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DATE: Aug. 4/04

V2500-A1/A5/D5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 1 to Service Bulletin EV2500-80-0020

Document History

Service Bulletin Revision Status		Supplement Revision Status
Initial Issue	Jul.6/04	

Bulletin Revision 1

Remove	Incorporate	Reason for change
All pages of the Summary	Page 1 and 2 of the Summary	Correction to Eng Serial No. in Summary Page 1
All pages of the Service Bulletin	Pages 1 to 18 of the Service Bulletin	Correction to Eng Serial No. in Summary Page 1

V2500-ENG-80-0020

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Publication Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 1 are as follows:

Page		Revision Number	Revision Date
	Summary		
R	1	1	Aug.4/04
R	2	1	Aug.4/04
	Bulletin		
R	1	1	Aug.4/04
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R	13	1	Aug.4/04
R	14	1	Aug.4/04
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R	18	1	Aug.4/04

International Aero Engines

SERVICE BULLETIN

STARTING - PNEUMATIC STARTER - INTRODUCTION OF A PNEUMATIC STARTER WITH A VENTED INLET HOUSING

SUMMARY

1. PLANNING

A. EFFECTIVITY

Engine	Serial No.
V2500-A1	V0001 to V0361
R V2500-A5	V10001 to V11724
V2500-D5	V20001 to V20285

B. CONCURRENT REQUIREMENTS

None.

C. REASON/PROBLEM

Problem

Premature failure of the Pneumatic Starter turbine bearing may occur.

The problem is attributed to pressure build up in the unit's nozzle cavity which increases the thrust load on the turbine disc and bearings.

Evidence

The problem has been experienced on units in service.

Substantiation

The changes introduced by this Service Bulletin (modification) have been the subject of successful engineering assessment tests and representative service experience.

Objective

Incorporation of this Service Bulletin is designed to maintain unit reliability.

D. DESCRIPTION

This Service Bulletin covers the fitment to engines of a Pneumatic Starter, supplied by Sumitomo Precision Products Co., incorporating design changes to reduce the pressure build up in the nozzle cavity.

E. COMPLIANCE

Category Code 6

Accomplish when the sub assembly (i.e. modules, accessories, components, build groups) is disassembled sufficiently to afford access to the affected part and to all affected spare parts.

F. MANPOWER

In service - Not applicable.

At overhaul - Not affected.

G. INTERCHANGEABILITY OF PARTS

Not affected.

2. MATERIAL INFORMATION

A. PARTS PRICES

None (No new parts are introduced by this Service Bulletin).

International Aero Engines

SERVICE BULLETIN

STARTING - PNEUMATIC STARTER - INTRODUCTION OF A PNEUMATIC STARTER WITH A VENTED INLET HOUSING

1. Planning Information

A. Effectivity

(1) Airbus A319

V2522-A5, V2524-A5, V2527M-A5 Engines prior to Serial No. V11725

(2) Airbus A320

V2500-A1 Engines prior to Serial No.V0362

V2527-A5, V2527E-A5 Engines prior to Serial No. V11725

(3) Airbus A321

V2530-A5, V2533-A5 Engines prior to Serial No. V11725

(4) Boeing - Longbeach Division MD-90

V2525-D5, V2528-D5 Engines prior to Serial No.V20286

B. Concurrent Requirements

None.

C. Reason

(1) Problem

Premature failure of the Pneumatic Starter turbine bearing may occur.

The problem is attributed to pressure build up in the unit's nozzle cavity which increases the thrust load on the turbine disc and bearings.

(2) Evidence

The problem has been experienced on units in service.

(3) Substantiation

The changes introduced by this Service Bulletin (modification) have been the subject of successful engineering assessment tests and representative service experience.

(4) Objective

Incorporation of this Service Bulletin is designed to maintain unit reliability.

(5) Effect of Bulletin on:

(a) Operation

Not affected.

(b) Maintenance

Not affected.

(c) Overhaul

Not affected.

(d) Repair Schemes

Not affected.

(e) Interchangeability

Not affected.

(f) Fits and Clearances

Not affected.

D. Description

(1) This Service Bulletin covers the fitment to engines of a Pneumatic Starter, supplied by Sumitomo Precision Products Co., incorporating design changes to reduce the pressure build up in the nozzle cavity.

The changes introduced are:

(a) A revised Pneumatic Starter is introduced similar to the existing unit except for the introduction of 34 venting holes into the solid fixed inlet guide vanes.

(2) Existing Pneumatic Starters may be reworked. Refer to Sumitomo Service Bulletin 80-2518. (See 1.N. References).

(3) Units incorporating this Service Bulletin will be identified by endorsement of the modification plate with L16.

(4) This Service Bulletin is in three parts as follows:

Part 1

New production.

Part 2

Application to pneumatic starters to pre-Service Bulletin ENG-70-0395 (A1 and A5) and ENG-70-0391 (D5).

Part 3

Application to pneumatic starters to pre-Service Bulletin ENG-80-0008.

E. Compliance

Category Code 6.

Accomplish when the sub assembly (i.e. modules, accessories, components, build groups) is disassembled sufficiently to afford access to the affected part and to all affected spare parts.

F. Approval

The part number changes and/or part modifications described in Sections 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and Joint Aviation Rules and are approved for the effectivity in Section 1.A.

G. Manpower

In service

Not applicable.

At overhaul

Not affected.

NOTE: The parts affected by this Service Bulletin are accessible at overhaul.

H. Material Price and Availability

For prices and availability of future spares refer to Sumitomo Service Bulletin 80-2518.

I. Tooling Price and Availability

Refer to Sumitomo Service Bulletin 80-2518.

J. Industry Support Information

None.

K. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

None.

(3) Datum

Engine Front Mount Centreline (Power Plant Station (PPS) 100).

L. Electrical Load Data

The aircraft electrical load is not affected by this Service Bulletin.

M. Software Accomplishment Summary

Not applicable.

N. References

(1) Vendor Service Bulletin:

Sumitomo 80-2518

STARTING - PNEUMATIC STARTER - VENTED INLET HOUSING.

(2) IAE V2500 Service Bulletins:

ENG-70-0395

STARTING - PNEUMATIC STARTER - INTRODUCTION OF A PNEUMATIC STARTER SUPPLIED WITH AN OIL PRESSURE FILL FACILITY.

ENG-70-0391

STARTING - PNEUMATIC STARTER - INTRODUCTION OF A PNEUMATIC STARTER SUPPLIED WITH AN OIL SIGHT GLASS.

