International Aero Engines

400 MAIN STREET, MAIL STOP 121-10
EAST HARTFORD, CT 06108, USA.
TELEPHONE:- 860 565 5515
FAX:- 860 565 0600

P.O. BOX 31, DERBY
TELEGRAMS - 'ROYCAR' DERBY
TELEX - 37645
TELEPHONE:- 44 (0) 1332 242424
FAX:- 44 (0) 1332 249936

DATE: Sep.30/05

V2500-D5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 3 to Service Bulletin EV2500-73-0105 and Revision 1 to the Supplement

Document History

Service Bulletin Revision Status		Supplement Revision Status	
Initial Issue	Apr.11/97	Initial Issue	Sep.29/05
Revision 1	Sep.4/98		
Revision 2	Sep.29/05		

Bulletin Revision 3

Remove	Incorporate	Reason for change
All pages of the Summary	Page 1 and 2 of the Summary	Non-technical editorial changes
All pages of the Service Bulletin	Pages 1 to 20 of the Service Bulletin	Non-technical editorial changes

Supplement Revision 1

Remove	Incorporate	Reason for change
All pages	Page 1	Non-technical editorial changes

V2500-ENG-73-0105

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 3 to the Bulletin and Revision 1 to the Supplement are as follows:

Page		Revision Number	Revision Date
	Summary		
R	1	3	Sep.30/05
R	2	3	Sep.30/05
	Bulletin		
R	1	3	Sep.30/05
R	2	3	Sep.30/05
R	3	3	Sep.30/05
R	4	3	Sep.30/05
R	5	3	Sep.30/05
R	6	3	Sep.30/05
R	7	3	Sep.30/05
R	8	3	Sep.30/05
R	9	3	Sep.30/05
R	10	3	Sep.30/05
R	11	3	Sep.30/05
R	12	3	Sep.30/05
R	13	3	Sep.30/05
R	14	3	Sep.30/05
R	15	3	Sep.30/05
R	16	3	Sep.30/05
R	17	3	Sep.30/05
R	18	3	Sep.30/05
R	19	3	Sep.30/05
R	20	3	Sep.30/05
	Supplement		
R	1	1	Sep.30/05

International Aero Engines

SERVICE BULLETIN

ENGINE FUEL AND CONTROL - FUEL SYSTEM AIR TUBES - INTRODUCTION OF ADDITIONAL MOISTURE TRAP ON THE PB SENSE LINE AIR TUBE ASSEMBLY

SUMMARY

1. PLANNING

A. EFFECTIVITY

Engine	Serial No.
V2500-D5	Prior to Serial No. V20143

B. CONCURRENT REQUIREMENTS

Check EEC Fault History (SIL092).

C. REASON

Problem

Surge indications and Pb sensor fault messages which are not correct can be transmitted to the cockpit instruments. Poor engine starts can also occur.

The problem is caused by moisture contamination of the Pb sensor chamber. The moisture comes out of the air and goes to the sensors thru the Pb sensor tube. Only one vented water trap is installed on the tube for D5 engines.

Background

The problem has been found on in-service engines.

Substantiation

A satisfactory engineering analysis and a successful trial installation on a V2500 mock-up engine have been done on the changes contained in this Service Bulletin. A similar design is installed on A5 engines.

Objective

The purpose of this Service Bulletin is to improve reliability.

D. DESCRIPTION

This Service Bulletin introduces an additional vented water trap and condensate loop at the bottom point in the Pb sense line. This is in the cool zone of the engine on the fancase. The changes are as follows:

a) A Pb air tube has been added. This tube forms a 'U' shaped condensate loop when it is assembled with the tube in step (b).

b) A Pb air tube with a vented moisture trap has been added. This tube forms a 'U' shaped condensate loop when it is assembled with the tube in step (a).

c) The following clipping points have been revised: CP2038, CP2168, CP2331 and CP2486.

d) The following clip points are additional: CP2680, CP2681, CP2682, CP2683 and CP2685.

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 parts and to all affected spare parts.

F. MANPOWER

In service

To enbody: 1 hour 30 minutes.

At overhaul - Not affected.

2. MATERIAL INFORMATION

A. PARTS PRICES

Part No.	Description	Unit Price US Dollars
4W0110	Bolt	7.20
UP10479	Spacer	15.60
AS62510	Clamp	15.60
4W0103	Bolt	6.94
AS62509	Clamp	15.30
4W0001	Nut	3.97
4W0120	Bolt	7.06
4W0109	Bolt	6.56
AS62412	Clip	36.90
4W0102	Bolt	6.94
6A6177	Tube assy	646.00
AS62404	Clip	32.00
4W0043	Nut	3.67
6A6178	Tube assy	1719.00
MS9405-01	Plug	44.60
MS9321-10	Washer, flat	0.56
AS62404	Clip	32.00
AS62408	Clip	34.20

International Aero Engines

SERVICE BULLETIN

ENGINE FUEL AND CONTROL - FUEL SYSTEM AIR TUBES - INTRODUCTION OF ADDITIONAL MOISTURE TRAP ON THE PB SENSE LINE AIR TUBE ASSEMBLY

1. Planning Information

R A. Effectivity

(1) Aircraft

(a) Boeing-Douglass Product Division MD-90

(2) Engine

(a) V2525-D5 Engines prior to Serial No.V20143

(b) V2528-D5 Engines prior to Serial No.V20143

B. Concurrent Requirements

Check EEC Fault History (SIL092).

C. Reason

(1) Problem

Surge indications and Pb sensor fault messages which are not correct can be transmitted to the cockpit instruments. Poor engine starts can also occur.

The problem is caused by moisture contamination of the Pb sensor chamber. The moisture comes out of the air and goes to the sensors thru the Pb sensor tube. Only one vented water trap is installed on the tube for D5 engines.

(2) Background

The problem has been found on in-service engines.

(3) Substantiation

A satisfactory engineering analysis and a successful trial installation on a V2500 mock-up engine have been done on the changes contained in this Service Bulletin. A similar design is installed on A5 engines.

