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

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V2500-A5 SERIES PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits the Revision 4 to Service Bulletin V2500-ENG-73-0197.

Document History

Service Bulletin Revision Status

Initial Issue	Jul.20/06.
Revision 1	Dec.12/06.
Revision 2	Mar.22/07.
Revision 3	Feb.19/08.

Service Bulletin Revision 4

Remove	Incorporate	Reason for change
All pages of the Service Bulletin.	Pages 1 to 45 of the Service Bulletin.	To reformat the Accomplishment Instructions and include instructions for the use of new EEC Software Loader, P/N IAE2P16552.
All pages of the Appendix 1.	Pages 1 to 4 of the Appendix 1.	No Change.

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 Appendix 2.	Page 1 of the Appendix 2.	No Change.
All pages of the supplement.	Page 1 of the Supplement.	No Change.

International Aero Engines

SERVICE BULLETIN

ENGINE - FUEL AND CONTROL - TO PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH A5 SCN19/X SOFTWARE

1. Planning Information

A. Effectivity Data

(1) (For Airbus A319)

Engine Models Applicable

V2522-A5, V2524-A5, V2527M-A5

Engine Serial Nos. V10001 thru V12376.

R Engine Serial No. V12378.

Engine Serial Nos. V12380 thru V12388.

R Engine Serial No. V12390.

Engine Serial Nos. V12392 thru V12393.

R Engine Serial Nos. V12395 and V12397.

Engine Serial Nos. V12399 thru V12401.

R Engine Serial Nos. V12403, V12405, V12407 and V12409.

Engine Serial Nos. V12411 thru V12425.

R Engine Serial No. V12427.

Engine Serial Nos. V12429 thru V12441.

Engine Serial Nos. V12444 thru V12445.

Engine Serial Nos. V12448 thru V12457.

Engine Serial Nos. V12459 thru V12464.

R Engine Serial No. V12466.

Engine Serial Nos. V12468 thru V12471.

R Engine Serial No. V12485.

(2) (For Airbus A320)

Engine Models Applicable

V2527-A5, V2527E-A5

Engine Serial Nos. V10001 thru V12376.

R Engine Serial No. V12378.

Engine Serial Nos. V12380 thru V12388.

R Engine Serial No. V12390.

Engine Serial Nos. V12392 thru V12393.

R Engine Serial Nos. V12395 and V12397.

Engine Serial Nos. V12399 thru V12401.

R Engine Serial Nos. V12403, V12405, V12407 and V12409.

Engine Serial Nos. V12411 thru V12425.

R Engine Serial No. V12427.

Engine Serial Nos. V12429 thru V12441.

Engine Serial Nos. V12444 thru V12445.

Engine Serial Nos. V12448 thru V12457.

Engine Serial Nos. V12459 thru V12464.

R Engine Serial No. V12466.

Engine Serial Nos. V12468 thru V12471.

R Engine Serial No. V12485.

(3) (For Airbus A321)

Engine Models Applicable

V2530-A5, V2533-A5

Engine Serial Nos. V10001 thru V12376.

R Engine Serial No. V12378.

Engine Serial Nos. V12380 thru V12388.

R Engine Serial No. V12390.

Engine Serial Nos. V12392 thru V12393.

R Engine Serial Nos. V12395 and V12397.

Engine Serial Nos. V12399 thru V12401.

R Engine Serial Nos. V12403, V12405, V12407 and V12409.

Engine Serial Nos. V12411 thru V12425.

R Engine Serial No. V12427.

Engine Serial Nos. V12429 thru V12441.

Engine Serial Nos. V12444 thru V12445.

Engine Serial Nos. V12448 thru V12457.

Engine Serial Nos. V12459 thru V12464.

R Engine Serial No. V12466.

Engine Serial Nos. V12468 thru V12471.

R Engine Serial No. V12485.

B. Concurrent Requirements

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

C. Reason

(1) Derated Take-off Increase from 24% to 40%.

(a) Condition:

Airbus intends to allow, at the aircraft level, a maximum derate capability of 40% for the A319, A320, and A321 aircraft. Flex take-off and fixed derate take-off is currently limited to 24% derate. This change will allow operators to achieve greater levels of take-off derate and improve operational flexibility.

(b) Background:

This feature is a new requirement.

(c) Objective:

For both flex and fixed derate takeoff, extend the derate capability from 24% to 40% for all ratings, except for the A319/V2524 and the A319/V2522 models. The fan keep-out zone prevents the lowest thrust ratings from being derated to 40%. Therefore, the A319/V2524 and the A320/V2524 derate limit will be 30% and the A319/V2522 derate limit will remain at 24%.

NOTE: Aircraft updates must be made in order to access this feature.

(2) Stator Vane Dual Track Check Nuisance Faults.

(a) Condition:

Many occurrences of the "ENG COMPRESSOR VANE" ECAM warning have been encountered at the end of the take-off phase, during the transition to climb. Usually, this problem occurs during the first 2000 cycles of engine operation.

(b) Background:

The ECAM warning is caused by a stator vane (VSV) dual track-check fault. A dual track-check fault is detected when the actual VSV position is different from the commanded position by more than a specified tolerance. Investigation has determined that the dual track-check condition is due to slow movement of the VSV system caused by the combination of the VSV aerodynamic loading, mechanism friction, and weak fuel muscle pressure.

(c) Objective:

Modify the engine deceleration schedule so that the engine will decelerate slower. The slower deceleration rate will help balance the friction and loading on the VSV system so that the dual track-check fault is less likely to occur. The slower deceleration rate will have no effect on engine stability and aircraft operation or handling.

(3) TRA Fault Accommodation: Latch of IDLE Accommodation.

(a) Condition:

Airbus requires a change to the Throttle Resolver Angle (TRA) fault accommodation logic for a dual TRA failure and a TRA disagree failure in order to latch the "forward idle" accommodation before take-off.

(b) Background:

The current fault accommodation for a dual TRA failure occurring during a take-off run is the selection of "forward idle". If the take-off is pursued (because the fault has occurred above V1), at the ground to flight transition the accommodation will then select the last valid TRA value at the time of the fault detection. That is, take-off power will be commanded. Such engine thrust variation occurring at aircraft lift-off, whereas an asymmetrical thrust is already being compensated, is judged not acceptable.

