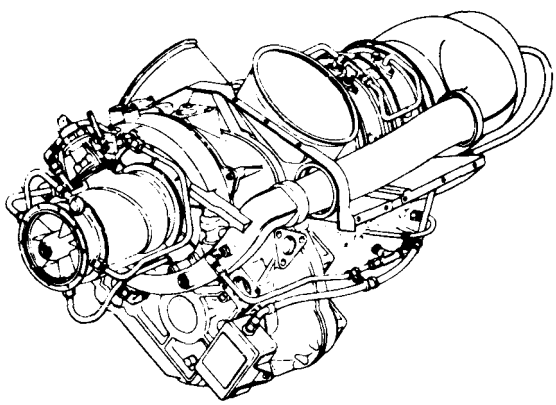
TM 55-2840-231-23

TECHNICAL MANUAL

AVIATION UNIT
AND
AVIATION INTERMEDIATE
MAINTENANCE MANUAL

ENGINE ASSEMBLY



MODE L T63-A-5A

NSN 2840-00-923-6023

MODEL T63-A-700

NSN 2840-00-179-5536

HEADQUARTERS
DEPARTMENT OF THE ARMY
27 FEBRUARY 1981

	ENGINE - GENERAL
	COMPRESSOR SECTION
	COMBUSTION SECTION
	POWER TURBINE
	ACCESSORY GEARBOX
	FUEL SYSTEM
	ELECTRICAL SYSTEM
	OIL SYSTEM
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This copy is a reprint which includes current pages from Change 1 through 6,7,8,9,10,11

TECHNICAL MANUAL

NO. 55-2840-231-23

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 February 1981

Aviation Unit and Intermediate *Maintenance* Manual
Engine Assembly
Model T63-A-700
NSN 2840-00-179-5536

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or 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, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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*This manual supersedes TM 55-2840-231-24, 3 March 1972, including all changes.

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CHAPTER 1

ENGINE - GENERAL

OVERVIEW

This chapter contains information and descriptions pertaining to the T63-A-700 engine system, system components, major assemblies, leading particulars and operation. General maintenance and support information is also provided for inspection, servicing, maintenance, troubleshooting and testing of the complete engine.

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Section I. GENERAL INFORMATION

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1.1. SCOPE.

Type of Manual: Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM)

Model Number and Equipment Name: T63-A-700 Turboshaft Engine (See figure 1-1.)

Purpose of Equipment: To supply engine power requirements for various helicopter aircraft which have been designed to accept the turboshaft engine contained in this manual. External view of the engine is given below.

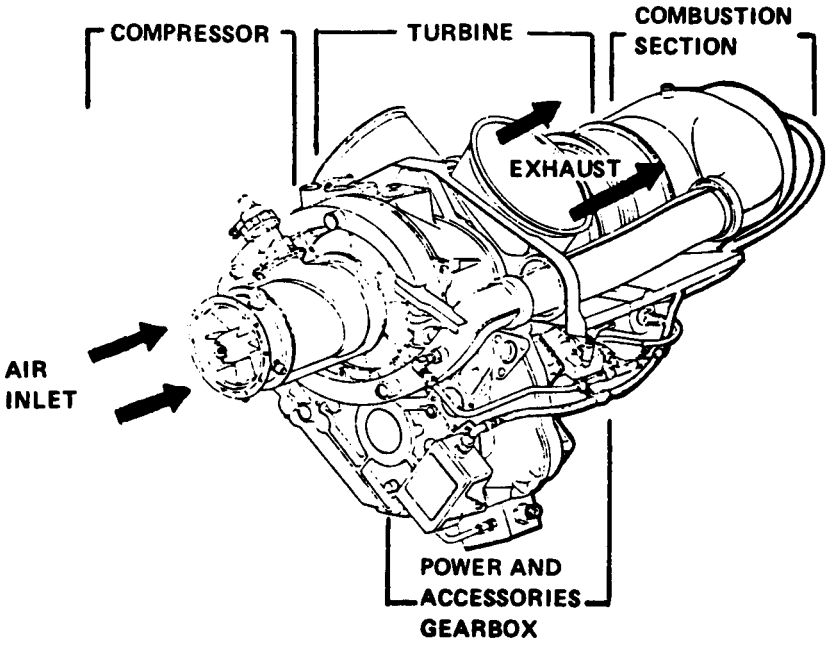

Figure 1-1. T63-A-700 Turboshaft Engine

a. GENERAL DESCRIPTION. Consists of:

(1) Engine

(2) Systems

(3) Components

(4) Accessories

b. MAINTENANCE PROCEDURES. Consists of:

