P U B L I C A T I O N T R A N S M I T T A L

RR-DERBY

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DATE: Feb.15/03

V2500-A5/D5 PROPULSION SYSTEM SERVICE BULLETIN

This document transmits the Initial Issue of Service Bulletin EV2500-73-0179

Bulletin Initial Issue

Remove	Incorporate	Reason for change
	Pages 1 to 13 of the Service Bulletin	Initial issue

V2500-ENG-73-0179

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 are as follows:

Page	Revision Number	Revision Date
Bulletin		
1		Feb.15/03
2		Feb.15/03
3		Feb.15/03
4		Feb.15/03
5		Feb.15/03
6		Feb.15/03
7		Feb.15/03
8		Feb.15/03
9		Feb.15/03
10		Feb.15/03
11		Feb.15/03
12		Feb.15/03
13		Feb.15/03

ENGINE FUEL AND CONTROL - FUEL METERING UNIT - INTRODUCTION OF A WOODWARD AIRCRAFT ENGINE SYSTEMS (WAES) REVISED STANDARD OF VESPEL BALL

1. Planning Information

A. Effectivity

(1) Airbus A319

V2522-A5, V2524-A5, V2527M-A5 Engines prior to Serial No.V11375

(2) Airbus A320

V2527-A5, V2527E-A5 Engines prior to Serial No.V11375

(3) Airbus A321

V2530-A5, V2533-A5 Engines prior to Serial No.V11375

(4) Boeing - Longbeach Division MD-90

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

B. Concurrent Requirements

None.

C. Reason

(1) Condition

Removal of the Woodward Aircraft Engine Systems (WAES) Fuel Metering Unit (FMU) due to stiction in the unit's mechanism for operating valve position indicating microswitches.

The problem is attributed to the mechanism's sintered Vespel ball, that possesses low end range material density, to swell and thus cause stiction. The swelling of the Vespel ball is caused by fuel additives, particularly icing inhibitor.

(2) Background

The problem has been observed on units in service.

(3) Objective

Incorporation of the changes introduced by this Service Bulletin (Modification) is designed to maintain unit reliability.

(4) Substantiation

The changes introduced by this Service Bulletin have been the subject of satisfactory engineering assessment and significant development and laboratory testing.

In addition, in-service experience has been gained with overhauled units that have been fitted with selected balls with the higher density material.

(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 FMU supplied by WAES incorporating design changes to prevent stiction in the unit's mechanism for operating valve position indicating microswitches.

(2) A revised FMU is introduced similar to the existing unit except for the following changes:

(a) A revised Vespel ball is introduced into the unit's mechanism for operating both the Pressure Raising and Shut Off Valve (PRSOV) and Overspeed Valve (OSV) position indicating microswitches.

(b) The Vespel ball material specification is re-defined in order to ensure that the new balls conform to the higher density requirement.

(3) Existing units may be reworked. Refer to Woodward Aircraft Engine Systems Service Bulletin 83724-73-0179.

(4) Units incorporating this Service Bulletin (Modification) will be identified by endorsement of the modification plate with 73-0179.

E. Compliance

Category Code 6

Accomplish when the subassembly (i.e. modules, accessories, components, build groups) is disassembled sufficiently to afford access tot he 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 are FAA approved for the engine models listed.

G. Manpower

In service

Not affected.

At overhaul

Affected - 1 hour plus testing.

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

H. Material Price and Availability

Modification kit not required; parts supplied as single line items.

I. Tooling Price and Availability

Special tools are not required.

J. Industry Support Information

None.

K. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

No effect.

(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) Aircraft Maintenance Manual, 73-22-52 (A5) (Airbus).

(2) Aircraft Maintenance Manual, 73-21-52 (D5) (Boeing MD-90).

(3) Woodward CMM 73-28-06.

(4) Woodward Aircraft Engine Systems Service Bulletin 83724-73-0179.

(5) Airbus aircraft modification Nos. 32648 and 33031.

(6) Internal reference number 01VI004.

(7) ATA locator 73-22-52.

O. Other Publications Affected

(1) Illustrated Parts Catalogue (IPC) S-V2500-2IB, 3IB, 6IB and 7IB will be revised.

