International Aero Engines

SERVICE BULLETIN

ENGINE FUEL AND CONTROL - LP/HP FUEL PUMPS - INTRODUCTION OF A REVISED LP/HP FUEL PUMP WITH REDUCED GEARSHAFT BENDING

MODEL APPLICATION

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

BULLETIN INDEX LOCATOR

73-12-00

Compliance Category Code

6

Internal Reference No.

EC97VI014

ENGINE FUEL AND CONTROL - LP/HP FUEL PUMPS - INTRODUCTION OF A REVISED LP/HP FUEL PUMP WITH REDUCED GEARSHAFT BENDING

1. Planning Information

A. Effectivity

(1) Aircraft:

(a) Airbus A319.

(b) Airbus A320.

(c) Airbus A321.

(d) Boeing-Douglas MD-90.

(2) Engines:

(a) V2500-A1 Engines prior to engine serial No. V0362.

(b) V2522-A5 Engines prior to engine serial No. V10625.

(c) V2524-A5 Engines prior to engine serial No. V10625.

(d) V2527-A5 Engines prior to engine serial No. V10625.

(e) V2527E-A5 Engines prior to engine serial No. V10625.

(f) V2530-A5 Engines prior to engine serial No. V10625.

(g) V2533-A5 Engines prior to engine serial No. V10625.

(h) V2525-D5 Engines prior to engine serial No. V20286.

(i) V2528-D5 Engines prior to engine serial No. V20286.

B. Concurrent Requirements

None.

C. Reason

(1) Problem

Fracture of the LP/HP fuel pump gearshaft can occur and in extreme conditions it can result in reduced flow from the fuel pump outlet.

The problem is caused by bending of the drive shaft of the LP impeller. This causes cyclic loads and can result in low stress, high cycle reverse-bending fatigue of the gearshaft.

(2) Evidence

There have been four reports of this problem on V2500-A1 engines in service.

(3) Objective

The purpose of this Service Bulletin is to maintain unit reliability.

(4) Substantiation

A satisfactory engineering analysis has been done on the changes introduced by this Service Bulletin.

(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 contains the installation of the LP/HP fuel pumps that embody vendor modifications.

(2) The LP/HP fuel pumps have been revised, the changes introduced are as follows:

(a) The perpendicular and concentricity tolerances have been improved.

(b) A revised Invar washer is introduced with improved material characteristics, improved parallelism and increased surface area.

(c) The clearance between the LP Impeller pilot and gearshaft has increased.

(d) A non-locking helicoil insert replaces the locking helicoil insert of the LP Impeller.

(e) The impeller sleeve has been revised, chamfers are introduced on its outer diameter.

(3) Existing LP/HP fuel pumps can be reworked, refer to the vendor Service Bulletin at 1. L. (4).

(4) A new type number will identify units that embody this Service Bulletin. (Refer to 2. B.).

E. Compliance

Category 6

Accomplish when the subassembly (That is modules, accessories, components, build groups) is disassembled sufficiently to get access to all the affected parts.

F. Approval

The part number changes and/or 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 models listed.

G. Manpower

Estimate of man-hours necessary to embody this Service Bulletin in full:

(1) In Service Not applicable.

(2) At Overhaul No additional time is necessary to embody this Service Bulletin.

NOTE: It is possible to get access to the parts affected by this Service Bulletin at overhaul.

H. Material - Price and Availability

(1) Modification kits are necessary, refer to 2. A..

(2) Refer to 2. Material Information for the prices and availability of future spares.

I. Tooling - Price and Availability

Special tools are not necessary.

J. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

Not effected.

(3) Datum

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

K. Electrical Load Data

This Service Bulletin does not affect the aircraft electrical load.

L. References

(1) A1/A5/D5 Engine Manual (EM), Chapter/Section 72-00-60, Removal/Installation.

(2) A319/A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 73-12-41, Removal/Installation.

(3) MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 73-12-01, Removal/Installation.

(4) Sundstrand vendor Service Bulletins:

(a) 5008735-73-003 (A1).

(b) 5009913-73-005 (A5).

(c) 5010216-73-004 (D5).

(5) This Service Bulletin is subject of Aircraft modification No. 28310

M. Other Publications Affected

Illustrated Parts Catalogue (IPC), Chapter/Section 73-12-41.

2. Material Information

A. Kits necessary for this Service Bulletin:

NEW PART No. (ATA No.)	QTY	EST'D UNIT PRICE ($)	PART TITLE	OLD PART No. (IPC No.)	INSTR DISP
A1 Model					
768094	1		..Impellor assembly, inducer	762726	
All A5 and D5 Models					
768093	1		..Impellor assembly, inducer	762725	
All Models					
767997	1		..Sleeve	762723	
767998	1		..Spacer	762724	
MS124661	1		..Insert	MS21209F9-10	

B. Vendor unit affected by this Service Bulletin:

NEW PART No. (ATA No.)	QTY	EST'D UNIT PRICE ($)	PART TITLE	OLD PART No. (IPC No.)	INSTR DISP
The equipment given below is for information only:					
A1 Model					
5008735G (73-12-41)	1		.Pump, Fuel LP/HP (VS4980)	5008735F (01-100)	(A)(S1)
All A5 Models					
5009913F (73-12-41)	1		.Pump, Fuel LP/HP (V99167)	5009913E (01-100)	(A)(S1)

NEW PART No. (ATA No.)	QTY	EST'D UNIT PRICE ($)	PART TITLE	OLD PART No. (IPC No.)	INSTR DISP
All D5 Models					
5010216F (73-12-41)	1		.Pump, Fuel LP/HP (V99167)	5010216E (01-100)	(A)(S1)

NOTE: The unit prices, if shown, are an estimate and they are given for the purpose of planning only. For actual prices, refer to IAE Price Catalog or contact IAE's spare parts sales department.

C. Instruction/Disposition Codes:

(1) (A) New standard of unit will be available from April 1999.
(2) (S1) Old and new units are freely and fully interchangeable.
(3) (1D) Old unit can be reworked and re-identified to the new part number.

3. Accomplishment Instructions

A. Rework Instructions

Refer to the vendor Service Bulletins at 1. L. (4).

B. Assembly Instructions

(1) For the correct removal/installation procedures refer to:

(a) The A1/A5/D5 Engine Manual (EM), Chapter/Section 72-00-60, Removal/Installation.

or

(b) The A319/A320/A321 Aircraft Maintenance Manual (AMM), Chapter/Section 73-12-41, Removal/Installation.

or

(c) The MD-90 Aircraft Maintenance Manual (AMM), Chapter/Section 73-12-01, Removal/Installation.

C. Recording Instructions

(1) A record of accomplishment is necessary. Refer to the vendor Service Bulletin at 1. L. (4).

HAMILTON SUNDSTRAND

SERVICE BULLETIN

Transmittal Sheet

Hamilton Sundstrand Service Bulletin 5008735-73-003

Attached is Revision 2 to Service Bulletin 5008735-73-003 dated April 25, 2002, applicable to the Hamilton Sundstrand V2500-A1 Engine used on A320 aircraft.

Revision 2 is issued to change the date of the service bulletin to coincide with the issue date of the International Aero Engines service bulletin.

Units previously modified according to this bulletin do not require remodification according to this bulletin revision.

This bulletin has been reproduced in its entirety. Discard the bulletin you now have and replace it with this copy. The tabulation below is provided for record keeping and traceability of bulletin issues.

Issue	Date	Page Number(s)
Original	May 12, 1999	Not Applicable
Revision 1	Nov. 20, 2001	Not Applicable
Revision 2	Apr. 25, 2002	1 through 13

SERVICE BULLETIN

NO. 5008735-73-003

ENGINE - FUEL AND CONTROL - MODIFICATION OF LP/HP FUEL PUMPS IMPELLER/INDUCER AND CENTER PLATE

1. PLANNING INFORMATION

A. EFFECTIVITY

(1) Aircraft : A320

(2) Engines : V2500-A1 Engine

(3) Pumps:

IAE PART NUMBER	TS/STS PART NUMBER	
5L0067	5008735E	∗1
5L0070	5008735F	∗2

NOTE: ∗1 This Service Bulletin must be incorporated after or concurrently with the STS Service Bulletin No. STS-73-001 (Engine Fuel and Control - Replacement of LP/HP Fuel Pumps, Face Seal Assembly and O-Rings).

∗2 Indicated are pumps incorporated STS Service Bulletin No. STS-73-002 (Engine Fuel and Control - Modification of LP/HP Fuel Pumps, Impeller/Inducer).

B. REASON

(1) Condition:

Four V2500-A1 Main Fuel Pumps, serial numbers 547, 591,545 and 262 were returned for a loss of power during take-off or flight. This problem has been seen on previous pumps due to shearing of the drive gear impeller mount. These pumps had Service Bulletin STS-73-002 incorporated, which addressed this shear problem.

(2) Background:

The drive gear impeller mount sheared due to reverse bending fatigue. With the boost stage then inoperative, the inlet to the gear stage was limited resulting in reduced pump outlet flow and hence partial loss of engine power. Incorrect clamping of the impeller on the gear caused uneven fretting wear and together with the machining misalignment caused bending loads that eventually sheared the gear shaft.

Three failures (serial numbers 446, 539, and 579) have been found on pumps from a later

batch than originally identified in this service bulletin. The pump serial numbers from this later batch have been added to paragraph E.(2).

(3) Objective:

(a) To identify pump serial numbers that have been modified to SB STS-73-002 that are suspect of a potential problem.

(b) The helical coil insert should be replaced with a non locking helical coil insert to reduce the run on torque and reduce the installation bending loads.

(c) The impeller to gear shaft pilot clearance should be increased to avoid interference with the shoulder during installation.

(d) The invar washer (spacer) should be modified with the improved material to increase the compressive strength, smaller I.D. to increase the contact area and tighter parallelism to reduce the installation bending load.

(e) In order to ensure the proper clamping loads of the impeller onto the gear at all conditions, the installation torque must be applied above run on torque. The manuals have been changed to reflect this.

(f) The impeller/drive gear assembly should be inspected for concentricity to eliminate shaft shears in operation

C. DESCRIPTION

(1) This Bulletin gives instructions necessary to modify the impeller and to inspect the impeller/drive gear assembly on centers and assemble the LP/HP Fuel Pump with the modified impeller/inducer assembly.

(2) This Service Bulletin describes two options to accomplish the modification of the LP/HP Fuel Pump.

(a) Option 1: Operators who wish to accomplish the modification and inspection in the shop by repairing/replacing any impeller/inducer that prove to be suspect.

(b) Option 2: Operators who wish to have the modification accomplished by Hamilton Sundstrand.

D. APPROVAL

This Service Bulletin has been technically agreed by IAE.

E. COMPLIANCE

NOTE: This service bulletin supersedes Service Bulletin STS-73-002.

(1) Category Code 4
Accomplished at the first visit of an engine or pump is at a maintenance base that can do the procedures regardless of the other planned maintenance. Pump serial No. are;

202,210,217,222,223,232,235,253,265,266,272,275,281,282,283,290,297,304,317,327,328,
329,331,344,364,402,429,436,437,459,474,519,520,521,527,532,534,540,559,580,610,611,
615,622,632,645,646.

(2) Category Code 5
Accomplish when an engine is disassembled and access to the pump is available after 8000 hours operation since modification. Pump serial No. are;

209,211,213,218,230,236,238,246,248,252,254,259,260,263,277,279,286,288,
289,293,294,309,310,311,316,323,332,333,345,347,366,369,375,378,379,380,
391,394,397,432,455,456,461,463,486.

