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SERVICE BULLETIN

ENGINE CONTROLS - POWER CONTROLS - Rework Electronic Control Unit (ECU), PN 2119576-1011 to PN 2119576-1013, or Install ECU PN 2119576-1013 on the AS907-1-1A Engine Model

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Transmittal Information

ATA Number AS907-76-9031 (Publication Number D202101001575)

Summary

This revision is a FULL replacement. This revision includes the changes that follow:

- Updated Keyword/ Nomenclature of New PNs SM4208004-5001, SW4208026-1003, SM70100863-1001, SW70100864-1001 and deleted Instructions/ Disposition Code 4 of New PN SM70100863-1001 in Table 7.
- Updated the text from "Download" to "Load" in footnote 6 under Table 7.
- Updated footnote 7 under Table 7.
- Added the text "load tool" in Paragraph 3.C.(4) and Paragraph 3.C.(4)(b).
- Added the text "ECU software" in Paragraph 3.C.(14)(a).
- Added the text ", if applicable" in Paragraph 3.C.(15).

The information that is identified with revision bars is listed in the Revision History section. Revision bars are not used before Paragraph 1.A. The editorial changes and information that was moved, removed, or reformatted are not identified with revision bars.

Refer to Paragraph 4.A. for a list of the acronyms and abbreviations used in this service bulletin.

Revision History

This service bulletin has had two revision(s) as shown in Table 1.

Revision Number	Revision Date
0	2 Dec 2021
1	13 Apr 2022
2	15 May 2022

Table 1. Revision History

Highlights

This section issues Revision 2 to Service Bulletin, ATA Number AS907-76-9031 (Publication Number D202101001575), and contains these changes:

The list of highlights tells the users about the changes that the revision makes. The list has three columns. The "Page" column shows the block of data that the revision changes and the page on which the block begins. The block can be a section, subsection, graphic, table, etc. Revision marks give the location of the change in the block. The "Description" column tells the user about the change or changes in each block. A paragraph, table, or figure reference often comes before the description. The "Effectivity" column tells the user about the part

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number(s) to which the block of information applies. The default value for this column is "All." "All" means that the block applies to all parts.

Page	Description	Effectivity
13	Paragraph 2.C. Updated Keyword/ Nomenclature of New PNs SM4208004-5001, SW4208026-1003, SM70100863-1001, SW70100864-1001 and deleted Instructions/ Disposition Code 4 of New PN SM70100863-1001 in Table 7.	All
13	Paragraph 2.C. Updated the text from "Download" to "Load" in footnote 6 under Table 7.	All
13	Paragraph 2.C. Updated footnote 7 under Table 7.	All
20	Paragraph 3.C.(4) . Added the text "load tool" in Paragraph.	All
20	Paragraph 3.C.(4)(b) . Added the text "load tool" in Paragraph.	All
21	Paragraph 3.C.(14)(a) . Added the text "ECU software" in Paragraph.	All
22	Paragraph 3.C.(15) . Added the text ", if applicable" in Paragraph.	All





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1. Planning Information

A. Effectivity

- (1) This is a CATEGORY 1, SAFETY service bulletin.
 - <u>NOTE</u>: Category 1 service bulletins address safety issues, typically require urgent action and are often, but not always, referred to by FAA Airworthiness Directives. Category 1 bulletins may be labeled ALERT when immediate attention is required. ALERT service bulletins are printed on light blue paper. Category 1 bulletins will have variable compliance time which will be specific to the individual issue.
- (2) This service bulletin is applicable to the turbofan aircraft engines shown in Table 2.

PN	Model Number	Prior to Serial Number ¹	Application
3030001-4	AS907-1-1A	ALL	Bombardier BD-100-1A10 (Challenger 300)

NOTE:

1. Improvement provided by the service bulletin have been approved for all existing units.

B. Concurrent Requirements

(1) The service bulletin listed in Table 3 shall be accomplished prior to or concurrent with this service bulletin. The accomplishment instructions outlined in each service bulletin stand alone; therefore, compliance with this service bulletin does not indicate compliance with any other service bulletin.

Table 3. Concurrent Service Bulletin

Service Bulletin Number	Service Bulletin Title
AS907-76-9021	ENGINE CONTROLS - POWER CONTROLS - Apply Sealant to Prevent Water Entry into Electronic Control Unit (ECU) on AS907 Model Engines

(2) Accomplishment of the service bulletin listed in Table 4 will no longer be applicable when the equipment has been modified in accordance with the accomplishment instructions outlined in this service bulletin.

