

TECHNICAL MANUAL

**AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL**

VOLUME 1 OF 9

**HELICOPTER, ATTACK,
AH-64A APACHE
(NSN 1520-01-106-9519)
(EIC: RHA)**

**CHAPTER 1
AIRCRAFT GENERAL**

GLOSSARY

ALPHABETICAL INDEX

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 16 May 1994

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL FOR
ARMY MODEL AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual, 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 immediately preceding the hard copy 2028. For the World Wide Web use: <https://amcom2028.redstone.army.mil>.

OZONE DEPLETING CHEMICAL INFORMATION

This document has been reviewed for the presence of Class I Ozone depleting chemicals. As of Change 8 dated 10 May 2000, all references to Class I Ozone depleting chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric Ozone depletion.

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HOW TO USE THIS MANUAL

a. Overview

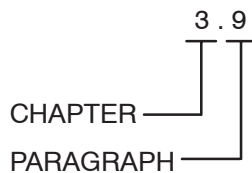
To get the job done correctly, you must be able to find all the information you need. Knowing how to use this manual is the key. You should know what is in this manual, how it is organized, and how to use it.

b. Organization

- (1) The complete AH-64A Apache helicopter (AVUM/AVIM) maintenance manual consists of a set of volumes. These volumes are numbered as follows: TM 1-1520-238-23-1 through TM 1-1520-238-23-9. The troubleshooting manual, TM 1-1520-238-T, contains a full description of each system.
- (2) Volumes are made up of chapters. Each chapter is numbered in Arabic numerals (1, 2, 3, etc.). Each chapter is an individual book which has maintenance information on a particular helicopter system.
- (3) Chapters (books) are broken down into sections. Sections are numbered in Roman numerals (I, II, III, etc.). Chapters have all the maintenance information you need on a particular system.
- (4) Sections are made up of paragraphs. Each paragraph is numbered in Arabic numerals (1, 2, 3, etc.). The sections cover major parts of a system.
- (5) Paragraphs (tasks) are detailed descriptions of a maintenance task. Some paragraphs are brief. Some are several pages long.
- (6) A paragraph starts with an initial setup which is followed by a step-by-step procedure on how to perform the task correctly. Each step in the procedure has an illustration to help make things clear.

c. Paragraph Numbering

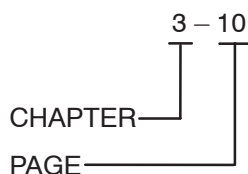
Paragraph numbers are in two parts. The first is the chapter number. The second is the paragraph number in that chapter. Each number is separated by a period (.) as shown in the example:



Paragraph numbers are the most important numbers in the manual. Always use the paragraph number to find information – NOT the page number.

d. Page Numbering

All page numbering is by chapters. The first number is the number of the chapter; the second number is the number of the page in that chapter. The numbers are separated by a dash as shown in the example:



HOW TO USE THIS MANUAL

e. Manual Index

- (1) The index for the entire manual is in this chapter. The index lists all paragraph titles in alphabetical order. After you find the title in the index, it tells the paragraph number of that task. For example, if you need information on the tire, either main landing gear or tail landing gear tire, go to the “T” section of the index and look under “Tire.” There you will find:

Tire, Main Landing Gear (LGS)	Tire and Tube, Tail Landing Gear (LGS)
Removal 3.7 Installation 3.7	Removal 3.47 Installation 3.47

The index tells that the tire information for the main landing gear is in chapter 3, paragraph 3.7. For the tail landing gear, it is in chapter 3, paragraph 3.47.

- (2) You can find your task in the index, even if you only know a single word in the title. In the sample tire titles you could also find your tasks by looking under “Landing.” Examples:

Landing Gear Tire, Main (LGS)	Landing Gear Tire and Tube, Tail (LGS)
Removal 3.7 Installation 3.7	Removal 3.47 Installation 3.47

Or, you could look under “Gear:”

Gear Tire, Main Landing (LGS)	Gear Tire and Tube, Tail Landing (LGS)
Removal 3.7 Installation 3.7	Removal 3.47 Installation 3.47

The abbreviation for the system is placed in parentheses, under the paragraph title in the index. In the example, the landing gear system is one of the few where an acronym is used for the system (LGS). For most systems, an abbreviation is used (example: flight control system: Flt Ctrl Sys). In the case of tires, the system would be obvious; tires would only be used on the landing gear. However, in the rest of the manual, some titles are similar though in different systems. This is true with shafts, brackets, supports, bearings, etc. The index will always provide the name of the correct system to help you avoid going to the wrong book.