114,208,214,215,217,226,228,233,240,243,245,251,255,258,262,266,267,
271,274,276,280,281,282,292,314,318,321,322,327,334,335,338,339,350,
355,356,359,362,368,372,377,382,383,384,387,393,398,400,410,416,418,423,
429,441,442,445,446,448,451,459,464,465,466,468,470,476,489,502,503,507,
508,510,511,524,528,530,537,539,545,553,559,560,567,569,570,573,577,578,579,590,591,
592,594,596,598,599,601,602,603,604,608,609,613,619,623,627,628,630,631,
635,640,642,643,644,646,647,649

(3) Category Code 6
Accomplish at pump first shop visit after 8,000 total operating time. All pumps not modified to SB STS-73-002 and pumps modified to SB STS-73-002 that do not appear in above lists.

F. MANPOWER

Approximately 10.0 man-hours will be required to perform this modification.

G. MATERIAL - PRICE AND AVAILABILITY

(1) Description of Product Improvement:

(a) Price for the modification:

1 For pump under warranty:

TS/Hamilton Sundstrand will provide free of charge replacement of any impeller/inducer which has been rendered inoperable because of damage as described in paragraph 1.B.(2) until **November 20, 2004**.

2 For pump out of warranty:

TS/Hamilton Sundstrand will provide a special price for the replacement of any impeller/inducer which has been rendered inoperable because of damage as described in paragraph 1.B.(2) until **November 20, 2004** as follows :

To modify the pump impeller/inducer and center plate: $ 8,000.00.

3 For pump already incorporated Service Bulletin STS-73-002

TS/Hamilton Sundstrand will provide a special price for the replacement of any impeller/inducer for pumps having already incorporated Service Bulletin STS-73-002 as follows:

COMPLIANCE (REFER TO PARAGRAPH 1.E. FOR PUMP SERIAL NUMBERS)	LESS THAN 8000 HOURS *	OVER 8000 HOURS * AND RETURNED FOR INCORPORATION OF THIS SERVICE BULLETIN ONLY	OVER 8000 HOURS* AND RETURNED FOR OVERHAUL (IMPELLER MODIFICATION COST ONLY)
Category Code 4	Free of charge.	Free of charge.	Free of charge.
Category Code 5	Not applicable.	Impeller modification is free of charge. Labor costs associated with disassembly, assembly, and test will be prorated from $0.00 at 8000 hours* to $6,000.00 at 12,000 hours*.	Free of charge.
*Flight hours specified are after incorporation of Service Bulletin STS-73-002.			

NOTE: All of the above are subject to escalation.

(2) Availability:

(a) Option 1:

Operators who wish to accomplish the modification in the shop by replacing impeller/inducer;

New parts required to accomplish this Service Bulletin are listed in Section 3 of this bulletin. Parts are currently available in limited quantities. Initial quantities will be shipped within 15 days after receipt of order. Orders should include total fleet requirements and anticipated incorporation schedule.

(b) Option 2:

Operators who wish to have the modification accomplished by Hamilton Sundstrand;

Accomplishment of this Service Bulletin will be completed based on Hamilton Sundstrand standard terms, and prices of sale pertaining to commercial

contracts. Contact Hamilton Sundstrand for information concerning firm quotation.

H. TOOLING PRICE AND AVAILABILITY

No additional tooling other than that required for shop maintenance of the LP/HP Fuel Pump is required to accomplish this Service Bulletin.

I. WEIGHT AND BALANCE

None.

J. ELECTRICAL LOAD DATA

Not affected.

K. REFERENCES

(1) STS/Hamilton Sundstrand Component Maintenance Manual (CMM) 73-12-41.

(2) IAE Engineering Change No. 97VI014

IAE Service Bulletin No. SB-V2500-ENG-73-0143

L. OTHER PUBLICATIONS AFFECTED

STS/Hamilton Sundstrand Component Maintenance Manual (CMM) 73-12-41 will be revised to incorporate this Bulletin.

2. ACCOMPLISHMENT INSTRUCTIONS

A. DISASSEMBLY

Disassemble the pump in accordance with approved procedures in CMM in REFERENCE (1) to the extent necessary to get the impeller/inducer (320 or 320A, IPL Figure 1, CMM 73-12-41), the center plate assembly (350, IPL Figure 1, CMM 73-12-41) and the drive gear (480, IPL Figure 1, CMM 73-12-41).

B. MODIFICATION

(1) Modify the impeller/inducer (320, IPL Figure 1, CMM 73-12-41). Refer to Figure 1, 2, and 3 of this Bulletin.

(2) If the impeller/inducer is damaged to the extent that modification is not possible, replace impeller/inducer assembly according to below:

REPLACE WITH		EXISTING	APPLICATION FOR PUMPS	
P/N	KEYWORD	P/N	TS/STS PART NO.	IAE PART NO.
768094	Impeller/ Inducer Assembly	5008741 or 762726	5008735E 5008735F	5L0067 5L0070

Identify modified impeller/inducer according to paragraph 2.D.(1) and 2.D.(2).

(3) Modify the center plate assembly (350, IPL Figure 1, CMM 73-12-41). Refer to Figure 4 of this Bulletin.

(4) Clean up the shoulder on the gear that interfaces with the impeller (often has aluminum particles attached.)

C. INSPECTION

(1) Assemble the drive gear on centers and measure the run-out of the journal nearest the impeller/inducer mounting thread, per Figure 5.

(2) Attach the impeller/inducer to 170 in-lb torque above run-on torque and repeat (1).

(3) If the run-out in step (2) is greater than step (1) by .0005 inch, replace the impeller/inducer and repeat the above.

(4) If another impeller/inducer is not available, machine out the impeller sleeve ID to .8012 inch max. and repeat (1) to (3).

(5) If the run-out is still bad, repeat (1) to (3) with a drive gear from another matched set. If the run-out is still bad, re-machine the impeller face and replace the washer. Repeat above. If the run-out is good with the different drive gear, then return the original gear set for investigation.

MODIFICATION OF IMPELLER/INDUCER

PROCEDURE

A. Machine impeller/inducer and remove sleeve, spacer and helical coil insert if installed. (Refer to the Figure 2 of Modification of Impeller/Inducer.)

B. Measure labyrinth surface finish. If it is more than 32 Ra, or if it is already worn and anodize has been removed, do not perform steps C. and F.

C. Machine off anodized layer of two (2) labyrinth O.D. to diameter in Figure 2 to roughen it up to 63-125 Ra finish.

D. Perform local fluorescent penetrant inspection according to Hamilton Sundstrand Standard Practices Manual, Bulletin 985, CHECK or Military Specification MIL-STD-6866.

E. Apply chemical film to reworked surfaces per MIL-C-5541, TYPE 1A except two (2) labyrinth O.D.s (∅ 2.190, ∅ 2.070) .

CAUTION: DO NOT MACHINE TWO (2) LABYRINTH O.D.S (∅ 2.190, ∅ 2.070) AFTER ANODIZED PER MIL-A-8625, TYPE 3.

F. Anodize two (2) labyrinth O.D.s (∅ 2.190, ∅ 2.070) per MIL-A-8625, TYPE 3 (Refer to Figure 2) to build up .001/.002 inch diameter.

G. Install helical coil insert (P/N MS124661) 1 to 1 1/2 pitches below the entering surface, and install spacer (P/N 767998).

NOTE: Helical diameter is now larger than Spacer I.D.

CAUTION: DO NOT HEAT IMPELLER/INDUCER TO MORE THAN 400 DEGREES FAHRENHEIT.

H. Heat impeller/inducer and cool sleeve (P/N 767997) as required to obtain a temperature differential of at least 350 degrees Fahrenheit between the impeller and sleeve.

I. Install sleeve to be flush/.005 inch below surface D. Allow impeller/inducer to cool to room temperature.

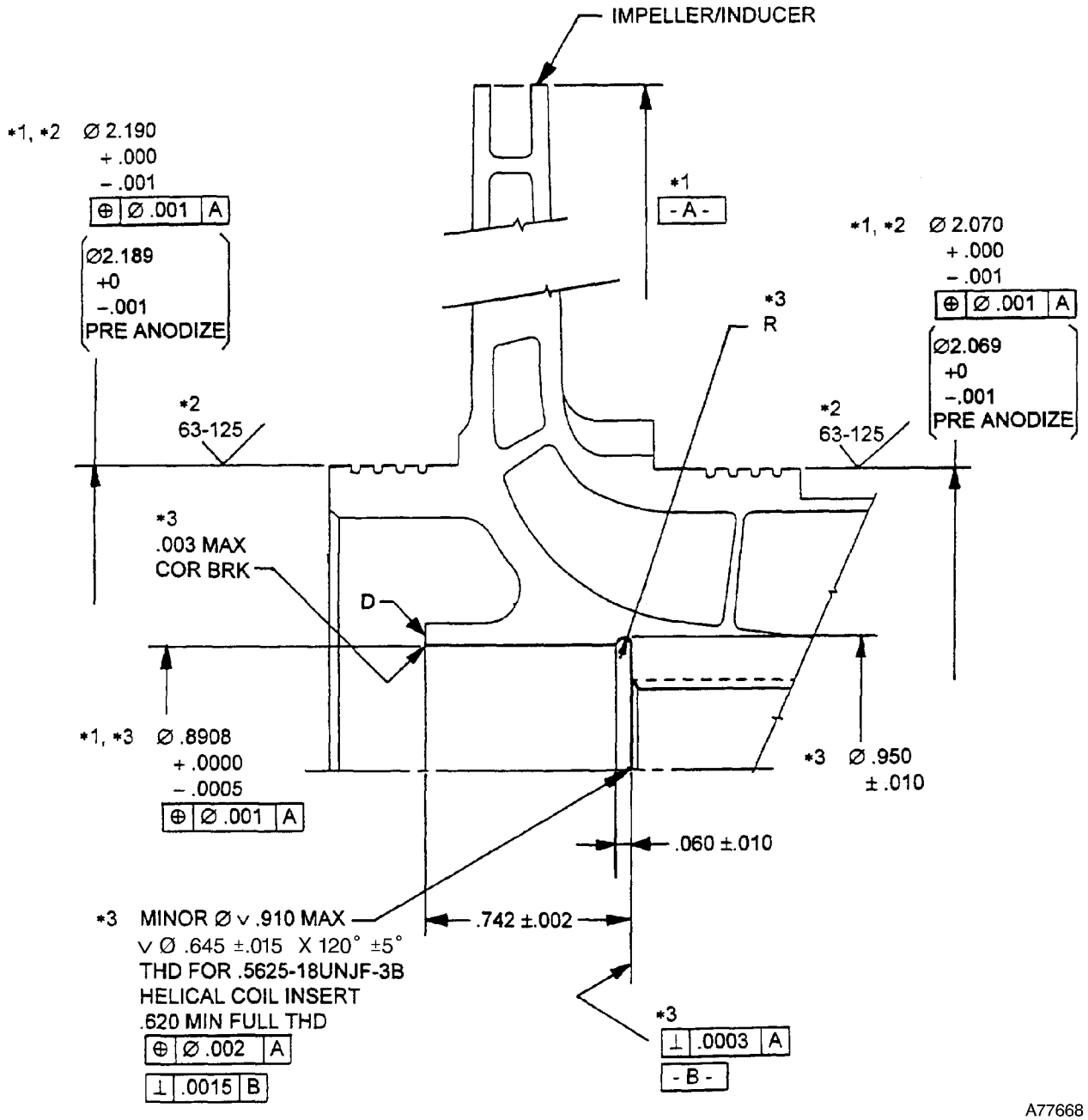
J. Peen impeller/inducer on surface D of Figure 3 of Modification of Impeller/Inducer in four (4) places to retain sleeve.

K. Finish machine sleeve installed in impeller/inducer according to Figure3.

L. Clean according to Hamilton Sundstrand Standard Practices Manual, Bulletin 985, CLEANING or Cleaning instruction of the appropriate STS CMM in REFERENCE (1).