Table 4. No Longer Applicable Service Bulletin

Service Bulletin Number	Service Bulletin Title
AS907-72-9040	ENGINE - GENERAL - Annunciation of Oil Chip Detect Events

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C. Reason

WARNING: FAILURE TO COMPLY WITH THIS SERVICE BULLETIN COULD RESULT IN A MULTI-SURGE EVENT ON ONE OR BOTH ENGINES DURING TAKEOFF CLIMB OUT THROUGH A TEMPERATURE INVERSION AND BELOW 400 FEET (121.92 M) ABOVE GROUND LEVEL. THIS HAZARD COULD IMPACT AIRCRAFT RATE OF CLIMB AND OBSTACLE VERTICAL CLEARANCE, RESULTING IN THE POTENTIAL FOR SERIOUS INJURY OR DEATH TO PERSONNEL AND/OR DAMAGE TO OR LOSS OF THE AIRCRAFT.

- (1) Honeywell has developed a software upgrade for ECU PN 2119576-1011 that include:
 - (a) Addresses a susceptibility to engine surge during takeoff climb out if a significant temperature inversion exists that was identified and classified as a safety issue.
 - (b) Provides several fault and detection accommodation improvements.
 - (c) The software update will reidentify ECU, PN 2119576-1011 to PN 2119576-1013.
- (2) The possibility exists that one or both engines on the aircraft may experience compressor surge with the existing engine inlet total temperature (TT2) parameter lockout logic for takeoff and initial climb out to 400 feet (121.92 m) above ground level (AGL) when a significant temperature inversion is present. Honeywell has updated the logic associated with the TT2 parameter in the ECU software to eliminate this hazard.

(3) Background:

- (a) Upgrade the software version for the ECU from software AS907_1001 (commonly called Version 10B) to software AS907_1101 (commonly called Version 11B) and re-identify the ECU, PN 2119576-1011 with PN 2119576-1013, or replace the ECU, PN 2119576-1011 with PN 2119576-1013.
- (b) New ECU software includes:
 - Removal of TT2 lockout feature used for engine dynamic control during takeoff
 - Updated TT2 filter time constant to be consistent with aircraft climb and descend capabilities
 - Improved surge detection and recovery logic to prevent no throttle response after a multiple, rapid surge event
 - Improved compressor discharge pressure (P3) fault detection and signal detection logic
 - Improved fault detection on the overspeed system to prevent incorrect intermittent reads of the overspeed status words from causing an inflight shutdown event
 - Modify exhaust gas temperature (EGT) and cold junction compensation (CJC) built-in-test logic
 - Improved cross-channel data link fault accommodation logic to address rapid intermittent failures
 - Revised power supply fault detection to ensure ±15 V supply failures drive master-kill



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- Added power lever angle (PLA) and compressor guide vane (CGV) variance detection logic and updated existing EGT variance detection logic to improve detection of in-range failure modes
- Updated oil pressure signal fault detection and accommodation logic to ensure a potentially erroneous oil pressure signal is not used when two faults have occurred
- Updated health score and degraded mode logic to ensure pre-emptive action such as channel swapping occurs to prevent more severe failures
- Raised the compressor speed (N2) maximum limit while in degraded mode 1 to reduce the risk of loss of thrust control (LOTC) events
- Added No Dispatch (ND) condition when one ECU loses ability to detect overspeed and the other ECU loses ability to shut down the engine
- Updated thrust reverser (TR) BIT logic to ensure there is no unintended activation of the TR during maintenance
- Updated TR state determination logic to ensure rapid throttle movements will not cause the control system to erroneously detect TR failures
- Updated the TR idle set logic to mitigate the possibility of a dual failure mode causing asymmetric thrust due to the TR deploying on one engine and not the other
- Updated the TR opening/closing timeout logic to include the engine at or above idle to allow the detection of TR fail due to timeout in the event the maintenance switch is failed on
- Added fuel interrupt logic to enhance the recovery of extended fuel interrupt durations
- Added CGV BIT to compare CGV actual position against commanded position to ensure proper functionality of the system
- Revised chip detection logic to properly store the chip zap count and set a crew alerting system (CAS) message after 20 chip zaps.

(4) Action:

(a) Upgrade the software version for the ECU from software AS907_1001 (V10B) to software AS907_1101 (V11B) and re-identify the ECU, PN 2119576-1011 with PN 2119576-1013, or replace the ECU, PN 2119576-1011 with PN 2119576-1013.

D. Description

- (1) This service bulletin provides instructions for reprogramming and re-identification of ECU, PN 2119576-1011 to PN 2119576-1013.
- (2) This service bulletin authorizes installation of ECU, PN 2119576-1013.
- (3) The reprogramming and re-identification, or installation may be accomplished on AS907-1-1A engines installed on the aircraft.

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E. Compliance

- (1) Compliance addresses a safety issue.
- (2) Honeywell recommends that this service bulletin be accomplished at next scheduled engine or airframe maintenance, but no later than November 27, 2023.