- (3) Any task can be located in the way described. If you know the name, job, part, assembly, procedure, description, etc., you can use one of the words to find the paragraph number in the index. It makes locating information quick and easy.

HOW TO USE THIS MANUAL - continued

f. Glossary

- (1) A glossary of words used throughout the manual is located at the back of chapter 1. Section I of the glossary is the list of abbreviations and acronyms. Abbreviations are shortened terms for words. Acronyms are shortened terms for several words and use only the first letter of each of the words. Abbreviations and acronyms are defined where they are used. The list in the glossary, however, provides a good place to check if there is any doubt.
- (2) Section II of the glossary contains definitions of unusual terms that appear in the manual. Many words have more than one meaning. A word that has a certain meaning in everyday language could have a different meaning for the helicopter. This is the reason for the definitions. If you see a word in the manual you're not sure of check the list of definitions.

It is always a good idea to look over the glossary and become familiar with abbreviations, acronyms, and unusual terms.

g. Initial Setup (Example next page)

The first page of each maintenance paragraph in the manual is the initial setup. Always check the initial setup before starting a task on the helicopter. The initial setup contains information you must know. **DON'T START A TASK UNTIL:**

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

An example initial setup is shown on the next page. Not all tasks have all the headings shown.

Each part of the initial setup is explained by the following subparagraphs (1 through 7). Each subparagraph describes initial setup entries in order of its appearance in the example.

- (1) **Title:** The title in the upper border contains the chapter/paragraph number and title of the task as listed in the index. The task is performed at the intermediate level if (AVIM) appears in the title.
- (2) **Description:** This entry appears in the border below the title. The task may require one or more operations (such as removal and installation). Each operation is listed here in order of its performance in the task.
- (3) **Tools:** This heading will list the tool kit of your MOS. The tools in this kit will be all that is required to perform the task. Tasks requiring tools other than those in this tool kit are considered **SPECIAL TOOLS**. Special tools could be: (1) tools from the shop set; (2) tools from the kits of other MOS's, or (3) tools made specially for the AH-64A Apache helicopter. Special tools will be listed in addition to MOS tool kit when needed. Tool kits and special tools have an item number assigned to them and are located in Appendix H. It is acceptable to use a substitute torque wrench other than listed as long as the torque range is the same. Example: 1/4 torque wrench **30 INCH-POUNDS to 150 INCH-POUNDS**, 3/8 torque wrench **30 INCH-POUNDS to 150 INCH-POUNDS**.

HOW TO USE THIS MANUAL - continued

INITIAL SETUP EXAMPLE

10.12. FORWARD FUEL CELL PILOT VALVE HOSE REPLACEMENT

10.12.1. Description

This task covers: Removal. Cleaning. Inspection. Installation.

10.12.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 5/8 x 3/8-inch drive box end torque wrench adapter
 (item 14, App H)
 150 - 750 inch-pound 3/8-inch drive click type torque
 wrench (item 442, App H)
 0 - 600 inch-pound 3/8-inch drive dial indicator torque
 wrench (item 447, App H)

References:

TM 1-1520-238-T
 TM 9-1090-208-23-1

Materials/Parts:

Bolt MS25789 (used for removal)
 Packing (2)
 Wire (item 221, App F)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, and L325 opened
10.2	Fuel system safety precau- tions observed
TM 9-1090-208-23-1	Ammunition storage maga- zine removed

Personnel Required:

67R Attack Helicopter Repairer
 One person to assist
 67R3F Attack Helicopter Repairer/Technical
 Inspector

(4) **Materials and Parts:** This lists materials and parts needed to complete the task. Parts are listed before materials. Most materials cannot be used on the helicopter a second time; they are expendable. Expendable materials are items such as solvent, grease, oil, hydraulic fluid, etc.

(a) Each expendable has an item number assigned to it and is located in Appendix F. The item number is placed in parentheses following the item name on the initial setup page. A typical example of an expendable items is:

Wire (item 221, App F)

See the expendable and durable item list in Appendix F for more information about expendable and durable materials.

(b) Some parts are also expendable. The replacement part will be listed under the heading by part nomenclature if the task step tells you to DISCARD a part. This will help you look up the part in TM 1-1520-238-23P.