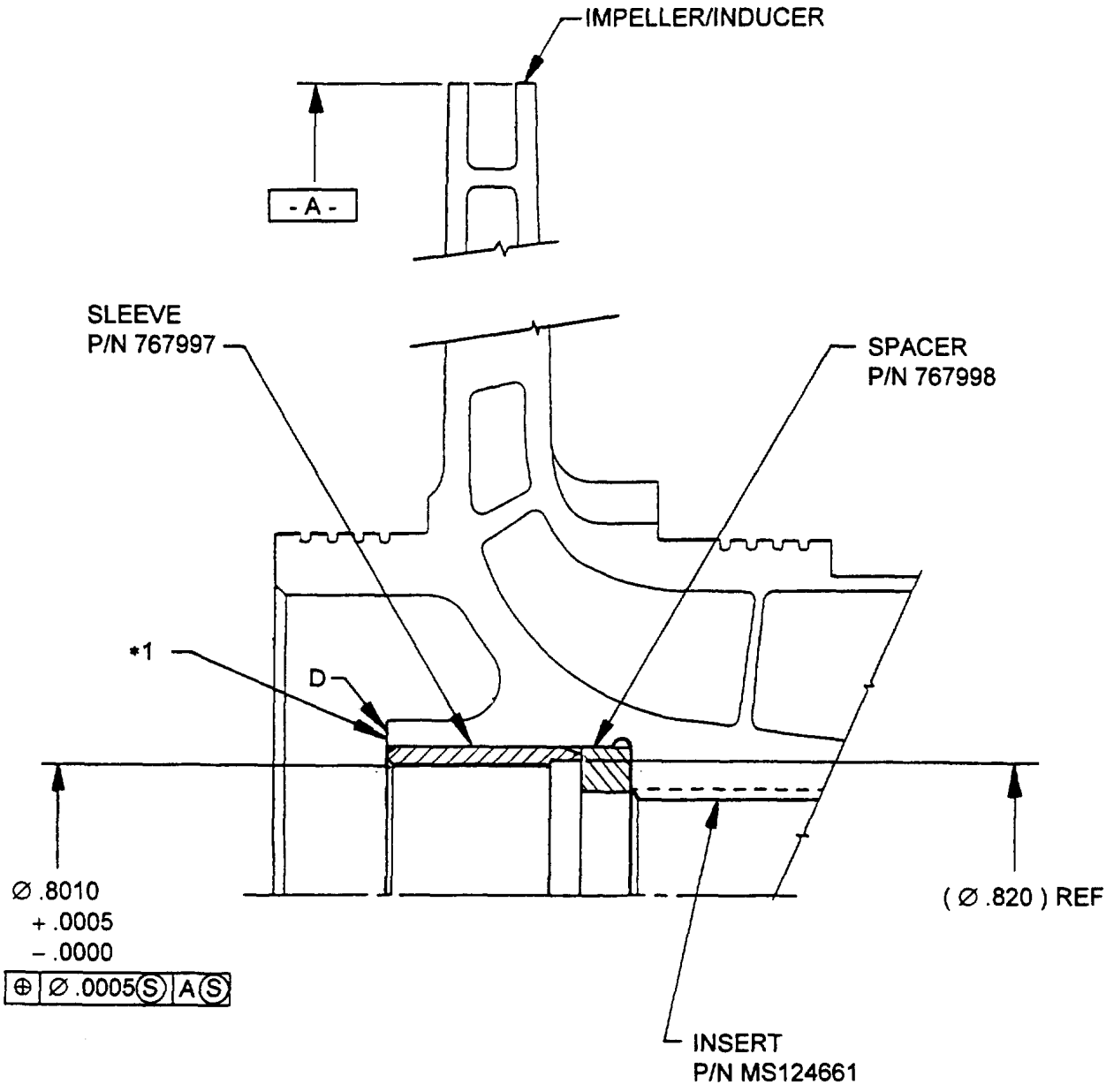
Modification of Impeller/Inducer
Figure 1

NOTE
*1. ALIGN BEFORE MACHINING WITH INDICATED DIAMETERS.
*2. THESE DIMENSIONS ARE APPLIED AFTER ANODIZED PER MIL-A-8625, TYPE 3. DO NOT MACHINE AFTER ANODIZED.
*3. APPLY CHEMICAL FILM PER MIL-C-5541, CLASS 1A.



Modification of Impeller/Inducer
Figure 2

NOTE *1. PEEN FOUR (4) PLACES TO RETAIN SLEEVE, P/N 767997.



Modification of Impeller/Inducer
Figure 3

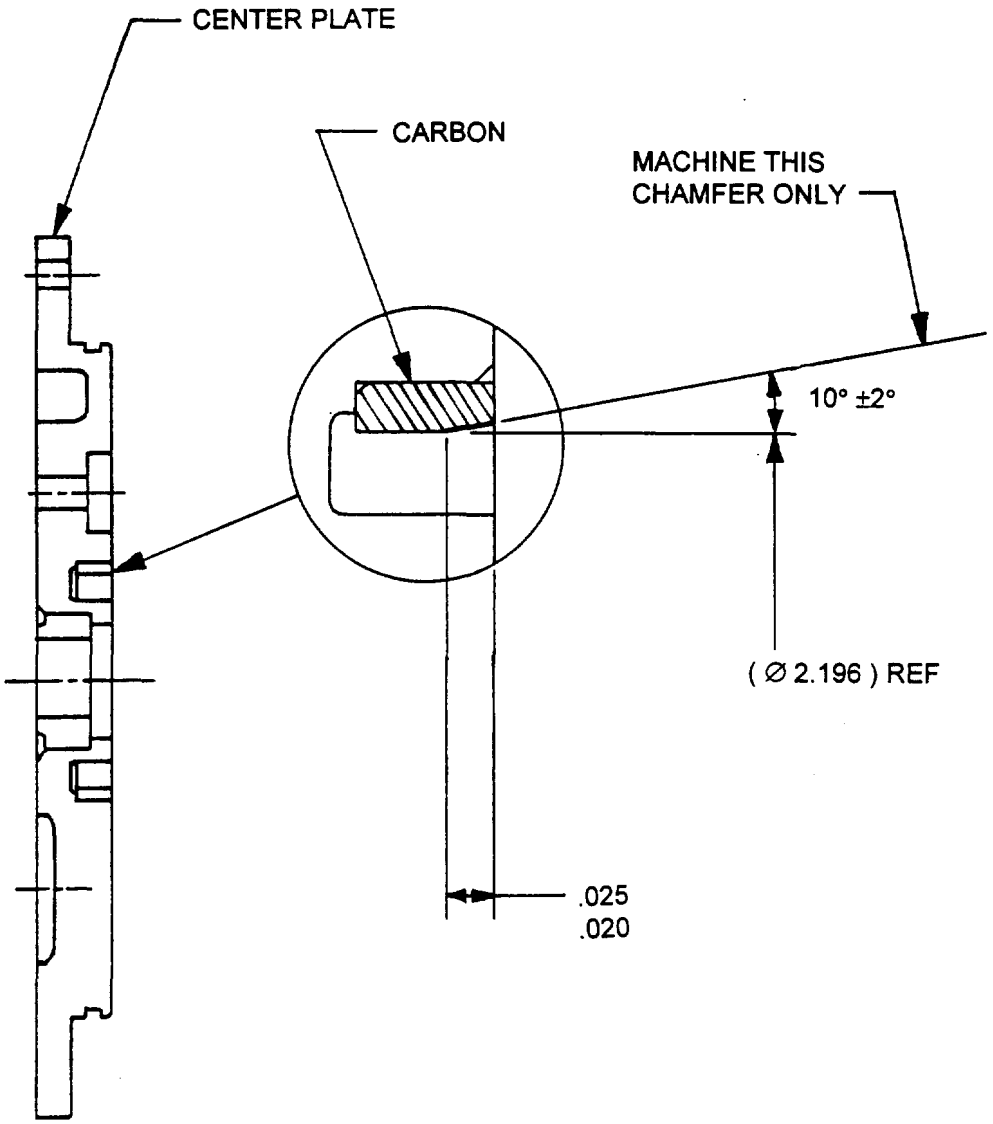
SERVICE BULLETIN

MODIFICATION OF CENTER PLATE ASSEMBLY

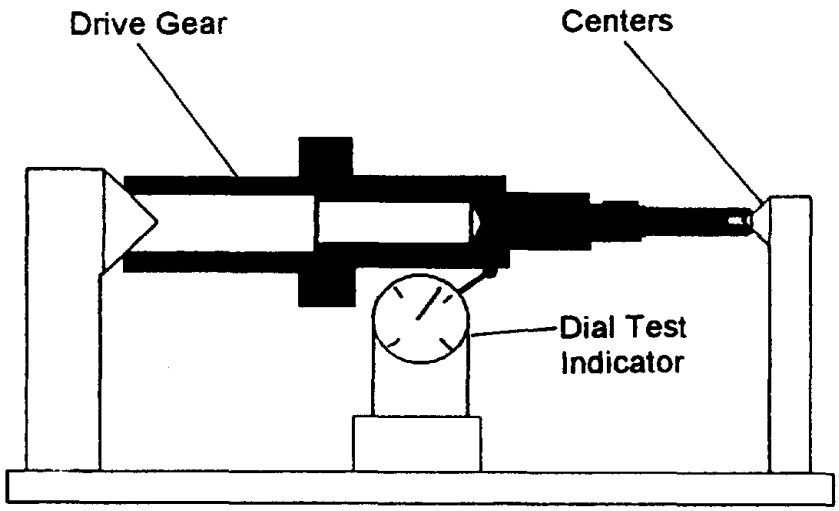
PROCEDURE

A. Machine carbon ring in center plate. (Refer to the Figure 4 of Modification of Center Plate Assembly.)

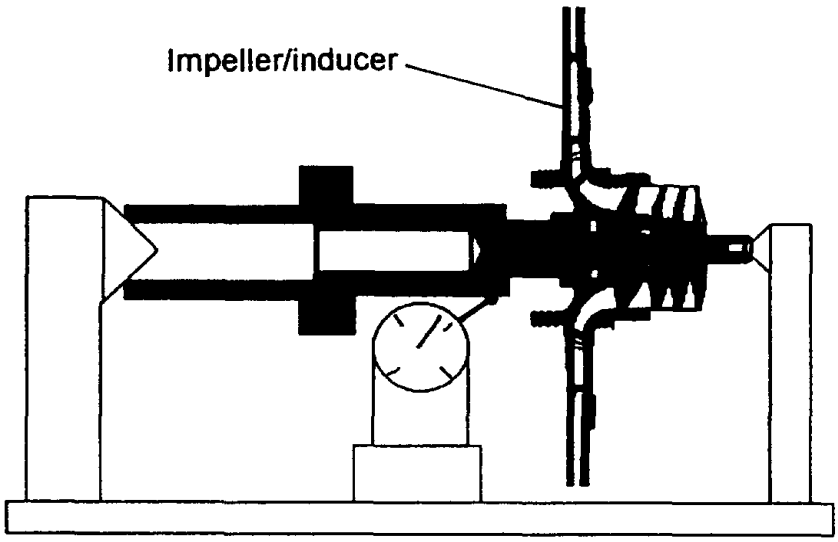
B. Clean according to Sundstrand Standard Practices Manual, Bulletin 985, CLEANING or Cleaning instruction of the appropriate STS CMM in REFERENCE (1).



Modification of Center Plate Assembly
Figure 4



Drive Gear bending inspection
without LP Impeller/inducer installed



Drive Gear bending inspection
with LP Impeller/inducer installed

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Inspection of Drive Gear and Impeller/Inducer
Figure 5

C. ASSEMBLY

CAUTION: APPLY TORQUE PRESCRIBED ON CMM ABOVE RUN ON TORQUE.

Assemble the pump in accordance with approved procedures in CMMs in REFERENCE (1) with a modified or replacement impeller/inducer assembly and center plate assembly.

NOTE : Torque the impeller/inducer assembly to 156 ~ 172 in-lbs above run on torque.

D. IDENTIFICATION

(1) After modification of the impeller/inducer, using a vibro peen or routing, mark out the part number (5008741 or 762726) on the impeller/inducer.

