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

International Aero Engines

628 Hebron Avenue, Suite 400
Glastonbury, CT 06033, USA.
Tel: +1 (860) 368-3823
Fax: +1 (860) 755-6876

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V2500-A5 SERIES PROPULSION SYSTEM SERVICE BULLETIN

This document transmits the Revision 3 of Service Bulletin V2500-ENG-73-0208.

Document History

Service Bulletin Revision Status

Initial Issue	Nov.20/08
Revision 1	Jan. 8/09
Revision 2	Aug.10/10

Service Bulletin Revision 3

Remove	Incorporate	Reason for change
All pages of the Service Bulletin.	Pages 1 to 38 of the Service Bulletin.	To revise the instructions for marking the EEC nameplate and software identification plate.
All pages of the Appendix (Parts Progression Charts).	Pages 1 to 6 of the Appendix (Parts Progression Charts).	Revision 3.

CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise IAE International Aero Engines AG

All pages of the Supplement (Prices and Availability).	Page 1 of the Supplement (Prices and Availability).	Revision 3.
All pages of the Supplement (Added Data).	Page 1 to 4 of the Supplement (Added Data).	Revision 3.

SERVICE BULLETIN

ENGINE – FUEL AND CONTROL – PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH A5 SCN20A/Z SOFTWARE

1. Planning Information

A. Effectivity

(1) Airbus A319

(a) V2522-A5, V2524-A5, V2527M-A5 (A5 Standard and A5 SelectOne™ Retrofit Standard)

Engine Serial Nos. – Prior to Serial No. V13155

(b) V2522-A5, V2524-A5, V2527M-A5 (A5 SelectOne™ Production Standard)

Engine Serial Nos. – Prior to Serial No. V15094

(2) Airbus A320

(a) V2527-A5, V2527E-A5 (A5 Standard and A5 SelectOne™ Retrofit Standard)

Engine Serial Nos. – Prior to Serial No. V13155

(b) V2527-A5, V2527E-A5 (A5 SelectOne™ Production Standard)

Engine Serial Nos. – Prior to Serial No. V15094

(3) Airbus A321

(a) V2530-A5, V2533-A5 (A5 Standard and A5 SelectOne™ Retrofit Standard)

Engine Serial Nos. – Prior to Serial No. V13155

(b) V2530-A5, V2533-A5 (SelectOne™ Production Standard)

Engine Serial Nos. – Prior to Serial No. V15094

NOTE: SCN20A/Z is intended for fleetwide incorporation and should be installed on all V2500-A5 Standard, SelectOne™ Production and SelectOne™ Retrofit engines.

B. Concurrent Requirements

Engine models V2527E-A5 and V2533-A5 (Base and Bump Ratings) must have Service Bulletins Reference 5, V2500-ENG-73-0152 and Reference 13, V2500-NAC-71-0206 incorporated prior to or concurrently with this Service Bulletin.

C. Reason

(1) Condition: The aircraft Environmental Control System (ECS) over-pressurization protection valve could activate during slam accelerations on the ground if using the SelectOne engine. A reduction in engine power is required to reset the valve. This problem does not occur for the A5 Baseline engine.

(2) Background: When the engine is commanded to accelerate from take-off pre-setting level of 1.05 EPR to take-off power, the pressure in the 7th stage bleed manifold rises quickly and spikes to the high levels such that the aircraft Pressure Regulating Valve (PRV) can not respond quickly enough. This causes the aircraft (ECS) over-pressurization protection valve to be activated.

(3) Objective: Modify the Engine-7C handling bleed schedule such that it will be kept closed for on-ground accelerations when customer bleed is being extracted. In addition, a derated engine acceleration schedule will be implemented. Both of these changes will be applied to the SelectOne engine configuration only and limited to on-ground conditions during takeoff roll.

(4) Substantiation: The software was designed, developed and certification tested per the guidelines of RTCA DO-178A.

(5) Effects of Bulletin on:

Removal/Installation: None

Disassembly/Assembly: None.

Cleaning: None.

Inspection/Check: None.

Repair: None.

Testing: None.

(6) Supplemental Information

The Added Data section at the end of this Service Bulletin contains the description of the SCN20/Y software changes taken from Reference 11, Service Bulletin ENG-73-0203. This was included since most operators will be upgrading from a pre-SCN20 software standard to the SCN20A/Z standard. By inlcuding this additional data, a complete description of all of the SCN20/Y and SCN20A/Z software modifications can be found in one document.

D. Description

A new Electronic Engine Control is provided with SCN20A/Z software in support of the new SelectOne Production Standard and current A5 configurations.

The SCN20A/Z software is the minimum standard required for V2500-A5 SelectOne Retrofit and SelectOne Production Standard engines.

NOTE: The SCN20/Y standard was provided to support customers taking delivery of SelectOne engines prior to the release of SCN20A/Z.

E. Compliance

For V2500-A5 SelectOne Engines:

Category 4

Accomplish at the first visit of an engine or module to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action or the reason for engine removal.

NOTE: Service Bulletin incorporation on engines installed on aircraft may be desirable and should be individually evaluated

For V2500-A5 Standard Engines:

Category 6

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

F. Approval Data

The part number changes and/or part modifications specified in the Accomplishment Instructions and Material Information sections of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model given.

The compliance statement and the procedures described in this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Model listed.

G. Manpower

For Part A - Replacement or Programming of the EEC by an Authorized Rework Vendor (for Engines Installed on Aircraft)

(1) In Service: 1.9 hours total

For Part B - Programming of the EEC Using Software Loader, PN IAE2P16552 (for Engines Installed on Aircraft)

(1) Prepare EEC for software load: 0.4 hours

(2) Set-up Software Loader, PN IAE2P16552: 0.1 hours

(3) Install EEC software: 0.4 hours

(4) Shut down PN IAE2P16552 after reprogramming: 0.1 hours

(5) Total: 1.0 hours

For Part C - Programming of the EEC Using Software Reprogrammer System, PN IAE3R19290 (for Engines Installed on Aircraft)

(1) Prepare EEC for software load: 0.4 hours

(2) Set-up Software Loader, PN IAE3R19290: 0.1 hours

(3) Install EEC software: 1.0 hours

(4) Total: 1.5 hours

For Part D - Replacement or Programming of the EEC by an Authorized Rework Vendor (for Engines Removed from Aircraft)

(1) At Overhaul: 1.4 hours total

For Part E - Programming of the EEC Using Software Loader, PN IAE2P16552 (for Engines Removed from Aircraft)

(1) At Overhaul: 0.6 hours total

For Part F - Programming of the EEC Using Software Reprogrammer System, PN IAE3R19290 (for Engines Removed from Aircraft)

(1) At Overhaul: 1.2 hours total

H. Weight and Balance

(1) Weight Change

None.

(2) Moment Arm

No effect.

(3) Datum

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

I. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

J. Software Accomplishment Summary

Not Applicable.

K. References

(1) IAE V2500 Service Bulletin V2500-ENG-72-0572 (Engine - Provide The Requirements For Modification To The V2500 SelectOne Production Standard).

(2) IAE V2500 Service Bulletin V2500-ENG-72-0565 (Engine - Provide The Requirements For Modification To The V2500 SelectOne Retrofit Standard).

(3) IAE V2500 Service Bulletin V2500-ENG-72-0285 (Engine - Conversion - Provide Instructions To Change The V2500-A5 Engine Rating By Modifying The Data Entry Plug).

(4) IAE V2500 Service Bulletin V2500-ENG-70-0888 (Engine - Fuel And Control - Electronic Engine Control (EEC) - New Slimline Casting).

(5) IAE V2500 Service Bulletin V2500-ENG-73-0152 (Engine - Introduction Of Longer P2T2 Probe).

(6) IAE V2500 Service Bulletin V2500-ENG-73-0184 (Engine - Fuel And Control - To Provide A New Electronic Engine Control (EEC) With A5 SCN17/V Software).

(7) IAE V2500 Service Bulletin V2500-ENG-73-0185 (Engine - Fuel And Control - EEC150-40 Pressure Burner Sensor Port Screen Deletion).

(8) IAE V2500 Service Bulletin V2500-ENG-73-0189 (Engine - Fuel And Control - To Provide A New Electronic Engine Control (EEC) With A5 SCN18/W Software).

(9) IAE V2500 Service Bulletin V2500-ENG-73-0197 (Engine - Fuel And Control - To Provide A New Electronic Engine Control (EEC) With A5 SCN19/X Software).

(10) IAE V2500 Service Bulletin V2500-ENG-73-0200 (Engine - Fuel And Control - Replacement Of Resistors And Tough-Up Of Solder Joints For Engines With EEC150-40 Electronic Engine Control (EEC) Installed).

(11) IAE V2500 Service Bulletin V2500-ENG-73-0203 (Engine - Fuel And Control - Provide a New Electronic Engine Control (EEC) With A5 SCN20/Y Software).

(12) IAE V2500 Service Bulletin V2500-ENG-70-0832 (Information - Electronic Engine Control (EEC) - Flame Shield Removal for EEC150-1 and EEC150-20).

(13) IAE V2500 Service Bulletin V2500-NAC-71-0206 (Nacelle - Powerplant - Cowl, Air Intake - Rework To Accommodate Longer P2T2 Probe).

(14) Hamilton Sundstrand Service Bulletin EEC-150-20-73-16 (Install Software Identification Plate).

(15) Hamilton Sundstrand Service Bulletin EEC-150-20-73-37 (Incorporation of New Software Configuration: A5 SCN20A/Z).

(16) Hamilton Sundstrand Service Bulletin EEC-150-40-73-27 (Incorporation of New Software Configuration: A5 SCN20A/Z).

(17) Airbus Service Bulletin A320-73-1093 (Engine Fuel and Control FADEC System - Introduce EEC Software Standard "SCN20A/Z on IAE V2500-A5 Engines and Aircraft Modification No. 39483)

(18) IAE V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-00-32.

(19) V2500 Engine Illustrated Parts Catalogues (S-V2500-2IA, S-V2500-2IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA and S-V2500-7IB), Chapter/Section 73-22-34.

(20) IAE V2500 Illustrated Parts Catalogues (S-V2500-2SA, S-V2500-2SB, S-V2500-5SA, S-V2500-5SB, S-V2500-6SA, S-V2500-6SB, S-V2500-7SA, S-V2500-7SB), Chapter/Section 73-22-34.

(21) IAE Standard Practices/Procedures Manual, Chapter/Section 70-10-00.

(22) V2500 Aircraft Maintenance Manual, Chapter/Section 73-22-34.

(23) Internal Reference No. - EC 07VZ020, EC 07VZ020 Memo 4, EC 07VZ020D, IEN
R 10VC023, IEN 10VC057 and EA 11VC209.