(4) Objective

The purpose of this Service Bulletin is to improve reliability.

(5) Effect of Bulletin on:

(a) Operation

Not affected.

(b) Maintenance

Affected.

(c) Overhaul

Affected.

(d) Repair Schemes

Affected.

(e) Interchangeability

Affected.

(f) Fits and Clearances

Not affected.

D. Description

(1) This Service Bulletin introduces an additional vented water trap and condensate loop at the bottom point in the Pb sense line. This is in the cool zone of the engine on the fancase. The changes are as follows:

(a) A Pb air tube has been added. This tube forms a 'U' shaped condensate loop when it is assembled with the tube in step (b).

(b) A Pb air tube with a vented moisture trap has been added. This tube forms a 'U' shaped condensate loop when it is assembled with the tube in step (a).

(c) The following clipping points have been revised:

CP2038, CP2168, CP2331 and CP2486.

(d) The following clip points are additional:

CP2680, CP2681, CP2682, CP2683 and CP2685.

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 parts and to all affected parts.

F. Approval

The part number changes and/or part modification are given in Section 2 and 3 of this Service Bulletin. They comply with the applicable Federal Aviation Regulations and are FAA- APPROVED for the engine model listed.

G. Manpower

Estimated man-hours to incorporate the full intent of this Bulletin:

(1) In Service

(a) To embody

1 hour 30 minutes

(2) At Overhaul

Not affected.

H. Material - Price and Availability

(1) A modification kit is not necessary.

(2) For prices and availability of future spares, see supplement.

I. Tooling - Price and Availability

Special tools are not required.

J. Weight and Balance

(1) Weight change

Plus 0,28 kg. (0.6 lb.)

(2) Moment arm

254 mm. (10.0in.) forward of datum

(3) Datum

Engine front mount centreline (Power Plant Station - PPS 100)

K. Electrical Load Data

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

L. References

(1) Engineering Change No. - 96VR015.

(2) ATA Locator - 73-22-00.

M. Other Publications Affected

(1) Component Maintenance Manual (CMM), Chapter/Section 73-22-49, Cleaning, Inspection/Check and Repair.

(2) Engine Manual, Chapter/Sections 72-00-32 and 72-00-40, Removal/Installation

(3) Illustrated Parts Catalogue (IPC), Chapter/Sections 71-51-51, 73-11-49, 73-22-49, 75-32-49.

2. Material Information

A. Kits associated with this Bulletin:

None.

B. Parts affected by this Bulletin:

Applicability: For each V2500 engine to incorporate this Bulletin.

71-51-51

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
01-549	4W0110	1	Bolt, machine double hex CP2486 (.190 dia x .938)	-	AS20910	(A)(E)(S1)
01-554	UP10479	1	Spacer CP2486 (10mm)	-	-	(A)(C)
01-560	AS62510	1	Clamp, loop, style, cushion-CP2486 (15,88(0.625))		AS62509	(A)(E)(S1)
01-565	4W0103	1	Bolt, machine double hex CP2331 (.190 dia x .500)	-	AS20907	(A)(E)(S1)
01-568	AS62509	1	Clamp, loop, style, cushion-CP2331 (14,27mm(0.562))		AS62508	(A)(E)(S1)
01-572	4W0001	1	Nut, self locking dbl hex CP2331 (.190 dia)	-	4W0043	(A)(E)(S2)

73-11-49

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
08-133	4W0120	1	Bolt, machine double hex CP2038 (.190 dia x 1.562)	-	AS20925	(A)(E)(S2)
08-140	4W0001	1	Nut, self locking dbl hex CP2038 (.190 dia)	-	4W0043	(A)(E)(S2)
08-149	4W0109	1	Bolt, machine double hex CP2685 (.190 dia x .875)	-	-	(A)(C)
08-152	AS62412	1	Clip CP2685 (19,05mm (0.750))	-	-	(A)(C)
08-154	UP10479	1	Spacer CP2685 (10mm)	-	-	(A)(C)
08-156	4W0001	1	Nut, self locking dbl hex CP2685 (.190 dia)	-	-	(A)(C)

73-22-49

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
02-525	4W0102	1	Bolt, machine double hex CP2168 (.190 dia x .438)	-	AS20907	(A)(E) (S2)
06-100	6A6177	1	Tube Assy, Pb air-bifurcation panel to line disconnect	-	6A5322	(A)(B) (S1)
06-133	4W0102	1	Bolt, machine double hex CP2681 (.190 dia x .438)	-	-	(A)(C)
06-136	AS62404	1	Clip CP2681 (6,35mm (0.250))	-	-	(A)(C)
06-140	4W0043	1	Nut, A/O self locking CP2681 (.190 dia)	-	-	(A)(C)
06-700	6A6178	1	Tube assy, Pb air-line disconnect to line disconnect	-	-	(A)(C)
06-718	MS9405-01	1	Plug	-	-	(A)(C)
06-720	MS9321-10	1	Washer, flat	-	-	(A)(C)
06-728	AS62404	1	Clip CP2038 (6,35 mm (0.250))	-	-	(A)(C)
06-736	AS62404	1	Clip CP2331 (6,35 mm (0.250))	-	-	(A)(C)
10-173	4W0102	1	Bolt, machine double hex CP2680 (.190 dia x .438)	-	-	(A)(C)
10-176	AS62404	1	Clip CP2680 (6,35 mm (0.250))	-	-	(A)(C)
10-180	4W0043	1	Nut,A/O self locking CP2680 (.190 dia)	-	-	(A)(C)

75-32-49

FIG ITEM NO.	NEW PART NO.	QTY	PART TITLE	MAT	OLD PART NO.	INSTR DISP
02-165	4W0102	1	Bolt, machine double hex CP2682 (.190 dia x .438)	-	-	(A)(C)
02-168	AS62408	1	Clip CP2682 (12,70 mm (0.500))	-	-	(A)(C)
02-172	4W0043	1	Nut,A/O self locking CP2682 (.190 dia)	-	-	(A)(C)
02-173	4W0102	1	Bolt, machine double hex CP2683 (.190 dia x .438)	-	-	(A)(C)
02-176	AS62408	1	Clip CP2683 (12,70mm (0.500))	-	-	(A)(C)
02-180	4W0043	1	Nut,A/O self locking CP2683 (.190 dia)	-	-	(A)(C)

C. Instructions/Disposition Code Statements:

(A) New parts are currently available.

