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

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DATE: Aug.12/05

V2500-D5 SERIES PROPULSION SYSTEM SERVICE BULLETIN

This document transmits Revision 2 to Service Bulletin EV2500-24-0019 and Revision 2 to the Supplement

Document History

Service Bulletin Revision Status		Supplement Revision Status	
Initial Issue	Sep.24/04	Initial Issue	Sep.24/04
Revision 1	Nov.18/04	Revision 1	Nov.18/04

Bulletin Revision 2

Remove	Incorporate	Reason for change
All pages of the Summary	Page 1 and 2 of the Summary	To revise Figure 2 and price information.
All pages of the Service Bulletin	Pages 1 to 18 of the Service Bulletin	To revise Figure 2 and price information.

Supplement Revision 2

Remove	Incorporate	Reason for change
All pages	Page 1	To revise Figure 2 and price information.

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 2 to the Bulletin and Revision 2 to the Supplement are as follows:

Page		Revision Number	Revision Date
	Summary		
R	1	2	Aug.12/05
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R	13	2	Aug.12/05
R	14	2	Aug.12/05
R	15	2	Aug.12/05
R	16	2	Aug.12/05
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	Supplement		
R	1	2	Aug.12/05

International Aero Engines

SERVICE BULLETIN

ELECTRICAL POWER - VARIABLE SPEED CONSTANT FREQUENCY GENERATOR OIL COOLER - INTRODUCTION OF REVISED VARIABLE SPEED CONSTANT FREQUENCY (VSCF) GENERATOR COOLING TUBES

SUMMARY

1. PLANNING

A. EFFECTIVITY

Engine	Serial No.
V2500-D5	V20001 to V20285

B. CONCURRENT REQUIREMENTS

None.

C. REASON/PROBLEM

Problem

Some operators are experiencing premature deterioration of the VSCF oil cooling tubes. The problem has been attributed to frettage between the inner convolutes and the metallic braiding caused by vibration.

Cracking at the root of the convolute can also occur which has been attributed to excessive bending of the flexible portion of the tube when replacing the VSCF generator in service.

Evidence

The problem has been experienced on engines in service.

Substantiation

The changes introduced by this Service Bulletin (Modification) have been the subject of extensive engineering analysis and a successful trial assembly on a mock-up engine.

Objective

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

D. DESCRIPTION

This Service Bulletin introduces revised VSCF flexible oil cooling tubes similar to the existing items with changes.

The existing VSCF to dedicated FCOC and dedicated FCOC to VSCF tubes are revised from one piece assemblies into separate flexible and rigid tube assemblies with changes:

The existing clipping bracket, mounted on the Angle Gearbox housing, has been deleted and replaced with a new bracket attached to the base of the radial gear assembly.

Clip points CP2354, CP2356 are deleted.

Clip points CP2695, CP2696, CP2697 are introduced.

E. COMPLIANCE

Category Code 8

Accomplish based upon experience with the prior configuration.

F. MANPOWER

In service - 3 hours 56 minutes.

At overhaul - 2 hours 50 minutes.

G. INTERCHANGEABILITY OF PARTS

It is essential that parts are fitted as a set.

2. MATERIAL INFORMATION

A. PARTS PRICES

Total price of all new production parts introduced by this Service Bulletin is
R 9,851.47 (US $).

ELECTRICAL POWER - VARIABLE SPEED CONSTANT FREQUENCY GENERATOR OIL COOLER - INTRODUCTION OF REVISED VARIABLE SPEED CONSTANT FREQUENCY (VSCF) GENERATOR COOLING TUBES

1. Planning Information

A. Effectivity

(1) Boeing - Longbeach Division MD-90

(a) V2525-D5, V2528-D5 Engines prior to Serial No.V20285

B. Concurrent Requirements

None.

C. Reason

(1) Problem

Some operators are experiencing premature deterioration of the VSCF oil cooling tubes. The problem has been attributed to frettage between the inner convolutes and the metallic braiding caused by vibration.

Cracking at the root of the convolute can also occur which has been attributed to excessive bending of the flexible portion of the tube when replacing the VSCF generator in service.

(2) Evidence

The problem has been experienced on engines in service.

(3) Substantiation

The changes introduced by this Service Bulletin have been the subject of extensive engineering analysis and a successful trial assembly on a mock up engine.

(4) Objective

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

(5) Effect of Bulletin on:

(a) Operation

Not affected.

(b) Maintenance

Affected.

(c) Overhaul

Affected.

(d) Repair Schemes

Not affected.

(e) Interchangeability

Not affected.

(f) Fits and Clearances

Not affected.

D. Description

(1) This Service Bulletin introduces revised VSCF flexible oil cooling tubes similar to the existing items except for the following changes:

(a) The existing VSCF to dedicated FCOC and dedicated FCOC to VSCF tubes are revised from one piece assemblies into separate flexible and rigid tube assemblies with the following changes:

(i) The new flexible section is constructed from a helicoidally convoluted Teflon (PTFE) bore pipe which is surrounded by a wire braid. This is enclosed by a fire resistant silicone sleeve.

(ii) Disconnects have been introduced between the rigid and flexible pipes.

(iii) A 90 degree elbow has been introduced adjacent to the disconnect on the oil cooler to VSCF rigid tube assembly.

(iv) The flexible tube routing has changed to reduce the bend radii.

(b) The existing clipping bracket, mounted on the Angle Gearbox housing, has been deleted and replaced with a new bracket attached to the base of the radial gear assembly.

(c) The following clip points are deleted:

CP2354, CP2356.