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

L. Other Publications Affected

(1) IAE V2500 Illustrated Parts Catalogues (S-V2500-2SA, S-V2500-2SB, S-V2500-5SA, S-V2500-5SB, S-V2500-6SA, S-V2500-6SB, S-V2500-7SA, S-V2500-7SB), Chapter/Section 73-22-34.

(2) IAE V2500 Illustrated Parts Catalogues (S-V2500-2IA, S-V2500-2IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, S-V2500-7IB), Chapter/Section 73-22-34.

M. Interchangeability of Parts

(1) For V2500-A5 Production and Delivered Engines:

R SCN20A/Z is functionally two way interchangeable with SCN19/X.

For the V2500-A5 SelectOne™ Retrofit and SelectOne™ Production Standard:

R SCN20A/Z EEC software standard is the minimum EEC software standard for
R the V2500-A5 Select One™ engines (production and retrofit).

For aircraft installation observe the following: Intermix conditions with engines having any prior software version, crosswing on the same aircraft, are given in Reference 17, Airbus Service Bulletin A320-73-1093.

The new Electronic Engine Control, PN 2A4251, PN 2A4249, PN 2A4253, PN 2A4254, PN 2A4244, PN 2A4245, PN 2A4246, PN 2A4247 and PN 2A4248 must be used with Data Entry Plug Kit Assembly, PN 2A3106, Variants 6, 14, 34, 49, 54, 55 or 59.

The Data Entry Plug Kit Assembly, PN 2A3106, Variants 6, 14, 34, 49, 54, 55 or 59 cannot be used on Non-SelectOne™ V2500-A5 engines.

N. Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

Supplement (Yes)

Added Data (Yes)

2. Material Information

A. Material - Price and Availability

Modification kit is not required.

Contact IAE Spares Parts Sales for the estimated price of new material to do this Service Bulletin when the part modification procedure is used.

Contact IAE Spares Parts Sales for the estimated price of new material to do this Service Bulletin using new replacement parts.

B. Industry Support Program

Not Applicable.

C. The material data that follows is for each engine.

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5
Production Engines:

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
	73-22-34					
01-280	2A4251 (824972 -11-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4191 (824972 -11-016)	(1)(A)(F) (I)(V)

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5
Delivered Engines:

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
	73-22-34					
01-280	2A4251 (824972 -11-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4191 (824972 -11-016)	(1)(A)(F) (I)(V)
01-280	2A4249 (824972 -9-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4179 (824972 -9-016)	(1)(A)(M) (I)(V)
01-280	2A4253 (808050-4 -066)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4028 (808050 -4-062)	(1)(A)(M) (I)(V)
01-280	2A4254 (808050 -5-066)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4029 (808050 -5-062)	(1)(A)(M) (I)(V)

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
01-280	2A4244 (824972 -2-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4030 (824972 -2-016)	(1)(A)(M) (I)(V)
01-280	2A4245 (824972 -3-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4031 (824972 -3-016)	(1)(A)(M) (I)(V)
01-280	2A4246 (824972 -4-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4033 (824972 -4-016)	(1)(A)(M) (I)(V)
01-280	2A4247 (824972 -5-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4034 (824972 -5-016)	(1)(A)(M) (I)(V)
01-280	2A4248 (824972 -7-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4177 (824972 -7-016)	(1)(A)(M) (I)(V)

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5 SelectOne™ Production Standard Engines:

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
	73-22-34					
01-280	2A4251 (824972 -11-020)	1	Control, Electronic Engine (SCN20A/Z) OR	-	2A4212 (824972 -11-018)	(1)(A)(F) (I)(V)
01-280	2A4249 (824972-9-020)	1	Control, Electronic Engine (SCN20A/Z) OR	-		(M1)(V)
01-280	2A4253 (808050-4-066)	1	Control, Electronic Engine (SCN20A/Z) OR	-		(M1)(V)
01-280	2A4254 (808050-5-066)	1	Control, Electronic Engine (SCN20A/Z) OR	-		(M1)(V)
01-280	2A4244 (824972-2-020	1	Control, Electronic Engine (SCN20A/Z) OR	-		(M1)(V)
01-280	2A4245 (824972-3-020)	1	Control, Electronic Engine (SCN20A/Z) OR	-		(M1)(V)

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
01-280	2A4246 (824972-4-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4247 (824972-5-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4248 (824972-7-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5 SelectOne™ Delivered Engines:

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
	73-22-34					
01-280	2A4251 (824972 -11-020)	1	Control, Electronic Engine (SCN20A/Z)	-	2A4212 (824972 -11-018)	(1)(A)(F) (I)(V)
			OR			
01-280	2A4249 (824972-9-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4253 (808050-4-066)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4254 (808050-5-066)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4244 (824972-2-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4245 (824972-3-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4246 (824972-4-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			

FIG- ITEM NUMBER	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PN	INSTR - DISP
01-280	2A4247 (824972-5-020)	1	Control, Electronic Engine (SCN20A/Z)	-		(M1)(V)
			OR			
01-280	2A4248 (824972-7-020)	1	Control, Electronic Engine (SCN20A/Z)			(M1)(V)

D. Instructions/Disposition Code Statements:

Parts Modification Conditions

(1) The new part can be obtained by modification of the old part as specified in the Accomplishment Instructions.
(2) The new part is a replacement part only, and cannot be obtained by modification of the old part.

Spare Parts Availability

(A) The old part is not available.
(F) The new part will be available on a Full Manufacturing lead time quote basis only.
(M) It is possible to get the new part only by modification.
(M1) It is possible to get the new A5 SelectOne™ part only by modification of an A5 part. Refer to the A5 Material Table for the applicable part number that is modified to this part number.
(V) This is the Hamilton Sundstrand part number.

Cleaning, Inspection and Repair Information

(I) The cleaning, inspection and repair requirements are the same for the old and new part. The applicable engine manuals will be revised.

E. Tooling - Price and Availability

The following equipment is required to accomplish this Service Bulletin for units that are reprogrammed in the field. Units that are returned to Hamilton Sundstrand Support Systems or Maastricht Aachen Airport to incorporate this Service Bulletin will be charged to the operator.

(1) IAE Software Loader, PN IAE2P16552

R NOTE: The IAE software loader must be used with the appropriate reprogramming SD card to accomplish this Service Bulletin. This equipment can be obtained by contacting your Customer Fleet Director.

The reprogramming SD card is referenced in Accomplishment Instructions, Table 2. This reprogramming SD card contains the EEC 150-20/150-40 application code, trims, memory clear utilities and software loader. The reprogramming SD card can be obtained from your Customer Fleet Director.

OR

Hamilton Sundstrand Software Reprogrammer System, PN IAE3R19290 and Hamilton Sundstrand PN AD42600-1, PN AD42600-2 or PN AD42600-3.

NOTE: The Hamilton Sundstrand software reprogrammer system must be used with the appropriate reprogramming diskette to accomplish this Service Bulletin. This equipment can be obtained by contacting your Customer Fleet Director.

The reprogramming diskette is referenced in Accomplishment Instructions, Table 2. This reprogramming diskette contains the EEC 150-20/150-40 application code, trims, memory clear utilities and software loader. The reprogramming diskette can be obtained from your Customer Fleet Director.

(2) EEC 150-20/150-40 Name Plate PN 7513331-1 or modified Name Plate PN 822815-1.

F. Reidentified Parts

Reidentified Parts Data

New PN	Keyword	Old PN
2A4251 (824972-11-020)	Control, Electronic Engine (SCN20A/Z)	2A4212 (824972-11-018)
2A4249 (824972-9-020)	Control, Electronic Engine (SCN20A/Z)	2A4179 (824972-9-016)
2A4251 (824972-11-020)	Control, Electronic Engine (SCN20A/Z)	2A4191 (824972-11-016)
2A4253 (808050-4-066)	Control, Electronic Engine (SCN20A/Z)	2A4028 (808050-4-062)
2A4254 (808050-5-066)	Control, Electronic Engine (SCN20A/Z)	2A4029 (808050-5-062)
2A4244 (824972-2-020)	Control, Electronic Engine (SCN20A/Z)	2A4030 (824972-2-016)
2A4245 (824972-3-020)	Control, Electronic Engine (SCN20A/Z)	2A4031 (824972-3-016)
2A4246 (824972-4-020)	Control, Electronic Engine (SCN20A/Z)	2A4033 (824972-4-016)
2A4247 (824972-5-020)	Control, Electronic Engine (SCN20A/Z)	2A4034 (824972-5-016)

New PN	Keyword	Old PN
2A4248 (824972-7-020)	Control, Electronic Engine (SCN20A/Z)	2A4177 (824972-7-016)

G. Other Material Information Data

Not applicable.

3. Accomplishment Instructions

A. Part A - Replacement or Programming of the EEC by an Authorized Rework Vendor (for Engines installed on Aircraft)

NOTE: Service Bulletin incorporation on engines installed on aircraft may be desirable and should be individually evaluated.

(1) Remove the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

(2) Replace the old EEC with a new one as specified in the Material Information Section.

OR

Send your EEC to one of the authorized rework vendors that follows:

NOTE: Only fully authorized repair facilities are allowed to perform this rework.

The designation by IAE of an authorized rework vendor indicates that the vendor has demonstrated the necessary capability to carry out the rework. However, IAE makes no warranties or representations concerning the qualifications or quality standards of the vendors to carry out the rework, and accepts no responsibility whatsoever for any work that may be carried out by a rework vendor, other than IAE. Authorized rework vendors do not act as agents or representatives of IAE.

(a) Hamilton Sundstrand Corporation

A United Technologies Company

One Hamilton Road

Dock W

Windsor Locks, Ct. 06096-1010

USA

(b) Hamilton Sundstrand Corporation

A United Technologies Company

Worldwide Repair - Maastricht

Maastricht Airport

Horsterweg

6191 RX Beek

The Netherlands

(3) Install the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010. See Table 2 for old and new part numbers.

(4) Recording Instructions

(a) A record of accomplishment is required.

B. Part B - Programming of the EEC Using Software Loader, PN IAE2P16652 (for Engines Installed on Aircraft)

NOTE: Service Bulletin incorporation on engines installed on aircraft may be desirable and should be individually evaluated.

NOTE: The latest software standard may be loaded directly over any prior approved software standard. it is not required to load all the interim software standards.

Reprogramming assistance regarding proper use of Software Loader, PN IAE2P16552 is available from your local IAE representative.

Reprogramming the EEC will clear the fault memory. Fault dump will be automatically stored in the TDS Ranger device that is included with Software Loader, PN IAE2P16552 and may be retrieved at a later time.

NOTE: Disassembly of the EEC is not required.

Data integrity check of the Hamilton Sundstrand supplied software is performed as part of the reprogramming procedure.

A bit-for-bit memory verification test is included as part of the reprogramming procedure.

