SERVICE BULLETIN REVISION NOTICE

STARTING — PNEUMATIC STARTER — INTRODUCTION OF A REVISED PNEUMATIC STARTER WITH AN IMPROVED MAGNETIC SEAL AND NEW GEAR CAGE STEEL SLEEVES

Turbojet Engine Service Bulletin No. V2500-ENG-80-0024 Revision No. 2 dated December 18, 2013.

Revision History

Original Issue September 16, 2013

Revision 1 dated November 27, 2013

Revision 2 dated December 18, 2013

Reason for the Revision

To add to the Approval Section to include the JAR25 regulation and add an additional reference.

Effect of Revision on Prior Compliance

None.

This is a Complete Revision (Not Applicable to the SGML version)

The contents are in accordance with the list of effective pages. All pages have the current revision number. Technical changes are marked with black bars.

MODEL APPLICATION

V2500-A1, V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 80-0024

Page	Revision No.	Date
1 thru 14	2	December 18/13

A copy of this Revision Notice and any future revision notices must be filed as a permanent record with your copy of the subject bulletin.

SERVICE BULLETIN

STARTING — PNEUMATIC STARTER — INTRODUCTION OF A REVISED PNEUMATIC STARTER WITH AN IMPROVED MAGNETIC SEAL AND NEW GEAR CAGE STEEL SLEEVES

MODEL APPLICATION

V2500-A1, V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 80-0024

ATA NUMBER

80-13-41

Supplier Service Bulletin

Sumitomo Precision Products Service Bulletin 80-2520

Sumitomo Precision Products Service Bulletin 80-2521

Compliance Category

7

Summary

The purpose of this Service Bulletin is to introduce a revised Pneumatic Starter with improvements described in two Vendor Service Bulletins.

Planning Information

Effectivity Data

Engine Models Applicable

V2500-A1
Engine Serial Nos. V0001 thru V0361

V2522-A5, V2524-A5, V2527M-A5, V2527-A5, V2527E-A5, V2530-A5, V2533-A5
Engine Serial No. — All engines

V2525-D5, V2528-D5
Engine Serial Nos. V20001 thru V20285

Concurrent Requirements

This Service Bulletin must be done at the same time or after Reference 20, Service Bulletin No. V2500-ENG-80-0020 has been incorporated.

Reason

1. Condition:
   A. There has been oil leakage in the output shaft seal area at the current magnetic seal.
   B. The gear cage cluster gear shaft bores are experiencing service wear, which has been identified as a contributing factor of cluster gear fractures. Cluster gear fracture has occasionally resulted in an uncontained starter event which appears as a thru-hole in the fan cowl door.
2. Background:
   A. The high operating temperatures of the magnetic seal may cause degradation of the associated o-rings and seal face, resulting in oil leakage.
   B. Vibration and applied torque during the starting operation may cause the steel cluster gear bushings to wear the magnesium gear cage over time.
3. Objective:
   A. Incorporate a new magnetic seal with an increased air gap and decreased outside diameter to improve oil circulation and remove heat. It has a wider o-ring groove and provides more axial shaft movement. It also adds holes for better oil circulation and to minimize coking.
   B. Add steel sleeves to the cluster gear bushing bores. The sleeves are an interference fit which eliminates movement between the steel and magnesium. The steel sleeves support the steel bushings and reduce wear.
4. Substantiation: The changes introduced by this Service Bulletin were the subject of satisfactory engineering analysis and test. This Service Bulletin complies with the applicable engine certification basis.

5. Effects of Bulletin on:

   Removal/Installation: Not affected.

   Disassembly/Assembly: Not affected.

   Cleaning: Not affected.

   Inspection/Check: Not affected.

   Repair: Not affected.

   Testing: Not affected.

6. Supplemental Information

   None.

Description

1. Do the attached Vendor Service Bulletins to improve the Pneumatic Starter. Each Service Bulletin is independent of the other but to get the full benefit of the improvements, both should be accomplished.

   A. Do Reference 21 Sumitomo Precision Products (SPP) Service Bulletin 80-2520 to reduce oil loss and oil temperature in the Pneumatic Starter.

   B. Do Reference 22 Sumitomo Precision Products (SPP) Service Bulletin 80-2521 to improve durability by adding steel sleeves to the cluster gear bushing bores in the Pneumatic Starter.

Compliance

Category 7

Accomplish when supply of superseded parts has been depleted.

Approval Data

The part number changes and/or part modifications specified in the Accomplishment Instructions and Material Information sections of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model(s) given.

The technical content under the JAR25 regulation of this document is approved under the authority of DOA No. EASA.21J.031.

Manpower

1. In Service: Not Applicable.
2. At Overhaul: Not Applicable.

Weight and Balance

1. Weight Change

   None.

   NOTE: The weights shown in the attached Vendor Service Bulletins are below the limit which requires reporting in IAE Service Bulletins.

2. Moment Arm

No Effect.

3. Datum

Engine Front Mount Centerline (Power Plant Station (PPS) 100)

Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

Software Accomplishment Summary

Not Applicable.

