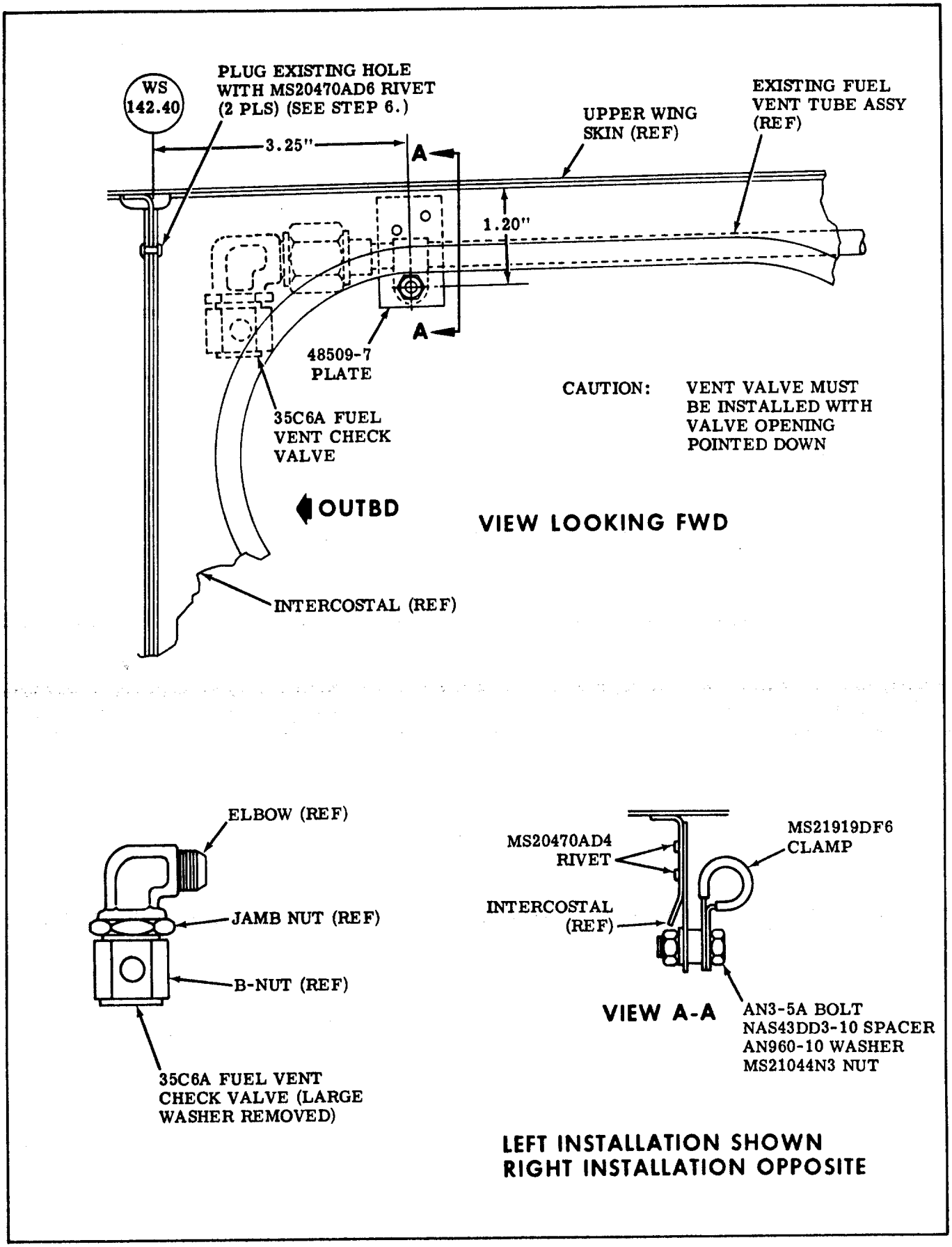

WS
142.40
PLUG EXISTING HOLE
WITH MS20470AD6 RIVET
(2 PLS) (SEE STEP 6.)
3.25"
A
UPPER WING
SKIN (REF)
EXISTING FUEL
VENT TUBE ASSY
(REF)
1.20"
A
48509-7
PLATE
35C6A FUEL
VENT CHECK
VALVE
CAUTION: VENT VALVE MUST
BE INSTALLED WITH
VALVE OPENING
POINTED DOWN
OUTBD
VIEW LOOKING FWD
INTERCOSTAL (REF)
ELBOW (REF)
JAMB NUT (REF)
B-NUT (REF)
35C6A FUEL VENT
CHECK VALVE (LARGE
WASHER REMOVED)
MS20470AD4
RIVET
INTERCOSTAL
(REF)
MS21919DF6
CLAMP
VIEW A-A
AN3-5A BOLT
NAS43DD3-10 SPACER
AN960-10 WASHER
MS21044N3 NUT
LEFT INSTALLATION SHOWN
RIGHT INSTALLATION OPPOSITE

Figure 1.

3

8. Reassemble 35C6A fuel vent check valve as follows (see Figure 1.):

   a. Install jamb nut on elbow and run nut all the way up on threads.

   b. Install B-nut on elbow, assuring that the float ball is inside the B-nut, and tighten B-nut on elbow.

   c. Torque jamb nut against B-nut.

9. Locate, drill and install 48509-7 plate on left and right wing intercostals (see Figure 1.).

10. Install 35C6A fuel vent check valves on left and right fuel vent tube assemblies (see Figure 1.).

11. Install MS21919DF6 clamps (see Figure 1.).

12. Reinstall and reseal lower wing access plates, using PRC-1321, Class B sealant, as outlined in the applicable Airplane Maintenance Manual, Section V.

13. Inspect and pressure check the tanks after sealing compound has cured (approximately 8 to 10 hours) and check for possible leaks.

CAUTION

Do not attempt to apply pressure to the tanks without first sealing off all lines and vents, and without an adequate regulator to control pressure. Do not pressurize the tank in excess of 1/2 PSI (13.8 inches of water manometer) or structural damage may occur.

14. Refuel airplane as outlined in the applicable Airplane Maintenance Manual, Section II.

ELECTRICAL LOAD:	NO CHANGE.
WEIGHT AND BALANCE:	NO CHANGE.
SPARES AFFECTED:	YES.
PUBLICATIONS AFFECTED:	The Illustrated Parts Catalog change required by this document will be incorporated at the next scheduled change/revision.

RECORD COMPLIANCE: Make appropriate entry in airplane Maintenance records as follows: Service Information No. SI-147, dated 21 July 1978, entitled "Spares Replacement Fuel Vent Check Valve Installation", accomplished_____(date)_____.

Service Information

Rockwell International

General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-148
28 March 1978

SPARES REPLACEMENT FUEL PUMP INSTALLATION

MODELS AFFECTED: MODEL 112, SERIAL NO'S 3 THRU 380.

REASON FOR PUBLICATION: TO PROVIDE INSTALLATION INSTRUCTIONS FOR SPARES REPLACEMENT FUEL PUMP.

COMPLIANCE: WHEN REPLACING EXISTING PART NO. A8120A FUEL PUMP WITH NEW REPLACEMENT PART NO. A8120C FUEL PUMP.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION LETTER, CONTACT YOUR NEAREST ROCKWELL COMMANDER DEALER/DISTRIBUTOR OR SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: FAA DOA SW-2 Approved.

ESTIMATED MAN HOURS: SIX (6) HOURS.

PARTS DATA: Contact your nearest Rockwell Commander Dealer/Distributor or ServiCenter for the new Spares replacement fuel pump kit part number 635021-450.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Gain access to the battery, located in the aft fuselage, through the baggage compartment door.
2. Remove baggage compartment liner, as necessary, to expose battery.
3. Remove cover from battery and disconnect battery cables from battery.
4. Remove upper and lower cowling from engine as outlined in the Airplane Maintenance Manual, Section IV.
5. Assure that the master battery switch is in the OFF position and the fuel selector is also in the OFF position.
6. Open gascolator and drain fuel.
7. On Serial Numbers 221 thru 380, disconnect gascolator drain cable from top of gascolator.
8. Disconnect tube assemblies and hoses from fuel pump and gascolator and cap all fuel lines.
9. Disconnect electrical wiring from fuel pump.
10. Remove fuel pump and gascolator from engine firewall.
11. Plug existing holes in firewall with existing screws and MS20365-416C nut (4 places) (see Figure 1.).
12. Reduce brake system pressure to zero, remove and discard existing brake tube assembly, forward of engine firewall, that is routed from pilot's right brake cylinder over to copilot's right brake cylinder and cap firewall fittings.
13. Remove gascolator from existing fuel pump.

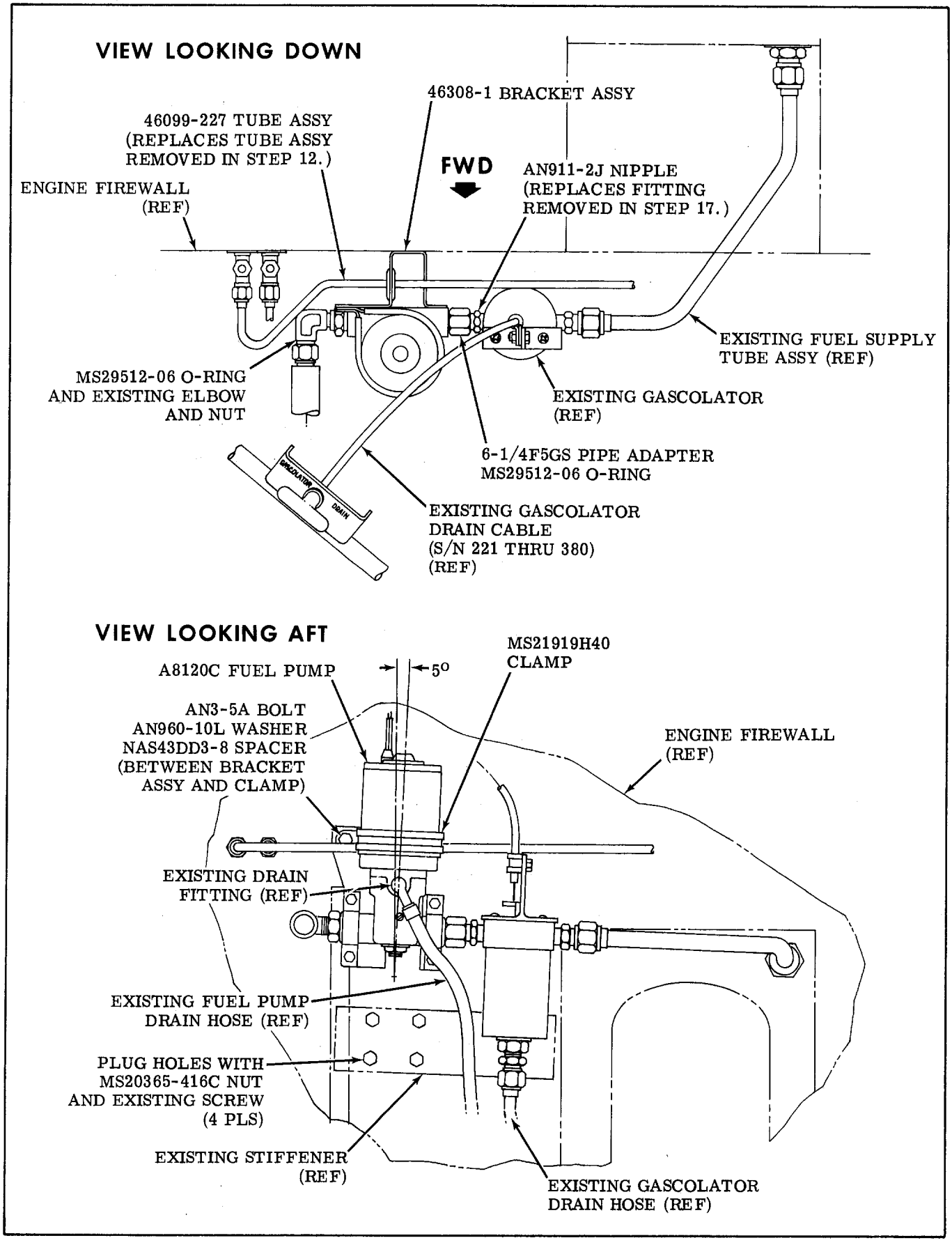

VIEW LOOKING DOWN
46308-1 BRACKET ASSY
46099-227 TUBE ASSY
(REPLACES TUBE ASSY
REMOVED IN STEP 12.)
FWD
AN911-2J NIPPLE
(REPLACES FITTING
REMOVED IN STEP 17.)
ENGINE FIREWALL
(REF)
EXISTING FUEL SUPPLY
TUBE ASSY (REF)
MS29512-06 O-RING
AND EXISTING ELBOW
AND NUT
EXISTING GASCOLATOR
(REF)
6-1/4F5GS PIPE ADAPTER
MS29512-06 O-RING
EXISTING GASCOLATOR
DRAIN CABLE
(S/N 221 THRU 380)
(REF)
VIEW LOOKING AFT
MS21919H40
CLAMP
A8120C FUEL PUMP
5°
AN3-5A BOLT
AN960-10L WASHER
NAS43DD3-8 SPACER
(BETWEEN BRACKET
ASSY AND CLAMP)
ENGINE FIREWALL
(REF)
EXISTING DRAIN
FITTING (REF)
EXISTING FUEL PUMP
DRAIN HOSE (REF)
PLUG HOLES WITH
MS20365-416C NUT
AND EXISTING SCREW
(4 PLS)
EXISTING STIFFENER
(REF)
EXISTING GASCOLATOR
DRAIN HOSE (REF)

Figure 1.

14. Remove existing drain fitting from fuel pump and retain fitting for later installation.

15. Remove existing elbow and nut from fuel pump and retain elbow and nut for later installation.

16. Discard existing fuel pump and O-rings.

17. Remove and discard existing fitting from the right port of the gascolator.

18. Install existing elbow and nut (removed in step 15.)., MS29512-06 O-ring (2 places) and 6-1/4F5GS pipe adapter on A8120C fuel pump (see Figure 1.).

19. Apply teflon tape (3M No. 547 or equivalent) to threads of AN911-2J nipple and existing fuel pump drain fitting (removed in step 14.) as follows:

    a. Place teflon tape two (2) threads in from end of male pipe threads and hold tape firmly with thumb.

    b. Stretch tape against threads and wind clockwise one (1) lap. Continue to hold tightly against threads until tape has been broken.

NOTE

Do not attempt to tear tape sideways. Snap tape off in same direction used for winding.

20. Install existing drain fitting on fuel pump (see Figure 1.).

21. Install AN911-2J nipple on existing gascolator (see Figure 1.).

22. Install gascolator on A8120C fuel pump (see Figure 1.).

23. Temporarily install 46308-1 bracket assembly and MS21919H40 clamp on A8120C fuel pump (see Figure 1.).

24. Position A8120C fuel pump and existing gascolator against engine firewall and connect existing tube assemblies and hoses to fuel pump and gascolator (see Figure 1.).

25. Temporarily install 46099-227 tube assembly (see Figure 1.).

26. Mark position of 46308-1 bracket assembly on engine firewall and mark bracket assembly upper attaching hole on engine firewall (see Figure 1.).

NOTE

Assure that 46099-227 tube assembly does not rub against bracket assembly grommet and that 46308-1 bracket assembly is oriented with 5 degree tilt as shown in Figure 2.

27. Remove 46099-227 tube assembly from airplane.

28. Disconnect tube assemblies and hoses from fuel pump and gascolator and remove fuel pump and gascolator from airplane.

29. Remove 46308-1 bracket assembly and clamp from fuel pump.

30. Drill and install 46308-1 bracket assembly on engine firewall. Observe 0.30-inch minimum edge distance on stiffener and 5 degree tilt down to gascolator (see Figure 2.).

NOTE

Remove any rivets from engine firewall that interfere with installation of bracket assembly and replace with MS20427M4-4 flush rivets.

31. Install 46099-227 tube assembly on engine firewall fittings (see Figure 1.).

32. Install A8120C fuel pump and existing gascolator and connect tube assemblies and hoses to fuel pump and gascolator (see Figure 1.).

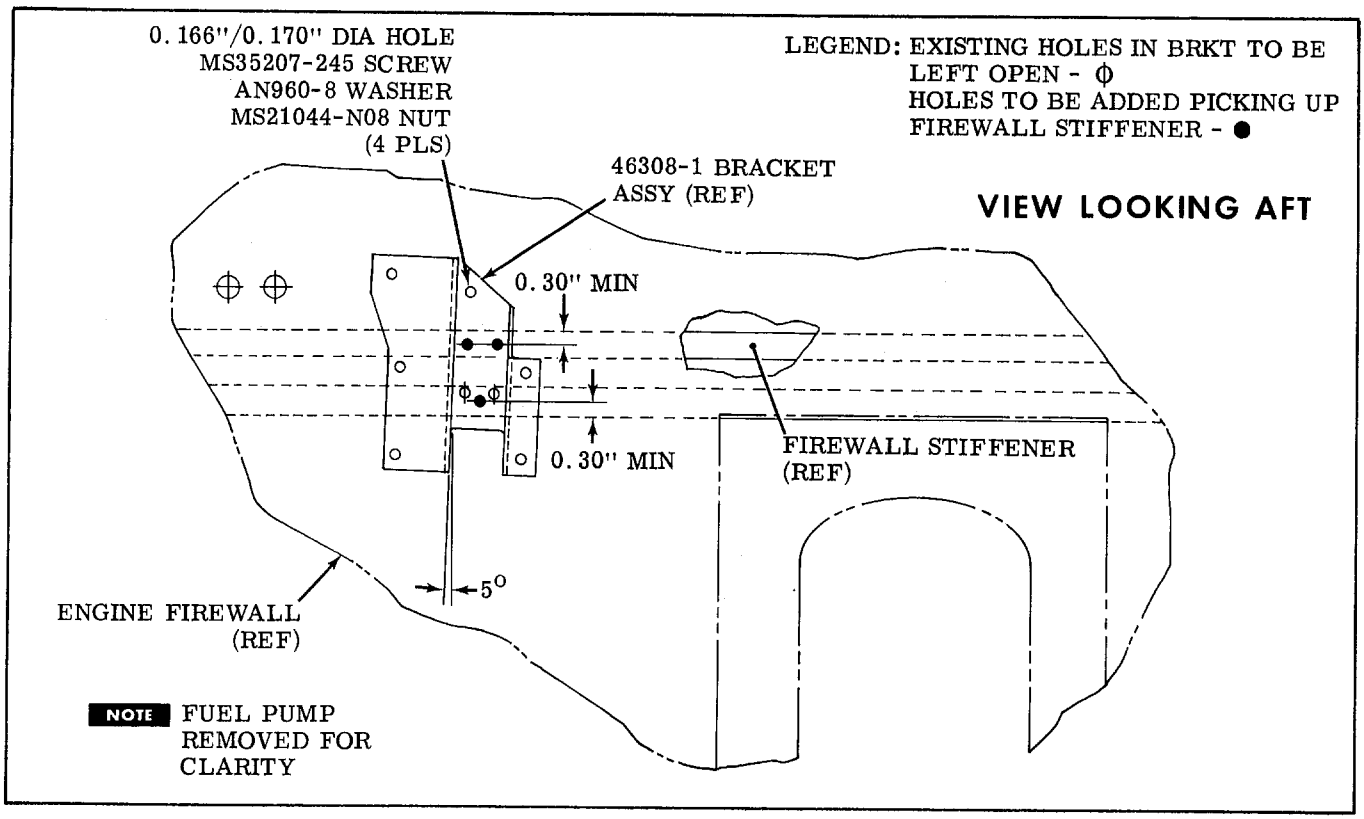


Figure 2.

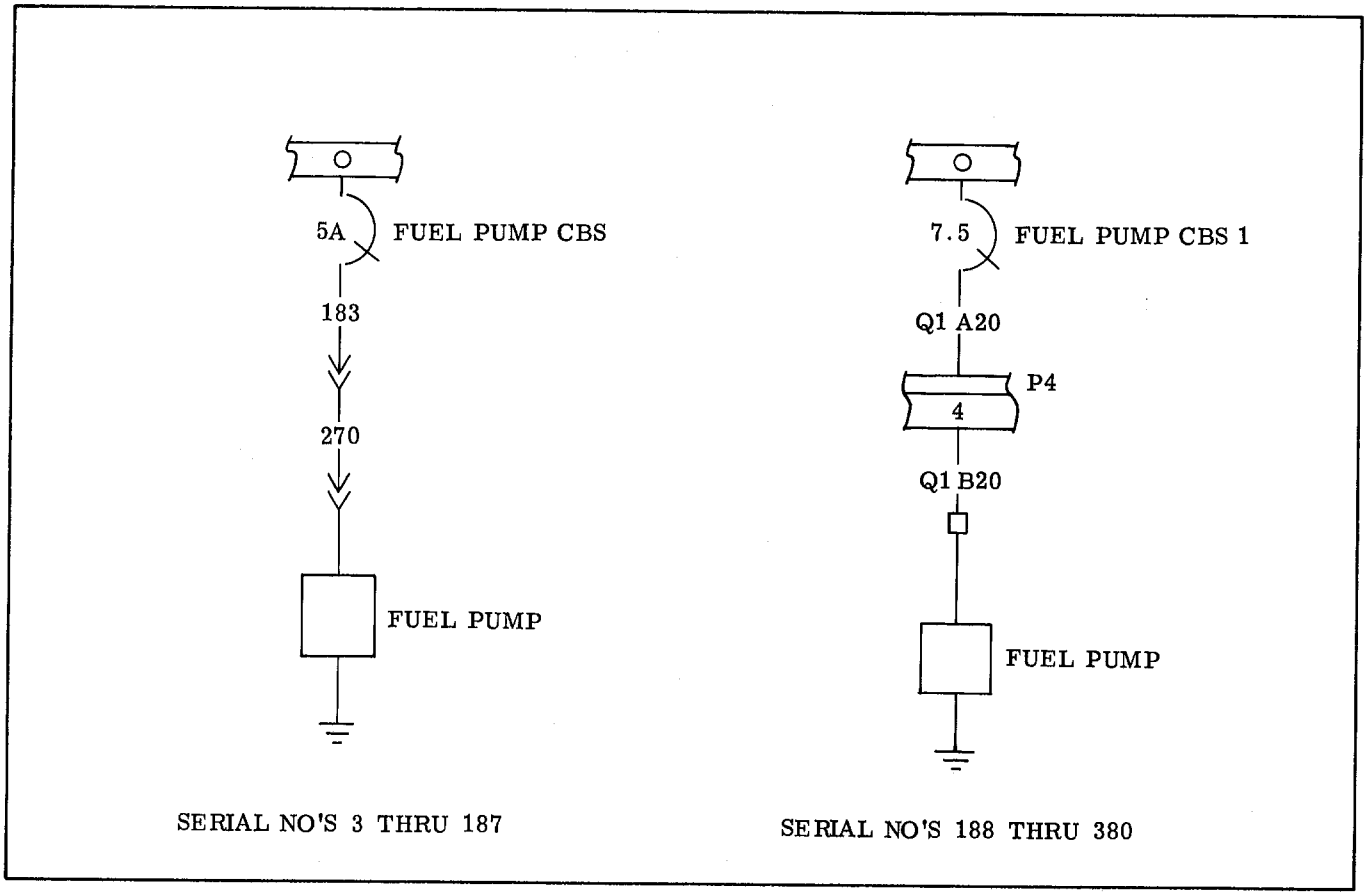


Figure 3.

33. On Serial Numbers 221 thru 380, reconnect gascolator drain cable to top of gascolator (see Figure 1.).

34. Connect fuel pump to airplane electrical system (see Figure 3.).

35. Assure that all fuel lines are tightened and no fuel leaks are evident.

36. Reconnect battery cables to battery and install cover on battery.

37. Reinstall baggage compartment liner.

38. Bleed brakes as outlined in the Airplane Maintenance Manual, Section VI.

39. Reinstall upper and lower cowling on engine as outlined in the Airplane Maintenance Manual, Section IV.

ELECTRICAL LOAD:	NO CHANGE.
WEIGHT AND BALANCE:	NO CHANGE.
SPARES AFFECTED:	YES.
PUBLICATIONS AFFECTED:	The Airplane Maintenance Manual and Illustrated Parts Catalog changes required by this document will be incorporated at the next scheduled change/ revision.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Service Information No. SI-148, dated 28 March 1978, entitled "Spares Replacement Fuel Pump Installation" accomplished ____(date)____.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-149A
(Supersedes Service Information No. SI-149 dated 17 March 1978 in its entirety)
13 September 1979

HYDRAULIC POWER PACK VENT PORT SCREW ADJUSTMENT

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NO'S 13000 AND 3 THRU 544, MODELS 112TC AND 112TCA, SERIAL NO'S 13001 THRU 13309 AND MODELS 114 AND 114A, SERIAL NO'S 14000 THRU 14540.

REASON FOR PUBLICATION: TO PREVENT THE POSSIBILITY OF THE HYDRAULIC POWER PACK VENT PORT BEING INADVERTENTLY CLOSED.

COMPLIANCE: WHEN REPLACING POWER PACK AND UPON EVIDENCE OF SLOW LANDING GEAR EXTENSION.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER AUTHORIZED SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: OWNER/OPERATOR.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: THIRTY (30) MINUTES.

PARTS DATA: NOT APPLICABLE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Gain access to the hydraulic power pack, located on the left side of the aft fuselage, through the baggage compartment door.
2. Remove the left side baggage compartment access panel to expose the hydraulic power pack.
3. Check hydraulic power pack vent port to assure that clearance between vent port washer and hydraulic power pack boss is a minimum of 0.06 inch (see Figure 1.).

NOTE

Vent is under washer.

4. If clearance between hydraulic power pack vent port washer and hydraulic power pack boss is a minimum of 0.06 inch, proceed to step 6.
5. If clearance between hydraulic power pack vent port washer and hydraulic power pack boss is less than 0.06 inch, adjust vent screw to obtain proper clearance of 0.06 inch minimum (see Figure 1.).
6. Reinstall the left side baggage compartment access panel.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

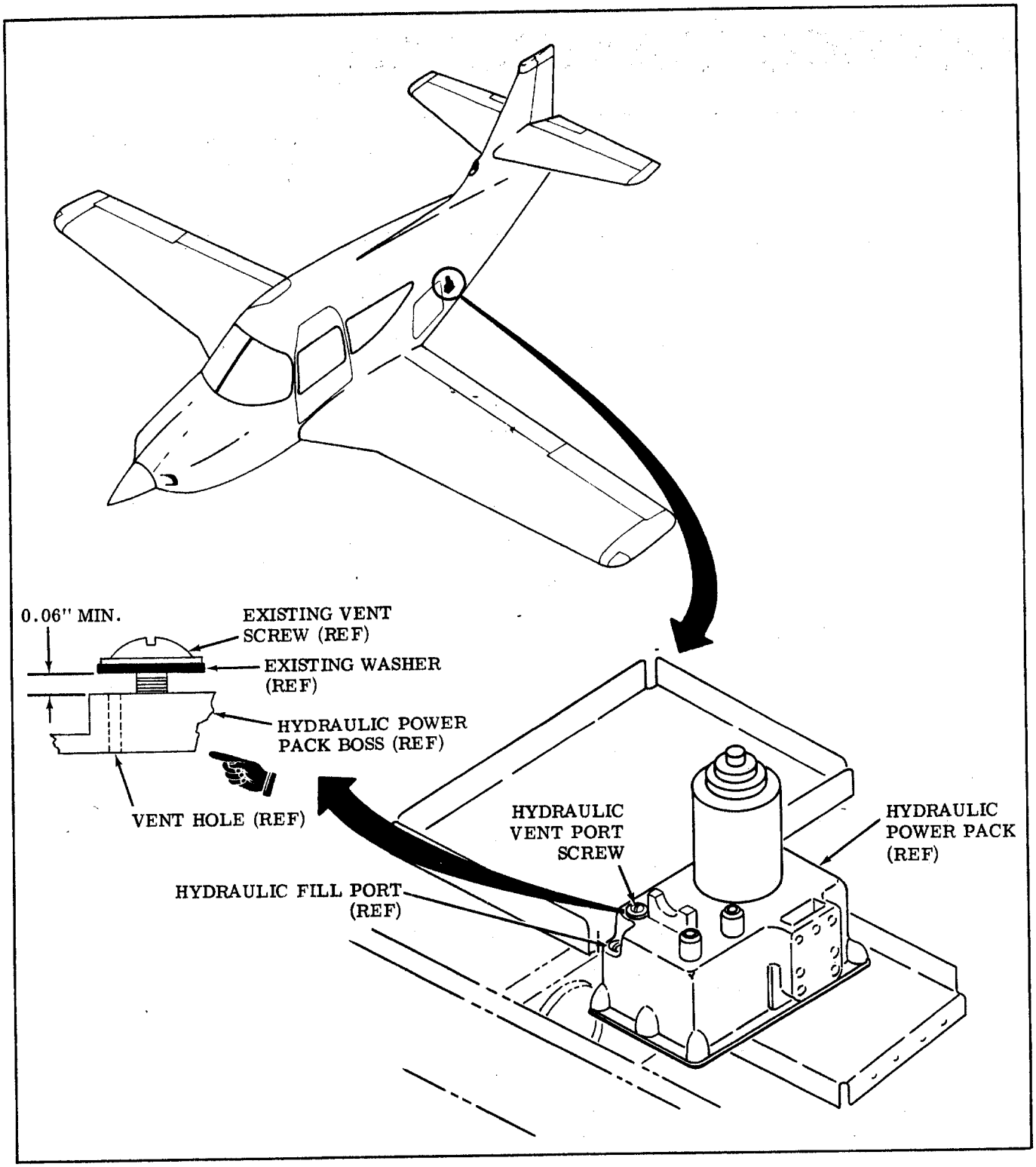


Figure 1.

PUBLICATIONS AFFECTED: The Airplane Maintenance Manual change required by this document will be incorporated at the next scheduled change/revision.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Service Information No. SI-149A, dated 13 September 1979, entitled "Hydraulic Power Pack Vent Port Screw Adjustment", accomplished _____(date)_____.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-157
17 November 1978

ROCKWELL-COLLINS SERVICE BULLETIN NO. 8

MODELS AFFECTED: THE FOLLOWING EQUIPPED WITH COLLINS MICROLINE TDR-950 TRANSPONDER WITH UNIT SERIAL NO'S. 8100 THRU 8600: MODEL 112, SERIAL NO'S 446 THRU 499 AND 13000, MODEL 112B, SERIAL NO'S 500 THRU 544, MODELS 112TC AND 112TCA, SERIAL NO'S. 13001 THRU 13195, 13250 THRU 13276, MODEL 114, SERIAL NO'S. 14000 THRU 14437 AND MODEL 500S, SERIAL NO'S. 3269 THRU 3316.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH ROCKWELL-COLLINS SERVICE BULLETIN NO. 8.

COMPLIANCE: WITHIN NEXT FIFTY (50) HOURS TIME IN SERVICE.

BY WHOM WORK WILL BE ACCOMPLISHED: AN AUTHORIZED COLLINS SERVICE AGENCY.

APPROVAL: SEE ROCKWELL-COLLINS SERVICE BULLETIN NO. 8.

ESTIMATED MAN HOURS: ONE (1) HOUR.

PARTS DATA: See Rockwell-Collins Service Bulletin No. 8.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Rockwell-Collins Service Bulletin No. 8.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Service Information No. SI-157, dated 17 November 1978, entitled "Rockwell-Collins Service Bulletin No. 8", accomplished _____(date)_____.

Rockwell-Collins | **SERVICE BULLETIN**

Collins General Aviation Division/Rockwell International

TDR-950 TRANSPONDER (622-2092-001 THROUGH -006)

SERVICE BULLETIN NO 8

REPLY PULSE SPACING

1. Planning Information

A. Effectivity

Mandatory on all TDR-950 Transponders with serial numbers between 8100 and 8600.

B. Reason

Encoder clock generator inductor L15 may exhibit inductance variations caused by temperature shock. Depending upon the extent of value change, some units may generate replies that do not meet the 20.3 μs ±0.1 μs pulse spacing specification for framing pulses F1 and F2. Although the transponder will appear to be operating properly in the cockpit (reply lamp will flash when responses are made to valid interrogations), air traffic control plan position indicators may not paint responses because of the erroneous framing pulse period. In this case, pilot reports on units experiencing this problem may include "inoperative unit" or "intermittent operation".

C. Description

(1) Technical

Inductive variations in L15 will cause the decoder clock generator frequency to change. The resulting frequency shift may be sufficient to cause reply pulse spacing to fall outside of equipment specifications.

To correct this problem, inductor L15 is replaced with a component that is not susceptible to temperature shock or inductance variation over the temperature and humidity ranges experienced during normal operating conditions.

(2) Physical

Inductor L15 is replaced with a component of the same value that does not drift with changes in temperature and humidity.

D. Approval

Conforms to FAA TSO-C74c.

E. Manpower

(1) An estimated 60 minutes is required to perform the subject modification and test circuit performance.

(2) The time required to test the TDR-950 as a result of this modification will not be affected.

F. Material -- Cost and Availability

The component listed in paragraph 3 is required to modify one TDR-950 Transponder. This part is available for shipment within 30 days after receipt of order at a price of $0.65 (price subject to change without notice). The part may be obtained from your regional customer service manager. All orders should specify the Collins part number of the desired component and reference TDR-950 service bulletin 8.

Collins Avionics/Rockwell International will bear the cost for implementation of this service bulletin including 60 minutes labor.

G. Tooling -- Price and Availability

None.

H. Weight and Balance

No effect.

I. References

(1) Other Service Bulletins/Service Information Letters

This service bulletin obsoletes TDR-950 Transponder service information letter 2-78 entitled "F1/F2 Pulse Spacing", dated September 26, 1978. Incorporation of this service bulletin does not depend upon other service bulletins or modifications to the TDR-950 Transponder.

(2) Other Publications Affected

The third edition of the TDR-950 Transponder instruction book, Collins part number 523-0766464, will include the changes described in this service bulletin.

J. Test Equipment

No modifications to the specified test equipment is required to test the TDR-950 Transponder as a result of this modification.

2. Accomplishment Instructions

A. Modification Procedure

(1) Remove the transponder top and bottom covers to provide access to the circuit card.

(2) Locate old inductor L15 and remove (old L15 is located adjacent to L8; refer to partial component location diagram included in this bulletin).

(3) Position new L15 as shown in the partial component location diagram. Wrap one lead of new L15 around the grounded end of R71 and insert the other lead into the hole vacated by old L15. Ensure L15 is located as close as possible to R71 as shown in the illustration.

(4) Replace unit top and bottom covers and perform the test procedures included in paragraph C.

B. Identification Procedure

Use a knife to remove the number 8 on the modification plate and cover the spot with black ink.