ENG-80-0008

STARTING - PNEUMATIC STARTER - INTRODUCTION OF A SYNCHRONOUS ENGAGEMENT CLUTCH.

(3) Engine Manual (EM), Chapter/Section 72-00-60, Removal/Installation.

(4) Aircraft Maintenance Manual (AMM), Chapter/Section 80-11-01 (D5), 80-13-41 (A1/A5) Removal/Installation.

(5) Engineering Change Nos. - 03VI005, 03VI005A, 03VI005B and 03VI005C.

(6) ATA Locator - 80-13-41.

O. Other Publications Affected

(1) Illustrated Parts Catalogue (IPC), Chapter/Section 80-13-41 will be revised.

P. Interchangeability of Parts

Not affected.

2. Material Information

A. The kit required consists of the following parts:

None.

B. Parts to be reworked:

None.

C. New production parts:

None.

D. Vendor units affected by this bulletin:

The type of equipment affected by this Service Bulletin is listed below for information only:

Part 1

A1 and A5 Models

80-13-41

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01200	790425A6	1	.Starter, pneumatic (VK0680)	-	790425A6	(A)(S1) (1D)
01200	790425A5	1	.Starter, pneumatic (VK0680) (Customer Option)	-	790425A5	(A)(S1) (1D)

D5 Models

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01200	790425A5	1	.Starter, pneumatic (VK0680)	-	790425A5	(A)(S1) (1D)
01200	790425A6	1	.Starter, pneumatic (VK0680) (Customer Option)	-	790425A6	(A)(S1) (1D)

Part 2

A1 and A5 Models

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01200	790425A4	1	.Starter, pneumatic (VK0680)	-	790425A4	(A)(S1) (1D)
01200	790425A3	1	.Starter, pneumatic (VK0680) (Customer Option)	-	790425A3	(A)(S1) (1D)

D5 Models

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01200	790425A3	1	.Starter, pneumatic (VK0680)	-	790425A3	(A)(S1) (1D)
01200	790425A4	1	.Starter, pneumatic (VK0680) (Customer Option)	-	790425A4	(A)(S1) (1D)

Part 3

A1 and A5 Models (Except V2533-A5)

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01200	790425-2	1	.Starter, pneumatic (VK0680)	-	790425-2	(A)(S1) (1D)

E. Instruction disposition codes:

(A) New standard of unit will be made available from May 2004.

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

(1D) Old standard of unit may be reworked.

3. Accomplishment Instructions

A. Rework Instructions

Refer to Sumitomo Service Bulletin 80-2518.

B. Assembly Instructions

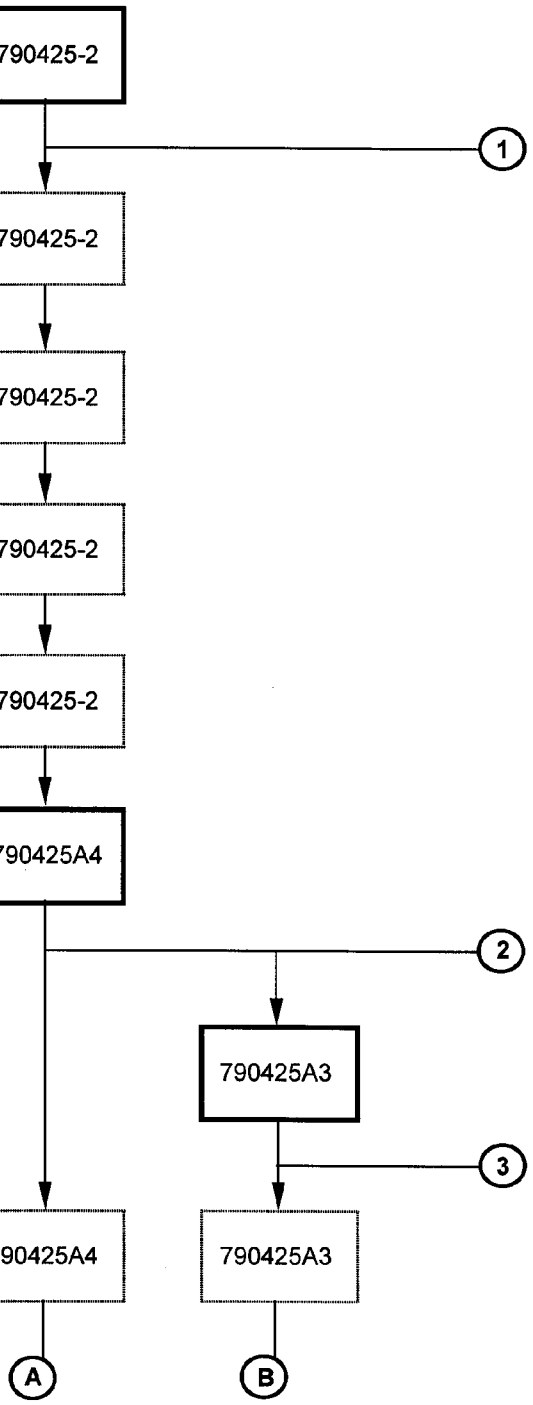
The revised pneumatic starter introduced by this Service Bulletin is interchangeable with existing. Remove and install in accordance with current overhaul procedures and maintenance practices (Engine Manual, 72-00-60, Removal and Installation and Aircraft Maintenance Manual, 80-11-01 (D5) 80-13-41 (A1/A5) Removal/Installation).

C. Recording Instructions

A record of accomplishment is necessary. Refer to Sumitomo Service Bulletin 80-2518.