The current accommodation for a TRA disagree failure occurring during a take-off run is "select larger TRA if both TRA are above idle; if not, select forward idle". Depending on the TRA disagree failure case and TRA signals evolution, this logic can induce high-power to idle then back to high-power engine thrust variations during the take-off run. Also, in case of continued take-off, the larger TRA will be selected as accommodation after the ground to flight transition, which can induce idle to high-power thrust variation. As stated previously, such engine thrust variation occurring at aircraft lift-off, whereas an asymmetrical thrust is already being compensated, is judged not acceptable.

(c) Objective:

The change to the dual TRA fault accommodation logic shall be as follows: once the "forward idle" accommodation for a dual TRA failure has been invoked on ground, it shall be latched until the failure has healed (*see below), that is, at least one TRA has become valid again.

A similar change shall be made to the TRA disagree fault accommodation logic: once the "forward idle" accommodation for a TRA disagree failure has been invoked on ground, it shall be latched until the failure has healed (*see below), that is, until the TRA are in agreement again.

* The requirement to allow a TRA signal to heal is as follows: The failure condition must be clear for at least 5 continuous seconds. The logic to heal the TRA signal is in the current software.

(4) T2 Selection Logic Improvement.

(a) Condition:

The T2 selection logic was designed to choose the best available T2 input from the four possible sources: left ADC TAT (Air Data Computer Total Air Temperature), right ADC TAT, local channel engine T2 probe, and remote channel engine T2 probe. This is not true for all failure scenarios.

(b) Background:

The logic that handles an engine T2 crosscheck occurring at the same time as an engine T2 to ADC TAT disagreement does not always choose the best available input. Instead, in this case, the logic will always choose the local engine T2.

The selection logic is designed to latch a soft fault against ADC TAT when there is an engine T2 to ADC TAT disagreement. This means that even if the ADC TAT is no longer soft failed, the logic will not use it. This defeats the logic's ability to always choose the best available input.

(c) Objective:

Modify the selection logic so that the best available source of T2 is always selected. This will be accomplished by not latching ADC TAT soft faults. The soft fault will still be detected and accommodated but the logic will not permanently exclude ADC TAT from use. That is, if ADC TAT is no longer soft failed, it can be selected again.

(5) ARINC Indication of Improved TRA Accommodation.

(a) Condition:

The TRA fault accommodation was changed in SCN17/V (Reference Service Bulletin V2500-ENG-73-0184). As a result, one of the Flight Warning Computer (FWC) messages that are displayed during TRA failures no longer agrees with the accommodation logic in the EEC.

(b) Background:

The FWC does not have the necessary information from the EEC to display the proper message in the cockpit.

(c) Objective:

Modify the EEC logic to provide an ARINC bit to the FWC to allow the correct message to be displayed during TRA failure situations.

(6) Prevent Potential Data Entry Plug (SM) Nuisance Fault.

(a) Condition:

SCN18/W software introduced an unanticipated nuisance fault message, DEPNG, Data Entry Plug Failure. This nuisance fault will occur if the EEC experiences a single channel reset or a staggered power-up. These conditions are not typical of in-service operation. The problem is most likely to be seen with an engine in a test stand, for example, at an overhaul or production facility.

The DEPNG fault is intended for maintenance purpose only and does not drive any downstream logic that would change the functional operation of the software. The DEPNG fault (ATA 732235, CLM - DATA ENTRY PLUG/EEC@) is classified as scheduled maintenance and is not reported to the cockpit.

NOTE: Where, @ equals "1" or "2" depending on engine position.

(b) Background:

An EEC software coding error introduced the nuisance fault.

(c) Objective:

Modify the EEC software to prevent this nuisance fault. In addition, the DEPNG fault will not be recorded unless it is set continuously for 2-seconds.

(7) Thrust Reverser Unlocked Nuisance Messages.

(a) Thrust Reverser Unlocked - Not Fault Recorded

(i) Condition:

It is possible for the Flight Warning Computer (FWC) to display "ENG 1(2) REVERSE UNLOCKED" without the corresponding EEC maintenance message, ATA 783142 HC/PROX SW/T/R UP ACT@, being generated.

NOTE: Where, @ equals "1" or "2" depending on engine position.

(ii) Background:

The EEC software has a longer fault confirmation time than the FWC software. The shorter fault confirmation time in the FWC allows the possibility for the fault to be displayed by the FWC without the fault being recorded by the EEC.

(iii) Objective:

Modify the EEC logic to make sure that the EEC fault message will be recorded when the FWC ECAM warning is set.

(b) Thrust Reverser Unlocked - Nuisance Fault Recording

(i) Condition:

It is possible for the EEC to record the reverser unlock fault message, ATA 783142 HC/PROX SW/T/R UP ACT@, with the aircraft on the ground, the engine shutdown, and the reverser stowed and locked. This nuisance fault recording does not cause the message "ENG 1(2) REVERSE UNLOCKED" to be displayed in the cockpit as it is inhibited by the FWC.

NOTE: Where, @ equals "1" or "2" depending on engine position.

(ii) Background:

The reverser lock/unlock proximity switches are on a different power bus than the EEC. It is possible for the EEC to be powered without the reverser proximity switches being powered. The status of the power bus to the reverser lock/unlock proximity switches is not available to the EEC. Thus, it is possible for the EEC to record a nuisance fault against the reverser lock/unlock proximity switches if they are not powered.

(iii) Objective:

Revise the EEC software to inhibit the reverser unlock fault message if the aircraft is on ground and the engine is not running (defined as N2 is below 2000 rpm). The reverser unlock fault will still be monitored if the Menu Mode reverser test is being performed.

(8) Pb Sensor Heater on at EEC Power-up.

(a) Condition:

Class 1 faults caused by soft failures of Pb, ATA 732215 PB LINE/EEC@, are occurring frequently in service. Soft failures are detected due to a disagreement between the sensed and calculated Pb value.

NOTE: Where, @ equals "1" or "2" depending on engine position.

(b) Background:

Excessive accumulation of water (which then freezes) in the Pb sense line and/or long-term build-up of contamination in the Pb sensor can cause soft failures in Pb.

(c) Objective:

As a system improvement, whenever the aircraft is on the ground and the EEC is powered, it will turn on the Pb sensor heater. Heating the Pb sensor prior to engine start will reduce the formation of condensation during the engine start cycle.