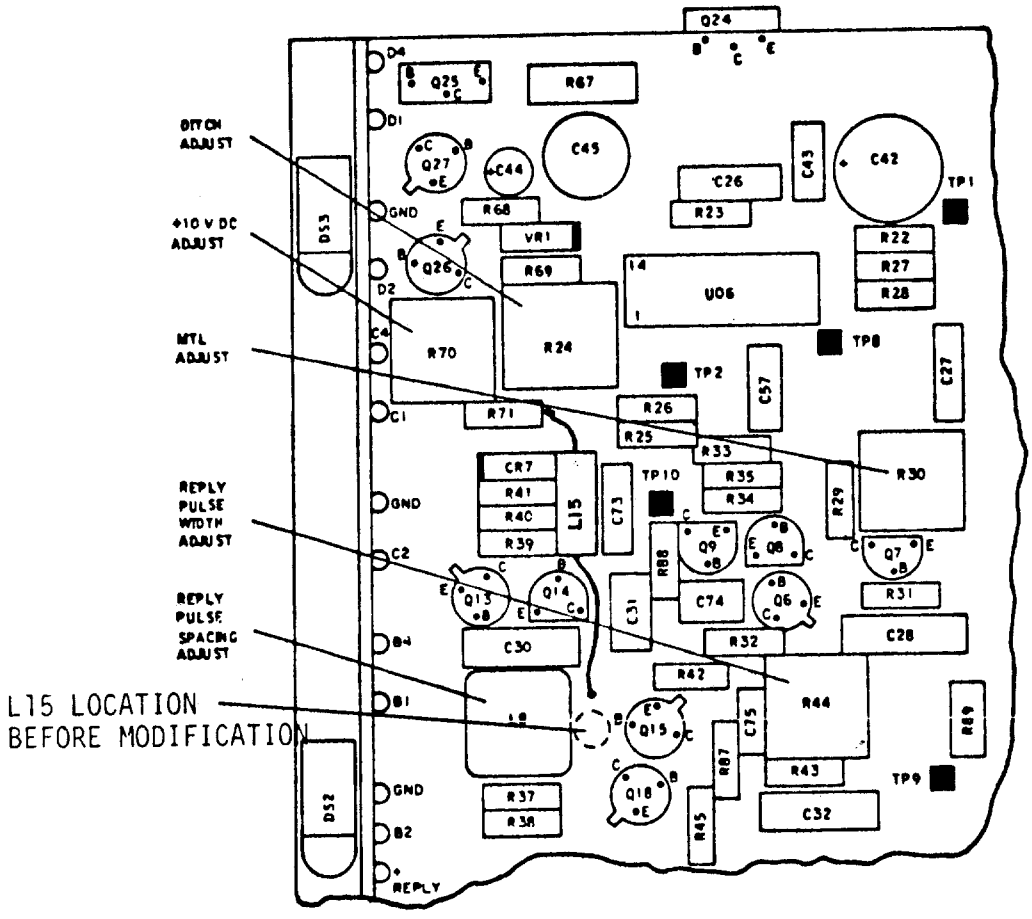
C. Testing Procedure

Refer to the TDR-950 instruction book maintenance section and perform the test procedures of paragraph 5.5.2.9 to ensure the unit is operating properly.

3. Material Information

The component required to modify one TDR-950 Transponder is listed below.

NEW COLLINS PART NUMBER	QTY	UNIT PRICE	DESCRIPTION	REPLACED COLLINS PART NUMBER
240-2747-320	1	$0.65	Inductor, 100 μh	240-2741-060



Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-159A
(Supersedes Service Information No. SI-159 dated 15 March 1979)
25 March 1980

AIRWORTHINESS DIRECTIVE - LITHIUM SULFUR DIOXIDE BATTERIES

MODELS AFFECTED: THE FOLLOWING THAT ARE EQUIPPED WITH AN EMERGENCY LOCATOR TRANSMITTER (ELT) POWERED BY LITHIUM SULFUR DIOXIDE BATTERIES:
MODELS 112 AND 112B, SERIAL NO'S 13000, 3 THRU 544, MODELS 112TC AND 112TCA, SERIAL NO'S 13001 THRU 13276, MODEL 114, SERIAL NO'S 14000 THRU 14442, MODELS 500, 500A, 500B, 500S, 500U, 520, 560, 560A, 560E, 560F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), 680T, 680V, 680W AND 720, SERIAL NO'S 1 THRU 1876, MODELS 500S, SERIAL NO'S 3050 THRU 3318, MODEL 681, SERIAL NO'S 6001 THRU 6072, MODEL 685, SERIAL NO'S 12000 THRU 12066, AND MODELS 690, 690A AND 690B, SERIAL NO'S 11001 THRU 11516.

NOTE

SOME OF THE FOLLOWING EMERGENCY LOCATOR TRANSMITTERS WERE DELIVERED FROM THE FACTORY WITH LITHIUM SULFUR DIOXIDE BATTERIES: SHARC 7A, SHARC 7H-1, SHARC 7K AND LARAGO MODEL 79007.

REASON FOR PUBLICATION: NOTIFICATION OF REVISION , DATED FEBRUARY 28, 1980, TO AIRWORTHINESS DIRECTIVE NO. 79-18-05 - LITHIUM SULFUR DIOXIDE BATTERIES.

COMPLIANCE: SEE REVISION, DATED FEBRUARY 28, 1980, TO AIRWORTHINESS DIRECTIVE NO. 79-18-05.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER AUTHORIZED SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: NONE.

PARTS DATA: NONE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with revision, dated February 28, 1980, to Airworthiness Directive No. 79-18-05 - Lithium Sulfur Dioxide Batteries.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-159A, dated 25 March 1980, entitled "Airworthiness Directive - Lithium Sulfur Dioxide Batteries" accomplished _____(date)_____.

February 28, 1980

AIRWORTHINESS DIRECTIVE REVISION

Title 14 - Aeronautics and Space
CHAPTER I - FEDERAL AVIATION ADMINISTRATION
DEPARTMENT OF TRANSPORTATION
(Docket No. 18734; Amdt. 39-3708)
Part 39 - AIRWORTHINESS DIRECTIVES
Lithium Sulfur Dioxide Batteries

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This amendment amends an existing airworthiness directive (AD), by extending the specified period of time in which aircraft, from which certain emergency locator transmitters (ELT's) have been removed, may continue to operate. The affected ELT's are those powered by lithium sulfur dioxide (LiSO2) batteries that do not meet prescribed performance safety requirements.

DATES: Effective - February 28, 1980. Compliance is required as indicated in body of AD.

FOR FURTHER INFORMATION CONTACT:

Mr. Adolfo O. Astorga, Systems Branch, Aircraft Engineering Division, Office of Airworthiness, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; Telephone (202) 426-8395.

SUPPLEMENTARY INFORMATION:

Amendment 39-3422 (44 FR 10980; February 26, 1979), AD 79-05-02, required removal of all LiSO2 batteries from U.S.-registered civil aircraft and the removal of all ELT's powered by LiSO2 batteries installed in U.S.-registered civil aircraft. It further provided that notwithstanding Section 91.52 of the Federal Aviation Regulations (FAR's), aircraft from which an ELT had been removed to comply with the AD would be permitted to operate for a specified period without the ELT. That AD was prompted by reports of LiSO2 batteries exploding, venting violently, corroding, burning, and leaking gas.

On August 23, 1979, the FAA issued a technical standard order (TSO-C97) which sets forth the minimum performance standards which must be met for TSO approval of LiSO2 batteries. This TSO, codified as FAR Section 37.209, was published in the FEDERAL REGISTER on August 27, 1979 (44 FR 50314).

The current AD (Amendment 39-3549, 44 FR 50321, August 27, 1979, AD 79-18-05), which superseded AD 79-05-02, requires removal from U.S.-registered civil aircraft of all LiSO2 batteries which do not meet the requirements of TSO-C97 and all ELT's powered by such batteries. It also requires that before March 28, 1980, in those aircraft from which ELT's were removed in accordance with the AD's, either that (1) LiSO2 batteries which meet the requirements of TSO-C97 be installed in the ELT and the ELT be reinstalled on the aircraft or (2) an approved ELT powered by a source other than LiSO2 batteries be installed in the aircraft. In either case, the ELT must meet the requirements of FAR Section 37.200. Further, the AD requires that this action be recorded in the aircraft records and that the "ELT NOT INSTALLED" placard be removed. Finally, the AD extends until March 28, 1980 the period in which an aircraft from which an ELT has been removed to comply with AD's 79-05-02 or 79-18-05 may be operated without the ELT required by FAR Sections 91.52(a) and (b). The date, March 28, 1980, was based on FAA estimates from information available as to the time required for battery testing and TSO authorization, and industry estimates of the time required for manufacture and distribution of new batteries that meet the standards of TSO-C97. However, AD 79-18-05 noted there was no certainty as to the date for commercial availability of qualified batteries.

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The first LiSO2 batteries to be qualified under TSO-C97 were manufactured by the Mallory Battery Company which received TSO authorization on December 27, 1979. As reported by that company, unforeseen delays were encountered in its qualification testing program. In view of that relatively late date, the FAA has been unable to disseminate earlier information on the availability of such batteries and retrofit kits in commercial quantities for ELT and other aircraft use. In addition, for various reasons including economic and technical factors, a number of ELT manufacturers, whose LiSO2 battery-powered ELT's were removed pursuant to the AD's, have planned retrofit with alkaline or magnesium rather than LiSO2 batteries. It is recognized that owners and operators of aircraft that were equipped with ELT's using LiSO2 batteries must look to the ELT or aircraft manufacturers and not to the battery manufacturers for approved replacement components.

To date, the only information received by the FAA concerning possible retrofit using approved LiSO2 batteries comes from Artex Aircraft Supplies, Inc., 24368 S. Skylane Drive, Canby, Oregon 97013. That company has informed the FAA that it plans to seek TSO approval for ELT's manufactured by Communications Components Corporation, Dorne & Margolin, and Pointer, using Mallory LiSO2 batteries. However, Artex does not have the specific information that would be needed at this time by operators to schedule retrofit of their aircraft.

Following is a summary of the current status of non-LiSO2 battery and replacement kit availability for the affected ELT's. These are discussed for each major ELT manufacturer as listed in AD 79-18-05. This summary is based on reports of the ELT manufacturers, verified to the extent possible by the FAA staff, which are a matter of public record and entered in the docket for this action.

Communications Components Corporation (CCC) advises that it has decided to make available only an alkaline battery as replacement for the LiSO2 battery in all ELT's manufactured by it. This course of action will require the ELT's to be requalified for TSO authorization. Several months will be required for the requalification and for production of necessary parts and batteries. It is estimated that sufficient battery replacement kits will be available by October 15, 1980 to permit all ELT's manufactured by CCC to be retrofited and reinstalled in their aircraft. Owners of aircraft that were equipped with CCC ELT equipment may contact the aircraft manufacturer's representative for information on replacement batteries.

Although the Cessna Aircraft Company and the Cessna ELT part numbers were listed in AD 79-18-05 among the manufacturers of LiSO2-powered ELT's whose products were affected by the AD, Cessna does not manufacture ELT's installed in its airplanes. Replacement battery availability for ELT's removed from Cessna airplanes may be determined by reference to the applicable ELT manufacturer.

Dorne and Margolin (D&M) advises of its decision to make available only an alkaline battery as replacement for the LiSO2 battery. The necessary TSO requalification of ELT with replacement battery has been completed and sufficient batteries will be produced to allow reinstallation of ELT's by the AD required date of March 28, 1980. Owners of Cessna airplanes with D&M equipment will require a Cessna P/N C589511-0118 retrofit kit and should contact a Cessna aircraft dealer for information as to its availability. Owners of other D&M-equipped aircraft will require P/N DM U103-4 and should contact the D&M dealer.

Garrett Manufacturing, Ltd. reports that it will not offer a replacement battery for its ELT's. That manufacturer states, however, that it is endeavoring to find a U.S. manufacturer to make replacement batteries. In view of this good faith effort of the manufacturer and in order to relieve the owners of Garrett equipped aircraft from the undue burden of obtaining new ELT's by March 28, 1980, an extension is being granted as discussed below. Owners of Garrett equipped aircraft should realize, however, that at the present time there is no known replacement battery under development and the owners should give consideration to reequipping their

aircraft with another ELT in order to continue operation after the cutoff date.

Leigh Systems Inc. advises that it will no longer be supplying parts or batteries for its ELT's. However, Artex Aircraft Supplies, Inc., at the address given above, has received TSO authorization for a 6-cell magnesium battery retrofit kit for Leigh ELT's previously powered by LiSO2 batteries. The kits will be available in sufficient supply to allow reinstallation of all Leigh ELT's by October 15, 1980. Information on retrofit kits is available from Artex.

FAA records indicate that Pathfinder Corporation is no longer in business. To the FAA's knowledge, no other ELT or battery manufacturer is developing replacement kits or batteries for Pathfinder ELT's. Accordingly, owners and operators of aircraft that were equipped with LiSO2 battery-powered Pathfinder ELT's will be required to install replacement ELT's as a condition for operation after the AD March 28, 1980 cutoff date.

Pointer, Inc. has received TSO authorization for its ELT's using replacement magnesium batteries. The company reports that the new batteries are in sufficient supply to allow the reinstallation of all Pointer-manufactured ELT's by March 28, 1980. These batteries are available through the avionics dealers and distributors currently used by Pointer.

Based on the information summarized above, the FAA has concluded that the great majority of LiSO2-powered ELT's removed from service under AD's 79-05-02 and 79-18-05 may be returned to service with qualified replacement batteries or battery kits without the necessity of replacing the ELT itself. Although there will be known delays for three makes in this category, replacements will be available for the rest in sufficient time to permit reinstallation of ELT's by March 28, 1980. For the relatively few remaining ELT's for which replacement batteries are not being developed, the owner/operators must install new ELT's and no purpose would be served by extending the March 28, 1980 date.

In the specific cases involving ELT's of CCC and Leigh, where replacement batteries or battery retrofit kits are being developed for the purpose of modifying existing ELT's, it is apparent that additional time will be required for battery production and distribution and for ELT requalification and reinstallation. For aircraft that were Garrett-equipped, in view of the Garrett situation discussed above, the FAA has determined that the operators should be accorded the same extended time for replacement that is being made available for CCC and Leigh ELT's where requalification and battery replacement programs are underway. The FAA has considered the burden that would be imposed on those owner/operators whose aircraft would be grounded or who would be required to purchase new ELT's in order to meet the March 28, 1980 date even though replacement batteries are expected to be available by a later date. Upon full consideration of the purpose for which ELT's are installed, and notwithstanding the statement in AD 79-18-05 that there would be no further extension, the FAA has concluded that additional time to bring existing ELT's into compliance in those cases is a reasonable alternative to grounding the aircraft or forcing purchase of new ELT's.

Statistics available to the FAA indicate that approximately 75,000 ELT's powered by LiSO2 batteries were affected by these AD actions. Of these, approximately 20,000 will be retrofitted with replacement batteries in time to meet the March 28, 1980 compliance date. For 3,000 others, there are no known battery replacement developments and new ELT's must be installed by March 28, 1980. The effect of this amendment is to extend the compliance date to October 15, 1980 for the approximately 52,000 other ELT's that are to be retrofitted with new batteries. Insofar as dollar costs are concerned, the battery retrofit for these 52,000 will total approximately $2,600,000 whereas installation of new ELT's would cost about $14,300,000. While dollar costs alone thus support battery retrofit, it should be further noted that replacement ELT's do not exist in sufficient quantity to meet the demand that would result if the compliance date were not extended and new ELT's had to be installed in all aircraft. The impact of grounded aircraft in this latter case is not

calculable but could be anticipated to be considerably in excess of the cost of the alternative chosen.

Since a situation exists that requires the immediate adoption of this regulation, it is found that notice and public procedure hereon are impracticable, and good cause exists for making this amendment effective in less than 30 days.

ADOPTION OF AMENDMENT

Accordingly, pursuant to the authority delegated to me by the Administrator (14 CFR 11.89), Sections 39.13 of Part 39 of the Federal Aviation Regulations, Amendment 39-3549 (44 FR 50321) is amended effective February 28, 1980, by amending paragraphs (c) and (e), by deleting the two paragraphs under the heading "Note" following paragraph (e), and by adding a new paragraph (f). As amended, the AD is set forth in its entirety as follows:

79-18-05 LITHIUM SULFUR DIOXIDE BATTERIES: Amendment 39-3549 as amended by Amendment 39-3708. Applies to all Lithium Sulfur Dioxide (LiSO2) batteries installed in aircraft or in equipment used in aircraft.

LiSO2 batteries have been used in, but not necessarily limited to, the following Emergency Locator Transmitters (ELT's):

Communications Components Corporation
Model CIR 10, all serial numbers Battery pack BP-60, BP-60A, BP-60B, and BP-60C.
Model CIR 11-2, all serial numbers Battery pack BP-60-11, BP-60-11A, BP-60-11B, and BP-60-11C.

Cessna Aircraft Co.
Part Number C589511-0103
Part Number C589510-0202
Part Number C589510-0209
Part Number C589510-0109

Dorne and Margolin, Inc.
Model DMELT 6 serial numbers 1 to 24,999 with battery pack DMELT 6.11, except those ELT's which have been modified by the change to battery pack DMELT 6.13.

Garrett Manufacturing Ltd.
Model No. 627-810 - all serial numbers
627-818 - all serial numbers
627-934 - all serial numbers
625-088 - all serial numbers
Battery part number
616-246-1
616-246-2

Leigh Systems, Inc.
Model SHARC 7 with a 3 or 4 cell battery pack. The ELT including battery weighs approximately 1.8 pounds.

Pathfinder Corporation
Model No. 2052

Pointer Inc.
Model 2000
Model 2000, Series Mod A
Model 3000, Series Mod A
Model 3000-2
LiSO2 battery pack - P/N 2018, P2018, M2018, 2018 HSP, and 2018 HSM.

Other aircraft equipments that have used LiSO2 batteries:

(1) Bendix RNAV Computer Model RNS3500 Control Display Unit CD-3501A.

(2) Emergency lighting, sliderafts, and flashlights.

Manufacturer's have not used LiSO2 batteries in the following ELT's. However, such batteries may have been substituted after manufacture.

Pacific Communication Corporation
Alert Model 50, 60, and 70

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Pacific Avionic Company, Inc.
Model ELT-1
DME Corporation
Model RLB-5 (A)
Model RLB-9 (A) and (B)
Micro Electronics, Inc.
Emergency Beacon Corporation
All models
LARAGO/MERL, Inc.
LARAGO 79007
MERL 1005
Dorne and Margolin
Model DMELT 6 serial no. 25,000 and above

Compliance is required as indicated, unless already accomplished.

To prevent fire, venting violently, explosion, corrosion, or leakage of gas associated with certain LiSO2 batteries, accomplish the following:

(a) Before further flight, remove all LiSO2 batteries which do not meet the requirements of TSO-C97 from U.S.-registered civil aircraft, including any installed in equipment used in such aircraft.

NOTE: This AD requires that LiSO2 batteries used in U.S.-registered civil aircraft meet the requirements of TSO-C97. LiSO2 batteries removed from equipment in accordance with AD 79-05-02 or this AD may be replaced by LiSO2 batteries which meet the requirements of TSO-C97 or another power source. However, in either case the equipment must meet all applicable requirements of the Federal Aviation Regulations.

(b) Before further flight, remove from U.S.-registered civil aircraft any ELT powered by LiSO2 batteries which do not meet the requirements of TSO-C97, and comply with the recordkeeping and placarding requirements of FAR Section 91.52(f)(10)(i).

(c) For any aircraft from which an ELT has been removed to comply with AD 79-05-02 or this AD, before March 28, 1980 (October 15, 1980 for ELT's specified in paragraph (f) of the AD) either -

(1) Install LiSO2 batteries which meet the requirements of TSO-C97 in the ELT and, provided the ELT meets the requirements of FAR Section 37.200, reinstall it in the aircraft; or

(2) Install in the aircraft an ELT which meets the requirements of FAR Section 37.200 which is powered by a source other than LiSO2 batteries.

(d) Upon installation of an ELT in accordance with paragraph (c) of this AD, record in the aircraft records the action taken, and remove the placard which states "ELT NOT INSTALLED."

(e) Notwithstanding FAR Section 91.52(f)(10)(ii), an aircraft from which an ELT has been removed in accordance with AD 79-05-02 or this AD, may operate without an ELT required by FAR Sections 91.52(a) and (b) until complying with paragraph (c) of this AD, but in no event later than March 28, 1980 (October 15, 1980 for ELT's specified in paragraph (f) of this AD).

(f) The later alternate compliance date specified in paragraphs (c) and (e) of this AD applies when a removed ELT was manufactured by:

(1) Communications Components Corporation
(2) Garrett Manufacturing Ltd; and
(3) Leigh Systems, Inc.

Amendment 39-3549 superseded Amendment 39-3422, AD 79-05-02.

Amendment 39-3549 became effective August 24, 1979.

This Amendment 39-3708 becomes effective February 28, 1980.

FOR FURTHER INFORMATION CONTACT:

Mr. Adolfo O. Astorga, Systems Branch, Aircraft Engineering Division, Office of Airworthiness, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; Telephone (202) 426-8395.

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Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-160
14 June 1979

EMERGENCY AIRWORTHINESS DIRECTIVE DATED JUNE 7, 1979
(Airborne Aviation Corporation Dry Air Pumps)

MODELS AFFECTED: MODELS 112 AND 112B, S/N's 13000 AND 3 THRU 544, MODELS 112TC AND 112TCA, S/N's 13001 THRU 13309, MODELS 114 AND 114A, S/N's 14000 THRU 14528 AND MODEL 700, S/N's 70004 THRU 70023.

NOTE NONE OF THE ABOVE LISTED AIRCRAFT LEFT THE FACTORY WITH THE DRY AIR PUMPS AFFECTED BY THIS EMERGENCY AIRWORTHINESS DIRECTIVE.

REASON FOR PUBLICATION: NOTIFICATION OF EMERGENCY AIRWORTHINESS DIRECTIVE.

COMPLIANCE: SEE EMERGENCY AIRWORTHINESS DIRECTIVE DATED JUNE 7, 1979.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: SEE EMERGENCY AIRWORTHINESS DIRECTIVE DATED JUNE 7, 1979.

ESTIMATED MAN HOURS: ONE (1) HOUR.

PARTS DATA: See Emergency Airworthiness Directive dated June 7, 1979.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Emergency Airworthiness Directive dated June 7, 1979.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: YES.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: NOT APPLICABLE.

EMERGENCY AIRWORTHINESS DIRECTIVE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FLIGHT STANDARDS SERVICE
FLIGHT STANDARDS NATIONAL FIELD OFFICE
P.O. BOX 25082
OKLAHOMA CITY, OKLAHOMA 73125

June 7, 1979

Pursuant to the authority of the Federal Aviation Act of 1958, delegated to me by the Administrator, the following Airworthiness Directive is issued and applicable to all aircraft equipped with Airborne Aviation Products Corporation dry air pumps. This directive is effective immediately upon receipt of this letter. Compliance required prior to next flight.

Action requires review of serial numbers of dry air pumps and removal of affected serial numbered pumps.

AIRBORNE AVIATION PRODUCTS CORPORATION: Applies to the below listed part number dry air pumps installed on piston engine aircraft certificated in all categories.

AIRBORNE PART NUMBER	SERIAL NUMBERS
211CC	5E9318 thru 5E9347 5E9407 thru 5E11419
211CC-9	5E616 thru 5E715
211CC TR	5E1264 thru 5E1406
212 CW	5E3403 thru 5E4197 5E9129E thru 5E9131E
212 CW-6	5E9 thru 5E25
242 CW-4	5E8 thru 5E11
441 CC	5E332 thru 5E401 5E450 thru 5E483
441 CC-7	5E911 thru 5E981
441 CC-9	5E75 thru 5E80
441 CC-11	5E4
441 CC-13	5E7 thru 5E12
441 CC-17	5E106 thru 5E116
442 CW	5E926 thru 5E1023
442 CW-4	5E137 thru 5E149
442 CW-6	5E765 thru 5E785
442 CW-8	5E114
442 CW-12	5E431 thru 5E435

These pumps were not available for installation before May 15, 1979, therefore dry air pumps installed previous to that date are exempt from this AD. Compliance is required prior to next flight. To preclude loss of vacuum source due

to possible pump bearing seizure, remove above listed dry air pumps from service and replace with an airworthy pump of the same part number. An airworthy pump is one which has a serial number not listed above or if listed above also has an "A" or "2" ink stamped by the manufacturer with black ink on the periphery of the body near the mounting flange. The aircraft may be flown, under day VFR conditions, in accordance with FAR 21.197 to a base where the corrective action can be performed.

Airborne Aviation Products Corporation Service Letter, Number 22A, dated June 5, 1979, applies to the subject matter of this AD.

FOR FURTHER INFORMATION CONTACT:

C.L. Smalley, Engineering and Manufacturing Branch, Flight Standards Division, AGL-213, Federal Aviation Administration, 2300 East Devon Avenue, Des Plaines, IL 60018, Telephone (312) 694-4500, Extension 379.

W.J. BARLOW
Acting Director, FAA Great Lakes Region

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-161
5 October 1979

BENDIX SERVICE BULLETIN NO. RS-68

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NO'S 13000 AND 3 THRU 544, MODELS 114 AND 114A, SERIAL NO'S 14000 THRU 14499, 14501 THRU 14512, 14515, 14516, 14518, 14520, 14521, 14523 THRU 14525, 14527 AND 14529 AND MODEL 700, SERIAL NO'S 70003 THRU 70007, 70009, 70011 THRU 70017, 70019 THRU 70023 AND 70028.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH BENDIX SERVICE BULLETIN NO. RS-68.

NOTE

FAA EMERGENCY AIRWORTHINESS DIRECTIVE DATED AUGUST 28, 1979 AND AVCO LYCOMING SERVICE BULLETIN NO. 442 PERTAIN TO THIS SUBJECT.

COMPLIANCE: SEE BENDIX SERVICE BULLETIN NO. RS-68.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER AUTHORIZED SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: SEE BENDIX SERVICE BULLETIN NO. RS-68.

ESTIMATED MAN HOURS: SEE BENDIX SERVICE BULLETIN NO. RS-68.

PARTS DATA: SEE BENDIX SERVICE BULLETIN NO. RS-68.

SPECIAL TOOLS: SEE BENDIX SERVICE BULLETIN NO. RS-68.

ACCOMPLISHMENT INSTRUCTIONS:

1. Remove cowling from engine as necessary to gain access to fuel injector.
2. Comply with Bendix Service Bulletin No. RS-68.
3. Reinstall engine cowling.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NO CHANGE REQUIRED TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Bendix Service Bulletin No. RS-68, dated 20 August 1979, entitled "Fuel Systems", accomplished (date) _____.

Bendix Energy Controls Division

South Bend, Indiana 46620, U.S.A.

Service Bulletin

Fuel Systems

Bulletin No.: RS-68

Date: 8/20/79

Revised: _____

Subject: INTEGRITY INSPECTION OF THE REGULATOR STEM NUT ON RSA-5/RSA-10 FUEL INJECTION UNITS

1. PLANNING INFORMATION:

NOTE: Compliance with this Bulletin must be accomplished on all injectors identified by listed parts lists if the letter "N" does not appear on the plug.

A. EFFECTIVITY:

Model No.	Parts List No.	
RSA-5AB1	2524199-9,	2524216-8
	2524254-7,	2524262-6
	2524378-7,	2524712-3,-5,-6
RSA-5AD1	2524054-7,-8	2524147-9,-10
	2524171-7,-8	2524189-7,-8
	2524213-7,-8	2524242-6,-7
	2524243-7,-8	2524291-7,-8
	2524297-6,-7	2524307-6,-7
	2524328-6,-7	2524341-6,-7
	2524348-7,-8	2524359-6,-7
	2524450-5,-6	2524459-5,-6
	2524475-4,-5	2524550-4,-5
	2524575-4,-5	2524590-4,-5
	2524592-4,-5	2524623-4,-5
	2524634-4,-5	2524640-4,-5
	2524673-4,-5	2524682-4,-5
	2524723-4,-5	2524742-4,-5
	2524752-3,-4	
RSA-10AD1	2524030-7,-8	2524152-6,-7
	2524163-10,-11	2524175-6,-7
	2524255-6,-7	2524256-8,-9
	2524311-6,-7	2524757-3,-4
RSA-10DB1	2524267-6,-7	2524275-11,-12
	2524276-7,-8	2524593-4,-5
	2524649-6,-7	
RSA-10DB2	2524501-5,-6	2524708-4,-5

ORIGINAL AS RECEIVED BY ATP

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1. PLANNING INFORMATION: (Continued)

RSA-10ED1	2524273-8,-9	2524298-8,-9
	2524366-6,-7	2524420-7,-8
	2524422-5,-6	2524477-7,-8
	2524491-5,-6	2524492-4,-5
	2524500-5,-6	2524556-5,-6
	2524582-4,-5	2524601-4,-5
	2524693-4,-5,-6,-7	2524709-3,-4
	2524733-3,-4	
RSA-10ED2	2524791-1,-2,-3	

B. REASON:

There have been instances in the field where the lock nut on the stem has become loose and caused cutoff of the fuel supply to the aircraft engine. The purpose of this Service Bulletin is to perform an inspection to assure that the lock nut is properly engaged and to provide additional locking means by crimping.

C. DESCRIPTION:

1. Inspect regulator stem end to verify that at least one and one-half full threads extend beyond the lock nut.

2. Crimp the threads of the regulator stem extending beyond the lock nut.

D. COMPLIANCE:

1. Operating Activities: Cutoff of fuel to the engine is a safety of flight condition. We therefore urge compliance at the earliest possible time.

2. Overhaul Activities: Comply immediately.

E. APPROVAL:

F. MANPOWER:

a. On engine 1.0 hour.

b. Off engine 2.5 hours.

c. Overhaul Facilities 2.0 hours.

G. MATERIALS:

N/A

H. TOOLING:

Crimping tool P/N 2550979 (See Figure 2 for local manufacture).
Adjusting wrench P/N 2550816 (See Figure 1 for local manufacture).

I. WEIGHT AND BALANCE:

N/A

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1. PLANNING INFORMATION: (Continued)

J. REFERENCES:

Figure 1, Adjusting wrench.
Figure 2, Crimping tool.
Figure 3, Regulator valve stem location.
Figure 4, Regulator valve stem thread location.

K. PUBLICATIONS AFFECTED:

Overhaul manuals for the following injectors:

1. RSA-5AB1 Form No. 15-419

2. RSA-5AD1 Form No. 15-381

3. RSA-10AD1 Form No. 15-433

4. RSA-10DB1 Form No. 15-471C

5. RSA-10DB2 Form No. 15-542

6. RSA-10ED1 Form No. 15-458D

2. ACCOMPLISHMENT INSTRUCTIONS:

Check the location of the fuel injector on the aircraft for accessibility.

a. If the injector is accessible, perform Steps 1 through 6 below;

b. If the injector is not accessible, remove the injector to a well lighted work bench and perform Steps 1 through 7 below;

c. The Model RSA-5AB1 with Automatic Mixture Control (AMC) attached must be removed from the engine. Disassemble the AMC from the injector using the following sequence:

(1) Remove safety wire from the two screws securing the AMC to the regulator body.

(2) Loosen and remove the screws.

(3) Remove AMC assembly and retain for reassembly.

(4) Perform Steps 1 through 7 below;

Step 1 Locate the brass plug (1 in. hex) on the injector regulator cover, Figure 3 (1).

Step 2 Remove lockwire and seal from brass plug.

Step 3 Remove brass plug and gasket, Figure 3 (1), (2).