(B) Old parts will no longer be available.

(C) Additional.

(E) Old part may be used up on other application.

(S1) Old and new parts are not interchangeable.

(S2) Old and new parts are freely and fully interchangeable.

3. Accomplishment Instructions

A. Rework Instructions

None.

B. Job Set-up Instructions

(1) Open the fan cowl doors (Refer to the MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 71-13-00, Maintenance Practices).

C. Consumable Materials

(1) OMat 02-136 Lockwire.

D. Removal Instructions

(1) Identify the Pb pressure air tubes 6A5322 and 6A5243 of the burner. These are between the RH bifurcation panel and the support raft. (Refer to Figure 1).

(2) Disassemble the clip points CP2444, CP2512 and CP2513. Keep the nuts and bolts. (Refer to Figure 1).

(3) Remove the air tube 6A5322 (Refer to Figure 1).

(a) Disassemble CP2171 and CP2172. Keep the bolts and spacers.

(b) At the connection with 6A5243 and the bifurcation panel, remove the lockwire and loosen the unions.

(c) Remove tube 6A5322.

(d) Remove and keep the five clips from the air tube 6A5322.

(4) Disassemble clip point CP2038. Keep the spacer but discard the bolt and clipnut (Refer to Figures 3 and 4).

(5) Disassemble clip point CP2331. Discard the bolt and clipnut (Refer to Figures 3 and 4).

(6) Disassemble clip point CP2168 and discard the bolt (Refer to Figures 3 and 9).

(7) Disassemble clip point CP2486 and discard the bolt (Refer to Figures 3 and 8).

E. Installation Instructions

(1) Install tubes 6A6177 and 6A6178

(a) Carefully install the moisture trap end of 6A6178 at the front end of the bifurcation panel.

(i) Put the tube behind tubes 6A5100 and 6A5321 and Loom-A. Make sure the moisture trap is clear of the bifurcation panel and tube 6A6004.

(ii) Turn the tube and put the top end behind Loom-A and over the tubes.

(b) Loosely connect tube 6A6178 to air tube 6A5243 (Refer to Figures 1 and 2).

(c) Position tube 6A6177 on the fancase.

(i) Loosely connect tube 6A6177 to 6A6178 and the bifurcation panel.

(d) At the bifurcation panel connection, tighten the union of 6A6177.

(i) Torque load the union to between 159 and 177 lbfin. (18 to 20 Nm).

(ii) Safety the union with OMat O2-126 lockwire (Refer to Figure 3).

(e) At the connection with 6A5243, tighten the union of 6A6178

(i) Torque load the union to between 159 and 177 lbfin. (18 to 20 Nm).

(ii) Safety the union with OMat O2-126 lockwire (Refer to Figures 1 and 3).

(f) At the connection of 6A6177 with 6A6178, tighten the union of 6A6177

(i) Torque load the union to between 159 and 177 lbfin. (18 to 20 Nm).

(ii) Safety the union with OMat O2-126 lockwire (Refer to Figure 3).

(g) Install the five clips removed at C.(3)(d) to tube 6A6178.

(h) With the nuts and bolts removed at step C.(2), assemble clip points CP2444, CP2512 and CP2513 (Refer to Figure 2).

(i) Torque the nuts to between 36 and 45 lbfin. (4 to 5 Nm). (Refer to Figure 2).

(i) With the bolts and spacers removed at step C.(3)(a), assemble clip points CP2171 and CP2172 (Refer to Figure 2).

(j) Install CP2038 (Refer to Figures 3 and 4).

(i) Install clip AS62406 to tube 6A6178.

(ii) With the spacer removed at step C.(4) and the new bolt 4W0120 and nut 4W0001, assemble CP2038.

(iii) Torque load the nut to between 36 and 45 lbfin. (4 to 5 Nm).

(k) Install CP2331 (Refer to Figures 3 and 4).

(i) Install clip AS62404 to tube 6A6178.

(ii) With the new bolt 4W0103 and nut 4W0001, assemble CP2331.

(iii) Torque load the nut to between 36 and 45 lbfin. (4 to 5 Nm).

(l) Install CP2681 (Refer to Figures 3 and 5).

(i) Install clip AS62404 to tube 6A6177.

(ii) With the new bolt 4W0102 and nut 4W0043, assemble CP2681.

(iii) Torque load the nut to between 36 and 45 lbfin. (4 to 5 Nm).

(2) Install the clip point CP2680 (Refer to Figures 2 and 5)

(a) Install clip AS62404 on tube 6A5100.

(b) With the new bolt 4W0102 assemble the clip point.

(3) Install the clip points CP2682 and CP2683 (Refer to Figures 3 and 6)

(a) Install the two clips AS62408 on tube 6A5162.

(b) With the new bolts 4W0102 and nuts 4W0043 assemble the clip point.

(4) Install the clip point CP2685 (Refer to Figures 3 and 7)

(a) Install the clip AS62412 on the fuel tube 6A6004.

(b) With the new bolt 4W0109, spacer UP10479 and nut 4W0001 assemble the clip point.