(9) Reheal of Pb Soft Failures.

(a) Condition:

The burner pressure (Pb) sense line is experiencing freezing problems in the field. If the line freezes, the EEC logic detects this problem as a soft failure and accommodates it by using a synthesized Pb. If the line thaws and a valid pressure is available, the EEC logic does not allow the measured Pb to reheal, that is, to clear the latched soft failure and allow the sensed burner pressure to be used again.

(b) Background:

The original design of the EEC logic did not include the ability to reheal a Pb fault.

(c) Objective:

Modify the EEC logic to allow the Pb signal to reheal. The following describes the details of this change:

(i) The Pb signal may reheal at any altitude to allow re-selection of the actual burner pressure signal rather than using a synthesized burner pressure.

(ii) Allow the Pb signal to fail and reheal three times per flight. If the Pb signal fails a fourth time, the signal will not be allowed to reheal but a synthesized burner pressure is used.

(iii) While in flight, the ECAM message "ENG 1(2) SENSOR FAULT" will be displayed anytime the Pb signal is failed. If Pb reheals, the ECAM message will no longer be displayed.

(iv) On the ground, the ECAM message "ENG 1(2) SENSOR FAULT" will be displayed if the Pb signal failed during the flight.

(v) A maintenance bit will set at first failure as with the current software.

(vi) The EEC recording logic will be changed to allow Pb reheal data to be gathered:

(1) The burner pressure soft failure will be recorded. (Same as current logic.)

(2) All reheal events will be recorded. (These are event recordings, not faults.) After the fourth failure of the Pb signal, the reheal logic will continue to operate. This means that if the Pb signal fails and reheals again, the reheal event data will be recorded. The software will not react to a Pb signal reheal after the fourth failure.

(3) Reheal events can be accessed at the bottom of the TROUBLE SHOOTING / FLIGHT DATA page through Menu Mode. The fault acronym will be REHEAL. The information on flight phase, flight leg, time, and engine parameters will allow the reheal event(s) to be correlated with Pb faults.

(10) Record Fuel Dipped Start as Class 3 Message

(a) Condition:

It is required that a procedure for troubleshooting HPC 7th and 10th stage bleed valve problems be made available through the EEC software. The positions of the bleed valves are not available to the EEC.

(b) Background:

This is a new requirement to improve the troubleshooting capability for the 7th and 10th stage bleed valves.

(c) Objective:

The current ground autostart logic includes a fuel depulse function (Reference Service Bulletin V2500-ENG-73-0086). A stuck closed bleed valve will very likely cause the fuel depulse to activate during the autostart sequence.

Modify the fault recording logic to record the use of the fuel depulse as a Class 3 fault. The troubleshooting manual will be updated to request a verification of the bleed valve functionality if fuel depulse Class 3 faults have been recorded.

The new fault acronym will be FUELDP:

ATA 000000, CLM - FUEL DEPULSE ACTIVATED@

NOTE: Where, @ equals "1" or "2" depending on engine position.

(11) Reduce Turbine Cooling Air (TCA) Valve Maintenance Burden

(a) Condition:

Many nuisance TCA (feedback) crosscheck faults are being seen in the field. The TCA valve feedback is provided to each channel of the EEC by microswitches. Crosschecks are detected when there is a disagreement between the two feedback signals. The TCA valve is still operating, just the feedback signal is failing. These nuisance crosscheck faults result in the setting of the Class 2 fault indicator. This is a maintenance burden to the field.

(b) Background:

Microswitches can be unreliable, especially when located in a hot, hostile area of the engine.

(c) Objective:

Change the EEC software to remove TCA crosscheck fault recording and annunciation. The valve out-of-position fault detection logic will remain unchanged.

(12) A320 V2524 Rating.

(a) Condition:

IAE and Airbus desire to offer the V2524 rating on the A320 aircraft. It is currently only available on the A319 aircraft.

(b) Background:

This feature is a new requirement.

(c) Objective:

Change the software such that the V2524 rating is available to the A320 aircraft. The V2524 rating shall be fully identical on the A319 and the A320.

(13) Tenth-Stage Service Bleed Delay Timer Change

(a) Condition:

The engine-7A bleed schedule is designed to ensure that the bleed is open during Aircraft Environmental Control System (ECS) bleed switching from 7th to 10th stage air. This is accomplished by delaying the ECS bleed switch from 7th to 10th stage air until the engine-7A bleed has been commanded open and given time to respond. Based on in-service data, it is believed that a deteriorated engine-7A bleed valve with a slow response time could briefly leave the engine without any stage 7 bleed off take during ECS switching. This situation could contribute to an engine surge but there is no firm evidence of this scenario.

(b) Background:

The delay in switching the ECS bleed from 7th to 10th stage air does not accommodate a slow responding engine-7A bleed valve.

(c) Objective:

As a precautionary change, modify the delay in switching the ECS bleed from 7th to 10th stage air so that even with a slow responding engine-7A bleed valve, there will always be stage 7 bleed off take during ECS switching from 7th to 10th stage air.

D. Description

Program the EEC with SCN19/X software or replace the EEC with a new EEC that has SCN19/X software.

E. Compliance

Category Code 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.

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

R Incorporation on aircraft must be accomplished in accordance with Airbus Service Bulletin A320-73-1088. See reference 13.

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(s) given.

The compliance statement 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.

R The technical content of this Service Bulletin has been approved under the
R authority of the EASA Design Organization Approval N° EASA.21J.031.

G. Manpower

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

R (1) In Service: 1.9 hours total

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

R (1) Prepare EEC for software load: 0.4 hours

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

R (3) Install EEC software: 0.4 hours

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

R (5) Total: 1.0 hours

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

R (1) Prepare EEC for software load: 0.4 hours

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

R (3) Install EEC software: 1.0 hours

R (4) Total: 1.5 hours

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

R (1) At Overhaul: 1.4 hours total

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

R (1) At Overhaul: 0.6 hours total

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

R (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-NAC-71-0206 (Nacelle - Power Plant - Cowl, Air Intake - Rework To Accommodate Longer P2T2 Probe).

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

(3) 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).

(4) 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).