2. ACCOMPLISHMENT INSTRUCTIONS: (Continued)

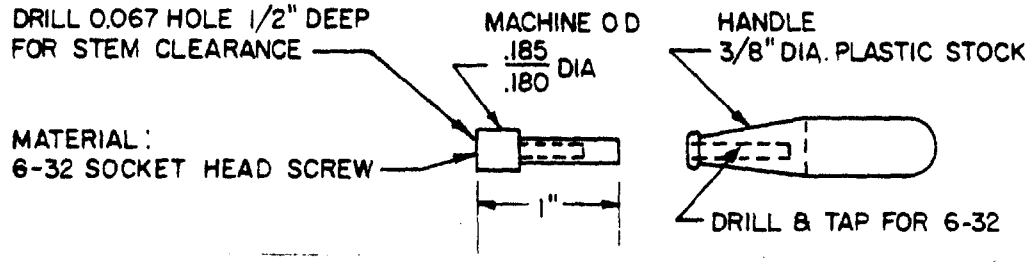

Figure 1. 2550816 Adjusting Wrench

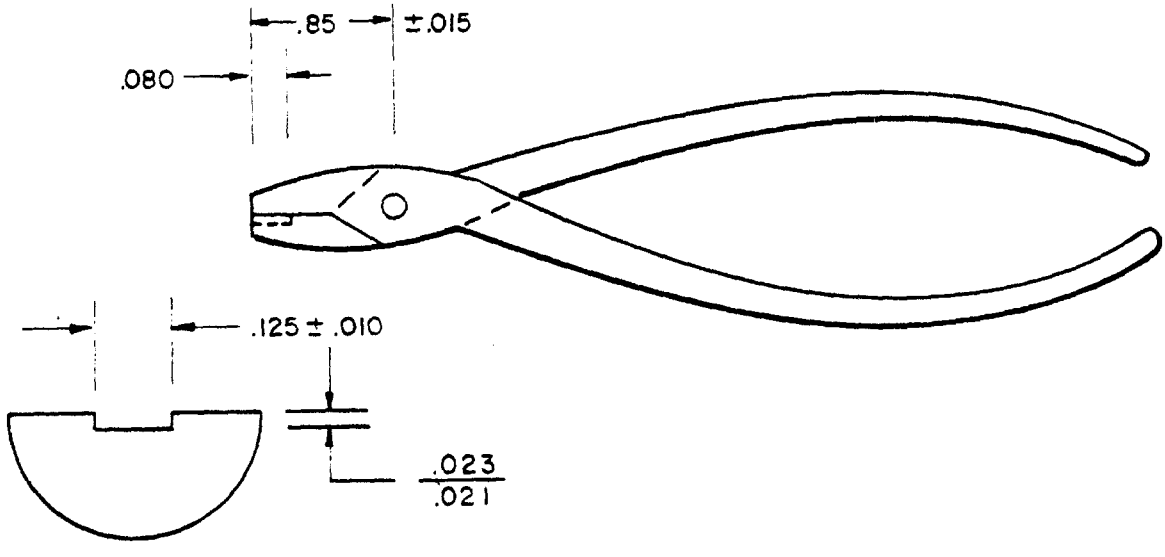

Figure 2. 2550979 Crimping Tool

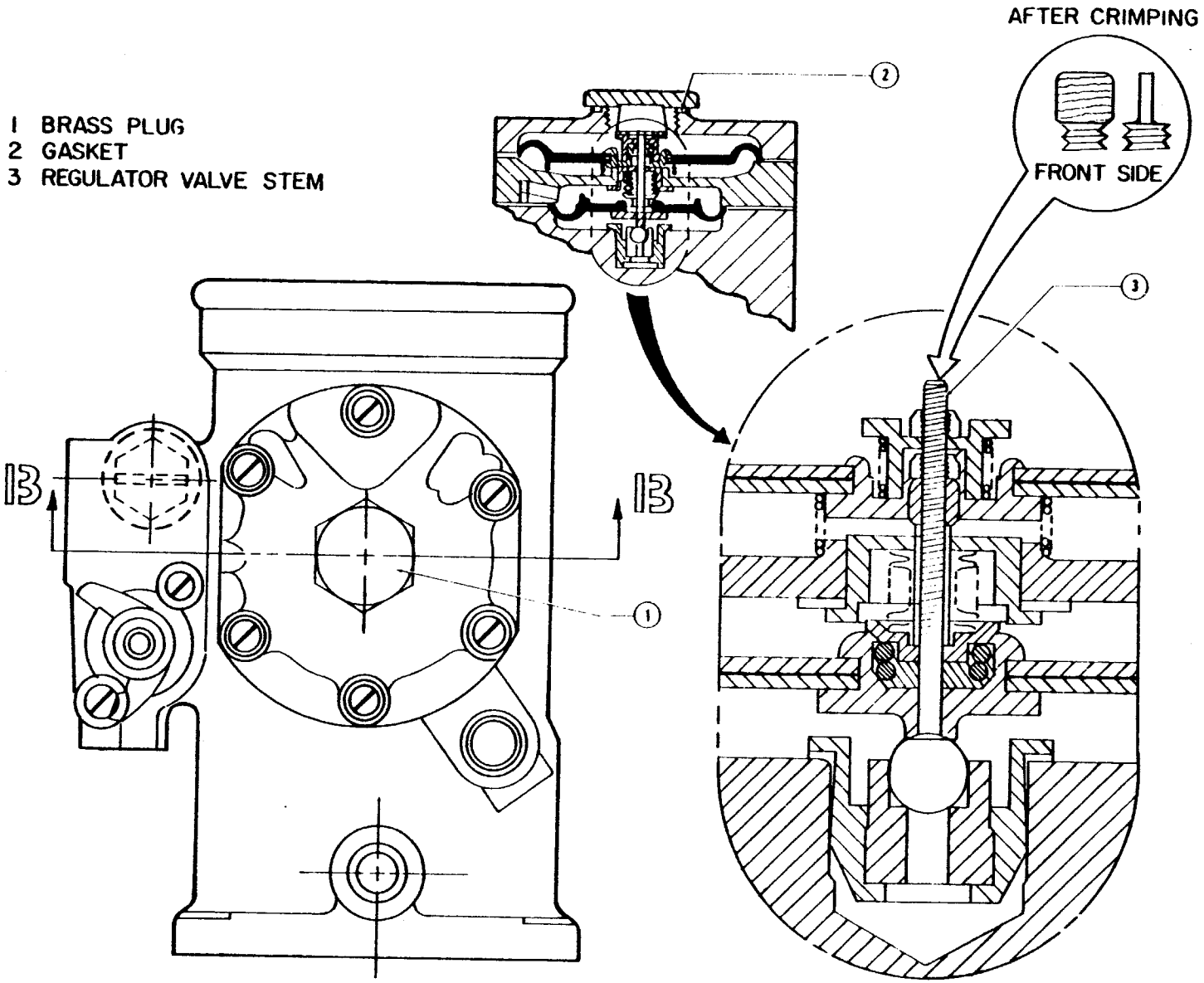

Figure 3. Regulator Valve Stem Location Model RSA-5/RSA-10

2. ACCOMPLISHMENT INSTRUCTIONS: (Continued)

Step 4 Using a 5X magnifying glass and necessary light inspect the end of the regulator stem to verify that not less than one and one-half full threads extend beyond the lock nut.

a. If less than one and one-half full threads are showing, injector must be sent to an overhaul facility for recalibration and compliance with this Service Bulletin.

CAUTION

If lock nut "bottoms out" prior to obtaining three full threads per following step b., injector is to be sent to an overhaul facility for recalibration and compliance with this Service Bulletin.

b. If one and one-half full threads or more are showing, adjust lock nut clockwise to obtain three full threads. Crimp end of stem, and inspect crimp per Figure 3. Adjust lock nut counter clockwise to its original position.

c. If three full threads or more are showing, crimp only, and inspect crimp per Figure 3.

Step 5 Reinstall gasket and brass plug in the injector. Torque plug to 40-50 pound-inches.

Step 6 Safety wire the plug to the injector and seal.

Step 7 If injector was removed from the aircraft, reinstall.

NOTE: For the Model RSA-5AB1 with an AMC, first reassemble the AMC on the injector using the following sequence;

a. Install two each screws and torque to 15-20 pound/inches.

b. Safety wire the two each screws.

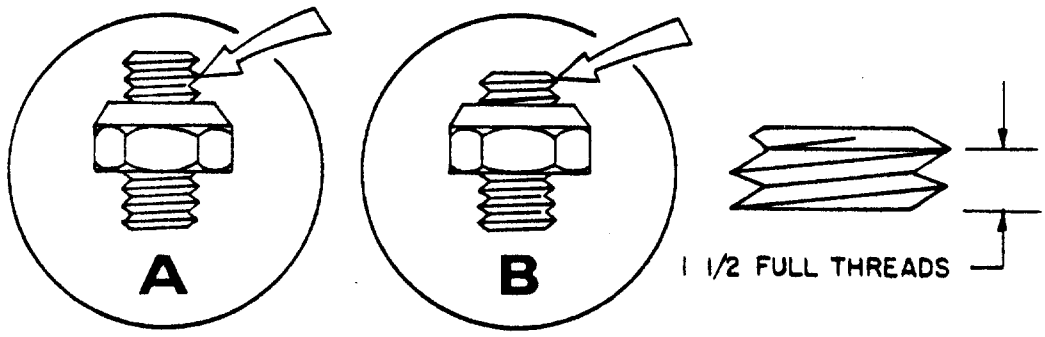

Figure 4. Regulator Valve Stem Thread Inspection

2. ACCOMPLISHMENT INSTRUCTIONS: (Continued)

c. Reinstall removed injector onto the engine.

L. IDENTIFICATION:

Identify inspected injectors by stamping the letter "N" on the head of the brass plug. The letter to be approximately 1/8" to 3/16" in height.

K. R. Dettweiler
Technical Support Manager

Bendix Energy Controls Division

South Bend, Indiana 46620, U.S.A.

Service Bulletin

Fuel Systems

Bulletin No.: RS-68
Amendment 1
Date: 8-29-79
Revised: _____

Subject: INTEGRITY INSPECTION OF THE REGULATOR STEM NUT ON RSA-5 AND RSA-10 FUEL INJECTOR UNITS.

This Amendment 1 to Service Bulletin RS-68 dated 8-20-79 is issued to clarify the following paragraph:

1. PLANNING INFORMATION:

F. MANPOWER:

(1) If the inspection can be accomplished on the aircraft, Bendix Energy Controls Division will allow 1.0 hour labor cost.

(2) If the fuel injector is inaccessible on the aircraft and must be removed from the aircraft's engine, Bendix Energy Controls Division will allow 2.5 hours labor cost for removal, inspection and installation on the aircraft's engine.

(3) If the fuel injector is rejected due to the inspection results described in Service Bulletin RS-68 dated 8-20-79 paragraph Step 4, a. and CAUTION:, the fuel injector must be sent to an overhaul facility. Bendix Energy Controls Division will allow 2.0 hours labor cost to the overhaul facility.

K. R. Dettweiler
Manager of Service

Bendix Energy Controls Division
South Bend, Indiana 46620, U.S.A.

Service Bulletin

Fuel Systems

Bulletin No.: RS-68
Amendment 2
Date: 9-6-79
Revised: _____

Subject: INTERGRITY INSPECTION OF THE REGULATOR STEM NUT ON RSA-5 AND RSA-10 FUEL INJECTOR UNITS.

1. PLANNING INFORMATION:

A. EFFECTIVITY:

NOTE: This supplement is to update the parts list covered by this Service Bulletin.

Model No.	Parts List No.
RSA-5ADI	2524145-8,-9

K.R. Dettweiler
Manager of Service

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-163
7 February 1980

AIRWORTHINESS DIRECTIVE 80-02-13 DATED JANUARY 17, 1980

MODELS AFFECTED: MODEL 112TC, SERIAL NO'S 13001 THRU 13108 AND MODEL 112TCA, SERIAL NO'S 13150 THRU 13195, 13250 THRU 13276 AND 13300 THRU 13309.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 80-02-13.

NOTE

LYCOMING SERVICE BULLETIN NO. 426 DATED AUGUST 11, 1978, PERTAINS TO THIS SUBJECT.

COMPLIANCE: PART I - UPON RECEIPT OF THIS SERVICE INFORMATION LETTER.

PART II - WITHIN 50-HOURS TIME IN SERVICE AFTER EFFECTIVE DATE OF AD 80-02-13 (January 22, 1980).

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST ROCKWELL COMMANDER AUTHORIZED SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: SEE LYCOMING SERVICE BULLETIN NO. 426.

ESTIMATED MAN HOURS: PART I - ONE (1) HOUR.
PART II - TWO (2) HOURS.

PARTS DATA: SEE LYCOMING SERVICE BULLETIN NO. 426.

SPECIAL TOOLS: SEE LYCOMING SERVICE BULLETIN NO. 426.

ACCOMPLISHMENT INSTRUCTIONS:

PART I

1. Review Engine Log Book for compliance of Lycoming Service Bulletin No. 426.
2. If Lycoming Service Bulletin No. 426 has been complied with, Part II of this Service Information is not required. Fill out and mail Compliance Card specifying that Lycoming Service Bulletin No. 426 has been accomplished.
3. If Lycoming Service Bulletin No. 426 has not been accomplished, comply with Part II of this Service Information within 50-hours time in service after effective date of AD 80-02-13 (January 22, 1980).

PART II

1. Remove upper cowling from engine.
2. Comply with Airworthiness Directive 80-02-13.
3. Reinstall engine cowling.
4. Fill out and mail Compliance Card specifying that Airworthiness Direction 80-02-13 has been accomplished.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NO CHANGE REQUIRED TO ROCKWELL INTERNATIONAL PUBLICATIONS.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Airworthiness Directive 80-02-13, dated January 17, 1980, accomplished____(date)_____.

AVCO LYCOMING

Airworthiness Directives

Volume I

80-02-13 AVCO LYCOMING: Amendment 39-3671. Applies to TO-360-C1A6D series engines serial numbers L-101-69A through L-264-69A except L-200-69A, L-246-69A and L-254-69A and all TO-360-C1A6D series engines overhauled (also known as remanufactured) by Lycoming prior to May 4, 1977.

Compliance required within the next 50 hours in service after the effective date of this AD, unless already accomplished.

To prevent possible loss of engine oil due to the failure of turbocharger oil drain flange P/N LW-14391, replace the turbocharger oil drain flange with oil drain flange P/N LW-16036 in accordance with AVCO Lycoming Service Bulletin No. 426 or FAA-approved equivalent.

Equivalent methods of compliance must be approved by the Chief, Engineering and Manufacturing Branch, Federal Aviation Administration, Eastern Region.

Upon submission of substantiating data by an owner or operator through an FAA Maintenance Inspector, the Chief, Engineering and Manufacturing Branch, FAA Eastern Region may adjust the compliance time specified in this AD.

This amendment is effective January 22, 1980.

AVCO LYCOMING DIVISION
WILLIAMSPORT, PENNSYLVANIA 17701

Service Bulletin

(L)

DATE: August 11, 1978

Service Bulletin No. 426
Engineering Aspects are
FAA (DER) Approved

SUBJECT: Turbocharger Oil Drain Flange Replacement

MODELS AFFECTED: TO-360-C1A6D serial numbers L-101-69A to L-264-69A inclusive except L-200-69A, L-246-69A and L-254-69A.

TIME OF COMPLIANCE: At the next scheduled inspection or earlier at owner's discretion.

A new turbocharger oil drain flange, constructed of steel, is currently being used on new and remanufactured engines to replace the earlier aluminum drain flanges. As a product improvement, the steel flange is now available for use on the engines listed above. It is recommended that owners procure the new flange for installation at an early opportune time.

1. Loosen turbocharger oil drain hose clamps.

2. Remove capscrews and washers securing drain flange to turbocharger center housing then remove the flange and gasket from the engine.

3. Install gasket P/N LW-14528 and drain flange P/N LW-16036 using two STD-1957 bolts and two STD-678 internal lockwashers (STD-33 plain washers are not required with steel drain flanges).

4. Torque the capscrew to 25 ft. lbs. and the drain hose clamps to 45 in. lbs.

5. Ground run engine and inspect for oil leaks. Record compliance with this Service Bulletin in the appropriate aircraft records.

PARTS DATA:

PART NO.	DESCRIPTION	QTY. REQD.
LW-14528	GASKET, Turbocharger drain flange	1
LW-16036	FLANGE, Turbocharger oil drain	1

19564, 20388 - These numbers for Avco Lycoming reference only.

Service Information

Rockwell International
General Aviation Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-165
4 June 1980

VOLCANIC ASH HAZARDS

MODELS AFFECTED: ALL ROCKWELL INTERNATIONAL MODELS.

REASON FOR PUBLICATION: TO PROVIDE MAINTENANCE AND INSPECTION RECOMMENDATIONS FOR AIRCRAFT EXPOSED TO VOLCANIC ASH.

COMPLIANCE: UPON EXPOSURE TO VOLCANIC ASH.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: NOT APPLICABLE.

ESTIMATED MAN HOURS: AS REQUIRED.

PARTS DATA: AS REQUIRED FOR ROUTINE MAINTENANCE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

The following are excerpts from AiResearch Phoenix Telex dated May 23, 1980:

Until such time as sufficient information is gathered to permit more accurate assessment of the immediate and long-term effects of operating the engine in an ash-laden environment - the following recommendations should be carefully considered - in addition to those outlined in your routine maintenance program.

Recommendations

1. Whenever possible - avoid operation in known volcanic ash-laden environment. Exposure to this foreign material in high concentrations or lesser concentration for prolonged periods is considered damaging to the engine and will likely result in increased cost of ownership.

2. If operation in ash-laden regions cannot be avoided - the following is recommended:

   a. Engine oil filters should be examined more frequently to insure that abnormal blockage is not occurring. Should an unusual amount of contaminate be observed in the filter, the filter and engine oil should be changed.

   b. If operation in ash-laden environment is fairly continual, the engine oil change interval should be shortened to:

      100 Hours for TPE331/TSE331
      150 Hours for TFE731

   c. Fuel system filter should be more frequently examined to insure that blockage is not occurring.

   d. Air filters in pneumatic circuits associated with the AiResearch and Bendix fuel control on Turbine Propulsion Engines /P3 filter/ should be examined and cleaned as required after each flight where ash was encountered.

   e. Use of thrust reversing should be avoided where possible on ash-coated runways.

   f. In ash fallout areas, inlet and exhaust covers should be installed as soon as engine cooling will permit. This is to avoid introduction of ash into the static engine.

NOTE

Detrimental effect on the engine from volcanic ash will be proportional to the concentration of the ash and the period of exposure.

Relaxation of these recommendations in favor of more typical, routine maintenance should be governed by experience. The rate at which erosion is occurring within the engine may be estimated by careful examination of fan/prop blade and compressor blade leading edges. Thinning, sharpening or roughening of these surfaces is indicative of accelerated erosion.

The following are excerpts from General Aviation Airworthiness Alerts AC No. 43-16:

1. Introduction. The purpose of this special alert is to provide safety information and recommended actions to preclude possible airworthiness problems associated with aircraft exposure to volcanic ash either in the atmosphere or on the ground. The following recommendations are based on the best available information at this time and will be amended as further information and facts are gathered.

2. Background. Volcanic ash from Mount St. Helens has been analyzed to contain abrasive and corrosive materials such as sulfuric acid and floride and chloride salts and acids. Depending on the location of the volcanic ash fallout, the particle sizes range from as small as .5 microns to 100 microns. Most aircraft screens will filter out material down to 15 microns but will pass particles that are smaller.

The ash will probably be encountered as a fine powder, like talcum powder, light grey in color. When dampened it has been reported to set similar to concrete. Due to adhesive action of the sulfuric acid, the acid tends to adhere to the interface between the particles and the aircraft structure causing corrosion. Although volcanic ash may not be visible on the structure, sulfuric acid may still exist causing corrosion and it is recommended that all aircraft that have been exposed to volcanic fallout be given a test to determine the acidity levels. This can be accomplished by the application of nitrazine paper available from many pharmacies. If the Ph factor is 4 or below, it is recommended that the following corrective actions be taken as soon as practicable.

3. Airframe.

(1) Safety precautions including safety glasses, gloves and protective clothing should be adhered to.

(2) Aircraft should be cleaned in the following sequence:

a. The aircraft manufacturer's maintenance manuals should be followed regarding the protection of aircraft systems during the cleaning process. The procedures recommended by the manufacturer for the inspection and cleaning or purging of pitot static systems, instruments systems, etc., should be followed.

b. If there is any volcanic ash coating on the aircraft structure, it should be removed by hand brushing, air or vacuum cleaning prior to performing any washing actions. If the aircraft is washed before removing ash, it will form a corrosive paste.

c. The aircraft should be thoroughly cleaned, inside and out, before washing.

d. The aircraft should be rinsed thoroughly with fresh water without scrubbing to ensure that all parts of the aircraft have been amply rinsed.

e. The aircraft should be given a test at the completion of each wash cycle to ensure a Ph factor of above 4. The Ph factor may be performed by taping nitrazine paper strips on various parts of the structure and wetting with distilled water.

f. It may be necessary to repeat the wash procedures on a continuous basis in areas where fallout continues. To ensure that the sulfuric acid is neutralized, complete the wash cycle using a petroleum base solvent.

g. It is recommended that regardless of the Ph factor, aircraft exposed to volcanic ash be given a water wash as assurance against corrosion.

h. Close inspection for external signs of damaged seals, especially landing gear and landing gear actuators.

4. Systems. For all aircraft exposed to volcanic ash on the ground or air, system checks should include inspection of pitot-static probes, static ports, air conditioning outflow valves and filters, generator cooling tubes and filters, vacuum lines and filters, and externally mounted sensors, such as long wire antenna, and angle-of-attack sensors, to remove any ash contamination. Precautionary inspection should be done on a random basis of electronic equipment subject to cooling air to assure need for equipment removal for removal of ash contamination.

5. Powerplant Considerations.

(1) General. As noted above the nature of the volcanic ash is that it is both abrasive (in the form of fine powder) and corrosive (in the form of acid content). Both turbine engines and reciprocating engines may be affected. Compressor and turbine blades suffer erosion by abrasive particle impact. Lubrication and other fluid systems are subject to contamination by solids and chemicals, while moving parts are subject to abrasive wear.

The abrasive nature of the material causes rapid mechanical damage to moving parts. Experience has shown that engines operated with oil contaminated with the ash has caused them to fail in as few as 20 hours after exposure.

The acids associated with the ash are soluble in oils and as such attack engine parts resulting in rapid deterioration. Engines can also be attacked externally by the corrosive action.

(2) Maintenance. Engines which have been operated or subjected to a volcanic ash fallout need:

a. Thorough external cleaning.

b. Cleaning or changing of all oil, fuel, and other systems screens and/or filters and draining all sumps. Flushing and cleaning of contaminated fluid systems should be accomplished following the engine manufacturer's recommended procedures.

c. Cleaning and scavenging of any open tanks where the ash or chemical action could collect and concentrate.

d. Oil and fluid draining and change.

e. Close inspection for external signs of damaged seals.

f. Cleaning and inspection of accessories and components for contamination such as vacuum filters and regulators.

g. Following cleaning, inspection, and fluid changes the proper operation of the engine should be verified by run-up. Frequent oil and fluid changes should be scheduled. During subsequent operation temperatures and pressures should be monitored closely for changes which may signal problems.

h. Spectrographic oil analysis is an indicator of engine wear and contamination. Comparison of analysis of early samples after cleaning with previous analysis reports can serve as an indicator of an engine's stability.

6. Recurrent Inspections. Aircraft owners and operators are urged to closely monitor aircraft and engines, including systems, on a continuing basis and take action as deemed necessary for aircraft exposed to volcanic ash as assurance against corrosion.

May 21, 1980

Flight into volcanic ash can damage windshields and side windows by pitting due to sand blasting effect.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: The Airplane Maintenance Manual changes required by this document will be incorporated at a future date.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-165, dated 4 June 1980, entitled "Volcanic Ash Hazards", accomplished (date).

Service Information

Gulfstream American
CORPORATION
Commander Division
5001 North Rockwell Avenue
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-175B
(Supersedes Service Information No. SI-175 and SI-175A in their entirety)
29 June 1982

AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 3 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14000 THRU 14540.
MODEL 500, SERIAL NOS. 618 THRU 852.
MODELS 500B, 500U AND 500S, SERIAL NOS. 893 THRU 1876.
MODEL 500S, SERIAL NOS. 3050 THRU 3323.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395.

COMPLIANCE: REFER TO AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395.

ESTIMATED MAN HOURS: REFER TO AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395.

PARTS DATA: REFER TO AIRWORTHINESS DIRECTIVE 81-18-04, AMENDMENT 39-4395.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 81-18-04, Amendment 39-4395.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Airworthiness Directive 81-18-04, Amendment 39-4395, effective June 7, 1982, accomplished _____(date)_____.

Title 14 - Aeronautics and Space

CHAPTER I - FEDERAL AVIATION ADMINISTRATION
DEPARTMENT OF TRANSPORTATION

(Docket No. 82-ANE-14; Amdt. 39-4395)

PART 39 - AIRWORTHINESS DIRECTIVES

Avco Lycoming Williamsport Division
Reciprocating Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: This amendment amends an existing Airworthiness Directive (AD), applicable to various Avco Lycoming model reciprocating engines which requires replacement of the sintered iron impellers in the oil pump, by providing clarification changes.

DATES: Effective June 7, 1982.

Comments on the rule must be received on or before July 7, 1982.

Compliance schedule as prescribed in body of the AD.

ADDRESSES: The applicable service bulletins specified in the AD may be obtained from Avco Lycoming Williamsport Division, Williamsport, Pennsylvania 17701, or may be examined at the FAA, New York Aircraft Certification Office, Federal Building, JFK International Airport, Jamaica, New York 11430. A copy of each of the service bulletins is contained in the Rules Docket, Federal Aviation Administration, Office of the Regional Counsel, 12 New England Executive Park, Burlington, Massachusetts 01803.

FOR FURTHER INFORMATION CONTACT:

Mr. I. Mankuta, Propulsion Section, ANE-174, New York Aircraft Certification Office, Federal Building, JFK International Airport, Jamaica, New York 11430; telephone: (212) 995-2894.

SUPPLEMENTARY INFORMATION: Many inquiries were received on AD 81-18-04R1, Amendment 39-4199 as amended by Amendment 39-4258,

requesting assistance in determining if a specific engine had the suspect oil pump parts. This was due to the number of modifications to which oil pumps were subjected to in the past resulting from compliance with Lycoming service publications and parts replaced during overhaul and remanufacture. Current service bulletins do not include sufficient details to enable owners to readily determine if their engine has a suspect oil pump. Therefore, additional clarifying information is being included in this amendment. There are no procedural or compliance changes to the context of the AD.

Since this amendment provides clarification only, and imposes no additional burden on any person, notice and public procedure is impracticable and good cause exists for making this amendment effective in less than 30 days.

INDEX TERMS: Engines, Air transportation, Aircraft, Aviation safety, Safety.

REQUEST FOR COMMENTS ON THE RULE

Although this action is in the form of a final rule which was not preceded by notice and public procedure, comments are invited on the rule. When the comment period ends, the FAA will use the comments submitted, together with other available information, to review the regulation. After the review, if the FAA finds that changes are appropriate, it will initiate rulemaking proceedings to amend the regulation.

Comments that provide the factual basis supporting the views and suggestions presented are particularly helpful in evaluating the effects of the AD and determining whether additional rulemaking is needed. Comments are specifically invited on the overall regulatory, economic, environmental, and energy aspects of the rule that might suggest a need to modify the rule.

ADOPTION OF THE AMENDMENT

Accordingly, pursuant to the authority delegated to me by the Administrator, Section 39.13 of Part 39 of the Federal Aviation Regulations, 14 CFR 39.13 is amended by further amending Amendment 39-4199, as amended by Amendment 39-4258, AD 81-18-04R1, as follows:

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FLIGHT STANDARDS NATIONAL FIELD OFFICE
P. O. BOX 25082
OKLAHOMA CITY, OKLAHOMA 73125

May 28, 1982

Airworthiness Directive
Revision

The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Federal Aviation Regulations Part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety. They are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (FAR 39.3)

81-18-04 R2 AVCO LYCOMING: Amendment 39-4199 as amended by Amendment 39-4258 is further amended by Amendment 39-4395. Applicability: All O-235, O-290-D, -D2, O-320, IO-320, AIO-320, AEIO-320, LIO-320, O-340, O-360, IO-360, AIO-360, AEIO-360, HO-360, HIO-360, LO-360, LIO-360, TIO-360, TO-360, LTO-360, VO-360, IVO-360, O-540 and IO-540 series engines, except for the following: O-320-H2AD, O-360-E1A6D, LO-360-E1A6D, TO-360-E1A6D, LTO-360-E1A6D, IO-540-P1A5, IO-540-R1A5, IO-540-S1A5 and; O-540/IO-540 series engines built with large capacity oil pumps and dual magnetos designated with "5D" in the model suffix (Example: IO-540-K1A5D).

Compliance required as indicated unless already accomplished.

To prevent failure of engine oil pumps which incorporate sintered iron impellers, accomplish the following:

(a) Compliance is required within the next 25 hours in service after the effective date of this AD for all Lycoming HIO-360-D1A, -E1AD, -E1BD and -F1AD up to and including serial number L-22579-51A except the following: L-22311-51A thru L-22313-51A, L-22396-51A, L-22397-51A, L-22416-51A, L-22546-51A thru L-22549-51A, L-22563-51A, L-22568-51A thru L-22571-51A, and in addition all of the above engines that were overhauled in the field prior to April 1, 1981; all remanufactured engines of the above model shipped prior to April 1, 1981, regardless of serial numbers.

(1) Replace the oil pump driven impeller and shaft with hardened steel impeller and shaft P/N LW-18110 and replace the driving impeller with impeller P/N LW-18109 in accordance with the instructions set forth in AVCO Lycoming Service Bulletin No. 454 dated April 10, 1981, or approved alternate method, unless it can be established that a sintered iron impeller is not installed (see NOTE below).

(b) Compliance is required within the next 25 hours in service after the effective date of this AD for: Lycoming models O-360-A1LD S/Ns L-17555-36A through L-22462-36A, O-360-A1F6D S/Ns L-16685-36A through L-22582-36A, O-360-A5AD S/Ns L-17057-36A through L-20038-36A, IO-360-A1B6D/-A3B6D S/Ns L-9598-51A through L-16595-51A, L-17273-51A, L-17312-51A through L-17319-51A, L-17321-51A, L-17336-51A through L-17340-51A, L-17347-51A through L-17351-51A, L-17355-51A, L-17358-51A, L-17377-51A through L-17380-51A, IO-360-C1E6D, S/N L-14527-51A, TO-360-C1A6D S/Ns L-101-69A through L-243-69A, and in addition, all of the above model engines which were overhauled in the field between April 7, 1970, and October 15, 1976, regardless of serial numbers; and all of the above model engines which were remanufactured and shipped before April 1, 1981, regardless of serial numbers.

(1) Replace the existing drive and driven impellers with a steel driving impeller P/N 60746 and an aluminum impeller and shaft assembly P/N LW-13775 in accordance with AVCO Lycoming Service Bulletin No. 455A dated April 24, 1981, or approved alternate, unless it can be established that a sintered iron impeller is not installed. (See NOTE below.)

(c) For all other engines in the subject Applicability paragraph not specifically listed in Paragraphs (a) and (b) above, comply with Avco Lycoming Service Bulletin No. 456 dated August 21, 1981, or FAA approved revision or alternate, at 2000 hours since new or since last overhaul, whichever is

later, or whenever the accessory section is removed. Those engines which have accrued 2000 hours or more on the effective date of this AD must comply within the next 100 hours in service. Compliance is required as described herein unless it can be established that a sintered iron impeller is not installed. (See NOTE below.)

Alternate methods of compliance must be approved by the Chief, New York Aircraft Certification Office. Upon submission of substantiating data by an owner or operator through an FAA maintenance inspector, the Chief, New York Aircraft Certification Office may adjust the compliance time specified in this AD.

In accordance with FAR 21.197 and 21.199, the aircraft may be flown to a location where the alterations required by this AD can be performed.

NOTE: Engines originally manufactured prior to 1970 did not incorporate sintered iron impellers. For these engines, reference should be made to engine maintenance/overhaul logbook records, Lycoming build records, and pertinent Service Bulletins. Service Bulletin Nos. 381C and 385C describe a method to determine if the early design oil pump with aluminum/steel impellers is installed. Aluminum/steel impellers do not require replacement.

Amendment 39-4199 became effective September 14, 1981.
Amendment 39-4258 became effective November 19, 1981.
This amendment 39-4395 becomes effective June 7, 1982.

FOR FURTHER INFORMATION CONTACT:

I. Mankuta, Propulsion Section, ANE-174, New York Aircraft Certification Office, Federal Building, JFK International Airport, Jamaica, New York 11430; telephone (212) 995-2894.

Service Information

Gulfstream American
CORPORATION
Commander Division
5001 North Rockwell Avenue,
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-184
16 July 1982

AIRWORTHINESS DIRECTIVE 82-11-05, AMENDMENT 39-4389
(Bendix Engine Products Division D-2000 and D-2200 Series Magnetos)

MODELS AFFECTED: MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14001 THRU 14540.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 82-11-05, AMENDMENT 39-4389.

COMPLIANCE: REFER TO AIRWORTHINESS DIRECTIVE 82-11-05, AMENDMENT 39-4389.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AIRWORTHINESS DIRECTIVE 82-11-05, AMENDMENT 39-4389.

ESTIMATED MAN HOURS: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 617.

PARTS DATA: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 617.

SPECIAL TOOLS: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 617.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 82-11-05, Amendment 39-4389.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: Refer to Bendix Engine Products Division Service Bulletin No. 617.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Airworthiness Directive 82-11-05, Amendment 39-4389, effective June 9, 1982, accomplished ____(date)____.

82-11-05 BENDIX: Amendment 39-4389. Applies to Bendix Engine Products Division D-2000 and D-2200 series magnetos with serial numbers below 35480 (red identification plate) and with serial numbers below 8122106 (blue identification plate), unless identified with an "X" in the upper left corner of the identification plate.

Compliance required as indicated, unless already accomplished.

To reduce the possibility of engine power loss and engine damage resulting from looseness of the distributor gear electrode, accomplish Paragraphs (a) and (b):

(a) Comply with the inspection requirements specified in the "Detailed Instructions" of Bendix Service Bulletin No. 617, dated November 1981, or later FAA-approved revision in accordance with the following schedule:

Magneto Time In Service Since New or Overhaul	Accomplish
Less than 500 hours	Within the next 50 hours in service and every 100 hours in service thereafter up to 550 hours in service.
500 hours or more	Within the next 50 hours in service.

(b) Magnetos with 1900 hours or more in service since new or overhaul: Within the next 100 hours time in service, replace distributor gear assembly with new serviceable gear assembly in accordance with Bendix Service Bulletin No. 617, dated November 1981, or later FAA approved revision.

(c) If the distributor block is contaminated with brass filings or bronze colored dust, inspect the engine as follows:

(1) Observe engine pistons through spark plug hole for evidence of burning.

(2) Check valve dry tappet clearance per engine manufacturer's instructions.

If piston damage, or lower than specified dry tappet clearance, is present, the engine must be inspected in accordance with the engine manufacturer's instructions for continued airworthiness.

Equivalent means of compliance may be approved by the Chief of the New York Aircraft Certification Office, ANE-170, Federal Aviation Administration (FAA), New England Aircraft Certification Division, Federal Building, JFK International Airport, Jamaica, New York 11430. As permitted by FAR 21.197, aircraft may be flown to a base where maintenance required by this AD can be accomplished.

This AD is effective June 9, 1982.

FOR FURTHER INFORMATION CONTACT:

Mr. A.T. Farrar, Propulsion Section, ANE-174, New York Aircraft Certification Office, Federal Building, JFK International Airport, Jamaica, New York 11430; telephone (212) 995-2894.

Service Information

Gulfstream American
CORPORATION
Commander Division
5001 North Rockwell Avenue,
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-185
16 July 1982

AIRWORTHINESS DIRECTIVE 82-13-01, AMENDMENT 39-4405
(Bendix Engine Products Division S-1200 Series Magnetos)

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 126 THRU 544.
MODEL 500S, SERIAL NOS. 1755 THRU 1876 AND 3050 THRU 3323.
MODEL 500U, SERIAL NOS. 1664 THRU 1780.
MODELS 680FL AND 680FL(P), SERIAL NOS. 1661 THRU 1854.
MODEL 685, SERIAL NOS. 12000 THRU 12066.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 82-13-01, AMENDMENT 39-4405.

COMPLIANCE: REFER TO AIRWORTHINESS DIRECTIVE 82-13-01, AMENDMENT 39-4405.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AIRWORTHINESS DIRECTIVE 82-13-01, AMENDMENT 39-4405.

ESTIMATED MAN HOURS: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 613.

PARTS DATA: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 613.

SPECIAL TOOLS: REFER TO BENDIX ENGINE PRODUCTS DIVISION SERVICE BULLETIN NO. 613.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 82-13-01, Amendment 39-4405.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: Refer to Bendix Engine Products Division Service Bulletin No. 613.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Airworthiness Directive 82-13-01, Amendment 39-4405, effective June 28, 1982, accomplished ___(date)___.

BENDIX

Airworthiness Directive

Volume I & II

82-13-01 BENDIX: Amendment 39-4405. Applies to Bendix Engine Products Division's S-1200 series magnetos which have green distributor blocks and do not have the letter "R" metal stamped on the identification plate as described under "Identification" in Bendix Service Bulletin No. 613.

Compliance required as indicated unless already accomplished.

To reduce the possibility of magneto and engine malfunction resulting from loose distributor block bushings, accomplish the following:

(a) Comply with the inspection, replacement, and identification procedures outlined under "Detailed Instructions" shown in Bendix Service Bulletin No. 613, dated April 1981, or later approved revisions in accordance with the following schedule:

Magneto Time in Service Since New or Overhaul	Accomplish
Less than 1000 hours	Inspect within the next 25 hours in service and every 25 hours in service thereafter, unless replaced with new "Gripper Bushing" distributor block.
1000 hours or more but less service than 1900 hours	Inspect within the next 100 hours in service unless replaced with new "Gripper Bushing" distributor block.
1900 hours or more	Replace the distributor block with new "Gripper Bushing" distributor block within the next 100 hours in service.