References

1. ATA Locator — 80-13-41.
2. Internal Reference No. — 13VI005.
3. V2500 Standard Practices/Processes Manual (E-V2500-1IA), Chapter/Section 71-00-02-000-017.
4. V2500 Standard Practices/Processes Manual (E-V2500-3IA), Chapter/Section 71-00-02-000-017.
5. V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA), Chapter/Section 80-13-41.
6. V2500 Engine Illustrated Parts Catalogs (S-V2500-2IA, S-V2500-2IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, S-V2500-7IB), Chapter/Section 80-13-41.
7. V2500 Engine Illustrated Parts Catalogs (S-V2500-2SA, S-V2500-2SB, S-V2500-2NA, S-V2500-2NB, S-V2500-5SA, S-V2500-5SB, S-V2500-5NA, S-V2500-5NB, S-V2500-6SA, S-V2500-6SB, S-V2500-6NA, S-V2500-6NB, S-V2500-7SA, S-V2500-7SB, S-V2500-7NA, S-V2500-7NB), Chapter/Section 80-13-41.
8. V2500 Engine Illustrated Parts Catalogs (V2500-3IA, S-V2500-3IB, S-V2500-3IC), Chapter/Section 80-13-41.
9. V2500 Component Maintenance Manual (E-V2500-1IA), Chapter/Section 80-13-41.
10. V2500 Engine Manual (E-V2500-1IA), Chapter/Section 71-00-02-000-017.
11. V2500 Engine Manual (E-V2500-3IA), Chapter/Section 71-00-02-000-017.
12. IAE V2500 Service Bulletin V2500-ENG-70-0395 (Information — Starting — To Announce The Introduction Of A New Pneumatic Starter With An Oil Pressure Fill Facility).
13. IAE V2500 Service Bulletin V2500-ENG-80-0007 (Starting — Pneumatic Starter — Introduction Of A Revised Pneumatic Starter With A Revised Carbon Seal Retention).
14. IAE V2500 Service Bulletin V2500-ENG-80-0008 (Starting — Pneumatic Starter — Introduction Of A Synchronous Engagement Clutch).
15. IAE V2500 Service Bulletin V2500-ENG-80-0013 (Starting — Pneumatic Starter — Introduction Of A Revised Pneumatic Starter With A Revised Carbon Seal Retention).
16. IAE V2500 Service Bulletin V2500-ENG-80-0014 (Starting — Pneumatic Starter — Introduction Of A Revised Starter With Modified Turbine Retention Nut Rework Of The Pinion Gear).

17. IAE V2500 Service Bulletin V2500-ENG-80-0015 (Starting — Pneumatic Starter — Introduction Of A Revised Pneumatic Starter With A Modified Synchronous Engagement Clutch Assembly).
18. IAE V2500 Service Bulletin V2500-ENG-80-0016 (Starting — Pneumatic Starter — Introduction Of A Revised Starter With Modified Planet Gear Setscrew Retention).
19. IAE V2500 Service Bulletin V2500-ENG-80-0019 (Starting — Pneumatic Starter — Introduction Of A Pneumatic Starter With Revised Dynamic 'O'-Ring Seals).
20. IAE V2500 Service Bulletin V2500-ENG-80-0020 (Starting — Pneumatic Starter — Introduction Of A Pneumatic Starter With A Vented Inlet Housing).
21. Sumitomo Precision Products Service Bulletin 80-2520.
22. Sumitomo Precision Products Service Bulletin 80-2521.
23. This Service Bulletin, is subject to aircraft modification No. 155563 P13775 (classified minor) and is covered by aircraft Service Bulletin No. A320-80-1004. Under no circumstances shall the modified equipment, resulting from the application of this SB, be installed on the aircraft type unless the corresponding modification, and if applicable, its aircraft SB are approved.

Other Publications Affected

1. V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, S-V2500-2IA, S-V2500-2IB, S-V2500-3IA, S-V2500-3IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, and S-V2500-7IB), Chapter/Section 80-13-41.

Interchangeability of Parts

Old and new parts are directly interchangeable.

NOTE: For A319, A320 and A321 applications, refer to Reference 23, Airbus Service Bulletin A320-80-1004 for further requirements at the aircraft level.

Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

Material Information

Material — Price and Availability

1. Refer to the attached, Reference 21 and 22 Vendor Service Bulletins for the cost of new materials to accomplish this Service Bulletin.

Industry Support Program

Not Applicable.

The material data that follows is for each engine.

For V2500-A1 V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
790425-2	1	*	STARTER, PNEUMATIC	790425-2 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A4	1	*	STARTER, PNEUMATIC	790425A4 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A6	1	*	STARTER, PNEUMATIC	790425A6 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A3	1	*	STARTER, PNEUMATIC	790425A3 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A5	1	*	STARTER, PNEUMATIC	790425A5 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A7**	1	*	STARTER, PNEUMATIC	790425A5 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A8**	1	*	STARTER, PNEUMATIC	790425A6 (80-13-41-01-200)	(3)(L)(P)(S1)(V)

The material data that follows is for each engine.

For V2525-D5, V2528-D5 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
790425A3	1	*	STARTER, PNEUMATIC	790425A3 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A5	1	*	STARTER, PNEUMATIC	790425A5 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A4	1	*	STARTER, PNEUMATIC	790425A4 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A6	1	*	STARTER, PNEUMATIC	790425A6 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A7**	1	*	STARTER, PNEUMATIC	790425A5 (80-13-41-01-200)	(3)(L)(P)(S1)(V)
			OR		
790425A8**	1	*	STARTER, PNEUMATIC	790425A6 (80-13-41-01-200)	(3)(L)(P)(S1)(V)

NOTE: ** The L number only advances to L17 when Reference 21 Sumitomo Precision Products (SPP) Service Bulletin 80-2520 is accomplished. The part number only advances when Reference 22 Sumitomo Precision Products (SPP) Service Bulletin 80-2521 is accomplished.

Instructions/Disposition Code Statements:

Parts Modification Conditions

Estimated part prices are provided when they are available at time of publication. The Estimate of Unit Price is only for planning purposes and does not constitute a firm quotation. An asterisk (*) is shown where part pricing information was unavailable.