(d) The following clip points are introduced:

CP2695, CP2696, CP2697.

E. Compliance

Category Code 8

Accomplish based upon experience with the prior configuration.

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

(1) In service

(a) To gain access

16 mins.

(b) To incorporate modification

3 hrs 20 mins.

(c) To return Engine to flyable status

20 mins.

Total - 3 hours 56 minutes.

(2) At overhaul

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

(a) To remove old cooling pipes from VSCF Generator/FCOC and bracket from gearbox

20 mins.

(b) To install tube 6A8453

40 mins.

(c) To install tube 6A8330

40 mins.

(d) To install bracket 6A8421

10 mins.

(e) To install clip points

1 hr.

Total - 2 hours 50 minutes.

H. Material Price and Availability

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

For prices and availability of future spares see Supplement to this Bulletin.

I. Tooling Price and Availability

Special tools are not required.

J. Industry Support Information

None.

K. Weight and Balance

(1) Weight Change

Plus 1.10 lb (+0,5 kg)

(2) Moment Arm

5.85 in. (149 mm) forwards of datum

(3) Datum

Engine Front Mount Centreline (Power Plant Station - PPS100).

L. Electrical Load Data

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

M. Software Accomplishment Summary

Not applicable.

N. References

(1) V2500 Engine Manual (D5) Chapter/Section 72-00-32 and 72-00-60.

(2) Boeing MD90 Aircraft Maintenance Manual, Chapter/Section 24-21-47.

(3) Engineering Change No. - 03VR009.

(4) ATA Locator - 24-21-47.

O. Other Publications Affected

(1) V2500 Engine Manual (D5) Chapter/Section 72-00-32 and 72-00-60, Disassembly and Assembly.

(2) Boeing MD90 Aircraft Maintenance Manual, Chapter/Section 24-21-47, Removal and Installation.

P. Interchangeability of Parts

It is essential that parts are fitted as a set.

2. Material Information

A. The kit required consists of the following parts:

None.

B. Parts to be reworked:

None.

C. New production parts:

All Engines

24-21-47

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01100	6A8453	1	.Tube,assy VSCF Oil Cooler (Cooler to VSCF)	-	M1542-1 or 556-1-15818	(A)(B)(S1)(B)
01149	4W0103	1	.Bolt,(See Appendix 5) (.190 dia x .500)(CP2696)	-	-	(C)
01152	AS62412	1	.Clip (19,05 mm (0.750))(CP2696)	-	-	(C)
01156	4W0001	1	.Nut,(See Appendix 5) (.190 dia)(CP2696)	-	-	(C)
01202	UP11791	1	..Adaptor tube flanged/bolted	-	-	(A)
01240	AS15783	1	..Wire,thrust	-	-	(C)
01241	AS15707	1	..Nut,tube coupling	-	-	(C)
01242	K17428	1	..Ferrule	-	-	(C)
01500	AE711361-1	1	.Hose,assy VSCF Oil Cooler (Cooler to VSCF)(VU2569)	-	-	(A)
02100	AE711361-2	1	.Hose,assy VSCF Oil Cooling (VSCF to Cooler)(VU2569)	-	M1540-1 or 556-1-15817	(A)(B)(S1)(B)
02500	6A8330	1	.Tube,assy VSCF Oil Cooling (VSCF to Cooler)	-	-	(A)
02600	AS15782	1	..Wire, thrust	-	-	(C)
02601	AS15706	1	..Nut, tube coupling	-	-	(C)
02602	AS15732	1	..Ferrule	-	-	(C)
02614	UP11156	1	..Bracket, inner tube support	-	-	(C)
02642	AS63022	1	..Adaptor tube flanged/bolted	-	-	(A)

71-51-50

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
04149	4W0109	1	.Bolt,(See Appendix 5) (.190 dia x .875)(CP2695)	-	-	(C)
04152	AS62410	1	.Clip (15,88mm (0.625))(CP2695)	-	-	(C)
04154	UP10479	1	.Spacer (10mm)(CP2695)	-	-	(C)
04156	4W0001	1	.Nut,(See Appendix 5) (.190 dia)(CP2695)	-	-	(C)
04157	4W0103	1	.Bolt,(See Appendix 5) (.190 dia x .500)(CP2697)	-	-	(C)
04160	AS62410	1	.Clip (15,88mm (0.625))(CP2697)	-	-	(C)
04164	4W0001	1	.Nut,(See Appendix 5) (.190 dia)(CP2697)	-	-	(C)

72-60-00

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01001	4A2052	1	Gearbox,Accessory Module	-	4A2051	(A)(S1)

72-60-40

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01001	4A2151	1	Gearbox,Assy Angle	-	4A2150	(A)(S1)
01090	6A8421	1	.Bracket, assy	-	-	(A)

72-61-00

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01001	4A2003	1	Gearbox,Accessory Module	-	4A2002	(A)(S1)

D. Redundant parts:

All Engines

24-21-47

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01125	-	1	.Bolt bihex HD (CP2354)	-	AS20911	(1D)
01128	-	1	.Clip (CP2354)	-	AS62412	(1D)
01130	-	1	.Spacer (CP2354)	-	UP10478	(1D)
01132	-	1	.Nut,(See Appendix 5) (CP2354)	-	4W0043	(1D)
02128	-	1	.Clip (CP2354)	-	AS62410	(1D)

71-51-50

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
04125	-	1	.Bolt,(See Appendix 5) (CP2356)	-	4W0108	(1D)
04128	-	1	.Clip (CP2356)	-	AS62410	(1D)
04130	-	1	.Spacer (CP2356)	-	UP10479	(1D)
04132	-	1	.Nut,(See Appendix 5) (CP2356)	-	4W0043	(1D)

72-60-40

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01057	-	1	.Bracket,clipping	-	6A5903	(B)

E. Instruction Disposition Codes:

(A) New part is available from September 2004.