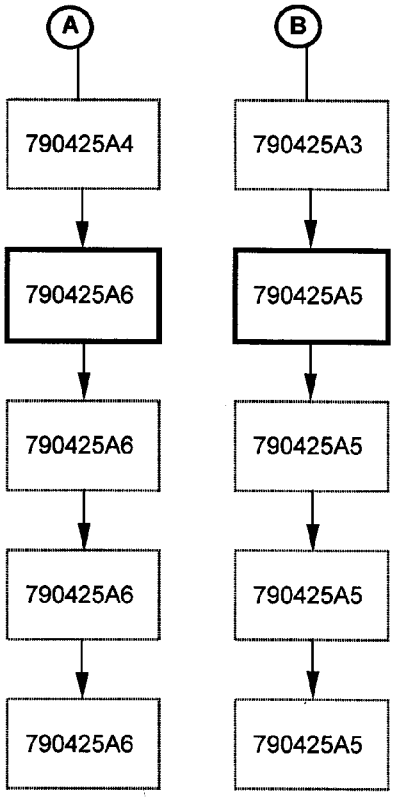
V2500-A1 Pneumatic Starter Family Tree *

Service Bulletin Number	Unit Mod Plate Endorsement
Baseline	**None**
V2500-ENG-80-0002 Introduction of a revised Pneumatic Starter with improved clutch and oil distribution	**L6**
V2500-ENG-80-0003 Introduction of a revised Pneumatic Starter with oil sight glass & increased oil quatity	**L8**
V2500-ENG-80-0005 Introduction of a revised Pneumatic Starter with improved turbine torque loading, oil flow & carbon seal sealing	**L10**
V2500-ENG-80-0007 Introduction of a revised Pneumatic Starter with revised transmission housing	**L11**
V2500-ENG-80-0008 Introduction of a revised Pneumatic Starter with synchronous engagement clutch	**NONE**
V2500-ENG-70-0395 Introduction of a revised Pneumatic Starter with oil pressure fill facility (Customer Option)	**NONE**
V2500-ENG-80-0013 Introduction of a revised Pneumatic Starter with revised carbon seal retention	**L12**



V2500-A1 Pneumatic Starter - Family Tree
(Sheet 1 of 3)

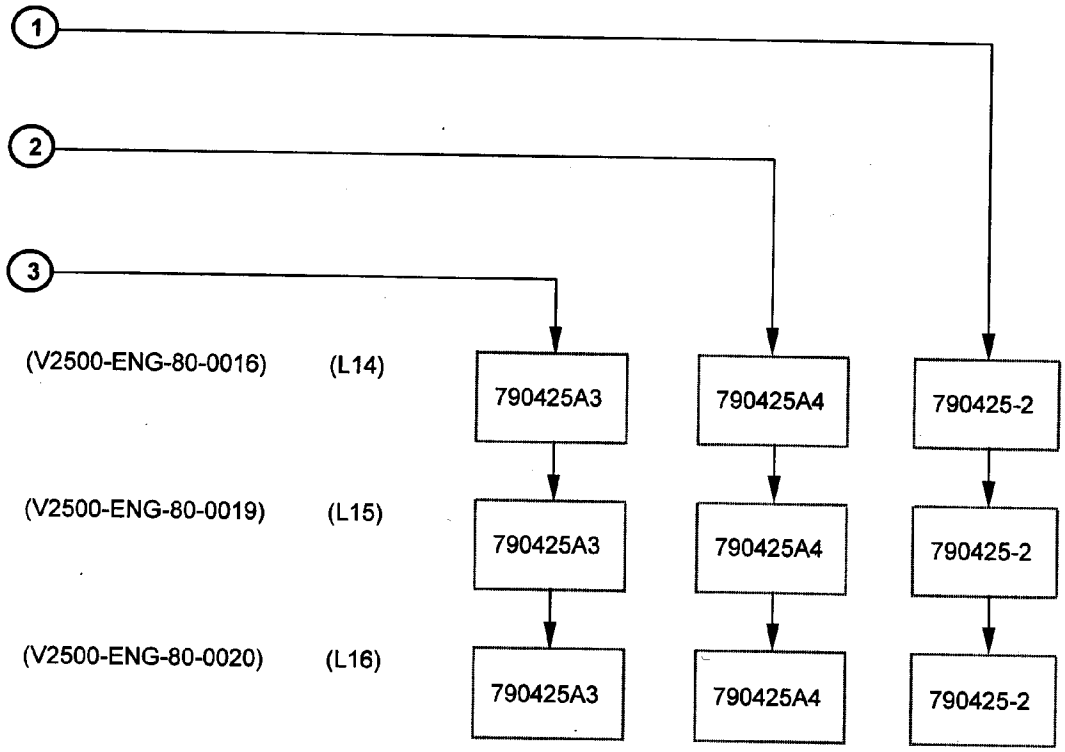
V2500-A1 Pneumatic Starter Family Tree * (cont.)



* This family tree is not intended to represent the combination of modifications fitted to units in service

V2500-A1 Pneumatic Starter - Family Tree
(Sheet 2 of 3)

V2500-A1 Pneumatic Starter Family Tree * (cont.)



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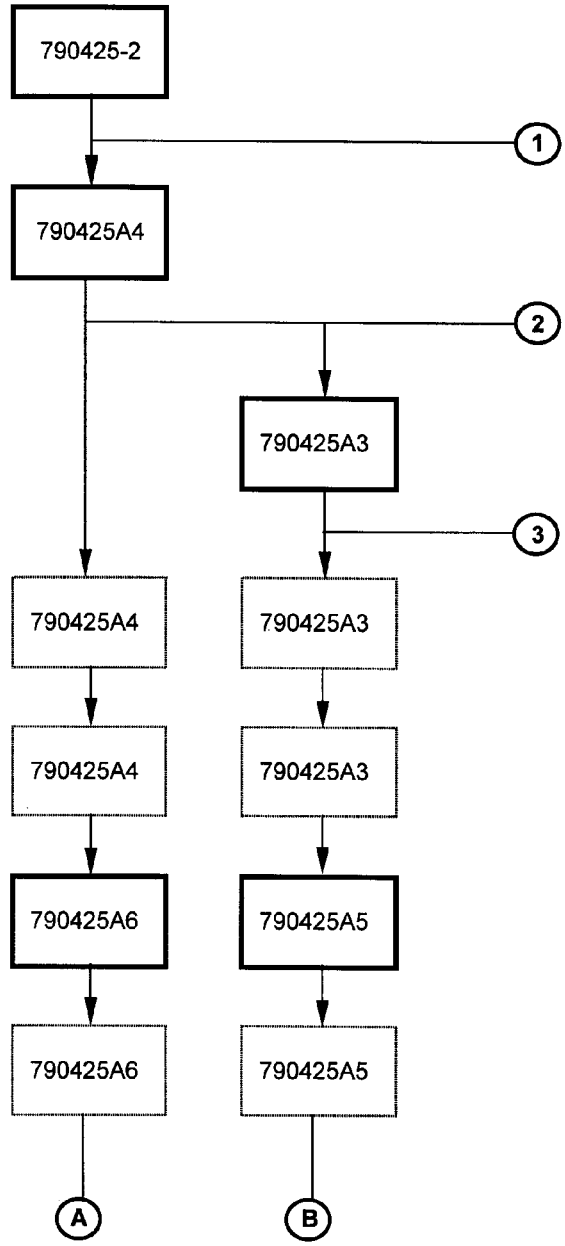
V2500-A1 Pneumatic Starter - Family Tree
(Sheet 3 of 3)