No functional, thermal cycle, or vibration testing is required for units reprogrammed in accordance with this Service Bulletin.

The EEC can be programmed at room ambient conditions or while it is installed on the engine.

(1) Section 1 - Prepare EEC for Software Load

(a) Open the nacelle and prepare the aircraft for servicing as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

(b) Remove the EEC harness connector from J1, J3, J7 and J9.

If desired, remove the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

(2) Section 2 - Initial Setup of Software Loader, PN IAE2P16552

CAUTION: DO NOT ATTACH YELLOW Y CABLE CONNECTORS TO THE TDS RANGER OR PN IAE2P16552 UNTIL INSTRUCTED OR SOFTWARE LOADING WILL NOT BE SUCCESSFUL.

(a) Make sure the power switch for PN IAE2P16552 is in the OFF position.

(b) Make sure that no cables are connected to the TDS Ranger.

(c) Prepare the TDS Ranger for operation as follows:

Depress the green power button on the TDS Ranger and hold it until the word "Booting" appears at the bottom of the screen. The "V2500 Front End Program" screen will be displayed.

(d) Connect Red Z and Blue X cables as labeled to PN IAE2P16552 and EEC at J1, J3, J7 and J9 connectors.

(e) Connect PN IAE2P16552 to an external power source 120VAC/60Hz or 240VAC/50Hz.

(3) Section 3 - Install EEC Software

Do the steps that follow:

NOTE: The center of the "D-Pad" or the "Enter Key" can be used interchangeably throughout the following procedure.

Step	Action	Result(s)	Additional Information
1	Move the main power switch, labeled "AC POWER INPUT" on PN IAE2P16552, to the ON position.	The orange "AC PWR ON" light will become illuminated.	The orange light means the equipment is powered and ready for use.

2	Connect Yellow Y Cable to PN IAE2P16552 and TDS Ranger as labeled.		System set up is complete.
3	a) Use the "D-Pad" on the TDS Ranger and highlight "Go to Engine Support Program". b) Depress the "Enter Key".	The "V2500 Engine Support Programs" screen will be displayed.	At this screen there will be three options: 1) V2500 Loader. 2) DEP Tester. 3) Administrative Functions.
4	a) Use the "D-Pad" on the TDS Ranger and highlight "V2500 Loader". b) Depress the "Enter Key".	The "V2500 Data Loader" screen will be displayed.	At this screen there will be two options: 1) Load Software. 2) Test equipment and cables.
5	a) Use the "D-Pad" on the TDS Ranger and highlight "Load Software". b) Depress the "Enter Key".	The Document Property Rights Notice will be displayed.	NOTE: YOU MUST AGREE TO THE TERMS AND CONDITIONS OR IT IS NOT PERMISSIBLE TO USE THIS DEVICE.
6	a) To agree to the terms and conditions, use the "D-Pad" to highlight the check box, and depress the "Enter Key". b) Use the "D-Pad" to highlight continue, and depress the "Enter Key".	The "V2500 Data Loader" screen will be displayed with instructions to: 1) Connect all Cables 2) Ensure main power switch is in the ON position.	Cables should already be connected by this time.

7	a) Use the "D-Pad" on the TDS Ranger and highlight "Continue". b) Depress the "Enter Key".	The TDS Ranger will perform an "integrity check". If the check is acceptable, the "V2500 Data Loader Screen" will be displayed with fields to enter Service Bulletin, EEC Serial Number, and Trim Checksum Number.	If cables are not connected properly, a screen will appear which will instruct you to "check cable connections". Check cable connections and select "Retry". If problems persist, disconnect all cables and return to the beginning of this section. NOTE: DURING INTEGRITY CHECK, RED "28 VDC EEC PWR" LIGHT WILL BECOME ILLUMINATED PROVIDING 28VDC TO THE EEC. WHILE RED LIGHT IS ILLUMINATED, DO NOT CONNECT OR DISCONNECT CABLES AT THE EEC.

	8	a) Use the "D-Pad", "Tab Key" and "Key Pad" on TDS Ranger to select a Service Bulletin for the desired software standard, enter last 4 digits of EEC Serial Number and the Trim Checksum Value. b) Use the "D-Pad" on the TDS Ranger to highlight "Continue". c) Depress the "Enter Key". NOTE: THE TRIM CHECKSUM VALUE IS LOCATED IN TABLE 2 FOR THE SOFTWARE YOU ARE INSTALLING.	The "V2500 Data Loader Screen" will be displayed with a blue progress bar, indicating that the software load is in progress. On EEC -40 units, software loading should take approximately 5 - 7 minutes. For EEC -20 units, software loading may take more than 20 minutes.	If the "Incorrect checksum value" appears in red after selecting "Continue", re-enter the correct trim checksum number. NOTE: DURING SOFTWARE LOAD, RED "28 VDC EEC PWR" LIGHT WILL BECOME ILLUMINATED PROVIDING 28VDC TO THE EEC. WHILE RED LIGHT IS ILLUMINATED, DO NOT DISCONNECT CABLES FROM THE EEC. NOTE: IF SERVICE BULLETIN FOR DESIRED SOFTWARE STANDARD IS NOT AVAILABLE IN THE DROP DOWN MENU, GO TO SECTION 8 TO LOAD SOFTWARE INTO THE TDS RANGER. CAUTION: DEPRESSING ANY KEY DURING SOFTWARE LOAD WILL CAUSE THE SYSTEM TO ABORT. IF THIS OCCURS, TURN OFF POWER, DISCONNECT ALL CABLES AND RETURN TO THE BEGINNING OF THIS SECTION.
	9	a) Wait for the software load to finish before pressing any buttons. b) After software load is successful, make note of new PN for EEC. This must be	When loading is complete, "Loading successful" will be displayed with the new part number for the EEC.	If "software load failed" is displayed, verify cable connections and retry.
R		scribed on the EEC. See Table 2 for old and new part numbers.		
R R R R		See Section 9 for marking new EEC part number on the identification plate.		

10	a) Use the "D-Pad" to highlight "Finish". b) Depress the "Enter Key".	The "V2500 Engine Support Programs" screen will be displayed.	Loading has been successful.

(4) Section 4 - Shut down PN IAE2P16552 After Installation of EEC Software

(a) Make sure the power switch for PN IAE2P16552 is in the OFF position and disconnect power cable.

(b) Disconnect Red Z Cable, Blue X Cable and Yellow Y Cable from PN IAE2P16552, EEC and TDS Ranger.

(c) To shut down the TDS Ranger, depress the green power button on the TDS Ranger and hold it until the countdown begins, then let it go. It should take approximately 3 seconds for the countdown to begin. If you hold the power button too long, the TDS Ranger will reset itself.

(d) At the "Power Menu", use the "D-Pad" on the TDS Ranger to highlight "Shutdown".

(e) Depress the "Enter Key" to shutdown the TDS Ranger.

(f) If necessary, install the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

Reconnect harness connectors to EEC J1, J3, J7 and J9 connectors.

(g) Close the nacelle and return the aircraft to service as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

(h) Recording Instructions

(i) A record of accomplishment is required.

(5) Section 5 - Initial Setup for Equipment and Cable Self Test

NOTE: The procedures in Sections 5 thru 7, for equipment and cable self test, are optional.

CAUTION: ALL CABLES ARE CONNECTED TO PN IAE2P16552 FOR THIS TEST. IF CABLES ARE CONNECTED TO EEC, TEST WILL FAIL.

CAUTION: DO NOT ATTACH YELLOW Y CABLE CONNECTORS TO THE TDS RANGER OR PN IAE2P16552 UNTIL INSTRUCTED OR CABLE TEST WILL NOT BE SUCCESSFUL.

(a) Make sure the power switch for PN IAE2P16552 is in the OFF position.

(b) Make sure that no cables are connected to the TDS Ranger.

(c) Prepare the TDS Ranger for operation as follows:

Depress the green power button on the TDS Ranger and hold it until the word "Booting" appears at the bottom of the screen. The "V2500 Front End Program" screen will be displayed.

(d) Connect Red Z cable as labeled to PN IAE2P16552 at connectors Z, J9W and J3W.

(e) Connect Blue X cable as labeled to PN IAE2P16552 at connectors X, J7W and J1W.

(f) Connect PN IAE2P16552 to an external power source 120VAC/60Hz or 240VAC/50Hz.

(6) Section 6 - Test Cables and Equipment

Do the steps that follow:

NOTE: The center of the "D-Pad" or the "Enter Key" can be used interchangeably throughout the following procedure.

Step	Action	Result(s)	Additional Information
1	Move the main power switch, labeled "AC POWER INPUT" on PN IAE2P16552, to the ON position.	The orange "AC PWR ON" light will become illuminated.	The orange light means the equipment is powered and ready for use.
2	Connect Yellow Y Cable to PN IAE2P16552 and TDS Ranger as labeled.		System set up is complete.
3	a) Use the "D-Pad" on the TDS Ranger and highlight "Go to Engine Support Program". b) Depress the "Enter Key"	The "V2500 Engine Support Programs" screen will be displayed.	At this screen there will be three options: 1) V2500 Loader. 2) DEP Tester. 3) Administrative Functions.
4	a) Use the "D-Pad" on the TDS Ranger and highlight "V2500 Loader". b) Depress the "Enter Key".	The "V2500 Data Loader" screen will be displayed.	At this screen there will be two options: 1) Load Software. 2) Test equipment and cables.

5	a) Use the "D-Pad" on the TDS Ranger and select "Test Equipment and Cables". b) Depress the "Enter Key".	The "Data Loader Cable Test Screen" will be displayed with instructions to connect cables.	Cables should already be connected by this time. If not, connect them now.
6	a) Use the "D-Pad" on the TDS Ranger and select "Continue". b) Depress the "Enter Key".	The "Data Loader Cable Test Screen" will be displayed with instructions to press start and shake cables during 30 seconds test.	
7	a) Use the "D-Pad" on the TDS Ranger and select "Start". b) Depress the "Enter Key".	A blue progress bar will begin to move from left to right across the screen. Test takes 30 seconds.	Shake cables during 30 seconds test to ensure there are no intermittent faults with the cables and equipment.
8	Wait for Equipment and Cable Test to finish.	The words "Data Loader Cable Test Passed" will be displayed.	If the words "Test Failed" appear, ensure cables are properly connected and retry.
9	a) Use the "D-Pad" on the TDS Ranger and select "Finish". b) Depress the "Enter Key".	The "V2500 Engine Support Programs" screen will be displayed.	Equipment and cable Test was successful. If desired, the test can be repeated by selecting "Repeat Test".

(7) Section 7 - Shut Down PN IAE2P16552 After Equipment and Cable Test

(a) Make sure the power switch for PN IAE2P16552 is in the OFF position and disconnect power cable.