(B) Old part becomes redundant upon embodiment of this modification.

(C) New part is currently available.

(1D) Old part may be used up on other applications.

(S1) Old and new parts are not interchangeable.

3. Accomplishment Instructions

A. Rework Instructions

None.

B. Assembly Instructions

(1) Removal Instructions

(a) Disconnect the VSCF generator cooling tubes M1540-1 and M1542-1 from the VSCF Generator as detailed in the V2500 D5 Engine Manual TASK 72-00-60-020-002, SUBTASK 72-00-60-020-153, or the MD90 Aircraft Maintenance Manual TASK 24-21-47-020-801, Figure 2 sheet 1 and 2.

(b) Remove the tubes M1540-1 and M1542-1 from the VSCF Generator fuel cooled oil cooler as detailed in the V2500 D5 Engine Manual TASK 72-00-32-020-003, SUBTASK 72-00-32-020-164 and MD90 Aircraft Maintenance Manual TASK 24-21-47-020-801, Figure 2 sheet 1 and 2.

(c) Remove the bracket 6A5903 from the gearbox

(i) Release and remove the bolts 4W1249, the washers MS9321-10 and the bracket 6A5903 from the gearbox.

(2) Installation instructions

(a) Install the tube 6A8453

(i) Lubricate a new seal ring AS43013-116 with CoMat 10-077 approved engine oils.

(ii) Install the tube 6A8453 and bracket 6A5489 to the connector marked OIL OUT on the VSCF Generator fuel cooled oil cooler with two bolts AS21528 and one bolt AS20911. Torque the bolts to 85 to 105 lbfin (10 to 12 Nm).

(iii) Loosely assemble hose AE711361-1 to the connection on the VSCF Generator and the VSCF cooler oil tube 6A8453.

(1) Tighten the connection on tube 6A8453 to tube AE711361-1 and torque the connection to 398 to 434 lbfin (45 to 49 Nm).

(2) Tighten the connection on tube AE711361-1 to the connection on the VSCF generator and torque the connection to 159 to 177 lbfin (18 to 20 Nm)

(b) Install the tube 6A8330

(i) Lubricate a new sealing ring AS43013-114 with CoMat 10-077 approved engine oils

(ii) Install the tube 6A8330 and bracket 6A5906 to the connector marked OIL IN on the VSCF Generator fuel cooled oil cooler with two bolts AS21527 and one bolt 4W0169. Torque the bolts to 85 to 105 lbfin (10 to 12 Nm).

(iii) Loosely assemble hose AE711361-2 to VSCF generator and the VSCF cooler oil tube 6A8330.

(1) Tighten the connection on tube 6A8330 to tube AE711361-2 and torque the connection to 319 to 345 lbfin (36 to 39 Nm).

(2) Tighten the connection on tube AE711361-2 to the connection on the VSCF generator and torque the connection to 159 to 177 lbfin (18 to 20 Nm)

(c) Install the bracket 6A8421.

(i) Install the bolts 4W1249, the washers MS9321-10 and the bracket 6A8421 to the gearbox, Figure 2 sheet 1. Torque the bolts to 85 to 105 lbfin (10 to 12 Nm).

(d) Install the clip points

(i) At clip position 2367 install the clip AS62410 on the tube 6A8330, the bolt 4W0103, the two washers K8831, and the nut 4W0001, Figure 2 sheet 2. Torque the nut to 36 to 45 lbfin (4 to 5 Nm).

(ii) At clip position 2695 install the clip AS62410 on the harness raceway 6A6127, the bolt 4W0109, the spacer UP10479 and the nut 4W0001 to the lug on tube 6A8330, Figure 2 sheet 2. Torque the nut to 36 to 45 lbfin (4 to 5 Nm).

(iii) At clip position 2696 install the clip AS62412 on the tube 6A8453, the bolt 4W0103 and the nut 4W0001 to the bracket 6A48421 on the gearbox, Figure 2 sheet 2. Torque the nut to 36 to 45 lbfin (4 to 5 Nm).

(iv) At clip position 2697 install the clip AS62410 on the harness raceway 6A6127, the bolt 4W0103 and the nut 4W0001 to the bracket 6A8421 on the gearbox, Figure 2 sheet 1. Torque the nut to 36 to 45 lbfin (4 to 5 Nm).

C. Recording Instructions

A record of accomplishment is necessary.

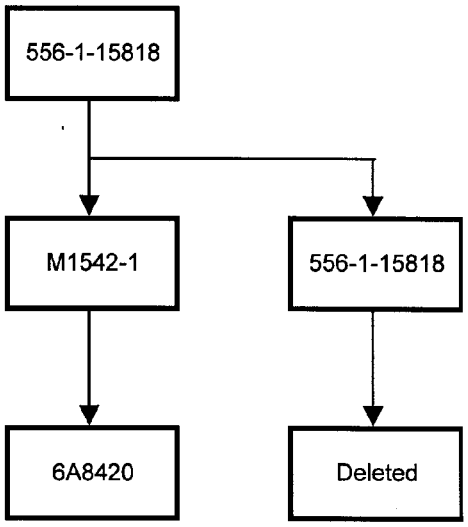
VSCF Generator Cooling Oil Tubes (FCOC to VSCF) Family Tree

D5 Engines Only

Baseline

V2500-ENG-70-0567
Information - Announcement Of Alternative Flexible Tube Assemblies.