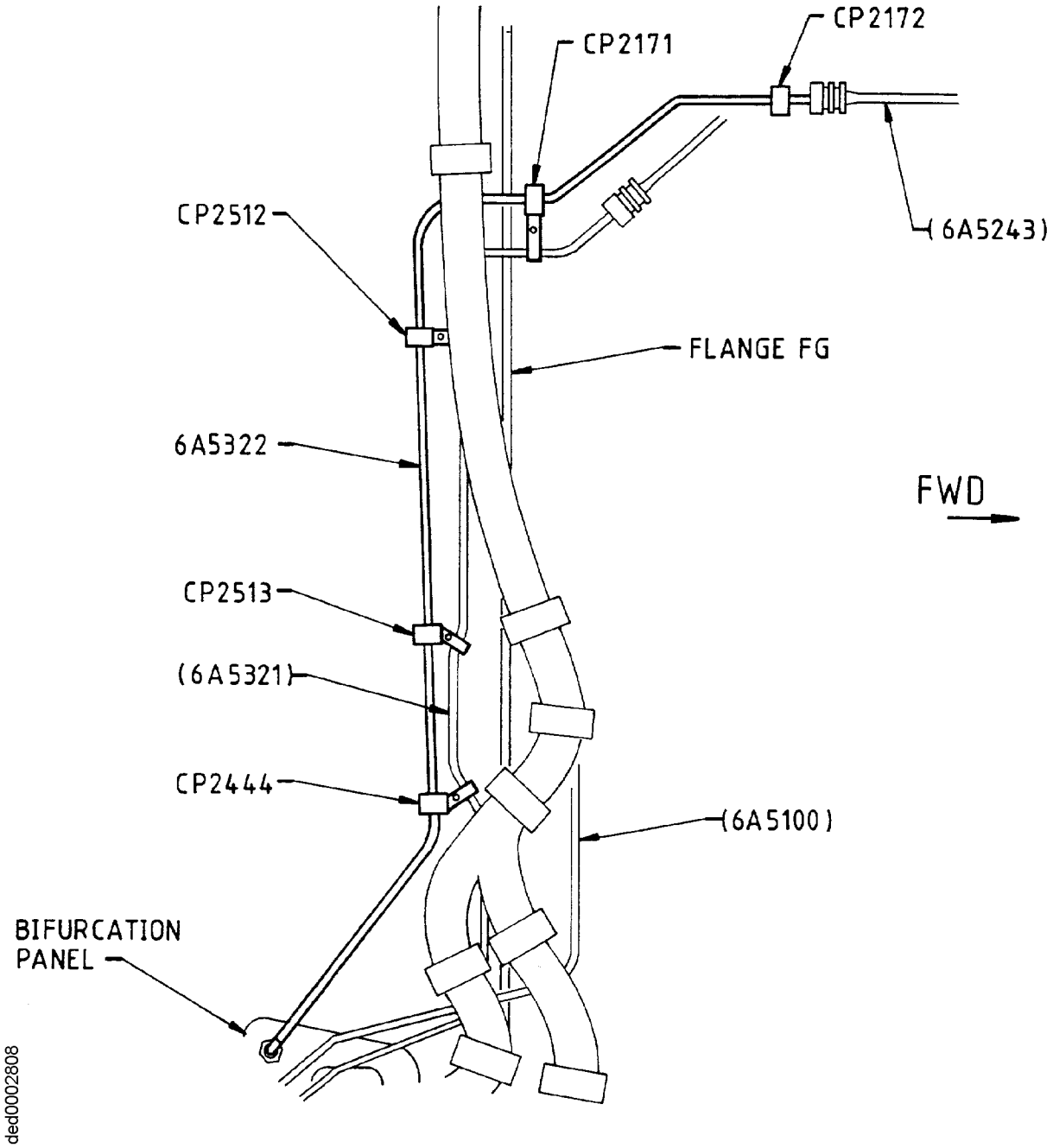
(5) With the new bolt 4W0102, assemble the clip point CP2168 (Refer to Figures 3 and 9).

(6) With the new clip AS26510, bolt 4W0110 and spacer UP10479, assemble the clip point CP2486.

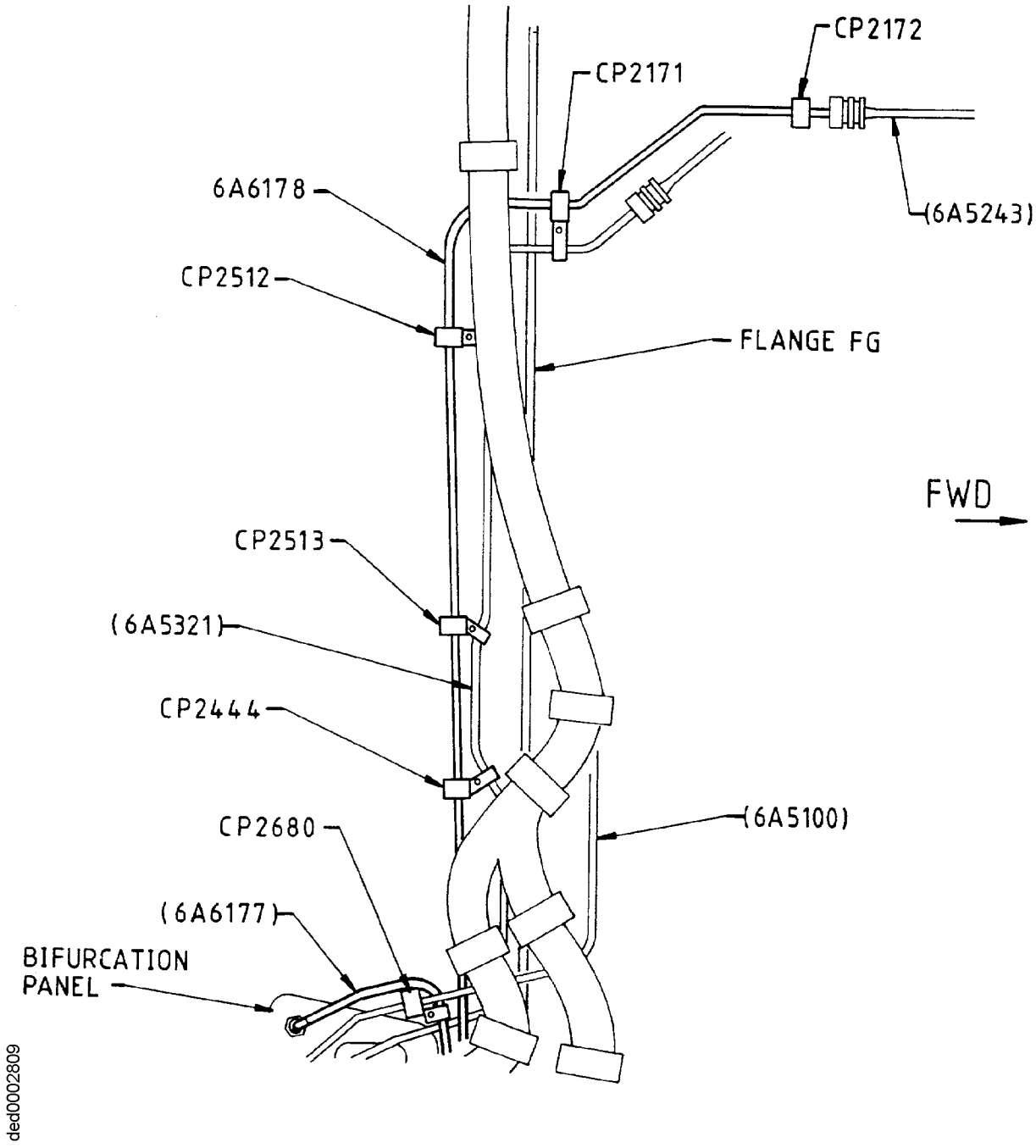
(7) Torque load the bolts at clip points CP2168, CP2486, CP2680, CP2682, CP2683 and CP2685 to between 36 and 45 lbfin. (4 to 5 Nm).