F. Approval

(1) The accomplishment instructions are FAA approved.

G. Manpower

- (1) ECU Software Reprogramming: An estimated 4 man-hours per engine are required to upload the software and re-identify the two (2) ECUs.
- (2) ECU Change / Replacement should be accomplished only if the ECU software reprogramming is unsuccessful and the ECU(s) are locked during the software upgrade. Evidence of ECU lock up must be provided to Honeywell prior to ECU replacement. Evidence of lock up needs to be provided in the form of laptop screen shot capture showing the download error. The error may be one of several messages, with the typical message being "Error occurred during download (the data load remote function did not complete successfully)".
 If required, an estimated 2 man-hours are required for the change/replacement of two.

If required, an estimated 2 man-hours are required for the change/replacement of two (2) ECUs per engine.

(3) An estimated 2 man-hours are required for the engine power assurance run for both engines.

H. Weight and Balance

(1) None.

I. Electrical Load Data

(1) Not applicable.

J. Software Accomplishment Summary

(1) Not applicable.



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K. References

(1) The sources of information used in the preparation of this service bulletin include Honeywell engineering documentation and the documents listed in Table 5.

	Table	5.	Sources	of	Information
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Part/Model Number	Heavy Maintenance	Light Maintenance	Illustrated Parts
	Manual	Manual ¹	Catalog ¹
AS907-1-1A	72-05-13	72-05-12	72-05-11

NOTE:

- 1. Affected Chapter/Section/Subject 76-10-05.
 - (2) Refer to the following tasks in the engine light maintenance manual (LMM):
 - Task 72-00-00-810-801-A01, Fault Isolation
 - Subtask 72-00-00-700-005-A01, Testing
 - Subtask 72-00-00-700-012-A01, Testing
 - Task 76-10-05-020-802-A01, Removal
 - Task 76-10-05-420-802-A01, Installation.
 - (3) Honeywell Software Requirements Specification for electronic engine interface (EEI) 21-12679B.
 - (4) Software Download Procedures per Table 7.

L. Other Publications Affected

(1) Same as those listed under Paragraph 1.K.(1).

M. Interchangeability or Intermixability of Parts

(1) Not applicable.

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2. <u>Material Information</u>

A. Material - Price and Availability

- (1) Information regarding price and availability of parts may be obtained from a Honeywell-authorized service facility. You can also use the "Dealer and Service Center Locator" tool at https://aerospace.honeywell.com to find approved service locations. Get the price and availability of parts from the Honeywell Product Catalog at https://aerospace.honeywell.com. If the part is not in the catalog, go to Honeywell, Aerospace Contact Team, Telephone: 800-601-3099 (Toll Free U.S.A./Canada), 602-365-3099 (International Direct).
- (2) Refer to Paragraph 2.C. for information regarding price of parts required to accomplish this service bulletin.

B. Industry Support Information

- (1) Send claims through the Honeywell MyAerospace web portal (https://aerospace.honeywell.com). Select Service & Support and use Warranty & Protection Plans.
- (2) A special/warranty program may be available for this modification, under certain conditions, provided compliance recommendations of Paragraph 1.E. are met. Information on special/warranty program and availability of parts may be obtained from a Honeywell-authorized service facility. You can also use the "Dealer and Service Center Locator" tool at https://aerospace.honeywell.com to find approved service locations.
- (3) The warranty/program data is listed in Table 6.
 - <u>NOTE</u>: The procedures outlined in this service bulletin may be accomplished at the Select Line Maintenance level or greater.

Table 6. Warranty/Program Data

Warranty/Program	Yes ^{1, 2}	No
In Warranty		
original equipment manufacturer (OEM) Warranty (Standard new engine warranty)		x
Spare Part Warranty (Standard new spare part warranty)		x
Special Program Number (SPGM) (Programs in which special pricing and/or special conditions may apply)		x
Special Pricing Notice (SPN) Number (Reduction from catalog list pricing, i.e., "P" condition pricing may apply)		x
Out of Warranty		
SPGM 30 (Programs in which special pricing and/or special conditions may apply)	X	

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Table 6. Warranty/Program Data (Cont)

Warranty/Program	Yes ^{1, 2}	No
SPN Number		Х
(Reduction from catalog list pricing, i.e., "P" condition pricing may apply)		
Maintenance Service Program (MSP)	Х	

NOTES:

1.

The costs of compliance with this service bulletin may be covered by Warranty, MSP, or other Programs marked with an "X" in the "Yes" column, subject to the terms and conditions of the applicable Warranty, MSP, or other Programs contracts. This service bulletin in no way alters, modifies, or extends the terms of any Warranty, MSP, or other Programs contract. For clarification or questions, contact Honeywell Warranty Department at 800-601-3099, Domestic or 602-365-3099, International and select Option No. 2.