V2500-ENG-24-0019
Electrical Power - Integrated Drive Generator Oil Cooler - Introduction Of Revised Variable Speed Constant Frequency (VSCF) Generator Cooling Tubes.



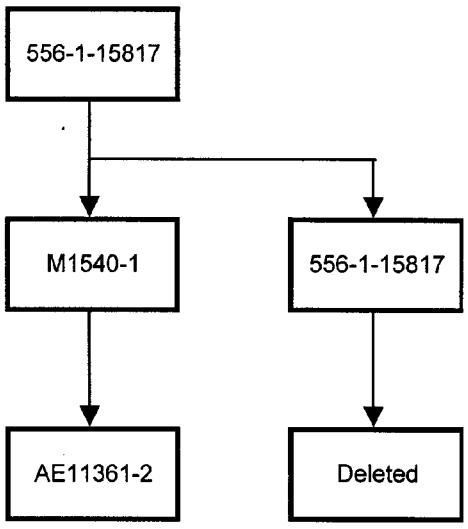
VSCF Generator Cooling Oil Tubes (VSCF to FCOC) Family Tree

D5 Engines Only

Baseline

V2500-ENG-70-0567
Information - Announcement Of Alternative Flexible Tube Assemblies.

V2500-ENG-24-0019
Electrical Power - Integrated Drive Generator Oil Cooler - Introduction Of Revised Variable Speed Constant Frequency (VSCF) Generator Cooling Tubes.



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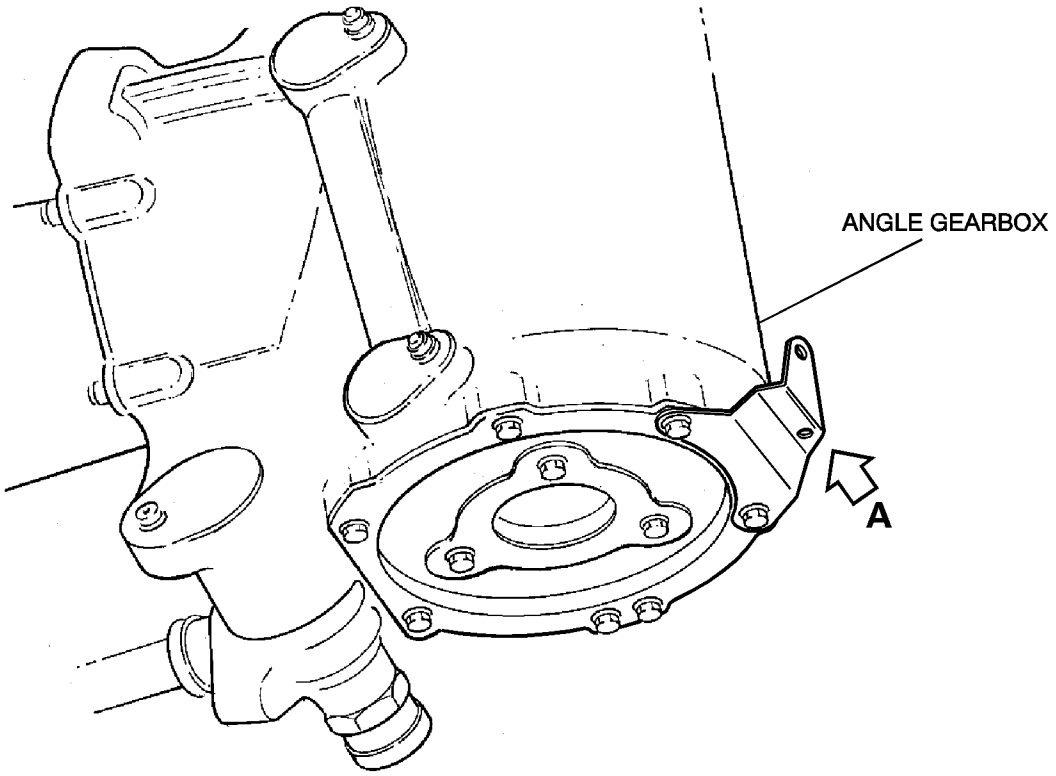
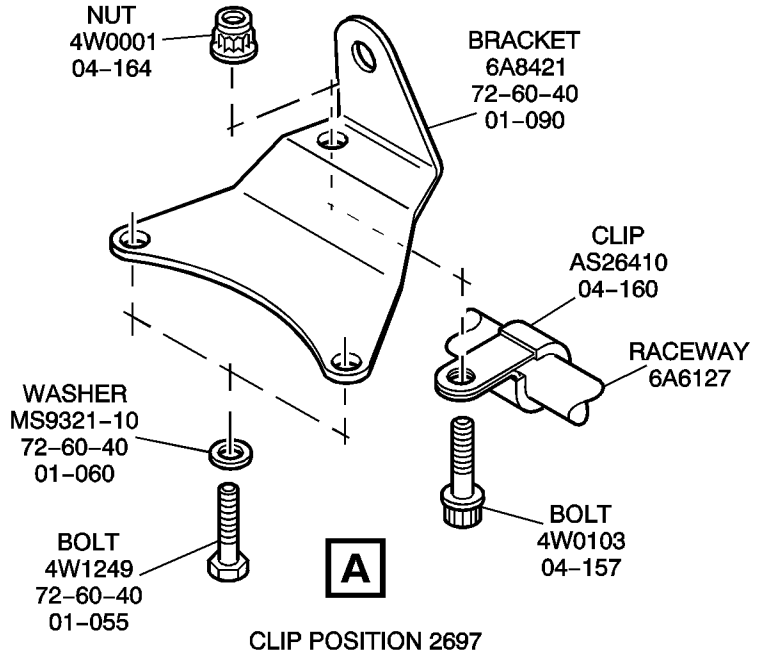
VSCF Generator Cooling Oil Tubes (FCOC to VSCF) Family Tree
Figure 1