F. Recording Instructions

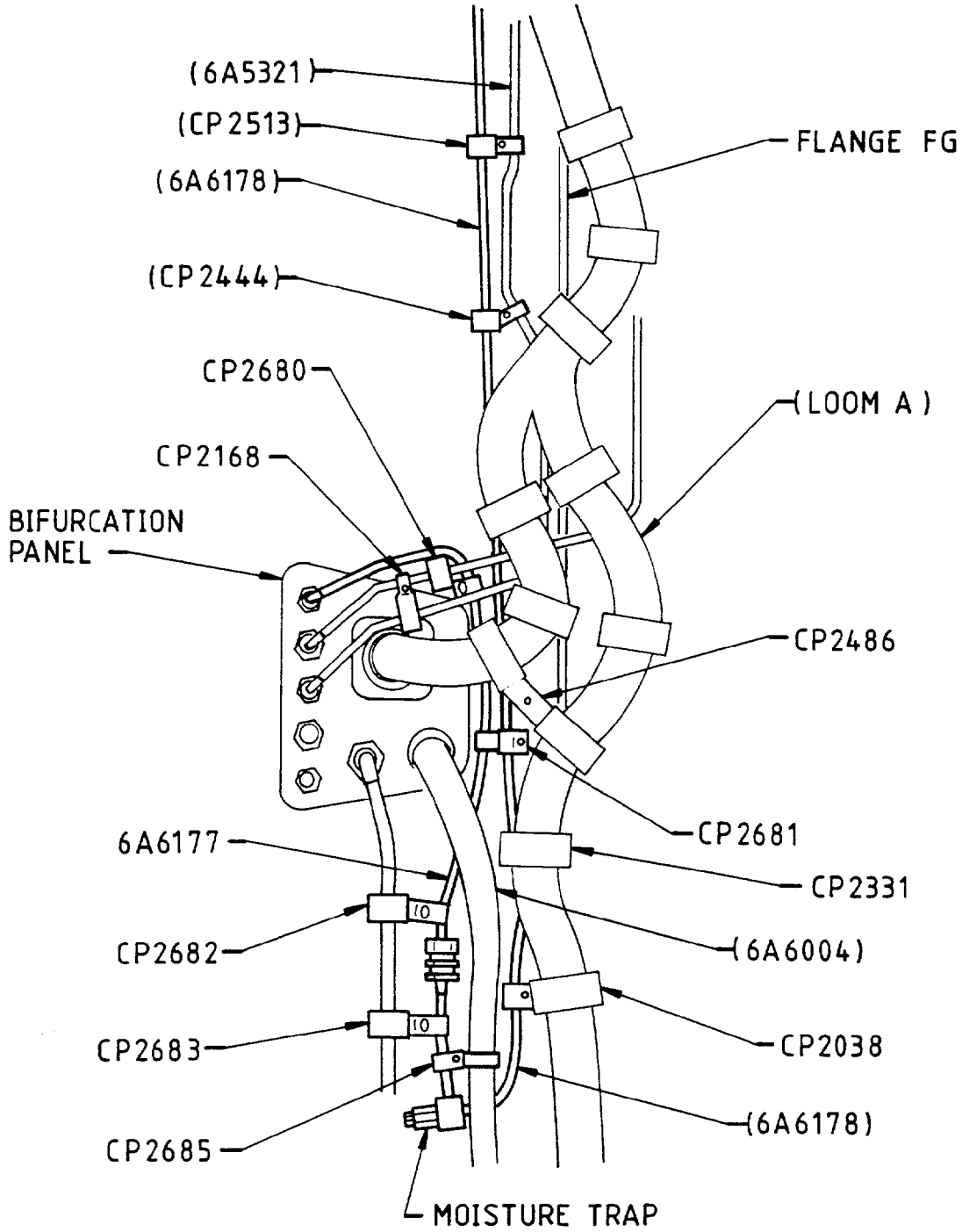
(1) A record of accomplishment is necessary.