V2500-A5 (EXCEPT V2533-A5)
Pneumatic Starter Family Tree

Service Bulletin Number	Unit Mod Plate Endorsement
Baseline	**L11**
V2500-ENG-80-0008 Introduction of a revised Pneumatic Starter with synchronous engagement clutch	**NONE**
V2500-ENG-70-0395 Introduction of a revised Pneumatic Starter with oil pressure fill facility (Customer Option)	**NONE**
V2500-ENG-80-0013 Introduction of a revised Pneumatic Starter with revised carbon seal retention	**L12**
V2500-ENG-80-0014 Introduction of a revised Pneumatic Starter with modified turbine retention nut pre-load	**L13**
V2500-ENG-80-0015 Introduction of a revised Pneumatic Starter with a modified synchronous engagement clutch assembly	**NONE**
V2500-ENG-80-0016 Introduction of a revised Pneumatic Starter with modified planet gear setscrew retention	**L14**



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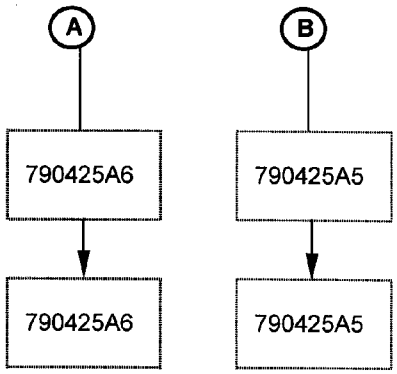
V2500-A5 (Except V2533-A5) Pneumatic Starter - Family Tree
(Sheet 1 of 3)

V2500-A5 (EXCEPT V2533-A5)
Pneumatic Starter Family Tree (cont.)

V2500-ENG-80-0019 **L15**
Introduction of a Pneumatic Starter
with revised Dynamic 'O' Ring Seals

V2500-ENG-80-0020 **L16**
Introduction of a Pneumatic Starter
with a vented inlet housing



* This family tree is not intended to represent the combination of modifications fitted to units in service

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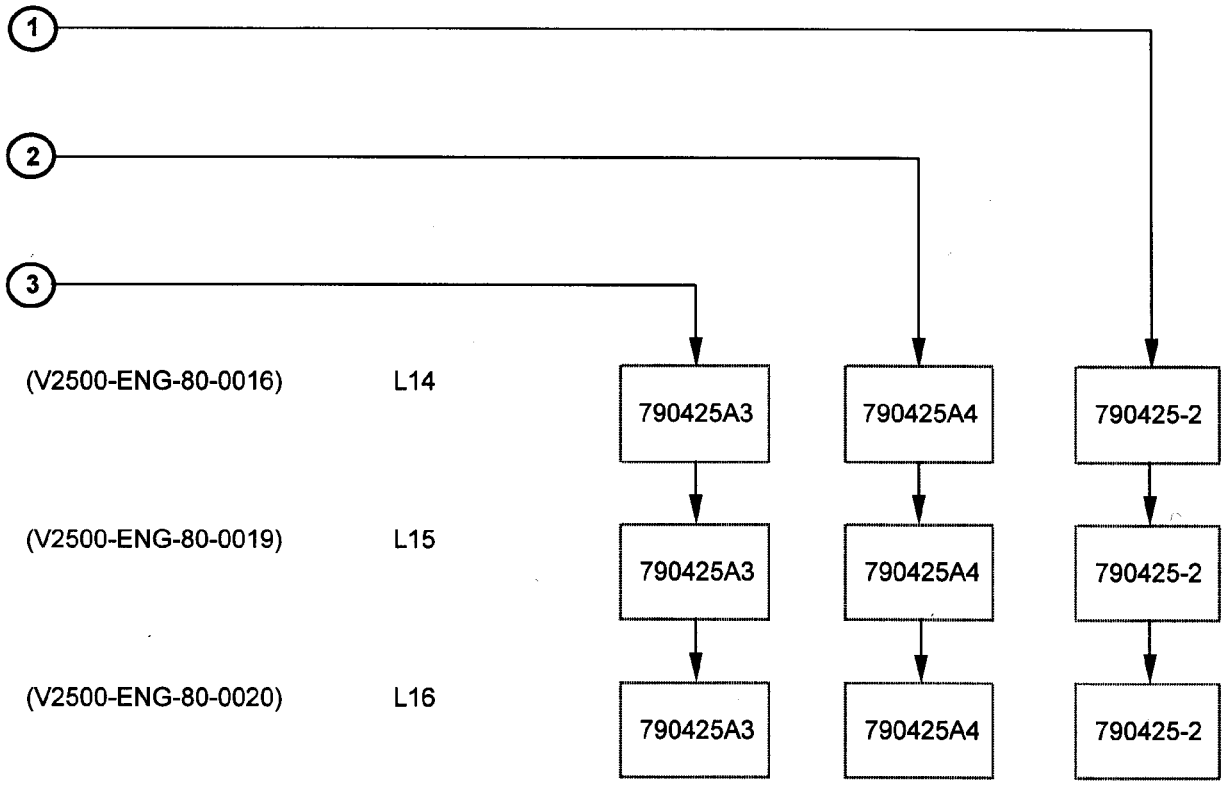
V2500-A5 (Except V2533-A5) Pneumatic Starter - Family Tree
(Sheet 2 of 3)

V2500-A5 (EXCEPT V2533-A5)
Pneumatic Starter Family Tree (cont.)