R



All IPC Fig/Item numbers are 24–21–47 unless identified differently



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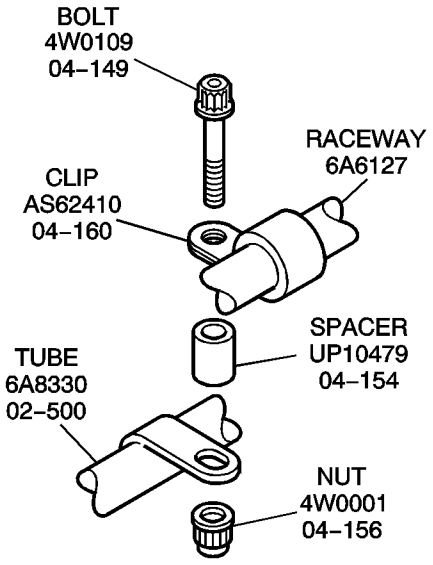
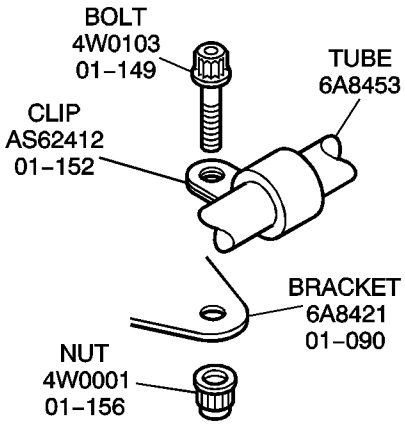
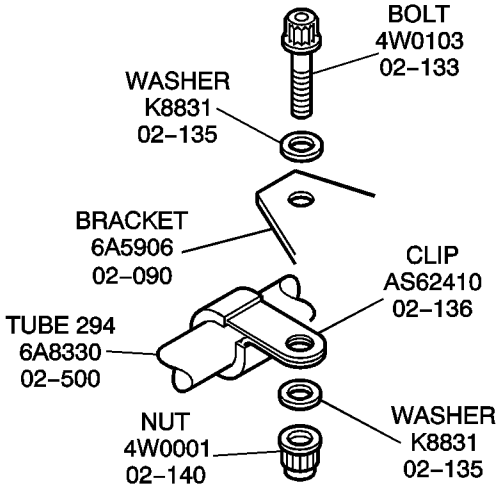
R VSCF Generator Cooling Oil Tubes Clipping points
R Figure 2 (sheet 1)



CLIP POSITION 2695



CLIP POSITION 2696



CLIP POSITION 2367

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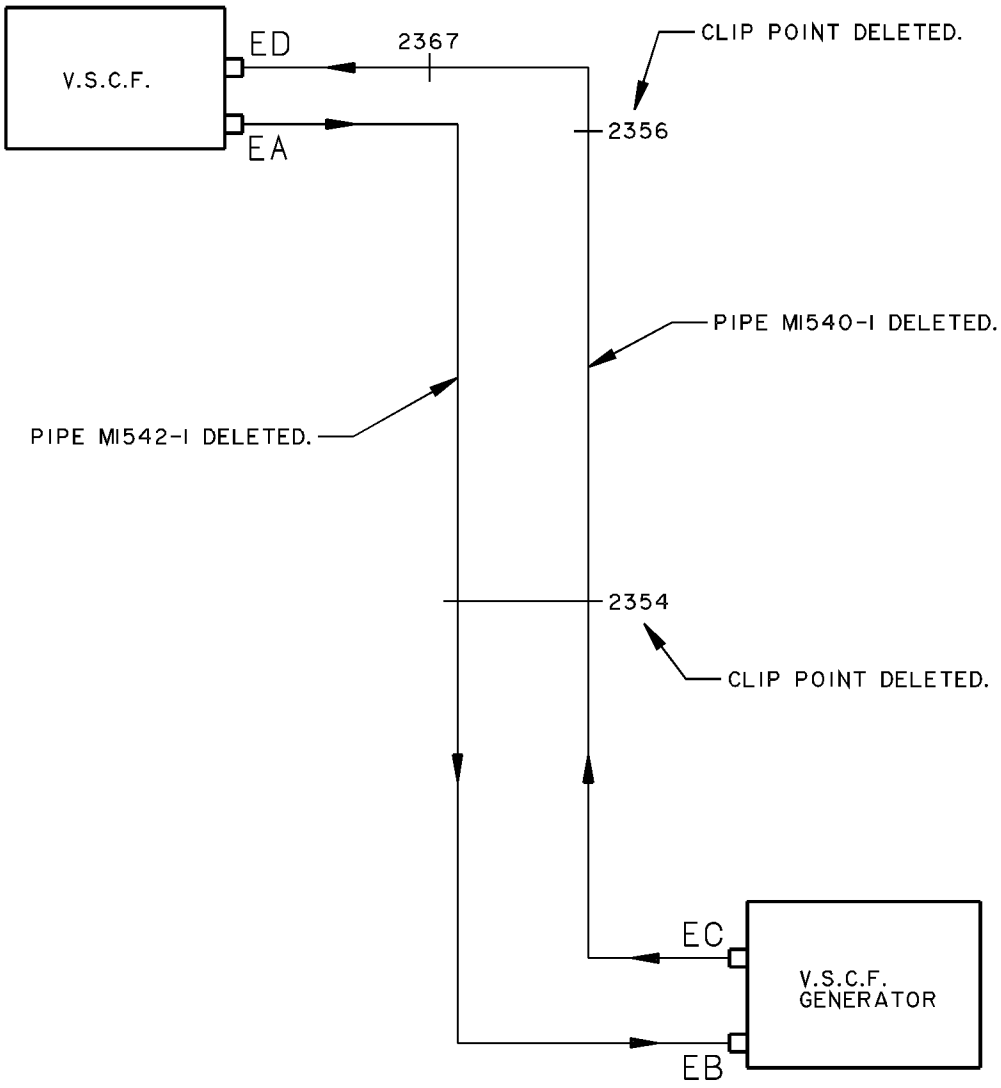
All IPC Fig/Item numbers are 24–21–47