(b) Disconnect Red Z Cable, Blue X Cable and Yellow Y Cable from PN IAE2P16552 and TDS Ranger.

(c) To shutdown the TDS Ranger, depress the green power button on the TDS Ranger and hold it until the countdown begins, then let it go. It should take approximately 3 seconds for the countdown to begin. If you hold the power button too long, the TDS Ranger will reset itself.

(d) At the "Power Menu", use the "D-Pad" on the TDS Ranger to highlight "Shutdown".

(e) Depress the "Enter Key" to shutdown the TDS Ranger.

(8) Section 8 - Load Software into TDS Ranger

NOTE: This section is not required, unless the Service Bulletin for the desired software standard does not appear in the drop down menu during EEC software load.

(a) Make sure that no cables are connected to the TDS Ranger.

(b) Prepare the TDS Ranger for operations as follows:

Depress the green power button on the TDS ranger and hold it until the word "Booting" appears at the bottom of the screen. The "V2500 Front End Program" screen will be displayed.

(c) At the "V2500 Front End Program" screen, use the "D-Pad" to highlight "Install Update to Ranger". Depress the "Enter Key". A pop up screen will appear with the words, "Please open the top of this device, insert the Program Update SD card and hit OK".

(d) Loosen the screw at the top of TDS Ranger.

(e) Remove the black lid from the TDS Ranger.

(f) If the SD slot already has an SD card installed, remove the SD card.

(g) Insert the Reprogramming SD Card, PN 1018294-1 or PWA 107829 into slot labeled "SD".

(h) Use the "D-Pad" to highlight "OK". Depress the "Enter Key".

(i) When the words "Press any key to continue" appear at the bottom of the log file, press any key to continue.

The TDS Ranger has been successfully updated with the appropriate software standard.

(j) Place the black lid on top of the TDS Ranger and tighten the screw.

(k) Use a ballpoint pen or equivalent to mark the date and the part number of the reprogramming SD card from Table 2 on the software identification plate on PN IAE2P16552. See Table 2 for old and new part numbers.

(l) To shutdown the TDS Ranger, depress the green power button on the TDS Ranger and hold it until a countdown begins, then let go. It should take approximately 3 seconds for the countdown to begin. If you hold the power button too long, the TDS Ranger will reset itself. At the "Power Menu", use the "D-Pad" on the TDS Ranger to highlight "Shutdown". Depress the "Enter Key" to shutdown.

R (9) Section 9 - Identify the EEC by the procedure that follows:

R (a) If not already installed, install the software identification plate
R below the existing nameplate by the procedure specified in Reference
R 14, Hamilton Sundstrand SB EEC 150-20-73-16.

R NOTE: If there is no space available on the existing software
R identification plate to identify the EEC part number, remove
R and install a new identification plate.

R (b) Use a ballpoint pen or equivalent to put the last three digits of the
R new Hamilton Sundstrand hardware part number from Table 2 in the
R software "S/W NO." column of the identification plate, and the date in
R the "DATE" column of the software identification plate. See Table 2
R for old and new part numbers.

R (c) Erase (scratch out) the existing Hamilton Sundstrand hardware part
R number and date, if previously marked on the software identification
R plate.

R (d) Erase (scratch out) the last three digits of the Hamilton Sundstrand
R hardware part number from the nameplate above the software
R identification plate.

C. Part C - Programming of the EEC Using Software Reprogrammer System, PN IAE3R19290 (for Engines Installed on Aircraft)

NOTE: Service Bulletin incorporation on engines installed on aircraft may be desirable and should be individually evaluated.

NOTE: The latest software standard may be loaded directly over any prior approved software standard. it is not required to load all the interim software standards.

Reprogramming assistance regarding proper use of Software Reprogrammer System, PN IAE3R19290 is available from your local IAE representative.

Do not turn on aircraft/external supply 28VDC power until instructed to do so.

Reprogramming the EEC will clear the fault memory. It is recommended that a record of existing EEC faults be obtained before initiating reprogramming.

NOTE: Hamilton Sundstrand Electronic Engine Control Model EEC150-20 or 150-40 software is loaded into the EEC using the Hamilton Sundstrand supplied reprogrammer and software.

Disassembly of the EEC is not required.

Data integrity check of the Hamilton Sundstrand supplied software is performed as part of the reprogramming procedure.

A bit-for-bit memory verification test is included as part of the reprogramming procedure.

No functional, thermal cycle, or vibration testing is required for units reprogrammed in accordance with this Service Bulletin.

The EEC can be programmed at room ambient conditions or while it is installed on the engine.

(1) Section 1

(a) Open the nacelle and prepare the aircraft for servicing as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010.

(b) Verify that the model number on the identification plate of the unit is "EEC 150-20" or "EEC 150-40". See Figure 1 for the location of the part.

(c) If desired, remove the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

(d) Record the current unit part number and the unit serial number from the nameplate. This information will be input into your computer.

(e) Connect power to all necessary equipment.

(f) Remove the harness connector from the EEC connector marked J1 and connect the programming harness connector marked P1 to the EEC connector marked J1. Make sure that the red engagement stripe on the EEC connector J1 is fully covered.

(g) Remove the harness connector from the EEC connector marked J7 and connect the programming harness connector marked P7 to the EEC connector marked J7. Make sure that the red engagement stripe on the EEC connector J7 is fully covered.

(h) If the computer and power supply connections to the cables are permanent, then go to the subsequent section titled: "Section 2"

(i) Connect the programming harness connector marked CH A UART to the IBM compatible computer UART board connectors for the channel A RS-422 Port (COM3). Make sure that the connectors are properly mated.

NOTE: UART connections can differ for different IBM compatible computers.

It is important to verify that the connectors are correctly installed for correct loader operation. Hamilton Sundstrand recommends labeling the RS-422 COM3 port as CH A UART and COM4 port as CH B UART on the computer to reduce errors.

(j) Connect the programming harness connector marked CH B UART to the IBM compatible computer UART board connectors for the channel B RS-422 Port (COM4). Make sure that the connectors are properly mated.

NOTE: UART connections can differ for different IBM compatible computers.

It is important to verify that the connectors are correctly installed for correct loader operation. Hamilton Sundstrand recommends labeling the RS-422 COM3 port as CH A UART and COM4 port as CH B UART on the computer to reduce errors.

(2) Section 2

(a) If the EEC is powered by aircraft 28VDC power supply, then go to the subsequent section titled: "Section 3"

(b) If the computer and power supply connections to the cables are not permanent, connect the opposite end of P3 and P9 cables to the 28VDC power supply.

(c) Remove the harness connector from the EEC connector marked J3 and connect the power supply harness connector marked P3 to the EEC connector marked J3. Ensure that the red engagement stripes on EEC connector J3 are fully covered.

(d) Remove the harness connector from the EEC connector marked J9 and connect the power supply harness connector marked P9 to the EEC connector marked J9. Ensure that the red engagement stripes on EEC connector J9 are fully covered.

(3) Section 3

(a) Set the BOOT/BITE switches to the ON (closed) position.

NOTE: These switches are located in the junction box on the EEC Programming Harness that is attached to the computer.

(b) Turn on the power to the reprogramming computer.

(c) Turn on the 28VDC power supply to the EEC.

NOTE: Make sure that the disk drive "A" has no disks present prior to power on of the computer.

(d) Wait for the MSDOS prompt "C:\>" to appear on the reprogramming computer.

(e) Obtain the Hamilton Sundstrand reprogramming diskette which is identified in Table 2 of these Accomplishment Instructions.

CAUTION: ENSURE THAT ORIGINAL DISKETTE IS PROVIDED IN A CLOSED ELECTROSTATIC DISPATCH BAG, IS UNDAMAGED, AND HAS THE CORRECT PART NUMBER.

HANDLE DISKETTE WITH CAUTION. DO NOT EXPOSE TO STRONG MAGNETIC FIELDS, EXTREME TEMPERATURE, DUST OR WATER, ETC.

(i) Make sure that the write protection tab of the diskette covers the "hole".

NOTE: 1. If necessary, you can remove the stickers from the corner of the disk and move the protecting device to close the hole.

2. The diskette may be used multiple times for multiple engines. A log file is generated each time containing the engine and EEC serial numbers.

(ii) Insert the diskette into the floppy drive of the reprogramming computer.

(f) The display will show the "C:\>" prompt.

Type "a:", then press the RETURN key.

NOTE: Some computers have the RETURN key designated ENTER.

(g) The display will show "A:\>" prompt.

Type "LDR150", then press the RETURN key. This starts the UART programming utility.

NOTE: Several messages will appear including the program identification, version number, time and the UTC/PW document property rights notice.

If there is a configuration error on the diskette, the program will display the appropriate error message and abort the programming process. Refer to Table 1 for a summary of error code description and troubleshooting suggestions.

(4) Section 4

(a) The UART programming utility LDR150 will display the following message:

"Enter operators name performing download: [ ] >"

NOTE: The field between the brackets will always be empty the first time the program is executed on the diskette.

Subsequent execution of the program will display the last name entered.

(i) If the operator is the same, press the RETURN key to continue.

(ii) If a different name is present than the operator or no name is present, the operator should enter his/her name and press the RETURN key.

(b) The LDR150 program will display the following message:

"WARNING-EEC Fault Memory Will Be Cleared By This Program"

"If an EEC Fault Dump Is Requested prior to Programming, enter "Q" to Quit or "C" to Continue [Q/C] :>"

(i) If a fault dump has already been accomplished or is not required:

Type "C", then press the RETURN key.

(ii) If a fault dump is required or the operator wishes to terminate the programming procedure:

Type "Q", then press the RETURN key.

(iii) If the operator selects the quit option, turn off the 28VDC power to the EEC and go to the section titled: "Section 6"

(c) The LDR150 program will now prompt with the following message:

"Enter the 9 character EEC Serial Number: [XXXX-XXXX]>"

From the Hamilton Sundstrand nameplate, enter the nine character EEC serial number and press the RETURN key.

NOTE: For the next two steps, if the EEC 150-20 or EEC 150-40 part number on the nameplate between the dashes is a single digit, enter a zero immediately preceding this digit.

Example: PN 808050-4-030 would be entered as 808050-04-030.

(d) The LDR150 program will now prompt with the following message:

"Enter the 13 character Current EEC HW Part No.: [XXXXXX-XX-XXX]>"

From the Hamilton Sundstrand nameplate, enter the 13 character EEC hardware part number and press the RETURN key.

(e) The LDR150 program will now prompt with the following message:

"Enter the 13 character SB EEC HW Part No.: [XXXXXX-XX-XXX]>"

From Table 2 enter the 13 character EEC hardware part number and press the RETURN key.