A number in parentheses after the part indicates the quantity required for the task. Example:

HOW TO USE THIS MANUAL - continued

Packing (2)

This would mean two packings are required.

- (c) Sometimes it is necessary to use a part as a tool to do a step of a task. These parts do not appear in TM 1-1520-238-23P. A typical example would be when a bolt is used to temporarily hold an assembly in place or to align two pieces of material to be fastened. Parts used as tools will appear in the setup table under **Materials/Parts**:

Bolt MS25784 (used for alignment)

- (5) **Personnel Required:** This heading lists the people required to perform the task. It also tells the MOS of each person and the number of persons required. For example:

67R Attack Helicopter Repairer
 One to assist
 67R3T Attack Helicopter Repairer/Technical Inspector

This listing would indicate that one 67R repairer and any one MOS to assist, and a 67R3T repairer/technical inspector will be needed to complete the task.

IF YOUR MOS IS NOT LISTED IN THE PERSONNEL REQUIRED COLUMN IN THE INITIAL SETUP, CHECK WITH YOUR MAINTENANCE SUPERVISOR FIRST BEFORE STARTING THE TASK.

- (6) **References:** This lists other technical manuals (TMs) you will need to complete the task. The steps in the task will tell you when you must refer to another TM.
- (7) **Equipment Conditions:** This lists things that must be done before starting the task. It may require an operation such as jacking the helicopter, or just the tail boom; or removing parts, assemblies, etc. These operations are described in other tasks or technical manuals. The paragraphs or TM's that describe how to do these operations are referenced here. If the job is to be done on the helicopter, the statement "Helicopter safed" will appear here. The reference will be to paragraph 1.57 where safing is described. Be sure to do the things necessary in order of listing as called out under equipment conditions; then do the task.

h. Warnings, Cautions, and Notes

Icon warnings are pictorial images which may be used in place of words. The safety summary sheet explains in detail what each icon means.



WARNINGS are used to tell where there is danger of injury or death to personnel. They appear before the danger item. WARNINGS must be obeyed by all personnel working on the helicopter.



CAUTIONS tell of the danger of damaging the helicopter or its parts. They appear immediately before the item where damage might happen. CAUTIONS must be obeyed by all personnel working on the helicopter.

HOW TO USE THIS MANUAL - continued

NOTE

NOTES tell something extra or special a person must know to do the task. They can appear before or after the item they tell about. NOTES must be read and remembered when working on the helicopter.

i. Use of Shall, Will, Should, and May

Within this technical manual the word “shall” is used to indicate a mandatory requirement. The word “will” is used to express a declaration of purpose. The word “should” is used to indicate a nonmandatory but preferred method of accomplishment. The word “may” is used to indicate an acceptable method of accomplishment.

j. Torquing Information

- (1) Inspect (QA) torques as required by specific instructions contained within each task.
- (2) There are two types of applied torques. They are: special torques and standard torques.
- (3) Each hardware fastener (except types used in sheet metal work) is assigned an applied torque.
- (4) Special torques are given, when needed, in each task. Torques appear in bold type. Torque wrenches and adapters to be used when a special torque is given are listed under TOOLS in the initial setup. Special torques usually differ from standard torques.
- (5) Standard torques are not in this technical manual. Refer to TM 1-1500-204-23 for all standard torque values.
- (6) Run-on torque shall always be added to all nuts in accordance with TM 1-1500-204-23, including nuts requiring special torques and standard torques, unless otherwise stated in each task.

k. Inspection Information

General inspection information is in the front of each chapter or section for the equipment covered in that chapter or section. Inspection criteria peculiar to a specific part, assembly, or component are in the inspection steps of the removal/installation task for that part, assembly, or component.

l. General References

- (1) Refer to TM 55-1500-323-24 for all electrical tasks of a general nature not peculiar to the AH-64A helicopter.
- (2) Refer to TM 1-1500-204-23 for all mechanical tasks of a general nature not peculiar to the AH-64A helicopter.
- (3) Refer to TM 1-1520-264-23 for approved nondestructive inspection methods. ■


HOW TO USE THIS MANUAL

m. Using AH-64A Helicopter Effectivity Codes

Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters representing various helicopter serial number blocks. They are used throughout this volume as necessary to aid the helicopter troubleshooting effort.