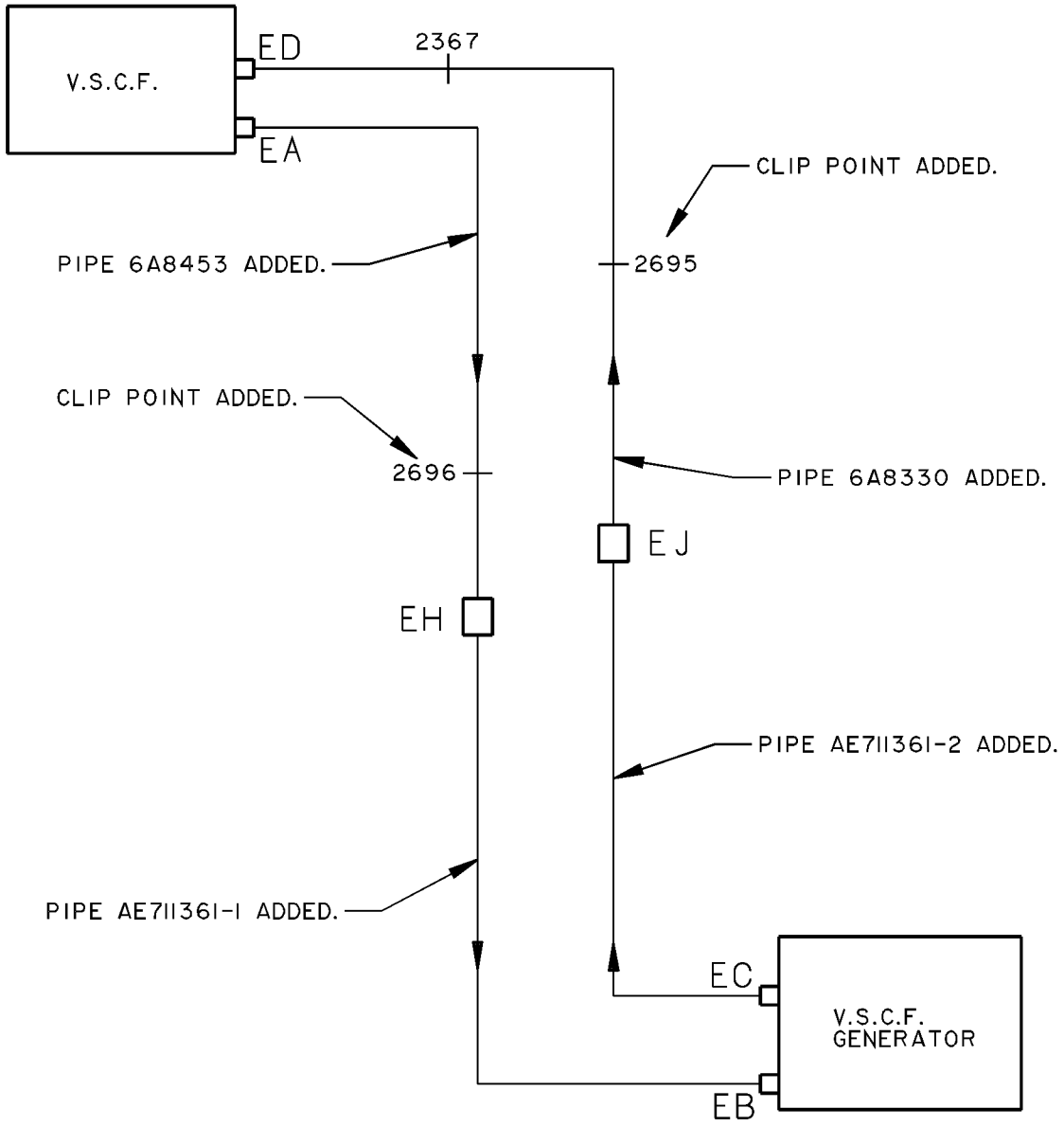
VSCF Generator Cooling Oil Tubes Clipping points
Figure 2 (sheet 2)



SCHEMATIC VIEW OF V.S.C.F. COOLING
OIL SYSTEM BEFORE ALTERATION.