(3) See Reference 21 and 22 for new part information.

Spare Parts Availability

(L) The old part will be supplied until the supply is fully used.

(P) Procure the part directly from the Supplier referenced in Vendor Services or Special Components.

(S1) Old and new parts are fully and freely interchangeable.

(V) This is the Sumitomo Precision Products part number.

Vendor Services or Special Components/Materials

See Reference 21 or 22 for Vendor Contact information.

Tooling — Price and Availability

Special tools are not required to accomplish this Service Bulletin.

Reidentified Parts

Not Applicable.

Other Material Information Data

Not Applicable.

Accomplishment Instructions

1. Do the attached Vendor Service Bulletins to improve the Pneumatic Starter. Each Service Bulletin is independent of the other but to get the full benefit of the improvements, both should be accomplished.

   A. Do Reference 21 Sumitomo Precision Products (SPP) Service Bulletin 80-2520 to reduce oil loss and oil temperature in the Pneumatic Starter.

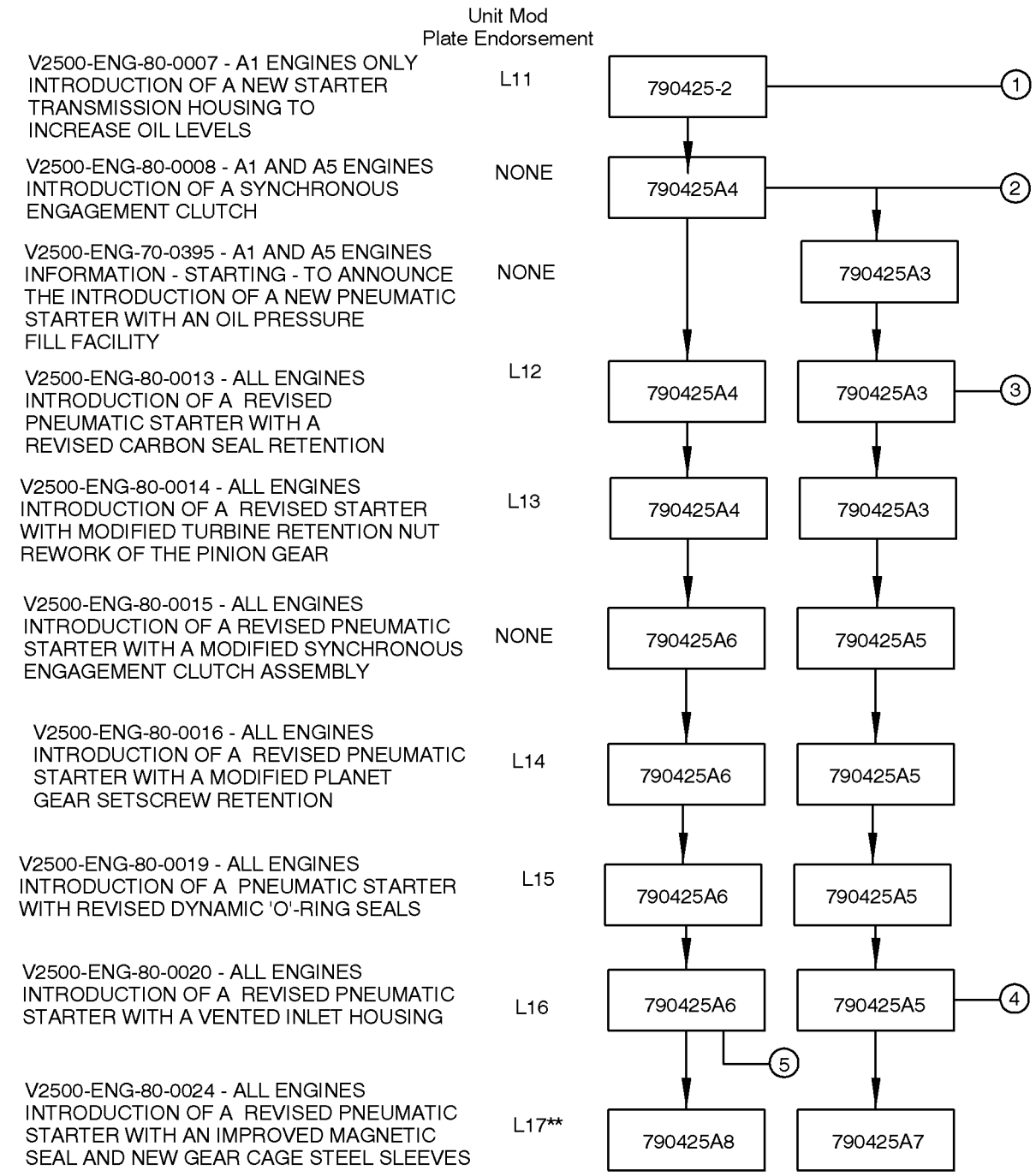
   B. Do Reference 22 Sumitomo Precision Products (SPP) Service Bulletin 80-2521 to improve durability by adding steel sleeves to the cluster gear bushing bores in the Pneumatic Starter.