Part view - RH of engine - Before alteration
Figure 1

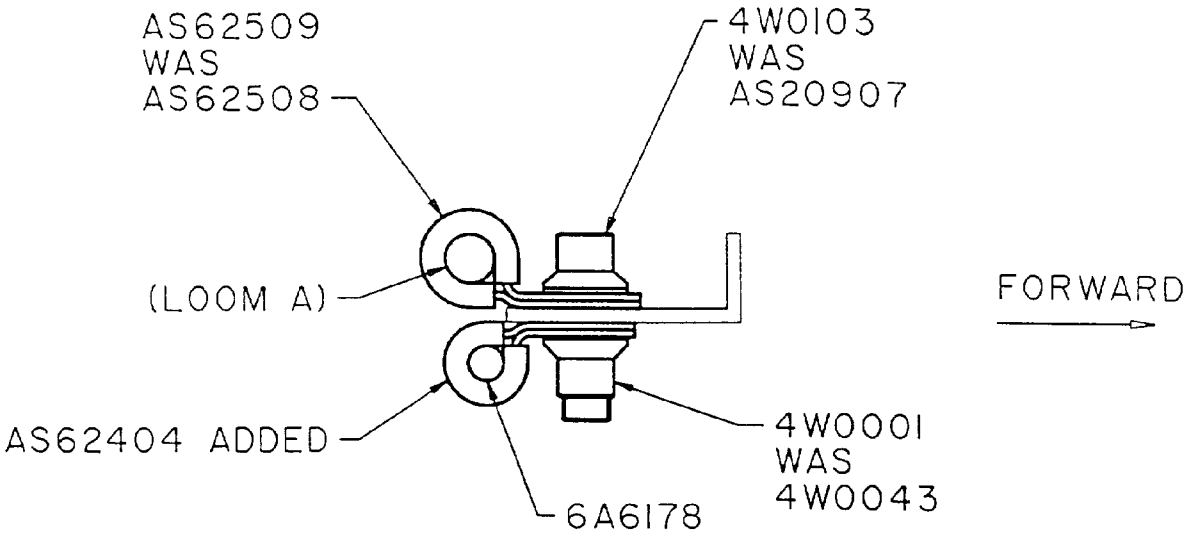


Part view - RH of engine - After alteration
Figure 2

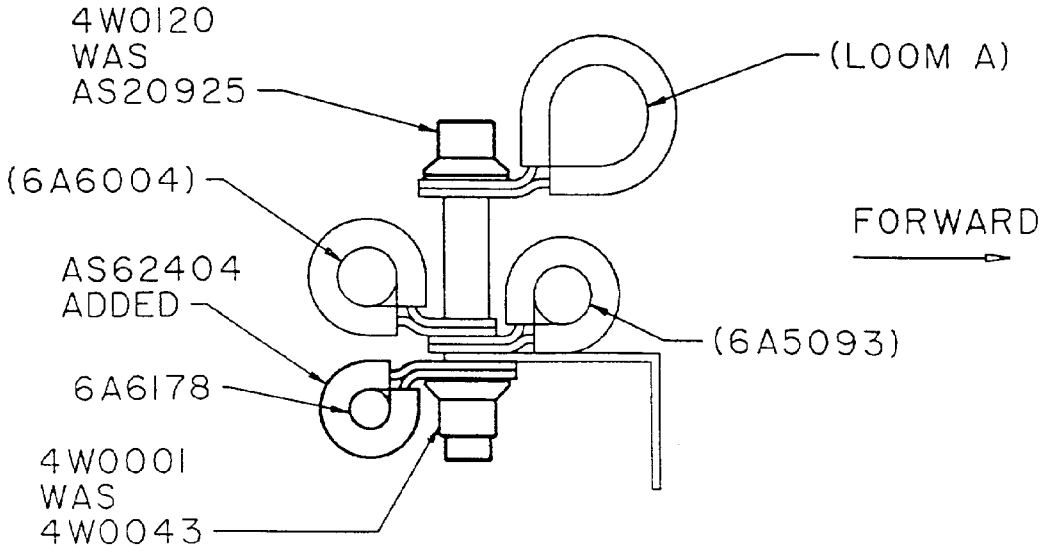


ded0002810

Part view - RH Bifurcation - After alteration
Figure 3



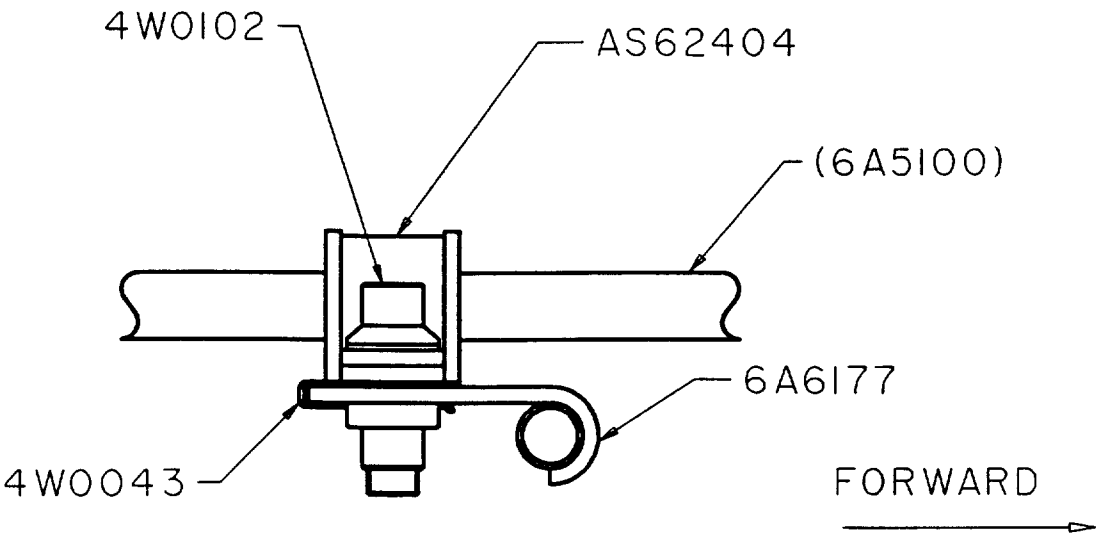
CLIPPING POINT 2331
VIEW LOOKING UPWARDS