- 2. Send claims through the Honeywell MyAerospace web portal (https://aerospace.honeywell.com). Select Service & Support and use Warranty & Protection Plans.
 - (4) Refer to Paragraph 2.C. for information regarding price of parts required to accomplish this service bulletin.

C. Material Necessary for Each Engine

- (1) The parts required to accomplish the instructions outlined in this service bulletin are shown in Table 7. Refer to Table 8 for the Instructions/Disposition Codes.
 - <u>NOTE</u>: Applicable illustrated parts catalogs and spare parts bulletins, dated later than the original issue date of this service bulletin, may introduce different parts for installation. Refer to these documents before ordering parts.
 - <u>NOTE</u>: Expendable parts, discarded in gaining access to the affected area of the equipment, are not included.

New PN	Keyword/ Nomenclature	Old PN	Qty	Unit Price ¹	Instructions/ Disposition Codes
2119576-1013	Electronic Control Unit (ECU)	2119576-1011	2 ²		C, O
4244228-1050	Supplemental Label	N/A	2 ^{3, 4}		
SM4208004-5001 Rev A	ECU Software	N/A			4, 5
SW4208026-1003, Rev A, 12 June 2020	Software Load Procedures (Windows 95, 98, 2000, ME, XP, NT, or 7)				6

Table 7. Operator-Purchased Material

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Table 7. Operator-Purchased Material (Cont)

New PN	Keyword/ Nomenclature	Old PN	Qty	Unit Price ¹	Instructions/ Disposition Codes
SM70100863-1001 Rev -	Software Load Tool Software (Windows 10)				7
SW70100864-1001	Software Load Procedure (Windows 10)				8

NOTES:

- 1. Refer to Paragraph 2.A. for information regarding price and availability of parts.
- 2. Quantity is two per engine (four per aircraft). The ECUs on BOTH engines on the aircraft must be upgraded at the same time.
- 3. The labels PN 4244228-1050 are for ECUs upgraded to PN 2119576-1013, 1 per ECU as required.
- 4. Available only to Honeywell personnel or Honeywell authorized personnel (Service Center Network) to rework the ECU.
- 5. ECU software PN SM4208004-5001 Rev A MEDIA is available for download from the Honeywell Portal (https://aerospace.honeywell.com). Prior registration is required in order to download ECU software. Save the zip file to an identified folder on the laptop computer hard drive.
- Software Load Procedure PN SW4208026-1003, Rev A, 12 June 2020 document required with Windows 95, 98, 2000, ME, XP, NT, or 7 computer operating system and will be provided to Honeywell Authorized Service provider by Honeywell. This document is not accessible from the Honeywell Portal.
- 7. Software Load Tool PN SM70100863-1001 Rev- required with Windows 10 computer operating system is available for download from the Honeywell Portal (https://aerospace.honeywell.com). Prior registration is required in order to download Software Load Tool software. Save the zip file to an identified folder on the laptop computer hard drive.
- 8. Software Load Procedure PN SW70100864-1001 document required with Windows 10 computer operating system is available for download from the Honeywell Portal (https://aerospace.honeywell.com). Prior registration is required in order to download software. Save the file to an identified folder on the laptop computer hard drive.

Table 8. Instructions/Disposition Codes

Code	Description
Disposition Code C	Rework or replace part as specified in this SB. If replaced, evidence of failure or lockup during reprogramming is required.
Disposition Code O	A replacement part is available on an Exchange Basis if the ECU has failed or experiences lockup during the reprogramming process.

D. Material Necessary for Each Spare

(1) The same as given in Paragraph 2.C.

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E. Reidentified Parts

- (1) Not applicable.
- F. Tooling Price and Availability
 - (1) Not applicable.

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3. Accomplishment Instructions

A. General Information

- (1) Obey the precautions.
- <u>NOTE</u>: Publications listed in Paragraph 1.K.(1) provide applicable disassembly, cleaning, inspection, reassembly, and testing instructions and shall be referred to during the accomplishment of the following instructions.
- (2) These accomplishment instructions are divided into two segments.
 - To rework the ECUs with engines installed on aircraft, refer to Paragraph 3.B., or Paragraph 3.C.
 - To replace the ECUs with engines installed on aircraft, refer to Paragraph 3.D.
- (3) Both ECUs on both engines must be reworked, or replaced, concurrently for engines installed on the aircraft. Both ECUs on the engine must be reworked, or replaced, concurrently for engine not installed on aircraft.