2. Recording Instructions

   A. A record of accomplishment is required.

Appendix

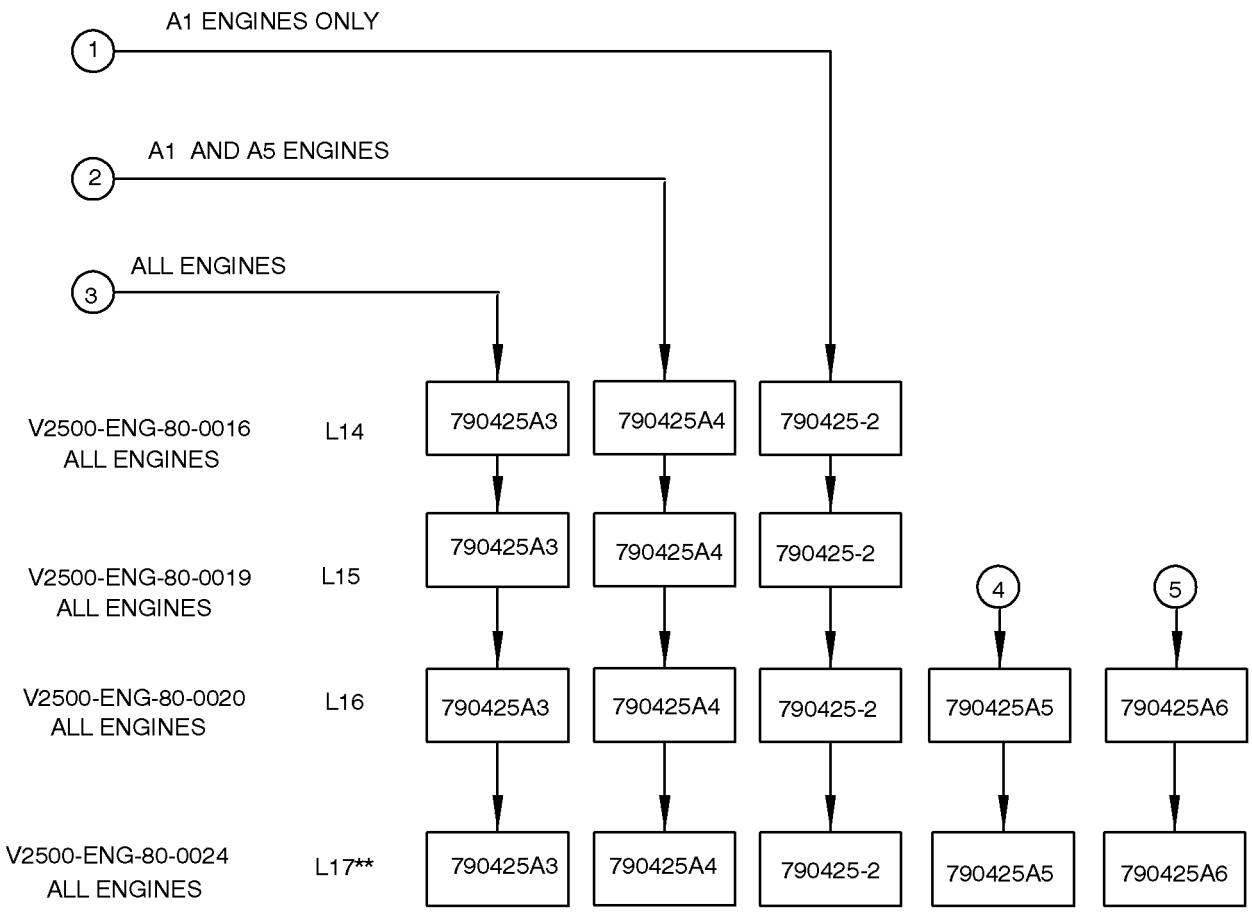
Parts Progression To Show the Changed Part in Relation to Other Parts



pw0b525123

** THE L NUMBER ONLY ADVANCES TO L17 WHEN SPP SB 80-2520 IS ACCOMPLISHED
PART NUMBER ADVANCES WHEN SPP SB 80-2521 IS ACCOMPLISHED

FAMILY TREE — V2500-A1, A5 AND D5 PNEUMATIC STARTER
CHART A, SHEET 1



** THE L NUMBER ONLY ADVANCES TO L17 WHEN SPP SB 80-2520 IS ACCOMPLISHED
PAET NUMBER IS CHANGED WHEN SPP SB 80-2521 IS ACCOMPLISHED

pw0b525124

FAMILY TREE — V2500-A1, A5 AND D5 PNEUMATIC STARTER
CHART A, SHEET 2

Added Data

Added Data

Internal Reference Information

Revision No.	Reference Document	Origination
Original	EC13VI005	PT/CMS
1	EC13VI005	WK/SLS
2	EC13VI005	WK/CMS

Number values shown in parentheses adjacent to U.S. values are International System of units (SI) equivalents.

Reference 21, Sumitomo Precision Products Service Bulletin 80-2520 follows:

Reference 22, Sumitomo Precision Products Service Bulletin 80-2521 follows:

SUMITOMO PRECISION PRODUCTS CO., LTD.

SERVICE BULLETIN

STARTING - PNEUMATIC STARTER - IMPROVED MAGNETIC SEAL

1. PLANNING INFORMATION

A. Effectivity

(1) Sumitomo Precision Products Pneumatic Starter, Model PS400-1, part number 790425 series, all serial numbers, used on Airbus A319, A320, A321 and Boeing/ Douglas MD90 aircraft that use IAE V2500 engines that do not incorporate modification number L17.

B. Concurrent Requirements

(1) None

C. Reason

(1) Problem - There has been oil leakage from the Pneumatic Starter in the output shaft seal area due to the high operating temperature of the current magnetic seal. The oil leakage has contributed to poor performance of the Pneumatic Starter.