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

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

(7) IAE V2500 Service Bulletin V2500-ENG-73-0185 Revision 1 (Engine - Fuel And Control - EEC150-40 Pressure Burner Sensor Port Screen Deletion).

(8) IAE V2500 Service Bulletin V2500-ENG-73-0200 (Engine - Fuel And Control - Replacement of Resistors and Touch-up of Solder Joints For Engines With EEC150-40 Electronic Engine Control (EEC) Installed).

R (9) IAE V2500 Service Bulletin V2500-ENG-73-0086 (Engine - Fuel And Control -
R To Provide A New Electronic Engine Control (EEC) With The A5 SCN11
R Software Configuration).

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

(11) Hamilton Sundstrand Service Bulletin EEC-150-20-73-34 (Incorporation of New Software Configuration: A5 SCN19/X).

(12) Hamilton Sundstrand Service Bulletin EEC-150-40-73-20 (Incorporation of New Software Configuration: A5 SCN19/X).

(13) Airbus Service Bulletin A320-73-1088 (Engine Fuel And Control - FADEC System - Introduce EEC Software Standard "SCN19" On IAE V2500-A5 Engines) and Aircraft Modification No.35944.

R This Service Bulletin is subject to to Aircraft Modification Number. 35944
R and is covered by A/C Service Bulletin Number A320-73-1088. Under no
R circumstances shall the modified equipment, resulting from the application
R of this SB, be installed on the aircraft type unless the corresponding
R modification, and if applicable, its aircraft SB are approved.

R (14) V2500 Aircraft Maintenance Manual, Chapter/Section 73-22-34.

R (15) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-00-32.

(16) V2500 Engine Illustrated Parts Catalogs (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).

R (17) Internal Reference No. - 05VZ001, 05VZ001B, 05VZ001-01, 06VC269, 07VC351,
R IEN 10VC024 and IEN 10VC057.

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

L. Other Publications Affected

(1) V2500 Engine Illustrated Parts Catalogs (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, to add the new part.

(2) V2500 Engine Manuals (E-V2500-1IA and E-V2500-3IA), Chapter/Section 72-22-34 Cleaning, Inspection and Repair, to add the new part.

M. Interchangeability of Parts

SCN19 is functionally one way interchangeable with any prior software version. (It cannot be reverted to any prior software version due to the flex derate takeoff logic incorporated in SCN19) Refer to Airbus Service Bulletin A320-73-1088 for additional information.

For aircraft installation observe the following:

Engines with SCN19 software must not be intermixed with engines having any prior software version, on the same aircraft, due to the flex derate takeoff logic incorporated in SCN19. Refer to Airbus Service Bulletin A320-73-1088 for additional information.

N. Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

2. Material Information

R A. Material - Price and Availability

R For Price and Availability of spares refer to the Supplement of this Service
R Bulletin.

B. Industry Support Program

Not Applicable.

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

73-22-34

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

FIG ITEM NO.	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PART NUMBER	INSTR DISP
01-280	808050-4-062 (2A4028)	1	Control, Electronic Engine (150-20 with Pb screen) OR	-	808050-4-042 (2A3488)	(V) (1)(A)(B)
01-280	808050-4-062 (2A4028)	1	Control, Electronic Engine (150-20 with Pb screen) OR	-	808050-4-044 (2A3505)	(V) (1)(A)(B)
01-280	808050-4-062 (2A4028)	1	Control, Electronic Engine (150-20 with Pb screen) OR	-	808050-4-056 (2A3840)	(V) (1)(A)(B)
01-280	808050-4-062 (2A4028)	1	Control, Electronic Engine (150-20 with Pb screen) OR	-	808050-4-060 (2A3909)	(V) (1)(A)(B)
01-280	808050-5-062 (2A4029)	1	Control, Electronic Engine (150-20 without Pb screen) OR	-	808050-5-056 (2A3898)	(V) (1)(A)(B)
01-280	808050-5-062 (2A4029)	1	Control, Electronic Engine (150-20 without Pb screen) OR	-	808050-5-044 (2A3899)	(V) (1)(A)(B)
01-280	808050-5-062 (2A4029)	1	Control, Electronic Engine (150-20 without Pb screen) OR	-	808050-5-042 (2A3901)	(V) (1)(A)(B)

FIG ITEM NO.	NEW PART NUMBER	QTY	PART TITLE	MAT	OLD PART NUMBER	INSTR DISP
01-280	808050-5-062 (2A4029)	1	Control, Electronic Engine (150-20 without Pb screen) OR	-	808050-5-060 (2A3910)	(V) (1)(A)(B)
01-280	824972-2-016 (2A4030)	1	Control, Electronic Engine (150-40 with Pb screen) OR	-	824972-2-014 (2A3911)	(V) (1)(A)(B)
01-280	824972-3-016 (2A4031)	1	Control, Electronic Engine (150-40 without Pb screen) OR	-	824972-3-008 (2A3893)	(V) (1)(A)(B)
01-280	824972-3-016 (2A4031)	1	Control, Electronic Engine (150-40 without Pb screen) OR	-	824972-3-010 (2A3894)	(V) (1)(A)(B)
01-280	824972-3-016 (2A4031)	1	Control, Electronic Engine (150-40 without Pb screen) OR	-	824972-3-014 (2A3912)	(V) (1)(A)(B)
01-280	824972-4-016 (2A4033)	1	Control, Electronic Engine (150-40 Slimline Casting with PB screen) OR	-	824972-4-014 (2A3928)	(V) (1)(A)(B)
01-280	824972-5-016 (2A4034)	1	Control, Electronic Engine (150-40 Slimline Casting without PB screen)	-	824972-5-014 (2A3929)	(V) (1)(A)(B)

D. Instructions/Disposition Code Statements:

(1) The new part can be obtained through modification by the approved procedure in the Accomplishment Instructions. Obtain the new parts from or return the old parts for modification to one of the approved vendors listed in the instructions.

(A) The new part will be available approximately 21 August 2006.

(B) The old part will no longer be supplied.

(V) This is the Hamilton Sundstrand part number.