B. Rework ECU, PN 2119576-1011 to PN 2119576-1013 with Engines Installed on Aircraft (Utilizing Computer with Windows 95, 98, 2000, ME, XP, NT, or 7 Operating System)

- NOTE: Both ECUs on both engines must be reworked concurrently.
- (1) Make sure an EEI data download of all ECUs has been performed. Refer to engine LMM, Task 72- 00-00-810-801-A01, Fault Isolation.
- (2) Ensure ECU software PN SM4208004-5001 Rev A has been downloaded from the Honeywell Portal.
- (3) Save the Zip file to an identified folder on the laptop computer.
- (4) Unzip (extract) file to access software. Save extracted files to an identified folder.
- (5) Remove electrical power from all four ECUs. Open and tag applicable circuit breakers. Refer to the applicable aircraft maintenance manual (AMM).
- (6) Remove the upper cowling ECU access panels. Refer to the applicable AMM.
- (7) Record the part number, serial number, series, and modification record from the existing ECU nameplate for each ECU in Table 9 for use during software reprogramming.

Table 9. Record Initial ECU Information

ECU Location	ECU PN	ECU SN	ECU Series	ECU MOD
LH Engine ECU A (outboard)				
LH Engine ECU B (inboard)				
RH Engine ECU A (inboard)				

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Table 9. Record Initial ECU Information (Cont)

ECU Location	ECU PN	ECU SN	ECU Series	ECU MOD
RH Engine ECU B				
(outboard)				

(8) Record the part number, serial number, and model number from the engine nameplate for each engine in Table 10 for use following the software reprogramming process.

Table 1	0.	Record	Engine	Information
	•••		ge	

Engine Location	Engine PN	Engine SN	Engine Model No.
Left Engine			
Right Engine			

- (9) Make sure external DC (28V) power (ground cart) is available to the aircraft.
- (10) Connect the laptop personal computer (PC) loaded with EEI software Version 3.00.00 to 110V electrical power using PC power cord and adapter. Confirm laptop PC COM ports associated with each ECU. Record PC COM port assignment in Table 11.

Table 11. Record COM Ports

ECU Location	PC COM Port
LH Engine ECU A (outboard)	
LH Engine ECU B (inboard)	
RH Engine ECU A (inboard)	
RH Engine ECU B (outboard)	

NOTE:

- 1. Do not rely on laptop battery power during software reprogramming. Disable laptop screen savers and power management.
 - (11) Connect the cabling to laptop PC loaded with EEI software Version 3.00.00. Refer to the engine LMM, Task 72-00-00-810-802-A01, Fault Isolation.
 - (12) Connect the electrical power to the aircraft. Refer to the applicable AMM.
 - (13) Reset the circuit breaker for the ECU to be programmed. Verify the circuit breakers for the remaining ECUs are disengaged. Refer to the AMM.
 - (14) Update ECU software as follows:
 - (a) Load Version PN SM4208004-5001 Rev A software as specified in Software Download Procedure PN SW4208026-1003 Rev A, 12 June 2020.

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- (b) Access ECU software from the temporary directory recorded in Paragraph 3.B.(4).
- (c) Load ECU software using the laptop PC COM port recorded in Table 11.
- (d) At the completion of the reprogramming process extract post reprogram software data as specified in Software Download Procedure PN SW4208026-1003 Rev A, 12 June 2020.
 - <u>1</u> Verify the following are displayed:
 - Operational Software CRC = 0xd2f35295
 - Operational Software Version = AS907_1101.
- (e) Update ECU hardware identification with PN 2119576-1013. Refer to the Software Download Procedure PN SW4208026-1003 Rev A, 12 June 2020.
- (f) Update ECU hardware identification with the serial number and Hardware MOD Record identified in Table 9.
- (15) Repeat Paragraph 3.B.(13) and Paragraph 3.B.(14) for remaining ECUs. For any ECU which the software reprogramming is unsuccessful and the ECU is locked during the software upgrade, see Paragraph 3.D.
- (16) After reprogramming ECUs, remove the electrical power from all ECUs by pulling all four ECU circuit breakers. Wait 5 seconds. Reset all four ECU circuit breakers at the same time. Refer to the applicable AMM.
 - <u>NOTE</u>: Make sure there are no inappropriate engine-related CAS messages or faults on either the engine indication and crew alerting system (EICAS) or the maintenance diagnostic computer (MDC).
- (17) Start the EEI application. Select the "Initialize Engine" function and initialize all ECUs with engine data recorded in Table 10.
 - <u>NOTE</u>: Make sure there are no inappropriate engine-related CAS messages or faults on either the EICAS or the MDC.
- (18) Re-identify each reprogrammed ECU PN 2119576-1011 using supplemental label, PN 4244228-1050, as specified in Software Download Procedure PN SW4208026-1003 Rev A, 12 June 2020.
 - <u>NOTE</u>: If the ECU was originally manufactured as PN 2119576-1011 ensure the ECU part number suffix is marked out on the ECU nameplate. Refer to Figure 1.