(2) Cause - The high operating temperatures of the magnetic seal are causing a degradation of the associated O-rings and seal face resulting in oil leakage.

(3) Solution - Incorporate new seal PN 797645-3. The new seal has an increased air gap and decreased outside diameter to improve oil circulation and remove heat. It has a wider O-ring groove and provides more axial shaft movement. It also adds six holes for better oil circulation and to minimize coking.

(4) Substantiation - The new seal design changes make it similar to the magnetic seal used on the PS600/PS700 pneumatic starters. The PS600/PS700 seal was introduced into the field in the early 1990's and the performance of the new seal has been acceptable. The magnetic seal leakage has been less of a problem on the PS600/ PS700 pneumatic starters.

The changes provide better oil circulation and, therefore, heat removal capability which addresses the high operating temperature problem. Testing of the new seal has shown a decrease in operating temperatures.

D. Description

(1) This bulletin gives the instructions to replace the output shaft magnetic seal and identify the Pneumatic Starter.

SERVICE BULLETIN

E. Compliance

(1) Incorporation of this service bulletin is to be accomplished when the Pneumatic Starter is disassembled for other reasons and the new magnetic seal is available, or if the operator thinks the change is necessary because of what the operator knows of the history of the unit.

F. Approval

(1) This Service Bulletin 80-2520 (IAE SB 80-0024) was technically agreed by IAE on 27 June 2013.

G. Manpower

(1) Approximately 0.2 man-hours are required to replace the magnetic seal when the Pneumatic Starter is in for normal repair or overhaul.

H. Weight and Balance

(1) None

I. Electrical Load Data

(1) Not changed

J. Software Accomplishment Summary

(1) Not Applicable

K. References

(1) Component Maintenance Manual (CMM) 80-13-41

(2) Engineering Change 10B594

(3) IAE Engineering Change 13VI005

L. Other Publications Affected

(1) Component Maintenance Manual 80-13-41 will be revised to incorporate this bulletin.

M. Interchangeability or Intermixability of Parts

(1) The incorporation of this bulletin does not affect the interchangeability or intermixability of the Pneumatic Starter.

2. MATERIAL INFORMATION

A. Material - Price and Availability

(1) The prices that are shown in Table 1 are an estimate for one part in US dollars. When you buy the parts, the prices may be different. Send requests for parts to:

Mail:

Sumitomo Precision Products Co.
Attention: Product Support Department
1-10, Fuso-cho, Amagasaki
Hyogo 660-0891 Japan

Telephone: +81-6-6489-5884
FAX: +81-6-6489-5889

B. Industry Support Information

(1) All costs associated with the incorporation of this bulletin are at the operator's expense.

C. Material Necessary For Each Unit

(1) Refer to CMM 80-13-41 for expendable parts information.

(2) Material to be Purchased

Table 1
New Parts Required

New Part Number	Keyword	Old Part Number	Qty	Unit Price (Note 1)	Special Instructions/ Disposition
797645-3	Seal, Magnetic	797645-2	1	US $ 1,200.00	Remove and discard old, install new
732081-179	Shim, Solid	None	AR	US $ 13.50	Install.
732081-180	Shim, Solid	None	AR	US $ 13.50	Install.
732081-181	Shim, Solid	None	AR	US $ 13.50	Install.
732081-182	Shim, Solid	None	AR	US $ 13.50	Install.
732081-183	Shim, Solid	None	AR	US $ 13.50	Install.

Table 1 Note 1: The noted price is valid at the time of the original bulletin issue. Refer to the latest catalog for the current price.

(3) Material Supplied by the Operator

(a) None

D. Material Necessary For Each Spare

(1) The same as the material necessary for each unit.

E. Reidentified Parts

(1) Not Applicable

F. Tooling - Price and Availability

(1) No tooling other than that required for shop maintenance of the Pneumatic Starter is required to do this modification.

3. ACCOMPLISHMENT INSTRUCTIONS

A. General

(1) The facility performing the work (user) should obtain the material safety data sheets [Occupational Safety and Health Act (OSHA) Form 20 or equivalent] from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. The user should also read the long version of the warnings contained in this bulletin. The long version warnings are contained in Hamilton Sundstrand Warnings Registry 341-006 available free of charge to all organizations that are on distribution for this bulletin. The Warnings Registry 341-006 is also available at myhs.hamiltonsundstrand.com.

(2) A unit modified according to this service bulletin might be returned to the shop for maintenance or repair before the new or modified part numbers or procedures in this bulletin are incorporated into the applicable CMM.

Until this service bulletin is incorporated into the CMM, operators are allowed to disassemble, clean, check, repair, assemble, and test the unit according to the applicable CMM, using the new or modified part numbers or procedures in this bulletin.

After this service bulletin is incorporated into the CMM, the CMM procedures will supersede this bulletin.

B. Disassembly

(1) Refer to CMM 80-13-41, DISASSEMBLY and the steps that follow to disassemble the Pneumatic Starter.

(a) Disassemble the Pneumatic Starter according to CMM 80-13-41, DISASSEMBLY to the extent necessary to remove the magnetic seal (160, IPL Figure 1).

(b) Remove the magnetic seal (160) and discard it.

C. Modification

(1) None

D. Assembly

(1) Refer to CMM 80-13-41, ASSEMBLY and the steps that follow to assemble the Pneumatic Starter.

NOTE: The assembly sequence that follows should be used instead of the sequence given in paragraph 7.G.(1) thru 7.G.(12) in CMM 80-13-41.