(2) Aircraft Maintenance Manual, 73-22-52 (A5) (Airbus).

(3) Aircraft Maintenance Manual, 73-21-52 (D5) (Boeing MD-90).

(4) Woodward CMM 73-29-06.

P. Interchangeability of Parts

Not affected.

2. Material Information

A. Prices and availability:

For prices and availability of parts refer to Woodward Aircraft Engine Systems Service Bulletin 83724-73-0179.

B. Vendor units affected by this bulletin:

Applicability: - For each V2500 engine to incorporate this bulletin

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

V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5 models only

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-636	1	.Meter, fuel (V6650 3)	-	8061-636	(A)(S1) (1D)

V2530-A5 and V2533-A5 models only

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-637	1	.Meter, fuel (V6650 3)	-	8061-637	(A)(S1) (1D)

V2522-A5, V2524-A5 models (Pre SB ENG-73-0172 and incorporating SB ENG-73-0158)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-633	1	.Meter, fuel (V6650 3)	-	8061-633	(A)(S1) (1D)

V2527-A5, V2527E-A5 models (Pre SB ENG-73-0172 and incorporating SB ENG-73-0157)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-633	1	.Meter, fuel (V6503)	-	8061-633	(A)(S1)(1D)

V2527M-A5 models (Pre SB ENG-73-0172)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-633	1	.Meter, fuel (V6503)	-	8061-633	(A)(S1)(1D)

V2530-A5 and V2533-A5 models (Pre SB ENG-73-0172)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-632	1	.Meter, fuel (V6503)	-	8061-632	(A)(S1)(1D)

V2525-D5 and V2528-D5 models

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-632	1	.Meter, fuel (V6503)	-	8061-632	(A)(S1)(1D)

V2522-A5 and V2524-A5 models (Pre SB ENG-73-0158)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-627	1	.Meter, fuel (V6650 3)	-	8061-627	(A)(S1) (1D)

V2527-A5 and V2527E-A5 models (Pre SB ENG-73-0157)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-632	1	.Meter, fuel (V6650 3)	-	8061-632	(A)(S1) (1D)

V2525-D5 and V2528-D5 models (Pre SB ENG-73-0108)

73-22-52

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	8061-626	1	.Meter, fuel (V6650 3)	-	8061-626	(A)(S1) (1D)

C. Instructions disposition codes:

(A) New standard of unit will be made available from August 2002.

(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 Vendor Service Bulletin, Woodward Aircraft Engine Systems 83724-73-0179.

B. Assembly Instructions

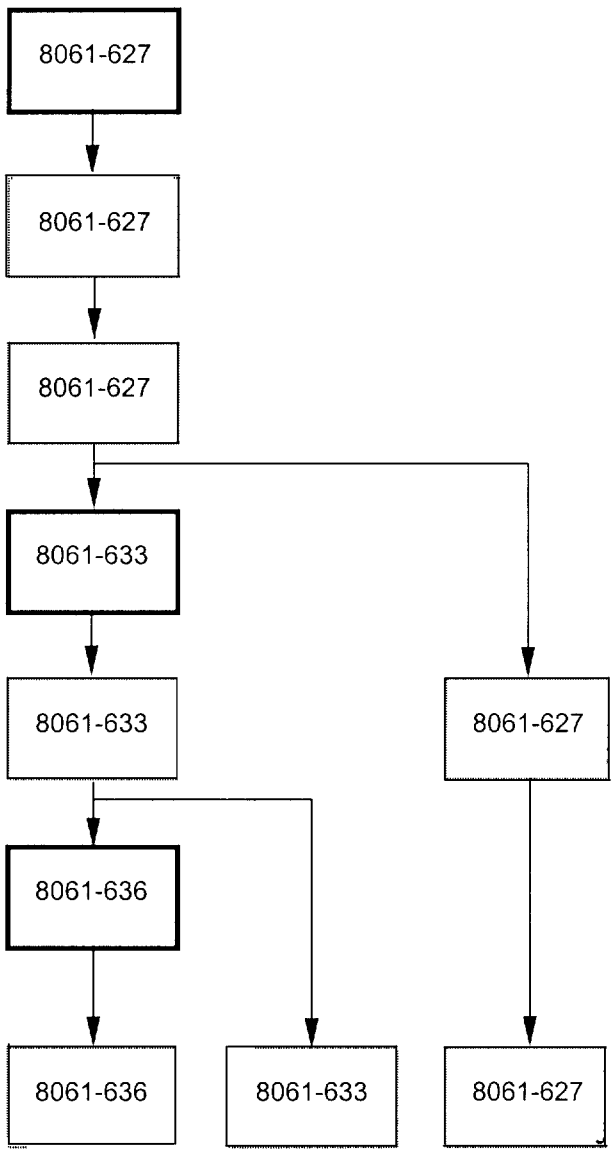
The revised FMU introduced by this Service Bulletin is freely and fully interchangeable with the existing. Remove and install in accordance with current overhaul procedures and maintenance practices (Engine Manual, 72-00-60, Removal/Installation, Aircraft Maintenance Manual, 73-22-52, (Airbus A319/320/321), Removal/Installation, Aircraft Maintenance Manual, 73-21-52 (Boeing MD-90), Removal/Installation).