E. Reidentified Parts

Reidentified Parts Data

New PN	Keyword	Old PN
808050-4-062 (2A4028)	Control, Electronic Engine (150-20 with Pb screen)	808050-4-042 (2A3488)
808050-4-062 (2A4028)	Control, Electronic Engine (150-20 with Pb screen)	808050-4-044 (2A3505)
808050-4-062 (2A4028)	Control, Electronic Engine (150-20 with Pb screen)	808050-4-056 (2A3840)
808050-4-062 (2A4028)	Control, Electronic Engine (150-20 with Pb screen)	808050-4-060 (2A3909)
808050-5-062 (2A4029)	Control, Electronic Engine (150-20 without Pb screen)	808050-5-056 (2A3898)
808050-5-062 (2A4029)	Control, Electronic Engine (150-20 without Pb screen)	808050-5-044 (2A3899)
808050-5-062 (2A4029)	Control, Electronic Engine (150-20 without Pb screen)	808050-5-042 (2A3901)
808050-5-062 (2A4029)	Control, Electronic Engine (150-20 without Pb screen)	808050-5-060 (2A3910)
824972-2-016 (2A4030)	Control, Electronic Engine (150-40 with Pb screen)	824972-2-014 (2A3911)
824972-3-016 (2A4031)	Control, Electronic Engine (150-40 without Pb screen)	824972-3-008 (2A3893)
824972-3-016 (2A4031)	Control, Electronic Engine (150-40 without Pb screen)	824972-3-010 (2A3894)
824972-3-016 (2A4031)	Control, Electronic Engine (150-40 without Pb screen)	824972-3-014 (2A3912)
824972-4-016 (2A4033)	Control, Electronic Engine (150-40 Slimline Casting with Pb screen)	824972-4-014 (2A3928)
824972-5-016 (2A4034)	Control, Electronic Engine (150-40 Slimline Casting without Pb screen)	824972-5-014 (2A3929)

R F. Tooling - Price and Availability

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

R (1) IAE Software Loader, PN IAE2P16552

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

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

R OR

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

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

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

R (2) EEC 150-20/150-40 Name Plate PN 751333-1 or modified Name Plate PN
R 822815-1.

G. Other Material Information Data

Not Applicable.

3. Accomplishment Instructions

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

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

R (1) Remove the EEC as specified in Reference 14, Aircraft Maintenance Manual,
R Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the
R location of the part.

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

R OR

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

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

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

R (a) Hamilton Sundstrand Corporation

R A United Technologies Company

R One Hamilton Road

R Dock W

R Windsor Locks, Ct. 06096-1010

R USA

R (b) Hamilton Sundstrand Corporation

R A United Technologies Company

R Worldwide Repair - Maastricht

R Maastricht Airport

R Horsterweg

R 6191 RX Beek

R The Netherlands

R (3) Install the EEC as specified in Reference 14, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010. See Table 2 for old and new part numbers.

R (4) Recording Instructions

R (a) A record of accomplishment is required.

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

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

R 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.

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

R 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.

R NOTE: Disassembly of the EEC is not required.

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

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

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

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

R (1) Section 1 - Prepare EEC for Software Load

R (a) Open the nacelle and prepare the aircraft for servicing as specified in Reference 14, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

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

R (c) If desired, remove the EEC as specified in Reference 14, Aircraft Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010. See Figure 1 for the location of the part.

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

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

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

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

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

R 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.

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

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

R (3) Section 3 - Install EEC Software

R Do the steps that follow:

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

R	Step	Action	Result(s)	Additional Information
R	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.

R	2	Connect Yellow Y Cable to PN IAE2P16552 and TDS Ranger as labeled.		System set up is complete.
R	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.
R	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.
R	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.
R	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.

R	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.

R	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.

R	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 scribed on the EEC. 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.	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	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.

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

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

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

R (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.

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

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

R (f) If necessary, install the EEC as specified in Reference 14, Aircraft
R Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

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

R (g) Close the nacelle and return the aircraft to service as specified in
R Reference 14, Aircraft Maintenance Manual, Chapter/Section 73-22-34,
R Task 73-22-34-400-010.

R (h) Recording Instructions

R (i) A record of accomplishment is required.

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

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

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

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

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

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

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

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

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

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

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

R (6) Section 6 - Test Cables and Equipment

R Do the steps that follow:

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

	Step	Action	Result(s)	Additional Information
R	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.
R	2	Connect Yellow Y Cable to PN IAE2P16552 and TDS Ranger as labeled.		System set up is complete.
R	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.
R	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.
R	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.
R	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.	
R	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.

R	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.
R	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".

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

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

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

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

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

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

R (8) Section 8 - Load Software into TDS Ranger

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

R Disassembly of the EEC is not required.

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

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

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

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

R (1) Section 1

R (a) Open the nacelle and prepare the aircraft for servicing as specified
R in Reference 14, Aircraft Maintenance Manual, Chapter/Section
R 73-22-34, Task 73-22-34-000-010.

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

R (c) If desired, remove the EEC as specified in Reference 14 Aircraft
R Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-000-010.
R See Figure 1 for the location of the part.

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

R (e) Connect power to all necessary equipment.

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

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

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

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

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

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

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

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

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

R (2) Section 2

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

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

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

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

R (3) Section 3

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

R NOTE: Some computers have the RETURN key designated ENTER.

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

R Type "LDR15O", then press the RETURN key. This starts the UART
R programming utility.

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

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

R (4) Section 4

R (a) The UART programming utility LDR15O will display the following
R message:

R "Enter operators name performing download: [ ] >"

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

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

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

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

R (b) The LDR15O program will display the following message:

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

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

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

R Type "C", then press the RETURN key.

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

R Type "Q", then press the RETURN key.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

R (i) To proceed with programming process:

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

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

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

R (iii) To quit the programming process:

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

R (5) Section 5

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

R (i) Status messages will scroll across the screen.

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

R EEC 150-20: 30 minutes.

R EEC 150-40: 10 minutes.

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

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

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

R "then"

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

R "then"

R "Turn ON POWER to the EEC"

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

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

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

R (d) Press the RETURN key.

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

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

R "then"

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

R "then"

R "Turn ON POWER to the EEC"

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

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

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

R (g) Press the RETURN key.

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

R "Turn OFF POWER to the EEC"

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

R Switch off the 28VDC supply to the EEC.

R (i) Press the RETURN key.

R (j) The LDR150 program will now display the status of the programming
R process.