(1) Removal

(2) Disassembly

(3) Cleaning

(4) Repair and Replacement

(5) Assembly

(6) Installation

(7) Preservation

(8) Storage

(9) Activation of Uninstalled Engine

c. PROCEDURES. Contained in the airframe Organizational Maintenance Manual consist of:

(1) Preservation

(2) Storage

(3) Activation of installed engines

Applicable Airframe Organizational Manuals

Airframe Manual	Title
TM 55-1520-214-23	AVUM and AVIM Maintenance Manual Helicopter, Observation OH-6A (Hughes)
TM 55-1520-228-23	AVUM and AVIM Maintenance Manual Army Model OH-58A Helicopter

1.2 MODIFICATIONS: The following modification directives (table 1-1) have been incorporated in the manual. If the time compliance period for the modification directive has not been reached, both configurations are included in the manual. If the time compliance period has expired, only the current configuration is shown.

Table 1-1. Modification Directives

*MWO 55-2840-231-30/2	Modification to Install a P_c Air Filter Kit (T63-A-700)
MWO 55-2840-231-3014	Modification to Install a Compressor Bleed Valve Orifice Engine to be modified at next overhaul.

* Cancelled.

1-3. MAINTENANCE FORMS, RECORDS AND REPORTS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pamphlet 738-751, Functional Users/ Manual for the Army Maintenance Management System - Aviation (TAMMS-A).

1-4. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE. Destroy engine when evacuation to safety is not possible to prevent use by enemy. Refer to TM 750-244-1-5.

a. Demolition of Engine by Explosives. Use explosives to destroy engine. Place explosives, whenever possible in inlet and exhaust opening of engine. Detonate when personnel have withdrawn to a safe distance or cover. Explosives may also be detonated under an engine stored in a shipping container.

b. Demolition of Engine Using Mechanical Means. Smash all cast parts to destroy engine mechanically. A smashed compressor housing will cause engine to become inoperable. Other parts and accessories may be smashed or crushed as time permits. When more than one engine is to be destroyed mechanically, insure similiar parts on each engine are destroyed.

c. Demolition of Engine by Fire. An incendiary grenade or any other source of intense and sustained combustion may be used to destroy the engine by fire.

1.5. ADMINISTRATIVE STORAGE. Requirements are part of maintenance instructions. Refer to Section VII.

1.6. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC). Refer to TM 55-0411 for information about Quality Assurance/Quality Control (QA/QC).

Section II. EQUIPMENT DESCRIPTION AND DATA

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1-7. EQUIPMENT PURPOSE, CAPABILITIES AND FEATURES.

a. Purpose of Engine, Shaft Turbine. The T63 Series engines are designed for use on the OH-6A and OH-58A helicopters.

b. Capabilities and Features.

Ž Major Sections:

1. Combustion Section
2. Turbine Section
3. Compressor Section
4. Power and Accessories Gearbox

Ž Major Engine Systems:

1. Fuel and Control
2. Lubrication
3. Ignition
4. Anti-icing air
5. Temperature Measurement
6. Compressor acceleration bleed air

● All components are covered separately in this manual.

1-8. Deleted.