BEFORE AND AFTER ALTERATION



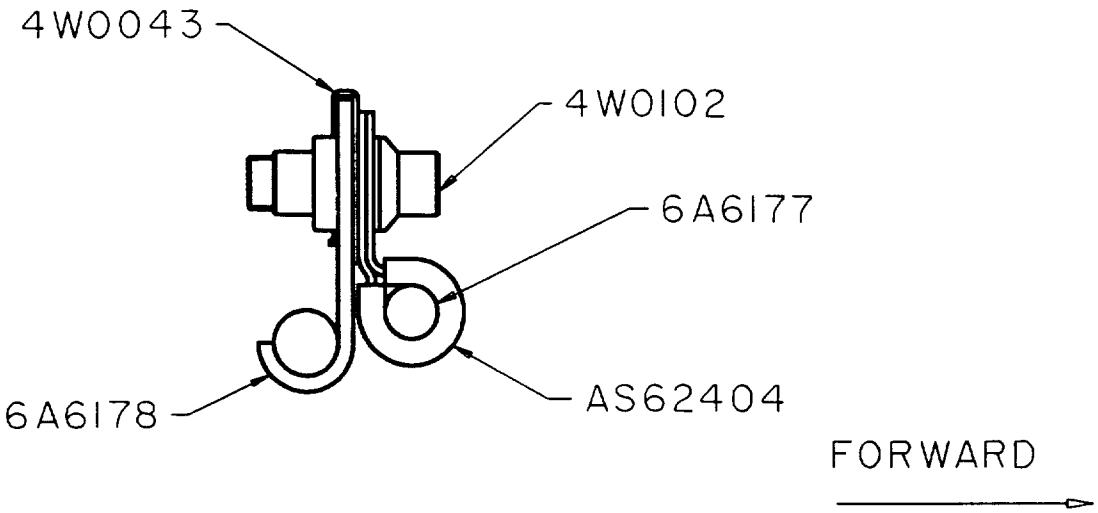
CLIPPING POINT 2038
VIEW LOOKING UPWARDS

ded0002811

Clip points CP2038 and CP2331 - Before and after alteration
Figure 4



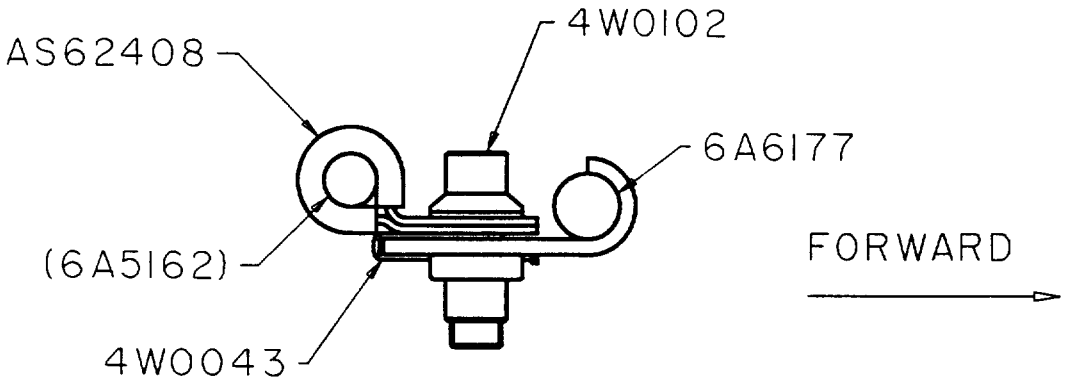
CLIPPING POINT 2680
VIEW LOOKING UPWARDS



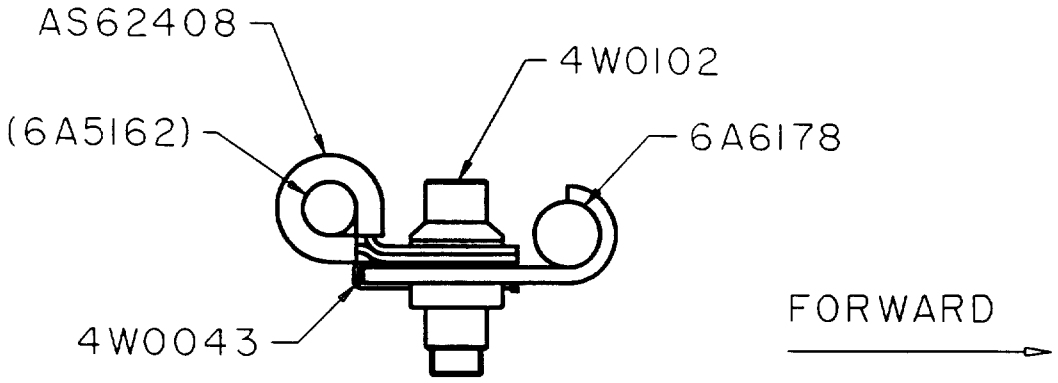
CLIPPING POINT 2681
VIEW LOOKING UPWARDS