demOOO1888

Schematic View VSCF Cooling Oil System (Before Alteration)
Figure 3



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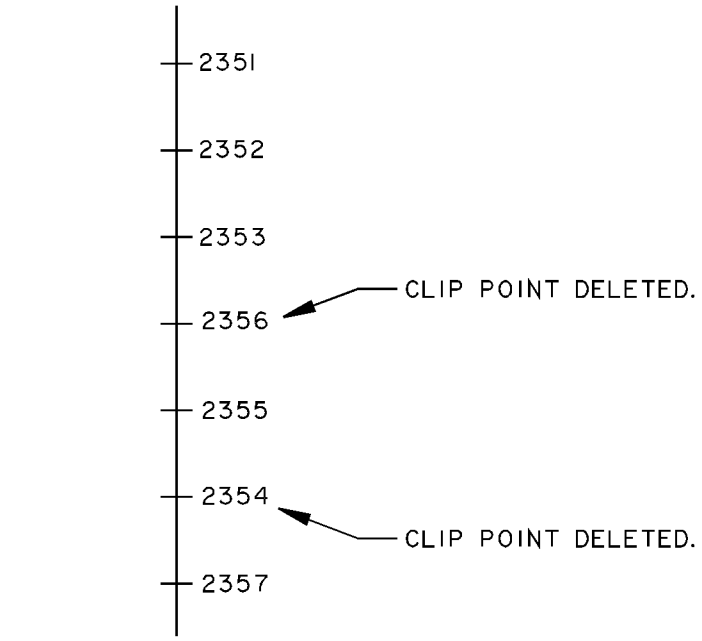
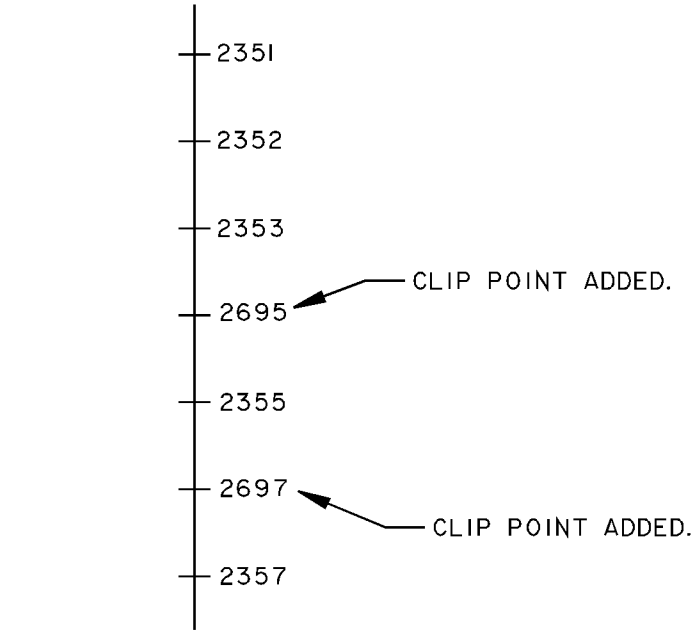
SCHEMATIC VIEW OF V.S.C.F. COOLING OIL SYSTEM AFTER ALTERATION.

Schematic View VSCF Cooling Oil System (After Alteration)
Figure 4



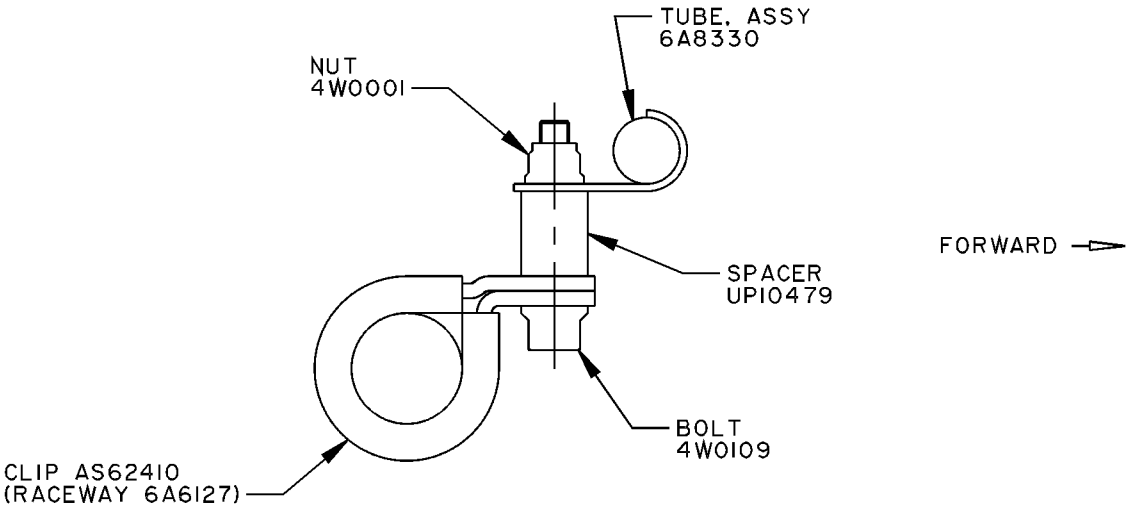
SCHEMATIC VIEW OF RACEWAY
BEFORE ALTERATION.



