URGENT

***TB 1-2840-248-30-1**

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

T700 SERIES ENGINE RESET PROGRAM

Headquarters, Department of the Army, Washington, D. C.
08 December 2003

NOTE

THIS PUBLICATION IS EFFECTIVE UNTIL RESCINDED OR SUPERSEDED.

1. **Purpose.** This bulletin is to be used as guidance for the restoration of performance to T700 engines that have been operating in Southwest Asia (SWA). These engines are susceptible to damage and accelerated performance degradation because of their exposure to the hostile sand and dirt environment of SWA.

2. **Priority Classification.** This technical bulletin is classified as **URGENT**. Equipment in use (including Equipment in Supply or Maintenance Activities below Depot Level and Equipment in Administrative Storage) will be inspected as soon as practical.

3. **End Items to be Inspected.**

NOMENCLATURE	PART NUMBER	NSN
T700-GE-700	6035T00G01	2840-01-070-1003
T700-GE-701	6044T06G01	2840-01-114-2211
T700-GE-701C	6071T24G01	2840-01-284-4011

4. **Modules (Components, Assemblies, and Subassemblies) to be inspected.** As required.

5. **Parts to be inspected.** Not applicable.

6. **Application.**

a. Level of Maintenance. Aviation Unit Maintenance (AVUM)/Aviation Intermediate Maintenance (AVIM).

b. Applied by. AVUM/AVIM.

(1) Maximum Power Check – Operator.

(2) Cleaning of Engine and Engine Components – AVUM.

*This TB supersedes TB 1-2840-248-30-1 dated 22 August 2003.

(3) Borescope Inspection – AVUM.

(4) Engine Removal/Installation – AVUM.

(5) Removal of Compressor Case Half – AVIM.

(6) Removal of Modules – AVIM.

(7) Media Blasting to Clean T700 Gas Generator Hardware – AVIM.

c. Additional Information. These instructions are for SWA deployed and operated engines only unless specifically stated to the contrary.

7. **Supply Kits, Parts and Disposition.**.

a. Parts Required to Accomplish this Technical Bulletin. Not applicable.

b. Parts Disposition. Not applicable.

c. Expendable Supplies. Not applicable.

8. **Procedures.** The following procedures are designed to restore T700 engines to an acceptable performance level.

a. An Engine Torque Factor (ETF) of 0.95 has been determined an acceptable performance level for ALL engines operated on UH–60 **BLACK HAWK** helicopters.

b. An ETF of 0.93 has been determined an acceptable performance level for T700–701 and T700–701C engines operated on AH–64A/D **Apache** helicopters.

c. To achieve those goals, the present performance (ETF) of the engine must be known.

d. If engine ETFs cannot be determined due to the non-flyable status of an aircraft, the engines will be removed from the aircraft and sent to a supporting AVIM for teardown analysis, cleaning, and 500-hour inspection.

e. The cleaning of T700 engine hot section is recommended prior to returning the engine to service. An effective alternate method of cleaning is the use of Plastic Media Blast (PMB).

(1) The purpose of this method is to provide an alternate off-wing cleaning method for Stage 1 Nozzles, Stage 1 Rotor Assemblies, and Stage 2 Rotor Assemblies that have been operated in a “dirty” environment. However, the Stage 2 Nozzles and Stator may **not** be cleaned by this method.

CAUTION

This approval only applies to the following parts.

(2) Parts:

T700-GE-700, T700-GE-701, and T700E-701C engines:

Stage 1 Nozzle Assembly
Stage 1 GG Rotor Assembly
Stage 2 GG Rotor Assembly

(3) Support equipment listing:

CAUTION

Do not use plastic media in spray booths used for other abrasive media operations. It is important that the spray booth be dedicated to only PMB of aircraft engine parts.