C. Recording Instructions

A record of accomplishment is necessary. Refer to vendor Service Bulletin, Woodward Aircraft Engine Systems 83724-73-0179.

V2522-A5 and V2524-A5 FMU Family Tree

Service Bulletin Number	Unit Mod Plate Endorsement
V2500-ENG-73-0097 Introduction of Woodward Governor Company (WGC) Fuel Metering Unit (FMU)	**NONE**
V2500-ENG-73-0101 Introduction of WGC FMU with strengthened housing	**ENG-73-0101**
V2500-ENG-73-0136 Introduction of WGC FMU with revised servovalve cover	**ENG-73-0136**
V2500-ENG-73-0158 Introduction of WGC FMU with revised max fuel flow stop (A319)	**NONE**
V2500-ENG-73-0151 Introduction of WGC FMU with revised microswitch	**ENG-73-0151**
V2500-ENG-73-0172 Introduction of a WGC switchable FMU suitable for all V2500-A5 engine models	**NONE**
V2500-ENG-73-0179 Introduction of a WAES FMU with revised standard of Vespel ball	**ENG-73-0179**



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

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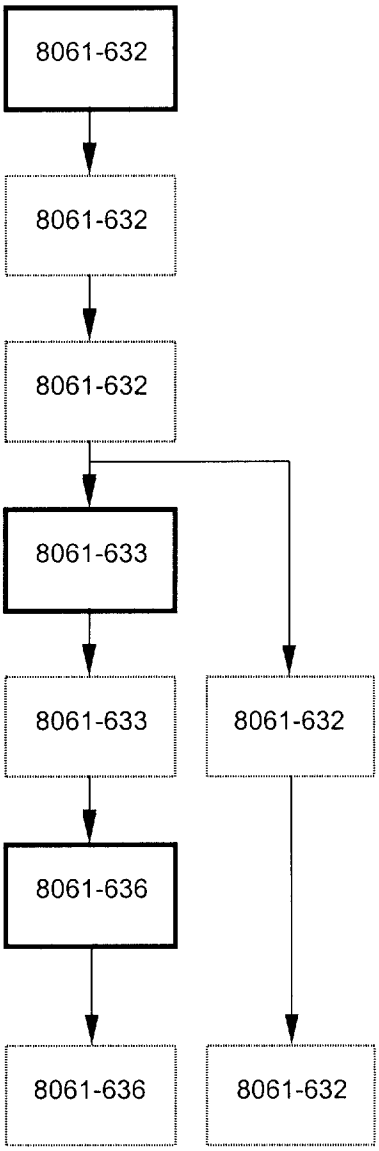
FMU Family Tree - V2522-A5 and V2524-A5
Fig.1