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

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

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

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

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

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

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

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

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

R (6) Section 6

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

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

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

R (i) At the MSDOS prompt:

R Type "VLXXXX.LOG".

R (ii) Press the RETURN key.

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

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

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

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

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

R (i) If not already installed, install the software identification
R plate below the existing nameplate by the procedure specified
R in Reference 10, Hamilton Sundstrand SB EEC 150-20-73-16.

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

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

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

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

R (g) If necessary, install the EEC as specified in Reference 14, Aircraft
R Maintenance Manual, Chapter/Section 73-22-34, Task 73-22-34-400-010.

R (h) Close the nacelle and return the aircraft to service as specified in
R Reference 14, Aircraft Maintenance Manual, Chapter/Section 73-22-34,
R Task 73-22-34-400-010.

R (7) Recording Instructions

R (a) A record of accomplishment is required.

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

R (1) Replace the old EEC with a new one as specified in the Material
R Information Section.

R OR

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

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

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

R (a) Hamilton Sundstrand Corporation

R A United Technologies Company

R One Hamilton Road

R Dock W

R Windsor Locks, Ct. 06096-1010

R U.S.A.

R (b) Hamilton Sundstrand Corporation

R A United Technologies Company

R Worldwide Repair - Maastricht

R Maastricht Airport

R Horsterweg

R 6191 RX Beek

R The Netherlands

R (2) Recording Instructions

R (a) A record of accomplishment is required.

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

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

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

R See Part C of this Service Bulletin for Accomplishment Instructions.

R Table 1 Error Code Definitions

R ERROR CODE	ERROR TYPE	ACTION
R 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.
R E2	COMMUNICATION ERROR - Communication problem between EEC and IBM compatible computer.	Check BITE, cables, power supply, UART board, and EEC. Retry 3 times.
R 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.

R	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.

R Table 2 Reprogramming Input Reference Table

R A5 SCN19/X

	New P/N	Old P/N
R Trim Checksum	3835	n/a
R Reprogramming SD Card for IAE2P16552 R 150-20/150-40	1018294-1 or R PWA 107829 R OR	n/a
R Reprogramming Diskette R 150-20/150-40	819191-39 R OR	n/a
R Reprogramming Diskette R (Revised) R 150-20/150-40	819191-42	n/a

R NOTE: Revised disk can be used with old and new Hamilton Sundstrand laptop loaders. Existing disk can only be used with old loaders. All new loaders have a "-3" at the end of the part number. Old loaders have a "-1" or "-2" at the end of the part number. Please contact IAE Technical Service if there is any question concerning loader version.

R Reprogramming Diskette R 150-20/150-40	819191-46	n/a

R NOTE: This disk contains the addition of post SB 73-0200 part numbers for EEC 150-40's with solder joint corrected circuit boards and SCN 19 installed. Please refer to SB 73-0200 for a complete description of the issue along with part number interchangeability and the family tree.

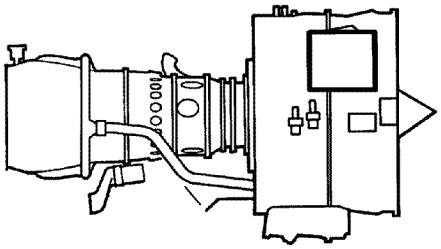
R 150-20 Production EEC: R (Pb Screen Yes) R (Flameshield No) R (HS HW Part No. R (PW Part No.)	808050-4-062 (2A4028)	808050-4-060 (2A3909)
R 150-20 EEC: R (Pb Screen Yes) R (Flameshield No) R (HS) HW Part No. R (PW Part No.)	808050-4-062 (2A4028)	808050-4-056 (2A3840)

R A5 SCN19/X

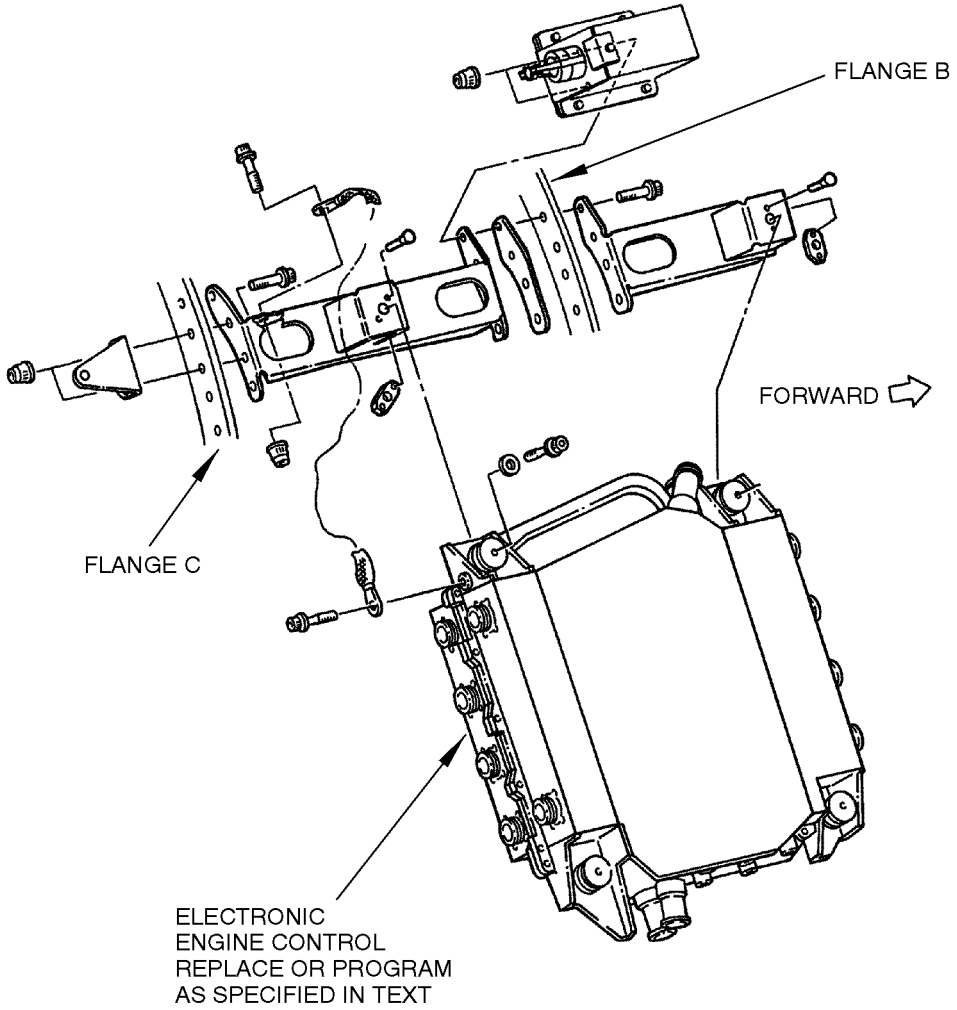
R		New P/N	Old P/N
R	150-20 EEC:		
R	(Pb Screen Yes)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-4-062	808050-4-044
R	(PW Part No.)	(2A4028)	(2A3505)
R	150-20 EEC:		
R	(Pb Screen Yes)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-4-062	808050-4-042
R	(PW Part No.)	(2A4028)	(2A3488)
R	150-20 EEC:		
R	(Pb Screen No)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-5-062	808050-5-056
R	(PW Part No.)	(2A4029)	(2A3898)
R	150-20 EEC:		
R	(Pb Screen No)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-5-062	808050-5-044
R	(PW Part No.)	(2A4029)	(2A3899)
R	150-20 EEC:		
R	(Pb Screen No)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-5-062	808050-5-042
R	(PW Part No.)	(2A4029)	(2A3901)
R	150-20 EEC:		
R	(Pb Screen No)		
R	(Flameshield No)		
R	(HS) HW Part No.	808050-5-062	808050-5-060
R	(PW Part No.)	(2A4029)	(2A3910)
R	150-40 Production EEC:		
R	(Pb Screen No)		
R	(Slimline Case Yes)		
R	(HS) HW Part No.	824972-5-016	824972-5-014
R	(PW Part No.)	(2A4034)	(2A3929)
R	150-40 EEC:		
R	(Pb Screen Yes)		
R	(Slimline Case No)		
R	(HS) HW Part No.	824972-2-016	824972-2-014
R	(PW Part No.)	(2A4030)	(2A3911)