(f) The LDR150 program will now prompt with the following message:

"Enter Trim Checksum Value for "XXXXXX.TRM" :"

The XXXXXX.TRM designation is the name of the trim file being loaded to the EEC. From Table 2, enter the trim checksum value and press the RETURN key.

(g) The LDR150 program will now prompt with the following message:

"Do you wish to reenter the above entries [Y/N/Q] :"

(i) To proceed with programming process:

Type "N" , then press the RETURN key. Go to the subsequent section titled: "Section 5", then continue.

(ii) To correct any errors in the data entered:

Type "Y", then press the RETURN key. Then go back to the beginning of Section 4.

(iii) To quit the programming process:

Type "Q", then press the RETURN key. Turn off the 28VDC power to the EEC then go to the section titles: "Section 6"

(5) Section 5

(a) At this point the screen will display the progress of the programming process.

(i) Status messages will scroll across the screen.

NOTE: For a successful reprogramming operation, this step will take the following approximate times:

EEC 150-20: 30 minutes.

EEC 150-40: 10 minutes.

(ii) If an error occurs, see Table 1 for a summary of error code description and troubleshooting suggestions.

(b) The LDR150 program will now prompt with the following message:

"Turn OFF the BITE and BOOT switches to the EEC"

"then"

"Turn OFF POWER to the EEC and wait at least 5 seconds"

"then"

"Turn ON POWER to the EEC"

"... Press the RETURN Key When Ready to Continue"

Set the BOOT/BITE switches to the OFF (open) position.

(c) Switch off the 28VDC supply to the EEC, wait 5 seconds, then switch on the 28VDC power supply to the EEC.

(d) Press the RETURN key.

(e) Wait until the LDR150 program prompts with the following message:

"Turn ON the BITE and BOOT switches to the EEC"

"then"

"Turn OFF POWER to the EEC and wait at least 5 seconds"

"then"

"Turn ON POWER to the EEC"

"... Press the RETURN Key When Ready to Continue"

Set the BOOT/BITE switches to the ON (closed) position.

(f) Switch off the 28VDC power supply to the EEC, wait 5 seconds, then switch on the 28VDC supply to the EEC.

(g) Press the RETURN key.

(h) Wait until the LDR15O program prompts with the following message:

"Turn OFF POWER to the EEC"

"... Press the RETURN Key When Ready to Continue"

Switch off the 28VDC supply to the EEC.

(i) Press the RETURN key.

(j) The LDR15O program will now display the status of the programming process.

(i) If a successful programming occurred, the following message will be displayed:

"****EEC PROGRAMMING SUCCESSFULLY COMPLETED****"

"Record the log file name "VLXXXX.LOG" for later printout."

If desired, record the log file name "VLXXXX.LOG" for later printout.

(ii) If programming was unsuccessful, the following message will be displayed:

"****DOWNLOAD PROCESS ABORTED - ERROR CODE "X" "

"Record the log file name "VLXXXX.LOG" for later printout."

If desired, record the log file name "VLXXXX.LOG" for later printout.

The "X" refers to the type of error that caused the process to abort. Table 1 describes the error codes and action to be taken.

(6) Section 6

(a) Press the RETURN key to terminate the program and return to the MSDOS prompt "A:\>".

(b) A Paper copy of the log file can be made from the reprogramming computer if a printer is available. You can do this as follows:

NOTE: You can remove the diskette and move to a computer with a printer if no printer is connected to the original system. Complete the following commands to make a paper copy.

(i) At the MSDOS prompt:

Type "VLXXXX.LOG".

(ii) Press the RETURN key.

(iii) Wait until the printer is finished before proceeding to the next step.

(iv) Remove the diskette, write protect the diskette.

(c) Disconnect the EEC reprogramming electrical connectors from J1 and J7 and J3/J9, if applicable.

(d) Reconnect the aircraft electrical harness connectors to J1 and J7 and J3/J9, if applicable.

(e) Identify the EEC by the procedure as follows:

(i) If not already installed, install the software identification plate below the existing nameplate by the procedure specified in Reference 14, Hamilton Sundstrand SB EEC 150-20-73-16.

R NOTE: If there is no space available in the existing software
R identification plate to identify the EEC part number,
R remove and install new identification plate.

(ii) Use a ballpoint pen or equivalent to put the last three digits of the new Hamilton Sundstrand hardware part number from Table 2 in the software "S/W NO." column of the identification plate, and the date in the "DATE" column of the software identification plate. See Table 2 for old and new part numbers.

(iii) Erase (scratch out) the existing Hamilton Sundstrand hardware part number and date, if previously marked on the software identification plate.

(iv) Erase (scratch out) the last three digits of the Hamilton Sundstrand hardware part number from the nameplate above the software identification plate.

(f) For this reprogramming diskette, make/add a record of accomplishment, listing diskette part number, operator, EEC serial number and date.

(g) If necessary, install the EEC as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

(h) Close the nacelle and return the aircraft to service as specified in Reference 22, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

(7) Recording Instructions

(a) A record of accomplishment is required.

D. Part D - Replacement or Programming of the EEC by an Authorized Rework Vendor (for Engines Removed from Aircraft)

(1) For V2500 A5 SelectOne™ Engines - Compliance Category 4:

Remove the EEC as specified in Reference 18, Engine Manual, Chapter/Section 72-00-32, Removal 08, Task 72-00-32-050-001. See Figure 1 for the location of the part.

(2) Replace the old EEC with a new one as specified in the Material Information Section.

OR

Send your EEC to one of the authorized rework vendors that follows. See Figure 1 for the location of the part. See Table 2 for old and new part numbers.

NOTE: Only fully authorized repair facilities are allowed to perform this rework.

The designation by IAE of an authorized rework vendor indicates that the vendor has demonstrated the necessary capability to carry out the rework. However, IAE makes no warranties or representations concerning the qualifications or quality standards of the vendors to carry out the rework, and accepts no responsibility whatsoever for any work that may be carried out by a rework vendor, other than IAE. Authorized rework vendors do not act as agents or representatives of IAE.

(a) Hamilton Sundstrand Corporation

A United Technologies Company

One Hamilton Road

Dock W

Windsor Locks, Ct. 06096-1010

U.S.A.

(b) Hamilton Sundstrand Corporation

A United Technologies Company

Worldwide Repair - Maastricht

Maastricht Airport

Horsterweg

6191 RX Beek

The Netherlands

(3) For V2500 A5 SelectOne™ Engines - Compliance Category 4:

Install the EEC as specified in Reference 18, Engine Manual, Chapter/Section 72-00-32, Installation 08, Task 72-00-32-450-001.

(4) Recording Instructions

(a) A record of accomplishment is required.

E. Part E - Programming of the EEC Using Software Loader, PN IAE2P16552 (for Engines Removed from Aircraft)

See Part B of this Service Bulletin for Accomplishment Instructions, except disregard the steps to open and close the nacelle.

F. Part F - Programming of the EEC Using Software Reprogrammer System, PN IAE3R19290 (for Engines Removed from Aircraft)

See Part C of this Service Bulletin for Accomplishment Instructions.

Table 1 Error Code Definitions

ERROR CODE	ERROR TYPE	ACTION
E1	EEC VERIFY ERROR - Data verify error in EEC - Compare failed or location could not be programmed.	Try procedure 3 times. If still bad, operator has the option to: return the unit OR successfully reprogram the unit to the prior A5 Software Standard, as defined by the corresponding Software Service Bulletin in the Family Tree.

E2	COMMUNICATION ERROR - Communication problem between EEC and IBM compatible computer.	Check BITE, cables, power supply, UART board, and EEC. Retry 3 times.
E3	CONFIGURATION ERROR - Configuration data comparison failed. (Possible Hardware P/N mismatch, EEC compatibility mismatch, Trim Checksum mismatch).	Operator data entered incorrectly or incorrect data on existing nameplate. Check data - retry with the correct information.
E4	SYSTEM PROBLEM - Poor operating environment, bad disk, or program aborted by operator.	If the process was not terminated by the operator, check that the disk is not write protected, or replace the disk and retry.

Table 2 Reprogramming Input Reference Table
A5 and A5 SelectOne™ SCN20A/Z

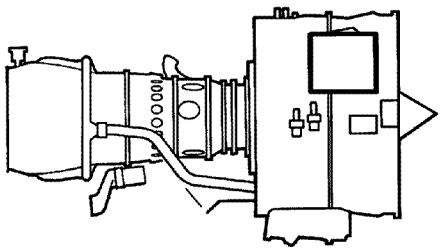
	New P/N	Old P/N
Trim Checksum	19177	n/a
Reprogramming SD Card for IAE2P16552 150-20/150-40	1018294-1 or PAW 107829	n/a
Reprogramming Diskette for IAE3R19290 150-20/150-40	819191-48	n/a
Control, Electronic Engine (SCN20A/Z) PW Part No.	2A4249	2A4211
(HS) HW Part No.	824972-9-020	824972-9-018
Control, Electronic Engine (SCN20A/Z) PW Part No.	2A4251	2A4212
(HS) HW Part No.	824972-11-020	824972-11-018
Control, Electronic Engine (SCN20A/Z) PW Part No.	2A4253	2A4213
(HS) HW Part No.	808050-4-066	808050-4-064
Control, Electronic Engine (SCN20A/Z) PW Part No.	2A4254	2A4214
(HS) HW Part No.	808050-5-066	808050-5-064
Control, Electronic Engine (SCN20A/Z) PW Part No.	2A4244	2A4205
(HS) HW Part No.	824972-2-020	824972-2-018