(a) Temporarily install the seal insulator (150), solid shim (140) and the internal retainer ring (130) in the bearing sleeve (340) as shown in Figure 1. Use a feeler gauge to measure the gap between the solid shim (140, IPL Figure 1) and the internal retainer ring (130). Determine the quantity of solid shims, PN 732081-179 thru PN 732081-183, required to reduce the gap to 0.005 inch (0.127 millimeter) maximum. Remove the internal retainer ring (130).

(b) Temporarily install a sufficient quantity of solid shims, PN 732081-179 thru PN 732081-183, so that a 0.005 inch (0.127 millimeter) feeler gauge cannot be inserted after the internal retainer ring (130) is installed.

(c) Remove the internal retainer ring (130), the temporarily installed solid shims, PN 732081-179 thru PN 732081-183, and the seal insulator (150).

NOTE: Retain the solid shims (140) and PN 732081-179 thru PN 732081-183, and the internal retainer ring (130) for final assembly.

(d) Lubricate preformed packing (210) with lubricating oil MIL-PRF-23699 and install in bearing sleeve (340).

(e) Lubricate the inner diameter of the seal insulator (150), as indicated in Figure 1, with a thin layer of Ultrachem Assembly Fluid No. 1. Install the seal insulator (150, IPL Figure 1).

(f) Remove and lubricate the preformed packings (180 and 200) on the magnetic seal (160) with a thin layer of Ultrachem Assembly Fluid No. 1. [The preformed packings are provided as part of the magnetic seal (160).] Assemble the preformed packings back on the magnetic seal (160).

(g) Lubricate the preformed packing (240) with MIL-PRF-23699 and install it on the shaft of the synchronous clutch (311). Lubricate the outer diameter of the bearing nut (230) with a thin layer of Ultrachem Assembly Fluid No. 1. Lubricate the threads of the bearing nut (230) with lubricating oil, MIL-PRF-23699.

(h) Install the magnetic seal (160) on the bearing nut (230). Put the magnetic seal 0.260 to 0.350 inch (6.61 to 8.89 millimeters) from the end of the bearing nut (230) as shown in Figure 1.

(i) Install the bearing nut (230, IPL Figure 1), magnetic seal (160), solid shim (140), and the solid shims, PN 732081-179 thru PN 732081-183, from step 3.D.(1)(c). Install the bearing nut (230) on the synchronous clutch (311). Install Torque Adapter, T-00894-1, in clutch splines and use a suitable wrench to keep it from turning. Tighten the bearing nut (230) with Bearing Nut Wrench, T-00895-1, to 420 to 500 pound-inches (47.5 to 56.4 N•m) torque and align the slot in the bearing nut (230) with a hole in output shaft (260, IPL Figure 4A).

(j) Install the retaining ring (220, IPL Figure 1) in the groove in the ID of the shaft of the synchronous clutch (311) with the bent end through the hole in the shaft of the synchronous clutch (311) and the slot in the bearing nut (230).

(k) Press on the solid shims, PN 732081-179 thru PN 732081-183, from step 3.D.(1)(c) with sufficient force so that the internal retainer ring (130) can be installed.

(l) Install the internal retainer ring (130) in the bearing sleeve (340). The internal retainer ring (130) must be fully engaged in the ring groove of the bearing sleeve (340) as shown in Figure 1.

(2) Install the output shaft (110) and the remainder of the Pneumatic Starter parts according to CMM 80-13-41, ASSEMBLY, paragraphs 7.H. through 7.M.