(2) Using a vibro peen or routing, mark the new part number on the impeller/inducer according to below:

CHANGE TO	EXISTING PART NUMBER
768094	5008741 or 762726

(4) Apply a small amount of Vaseline (commercially available), when the O-Rings are installed on the pump.

(5) After re-assembly of the pump, using a vibro peen or routing, mark out the letter following the 7-digit part number and IAE part number marked in the STS P/N and IAE P/N block of the identification plate (570, IPL Figure 1, CMM 73-12-41).

(6) Using a vibro peen or routing, change the letter following the 7-digit part number and IAE part number according to below:

CHANGE TO		EXISTING PART NO.	
TS/STS PART NO.	IAE PART NO.	TS/STS PART NO.	IAE PART NO.
5008735G	N/A	5008735E	5L0067
5008735G	N/A	5008735F	5L0070

E. TEST

Test the MFP assembly according to the applicable CMM.

3. MATERIAL INFORMATION

APPLICABILITY : For each pumps TS/STS P/N 5008735E and 5008735F, that is installed on V2500-A1 engines and the spare pumps to incorporate this Bulletin.

A. KITS ASSOCIATED WITH THIS BULLETIN

None.

B. PARTS AFFECTED BY THIS SERVICE BULLETIN

NEW P/N	QTY PER UNIT	UNIT LIST PRICE	KEYWORD	OLD P/N	DISPOSITION/ INSTRUCTION	
768094	1	*	. Impeller/ Inducer Assembly	5008741 or 762726	Modify	(A) (B) (S1) (1D)
MS124661	1	*	. . Helical Coil Insert	MS124661 or MS21209F9-10	Install	(S1)
767998	1	*	. . Spacer	763417 or 762724	Install	(S1)
767997	1	*	. . Sleeve	762809 or 762723	Install	(S1)
5009027	1	(*)	. Center Plate Assembly	5009027	Modify	(1D)

NOTE: * Contact the Hamilton Sundstrand's Business Operations Manager for the information concerning prices and lead time.

C. DISPOSITION/INSTRUCTION CODE STATEMENT

(A) New part is currently available.

(B) Old part is no longer available for sale.

(S1) New parts coded (S1) must replace old parts coded (S1) in a COMPLETE SET per Unit.

(1D) New part is obtained by rework of old part by this Service Bulletin incorporation.

SERVICE BULLETIN

NO. 5009913-73-005

ENGINE - FUEL AND CONTROL - MODIFICATION OF LP/HP FUEL PUMPS IMPELLER/INDUCER AND CENTER PLATE

1. PLANNING INFORMATION

A. EFFECTIVITY

(1) Aircraft: A319, A320, A321

(2) Engines: V2500-A5 Engine

(3) Pumps :

INTERNATIONAL AERO ENGINES (IAE) PART NUMBER	HAMILTON SUNDSTRAND PART NUMBER	
5L0050	5009913B	(Note 1)
5L0068	5009913C	(Note 1)
5L0071	5009913D	(Note 2)
5L0071	5009913E	(Note 3)

NOTE 1: This service bulletin must be incorporated after or concurrently with Service Bulletin STS-73-001 (Replacement of LP/HP Fuel Pumps, Face Seal Assembly and O-Rings).

NOTE 2: Service Bulletin STS-73-001 (Replacement of LP/HP Fuel Pumps, Face Seal Assembly and O-Rings) and Service Bulletin STS-73-002 (Modification of LP/HP Fuel Pumps, Impeller/Inducer) have been incorporated into noted pump.

NOTE 3: If Service Bulletin 73-004 (Replacement of LP/HP Fuel Pump Bearings) has been incorporated into noted pump.

B. REASON

(1) Product Improvement:

This service bulletin introduces a product improvement that will reduce impeller wear and increase service life of the pump.

(2) Background:

V2500-A1 Main Fuel Pumps, similar in design to V2500-A5 Pumps, have experienced impeller wear and shaft failures. Service Bulletin STS-73-002 addressed this wear and shear problem but if not correctly machined still resulted in some shears. A service bulletin was introduced to eliminate these later shears on the A1 Pump. This service bulletin introduces those improvements to the A5 Pump. To date, no failures have occurred on V2500-A5 Pumps, but some wear has been seen on high-time pumps.

(3) Objective:

(a) To incorporate changes required on the referenced V2500-A1 pump as a product improvement to the V2500-A5 pump.

(b) The helical coil insert should be replaced with a non-locking helical coil insert to reduce the run-on torque and reduce the installation bending loads.

(c) The impeller to gear shaft pilot clearance should be increased to avoid interference with the shoulder during installation.

(d) The washer (spacer) should be replaced with an improved washer (spacer), which is made from improved material to increase the compressive strength, smaller inside diameter to increase the contact area and tighter parallelism to reduce the installation-bending load.

(e) In order to ensure the proper clamping loads of the impeller onto the gear at all conditions, the installation torque must be applied above run-on torque. The manual has been changed to reflect this.

(f) The impeller/drive gear assembly should be inspected for differential run-out, with and without the impeller attached, to eliminate shaft shear during operation.

C. DESCRIPTION

(1) This service bulletin gives instructions necessary to modify the impeller and to inspect the impeller/drive gear assembly on centers and assemble the LP/HP Fuel Pump with the modified impeller/inducer assembly.

(2) This service bulletin describes two options to accomplish the modification of the LP/HP Fuel Pump.

(a) Option 1: Operators who wish to accomplish the modification and inspection in the shop by modifying/replacing any impeller/inducer that proves to be suspect.

(b) Option 2: Operators who wish to have the modification accomplished by Hamilton Sundstrand.

D. APPROVAL

This service bulletin has been technically agreed by IAE.

E. COMPLIANCE

NOTE: This service bulletin supersedes Service Bulletin STS-73-002.

Category Code 6

(a) For all pumps 5009913B/C (serial numbers prior to 3150), not modified according to Service Bulletin STS-73-002, this service bulletin should be accomplished at pump first shop visit after 8,000 hours total operating time.

(b) For all pumps 5009913D/E that have been modified according to Service Bulletin STS-73-002, this service bulletin should be accomplished at pump first shop visit after 12,000 hours total operating time after incorporation of Service Bulletin STS-73-002.

(c) For all pumps 5009913E with serial number 3150 and subsequent, this service bulletin should be accomplished at pump first shop visit after 12,000 hours total operating time.

F. MANPOWER

Approximately 10.0 man-hours will be required to perform this modification.

G. MATERIAL - PRICE AND AVAILABILITY

(1) Description of Product Improvement:

(a) Price for the modification:

1 For all pumps 5009913B/C (serial numbers prior to 3150), not modified according to Service Bulletin STS-73-002, the cost to modify the impeller/inducer will be $8,000 until **July 25, 2003.**

2 For all pumps 5009913D/E that have been modified according to Service Bulletin STS-73-002, the cost to modify the impeller/inducer will be $4,000 until **July 25, 2003.**

3 For all pumps 5009913E with serial number 3150 and subsequent, the cost to modify the impeller/inducer will be $8,000 until **July 25, 2003.**

(2) Availability:

(a) Option 1:

Operators who wish to accomplish the modification in the shop:

New parts required to accomplish this service bulletin are listed in Section 3.

Material Information is available at prices and lead-time indicated. An order for spare parts should be addressed to:

Hamilton Sundstrand
4747 Harrison Avenue. P. O. Box 7002
Rockford, Illinois 61125-7002 U. S. A.
(Attention of Manager, Business Operations, Department No. 890-6)
Telephone: 1-800-622-3199 or 815-226-6481
Fax: 815-226-2624

(b) Option 2:

Operators who wish to have the modification accomplished by Hamilton Sundstrand:

Accomplishment of this service bulletin will be completed based on Hamilton Sundstrand standard terms and prices of sale pertaining to commercial contract. Contact the Hamilton Sundstrand Business Operations Manager as listed above.

H. TOOLING PRICE AND AVAILABILITY

No additional tooling other than that required for shop maintenance of the LP/HP Fuel Pump is required to accomplish this service bulletin.

I. WEIGHT AND BALANCE

None.

J. ELECTRICAL LOAD DATA

Not affected.

K. REFERENCES

(1) Hamilton Sundstrand Component Maintenance Manual (CMM) 73-18-41.

(2) Hamilton Sundstrand Standard Practices Manual (SPM) Bulletin 985.

(3) IAE Engineering Change No. 97VI014.

(4) IAE Service Bulletin No. 73-0143.

L. OTHER PUBLICATIONS AFFECTED

Hamilton Sundstrand CMM 73-18-41 will be revised to incorporate this service bulletin.

2. ACCOMPLISHMENT INSTRUCTIONS

A. DISASSEMBLY

Disassemble the pump in accordance with approved procedures in CMM 73-18-41 to the extent necessary to get the impeller/inducer (340 or -340A, IPL Figure 1, CMM 73-18-41), the center plate assembly (370 or -370A), and the drive gear (500).

B. MODIFICATION

(1) Modify the impeller/inducer (340 or –340A, IPL Figure 1, CMM 73-18-41). Refer to Figures 1, 2, and 3 of this service bulletin.

(2) If the impeller/inducer is damaged to the extent that modification is not possible, replace impeller/inducer assembly according to the following:

REPLACE WITH		EXISTING P/N	APPLICATION FOR PUMPS	
P/N	KEYWORD		HAMILTON SUNDSTRAND P/N	IAE P/N
768093	Impeller/ Inducer Assembly	5009951 or 762725	5009913B 5009913C 5009913D 5009913E	5L0050 5L0068 5L0071 5L0071

(3) Identify modified impeller/inducer according to paragraph 2.E.(1) and 2.E.(2).

(4) Modify the center plate assembly (370 or –370A, IPL Figure 1, CMM 73-18-41). Refer to Figure 4 of this service bulletin.

(5) Clean up the shoulder and adjacent radius on the gear that interfaces with the impeller spacer (often has aluminum particles attached.)

C. INSPECTION

(1) Assemble the drive gear on centers and measure the run-out of the journal nearest the impeller/inducer mounting thread according to Figure 5 of this service bulletin.

(2) Attach the impeller/inducer to 170 pound-inches (19.3 Newton meters) torque above run-on torque and repeat step (1).

(3) If the run-out in step (2) is greater than step (1) by 0.0007 inch (0.0178 millimeter), replace the impeller/inducer and repeat the above.

(4) If another impeller/inducer is not available, machine out the impeller sleeve inside diameter to 0.8015 inch (20.3581 millimeter) maximum and repeat steps (1) to (3).

(5) If the run-out is still bad, repeat steps (1) to (3) with a drive gear from another matched set or another impeller. If the run-out is consistently bad, remove sleeve and washer and remachine bore and shoulder concentric and perpendicular to the thread. Repeat above. If the run-out is satisfactory with the different drive gear, then return the original gear set to Hamilton Sundstrand for investigation.

PROCEDURE

A. If Service Bulletin STS-73-002 has been incorporated, machine the sleeve to a thickness of approximately 0.010-inch to allow removal. Remove spacer and helical coil insert. Run a tap through the thread several times to clean it up. The thread must be loose.

B. Machine the impeller inducer (refer to Figure 2 of this bulletin).

C. Visually check labyrinth surface finish. If it is more than 32 micro inch (0.813 micrometer) Ra, or if it is already worn and anodize has been removed, do not perform steps C. and F.

D. Machine off anodized layer of two labyrinth outside diameters to diameters in Figure 2 of this service bulletin to roughen it up to 63-125 micro inch (1.600 to 3.175 micrometer) Ra finish.

E. Perform local fluorescent penetrant inspection according to SPM Bulletin 985, CHECK.

F. Apply chemical film to reworked surfaces according to MIL-C-5541, TYPE 1A except two labyrinth outside diameters.

CAUTION: DO NOT MACHINE TWO LABYRINTH OUTSIDE DIAMETERS AFTER ANODIZED ACCORDING TO MIL-A-8625, TYPE 3.