Any distributor block discovered having a loose bushing must be replaced before further flight.

(b) If compliance with Paragraph (a) reveals the distributor block to be contaminated with brass filings or bronze colored dust, inspect the engine as follows:

(1) Observe engine pistons through spark plug holes for evidence of burning.

(2) Check valve dry tappet clearance per engine manufacturer's instructions.

If piston damage or lower than specified dry tappet clearance is present, the engine must be inspected and maintained in accordance with the engine manufacturer's instructions for continued airworthiness.

Make an engine log entry of each compliance with Paragraph (a) including the magneto serial number.

Equivalent means of compliance may be approved by the Chief of the New York Aircraft Certification Office, ANE-170, Federal Aviation Administration (FAA), New England Aircraft Certification Division, Federal Building, JFK International Airport, Jamaica, New York 11430. As permitted by FAR 21.197, aircraft may be flown to a base where maintenance required by this AD can be accomplished.

This amendment becomes effective June 28, 1982.

FOR FURTHER INFORMATION CONTACT:

Mr. Alfred T. Farrar, Propulsion Section, ANE-174, New York Aircraft Certification Office, Federal Building, JFK International Airport, Jamaica, New York 11430; telephone (212) 995-2894.

Service Information

Gulfstream American
CORPORATION
Commander Division
5001 North Rockwell Avenue,
Bethany, Oklahoma 73008

SERVICE INFORMATION NO. SI-186
23 September 1982

AIRWORTHINESS DIRECTIVE 82-20-01

(Bendix Engine Products Division Magnetos)

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 3 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14000 THRU 14540.
MODELS 500, 500A, 500B, 500U, 520, 560, 560A, 560E, 560F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), AND 720, SERIAL NOS. 1 THRU 1876.
MODEL 500S, SERIAL NOS. 1755 THRU 1876 AND 3050 THRU 3323.
MODEL 685, SERIAL NOS. 12000 THRU 12066.
MODEL 700, SERIAL NOS. 70001 THRU 70032.

NOTE

IF THE AIRPLANE IS NOT EQUIPPED WITH MAGNETOS LISTED IN AD 82-20-01, DISREGARD THIS SERVICE INFORMATION.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 82-20-01.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SERVICENTER.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AIRWORTHINESS DIRECTIVE 82-20-01.

ESTIMATED MAN HOURS: REFER TO AIRWORTHINESS DIRECTIVE 82-20-01.

PARTS DATA: REFER TO AIRWORTHINESS DIRECTIVE 82-20-01.

SPECIAL TOOLS: REFER TO AIRWORTHINESS DIRECTIVE 82-20-01.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 82-20-01.

2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-186, dated 23 September 1982, entitled "Airworthiness Directive 82-20-01", accomplished _____(date)_____.

SERVICE INFORMATION NO. SI-186

AIRWORTHINESS DIRECTIVE 82-20-01

AERONAUTICAL CENTER
AFO-510

EMERGENCY DISTRIBUTION BY PRIORITY MAIL IS REQUESTED.

THIS EMERGENCY AIRWORTHINESS DIRECTIVE (AD) IS APPLICABLE TO OPERATORS AND OWNERS OF AIRCRAFT EQUIPPED WITH BENDIX MAGNETOS OF TYPE DESIGNATION IDENTIFIED BELOW.

ENGINE STOPPAGE, ATTRIBUTED TO FAILURE OF THE MAGNETO IMPULSE COUPLING, HAS OCCURRED IN TWO AIRCRAFT (LESS THAN 200 HOURS OPERATING TIME). IT WAS FOUND THAT THE IMPULSE COUPLING FLYWEIGHTS HAD BEEN IMPROPERLY HEAT TREATED (SOFT) AND HAD WORN RAPIDLY AND JAMMED. IT IS BELIEVED THIS DAMAGED THE ENGINE ACCESSORY DRIVE RESULTING IN ENGINE FAILURE. PURSUANT TO THE AUTHORITY OF THE FEDERAL AVIATION ACT OF 1958, DELEGATED TO ME BY THE ADMINISTRATOR, THE FOLLOWING AD IS EFFECTIVE IMMEDIATELY UPON RECEIPT.

BENDIX: APPLIES TO ALL BENDIX MAGNETOS WITH TYPE DESIGNATIONS AS FOLLOWS: S4LN-21/1225/1227, S4RN-21/1225/1227, S6LN-21/23/25/1225/1227, S6RN-21/23/25/1225/1227, S4LN-200 P/N 10-163005-7, D-2021/2031, ALL D-3000; EXCEPT BENDIX BLUE LABEL IMPULSE COUPLED MAGNETOS SERIAL NUMBER 8236001 AND ABOVE AND; EXCEPT BENDIX RED LABEL IMPULSE COUPLED MAGNETOS WITH THE FOLLOWING SERIAL NUMBERS AND ABOVE:

S-20 SERIES: B-001171 OR A297043

S-200 SERIES: B-001732 OR A297043

S-1200 SERIES: B-001162 OR A297043

D-2000 SERIES: 35550

D-3000 SERIES: B-000249 OR 5806

COMPLIANCE REQUIRED WITHIN NEXT 10 HOURS OF ENGINE OPERATION UNLESS ALREADY ACCOMPLISHED FOR ALL AFFECTED IMPULSE COUPLINGS HAVING LESS THAN 300 OPERATING HOURS.

TO PREVENT FAILURE OF IMPULSE COUPLING DUE TO IMPROPERLY HEAT TREATED (SOFT) FLYWEIGHTS RESULTING IN ENGINE DAMAGE OR FAILURE, ACCOMPLISH THE FOLLOWING: (REF. BENDIX SERVICE BULLEIN NO. 623 DATED SEPTEMBER 1982.)

NOTE – THE MAGNETO SHOULD BE REMOVED FROM THE ENGINE ONLY TO THE EXTENT NECESSARY TO PERFORM THE INSPECTION DESCRIBED HEREIN. DEPENDING ON THE ENGINE APPLICATION, IT MAY NOT BE NECESSARY TO REMOVE THE HARNESS FROM THE MAGNETO FOR THE INSPECTION PROCEDURE.

NOTE – ALL MAGNETOS WITH THE IMPULSE COUPLING RECESSED INTO THE MAGNETO FLANGE MUST HAVE THE IMPULSE COUPLING REMOVED FROM THE MAGNETO TO PERFORM THE INSPECTION. THIS IS A BENCH OPERATION AND WILL REQUIRE THE MAGNETO TO BE COMPLETELY REMOVED FROM THE ENGINE AND THE HARNESS REMOVED FROM THE MAGNETO.

NOTE – WHENEVER AN IMPULSE COUPLING IS REMOVED FROM A MAGNETO, IT MUST BE REMOVED FOLLOWING MANUFACTURER'S PUBLISHED PROCEDURES, PAYING STRICT ATTENTION TO NOTES AND CONDITIONS. UPON REASSEMBLY, THE CASTELLATED NUT SECURING THE IMPULSE COUPLING TO THE DRIVE SHAFT MUST BE TORQUED TO 18-28 FT. LB. THE COTTER PIN, BENDIX PN 10-90751-18 REMOVED DURING DISASSEMBLY, MUST BE DISCARDED AND REPLACED.

1. REMOVE MAGNETO FROM THE ENGINE IN ACCORDANCE WITH ENGINE/AIRCRAFT MANUFACTURER'S PUBLISHED INSTRUCTIONS.

2. PLACE THE MAGNETO IN A SUITABLE WORK STAND WITH THE IMPULSE COUPLING FACING UP.

3. USE FINGER PRESSURE TO PUSH INWARD ON THE TOE (SEE FIGURE 1) OF EACH FLYWEIGHT SO THAT THE FLYWEIGHT HEEL PROTRUDES OUTWARD.

4. USING A FINE #1, DOUBLE CUT, ½ INCH WIDE FILE AT LEAST 3/32 INCH THICK, PASS THE FILE ACROSS THE HEEL OF THE FLYWEIGHT ATTEMPTING TO REMOVE MATERIAL. (SEE FIGURE 1). IF THE FLYWEIGHT HAS BEEN PROPERLY HEAT TREATED THE FILE WILL "GLIDE" SMOOTHLY OVER THE HEEL OF THE FLYWEIGHT, REMOVING NO MATERIAL. IF THE FLYWEIGHT IS NOT PROPERLY HEAT TREATED (SOFT) THE FILE WILL NOT "GLIDE" EASILY ACROSS THE SURFACE OF THE FLYWEIGHT HEEL, AND MATERIAL WILL BE REMOVED.

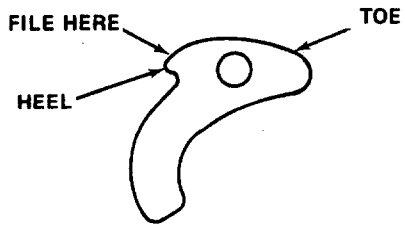

Figure 1.

5. IF AN IMPROPERLY HEAT TREATED (SOFT) FLYWEIGHT IS FOUND, IMMEDIATELY REMOVE AND REPLACE THE CAM ASSEMBLY AND/OR THE IMPULSE COUPLING ASSEMBLY WITH AN ASSEMBLY MEETING REQUIREMENT OF THIS AD, FOLLOWING PROCEDURES IN THE MAGNETO OVERHAUL INSTRUCTIONS, AND PAYING STRICT ATTENTION TO NOTES AND CAUTIONS.

6. INSPECT THE IMPULSE COUPLING STOP PINS FOR WEAR AND REPLACE AS NECESSARY.

7. AFTER FLYWEIGHTS HAVE BEEN IDENTIFIED, STOP PINS INSPECTED AND THE IMPULSE COUPLING REINSTALLED ON THE MAGNETO (IF REMOVED), IDENTIFY THE MAGNETO BY STAMPING A 1/16 INCH LETTER "F" IN THE UPPER RIGHT CORNER OF THE IDENTIFICATION PLATE TO INDICATE THAT THIS AD AND BENDIX SERVICE BULLETIN NO. 623 HAVE BEEN COMPLIED WITH.

8. REINSTALL THE MAGNETO ON THE ENGINE FOLLOWING MANUFACTURER'S PUBLISHED PROCEDURES.

9. MAKE AN APPROPRIATE ENGINE LOG BOOK ENTRY, RECORDING MAGNETO SERIAL NUMBER TO INDICATE THAT THIS AD AND BENDIX SERVICE BULLETIN NO. 623 HAVE BEEN COMPLIED WITH.

10. INSPECT ALL SPARE IMPULSE COUPLING ASSEMBLIES, CAM ASSEMBLIES, AND MAGNETOS FOLLOWING THE SAME PROCEDURES DESCRIBED IN STEPS 3 AND 4 OF THIS AIRWORTHINESS DIRECTIVE. IF BOTH FLYWIEGHTS ARE FOUND ACCEPTABLE IDENTIFY THE CAM ASSEMBLY BY APPLYING YELLOW DYKEM OR YELLOW LACQUER TO THE HEEL OF EACH FLYWEIGHT. STAMP "F" ON DATA PLATE AS DESCRIBED IN STEP 7.

11. AN EQUIVALENT METHOD OF COMPLIANCE WITH THIS AIRWORTHINESS DIRECTIVE MAY BE USED IF APPROVED BY THE MANAGER, NEW YORK AIRCRAFT CERTIFICTION OFFICE, FEDERAL AVIATION ADMINISTRATION, 181 SOUTH FRANKLIN AVENUE, ROOM 202, VALLEY STREAM, NEW YORK 11581.

FOR FURTHER INFORMATION CONTACT: IRVING MANKUTA, FEDERAL AVIATION ADMINISTRATION, ANE-174, 181 SOUTH FRANKLIN AVE, ROOM 202, VALLEY STREAM, NEW YORK 11581, TELEPHONE (516) 791-7421.

PUBLICATION IN THE FEDERAL REGISTER TO FOLLOW.

NOTE: THE FAA HAS DETERMINED THAT THIS REGULATION IS AN EMERGENCY REGULATION THAT IS NOT MAJOR UNDER SECTION 8 OF EXECUTIVE ORDER 12291. IT IS IMPRACTICABLE FOR THE AGENCY TO FOLLOW THE PROCEDURES OF ORDER 12291 WITH RESPECT TO THIS RULE SINCE THE RULE MUST BE ISSUED IMMEDIATELY TO CORRECT AN UNSAFE CONDITION IN AIRCRAFT. IT HAS BEEN FURTHER DETERMINED THAT THIS DOCUMENT INVOLVES AN EMERGENCY REGULATION UNDER DOT REGULATORY POLICIES AND PROCEDURES, 44 FR 11034; FEBRUARY 26, 1979. IF THIS ACTION IS SUBSEQUENTLY DETERMINED TO INVOLVE A SIGNIFICANT REGULATION, A FINAL REGULATORY EVALUATION OR ANALYSIS, AS APPROPRIATE, WILL BE PREPARED AND PLACED IN THE REGULATORY DOCKET. OTHERWISE, AN EVALUATION IS NOT REQUIRED. A COPY OF IT, WHEN FILED, MAY BE OBTAINED BY CONTACTING THE PERSON IDENTIFIED UNDER THE CAPTION, "FOR FURTHER INFORMATION CONTACT."

ISSUED IN BURLINGTON, MASSACHUSETTS, ON

/S/

ROBERT E. WHITTINGTON
DIRECTOR, NEW ENGLAND REGION

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-192
27 May 1983

TERMINATION OF FACTORY FINANCIAL PARTICIPATION ON PARTS AND/OR LABOR ALLOWANCES ON CERTAIN SERVICE PUBLICATIONS.

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 1 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14000 THRU 14540.

REASON FOR PUBLICATION: TO ESTABLISH A TERMINATION DATE FOR FACTORY FINANCIAL PARTICIPATION.

AS OF MAY 27, 1983, THE FACTORY WILL NO LONGER PROVIDE FINANCIAL PARTICIPATION FOR THE FOLLOWING SERVICE PUBLICATIONS.

SERVICE BULLETINS

NO.	TITLE	ISSUE DATE
SB-112-2	Inspection of Electric Fuel Pump (Weldon Tool Company P/N A8120-A)	5-23-73
SB-112-3	Inspection of Upper Fin Main Spar Attachment Bolts	6-1-73
SB-112-4	Inspection of Spinner	6-5-73
SB-112-7	Improved Propeller Spinner Assembly	12-17-73
SB-112-8	Improved Engine Control Cables	12-17-73
SB-112-9	Modification of Nose Landing Gear Collar	12-17-73
SB-112-10A	Inspection and/or Replacement of Main Landing Gear Lower Side Braces	2-12-74
SB-112-11	Restricted Elevator Travel	12-17-73
SB-112-12	Brake System Improvements	1-22-74
SB-112-13	Replacement of Induction Air Box Assembly	1-15-74
SB-112-16	Inspection and/or Replacement of Fuel Line	5-28-74
SB-112-17	Guard Pin Clearance with Aileron Balance Cable	8-15-74
SB-112-26	Inspection of Induction Air Flexible Ducting	12-30-74
SB-112-29	Alternator Wire Support Improvement	5-14-75
SB-112-31	Replacement of Fuel Pump Circuit Breaker Switch	5-28-75
SB-112-34	Installation of Alternator Switch Placard	8-15-75
SB-112-35	Inspection of Aileron Hinge Doublers	10-1-75
SB-112-44A	Replacement of Fuel Selector Valve	3-23-78
SB-112-45B	Pilot and Front Passenger Seat Modification	12-13-77
SB-112-48	Mixture Control Cable Attaching Hardware Replacement	1-12-77
SB-112-51	Headrest Placard Installation	3-15-77
SB-112-52	Carburetor Modification	6-14-77
SB-112-54	Parking Brake Valve Assembly Clamp Replacement	8-19-77
SB-112-58	Pilot and Front Passenger Seat Inspection and/or Modification	12-13-77
SB-112-59	Wing Rib Inspection and Modification	12-16-77
SB-112-60A	Inspection and Replacement of Aileron Hinge Supports	5-10-78
SB-112-62	Replacement of Vacuum Pump Retention Nuts	8-28-78
SB-112-63	Avco Lycoming Service Instruction No. 1369	11-15-78
SB-114-4	Replacement of Fuel Selector Valve	3-23-78
SB-114-5B	Pilot and Front Passenger Seat Modification	12-13-77
SB-114-6	Cabin Air Vent Modification	11-1-76
SB-114-9	Headrest Placard Installation	3-15-77
SB-114-10	Parking Brake Valve Assembly Clamp Replacement	8-19-77
SB-114-13	Pilot and Front Passenger Seat Inspection and/or Modification	12-13-77
SB-114-14A	Inspection and Replacement of Aileron Hinge Supports	5-10-78

SERVICE LETTERS

NO.	TITLE	ISSUE DATE
SL-112-1	Rudder Assembly	4-30-73
SL-112-4	Gross Weight Increase	12-17-73
SL-112-5	Floorboard Vibration	1-15-74
SL-112-6A	Improved Cabin Ventilation	8-9-74
SL-112-25	Alternate Static Source Correction Placard Replacement	4-13-76
SL-112-30	Fuel Pressure Snubber Installation	9-3-76
SL-112-32	Take-Off and Landing Checklist Placard Installation	10-21-76
SL-112-33	Main Landing Gear Rod Assembly Pin Retaining Screw Replacement	11-1-76
SL-112-35	Carburetor Replacement	1-7-77
SL-112-39	Landing Gear Retract Cylinder Retainer and/or Lockwasher Installation	8-9-77
SL-112-43	Oil Pressure Indicator and/or Oil Placard Replacement	10-26-77
SL-114-5	Main Landing Gear Rod Assembly Pin Retaining Screw Replacement	11-1-76
SL-114-7	Fuel Pressure Snubber Installation	11-19-76
SL-114-11	Landing Gear Retract Cylinder Retainer and/or Lockwasher Installation	8-9-77

SERVICE INFORMATION LETTERS

NO.	TITLE	ISSUE DATE
SI-142	Fuel Vent Check Valve Ball Inspection	9-15-77
SI-145	Improved Induction Air Box Installation	11-7-77

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-207A
(Supersedes Service Information No. SI-207)
31 March 1987

AVCO LYCOMING SERVICE BULLETIN NO. 455D
(Replacement of Oil Pump Impellers)

MODELS AFFECTED: MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AVCO LYCOMING SERVICE BULLETIN NO. 455D.

COMPLIANCE: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 455D.

NOTE

THIS PUBLICATION IS TO BE COMPLIED WITH EVEN IF AVCO LYCOMING SERVICE BULLETIN NO. 455B HAS BEEN COMPLETED. ALSO REFER TO GULFSTREAM AEROSPACE SERVICE INFORMATION NO. SI-175B.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 455D.

ESTIMATED MAN HOURS: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 455D.

PARTS DATA: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 455D.

SPECIAL TOOLS: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 455D.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Avco Lycoming Service Bulletin No. 455D.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-207A, dated 31 March 1987, entitled "Avco Lycoming Service Bulletin No. 455D," accomplished _____(date)_____.

Avco Lycoming TEXTRON
Williamsport Division
Avco Lycoming/Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701
U.S.A.

SERVICE BULLETIN

DATE: January 2, 1987

Service Bulletin No. 455D
(Supersedes Service Bulletin No. 455C)
Engineering Aspects are
FAA Approved

SUBJECT: Replacement of Oil Pump Impellers

MODELS AFFECTED:

O-360-A1LD	L-17555-36A thru L22462-36A
O-360-A1F6D	L-16685-36A thru L-22582-36A
O-360-A5AD	L-17057-36A thru L20038-36A
IO-360-A1B6D and IO-360-A3B6D	L-9598-51A thru L-16595-51A L-17273-51A L-17312-51A thru L-17319-51A L-17321-51A L-17336-51A thru L-17340-51A L-17347-51A thru L-17351-51A L-17355-51A L-17358-51A L-17377-51A thru L-17380-51A
IO-360-C1E6D	L-14527-51A
TO-360-C1A6D and TIO-360-C1A6D	L-101-69A thru L-243-69A

Any of the above model engines overhauled in the field between April 7, 1970 and October 15, 1976.

All above model remanufactured engines shipped prior to April 1, 1981.

TIME OF COMPLIANCE: If Service Bulletin 455B has not been complied with, the Time of Compliance must be within the next 25 hours; however, if Service Bulletin 455B has been complied with, the Time of Compliance can be extended to the next recommended overhaul.

Avco Lycoming Textron has available, for the listed engines, improved, hardened-steel impellers for the oil pump assembly.

As product improvements, the new driving impeller (P/N LW-18109) and new driven impeller and shaft assembly (P/N LW-18110) replace the steel driving impeller (P/N 60746) and aluminum driven impeller and shaft assembly (P/N LW-13775).

The new nitrided driving impeller can be identified by the character "N" located on the centerline of a geartooth. (See Figure 1.) The new, carburized driven impeller will have the character "C" located on a geartooth centerline. (See Figure 2.)

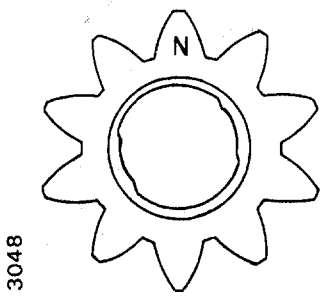

Figure 1. Nitrided Driving Impeller

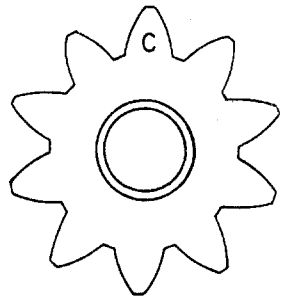

Figure 2. Carburized Driven Impeller

Install the new oil pump impellers as follows:

1. Remove the magneto.

2. Remove the sump.

3. Remove the fuel pump.

NOTE

Care must be taken when removing or reinstalling a diaphragm-type fuel pump. The actuating arm of the pump must be on the base circle of the cam, or pressure exerted on the arm of the fuel pump could cause damage to the mounting bolt threads.

4. Remove any other accessories from the housing.

5. Remove the accessory housing from the engine.

6. After the accessory housing has been removed, disassemble the oil pump and inspect both the housing and oil pump cover for damage.

7. Reassemble the oil pump using the new steel driving impeller (P/N LW-18109) and new steel driven impeller and shaft assembly (P/N LW-18110). Be sure all parts are lubricated thoroughly during assembly. As the slotted nuts are tightened to a torque of 17-foot pounds, make sure that the oil pump impellers are free by rotating the oil pump shaft. Correct any problems before proceeding.

CAUTION

Although the steel driving impeller P/N 60746 is superseded on all models except GO-435 and GO-480 and is still a functional in-service item on these engines, it must not be used with new impellers.

Aluminum driven Impeller and Shaft Assy. P/N LW-13775 is a discontinued item. In order to avoid confusion and prevent inadvertent mixing of gears, P/N LW-13775 must be returned to your authorized distributor along with the appropriate paperwork to receive full credit. This applies **only** to current "on shelf" inventory. It is not applicable to impellers already installed in any engines.

To insure new impellers are used together, they must be purchased in a Kit P/N 05K19423-S.

8. Before reinstalling the accessory housing make sure that the crankshaft to camshaft timing is correct and has not moved. See Overhaul Manual No. 60294-7 for procedure.

9. Reinstall accessory housing using a new gasket.

10. Reinstall the oil sump using a new gasket. Reinstall any clamps and hoses that were removed.

11. Reinstall the fuel pump.

12. Install magneto or magnetos. Consult the proper magneto timing procedure in Overhaul Manual No. 60294-7.

13. Reinstall any other accessories removed under paragraph 4.

14. Following completion of assembly, run the engine. Check oil pressure and magnetos for drop-off.

15. Check for any oil leaks prior to release for flight.

NOTE

An entry must be made in engine log book that compliance to this service bulletin was accomplished.

PARTS DATA: Oil Pump Impeller and Gasket Kit (P/N LW-18271-1) for the engines listed consists of the following parts:

QTY.	PART NO.	DESCRIPTION
*1	05K19423-S	Oil Pump Impeller Kit (1) Steel Driving Impeller (P/N 18109) (1) Steel Driven Impeller Assembly (P/N 18110) (1) Caution Tag (SSP-285)
1	73818	Accessory Housing Gasket
1	LW-13353	Sump Gasket
1	LW-12681	Magneto Gasket
1	68315	Propeller Governor Gasket
1	8313	Vacuum Pump Gasket
1	60096	Fuel Pump Gasket (for TIO-360-C, order Fuel Pump Adapter Gasket, P/N 69159)

* If the oil pump impellers are to be changed during engine overhaul and the gaskets that are supplied with the Oil Pump Impeller and Gasket Kit P/N LW-18271-1 are not required, order Oil Pump Impeller Kit P/N 05K19423-S which contains 1 ea. P/N LW-18109 Driving Impeller and 1 ea. P/N LW-18110 Driven Impeller only. These impellers are available only by ordering either of the above mentioned kits and must be used together in all instances.

NOTE: Revision "D" revises CAUTION note and Kit part number.

21403B, 22330B — These numbers for Avco Lycoming Textron reference only.

"C" GC 0031

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-208A
(Supersedes Service Information No. SI-208)
31 March 1987

AVCO LYCOMING SERVICE BULLETIN NO. 456C

(Replacement of Oil Pump Impellers)

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 1 THRU 544 AND 13000.
MODELS 114 AND 114A, SERIAL NOS. 14001 THRU 14540.
MODEL 500, SERIAL NOS. 618 THRU 852.
MODELS 500B AND 500U, SERIAL NOS. 893 THRU 1780.
MODEL 500S, SERIAL NOS. 1755 THRU 3323.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AVCO LYCOMING SERVICE BULLETIN NO. 456C.

COMPLIANCE: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 456C.

NOTE

REFER TO GULFSTREAM AEROSPACE SERVICE INFORMATION NO. SI-175B.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 456C.

ESTIMATED MAN HOURS: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 456C.

PARTS DATA: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 456C.

SPECIAL TOOLS: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 456C.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Avco Lycoming Service Bulletin No. 456C.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-208A, dated 31 March 1987, entitled "Avco Lycoming Service Bulletin No. 456C," accomplished _____(date)_____.

Avco Lycoming TEXTRON
Williamsport Division
Avco Lycoming/Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701
U.S.A.

SERVICE BULLETIN

DATE: January 2, 1987

Service Bulletin No. 456C
(Supersedes Service Bulletin No. 456B and Supplement No. 1)
Engineering Aspects are
FAA Approved

SUBJECT: Replacement of Oil Pump Impellers

MODELS AFFECTED:

O-235 series engines with serial numbers up to and including L-13039-15.
O-320 series engines with serial numbers up to and including L-47241-27A.
O-320 series engines with serial numbers up to and including L-7118-39A.
IO-320 series engines with serial numbers up to and including L-5521-55A.
LIO-320 series engines with serial numbers up to and including L-304-66A.
O-360, HO-360 series engines with serial numbers up to and including L-23384-36A.
IO-360, HIO-360-A, -B, -C series engines with serial numbers up to and including L-17821-51A.
VO-360 series engines with serial numbers up to and including L-345-45A.
IVO-360 series engines with serial numbers up to and including L-232-58A.
AIO-360 series engines with serial numbers up to and including L-250-63A.
LIO-360 series engines with serial numbers up to and including L-1075-67A.
*O-540 series engines with serial numbers up to and including L-18521-40A.
*IO-540 series engines with serial numbers up to and including L-16596-48A, except all IO-540-P1A5, -R1A5, and -S1A5 series engines.

NOTE

Some listed engines may still have sintered iron impellers, if earlier revisions of this Service Bulletin have not been complied with.

All remanufactured engines of the above models shipped prior to April 1, 1981, if earlier revisions of this Service Bulletin have not been complied with.

All engines that have complied with Service Instructions Nos. 1230 and 1272; Service Bulletins Nos. 381 and 385, if earlier revisions of this Service Bulletin have not been complied with.

* NOTE

This bulletin does not apply to O-540 and IO-540 series engines built with large-capacity oil pumps and dual magnetos. The impellers used in the large oil pump assembly in 6-cylinder engines are 1.00 inch thick; the impellers used in the small oil pump assembly in 6-cylinder engines are 0.75 inch thick.

TIME OF COMPLIANCE:

1. At next recommended overhaul, not to exceed 2000 hours with sintered iron gears.

2. Compliance is required as described herein unless it can be established that a sintered iron impeller is not installed.

Improved oil pump impellers are available for the listed engines. Both the driving impeller (P/N LW-18109) and the driven impeller and shaft assembly (P/N LW-18110) are made of case-hardened steel. The nitride-hardened, driving impeller can be identified by the character "N" located on the centerline of a gear tooth (Figure 1); the carburized, driven impeller can be recognized by the character "C" located on the centerline of a gear tooth (Figure 2).

NOTE

Those applicable engine models not in compliance with earlier issues of this service bulletin could still have sintered-iron impellers, which can be identified by pit marks in the impeller faces (Figure 3).

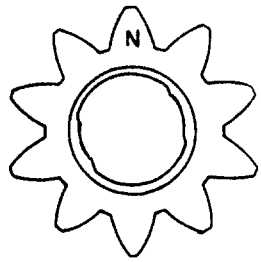

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Figure 1. Nitrided Impeller

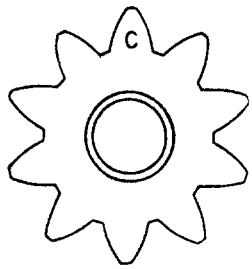

Figure 2. Carburized Impeller

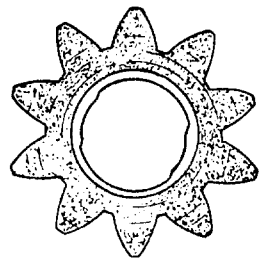

Figure 3. Sintered-Iron Impeller

CAUTION

Although the steel driving impeller P/N 60746 is superseded on all models except GO-435 and GO-480 and is still a functional in-service item on these engines, it must not be used with new impellers.

Aluminum driven Impeller and Shaft Assembly P/N LW-13775 is a discontinued item. In order to avoid confusion and prevent inadvertent mixing of gears, P/N LW-13775 must be returned to your authorized distributor along with the appropriate paperwork to

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receive full credit. This applies only to current "on shelf" inventory. It is not applicable to impellers already installed in any engines.

To insure new impellers are used together, they must be purchased in a Kit P/N 05K19423-S.

NOTE

Compliance to this Service Bulletin must be noted in the engine log book.

PARTS DATA:

Oil pump impeller kit (P/N 05K 19423-S) consists of:

QTY.	PART NO.	DESCRIPTION
1	LW-18109	Steel Driving Impeller
1	LW-18110	Steel Driven Impeller Assembly
1	SSP-285	Caution Tag

NOTE: Revision "C" revises CAUTION note and removes sentence at bottom of Models Affected.

21403B, 22330B — These numbers for Avco Lycoming Textron reference only.

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-213
30 June 1986

AIRWORTHINESS DIRECTIVE 86-01-06, AMENDMENT 39-5206
(PARKER HANNIFIN CORP. DRY AIR PUMPS)

MODELS AFFECTED: THE FOLLOWING MODELS THAT HAVE REPLACED PARKER HANNIFIN CORP., AIRBORNE DIVISION DRY AIR PUMPS OR AUXILIARY DRY AIR PUMPS SINCE SEPTEMBER 1, 1985:

MODELS 112 AND 112B, SERIAL NOS. 1 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14000 THRU 14540.
MODEL 700, SERIAL NOS. 70001 THRU 70032.

REASON FOR PUBLICATION: POSSIBLE MALFUNCTION OF DRY AIR PUMPS.

COMPLIANCE: REFER TO AIRWORTHINESS DIRECTIVE 86-01-06, AMENDMENT 39-5206.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AIRWORTHINESS DIRECTIVE 86-01-06, AMENDMENT 39-5206.

ESTIMATED MAN HOURS: INSPECT DRY AIR PUMPS – THIRTY (30) MINUTES.
REPLACE DRY AIR PUMPS – (SINGLE ENGINE) – TWO (2) HOURS.
(TWIN ENGINE) – THREE (3) HOURS.

PARTS DATA: REFER TO AIRWORTHINESS DIRECTIVE 86-01-06, AMENDMENT 39-5206.

SPECIAL TOOLS: REFER TO AIRWORTHINESS DIRECTIVE 86-01-06, AMENDMENT 39-5206.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 86-01-06, Amendment 39-5206.
2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-213, dated 30 June 1986, entitled "Airworthiness Directive 86-01-06, Amendment 39-5206," accomplished ___(date)___.

U.S. Department of Transportation
Federal Aviation Administration

AIRWORTHINESS DIRECTIVE

AVIATION STANDARDS NATIONAL FIELD OFFICE
P.O. BOX 26460
OKLAHOMA CITY, OKLAHOMA 73125

86-01-06 AIRBORNE DIVISION, PARKER HANNIFIN CORPORATION: Amendment 39-5206. Applies to the following Airborne Dry Air Pumps and Auxiliary Dry Air Pumps installed on piston engine airplanes certificated in any category:

AIRBORNE PART NUMBER	SERIAL NUMBERS
Dry Air Pumps	
241CC-13	10AA30 thru 10AA36 and 10AA38
242CW	10AA281 thru 10AA293
441CC	9AA260 thru 9AA288 9AA291, 9AA294, 9AA295
441CC-7	9AA929 thru 9AA-949 9AA953, 9AA954 9AA956, 9AA957, 9AA959
442CW	9AA850 thru 9AA875 9AA880 thru 9AA886, 9AA888 thru 9AA903, 9AA905 thru 9AA921, 9AA928, 9AA934, 9AA936, 9AA939, 9AA940, 9AA945 thru 9AA952, 9AA955 thru 9AA958, 9AA962 thru 9AA967
442CW-4	10AA173 thru 10AA179 10AA182 thru 10AA199 10AA201, 10AA202
442CW-12	10AA356, 10AA357, 10AA386, 10AA389
Auxiliary Dry Air Pumps	
4A2-1 4A3-1	9AA44 thru 9AA46 9AA56, 9AA59 thru 9AA66, 9AA73, 9AA79 thru 9AA82 10AA83 thru 10AA88, 10AA90 thru 10AA94, 10AA96, 10AA114, 10AA126, 10AA130, 10AA131, 10AA132, 10AA138, 10AA150, 10AA154, 10AA155, 10AA159, 10AA161

NOTE: These pumps were not available for installation before September 1, 1985. Therefore, new Airborne Dry Air Pumps or Auxiliary Dry Air Pumps installed previous to that date are exempt from this AD. Pumps that have been reworked by Airborne will have a white date code stamped on the pump

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housing near the discharge port. This will indicate that the pump complies with this AD.