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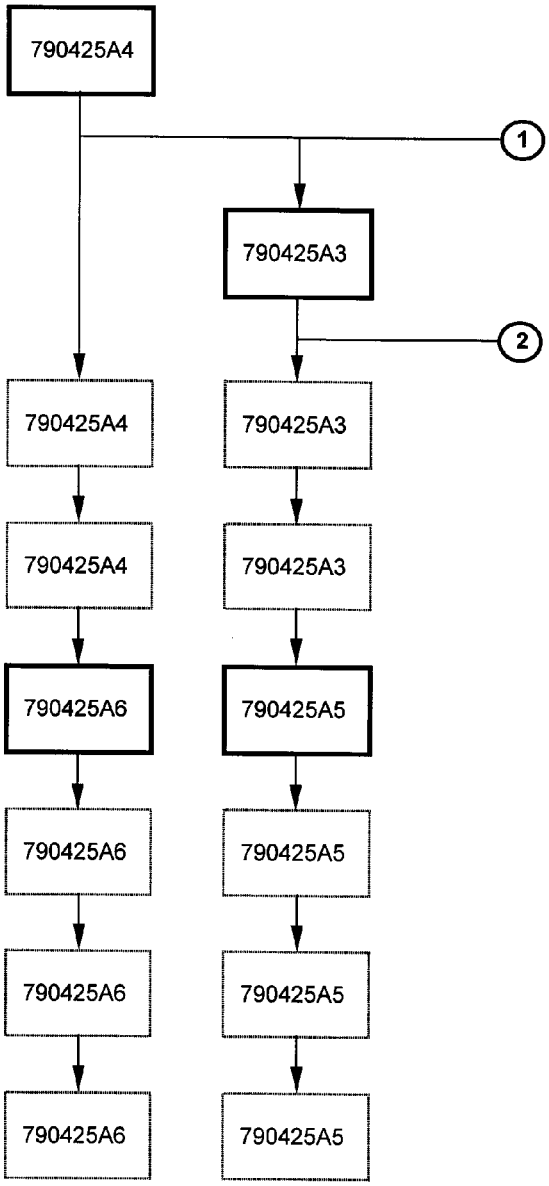
V2500-A5 (Except V2533-A5) Pneumatic Starter - Family Tree
(Sheet 3 of 3)

V2533-A5 Pneumatic Starter Family Tree*

Service Bulletin Number	Unit Mod Plate Endorsement
Baseline	**NONE**
V2500-ENG-70-0395 Introduction of a revised Pneumatic Starter with oil pressure fill facility (Customer Option)	**NONE**
V2500-ENG-80-0013 Introduction of a revised Pneumatic Starter with revised carbon seal retention	**L12**
V2500-ENG-80-0014 Introduction of a revised Pneumatic Starter with modified turbine retention nut pre-load	**L13**
V2500-ENG-80-0015 Introduction of a revised Pneumatic Starter with a modified synchronous engagement clutch assembly	**NONE**
V2500-ENG-80-0016 Introduction of a revised Pneumatic Starter with modified planet gear setscrew retention	**L14**
V2500-ENG-80-0019 Introduction of a Pneumatic Starter with revised Dynamic 'O' Ring Seals	**L15**
V2500-ENG-80-0020 Introduction of a Pneumatic Starter with a vented inlet housing	**L16**



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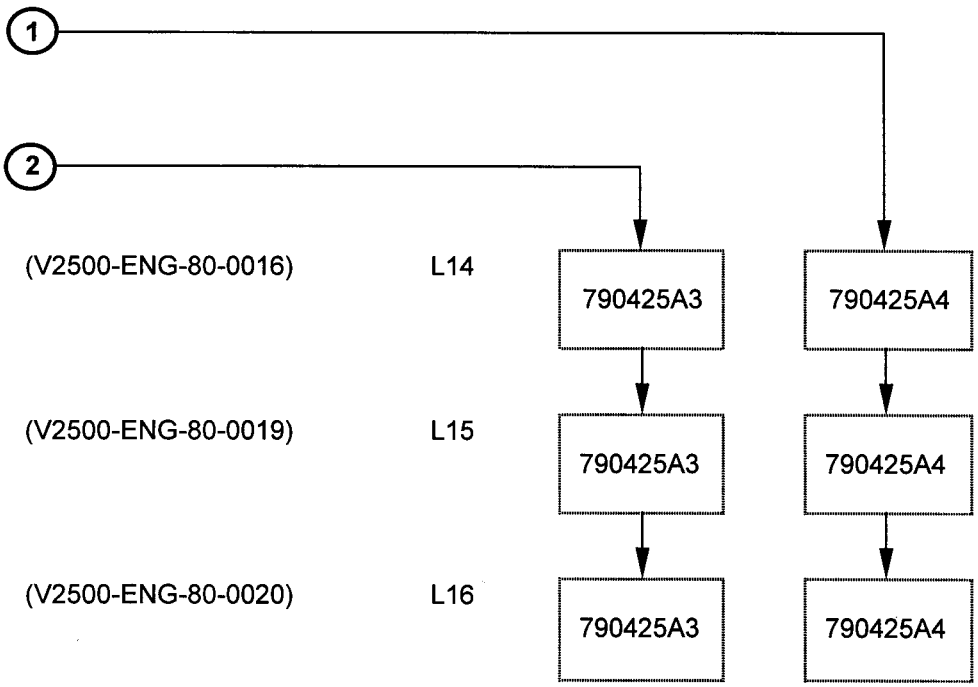
* This family tree is not intended to represent the combination of modifications fitted to units in service

V2533-A5 Pneumatic Starter - Family Tree
(Sheet 1 of 2)

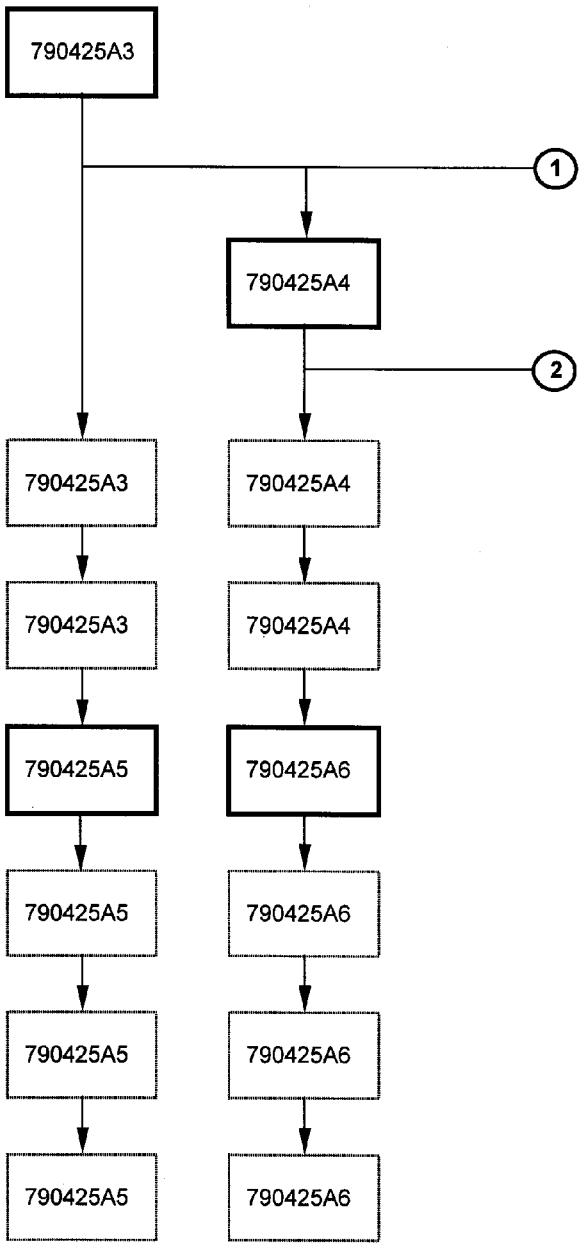
V2533-A5 Pneumatic Starter Family Tree* (cont.)