G. Anodize two labyrinth outside diameters according to MIL-A-8625, TYPE 3 (Refer to Figure 2 of this service bulletin) to build up 0.001 to 0.002 inch (0.026 to 0.050 millimeter) diameter.

H. Install helical coil insert (P/N MS124661) 1 to 1-1/2 pitches below the entering surface, taking care not to damage the entering surface, and install spacer (P/N 767998).

NOTE: Helical diameter is now larger than spacer inside diameter.

I. Perform inspection for run-out [refer to paragraphs 2.C.(1) through 2.C.(3) of this bulletin]. Remachine surface E of Figure 2 until run-out is satisfactory.

CAUTION: DO NOT HEAT IMPELLER/INDUCER TO MORE THAN 400 DEGREES FAHRENHEIT (240 DEGREES CELCIUS).

J. Heat impeller/inducer and cool sleeve (P/N 767997) as required to obtain a temperature differential of at least 350 degrees Fahrenheit (177 degrees Celsius) between the impeller and sleeve.

K. Install sleeve to be flush 0.000 to 0.005 inch (0.000 to 0.1270 millimeter) below surface D of Figure 3 of this service bulletin. Allow impeller/inducer to cool to room temperature.

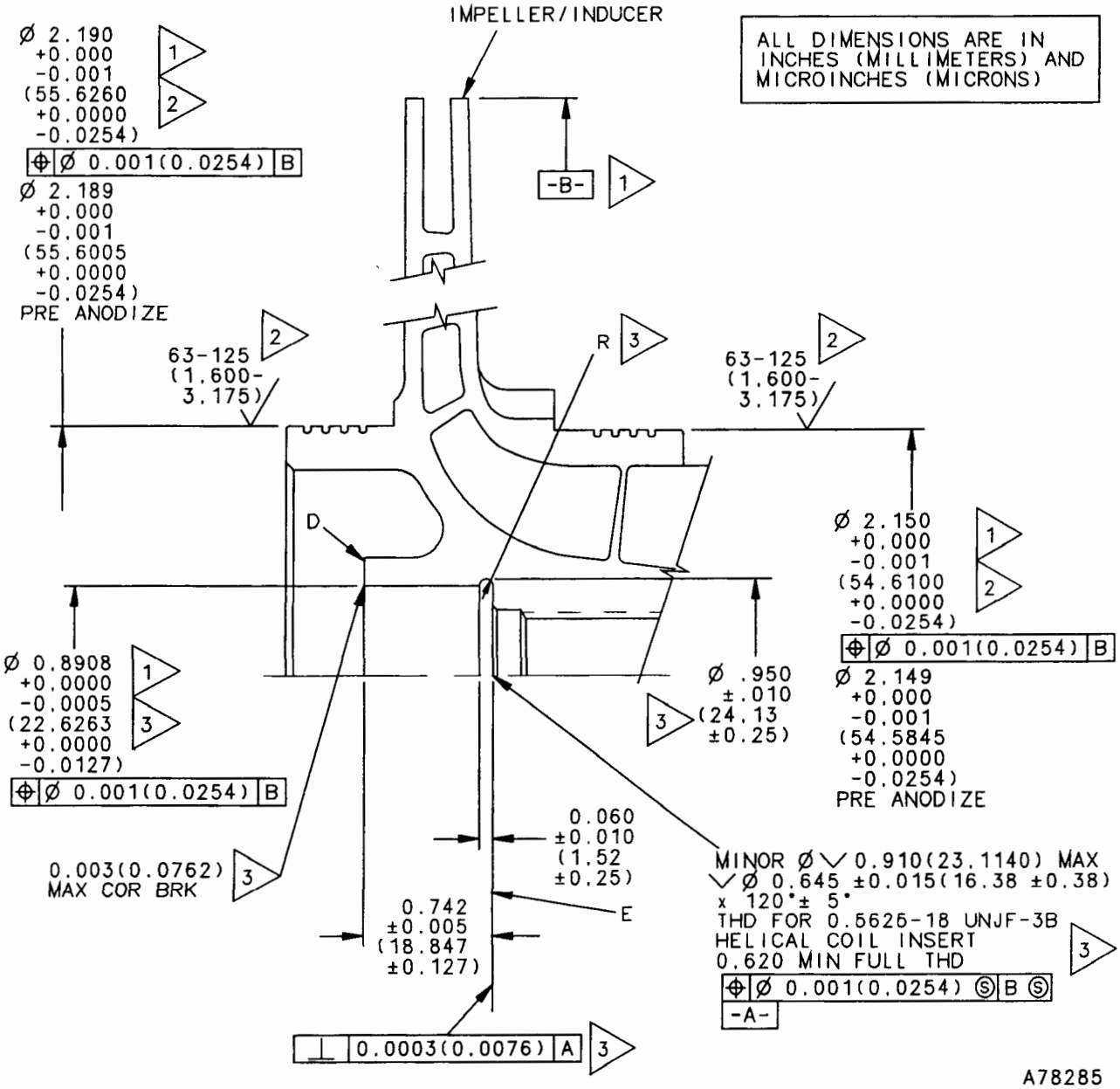
L. Peen impeller/inducer on surface D of Figure 3 of this service bulletin in four places to retain sleeve.

M. Finish machine sleeve installed in impeller/inducer according to Figure 3 of this service bulletin.

N. Clean according to SPM Bulletin 985, CLEANING or CMM 73-18-41, CLEANING.

Modification of Impeller/Inducer
Figure 1

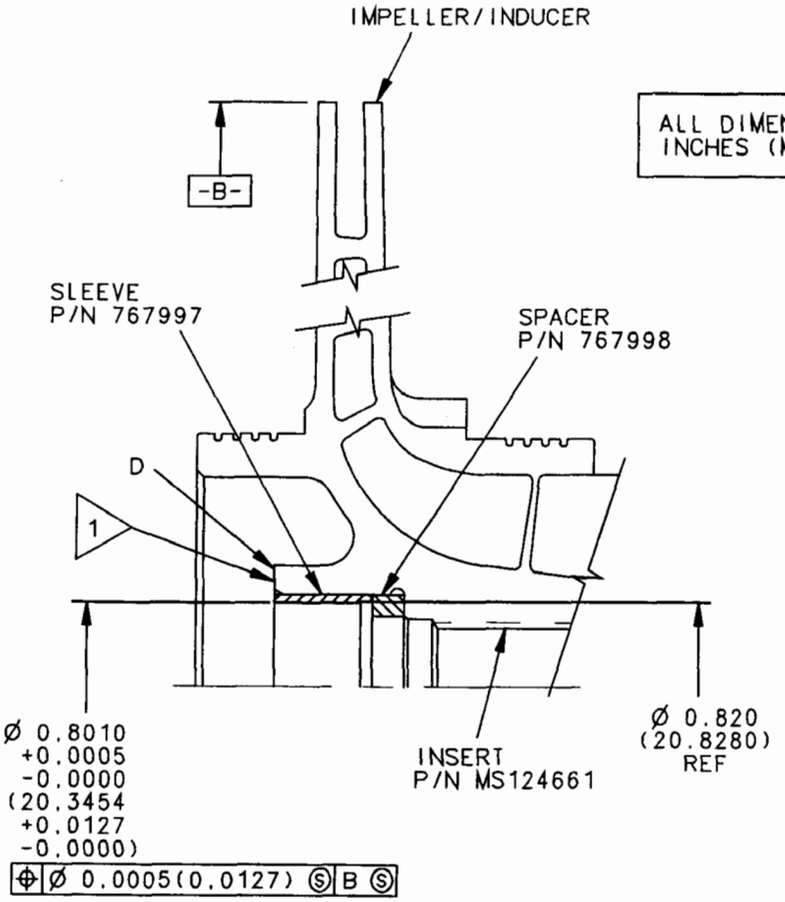
SERVICE BULLETIN



NOTES

1. Align before machining with indicated diameters.
2. Noted dimensions applied after anodized per MIL-A-8625, Type 3. Do not machine after anodized.
3. Apply chemical film per MIL-C-5541, Class 1A.

Modification of Impeller/Inducer
Figure 2



NOTE

1. Peen four places to retain sleeve 767997.

Modification of Impeller/Inducer
Figure 3

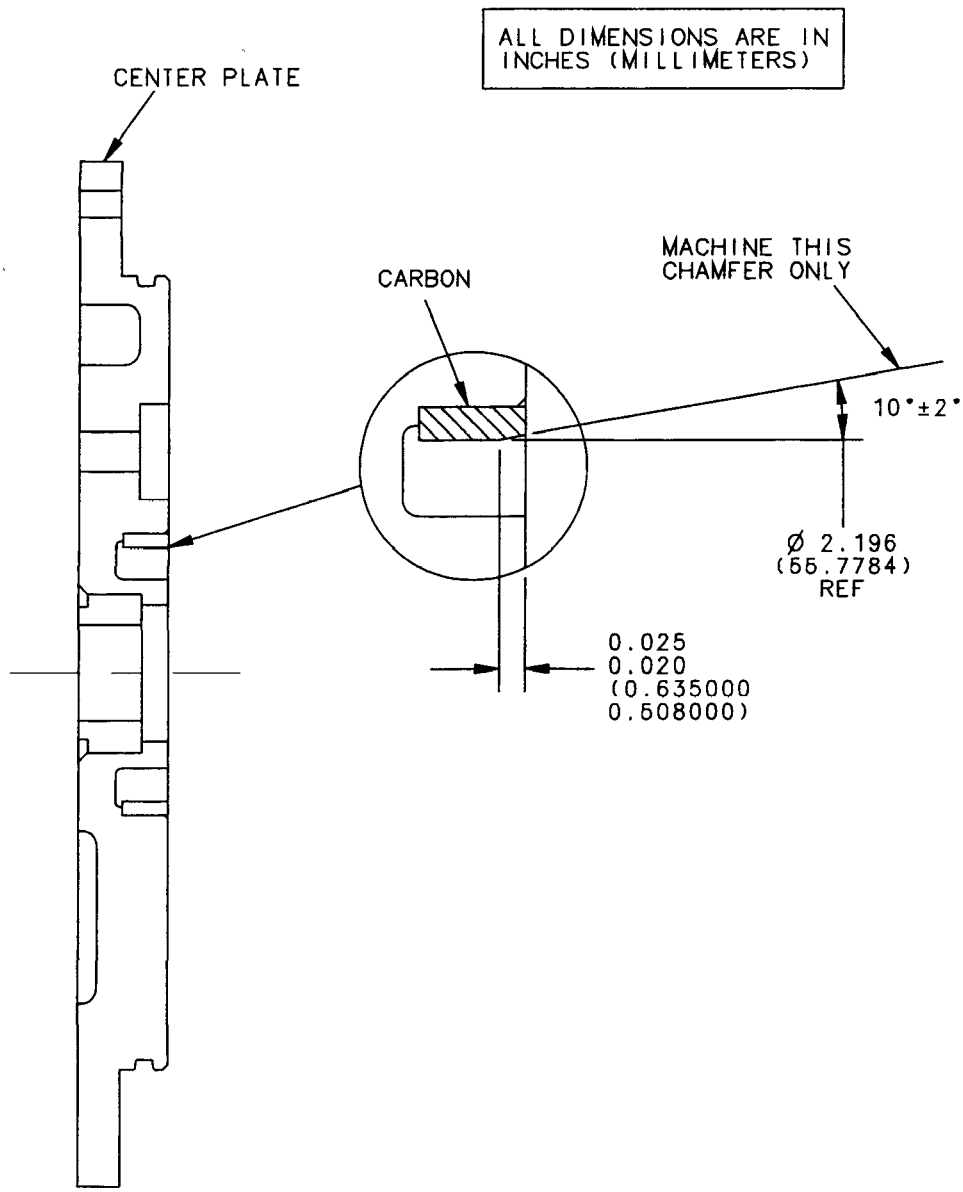
SERVICE BULLETIN

MODIFICATION OF CENTER PLATE ASSEMBLY

PROCEDURE

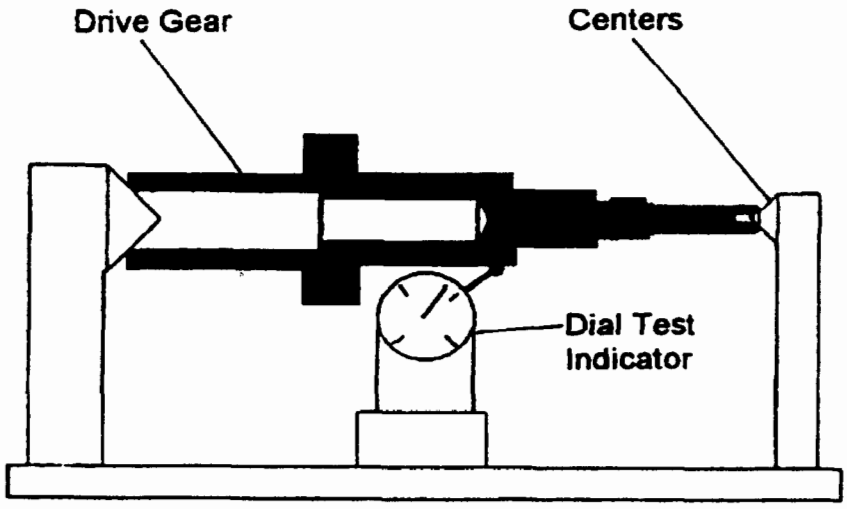
A. Machine carbon ring in center plate. (Refer to Figure 4 of this service bulletin).