ded0002812

Clip points CP2680 and CP2681 - Additional
Figure 5



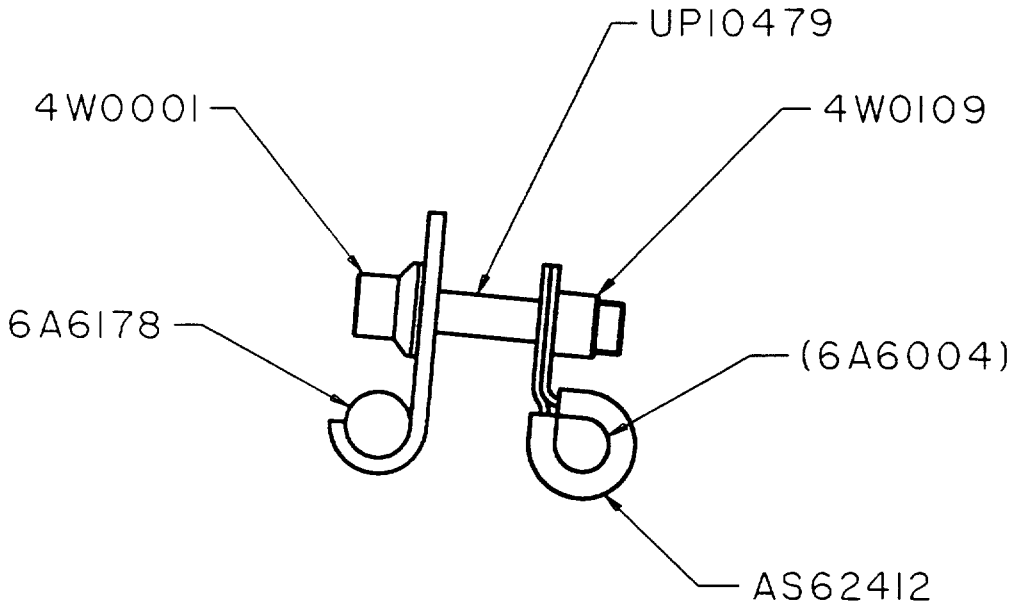
CLIPPING POINT 2682
VIEW LOOKING UPWARDS



ded0002813

CLIPPING POINT 2683
VIEW LOOKING UPWARDS

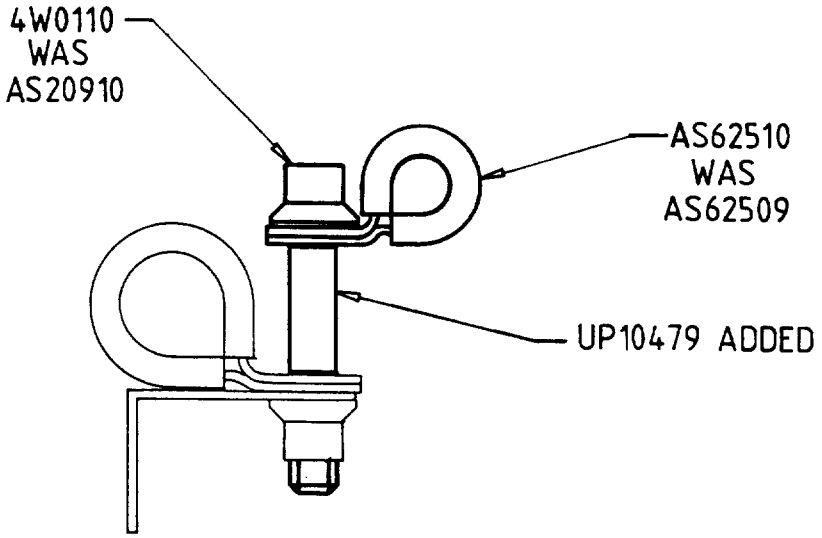
Clip points CP2682 and CP2683 - Additional
Figure 6



CLIP POINT 2685
VIEW LOOKING DOWNWARDS

ded0002814

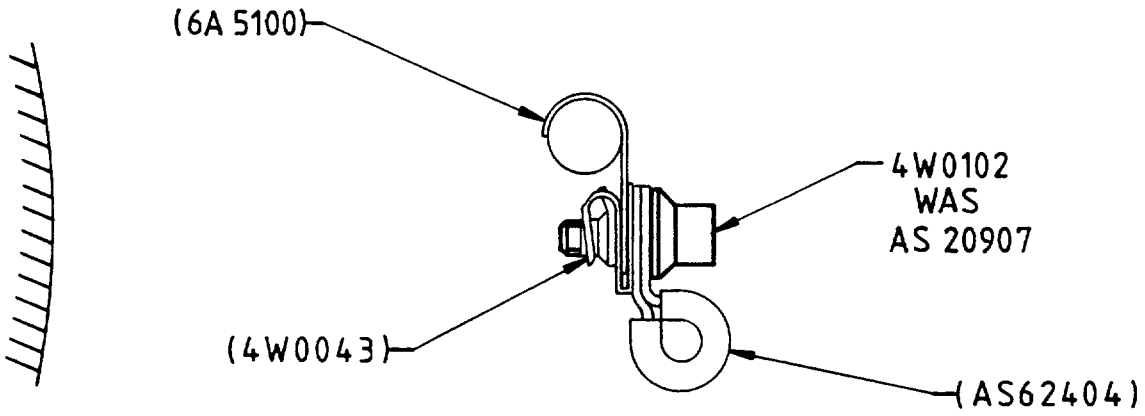
Clip point CP2685 - Additional
Figure 7



CLIPPING POINT 2486
LOOKING REARWARDS

ded0002815

Clip point CP2486 - Before and after alteration
Figure 8



CLIPPING POINT 2168.
LOOKING FORWARD

ded0002816

Clip point CP2168 - Before and after alteration
Figure 9

International Aero Engines

SERVICE BULLETIN

ENGINE FUEL AND CONTROL - FUEL SYSTEM AIR TUBES - INTRODUCTION OF ADDITIONAL MOISTURE TRAP ON THE PB SENSE LINE AIR TUBE ASSEMBLY

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
4W0110	Bolt	7.20
UP10479	Spacer	15.60
AS62510	Clamp	15.60
4W0103	Bolt	6.94
AS62509	Clamp	15.30
4W0001	Nut	3.97
4W0120	Bolt	7.06
4W0109	Bolt	6.56
AS62412	Clip	36.90
4W0102	Bolt	6.94
6A6177	Tube assy	646.00
AS62404	Clip	32.00
4W0043	Nut	3.67
6A6178	Tube assy	1719.00
MS9405-01	Plug	44.60
MS9321-10	Washer, flat	0.56
AS62404	Clip	32.00
AS62408	Clip	34.20