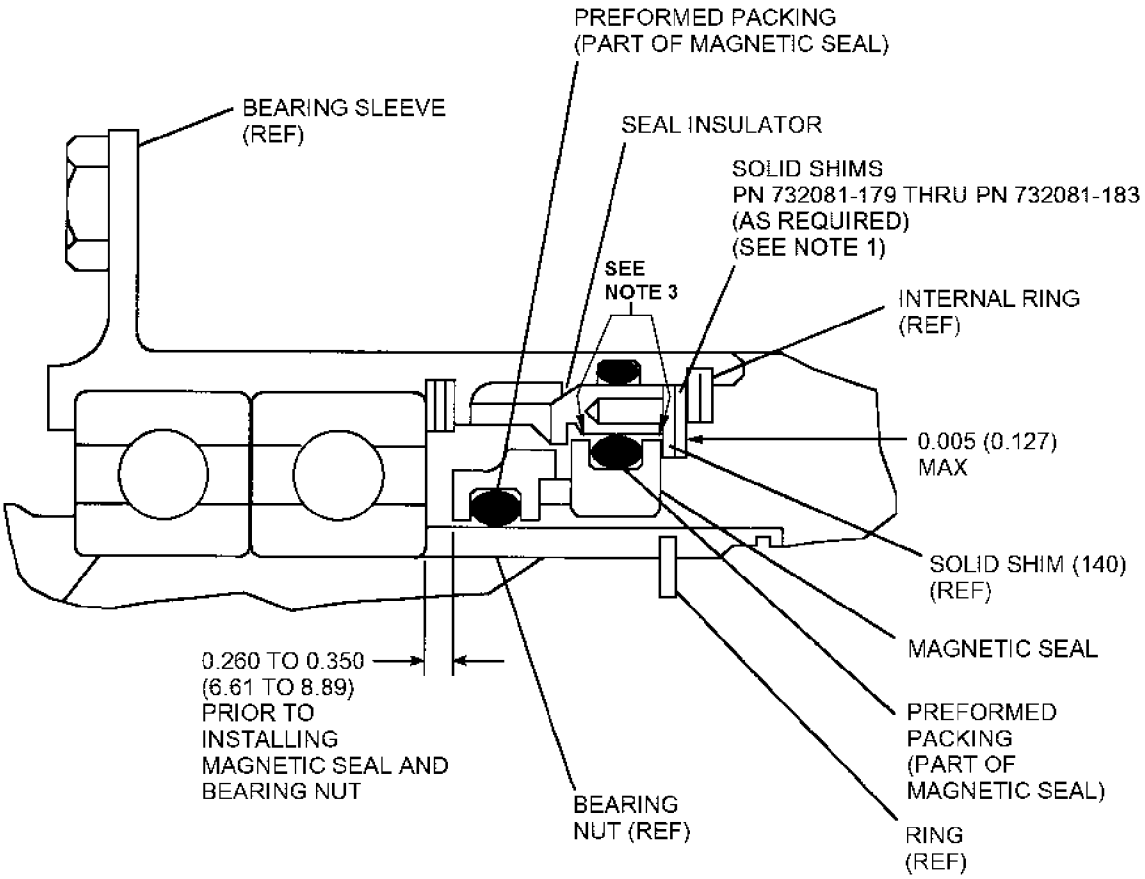
E. Test

(1) Do a test of the Pneumatic Starter (refer to CMM 80-13-41, TESTING AND FAULT ISOLATION).

F. Identification

(1) On the identification plate (430), use a permanent marking method to put L17 in the MOD DATA section

SERVICE BULLETIN



NOTES:

1. TEMPORARILY INSTALL SOLID SHIMS AND THE INTERNAL RETAINER RING AS SHOWN. INSTALL A SUFFICIENT QUANTITY OF SOLID SHIMS TO GET A 0.005 (0.127) MAXIMUM CLEARANCE BETWEEN THE INTERNAL RETAINER RING AND THE SOLID SHIMS.
2. DIMENSIONS IN INCHES (MILLIMETERS).
3. **COAT ID OF INSULATOR AT INCLUDED AREA WITH A THIN LAYER OF ULTRACHEM ASSEMBLY FLUID NO. 1.**
4. ITEM NUMBERS REFER TO IPL FIGURE 1.

SB 80-2520-311-51-A

Figure 1
Assembly of the Magnetic Seal

SUMITOMO PRECISION PRODUCTS CO., LTD.

SERVICE BULLETIN

STARTING - PNEUMATIC STARTER - IMPROVED GEAR CAGE AND INSERTS

1. PLANNING INFORMATION

A. Effectivity

(1) Sumitomo Precision Products Pneumatic Starter, Model PS400-1, part number 790425A5, 790425-5, 790425A6, and 790425-6, all serial numbers, used on Airbus A319, A320, A321 and Boeing/Douglas MD90 aircraft that use IAE V2500 engines.

B. Concurrent Requirements

(1) None

C. Reason

(1) Problem - After several thousand start cycles, the Pneumatic Starter gear cage cluster gear shaft bores are experiencing service wear. The wear increases with cycles and leads to misalignment in the gear train. The misalignment causes additional stress on the cluster gears. This may lead to cluster gear damage and may lead to wear of the surrounding components.

(2) Cause - The Pneumatic Starter gear mesh vibration and applied torque during the starting operation causes the steel cluster gear bushings to wear the magnesium gear cage cluster gear bores over time. The wear will lead to gear train misalignment and damage.

(3) Solution - Add steel sleeves to the cluster gear bushing bores. The sleeves are an interference fit which eliminates movement between the steel and magnesium. The steel sleeves support the steel bushings and the wear rate is reduced.

(4) Substantiation - The sleeved gear cage configuration is a repair that has been used on several pneumatic starters. Field experience has shown the steel sleeves to reduce wear and prolong the life of the component. The PS400-1 pneumatic starter has incorporated the use of steel sleeves as an aftermarket repair for many years. The steel sleeved gear cage has been used since 1978 in starter applications where the torque and horsepower output is greater than the PS400-1 Pneumatic Starter.

D. Description

(1) This bulletin gives the instructions to replace the existing gear cage and inserts with one that incorporates steel sleeves in the gear cage cluster gear bores.

E. Compliance

(1) Incorporation of this service bulletin is to be accomplished at the next shop visit when the Pneumatic Starter is disassembled and you have access to the gear cage.

F. Approval

(1) This Service Bulletin 80-2521 (IAE SB 80-0024) was technically agreed by IAE on 27 June 2013.

G. Manpower

(1) Approximately 3.2 man-hours are required to inspect and rework the gear cage when the Pneumatic Starter is disassembled for normal repair or overhaul.

H. Weight and Balance

(1) Incorporation of this service bulletin increases the weight of the Pneumatic Starter by 0.056 pound (0.03 kilogram).

I. Electrical Load Data

(1) Not changed

J. Software Accomplishment Summary

(1) Not Applicable

K. References

(1) Component Maintenance Manual (CMM) 80-13-41

(2) Engineering Change 13B376

(3) IAE Engineering Change 13VI005

L. Other Publications Affected

(1) Component Maintenance Manual 80-13-41 will be revised to incorporate this bulletin.

M. Interchangeability or Intermixability of Parts

(1) The incorporation of this bulletin does not affect the interchangeability or intermixability of the Pneumatic Starter.

2. MATERIAL INFORMATION

A. Material - Price and Availability

(1) The prices that are shown in Table 1 are an estimate for one part in US dollars. When you buy the parts, the prices may be different. Send requests for parts to:

Mail:

Sumitomo Precision Products Co.
Attention: Product Support Department
1-10, Fuso-cho, Amagasaki
Hyogo 660-0891 Japan

Telephone: +81-6-6489-5884
FAX: +81-6-6489-5889

B. Industry Support Information

(1) All costs associated with the incorporation of this bulletin are at the operator's expense.