V2533-A5 Pneumatic Starter - Family Tree
(Sheet 2 of 2)

V2500-D5 Pneumatic Starter Family Tree*

Service Bulletin Number	Unit Mod Plate Endorsement
Baseline	**NONE**
V2500-ENG-70-0391 Introduction of a revised Pneumatic Starter with an oil sight glass	**NONE**
(Customer Option)	
V2500-ENG-80-0013 Introduction of a revised Pneumatic Starter with revised carbon seal retention	**L12**
V2500-ENG-80-0014 Introduction of a revised Pneumatic Starter with modified turbine retention nut pre-load	**L13**
V2500-ENG-80-0015 Introduction of a revised Pneumatic Starter with a modified synchronous engagement clutch assembly	**NONE**
V2500-ENG-80-0016 Introduction of a revised Pneumatic Starter with modified planet gear setscrew retention	**L14**
V2500-ENG-80-0019 Introduction of a Pneumatic Starter with revised Dynamic 'O' Ring Seals	**L15**
V2500-ENG-80-0020 Introduction of a Pneumatic Starter with a vented inlet housing	**L16**



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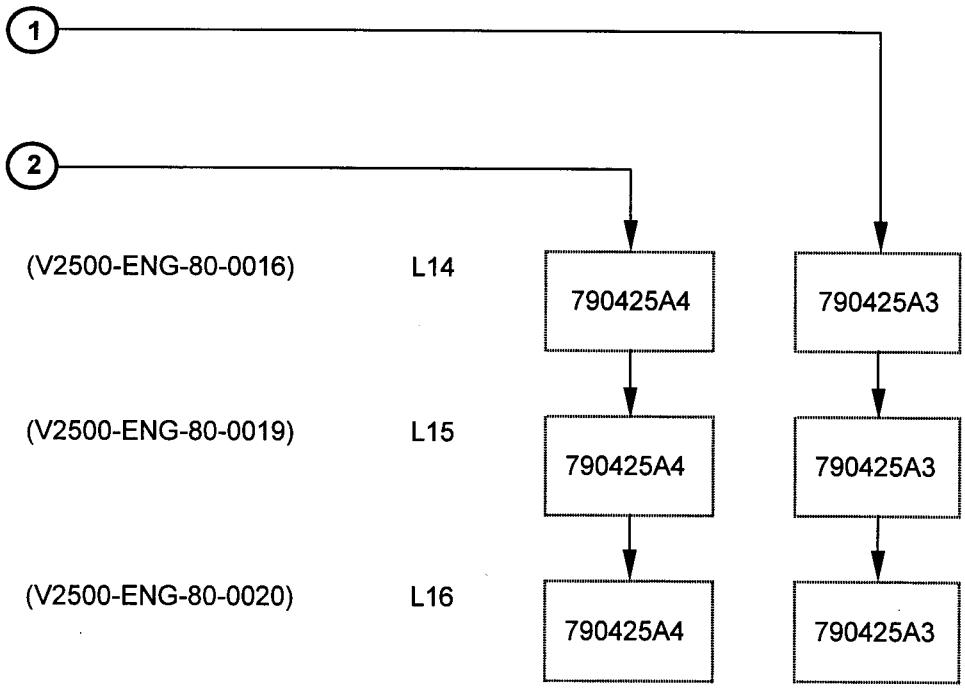
* This family tree is not intended to represent the combination of modifications fitted to units in service

V2500-D5 Pneumatic Starter - Family Tree
(Sheet 1 of 2)

V2500-D5 Pneumatic Starter Family Tree* (cont.)



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V2500-D5 Pneumatic Starter - Family Tree
(Sheet 2 of 2)

SUMITOMO PRECISION PRODUCTS CO., LTD.

SERVICE BULLETIN

STARTING - PNEUMATIC STARTER - VENTED INLET HOUSING

1. Planning Information

A. Effectivity

(1) Refer to Table 1.

Table 1. Effectivity

Part Number
All Pneumatic Starters Part Number (PN) 790425 That Do Not Incorporate Stock List Number L16

NOTE: This Service Bulletin is applicable to the Pneumatic Starters that are installed in Airbus A319, A320, A321 and Boeing/Douglas MD90 aircraft that use IAE/V2500 Engines.

B. Reason

(1) Problem - The turbine end bearing can have high thrust loads which can reduce its service life.

(2) Cause - Applied inlet pressure that is built up in the unit's nozzle cavity generates the thrust loads and subsequent temperature rise that put wear on the turbine bearing, which reduce normal bearing life.

(3) Solution - Reducing the thrust loads will increase bearing life and starter reliability. Venting the inlet housing to lower the air pressure on the turbine rotor hub will reduce the thrust load on the turbine bearing. This will increase bearing life.

(4) Substantiation - Testing was conducted that showed a decrease in the thrust load on the turbine end bearing when the cavity in the center of the inlet housing is vented. Lower bearing loads increase bearing life.

C. Description

(1) Vent holes are added to the inlet housing.

(2) Reidentify the starter by adding L16 on the starter identification plate.

D. Compliance

(1) Recommended - Do the procedures in this Service Bulletin when the Pneumatic Starter is disassembled for other causes.

E. Approval

(1) This Service Bulletin 80-2518 (IAE SB 80-0020) was technically agreed by IAE on 31 May 04.

F. Manpower

(1) Approximately 7 man-hours are necessary to do this Service Bulletin procedure at component maintenance (or overhaul). This estimate does not include any time for a test.

G. Weight and Balance

(1) None

H. Electrical Load Data

(1) None

I. References

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

(2) IAE SB 80-0020

J. Other Publications Affected

(1) CMM 80-13-41

2. Material Information

A. Material - Price and Availability

(1) Refer to Table 2.