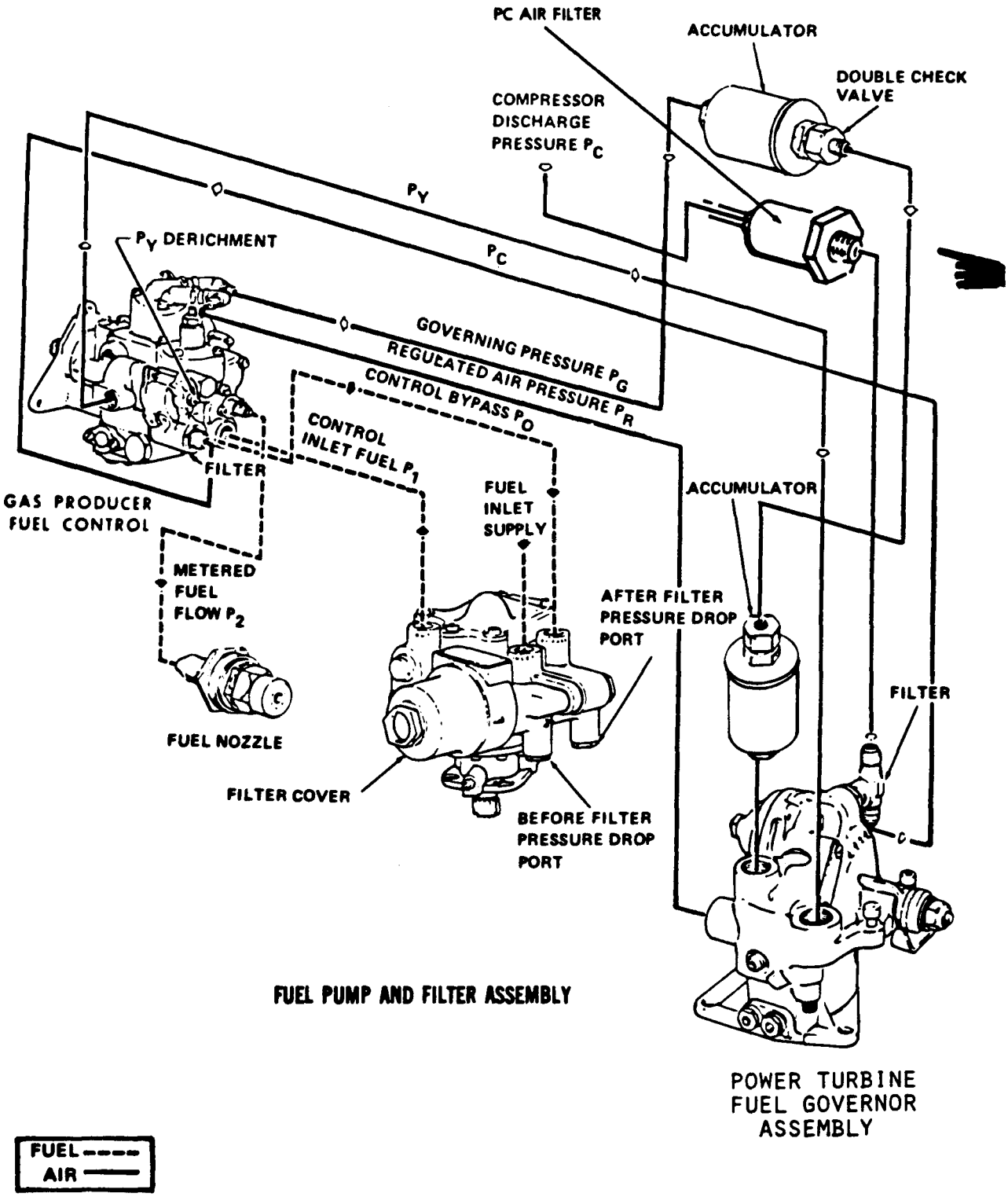

Figure 1-2. Engine Fuel and Control System

1-9. DESCRIPTION OF ENGINE OPERATION. The engine is a free turbine engine (no mechanical connection between the gas producer turbine and the power turbine). The power turbine is gas coupled to the gas producer turbine by the combustion gases.

The helicopter uses a conventional control system. The collective pitch of the helicopter rotor establishes the power output demand on the engine. For all practical purposes, helicopter rotor speed is held constant by the engine and its control system.

The fuel control is connected to the twist grip on the pilot's and copilot's collective pitch sticks. The power turbine governor is interconnected to the collective-pitch sticks through a coordinated system of bellcranks and linkages. Any change in collective pitch resets the-governor to a new power demand. This demand is transmitted to the gas producer fuel control, which resets and varies the N1 speed of the gas producer turbine accordingly.

A motor-actuated speed trimming device is installed in the linkage between the collective pitch sticks and the power turbine governor lever. It is operated by a trim switch on each collective pitch stick, and allows engine output speed to be varied over a normal range of approximately 98 to 103 percent (5880 to 6180 rpm).

1-10. Fuel and Control System. The gas producer fuel control (figs. 1-2 and 1-3) is located schematically in the fuel system between the fuel pump assembly and the fuel nozzle. A power turbine governor, also apart of the control system, provides control intelligence to the gas producer fuel system.

The system controls engine power output by controlling gas producer speed. Gas producer speed levels are established by the action of the power turbine governor which senses power turbine speed. Power turbine speed is selected by the operator. The power required to maintain this speed is automatically maintained by power turbine governor action on the gas fuel control.

The power turbine governor lever schedules the governor requirements. The power turbine governor in turn, schedules the gas producer speed to a changed power output to maintain output shaft speed.

Fuel flow for engine control depends on compressor discharge pressure (P_c), engine speed (gas producer - N1 and/or power turbine - N2), and lever angle. Fuel flow is a function of P_c as sensed in the fuel control. Variations of fuel flow schedules are obtained by modulating the P_c to P_x and P_y pressures in the control through the action of a bleeddown circuit actuated by the governors.