C. Material Necessary For Each Unit

(1) Refer to CMM 80-13-41 for expendable parts information.

(2) Material to be Purchased

Table 1
New Parts Required

New Part Number	Keyword	Old Part Number	Qty	Unit Price (Note 1)	Special Instructions/ Disposition
738138-109	Gear Cage and Inserts	738138-104	1	US $ 5,986.00	Remove old, install new (Note 2 and Note 3)
738138-31	Steel Sleeve	None	3	US $ 96.00	Install new (Note 3 and Note 4)
738138-41	Steel Sleeve	None	3	US $ 94.00	Install new (Note 3 and Note 4)

Table 1 Note 1: The noted price is valid at the time of the original bulletin issue. Refer to the latest catalog for the current price.

Table 1 Note 2: The old gear cage and inserts can be retained for possible rework to the new gear cage and inserts.

Table 1 Note 3: Production gear cages and inserts contain steel sleeves PN 738138-31 and PN 738138-41. These steel sleeve part numbers are dimensionally identical to the repair steel sleeves PN SK95774-10 and PN SK95774-20 respectively.

Table 1 Note 4: When purchasing the steel sleeves from Sumitomo Precision Products to support Repair 2-3 in CMM 80-13-41, order PN 738138-31 for SK95774-10 and PN 738138-41 for SK95774-20. Steel sleeves that are locally manufactured by the repair facility are PN SK95774-10 and PN SK95774-20.

(3) Material Supplied by the Operator

(a) None

D. Material Necessary For Each Spare

(1) The same as the material necessary for each unit.

E. Reidentified Parts

(1) The Pneumatic Starter part number is changed as listed in Table 2 (refer to paragraph 3.F.(1) of this bulletin).

Table 2
Reidentified Parts

New Part Number	Keyword	Old Part Number
790425-7	Pneumatic Starter	790425-5
790425A7	Pneumatic Starter	790425A5
790425-8	Pneumatic Starter	790425-6
790425A8	Pneumatic Starter	790425A6

F. Tooling - Price and Availability

(1) No tooling other than that required for shop maintenance of the Pneumatic Starter is required to do this modification.

3. ACCOMPLISHMENT INSTRUCTIONS

A. General

(1) The facility performing the work (user) should obtain the material safety data sheets [Occupational Safety and Health Act (OSHA) Form 20 or equivalent] from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. The user should also read the long version of the warnings contained in this bulletin. The long version warnings are contained in Hamilton Sundstrand Warnings Registry 341-006 available free of charge to all organizations that are on distribution for this bulletin. The Warnings Registry 341-006 is also available at myhs.hamiltonsundstrand.com.

(2) A unit modified according to this service bulletin might be returned to the shop for maintenance or repair before the new or modified part numbers or procedures in this bulletin are incorporated into the applicable CMM.

Until this service bulletin is incorporated into the CMM, operators are allowed to disassemble, clean, check, repair, assemble, and test the unit according to the applicable CMM, using the new or modified part numbers or procedures in this bulletin.

After this service bulletin is incorporated into the CMM, the CMM procedures will supersede this bulletin.

B. Disassembly

(1) Refer to CMM 80-13-41, DISASSEMBLY and the steps that follow to disassemble the Pneumatic Starter.

(a) Disassemble the Pneumatic Starter according to CMM 80-13-41, DISASSEMBLY to the extent necessary to remove the gear cage and inserts (360, IPL Figure 2).

(b) Remove the gear cage and inserts (360).

C. Modification

(1) If the gear cage and inserts (360) is marked with "SK95774," put a mark through part number 738138-104 on the housing and re-mark the gear cage and inserts with part number 738138-109. Do not remove the "SK95774" mark. Proceed with step 3.D.(1).

NOTE: Gear cage bore inspection according to CMM 80-13-41, CHECK, is required on all gear cages during repair or overhaul of the Pneumatic Starter.

(2) If the gear cage and inserts (360) is not marked with "SK95774," perform REPAIR 2-3 in CMM 80-13-41, regardless of bore diameter measurements, and re-identify the gear cage and inserts (360) by putting a mark through the part number and adding the new part number, 738138-109 SK95774.

NOTE: The gear cage and inserts (360) must be inspected for proper bore location according to CMM 80-13-41, CHECK.

NOTE: The REPAIR 2-3 in CMM 80-13-41 refers to the steel sleeves, PN SK95774-10 and PN SK95774-20, as bushings.

NOTE: If the gear cage and inserts (360) is damaged beyond repair limits, replace it with a new or repaired gear cage and inserts (360).

D. Assembly

(1) Refer to CMM 80-13-41, ASSEMBLY and the steps that follow to assemble the Pneumatic Starter.

(a) Install the new gear cage and inserts PN 738138-109 or a gear cage and inserts that has been repaired according to CMM 80-13-41, REPAIR 2-3 onto the Pneumatic Starter according to CMM 80-13-41, ASSEMBLY.

(b) Complete the assembly of the Pneumatic Starter according to CMM 80-13-41, ASSEMBLY.

E. Test

(1) Do a test of the Pneumatic Starter (refer to CMM 80-13-41, TESTING AND FAULT ISOLATION).

F. Identification

(1) On the identification plate (430, IPL Figure 1), put a mark through the "dash" number that follows the Pneumatic Starter part number 790425. Use a permanent marking method to add the new Pneumatic Starter "dash" number as detailed in Table 2 of this bulletin.