B. Clean according to SPM Bulletin 985, CLEANING, or cleaning instruction of CMM 73-18-41.

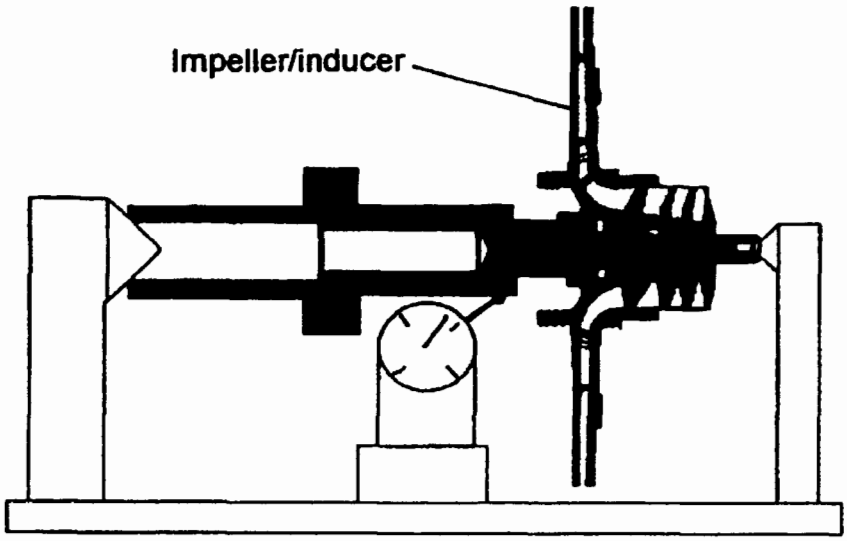


Modification of Center Plate Assembly
Figure 4

INSPECTION OF DRIVE GEAR AND IMPELLER/INDUCER



Drive Gear bending inspection
without LP Impeller/inducer installed



Drive Gear bending inspection
with LP Impeller/inducer installed

Inspection of Drive Gear and Impeller/Inducer
Figure 5

D. ASSEMBLY

CAUTION: APPLY TORQUE PRESCRIBED IN CMM 73-18-41 ABOVE RUN-ON TORQUE.

Assemble the pump in accordance with approved procedures in CMM 73-18-41 with a modified or replacement impeller/inducer assembly and center plate assembly.

NOTE : Torque the impeller/inducer assembly to 156 to 172 pound inches (17.7 to 19.4 Newton meters) above run-on torque.

E. IDENTIFICATION

(1) After modification of the impeller/inducer, using a vibro peen or routing, mark out the part number (5009951 or 762725) on the impeller/inducer.

(2) Using an electric vibro peen or routing tool, mark the new part number on the impeller/inducer according to below:

CHANGE TO	EXISTING PART NUMBER
768093	5009951 or 762725

(4) Apply a small amount of Vaseline (commercially available), or equivalent, when the O-Rings are installed on the pump.

(5) After re-assembly of the pump, using an electric vibro peen or routing tool, mark out the letter following the 7-digit part number marked in the Hamilton Sundstrand P/N block and, if necessary, the IAE part number marked in the IAE P/N block of the identification plate (590, IPL Figure 1, CMM 73-18-41).

(6) Using a vibro peen or routing, change the letter following the 7-digit part number and IAE part number according to below:

CHANGE TO			EXISTING PART NUMBER	
HAMILTON SUNDSTRAND PART NO.		IAE PART NO.	HAMILTON SUNDSTRAND PART NO.	IAE PART NO.
5009913F 5009913F-E	(Note 1) (Note 2)	5L0071	5009913B	5L0050
5009913F 5009913F-E	(Note 1) (Note 2)	5L0071	5009913C	5L0068
5009913F 5009913F-E	(Note 1) (Note 2)	Same	5009913D	5L0071
5009913F		Same	5009913E	5L0071

NOTE 1: If Service Bulletin 5009913-73-004 is incorporated.

NOTE 2: If Service Bulletin 5009913-73-004 is not incorporated.

F. TEST

Test the main fuel pump assembly according to CMM 73-18-41.

3. MATERIAL INFORMATION

APPLICABILITY: For each pump 5009913B/C/D/E that is installed on V2500-A5 engines and the spare pumps to incorporate this service bulletin.

A. KITS ASSOCIATED WITH THIS SERVICE BULLETIN

None.

B. PARTS AFFECTED BY THIS SERVICE BULLETIN

NEW P/N	QTY PER UNIT	UNIT LIST PRICE	KEYWORD	OLD P/N	DISPOSITION/ INSTRUCTION	
(Note 1)	REF	N/A	Pump	5009913B/C/D/E	Modify and reidentify	
768093	1	(Note 2)	. Impeller/ Inducer Assembly	5009951 or 762725	Modify	(A) (B) (S1) (1D)
MS124661	1	(Note 2)	. . Helical Coil Insert	MS124661 or MS21209F9-10	Install	(S1)
767998	1	(Note 2)	. . Spacer	763417 or 762724	Install	(S1)
767997	1	(Note 2)	. . Sleeve	762809 or 762723	Install	(S1)
5009949 5009949A	1	(Note 2)	. Center Plate Assembly	5009949 5009949A	Modify	(1D)

NOTE 1: Refer to IDENTIFICATION paragraph of this service bulletin for pump identification.

NOTE 2: Contact Hamilton Sundstrand's Business Operations Manager for prices and lead-time.

C. DISPOSITION/INSTRUCTION CODE STATEMENT

(A) New part is currently available.

(B) Old part is no longer available for sale.

(S1) New parts coded (S1) must replace old parts coded (S1) in a COMPLETE SET per Unit.

(1D) New part is obtained by rework of old part by this service bulletin incorporation.

SERVICE BULLETIN

NO. 5010216-73-004

ENGINE - FUEL AND CONTROL - MODIFICATION OF LP/HP FUEL PUMPS IMPELLER/INDUCER AND CENTER PLATE

1. PLANNING INFORMATION

A. EFFECTIVITY

(1) Aircraft: Boeing MD-90

(2) Engines: V2500-D5 Engine

(3) Pumps :

INTERNATIONAL AERO ENGINES (IAE) PART NUMBER	HAMILTON SUNDSTRAND PART NUMBER	
5L0069	5010216D	(Note 1)
5L0072	5010216E	(Note 2)

NOTE 1: This service bulletin must be incorporated after or concurrently with Service Bulletin STS-73-001 (Replacement of LP/HP Fuel Pumps, Face Seal Assembly and O-Rings).

NOTE 2: Service Bulletin STS-73-001 (Replacement of LP/HP Fuel Pumps, Face Seal Assembly and O-Rings) and Service Bulletin STS-73-002 (Modification of LP/HP Fuel Pumps, Impeller/Inducer) have been incorporated into noted pump.

B. REASON

(1) Product Improvement:

This service bulletin introduces a product improvement that will reduce impeller wear and increase service life of the pump.

(2) Background:

V2500-A1 Main Fuel Pumps, similar in design to V2500-D5 Pumps, have experienced impeller wear and shaft failures. Service Bulletin STS-73-002 addressed this wear and shear problem but if not correctly machined still resulted in some shears. A service bulletin was introduced to eliminate these later shears on the A1 Pump. This service bulletin introduces those improvements to the D5 Pump. To date, no failures have occurred on V2500-D5 Pumps, but some wear has been seen on high-time pumps.

(3) Objective:

(a) To incorporate changes required on the referenced V2500-A1 pump as a product improvement to the V2500-D5 pump.

(b) The helical coil insert should be replaced with a non-locking helical coil insert to reduce the run-on torque and reduce the installation bending loads.

(c) The impeller to gear shaft pilot clearance should be increased to avoid interference with the shoulder during installation.

(d) The washer (spacer) should be replaced with an improved washer (spacer), which is made from improved material to increase the compressive strength, smaller inside diameter to increase the contact area and tighter parallelism to reduce the installation-bending load.

(e) In order to ensure the proper clamping loads of the impeller onto the gear at all conditions, the installation torque must be applied above run-on torque. The manual has been changed to reflect this.

(f) The impeller/drive gear assembly should be inspected for differential run-out, with and without the impeller attached, to eliminate shaft shear during operation.

C. DESCRIPTION

(1) This service bulletin gives instructions necessary to modify the impeller and to inspect the impeller/drive gear assembly on centers and assemble the LP/HP Fuel Pump with the modified impeller/inducer assembly.

(2) This service bulletin describes two options to accomplish the modification of the LP/HP Fuel Pump.

(a) Option 1: Operators who wish to accomplish the modification and inspection in the shop by modifying/replacing any impeller/inducer that proves to be suspect.

(b) Option 2: Operators who wish to have the modification accomplished by Hamilton Sundstrand.

D. APPROVAL

This service bulletin has been technically agreed by IAE.

E. COMPLIANCE

NOTE: This service bulletin supersedes Service Bulletin STS-73-002.

Category Code 6

(a) For all pumps 5010216D (serial numbers prior to 6033), not modified according to Service Bulletin STS-73-002, this service bulletin should be accomplished at pump first shop visit after 8,000 hours total operating time.

(b) For all pumps 5010216E that have been modified according to Service Bulletin STS-73-002, this service bulletin should be accomplished at pump first shop visit after 12,000 hours total operating time after incorporation of Service Bulletin STS-73-002.

(c) For all pumps 5010216E with serial number 6033 and subsequent, this service bulletin should be accomplished at pump first shop visit after 12,000 hours total operating time.

F. MANPOWER

Approximately 10.0 man-hours will be required to perform this modification.

G. MATERIAL - PRICE AND AVAILABILITY

(1) Description of Product Improvement:

(a) Price for the modification:

1 For all pumps 5010216D (serial numbers prior to 6033), not modified according to Service Bulletin STS-73-002, the cost to modify the impeller/inducer will be $8,000 until **July 25, 2003.**

2 For all pumps 5010216E that have been modified according to Service Bulletin STS-73-002, the cost to modify the impeller/inducer will be $4,000 until **July 25, 2003.**

3 For all pumps 5010216E with serial number 6033 and subsequent, the cost to modify the impeller/inducer will be $8,000 until **July 25, 2003.**

(2) Availability:

(a) Option 1:

Operators who wish to accomplish the modification in the shop:

New parts required to accomplish this service bulletin are listed in Section 3.
Material Information is available at prices and lead-time indicated.
An order for spare parts should be addressed to:

Hamilton Sundstrand
4747 Harrison Avenue. P. O. Box 7002
Rockford, Illinois 61125-7002 U. S. A.
(Attention of Manager, Business Operations, Department No. 890-6)
Telephone: 1-800-622-3199 or 815-226-6481
Fax: 815-226-2624

(b) Option 2:

Operators who wish to have the modification accomplished by Hamilton Sundstrand:

Accomplishment of this service bulletin will be completed based on Hamilton Sundstrand standard terms and prices of sale pertaining to commercial contract. Contact the Hamilton Sundstrand Business Operations Manager as listed above.