COMPLIANCE: Required as indicated, unless previously accomplished. To prevent premature failure of the Airborne Dry Air and Auxiliary Dry Air Pumps, accomplish the following:

(a) For Dry Air Pumps P/N's 241CC-13, 242CW, 441CC, 441CC-7, 442CW, 442CW-4, and 442CW-12, prior to further flight in IFR conditions, inspect installed dry air pump(s) to determine if one of the subject pumps is installed.

(1) If one of these pumps is installed, and if the airplane is equipped for IFR flight, fabricate using minimum 0.10 inch letters, and install a placard in full view of the pilot which states; "FLIGHT IN IFR CONDITIONS PROHIBITED", and operate in accordance with this limitation.

(2) And within 15 days of the effective date of this AD, replace the subject pump and remove the placard. Return pump to Airborne as described in Airborne Service Letter No. 30, dated November 11, 1985.

(b) For Airborne Auxiliary Dry Air Pump P/N 4A2-1 or 4A3-1, prior to further flight in IFR conditions, inspect the auxiliary dry air pump if installed, to determine if one of the subject pumps is installed.

(1) If one of these pumps is installed, fabricate using a minimum of 0.10 inch letters and install a placard in full view of the pilot which states;

"STANDBY VACUUM SYSTEM MAY BE INOPERATIVE DUE TO VACUUM PUMP MALFUNCTION".

(2) And within 30 days of the effective date of this AD, replace the subject pump and remove the placard. Return pump to Airborne as described in Airborne Service Letter No. 30, dated November 11, 1985.

(c) Aircraft may be flown in accordance with FAR 21.197 to a location where this AD can be accomplished.

(d) An equivalent method of compliance with this AD, if used, must be approved by the Manager, Chicago Aircraft Certification Office, 2300 East Devon Avenue, Room 232, Des Plaines, Illinois 60018, Telephone (312) 694-7357.

All persons affected by this directive may obtain copies of the documents referred to herein upon request to Betty Annable, Parker Hannifin Corp., Airborne Division, 711 Taylor Street, Elyria, Ohio 44036 or the FAA, Rules Docket, Office of the Regional Counsel, Room 1558, 601 East 12th Street, Kansas City, Missouri 64106.

This amendment becomes effective on January 31, 1986.

FOR FURTHER INFORMATION CONTACT:

Mr. Charles Smalley, Aerospace Engineer, Systems and Equipment Branch, ACE-130C, FAA, Central Region, Chicago Aircraft Certification Office, 2300 East Devon Ave., Des Plaines, Illinois 60018; Telephone (312) 694-7126.

SERVICE PUBLICATIONS
revision notice

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-215
REVISION NO. 1
19 August 1986

AIRWORTHINESS DIRECTIVE 72-06-05 R1, AMENDMENT 39-5338

(Marvel Schebler Carburetors)

This Revision Notice is being issued to delete the following Models from this Service Information:

MODELS 112, 112B, 114, 114A, 500A, 500B, 500U, 500S, 560F, 680F, 680F(P), 680FL, 680 FL(P), AND 700.

The effectivity should now read as follows:

MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 500, 520, 560, 560A, 560E, 680, 680E AND 720, SERIAL NOS. 1 THRU 892.

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Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-215
15 July 1986

AIRWORTHINESS DIRECTIVE 72-06-05 R1, AMENDMENT 39-5338
(Marvel Schebler Carburetors)

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 1 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14000 THRU 14540.
MODELS 500, 500A, 500B, 500U, 520, 560, 560A, 560E, 560F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), AND 720, SERIAL NOS. 1 THRU 1854.
MODEL 500S, SERIAL NOS. 1755 THRU 1876 AND 3050 THRU 3323.
MODEL 700, SERIAL NOS. 70001 THRU 70032.

REASON FOR PUBLICATION: TO RECOMMEND COMPLIANCE WITH AIRWORTHINESS DIRECTIVE 72-06-05 R1, AMENDMENT 39-5338.

COMPLIANCE: REFER TO AIRWORTHINESS DIRECTIVE 72-06-05 R1, AMENDMENT 39-5338.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 330B.

ESTIMATED MAN HOURS: ONE (1) HOUR.

PARTS DATA: REFER TO AVCO LYCOMING SERVICE BULLETIN NO. 330B.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 72-06-05 R1, Amendment 39-5338.

2. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-215, dated 15 July 1986, entitled "Airworthiness Directive 72-06-05 R1, Amendment 39-5338," accomplished ___(date)___.

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MARVEL SCHEBLER
Airworthiness Directive
Revision
VOLUME I

72-06-05 R1 MARVEL SCHEBLER (Facet Aerospace Products Company): Amendment 39-1411 as amended by Amendment 39-1685 is further amended by Amendment 39-5338. Applies to Models MA-3, MA-3A, MA3-PA, MA-3SPA, MA4-SPA, MA4-5, MA4-5AA, MA-5, MA-5AA, MA-6AA and HA-6 carburetors used on various Franklin (Aircooled), Continental, Lycoming and Ranger engines, having one of the throttle arm and shaft configurations shown in Illustrations A, B, C, or D.

Compliance is required within 30 days after the effective date of the AD, unless already accomplished.

To present looseness or separation of the throttle arm, accomplish the following or any equivalent procedure approved by the Manager, New York Aircraft Certification Office, FAA, New England Region.

(1) Inspect the throttle arm to verify that it is bottomed against the shoulder on the throttle stop and positioned so that full throttle travel is obtained, and if not, loosen clamping screw and reposition arm and/or re-rig control system in accordance with airplane manufacturers' maintenance instructions to obtain these conditions.

(2) Inspect the throttle arm on Marvel Schebler MA-3, MA-3A, MA-3PA, MA3-SPA, and MA-4SPA carburetors to determine whether it has a spotfaced or milled flat for the head of the clamping screw. Replace any arm having a milled flat with one having a spotfaced flat. If not already installed, install a Marvel Schebler P/N A15-493 clamping screw (No. 10-24 x 5/8 slotted drilled fillister head) in the throttle arm. Torque the clamping screw to 20-28 in.-lb. and inspect the slot in the end of the arm for clearance. If the slot has closed so that no clearance remains, replace the arm and retorque to the above specifications. After the specified torque is established safety wire the throttle arm and clamping screw to the throttle stop as shown in Illustration A.

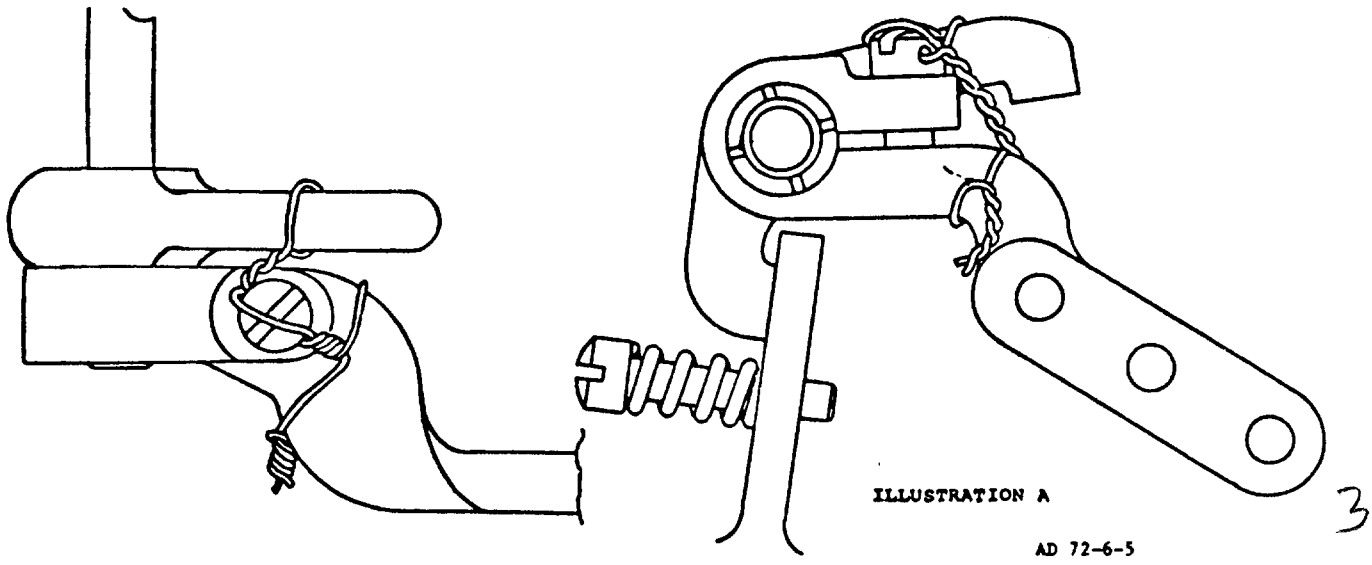


ILLUSTRATION A

(3) On Marvel Schebler MA-4-5, MA4-5AA, MA-5, MA-5AA, MA-6AA, and HA-6 series carburetors with throttle arms having a 10-32 bolt and nut clamping the arm on the throttle stop, torque the nut to 35 to 40 in. lbs. and safety wire the throttle arm to the throttle stop as shown in Illustration B. On these series carburetors having a throttle arm threaded for a 10-24 screw, if not already installed, install a Marvel Schebler P/N A15-493 clamping screw (No. 10-24 x 5/8 slotted drilled fillister head) in the throttle arm and torque the screw to 20 to 28 in. lbs. Safety wire the throttle arm to the throttle stop as shown in Illustration C or D.

NOTE: The procedures specified in American Aviation Corporation Service Letter No. 69-4, dated October 3, 1969, Cessna Service Letter SE71-17 revised February 25, 1972, and Lycoming Service Bulletin No. 330A, dated October 30, 1970, are approved as equivalent procedures to those prescribed in this AD for the applicable carburetors.

Upon request, an equivalent means of compliance with the requirements of this AD may be approved by the Manager, New York Aircraft Certification Office, Aircraft Certification Division, New England Region, 181 South Franklin Avenue, Room 202, Valley Stream, New York 11581.

Amendment 39-1411 (AD 72-6-5) became effective March 24, 1972.

Amendment 39-1685 became effective July 9, 1973.

This Amendment 39-5338 becomes effective July 3, 1986.

FOR FURTHER INFORMATION CONTACT:

Roy Hettenbach, ANE-174, New York Aircraft Certification Office, Aircraft Certification Division, New England Region, 181 South Franklin Avenue, Room 202, Valley Stream, New York 11581, telephone (516) 791-7421.

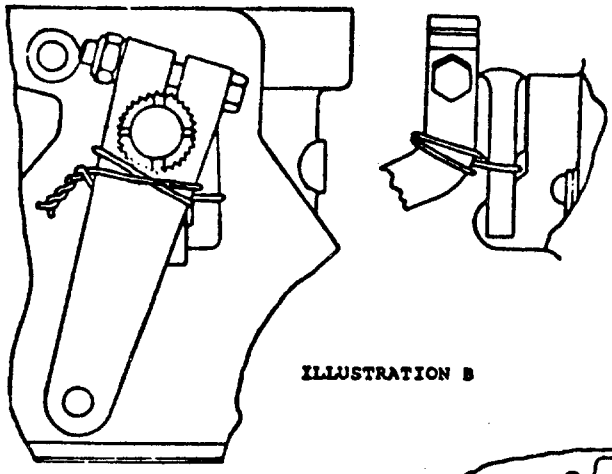


ILLUSTRATION B

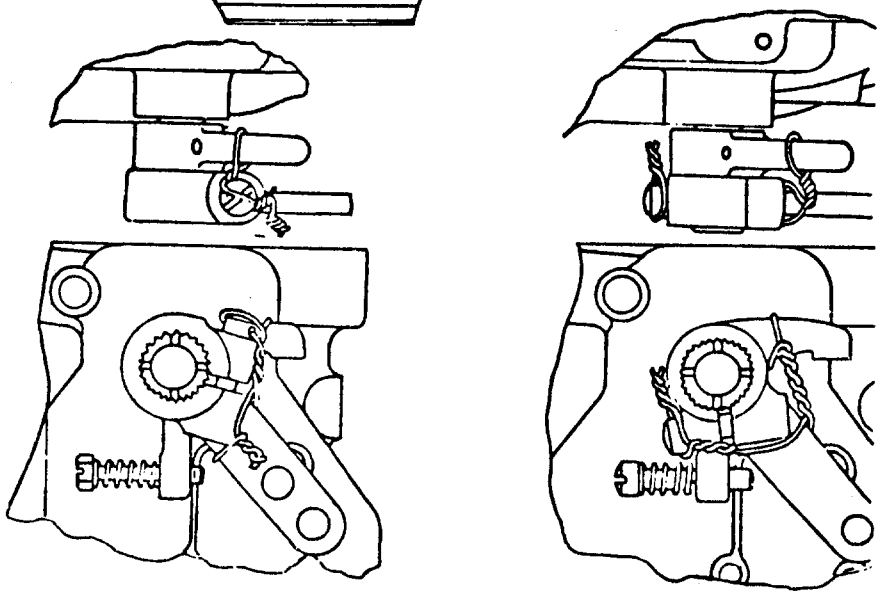


ILLUSTRATION C

AD 72-6-5

ILLUSTRATION D

AVCO LYCOMING DIVISION
WILLIAMSPORT, PENNSYLVANIA 17701

Service Bulletin

L

DATE: April 20, 1973

Service Bulletin No. 330B
(Supersedes Service Bulletin No. 330A)
Engineering Aspects are
FAA (DEER) Approved

SUBJECT: Retighten and Lockwire Carburetor Throttle Arm Screw

MODELS AFFECTED: All Avco Lycoming opposed series engines with Marvel-Schebler carburetors.

TIME OF COMPLIANCE: Not later than next 100 hour inspection of the aircraft. Compliance with latest edition of Service Instruction 1265 removes requirement for compliance with this Bulletin.

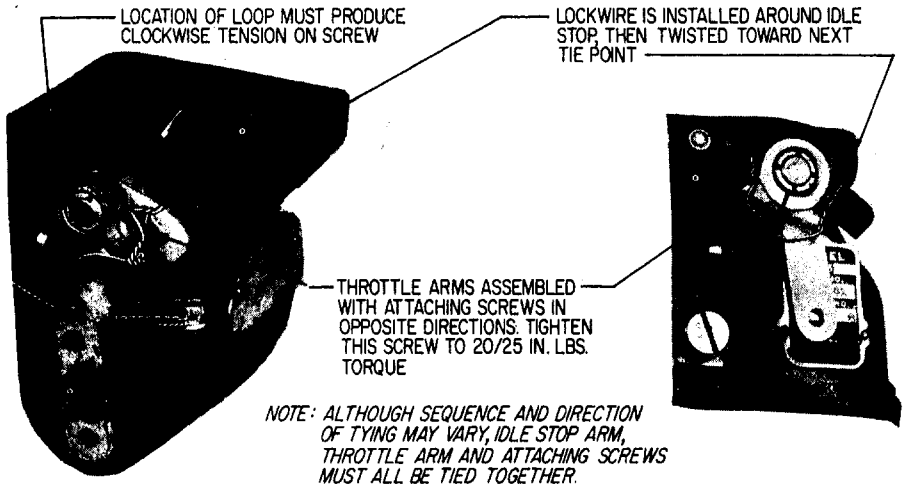
A few instances of loosening of the throttle arm on Marvel-Schebler carburetors have been reported to Avco Lycoming. This is a condition caused by improper torque on the screw during assembly of the throttle arm. Because of the serious consequences of a loosened throttle arm, Avco Lycoming has established a torque value of 20 to 25 inch pounds for the No. 10-24 throttle arm tightening screws and recommends that all owners and operators of applicable aircraft check the screw at the earliest opportunity, not later than the next 100 hour inspection. Be sure the torque handle is correctly calibrated to insure the attaching screw is neither under nor over tightened.

NOTE

Before tightening the screw, remove lock tab. After retightening to 20/25 inch pounds secure the screws with .032 inch diameter lockwire as shown in the illustration. If required, drill 1/16 in. dia. hole thru head of the throttle arm screw for lockwire.

The throttle arm may be found assembled to the carburetor in either of the two positions shown in the accompanying illustration. That is, the arm may be assembled with the head of its attaching screw toward the front or toward the rear. In either instance, the methods of applying the lockwire are similar.

The wire is first tied to the idle stop lever, then continued as shown in the illustration. Make sure the wire is looped around the screw to tension it in the tightening direction of the screw.



Carburetors, Showing Throttle Arms Lockwired to Idle Stop and Attaching Screws

NOTE: Revision "B" adds statement on compliance with Service Instruction 1265.

15529 - This number for Avco Lycoming reference only.

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-226
7 August 1987

SERVICING ENGINE OIL SYSTEM

MODELS AFFECTED: MODELS 112 AND 112B, SERIAL NOS. 3 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14001 THRU 14540.
MODELS 500, 500A, 500B, 500U, 520, 560, 560A, 560E, 560F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), AND 720, SERIAL NOS. 1 THRU 1854.
MODEL 500S, SERIAL NOS. 1755 THRU 1876 AND 3050 THRU 3323.
MODEL 685, SERIAL NOS. 12001 THRU 12066.
MODEL 700, SERIAL NOS. 70001 THRU 70032.

REASON FOR PUBLICATION: TO MAKE OWNER/OPERATOR AWARE OF THE POSSIBILITY OF CONTAMINATING ENGINE OIL SYSTEM WHEN SERVICING OIL SYSTEM WITH AEROSHELL OIL CONTAINED IN PLASTIC BOTTLES.

COMPLIANCE: WHEN SERVICING ENGINE OIL SYSTEM.

BY WHOM WORK WILL BE ACCOMPLISHED: OWNER/OPERATOR.

APPROVAL: ENGINEERING DESIGN ASPECTS ARE FAA APPROVED.

ESTIMATED MAN HOURS: NOT APPLICABLE.

PARTS DATA: NOT APPLICABLE.

SPECIAL TOOLS: NONE.

ACCOMPLISHMENT INSTRUCTIONS:

When servicing engine oil system with Aeroshell oil, be aware of the following:

CAUTION

THE SMALL PLASTIC CAP LINER ON THE AEROSHELL OIL PLASTIC BOTTLES MAY REMAIN ON TOP OF THE BOTTLE AND NOT IN THE CAP. IF NOT NOTICED, THE CAP LINER CAN EASILY BE PUT INTO THE ENGINE WITH THE OIL. THIS COULD CAUSE AN OIL STARVATION SITUATION WITH A SUBSEQUENT LOSS OF AN ENGINE.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: The Airplane Maintenance Manual change required by this document will be incorporated at the next scheduled revision.

RECORD COMPLIANCE: NOT APPLICABLE.

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-232
Date January 15, 1996

TEXTRON LYCOMING
SERVICE BULLETIN NO. 524

MODELS AFFECTED: Model 112 and 112B, S/N 3 thru 544 and 13000, Model 112TC, S/N 13000 and Subs., Model 114 and 114A, S/N 14000 thru 14540

REASON FOR PUBLICATION: To advise Commander owners/operators of Textron Lycoming Service Bulletin No. 524

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with Textron Lycoming Service Bulletin No. 524

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic or equivalent

APPROVAL: Refer to Textron Lycoming Service Bulletin No. 524

ESTIMATED MAN HOURS: Contact Textron Lycoming Product Support

PARTS DATA: Refer to Textron Lycoming Service Bulletin No. 524

SPECIAL TOOLS: Refer to Textron Lycoming Service Bulletin No. 524

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Textron Lycoming Service Bulletin No. 524

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Textron Lycoming Service Bulletin No. 524, dated September 1, 1995, accomplished _____(date)_____.

TEXTRON Lycoming

652 Oliver Street
Williamsport, PA 17701 U.S.A.
717/323-6181

MANDATORY

SERVICE BULLETIN

DATE: September 1, 1995

Service Bulletin No. 524
(Supersedes Service Bulletin No. 381, Service Bulletin No. 385, Service Bulletin No. 454B, Service Bulletin No. 455D, and Service Bulletin No. 456F)

SUBJECT: I. Replacement of Sintered Iron Oil Pump Impellers.

II. Replacement of Aluminum Oil Pump Impellers.

MODELS AFFECTED: See attached Lists I and II for specific models and serial numbers. All new, overhauled and remanufactured engines shipped from the factory after March 31, 1985 are in compliance with this Service Bulletin.

For field overhauled engines, the overhaul facility must be contacted for information concerning the oil pump impellers which were installed.

TIME OF COMPLIANCE: **I. Sintered Iron Oil Pump Impellers:** Within next 25 hours of operation for engines which have sintered iron oil impellers and have not complied with any revisions to Service Bulletin No. 454, No. 455, or No. 456.

II. Aluminum Oil Pump Impellers: At next recommended overhaul not to exceed 2000 hours (2400 hours for O-235 series engines with extended TBO) of operation for engines which have steel and aluminum impellers installed or have complied with revisions to Service Bulletin No. 455, or No. 456.

I.Sintered Iron Oil Pump Impellers:

Textron Lycoming requires replacement of all sintered iron oil pump impellers within the next 25 hours of operation. Sintered iron impellers being replaced are P/N 77313, P/N 78532, P/N LW-12897, P/N LW-14038, P/N LW-14712 and P/N LW-15863. They can be identified by a porous surface finish on the impeller faces (refer to Figure 3). Engines from the attached List I with sintered iron impellers which are not in compliance with any revisions to Service Bulletin No. 454, No. 455, or No. 456 must have kit, P/N 05K19423-S installed within the next 25 hours of operation.

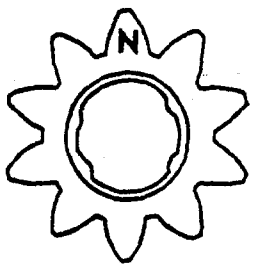


Figure 1. Nitrided Impeller

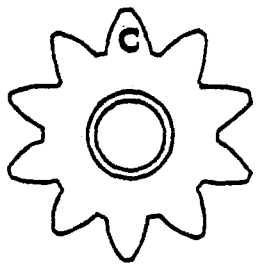


Figure 2. Carburized Impeller

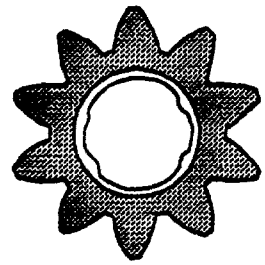


Figure 3. Sintered-Iron Impeller

II. Aluminum Oil Pump Impellers:

Textron Lycoming requires replacement of all aluminum oil pump impellers at the next recommended overhaul not to exceed 2000 hours of operation. The aluminum oil pump impellers being replaced are P/N 60747 (except on GO-435 and GO-480 engines) and P/N LW-13775. Engines from the attached List II, engines with aluminum oil pump impellers installed in the field, and engines in compliance with Service Bulletin No. 455, No: 455A, No. 455B, No. 456, or No. 456A, but not with any later revisions, must install kit P/N 05K19423-S at the next recommended overhaul not to exceed 2000 hours of operation.

CAUTION

GO-435 AND GO-480 ENGINES ARE THE ONLY MODELS APPROVED FOR USE OF STEEL DRIVING IMPELLER P/N 60746 AND ALUMINUM DRIVEN IMPELLER P/N 60747. THESE IMPELLERS MUST BE USED IN SETS. NEVER USE IMPELLER P/N 60746 WITH A HARDENED STEEL DRIVEN IMPELLER.

As a product improvement, a nitrided driving impeller, P/N LW-18109 and a carburized driven impeller shaft assembly, P/N LW-18110, are available to replace the sintered iron or aluminum impellers which may still be in service. The nitrided impeller can be identified by the character "N" located on the centerline of a gear tooth (refer to Figure 1). The carburized impeller will have a character "C" positioned on a gear tooth centerline (refer to Figure 2).

To ensure the steel impellers are used together, they must be purchased in a kit, P/N 05K19423-S.

Install steel oil pump impellers as follows:

1. Remove the magneto(s).
2. Remove the sump.
3. Remove the fuel pump.

NOTE

Care must be taken when removing or reinstalling a diaphragm-type fuel pump. The actuating arm of the pump must be on the base circle of the cam, or pressure exerted on the arm of the fuel pump could cause damage to the mounting bolt threads.

4. Remove any other accessories from the housing.

5. Remove the accessory housing from the engine.

6. After the accessory housing has been removed, disassemble the oil pump and inspect both the housing and oil pump for damage. If oil pump is two piece (old style) do not reuse, refer to latest edition of Service Instruction No. 1164 for correct oil pump body part numbers along with appropriate model applications.

7. Reassemble the oil pump using the steel driving impeller (P/N LW-18109) and steel driven impeller and shaft assembly (P/N LW-18110). Be sure all parts are lubricated thoroughly during assembly. Refer to latest edition of Service Instruction No. 1341 for oil pump shaft lubrication requirements. As the slotted nuts are tightened to a torque of 17 foot-pounds, make sure that the oil pump impellers are free by rotating the oil pump shaft. Correct any problems before proceeding.

8. Before reinstalling the accessory housing make sure that the crankshaft to camshaft timing is correct and has not moved. See applicable Overhaul Manual for procedure.

9. Reinstall accessory housing using a new gasket. The new gasket may be too long and must be trimmed to fit at the oil sump parting face.

10. Reinstall the oil sump using a new gasket. Reinstall any clamps and hoses that were removed.

11. Reinstall the fuel pump.

12. Install magneto or magnetos. Consult the proper magneto timing procedure in applicable Overhaul Manual.

13. Reinstall any other accessories removed under step 4.

14. Following completion of assembly, run the engine. Check oil pressure and magnetos for drop-off.

15. Check any leaks prior to release for flight.

NOTE

Compliance with this Service Bulletin must be noted in engine log book.

PARTS DATA:

Oil pump impeller kit (P/N 05K19423-S) consists of:

Qty.	Part No.	Description
1	LW-18109	Steel Driving Impeller
1	LW-18110	Steel Driven Impeller Assembly
1	SSP285	Caution Tag

14586, 16650, 19174, 21403A, 21403B, 22330B – These numbers for Textron Lycoming reference only.

ATTACHMENT - Service Bulletin No. 524

MODELS AFFECTED:

LIST I

All Textron Lycoming engines employing sintered iron impellers as follows:

NOTE

For the purpose of this Service Bulletin, disregard the 2 or 3 character suffix on the end of the serial numbers (i.e. -15 or -27A). Any engine which falls within the serial number range specified for the model, regardless of the suffix, is subject to this Service Bulletin.

AIO-320 series engines with serial numbers L-137-63A thru L-250-63A inclusive.

LIO-360 series engines with serial numbers L-101-67A thru L-1075-67A inclusive.

**O-540 series engines with serial numbers L-14227-40A thru L-18521-40A inclusive.

O-235 series engines with serial numbers L-10287-15 thru L-13039-15 inclusive.

O-290 series engines with serial numbers L-8560-21 thru L-8565-21 inclusive.

O-320 series engines with serial numbers L-28444-27A thru L-47241-27A inclusive.

O-320 series engines with serial numbers L-6673-39A thru L-7118-39A inclusive.

IO-320 series engines with serial numbers L-4625-55A thru L-5521-55A inclusive.

LIO-320 series engines with serial numbers L-101-66A thru L-304-66A inclusive.

*O-360, HO-360 series engines with serial numbers L-15277-36A thru L-23384-36A inclusive.

*IO-360, HIO-360-A, -B, -C series engines with serial numbers L-7274-51A thru L-17821-51A inclusive.

IVO-360 series engines with serial numbers L-232-58A thru L-233-58A inclusive.

**IO-540 series engines with serial numbers L-8771-48A thru L-16596-48A inclusive.

***NOTE**

All dual magneto 360 wide deck series engines that have complied with Service Bulletin No. 455C or Service Bulletin No. 455D are in compliance with this Service Bulletin.

****NOTE**

All dual magneto 540 wide deck series engines and all IO-540-P1A5, -R1A5, -S1A5 series engines were built with large capacity oil pumps. This Service Bulletin does not apply to these engines.

NOTE

Some of the models affected, regardless of serial numbers, that may still have sintered iron impellers are as follows:

1. All remanufactured engines shipped between April 6, 1970 thru April 1, 1981.

2. All engines that were overhauled in the field using any of the following sintered iron impeller part numbers:

ATTACHMENT - Service Bulletin No. 524

MODELS AFFECTED:

LIST I (CONT)

77313, 78532, LW-12897, LW-14038, LW-14712 and LW-15863.

These parts were available from Lycoming distributors between April 6, 1970 thru April 1, 1981.

For field overhauled engines, the overhaul facility must be contacted for information concerning the oil pump impellers which were installed.

3. All engines that have complied with Service Instructions No. 1230 and No. 1272; Service Bulletins No. 381 and No. 385.

ATTACHMENT - Service Bulletin No. 524

MODELS AFFECTED (CONT.):

LIST II

All Textron Lycoming engines employing aluminum oil pump impellers as follows:

> **NOTE**
>
> For the purpose of this Service Bulletin, disregard the 2 or 3 character suffix on the end of the serial numbers (i.e. -15 or -27A). Any engine which falls within the serial number range specified for the model, regardless of the suffix, is subject to this Service Bulletin.

O-235 series engines with serial numbers up to and including L-10286-15, L-13040-15 thru L-24051-15 inclusive except the following: L-24033-15, L-24034-15, L-24035-15, L-24040-15 thru L-24049-15 inclusive.

O-290 series engines with serial numbers up to and including L-8565-21.

O-320 series engines with serial numbers up to and including L-28443-27A, L-47242-27A thru L-50133-27A inclusive.

O-320 series engines with serial numbers up to and including L-6672-39A, L-7119-39A thru L-13788-39A inclusive except for the following: L-13755-39A and L-13780-39A thru L-13783-39A.

IO-320 series engines with serial numbers up to and including L-4624-55A, L-5522-55A thru L-5897-55A inclusive.

AIO-320 series engines with serial numbers up to and including L-188-65A.

LIO-320 series engines with serial numbers up to and including L-100-66A, L-305-66A thru L-329-66A inclusive.

O-340 series engines with serial numbers up to and including L-345-30.

*O-360, HO-360 series engines with serial numbers up to and including L-15276-36A, L-23384-36A thru L-31007-36A inclusive except for the following: L-30988-36A, L-30989-36A, L-30990-36A, L-30991-36A, L-31001-36A, L-31002-36A, L-31003-36A.

*IO-360, HIO-360-A, -B, -C series engines with serial numbers up to and including L-7273-51A, L-17822-51A thru L-24033-51A inclusive except for the following: L-24020-51A, L-24029-51A, L-24030-51A, L-24031-51A.

HIO-360-D1A, -E1AD, -E1BD, -F1AD series engines with serial numbers up to and including L-25579-51A except for the following: L-22311-51A thru L-22313-51A, L-22396-51A, L-22397-51A, L-22416-51A, L-22546-51A thru L-22549-51A, L-22563-51A, L-22568-51A thru L-22571-51A inclusive.

LO-360 series engines with serial numbers up to and including L-544-71A.

VO-360 series engines with serial numbers up to and including L-395-45.

IVO-360 series engines with serial numbers up to and including L-L-234-58A.

AIO-360 series engines with serial numbers up to and including L-136-63A, L-251-63A thru L-258-63A inclusive.

LIO-360 series engines with serial numbers up to and including L-100-67A, L-1075-67A thru L-1113-67A inclusive.

ATTACHMENT - Service Bulletin No. 524

MODELS AFFECTED (CONT):

LIST II (CONT.)

*TO-360, TIO-360 series engines with serial numbers up to and including L-367-69A.

*TIO-360 series engines with serial numbers up to and including L-183-64A.

**O-540 series engines with serial numbers up to and including L-14226-40A, L-18522-40A thru L-23888-40A inclusive.

**IO-540 series engines with serial numbers up to and including L-8870-48A, L-16597-48A thru L-22725-48A inclusive except for the following: L-22721-48A, L-22723-48A.

***NOTE**

All dual magneto 360 wide deck series engines that have complied with Service Bulleton No. 455C or Service Bulletin No. 455D are in compliance with this Service Bulletin.

****NOTE**

All dual magneto 540 wide deck series engines and all IO-540-P1A5, -R1A5, -S1A5 series engines were built with large capacity oil pumps. This Service Bulletin does not apply to these engines.

NOTE

Some of the models affected, regardless of serial numbers, that may still have aluminum impellers are as follows:

1. All remanufactured engine models listed above shipped prior to March 31, 1985.

2. All engine models listed above that were overhauled in the field prior to March 31, 1985.

For field overhauled engines, the overhaul facility must be contacted for information concerning the oil pump impellers which were installed.

3. Any 360 dual magneto wide deck series engines that have complied with Service Bulletin No. 455, No. 455A, No. 455B, but have not complied with Service Bulletin No. 455C or No. 455D.

Model 112 Service Information Index (Cont)

Number	Subject	Effectivity
218	Flap Torque Tube Modification	Models 112 and 112B, S/N 3 thru 544 and 13000, Models 112TC and 112TCA, S/N 13001 thru 13309.
226	Servicing Engine Oil System	Models 112 and 112B, S/N 3 thru 544 and 13000. Models 112TC and 112TCA, S/N 13001 thru 13309.
230	Textron Lycoming Service Bulletin No. 518B	Models 112 and 112B, S/N 3 thru 544 and 13000, Models 112TC and 112TCA, S/N 13001 and Subs.
231	Airworthiness Directive 95-07-01	Models 112 and 112B, S/N 3 thru 544 and 13000, Models 112TC and 112TCA, S/N 13001 and Subs.
232	Textron Lycoming Service Bulletin No. 524	Model 112 and 112B, S/N 3 thru 544 and 13000, Model 112TC and 112TCA, S/N 13001 and Subs.

Model 114 Service Information Index (Cont)

230	Textron Lycoming Service Bulletin No. 518B	Model 114, 114A, and 114B S/N 14000 and Subs.
231	Airworthiness Directive 95-07-01	Model 114, 114A, and 114B S/N 14000 and Subs.
232	Textron Lycoming Service Bulletin No. 524	Model 114 and 114A, S/N 14000 thru 14540

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-233
Date March 25, 1997

TEXTRON LYCOMING
SERVICE BULLETIN NO. 526

MODELS AFFECTED: Model 112TC and Model 112TCA, S/N 13000 and subsequent, Model 114 and Model 114A, S/N 14000 thru 14540

REASON FOR PUBLICATION: To advise Commander owners/operators of Textron Lycoming Service Bulletin No. 526

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with Textron Lycoming Service Bulletin No. 526 before further flight of aircraft.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic or equivalent

APPROVAL: Refer to Textron Lycoming Service Bulletin No. 526

ESTIMATED MAN HOURS: Contact Textron Lycoming Product Support

PARTS DATA: Refer to Textron Lycoming Service Bulletin No. 526

SPECIAL TOOLS: Refer to Textron Lycoming Service Bulletin No. 526

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Textron Lycoming Service Bulletin No. 526

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Textron Lycoming Service Bulletin No. 526, dated February 24, 1997, accomplished _____(date)_____.