B. Industry Support Information

(1) None

C. Material Necessary for Each Component

(1) Material to be Purchased

(a) The parts that are necessary to do this Service Bulletin are shown in Table 2.

(b) Any parts that usually are discarded when you disassemble the Pneumatic Starter are not shown in Table 2.

(c) In Table 2, “MSQ” is the Minimum Sales Quantity. The parts that have an entry in this area of Table 2 are supplied only in this quantity, or a multiple of this quantity.

(d) In Table 2, “Keyword” is the name of the part.

(e) In Table 2, the “Instruction Codes” tell you what to do with the parts. A short list under Table 2 tells you about the instruction codes that are used in Table 2.

(f) The prices that are shown are an estimate for one part in US dollars. When you buy the parts, the prices may be different. Send request 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

(g) Lacquer per Henco-Mask Type I, or equivalent, must be purchased to accomplish this Service Bulletin. Lacquer per Henco-Mask Type I can be purchased at the following:

E/M Everlube Products
100 Cooper Circle
Peachtree City, GA 30269
Phone: 770-261-4800
FAX: 770-261-4805

Table 2. Material Information

New PN	Qty	MSQ	Estimated Unit Price	Keyword	PN Before this SB	Instruction Codes
792993-6	1	1	$7,219.00	Inlet Housing	792993-3	A

- Instruction Code A. This Service Bulletin change uses the “PN Before this SB” to make the “New PN”.

(2) Material Supplied by the Operator

(a) None

D. Material Necessary for Spare

(1) None

E. Re-identified Parts

(1) Refer to Table 2 for parts that you can rework and reidentify.

F. Tooling - Price and Availability

(1) Fixture, Vent Hole Drilling - 63001014

NOTE: Sumitomo can quote tooling price and availability upon request. Tool can be manufactured locally.

SERVICE BULLETIN

3. Accomplishment Instructions

A. Use the procedure in DISASSEMBLY of the CMM to remove the inlet housing.

B. To change the inlet housing, (Figure 1 and Figure 2) do these steps.

(1) Drill holes as per View L in Figure 2. Fixture 63001014 can be used.

C. Apply nickel plating to the inlet housing as follows:

(1) Mask the vented inlet holes.

(a) Cut a PN 69494J153 or 69494J154 preformed packing to form a string or noodle.

(b) Insert the string or noodle into the vent hole at one end, guiding it through the hole until it exits at the other end.

(2) Mask the inlet housing sleeve using lead or aluminum tape.

(3) Mask the housing by immersing it in lacquer per Henco-Mask Type I, or equivalent.

(4) Nickel plate to a thickness of 0.0005 to 0.0008 inch (0.0127 to 0.0203 mm).

NOTE: Nickel plate over nickel plate is not permitted, except fade out permissible over a 0.160 inch (4.064 mm) around vent holes.

(5) Remove the tape and the masking from the vented inlet holes.

WARNING: USE ACETONE, ASMT D329, CORRECTLY. THE ACETONE IS VERY FLAMMABLE. IT CAN HAVE A BAD EFFECT ON YOUR HEALTH OR SAFETY. BEFORE YOU USE THE ACETONE, GET THE MATERIAL SAFETY DATA SHEET FROM THE MANUFACTURER OR SUPPLIER OF THE MATERIAL AND READ IT CAREFULLY. READ THE DETAILED WARNING, W0001SE, IN THE WARNING REGISTRY 341-006. BEFORE YOU USE THE ACETONE, PUT ON CHEMICAL-SPLASH GOGGLES, AND ACETONE-RESISTANT GLOVES (BUTYL RUBBER), APRON, AND SHOES. MAKE SURE THAT YOU HAVE SUFFICIENT AIRFLOW TO KEEP THE ACETONE FUMES BELOW THE MATERIAL SAFETY DATA SHEET LIMIT.

(6) Remove the Henco-Mask Type I by soaking or wiping the part with Acetone.

D. Electrolytic etch the new PN on the inlet housing. Do these steps:

(1) Add an “X” over the “-3” of PN 792993-3 on the inlet housing.

(2) Add “-6” adjacent to the PN.

(3) Add an “X” over the “-10” of PN 792993-10 on the housing.

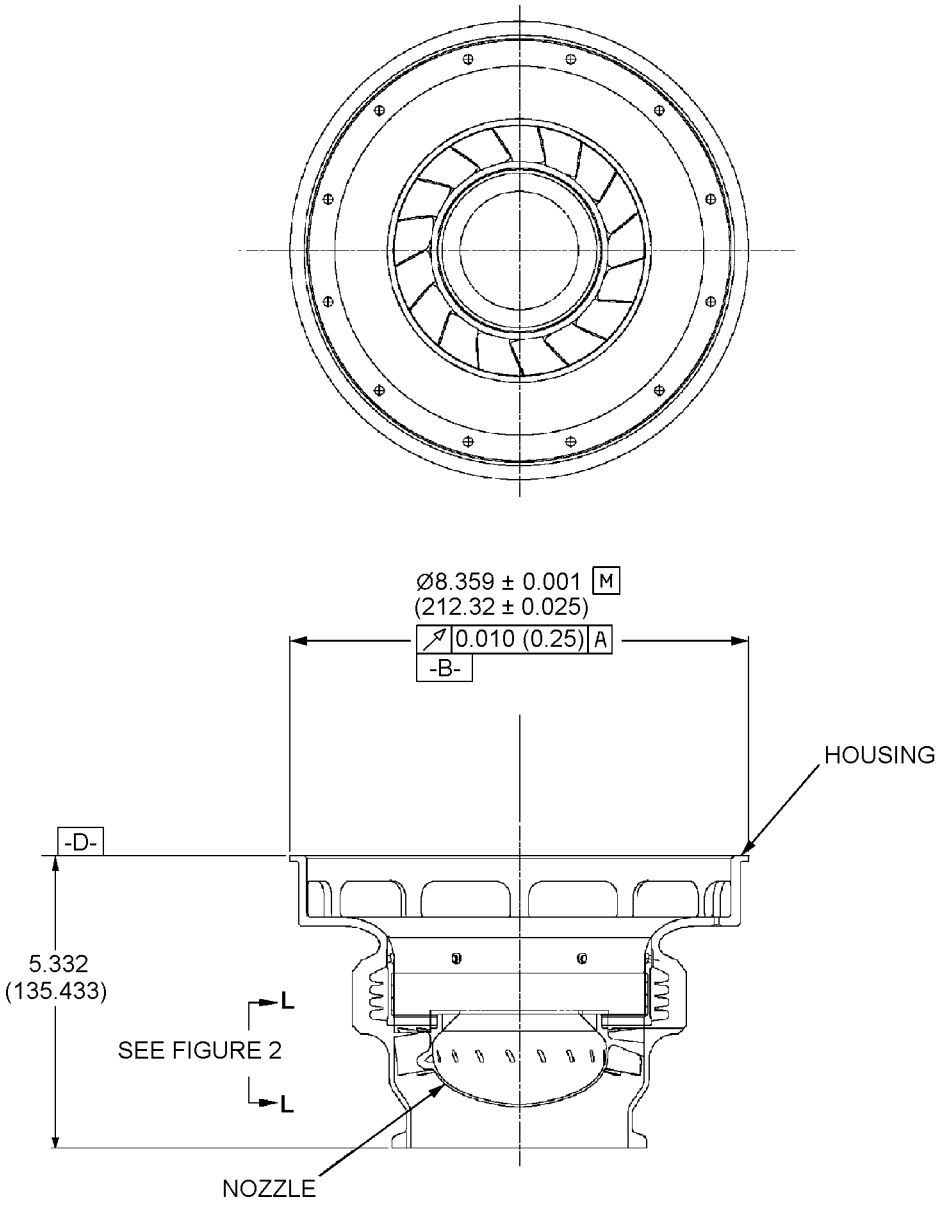
(4) Add “-12” adjacent to the PN.