(a) Spray booth equipment (or equivalent):

Empire Abrasive Equipment Company
2101 W. Cabot Blvd.
Langhorne, PA 19047
Pro-Finish, Model EB-FS-4848

–OR–

Abrasive Blast Systems, Inc.
(913)263-3786
Glovebox PMB, PRC 4848

(b) Media:

Abrasive, Plastic Media, Grit 20-30 or 30-40

MIL-P-85891, Type II, NSN 5350-01-289-6413 (50 lb.)

MIL-P-85891, Type V, NSN 5350-01-326-9261 (50 lb.)

(c) Tape (or equivalent):

PMB Protective, 3M NR 500 (NSN 7510-01-300-2124)

–OR–

Tape, Pressure – A-A-1689 (NSN 7510-00-634-3330)

NOTE

Use of PMB is not authorized for use on the Stage 2 Nozzle or the GG Stator Assembly.

(4) Plastic Media Blast for off-wing cleaning of Stage 1 Nozzles, Stage 1 Rotor Assembly, and State 2 Rotor Assembly.

(a) For Stage 1 and 2 Rotors, mask both Forward and Aft Cooling Plate Seal Teeth using appropriate tape to prevent damage to the teeth coatings. No masking is necessary for the Stage 1 Nozzle.

(b) Part must be free of oil and grease to prevent the quality of the abrasive material from deteriorating.

WARNING

Observe appropriate WARNINGs when using compressed air. Do not exceed 30 psig shop air at the nozzle.

CAUTION

Do not exceed 35 psi while cleaning parts.

NOTE

Refer to the specific machine operating instructions and warnings associated with the use of the cleaning machine.

(c) Using appropriate media (Type II or V, Grit Size 20-30 or 30-40, MIL-P-85891), set air pressure to 25-35 psi, and hold blasting nozzle 4-12 inches from part at a 30-80 degree angle. Recommended nozzle diameter is 0.3–0.5 inches.

CAUTION

Extended operation of the blasting nozzle at one specific location on the Hot Section Parts may remove the part's diffused coatings, which are essential for safe engine operation.

(d) Using sweeping or circular motion, begin blasting part as necessary to remove deposits. Do not dwell in any one area. Please note that the process will remove the dirt build-up, but does not result in the part looking shiny or "as new" condition. Do not continue blasting in an attempt to make the part look "as new"; removal of dirt is sufficient to allow for reinstallation in to the engine.

(e) Plastic Media Blasing equipment should have the correct media filter and a reclaim system to remove residues from the blast stream. Follow manufacturer's recommended procedures for media inspection and/or replacement.

(f) Use clean, dry, filtered, compressed air to remove any residual blast media. Ensure that the combustor seal on the outer rim of the Stage 1 Nozzle moves freely.

SECTION I. UH–60 BLACK HAWK PROCEDURES.

NOTE

All references are to paragraphs contained in TM 1–2840–248–23, unless specifically stated otherwise.

9. Determine the engine ETF. Before determining the ETF, however, the following actions are required:

a. Visually inspect engine for evidence of oil leaks; repair as necessary.

b. Clean engines externally (para 1-108).

c. Perform a Compressor Wash (para 1-165).

d. Perform a Hot Section Wash (para 1-167).

NOTE

Borescoping all engines is recommended after washing the Compressor and Hot Section.

e. Perform an Idle Speed Leakage Check (Para 1-139).

f. Perform a Maximum Power Check (para 1-145 or 1-147), and calculate the ETF.