TEXTRON Lycoming

652 Oliver Street
Williamsport, PA 17701 U.S.A.
717/323-6181

MANDATORY SERVICE BULLETIN

DATE: February 24, 1997

Service Bulletin No. 526
Engineering Aspects are
FAA Approved

SUBJECT: Replacement of Impulse Coupling Springs or Impulse Coupling Assembly on TCM (Bendix) D-2000 and D-3000 Impulse Dual Magnetos

MODELS AFFECTED: The following Textron Lycoming engines employing D-2000 or D-3000 TCM (Bendix) dual magnetos with impulse couplings:

O-320-H2AD; **O-360**-A1AD, -A1F6D, -A1G6D, -A1LD, -A3AD, -A4AD, -A5AD, -E1A6D; **IO-360**-A1B6D, -A1D6D, -A3B6D, -A3D6D, -C1E6D, -J1A6D; **HIO-360**-E1AD; **LO-360**-A1G6D, -E1A6D; **LTO-360**-E1A6D; **TO-360**-C1A6D, -E1A6D, -F1A6D; **TIO-360**-C1A6D; **O-540**-J1A5D, -J1C5D, -J2A5D, -J2C5D, -J3A5D, -J3C5D, -L3C5D; **IO-540**-C4D5D, -K1A5D, -K1B5D, -K1E5D, -K1G5D, -L1A5D, -M1B5D, -T4A5D, -T4B5D, -U1A5D, -U1B5D, -V4A5D, -W1A5D, -W3A5D; **AEIO-540**-L1B5D; **TIO-540**-S1AD, -AB1AD, -AB1BD.

TIME OF COMPLIANCE: Before next flight for all new or overhauled dual D-2000 and D-3000 impulse magnetos in service more than 4 years.
Dual D-2000 and D-3000 impulse magnetos in service less than 4 years, compliance at engine overhaul or 4 years, whichever is sooner (or earlier at owner's discretion).

Textron Lycoming has received several reports from the field that dual D-2000 and D-3000 impulse coupling springs in service more than 4 years have broken in flight. These impulse coupling springs should have been replaced after 4 years in service in accordance with Teledyne Continental Motors Service Bulletin No. SB643, which requires magneto overhaul every 4 years or at engine overhaul, whichever is sooner.

This overhaul should be made in accordance with TCM (Bendix) instructions in their Service Support Manual, number X42003 (latest revision) for the D-3000 series High Tension Ignition Systems. Be sure to install a new impulse coupling spring during the magneto overhaul as specified by the TCM publication.

WARNING

FAILURE TO COMPLY WITH THIS SERVICE BULLETIN MAY RESULT IN A TOTAL LOSS OF ENGINE POWER.

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-234
Date March 26, 1997

TEXTRON LYCOMING
SERVICE BULLETIN NO. 425C

MODELS AFFECTED: Model 112 and 112B, S/N 3 thru 544 and 13000,
Model 112TC and 112TCA, S/N 13001 and Subs.
Model 114 and Model 114A, S/N 14000 thru 14540

REASON FOR PUBLICATION: To advise Commander owners/operators of Textron Lycoming Service Bulletin No. 425C

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with Textron Lycoming Service Bulletin No. 425C before further flight of aircraft.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic or equivalent

APPROVAL: Refer to Textron Lycoming Service Bulletin No. 425C

ESTIMATED MAN HOURS: Contact Textron Lycoming Product Support

PARTS DATA: Refer to Textron Lycoming Service Bulletin No. 425C

SPECIAL TOOLS: Refer to Textron Lycoming Service Bulletin No. 425C

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Textron Lycoming Service Bulletin No. 425C

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Textron Lycoming Service Bulletin No. 425C, dated March 14, 1997, accomplished _____(date)_____.

TEXTRON Lycoming

652 Oliver Street
Williamsport, PA 17701 U.S.A.
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.

ISSUED			REVISED			TELEDYNE CONTINENTAL MOTORS	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR	P.O. BOX 90 • MOBILE, ALABAMA 36601 (205) 438-3411	1 OF 6	
04	04	94						

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.

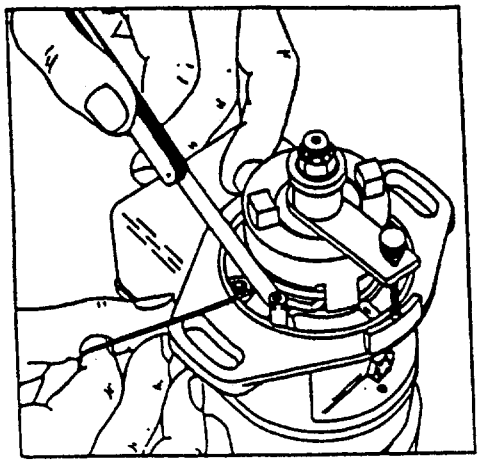


FIGURE 1. INSPECTION SET-UP

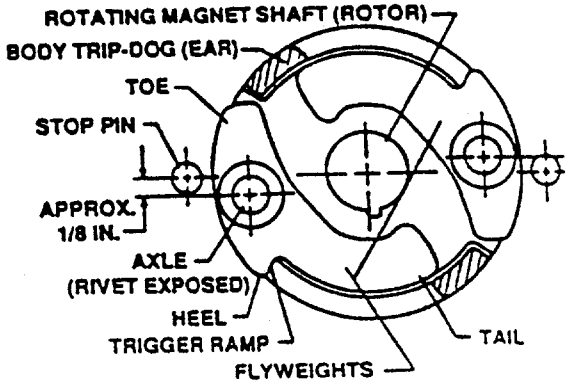
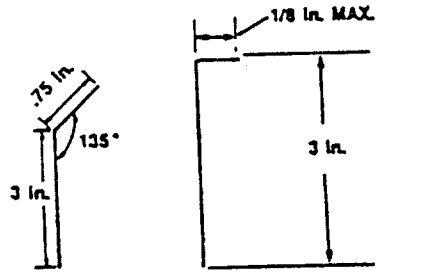


FIGURE 2. FLYWEIGHT TERMINOLOGY AND POSITIONING



MATERIAL: .050 in stiff wire
(I.e. Heavy Duty Paper Clip)

FIGURE 3. WIRE HOOK CONFIGURATIONS
ALL DIMENSIONS ARE APPROXIMATE

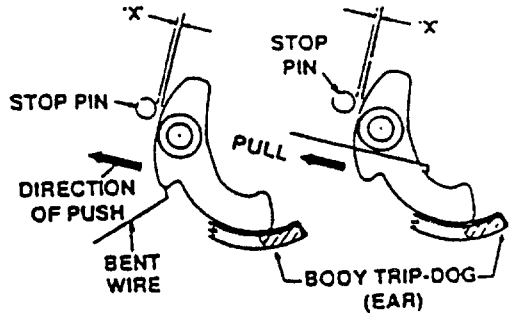


FIGURE 4. "X" VALUE MEASUREMENT

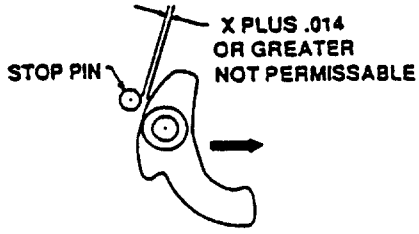


FIGURE 5. FLYWEIGHT TO AXLE WEAR CHECK

ISSUED			REVISED			TELEDYNE CONTINENTAL MOTORS P.O. BOX 90 • MOBILE, ALABAMA 36601 (205) 438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		3 OF 6	
04	04	94	-	-	-			

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.

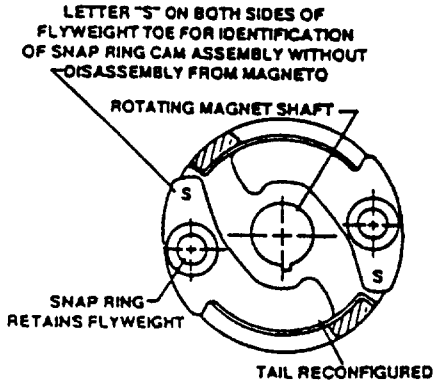


FIGURE 6. SNAP-RING CAM ASSEMBLY IDENTIFICATION

TABLE 2

SNAP RING IMPULSE COUPLING TEST LIMITS

MAGNETO TYPE	FULL ENGAGEMENT SPEED (RPM)	FULL DISENGAGEMENT SPEED (RPM)
D6LN-3000 D6LN-2031	0-75 Minimum	450 Maximum
All others.	0-125 Minimum	450 Maximum

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/N	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	10-349363	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

CONTINUED

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	10-400166-5
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	10-400166-5
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.

ISSUED			REVISED			TELEDYNE CONTINENTAL MOTORS	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR	P.O. BOX 90 • MOBILE, ALABAMA 36601 (205) 438-3411	6 OF 6	
04	04	94	-	-	-			

Service Information

TWIN COMMANDER
AIRCRAFT CORPORATION
P.O. Box 3369
Arlington, WA 98223
Tel: (206) 435-9797 Fax: (206) 435-1112

Service Information number 236, rev A
August 2, 1995

INSPECTION AND REPLACEMENT OF FLUID LINES

Models affected: All Twin Commander airplanes

Reason for publication: To recommend replacement of all hoses installed in engine compartment after a maximum of 10 years time in service and to recommend inspection of all other fluid hoses and lines annually.

Compliance: Twin Commander Aircraft Corporation recommends the part replacement and inspection intervals stated in this publication.

By whom work will be accomplished: A & P mechanic or equivalent

Approval: This Service Information is FAA approved.

Estimated man hours: 2 hours per side

Special tools: None

Accomplishment instructions:

Replace all engine compartment hoses with new hoses after a maximum of 10 years in service. This applies to all hoses installed forward of the engine compartment firewall. Inspect all tubing and fittings. Replace or repair any worn, damaged, or corroded fittings and tubes.

Inspect all fuel, oil, and hydraulic hoses, tubes, and fittings in the airplane at every annual inspection. Replace any worn or damaged hoses, regardless of age. Replace or repair any worn, damaged, or corroded fittings and tubes.

Note: Replacement hoses may differ in construction and outside diameter from original hoses. Be sure that clamps properly secure the hoses. It may be necessary to change to different size clamps.

Electrical load: No change

Weight and balance: No change

Spares affected: No

Record compliance: Make an entry in the airplane maintenance records as follows: "All engine compartment hoses replaced [date] in accordance with SI-236A, dated 8-2-95".

Service Information

TWIN COMMANDER AIRCRAFT CORPORATION

P.O. Box 3369, Arlington, WA 98223
(360) 435-9797 fax (360) 435-1112

Service Information 238
January 16, 1996

DEICER BOOT INSTALLATION

Models affected: all airplanes with deice boots.

Summary: This information updates the maintenance manual instructions for installing deice boots.

Compliance: When deice boots are replaced.

By whom work will be accomplished: A & P mechanic.

Approval: This Service Information is FAA approved.

Instructions:

Follow the instructions in the maintenance manual when installing deice boots, with the following updates and clarifications.

1) Cement 1300L is equivalent to EC-1403 and may be used in its place.
2) Toluol may be used anyplace that MEK is called for.
3) ProSeal 890 may be used in place of EC1031 and EC801 fillers.
4) Boots manufactured by Aerazur do not require Icex or conductive paint.
5) It is important that the mounting surface of the boots and the airplane be thoroughly cleaned.
6) It is important that the curing times and temperatures be observed: 24 hours at temperatures of 60°F and above, or 72 hours at temperatures below 60°F.
7) Boots on the right side of the airplane must be the same, except for being opposite, as the corresponding boots on the left. In particular, they must have been made by the same manufacturer.
8) It is recommended that when a boot on one side of the airplane is replaced that the boot on the other side be replaced at the same time.

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-230
Date April 10, 1995

TEXTRON LYCOMING
SERVICE BULLETIN NO. 518B

MODELS AFFECTED: Models 112 and 112B, S/N's 3 thru 544 and 13000
Models 112TC and 112TCA, S/N's 13001 and Subs.
Models 114, 114A, and 114B, S/N's 14000 and Subs.

REASON FOR PUBLICATION: To advise Commander owners/operators of Textron Lycoming Service Bulletin No. 518B

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with this Service Bulletin

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic

APPROVAL: See Textron Lycoming Service Bulletin No. 518B

ESTIMATED MAN HOURS: .75 hours

PARTS DATA: See Textron Lycoming Service Bulletin No. 518B

SPECIAL TOOLS: None

ACCOMPLISHMENT INSTRUCTIONS: See Textron Lycoming Service Bulletin No. 518B

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Textron Lycoming Service Bulletin No. 518B , dated March 21, 1995, accomplished _____(date)_____.

TEXTRON Lycoming

Reciprocating Engine Division/
Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701 U.S.A.

MANDATORY

SERVICE BULLETIN

DATE: March 21, 1995

Service Bulletin No. 518B
(Supersedes Service Bulletin No. 518A)
Engineering Aspects are
FAA Approved

SUBJECT: Inspection of Thermostatic Bypass Valves

MODELS AFFECTED: All Textron Lycoming engines employing thermostatic bypass valves P/N 53E19600 (except with serial numbers 53788 and higher), P/N 75944, P/N LW-13230 and P/N 53E19980 (except with serial numbers 159 and higher).

TIME OF COMPLIANCE: At next oil change, not to exceed 50 hours, and then annually thereafter.

Textron Lycoming has received reports that a number of thermostatic bypass valves are in service with loose crimp nuts. It has been shown that the nut can work free and drop into the engine causing engine damage.

All subject thermostatic bypass valves must be inspected at next oil change, not to exceed 50 hours, with subsequent inspection each year thereafter. Thermostatic bypass valve P/N 53E19600 with serial numbers 53788 and higher and P/N 53E19980 with serial number 159 and higher are not subject to the initial inspection or the annual inspection.

A physical inspection of the crimp nut is required to ensure it is seated and solid on the shaft. Separate the seat and retaining nut by holding the valve assembly in one hand and compressing the valve spring with the forefinger and thumb. (See Figure 1.) With the seat and nut separated, grasp the crimp nut with the other hand and attempt to move it. The crimp nut must not move. If the thermostatic bypass valve assembly does not meet this inspection, it must be replaced immediately.

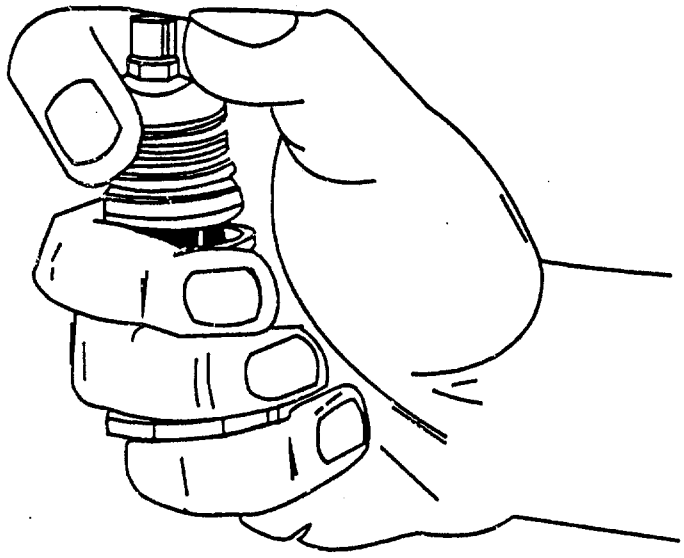


Figure 1.

Make appropriate log book entries for each inspection.

Normal warranty policy applies.

NOTE

All thermostatic bypass valves must be replaced at overhaul.

NOTE: Revision "B" revises text.

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-231
Date April 17, 1995

AIRWORTHINESS DIRECTIVE
95-07-01

MODELS AFFECTED: Model 112 and 112B, S/N 3 thru 544 and 13000
Model 112TC and 112TCA, S/N 13001 and Subsequent
Model 114, Model 114A, and Model 114B, S/N 14000 and Subsequent

REASON FOR PUBLICATION: To advise Commander owners/operators of Airworthiness Directive 95-07-01

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with Airworthiness Directive 95-07-01

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic

APPROVAL: Refer to Airworthiness Directive 95-07-01

ESTIMATED MAN HOURS: _____ hours

PARTS DATA: Refer to Airworthiness Directive 95-07-01

SPECIAL TOOLS: Refer to Airworthiness Directive 95-07-01

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Airworthiness Directive 95-07-01

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Airworthiness Directive 95-07-01 , dated March 17, 1995, accomplished _____(date)_____.

PRIORITY LETTER AIRWORTHINESS DIRECTIVE

REGULATORY SUPPORT DIVISION
P.O. BOX 26460
OKLAHOMA CITY, OKLAHOMA 73125-0460

U.S. Department
of Transportation
Federal Aviation
Administration

DATE: March 17, 1995
95-07-01

This priority letter Airworthiness Directive (AD) is prompted by reports of connecting rod bolt failures on Textron Lycoming O-360, LO-360, HO-360, HIO-360, TIO-360, LIO-360, AEIO-360, O-540, IO-540, TIO-540, LTIO-540, IVO-540, AEIO-540, TIO-541, and IO-720 series reciprocating engines. These connecting rod bolts failed with no particular pattern. The head of the bolt sheared off on some, while others failed at the threads and some at the shank. Examination of test specimens indicate that these connecting rod bolts were fabricated by machining bar stock material, including the head region, thus exposing end-grains in the head-to-shank radius. These connecting rod bolts exhibit extremely small fillet radii, numerous deep machining grooves, and inadequate material selection.

In a letter dated December 15, 1994, Superior Air Parts, Inc., advised the FAA that several connecting rod bolts had fractured in service on a Cessna 177RG on December 9, 1994. The pilot completed a power-off landing with no injuries. In a letter dated January 24, 1995, Textron Lycoming advised the FAA that their laboratory analysis indicated that the failed connecting rod bolts appeared to be suspected unapproved parts. A Superior Air Parts, Inc., report of their own laboratory analysis, dated January 3, 1995, was presented to the FAA in mid-February. Another connecting rod bolt failure was identified during maintenance on a Piper PA-60 on February 21, 1995. Superior Air Parts, Inc. advised the FAA of the second failure on the following day. The FAA had already initiated an independent laboratory analysis of a sample of suspect unapproved connecting rod bolts and received a report on February 23, 1995, which concluded that the connecting rod bolts did not meet material or design specifications. That report corroborated Superior Air Parts, Inc.'s and Textron Lycoming's earlier findings. Subsequent investigation revealed that of the 3,382 connecting rod bolts in the original Superior Air Parts, Inc. inventory, 2,473 had been shipped. The FAA considered all possible actions and concluded that the only prudent course of action was to issue this priority letter AD.

These connecting rod bolts were shipped from Superior Air Parts, Inc., between February 15, 1994, and December 20, 1994, as replacements for Textron Lycoming connecting rod bolts, Part Number (P/N) 75060, or Superior Air Parts, Inc., connecting rod bolts, P/N SL75060, or Aircraft Technologies, Inc. P/N AL75060. However, the failed parts have no markings to identify them. The traceability of these bolts is extremely difficult, and the FAA has determined that the vast majority of the bolts distributed cannot be recovered, nor can they be identified by a routine records search of engines which have been overhauled since February 15, 1994. The FAA has concluded that all engines which may have been overhauled using these connecting rod bolts must be visually inspected for the installation of unmarked connecting rod bolts. Further, since it is impossible to analytically determine how long these connecting rod bolts as installed may remain intact, this AD must be complied with before further flight. Therefore, all connecting rod bolts with no markings must be considered suspect unapproved parts. This condition, if not corrected, could result in engine failure due to connecting rod bolt failure, which could result in damage to or loss of the aircraft.

Also, during the investigation the FAA determined that only unmarked 75060 connecting rod bolts shipped from Superior Air Parts, Inc., between February 15, 1994, and December 20, 1994, are considered suspect unapproved parts. Approved serviceable parts can be readily identified by raised letters SPS, S, C, or FC, identifying them as Textron Lycoming parts, or SL75060 etched on the head identifying them as PMA parts manufactured by Superior Air Parts, Inc., or AL75060 forged into the head, identifying them as PMA parts manufactured by Aircraft Technologies, Inc.

Since an unsafe condition has been identified that is likely to exist or develop on other engines of this same type design, this AD requires removal prior to further flight of suspect unapproved connecting rod bolts and replacement with serviceable connecting rod bolts. Suspect unapproved connecting rod bolts may be identified as those bolts that are not clearly marked on the head by raised letters SPS, S, C, or FC, identifying them as Textron Lycoming parts, or not clearly marked with SL75060 etched on the head, identifying them as PMA parts manufactured by Superior Air Parts, Inc., or not clearly forged into the head with AL75060, identifying them as PMA parts manufactured by Aircraft Technologies, Inc.

This rule is issued under 49 U.S.C. Section 44701 (formerly section 601 of the Federal Aviation Act of 1958) pursuant to the authority delegated to me by the Administrator, and is effective immediately upon receipt of this priority letter.

95-07-01 Textron Lycoming: Priority Letter issued on March 17, 1995. Docket No. 95-ANE-14.

Applicability: The following Textron Lycoming reciprocating engine models, assembled on or after February 15, 1994, and that contain connecting rod bolts shipped directly or indirectly from Superior Air Parts, Inc., on or after February 15, 1994:

O-360-A1A, -A1AD, -A1C, -A1D, -A1F6, -A1F6D, -A1G6, -A1G6D, -A1LD, -A2A, -A2D, -A2E, -A2F, -A2G, -A3A, -A3AD, -A4A, -A4G, -A4J, -A4K, -A4M, -A4N, -A5AD, -B2A, -C1A, -C1C, -C1E, -C1F, -C1G, -C2A, -C2C, -C2D, -C2E, -D2A, -D2B, -F1A6; IO-360-A1A, -A1B, -A1B6, -A1B6D, -A1C, -A1D, -A1D6, -A2A, -A2B, -A3B6D, -B1A, -B1B, -B1D, -B1E, -B1F, -B2F, -B2F6, -B4A, -C1A, -C1B, -C1C6, -C1D6, -C1E6, -C1F, -J1A6D; AIO-360-A1A, -A1B, -B1B; LO-360-A1G6D; HO-360-B1A, -B1B; HIO-360-A1A, -B1A, -C1A, -C1B, -E1AD, -E1BD; LIO-360-C1E6; TIO-360-A1B; AEIO-360-A1E, -B1G6, -H1A; O-540-A1A, -A1A5, -A1B5, -A1C5, -A1D, -A1D5, -A2B, -A3D5, -B1A5, -B1B5, -B2B5, -B2C5, -B4B5, -E4A5, -E4B5, -E4C5, -F1A5, -F1B5, -G1A5, -G2A5, -H1B5D, -H2B5D, -J1A5D, -J3A5D, -J3C5D, -L3C5D; IO-540-A1A5, -B1A5, -B1C5, -C1B5, -C4B5, -C4C5, -C4D5D, -D4A5, -E1A5, -E1B5, -G1A5, -G1B5, -G1C5, -G1D5, -G1E5, -G1F5, -J4A5, -K1A5, -K1A5D, -K1B5, -K1C5, -K1D5, -K1E5, K1K5, -M1A5, -N1A5, -P1A5, -R1A5, -T4C5D, -K1F5, -K1F5D, -K1G5, -K1G5D, -K1J5D, -K1K5, -M1QA5, -M1B5D, -N1A5, -P1A5, -R1A5, -S1A5, -T4A5D, -T4B5D, -T4CTD, -V4A5D, -W1A5D, -W3A5D, -AA1A5; TIO-540-A1A, -A1B, -A2A, -A2B, -A2C, -C1A, -E1A, -G1A, -H1A, -J2B, -F2BD, -J2BD, -N2BD, -R2AD, -S1AD, -AA1AD, -AB1AD; LTIO-540-J2B, -F2BD, -J2BD, -N2BD, -R2AD; IVO-540-A1A; AEIO-540-D4B5; TIO-541-A1A, -E1A4, -E1B4, -E1C4; IO-720-A1A, -A1B, -B1B, -B1BD, -C1B, and -D1B.

These engines are installed on but not limited to the following aircraft:
Beech series 95, 23, 76,60; Piper series PA-24, PA-44, PA-28, PA-34, PA-23, PA-25, PA-32, PA-60, PA-31; Aero Commander (Intermountain, Callair, Aeronautical Agricola Mexicana, Twin Commander Aircraft Corp.) series A-6, A-9, 100, 500; Lake Aircraft Corporation (Consolidated Aero., Inc., REVO) series C-2, LA-4; Mooney Aircraft Corp. series M-20, M-22; Sud Aviation GY-180; Partenavia series P-68; Siai-Marchetti (Agusta S.p.A) series S.205, S.210, F.260, S.208; Procaer series F 15; SOCATA series TB10, MS-893, 235, TB20, TB21; Teal Aircraft Corporation (Bohica) TWC-1; Avions Mudry et Cie CAP 10; Augustair (Montanair, Inc.) 2150; Grumman American (American General Aircraft Holding Co., Inc.) AA-5 series; Fuji Heavy Industries, Ltd. FA-200 series; Bellanca (American Champion Aircraft Corp.) Aircraft 8GCBC, 8KCAB; Maule Aerospace Technology Corp. series MX-7, M5, M-6; Christen A-1, (Pitts) S1T; Schweizer Aircraft Corp.(Hughes, McDonnell Douglas) 269A series; Rockwell (Commander Aircraft Company) series 112, 114; Moravan ZLIN Z 242L; Slingsby Aviation Limited T67M; Enstrom F-28 series; Found Brothers Aviation Ltd. FBA-2C, FBA Centennial "100"; Dornier Luftfahrt GmbH DO-28 series; Spinks Industries, M.H. Spinks, Sr. Rawdon T-1; Pilatus Britten-Norman BN-2 series; Omega Aircraft Corporation BS-12D1; Robinson R-44 series; Aerostar Aircraft Corp. (Piper, Ted Smith); Brantly Helicopters Industries U.S.A. Co., Ltd. 305; Pacific Aerospace Corp., Ltd. FU-24-954 series.

NOTE: This AD applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must use the authority provided in paragraph (g) to request approval from the FAA. This approval may address either no action, if the current configuration eliminates the unsafe condition, or different action necessary to address the unsafe condition described in this AD. Such a request should include an assessment of the effect of the changed configuration on the unsafe condition addressed by this AD. In no case does the presence of any modification, alteration, or repair remove any engine from the applicability of this AD.

Compliance: Required as indicated, unless accomplished previously.

To prevent engine failure due to connecting rod bolt failure, which could result in damage to or loss of the aircraft, accomplish the following:

(a) Prior to further flight, determine if the engine has been assembled on or after February 15, 1994. This AD does not apply to engines assembled prior to February 15, 1994.

(b) For the purpose of this AD, assembled is defined as the construction of an engine from its component parts for any purpose, such as, but not limited to, overhaul and inspection.

(c) For engines assembled on or after February 15, 1994, prior to further flight, determine if any connecting rod bolts were replaced during assembly. This AD applies only to engines that had connecting rod bolts replaced on or after February 15, 1994.

(d) For engines that contain replacement connecting rod bolts installed on or after February 15, 1994, prior to further flight, determine if any of those replacement connecting rod bolts were purchased directly from Textron Lycoming or Aircraft Technologies, Inc. This AD does not apply to engines with replacement connecting rod bolts purchased directly from Textron Lycoming or Aircraft Technologies, Inc. In addition, this AD does not apply to engines that were manufactured or remanufactured at Textron Lycoming.

(e) For engines that contain replacement connecting rod bolts installed on or after February 15, 1994, that were not purchased directly from Textron Lycoming or Aircraft Technologies, Inc., prior to further flight, visually inspect to determine if the connecting rod bolts are clearly identified by raised letters SPS, S, C, or FC, identifying them as Textron Lycoming parts, or SL75060 etched on the head, identifying them as PMA parts manufactured by Superior Air Parts, Inc., or AL75060 forged into the head, identifying them as PMA parts manufactured by Aircraft Technologies, Inc. If the connecting rod bolts can be positively identified, as provided in this paragraph, then no further action is required.

(f) If the connecting rod bolts can not be positively identified in accordance with paragraph (e) of this AD, prior to further flight remove unapproved connecting rod bolts and replace with serviceable parts.

NOTE: Further information may be found in Superior Air Parts Service Bulletin No. 95-002, dated March 3, 1995, or by contacting Superior Air Parts, Inc., 14280 Gillis Rd., Dallas, TX 75244-3792; telephone (800) 487-4884.

(g) An alternative method of compliance that provides an acceptable level of safety may be used if approved by the Manager, Special Certification Office. The request should be forwarded through an appropriate FAA Maintenance Inspector, who may add comments and then send it to the Manager, Special Certification Office.

NOTE: Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the Special Certification Office.

(h) Special flight permits shall not be issued.

(i) Priority Letter AD 95-07-01, issued March 17, 1995, becomes effective upon receipt.

FOR FURTHER INFORMATION CONTACT: Richard D. Karanian, Aerospace Engineer, Special Certification Office, FAA, Rotorcraft Directorate, 2601 Meacham Blvd., Fort Worth, TX 76137-4298; telephone (817) 222-5195, fax (817) 222-5959; or Locke Easton, Aerospace Engineer, Engine and Propeller Standards Staff, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803-5299; telephone (617) 238-7113, fax (617) 238-7199.

Service Information

Commander
AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-235
Date July 21, 1997

TEXTRON LYCOMING
SERVICE BULLETIN NO. 527C

MODELS AFFECTED: Model 112TC and 112TCA, S/N 13001 thru 13309
Model 114 and 114A, S/N 14000 thru 14540
Model 114B, S/N 14541 thru 14647

REASON FOR PUBLICATION: To advise Commander owners/operators of Textron Lycoming Service Bulletin No. 527C

COMPLIANCE: Commander Aircraft Company **strongly recommends** compliance with Textron Lycoming Service Bulletin No. 527C.

Commander Aircraft Co. has reviewed Attachments I and II of Textron Lycoming Service Bulletin No. 527C (attachments not included in this Service Information Publication) and condensed information that directly affect Commander Aircraft Co. models into Tables 1 and 2.

Aircraft Model	Effectivity	Engine Model	New Engines	Overhauled and Remanufactured Engines
112TC 112TCA	S/N 13001 thru 13309	TO-360-C1A6D	-----	L-259-69A
114	S/N 14000 thru 14149	IO-540-T4A5D	See Table 2 for Cylinder Kit Serial Numbers	
		IO-540-T4B5D	----	L-14265-48A L-20393-48A RL-15001-48A
114 114A	S/N 14150 thru 14540	IO-540-T4B5D	-----	L-14265-48A L-20393-48A RL-15001-48A

Table 1. Attachment I

SERVICE INFORMATION NO. SI-235

Cylinder Kits containing P/N LW-14077 Piston Pin shipped during the time period December 15, 1995 thru September 17, 1996 are as follows:							
05K21100	05K21101	05K21102	05K21103	05K21104	05K21108	05K21109	05K21110
05K21112	05K21116	05K21118	05K21119	05K21120	05K21121	05K21122	05K21124
05K21192	05K21204	05K21223	05K21226	05K21228	05K21234	05K21241	05K21242
05K21260	05K21262	05K21264	05K21265	05K21269	05K21270	05K21272	05K21273
05K21274	05K21276	05K21278	05K21745	05K22128	05K22129	05K22177	

Table 2. Attachment II

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic or equivalent

APPROVAL: Refer to Textron Lycoming Service Bulletin No. 527C

ESTIMATED MAN HOURS: Contact Textron Lycoming Product Support

PARTS DATA: Refer to Textron Lycoming Service Bulletin No. 527C

SPECIAL TOOLS: Refer to Textron Lycoming Service Bulletin No. 527C

ACCOMPLISHMENT INSTRUCTIONS:

1. Comply with Textron Lycoming Service Bulletin No. 527C

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

SPARES AFFECTED: N/A

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in the airplane maintenance records as follows: Textron Lycoming Service Bulletin No. 527C, dated April 18, 1997, accomplished _____(date)_____.

2

TEXTRON Lycoming

652 Oliver Street
Williamsport, PA 17701 U.S.A.
717/323-6181

MANDATORY

SERVICE BULLETIN

DATE: April 18, 1997

Service Bulletin No. 527C
(Supersedes Service Bulletin No. 527B)
Engineering Aspects are
FAA Approved

SUBJECT: Recall of Piston Pin Part No. LW-14077

MODELS AFFECTED: The following Textron Lycoming engine models could contain P/N LW-14077 piston pins:
O-320, (L)IO-320, AIO-320, AEIO-320.
(L)O-360, (L)IO-360, VO/IVO-360, HO-360, (L)HIO-360, AIO-360, AEIO-360, (L)TO/(L)TIO-360.
O-480, GO-480, IGO-480, GSO-480, IGSO-480.
O-540 (except O-540-J1A5D, -J1C5D, -J2A5D, -J3A5D, -J3C5D, -L3C5D), IO-540 (except IO-540-W1A5D, -W3A5D, -AB1A5), AEIO-540, (L)TIO-540, VO-540, IVO-540, TVO-540, TIVO-540, HIO-540, IGO-540, IGSO-540.
TIO-541, TIGO-541.
IO-720 Series aircraft engines.

Serial numbers of all engines affected and shipped from Textron Lycoming are listed as Attachment I for this bulletin.

Cylinder kits with P/N LW-14077 piston pins shipped from Textron Lycoming during the time period December 15, 1995 thru September 17, 1996 are listed as Attachment II for this bulletin.

Piston pins P/N LW-14077 shipped as spares during the time period December 15, 1995 thru September 17, 1996.

NOTE

Revision C of this Service Bulletin adds engine models which may contain piston pin P/N LW-14077. It is mandatory that the "Models Affected" section and Attachment I be reviewed for applicability to engines, including cylinder kits and spares. If an engine or cylinder kit was inspected per the requirements specified in Service Bulletin No. 527B, the requirements for compliance to Service Bulletin No. 527C have been met.

TIME OF COMPLIANCE: Prior to accumulation of 50 hours of operation with affected parts or within one year from the date of this Service Bulletin, whichever occurs first. Inventory of cylinder kits within thirty days.

Textron Lycoming has determined that a quantity of piston pins have been manufactured which do not meet Textron Lycoming manufacturing specifications. Some piston pins may have imperfections with no visual method of detection. The subject piston pins are identified by the code number located on the end of the pin as shown in Figure 1.

The following actions are required by this bulletin:

1. It is mandatory that all piston pins marked with code 17328 (per Figure 1) installed in engines manufactured and shipped from Textron Lycoming be removed from affected engines and returned to Textron Lycoming, Williamsport, PA. Subject engines are listed by models and serial numbers following the text of this bulletin. Satisfactory replacement pins are marked with codes BN or 71238 as shown in Figure 1.

2. Engines overhauled in the field using Piston Pin(s) P/N LW-14077 that were obtained during the time period December 15, 1995 thru September 17, 1996 must also have the piston pin(s) that are marked with code 17328 (per Figure 1) removed and returned to Textron Lycoming. Satisfactory replacement pins are marked with codes BN or 71238 as shown in Figure 1.