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Figure 1. ECU Nameplate

- (19) Install the upper cowling ECU access panels. Refer to the applicable AMM.
- (20) Disconnect the cabling to laptop PC.
- (21) Do a normal engine start. Refer to the engine LMM, Subtask 72-00-00-700-005-A01, Testing, and the applicable AMM.
- (22) Make sure the engine is stable at ground idle for 3 minutes.
- (23) Move the power lever slowly to a maximum of 80 percent N2. Make sure the engine is stable for 3 minutes.
- (24) Move the power lever slowly to ground idle. Make sure the engine is stable for 3 minutes.
- (25) Do an operational check of the TRs. Refer to the applicable AMM.
- (26) Do a normal engine shutdown. Refer to the engine LMM, Subtask 72-00-00-700-012-A01, Testing, and the applicable AMM.
- (27) Make an entry in the engine log book noting date of compliance, engine operating time, part number(s) and serial number(s) of installed component(s) (as applicable), and compliance with this service bulletin (and service bulletin revision number, if applicable).
- (28) Complete the Certificate of Compliance form in Paragraph 4.B. and send to Honeywell.

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C. Rework ECU, PN 2119576-1011 to PN 2119576-1013 with Engines Installed on Aircraft (Utilizing Computer with Windows 10 Operating System)

NOTE: Both ECUs on both engines must be reworked concurrently.

- (1) Make sure an EEI data download of all ECUs has been performed. Refer to engine LMM, Task 72-00-00-810-801-A01, Fault Isolation.
- (2) Ensure software load procedure PN SW70100864-1001 Rev has been downloaded from the Honeywell Portal.
 - (a) Save the file to an identified folder on the laptop computer.
- (3) Ensure ECU software PN SM4208004-5001 Rev A has been downloaded from the Honeywell Portal.
 - (a) Save the Zip file to an identified folder on the laptop computer.
 - (b) Unzip (extract) file to access software. Save extracted files to an identified folder.
- (4) Ensure software load tool PN SM70100863-1001 Rev has been downloaded from the Honeywell Portal.
 - (a) Save the Zip file to an identified folder on the laptop computer.
 - (b) Unzip (extract) file to access software load tool. Save extracted files to an identified folder.
 - (c) Install software load tool utilizing 'setup.exe' per software load procedure PN SW70100864-1001 Rev -, if not done so previously.
- (5) Remove electrical power from all four ECUs. Open and tag applicable circuit breakers. Refer to the applicable aircraft maintenance manual (AMM).
- (6) Remove the upper cowling ECU access panels. Refer to the applicable AMM.
- (7) Record the part number, serial number, series, and modification record from the existing ECU nameplate for each ECU in Table 12 for use during software reprogramming.

ECU Location	ECU PN	ECU SN	ECU Series	ECU MOD
LH Engine ECU A (outboard)				
LH Engine ECU B (inboard)				
RH Engine ECU A (inboard)				
RH Engine ECU B (outboard)				

Table 12. Record Initial ECU Information

(8) Record the part number, serial number, and model number from the engine nameplate for each engine in Table 13 for use following the software reprogramming process.



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Table 13. Record Engine Information

Engine Location	Engine PN	Engine SN	Engine Model No.
Left Engine			
Right Engine			

- (9) Make sure external DC (28V) power (ground cart) is available to the aircraft.
- (10) Connect the laptop personal computer (PC) loaded with EEI software version 3.00.00, or EEI for Forge (EEIFF), to 110V electrical power using PC power cord and adapter. Confirm laptop PC COM ports associated with each ECU. Record PC COM port assignment in Table 14.

Table 14. Record COM Ports

ECU Location	PC COM Port
LH Engine ECU A (outboard)	
LH Engine ECU B (inboard)	
RH Engine ECU A (inboard)	
RH Engine ECU B (outboard)	

NOTE:

- 1. Do not rely on laptop battery power during software reprogramming. Disable laptop screen savers and power management.
 - (11) Connect the cabling to laptop PC loaded with EEI software version 3.00.00, or EEI for Forge (EEIFF). Refer to the engine LMM, Task 72-00-00-810-802-A01, Fault Isolation.
 - (12) Connect the electrical power to the aircraft. Refer to the applicable AMM.
 - <u>NOTE</u>: The Windows 10 load tool provides the flexibility to load software into all four (4) ECUs simultaneously. To use this feature, all four (4) circuit breakers must be reset before beginning the software load procedure.
 - (13) Reset the circuit breaker for the ECU(s) to be programmed. Verify the circuit breakers for any remaining ECUs are disengaged if not reprogramming all ECUs simultaneously. Refer to the AMM.
 - (14) Update ECU software as follows:
 - (a) Load ECU software version PN SM4208004-5001 Rev A software as specified in Software Load Procedure PN SW70100864-1001 Rev -.
 - (b) Access ECU software from the temporary directory recorded in Paragraph 3.C.(3)(b).
 - (c) Load ECU software using the laptop PC COM port recorded in Table 14.