10. After completion of the steps in paragraph 9 above, BLACK HAWK engines with an ETF **less than 0.95,** proceed to paragraph 11 below. After completion of the steps in paragraph 9 above, BLACK HAWK engines with an ETF **equal to or greater than 0.95** are considered serviceable. These engines may continue to be operated in service **upon completion** of the additional maintenance requirements in steps a. through h. below.

a. Perform the flight hour inspection requirements (paras 1-64.1 and 1-65) (250 and 500 Hour Inspections).

b. Remove the Electronic Control Unit (ECU)/Digital Electronic Control Unit (DECU) (para 7-12). Inspect the cooling fins for sand compaction and clean the fins, scroll case, and seal (para 7-13).

c. Carefully remove the Hydromechanical Control Unit (HMU) and the T2 Sensor (para 6-40), and clean the Sensor and Holster (para 6-41). Re-install HMU (para 6-44).

d. Remove and clean the Anti–Ice/Start Bleed Valve (para 10-26, 10-27). **Replace** P/N 4046T28G01, G03, or G05 valves with later configuration.

e. Remove, clean, and inspect C-Sump heat shield and cover (para 4-12). Replace C-Sump packings (fig. 4-4, items 7 and 8).

f. Inspect VG Actuator lever arms for damage and missing bushings (para 2-59).

g. **(T700)** Remove P3 hose and tube assembly (para 10-5). Check for coking obstruction in P3 air manifold tube and fitting (fig. 2-40, item 3).

h. Remove the Particle Separator Blower (para 5-10), inspect (table 5-1), and clean (para 5-12). DO NOT IMMERSE IN SOLVENT!

11. After completion of the steps in para 9 above, if BLACK HAWK engine ETFs are below 0.95, perform the maintenance actions below.

a. Troubleshoot (TS) the engine (para TS Procedure #63) and make appropriate repairs.

b. Perform the flight hour inspection requirements (paras 1-64.1 and 1-65) (250 and 500 Hour Inspections).

c. Remove the ECU/DECU (para 7-12). Inspect the cooling fins for sand compaction and clean the fins, Scroll Case, and seal (para 7-13).

d. Remove (carefully) the HMU T2 sensor and HMU (para 6-40) and clean sensor and holster (para 6-41).

e. Remove and clean the Anti–Ice/Start Bleed Valve (paras 10-26 and 10-27). **Replace** P/N 4046T28G01, G03, or G05 valves with later configuration.

f. Remove, clean, and inspect C-Sump heat shield and cover (para 4-12). Replace C-Sump packings (fig. 4-4, items 7 and 8).

g. Inspect VG Actuator lever arms for damage and missing bushings (para 2-59).

h. **(T700)** Remove P3 hose and tube assembly (para 10-5). Check for coking obstruction in P3 air manifold tube and fitting (fig. 2-40, item 3).

i. Remove the Particle Separator Blower (para 5-10), inspect (table 5-1), and clean (para 5-12). DO NOT IMMERSE IN SOLVENT!

j. If repairs have been made from steps a. through h. above, re–perform the Maximum Power Check and recalculate the engine ETF. If no repairs were made, the engine is assumed to be less than 0.95; go to para 12 below.

12. If after completion of steps in para 11 above the ETF is still below 0.95, remove the engine (per applicable aircraft maintenance manual).

a. Evacuate engine to AVIM.

b. (AVIM) Perform maintenance in accordance with the applicable maintenance manuals, Standard Operating Procedures (SOPs), etc., necessary to restore the engine's performance.

c. (AVIM) Test engine in Flexible Engine Diagnostic System (FEDS) or equivalent. Engine power (ETF) must be equal to or greater than 0.95. For Modular Engine Test Stand (METS) or equivalent assistance in meeting these requirements, contact the Engineering point of contact listed in para 21.a. below.

SECTION II. AH–64A/D APACHE PROCEDURES.

NOTE

All references to paragraphs contained in TM 1-2840-248-23, unless specifically stated otherwise.

13. Determine the engine ETF during the required Pre–Desert Phase Inspection Maintenance Test Flight (MTF) prior to induction as directed in TB 1-1520-238-30-1.

a. Visually inspect engine for evidence of oil leaks; repair as necessary.

b. Clean engines externally (para 1-108).

c. Perform a Compressor Wash (para 1-134).

d. Perform a Hot Section Wash (para 1-135.1).