H. TOOLING PRICE AND AVAILABILITY

No additional tooling other than that required for shop maintenance of the LP/HP Fuel Pump is required to accomplish this service bulletin.

I. WEIGHT AND BALANCE

None.

J. ELECTRICAL LOAD DATA

Not affected.

K. REFERENCES

(1) Hamilton Sundstrand Component Maintenance Manual (CMM) 73-18-42.

(2) Hamilton Sundstrand Standard Practices Manual (SPM) Bulletin 985.

(3) IAE Engineering Change No. 97VI014.

(4) IAE Service Bulletin No. 73-0143.

L. OTHER PUBLICATIONS AFFECTED

Hamilton Sundstrand CMM 73-18-42 will be revised to incorporate this service bulletin.

2. ACCOMPLISHMENT INSTRUCTIONS

A. DISASSEMBLY

Disassemble the pump in accordance with approved procedures in CMM 73-18-42 to the extent necessary to get the impeller/inducer (370 or -370A, IPL Figure 1, CMM 73-18-42), the center plate assembly (400 or –400A) and the drive gear (530).

B. MODIFICATION

(1) Modify the impeller/inducer (370 or –370A, IPL Figure 1, CMM 73-18-42). Refer to Figures 1, 2, and 3 of this service bulletin.

(2) If the impeller/inducer is damaged to the extent that modification is not possible, replace impeller/inducer assembly according to the following:

REPLACE WITH		EXISTING	APPLICATION FOR PUMPS	
P/N	KEYWORD	P/N	HAMILTON SUNDSTRAND P/N	IAE P/N
768093	Impeller/ Inducer Assembly	5009951 or 762725	5010216D 5010216E	5L0069 5L0072

(3) Identify modified impeller/inducer according to paragraph 2.E.(1) and 2.E.(2).

(4) Modify the center plate assembly (400 or –400A, IPL Figure 1, CMM 73-18-42). Refer to Figure 4 of this service bulletin.

(5) Clean up the shoulder and adjacent radius on the gear that interfaces with the impeller spacer (often has aluminum particles attached.)

C. INSPECTION

(1) Assemble the drive gear on centers and measure the run-out of the journal nearest the impeller/inducer mounting thread according to Figure 5 of this service bulletin.

(2) Attach the impeller/inducer to 170 pound-inches (19.3 Newton meters) torque above run-on torque and repeat step (1).

(3) If the run-out in step (2) is greater than step (1) by 0.0007 inch (0.0178 millimeter), replace the impeller/inducer and repeat the above.

(4) If another impeller/inducer is not available, machine out the impeller sleeve inside diameter to 0.8015 inch (20.3581 millimeter) maximum and repeat steps (1) to (3).

(5) If the run-out is still bad, repeat steps (1) to (3) with a drive gear from another matched set or another impeller. If the run-out is consistently bad, remove sleeve and washer and remachine bore and shoulder concentric and perpendicular to the thread. Repeat above. If the run-out is satisfactory with the different drive gear, then return the original gear set to Hamilton Sundstrand for investigation.

PROCEDURE

A. If Service Bulletin STS-73-002 has been incorporated, machine the sleeve to a thickness of approximately 0.010-inch to allow removal. Remove spacer and helical coil insert. Run a tap through the thread several times to clean it up. The thread must be loose.

B. Machine the impeller inducer (refer to Figure 2 of this bulletin).

C. Measure labyrinth surface finish. If it is more than 32 micro inch (0.813 micrometer) Ra, or if it is already worn and anodize has been removed, do not perform steps C. and F.

D. Machine off anodized layer of two labyrinth outside diameters to diameters in Figure 2 of this service bulletin to roughen it up to 63-125 micro inch (1.600 to 3.175 micrometer) Ra finish.

E. Perform local fluorescent penetrant inspection according to SPM Bulletin 985, CHECK.

F. Apply chemical film to reworked surfaces according to MIL-C-5541, TYPE 1A except two labyrinth outside diameters.

CAUTION: DO NOT MACHINE TWO LABYRINTH OUTSIDE DIAMETERS AFTER ANODIZED ACCORDING TO MIL-A-8625, TYPE 3.

G. Anodize two labyrinth outside diameters according to MIL-A-8625, TYPE 3 (Refer to Figure 2 of this service bulletin) to build up 0.001 to 0.002 inch (0.026 to 0.050 millimeter) diameter.

H. Install helical coil insert (P/N MS124661) 1 to 1-1/2 pitches below the entering surface, taking care not to damage the entering surface, and install spacer (P/N 767998).

NOTE: Helical diameter is now larger than spacer inside diameter.

I. Perform inspection for run-out [refer to paragraphs 2.C.(1) through 2.C.(3) of this bulletin]. Remachine surface E of Figure 2 until run-out is satisfactory.

CAUTION: DO NOT HEAT IMPELLER/INDUCER TO MORE THAN 400 DEGREES FAHRENHEIT (240 DEGREES CELCIUS).

J. Heat impeller/inducer and cool sleeve (P/N 767997) as required to obtain a temperature differential of at least 350 degrees Fahrenheit (177 degrees Celsius) between the impeller and sleeve.

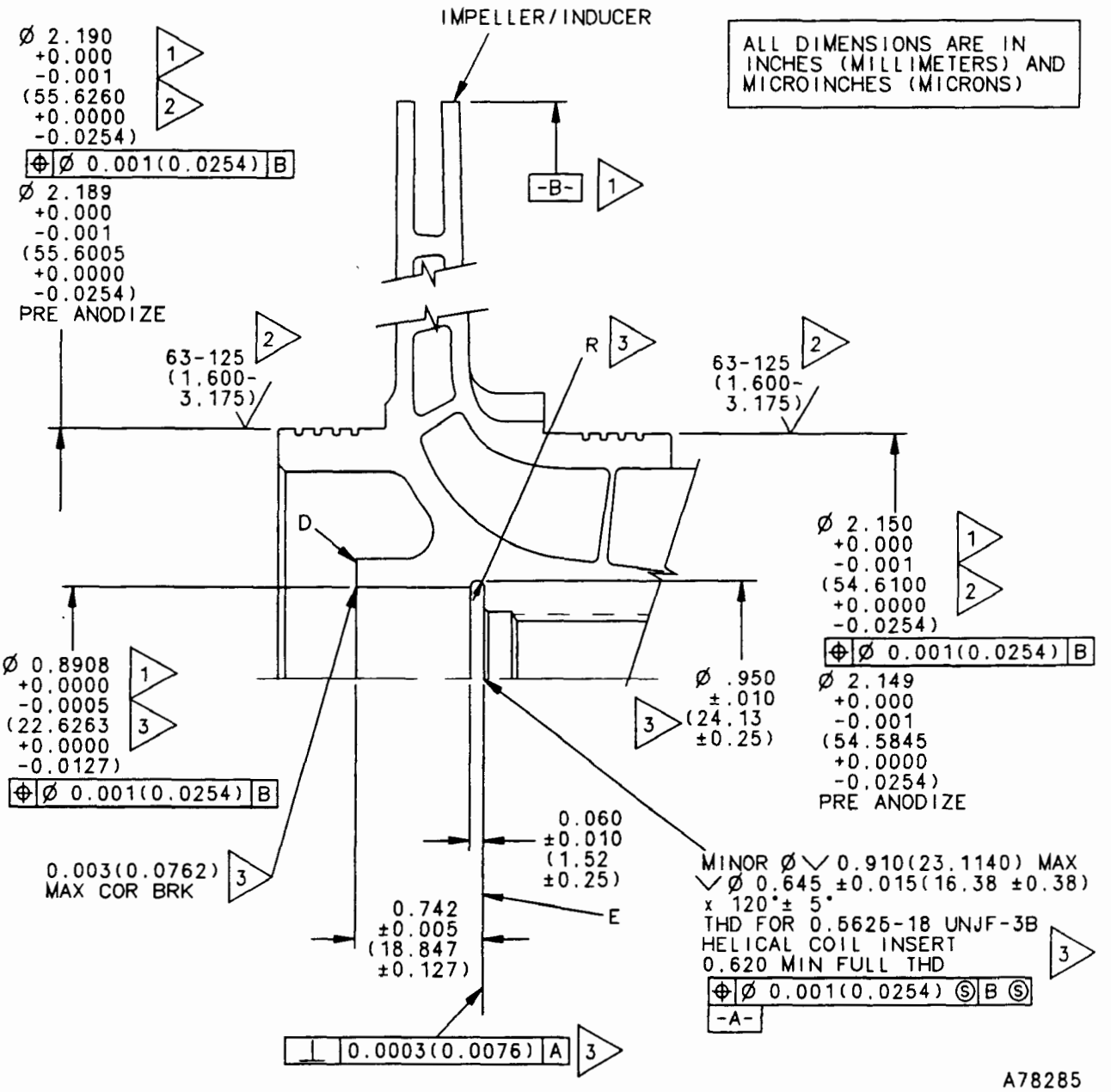
K. Install sleeve to be flush 0.000 to 0.005 inch (0.000 to 0.1270 millimeter) below surface D of Figure 3 of this service bulletin. Allow impeller/inducer to cool to room temperature.

L. Peen impeller/inducer on surface D of Figure 3 of this service bulletin in four places to retain sleeve.

M. Finish machine sleeve installed in impeller/inducer according to Figure 3 of this service bulletin.

N. Clean according to SPM Bulletin 985, CLEANING or CMM 73-18-42, CLEANING.

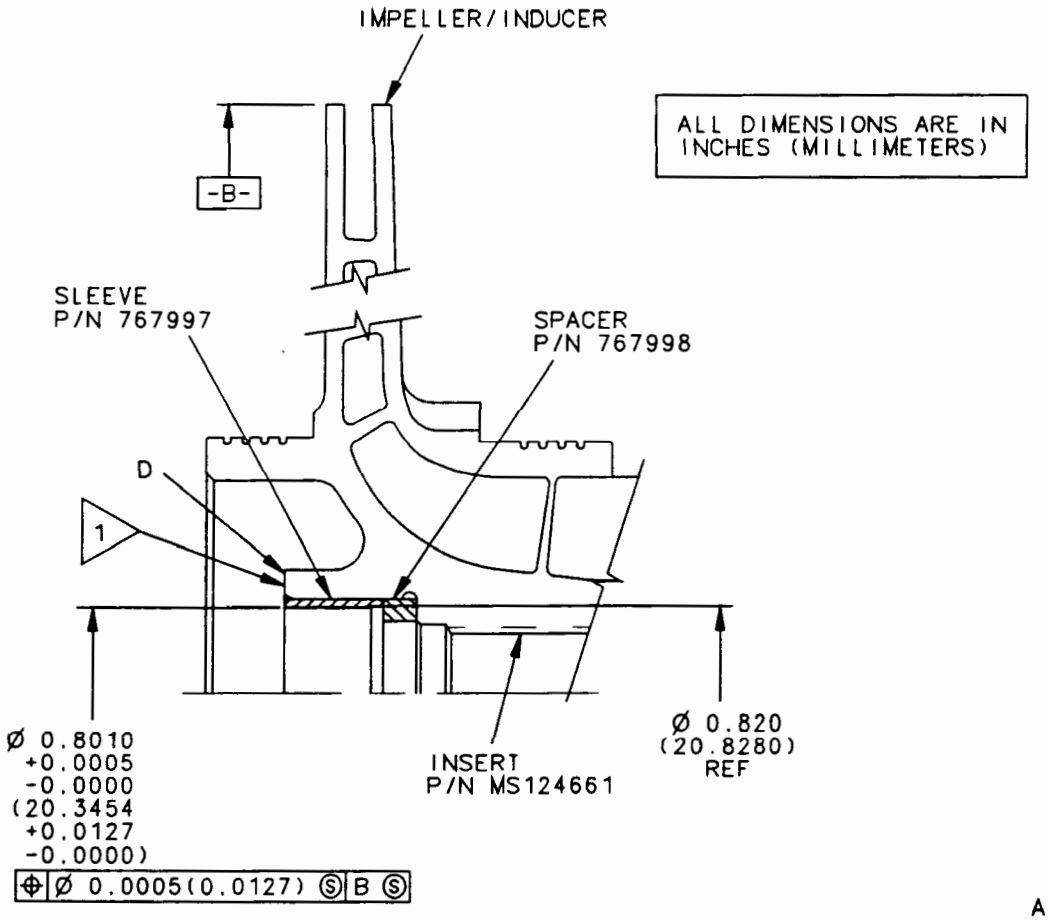
Modification of Impeller/Inducer
Figure 1



NOTES

1. Align before machining with indicated diameters.
2. Noted dimensions applied after anodized per MIL-A-8625, Type 3. Do not machine after anodized.
3. Apply chemical film per MIL-C-5541, Class 1A.