3. Any cylinder kits that were obtained/installed on engines during the time period December 15, 1995 thru September 17, 1996 that contain LW-14077 piston pins must have piston pin(s) that are marked with code 17328 (per Figure 1) removed and returned to Textron Lycoming. Satisfactory replacement pins are marked with codes BN or 71238 as shown in Figure 1.

a. If the cylinder kit has been installed on an engine, the cylinder assembly rocker cover flange must be inspected for a lot number which is permanent ink stamped on the flange (refer to Figure 2). The rocker cover must be removed to examine the lot number. Only the four or five digit number should be used for inspection. Any prefix letters should be ignored. Any five digit lot number and any cylinder marked with a four digit lot number less than 2450 requires the piston pin to be inspected for code marking as per Figure 1. If the four digit lot number is 2450 or greater, no further inspection is required.

b. Any cylinder kits which are still in kit form should be inspected for the date code which is stamped on top of the box. If the date code is between December 15, 1995 thru May 17, 1996 the piston pins should be inspected for the 17328 code and replaced. After this inspection the cylinder kit should be marked with permanent ink stating this cylinder kit complies with Service Bulletin No. 527C.

4. Any Piston Pin(s), LW-14077 obtained individually as spares during the time period December 15, 1995 thru September 17, 1996 that are marked with code 17328, must also be returned to Textron Lycoming, Williamsport, PA.

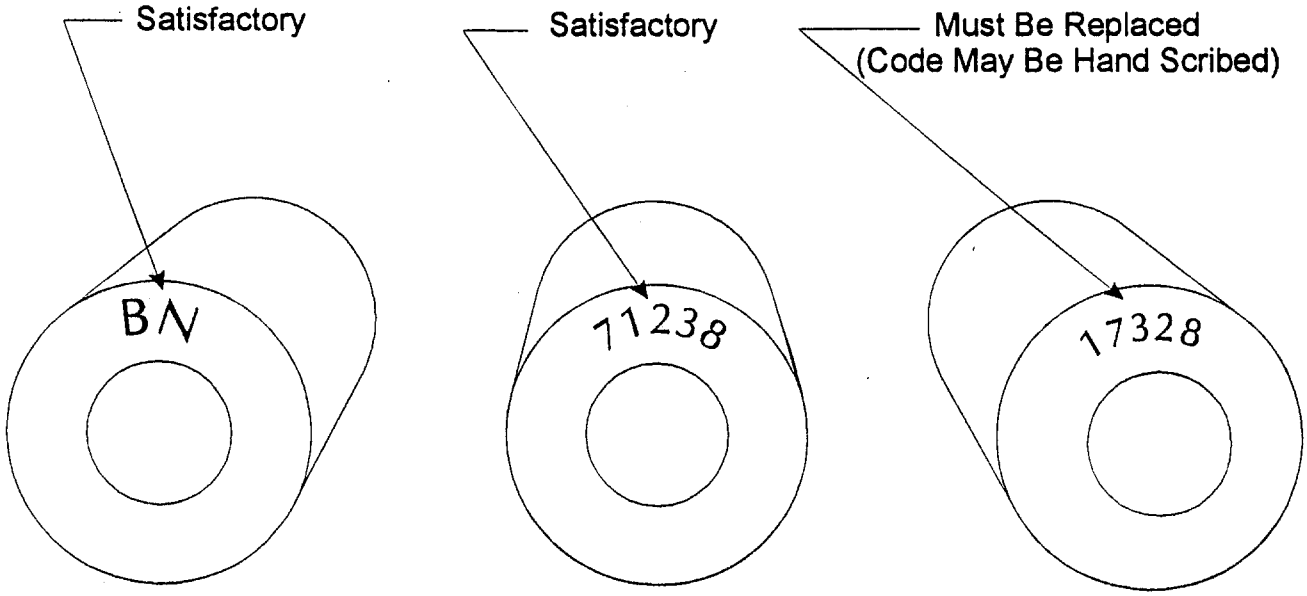


Figure 1.

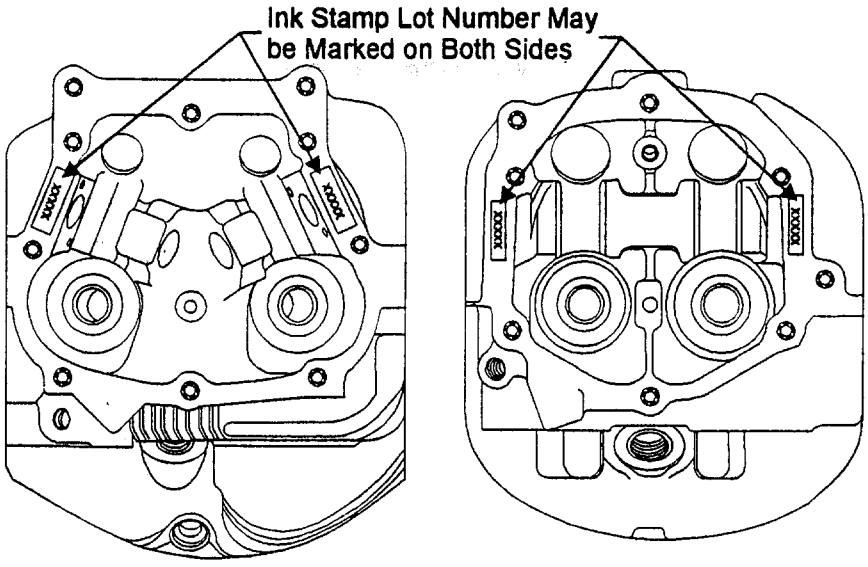
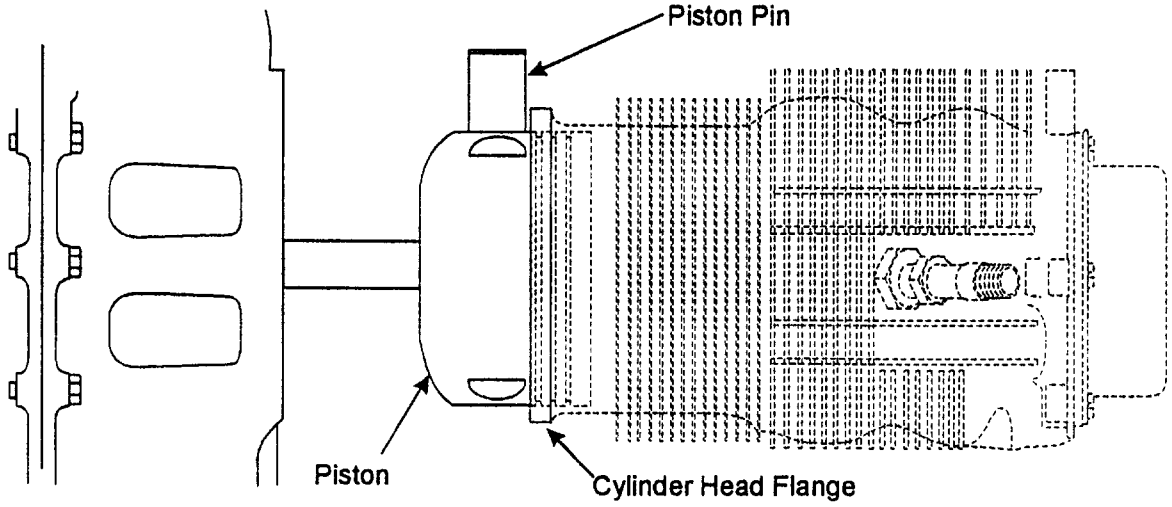


Figure 2.



NOTE

When removing cylinders for piston pin inspection, slide cylinder only far enough to allow removal of the pin without allowing rings to come out of cylinder as shown in Figure 3. It is not necessary to remove the piston from the cylinder for this inspection.

Figure 3.

Engine models affected must have the piston pins inspected, and if needed, replacement pins reinstalled in accordance with the appropriate overhaul manual procedures and all applicable service literature.

After completion of this work, a logbook entry is required, stating that the engine has been inspected and complies with this Service Bulletin.

WARRANTY:

Cylinder Kit or Piston Pin P/N LW-14077 – It will be necessary to supply proof of purchase; copy of work order or purchase order to a Textron Lycoming Distributor for the issuance of credit.

MATERIAL: If required, by inspection, one (1) each replacement piston pin P/N LW-14077 per cylinder, through a Textron Lycoming Distributor.

LABOR: Labor costs can be recovered by submitting a warranty application through an authorized Textron Lycoming Distributor.

Labor Allowances:	For Fixed Wing Aircraft -	Not to exceed 13 Hours for 4 Cylinder Engines. Not to exceed 22 Hours for 6 Cylinder Engines
	For Turbocharged Aircraft	Not to exceed 16 Hours for 4 Cylinder Engines Not to exceed 26 Hours for 6 Cylinder Engines Not to exceed 36 Hours for TIO-540-AE2A Not to exceed 30 Hours for TIO-540-AF1A/B
	For Helicopters	Not to exceed 22 Hours for 4 Cylinder Engines Not to exceed 30 Hours for 6 Cylinder Engines

Labor and material allowances will be effective until one (1) year from date of this Bulletin.

Replacement pins should be ordered through your authorized Textron Lycoming Distributor. Return subject piston pins through normal warranty procedure.

NEW ENGINES:

O-320-B2B - L-18437-39A, L-18441-39A, L-18446-39A.
O-320-D1A - L-18438-39A, L-18439-39A, L-18440-39A, L-18443-39A, L-18444-39A, L-18445-39A, L-18448-39A, L-18453-39A, L-18454-39A, L-18465-39A, L-18471-39A, L-18475-39A, L-18481-39A, L-18482-39A, L-18483-39A.
O-320-D1F - L-18447-39A, L-18474-39A, L-18477-39A.
O-320-D2A - L-18449-39A, L-18450-39A, L-18451-39A, L-18452-39A, L-18455-39A, L-18456-39A, L-18457-39A, L-18458-39A, L-18459-39A, L-18460-39A, L-18461-39A, L-18462-39A, L-18463-39A, L-18464-39A, L-18466-39A, L-18468-39A, L-18469-39A, L-18470-39A, L-18472-39A.
O-320-D3G - L-18476-39A, L-18480-39A.
O-320-E2A - L-50590-27A, L-50591-27A.
IO-320-D1B - L-5982-55A.
O-360-A1A - L-34859-36A, L-34861-36A, L-34862-36A, L-34863-36A, L-34879-36A, L-34881-36A, L-34882-36A, L-34888-36A, L-34917-36A, L-34918-36A, L-34919-36A, L-34921-36A, L-34926-36A, L-34947-36A, L-34948-36A, L-34950-36A, L-34990-36A, L-34991-36A, L-35011-36A.
O-360-A1AD - L-34858-36A, L-34872-36A, L-34873-36A, L-34874-36A, L-34898-36A, L-34899-36A, L-34901-36A.
O-360-A1F6 - L-34850-36A, L-34851-36A, L-34852-36A.
O-360-A1F6D - L-34971-36A.
O-360-A1H6 - L-34886-36A, L-34943-36A.
O-360-A1P - L-34842-36A, L-34870-36A, L-34871-36A, L-34889-36A, L-34897-36A, L-34920-36A, L-34946-36A, L-34949-36A, L-34956-36A, L-34966-36A, L-34987-36A.
O-360-A3A - L-34843-36A, L-34884-36A, L-34885-36A.
O-360-A4H - L-34518-36A.
O-360-A4M - L-34833-36A, L-34848-36A, L-34849-36A, L-34854-36A, L-34855-36A, L-34860-36A, L-34876-36A, L-34877-37A, L-34880-36A, L-34905-36A, L-34906-36A, L-34916-36A, L-34922-36A, L-34925-36A, L-34934-36A, L-34937-36A, L-34938-36A, L-34939-36A, L-34940-36A, L-34945-36A, L-34955-36A, L-34959-36A, L-34960-36A, L-34962-36A, L-34965-36A, L-34968-36A, L-34969-36A, L-34970-36A, L-34976-36A, L-34977-36A, L-34978-36A, L-34979-36A, L-34981-36A, L-34982-36A, L-34983-36A, L-34984-36A, L-34988-36A, L-34989-36A, L-34994-36A.
O-360-C1F - L-34864-36A, L-34867-36A, L-34902-36A, L-34903-36A, L-34929-36A, L-34930-36A, L-34931-36A, L-34932-36A.
O-360-C1G - L-34895-36A, L-34896-36A, L-34911-36A, L-34912-36A.
O-360-J2A - L-34844-36A, L-34845-36A, L-34846-36A, L-34847-36A, L-34893-36A, L-34894-36A, L-34900-36A, L-34904-36A, L-34907-36A, L-34913-36A, L-34914-36A, L-34915-36A, L-34927-36A, L-34928-36A, L-34935-36A, L-34936-36A, L-34944-36A, L-34953-36A, L-34954-36A, L-34957-36A, L-34958-36A, L-34963-36A, L-34964-36A, L-34974-36A, L-34999-36A, L-35001-36A, L-35002-36A, L-35003-36A.
IO-360-A1B6 - L-26793-51A, L-26794-51A, L-26795-51A, L-26800-51A, L-26801-51A, L-26805-51A, L-26814-51A, L-26815-51A, L-26816-51A.
IO-360-A3B6 - L-26780-51A, L-26796-51A, L-26797-51A, L-26802-51A, L-26806-51A, L-26807-51A, L-26808-51A, L-26820-51A, L-26827-51A, L-26837-51A.
IO-360-A3B6D - L-26809-51A.
IO-360-B1E - L-26829-51A, L-26838-51A, L-26840-51A.
IO-360-B1F - L-26778-51A, L-26779-51A, L-26823-51A.
IO-360-C1C6 - L-26791-51A, L-26803-51A, L-26813-51A.
IO-360-C1E6 - L-26776-51A, L-26777-51A, L-26787-51A, L-26834-51A.
IO-360-X128 - L-26858-51A.
IO-360-X129 - L-1308-00X, L-1309-00X.
HIO-360-D1A - L-26790-51A, L-26798-51A, L-26799-51A, L-26810-51A, L-26812-51A, L-26818-51A, L-26819-51A, L-26821-51A, L-26822-51A, L-26828-51A, L-26836-51A.
HIO-360-F1AD - L-26775-51A.
HO-360-C1A - L-34865-36A, L-34866-36A, L-34868-36A, L-34869-36A, L-34883-36A, L-34890-36A, L-34891-36A, L-34892-36A, L-34908-36A, L-34909-36A, L-34910-36A, L-34933-36A, L-34942-36A, L-34951-36A, L-34952-36A, L-34961-36A, L-34986-36A, L-34993-36A.
IVO-360-A1A - L-265-58A, L-266-58A, L-267-58A, L-268-58A, L-269-58A.
LO-360-A1H6 - L-586-71A, L-587-71A.
AEIO-360-A1E - L-26842-51A.
AEIO-360-B2F - L-26811-51A, L-26826-51A.
AEIO-360-H1B - L-26788-51A, L-26789-51A, L-26817-51A, L-26830-51A, L-26831-51A, L-26832-51A.
AEIO-360-A1B6 - L-26783-51A, L-26784-51A, L-26824-51A, L-26825-51A.
AEIO-360-A1E6 - L-26804-51A.
O-540-B4B5 - L-24960-40A.
O-540-E4A5 - L-24954-40A, L-24955-40A, L-24956-40A, L-24957-40A, L-24959-40A.

NEW ENGINES (Continued):

O-540-E4C5 - L-24946-40A, L-24947-40A.
O-540-F1B5 - L-24948-40A, L-24949-40A, L-24950-40A, L-24951-40A, L-24952-40A, L-24953-40A, L-24958-40A, L-24961-40A, L-24962-40A, L-24963-40A, L-24964-40A, L-24965-40A, L-24966-40A, L-24967-40A, L-24968-40A, L-24969-40A, L-24971-40A, L-24972-40A, L-24974-40A, L-24975-40A, L-24976-40A, L-24977-40A, L-24978-40A, L-24979-40A, L-24980-40A, L-24981-40A.
O-540-J3A5 - L-24944-40A, L-24945-40A, L-24970-40A, L-24973-40A.
IO-540-C4D5D - L-25763-48A, L-25764-48A, L-25765-48A, L-25783-48A, L-25784-48A, L-25790-48A, L-25791-48A, L-25801-48A, L-25802-48A.
IO-540-K1B5 - L-25774-48A, L-25807-48A, L-25815-48A.
IO-540-K1G5 - L-25754-48A, L-25758-48A, L-25762-48A, L-25766-48A, L-25767-48A, L-25768-48A, L-25781-48A, L-25782-48A, L-25785-48A, L-25786-48A, L-25789-48A, L-25792-48A, L-25793-48A, L-25795-48A, L-25803-48A, L-25804-48A, L-25813-48A, L-25818-48A.
IO-540-T4B5 - L-25799-48A.
TIO-540-AB1AD - L-9703-61A, L-9707-61A, L-9724-61A.
TIO-540-AE2A - L-9674-61A, L-9685-61A, L-9687-61A, L-9688-61A, L-9689-61A, L-9690-61A, L-9691-61A, L-9692-61A, L-9693-61A, L-9700-61A, L-9702-61A, L-9704-61A, L-9706-61A, L-9712-61A, L-9713-61A, L-9714-61A, L-9715-61A, L-9717-61A, L-9719-61A.
TIO-540-AF1B - L-9695-61A, L-9697-61A, L-9698-61A, L-9699-61A.
TIO-540-AG1A - L-9627-61A, L-9672-61A.
TIO-540-J2B - L-9708-61A.
TIO-540-U2A - L-9722-61A.
TIO-540-W2A - L-9705-61A.
LTIO-540-J2B - L-2952-68A.
AEIO-540-D4A5 - L-25759-48A, L-25761-48A, L-25772-48A, L-25775-48A, L-25777-48A, L-25778-48A, L-25788-48A, L-25794-48A, L-25798-48A, L-25800-48A, L-25805-48A, L-25808-48A, L-25809-48A, L-25810-48A, L-25811-48A, L-25812-48A, L-25819-48A.
AEIO-540-L1B5 - L-25755-48A, L-25756-48A, L-25769-48A, L-25770-48A, L-25776-48A, L-25779-48A, L-25780-48A, L-25787-48A, L-25796-48A, L-25797-48A, L-25806-48A.

OVERHAULED AND REMANUFACTURED ENGINES:

O-320-A2B - L-19727-27A, L-21482-27A, L-25373-27A, L-29468-27A, L-32493-27A, L-32725-27A, L-33989-27A, L-35896-27A, L-39669-27A, L-39817-27A, L-40694-27A, L-40876-27A, L-41559-27A, L-42408-27A, L-44990-27A, RL-19533-27A, RL-25674-27A, RL-40178-27A, RL-44023-27A.
O-320-A2C - L-15464-27A.
O-320-A3A - L-44752-27A.
O-320-A3C - L-24900-27A.
O-320-B2B - L-7107-39A, L-12182-39A, L-13030-39A, L-15849-39A, RL-10234-39A, RL-18467-39A.
O-320-B2C - L-5710-39A, L-10232-39A, L-11214-39A, L-11351-39A, L-11517-39A, L-12105-39A, L-12301-39A, L-13167-39A, L-13396-39A, L-13480-39A, L-13587-39A, L-13614-39A, L-13971-39A, L-13973-39A, L-14030-39A, L-14161-39A, L-14344-39A, L-14375-39A, L-14378-39A, L-14381-39A, L-14399-39A, L-14407-39A, L-14456-39A, L-14494-39A, L-14527-39A, L-14569-39A, L-14741-39A, L-14929-39A, L-14996-39A, L-15025-39A, L-15249-39A, L-15701-39A, L-15789-39A, L-15803-39A, L-15808-39A, L-15813-39A, L-15931-39A, L-15950-39A, L-15954-39A, L-16096-39A, L-16097-39A, L-16135-39A, l-16315-39A, L-16327-39A, L-16425-39A, L-16523-39A, L-16539-39A, L-16554-39A, L-16563-39A, L-16682-39A, L-16877-39A, L-16893-39A, L-16901-39A, L-16906-39A, L-16927-39A, L-16968-39A, L-17039-39A, L-17163-39A, L-17178-39A, L-17194-39A, L-17278-39A, L-17457-39A, L-17463-39A, L-17733-39A, L-17974-39A.
O-320-D1A - RL-8499-39A.
O-320-D1D - L-15524-39A, RL-12564-39A.
O-320-D2A - L-1524-39A, L-2275-39A, L-6339-39A, L-6980-39A, L-8836-39A, L-10261-39A, L-10681-39A, L-10907-39A, L-11265-39A, L-12570-39A, L-13004-39A, L-14270-39A, L-14882-39A, L-15075-39A, L-17565-39A, RL-9736-39A, RL-10675-39A, RL-10874-39A, RL-11996-39A, RL-18473-39A.
O-320-D2B - L-9170-39A.
O-320-D2G - L-9779-39A, L-10227-39A, RL-17474-39A.

OVERHAULED AND REMANUFACTURED ENGINES (Continued)

O-320-D2J - L-577-39A, L-1468-39A, L-5132-39A, L-5591-39A, L-6462-39A, L-6803-39A, L-6965-39A, L-7071-39A, L-7326-39A, L-7340-39A, L-7581-39A, L-8166-39A, L-8745-39A, L-8755-39A, L-9100-39A, L-9228-39A, L-9345-39A, L-9650-39A, L-9830-39A, L-10073-39A, L-10901-39A, L-10917-39A, L-11175-39A, L-11626-39A, L-12003-39A, L-12009-39A, L-12077-39A, L-12396-39A, L-12720-39A, L-12905-39A, L-12908-39A, L-13342-39A, L-13828-39A, L-14036-39A, L-14212-39A, L-14547-39A, L-14704-39A, L-14755-39A, L-15379-39A, L-15447-39A, L-15586-39A, L-15602-39A L-17305-39A, RL-7048-39A, RL-7267-39A, RL-7650-39A, RL-8043-39A, RL-8892-39A, RL-9014-39A, RL-9107-39A, RL-9433-39A, RL-10538-39A, RL-11873-39A, RL-12447-39A, RL-13160-39A, RL-13260-39A, RL-13819-39A, RL-14787-39A, RL-15185-39A, RL-18442-39A.

O-320-D3G - L-7075-39A, L-7749-39A, L-8189-39A, L-8661-39A, L-8993-39A, L-9359-39A, L-9619-39A, L-10004-39A, L-10126-39A, L-10217-39A, L-10497-39A, L-10765-39A, L-10787-39A, L-10905-39A, L-11120-39A, L-11908-39A, L-11975-39A, L-12393-39A, L-12555-39A, L-12602-39A, L-12888-39A, L-12996-39A, L-13198-39A, L-13447-39A, L-13493-39A, L-13599-39A, L-13719-39A, L-14078-39A, L-14081-39A, L-14312-39A, L-14447-39A, L-14734-39A, L-14816-39A, L-15362-39A, L-15397-39A, L-15431-39A, L-15487-39A, L-15534-39A, L-15600-39A, L-16120-39A, L-16299-39A, L-16631-39A, L-16694-39A, L-16932-39A, L-17020-39A, RL-7901-39A, RL-7972-39A, RL-9585-39A, RL-10485-39A, RL-10759-39A, RL-10761-39A, RL-11334-39A, RL-11480-39A, RL-12159-39A, RL-12675-39A, RL-13075-39A, RL-13196-39A, RL-13598-39A, RL-14624-39A, RL-15344-39A, RL-15747-39A.

O-320-E2A - L-15671-27A, L-19451-27A, L-24467-27A, L-25749-27A, L-29779-27A, L-37568-27A, L-38786-27A, L-39910-27A, L-44453-27A, L-44544-27A.

O-320-E2C - L-17019-27A.

O-320-E2D - L-15787-27A, L-19056-27A, L-19167-27A, L-22839-27A, L-24611-27A, L-25210-27A, L-26518-27A, L-29142-27A, L-29642-27A, L-29951-27A, L-31004-27A, L-31790-27A, L-32206-27A, L-32327-27A, L-33034-27A, L-33043-27A, L-33305-27A, L-33359-27A, L-34028-27A, L-34817-27A, L-36244-27A, L-37172-27A, L-39009-27A, L-39045-27A, L-39513-27A, L-39696-37A, L-41169-27A, L-41292-27A, L-41880-27A, L-43052-27A, L-43133-27A, L-43780-27A, L-44133-27A, L-44325-27A, L-44359-27A, L-44467-27A, L-44530-27A, L-44533-27A, L-44545-27A, L-44549-27A, L-44562-27A, L-44606-27A, L-44712-27A, L-44745-27A, L-44787-27A, L-44899-27A, L-44916-27A, L-44945-27A, L-44953-27A, L-44961-27A, RL-17385-27A, RL-19856-27A, RL-28241-27A, RL-30156-27A, RL-42588-27A, RL-43652-27A, RL-48803-27A.

O-320-E2G - L-32514-27A, L-37115-27A, L-44853-27A, L-48632-27A.

O-320-E3D - L-15236-27A, L-16333-27A, L-19198-27A, L-20311-27A, L-22235-27A, L-25852-27A, L-25877-27A, L-29263-27A, L-32613-27A, L-33136-27A, L-33647-27A, L-34669-27A, L-36069-27A, L-36885-27A, L-44340-27A, L-44956-27A, L-50420-27A, RL-25341-27A, RL-46393-27A, RL-50467-27A.

O-320-H2AD - L-572-76T, L-578-76T, L-1193-76T, L-1322-76T, L-2025-76T, L-2584-76T, L-2657-76T, L-2818-76T, L-2939-76T, L-3032-76T, L-3090-76T, L-3226-76T, L-3292-76T, L-3368-76T, L-3619-76T, L-3823-76T, L-3838-76T, L-3888-76T, L-4157-76T, L-4346-76T, L-4487-76T, L-4494-76T, L-4507-76T, L-4515-76T, L-4580-76T, L-4663-76T, L-4848-76T, L-4937-76T, L-5036-76T, L-5064-76T, L-5080-76T, L-5104-76T, L-5465-76T, L-5692-76T, L-5782-76T, L-5827-76T, L-5988-76T, L-6028-76T, L-6032-76T, L-6715-76T, L-6823-76T, L-6952-76T, L-7108-76T, L-7711-76T, L-8071-76T, L-8141-76T, L-8203-76T, L-8305-76T, L-8314-76T, RL-347-76T, RL-1112-76T, RL-1584-76T, RL-2208-76T, RL-2303-76T, RL-2309-76T, RL-2758-76T, RL-3608-76T, RL-3614-76T, RL-3904-76T, RL-4344-76T, RL-4831-76T, RL-4857-76T, RL-5151-76T, RL-6288-76T, RL-7393-76T, RL-7808-76T, RL-8270-76T.

IO-320-B1A - L-965-55A, L-974-55A, L-1020-55A, L-2745-55A, L-5289-55A, L-5523-55A, L-5797-55A, RL-3412-55A.

IO-320-C1A - L-3574-55A.

IO-320-D1B - L-858-55A.

LIO-320-B1A - L-234-66A, L-307-66A.

AEIO-320-D1B - L-1021-55A, L-3607-55A.

AEIO-320-E1B - RL-2650-55A.

AEIO-320-E2B - L-5905-55A.

O-360-A1A - L-3799-36A, L-12612-36A, L-19822-36A, L-27271-36A, L-27981-36A, L-29286-36A, L-29920-36A, L-30369-36A, L-31985-36A, RL-34924-36A.

O-360-A1AD - L-15546-36A, L-15855-36A, L-18862-36A, L-30763-36A, RL-34923-36A.

O-360-A1D - L-6134-36, L-7323-36A, L-8158-36A, L-8864-36A, L-11553-36A, L-12822-36A, L-23635-36A, L-24717-36A, L-25608-36A, L-26576-36A, L-29094-36A, L-29275-36A, L-32350-36A, L-33189-36A.

O-360-A1F6 - L-23853-36A, L-26878-36A, RL-34995-36A.

O-360-A1F6D - L-18021-36A, L-18285-36A, L-20697-36A, L-21675-36A, L-22170-36A, RL-19718-36A, RL-27679-36A.

O-360-A1G6D - L-6644-36A, L-9481-36A, L-23276-36A, L-27673-36A, L-30821-36A, L-31066-36A, L-32309-36A, RL-17491-36A, RL-22469-36A.

O-360-A2A - L-9494-36A.

O-360-A2F - RL-7804-36A.

OVERHAULED AND REMANUFACTURED ENGINES (Continued):

O-360-A3A - L-7831-36A, L-11909-36A, L-14833-36A, L-15283-36A, L-17397-36A, L-18445-36A, L-19783-36A, L-21331-36A, L-23342-36A, L-23555-36A, L-24129-36A, L-24159-36A, L-24423-36A, L-25745-36A, L-27270-36A, L-2788-36A, L-28236-36A, L-28571-36A, L-28923-36A, L-29137-36A, L-30774-36A, L-31347-36A, L-31758-36A, L-31795-36A, L-31854-36A, RL-10566-36A, RL-30603-36A, RL-34831-36A, RL-34832-36A, RL-34875-36A, RL-34973-36A, RL-34996-36A.
O-360-A3AD - L-18055-36A.
O-360-A4A - L-2284-36A, L-3324-36A, L-11220-36A, L-14007-36A, L-14568-36A, L-15225-36A, L-18625-36A, L-12014-36A, L-14289-36A, L-17001-36A, L-18967-36A, L-19432-36A, L-24126-36A, L-17507-36A, L-27856-36A, L-32212-36A, RL-13650-36A, RL-19340-36A, RL-34856-36A, RL-34972-36A, RL-35021-36A..
O-360-A4G - L-4531-36A, L-14903-36A, L-17997-36A, RL-34688-36A, RL-34690-36A.
O-360-A4J - L-26903-36A.
O-360-A4K - L-21237-36A, L-24113-36A, L-24448-36A, L-24612-36A, L-24902-36A, L-26138-36A, L-28467-36A, RL-34997-36A.
O-360-A4M - L-989-36A, L-1182-36A, L-1441-36A, L-1871-36A, L-3453-36A, L-11022-36A, L-12104-36A, L-12658-36A, L-13317-36A, L-15223-36A, L-15979-36A, L-16316-36A, L-16710-36A, L-18506-36A, L-20531-36A, L-21504-36A, L-22008-36A, L-22293-36A, L-22772-36A, L-22896-36A, L-23368-36A, L-23886-36A, L-23891-36A, L-23996-36A, L-24728-36A, L-24917-36A, L-25726-36A, L-25774-36A, L-26648-36A, L-27005-36A, L-27025-36A, L-27262-36A, L-27347-36A, L-27963-36A, L-28568-36A, L-29461-36A, L-29924-36A, L-29956-36A, L-30223-36A, L-30887-36A, L-31733-36A, L-32274-36A, RL-1355-36A, RL-22430-36A, RL-25889-36A, RL-27797-36A, RL-28487-36A, RL-28768-36A, RL-29383-36A, RL-30149-36A, RL-34805-36A, RL-34806-36A, RL-34813-36A, RL-34814-36A, RL-34826-36A, RL-34827-36A, RL-34829-36A, RL-34830-36A, RL-34853-36A, RL-34878-36A, RL-34967-36A.
O-360-A4N - L-29006-36A, L-30323-36A.
O-360-C1F - L-31067-36A, RL-34941-36A.
O-360-C1G - L-27646-36A.
O-360-C2E - L-14674-36A, L-22298-36A, L-30592-36A.
O-360-E1A6D - L-133-77T, L-286-77T, L-355-77T, L-380-77T, L-421-77T, L-488-77T, RL-132-77T, RL-196-77T, RL-373-77T.
O-360-F1A6 - L-14373-36A, L-17390-36A, L-19022-36A, L-20330-36A, L-20370-36A, L-22947-36A, L-23006-36A, L-27647-36A, L-28119-36A, L-32802-36A, RL-9393-36A, RL-10101-36A, RL-34857-36A, RL-34887-36A.
IO-360-A1A - L-1332-51A, L-4207-51A, L-12756-51A, L-13861-51A, L-14628-51A, L-14663-51A, L-17744-51A, L-18697-51A, L-18717-51A, L-19235-51A, L-19546-51A, L-21747-51A.
IO-360-A1B - L-9878-51A, RL-16682-51A.
IO-360-A1B6 - L-13946-51A, L-17330-51A, L-18231-51A, L-19023-51A, L-20003-51A, L-20165-51A, RL-6833-51A, RL-9773-51A, RL-13004-51A, RL-19237-51A, RL-19483-51A.
IO-360-A1B6D - L-8912-51A, L-16560-51A, L-21731-51A, L-24770-51A.
IO-360-A3B6D - L-13530-51A, L-14358-51A, L-15567-51A, L-16284-51A, L-16366-51A, L-16500-51A, L-17653-51A, L-19394-51A, L-21854-51A, L-22788-51A, L-23111-51A, L-23277-51A, L-23984-51A, L-25427-51A, L-25565-51A, RL-15506-51A, RL-17176-51A.
IO-360-B1B - L-11385-51A, L-16833-51A, L-23793-51A.
IO-360-B1E - L-18729-51A, L-22091-51A, L-24818-51A.
IO-360-B1F - L-20814-51A.
IO-360-C1C - L-3040-51A, L-4385-51A, L-4387-51A, L-10383-51A, L-11554-51A, L-12280-51A, L-17139-51A, L-20674-51A, L-23841-51A, L-25269-51A, L-26336-51A.
IO-360-C1C6 - L-6373-51A, L-6444-51A, L-10196-51A, L-13206-51A, L-13444-51A, L-14201-51A, L-15017-51A, L-18700-51A, L-20795-51A, L-20955-51A, L-21193-51A, L-22405-51A, L-22698-51A, L-23070-51A, L-24817-51A.
IO-360-C1E6 - L-1009-51A, L-1606-51A, L-10605-51A, L-10804-51A, L-12406-51A, L-16636-51A.
HIO-360-D1A - L-1462-51A, L-7627-51A, L-8276-51A, L-8372-51A, L-8458-51A, L-8500-51A, L-12228-51A, L-14165-51A, L-20300-51A, L-22024-51A, L-23779-51A, L-24094-51A, L-24215-51A, L-24467-51A, L-24666-51A, L-24880-51A, L-25294-51A, L-25571-51A, L-25690-51A, L-26320-51A, RL-4915-51A, RL-5753-51A.
HIO-360-E1AD - RL-10100-51A.
HIO-360-F1AD - RL-16623-51A, RL-24133-51A.
LIO-360-C1E6 - L-136-67A, L-339-67A, L-1001-67A.
LO-360-A1G6D - L-126-71A, L-279-71A, L-357-71A, L-361-71A, L-389-71A, L-505-71A, L-535-71A, L-562-71A, RL-416-71A, RL-567-71A, RL-570-71A.
LO-360-E1A6D - L-121-72T, L-196-72T, L-496-72T, L-530-72T, RL-204-72T, RL-312-72T.
TO-360-C1A6D - L-259-69A.
TIO-360-C1A6D - L-209-64A.