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- (d) At the completion of the reprogramming process extract post reprogram software data as specified in Software Load Procedure PN SW70100864-1001 Rev -.
 - <u>1</u> Verify the following are displayed:
 - Operational Software CRC = 0xd2f35295
 - Operational Software Version = AS907_1101.
- (e) Update ECU hardware identification with PN 2119576-1013. Refer to the Software Load Procedure PN SW70100864-1001 Rev -.
- (f) Update ECU hardware identification with the serial number and Hardware MOD Record identified in Table 12.
- (15) Repeat Paragraph 3.C.(13) and Paragraph 3.C.(14) for remaining ECUs, if applicable. For any ECU which the software reprogramming is unsuccessful and the ECU is locked during the software upgrade, see Paragraph 3.D.
- (16) After reprogramming ECUs, remove the electrical power from all ECUs by pulling all four ECU circuit breakers. Wait 5 seconds. Reset all four ECU circuit breakers at the same time. Refer to the applicable AMM.
 - <u>NOTE</u>: Make sure there are no inappropriate engine-related CAS messages or faults on either the engine indication and crew alerting system (EICAS) or the maintenance diagnostic computer (MDC).
- (17) Start the EEI application. Select the "Initialize Engine" function and initialize all ECUs with engine data recorded in Table 13.
 - <u>NOTE</u>: Make sure there are no inappropriate engine-related CAS messages or faults on either the EICAS or the MDC.
- (18) Re-identify each reprogrammed ECU PN 2119576-1011 using supplemental label, PN 4244228-1050, as specified in Software Load Procedure PN SW70100864-1001 Rev -.
 - <u>NOTE</u>: If the ECU was originally manufactured as PN 2119576-1011 ensure the ECU part number suffix is marked out on the ECU nameplate. Refer to Figure 2.



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Figure 2. ECU Nameplate

- (19) Install the upper cowling ECU access panels. Refer to the applicable AMM.
- (20) Disconnect the cabling to laptop PC.
- (21) Do a normal engine start. Refer to the engine LMM, Subtask 72-00-00-700-005-A01, Testing, and the applicable AMM.
- (22) Make sure the engine is stable at ground idle for 3 minutes.
- (23) Move the power lever slowly to a maximum of 80 percent N2. Make sure the engine is stable for 3 minutes.
- (24) Move the power lever slowly to ground idle. Make sure the engine is stable for 3 minutes.
- (25) Do an operational check of the TRs. Refer to the applicable AMM.
- (26) Do a normal engine shutdown. Refer to the engine LMM, Subtask 72-00-00-700-012-A01, Testing, and the applicable AMM.
- (27) Make an entry in the engine log book noting date of compliance, engine operating time, part number(s) and serial number(s) of installed component(s) (as applicable), and compliance with this service bulletin (and service bulletin revision number, if applicable).
- (28) Complete the Certificate of Compliance form in Paragraph 4.B. and send to Honeywell.

D. Replace ECU, PN 2119576-1011 with PN 2119576-1013, with Engines Installed on Aircraft

- <u>NOTE</u>: ECU Change / Replacement should be accomplished only if the ECU software reprogramming per Paragraph 3.B., or Paragraph 3.C. is unsuccessful, and the ECU(s) are locked during the software upgrade. Evidence of ECU lock up must be provided to Honeywell prior to ECU replacement, see Paragraph 1.G.(2).
- <u>NOTE</u>: Both ECUs on both engines must be reprogrammed per Paragraph 3.B., or Paragraph 3.C., or replaced concurrently.

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- (1) Remove the upper cowling ECU access panels. Refer to the applicable AMM.
- (2) Record the part number, serial number, and model number from the engine nameplate for each engine in Table 15 for use following ECU replacement.