Service Bulletin Number	Unit Mod Plate Endorsement
V2500-ENG-73-0087 Introduction of Woodward Governc Company (WGC) Fuel Metering Unit (FMU)	**NONE**
V2500-ENG-73-0101 Introduction of WGC FMU with strengthened housing	**ENG-73-0101**
V2500-ENG-73-0136 Introduction of WGC FMU with revised servovalve cover	**ENG-73-0136**
V2500-ENG-73-0157 Introduction of WGC FMU with revised max fuel flow stop (A320)	**NONE**
V2500-ENG-73-0151 Introduction of WGC FMU with revised microswitch	**ENG-73-0151**
V2500-ENG-73-0172 Introduction of a WGC switchable FMU suitable for all V2500-A5 engine models	**NONE**
V2500-ENG-73-0179 Introduction of a WAES FMU with revised standard of Vespel ball	**ENG-73-0179**



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

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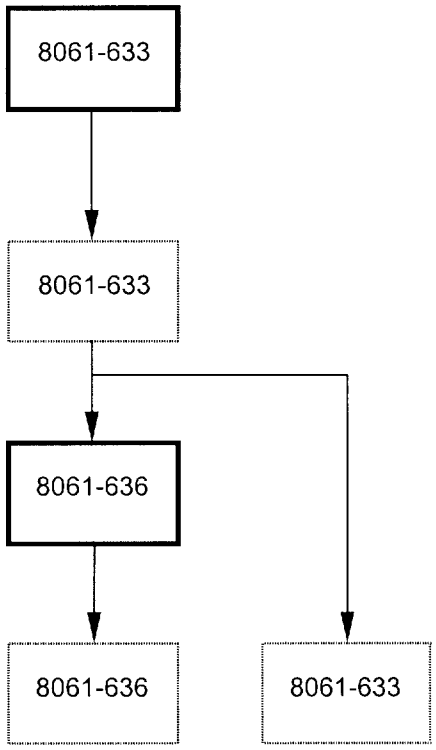
FMU Family Tree - V2527-A5 and V2527E-A5
Fig.2

V2527M-A5 FMU Family Tree *

Service Bulletin Number	Unit Mod Plate Endorsement
V2500-ENG-73-0158 Introduction of Woodward Governor Company (WGC) Fuel Metering Unit (FMU) with revised max fuel flow stop (A319)	**NONE**
V2500-ENG-73-0151 Introduction of a WGC FMU with revised microswitch	**ENG-73-0151**
V2500-ENG-73-0172 Introduction of a WGC switchable FMU suitable for all V2500-A5 engine models	**NONE**
V2500-ENG-73-0179 Introduction of a WAES FMU with revised standard of Vespel ball	**ENG-73-0179**

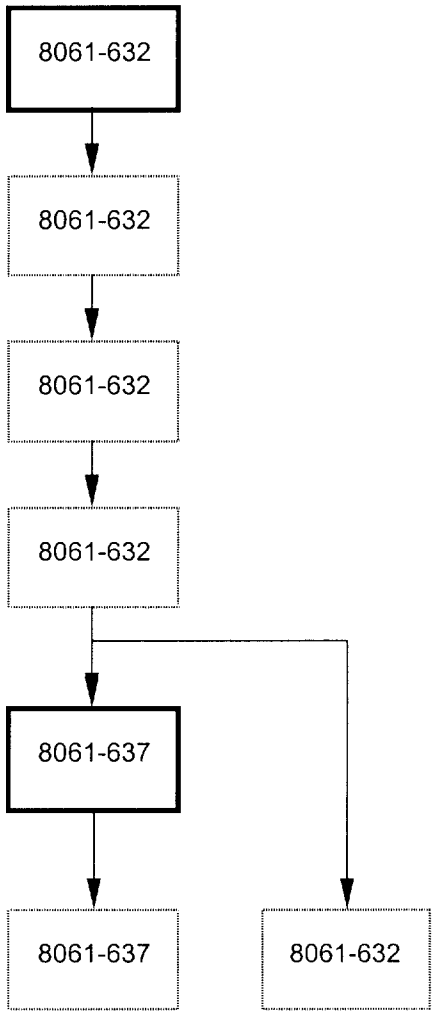


* This family tree is not intended to represent the combination of modifications fitted to units in service