R A5 SCN19/X

	New P/N	Old P/N
150-40 EEC:		
(Pb Screen No)		
(Slimline Case No)		
R (HS) HW Part No.	824972-3-016	824972-3-008
R (PW Part No.)	(2A4031)	(2A3893)
150-40 EEC:		
(Pb Screen No)		
(Slimline Case No)		
R (HS) HW Part No.	824972-3-016	824972-3-010
R (PW Part No.)	(2A4031)	(2A3894)
150-40 EEC:		
(Pb Screen No)		
(Slimline Case No)		
R (HS) HW Part No.	824972-3-016	824972-3-014
R (PW Part No.)	(2A4031)	(2A3912)
150-40 EEC:		
(Pb Screen Yes)		
(Slimline Case Yes)		
R (HS) HW Part No.	824972-4-016	824972-4-014
R (PW Part No.)	(2A4033)	(2A3928)



R

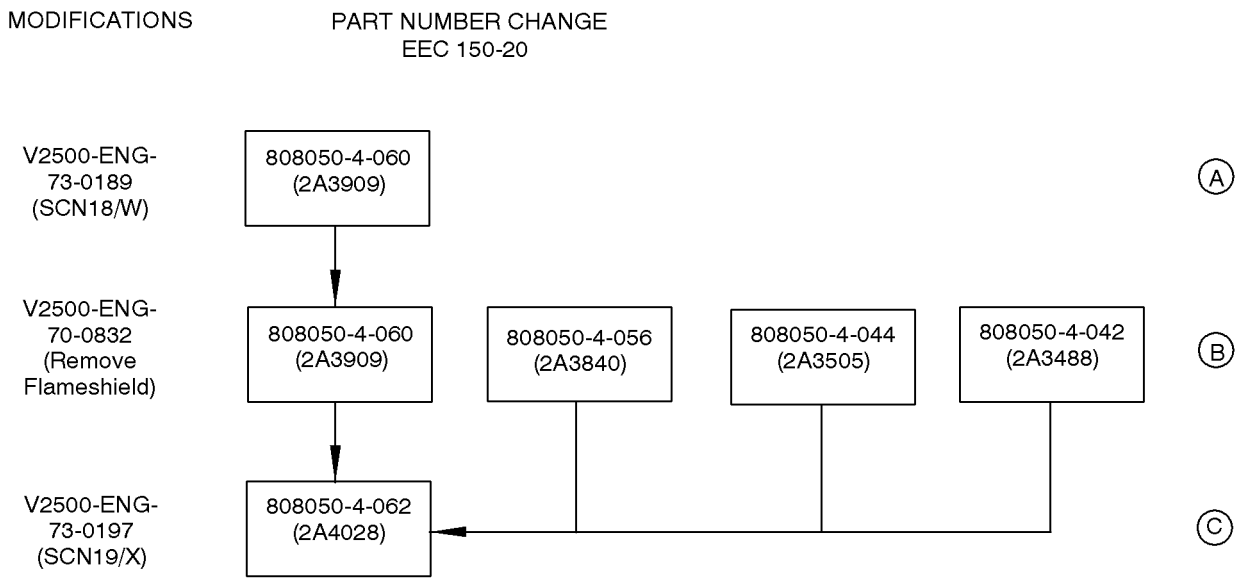


pw0b522845

R LOCATION OF THE ELECTRONIC ENGINE CONTROL
R 73-22-34
R FIGURE 1

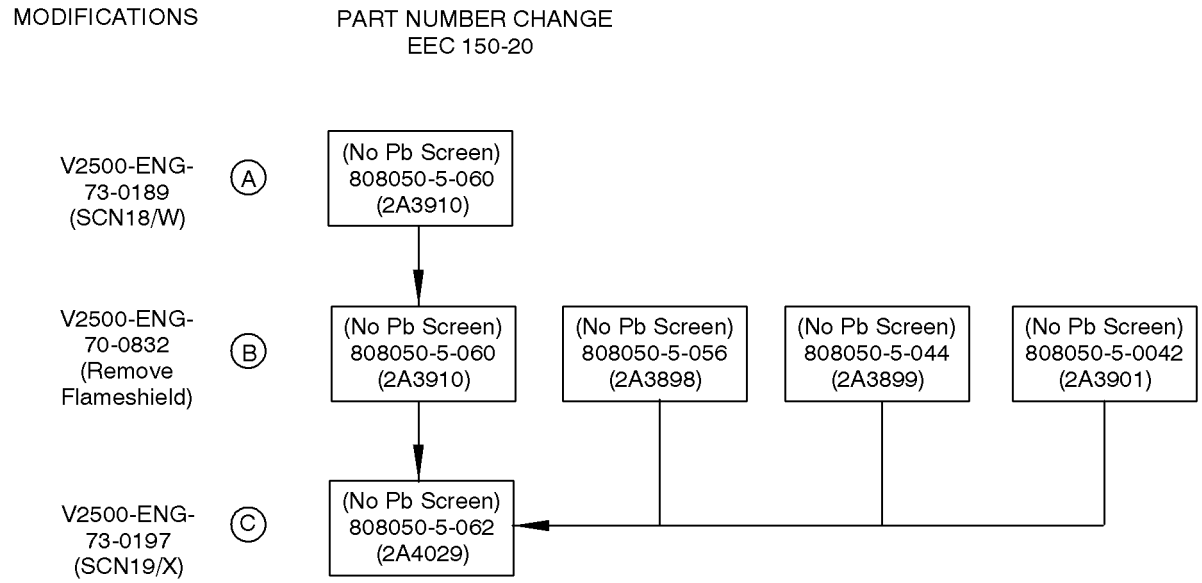
APPENDIX 1

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



pw0b518284

Family Tree - Electronic Engine Controller (EEC 150-20) Ref. Catalog Sequence No. 73-22-34. Fig 01 Item 280
Chart A (Sheet 1 of 2)

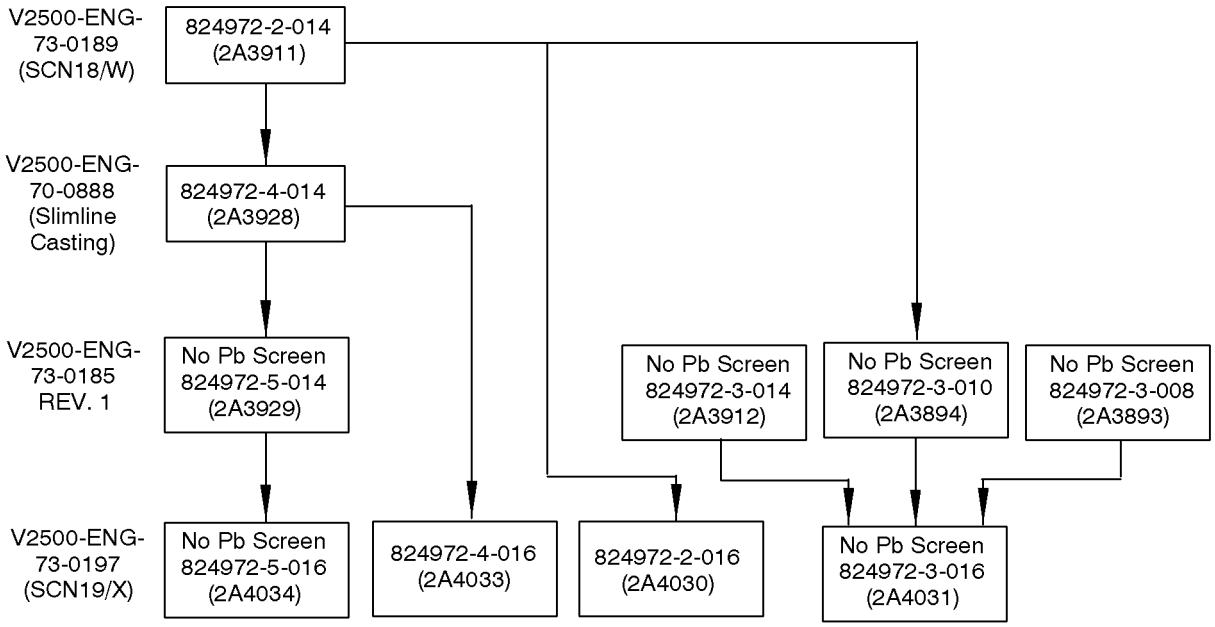


pw0b518285

Family Tree - Electronic Engine Controller (EEC 150-20) Ref. Catalog Sequence No. 73-22-34. Fig 01 Item 280
Chart A (Sheet 2 of 2)

MODIFICATIONS

PART NUMBER CHANGE
EEC 150-40



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Family Tree - Electronic Engine Controller (EEC 150-40) Ref. Catalog Sequence No. 73-22-34. Fig 01 Item 280
Chart B

APPENDIX 2

Added Data