NOTE

Borescoping all engines is recommended after washing the Compressor and Hot Section.

e. Perform an Idle Speed Leakage Check (para 1-139).

f. Perform a Maximum Power Check (para 1-146) and calculate the ETF.

14. After completion of the steps in para 13 above, engines with an ETF **equal to or greater than 0.93** are considered acceptable and will be inducted directly into the Reset Desert Phase.

a. While performing the Desert Phase Inspection, complete the flight hour inspection requirements (paras 1-64.1 and 1-65) (250 and 500 Hour Inspections) as well as the additional inspections listed below:

(1) Remove the ECU/DECU (para 7-12). Inspect the cooling fins for sand compaction and clean fins, scroll case, and seal (para 7-13).

(2) Carefully remove the HMU and the T2 Sensor (para 6-40) and clean the Sensor and Holster (para 6-41). Re-install HMU (para 6-44).

(3) Remove and clean the Anti−Ice/Start Bleed Valve (paras 10-26 and 10-27). Replace P/N 4046T28G01, G03, or G05 valves with later configuration.

(4) Remove, clean, and inspect C-sump heat shield and cover (para 4-12). Replace C−sump packings (fig. 4-4, items 7 and 8).

(5) Inspect VG Actuator lever arms for damage and missing bushings (para 2-59).

(6) Remove the particle separator blower (para 5-10), inspect (table 5-1), and clean (para 5-12). DO NOT IMMERSE IN SOLVENT!

b. If the engine **fails to meet the 0.93** level of performance, evacuate to AVIM where the 500 hour inspection will be performed in addition to the inspections listed in para 14.a. above.

c. (AVIM) Perform maintenance in accordance with the applicable maintenance manuals, SOPs, etc., necessary to restore the engine's performance.

d. If the appropriate level of efficiency (0.93) cannot be restored, acquire a replacement engine through supply.

15. **References.**

a. TM 1-2840-248-23, Aviation Unit and Intermediate Maintenance Manual, Engine, Aircraft, Turboshaft, Models T700-GE-700, T700-GE-701, and T700-GE-701C.

b. DA PAM 738-751, Functional Users' Manual for the Army Maintenance Management System – Aviation (TAMMS-A).

c. AMSAM-RD-AE-P (70-1-J2-03), Memorandum for SFAE-AV-UH-L, SUBJECT: Approval of Plastic Media Blast to Clean T700 Engine Gas Generator Hardware.

16. **Recording and Reporting Requirements.** Record and Reports Forms. Record compliance with this TB on DA Form 2408-5-1 (Equipment Modification Record (Component)), and DA Form 2408-13 (Aircraft Inspection and Maintenance Record) in accordance with DA PAM 738−751.

17. **Weight and Balance**. Not applicable.

18. **Points of Contact**. Questions regarding this TB should be addressed to the U.S. Army Aviation and Missile Command, Redstone Arsenal, AL 35898.

a. Engineering point of contact for this TB is Mr. Mark Heitert, AMSAM-RD-AE-P-E, commercial (256) 319-5227. E-mail is "Mark.Heitert@rdec.redstone.army.mil".

b. Logistical points of contact for this TB are:

(1) AH-64 series: Mr. Michael Waits, SFAE-AV-AAH-LF, DSN 897-4058 or commercial (256) 313-4058. E-mail is "Mike.Waits@PeoAvn.redstone.army.mil".

(2) UH-60 series: Mr. Dave Lizotte, SFAE-AV-UH-L, DSN 645-6903 or commercial (256) 955-6903. E-Mail is "Dave.Lizotte@uh.redstone.army.mil".

19. **Reporting of Errors and Recommending Improvements.** You can improve this TB. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is: DSN 788-6546 or commercial (256) 842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use: https://amcom2028.redstone.army.mil.

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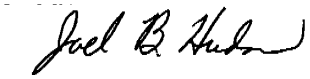

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2. *Unit:* home
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5. ***St:*** MO
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16. ***Submitter Phone:*** 123–123–1234
17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

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