FMU Family Tree - V2527M-A5
Fig.3

V2530-A5 and V2533-A5, FMU Family Tree *

Service Bulletin Number	Unit Mod Plate Endorsement
V2500-ENG-73-0087 Introduction of Woodward Governor Company (WGC) Fuel Metering Unit (FMU)	**NONE**
V2500-ENG-73-0101 Introduction of WGC FMU with strengthened housing	**ENG-73-0101**
V2500-ENG-73-0136 Introduction of WGC FMU with revised servovalve cover	**ENG-73-136**
V2500-ENG-73-0151 Introduction of WGC FMU with revised microswitch	**ENG-73-0151**
V2500-ENG-73-0172 Introduction of WGC switchable FMU suitable for all V2500-A5 engine models	**NONE**
V2500-ENG-73-0179 Introduction of a WAES FMU with revised standard of Vespel ball	**ENG-73-0179**



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

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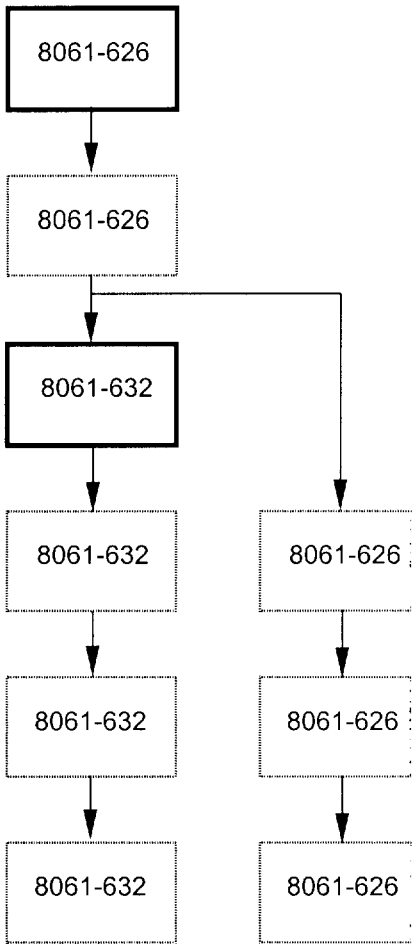
FMU Family Tree - V2530-A5 and V2533-A5
Fig.4

V2525-D5 and V2528-D5 FMU Family Tree *

Service Bulletin Number	Unit Mod Plate Endorsement
V2500-ENG-73-0085 Introduction of Woodward Governor Company (WGC) Fuel Metering Unit (FMU)	**NONE**
V2500-ENG-73-0101 Introduction of WGC FMU with strengthened housing	**ENG-73-0101**
V2500-ENG-73-0108 Introduction of WGC FMU with fuel flow straightener	**ENG-73-0108**
V2500-ENG-73-0136 Introduction of WGC FMU with revised servovalve cover	**ENG-73-0136**
V2500-ENG-73-0151 Introduction of WGC FMU with revised microswitch	**ENG-73-0151**
V2500-ENG-73-0179 Introduction of a WAES FMU with revised standard of Vespel ball	**ENG-73-0179**



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

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FMU Family Tree - V2525-D5 and V2528-D5
Fig.5

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SERVICE BULLETIN

ENGINE FUEL and CONTROL - FUEL METERING UNIT (FMU) - Replacement of Vespel Balls, P/N 1419-240

1. Planning Information

A. Effectivity

This Service Bulletin affects the following Fuel Metering Units manufactured by Woodward Aircraft Engine Systems: 8061-626, 8061-627, 8061-632, 8061-633, 8061-636 and 8061-637. The following V2500 engine models are affected:

- V2500-A5: V2522, V2524, V2527, V2527M, V2527E, V2530, and V2533.
- V2500-D5: V2525, V2528

B. Concurrent Requirements

Not applicable.

C. Reason

Objective: To inform users of an anomaly which could result in either an HP shutoff valve switch fault indication, or an overspeed switch fault indication.

Condition: Vespel balls processed in a "free sintered" state have been found to increase in size when exposed to fluids or vapors containing alcohol. The increased size causes an interference fit at elevated temperatures with the mating housing due to differences in thermal expansion. This interference causes the switch to remain in the actuated position.