Modification of Impeller/Inducer
Figure 2



NOTE

1. Peen four places to retain sleeve 767997.

Modification of Impeller/Inducer
Figure 3

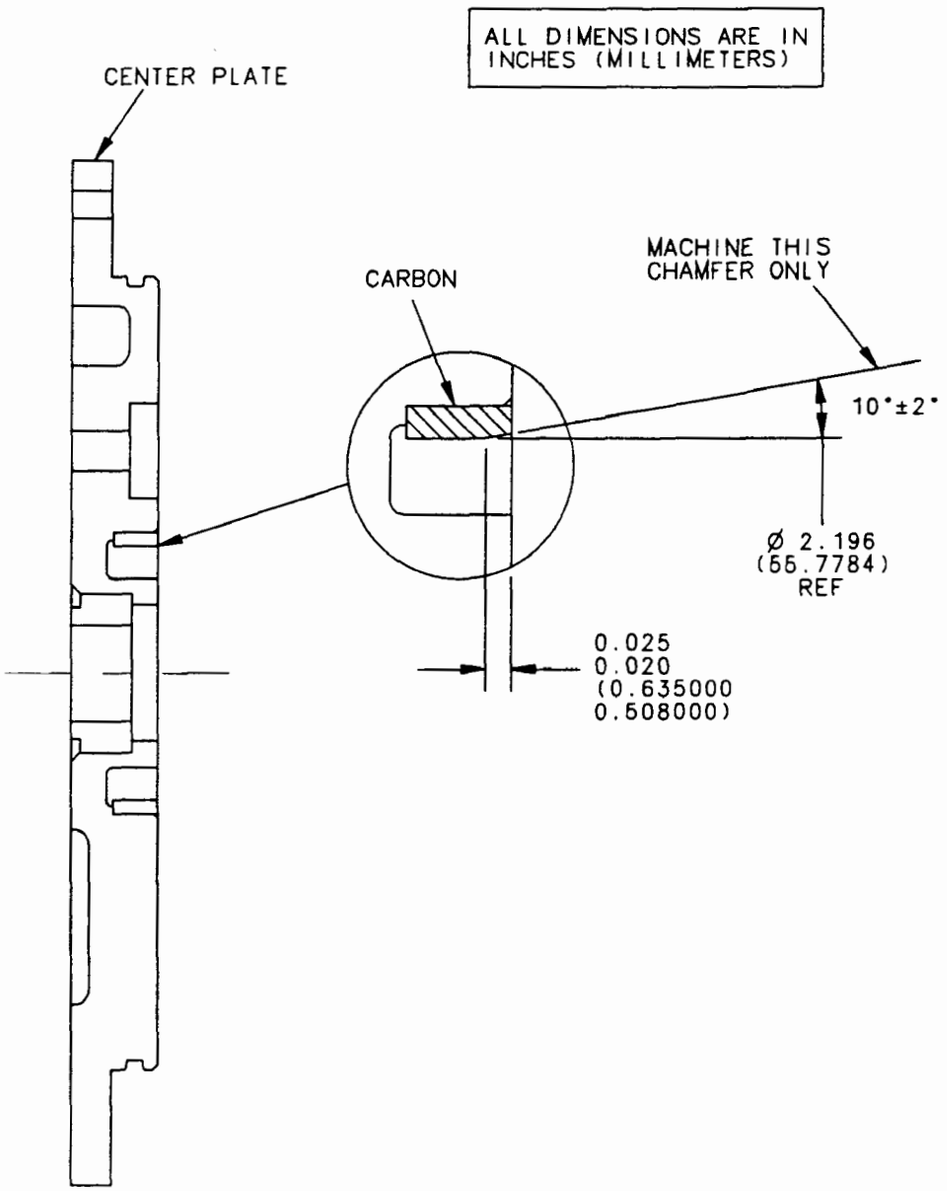
SERVICE BULLETIN

MODIFICATION OF CENTER PLATE ASSEMBLY

PROCEDURE

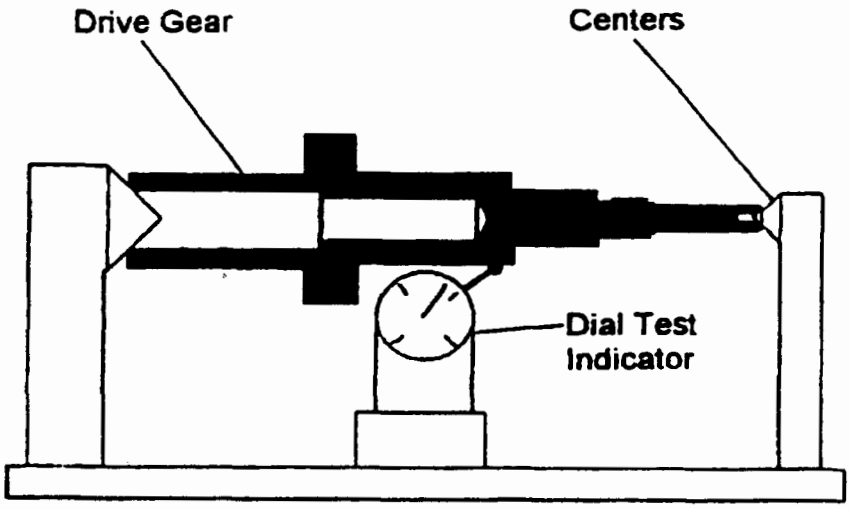
A. Machine carbon ring in center plate. (Refer to Figure 4 of this service bulletin).

B. Clean according to SPM Bulletin 985, CLEANING, or cleaning instruction of CMM 73-18-42.

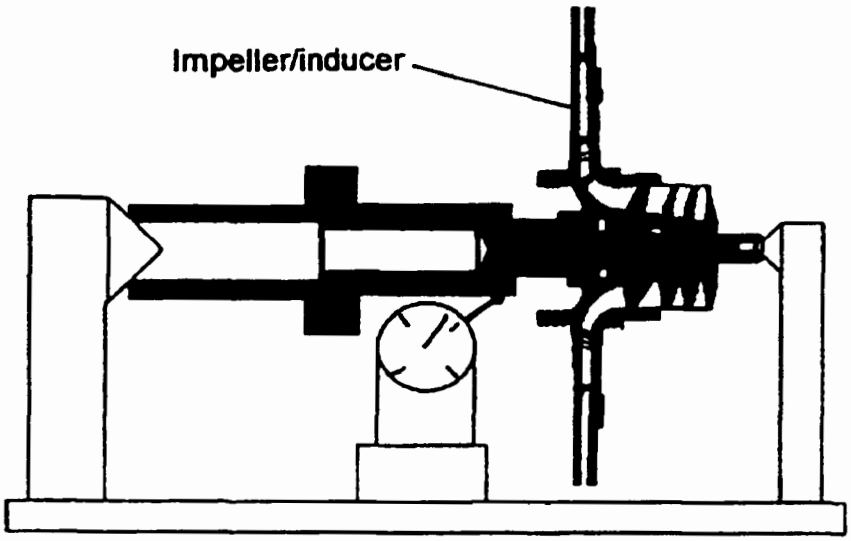


Modification of Center Plate Assembly
Figure 4

INSPECTION OF DRIVE GEAR AND IMPELLER/INDUCER



Drive Gear bending inspection
without LP Impeller/inducer installed



Drive Gear bending inspection
with LP Impeller/inducer installed

Inspection of Drive Gear and Impeller/Inducer
Figure 5

D. ASSEMBLY

CAUTION: APPLY TORQUE PRESCRIBED IN CMM 73-18-42 ABOVE RUN-ON TORQUE.

Assemble the pump in accordance with approved procedures in CMM 73-18-42 with a modified or replacement impeller/inducer assembly and center plate assembly.

NOTE: Torque the impeller/inducer assembly to 156 to 172 pound inches (17.7 to 19.4 Newton meters) above run-on torque.

E. IDENTIFICATION

(1) After modification of the impeller/inducer, using a vibro peen or routing, mark out the part number (5009951 or 762725) on the impeller/inducer.

(2) Using an electric vibro peen or routing tool, mark the new part number on the impeller/inducer according to below:

CHANGE TO	EXISTING PART NUMBER
768093	5009951 or 762725

(4) Apply a small amount of Vaseline (commercially available), or equivalent, when the O-rings are installed on the pump.

(5) After re-assembly of the pump, using an electric vibro peen or routing tool, mark out the letter following the 7-digit part number marked in the Hamilton Sundstrand P/N block and, if necessary, the IAE part number marked in the IAE P/N block of the identification plate (620, IPL Figure 1, CMM 73-18-42).

(6) Using a vibro peen or routing, change the letter following the 7-digit part number and IAE part number according to below:

CHANGE TO		EXISTING PART NUMBER	
HAMILTON SUNDSTRAND PART NO.	IAE PART NO.	HAMILTON SUNDSTRAND PART NO.	IAE PART NO.
5010216F	5L0072	5010216D	5L0069
5010216F	Same	5010216E	5L0072

F. TEST

Test the main fuel pump assembly according to CMM 73-18-42.

3. MATERIAL INFORMATION

APPLICABILITY: For each pump 5010216D and 5010216E that is installed on V2500-D5 engines and the spare pumps to incorporate this service bulletin.

A. KITS ASSOCIATED WITH THIS SERVICE BULLETIN

None.

B. PARTS AFFECTED BY THIS SERVICE BULLETIN

NEW P/N	QTY PER UNIT	UNIT LIST PRICE	KEYWORD	OLD P/N	DISPOSITION/ INSTRUCTION	
5010216F	REF	N/A	Pump	5010216D/E	Modify and reidentify	
768093	1	(Note 1)	. Impeller/ Inducer Assembly	5009951 or 762725	Modify	(A) (B) (S1) (1D)
MS124661	1	(Note 1)	. . Helical Coil Insert	MS124661 or MS21209F9-10	Install	(S1)
767998	1	(Note 1)	. . Spacer	763417 or 762724	Install	(S1)
767997	1	(Note 1)	. . Sleeve	762809 or 762723	Install	(S1)
5009949 5009949A	1	(Note 1)	. Center Plate Assembly	5009949 5009949A	Modify	(1D)

NOTE 1: Contact Hamilton Sundstrand's Business Operations Manager for prices and lead-time.

C. DISPOSITION/INSTRUCTION CODE STATEMENT

(A) New part is currently available.

(B) Old part is no longer available for sale.

(S1) New parts coded (S1) must replace old parts coded (S1) in a COMPLETE SET per Unit.

(1D) New part is obtained by rework of old part by this service bulletin incorporation.