OVERHAULED AND REMANUFACTURED ENGINES (Continued):

AEIO-360-A1A - RL-24578-51A.
AEIO-360-A1D - RL-21010-51A.
AEIO-360-B1F - RL-24501-51A.
AEIO-360-B2F - L-24504-51A, L-24616-51A, L-24945-51A, RL-24577-51A.
AEIO-360-H1A - L-20501-51A, L-24617-51A.
O-540-A1A5 - L-23815-40, L-23888-40.
O-540-A1D5 - L-4788-40, L-5729-40, L-10097-40, L-14318-40, L-24042-40.
O-540-B1A5 - L-15598-40.
O-540-B2C5 - L-2814-40, L-10005-40, L-16701-40, L-22882-40, RL-4813-40.
O-540-B4B5 - L-23318-40A.
O-540-E4A5 - RL-10840-40A.
O-540-E4B5 - L-9204-40, L-1379-40, L-21981-40.
O-540-E4C5 - L-14687-40A, L-15061-40, L-16383-40, L-18136-40A, L-19499-40A, L-20412-40A, L-21948-40A, L-22209-40A, L-22566-40A, L-22603-40A, L-23187-40A, L-23268-40, L-23871-40A, L-24119-40A, L-24353-40A, L-24433-40A, L-24466-40A, L-24679-40A, RL-8509-40, RL-12561-40A, RL-13037-40A, RL-16073-40, RL-17887-40A, RL-23442-40A, RL-23484-40A, RL-23567-40A, RL-24395-40A, RL-24396-40A, RL-24415-40A.
O-540-F1B5 - L-24552-40A, L-24600-40A, L-24762-40A.
O-540-G1A5 - L-15852-40, L-24118-40.
IO-540-AA1A5 - L-19180-48A.
IO-540-A1C5 - L-1425-40.
IO-540-B4A5 - L-4289-48.
IO-540-C4B5 - L-1936-48, L-2736-48, L-10322-48, L-18973-48, L-19315-48, L-19461-48, RL-19121-48.
IO-540-C4B5 - L-14091-48A, L-16014-48A, L-16849-48A, L-18738-48A, L-19241-48A, L-20820-48A, L-20851-48A, L-21445-48A.
IO-540-C4D5D - L-20470-48A, L-22388-48A, L-23644-48A.
IO-540-D4A5 - L-2924-48, L-3113-48, L-3192-48, L-3243-48, L-4289-48.
IO-540-E1A5 - L-17599-48, L-20126-48, L-20920-48, RL-1791-48.
IO-540-E1B5 - L-1587-48, L-1817-48, L-2303-48, L-2380-48, L-2512-48, L-17598-48, L-18073-48.
IO-540-K1A5 - L-13405-48A, L-17748-48A, L-18769-48, L-21767-48A, L-22185-48A.
IO-540-K1A5D - L-13795-48A, RL-11387-48A.
IO-540-K1B5 - L-17561-48, L-21267-48A, RL-14483-48A, RL-14542-48A.
IO-540-K1G5 - L-4277-48A, L-5650-48A, L-13303-48A, L-14117-48A, L-15002-48A, L-16725-48A, L-16984-48A, L-17326-48A, L-17800-48A, L-25124-48A, L-25268-48A, L-24650-48A.
IO-540-K1G5D - L-12241-48A, L-15344-48A, L-15517-48A, L-16484-48A, L-18614-48A, L-19470-48A, L-19646-48A, L-20723-48A, L-21901-48A, L-22393-48A.
IO-540-N1A5 - L-7183-48A, L-17706-48A.
IO-540-S1A5 - L-14251-48A, L-20516-48A, L-20864-48A, RL-10798-48A, RL-15862-48A.
IO-540-T4B5 - L-25134-48A.
IO-540-T4B5D - L-14265-48A, L-20393-48A, RL-15001-48A.
TIO-540-A2B - L-511-61, L-1786-61.
TIO-540-A2C - L-1320-61A, L-2138-61A, L-4479-61A, L-5069-61A, L-6323-61, L-6324-61, L-6937-61A, L-7095-61A, L-7342-61A, L-7651-61A, L-7676-61A, L-8129-61A, L-8737-61A, RL-2141-61, RL-6800-61A, RL-7875-61A, RL-7975-61A, RL-8213-61A, RL-8299-61A.
TIO-540-AE2A - L-2560-61A, RL-7100-61A.
TIO-540-AF1B - RL-7578-61A.
TIO-540-C1A - RL-8918-61A.
TIO-540-F2BD - L-6124-61A, L-6292-61A, L-6562-61A, L-7130-61A, RL-6619-61A, RL-7770-61A.
TIO-540-J2B - L-699-61A, L-1679-61A, L-1943-61A, L-3102-61A, L-3470-61A, L-4242-61A, L-4338-61A, L-4676-61A, L-4912-61A, L-4985-61A, L-6423-61A, L-8611-61A, RL-4185-61A, RL-6555-61A, RL-8045-61A, RL-8338-61A, RL-8762-61A, RL-9522-61A.
TIO-540-J2BD - L-108-61A, L-1234-61A, L-2368-61A, L-2649-61A, L-3260-61A, L-3423-61A, L-4019-61A, L-4217-61A, L-4433-61A, L-4551-61A, L-4552-61A, L-4614-61A, L-4710-61A, L-4732-61A, L-4835-61A, L-4875-51A, L-5429-61A, L-6124-61A, L-6291-61A, L-6303-61A, L-6618-61A, L-6624-61A, L-6892-61A, L-7085-61A, L-7122-61A, L-7198-61A, L-7302-61A, L-7307-61A, L-7549-61A, L-7557-61A, L-7590-61A, L-7815-61A, L-8253-61A, L-8323-61A, L-8328-61A, L-8508-61A, L-8850-61A, L-8851-61A, L-9083-61A, RL-2841-61A, RL-4031-61A, RL-5183-61A, RL-5300-61A, RL-7099-61A, RL-7669-61A, RL-7763-61A, RL-8938-61A, RL-8999-61A.
TIO-540-S1AD - L-1839-61A, L-3023-61A, L-3673-61A, L-4446-61A, L-5187-61A, L-5444-61A, L-7112-61A, L-7174-61A, L-7176-61A, L-8161-61A, RL-4452-61A.

OVERHAULED AND REMANUFACTURED ENGINES (Continued):

TIO-540-V2AD - L-8482-61A, L-8522-61A.
LTIO-540-F2BD - L-154-68A, L-1290-68A, L-2365-68A, L-2806-61A, RL-2039-68A, RL-2547-68A.
LTIO-540-J2B - L-588-68A, L-1484-68A, L-1485-68A, L-1971-68A, L-2306-68A, L-2708-68A, RL-2722-68A.
LTIO-540-J2BD - L-345-68A, L-422-68A, L-1069-68A, L-1087-68A, L-1115-68A, L-1179-68A, L-1507-68A, L-1720-68A, L-1796-68A, L-1844-68A, L-1853-68A, L-1885-68A, L-2054-68A, L-2181-68A, L-2222-68A, L-2281-68A, L-2311-68A, L-2320-68A, L-2406-61A, L-2484-68A, L-2680-68A, L-2730-68A, L-2743-68A, L-2883-68A, RL-211-68A, RL-1118-68A, RL-1459-68A, RL-1594-68A, RL-1681-68A, RL-1743-68A, RL-2132-68A, RL-2232-68A, RL-2277-68A, RL-2326-68A, RL-2482-68A, RL-2483-68A, RL-2510-68A, RL-2582-68A, RL-2590-68A, RL-2667-68A, RL-2670-68A, RL-2706-68A, RL-2839-68A, RL-2880-68A.
LTIO-540-V2AD - L-2750-68A, L-2754-68A, L-2775-68A.
AEIO-540-D4B5 - RL-23717-48A.
AEIO-540-L1B5 - L-23715-48A, L-24834-48A, L-25212-48A.
VO-540-C2A - L-2304-43.
TIO-541-E1A4 - L-219-59C, L-1749-59C.
TIO-541-E1C4 - L-153-59, L-655-59, L-1756-59, RL-292-59, RL-1744-59, RL-1746-59, RL-1772-59, RL-1774-59.
TIGO-541-E1A - L-131-62, L-440-62, L-461-62, L-702-62, RL-195-62.
IO-720-A1B - L-562-54A, L-597-54A, RL-1284-54A.
IO-720-D1CD - L-881-54A.

TEXTRON SERVICE CENTER:

Conversions:

TIO-540-AF1B - L-9120-61A, L-9356-61A, L-9459-61A, L-9852-61A.

Repairs:

O-320-B2C - L-49834-27AC.
IO-540-S1A5 - L-18211-48A.
TIO-540-AE2A - L-9590-61A.
TIGO-541 - RL-699-62.

Cylinder Kits containing P/N LW-14077 Piston Pin shipped during the time period December 15, 1995 thru September 17, 1996 are as follows:

05K21100
05K21101
05K21102
05K21103
05K21104
05K21108
05K21109
05K21110
05K21112
05K21116
05K21118
05K21119
05K21120
05K21121
05K21122
05K21124
05K21192
05K21204
05K21223
05K21226
05K21228
05K21234
05K21241
05K21242
05K21260
05K21262
05K21264
05K21265
05K21269
05K21270
05K21272
05K21273
05K21274
05K21276
05K21278
05K21745
05K22128
05K22129
05K22177

Service Information

Commander AIRCRAFT COMPANY
Wiley Post Airport
7200 NW 63rd St.
Bethany, OK

SERVICE INFORMATION NO. SI-238
Date December 3, 1998

AIRWORTHINESS DIRECTIVE 98-23-01
PARKER HANNIFIN AIRBORNE DRY AIR PUMPS

MODELS AFFECTED: Models 112, 112B, 112TC, and 112TCA S/N 3 thru 13309, Models 114 and 114A, S/N 14000 thru 14540, 114B S/N 14541 thru 14653, and 114TC, S/N 20001 thru 20017

REASON FOR PUBLICATION: To recommend compliance with Airworthiness Directive 98-23-01 issued against certain Parker Hannifin Airborne dry air pumps

NOTE
Although not specifically listed in the appendix to Airworthiness Directive 98-23-01, Airborne Dry Air Pumps Model 211CC and 212CW have been installed on Commander Aircraft Company Models 114B and 114TC. Models 114B and 114TC in the serial number range listed above should be inspected per Airworthiness Directive 98-23-01.

COMPLIANCE: Required as indicated in the body of Airworthiness Directive 98-23-01, unless already accomplished

BY WHOM WORK WILL BE ACCOMPLISHED: A & P Mechanic or equivalent

APPROVAL: Refer to Airworthiness Directive 98-23-01

ESTIMATED MAN HOURS: Refer to Airworthiness Directive 98-23-01, for instruction on obtaining a copy of Airborne Service Letter No. 48, dated October 20, 1998 from Parker Hannifin Corporation Airborne Division

PARTS DATA: Refer to Airworthiness Directive 98-23-01, for instruction on obtaining a copy of Airborne Service Letter No. 48, dated October 20, 1998 from Parker Hannifin Corporation Airborne Division

SPECIAL TOOLS REQUIRED: None

ACCOMPLISHMENT INSTRUCTIONS: Refer to Airworthiness Directive 98-23-01, for instruction on obtaining a copy of Airborne Service Letter No. 48, dated October 20, 1998 from Parker Hannifin Corporation Airborne Division

ELECTRICAL LOAD: No Change

WEIGHT AND BALANCE: No Change

PUBLICATIONS AFFECTED: None

RECORD COMPLIANCE: Make appropriate entry in airplane maintenance records as follows: Airworthiness Directive 98-23-01, accomplished ___(date)___ .

PRIORITY LETTER AIRWORTHINESS DIRECTIVE

REGULATORY SUPPORT DIVISION
P.O. BOX 26460
OKLAHOMA CITY, OKLAHOMA 73125-0460

U.S. Department
of Transportation
**Federal Aviation
Administration**

DATE: October 29, 1998
98-23-01

Actions Leading to This Priority Letter Airworthiness Directive (AD)

The FAA has received approximately 50 reports of failure of the flexible coupling on certain Parker Hannifin Airborne dry air pumps, conversion kits, and coupling kits installed in aircraft or engines. To this date, no accidents have occurred due to the failure of this coupling. This condition could result in loss of primary attitude and direction references during instrument flight rules (IFR) operations.

This condition is attributed to a manufacturing defect of Lots 1 and 2 of the B1-19-1 flexible coupling. This coupling was shipped between January 1, 1998, and October 13, 1998. Dry air pumps, conversion kits, and flexible coupling kits that incorporate any of the part numbers and serial numbers referenced in the Applicability section of this priority letter could have this manufacturing defect.

Dry air pumps that could incorporate the part number (P/N) B1-19-1 flexible coupling are installed as original equipment on many airplanes, particularly Cessna, Raytheon, Piper, and Mooney airplanes. In addition, Parker Hannifin holds a parts manufacturer approval (PMA) for field replacements. The dry air pumps are the primary vacuum source on small single-engine airplanes and the secondary vacuum source on larger twin-engine airplanes.

The affected flexible coupling was shipped from Parker Hannifin between January 1, 1998, and October 13, 1998.

Airborne dry air pumps, conversion kits, or coupling kits that were installed or modified prior to January 1, 1998, would not incorporate the affected coupling. A check of the maintenance records would show whether the dry air pump, conversion kit, or coupling kit was installed or modified prior to January 1, 1998.

Those Airborne dry air pumps, conversion kits, or coupling kits installed or modified between January 1, 1998, and October 13, 1998, could incorporate the affected coupling, depending on when the material was received. The coupling could be held as spares or obtained from salvaged parts. For this reason, any dry air pump, conversion kit, or coupling kit with flexible coupling, P/N B1-19-1, that was installed or modified after January 1, 1998, could be affected by the above condition. The flexible coupling has a date code that resembles a clockface and indicates a manufacture date of either "12/97" or "5-6/98".

Relevant Service Information

Parker Hannifin has issued Airborne Service Letter No. 48, dated October 20, 1998, which specifies procedures for:

- removing the dry air pump from the aircraft;
- inspecting and identifying the P/N B1-19-1 flexible coupling; and
- replacing the P/N B1-19-1 flexible coupling with P/N B1-7-3 flexible coupling (part of Parker Hannifin flexible coupling kit, Airborne P/N 350).

The FAA's Determination

After examining the circumstances and reviewing all available information related to the incidents described above, the FAA has determined that:

1. Any flexible coupling, P/N B1-19-1, incorporated on certain Airborne dry air pumps, conversion kits, and coupling kits, that has a date code resembling a clockface and indicating a manufacture date of either "12/97" or "5-6/98" should be replaced with P/N B1-7-3 flexible coupling (part of Parker Hannifin flexible coupling kit, Airborne P/N 350); and

2. Priority letter AD action should be taken to prevent failure of the primary dry air pump caused by defective flexible coupling, which could result in loss of primary attitude and direction references during IFR operations.

Provisions of This Priority Letter AD

Since an unsafe condition has been identified that is likely to exist or develop on aircraft or engines equipped with certain Parker Hannifin Airborne dry air pumps, conversion kits, and coupling kits, utilizing P/N B1-19-1 flexible coupling that has a date code resembling a clockface and indicating a manufacture date of either "12/97" or "5-6/98", the FAA is taking priority letter AD action. This priority letter requires replacing the affected flexible coupling with P/N B1-7-3 flexible coupling (part of Parker Hannifin flexible coupling kit, Airborne P/N 350), in accordance with Parker Hannifin Airborne Service Letter No. 48, dated October 20, 1998.

Presentation of the Actual AD

This rule is issued under 49 U.S.C. Section 44701 (formerly section 601 of the Federal Aviation Act of 1958), pursuant to the authority delegated to me by the Administrator, and is effective immediately upon receipt of this priority letter.

98-23-01 PARKER HANNIFIN CORPORATION: Docket No. 98-CE-108-AD.

Applicability: The following Airborne dry air pumps, conversion kits, and coupling kits, with flexible coupling, part number (P/N) B1-19-1, that:

1. Have a date code resembling a clockface on the coupling and indicating a manufacture date of either "12/97" or "5-6/98"; and
2. Are installed in, but not limited to, the following aircraft or engine models, certificated in any category, that are listed in the Appendix to this AD:

Item	Part Number	Serial Numbers
Dry Air Pump	211CC	2AP1 through 10AP319
Dry Air Pump	211CC-9	1AP1 through 2AP5
Dry Air Pump	E211CC	11AN543 through 11AN642 and 2AP1 through 7AP442
Dry Air Pump	212CW	2AP1 through 7AP286
Dry Air Pump	E212CW	1AP1 through 7AP492
Dry Air Pump	215CC	12AN719 through 12AN940 and 1AP1 through 9AP3510
Dry Air Pump	215CC-9	2AP1 through 7AP95
Dry Air Pump	216CW	12AN521 through 12AN660 and 1AP1 through 10AP2695
Conversion Kit	300-1	4AP120 through 4AP122 and 8AP256 through 8AP258
Conversion Kit	300-2	2AP30 through 2AP43, 4AP134, 4AP136, and 4AP137
Conversion Kit	300-3	1AP1 through 1AP3
Coupling Kit	350	1AP through 9AP and N/A (see Note 1 below)

NOTE 1: Some of the part number 350 coupling kits incorporated serial numbers 1AP through 9AP, while others were marked with "N/A" in the serial number block.

NOTE 2: The affected flexible coupling was shipped from Parker Hannifin between January 1, 1998, and October 13, 1998. Dry air pumps, conversion kits, or coupling kits that were installed or modified prior to January 1, 1998, would not incorporate the affected coupling. This AD allows the aircraft owner or pilot to check the maintenance records to determine whether the dry air pump, conversion kit, or coupling kit was installed or modified since January 1, 1998. See paragraph (d) of this AD for authorization.

NOTE 3: This AD applies to any aircraft or engine equipped with Airborne dry air pumps, conversion kits, and coupling kits, that have flexible coupling, part number (P/N) B1-19-1. Aircraft or engines with the P/N B1-19-1 flexible coupling are affected regardless of whether they have been modified, altered, or repaired in the area subject to the requirements of this AD. For aircraft or engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of

compliance in accordance with paragraph (f) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as indicated in the body of this AD, unless already accomplished.

To prevent failure of the primary dry air pump caused by defective flexible coupling, which could result in loss of primary attitude and direction references during instrument flight rules (IFR) operations, accomplish the following:

(a) Within 2 calendar days after receipt of this priority letter AD or prior to further flight after receipt of this priority letter AD, whichever occurs later, replace any affected flexible coupling with P/N B1-7-3 flexible coupling (part of Parker Hannifin flexible coupling kit, Airborne P/N 350) in accordance with Parker Hannifin Airborne Service Letter No. 48, dated October 20, 1998.

(b) If parts have been ordered from Parker Hannifin, but are not available, accomplish the following:

(1) Operate the aircraft in visual flight rules (VFR) conditions only;

(2) Operate the aircraft during daytime hours only; and

(3) When parts become available, replace the coupling prior to further flight.

(c) As of the receipt of this priority letter AD, no person shall install, on any aircraft or engine, any of the affected Airborne dry air pumps, conversion kits, and coupling kits, with flexible coupling, part number (P/N) B1-19-1, that have a date code resembling a clockface on the coupling and indicating a manufacture date of either "12/97" or "5-6/98".

(d) The owner/operator holding at least a private pilot certificate as authorized by section 43.7 of the Federal Aviation Regulations (14 CFR 43.7) may check the maintenance records to determine whether the existing dry air pump, conversion kit, or coupling kit was installed or modified since January 1, 1998. If the dry air pump, conversion kit, or coupling kit was not installed or modified since January 1, 1998, the AD does not apply and the owner/operator must make an entry into the aircraft records showing compliance with this AD in accordance with section 43.9 of the Federal Aviation Regulations (14 CFR 43.9).

(e) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the requirements of this AD can be accomplished, provided that:

(1) The aircraft is operated in VFR conditions only; and

(2) The aircraft is operated during daytime hours only.

(f) An alternative method of compliance or adjustment of the compliance times that provides an equivalent level of safety may be approved by the Manager, Chicago Aircraft Certification Office (ACO), 2300 E. Devon Avenue, Des Plaines, Illinois 60018. The request shall be forwarded through an appropriate FAA Maintenance Inspector, who may add comments and then send it to the Manager, Chicago ACO.

NOTE 4: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Chicago ACO.

(g) Copies of the applicable service information may be obtained from the Parker Hannifin Corporation, Airborne Division, 711 Taylor Street, Elyria, Ohio 44035; telephone: (440) 937-1315; facsimile: (44) 937-5409. This information may also be examined at the FAA, Central Region, Office of the Regional Counsel, Room 1558, 601 E. 12th Street, Kansas City, Missouri 64106.

(h) Priority Letter AD 98-23-01, issued October 29, 1998, becomes effective immediately upon receipt.

FOR FURTHER INFORMATION CONTACT:

Mr. Roy Boffo, Aerospace Engineer, FAA, Chicago Aircraft Certification Office, Systems and Flight Test Branch, 2300 E. Devon Avenue, Des Plaines, Illinois 60018; telephone: (847) 294-7564; facsimile: (847) 294-7834.

APPENDIX TO AD 98-23-01; DOCKET NO. 98-CE-108-AD

Part Name	Part Number	Airplane/Engine Make/Model
Dry Air Pump	211CC 215CC E211CC	AIRPLANES Aerospatiale / TB9, TB10, TB20 Beech / 19, 19A, B19, 23, B23, C23, 24, A24, A24R, B24R, C24R, 76, 77, E95 Cessna / F152, FA152, 172, FR172K, R172K, 177, 177RG, FR182, R182, TR182, T182, T303, 336, 337, F337, T337G, P337, FT337, 411, 411A, 421A, 421B, 421C Grumman / AAA1B, AA1C, AA5A, AA5B, GA7 Lake / LA-4-200, 250 Maule / M4-210 Mooney / M20B, M20C, M20D, M20E, M20F, M20G, M20J, M20K Navion / G, H Piper / PA-18, PA18-150, PA-22-108, PA-23-235, PA-23-250, PA-24-180, PA-24-250, PA-24-260, PA-24-400, PA-28-140, PA-28-150, PA-28-151, PA-28-160, PA-28-161, PA-28-180, PA-28R-180, PA-28-181, PA-28R-200, PA-28-201T, PA-28R-201, PA-28R-201T, PA-28RT-201, PA-28RT-201T, PA28-235, PA-28-236, PA-30, PA-31-300, PA-31-310, PA-31-325, PA-31-350, PA-31P-350, PA-32-260, PA-32-300, PA-32R-300, PA-32RT-300, PA-32RT-300T, PA-32-301, PA-32-301T, PA-32R-301, PA-32R-301T, PA-34-200, PA-34-200T, PA-38-112, PA-39, PA-44-180, PA-44-180T Rockwell / 100, 112, 112A, 112B, 112TC, 112TCA, 114, 114A, 180 Lovaux Ltd. / Optica OA7, Series 300 (FLS Aerospace) ENGINES Textron Lycoming / O-235, O-290, O-320, O-360, O-435, O-540, IO-320. IO-360, IO-540, IO-720, TIO-360, TIO-540, GO-480, GSO-480 Continental / O-300, GO-300, IO-360, TSIO-360, TSIO-520, GTSIO-520 United Aircraft / PT6A, PT6B
Dry Air Pump	211CC-9 215CC-9	AIRPLANES Cessna / 150, A150K, A150L, A150M, F150K, F150L, F150M, FA150K, FA150L, FA150M, 152, A152, 172, 177, 337 ENGINES Textron Lycoming / O-320 Continental / C90-16, O-200

Part Name	Part Number	Airplane/Engine Make/Model
Dry Air Pump	212CW E212CW 216CW	AIRPLANES Beech / A23, A23A, E33, E33A, F33A, F33C, V35A, V35A-TC, 36, A36, A36TC, B36TC, B55, 58, 76, Britten Norman / BN-2A Cessna / 152, A152, 172, 180, 182H thru M, 182N and P, F182, R182, TR182, T182, 185, U206, TU206, 207, T207, 210, T210, P210, T303, 310P, 310R, 335, 340, 340A, 401, 401A, 401B, 402, 402A, 402B, 414, 414A Helio / H295 Maule / M4-220 Mooney / M20K, M22 Navion / G, H Piper / PA-31-325, PA-31-350, PA-31P-350, PA-34-200, PA-34-200T, PA-39, PA-44-180, PA-44-180T, PA-46-310P, PA-46-350 ENGINES Textron Lycoming / LIO-360, GO-435, TIO-541 Continental / E-185, E-225, IO-346, O-470, IO-470, TSIO-470, IO 520 Franklin / 6A-335, 6A-350
Conversion Kit	300-1	Cessna / 172A, 172B thru 172H Piper / PA-22-108, PA-22-135, PA-22S-135, PA-22-150, PA-22S-150, PA-22-160, PA-22S-160
Conversion Kit	300-2	Beech / 35 thru S35, 35-33 thru35-A33, 35-B33 Cessna / 175 thru 175A, 175B, 175C, P172D, 180 thru 180H, 182 thru 182H, 185 thru 185D, 210, 210A thru 210J, 210-5, 210-5A
Conversion Kit	300-3	Cessna / 150, 150A thru 150H
Coupling Kit	350	Coupling kit may have been put on any of the above list airplanes or engines.

Service Publications revision notice

Commander AIRCRAFT COMPANY
Wiley Post Airport
7200 N.W. 63rd
Bethany, OK 73008

SERVICE INFORMATION NO. SI-218
REVISION NO. 1
Date April 8, 1999

FLAP TORQUE TUBE MODIFICATION

APPROVAL: Engineering design aspects are FAA approved

Add to Models Affected:

Model 114B, Serial Nos. 14541 and Subsequent
Model 114TC, Serial Nos. 20001 and Subsequent

Service Information

Gulfstream Aerospace

SERVICE INFORMATION NO. SI-218
27 February 1987

FLAP TORQUE TUBE MODIFICATION

MODELS AFFECTED MODELS 112 AND 112B, SERIAL NOS. 3 THRU 544 AND 13000.
MODELS 112TC AND 112TCA, SERIAL NOS. 13001 THRU 13309.
MODELS 114 AND 114A, SERIAL NOS. 14001 THRU 14540.

NOTE

IF AN AIRPLANE HAS BEEN MODIFIED PER GULFSTREAM DRAWING 47003 SALVAGE EO #1, THE REQUIREMENTS OF THIS SERVICE INFORMATION HAVE BEEN MET.

REASON FOR PUBLICATION: TO PROVIDE A MODIFICATION FOR FLAP TORQUE TUBE WHICH WILL ALLOW FOR REPLACEMENT OF 47508-1 LEFT TORQUE TUBE ARM ASSEMBLY OR 47508-2 RIGHT TORQUE TUBE ARM ASSEMBLY WITHOUT REMOVING WING ASSEMBLY FROM FUSELAGE.

COMPLIANCE: AT OWNER'S DISCRETION.

NOTE

IF ANY PROBLEMS ARE ENCOUNTERED WHILE COMPLYING WITH THIS SERVICE INFORMATION, CONTACT YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SINGLE ENGINE SERVICE FACILITY.

BY WHOM WORK WILL BE ACCOMPLISHED: A & P MECHANIC OR EQUIVALENT.

APPROVAL: ENGINEERING DESIGN ASPECTS ARE FAA APPROVED.

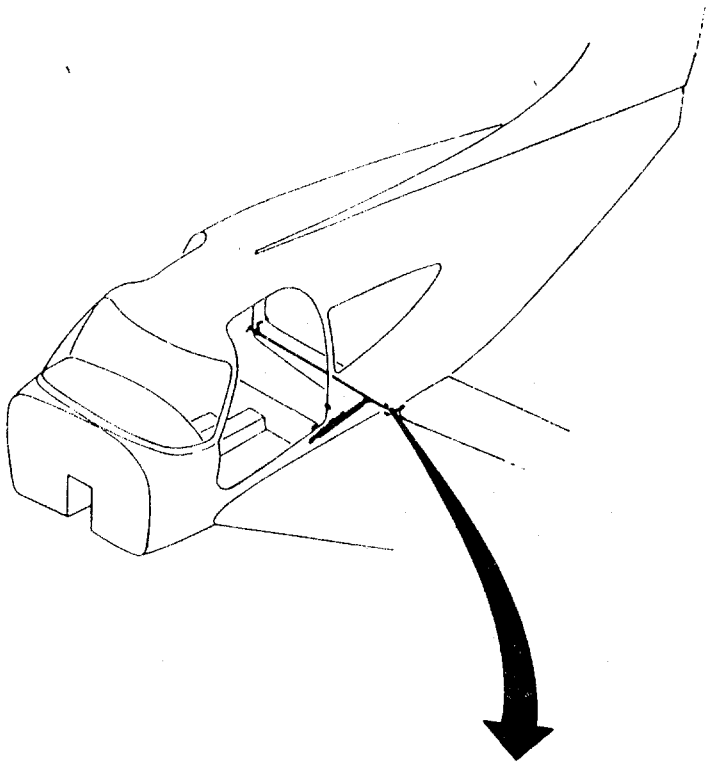
ESTIMATED MAN HOURS: FIVE (5) HOURS.

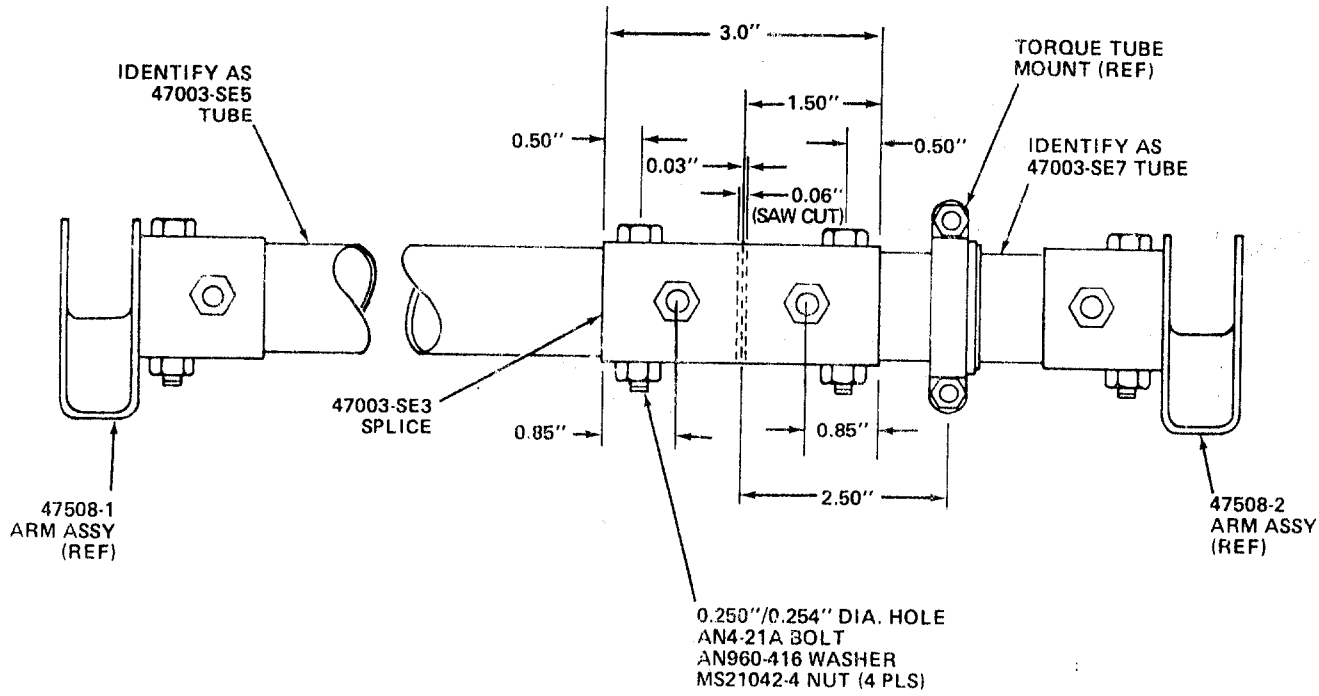
PARTS DATA: PARTS REQUIRED TO COMPLY WITH THIS SERVICE INFORMATION MAY BE PROCURED THROUGH YOUR NEAREST GULFSTREAM COMMANDER AUTHORIZED SINGLE ENGINE SERVICE FACILITY FOR $33.87. REFERENCE THIS SERVICE INFORMATION, AIRCRAFT MODEL AND FACTORY SERIAL NUMBER WHEN ORDERING SERVICE INFORMATION NO. SI-218 KIT CONSISTING OF THE FOLLOWING:

Price subject to change without notice

QTY	PART NO.	DESCRIPTION
1 ea.	47003-SE3	Splice
4 ea.	AN4-21A	Bolt
4 ea.	AN960-416	Washer
4 ea.	MS21042-4	Nut
1 ea.		Compliance Card
1 ea.	Service Information No. SI-218	Instructions.

SPECIAL TOOLS: NONE.





VIEW LOOKING FWD

NOTE

TORQUE NUTS 5 TO 10 IN-LBS.
TORQUE TO BE ADDED TO
FRICTION OF NUTS.

Figure 1.

ACCOMPLISHMENT INSTRUCTIONS:

1. Remove rear seats, carpeting and floor panels, as necessary, to gain access to flap torque tube which is located at fuselage station 144.26.

2. Clamp wing flaps in up position to prevent flaps from rotating downward when torque tube is cut.

3. Cut existing 47280-1 flap torque tube on right end as shown in Figure 1. and deburr sharp edges. Saw cut not to exceed 0.06-inch width.

4. Position 47003-SE3 splice on flap torque tube, drill and ream 0.250"/0.254" diameter hole (4 places) thru splice and flap torque tube and then remove splice (refer to Figure 1).

5. Deburr all holes in splice and torque tube.

6. Clean and degrease 47003-SE3 splice and coat outside surface of splice with oxide primer (The Glidden Co. or equivalent). The primer should be thoroughly dry before splice is installed.

7. Install 47003-SE3 splice on flap torque tube using AN4-21A bolt (4 places), AN960-416 washer (4 places) and MS21042-4 nut (4 places). Torque nuts 5 to 10 inch-pounds. Torque to be added to friction of nuts (refer to Figure 1).

NOTE

The 0.250"/0.254" diameter holes at the outboard ends of the torque tube must be in line with each other as shown in Figure 1.

8. Ink stamp part number 47003-SE5 on left end of torque tube and part number 47003-SE7 on right end of torque tube (refer to Figure 1).

9. Assure that flaps are operating properly.

10. Reinstall floor panels, carpeting and rear seats.

11. Fill out and mail Compliance Card.

ELECTRICAL LOAD: NO CHANGE.

WEIGHT AND BALANCE: NO CHANGE.

SPARES AFFECTED: NO.

PUBLICATIONS AFFECTED: NONE.

RECORD COMPLIANCE: Make an appropriate entry in airplane maintenance records as follows: Service Information No. SI-218, dated 27 February 1987, entitled "Flap Torque Tube Modification", accomplished ____(date)____.