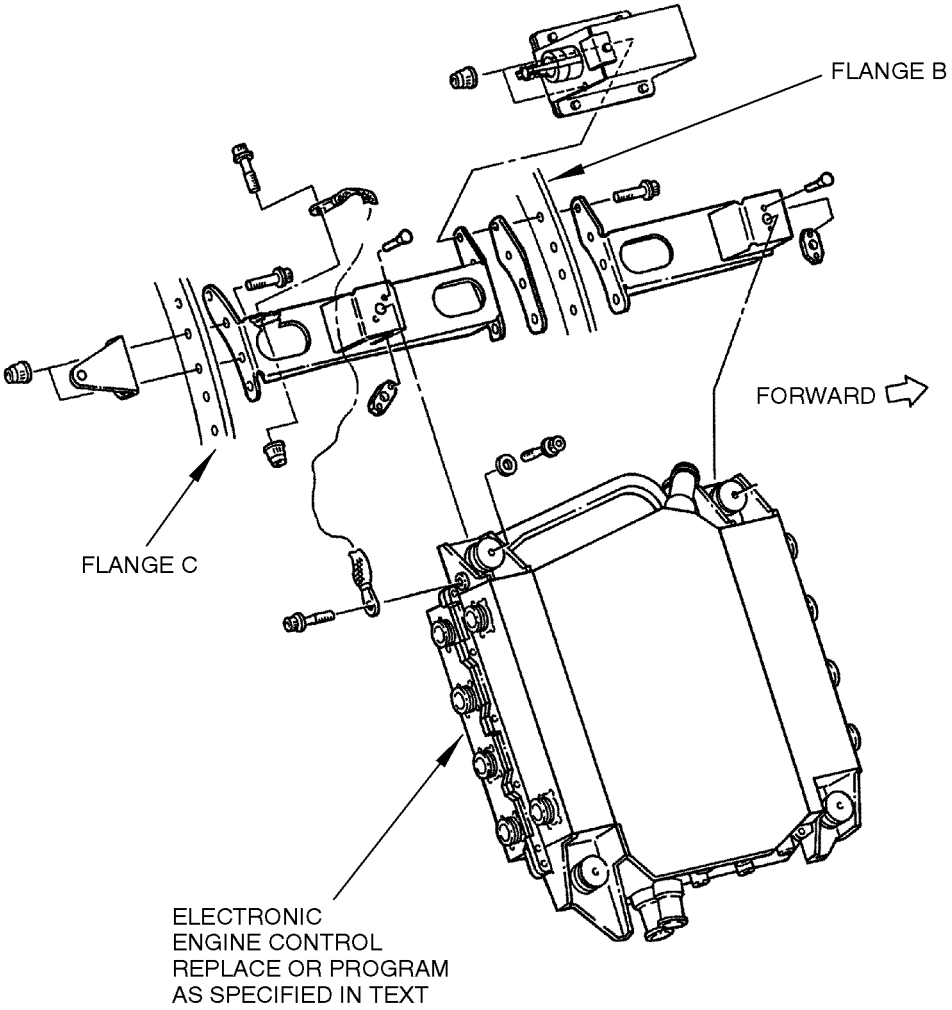
A5 and A5 SelectOne™ SCN20A/Z

	New P/N	Old P/N
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4245	2A4206
(HS) HW Part No.	824972-3-020	824972-3-018
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4246	2A4207
(HS) HW Part No.	824972-4-020	824972-4-018
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4247	2A4208
(HS) HW Part No.	824972-5-020	824972-5-018
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4248	2A4209
(HS) HW Part No.	824972-7-020	824972-7-018
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4249	2A4179
(HS) HW Part No.	824972-9-020	824972-9-016
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4251	2A4191
(HS) HW Part No.	824972-11-020	824972-11-016
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4253	2A4028
(HS) HW Part No.	808050-4-066	808050-4-062
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4254	2A4029
(HS) HW Part No.	808050-5-066	808050-5-062
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4244	2A4030
(HS) HW Part No.	824972-2-020	824972-2-016
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4245	2A4031
(HS) HW Part No.	824972-3-020	824972-3-016
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4246	2A4033
(HS) HW Part No.	824972-4-020	824972-4-016
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4247	2A4034
(HS) HW Part No.	824972-5-020	824972-5-016

A5 and A5 SelectOne™ SCN20A/Z

	New P/N	Old P/N
Control, Electronic Engine (SCN20A/Z)		
PW Part No.	2A4248	2A4177
(HS) HW Part No.	824972-7-020	824972-7-016



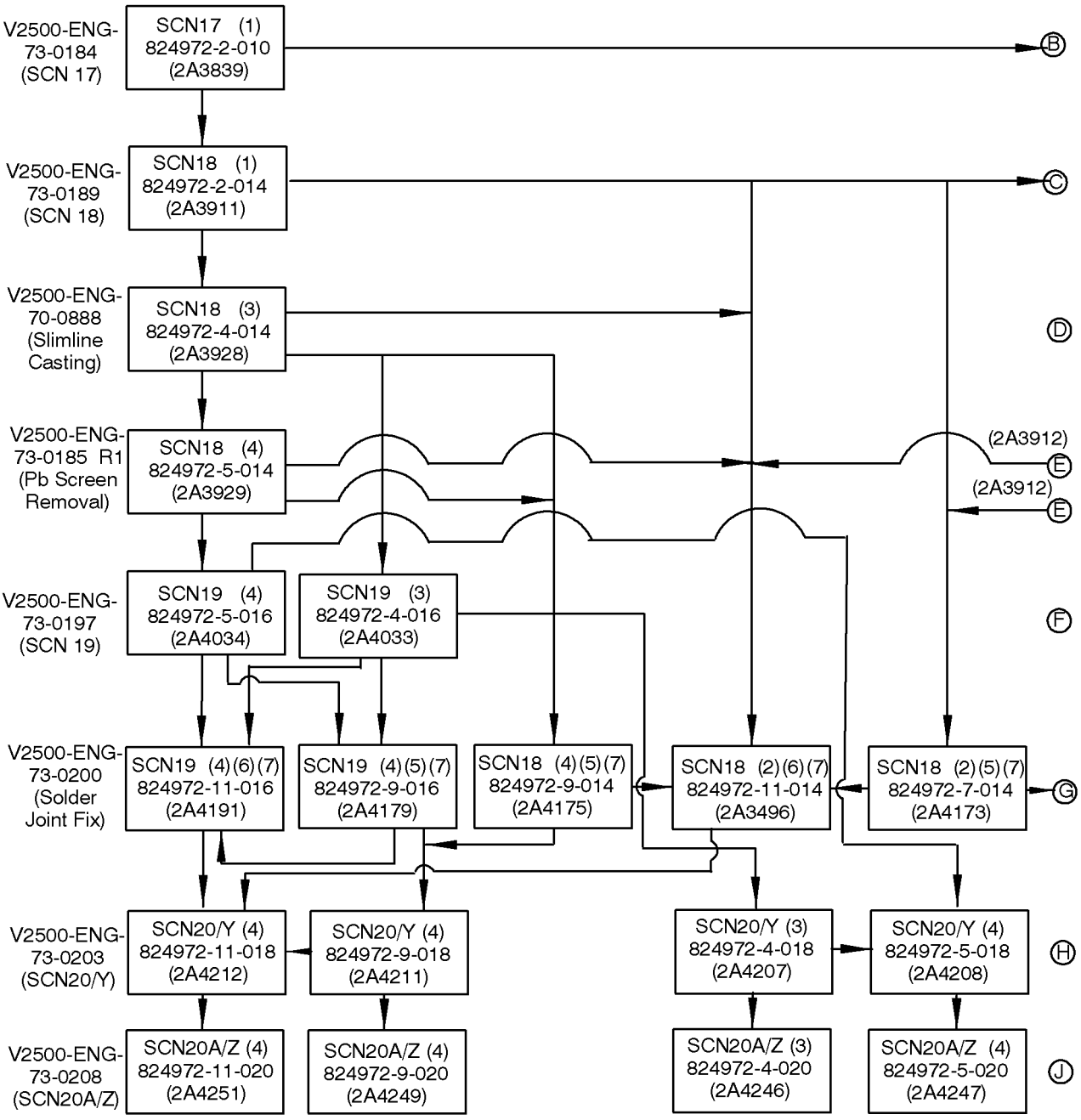


pw0b522129

LOCATION OF THE ELECTRONIC ENGINE CONTROL
FIGURE 1

APPENDIX 1

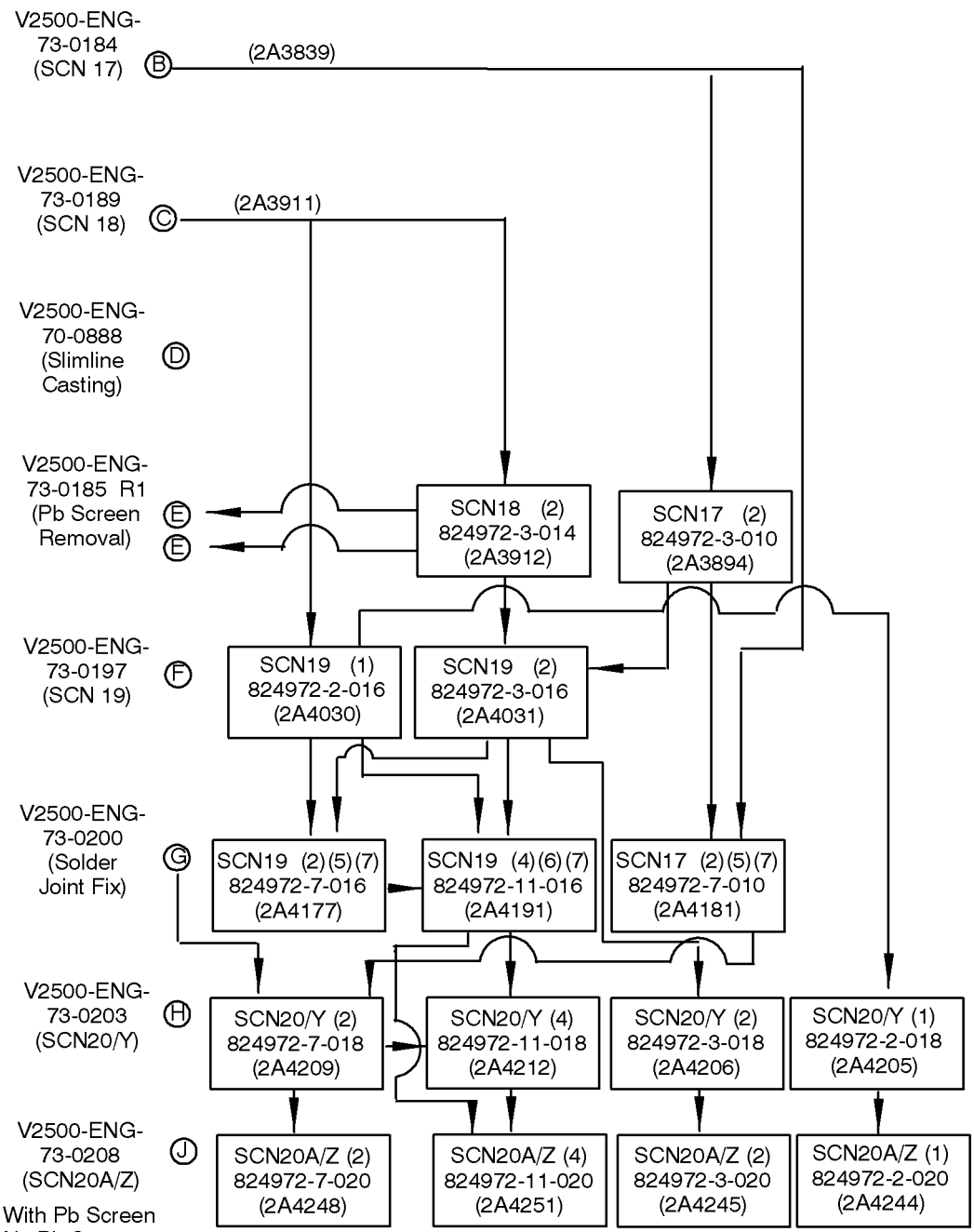
Parts Progression To Show the Changed Part in Relation to Other Parts