Table 15. Engine Information

Engine Location	Engine PN	Engine SN	Engine Model No.
Left Engine			
Right Engine			

- (3) Make sure an EEI data download of all ECUs has been performed with laptop PC loaded with EEI software Version 3.00.00, or EEI for Forge (EEIFF), as appropriate. Refer to engine LMM, Task 72-00-00-810-801-A01, Fault Isolation. (4) Remove the electrical power from the aircraft. Refer to the applicable AMM. (5) Remove the ECU(s), PN 2119576-1011. Refer to the engine LMM, Task 76-10-05-020-802-A01, Removal. (6) Install the new ECU(s), PN 2119576-1013. Refer to the engine LMM, Task 76-10-05-420-802-A01. Installation. (7) After replacing ECU(s), connect the electrical power to the aircraft. Refer to the applicable AMM. NOTE: Make sure there are no inappropriate engine-related CAS messages or faults on either the EICAS or the MDC. (8) Connect the cabling to laptop PC loaded with EEI software Version 3.00.00, or EEI for Forge (EEIFF), as appropriate. Refer to the engine LMM, Task 72-00-00-810-802-A01, Fault Isolation. (9) Start the EEI application. Select the "Initialize Engine" function and initialize ECU(s) with engine data recorded in Table 15. NOTE: Make sure there are no inappropriate engine-related CAS messages or faults on either the EICAS or the MDC. (10) Install the upper cowling ECU access panels. Refer to the applicable AMM. (11) Disconnect the cabling to laptop PC. (12)Do a normal engine start. Refer to the engine LMM, Subtask 72-00-00-700-005-A01, Testing, and the applicable AMM. (13) Make sure the engine is stable at ground idle for 3 minutes. (14) Move the power lever slowly to a maximum of 80 percent N2. Make sure the engine is stable for 3 minutes. (15) Move the power lever slowly to ground idle. Make sure the engine is stable for 3 minutes. (16) Do an operational check of the TRs. Refer to the applicable AMM.
 - (17) Do a normal engine shutdown. Refer to the engine LMM, Subtask 72-00-00-700-012-A01, Testing, and the applicable AMM.



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- (18) Make an entry in the engine log book noting date of compliance, engine operating time, part numbers(s) and serial number(s) of installed component(s) (as applicable), and compliance with this service bulletin (and service bulletin revision number, if applicable).
- (19) Complete the certification of Compliance form in Paragraph 4.B. and send to Honeywell.

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4. <u>Appendix</u>

A. Appendix A, Acronyms and Abbreviations

(1) Refer to Table 16 for a list of the acronyms and abbreviations used in this service bulletin.

Table 16. List of Acrony	ms and Abbreviations
--------------------------	----------------------

Term	Full Term
AGL	above ground level
АММ	aircraft maintenance manual
АТА	Air Transport Association
BIT	built-in-test
CAGE	commercial and government entity
CAS	crew alerting system
CFR	Code of Federal Regulations
CGV	compressor guide vane
CJC	cold junction compensation
ECCN	Export Control Classification Number
ECU	electronic control unit
EEI	electronic engine interface
EGT	exhaust gas temperature
EICAS	engine indication and crew alerting system
FAA	Federal Aviation Administration
HCS	Hazard Communication Standard
LMM	light maintenance manual
LOTC	loss of thrust control
m	meter
MDC	maintenance diagnostic computer
MOD	modification
MSP	Maintenance Service Program
N2	compressor speed
ND	No Dispatch
No.	number
OEM	original equipment manufacturer
OSHA	Occupational Safety and Health Administration
P3	compressor discharge pressure

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Table 16. List of Acronyms and Abbreviations (Cont)

Term	Full Term			
PC	personal computer			
PLA	power lever angle			
РМА	Parts Manufacturer Approval			
PN	part number			
Qty	quantity			
Rev	revision			
SB	service bulletin			
SN	serial number			
SPGM	Special Program Number			
SPN	Special Pricing Notice			
TR	thrust reverser			
TSN	time since new			
TSO	time since overhaul			
TT2	engine inlet total temperature			

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B. Appendix B, Certificate of Compliance

To: Operator or Service Center Performing Modification

Upon modification of equipment, please fill in the information requested below, then mail or email the completed Certificate of Compliance (refer to Figure 3) to:

Honeywell International Inc. 111 S 34th Street, Mail Stop 503-320 Phoenix, AZ 85034-2802 Email: engine.reliability@honeywell.com



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Owner/Operator

Aircraft Model

Aircraft Serial Number I certify that the following engine/equipment has been modified in accordance with the listed service bulletins.

ENGINE/EQUIPMENT									
NUMBER 1		NUMBER 2		NUMBER 3		NUMBER 4			
PART NUMBER		PART NUMBER		PART NUMBER		PART NUMBER			
MODEL NUMBER		MODEL NUMBER		MODEL NUMBER		MODEL NUMBER			
SERIAL NUMBER		SERIAL NUMBER		SERIAL NUMBER		SERIAL NUMBER			
TSN/TSO		TSN/TSO		TSN/TSO		TSN/TSO			
CYCLES		CYCLES		CYCLES		CYCLES			
SERVICE BULLETIN NUMBER	REV. NUMBER	SERVICE BULLETIN NUMBER	REV. NUMBER	SERVICE BULLETIN NUMBER	REV. NUMBER	SERVICE BULLETIN NUMBER	REV. NUMBER		
NUMBER 1		NUMBER 2		NUMBER 3		NUMBER 4			
Signature					Date				
Repair Facilit	ty								

ICN-99193-0000306376-001-01

Figure 3. Certificate of Compliance



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