E. Use the instructions in the ASSEMBLY section of the CMM to assemble the Pneumatic Starter.

F. Use the instructions in the TESTING AND TROUBLESHOOTING section of the CMM to test the Pneumatic Starter.

SERVICE BULLETIN

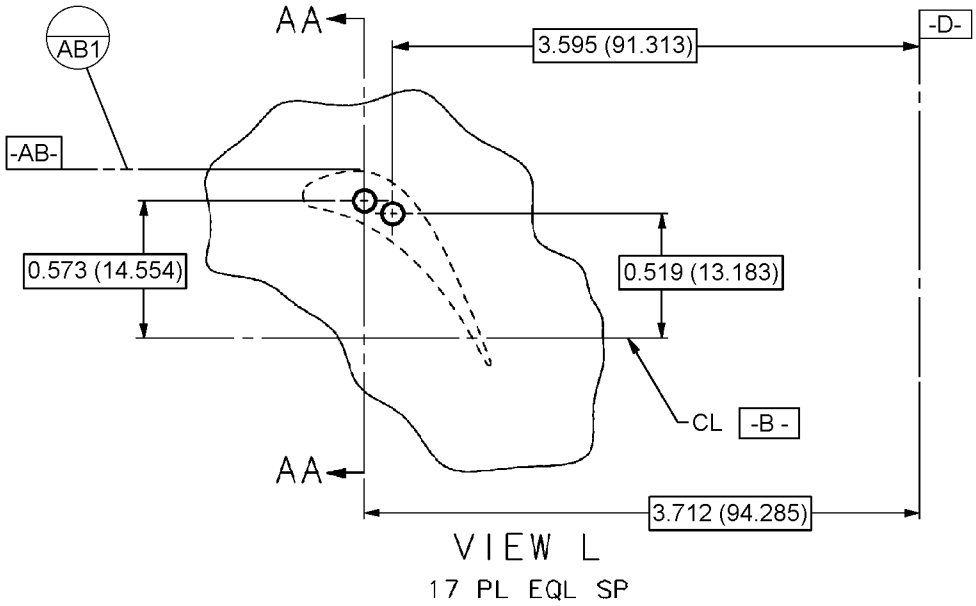
G. To show that this Service Bulletin was done, add the modification number “L16” to the Pneumatic Starter identification plate. The Sumitomo Precision Products part number is not changed by this Service Bulletin.



NOTE: DIMENSIONS IN INCHES (MM).

Figure 1. Modify the Inlet Housing (Part 1)

SERVICE BULLETIN



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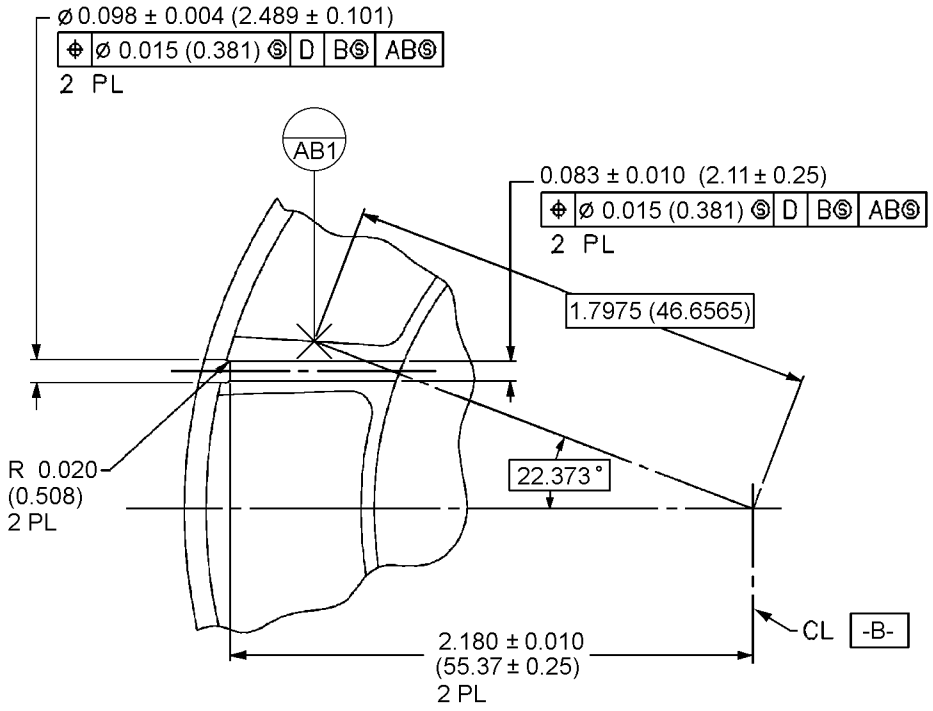
17 PL EQL SP



SECT AA-AA

NOTE: DIMENSIONS IN INCHES (MM).
BREAK EDGES 0.025 (0.635) MAXIMUM.

Figure 2. Modify the Inlet Housing (Part 2)