(1) With Pb Screen
(2) No Pb Screen
(3) With Pb Screen & Slimline Case
(4) No Pb Screen & Slimline Case
(5) The new part can be obtained by modification of the old part as specified in the Accomplishment Instructions.
(6) The new part is a replacement part only, and cannot be obtained by modification of the old part.
(7) With Reference 7, Service Bulletin No. V2500-ENG-73-0185 incorporated.

pw0b520781

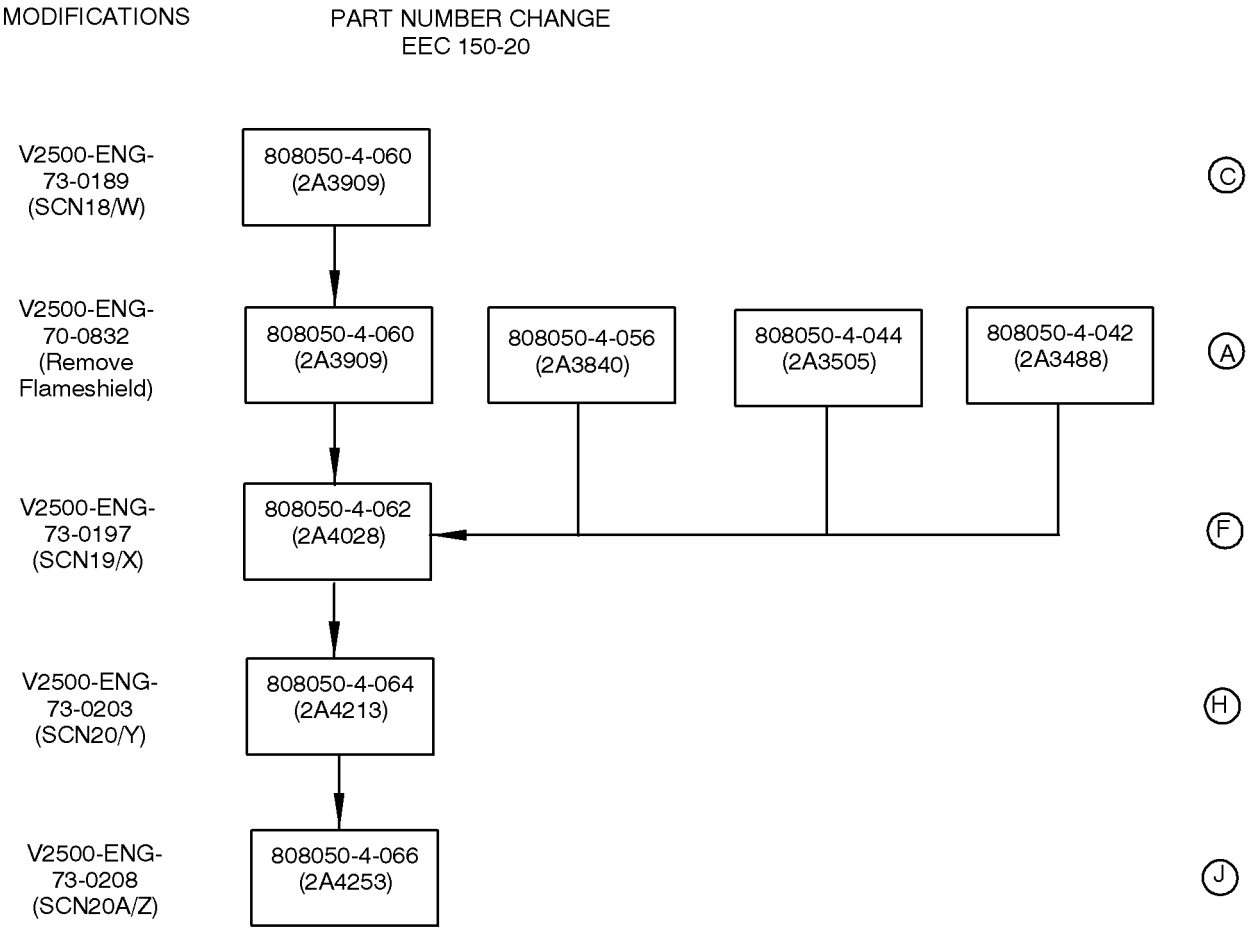
FAMILY TREE - ELECTRONIC ENGINE CONTROL (EEC) REF. CATALOG SEQUENCE NO. 73-22-34.
FIG. 01 ITEM 280 - FOR V2500-A5 DELIVERED ENGINES
CHART A (SHEET 1 OF 4)



(1) With Pb Screen
(2) No Pb Screen
(3) With Pb Screen & Slimline Case
(4) No Pb Screen & Slimline Case
(5) New part can be obtained by modification of the old part as specified in the Accomplishment Instructions.
(6) New part is a replacement part only, and cannot be obtained by modification of the old part.
(7) With Reference 7, Service Bulletin No. V2500-ENG-73-0185 incorporated.

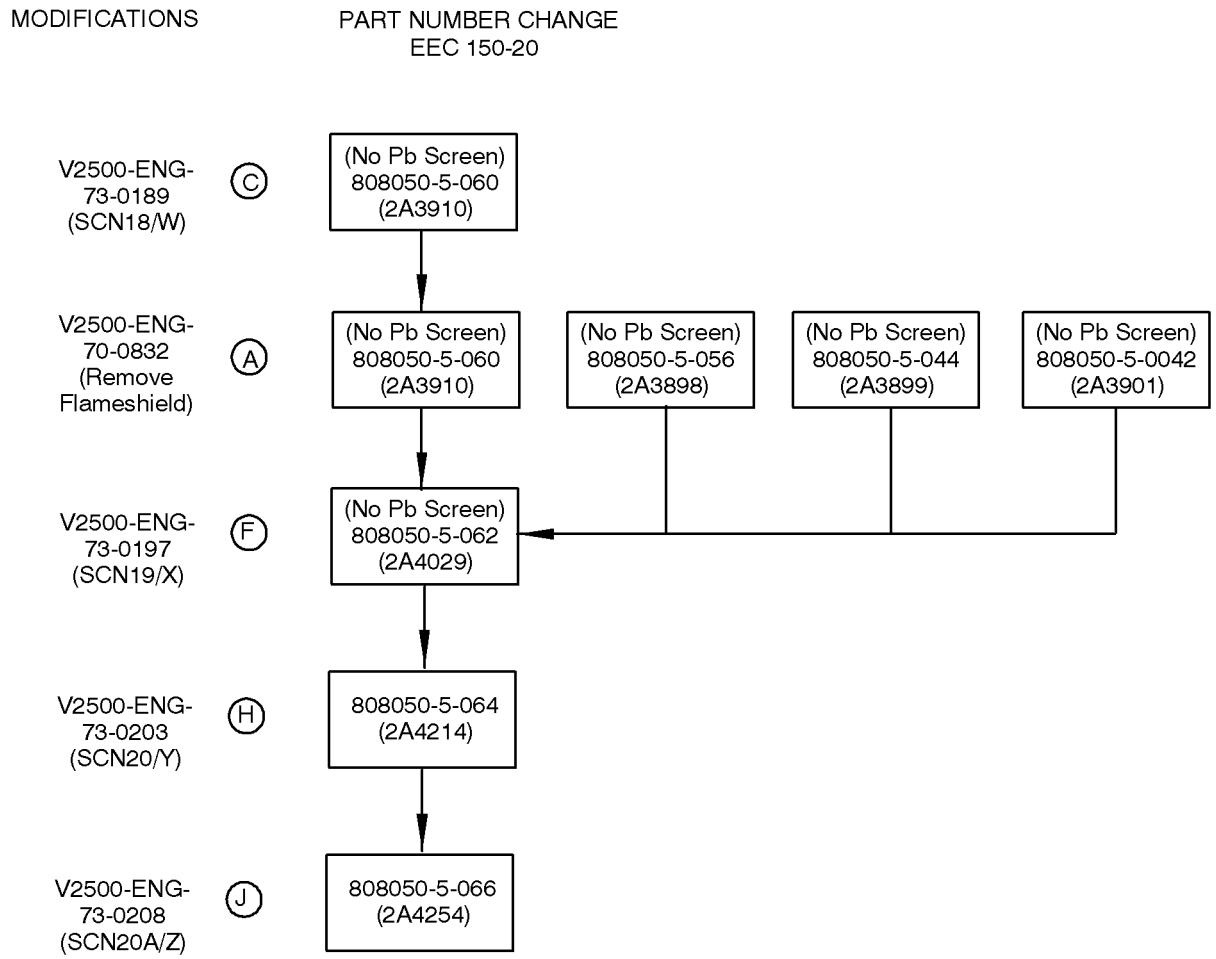
pw0b520782

FAMILY TREE - ELECTRONIC ENGINE CONTROL (EEC) REF. CATALOG SEQUENCE NO. 73-22-34.
FIG. 01 ITEM 280 - FOR V2500-A5 DELIVERED ENGINES
CHART A (SHEET 2 OF 4)