R 1. Internal Reference Information

R	Revision No.	Reference Document	Origination
R	Original	EC05VZ001	DL/MN
R	1	EC05VZ001, EC06VC269	DL/MN
R	2	EC05VZ001, EC06VC269, EC05VZ001-01	DL/MN
R	3	EC05VZ001, EC06VC269, EC05VZ001-01, EC06VC269, EC07VC351	DL/MN/TR
R	4	IEN10VC024, IEN10VC057	AR/JDH

Number values shown in parentheses adjacent to U.S. values are International System of units (SI) equivalents.

SERVICE BULLETIN

ENGINE – FUEL AND CONTROL – TO PROVIDE A NEW ELECTRONIC ENGINE CONTROL (EEC) WITH A5 SCN19/X SOFTWARE

Supplement

V2500 All

1. Modification Kit

   A. IAE will provide free of charge the software diskettes required for reprogramming the EEC. Contact your local IAE Customer Support Representative who will coordinate the reprogramming effort with each customer.

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

2. Material Cost

   NOTE: Refer to IAE Spares and/or current Price Catalog for current prices.

   A. There is no new material cost to do this Service Bulletin when the part modification procedure is used.

3. New Production Parts

New Production Part Number	Description	Unit Price US Dollars
808050-4-062 (2A4028)	Control, Electronic Engine (150-20 Pb screen Yes)	Contact IAE for price quote and lead time
824972-5-016 (2A4034)	Control, Electronic Engine (150-40) (Pb screen No) (Slimline Case Yes)	Contact IAE for price quote and lead time

R