

ALERT SERVICE BULLETIN

Bell Helicopter **TEXTRON**

A Subsidiary of Textron Inc.

NO. 407-99-28

DATE 04-28-99

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DATE

REV

MODELS AFFECTED: 407

SUBJECT: ENGINE FADEC ELECTRONIC CONTROL UNIT (ECU), UPGRADE OF.

HELICOPTERS AFFECTED: 407, S/N 53000 through 53359

[Helicopter Serial Numbers 53360 and subsequent will have the intent of this bulletin completed before delivery.]

COMPLIANCE: As given in Rolls-Royce Allison Commercial Engine CEB 73-6026.

DESCRIPTION:

The engine FADEC ECU software is upgraded from version 5.100 to version 5.202. The upgrade increases FADEC ECU performance.

A Flight Manual temporary revision and Instrument Panel decal change are also required. The Flight Manual temporary revision and decal are included with this bulletin.

Many improvements have been incorporated into ECU software version 5.202. One of the main changes modifies the Power Level Angle (PLA) value which lets the ECU have full authority on maintaining Main Rotor speed (NR), at 99 to 100%. ECU version 5.202 will have full authority at PLA angles between 62 and 100 degrees (ECU version 5.100 had full authority at PLA angles between 92 and 100 degrees).

Because ECU version 5.202 has full authority to maintain NR at 99 to 100% at PLA angles above 62 degrees, the Automatic mode engine acceleration schedule, when compared with ECU version 5.100, will be noticeably faster during throttle application from idle to full open. Throttle response in manual mode remains unchanged and is equivalent to that provided with ECU version 5.100.

For additional information on ECU software version 5.202, operators can refer to Rolls-Royce Allison CEB 73-6026. In addition, information on the software version 5.202 is also provided in the 407 Flight Manual, Revision 3 of Manufacturer's Data – Systems Description Section, dated 5 August 1998.

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AN APPROPRIATE ENTRY SHOULD BE MADE IN THE AIRCRAFT LOG BOOK UPON ACCOMPLISHMENT
IF OWNERSHIP OF AIRCRAFT HAS CHANGED PLEASE FORWARD TO NEW OWNER

Installation of version 5.202 FADEC software or ECU, 20370264, is not approved unless you have completed the Alert Service Bulletin 407-97-15 and Rolls-Royce Allison CEB A-73-6017.

- NOTE -

Only approved personnel from the Rolls-Royce Allison Engine Company or Chandler Evans will upload software version 5.202 for all FADEC ECU's that require the uploading in the field.

The FADEC version 5.202 software can be installed by computer upload or by direct ECU replacement.

The existing 3.1 and 3.2 versions of the Maintenance Terminal download software will not operate with ECU software version 5.202. As this is the case, Rolls-Royce Allison CEB 73-6026 refers to the use of the new EMC-35 Maintenance Terminal Version 2.00. This version of the Maintenance Terminal is Windows based and requires Windows 95 or higher to be installed on a Personal Computer (PC) IBM 486 33 MHZ or higher. The Windows version of the Maintenance Terminal will be supplied to all operators in conjunction with the CEB. Distribution will be accomplished by personnel from Rolls-Royce Allison or Chandler Evans who visit operators to carry out the CEB, by courier/mail or in conjunction with 5.202 ECU shipments.

In specific regards to those operators who do not have a Windows based PC, arrangements will have to be made for personnel from Rolls-Royce Allison or Chandler Evans to carry out the intent of the CEB. Operators who have a Windows based PC, will have the option to replace the existing ECU or have personnel from Rolls-Royce Allison or Chandler Evans carry out a computer upload.

In addition, those operators who do not have a Windows based PC, will be provided with a data file diskette which will allow existing Maintenance Terminal versions 3.1 or 3.2 to be compatible with ECU software versions 5.1 and 5.202. The data file diskette is P/N 114032-4 and will be made available by Chandler Evans.