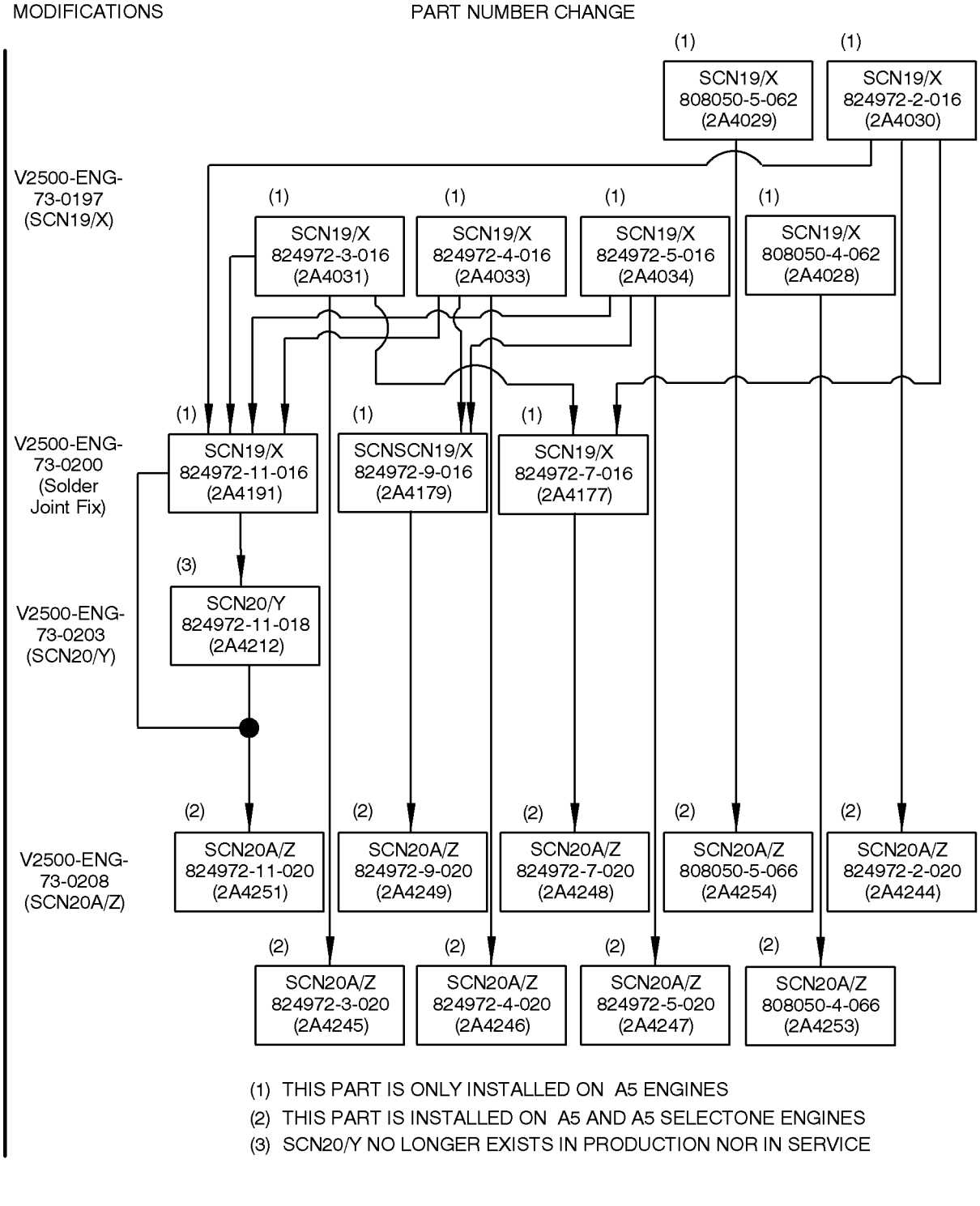
pw0b520783

FAMILY TREE - ELECTRONIC ENGINE CONTROL (EEC) REF. CATALOG SEQUENCE NO. 73-22-34.
FIG. 01 ITEM 280 - FOR V2500-A5 DELIVERED ENGINES
CHART A (SHEET 3 OF 4)



pw0b520784

FAMILY TREE - ELECTRONIC ENGINE CONTROL (EEC) REF. CATALOG SEQUENCE NO. 73-22-34.
FIG. 01 ITEM 280 - FOR V2500-A5 DELIVERED ENGINES
CHART A (SHEET 4 OF 4)



R FAMILY TREE - ELECTRONIC ENGINE CONTROL (EEC) REF. CATALOG SEQUENCE NO. 73-22-34.
R FIG. 01 ITEM 280 - FOR V2500-A5 SELECTONE PRODUCTION STANDARD ENGINES
R CHART B

SERVICE BULLETIN

ENGINE – FUEL AND CONTROL – PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH A5 SCN20A/Z SOFTWARE

Supplement

V2500-A5 SelectOne Production Standard Engines:

1. Modification Kit

   A. There is no kit provided to do this Service Bulletin.

2. Material Cost

   A. Contact IAE Spares Parts Sales for the estimated price of new material to do this Service Bulletin when the part modification procedure is used.

   B. Contact IAE Spares Parts Sales for the estimated price of new material to do this Service Bulletin using new replacement parts.

3. New Production Parts

New Production Part Number	Description	Unit Price US Dollars
2A4251 (824972-11-020)	Control, Electronic Engine (SCN20A/Z)	Quote

SERVICE BULLETIN

ENGINE – FUEL AND CONTROL – PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH A5 SCN20A/Z SOFTWARE

Added Data

NOTE: The following data provides the complete description of the SCN20/Y software modifications as described in Service Bulletin V2500-ENG-73-0203. All of these changes are included in the SCN20A/Z software package.

Reason

The V2500 SelectOne upgrade program has been launched by IAE for improved reliability, reduced fuel burn and increased time on wing for the V2500-A5 engine. The V2500 SelectOne consists of packages of modifications on the HPC, HPT, LPT module, EEC software and release of additional DEP variants.

While the SCN20/Y software contains improvements that apply to the current engine configuration, this Service Bulletin only applies to customers receiving SelectOne engines. A subsequent software change (SCN20A/Z) is planned for fleetwide incorporation in Q4 2008 and will contain all of the SCN20/Y changes and enhancements.

1. New SelectOne High Pressure Compressor Accommodation

   A. Condition: For the SelectOne, optimization of High Pressure Compressor (HPC) efficiency, flow capacity, and stability margin is required. The HPC performance is improved relative to the current Bill of Material (BOM) engine and this could lead to N2 speed margin reduction for Engine Production.

   B. Background: The new HPC has a different speed/flow relationship and improved stability margin relative to current BOM engine.

   C. Objective: Introduce a dedicated variable stator vane (VSV) schedule for SelectOne. This schedule will open the vanes at corrected N2 speeds greater than 11200 rpm to increase HPC flow capacity. This schedule will open the vanes more than the current BOM engine schedule opens the vanes. The vanes are opened more at both sea-level and altitude.

2. Eliminate EPR Fluctuations Caused by Engine 7C Bleed Fluctuation

   A. Condition: In-service reports have been received where EPR fluctuations have been observed at thrust reduction after takeoff. This is neither a safety issue nor a risk for surge.

   B. Background: The Engine 7C bleed is opened transiently during a pullback to climb power. For these in-service issues, the bleed was cycling (open/closed) and this caused EPR to fluctuate.

C. Objective: Avoid EPR fluctuations by eliminating Engine 7C bleed cycling by increasing the hysteresis on the transient trip speeds. This change will be applied to both the current and SelectOne configurations.

3. Improve Transient Detection Logic

A. Condition: The current transient detection logic does not detect slow decelerations. This limitation prohibits improvements to the stability bleed scheduling. This issue has made it difficult to address current field concerns.

B. Background: The logic needs to be enhanced to take advantage of the current standards for transient detection.

C. Objective: Enhance the robustness of transient detection logic by the introduction of a new architecture. This change will be applied to both the current and SelectOne configurations.

(1)The new architecture will recognize accelerations and decelerations in two phases:

(1) Anticipation: Change of external parameters (EPR Command, N1 Command, N2 or Pb Idle Command).

(2) Detection: Change of engine parameters (N2DOT).

(2)A heat soakage model will also be introduced to detect slow decelerations.

The benefits of this new architecture are:

(1) A simple logic structure has been implemented that protects against transient detection being triggered by changes of N2 due to bleed valve opening or closing.

(2) The heat soakage model detects slow decelerations and opens transient bleed valves; this makes it possible to lower the steady state bleed valve trip speed at cruise conditions.

(3) Transient detection during cruise has been enhanced and made more robust.

4. Improve Altitude Deceleration Stability

A. Condition: Investigation of in-service engine surge events has revealed that an engine stall can occur when the engine is commanded to decelerate rapidly at high altitude.

B. Background: The compressor stability margin for current Bill of Material (BOM) engines for snap decelerations at altitude with zero handling bleed extraction is low. The combination of events can cause an unstable situation in the compressor and stall is possible

C. Objective: Increase compressor stability margin by raising the Engine 7C handling bleed deceleration trip speed at altitudes higher than 20000 feet for current BOM engine. There will be no impact inside the take-off envelope. This change does not affect the Engine 7A steady state bleed and VSV schedules. This change will be applied only to the current engine configurations.

5. Improve Fuel Consumption at Cruise

A. Condition: In-service experience has shown that the Engine 7A handling bleed can be open for an extended period of time during high altitude, low speed cruise. This has a negative impact on fuel consumption.

B. Background: During low speed cruise, the engine sometimes operates in the speed range of the Engine 7A bleed steady-state (N2C26) schedule. This increases the chance that the bleed will be commanded open.

C. Objective: Reduce the Engine 7A bleed steady state (N2C26) trip speed for high altitudes by removing the altitude bias. This means there is no change in the Engine 7A handling bleed schedule for altitudes lower than 35000 feet and a maximum change of -445 rpm N2C26 at 42000 feet and above. This change will be applied to both the current and SelectOne configurations.

6. Enhance Quick Relight

A. Condition: This change is a product improvement.

B. Background: Enhanced quick relight logic, based on experience from other engine programs, was added to cover the risk for the SelectOne engine. In addition, the enhancement can be applied to both engine configurations.

C. Objective: Provide the capability to derate the fuel scheduling during quick relight. A quick relight is defined as when the master lever is turned off and then back on again within 30 seconds while HP spool speed is above 10%. This change will be applied to both the current and SelectOne configurations.

7. Maintain N1 Speed Margin for SelectOne Production

A. Condition: Production N1 speed margin for the SelectOne engine must be the same as the current production engine.

B. Background: SelectOne (production) cycle improvements result in a small change (less than 0.2%) in N1/EPR relationship at 33K maximum take-off thrust rating conditions. The current production engine also can benefit from this change.

C. Objective: Implement a 2-point EPR trimmer, defined by the data entry plug. The current EPR trimmer is a single value. With the 2-point trimmer, the first point will be fully applied to the MCL and MCT rating, so there will be no change to the MCL and MCT ratings as compared to the current method. The second point of the trimmer will be applied at take-off only (TLA position). The second point will be applied as a function of EPR to minimize impact at lower ratings. This change will be applied to both the current and SelectOne configurations.

8. SelectOne Engine Configuration Will Be Data Entry Plug Selectable

A. Condition: The SelectOne engine requires certain features of the software to be uniquely defined as compared to the current engine software.

B. Background: The EEC software will be configured for the SelectOne through the data entry plug.

C. Objective: Add the capability to configure the software for the SelectOne engine.

9. Substantiation:

A. The V2500 SelectOne upgrade package was evaluated and certified by means of a 3 engine validation / FAR-33 certification program, consisting of sea level and altitude performance / operability tests and sea level mechanical integrity tests. Further to that, V2500 Select engines were successfully flight tested at Airbus in support of JAR-25 certification.

B. DEP Substantiation: Each new DEP Select Variant was successfully tested on the Closed Loop Bench in March 2008. The test validated that the software reads and correctly responds to the new wiring configurations.

Internal Reference Information

Revision No.	Reference Document	Origination
1	EC07VZ020	DL/TR
2	EC07VZ020 EC07VZ020D IEN10VC023 IEN10VC057	DL/AR/JDH
R 3	EA11VC209	DL/CMS