The codes are used to designate serial number block differences as follows:

- When used within narrative text and fault isolation procedures (FIPs), effectivity codes appear within parentheses.
For Example: Narrative text and FIPs (AAA)
- When used inside wiring interconnect diagrams, effectivity codes appear within triangular borders and are placed on the line which represents that particular helicopter's configuration.

For Example: Wiring interconnect diagrams 

This volume uses these effectivity codes and corresponding helicopter serial numbers for reference.

To use the helicopter effectivity codes, note the helicopter serial number on the left side of the fuselage directly below the CPG window. Use this serial number to determine which procedure or path in a wiring interconnect diagram or FIP to use.

The effectivity codes and helicopter serial number blocks applicable to this volume are as follows:

<u>Effectivity Code</u>	<u>Helicopter Serial No.</u>
ADC	Before MWO 1-1520-238-50-49
ADD	After MWO 1-1520-238-50-49
ADF	Before MWO 1-1520-238-50-52
ADG	After MWO 1-1520-238-50-52
ADH	Before MWO 1-1520-238-50-15
ADI	After MWO 1-1520-238-50-15
ADL	Before MWO 1-1520-238-50-51
ADM	After MWO 1-1520-238-50-51
ADN	After MWO 1-1520-238-30-02
ADP	After MWO 1-1520-238-50-50
ADQ	Before ECP 1315/RSN 97A001
ADR	After ECP 1315/RSN 97A001

SAFETY SUMMARY

This publication describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the material safety data sheets (Occupational Safety and Health Act (OSHA) Form 20 or equivalent) from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. The following are general safety precautions and instructions that people must understand and apply during many phases of operation and maintenance to ensure personal safety and health and the protection of DOD property. Portions of this may be repeated elsewhere in this publication for emphasis.

WARNING AND CAUTION STATEMENTS

WARNING and CAUTION statements have been strategically placed throughout this text prior to operating or maintenance procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task, the WARNINGS or CAUTIONS included in the text for that task will be reviewed and understood. Refer to the materials list figure at the beginning of the appropriate manual section for material used during maintenance of this equipment. The detailed warnings for hazardous material only are listed separately in the safety summary as the "Hazardous Materials Warnings" section.

HAZARDOUS MATERIALS WARNINGS

Warnings for hazardous material in this manual are designed to warn personnel of hazards associated with such items when they come in contact with them during actual use. For each hazardous material used, a material safety data sheet (MSDS) is required to be provided and available for review by the users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures.

This Hazardous Materials Warnings section gives the complete warnings for hazardous material used in this manual. To help the user understand the potential hazards of these materials, a more detailed warning for these materials and an explanation of the hazard symbols follow.

SAFETY SUMMARY - continued

EXPLANATION OF HAZARD SYMBOLS



The abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to your life or health.



The symbol of drops of a liquid onto a hand shows that the material will cause burns or irritation of human skin or tissue.



The rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.



The symbol of a person wearing goggles shows that the material will injure your eyes.



The symbol of a flame shows that a material can ignite and burn you.



The symbol of a skull and crossbones shows that a material is poisonous or is a danger to life.



The symbol of a three circular wedges shows that the material emits radioactive energy and can injure human tissue or organs.



The symbol of a human figure in a cloud shows that vapors of a material present a danger to your life or health.

CHAPTER 1 AIRCRAFT GENERAL

CHAPTER OVERVIEW

Chapter 1 contains the maintenance instructions for aircraft general support. Aircraft general troubleshooting information is contained in TM 1-1520-238-T.

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SECTION I. GENERAL INFORMATION

1.1. SCOPE

- a. Type of Manual: Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) manual.
 - b. Model Numbers and Equipment Name: AH-64A Helicopter.
 - c. Purpose of Helicopter: Serves as a gun platform for antitank and suppressive firepower.
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1.2. MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System – Aviation (TAMMS-A).

1.3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Destruction procedures you need to know are in TM 750-244-1-5.

1.4. PREPARATION FOR STORAGE OR SHIPMENT

Storage procedures for this helicopter are in Appendix E of this manual. Shipping and transportability requirements for installed engines are met when landing gear tires are inflated to correct pressures and landing gear struts are not bottomed out. Shipping information for the helicopter you may need to know is in TM 55-1520-238-S.

1.5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Quality assurance information you are required to use is explained in FM 1-511.

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