Cause: The engineering drawing did not specify the processing method of the Vespel ball.

Improvement: The Vespel ball standard was changed from a "free sintered" to a "pressure sintered" standard for new production on FMU's in August 1998. The engineering drawing has been updated to specify the intended design requirements ("pressure sintered") of the Vespel ball.

Substantiation: Elevated temperature fuel bomb testing of the "pressure sintered" balls showed the change of size was not measurable, compared to the "free sintered" balls when exposed to alcohol.

D. Description

The Vespel balls have been updated to further define the manufacturing requirements. A forming operation has been specified that results in a pressure sintered ball that is not subject to swelling. This Service Bulletin provides instructions for the replacement of the Vespel indicator switch balls used in the Overspeed Valve and Pressure Raising/Shutoff Valve.

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The Indicator Switch Balls (P/N 1419-240) may not need to be replaced if installation of "pressure sintered" (also identified as P/N 1419-240) balls can be confirmed.

For any unit which has already incorporated Service Bulletin V2500-ENG-73-0162, the Vespel balls have already been replaced. Incorporation of aforementioned Service Bulletin includes all modifications contained in this Service Bulletin per IAE SIL-150. Additionally, since August 1998, Woodward has replaced "free sintered" Vespel balls with "pressure sintered" Vespel balls on all units shipped to Woodward. This includes new and repair units. Woodward maintains an internal record of this work.

E. Compliance

It is recommended that this Service Bulletin be accomplished, when convenient, during a normal shop visit.

F. Approval

S/B 83724-73-0179 has been technically approved by IAE on (April 30, 2002) in accordance with appropriate FAR regulations and is FAA approved for those units listed herein.

G. Manpower

An estimated 1 hour, not including test, is required to perform this service bulletin.

H. Weight and Balance

There is no change in weight and balance.

I. Electrical Load Data

Not applicable.

J. Software Accomplishment Summary

Not applicable.

K. References

Woodward Aircraft Engine Systems Component Maintenance Manual 73-28-06.

Woodward Aircraft Engine Systems Engineering Change E/C 1015096 (for internal use only).

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USA

IAE V2500 Non-Modification Service Bulletin Number V2500-ENG-73-0162

IAE V2500 Service Bulletin Number V2500-ENG-73-0179

IAE V2500 Service Information Letter Number 150 (SIL-150)

L. Other Publications Affected

Not applicable.

2. Material Information

A. Material - Price and Availability

Contact Woodward Aircraft Engine Systems for part availability and pricing.

B. Industry Support Information

Not applicable.

C. Material Necessary for Each Aircraft/Engine/Component

Two replacement P/N 1419-246 indicator switch balls will be required for affected units.

D. Material Necessary for Each Spare

Two replacement P/N 1419-246 indicator switch balls will be required for affected units.

E. Reidentified Parts

Not applicable.

F. Tooling - Price and Availability

Not applicable.

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3. Accomplishment Instructions

A. First, check for compliance:

(1) Inspect dataplate for incorporation of V2500-ENG-73-0162 Service Bulletin. If dataplate is marked with V2500-ENG-73-0162, mark Service Bulletin dataplate 73-0179.

(2) Contact Woodward to confirm that the "free sintered" vespel balls have been replaced with "pressure sintered" vespel balls if operators are uncertain about compliance. If Woodward records confirm replacement, mark Service Bulletin dataplate 73-0179.

B. Otherwise:

(1) Disassemble Fuel Metering Unit (FMU) as told in CMM 73-28-06 DISASSEMBLY to remove vespel balls from overspeed valve and pressure raising valve. Remove vespel indicator switch balls from overspeed valve and pressure raising valve.

(2) Replace two each P/N 1419-240 indicator switch balls with two each P/N 1419-246 vespel indicator switch balls.

(3) Assemble the overspeed valve assembly and the pressure raising valve assembly as told in CMM 73-28-06 ASSEMBLY.

(4) Test the FMU as told in CMM 73-28-06 TESTING AND FAULT ISOLATION.

(5) Mark Service Bulletin dataplate 73-0179.