For specific data on how to get an ECU upload or replacement ECU, phone or fax the Rolls-Royce Allison Engine Company Customer Support Department with the numbers that follow:

Phone: 1-888-255-4766 (International customers use USA direct) or 1-317-230-6400.

Fax: 1-317-230-4243.

The Rolls-Royce Allison CSL 6069 has also been attached, which will give operators a summary of the operational and maintenance guidelines for the engines that use a FADEC system.

For helicopters that operate in accordance with BHT-407-FMS-27 because the FADEC software version 5.201 was installed before, refer to the basic Flight Manual after you complete this bulletin.

APPROVAL:

The engineering design aspects of this Service Bulletin are Transport Canada approved.

MANPOWER:

Approximately 2.0 man-hours are necessary to complete this bulletin. Man-hours are based on hands-on time and can change because of the personnel and available facilities.

MATERIAL:

The material that follows, which is necessary to complete this Alert Service Bulletin, is supplied with the bulletin:

<u>PART NUMBER</u>	<u>NOMENCLATURE</u>	<u>QUANTITY</u>
407-075-011-107	DECAL	1

CONSUMABLE MATERIAL:

The material that follows is necessary to complete this bulletin. However, this material is consumable (bench stock) material and does not require ordering depending on the operator's consumable material stock levels. This material can be obtained through your Bell Helicopter Textron Supply Center.

<u>PART NUMBER</u>	<u>NOMENCLATURE</u>	<u>REF. NO.</u>
TT-N-95TYII 1GAL	ALIPHATIC NAPHTHA	C-305

- NOTE -

The "C" REF. NO. above is a cross reference to the consumable list found in the Standard Practices Manual.

SPECIAL TOOLS:

Not affected.

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

Rolls-Royce Allison Commercial Engine Bulletin CEB 73-6026.

Rolls-Royce Allison 250-C47B Operation and Maintenance Manual, CSP 21001.

BHT-407-MM, Maintenance Manual.

PUBLICATIONS AFFECTED:

BHT-407-FM-1, Flight Manual.

BHT-407-FMS-27, Flight Manual.

ACCOMPLISHMENT INSTRUCTIONS:

- CAUTION -

INSTALLATION OF VERSION 5.202 FADEC ECU, 23070264, IS NOT APPROVED UNLESS YOU HAVE COMPLETED ASB 407-97-15 AND ROLLS-ROYCE ALLISON CEB A-73-6017.

- NOTE -

If you are to install a replacement FADEC ECU, complete the instructions that follow, but do not do Steps 7 and 8. If the personnel from the Rolls-Royce Allison Engine Company or Chandler Evans is to upload version 5.202 software to FADEC ECU as given in CEB 73-6026, only complete Steps 7 through 15.

1. Remove the forward transmission fairing to get access to FADEC ECU (BHT-407-MM-5, Chapter 53).
2. To download the engine history from the ECU, refer to CEB 73-6026 and do Accomplishment Instruction (1), (a) Steps 1 through 7 on pages 3 and 4 of 20.
3. Remove the FADEC ECU 23070254. Install the version 5.202 FADEC ECU, 23070264. Refer to Figure 1 for the removal and installation. Make sure that the spacers (12) are installed in each of the ECU mounting pad isolation dampers. The ECU installation must agree with Figure 1 before the helicopter is put in service.
4. To upload the engine history that you downloaded in Step 2, refer to CEB 73-6026 and do Accomplishment Instructions from (1) (d) through step (h) on pages 4 and 5 of 20.
5. Install the fairing removed in Step 1 (BHT-407-MM-5, Chapter 53).
6. Send the removed FADEC ECU to Chandler Evans. Make sure that you send the FADEC ECU accessory log cards (3) with the FADEC ECU. The accessory log cards must show the total flight hours on the FADEC ECU and the reason for removal. Send the FADEC ECU and the accessory log cards as quickly as possible to the address that follows:

Chandler Evans
Talcott Road
West Hartford, CT 06110
Attn: Kurt Pahl
Phone: (860) 523-2235
Fax: (860) 232-1873

- NOTE -

Only personnel from the Rolls-Royce Allison Engine Company or Chandler Evans can upload software version 5.202 in the field.