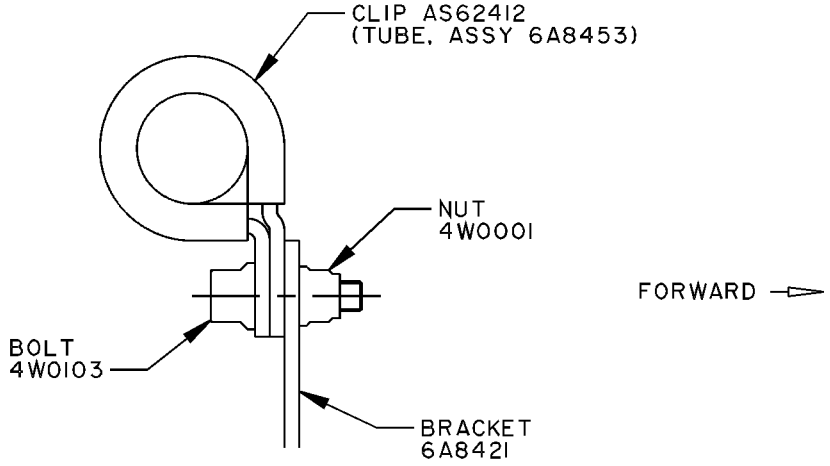
SCHEMATIC VIEW OF RACEWAY
AFTER ALTERATION.

dem0001890

Schematic View of Raceway (Before and After Alteration)
Figure 5



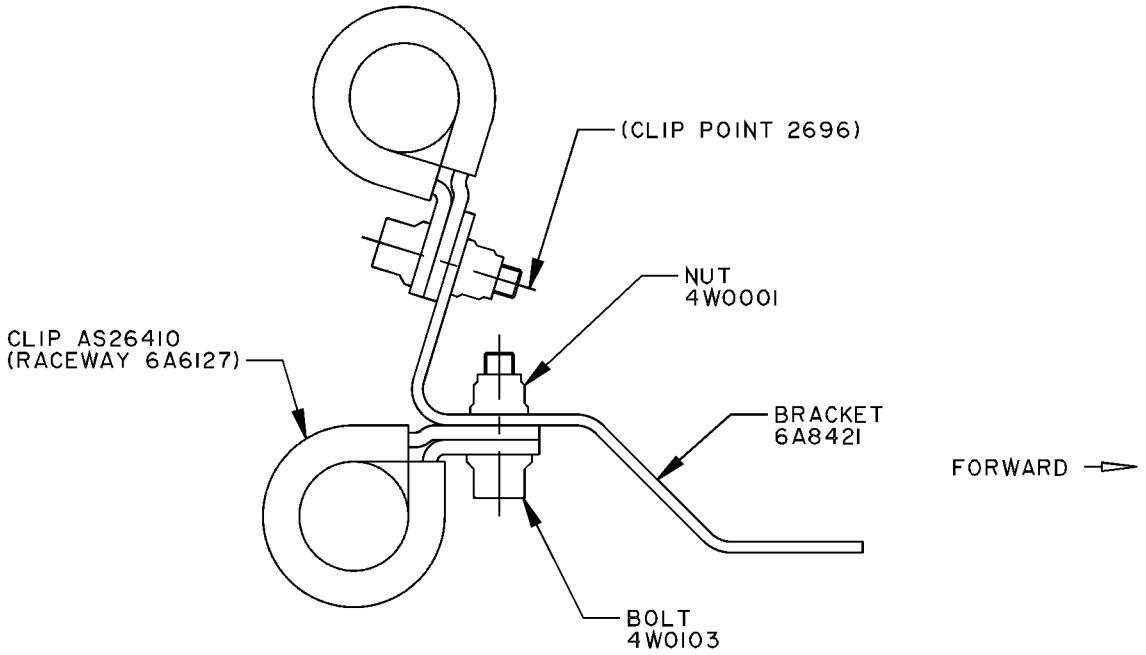
CLIP POINT 2695 ADDED.



CLIP POINT 2696 ADDED.

dem0001892

Clip Points 2695 and 2696
Figure 6



CLIP POINT 2697 ADDED.

dem0001893

Clip Point 2697
Figure 7

International Aero Engines

SERVICE BULLETIN

ELECTRICAL POWER - VARIABLE SPEED CONSTANT FREQUENCY GENERATOR OIL COOLER - INTRODUCTION OF REVISED VARIABLE SPEED CONSTANT FREQUENCY (VSCF) GENERATOR COOLING TUBES

SUPPLEMENT - PRICES AND AVAILABILITY

The prices (if shown) are for estimating purposes only and as such are given in good faith, without commercial liability for advanced planning purposes only. Refer to IAE Spares and/or current price catalogue for current prices.

1. Modification Kit:

Not applicable.

2. Parts required:

	Part No.	Description	Unit Price US Dollars
	4A2003	Gearbox, Accessory Module	Refer to IAE
	4A2052	Gearbox, Accessory Module	Refer to IAE
	4A2151	Gearbox, Assy Angle	69,180.00
	4W0001	Nut	3.78
	4W0103	Bolt	6.61
	4W0109	Bolt	6.25
	6A8330	Tube Assy	1,150.00
	6A8453	Tube Assy	1,125.00
	6A8421	Bracket Assy	112.00
	AE711361-1	Hose Assy	2,865.00
	AE711361-2	Hose Assy	2,935.00
R	AS15706	Nut	49.60
R	AS15707	Nut	53.70
R	AS15732	Ferrule	74.70
R	AS15782	Wire, thrust	5.28
R	AS15783	Wire, thrust	5.28
R	AS62410	Clip	53.90
R	AS62412	Clip	37.80
R	AS63022	Adaptor	363.00
R	K17428	Ferrule	465.00
R	UP10479	Spacer	15.50
R	UP11156	Bracket	5.07
R	UP11791	Adaptor	519.00