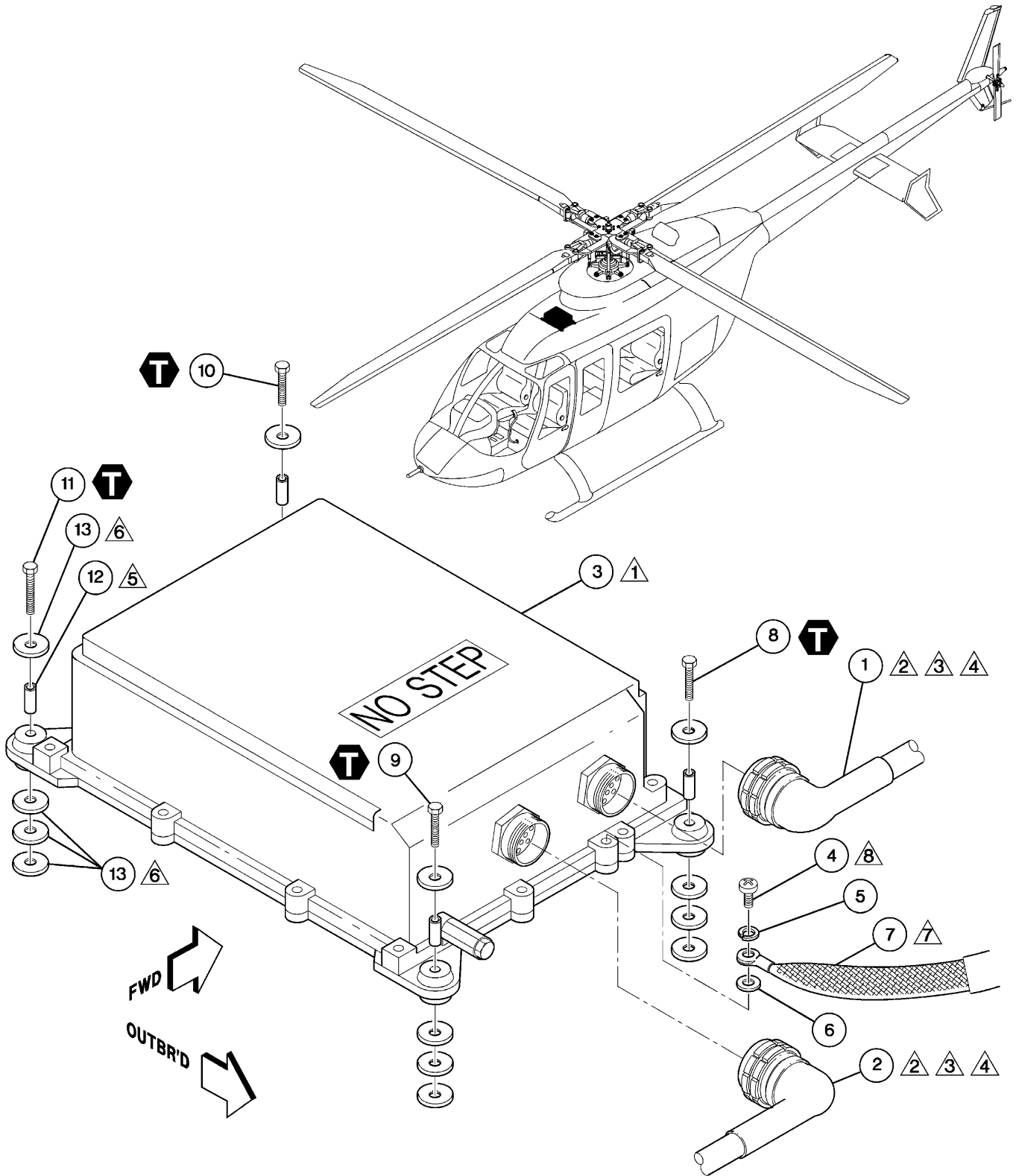
7. If the software is uploaded in the field, personnel from Rolls-Royce Allison or Chandler Evans will get access to the FADEC ECU. They will upload the software version 5.202 into the FADEC ECU (as given in the instructions in CEB 73-6026).
8. Remove the forward transmission fairing to get access to the FADEC ECU (BHT-407-MM-5, Chapter 53). Make sure that the ECU installation agrees with Figure 1. To make sure that spacers (12) are installed in each of the ECU mounting pad isolation dampers, the attachment bolts (8, 9, 10, and 11) and upper washer (13) will have to be removed at each of the four mounting pads. The ECU installation must agree with Figure 1 before the helicopter is put in service. Install the forward transmission fairing.

- NOTE-

For the best bond, apply the decal at a temperature of more than 60°F (15.5°C).

9. Use your fingers to carefully remove the FADEC software version 5.1 decal from the lower left-hand corner of the instrument panel. Fully clean this area with a clean lint-free cloth made moist with aliphatic naphtha or safety solvent. Put the FADEC software version 5.202 decal, 407-075-011-107, in this same location. Use your fingers to apply pressure to attach the decal to the clean dry surface.
10. Include BHT-407-FM-1, TEMPORARY REVISION FOR FADEC SOFTWARE VERSION 5.202 dated 22 December 1998, in the Flight Manual (BHT-407-FM-1).
11. Do the operational check that follows:
 - a. Do the Preflight and Prestart checks (BHT-407-FM-1).
 - b. Do the Engine Start (BHT-407-FM-1).
 - c. Do the Systems Check (BHT-407-FM-1). This check includes the preliminary Hydraulic Check, the FADEC Manual Check, the Engine Runup, and the Hydraulic Systems Check.

- d. Do the Engine Shutdown (BHT-407-FM-1). Use the OVSPD TEST button for the shutdown.
12. Make an entry in the helicopter Historical Records (HR) to show that you have completed this Alert Service Bulletin.
13. Make an entry in the record of Alert Service Bulletins in the Maintenance Manual to show that you completed this Alert Service Bulletin.
14. Make an entry in the Engine Log Book, FADEC ECU Accessory log card (yellow pages), Part III, Modification Record.
15. Return the helicopter to service.



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Figure 1 Electronic Control Unit (ECU) – Installation (Sheet 1)

LEGEND

1. ECU-to-airframe electrical connector
2. ECU-to-engine electrical connector
3. ECU
4. Screw (MS35206-261)
5. Lockwasher (MS35338-43)
6. Plain washer (NAS1149D0332J)
7. Bonding strap
8. Bolt (NAS6203-12)
9. Bolt (NAS6203-12)
10. Bolt (NAS6203-12)
11. Bolt (NAS6203-18)
12. Spacer (NAS43DD3-34N)
13. Washer (AN970-3)



30 TO 40 IN-LBS
(3.4 TO 4.5 Nm)

NOTES

1. Disconnect the electrical power from the helicopter when you remove or install the ECU.
2. Make sure that you do not cause damage to the connector contacts when you remove or install.
3. Put protective covers on the ECU and the harness connectors immediately after the removal.
4. Make sure that the red band on each ECU connector is not visible after you install the harness connectors.
5. Install one spacer in each of the ECU mounting pad isolation dampers.
6. Install one washer on the top of and three washers under each ECU mount.
7. Pre S/N 53200 or Pre T.B. 407-98-10, bonding strap MS25083-2BB6. S/N 53200 and subsequent or Post T.B. 407-98-10, bonding strap 961114-1.
8. Use only screw MS35206-261. Use of other type screw will damage the threads of the ECU casing.

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